

## Assembly Manual

Small package. Big fun. Micron.

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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 Doom 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.

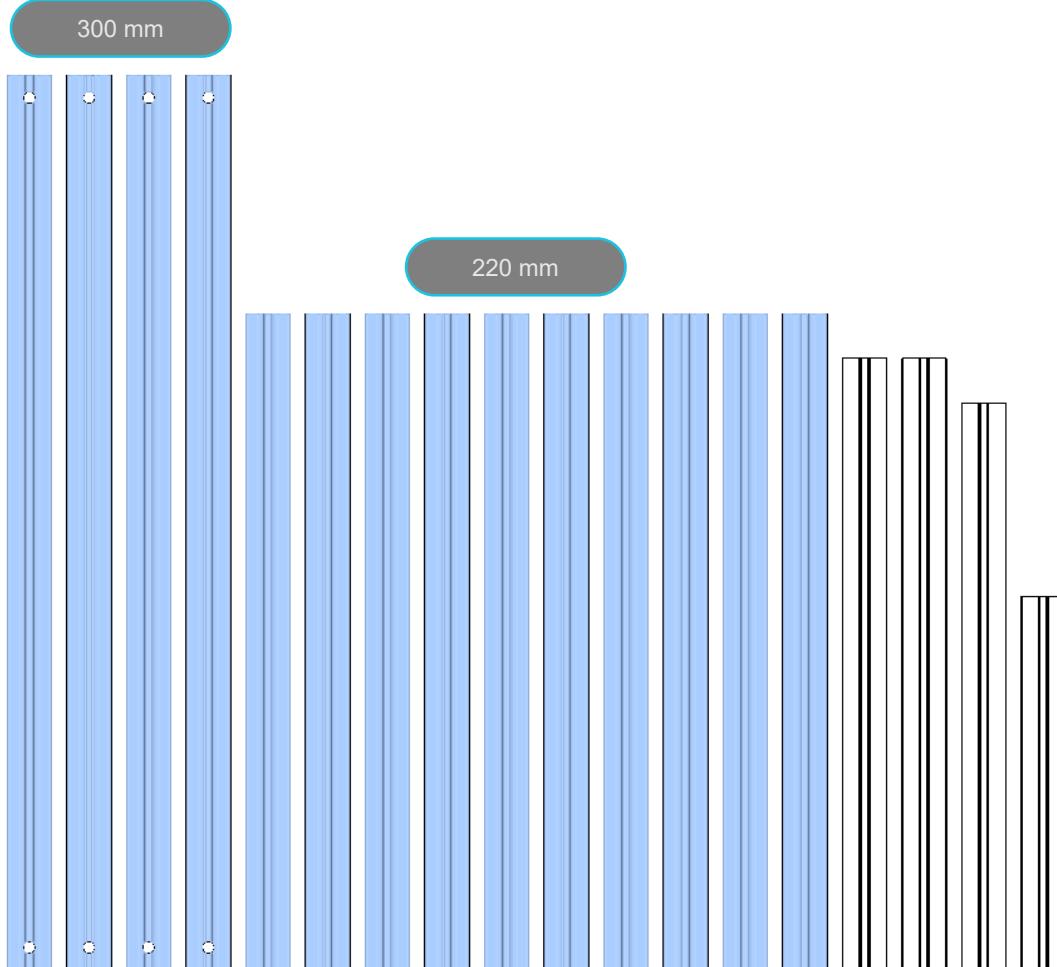
FRAME

MICRON



## GATHERING EXTRUSIONS

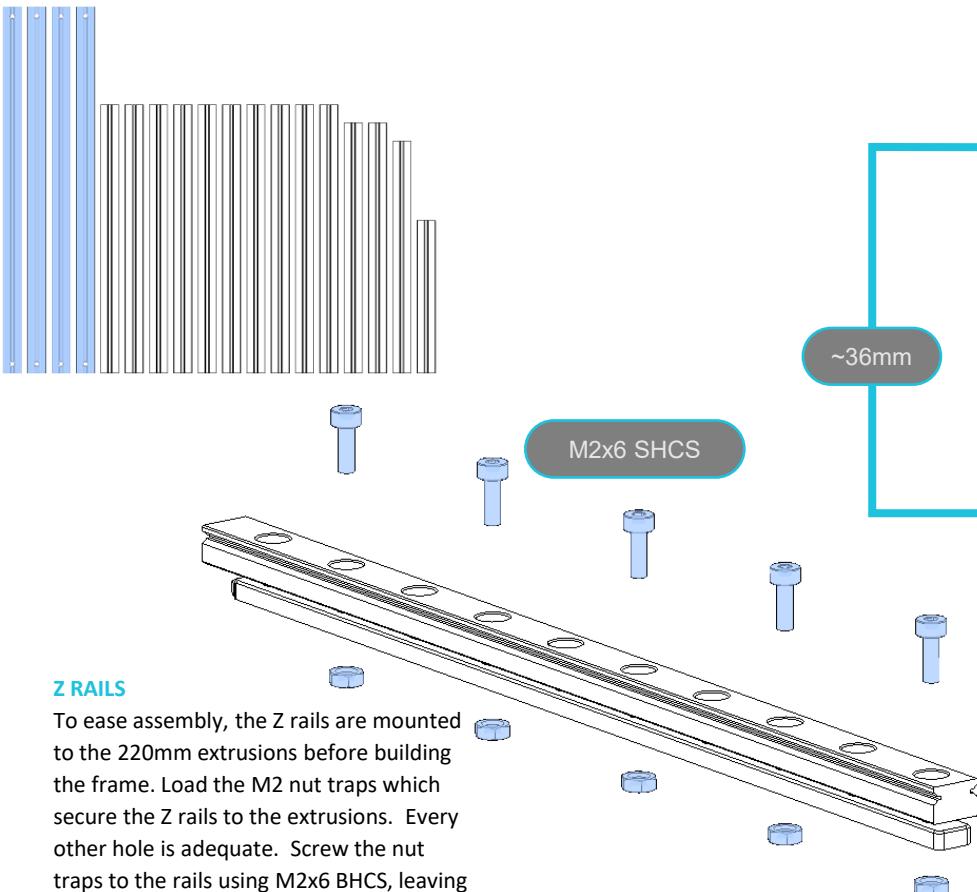
MICRON



### 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.

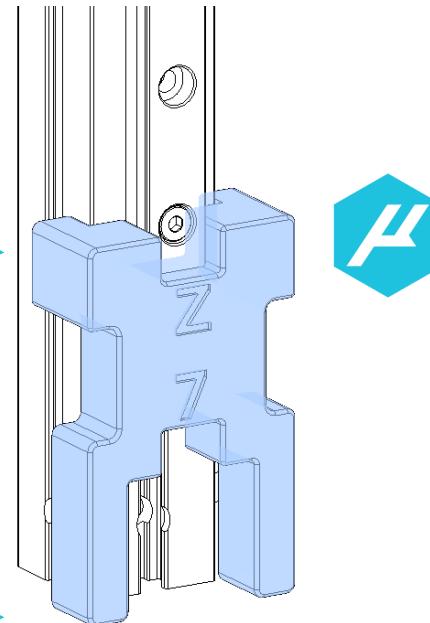
## Z RAIL



### 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.

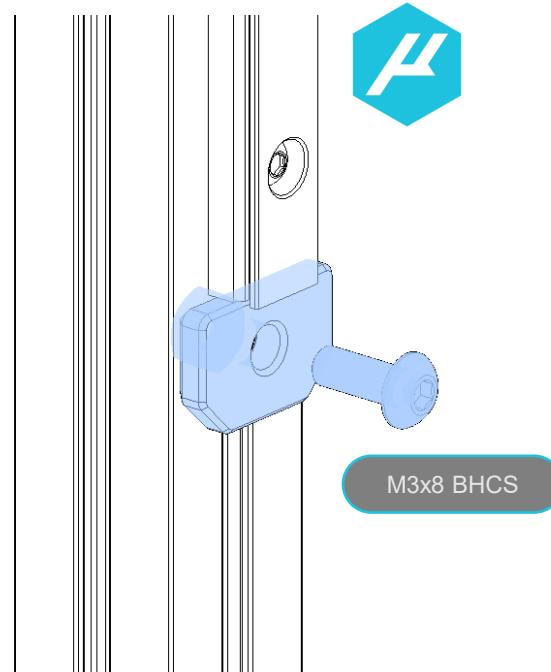
## Z RAIL STOPS

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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.



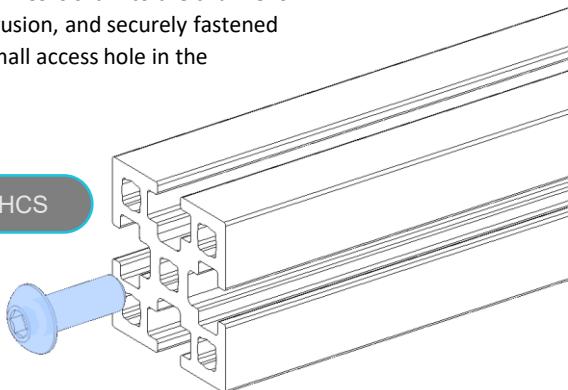
## BLIND JOINTS AND PRINTED NUT HOLDERS

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### BLIND JOINTS

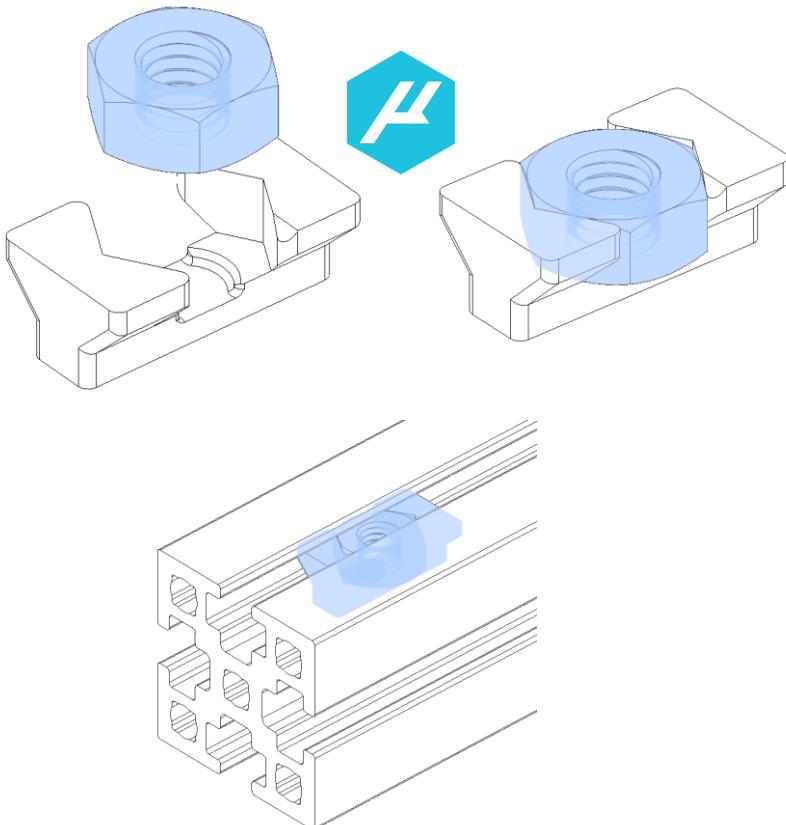
Blind Joints provide a cost effective and rigid frame assembly method. After being screwed into the end of one extrusion, the head of the BHCS is slid into the channel of another extrusion, and securely fastened through a small access hole in the extrusion.

M3x8 BHCS



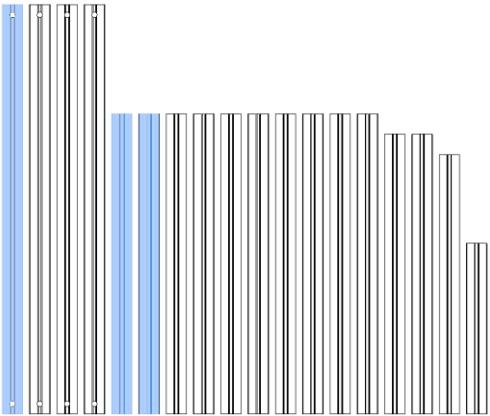
### NO DROP NUTS (OPTIONAL)

1515 extrusions require most nuts to be preloaded during frame assembly. To make it easier to both 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. They are noted as optional. They are however HIGHLY recommended.

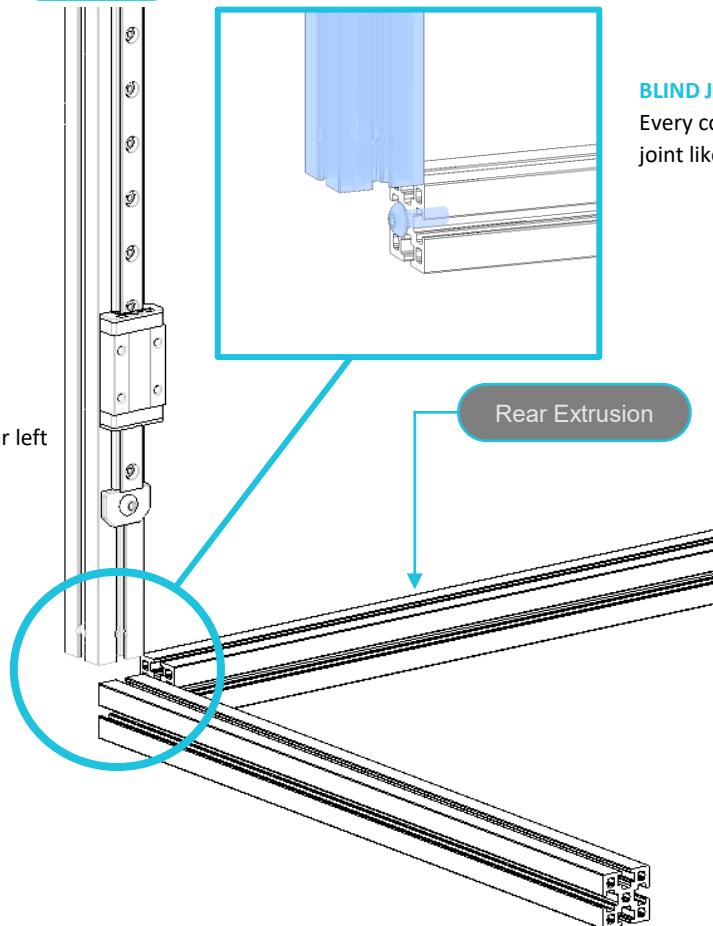


## ASSEMBLE FIRST CORNER

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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

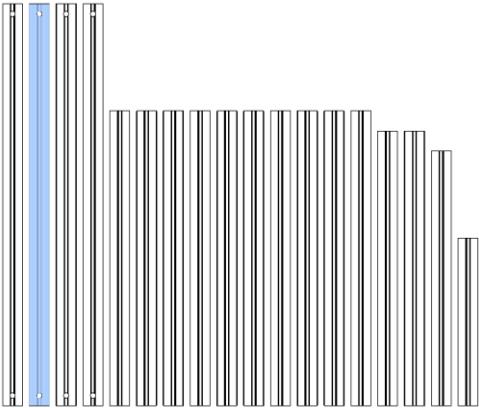
Assemble your frame on the flattest surface you have available. Glass tables and granite counters are two excellent options. This will make it much easier to assemble a frame that is square all the way around.

### 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.

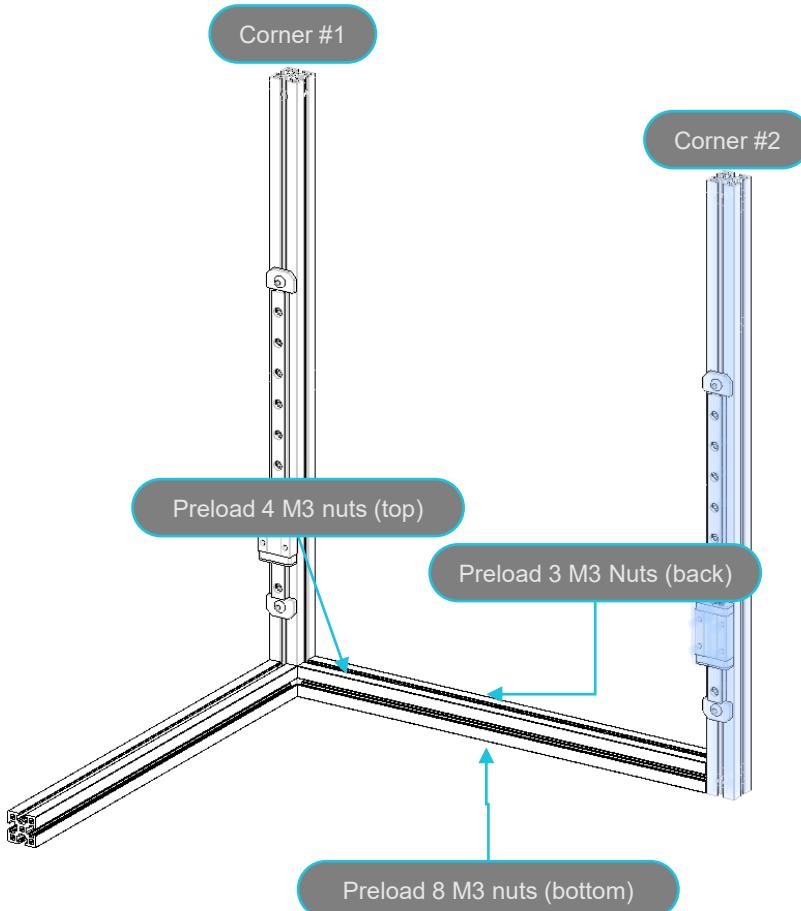
## ASSEMBLE SECOND CORNER

MICRON

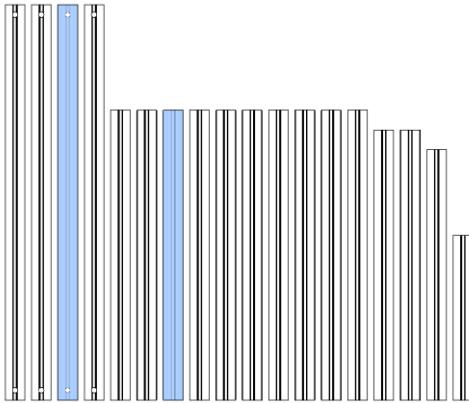


### SECOND CORNER

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

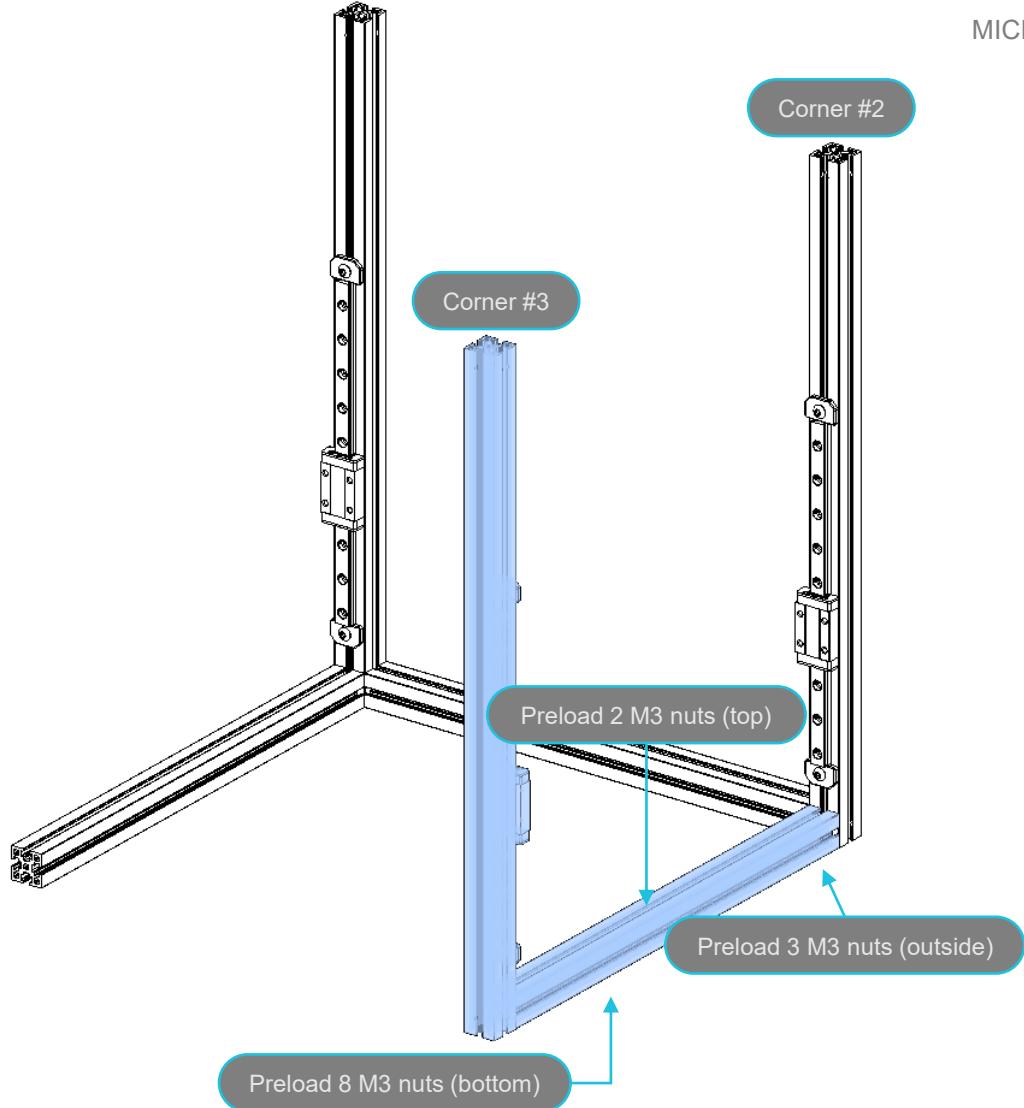


Corner #1

MICRON

Corner #2

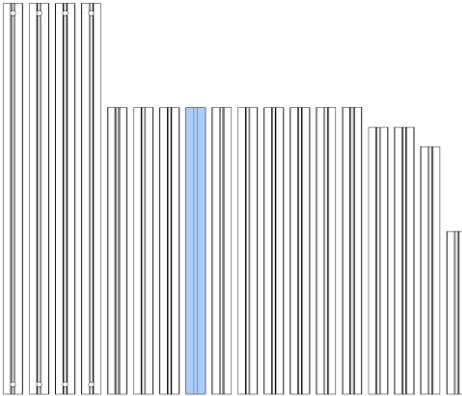
Corner #3



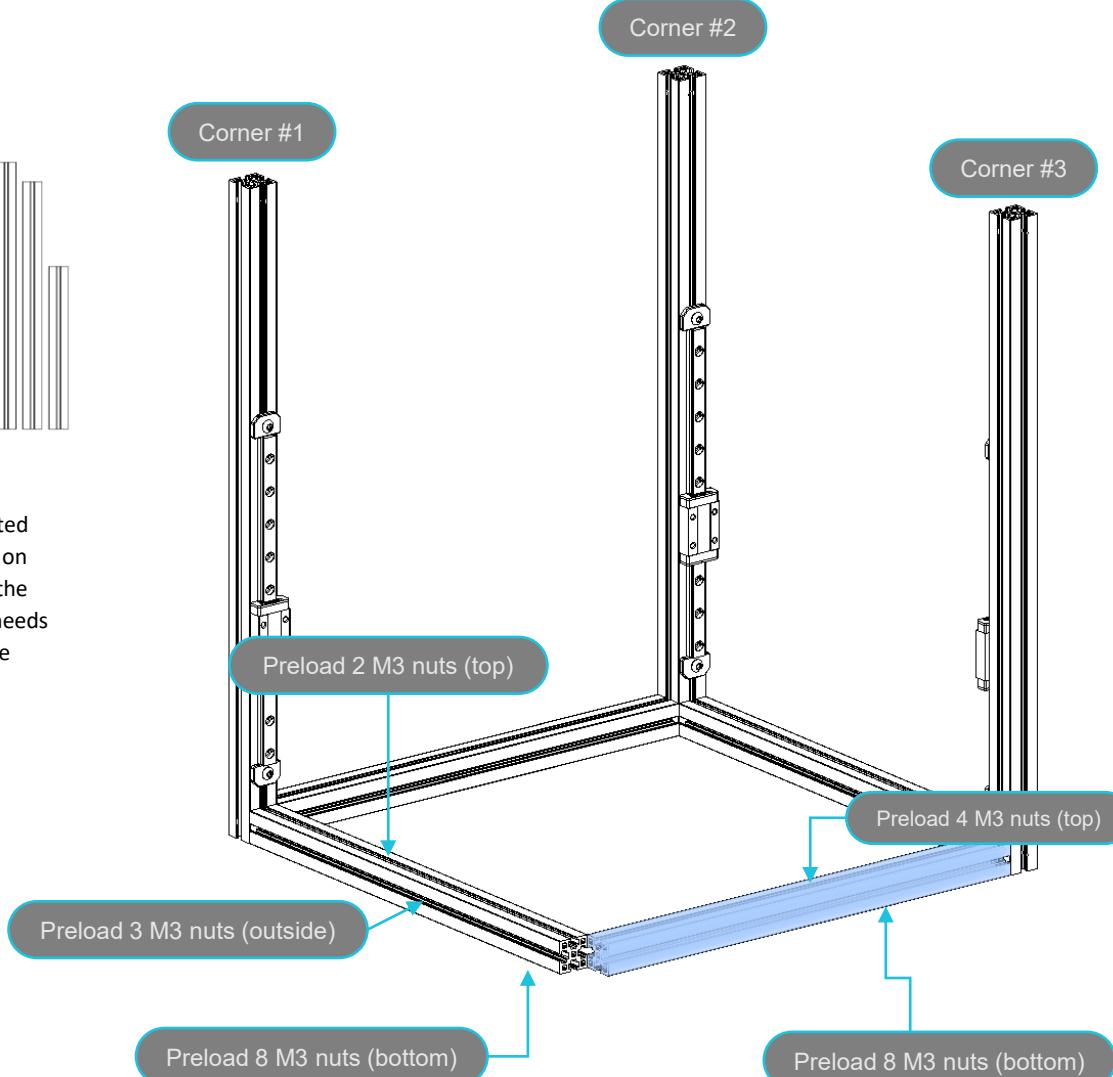
### THIRD CORNER

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.

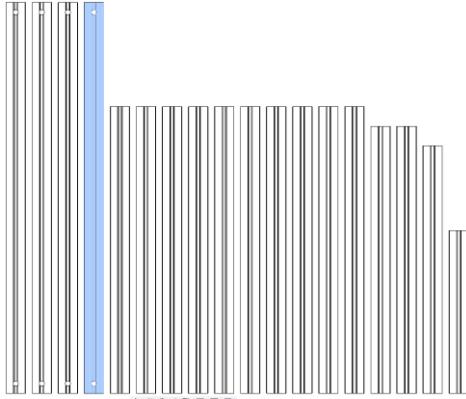
## FINAL LOWER EXTRUSION



MICRON

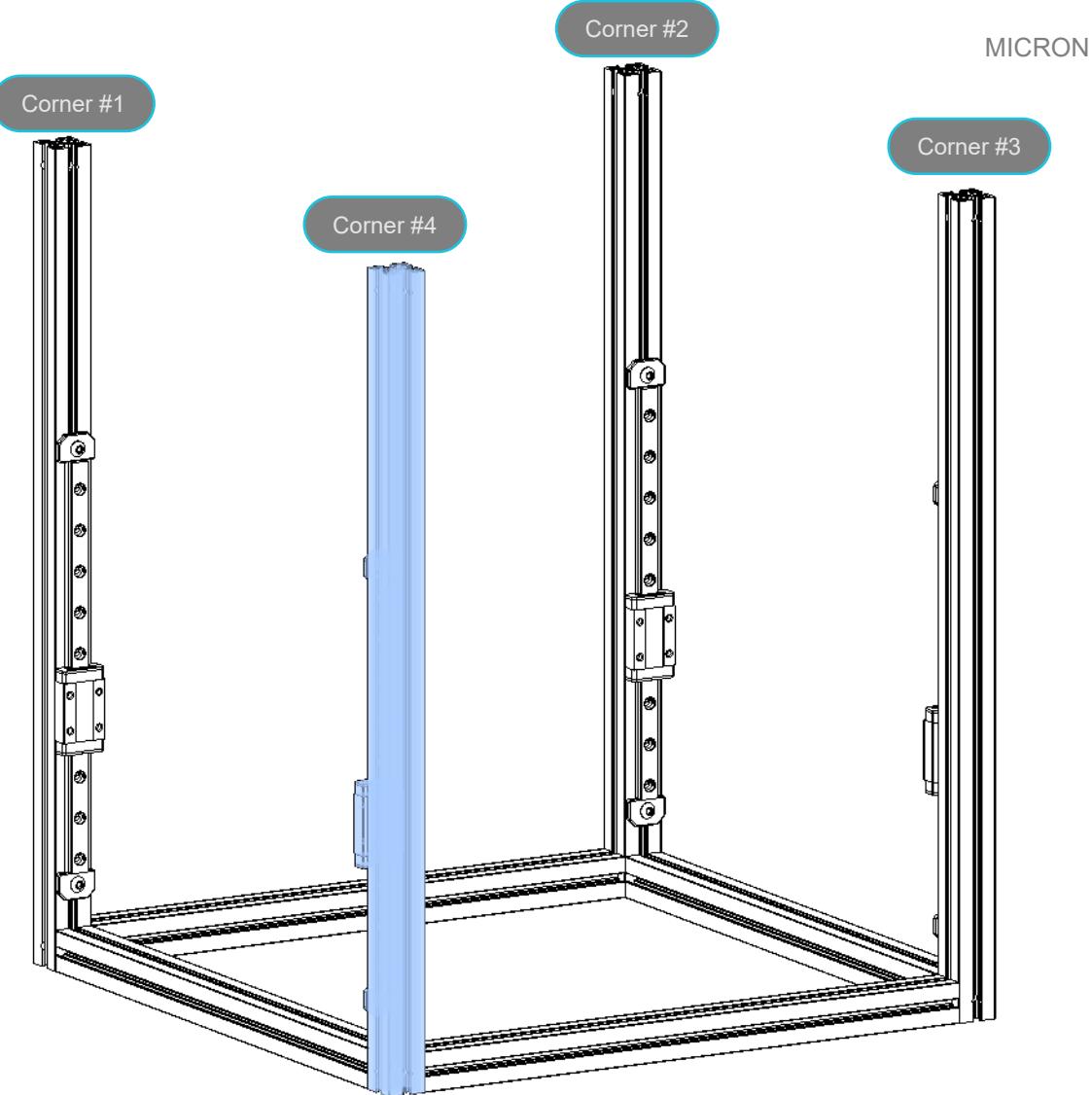


## ASSEMBLE THE FOURTH CORNER



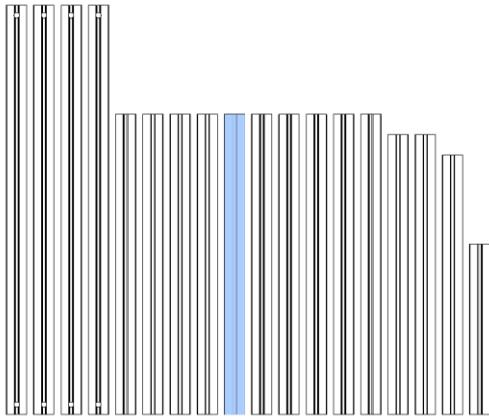
### FOURTH CORNER

The final vertical extrusion will now be installed.



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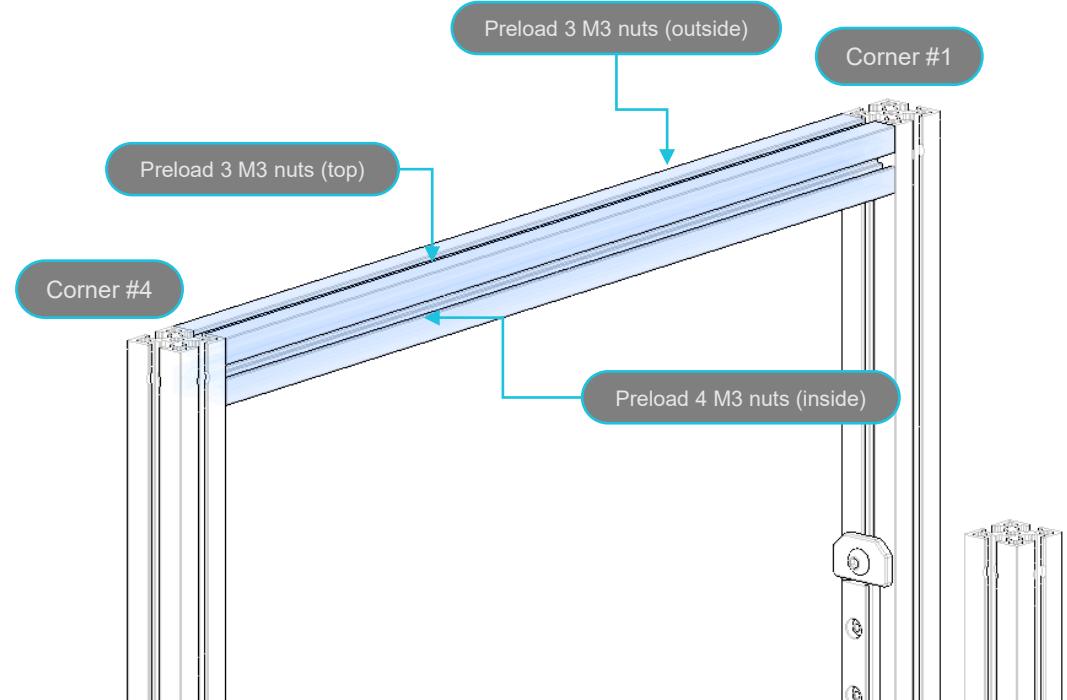
## TOP OF FRAME



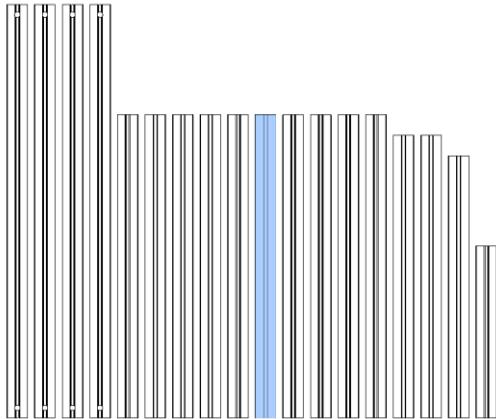
## TOP OF FRAME

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

MICRON



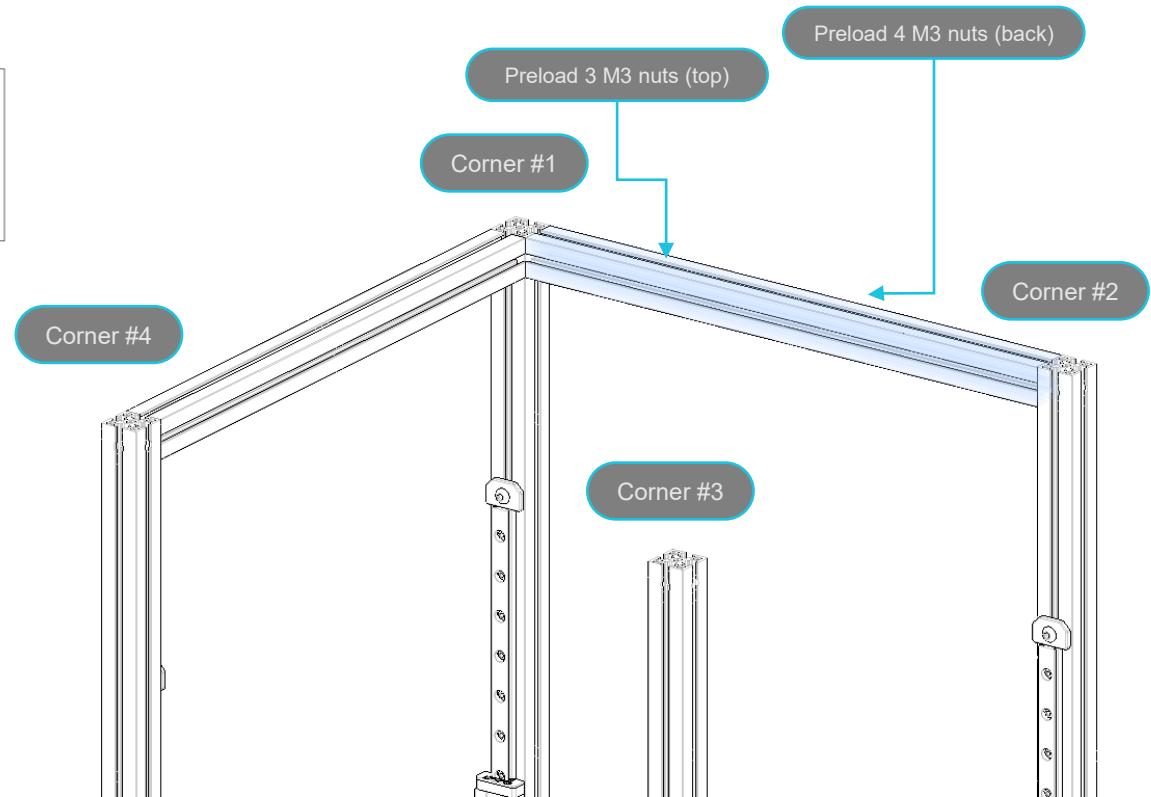
## TOP OF FRAME



MICRON

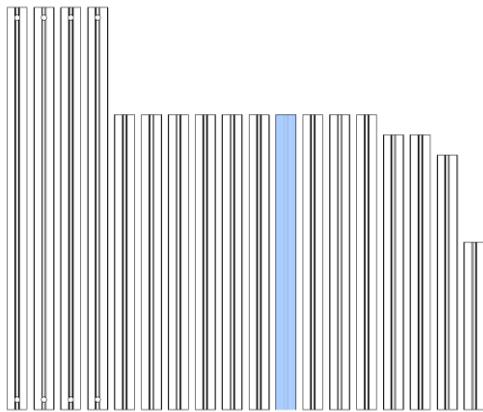
## TOP OF FRAME

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



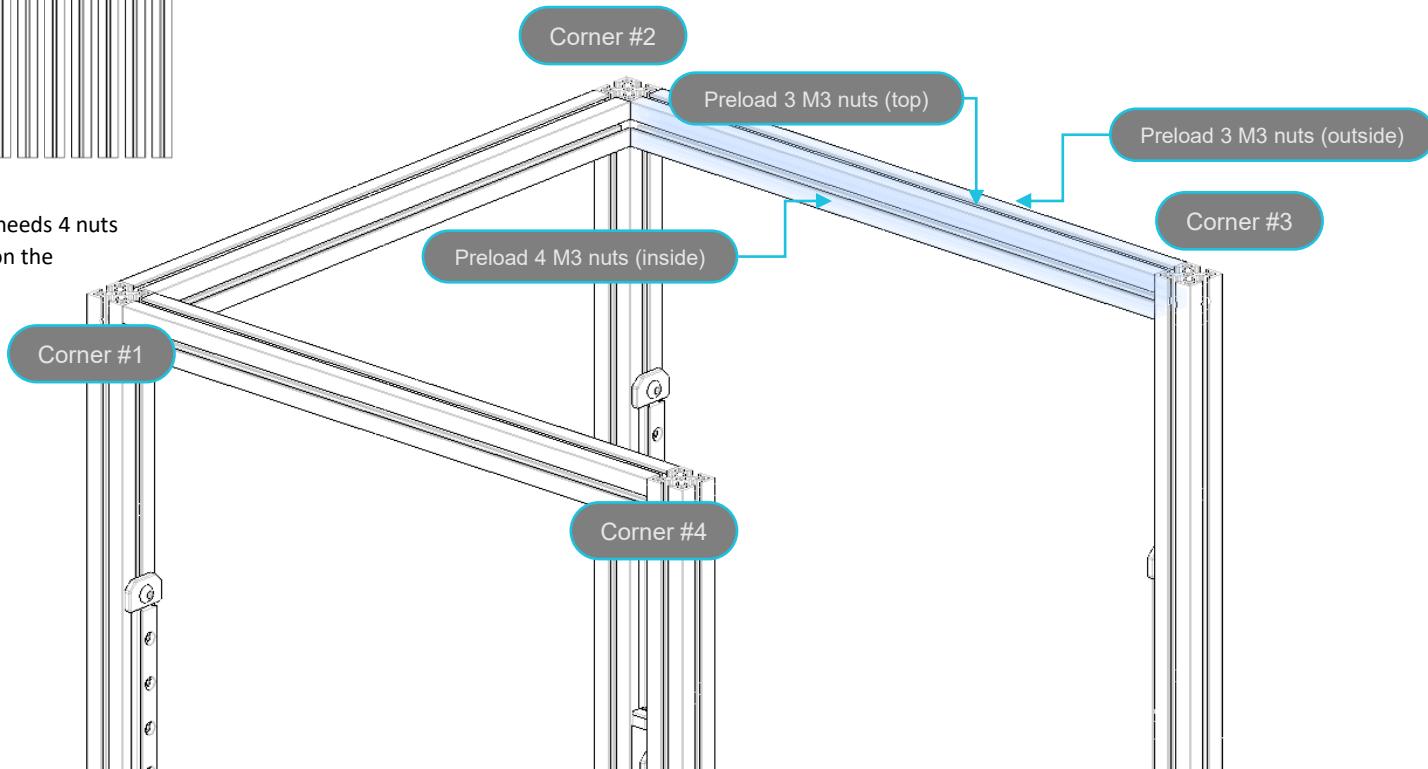
## TOP OF FRAME

MICRON

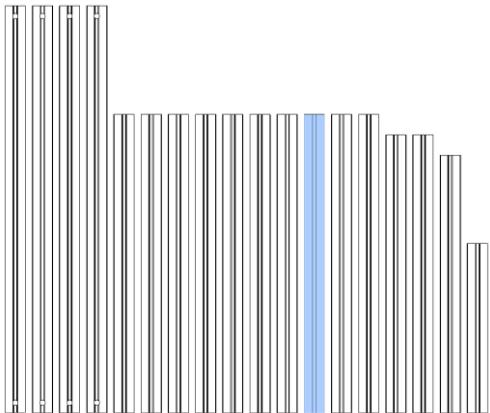


## TOP OF FRAME

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



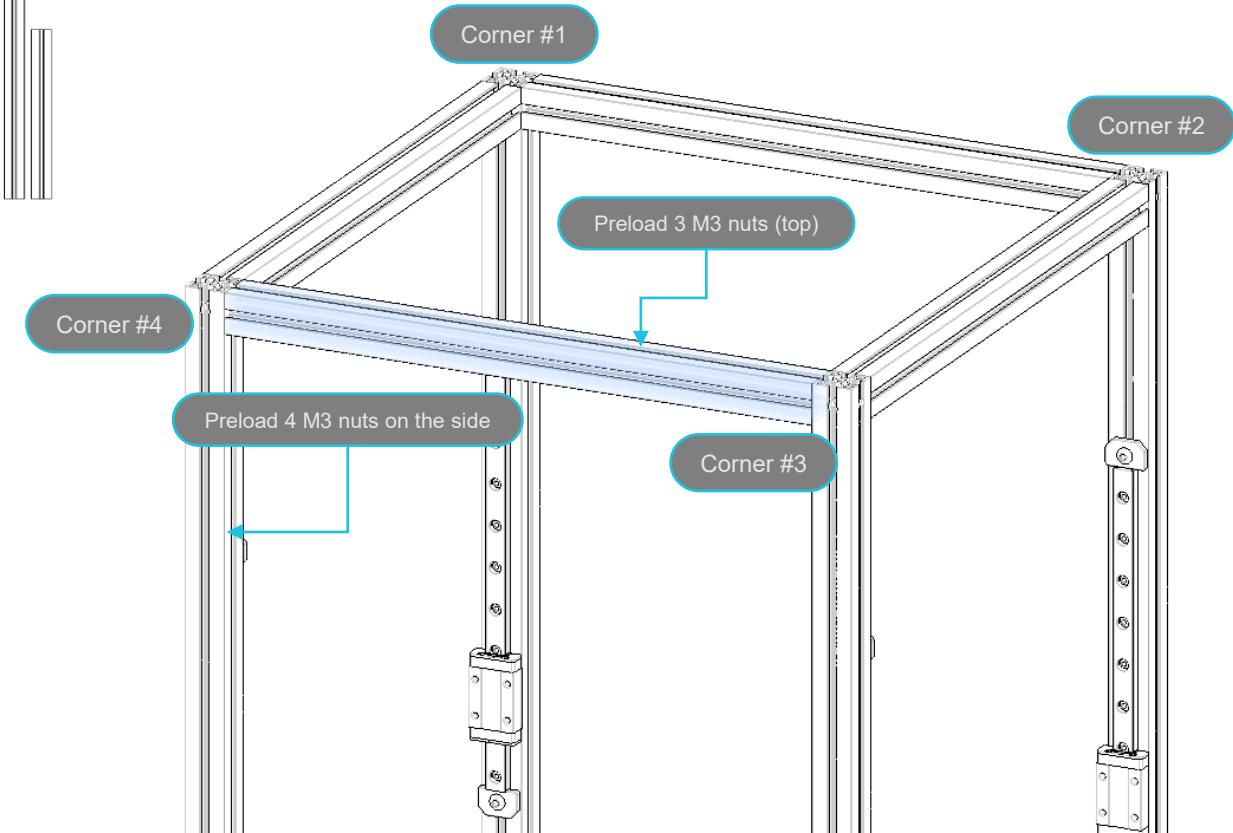
## FRAME



## MICRON

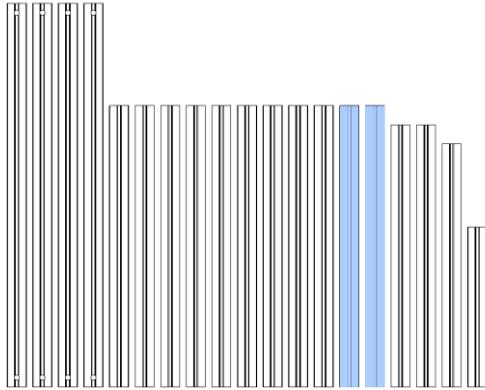
### TOP OF FRAME

The final top extrusion requires 3 preloaded nuts



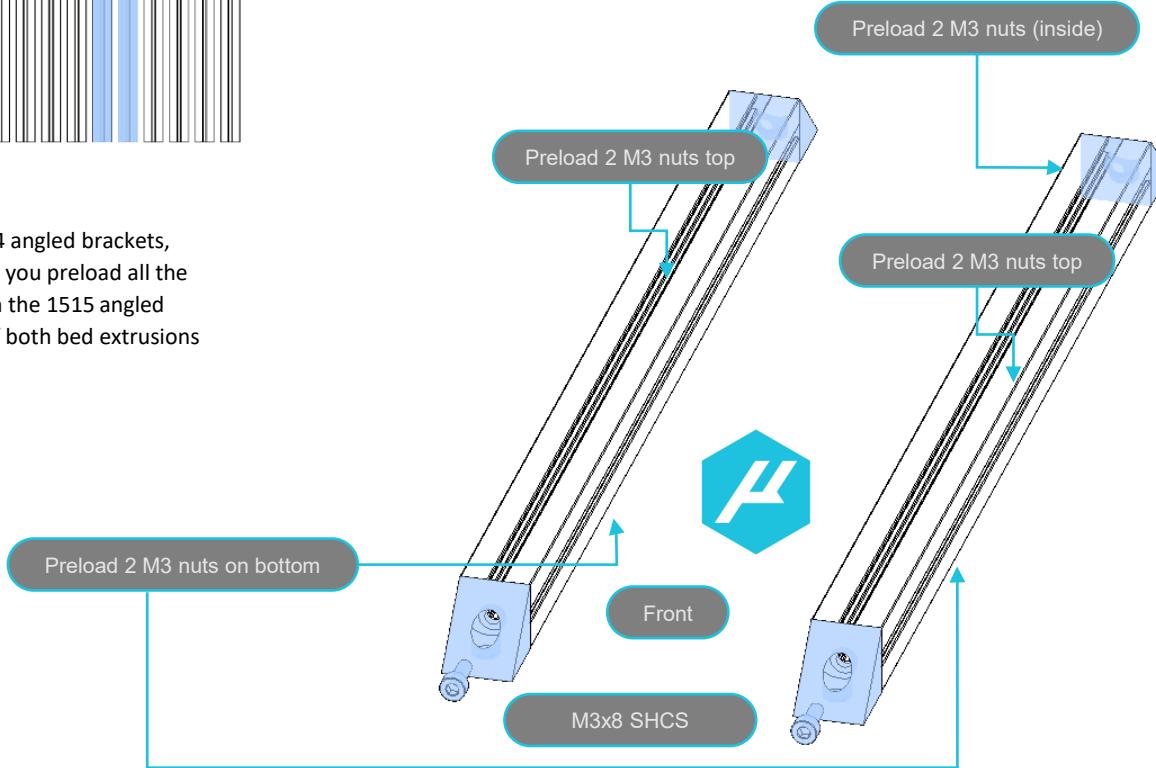
## BED EXTRUSIONS

MICRON



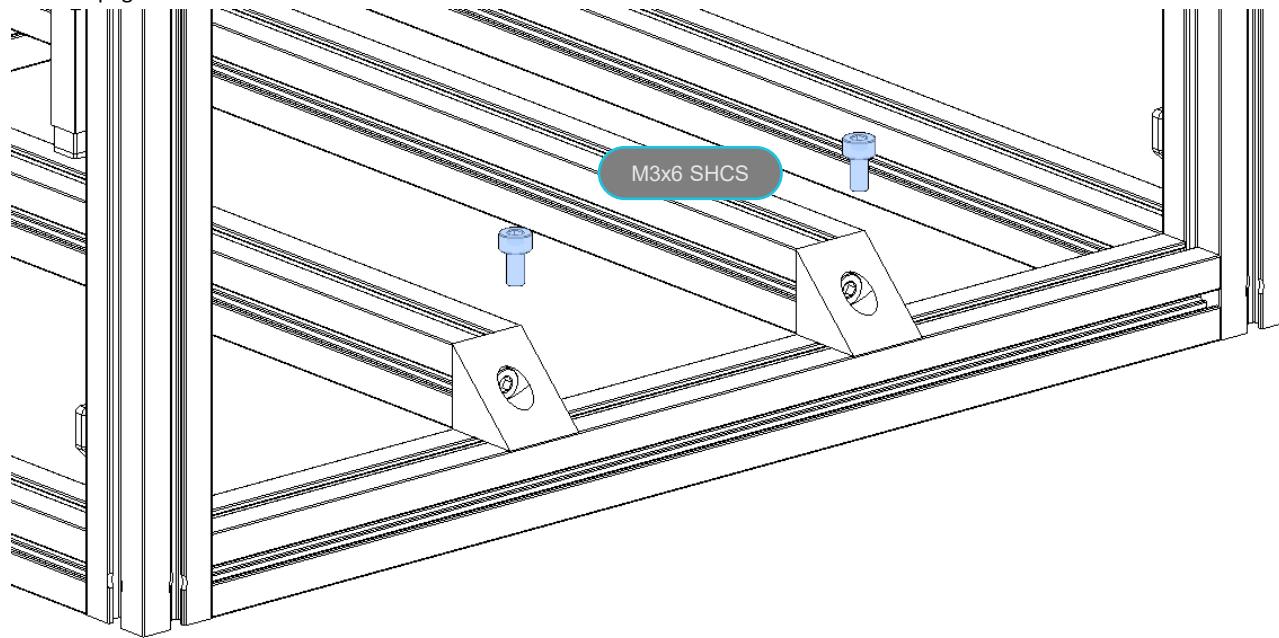
### BED EXTRUSIONS

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**

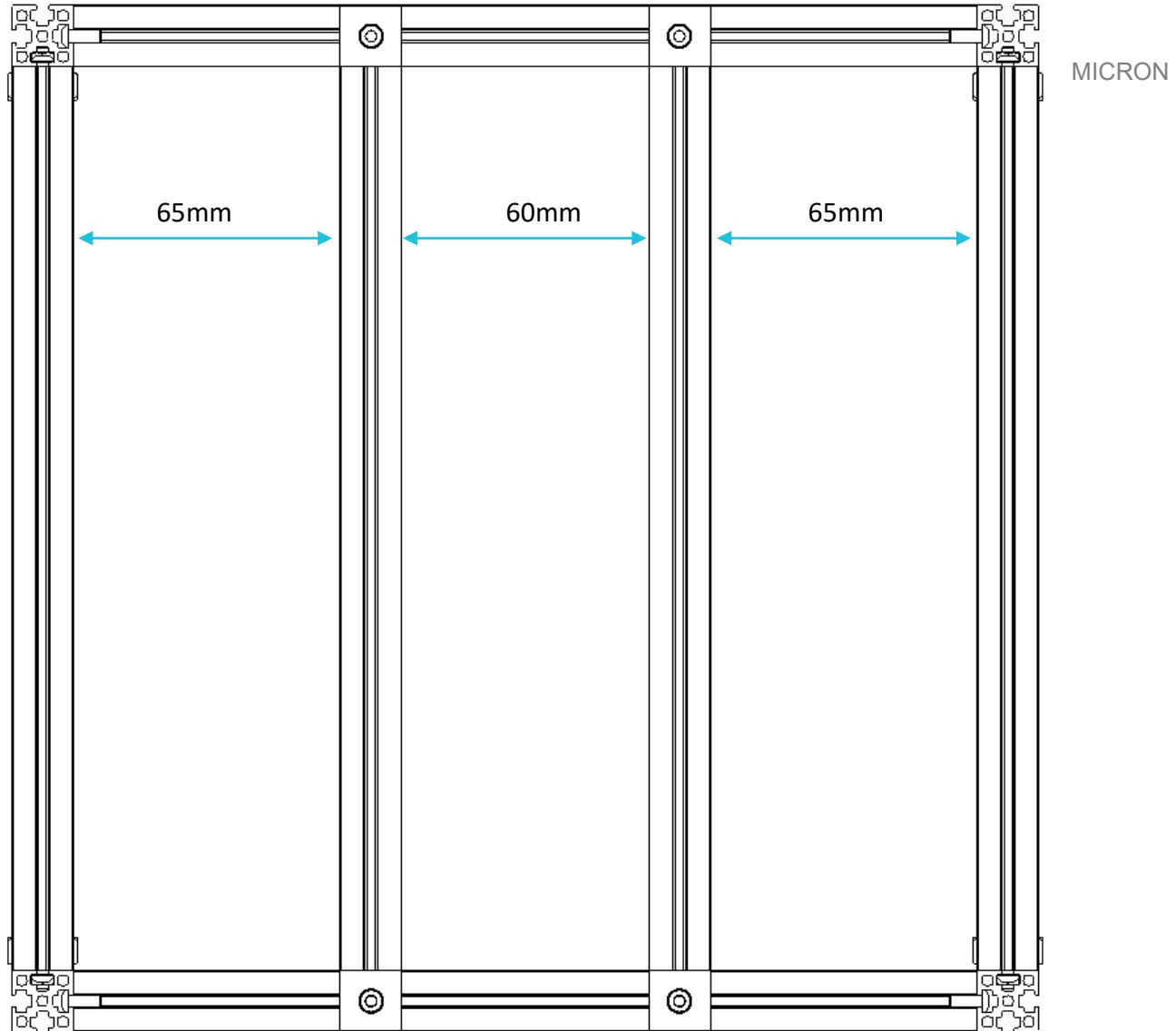
Mount the bed extrusion as shown, making sure to center them with 60mm between them as shown on the diagram on the next page



## 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

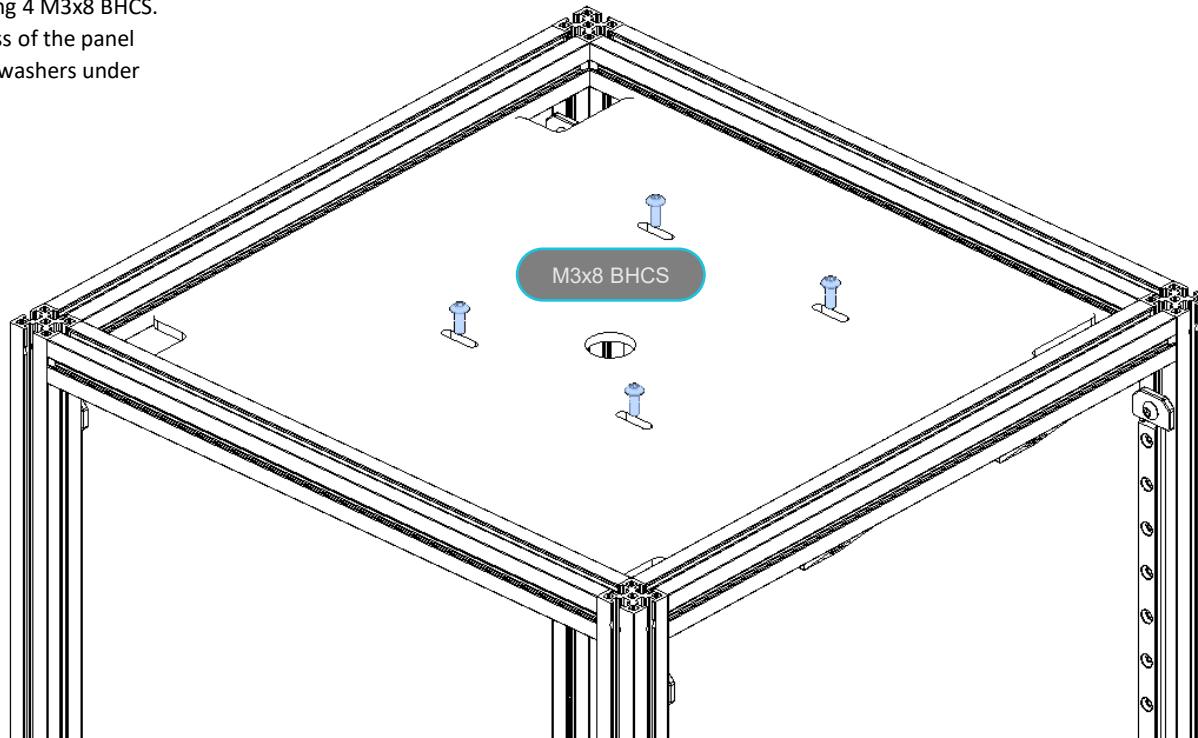


## MICRON

**DECK PANEL**

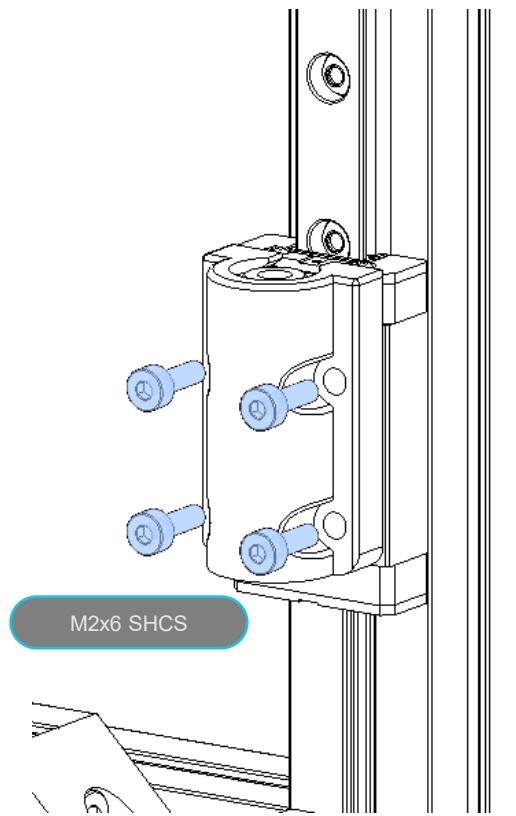
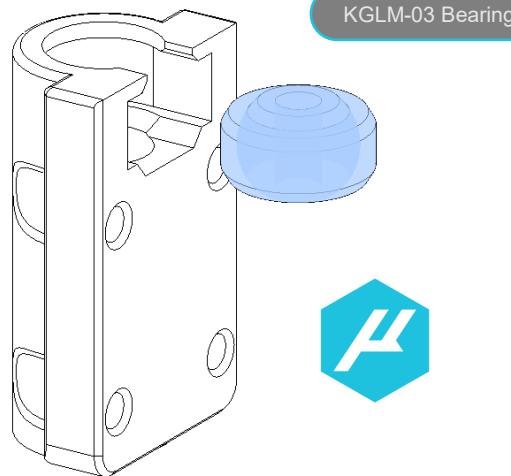
Install the deck panel , using 4 M3x8 BHCS.

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

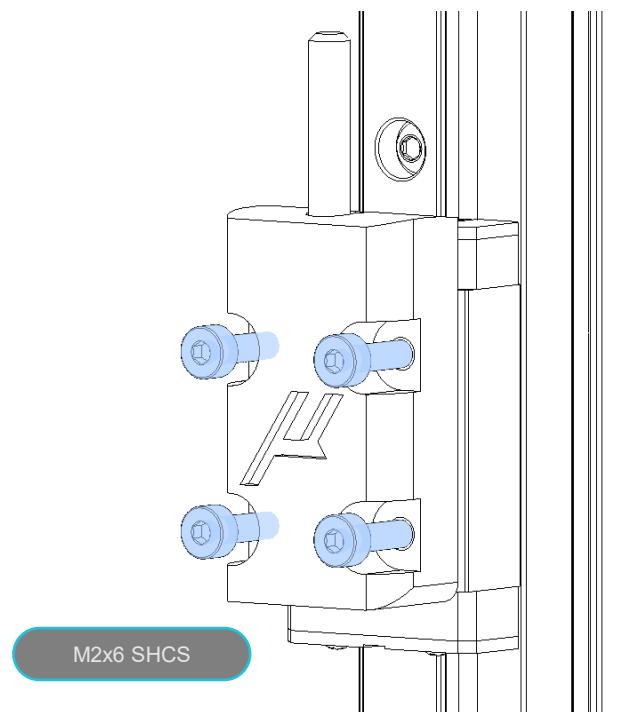
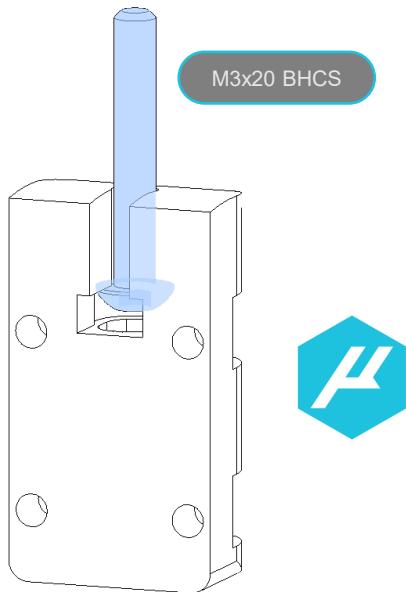


## Z JOINTS (Option 2)

MICRON

### Z JOINTS

Attach these to the Z rail carriages using 4  
M2x6 SHCS



**FRAME**

MICRON

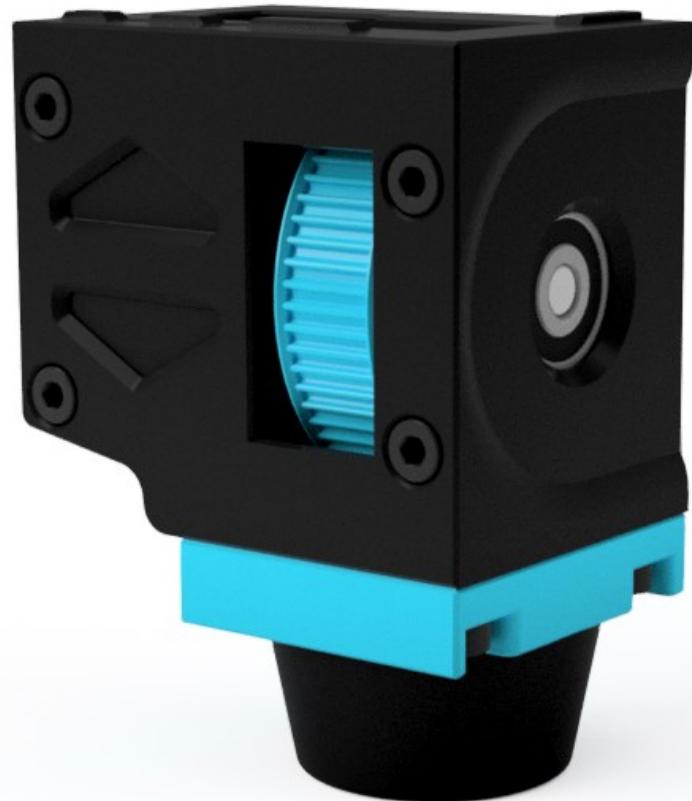


**FRAME**

At this point your frame should be looking like this.

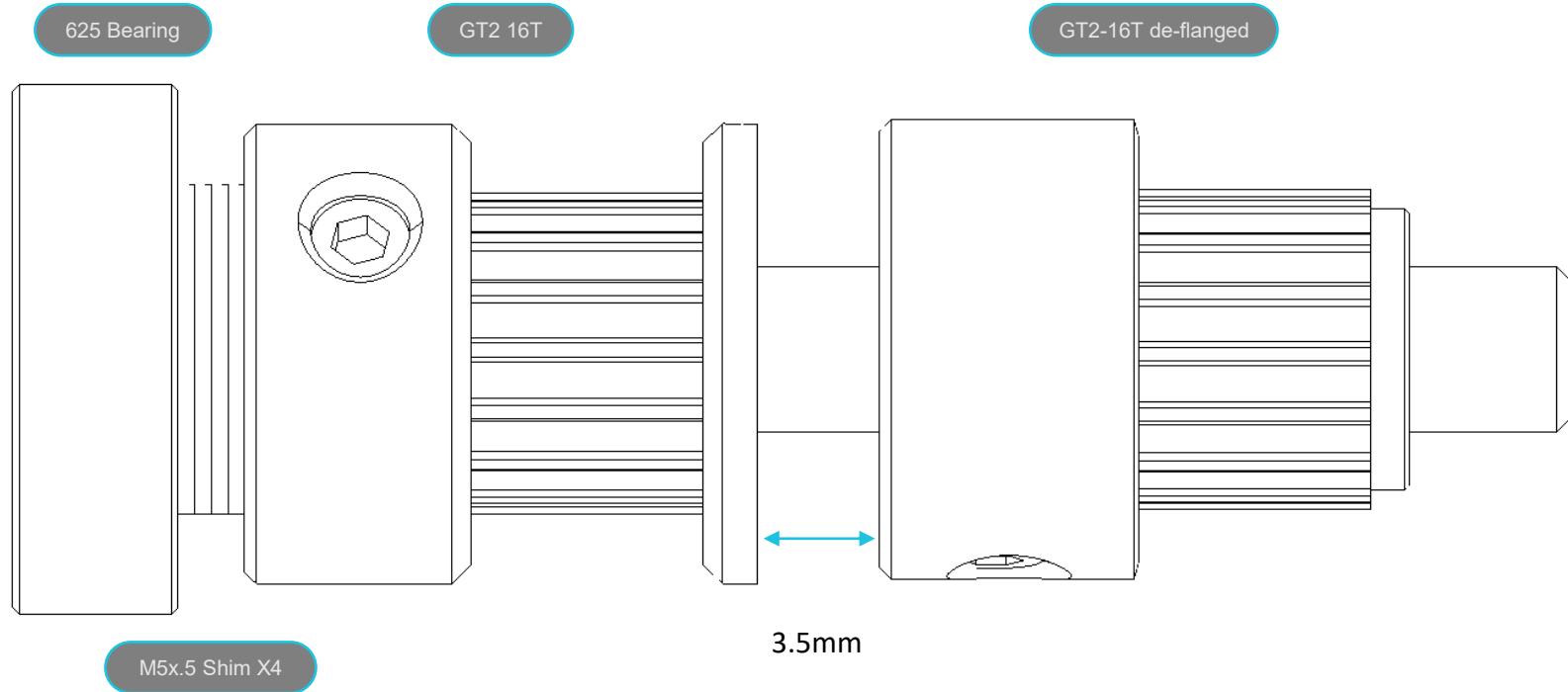
Z DRIVES

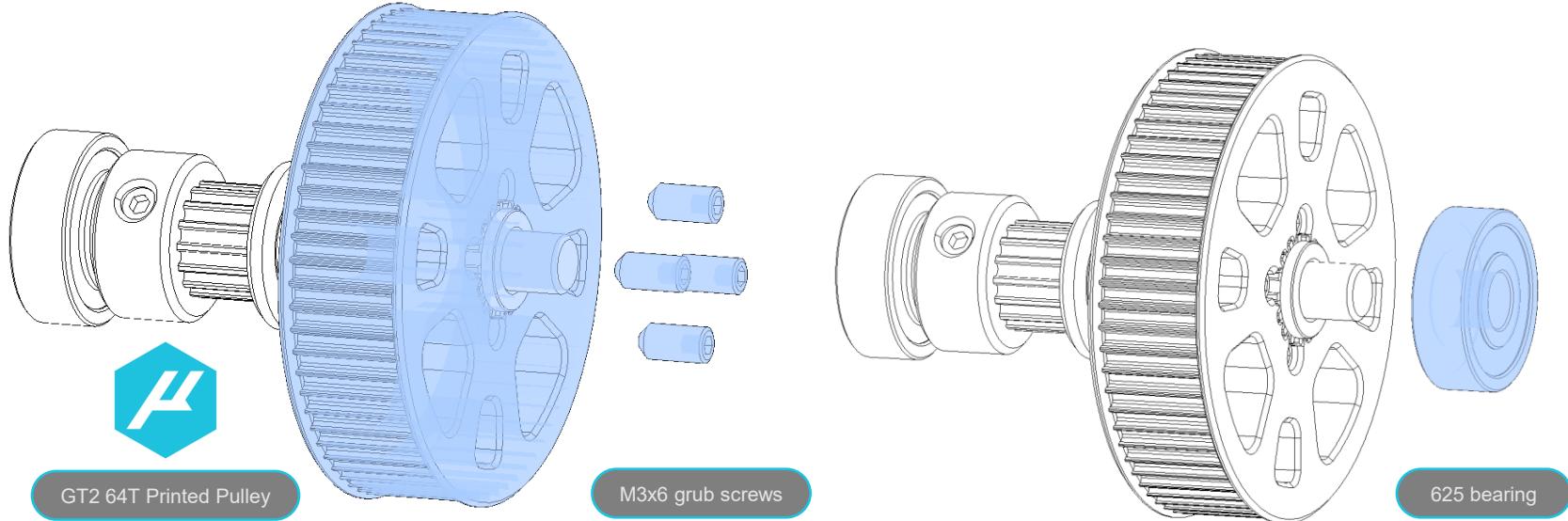
MICRON



## Z DRIVE 64T PULLEY ASSEMBLY

MICRON



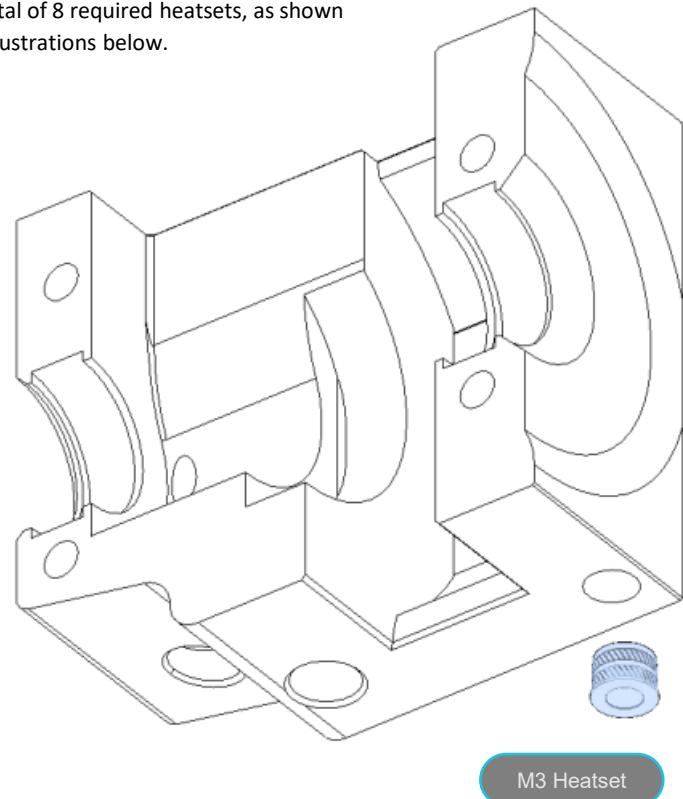
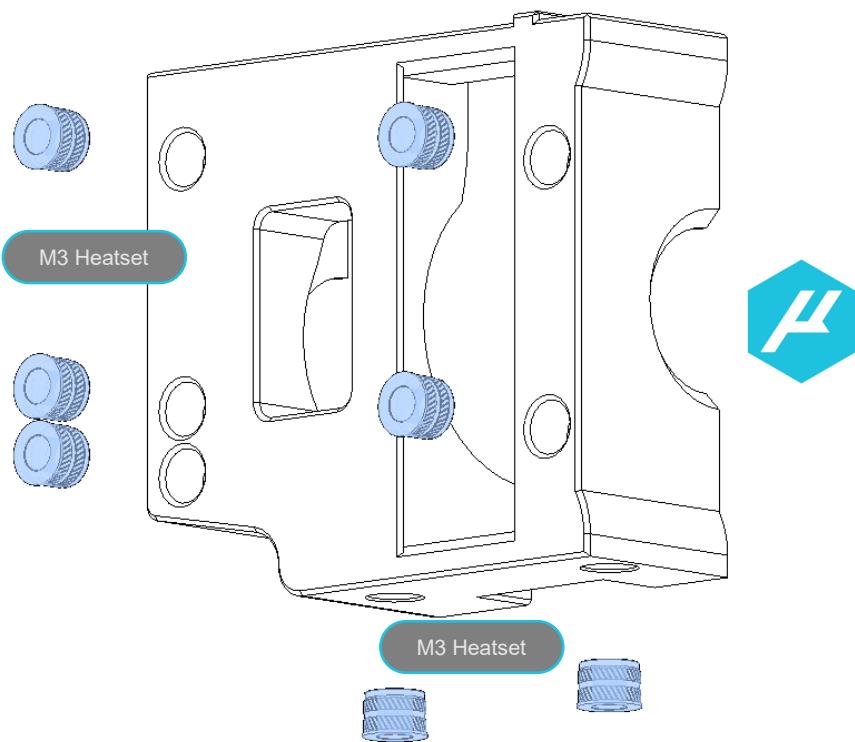


### ASSEMBLING 64T PULLEY

The printed pulley has a flat side and a concave side. The de-flanged pulley slides into the concave side of the printed pulley and is secured from the flat side with grub screws. Four M3x6 grub screws are inserted to lock the two components together. To ensure proper operation of the assembled Z drives, ensure that you drive the grub screws in all the way, until they are flush with or just below the flat face of the printed pulley.

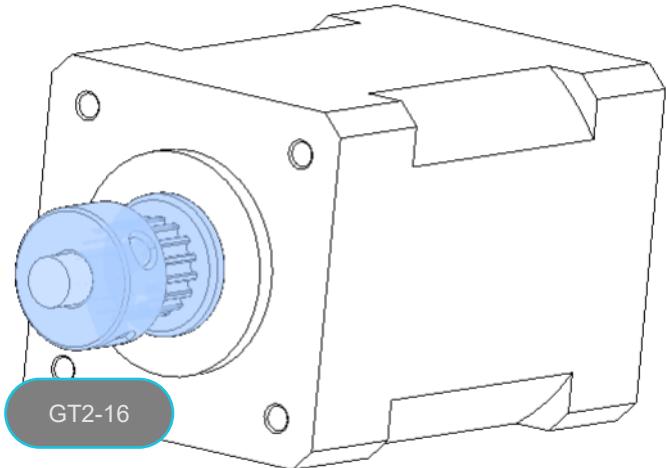
**Z DRIVE ASSEMBLY**

Begin by installing the headset 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

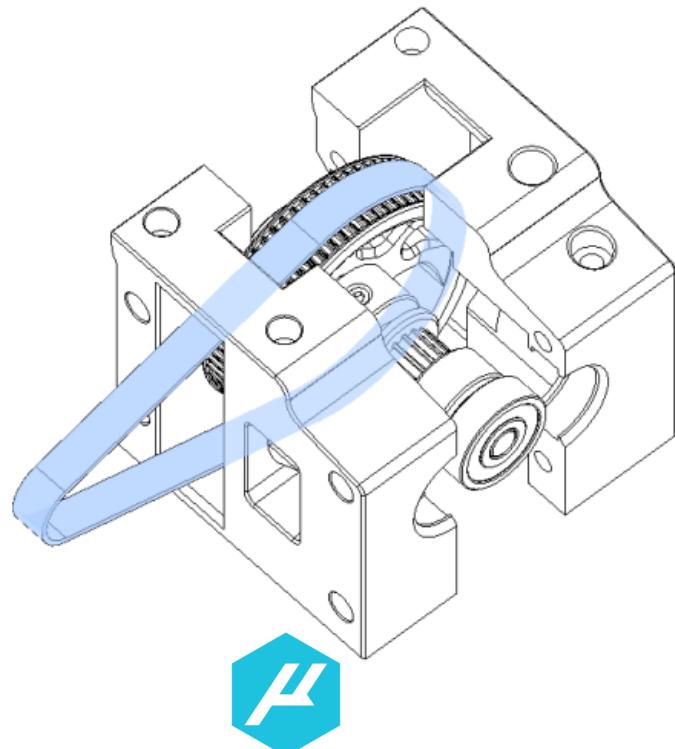


### Z MOTOR PULLEY

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.

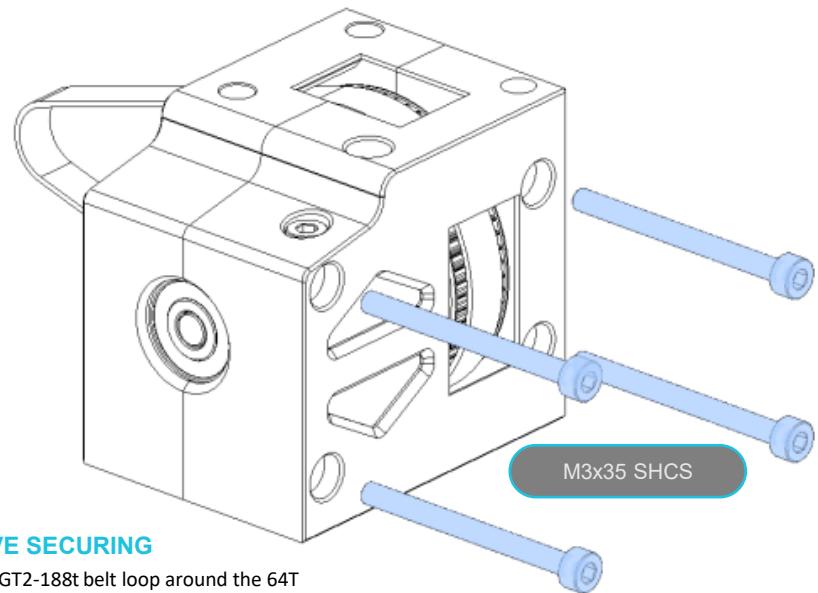
## Z DRIVE ASSEMBLY

MICRON



### Z DRIVE BELT

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

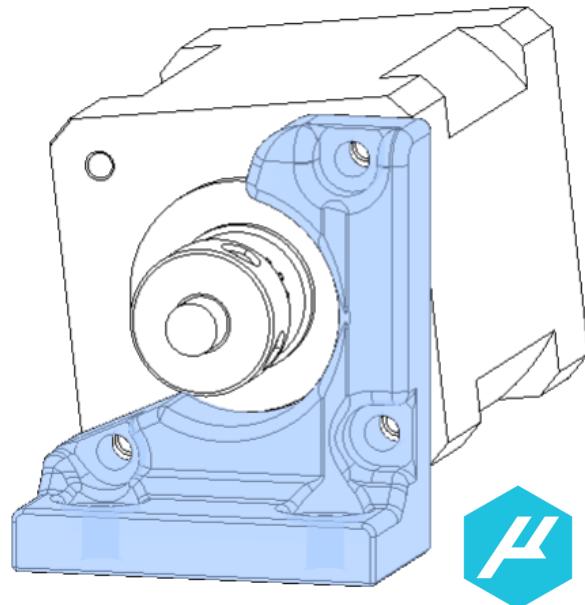


### Z DRIVE SECURING

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

## Z MOTOR MOUNT

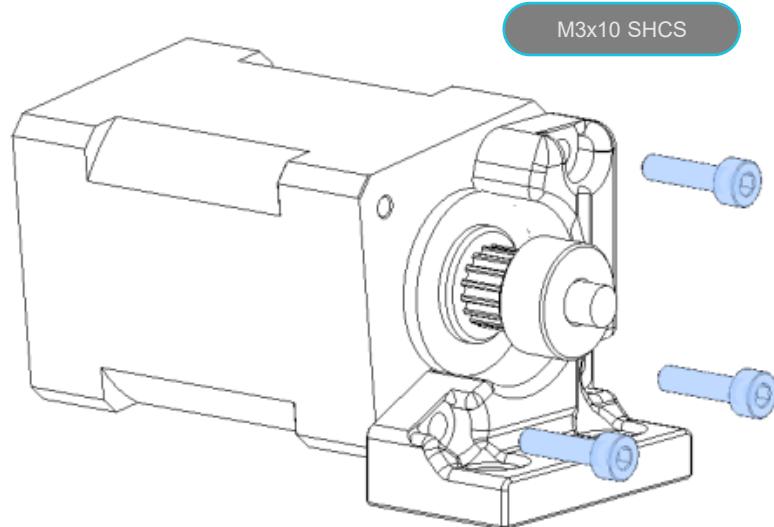
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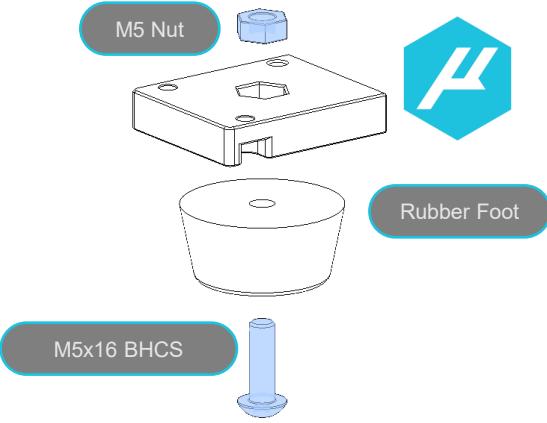
### Z MOTOR MOUNT

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.

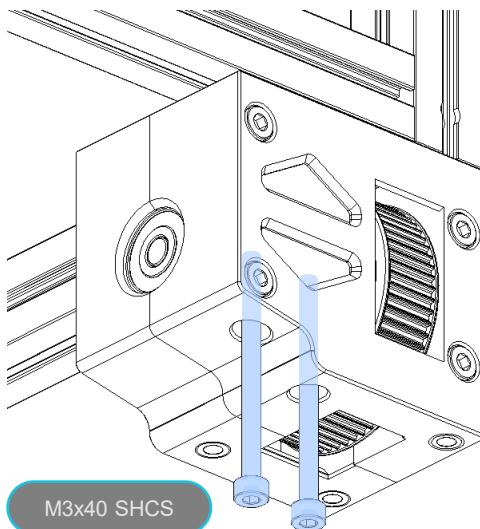


## Z DRIVES MOUNTING



### FEET ASSEMBLY

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



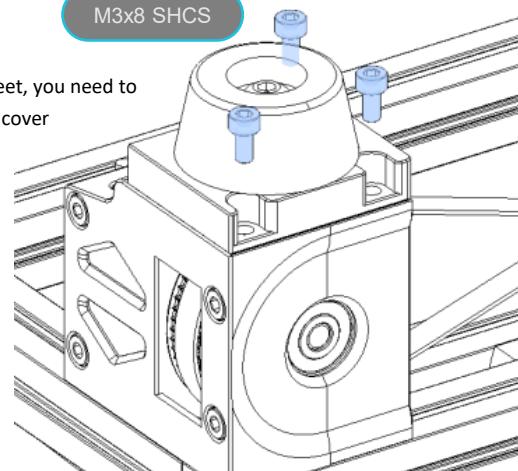
### Z DRIVE MOUNT

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

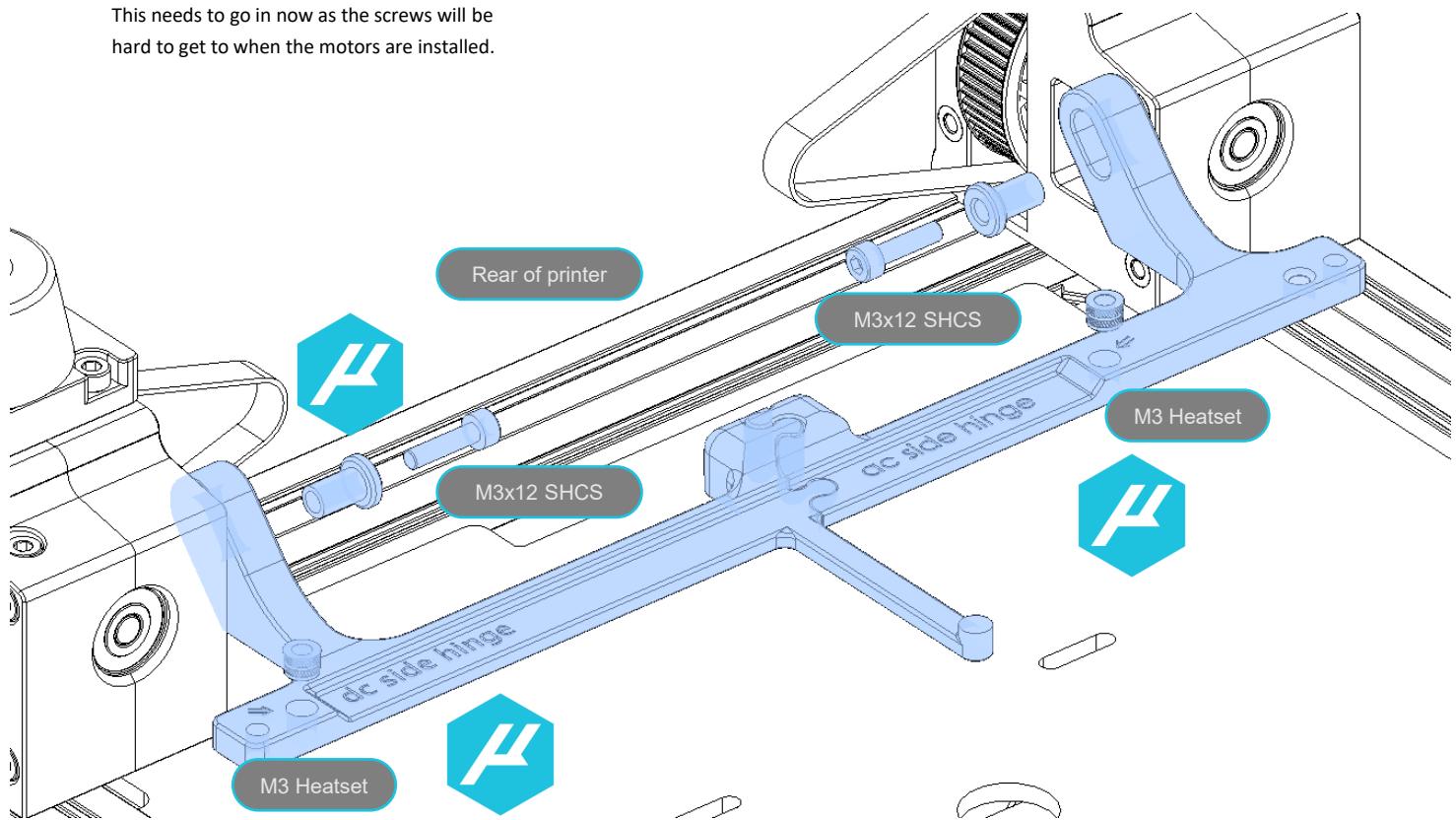
### FEET ASSEMBLY

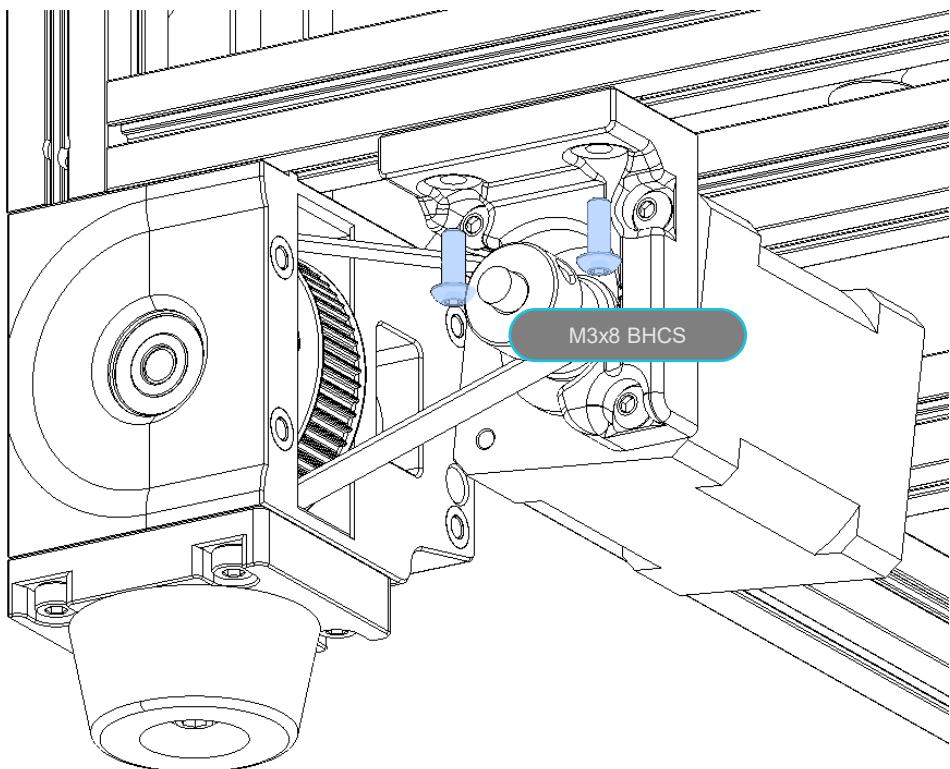
To assembly the Z drive cap / feet, you need to insert an M5 nut into the drive cover



**ELECTRONICS HINGED MOUNT**

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





### PRELOAD POSITIONS

Before installing the Z motors, take note of the 8 preloaded nuts in the slot to which we are mounting them. 4 of these nuts will be used to mount the Z motors. The position of the remaining 4 nuts is critical to finishing the assembly. When you have the motors mounted, you want one nut between each motor and its Z drive, and two nuts in the center, between the two motors. These 4 nuts will be used to secure the skirts later in the assembly.

### Z MOTOR MOUNTING

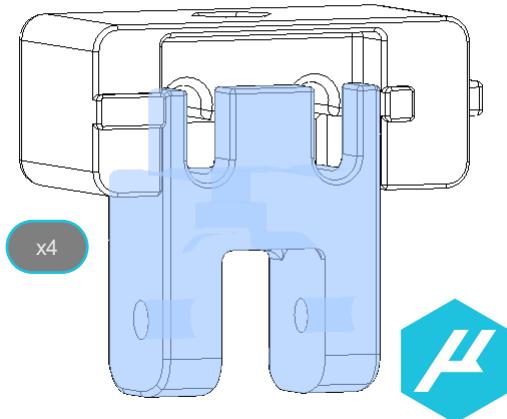
Using 2 M3x8 BHCS attach the Z motor. This is when you will tension the 188 tooth belt loop.

Z IDLERS

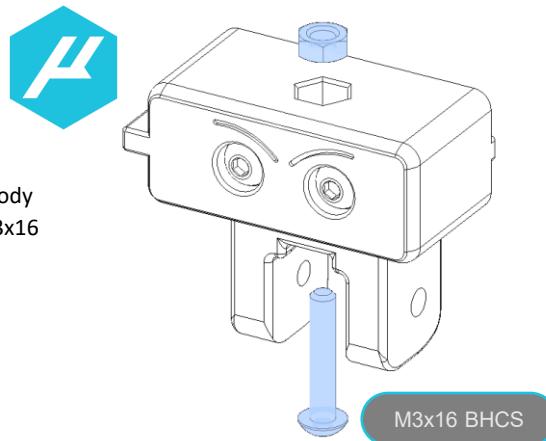
MICRON



## Z IDLERS

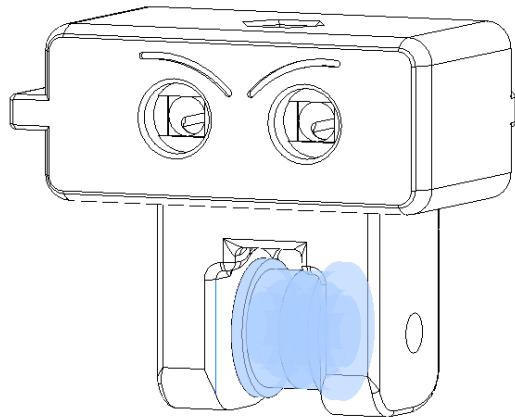


## MICRON



### Z TENSIONER

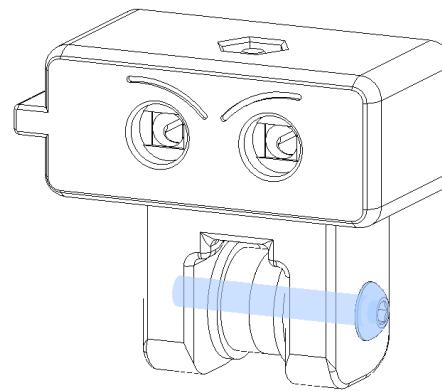
Slide the tensioner into the main body securing them together with an M3x16 BHCS and M3 hex nut.



F623 Bearing

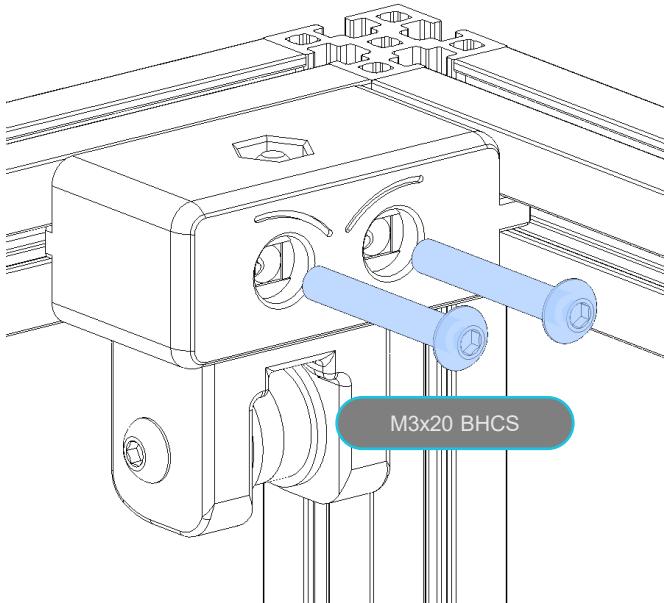
### Z TENSIONER PULLEY

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



M3x20 BHCS

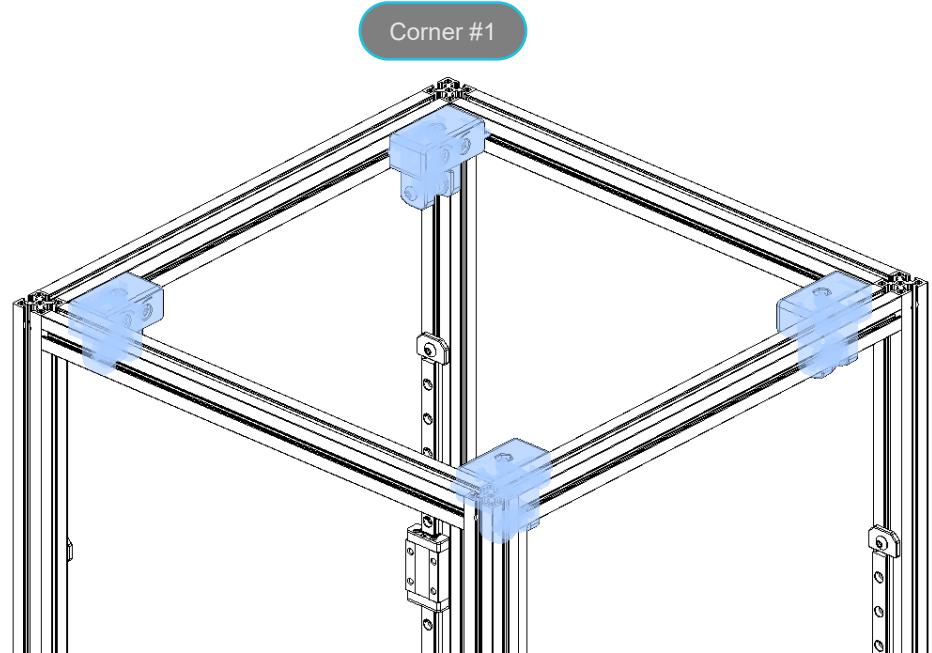
## Z IDLERS



### 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



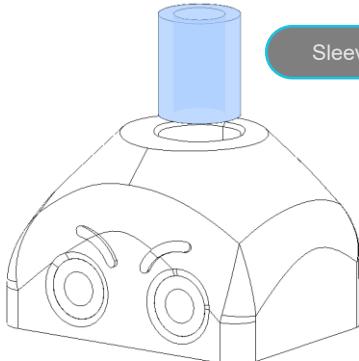
Z ENDSTOP

MICRON

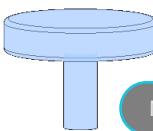
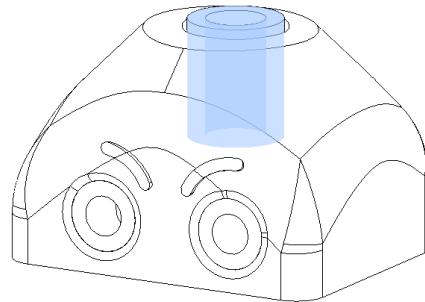


## Z ENDSTOP ASSEMBLY

MICRON

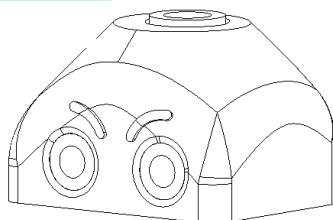


Sleeve Bearing

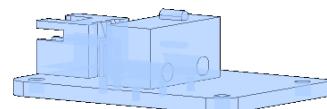
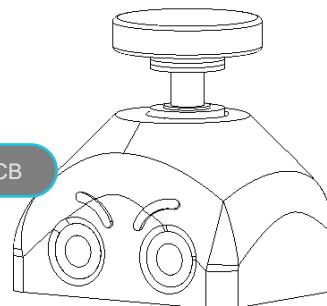


M4 Thumbscrew

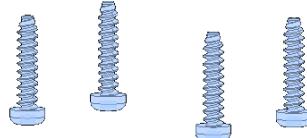
M4 Spacers (x4)



Z Endstop PCB



5mm Binding Post Screw

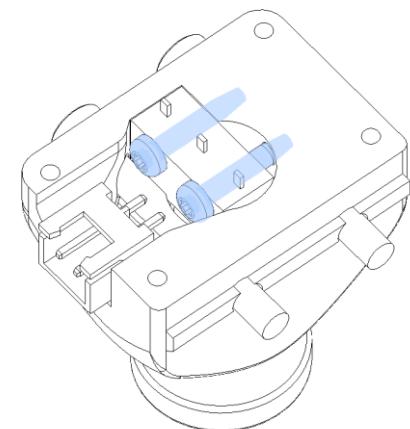


M2x10 Self Tapping screws

### 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

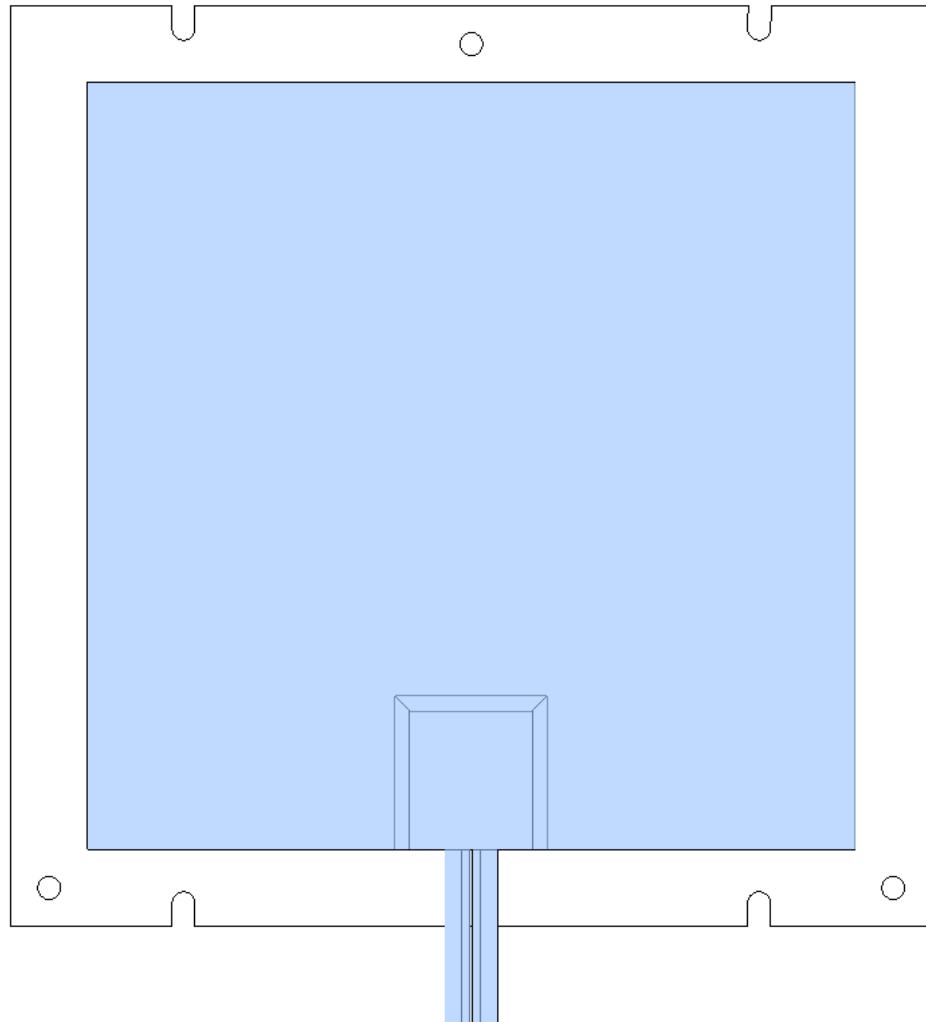
MICRON

### 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.

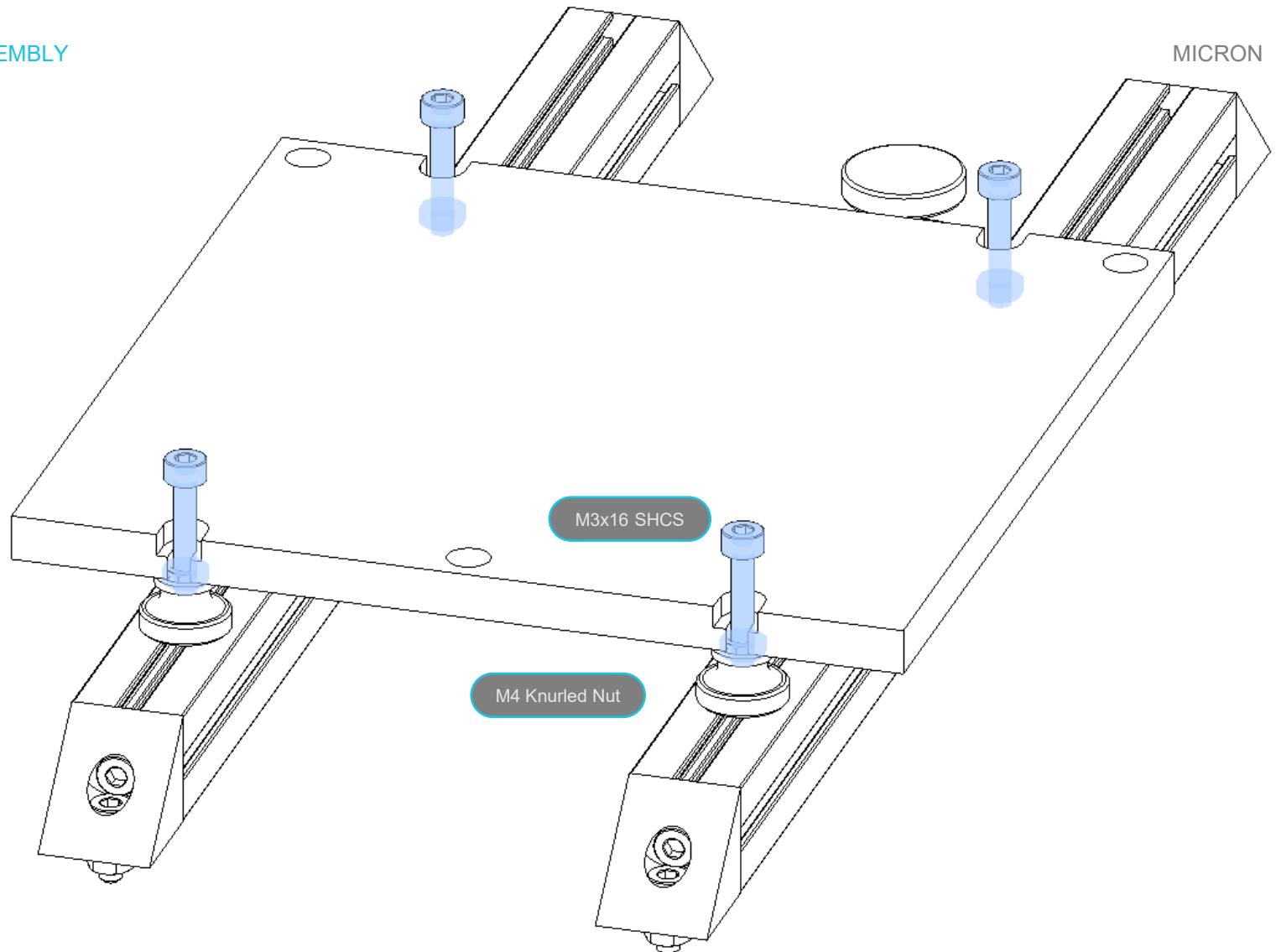
### THERMAL FUSE

If you are using an AC mains bed, it is recommended to install a thermal fuse. If you are using DC 24v bed thermal fuse is optional.



BED ASSEMBLY

MICRON

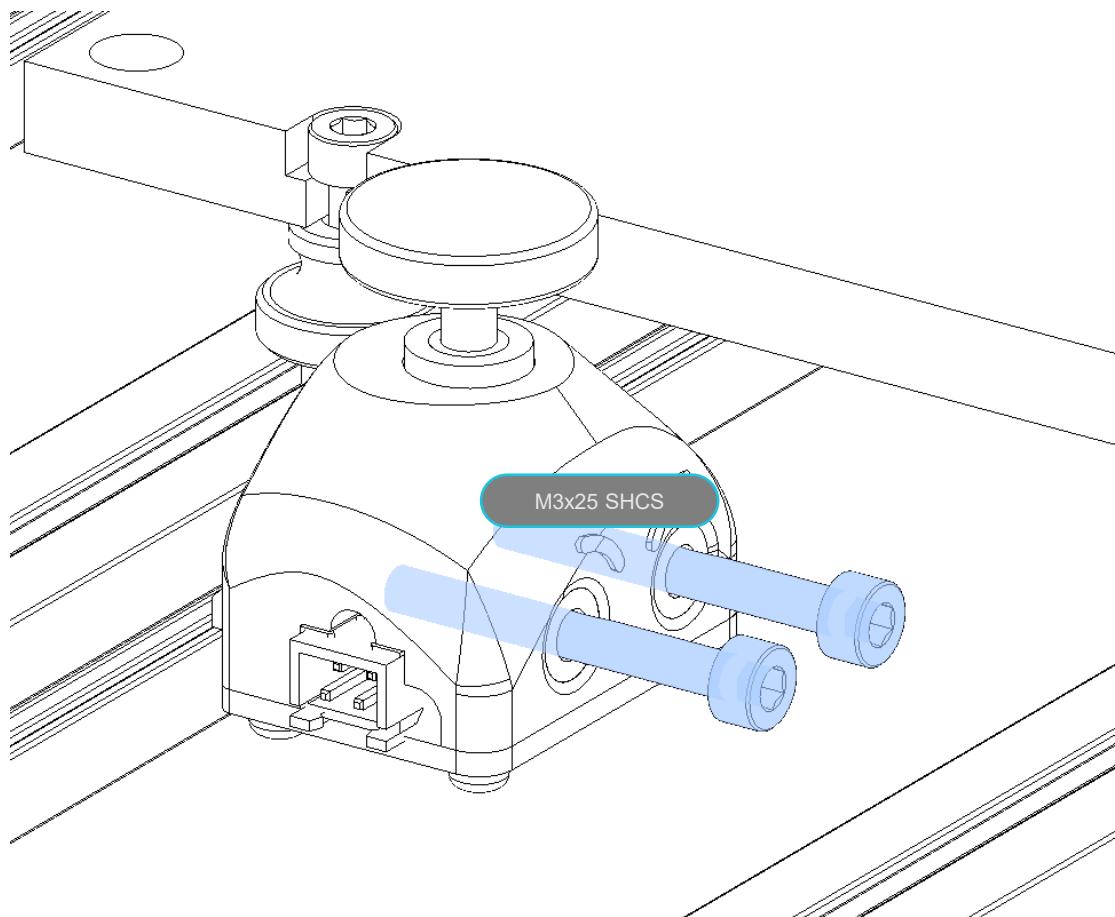


## Z ENDSTOP MOUNTING

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.



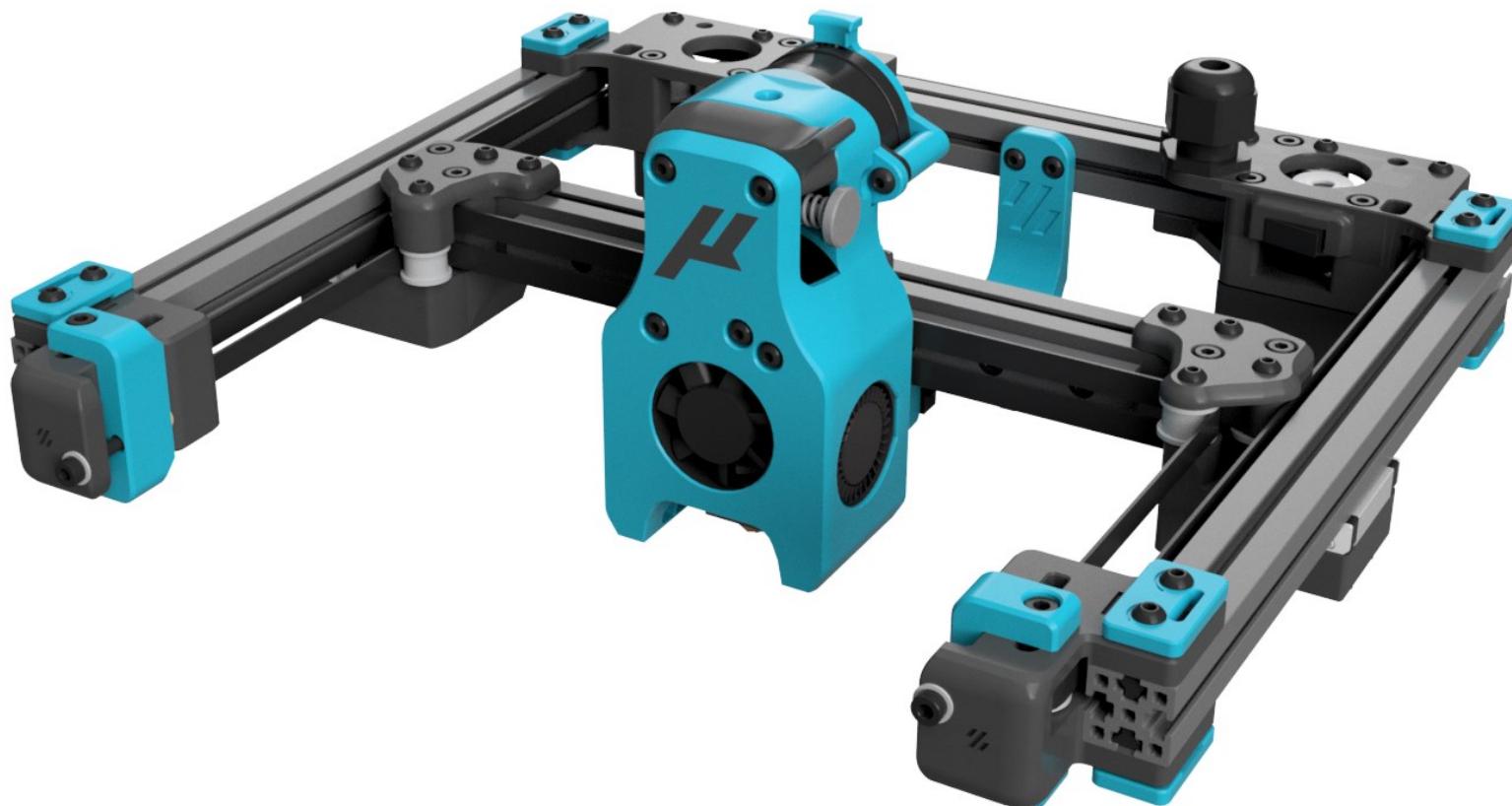
FRAME

MICRON



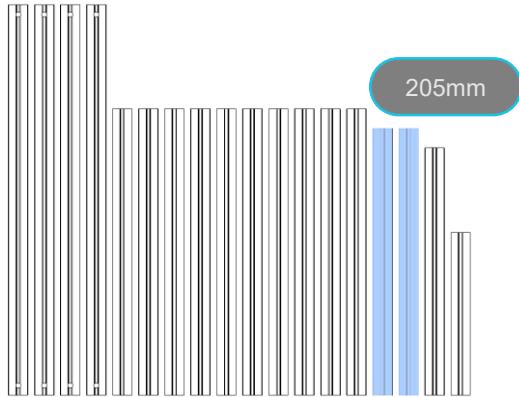
GANTRY

MICRON

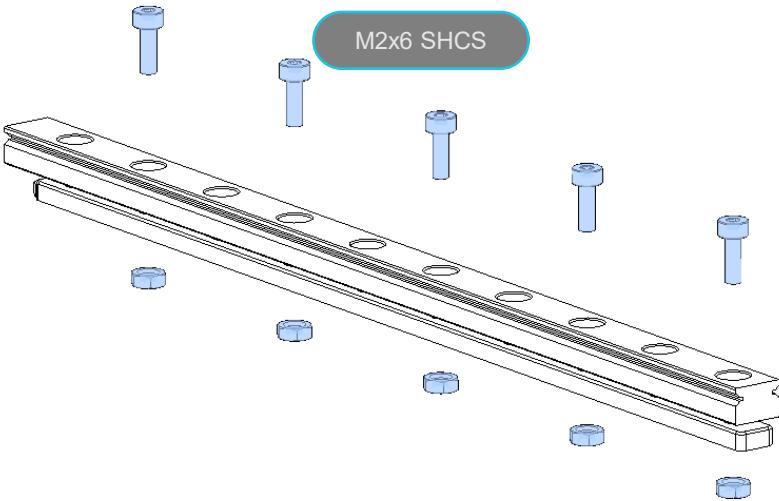


## Y AXIS LINEAR RAILS

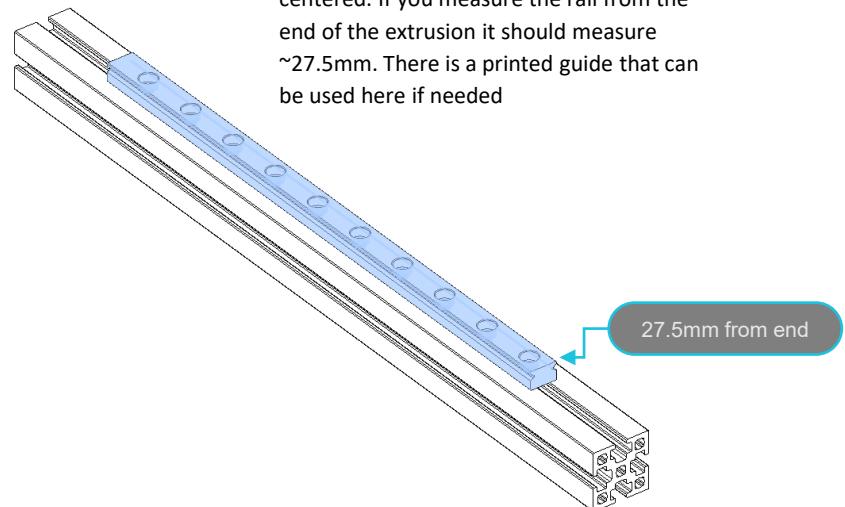
MICRON



205mm



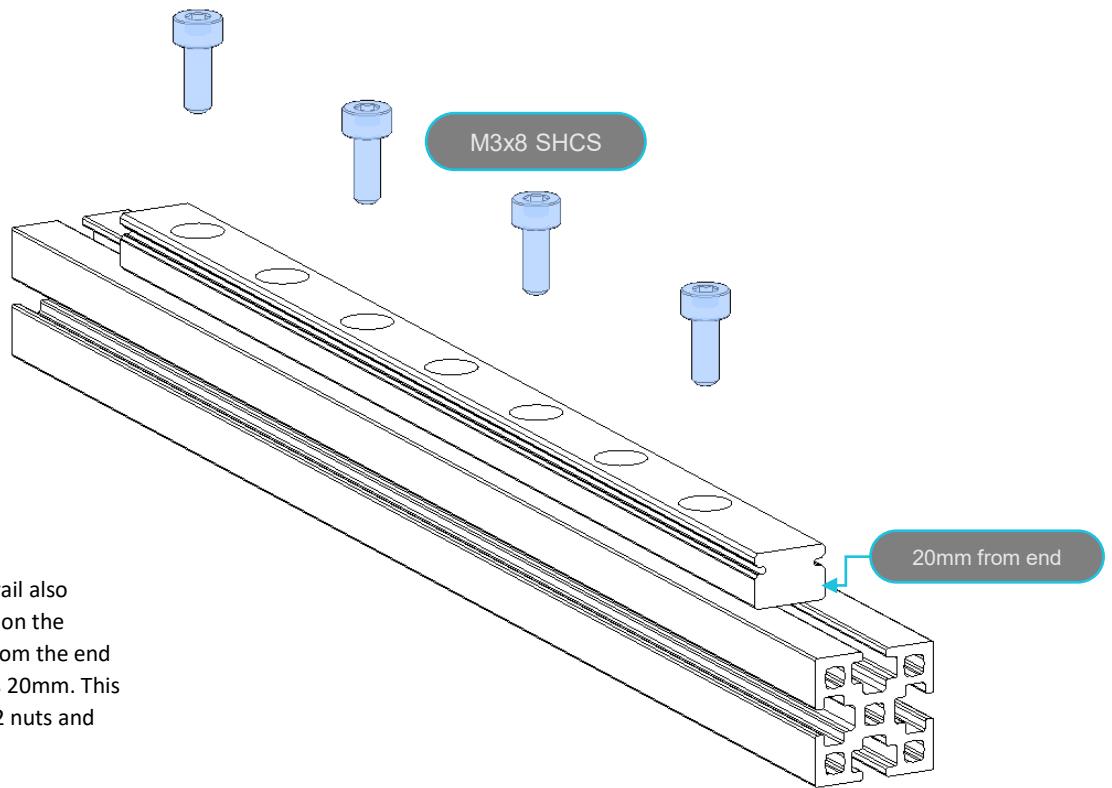
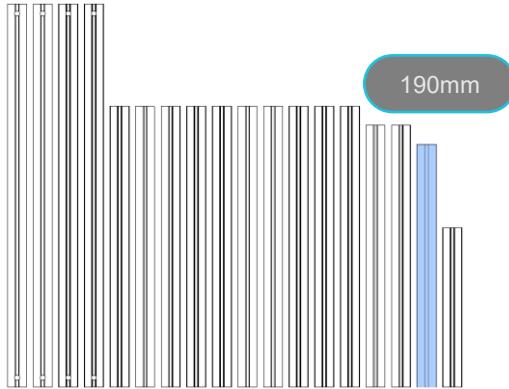
M2x6 SHCS



27.5mm from end

## X AXIS LINEAR RAIL

MICRON

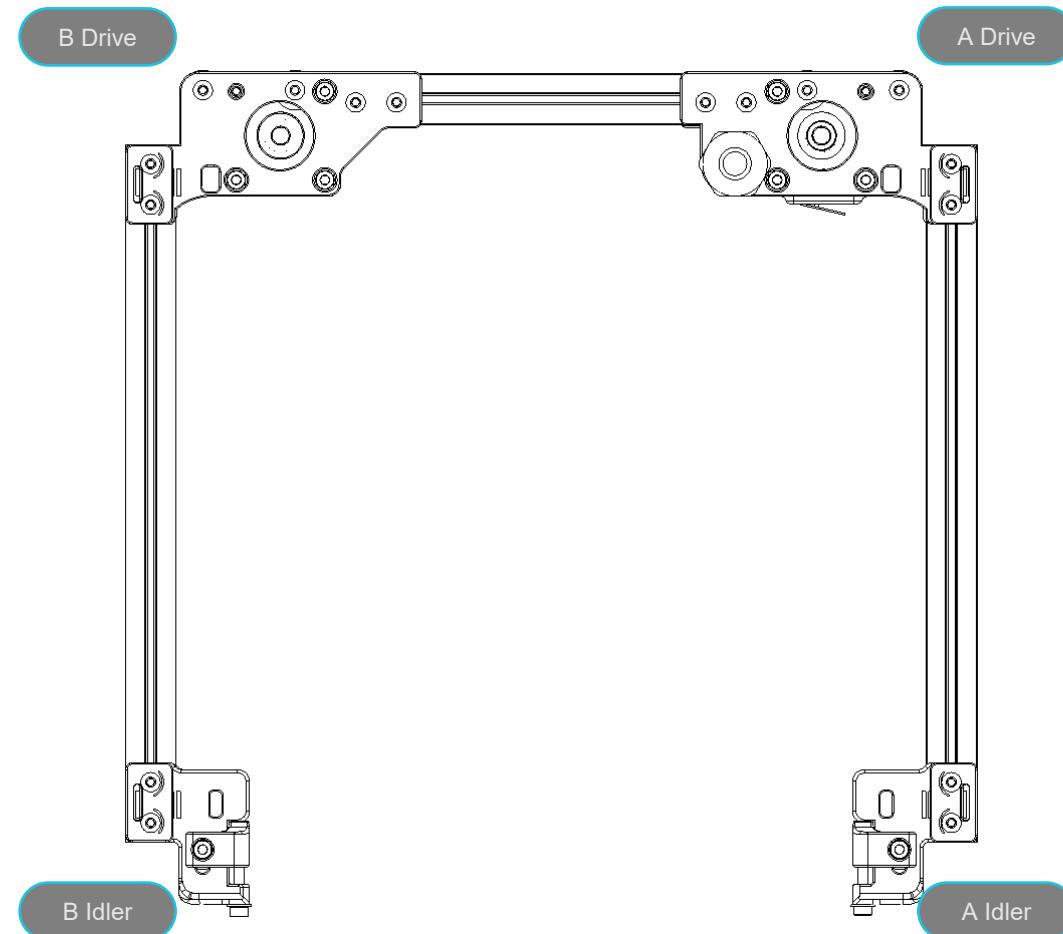


### X Axis Linear Rail

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. This uses M3 Nuts instead of the m2 nuts and printed nut bar

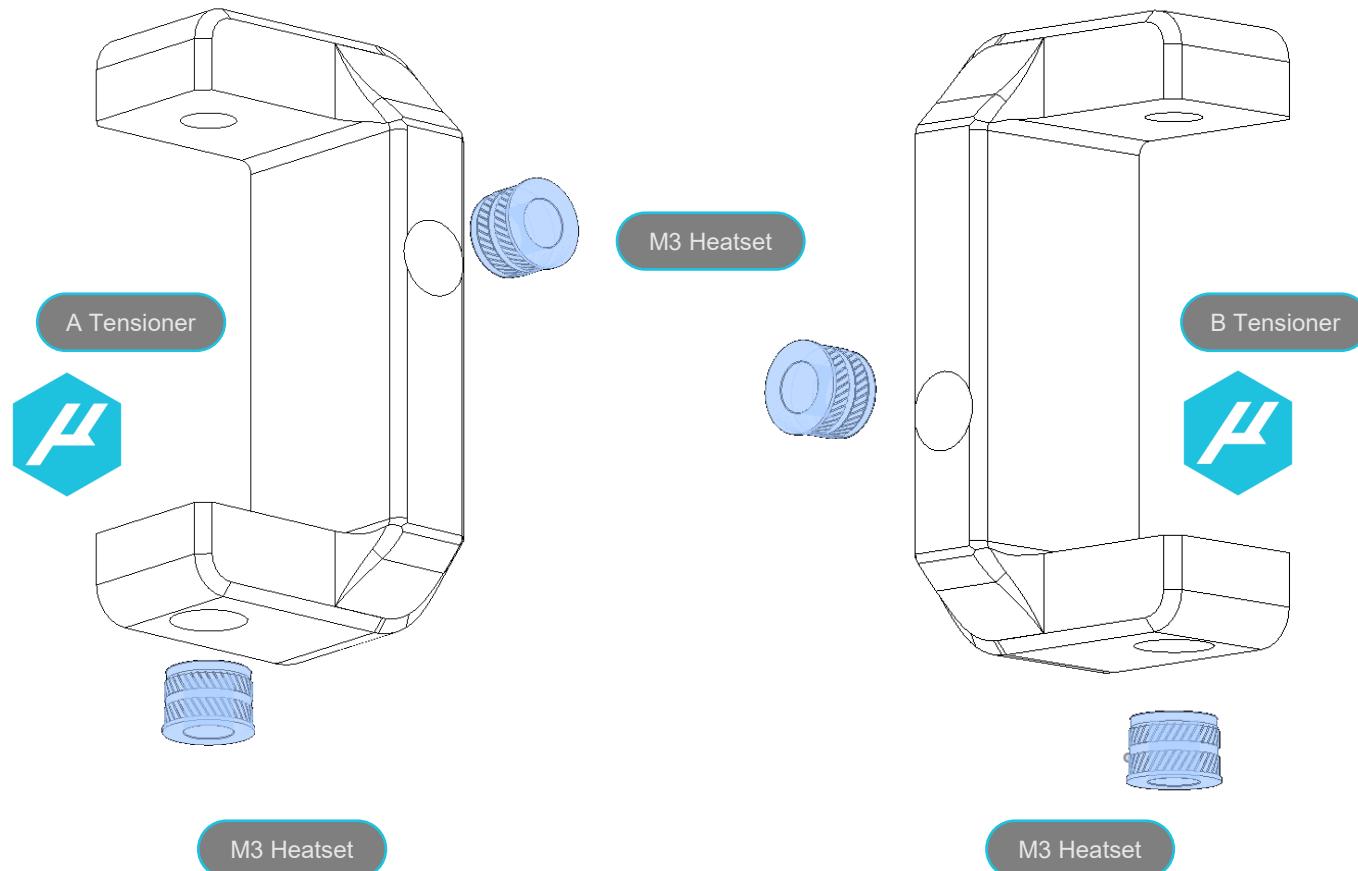
## GANTRY FRAME OVERVIEW

MICRON



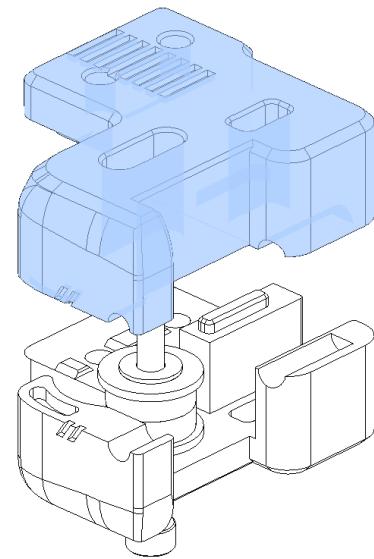
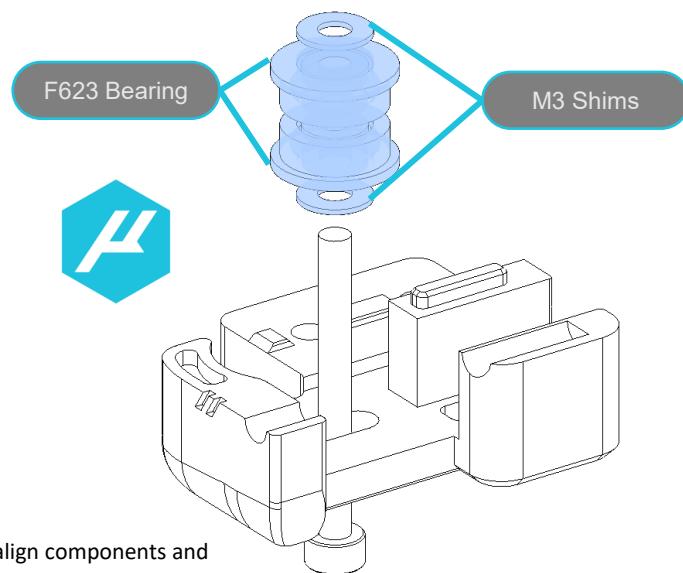
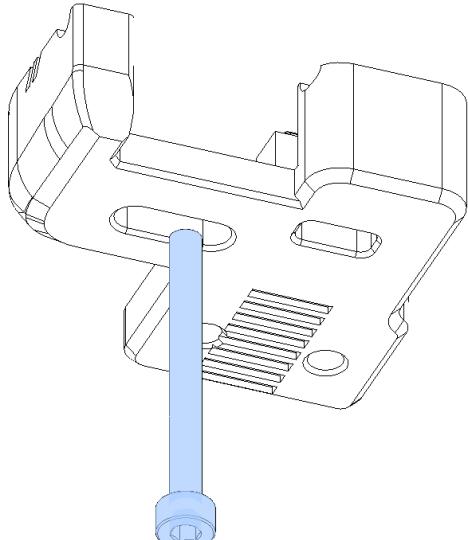
A/B IDLERS

MICRON



## A/B IDLERS

MICRON

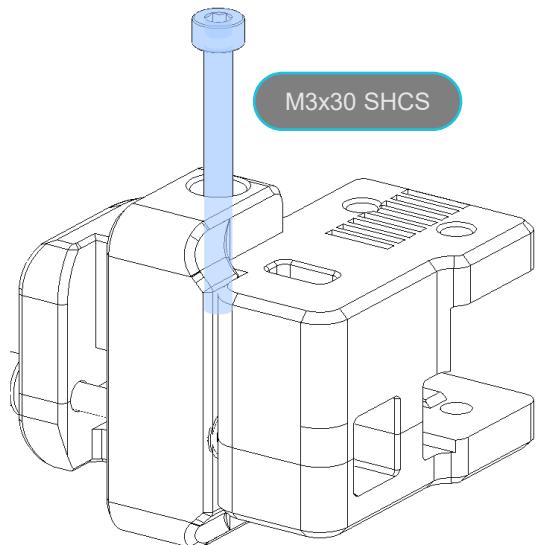
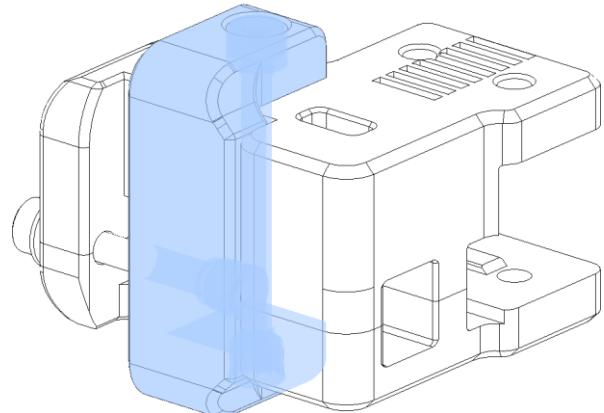


### ASSEMBLY AID

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

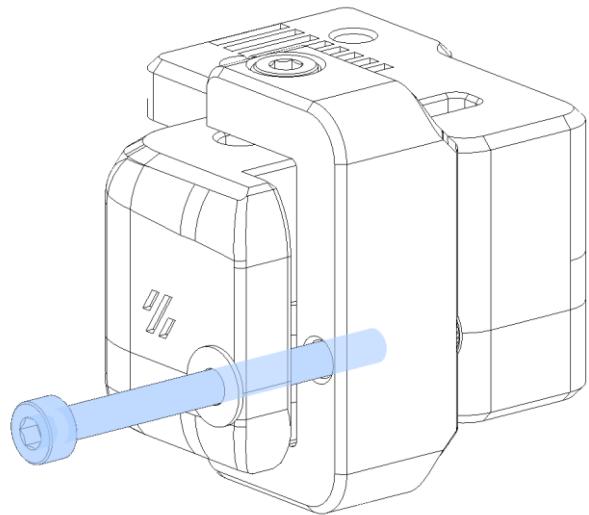
A/B IDLERS

MICRON



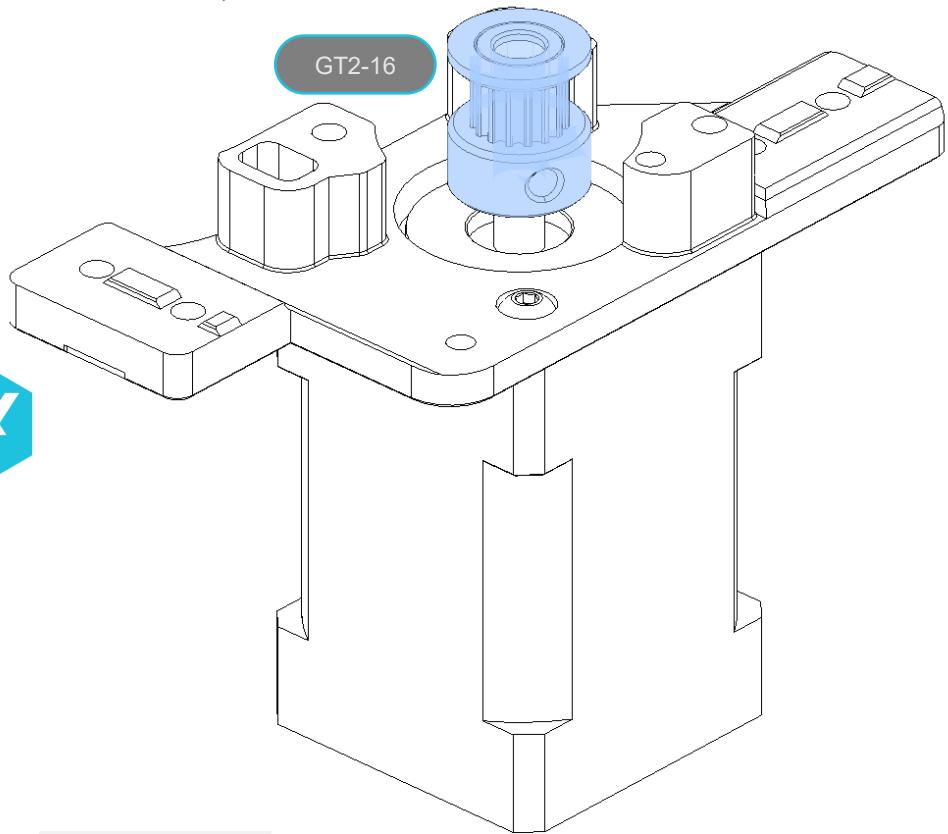
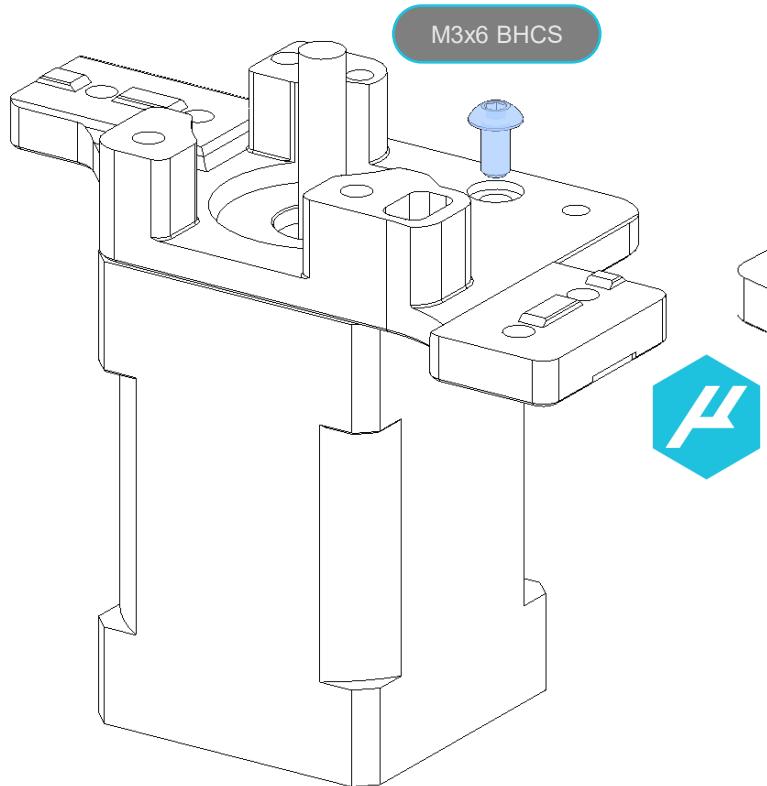
**REMOVE ASSEMBLY AID**

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



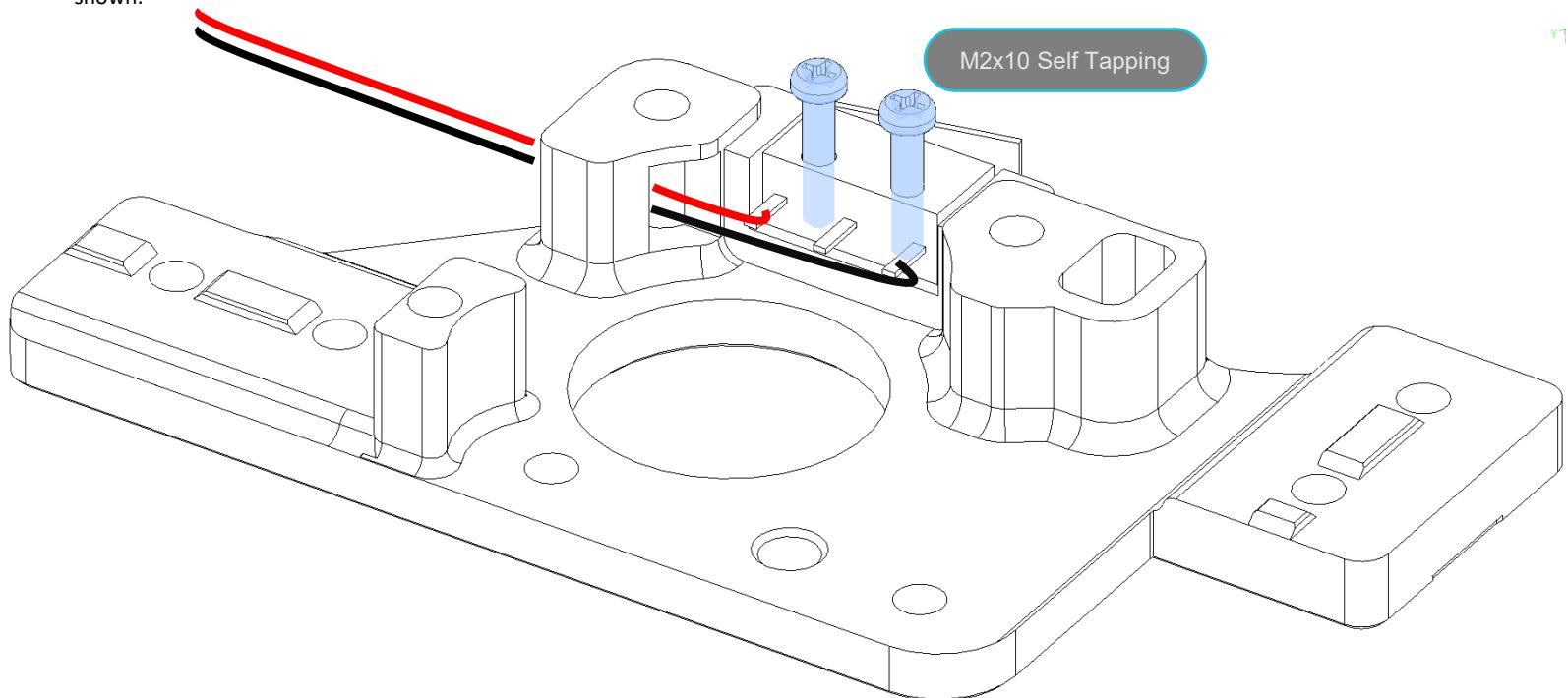
**A MOTOR PULLEY**

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.

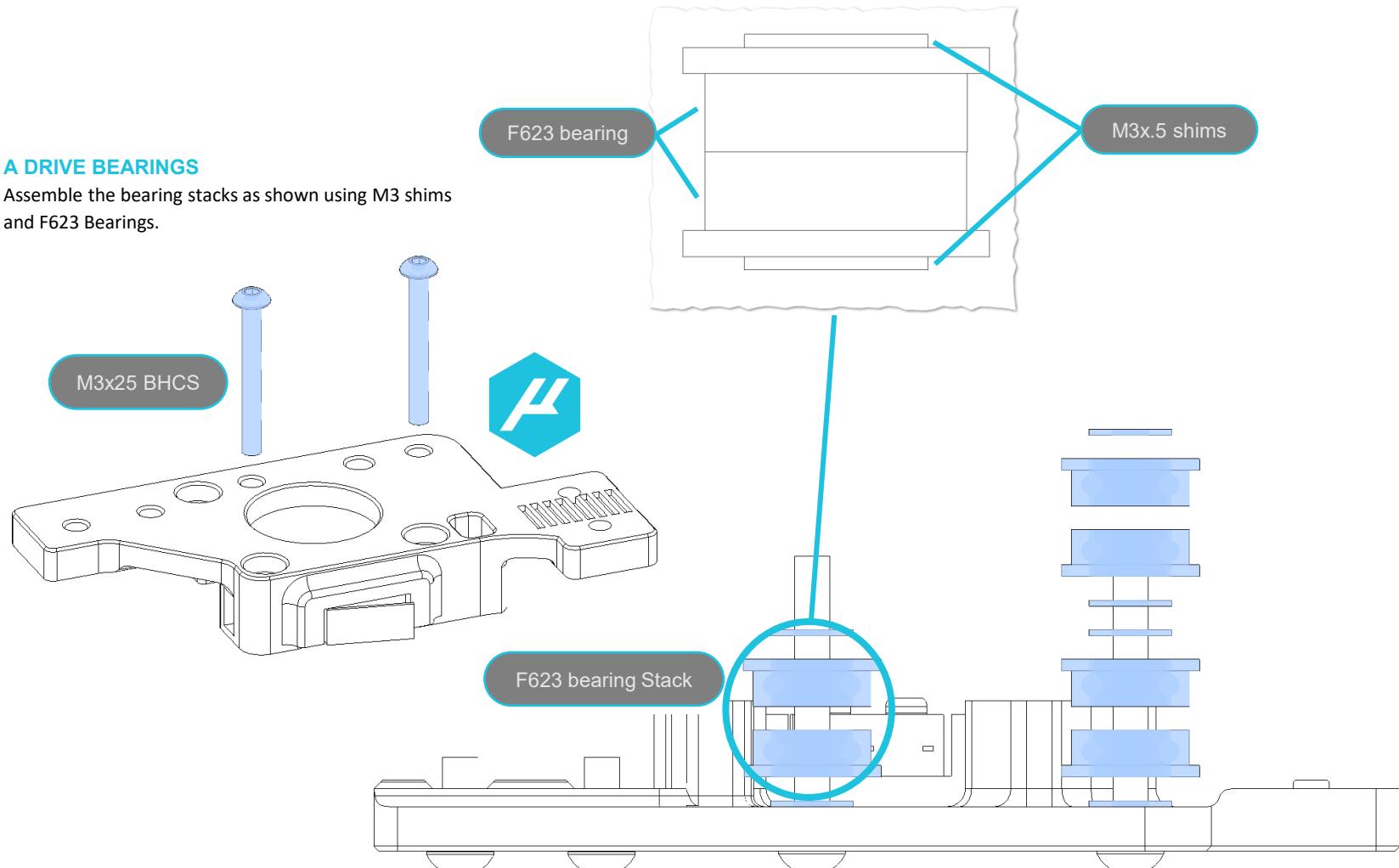


## A DRIVE CONTINUED

MICRON

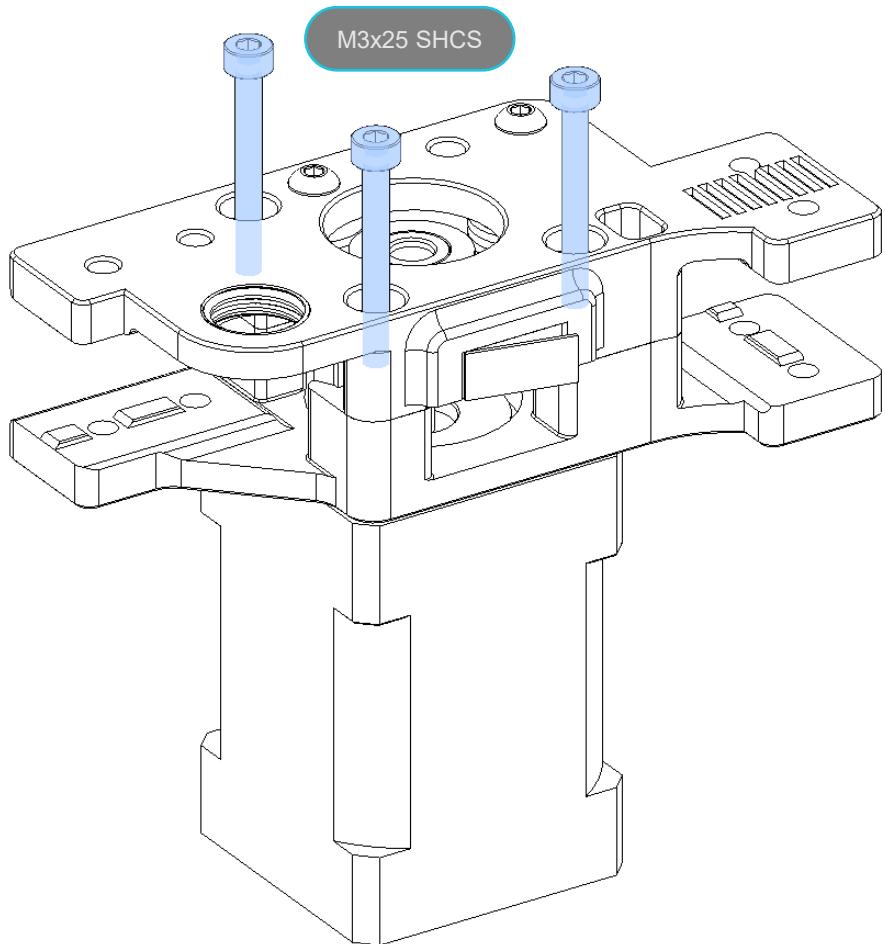
### A DRIVE BEARINGS

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



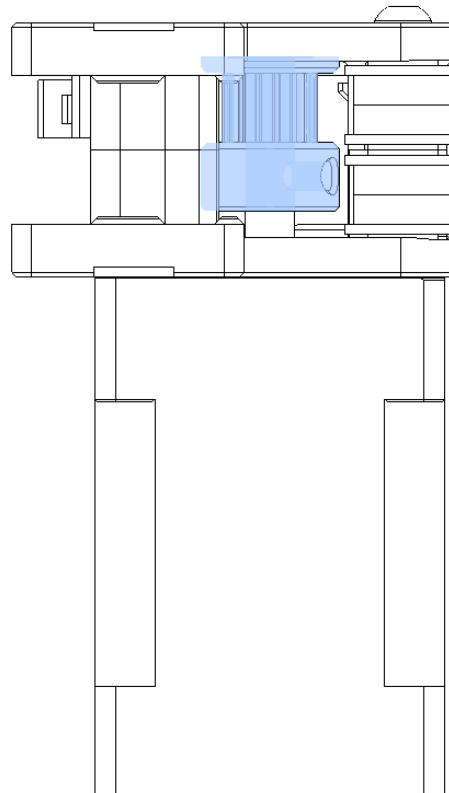
## A DRIVE CONTINUED

MICRON

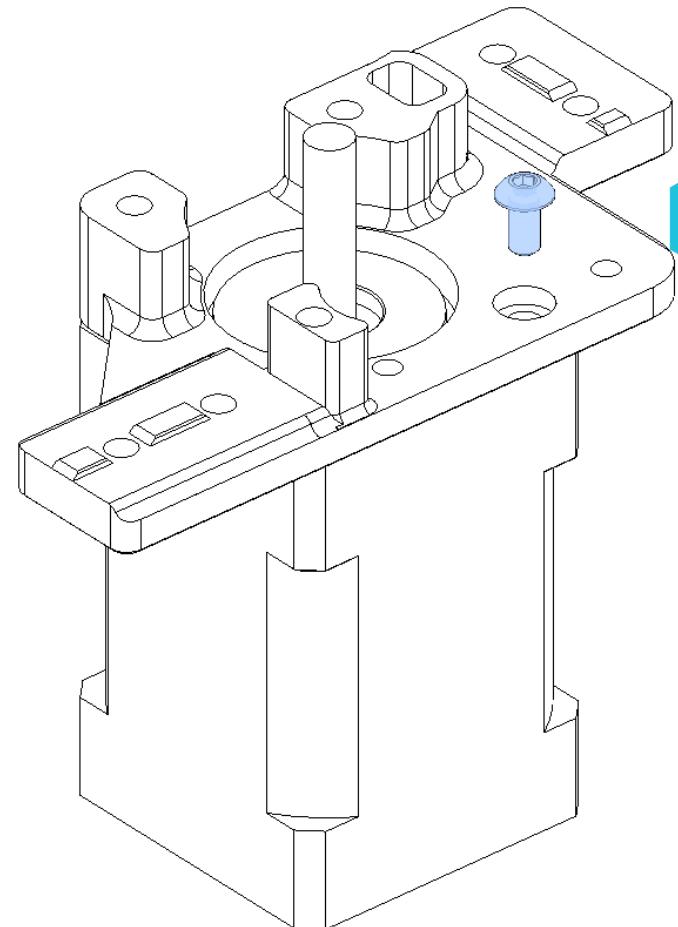


## A DRIVE PULLEY

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



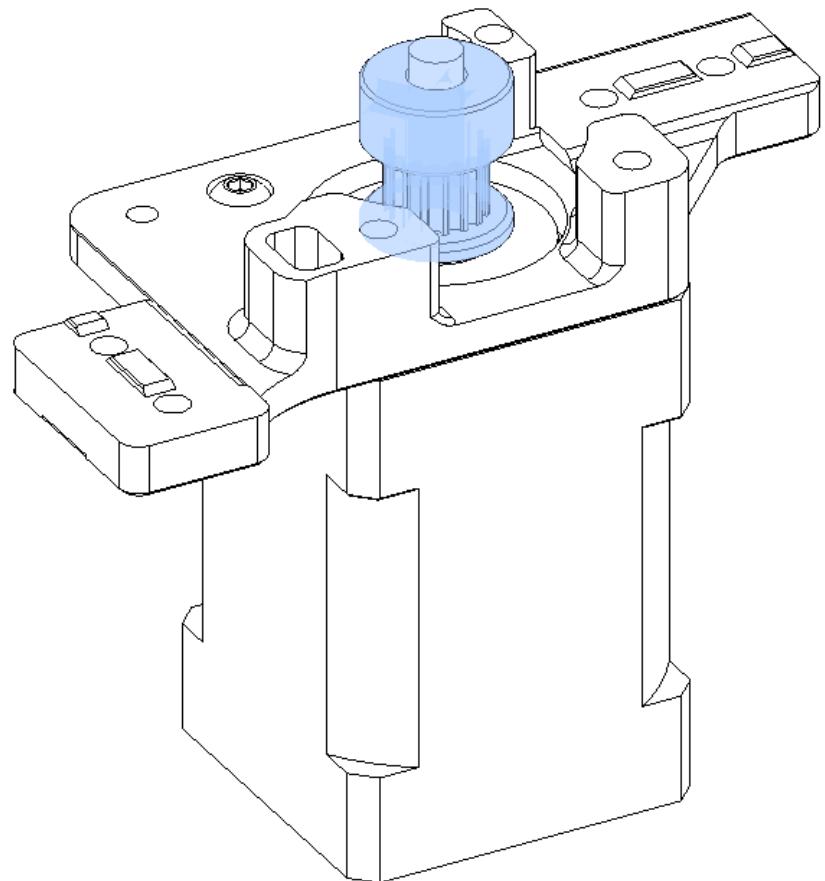
## B DRIVE



## 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

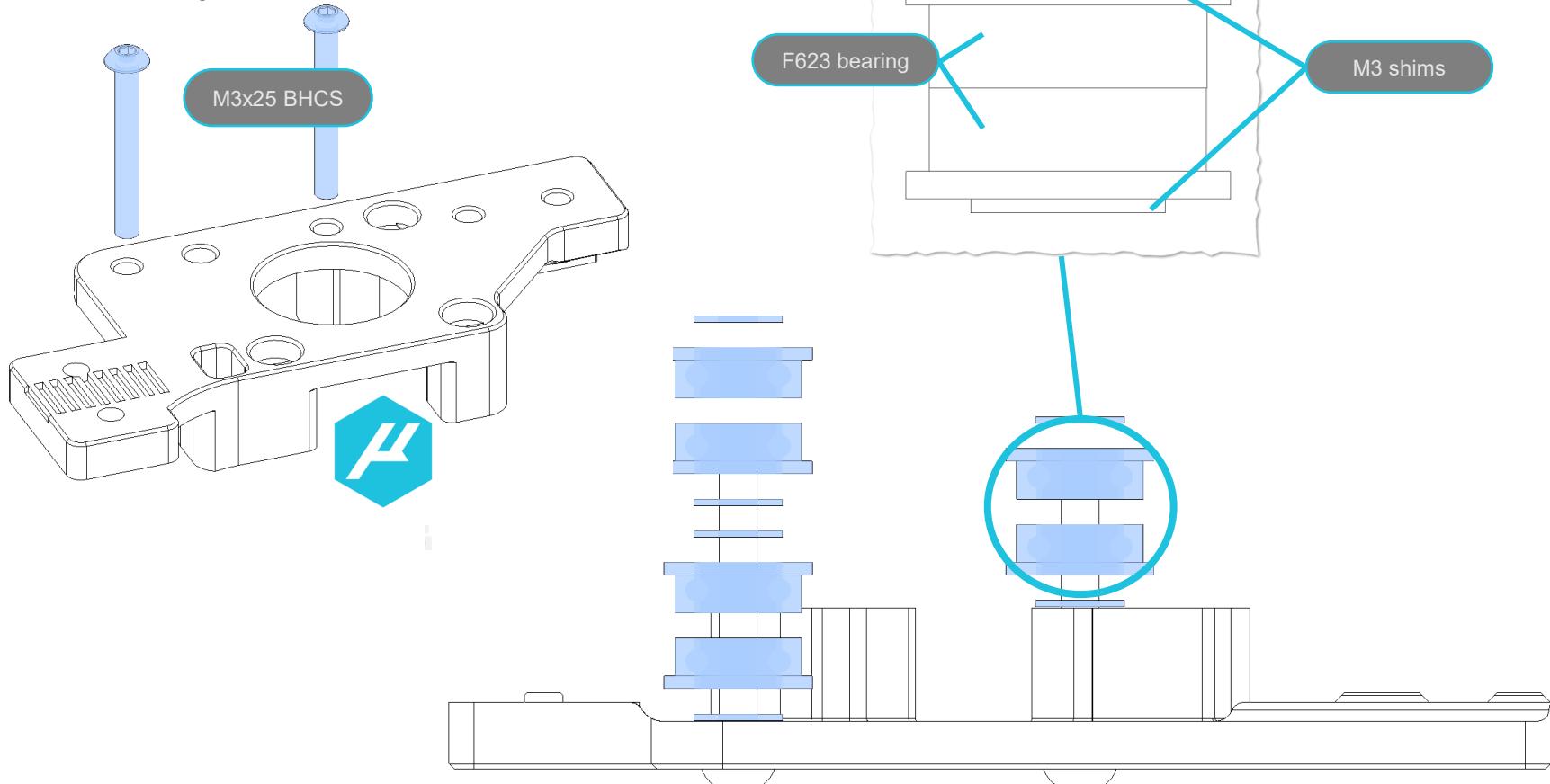


TEMPLATE

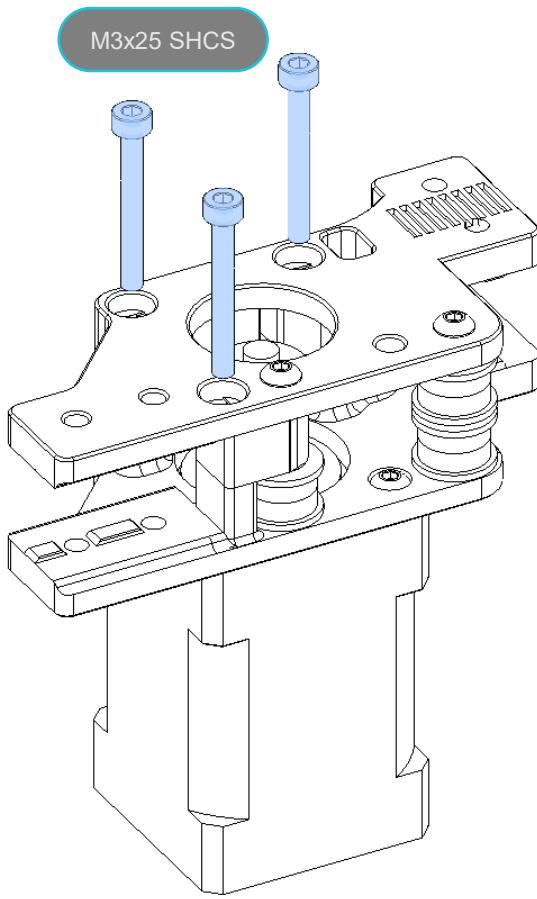
MICRON

### B DRIVE BEARINGS

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



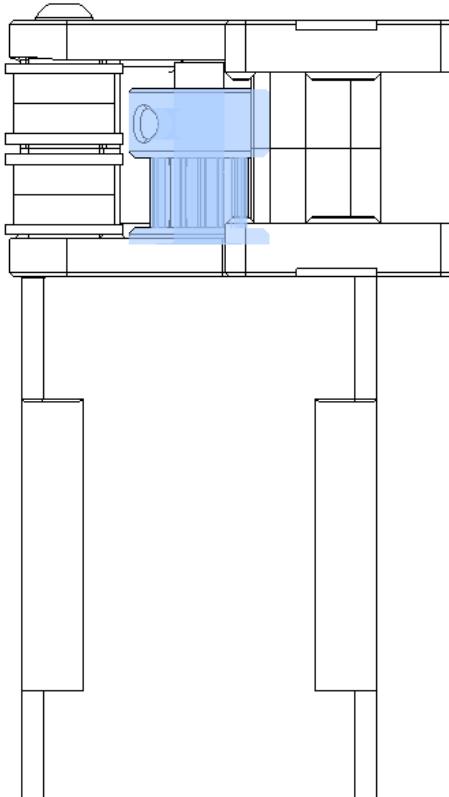
FRAME



MICRON

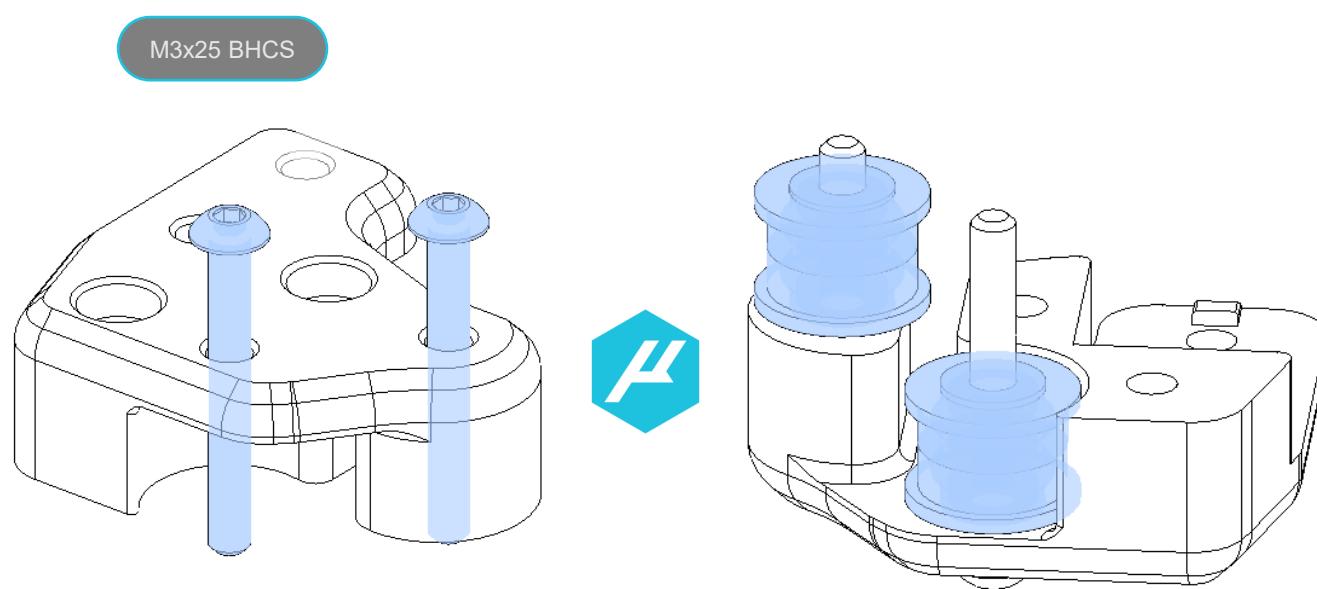
### B DRIVE PULLEY

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



## LEFT XY JOINT ASSEMBLY

MICRON

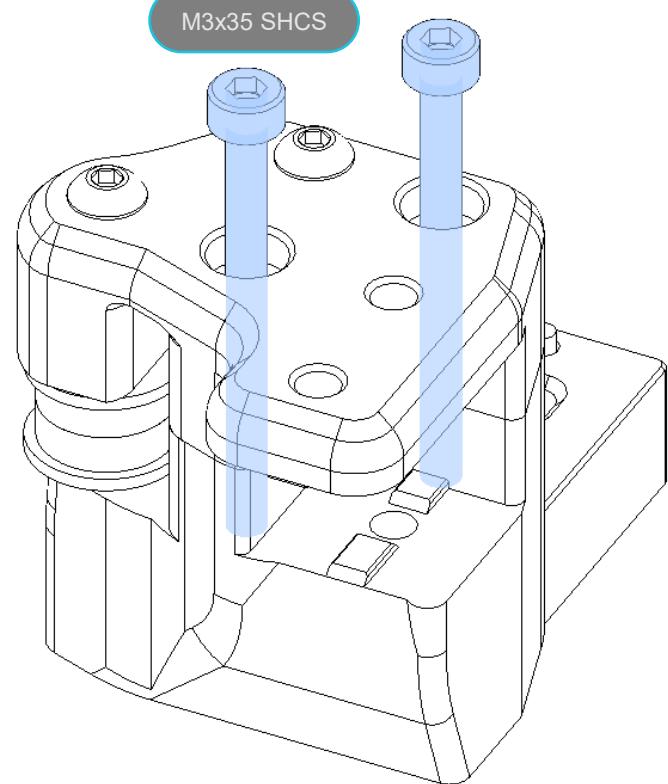
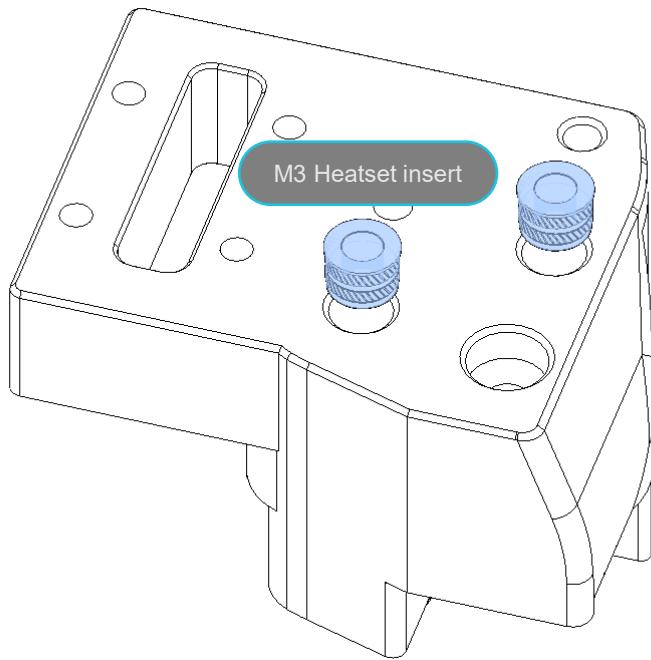


### LEFT XY JOINT BEARING STACKS

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

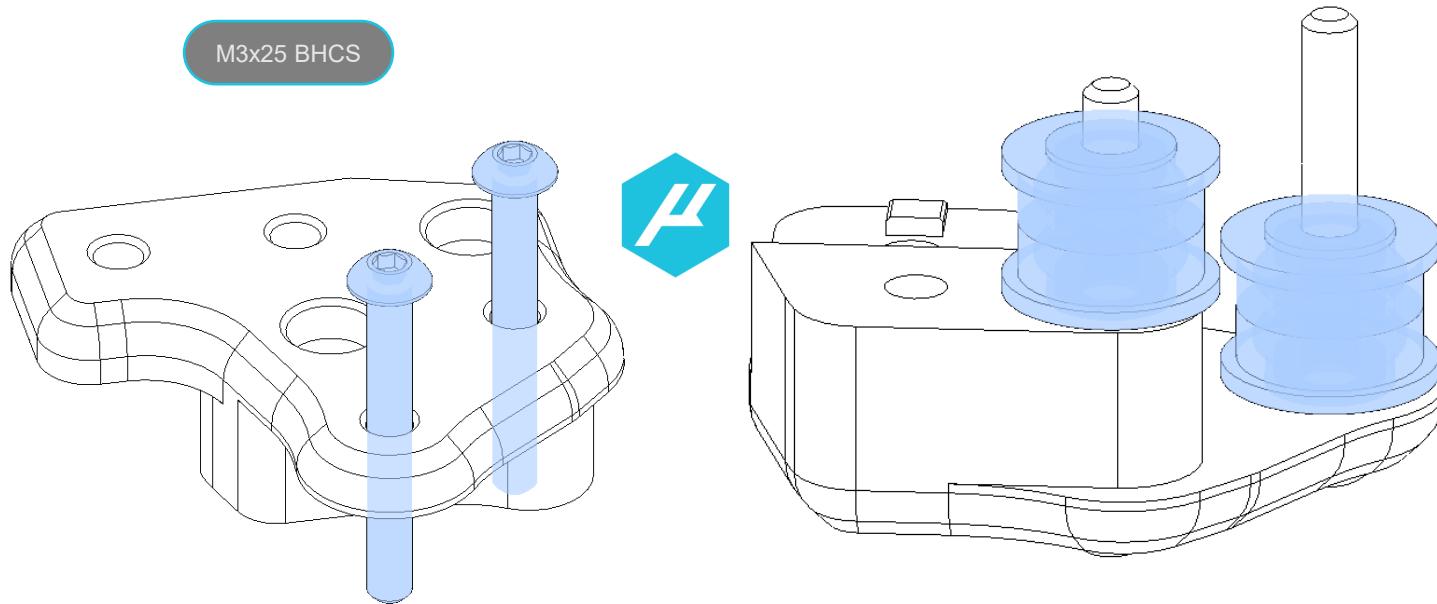
## LEFT XY JOINT CONTINUED

MICRON



## RIGHT XY JOINT

MICRON

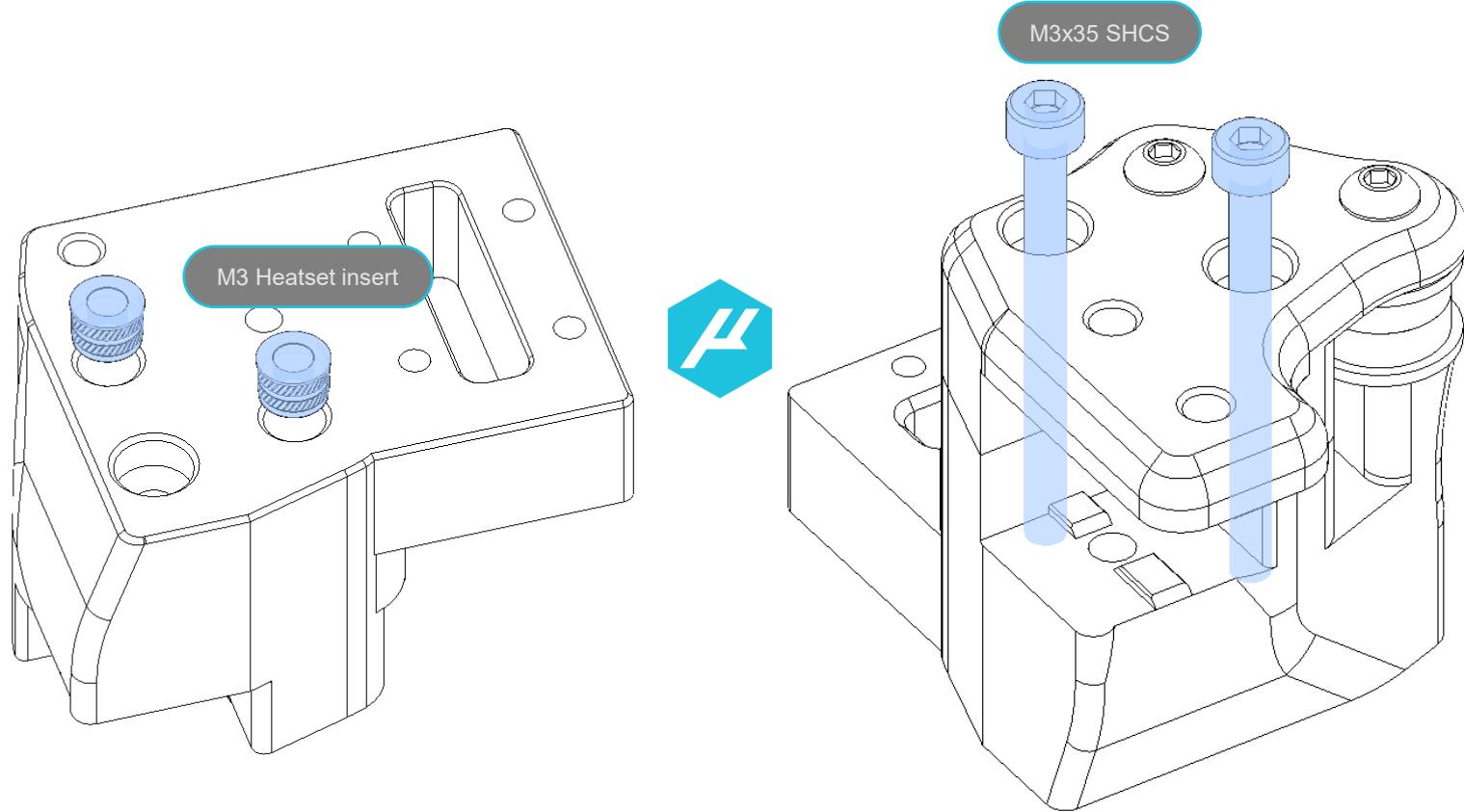


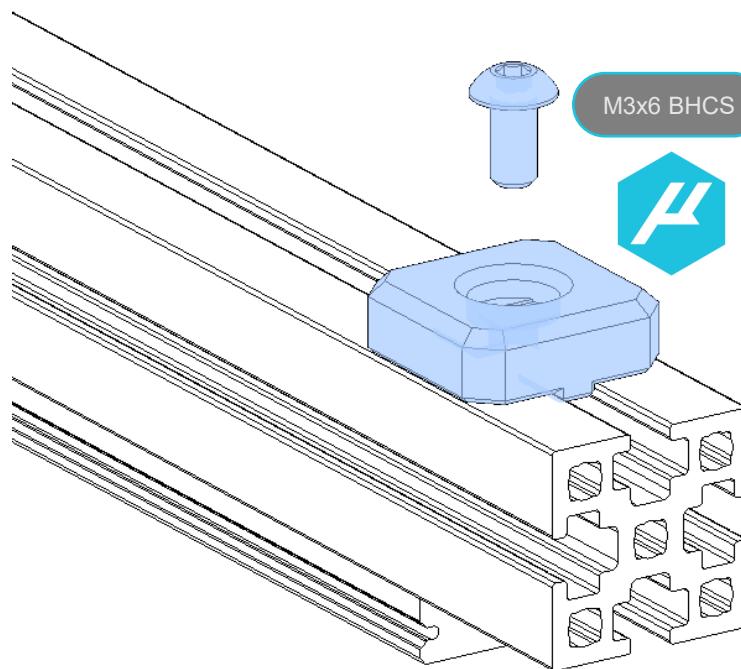
### RIGHT XY JOINT BEARING STACKS

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

## RIGHT XY JOINT CONTINUED

MICRON

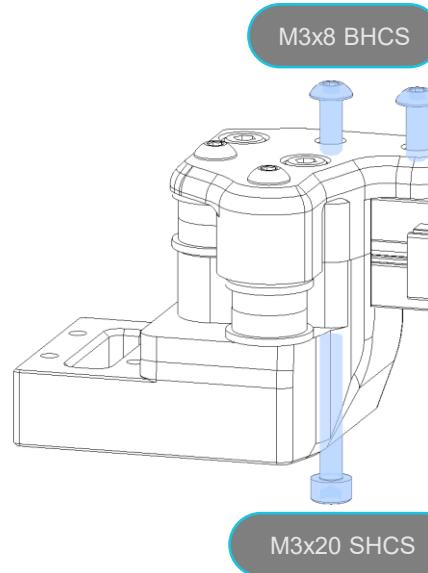




M3x6 BHCS

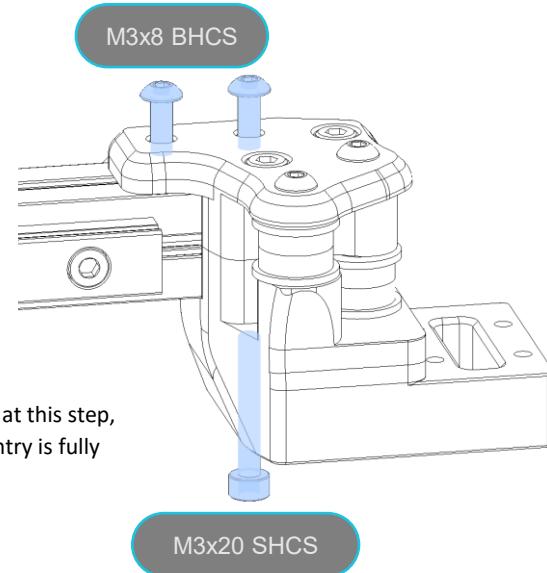
**Y Endstop extender**

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.

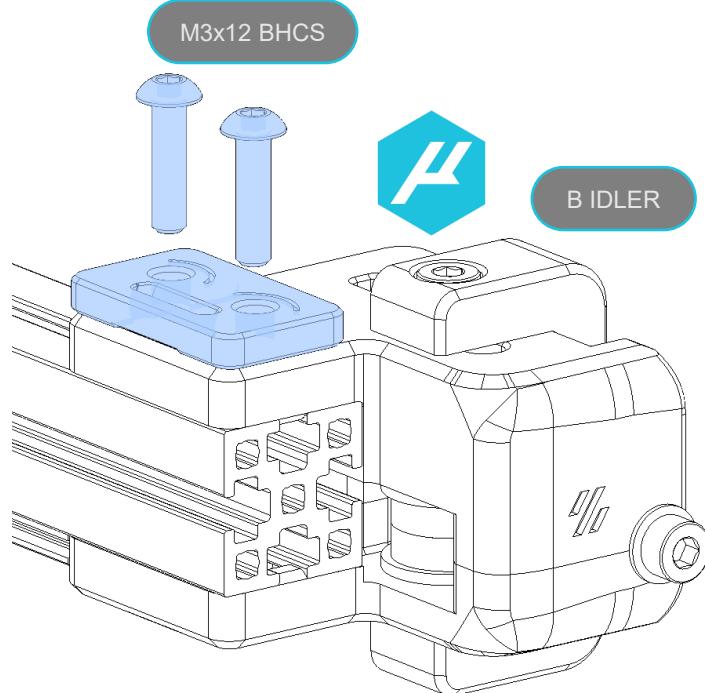


### Assembling the X axis

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



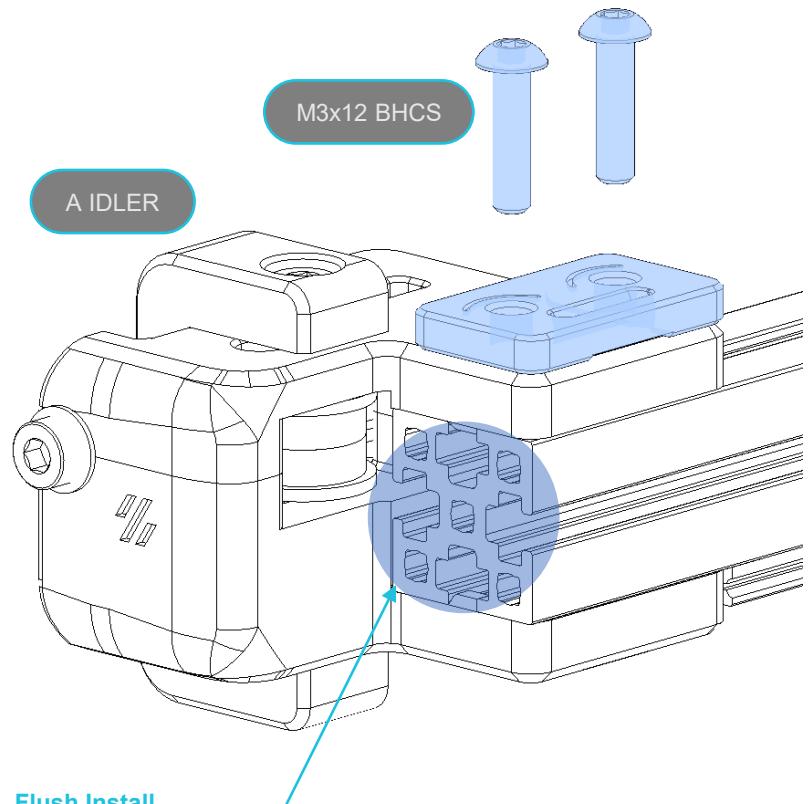
## AB IDLERS



### Belt Clamps

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

## MICRON

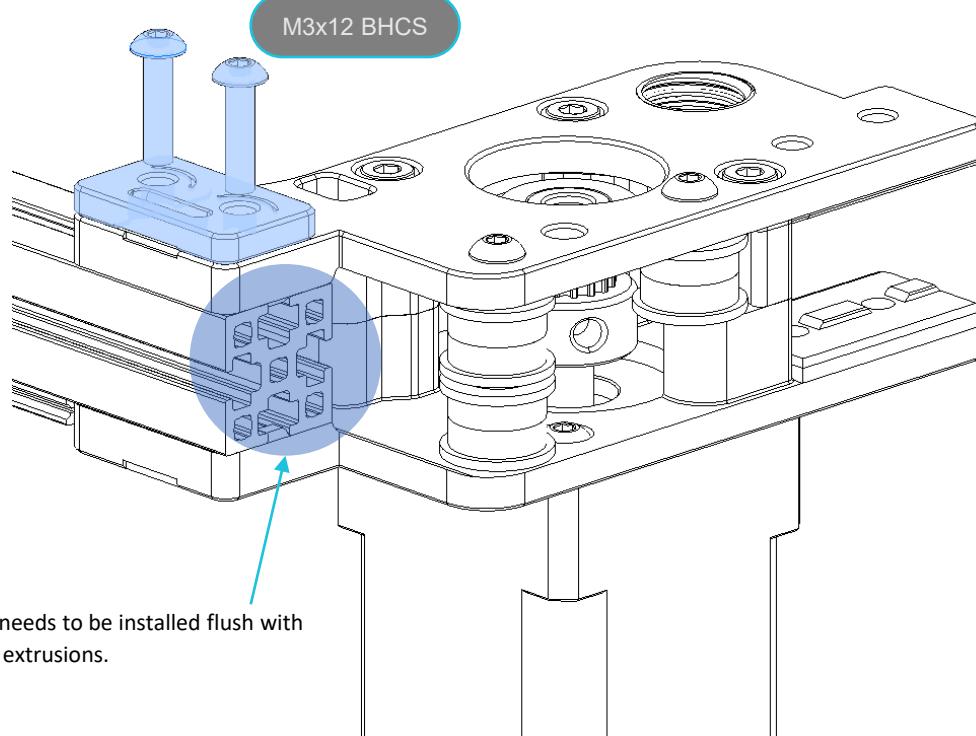


### Flush Install

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

**Belt Clamps**

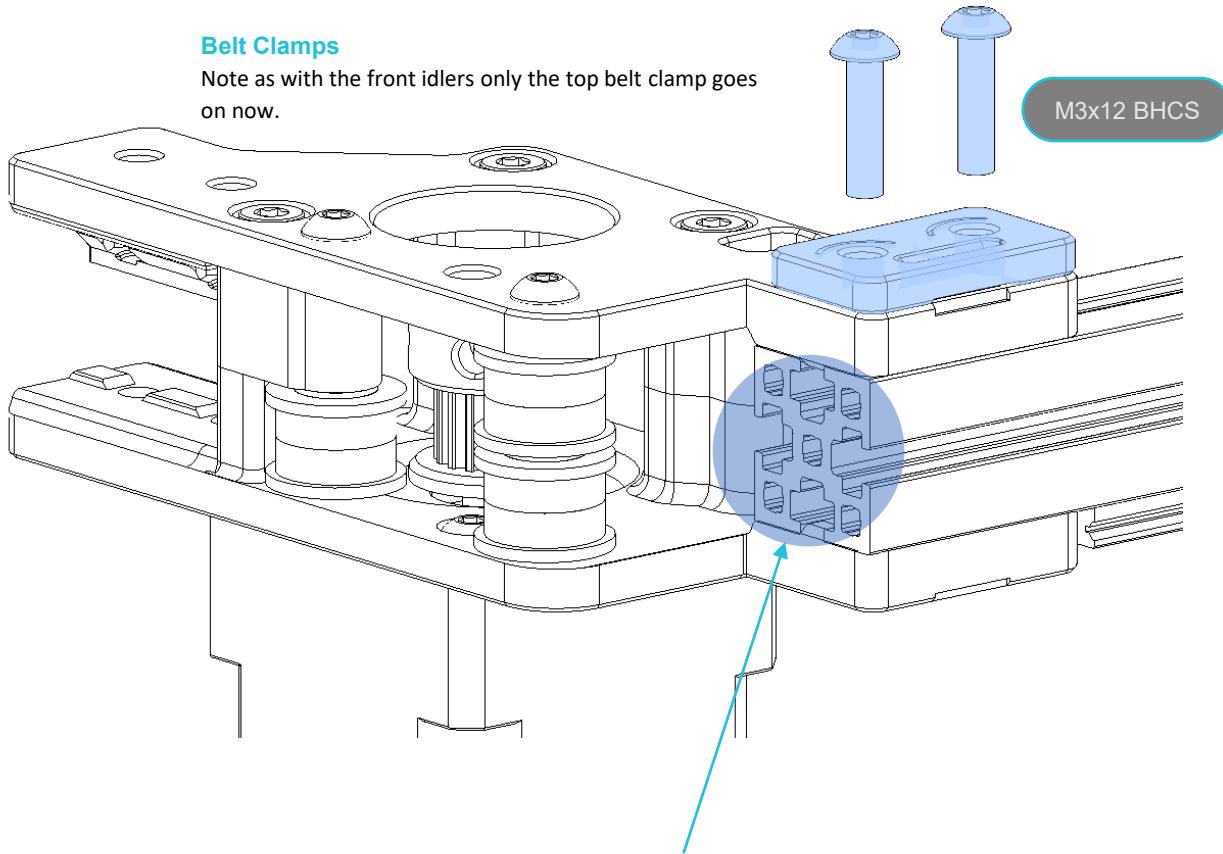
Note as with the front idlers only the top belt clamp goes on now.

**Flush Install**

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

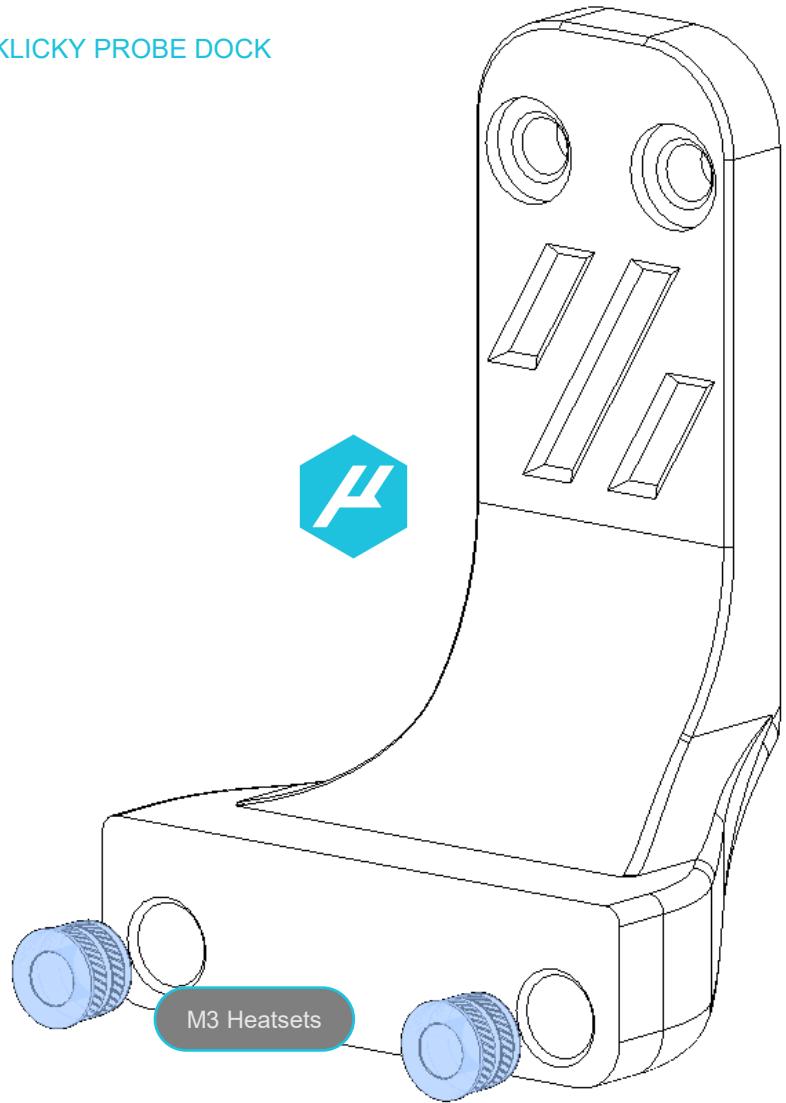
**Belt Clamps**

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.

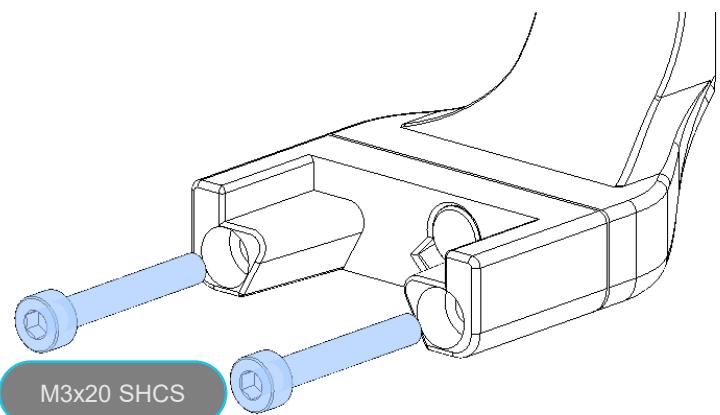
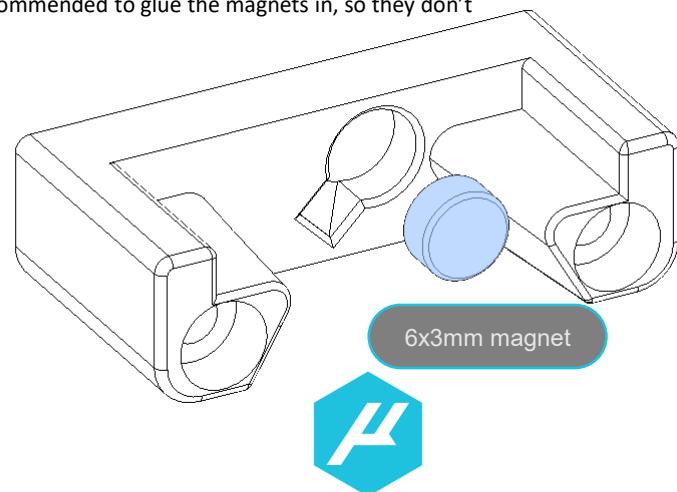
KLICKY PROBE DOCK



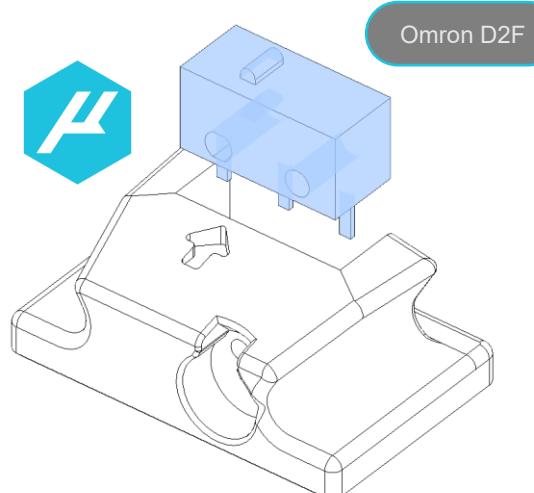
MICRON

**Magnet Install**

It is recommended to glue the magnets in, so they don't fall out.

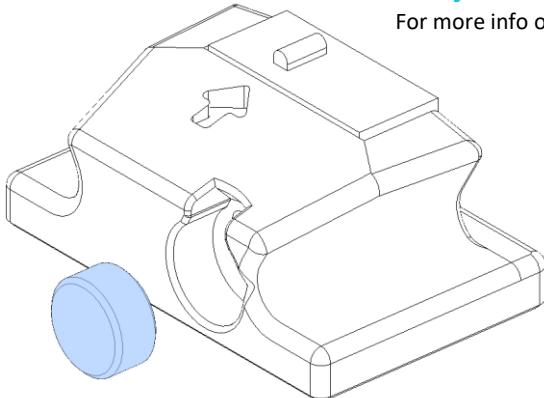


## KLICKY PROBE



### Klicky Probe

For more info on the Klicky probe , click here!

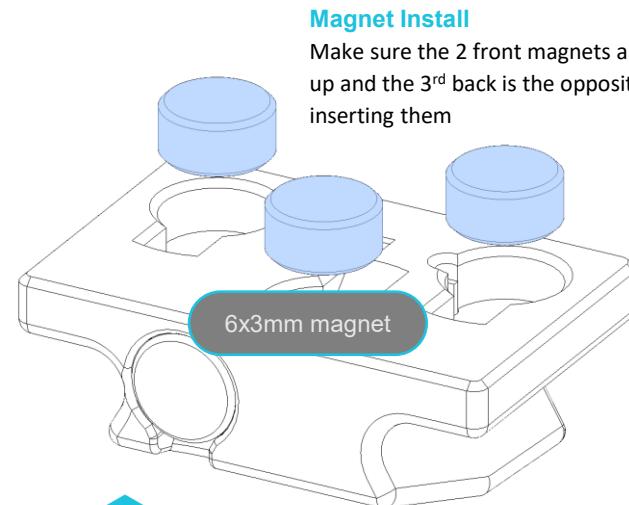


6x3mm magnet

### Don't forget!

Don't forget to glue the magnets in!

## MICRON



### Magnet Install

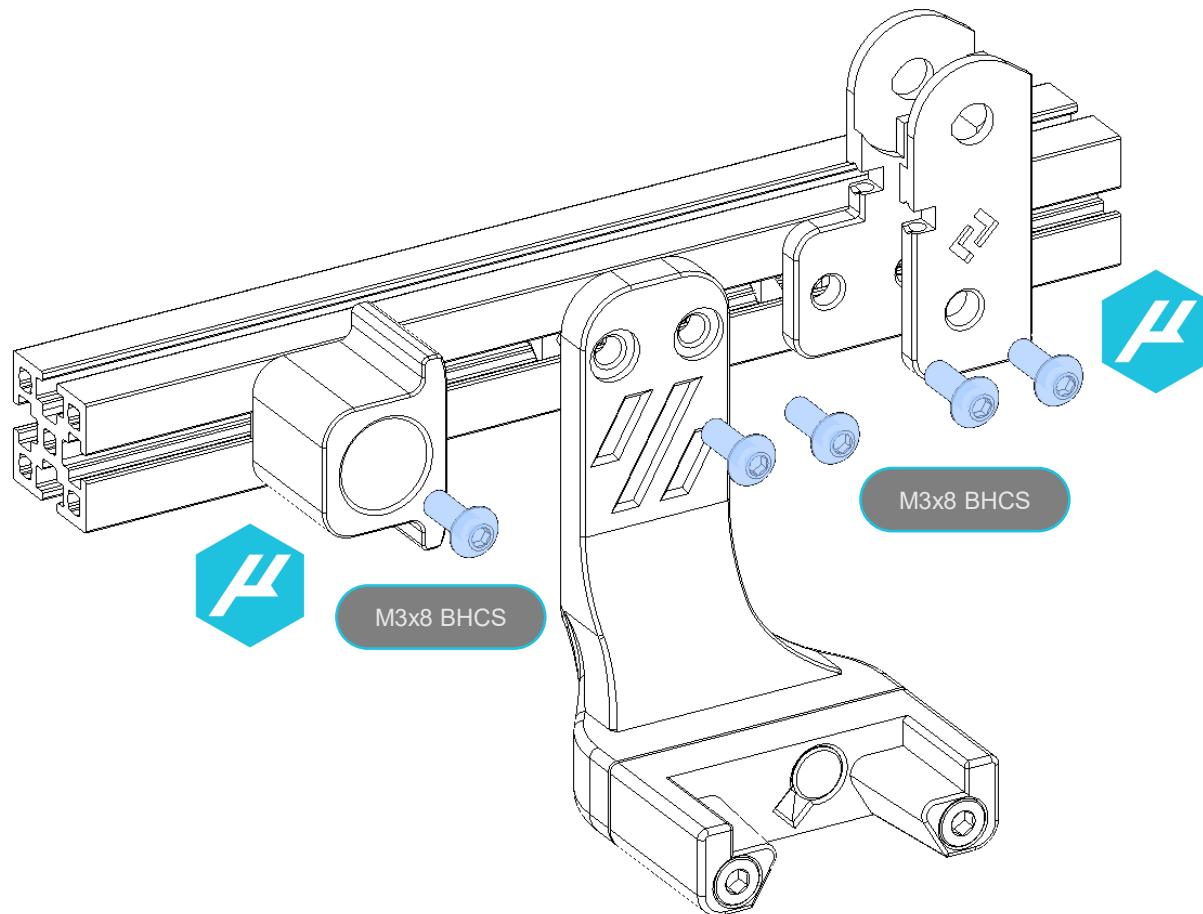
Make sure the 2 front magnets are facing the same way up and the 3<sup>rd</sup> back is the opposite and use glue when inserting them

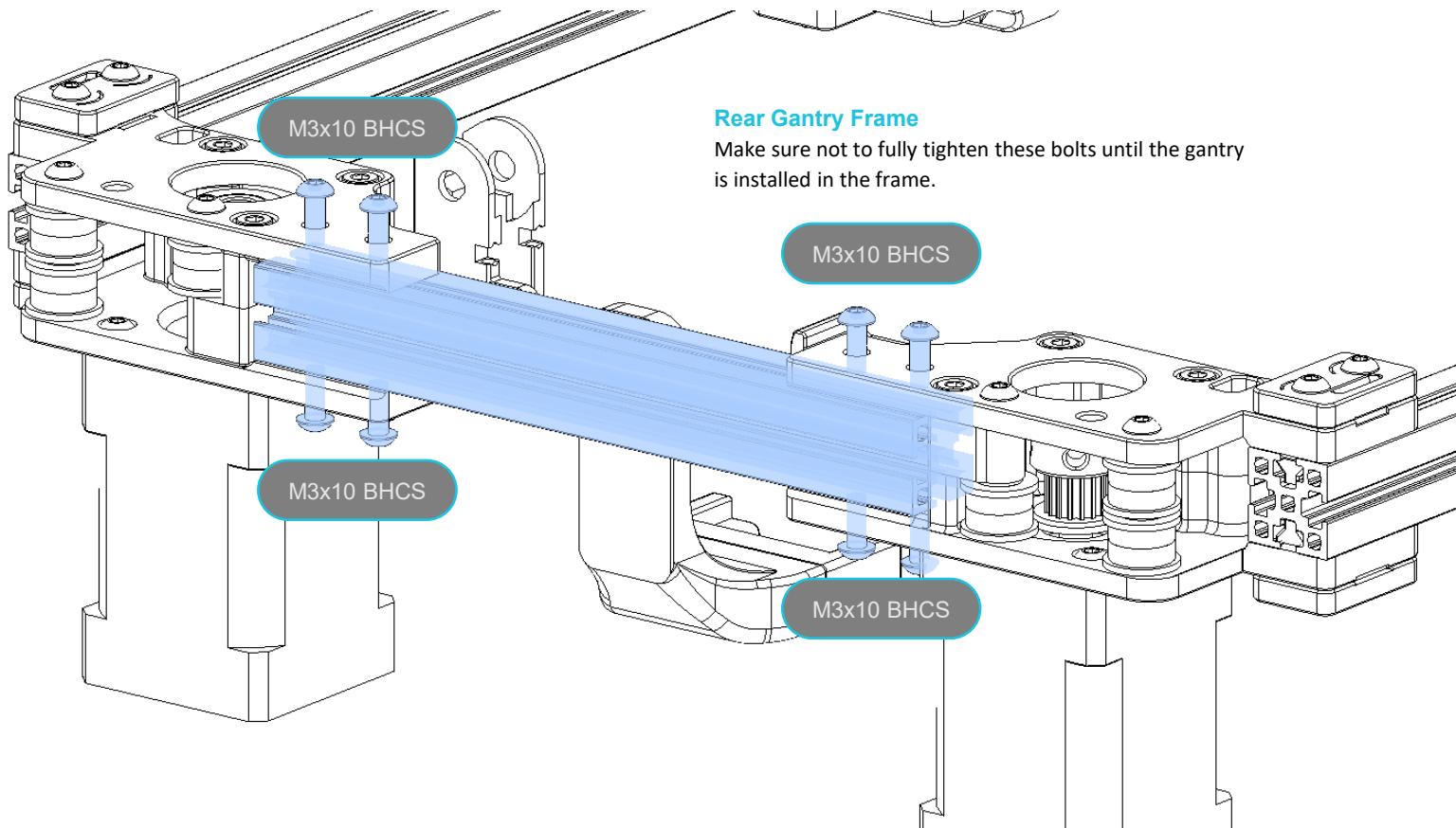


M2x10 Self Tapping

## REAR GANTRY FRAME

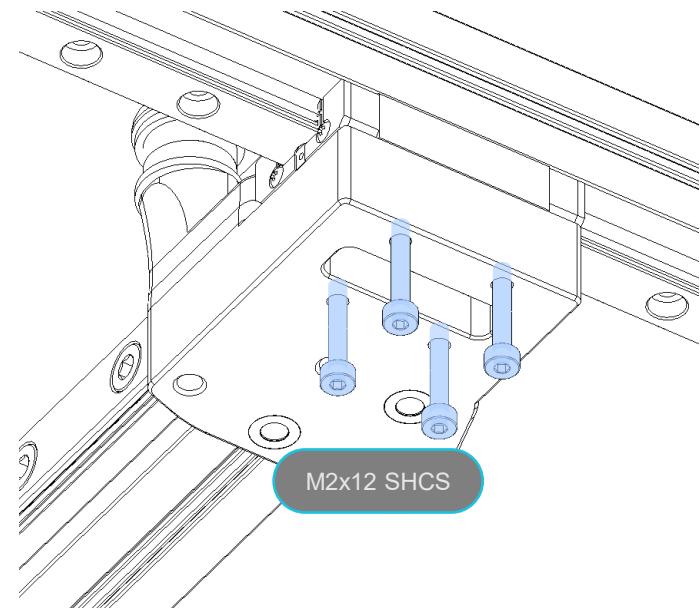
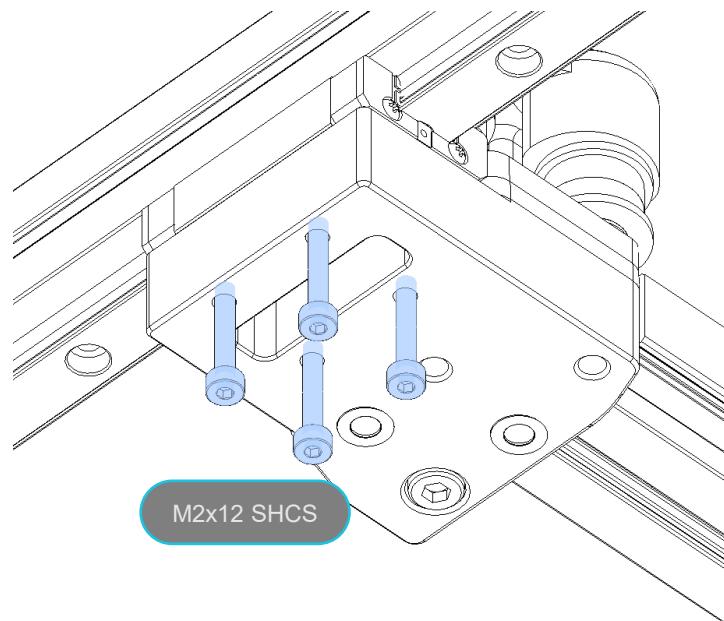
MICRON





**X Axis installation**

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

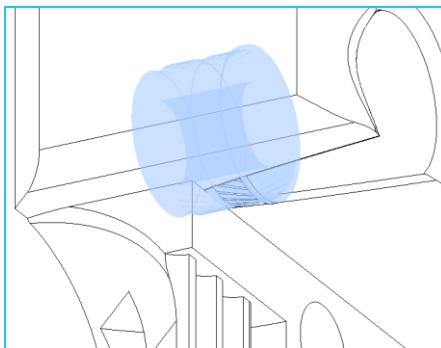
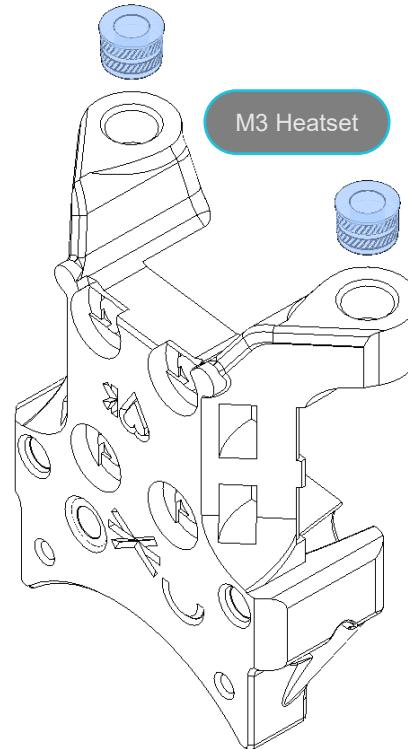
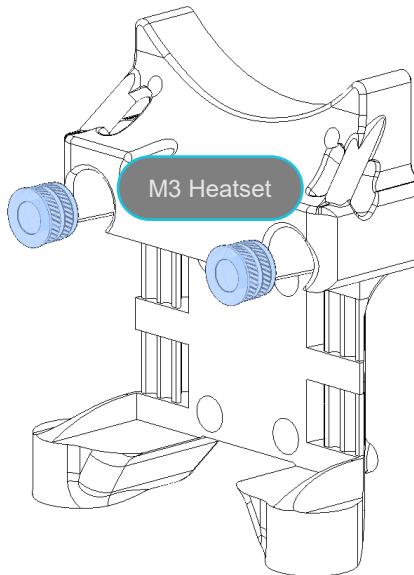
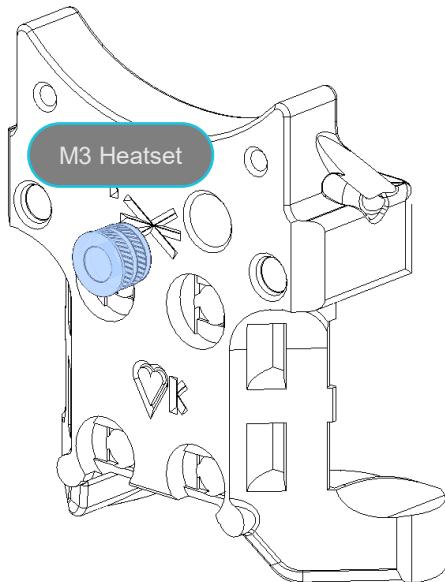


## X CARRAIGE

## MICRON

### Prepare the X Carriage

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

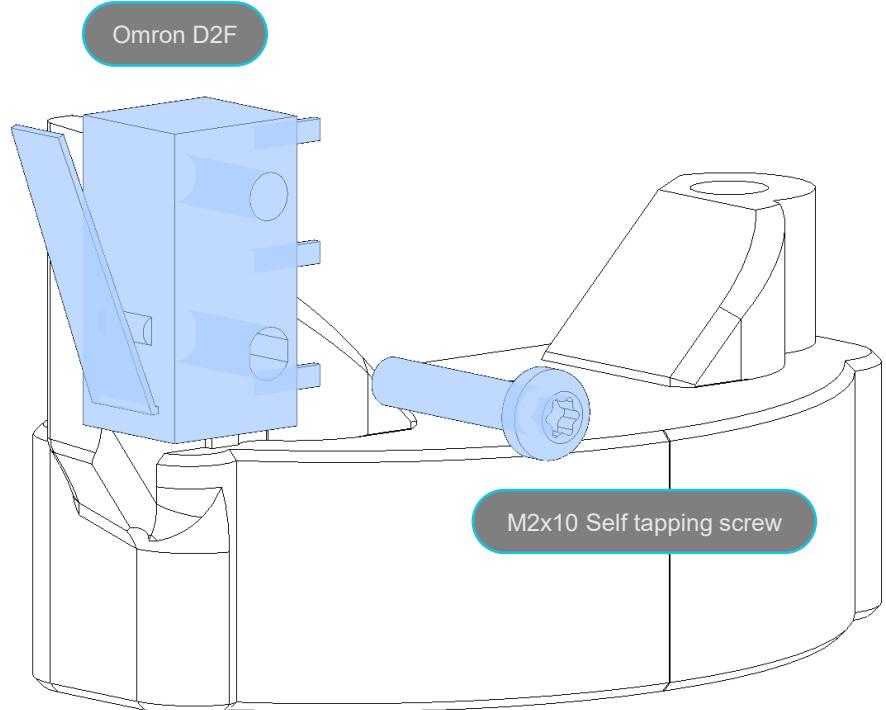
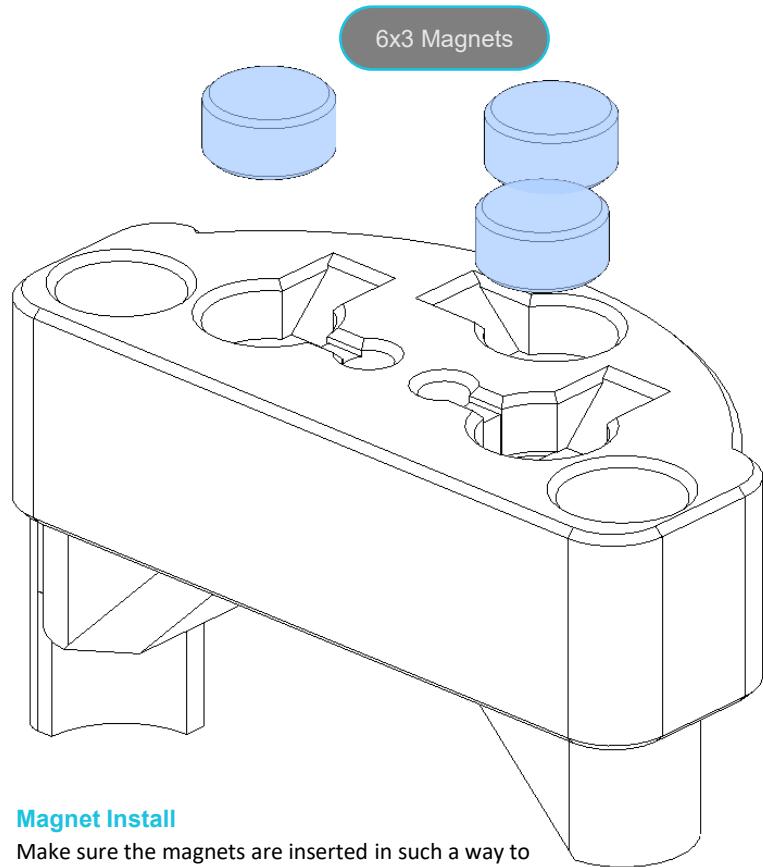


### Prepare the X Carriage

The 2 rear heatsets need to be pressed in deeper than the surface of the print, you can see here how deep it should be sitting

## CARRIAGE PROBE MOUNT

MICRON

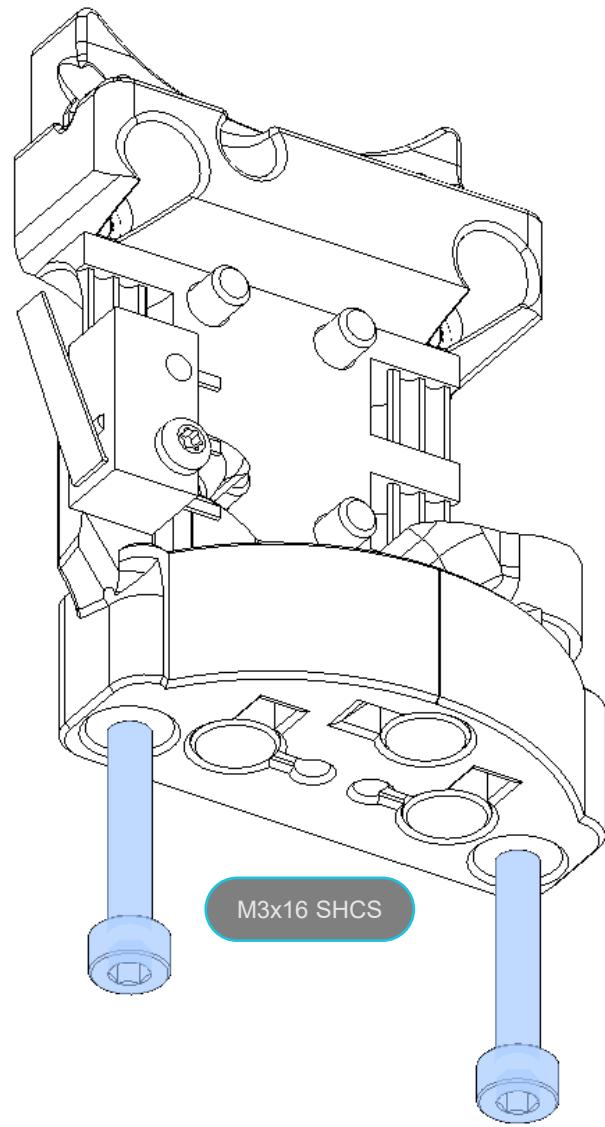


### Magnet Install

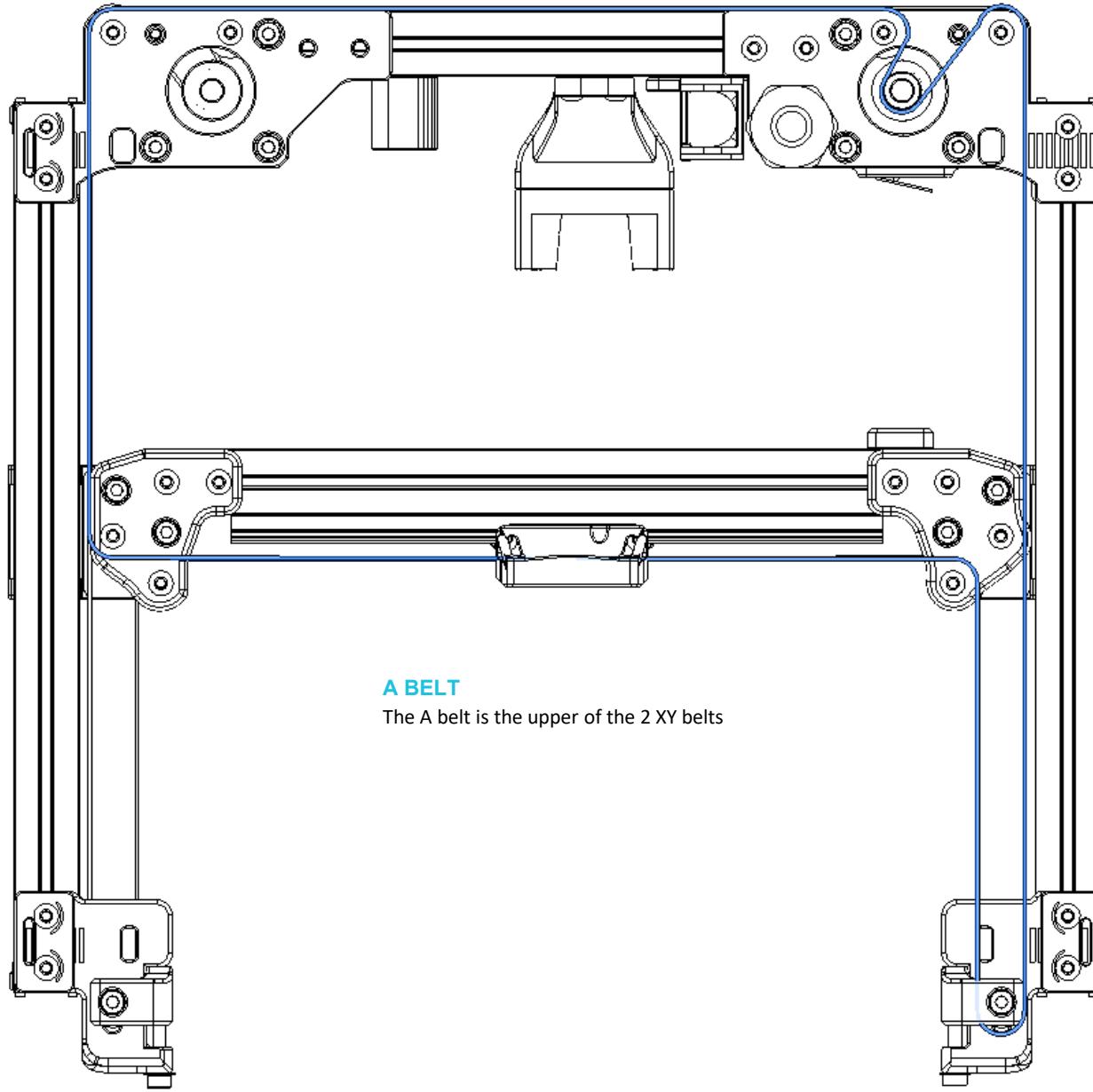
Make sure the magnets are inserted in such a way to attract the klicky probe that was assembled on pg 70.  
don't forget the glue!

X CARRAIGE PROBE MOUNT ASSEMBLY

MICRON

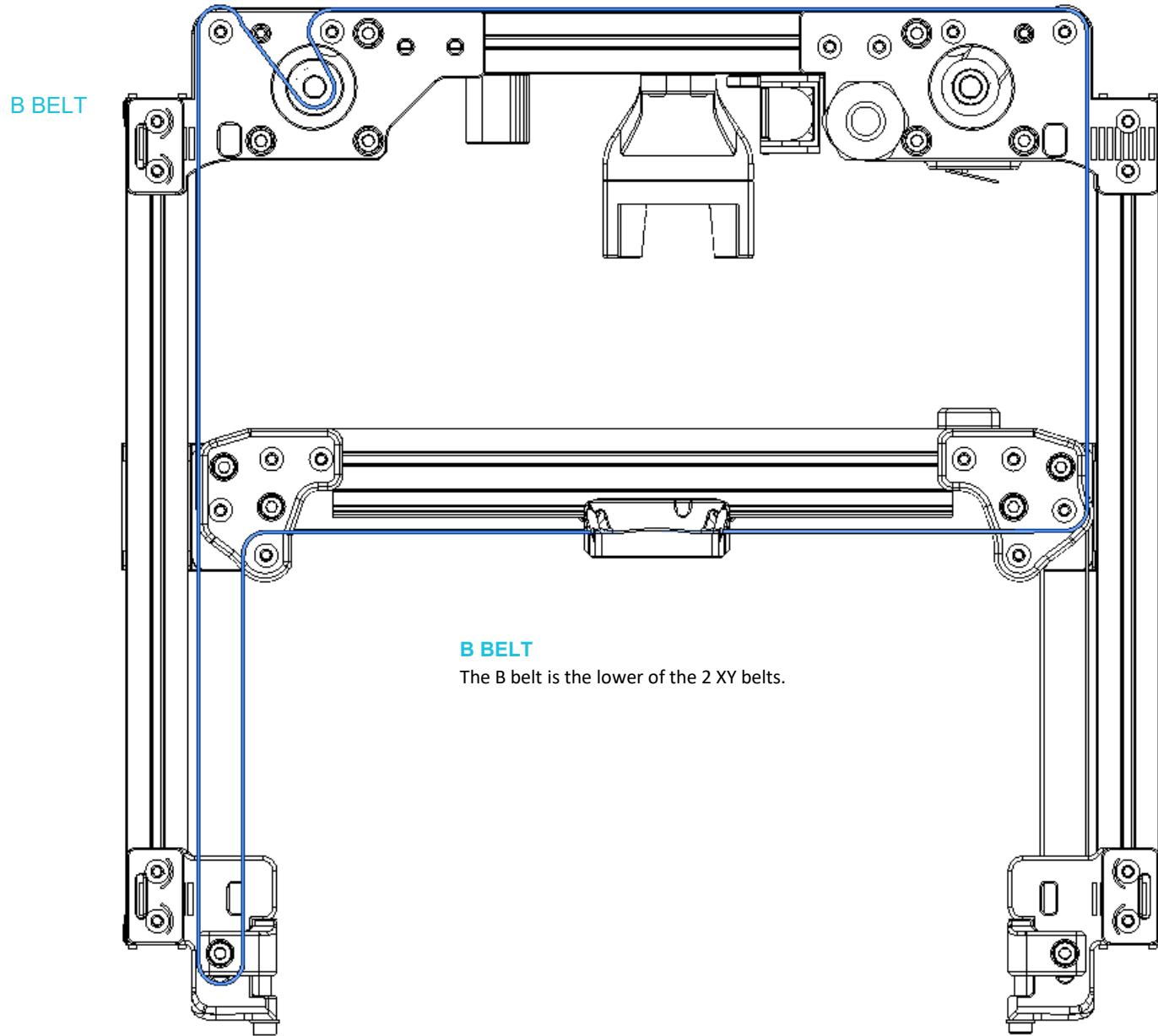


M3x16 SHCS



#### A BELT

The A belt is the upper of the 2 XY belts



B BELT

MICRON

**B BELT**

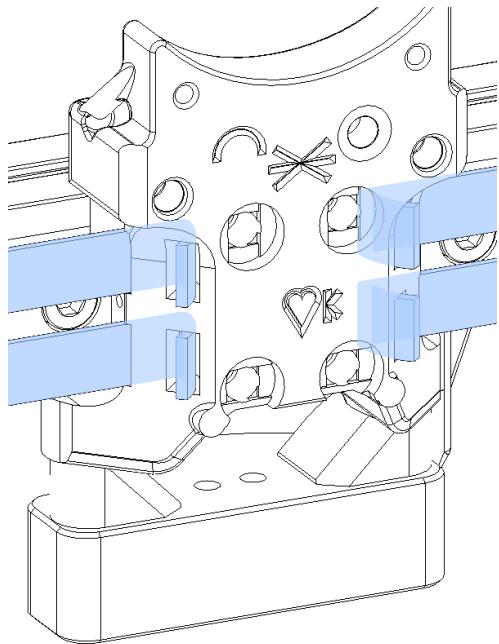
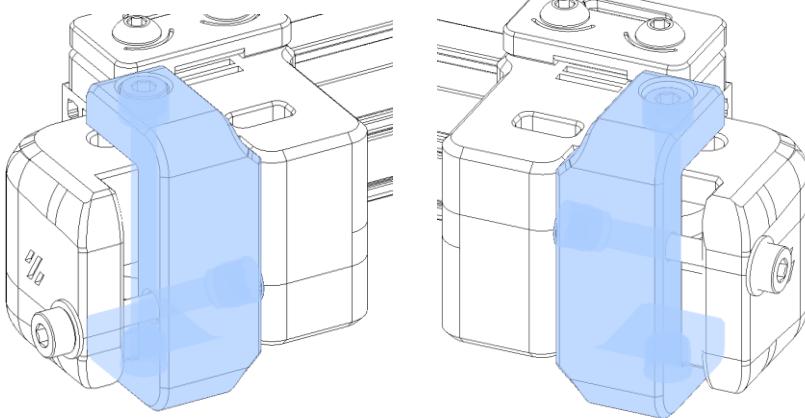
The B belt is the lower of the 2 XY belts.

## CARRAIGE MOUNTING

MICRON

### FRONT IDLERS

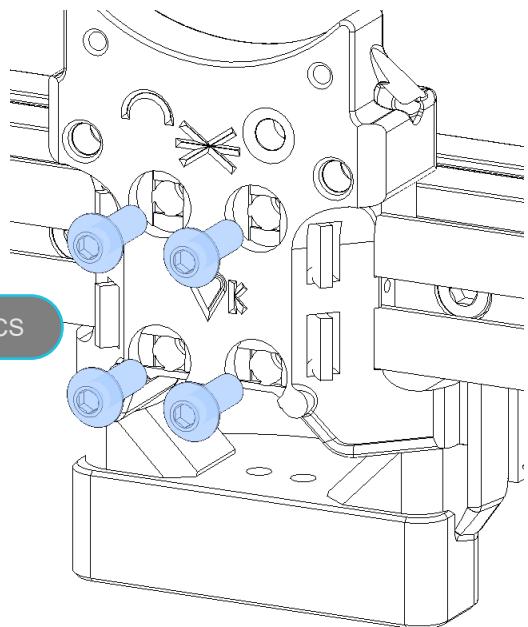
Make sure the front idlers are in the loose position before tightening down the carriage, so you have some room to tension the belts



### CARRAIGE MOUNTING

Feed the belts through the carriage and pull them so they are snug, don't need to get them too tight here as the front idlers will be used to tension the belts later. Using 4 M3x8 BHCS secure the carriage to the MGN9C carriage

M3x8 BHCS

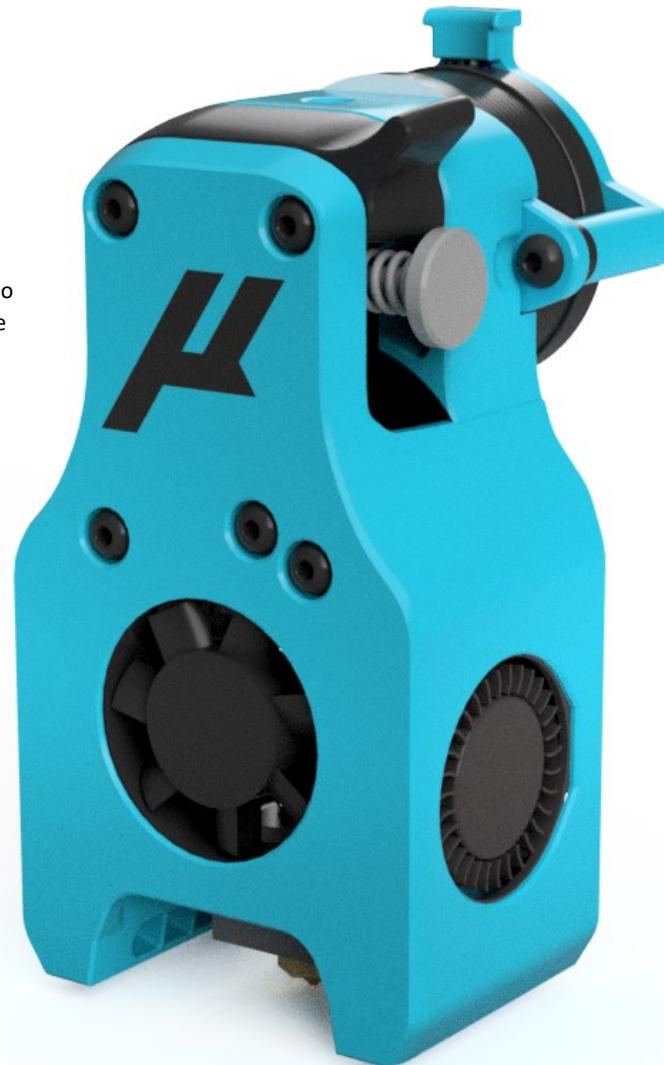


## MINI AFTERBURNER

MICRON

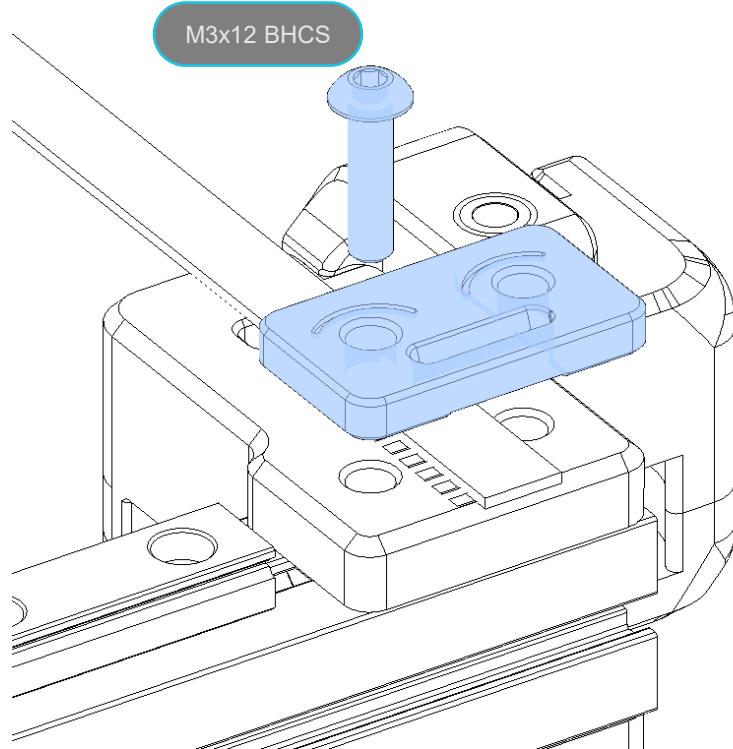
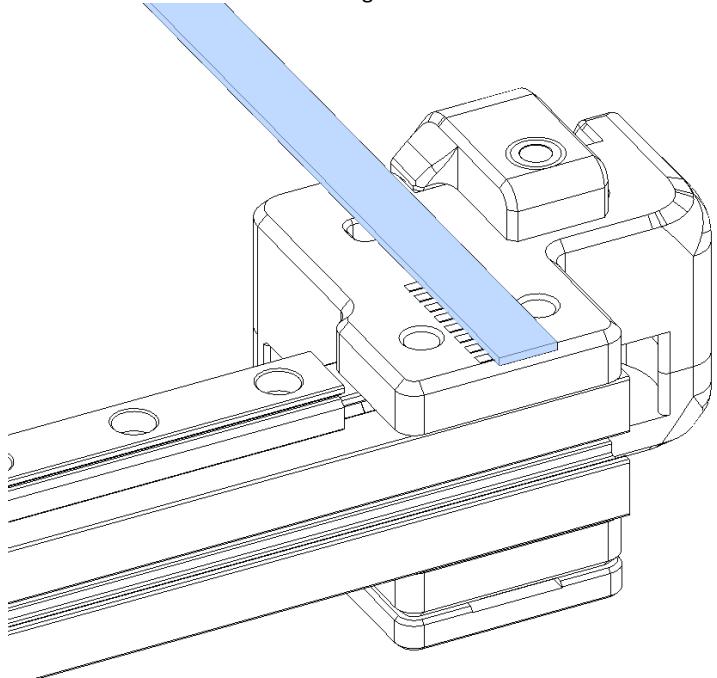
### Mini Afterburner

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 . This won't be attached to the gantry until the gantry is installed in the frame.



**Z belts**

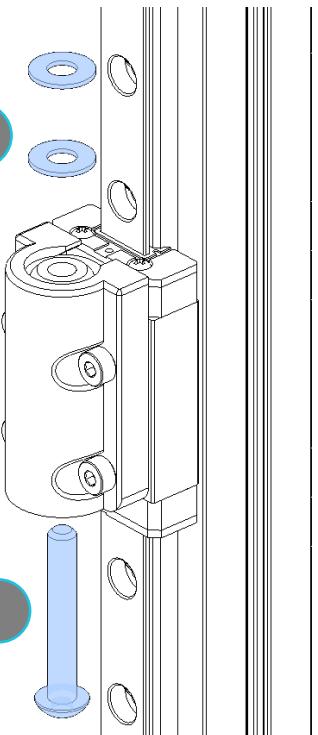
With the gantry upside down you can now install the lower belt clamps. Using only the single m3x12 shown for now.

**Teeth down**

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

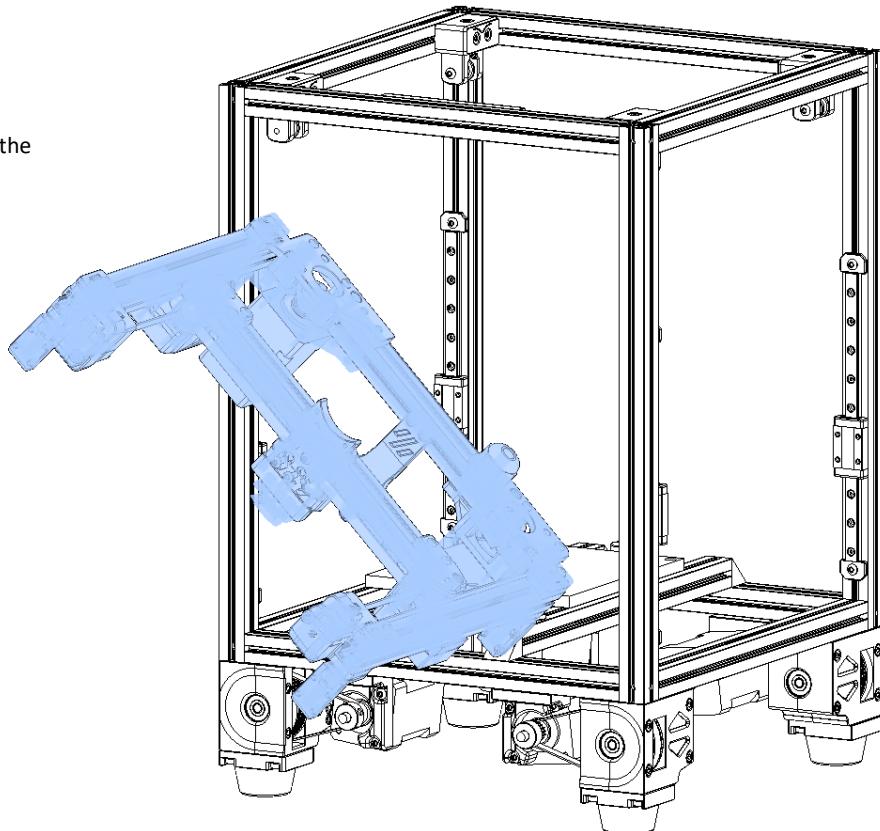
**Z Joints**

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



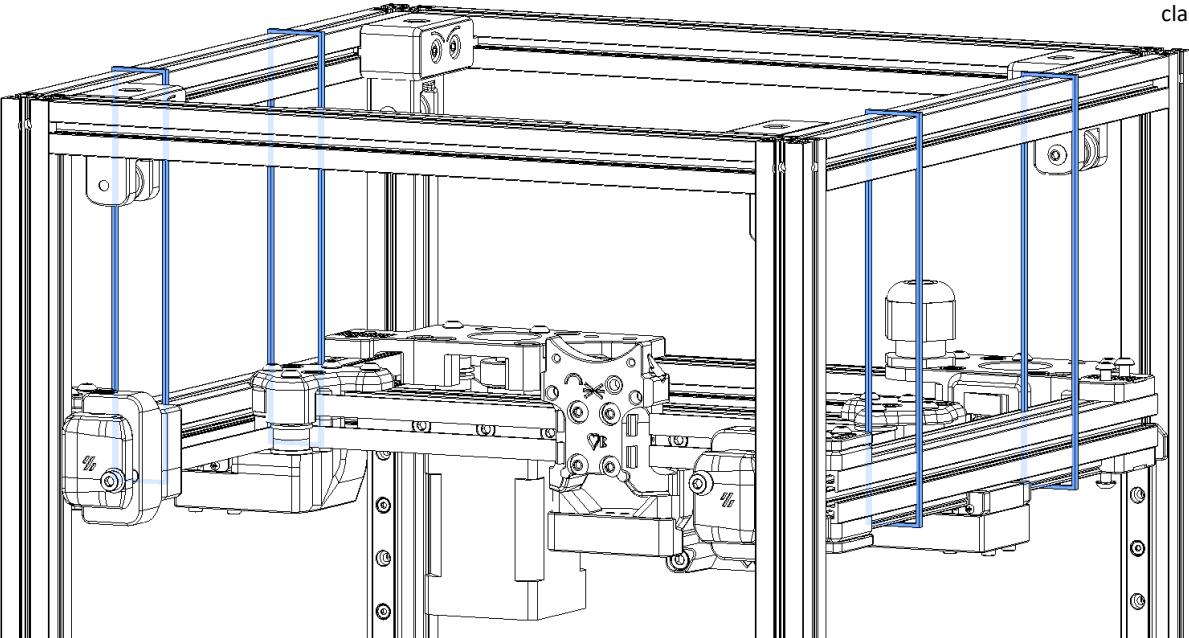
M3 Washer (X2)

M3x20 BHCS

**Gantry**

Now that the gantry is fully assembled you can now install it in the printer , its easiest if you tilt the gantry to slide it in. This will just get set on the Z joints from previous step.

## Z BELTS



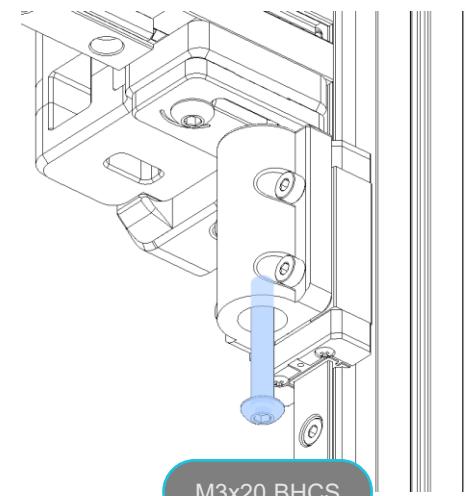
### ZIPTIES

You can use 4 zip ties to help hold up the gantry while you secure the Z joints as well as route the Z belts in the next step. Once the gantry is held up with the belts the zip ties can be removed.

## MICRON

### INSTALLING GANTRY

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

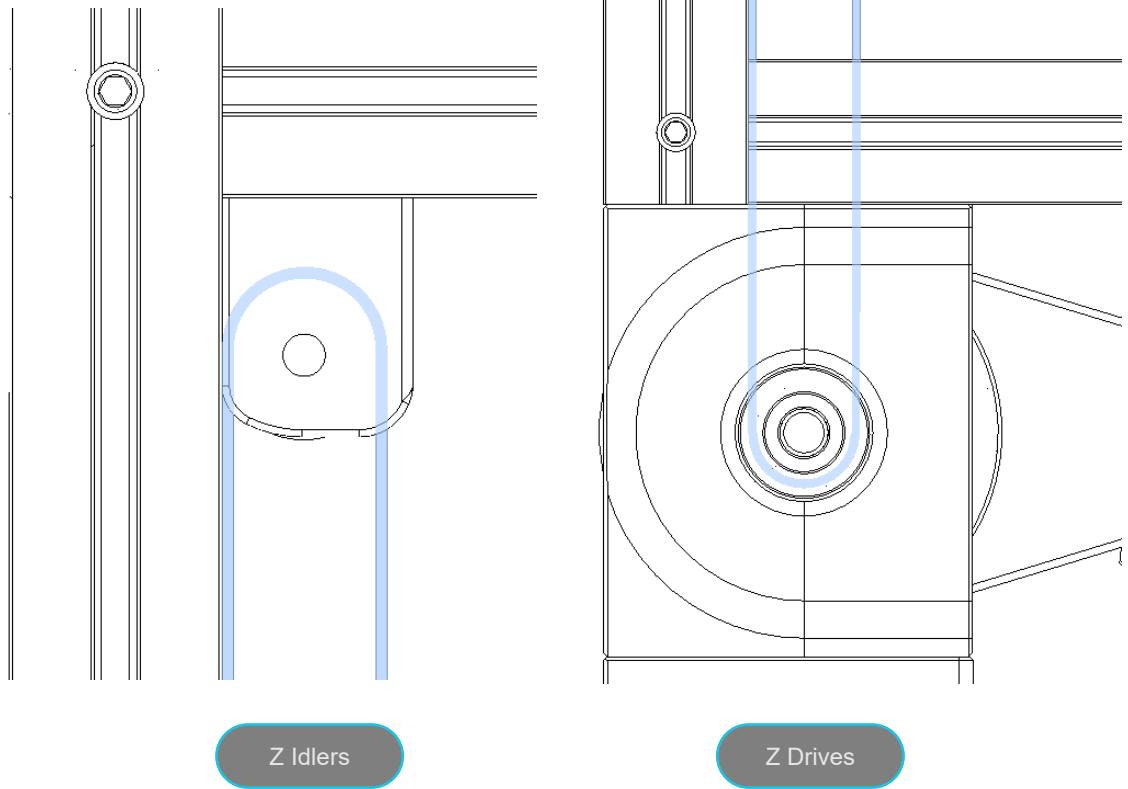


## Z BELTS

## MICRON

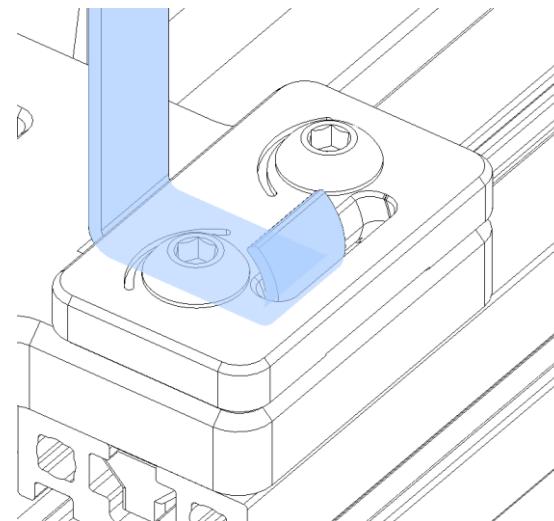
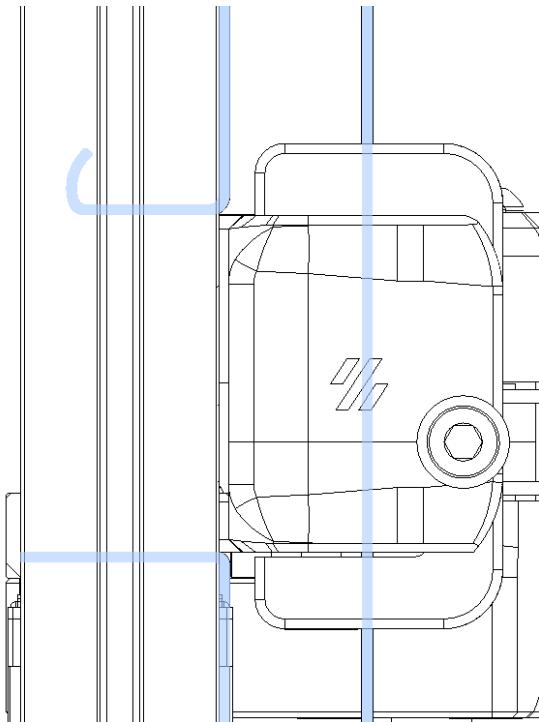
### ROUTING Z BELTS

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 and back down to the gantry.



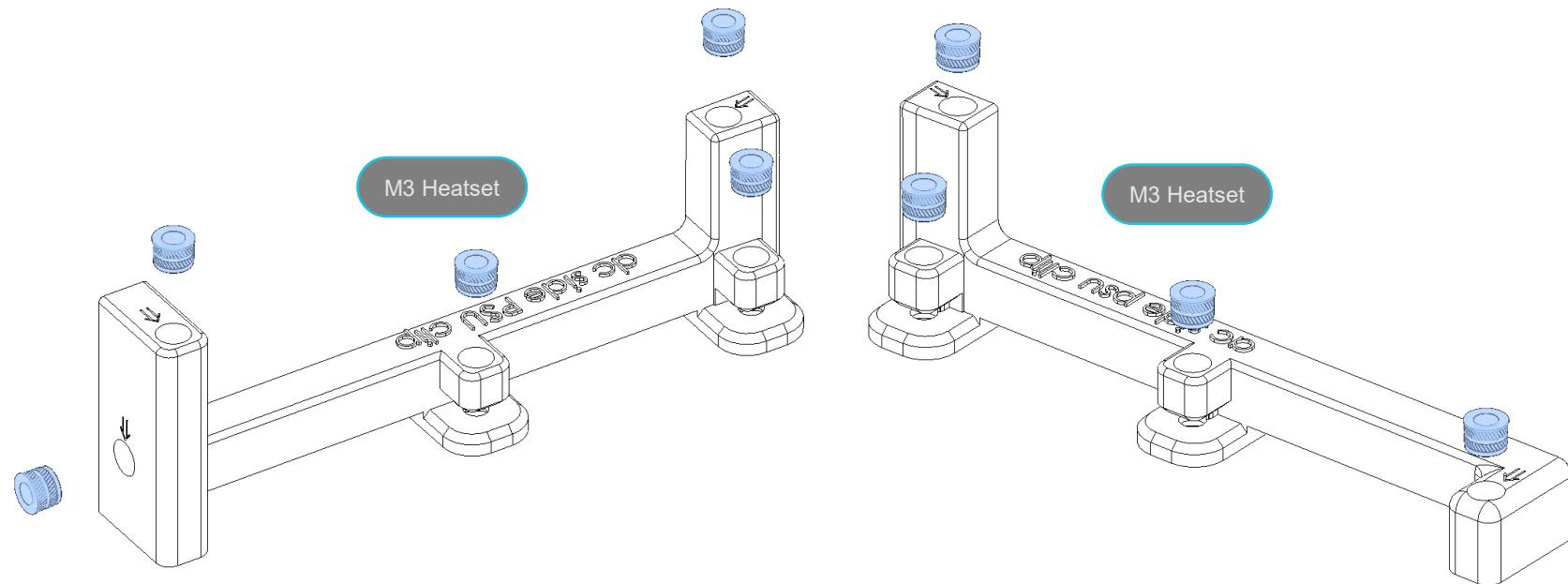
**SECURING THE Z BELTS**

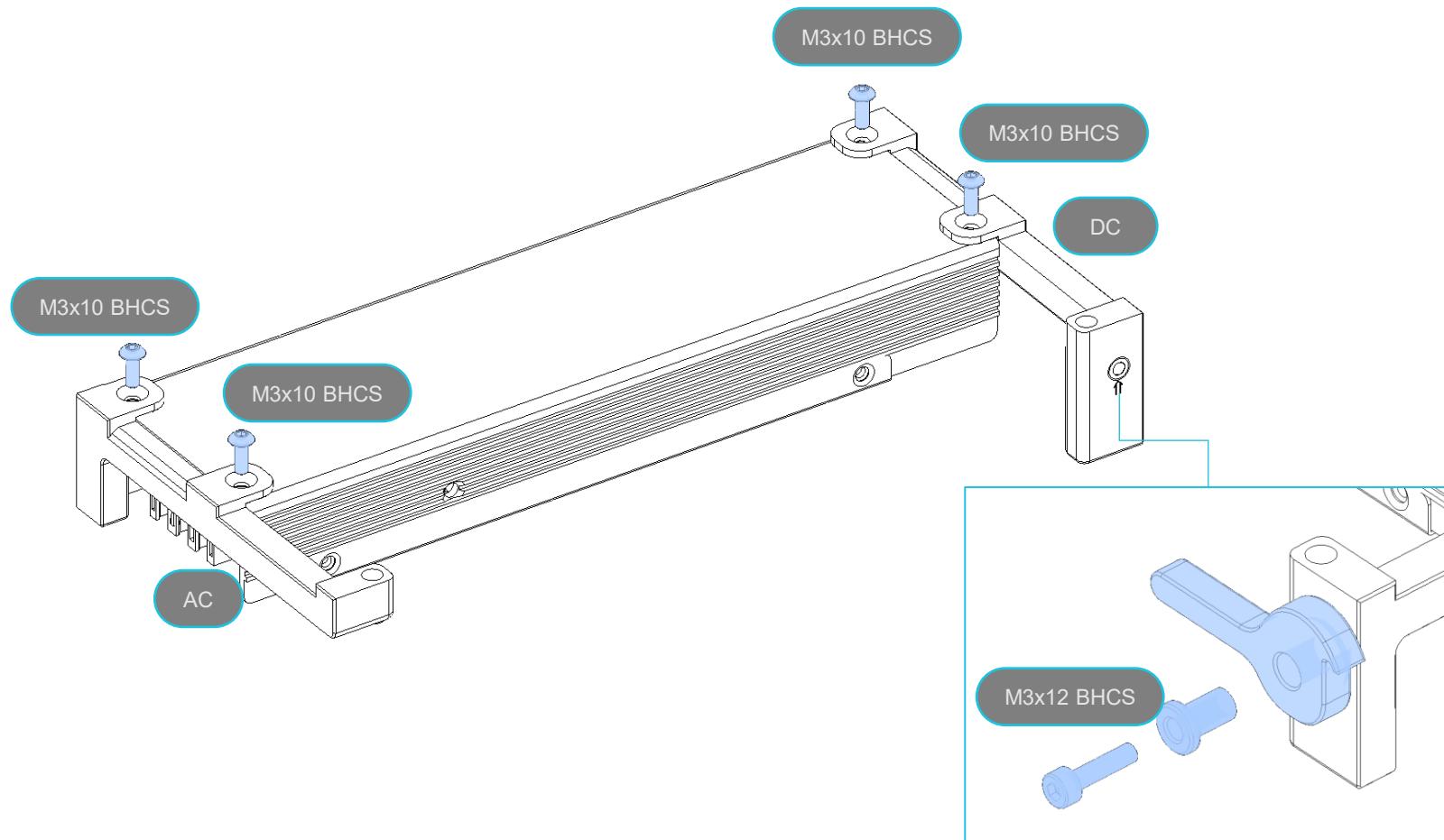
Loosen the screws that were used to secure the front Idlers and slip the belt under it, make sure to route the belt through the "mouth" of the belt clamp. Then tighten the idler back down.

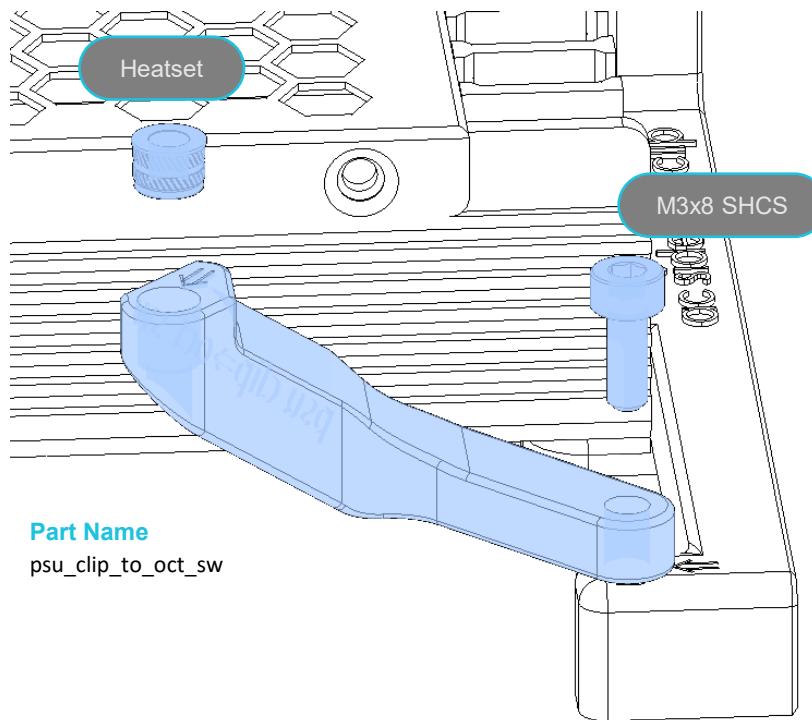


ELECTRONICS

MICRON

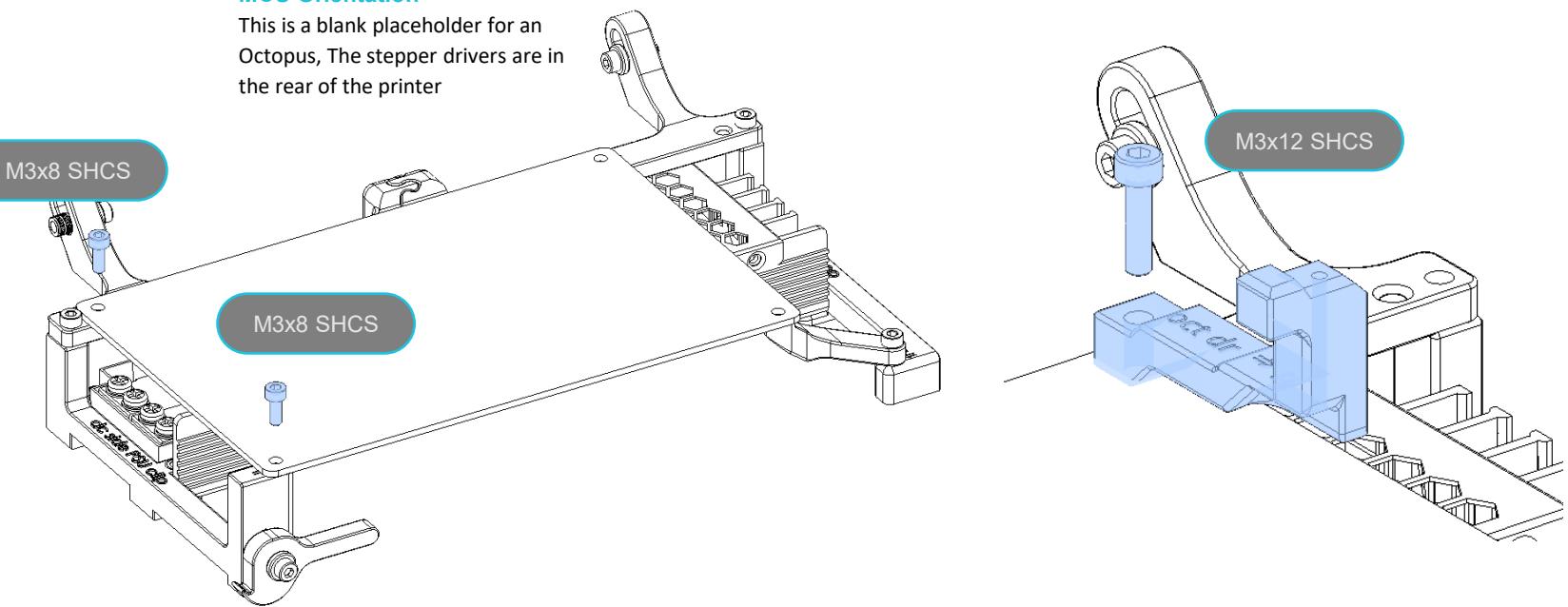






**MCU Orientation**

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



TEMPLATE

MICRON

TEMPLATE

MICRON