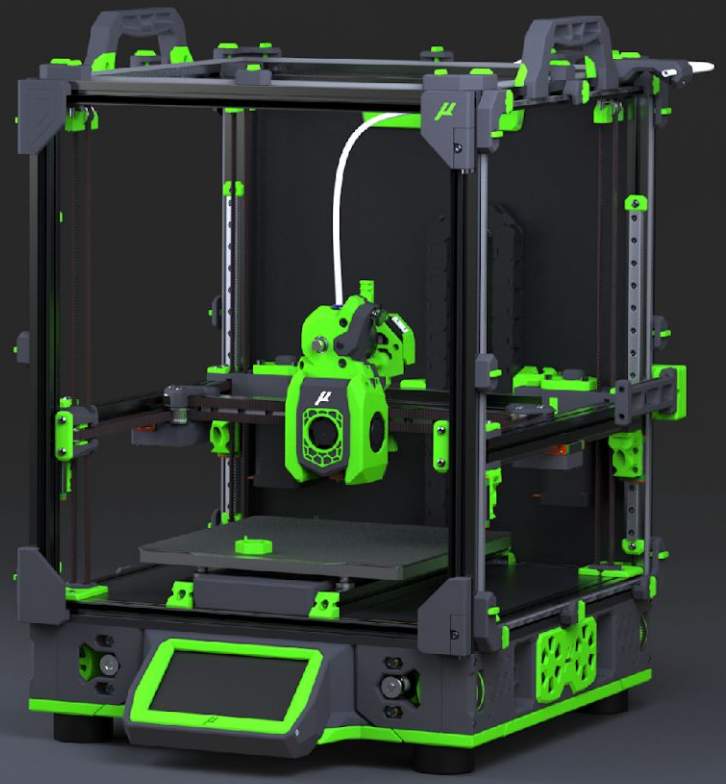
Micron

R1

ASSEMBLY MANUAL

Everything is smaller but the price.



VERSION {{CURRENT_DATE}}

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STL FILE KEY

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_drive_baseplate_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_drive_baseplate_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

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, Cubic, Adaptive Cubic.

WALL COUNT
Recommended : 4

SOLID TOP/BOTTOM LAYERS
Recommended : 5

SUPPORTS REQUIRED
If the part needs supports, they are built into the model.

HOW TO GET HELP

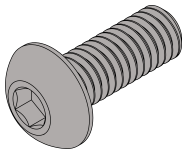
If you need assistance with your build you can head over the DOOMCUBE Discord server and post your questions (typically in the **#micron_build_questions** channel). It is the primary help channel for the Micron! You can also check the Github page for the latest releases.

DISCO? OH ...DISCORD

If you need assistance with your build you can head over the DOOMCUBE Discord server and post your questions (typically in the **#micron_build_questions** channel). It is the primary help channel for the Micron!

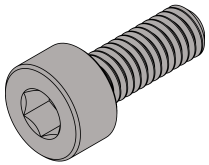
GIT GUD

If you want to stay up to date on the latest files for Micron. The github page is the only source for the latest files.



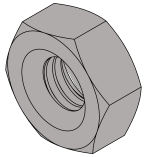
BUTTON HEAD CAP SCREW (BHCS)
Metric fastener with a domed shaped head and hex drive. Most commonly found in locations where M3 fasteners are used.

ISO 7380-1



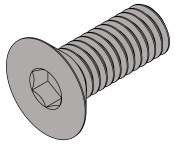
SOCKET HEAD CAP SCREW (SHCS)
Metric fastener with a cylindrical head
and hex drive. The most common fastener used on the Voron.

ISO 4762 / DIN 912



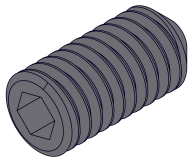
HEX NUT
Hex nuts couple with bolts to create a
tight, secure joint. You'll see these used in both M2 and M3 variants throughout this guide.

ISO 4032 / DIN 934



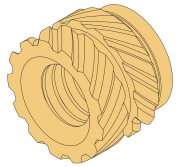
FLAT HEAD CAP SCREW (FHCS)
Metric fastener with a cone shaped head and a flat top.

ISO 10642

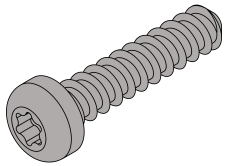


GRUB SCREW (GS)
Metric Socket Cup Point Set Screws (also called Hollow Point Grub Screws) are fitted with a concave cup point, which allows them to fit closely against a rounded surface such as a motor shaft.

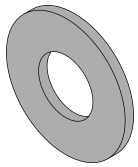
ISO 4029/ DIN 916



HEAT SET INSERT
Heat the inserts with a soldering iron so that they melt the plastic when installed. As the plastic cools, it solidifies around the knurls and ridges on the insert for excellent resistance to both torque and pull-out.

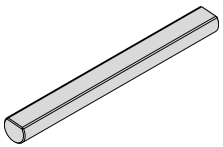


SELF TAPPING SCREW
Fastener with a pronounced thread profile that is screwed directly into plastic.

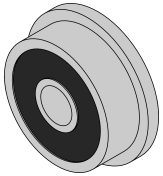


M3 SHIMS
Not to be confused with stamped washers. These are used in all M3 call-out locations in this manual.

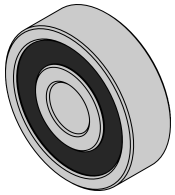
3x6x0.5 DIN 988



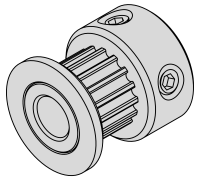
5mm x 47mm Shaft
Steel shaft, 5mm in diameter, 47mm long with a flat ground on it used in the Z drive gear box assembly



F623 BEARING
A ball bearing with a flange used in various gantry locations.



625 BEARING
A ball bearing with used in the Z drive.



PULLEY
GT2 pulley used on the motion system of the Micron.

ATTENTION BUBBLE
This logo denotes steps that are common areas that mistakes can occur.

MICRON Logo
Look for Micron Logo next to the printed part, this is a direct link to the file on the github repo.

(5) Bottom – **180**

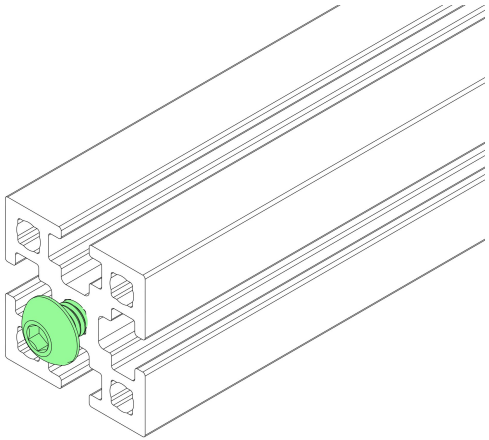
Look for the **BLACK** call outs to mention the preloaded M3 nuts, **NOTE:** some of them are specific to the size of printer and will be in bold at the end

M3x8 SHCS

Look for the **GREEN** call outs to mention the various hardware used

(3) outside

Look for the **GRAY** call outs to mention the preloaded M3 nuts that are optional, Some of the printed parts have a printed twist lock version to attach to the frame OR a screwed-on version. If you choose to use the twist lock then you can ignore the gray nut call outs

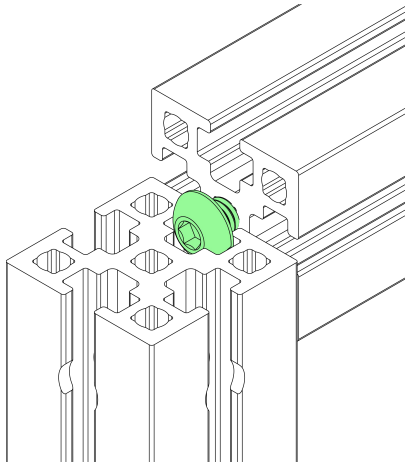


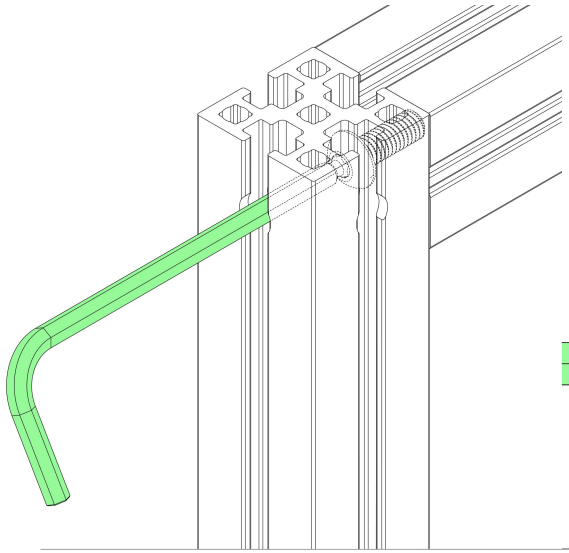
BLIND JOINT BASICS

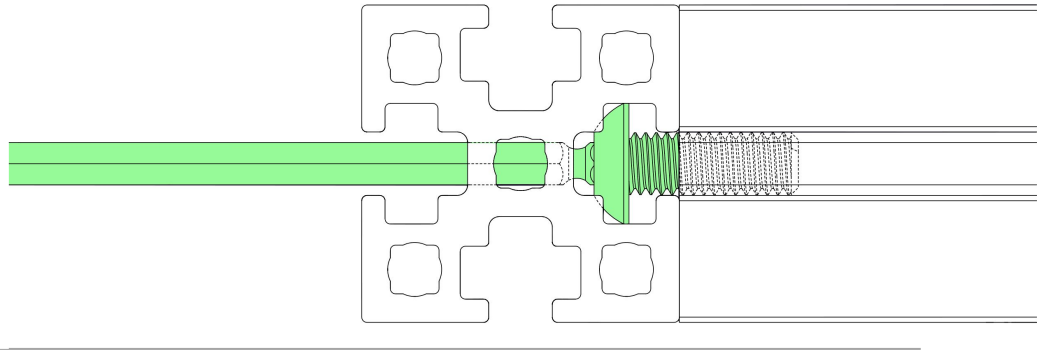
Blind Joints provide a cost-effective and rigid assembly method.

The head of the BHCS is slid into the channel of another extrusion and securely fastened through a small access hole in the extrusion.

If you've never assembled one before we recommend you watch the linked guide.







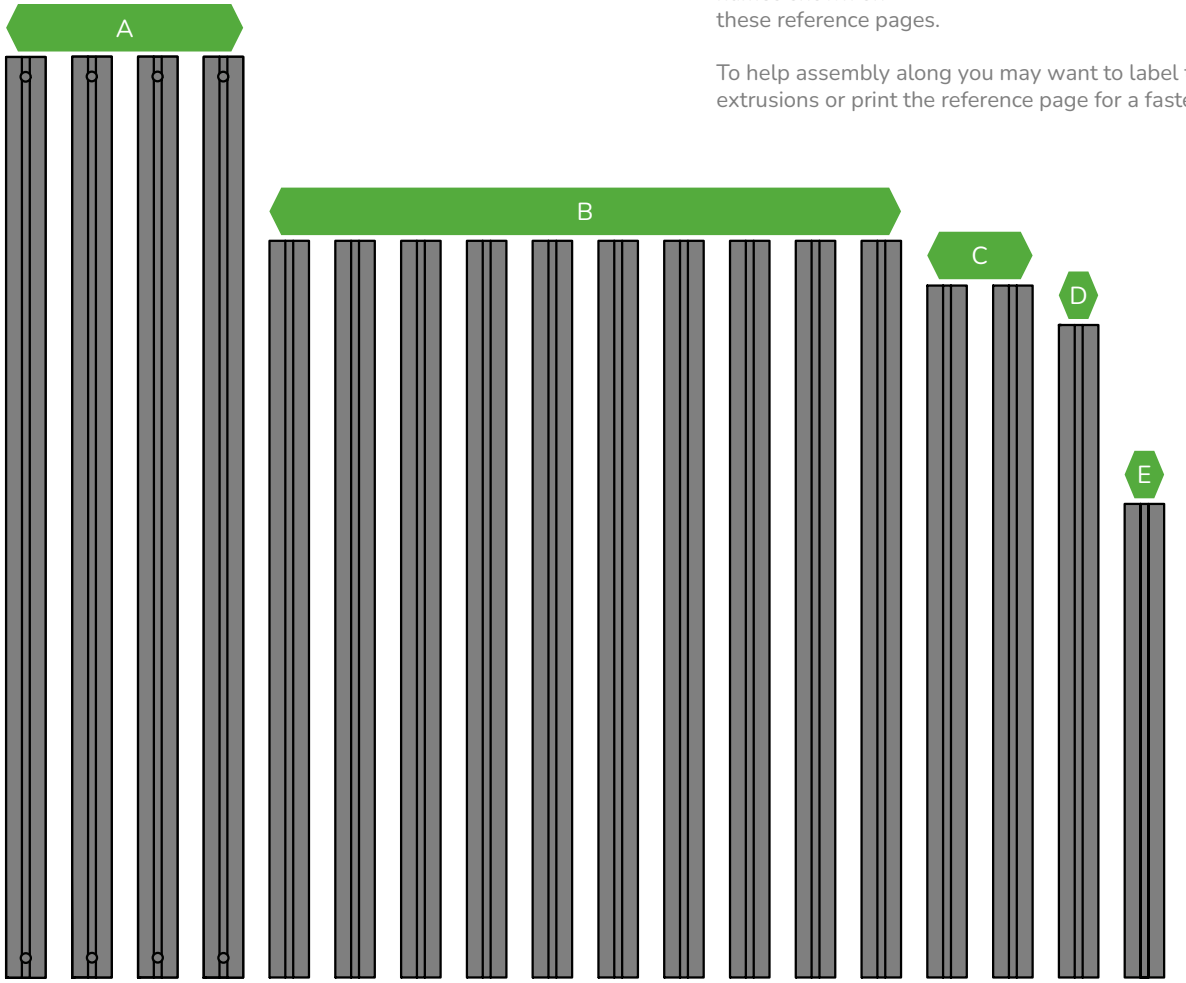
SORT EXTRUSIONS

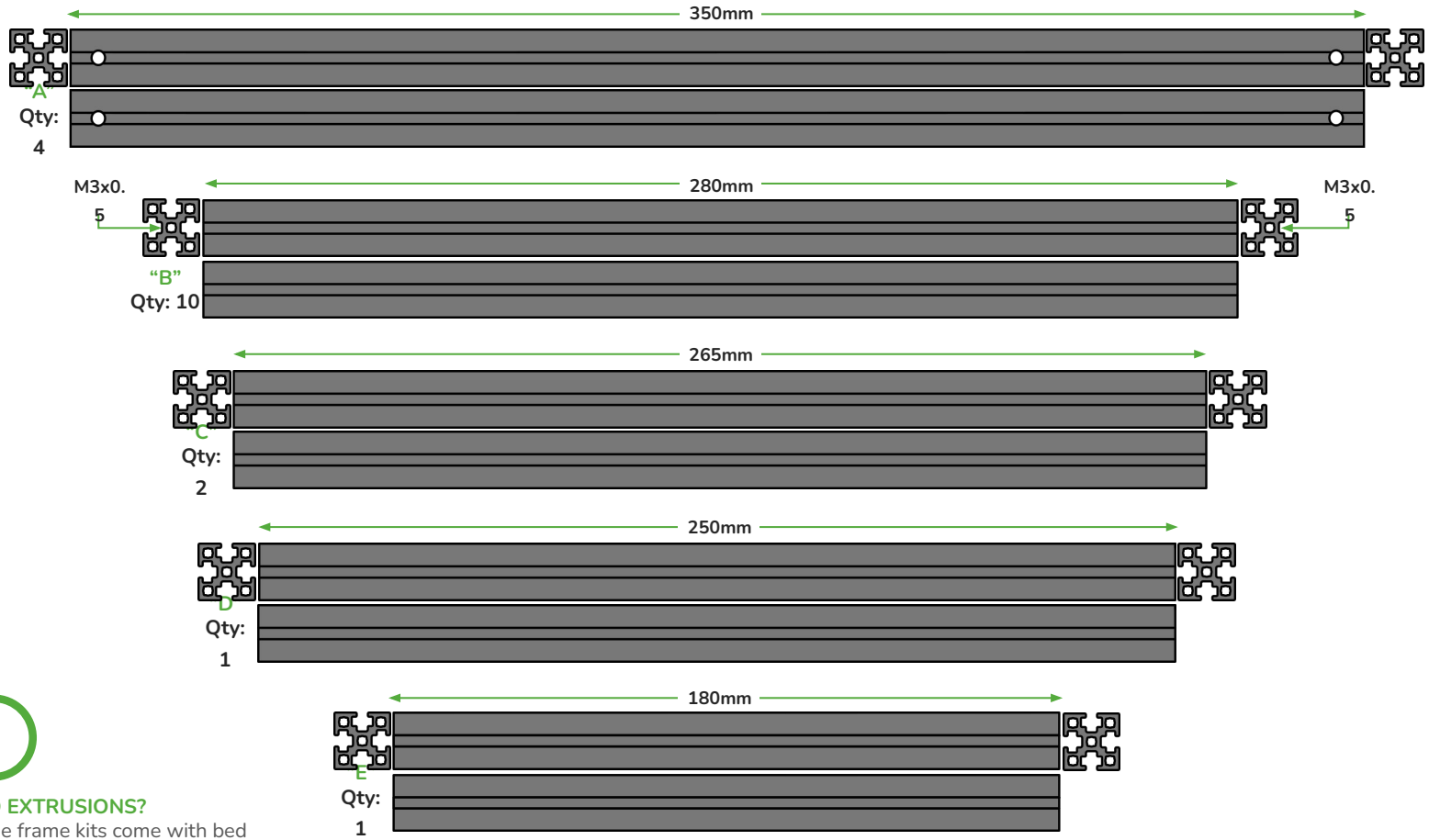
Collect your extrusions and sort them by length. We will highlight the extrusions used in each step and label them as shown on this page.

EXTRUSION CALL-OUTS

To avoid confusion, we will call out the extrusions by the names shown on these reference pages.

To help assembly along you may want to label the extrusions or print the reference page for a faster lookup.

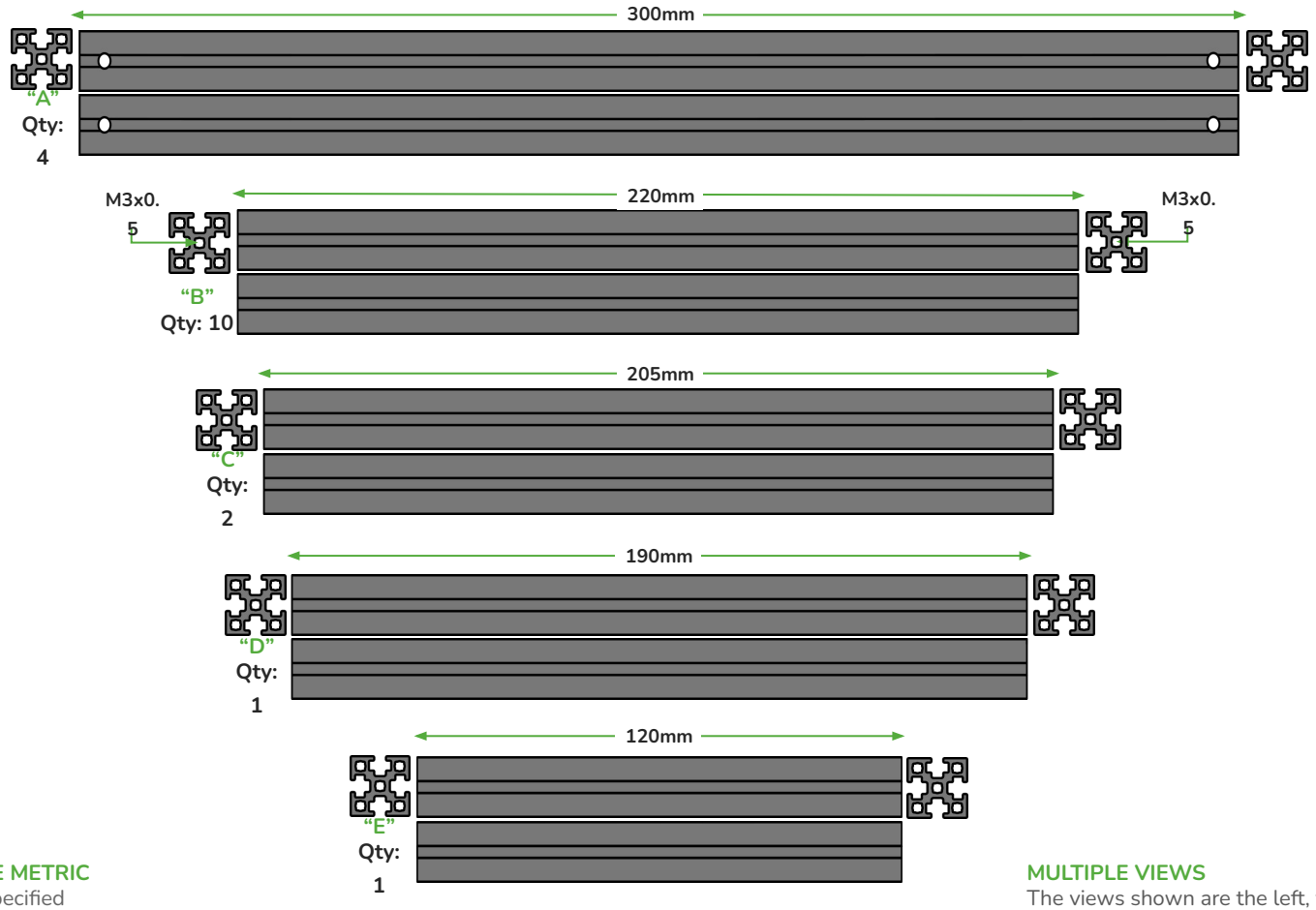




BED EXTRUSIONS?
Some frame kits come with bed extrusions that are mounted using blind joints. These will end up being 2 longer extrusions and 8 **B** extrusions.

MULTIPLE VIEWS
The views shown are the left, front, right, and bottom views of each extrusion.

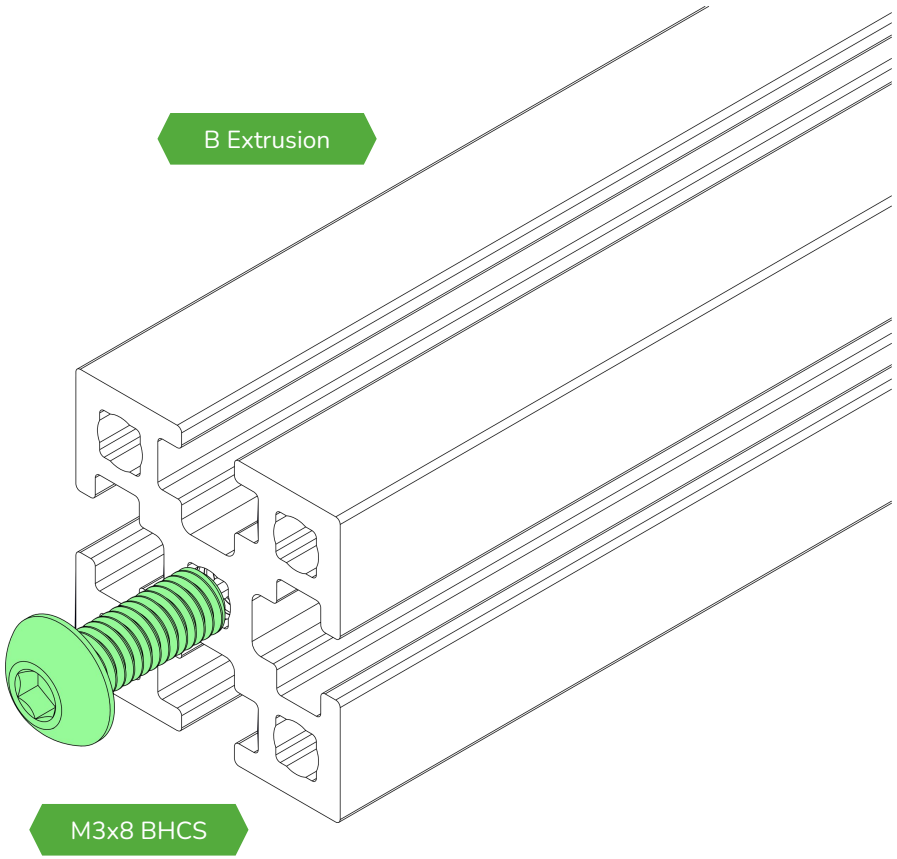
EXTRUSION PREP – REFERENCE – **120x120**



ALL UNITS ARE METRIC
If a unit is not specified assume it's metric.

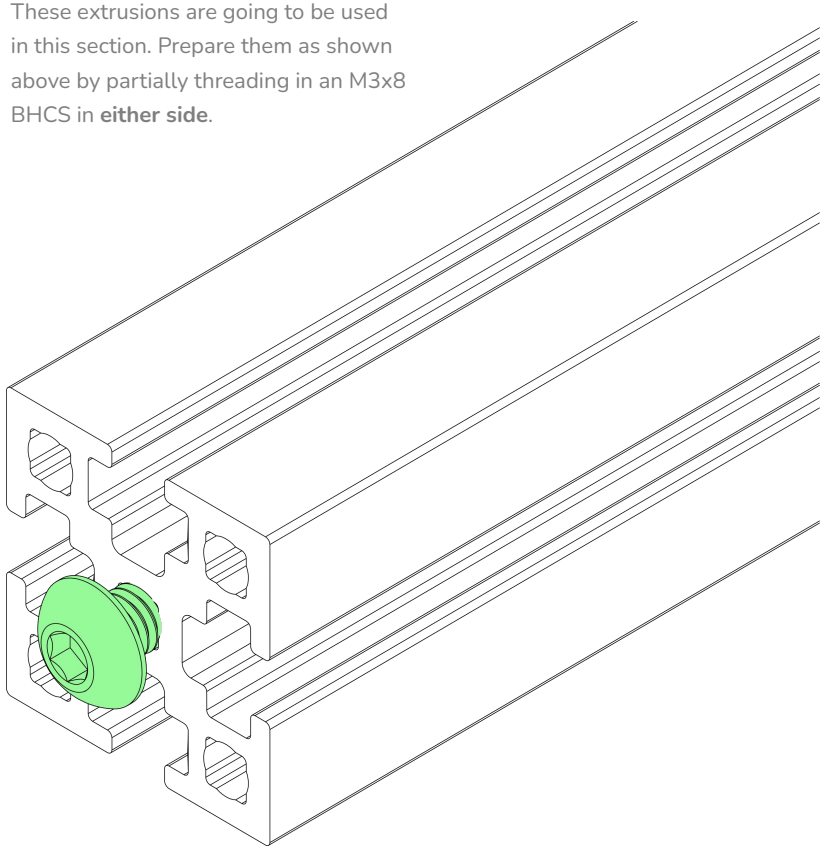
MULTIPLE VIEWS
The views shown are the left, front, right, and bottom views of each extrusion.


MICRON



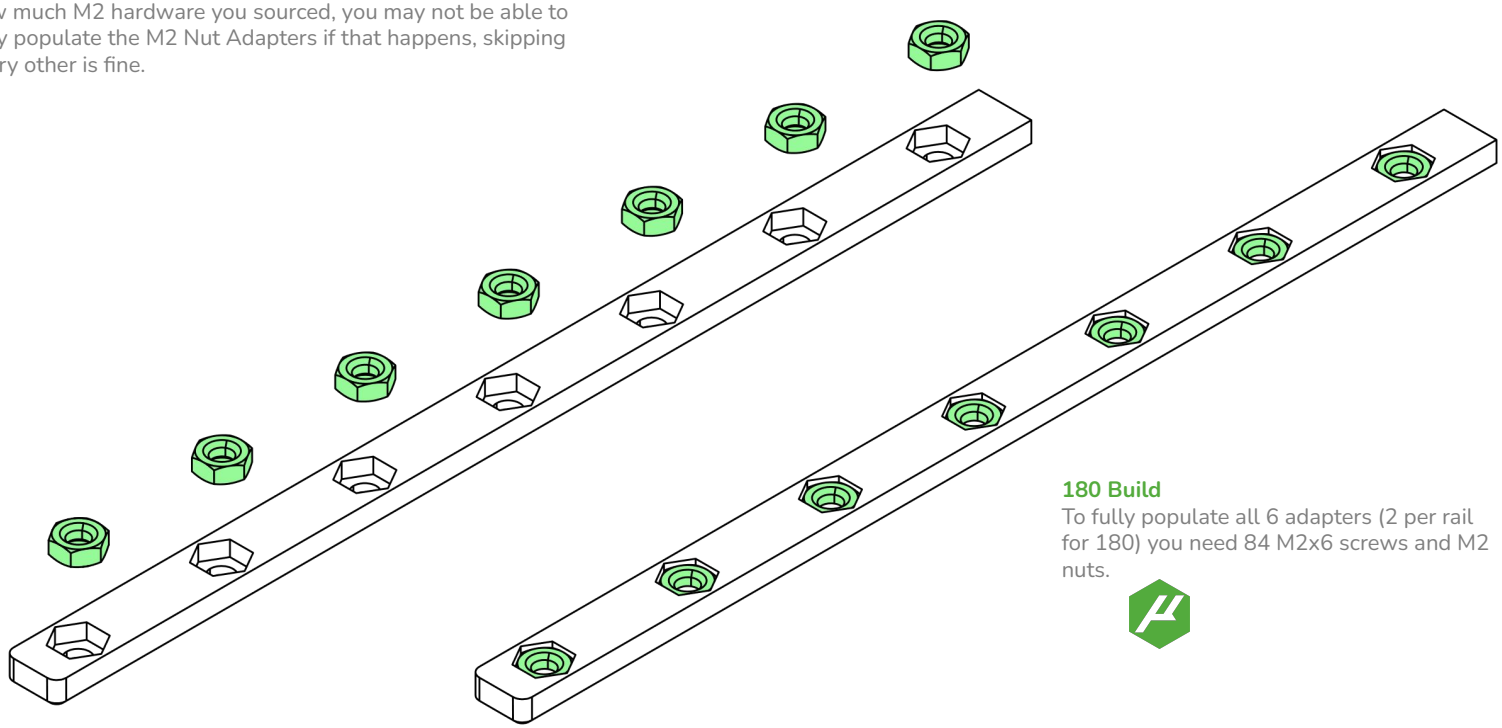
PREPARE 8 EXTRUSIONS

These extrusions are going to be used in this section. Prepare them as shown above by partially threading in an M3x8 BHCS in **either side**.



POPULATING NUT CARRIERS

Pictured shows all the m2 nuts populated, but depending on how much M2 hardware you sourced, you may not be able to fully populate the M2 Nut Adapters if that happens, skipping every other is fine.

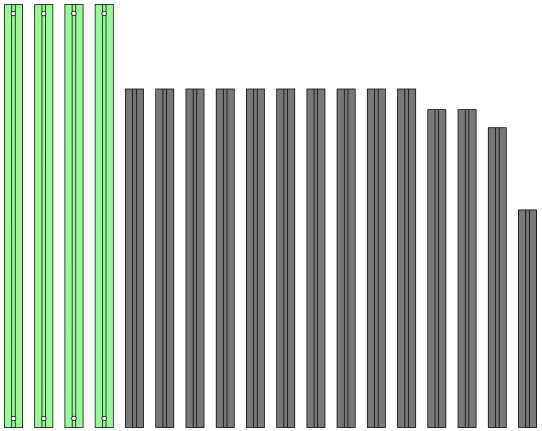


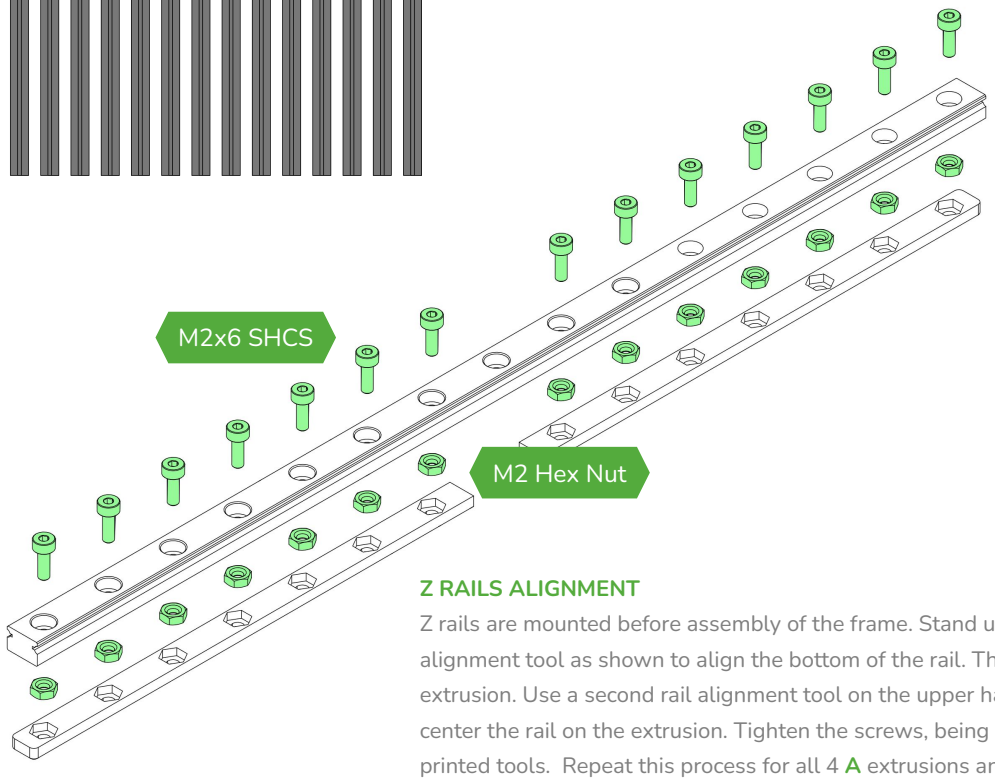
180 Build

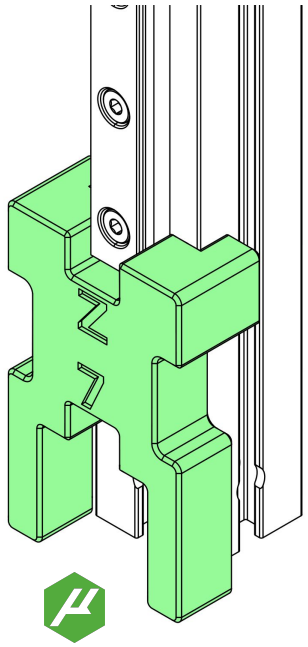
To fully populate all 6 adapters (2 per rail for 180) you need 84 M2x6 screws and M2 nuts.

120 Build

To fully populate all 6 adapters (1 per rail for 120) you need 60 M2x6 screws and M2 nuts.







Z RAILS ALIGNMENT

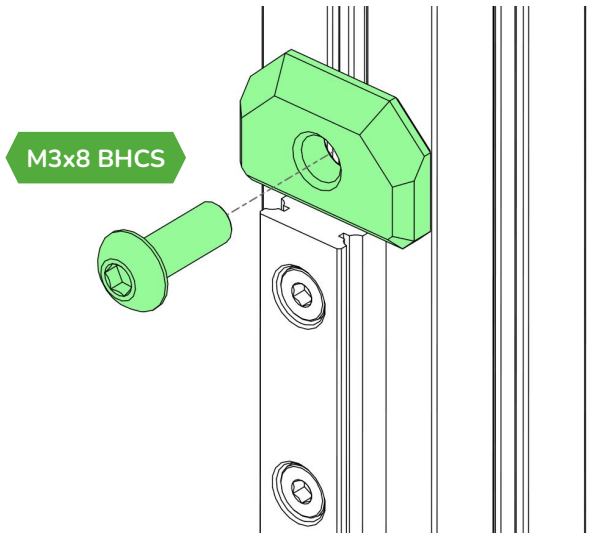
Z rails are mounted before assembly of the frame. Stand up one of the **A** extrusions and use the printed rail alignment tool as shown to align the bottom of the rail. The rail end should be **36mm** from the bottom of the extrusion. Use a second rail alignment tool on the upper half of the rail, using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

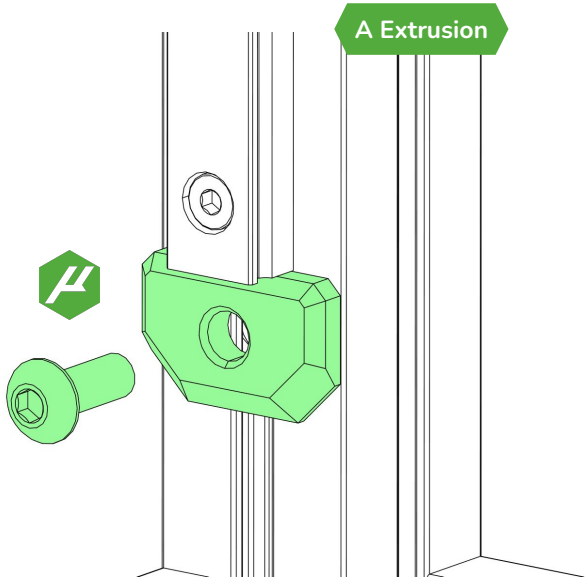
WHERE'S THE NUT!?

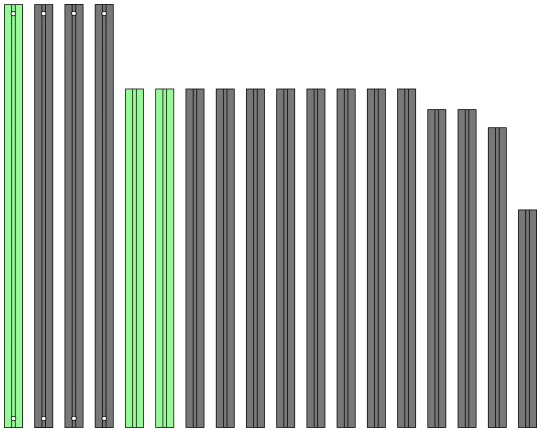
The instructions won't call out nuts that were inserted in a previous step, nor nuts that can be easily inserted in the current step. if a screw does NOT thread into a nut we will explicitly state this. **You can assume that all screws that enter extrusion slots thread into a nut.**

RAIL STOPS

With the Z rails installed, the rail stops can now be added to both ends. Loosely screw an M3x8 BHCS. Repeat for both ends of all 4 Z rails. Now you can work on the build without risking a Z carriage flying off its rail.





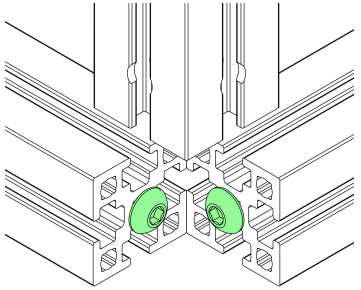


Corner 1

A Extrusion

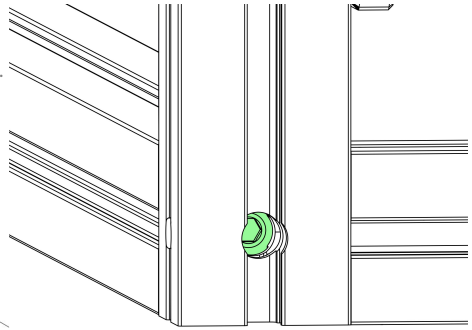
CORNER #1 ASSEMBLY

Start with one of our preassembled **A** extrusions, and two of the **B** extrusions. Note the direction the linear rail is facing. Slide one of the A extrusions on forming the first corner with two **B** extrusions. While using your assembly surface to hold things flush and square, tighten the two screws to make the first corner secure. This **Corner 1** will be the left rear corner of the printer.



BUILD ON A FLAT SURFACE

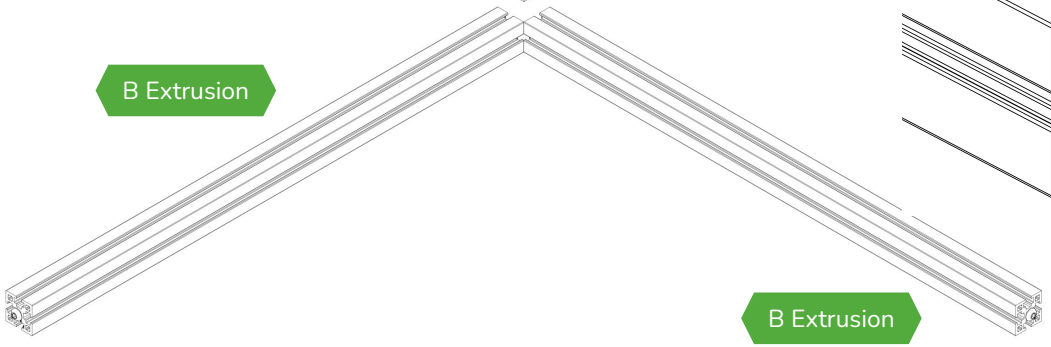
Build the frame on a glass or granite surface to ensure you can get it as square as possible.



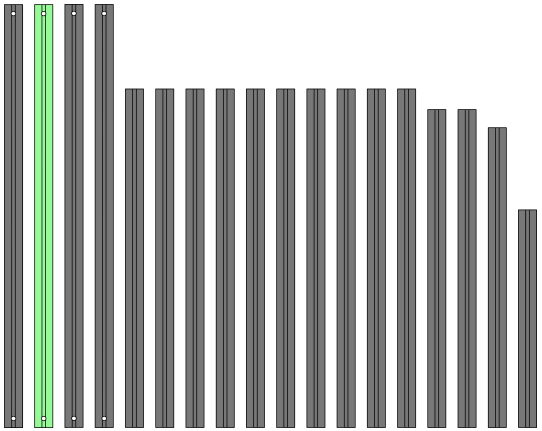
FRAME ASSEMBLY

This design relies on blind joints to assemble the frame. We outlined the basics of blind joints on page 7

B Extrusion

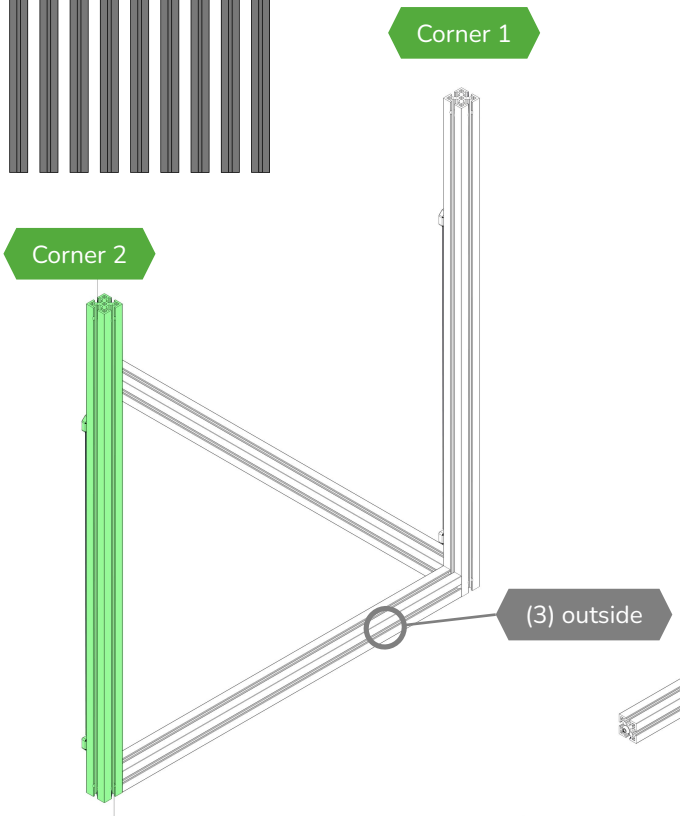


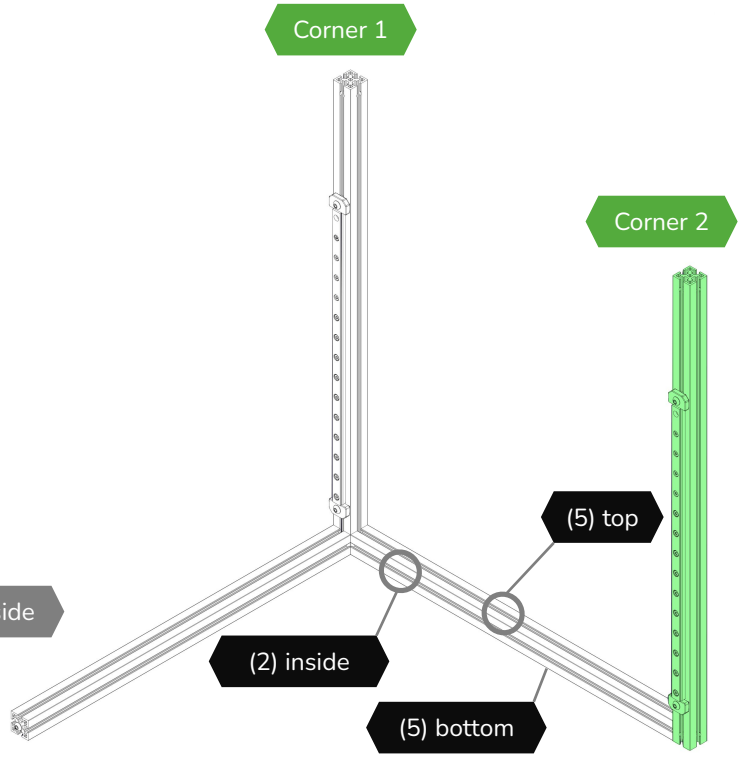
B Extrusion

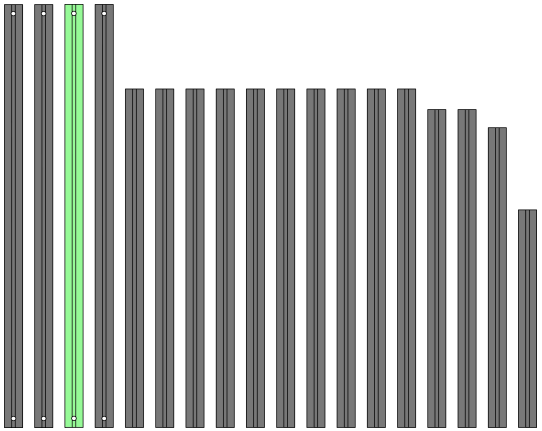


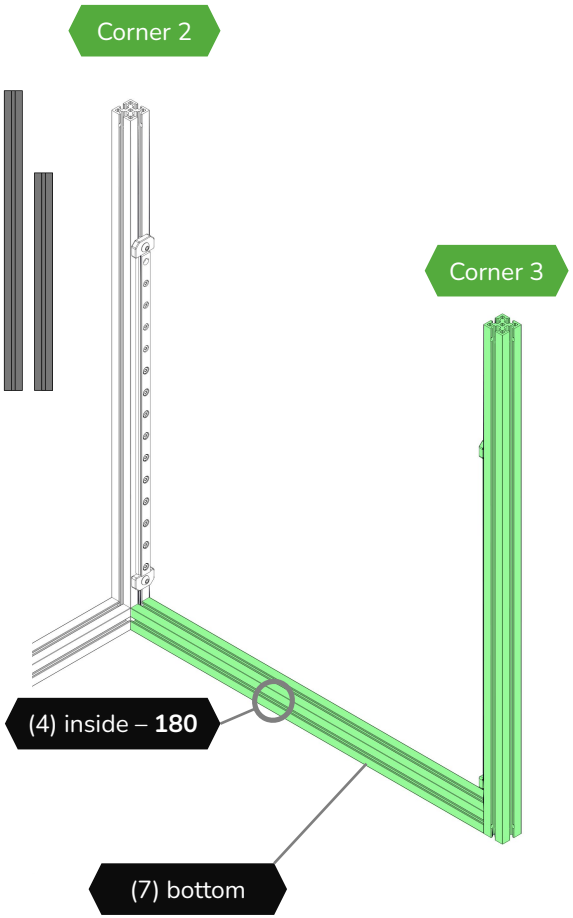
CORNER #2 ASSEMBLY

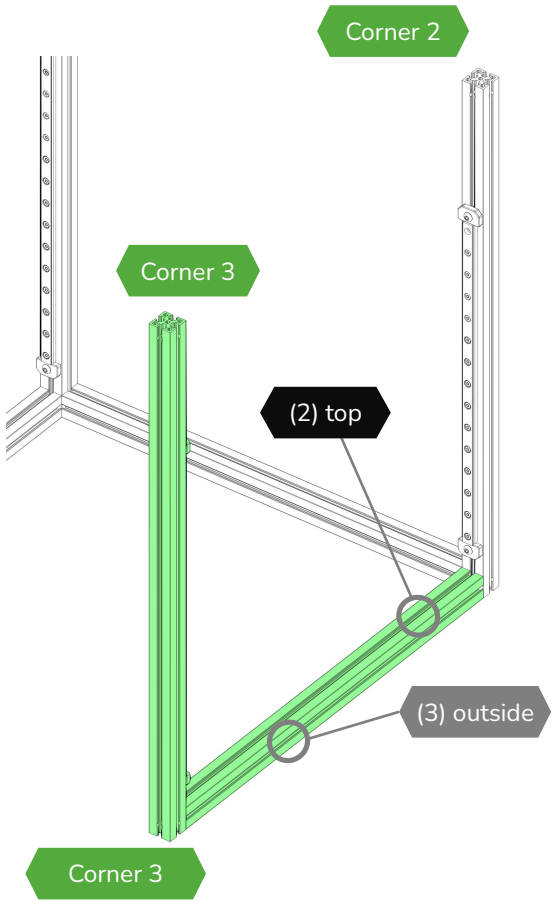
Before adding the next **A** extrusion, preload nuts into the **B** extrusion that is about to be enclosed, as shown. It receives. Corner extrusion **#2** will install the same as the first, using an M3x8 BHCS for the blind joint. The linear rail should face the same direction as the rail on Corner **#1**. Keep things as square and flush as possible as you tighten the screw to snug up the corner.





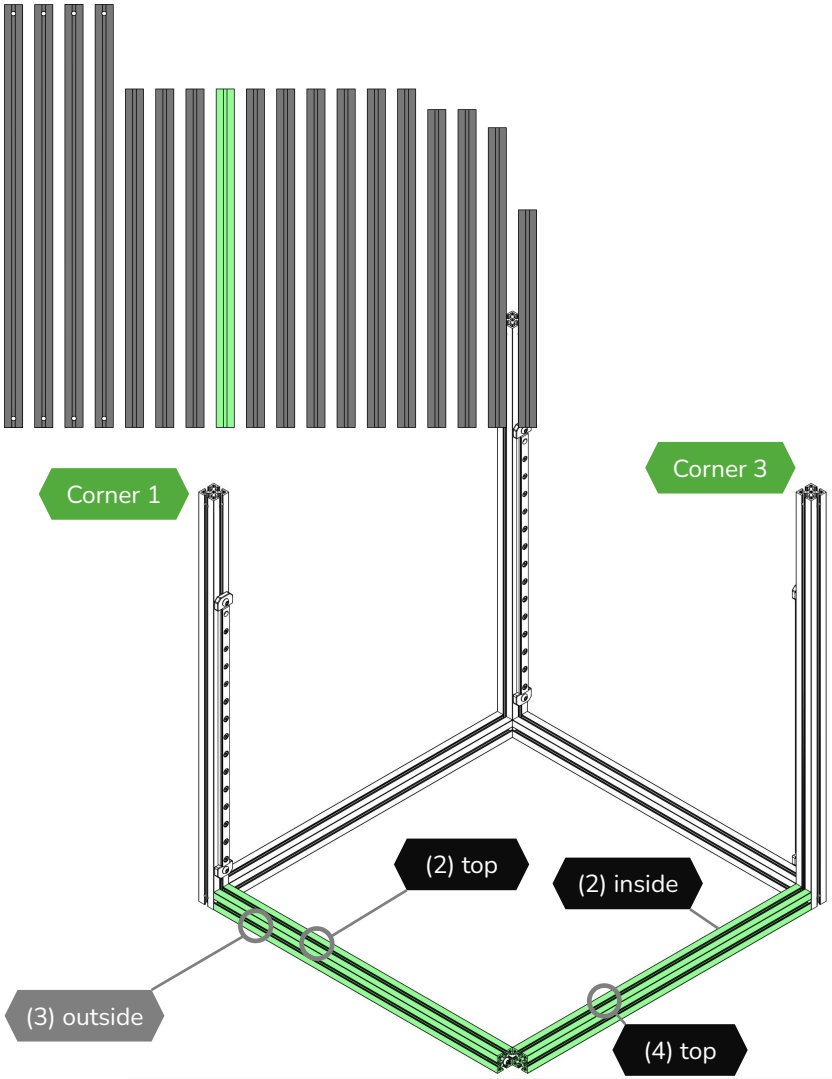






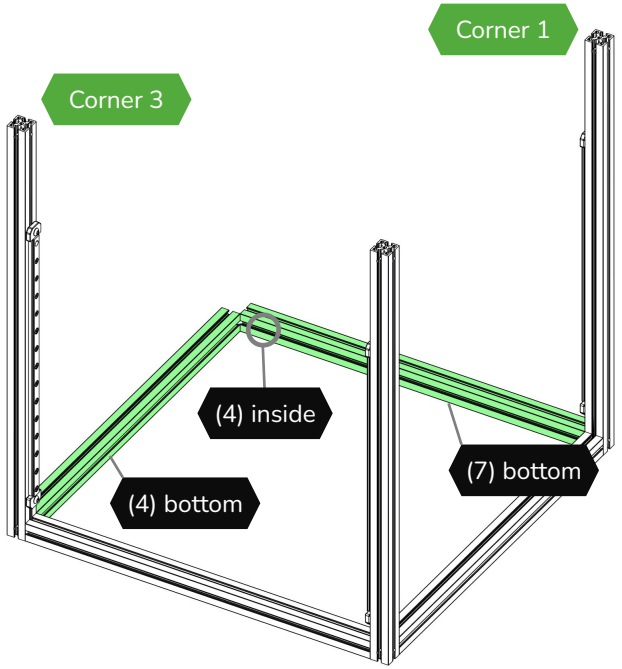
CORNER #3 ASSEMBLY

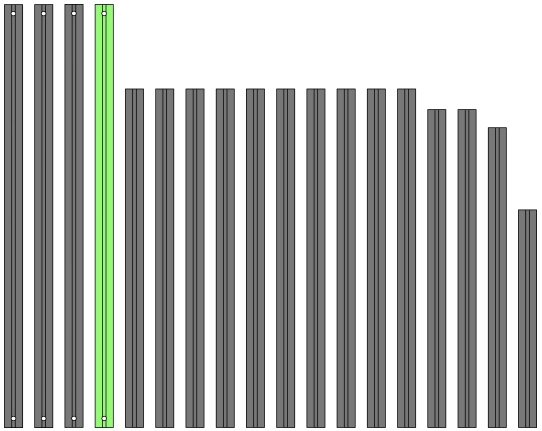
Before adding the next **A** extrusion, preload M3 nuts into the **B** extrusion that is about to be enclosed, as shown. It receives. Corner extrusion **#3** will install the same as the others, using an M3x8 BHCS for the blind joint. Note that the linear rail should face Corner **#2**. Keep things as square and flush as possible as you tighten the screw to snug up the corner.



FINAL LOWER EXTRUSION

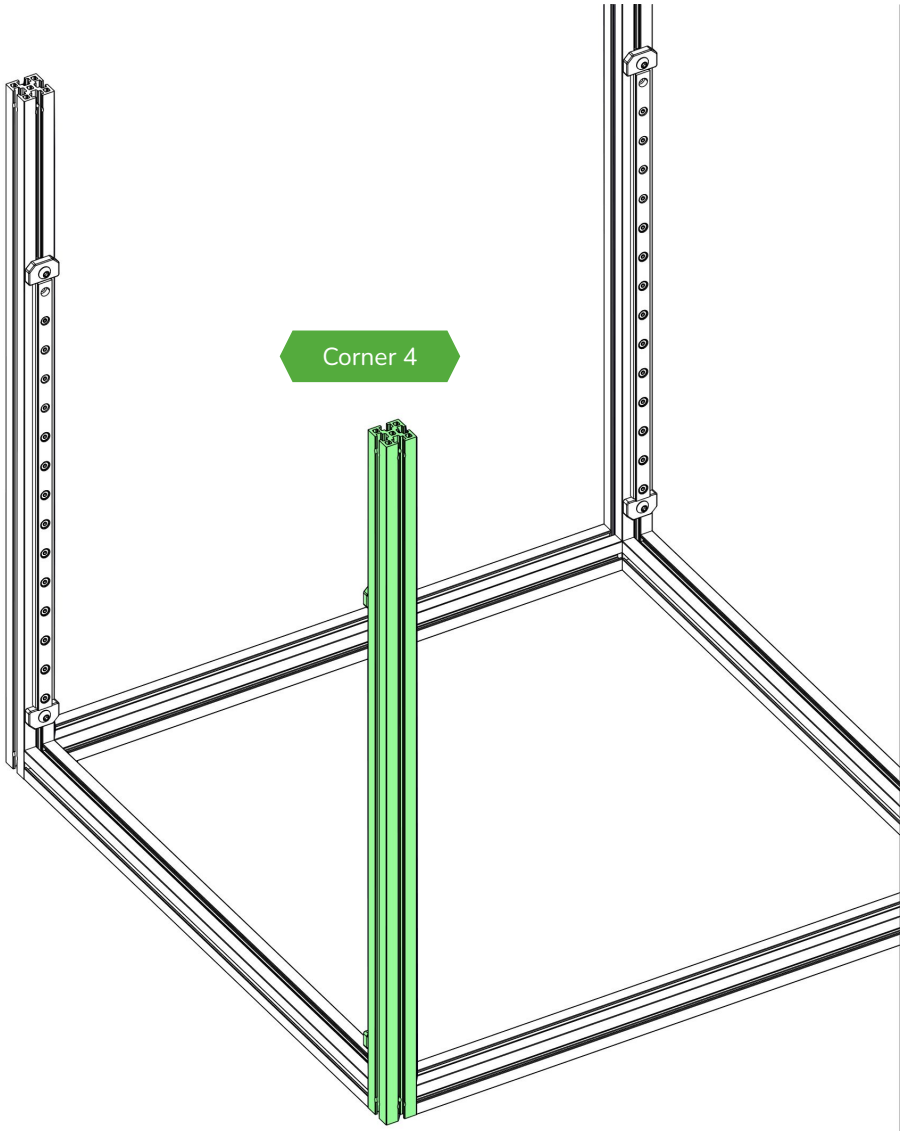
Before adding Corner **#4**, the there are 2 **B** extrusions that need to be secured to both Corner **#3** and Corner **#1** with a blind joint. Then preload all nuts into the as shown in both **B** extrusion before proceeding to the next page.

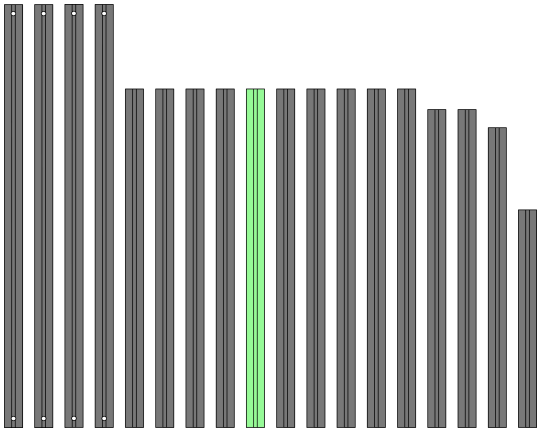




CORNER #4 ASSEMBLY

Now add the last **A** extrusion, being sure the linear rail faces Corner **#1**. Use blind joints to secure it to the **B** extrusions as we did with the other corners. The bottom half of the frame is complete. Great job! Did you get all the preloads in place? This would be a great time to make a visual count, and double check.





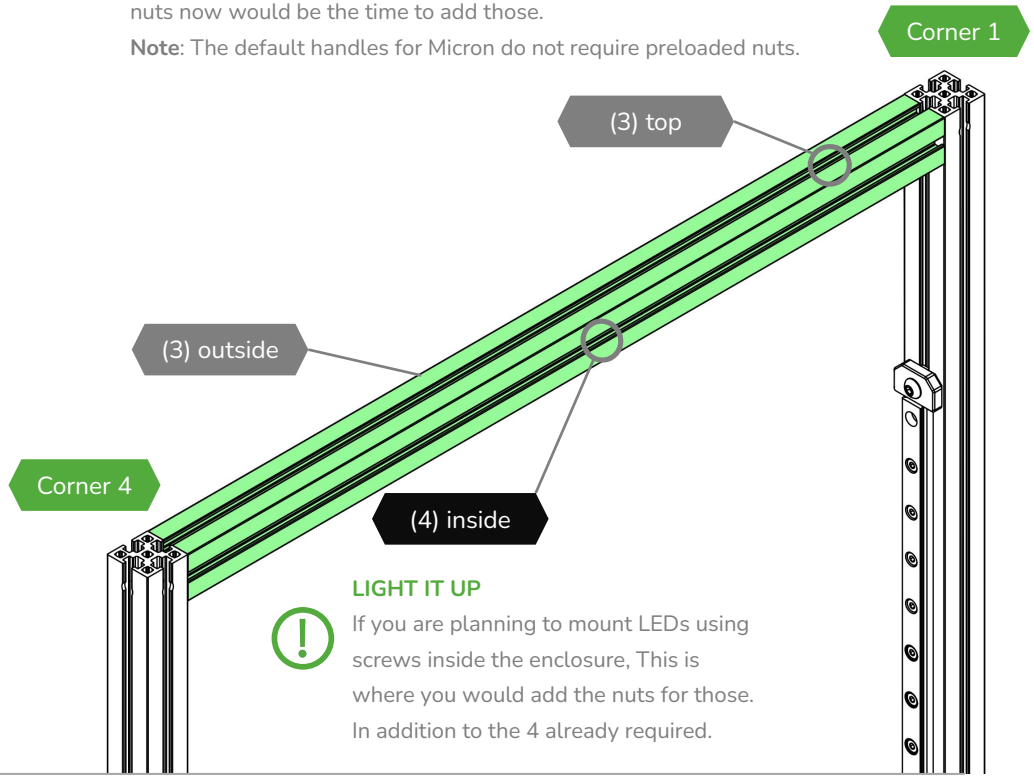
CAN YOU HANDLE IT?

Handles are an optional component you can install atop your Micron. They make carrying the printer very easy. If you want to install handles that need preloaded nuts now would be the time to add those.

Note: The default handles for Micron do not require preloaded nuts.

UPPER FRAME ASSEMBLY

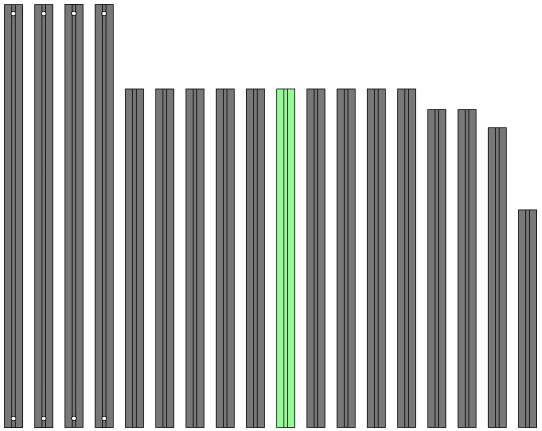
The remaining four **B** extrusions will install using blind joints, the same way the lower ones were assembled. The following pages will detail the preloads for these extrusions, including preloads for the optional handles. Start with the extrusion that connects Corners **#1** and **#4**.

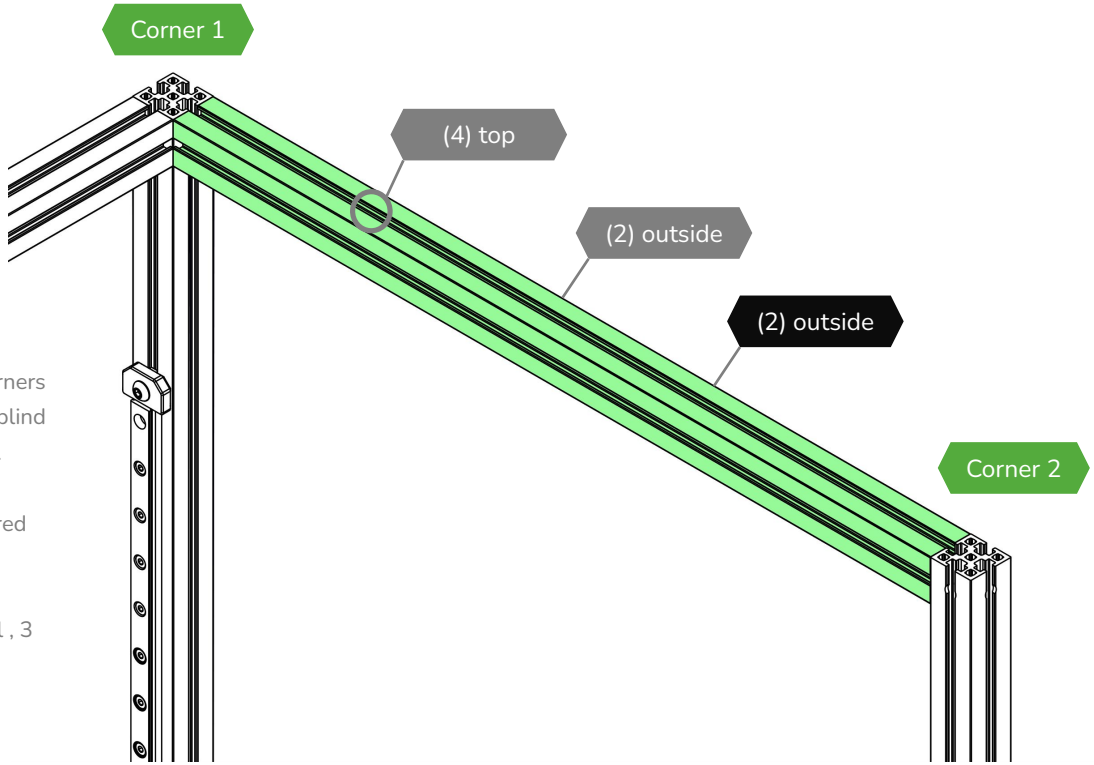


LIGHT IT UP

If you are planning to mount LEDs using screws inside the enclosure, This is where you would add the nuts for those. In addition to the 4 already required.

FRAME – TOP EXTRUSIONS – 2



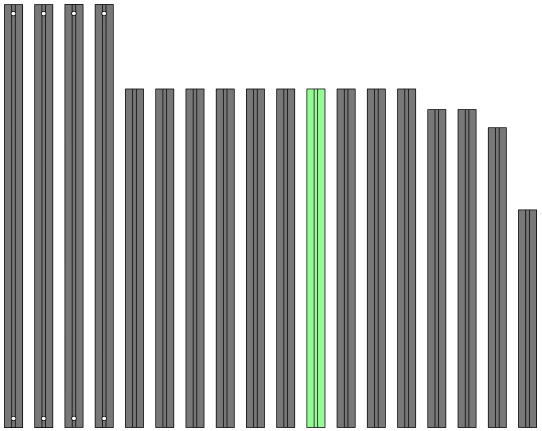


TOP OF FRAME

The **B** extrusion that connects Corners #1 and #2 receives. Attach using blind joints as with previous extrusions.

The rear side has 2 that are required and 2 that are optional

The top has all 4 that are optional , 3 for panel clips and 1 for ptfe tube retainer



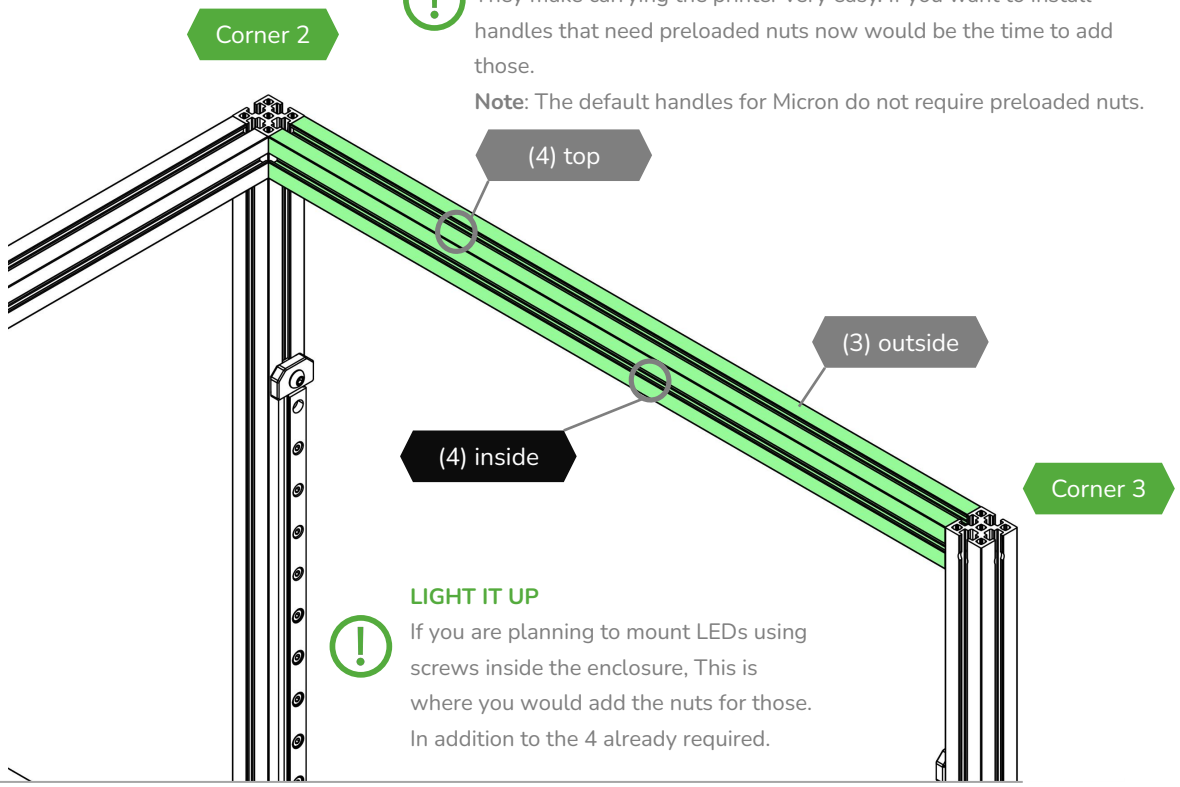
TOP OF FRAME #3

The **B** extrusion that connects Corners #2 and #3 receives: 4 nuts on top for handles(3 for no handles), 4 nuts inside, and 3 nuts outside. Attach using blind joints as with previous beams.

YOU CAN'T HANDLE THE TRUTH!

Handles are an optional component you can install atop your Micron. They make carrying the printer very easy. If you want to install handles that need preloaded nuts now would be the time to add those.

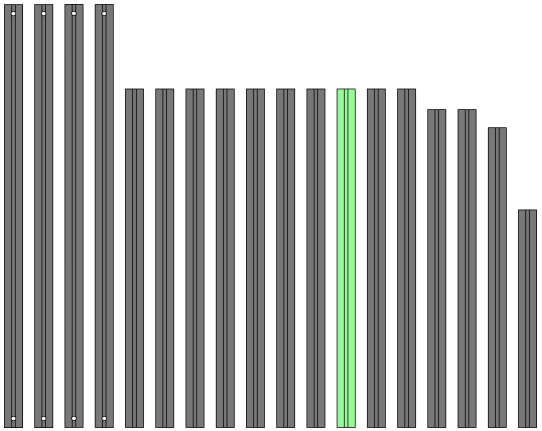
Note: The default handles for Micron do not require preloaded nuts.



LIGHT IT UP

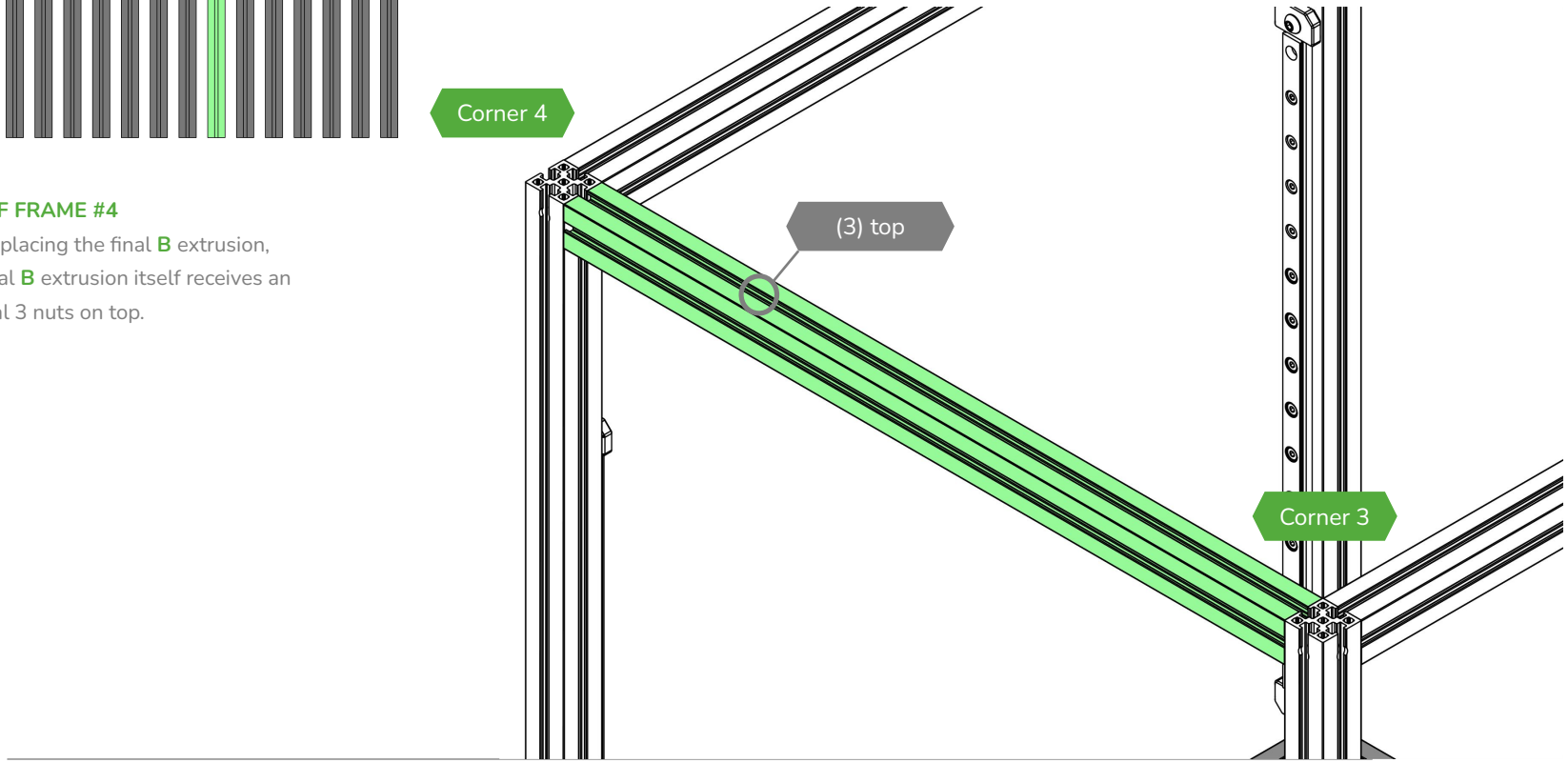
If you are planning to mount LEDs using screws inside the enclosure, This is where you would add the nuts for those. In addition to the 4 already required.

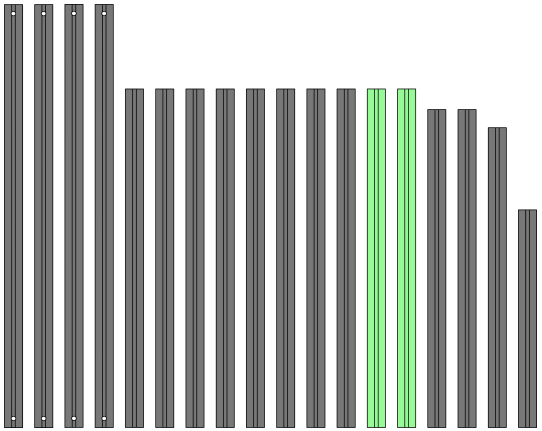
FRAME – TOP EXTRUSIONS – 4

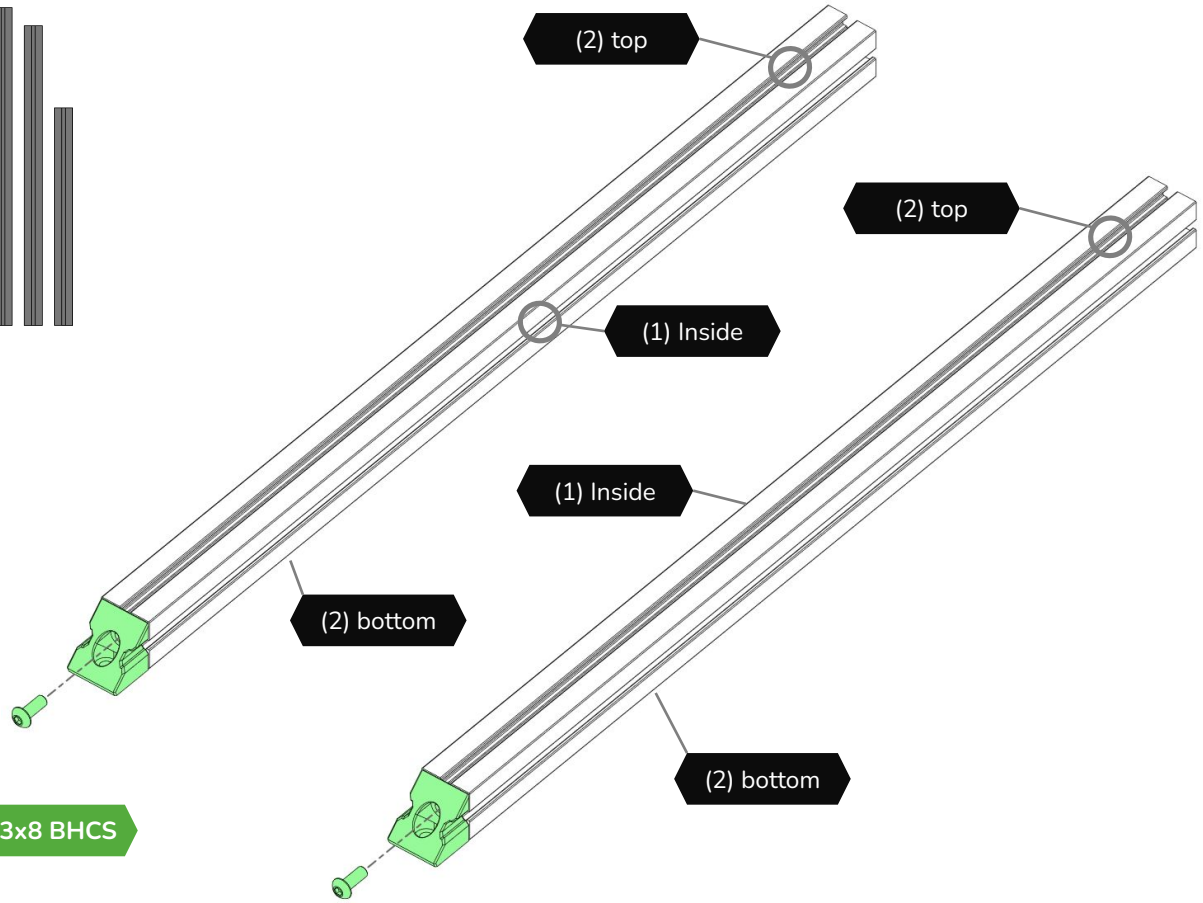


TOP OF FRAME #4

Before placing the final **B** extrusion,
The final **B** extrusion itself receives an
optional 3 nuts on top.







BED EXTRUSIONS

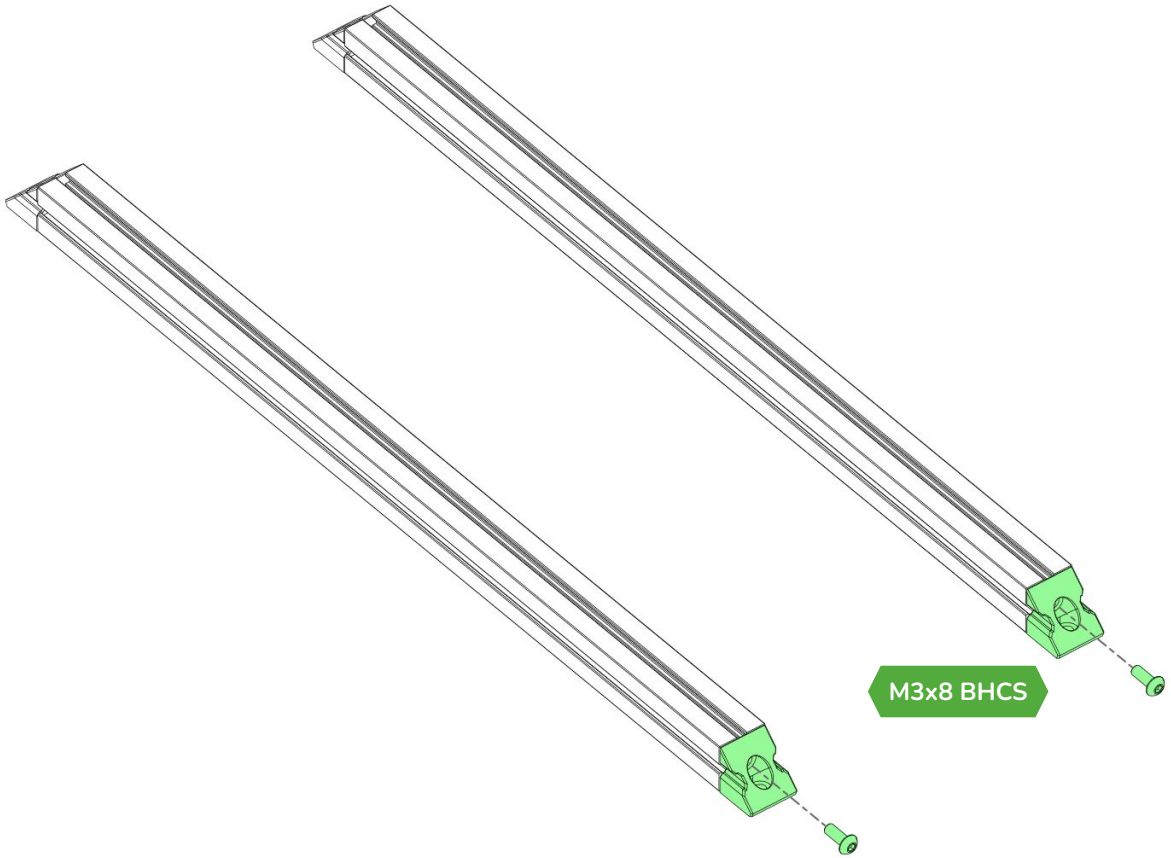
Attach 2 corner brackets to the end of the last two **B** extrusions

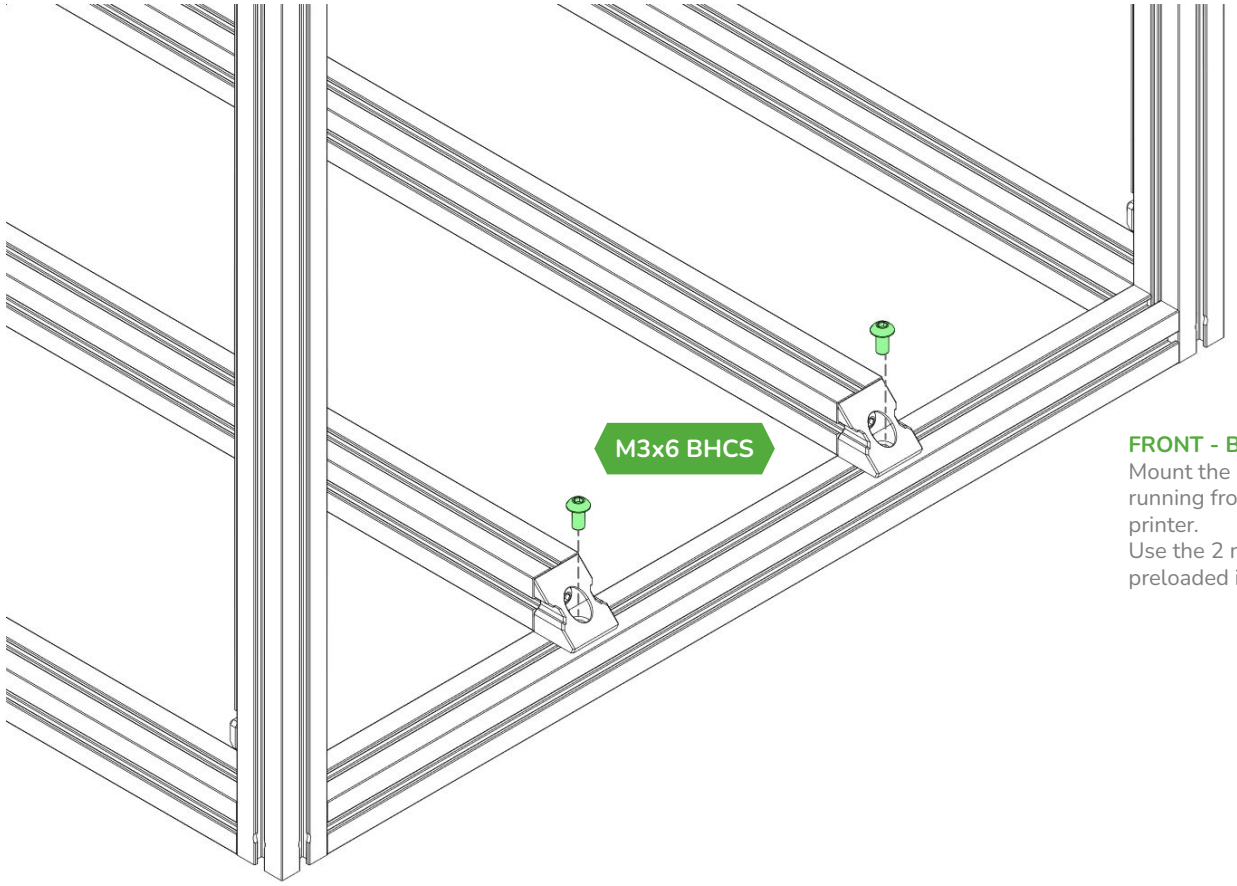
BLIND JOINTS

Some kits use blind joints for this instead of the printed brackets. If yours does you can skip these printed parts and the next page

BED EXTRUSIONS

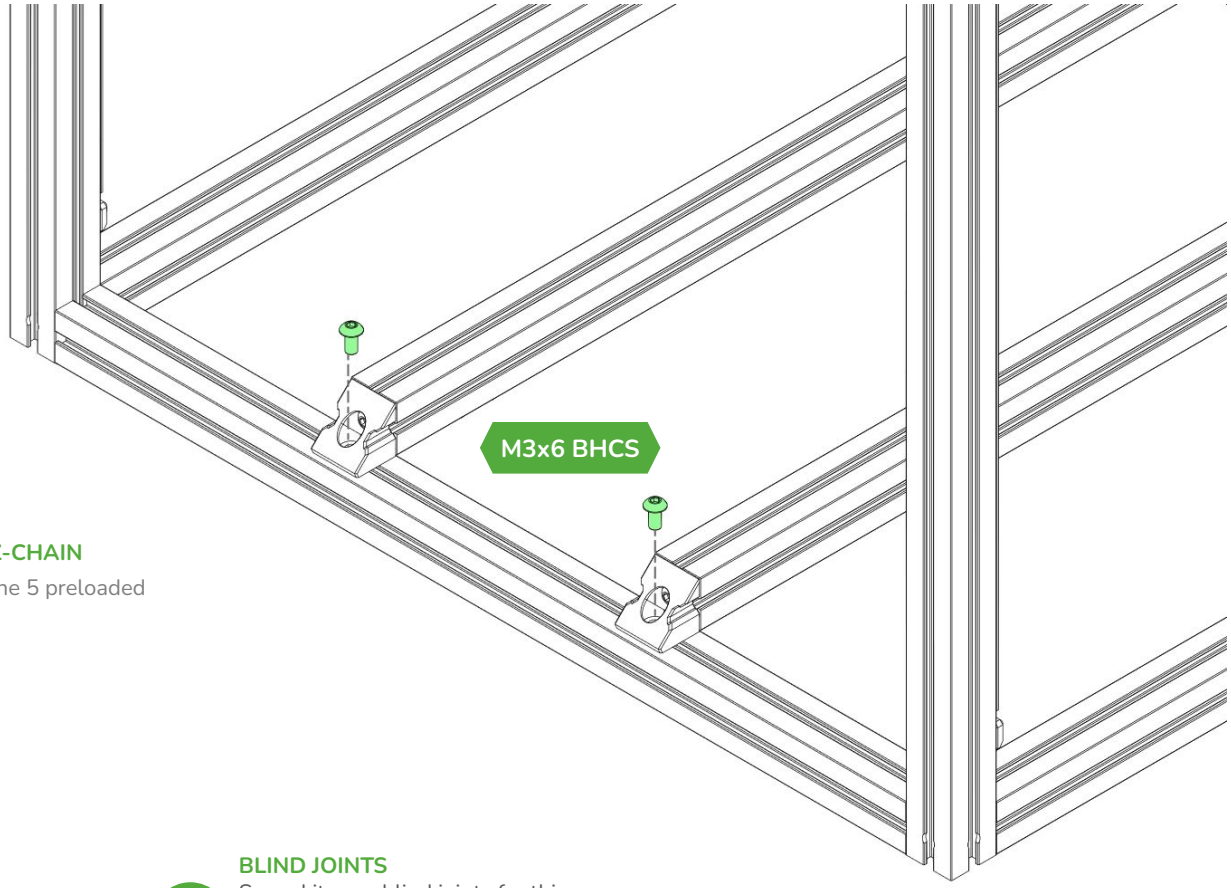
Attach the last 2 corner brackets to the end of the last two **B** extrusions while making sure not to lose any of the preloaded nuts





FRONT - BED EXTRUSIONS
Mount the bed extrusions as shown, running from the front to back in the printer.
Use the 2 middle nuts, of the 4 preloaded into the front .

BLIND JOINTS
Some kits use blind joints for this instead of the printed brackets. The same hardware is used for blind joints as well. Start by threading the screws into the nuts and sliding the extrusions over the screw head



BED EXTRUSIONS – Z-CHAIN

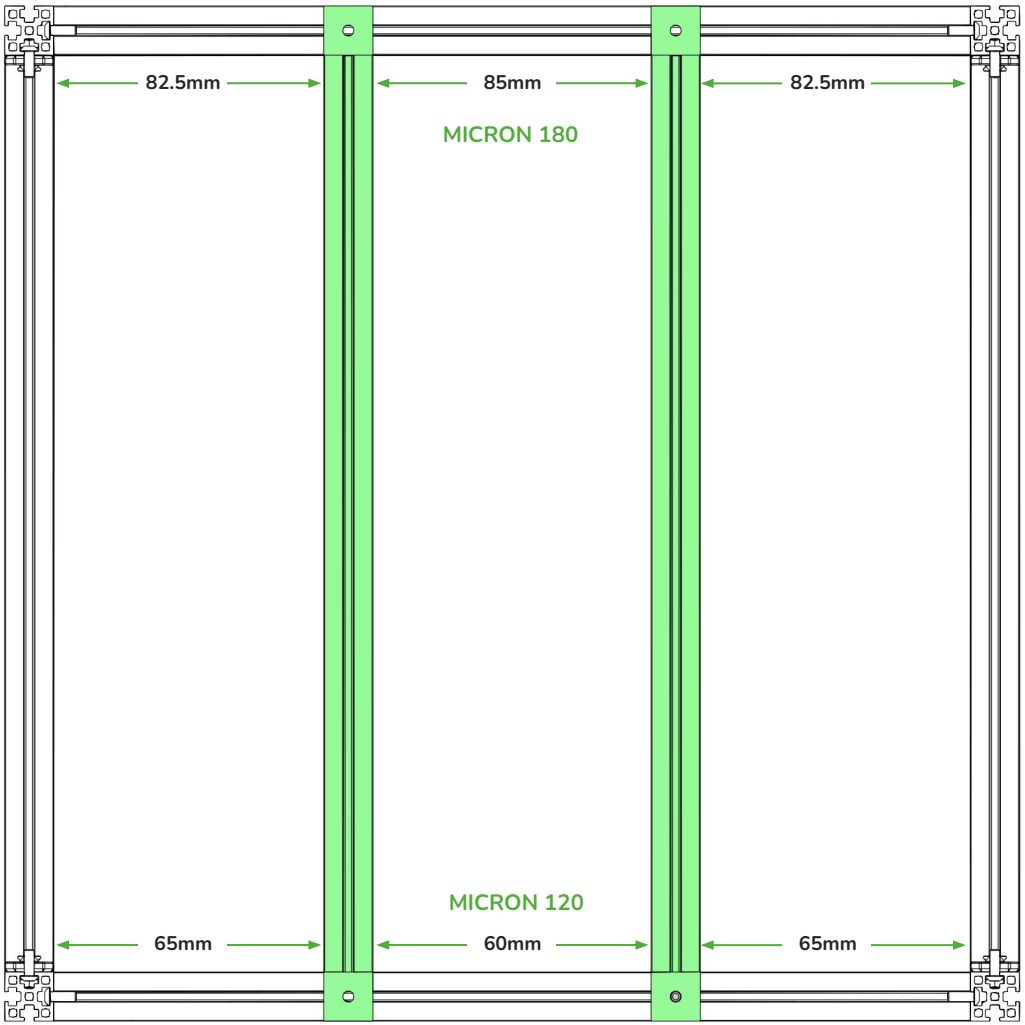
use the 2nd and 4th of the 5 preloaded into the rear extrusion,

BLIND JOINTS

Some kits use blind joints for this instead of the printed brackets. The same hardware is used for blind joints as well

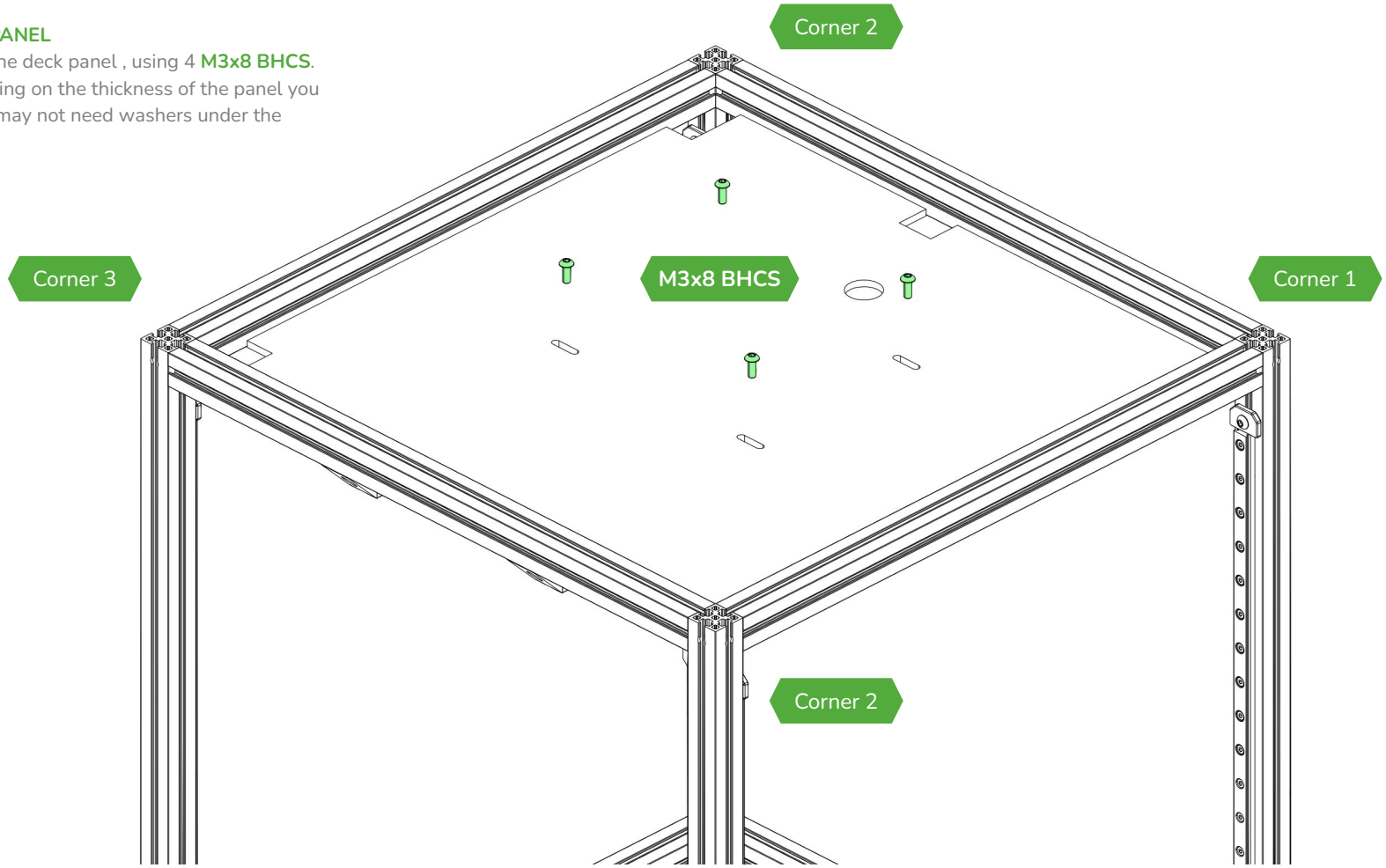
BED EXTRUSIONS

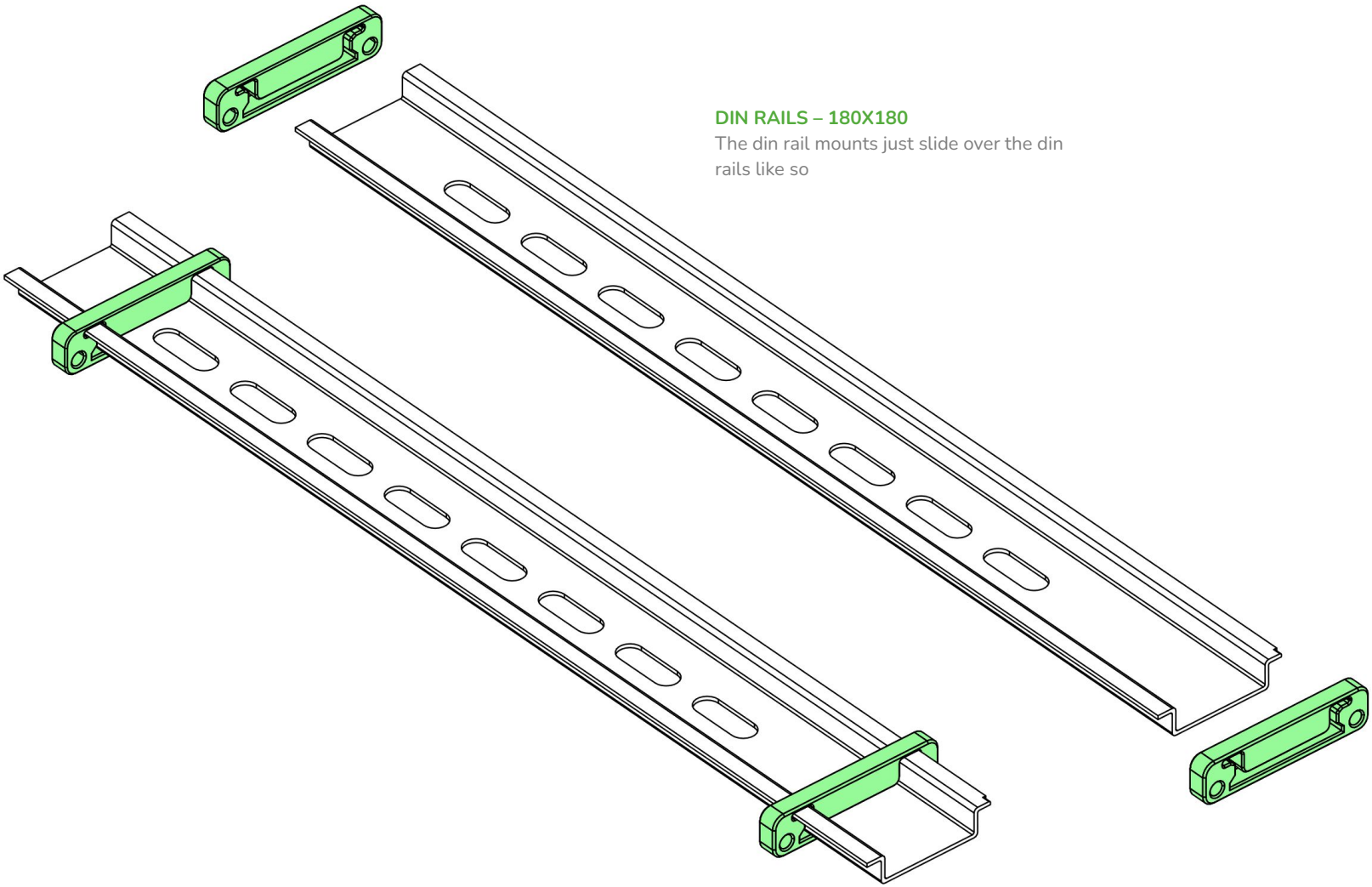
Mount the bed extrusion as shown, making sure to center the extrusions on the frame with the correct amount of space between them for your build. After they are aligned properly, you can then tighten the 4 **M3x6 BHCS** to secure the bed frame.



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



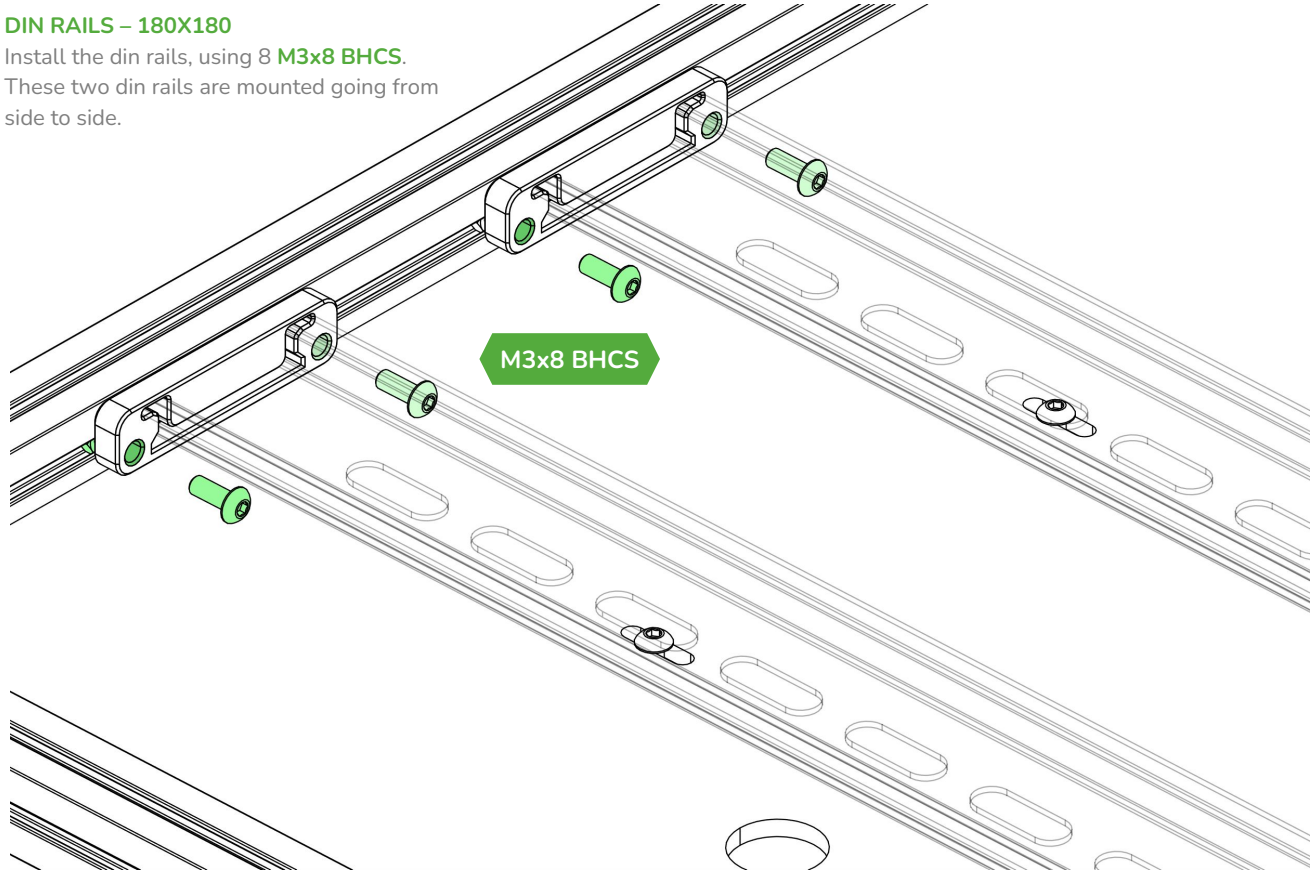


DIN RAILS – 180X180

The din rail mounts just slide over the din rails like so

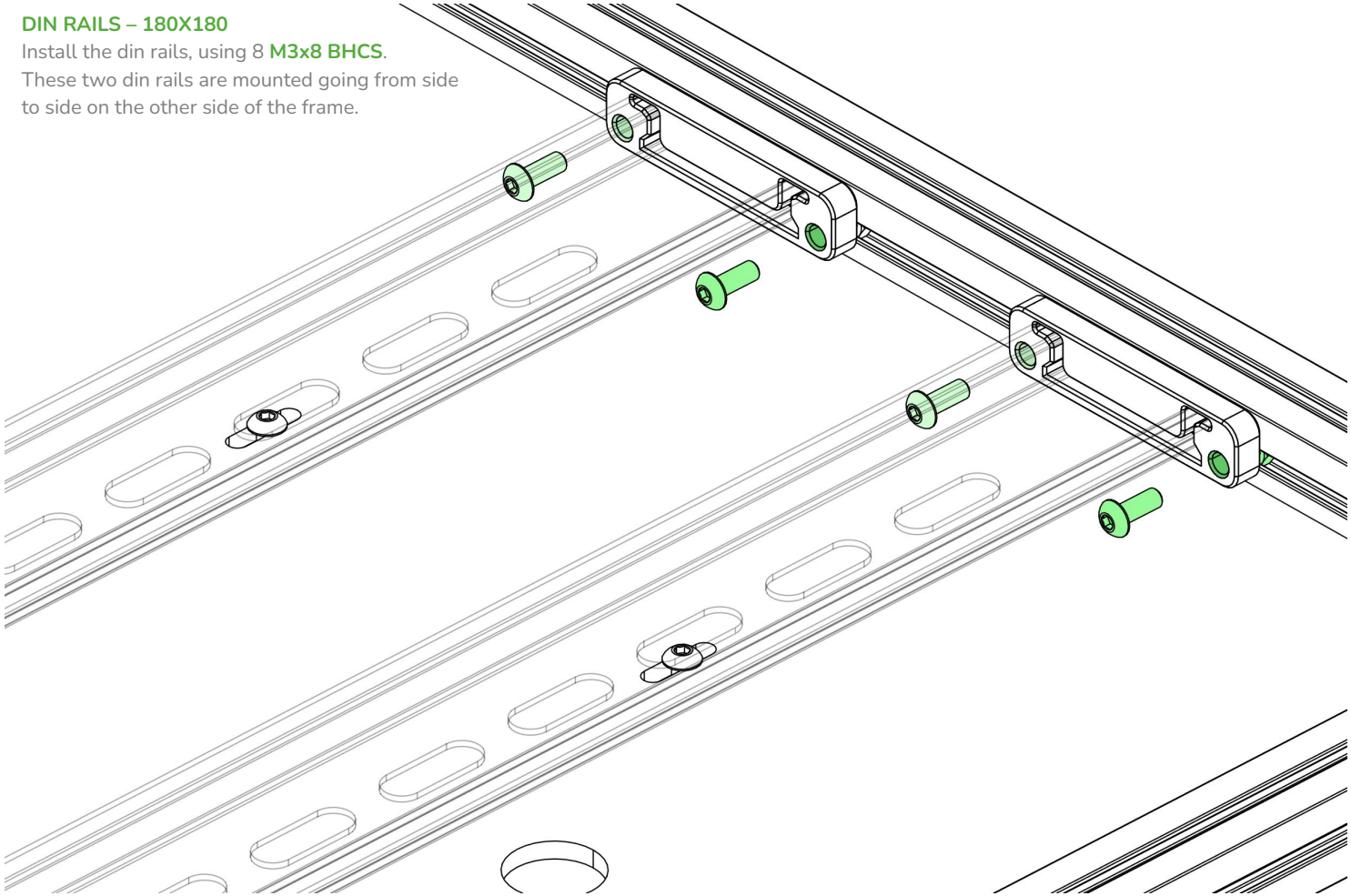
DIN RAILS – 180X180

Install the din rails, using 8 **M3x8 BHCS**.
These two din rails are mounted going from side to side.



DIN RAILS – 180X180

Install the din rails, using 8 **M3x8 BHCS**.
These two din rails are mounted going from side to side on the other side of the frame.

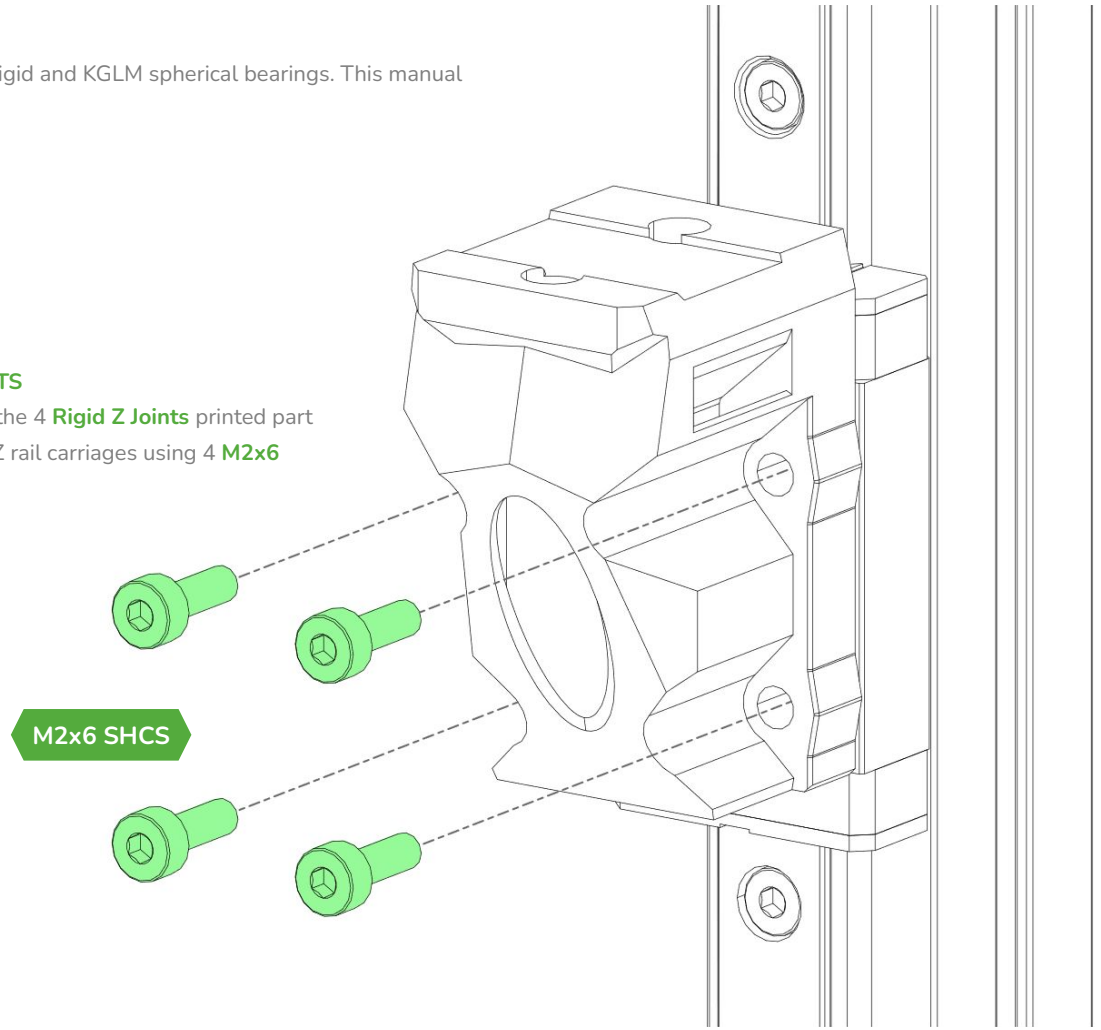


Z JOINTS - Decisions, decisions....

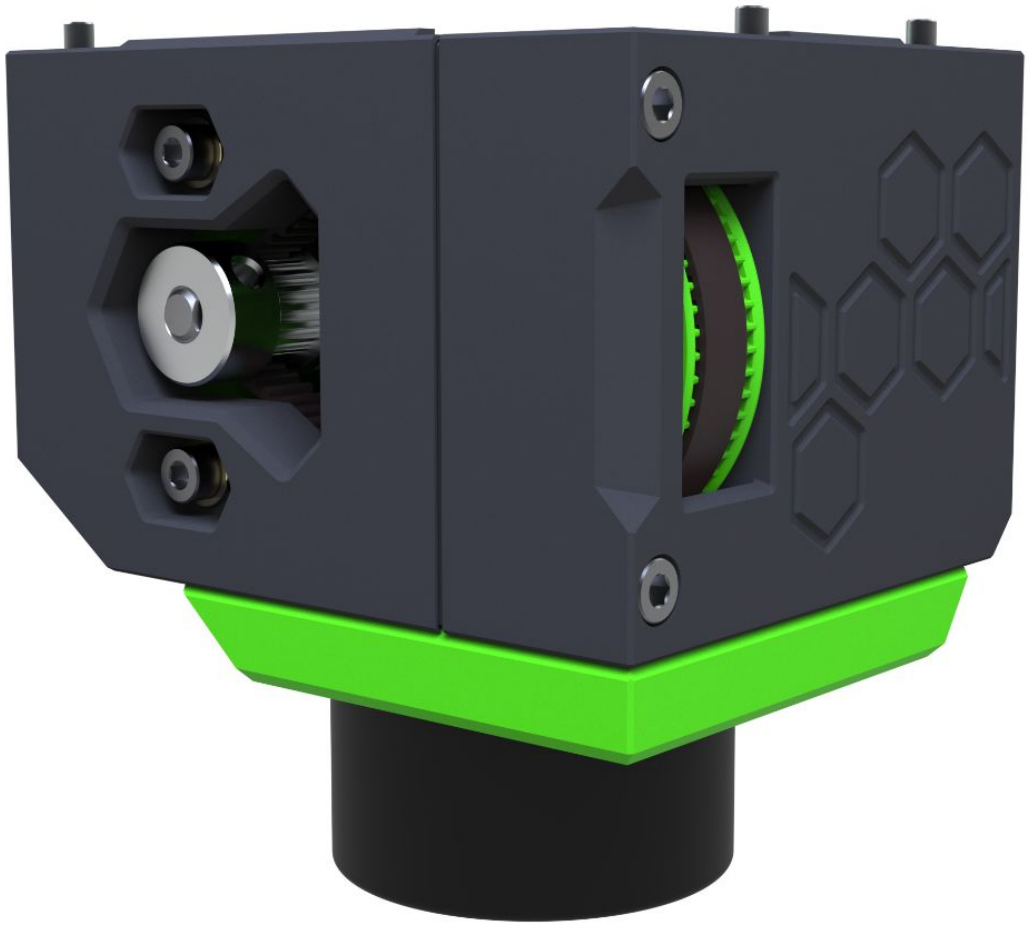
There are 2x options for the Z Joints, Rigid and KGLM spherical bearings. This manual will only cover the Rigid version

Z JOINTS

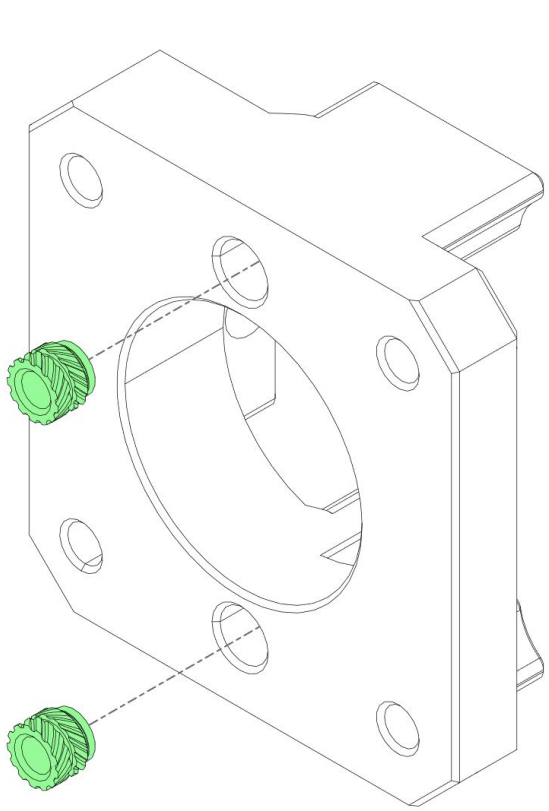
Install the 4 **Rigid Z Joints** printed part to the Z rail carriages using 4 **M2x6** SHCS

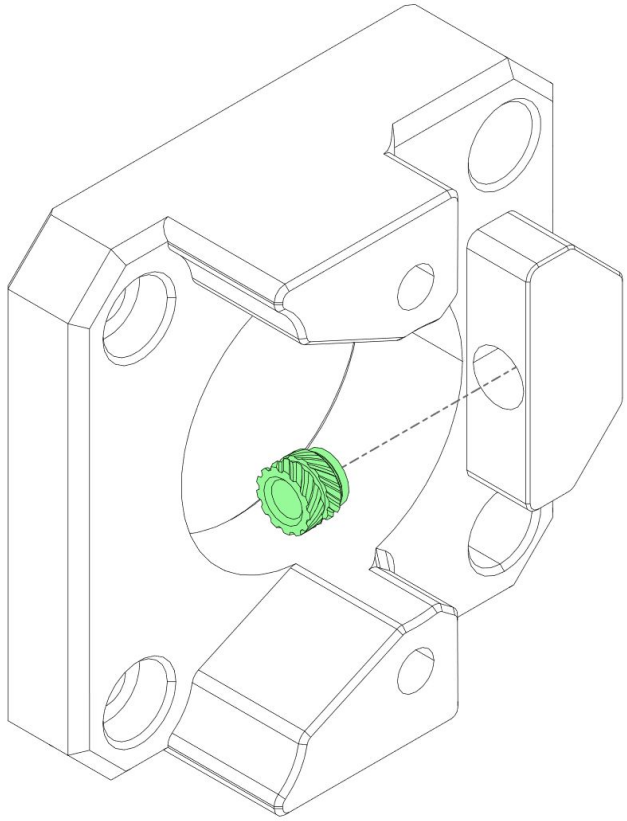


MICRON

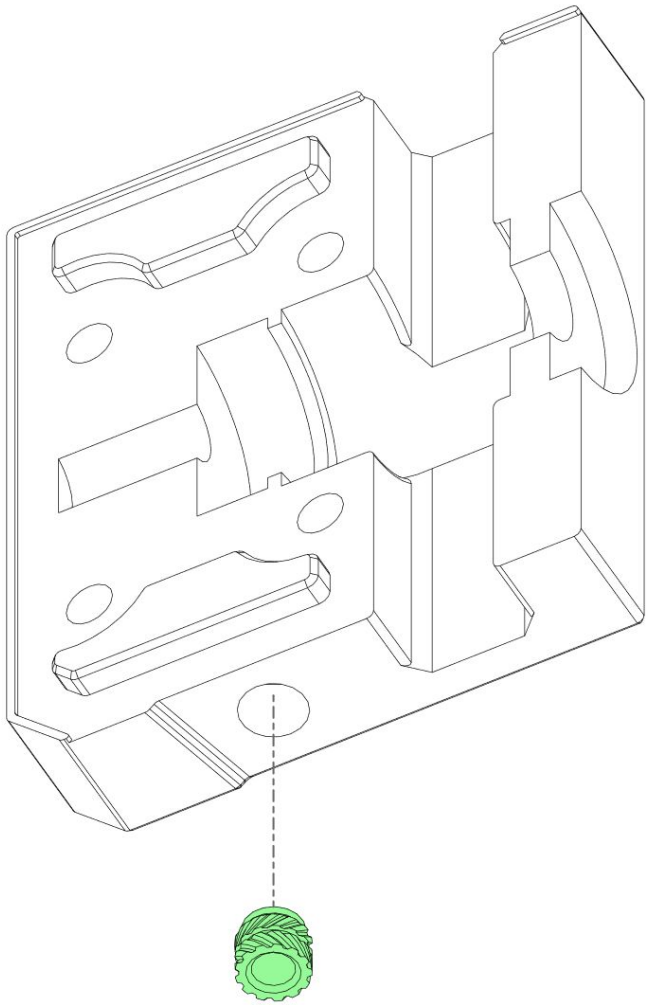


Z DRIVE HEATSET INSERTS

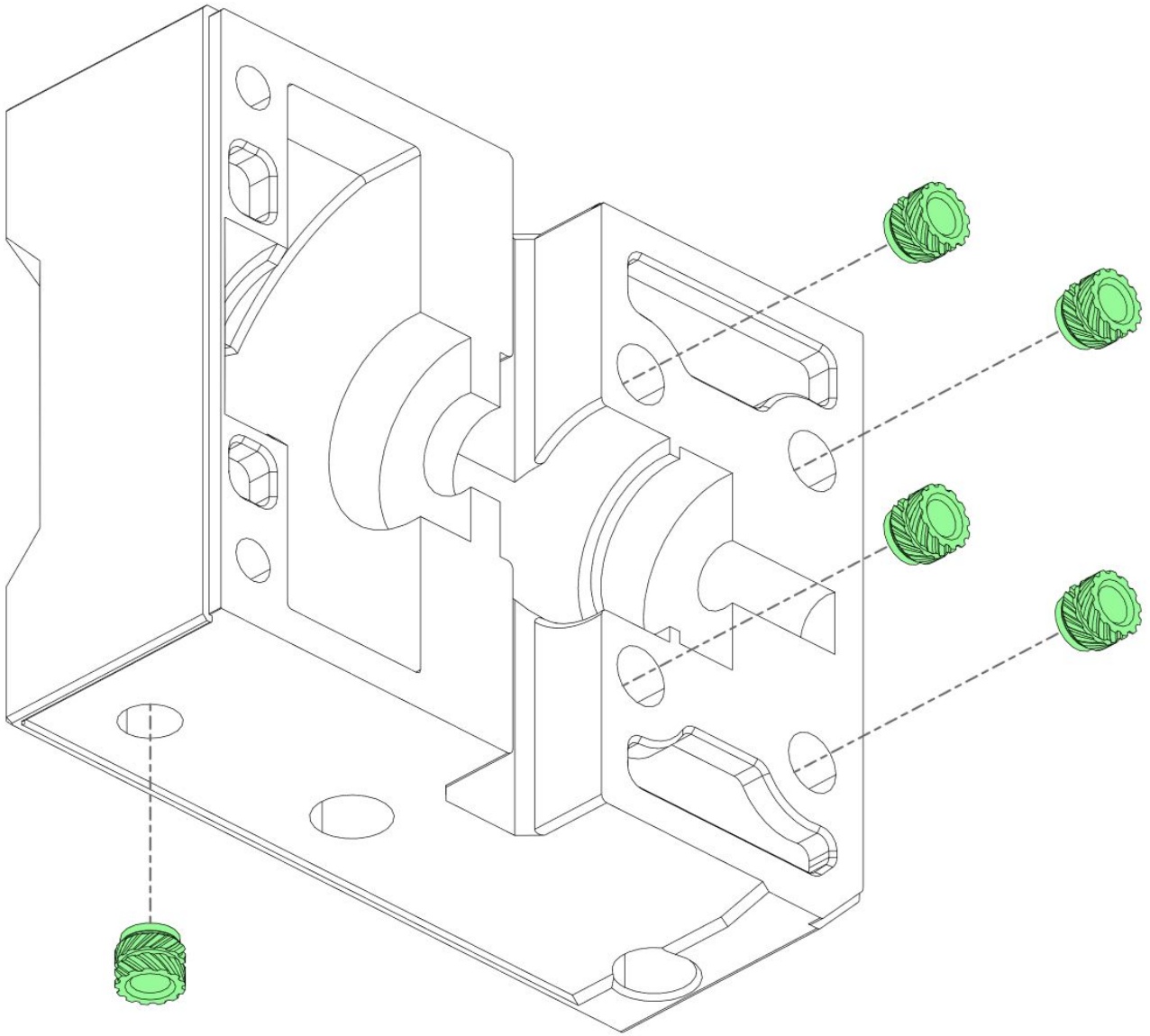




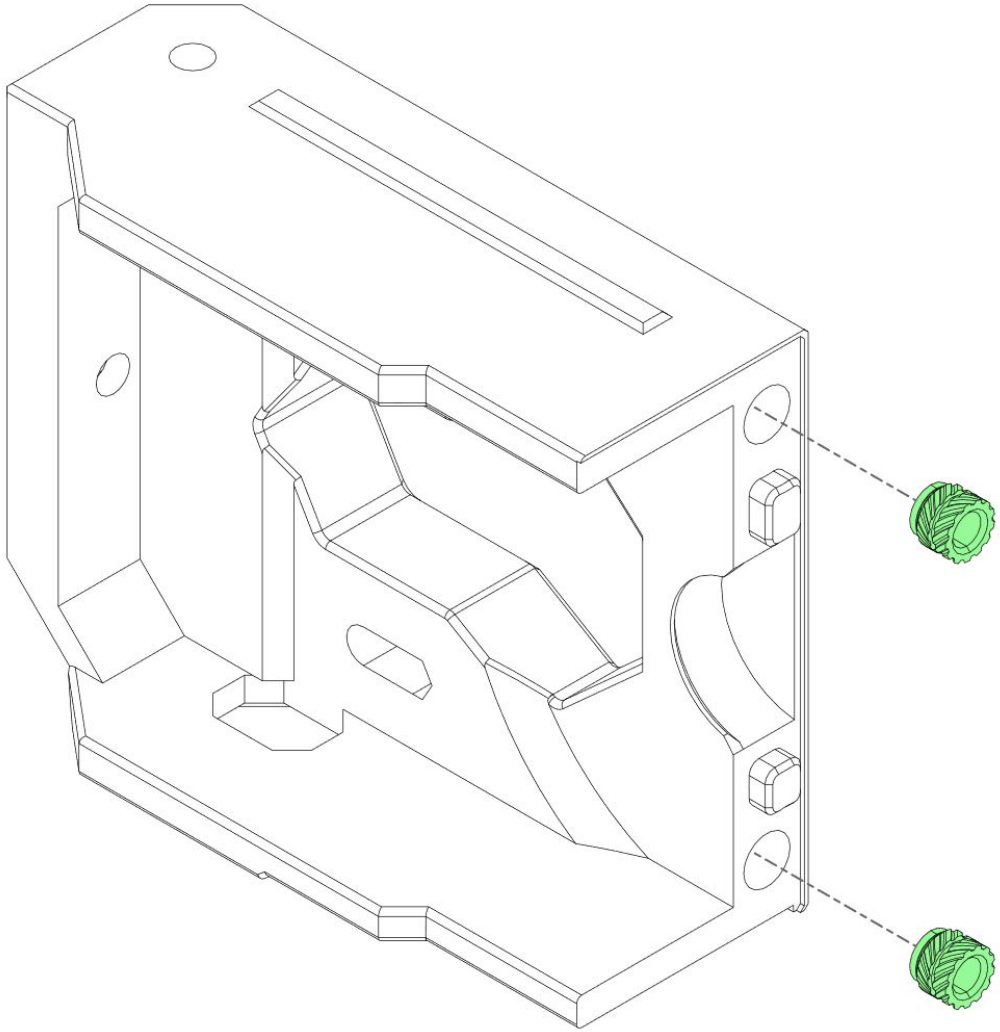
MICRON



Z DRIVE HEATSET INSERTS

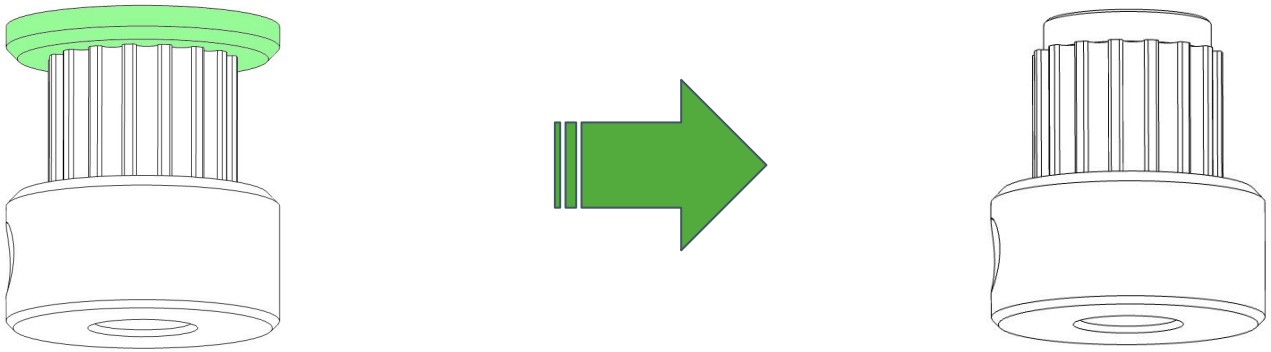


Z DRIVE HEATSET INSERTS

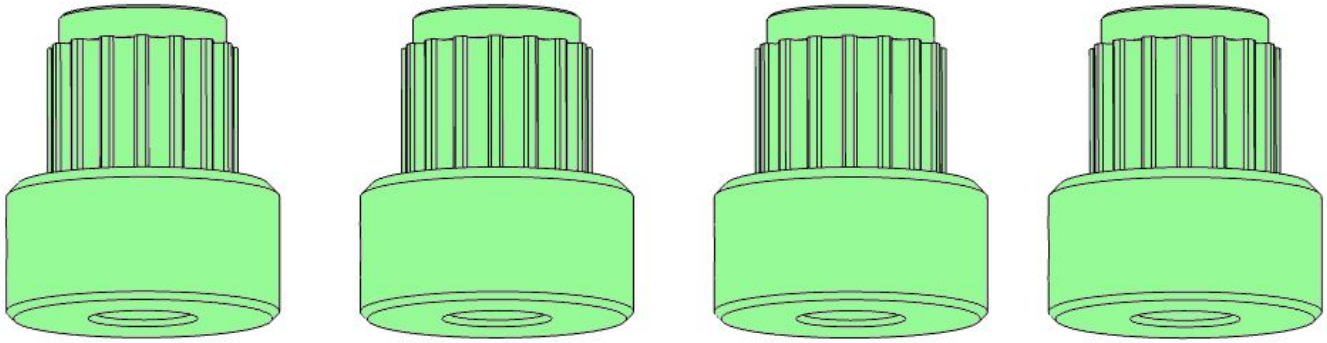


Removing the upper flange from the pulley

Take a pair of pliers or grips and firmly pull the top flange off of the **GT2 16t Pulley**.

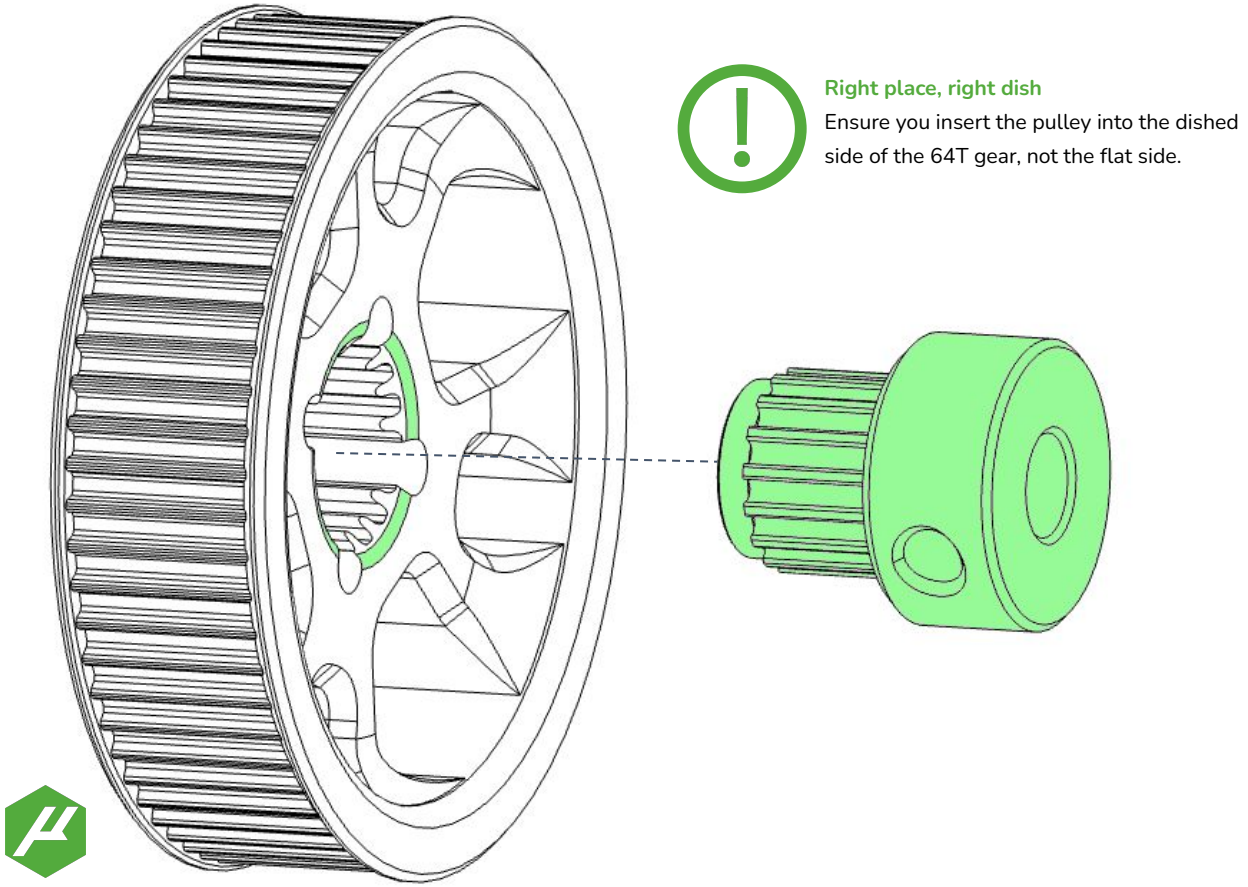


Do this **FOUR** times, so you end up with the below:



When two become one....

Insert one of the previously de-flanged GT2 16T Pulleys into the centre of the **[a]_64t_hubbed_gear_x4.stl**.

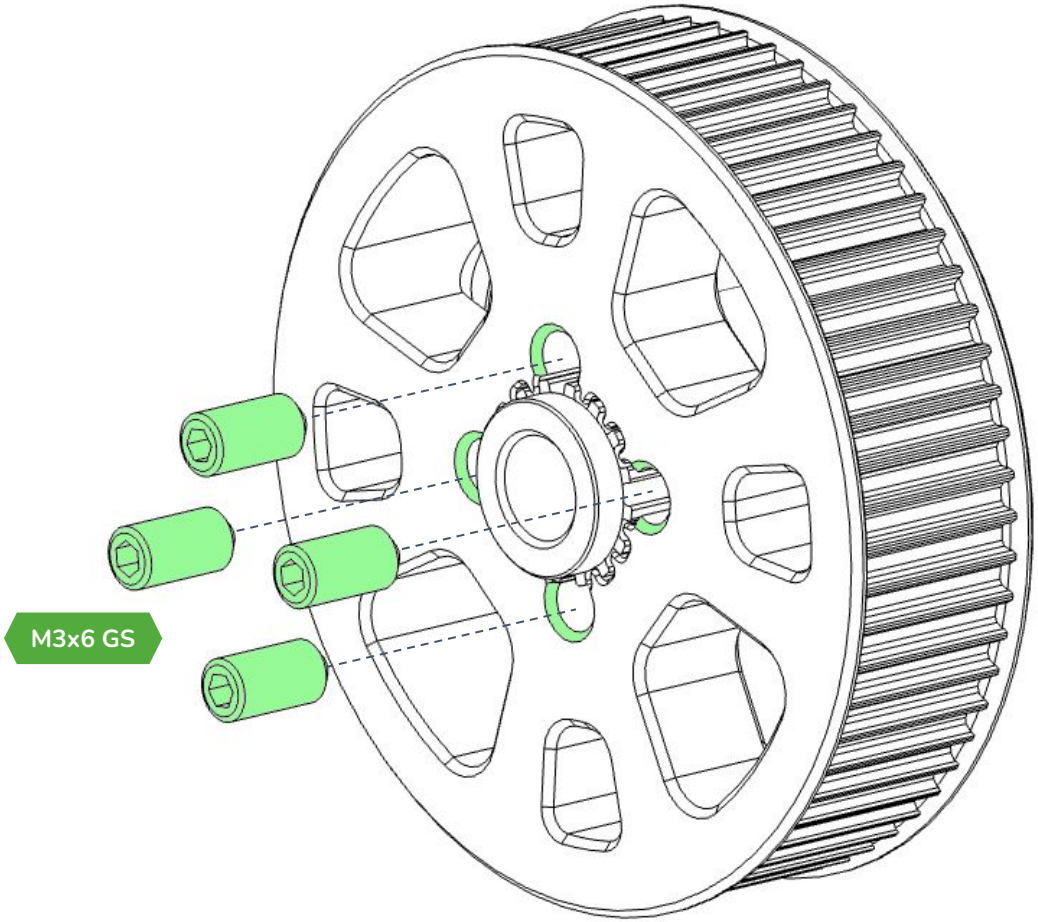


Right place, right dish

Ensure you insert the pulley into the dished side of the 64T gear, not the flat side.

Grub Screws Engage: Pulley Secured, Captain

Flip the 64T Gear / Pulley combo and slowly insert
4x **M3x6mm Grub Screw (GS)**, to secure the pulley in place.

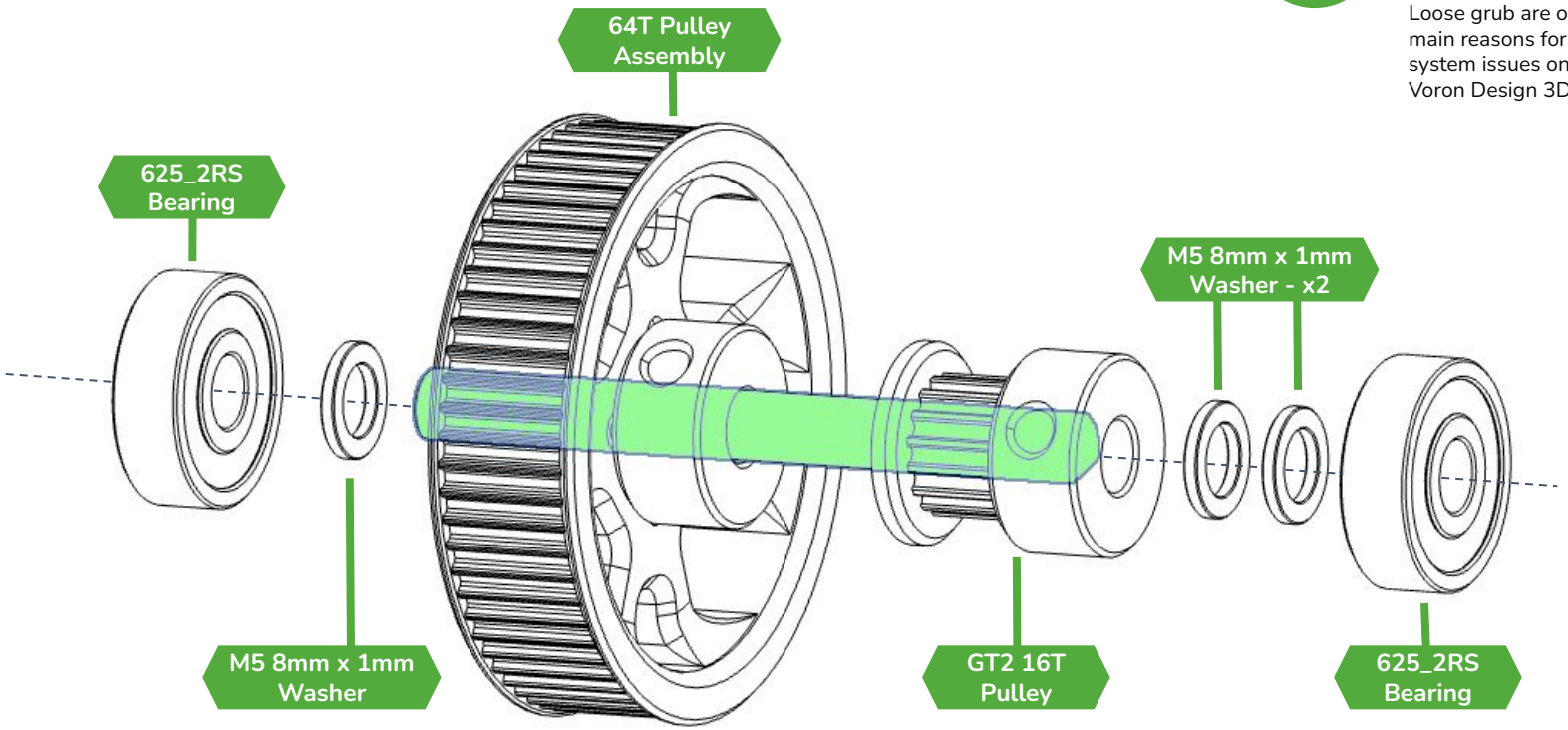


Balance in all things, even Grub Screws!
Follow the below pattern when screwing in the Grub Screws, a few threads/turns at a time.
This will ensure the two don't become skewed. If you don't, a wonky pulley is... inevitable.

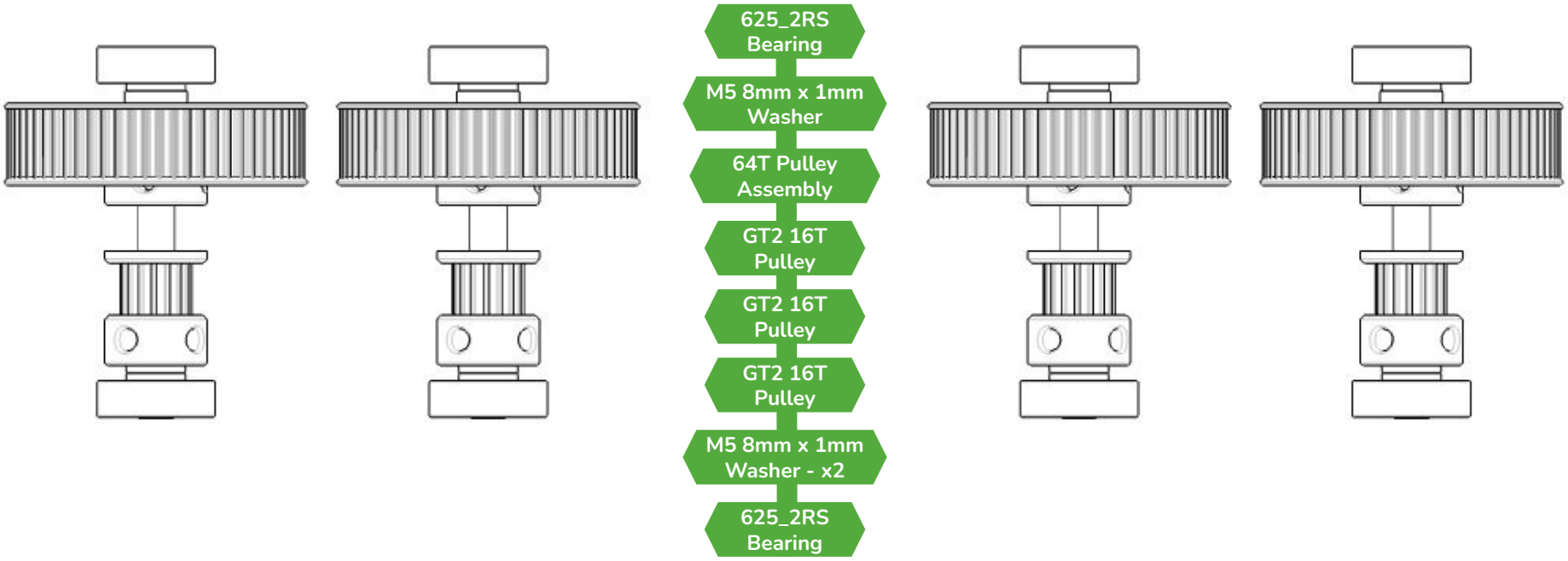
1
3 4
2

STACK IT LIKE IT'S HOT..
Grab your **5mmx47mm D-Shaft** and put the following components onto it, in the following order.

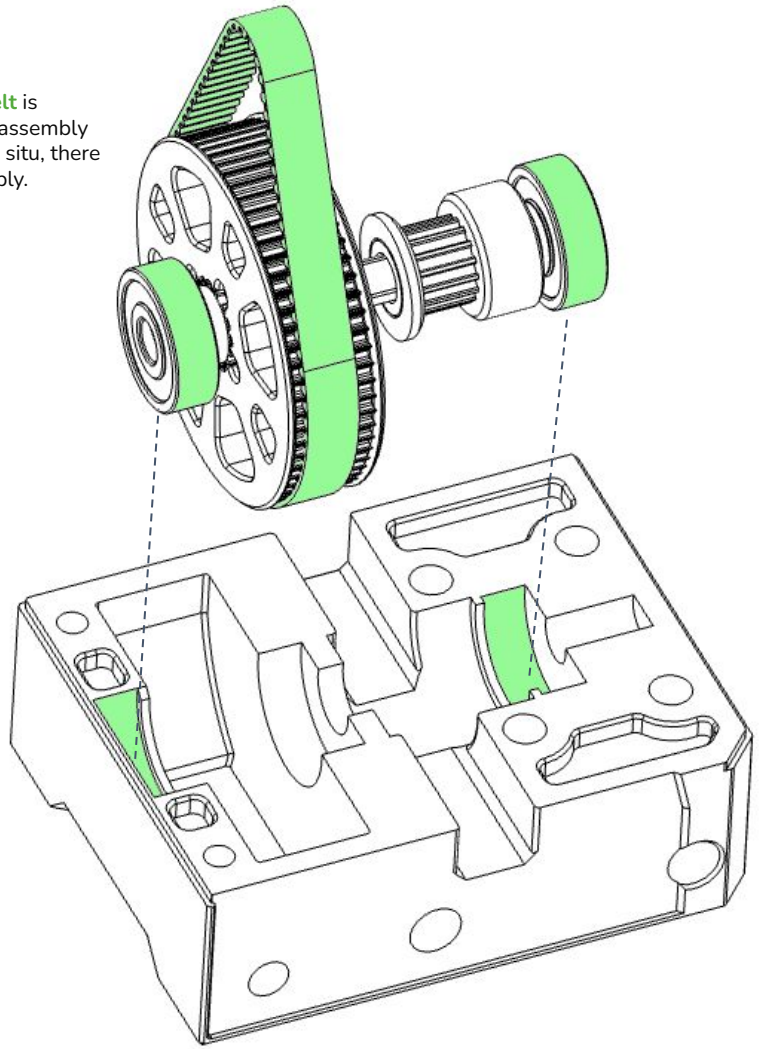
GRUB SCREWS?
It's always the grub screws... don't forget to Loctite the grub screws so they don't come loose. Loose grub are one of the main reasons for motion system issues on PFA & Voron Design 3D Printers.



REPEAT, REPEAT, REPEAT...
Assemble 3x more Drive Shaft Assemblies, and you should have a pile of well structured parts that look a little something like this...



PRIOR PREPARATION AND BELT PLACEMENT
For this step, ensure the **152mm Closed Loop Belt** is wrapped around the 64T Pulley before the shaft assembly is placed into the **main_body_x_x2.stl**, as once in situ, there is no way to add the belt after, without disassembly.

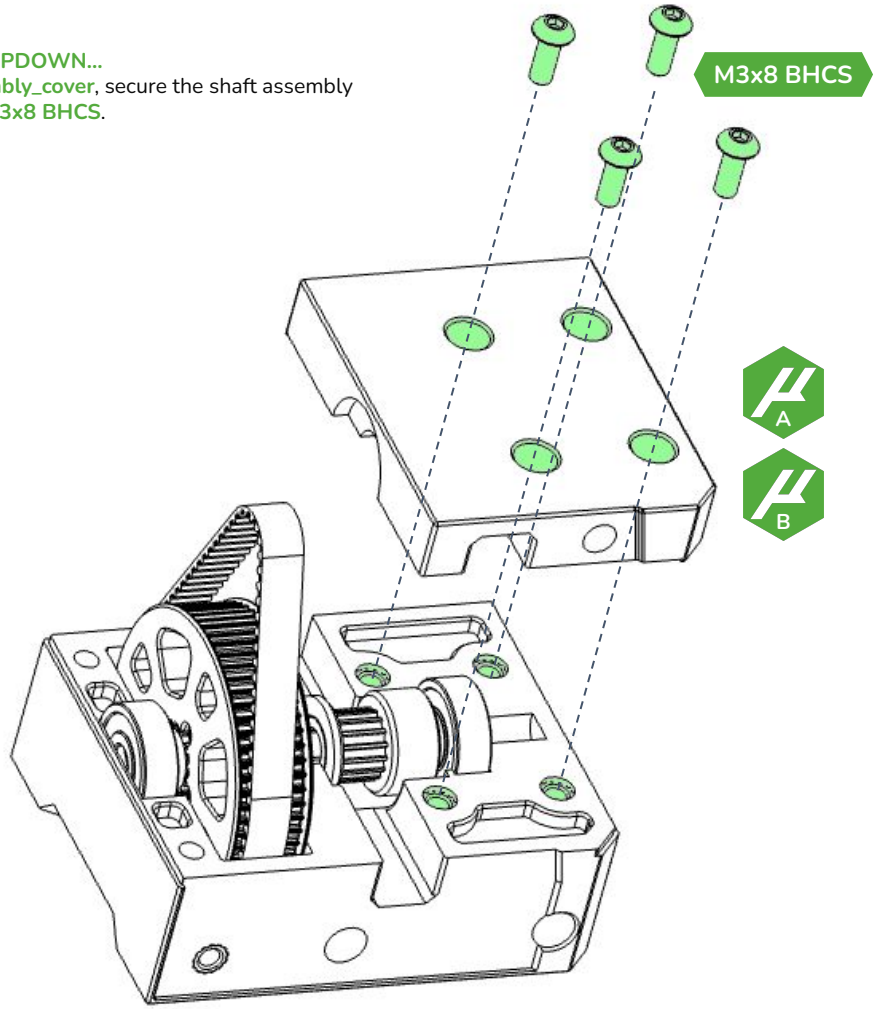


SEAT HAPPENS
Check the **625_2RS Bearings** are seated correctly in their recess to prevent any misalignment issues or skew.

A, B? I THOUGHT THIS WAS THE Z DRIVE?
It is, but there are 2x versions to assemble for opposing corners.

- 2x - A Assemblies
- 2x - B Assemblies

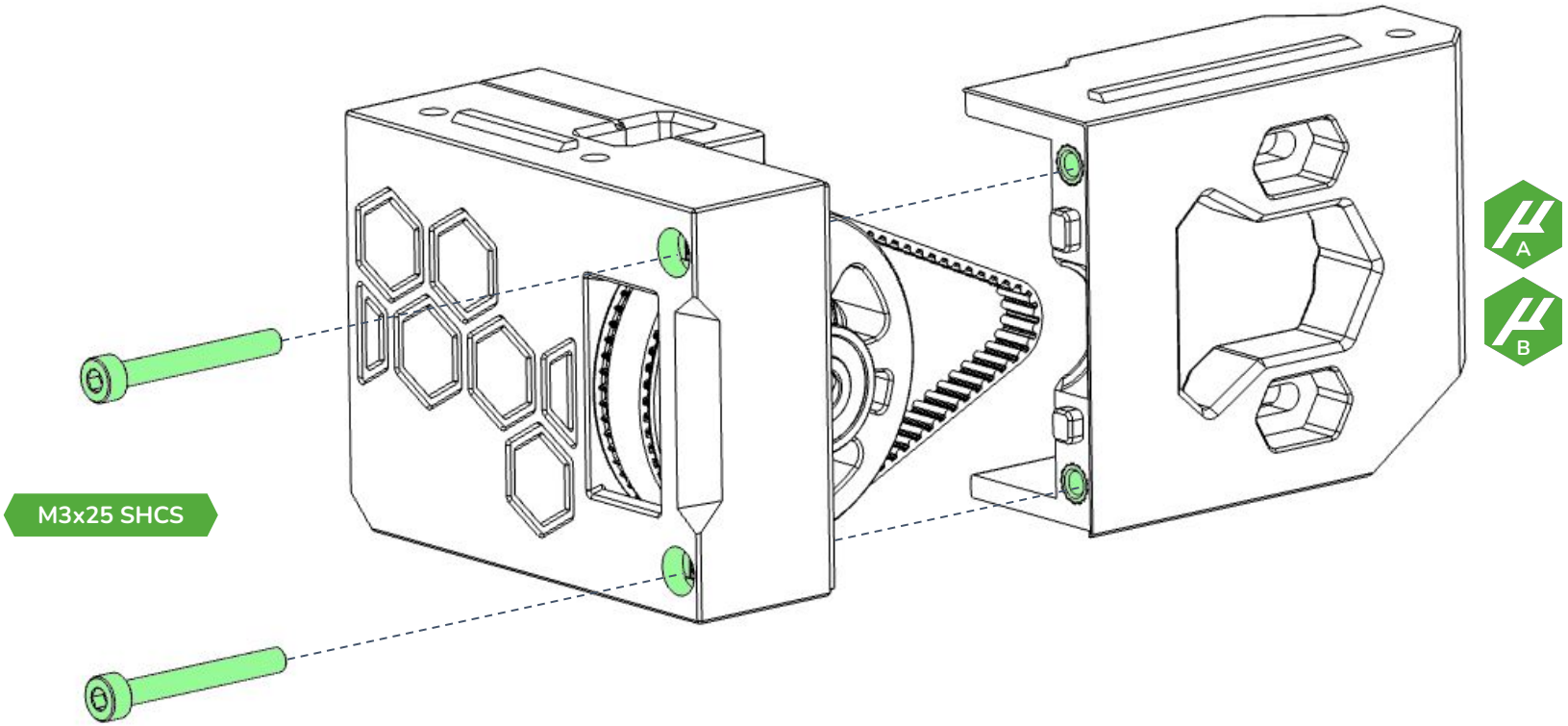
IT'S THE FINAL CLAMPDOWN...
Using **[a]_shaft_assembly_cover**, secure the shaft assembly into position with 4x **M3x8 BHCS**.



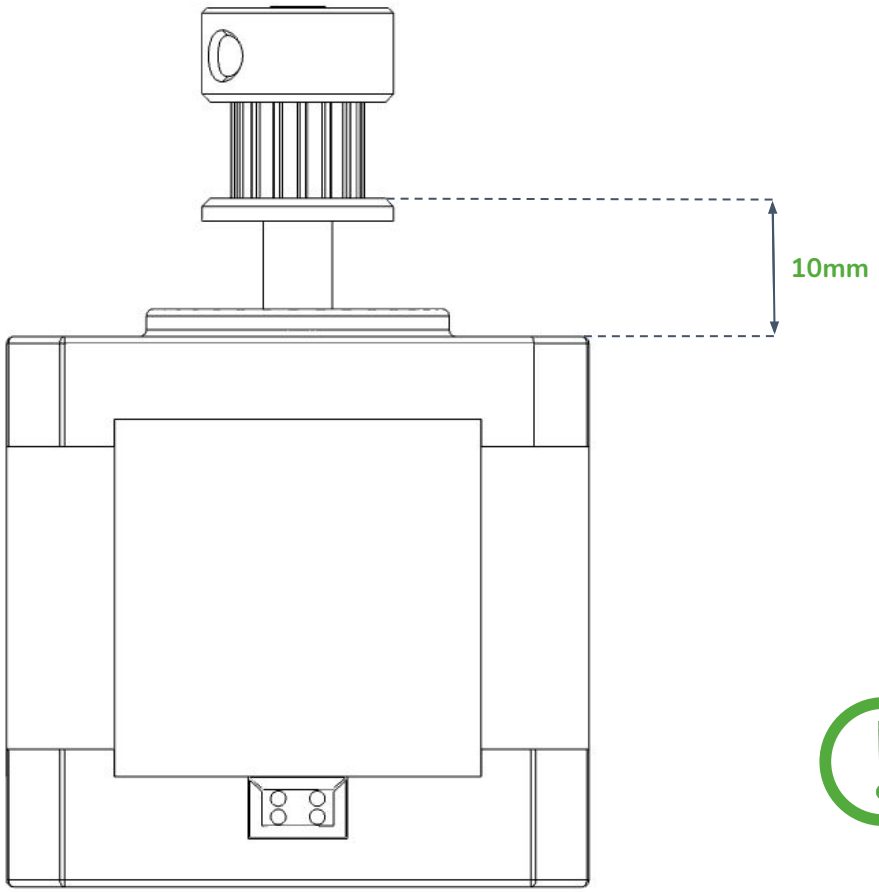
ARE YOU GOING TO OWN IT?
We know you sang the title of the description on this page, in your head at the very least..

The important question is are you going to make your way to the DoomCube Discord and confess to your inner Europe impression? Or not?...

THIS CORNER HOLDS IT ALL TOGETHER.
No pressure. Just perfect execution. Find your **tensioner_housing** printed part, and mount it to the previously assembled component using **x2 M3x25 SHCS**.

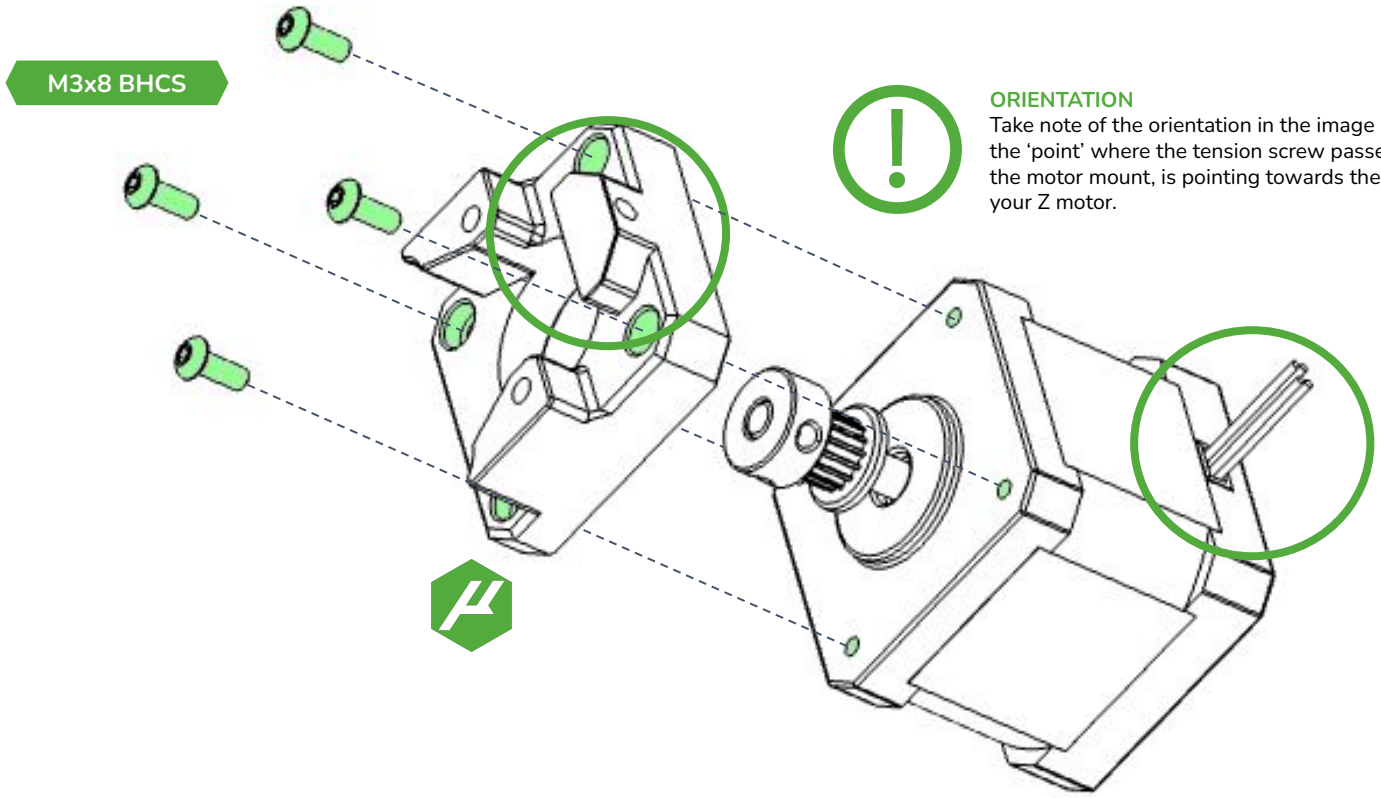


ONE SMALL PULLEY FOR MAN, ONE GIANT LEAP FOR Z-AXIS FUNCTIONALITY.
Now it's time to add the **GT2 16t Pulley** to the Z motor shaft. Again, don't forget the Loctite!



Z Motor Options
Micron supports 2x different Z Motors; Nema 17, and Nema 14. This manual shows Nema 17, but the process for Nema 14 is exactly the same.

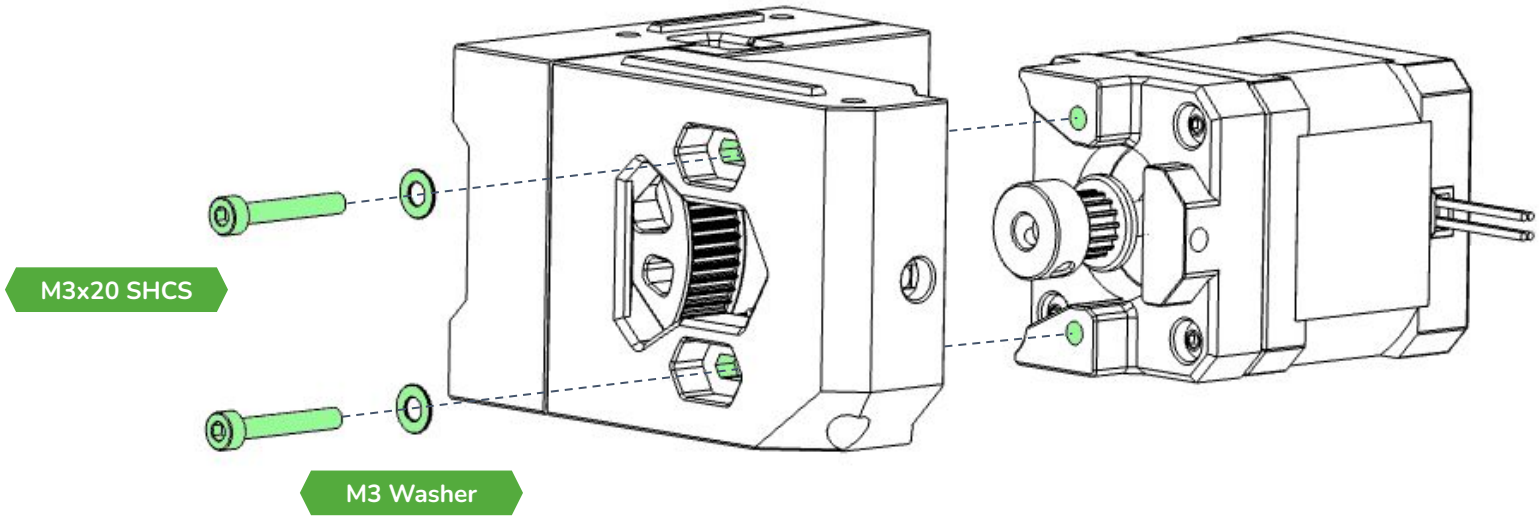
FIRST YOU MOUNT, THEN YOU CONQUER..
Grab one of your 4x **nema_xx_motor_mount**. and secure it to the Z motor using **4x M3x8 BHCS**.



ORIENTATION
Take note of the orientation in the image below. Ensure the 'point' where the tension screw passes through on the motor mount, is pointing towards the cable exit of your Z motor.

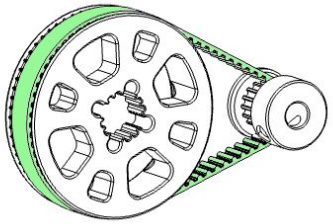
PREPARE FOR FINAL APPROACH..

Now we're going to mount the Z Motor to the assembly, imagine Gemini VIII docking to the ISS.. NASA would be proud.
Using **2x M3x20 SHCS & 2x M3 Washers** secure the motor in place, not too tight, as we're going to adjust tension later.
Just tight enough to hold the whole thing together securely whilst you continue to build.



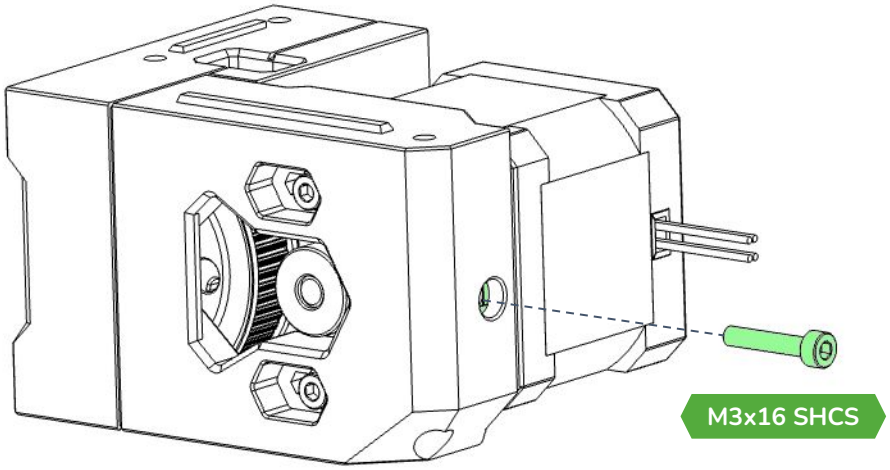
CLOSED LOOP BELT

As you're bringing the 2x assemblies together, make sure the **GT2 16t Pulley** on the motor shaft is passed through the **152mm closed loop belt** in the main assembly.



CREATING TENSION, ONE TURN AT A TIME..

Double check your **152mm closed loop belt** is able to move freely, and the shaft assembly turns as expected. Then insert an **M3x16 SHCS**, this will be used to adjust tension in the Z drive; now, and as the printer is used and the belt naturally stretches and finds its home.



WITH GREAT TENSION, COMES GREAT RESPONSIBILITY..

Make sure the **2x M3x16 SHCS** that mount the motor to the assembly aren't tight, and the motor can slide freely side to side.

Slowly apply tension to the belt using the **tension screw**. Once the desired tension is achieved, tighten the **2x M3x16 SHCS** to lock the motor in place.

LEFTY LOOSEY, RIGHTY TIGHTY

As with most things, applying or reducing tension to the belt is done by turning the tension screw either, clockwise, or anti-clockwise.
(This applies to all belts on the Micron, a link to this section will be provided throughout the manual where belt tensioning is required)

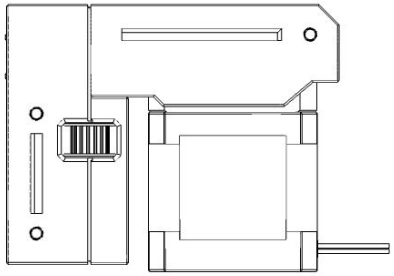
CLOCKWISE
Turn the tension screw clockwise to apply more tension to the belt.

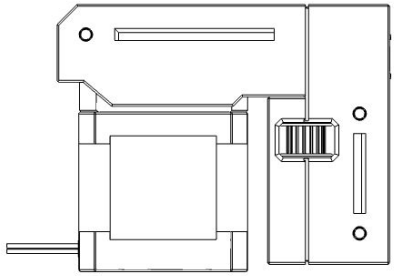
ANTI-CLOCKWISE
Turn the tension screw anti-clockwise to reduce the tension on the belt.

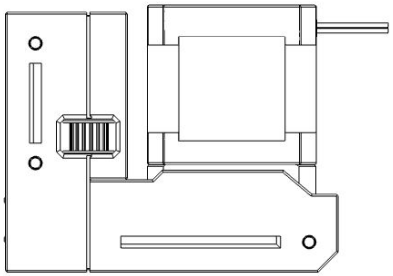
TAKE IT EASY
A little is a lot when it comes to tensioning belts. Don't over do it, little and often is best practice.

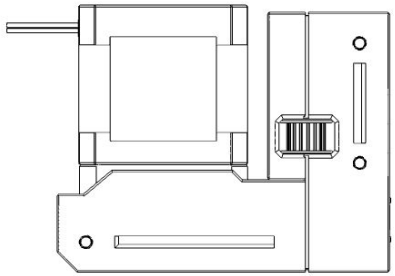
ONE, TWO, THREE, AND TO THE FOUR...

Repeat the steps to assemble another 3x Z Drive Assemblies, you should end up with something resembling the below. Take a second to go over all the steps and ensure everything is nice and snug, and your belts are tensioned.









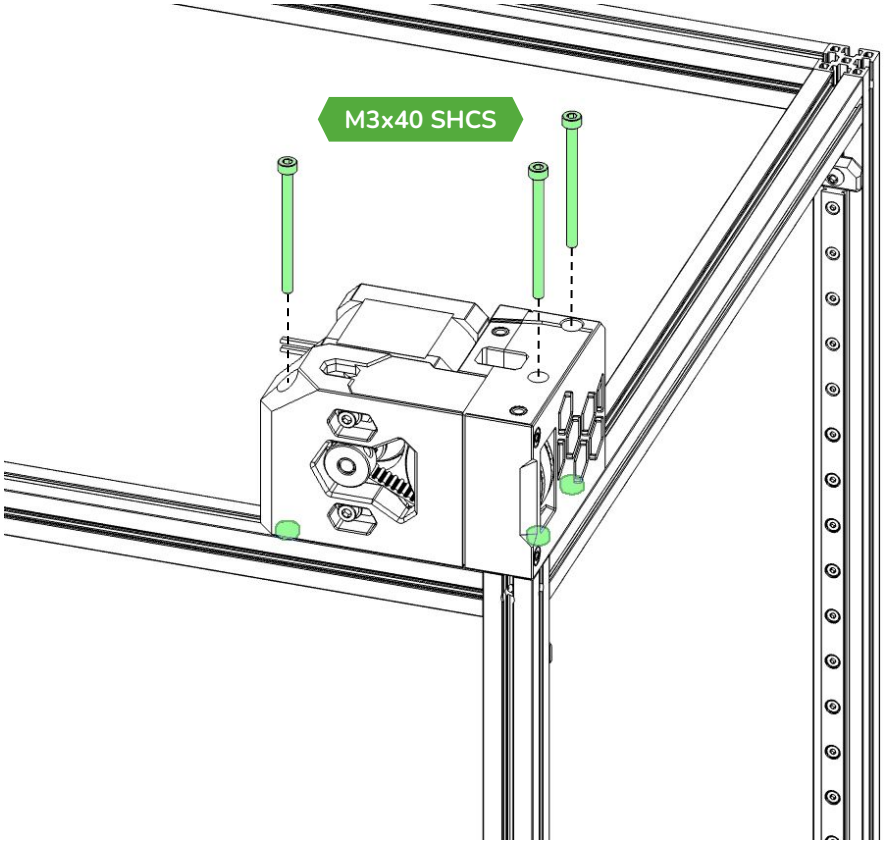
ADMIRE YOUR WORK

Now is the perfect opportunity to step back, and admire your work. Look at it, it's awesome! **Well done you!**

Grab a drink, and show off your new Micron Z drives to your significant other, dog, cat, goldfish, tarantula etc. etc. whilst you're at it.

YOU SPIN ME RIGHT ROUND, BABY RIGHT ROUND

Like a Micron frame, baby, right 'round 'round 'round....
Ok enough of that, grab your frame and flip it so the underside is pointing upwards. We're now going to install the **4x Z-Drive Assemblies** you have just carefully assembled onto the frame using **3x M3x40 SHCS** into the pre loaded nuts.

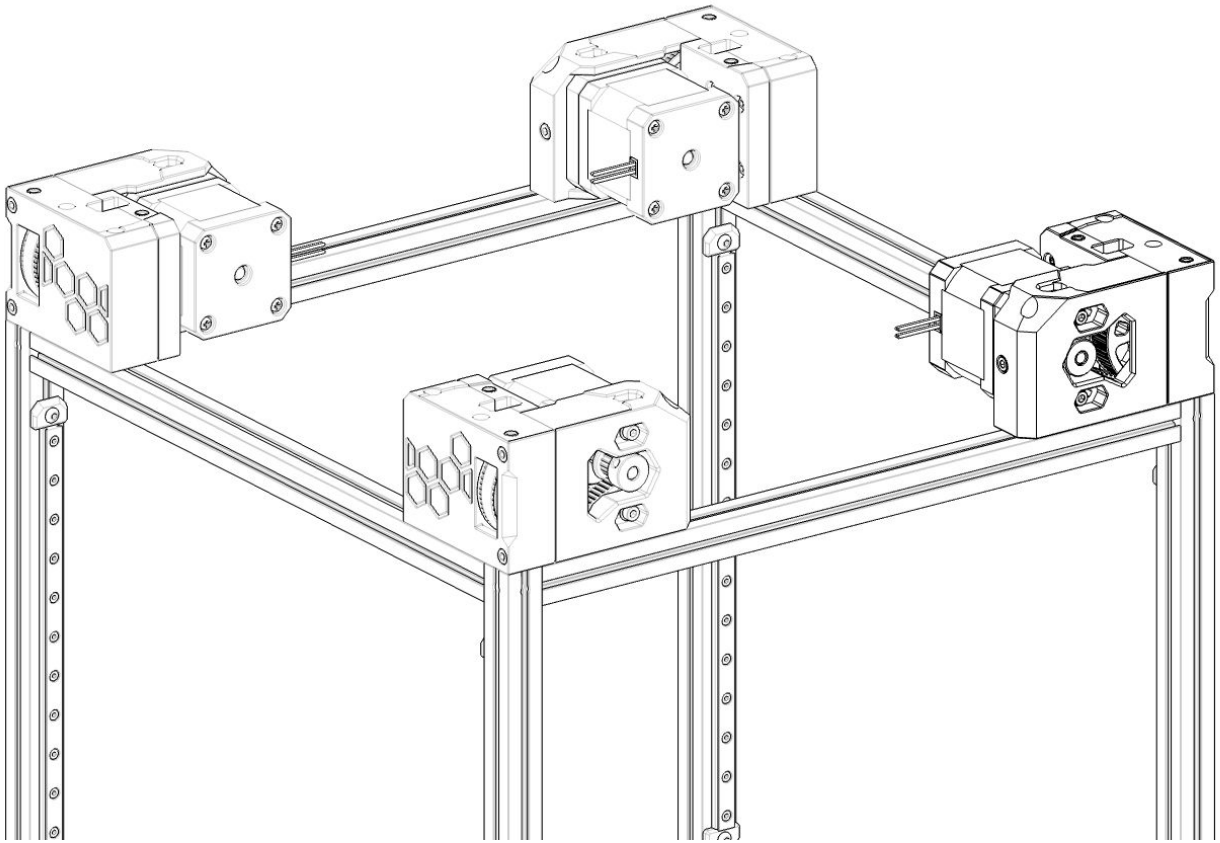


CHECK YOUR RAILS

Ensure your Z rails are orientated in the same direction as your Z motors.
If you need to check which way is up, the Z rails should be closer to the top in this step.

AAAAND AGAIN, WE'RE GOING TO REPEAT THAT PREVIOUS STEP

OK, you should be used to this now, install the other **3x Z Drive Assemblies** to your frame. You should now have an assembly on each corner.



PUT ON THE DAMN BELT!

(Extra internet points if you guess the movie reference there.)

Now we're going to insert the Z Belts into the Z Drive Assemblies before we attach the accent pieces and rubber feet. This step saves us a world of pain later down the line.