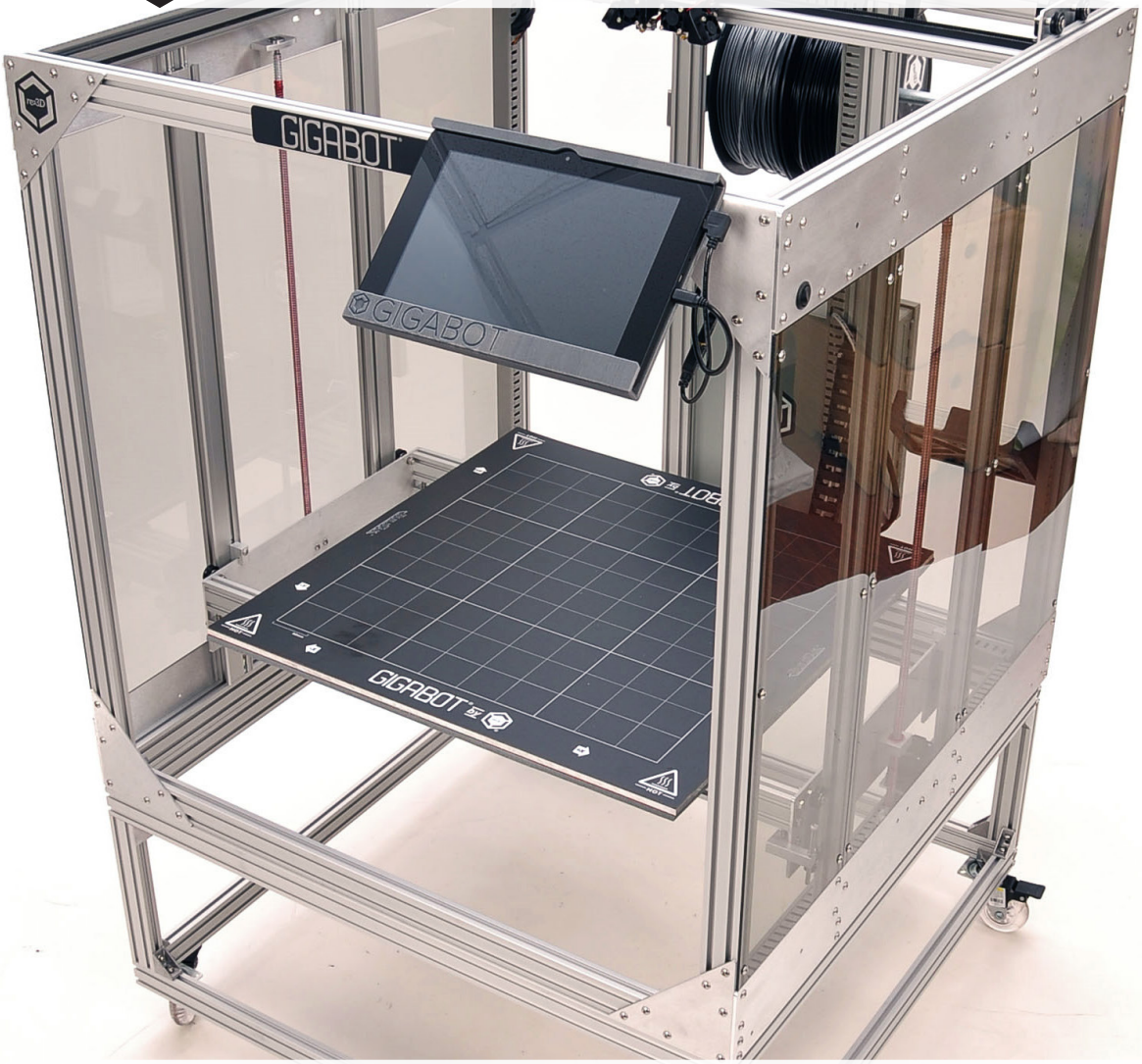
GIGABOT®

THINK BIG, PRINT HUGE



GIGABOT® : UNASSEMBLED (COMPLETE DIY KIT)

REV. OCTOBER 2015

LEGALESE

READ INSTRUCTIONS : All the safety and operating instructions should be read before the printer is operated.
RETAIN INSTRUCTIONS : The safety and operating instructions should be retained for future reference.
HEED WARNINGS : All warnings on the product and in the operating instructions should be adhered to.
FOLLOW INSTRUCTIONS : All operating and use instructions should be followed.
CLEANING : Unplug this product from the wall outlet before cleaning. Do not use liquid or aerosol cleaners.
ATTACHMENTS : Do not use attachments or enhancements not recommended by the product manufacturer as they may cause hazards.
WATER AND MOISTURE : Do not use Gigabot near water - for example, near a bath tub, wash bowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool, and the like.
PLACEMENT : Do not place this product on an unstable cart, stand, tripod, bracket, or table. The product may fall, causing serious injury to a child or adult, and serious damage to the product. Use only with a cart, stand, tripod, bracket, or table recommended by the manufacturer, or sold with the product. Any mounting of the product should follow the manufacturer's instructions, and should use a mounting accessory recommended by the manufacturer.
VENTILATION : Slots and openings in the cabinet are provided for ventilation and to ensure reliable operation of the product and to protect it from overheating, and these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should not be placed in a built-in installation such as a bookcase or rack unless proper ventilation is provided or the manufacturer's instructions have been adhered to.
POWER SOURCES : This product should be operated only from the type of power source indicated on the marking label. If you are not sure of the type of power supply to your home consult your appliance dealer or local power company. For products intended to operate from battery power, or other sources, refer to the operating instructions.
GROUNDING OR POLARIZATION : This product may be equipped with either a polarized 2-wire AC line plug (a plug having one blade wider than the other) or a 3-wire grounding type plug, a plug having a third (grounding) pin. The 2-wire polarized plug will outlet, try reversing the plug. If the plug still fails to fit, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the polarized plug. The 3-wire grounding type plug will fit into a grounding type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the grounding type plug.
POWER-CORD PROTECTION : Power-supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the product.
LIGHTNING : For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet and disconnect the antenna or cable system. This will prevent damage to the product due to lightning and power-line surges.
OVERLOADING : Do not overload wall outlets, extension cords, or integral convenience receptacles as this can result in a risk of fire or electric shock. A product and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the product and cart combination to overturn.
OBJECT AND LIQUID ENTRY : Never push objects of any kind into this product through openings as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Never spill liquid of any kind on the product.

INTRODUCTION

THANK YOU FOR PURCHASING THE GIGABOT® : UNASSEMBLED (COMPLETE DIY KIT)!

This kit contains all the parts necessary to construct a fully functioning Gigabot®. You will find that this is a high quality and very capable 3D printer that not only helps you develop your biggest ideas, but lets you do so at the human scale.

REFERENCES & HELPFUL DOCUMENTS :

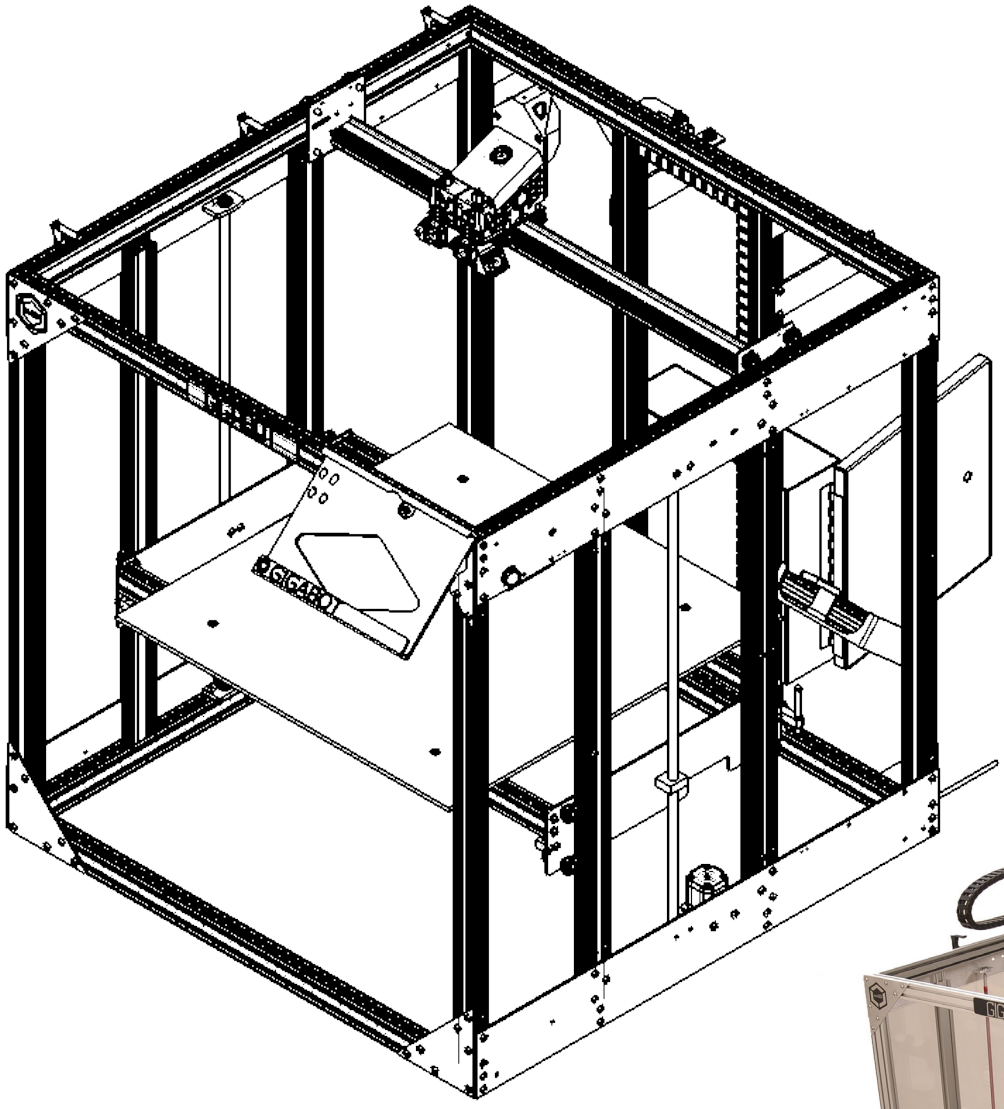
Some external resources may be helpful during the assembly process. For example, knowing the correct names for different parts on the Gigabot®, or proper use of certain tools. Resources that we thought may be helpful have been linked to at the end of this guide.

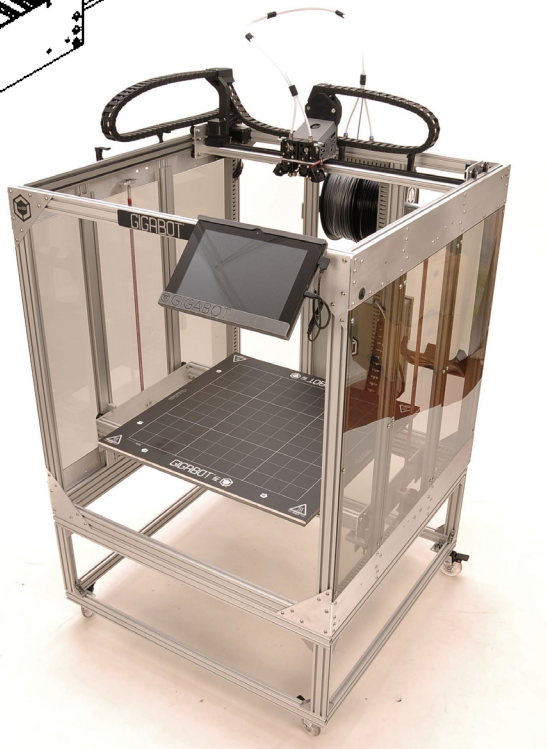
VIDEO INSTRUCTIONS :

If you prefer a video guide, please search for “re3D Tech” on YouTube and find our related Gigabot® retrofit kit video instructions. Short video tips on general Gigabot® assembly will be available in the near future as well.

TABLE OF CONTENTS

OVERVIEW

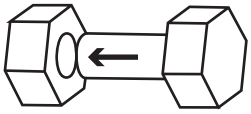




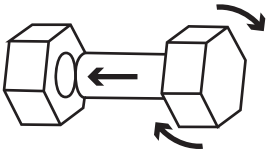
**Full Gigabot® rendering is for illustrative purposes only and may not reflect the final construction of your Gigabot®*

LEGEND

INSERT



FASTEN/SCREW



MEASURE

MARK

ROUTE

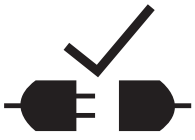
REMOVE

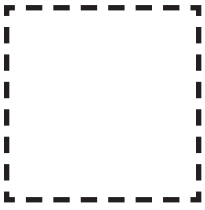
PLACE

ALIGN

EVENLY SPACE

CONNECT

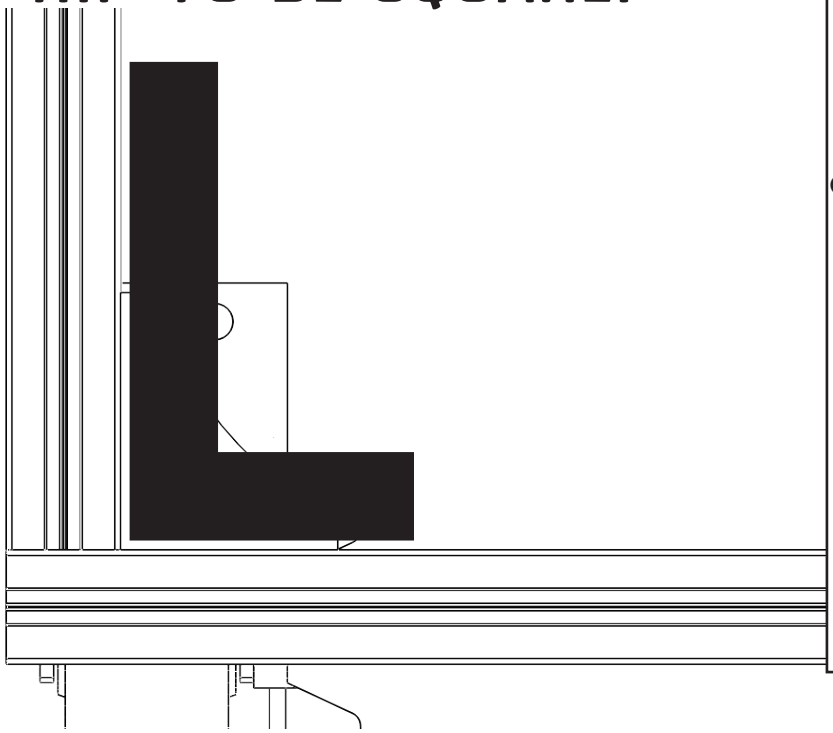




Objects of importance are outlined with dotted lines

BEFORE YOU BUILD

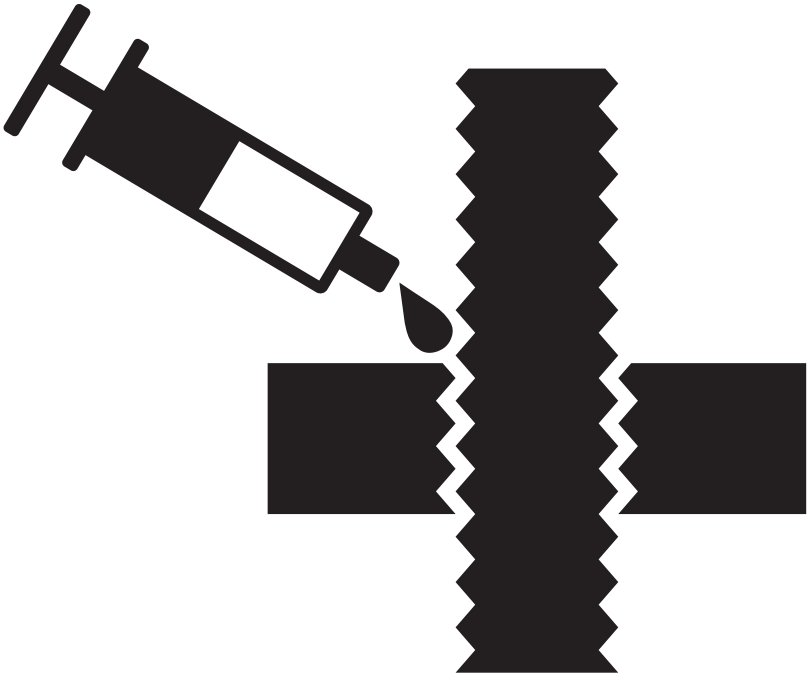
IT'S HIP TO BE SQUARE!



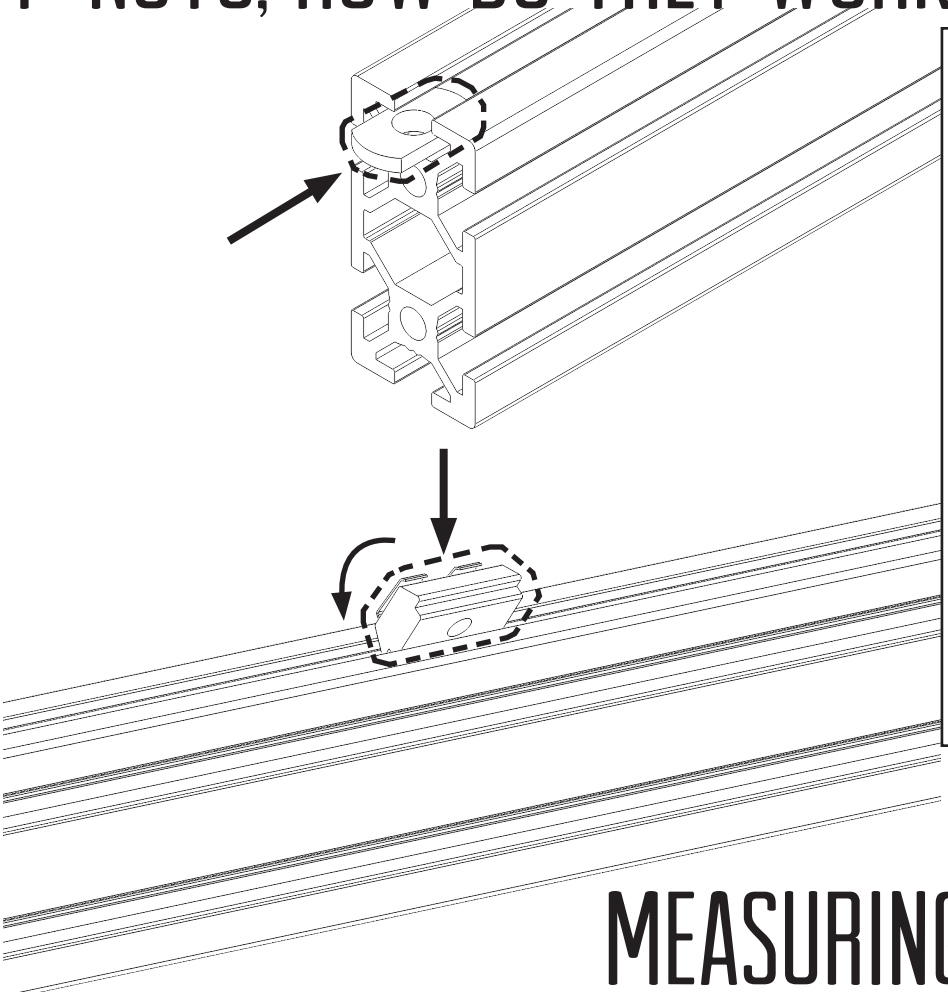
When assembling the Gigabot®, it is essential to work on a flat surface and to carefully square perpendicular parts as much as possible. This is especially important while assembling the side plates, Z-axis uprights and vertical common rails, bed frame, upper and lower cross rails, and bridge assembly. Use large clamps to help square up frames if needed.

THE USES OF GREASE

Make good use of grease during assembly. These will help hold the eccentric spacers when installing the V-groove wheels and also keep them from damaging the side plates or end trucks during adjustment. Likewise, it will ensure smooth, quiet operation when applied the the Z-axis ACME threaded rods.



T-NUTS, HOW DO THEY WORK?



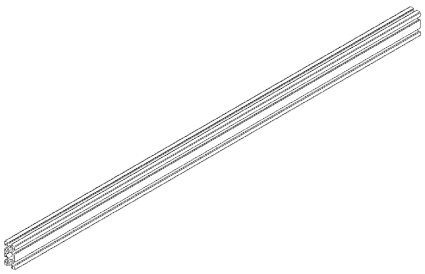
T-nuts are an essential part of assembling the Gigabot®. These are inserted into the aluminum extrusion in order to fasten parts to the frame. Post assembly T-nuts are also used. These hold their positions well without sliding around, and are useful when installing retrofits.

MEASURING AND MARKING

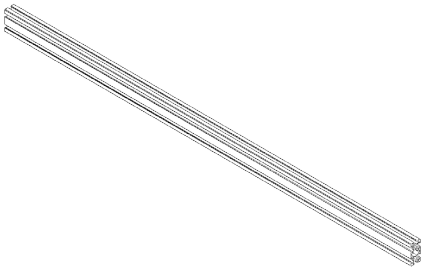
There are parts of the instructions that suggest marking spots on the Gigabot® to properly place parts. When marking, be sure to only use a pencil--using a permanent marker will leave unsightly marks on the metal!

BUILD GUIDE

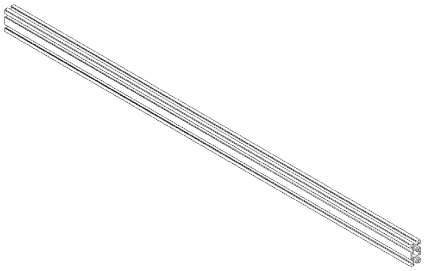
BILL OF MATERIALS



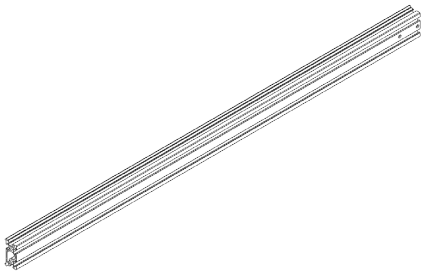
800mm Common rail **8**



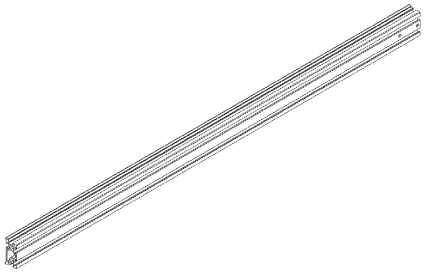
852mm Cross rail **4**



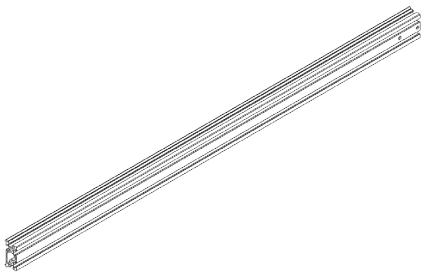
782mm Bed cross rail **2**



Bridge rail (X axis Maker Slide) **1**

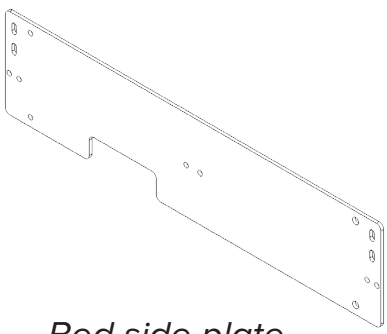


Runway rail (Y axis Maker Slide) **2**

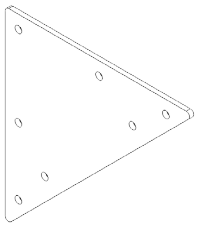


Z upright (Z axis Maker Slide) **4**

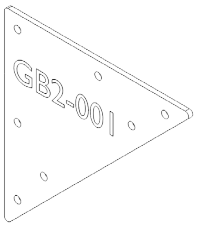
Side plate **4**



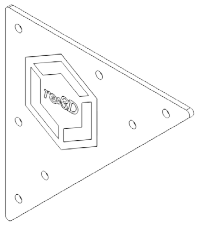
Bed side plate **2**



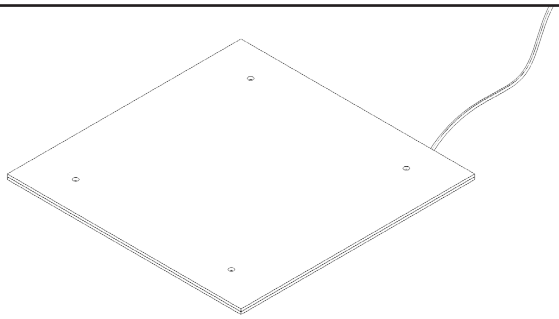
Corner plate **5**



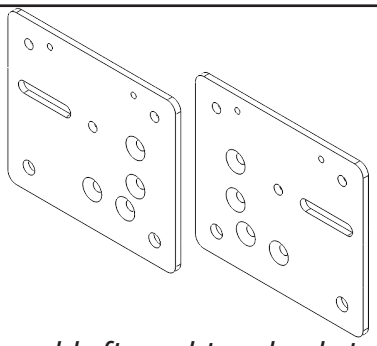
Serialized corner plate **1**



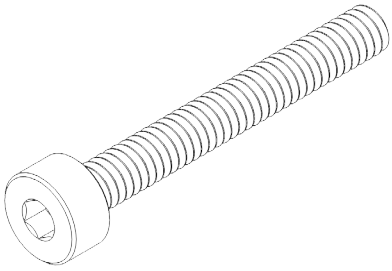
Logo corner plate **1**



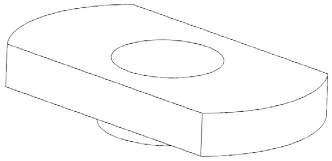
24”x24” bed plate, heater, and wires **1**



Right and left end truck plates **2**



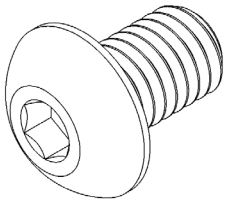
M2x16mm SHCS **8**



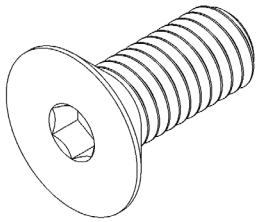
T-Nuts **217**

OTHER SOCKET HEAD CAP SCREWS (SHCS):

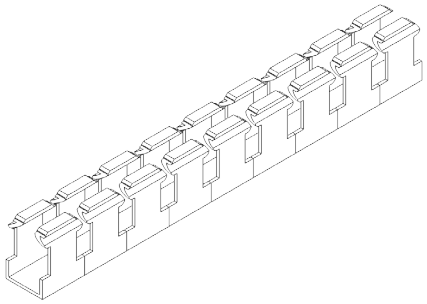
M2x10mm SHCS : 5
M3x18mm SHCS : 18
M3x8mm SHCS : 23
M3x14mm SHCS : 12
M3x10mm SHCS : 6



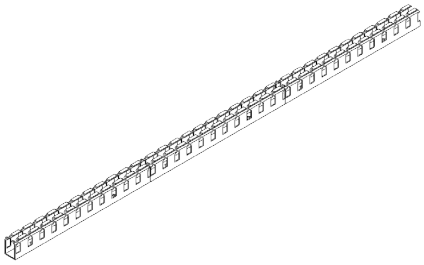
M5x8mm BHCS — 181



M5x12mm FHCS — 6



8.5” deep Panduit — 1



1”x1.5”x30” Panduit — 1

OTHER BUTTON HEAD CAP SCREWS (BHCS):

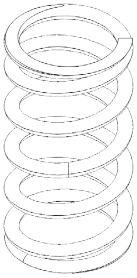
M4x10mm BHCS : 4
M5x12mm BHCS : 92
M5x25mm BHCS : 1
M5x45mm BHCS : 13
M6x60mm BHCS : 3
M3x25mm BHCS : 14

OTHER FLAT HEAD CAP SCREWS (FHCS):

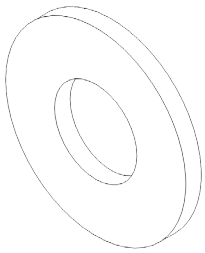
M3x10mm FHCS : 4
M5x20mm FHCS : 7
M5x35mm FHCS : 4

OTHER DEEP PANDUIT:

28.5” deep Panduit: 3
12” deep Panduit : 1



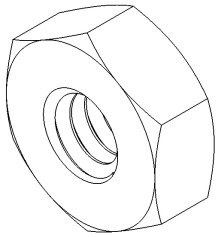
Leveling spring — 8



M3 washer 12

OTHER WASHERS:

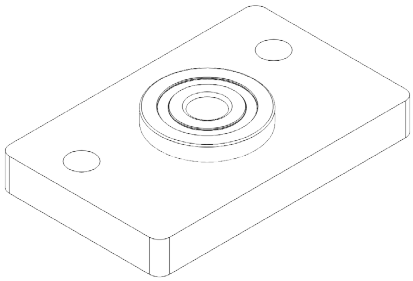
M5 washer : 90



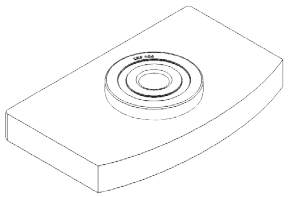
M2 hex nut 8

OTHER HEX NUTS:

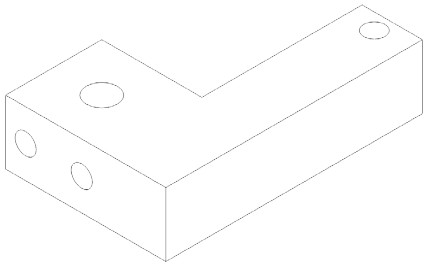
M5 hex nut : 40



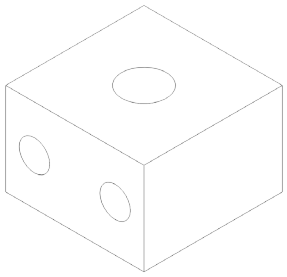
Lower bearing block 2



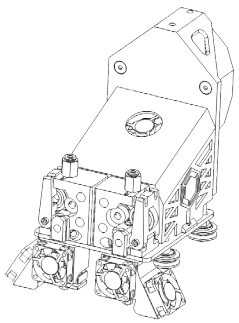
Upper bearing block 2



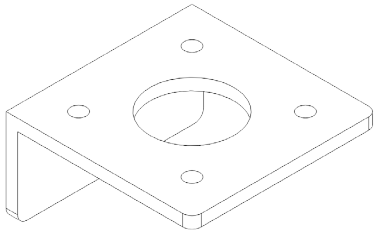
Limit switch leveling block 2



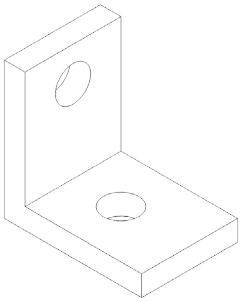
Square leveling block 2



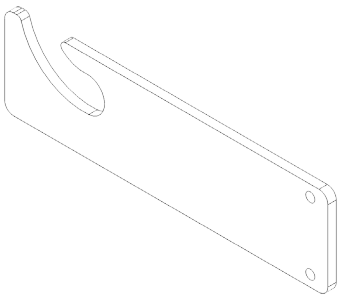
*Pre-assembled extruder trolley** 1



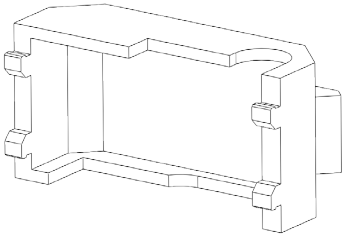
Z motor shelf 2



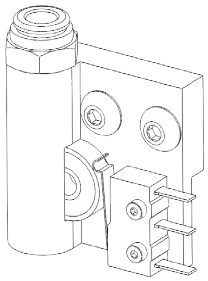
Bed plate angle bracket 4



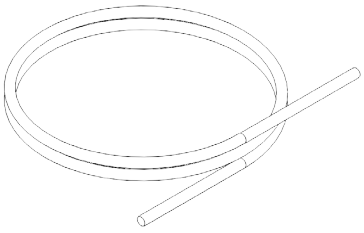
Filament spool rod shelf 2



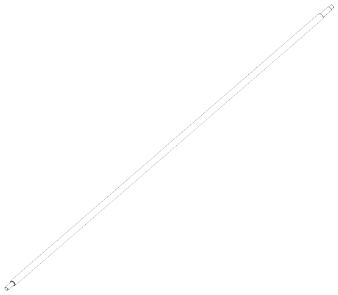
Filament detection cover 2



Assembled filament detection bracket 2

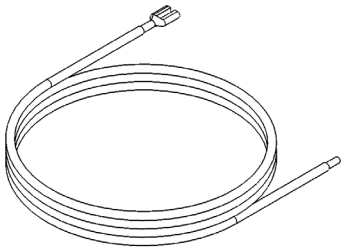


Filament tube 2



3/8”-8 ACME threaded rod 2

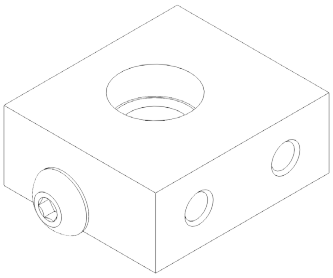
* Pre-assembled extruder trolley includes trolley plates, all covers, extruders, and extruder motors



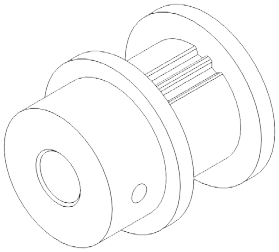
8’ 8” X limit switch cable 1

OTHER LIMIT SWITCH CABLES:

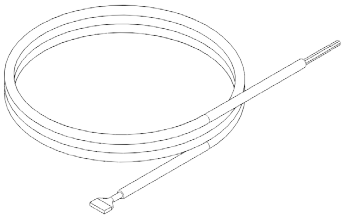
72 1/2” Y limit switch cable : 1
72 1/2” Z limit switch cable : 1
55” FD limit switch cable : 2
60” lower Z limit switch cable : 1



Nut cup 2



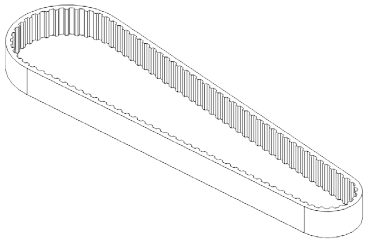
MXL 18 tooth Z motor pulley 2



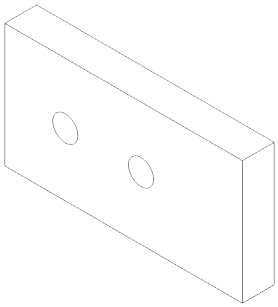
X motor cable 1

OTHER MOTOR CABLES:

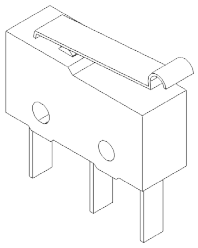
Y motor cable : 2
Z motor cable : 2
Extruder motor cable : 2



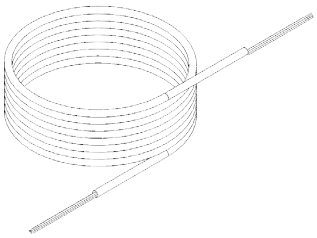
MXL belt 2



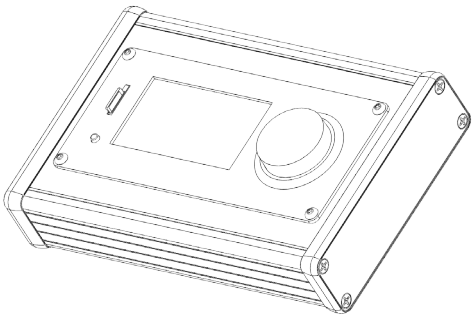
Z limit switch spacer 2



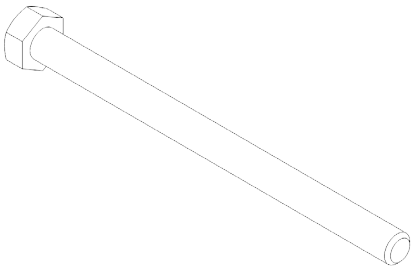
Limit switch **6**



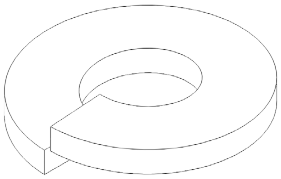
9’ 3” head bundle cable **1**



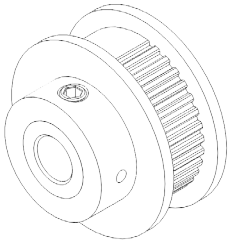
Viki 2.0 with enclosure **1**



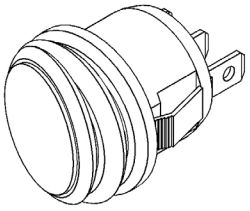
M5x70mm Hex head **2**



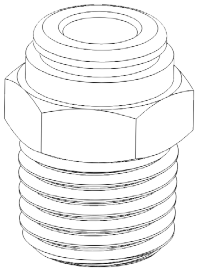
M5 lock washers **37**



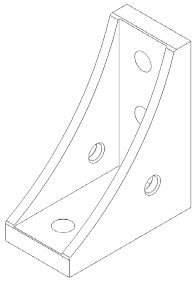
MXL 36 tooth pulley (threaded rod) **2**



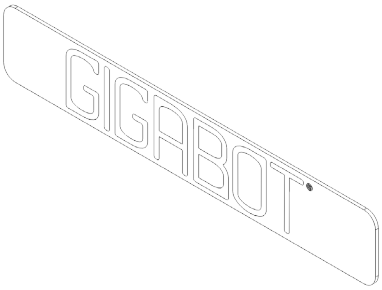
Power switch **1**



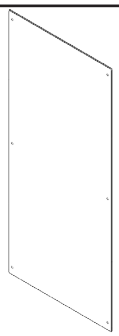
Push fit connector **4**



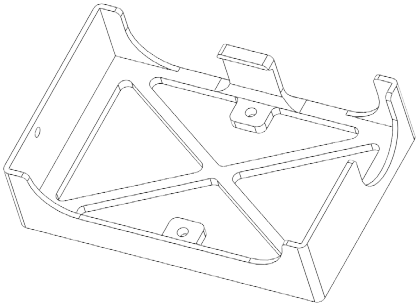
Triangle brace **8**



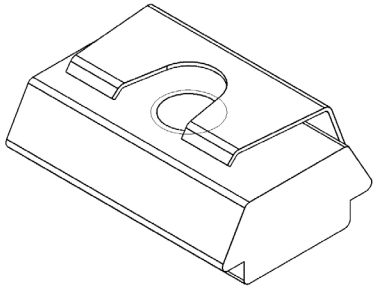
Gigabot® name plate **1**



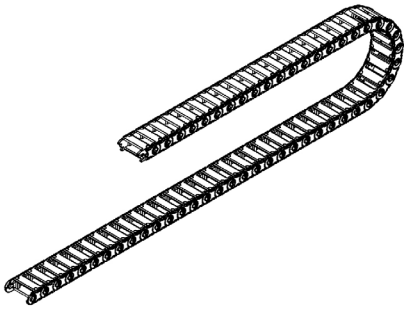
Center side panels **2**



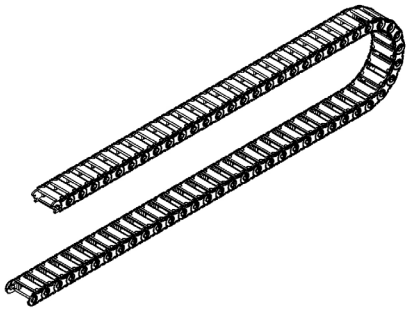
Viki Holder **1**



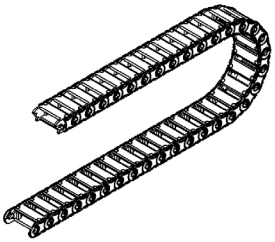
Post assembly T-nuts **12**



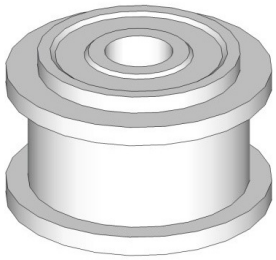
X axis cable carriers - 53 links **1**



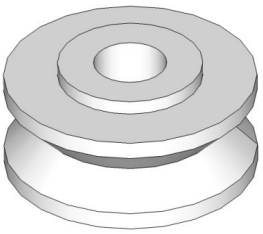
Y axis cable carrier - 60 links **1**



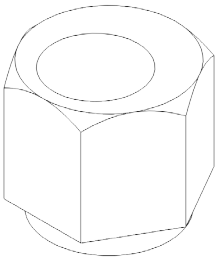
Z axis cable carrier - 34 links **1**



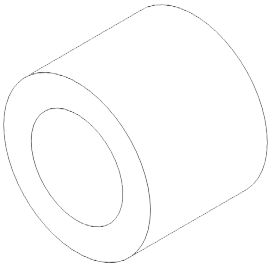
Idler pulley 3



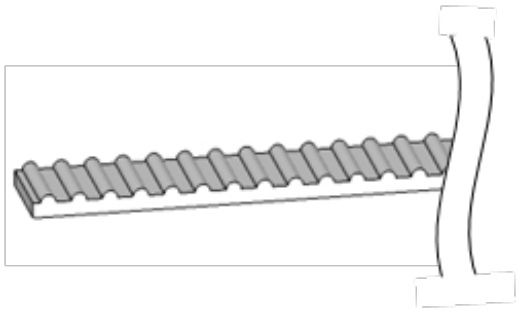
V-groove wheel 20



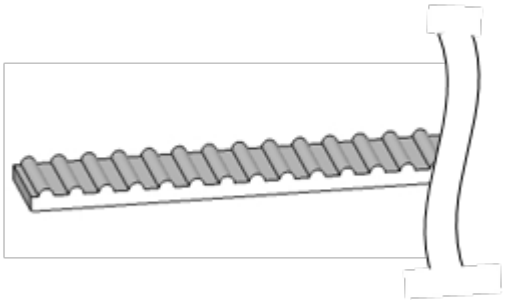
Eccentric wheel spacer 10



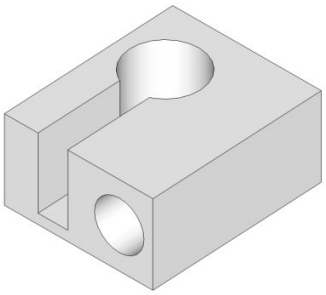
Round wheel spacer 10



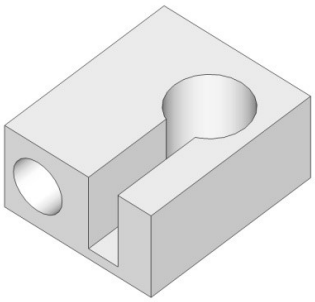
64” Y axis GT2 belt 2



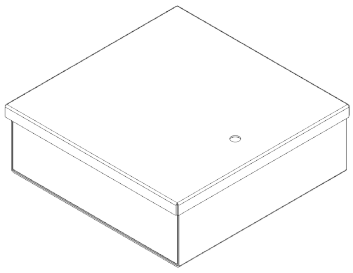
62.75” X axis GT2 belt 1



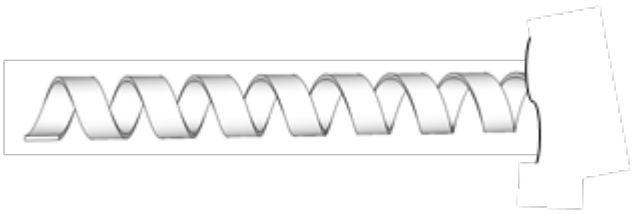
Threaded tensioner 3



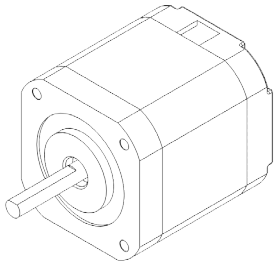
Unthreaded tensioner 3



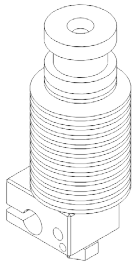
Electrical box with wiring **1**



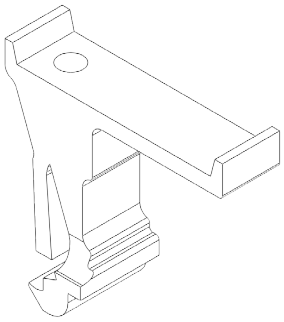
20” Spiralite **1**



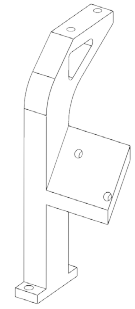
*Stepper motor*** **5**



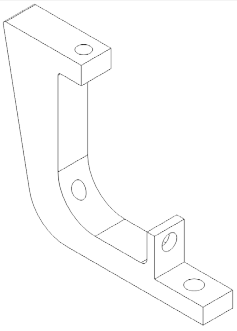
*E3D hot end assembly **** **2**



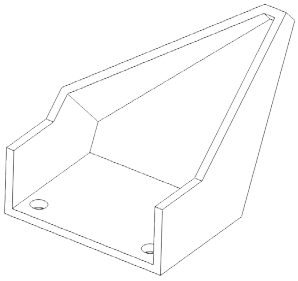
Y axis cable carrier support **3**



X/Y cable carrier support bracket **1**



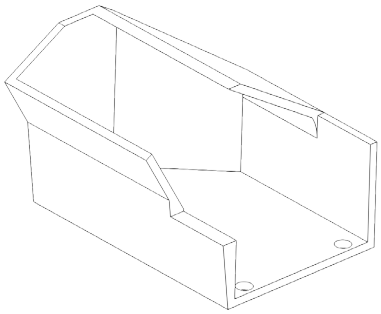
X axis cable carrier support **3**



Trolley bracket cover **1**

** Some motors (X, Y) are preassembled with mounts. Z motors require some assembly

*** E3D hot end assemblies include heater cartridge, thermocouple, fan, fan shroud, etc.



X/Y support bracket cover 1

MISCELLANIOUS PARTS:

Straight edge steel square : 1
10” filament guide rod : 1
Filament spool rod with end caps : 1
ACME rod alignment guide : 1
Z upright alignment tool : 1

TOOLS YOU’LL NEED

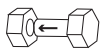
- ALLEN KEYS (1.5MM, 2MM, 2.5MM, 2MM, 4MM)
- STEEL SQUARE
- A LEVEL, OR A LEVEL SURFACE
- SCREWDRIVERS (PHILLIPS AND FLAT HEAD, #1 & #2)
- ACME ROD ALIGNMENT GUIDE
- Z UPRIGHT ALIGNMENT TOOL
- RULER AND PENCIL
- NEEDLE NOSE PLIERS
- 8MM WRENCH
- DRILL WITH ASSORTED BITS (OPTIONAL)

A : BRIDGE RAIL AND TROLLEY

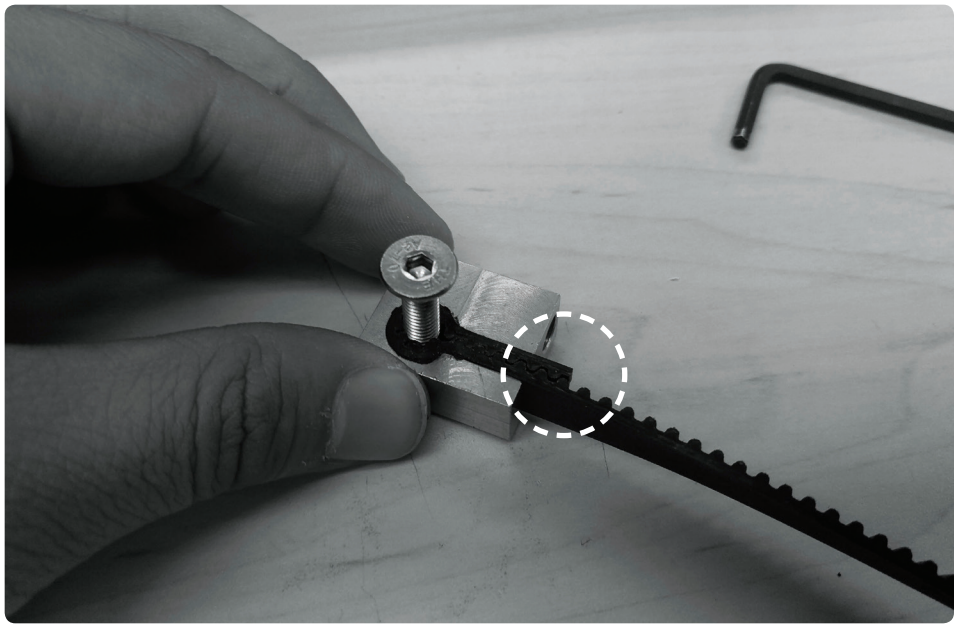
A1

Note the direction of the belt. Teeth must face the larger section of the block.

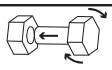
A2



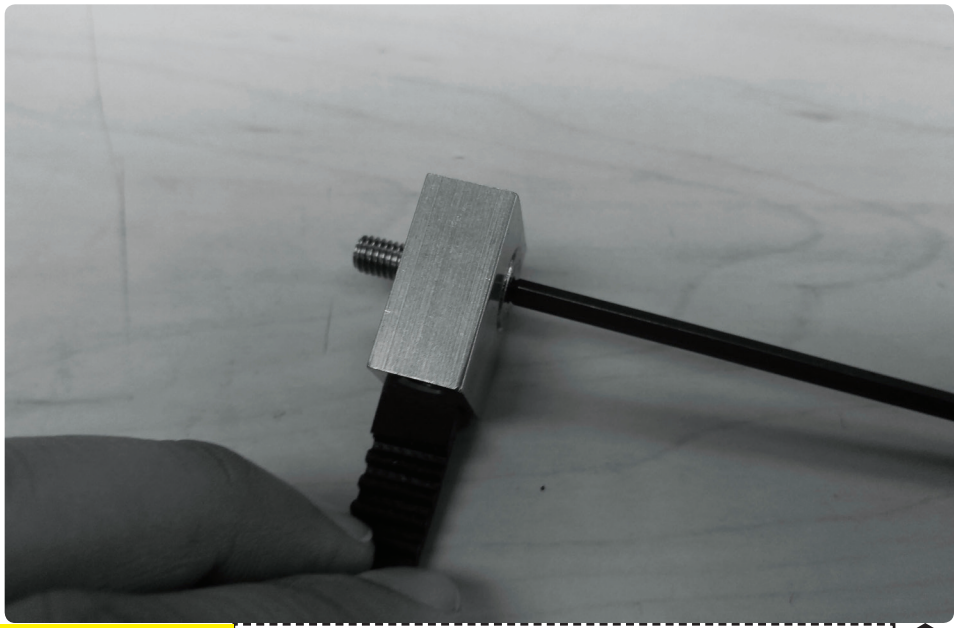
Loop the belt around a M5x20mm FHCS and press belt with screw into tensioning block. Be sure to only leave 1 or 2 teeth hanging out of the block on the end of the belt

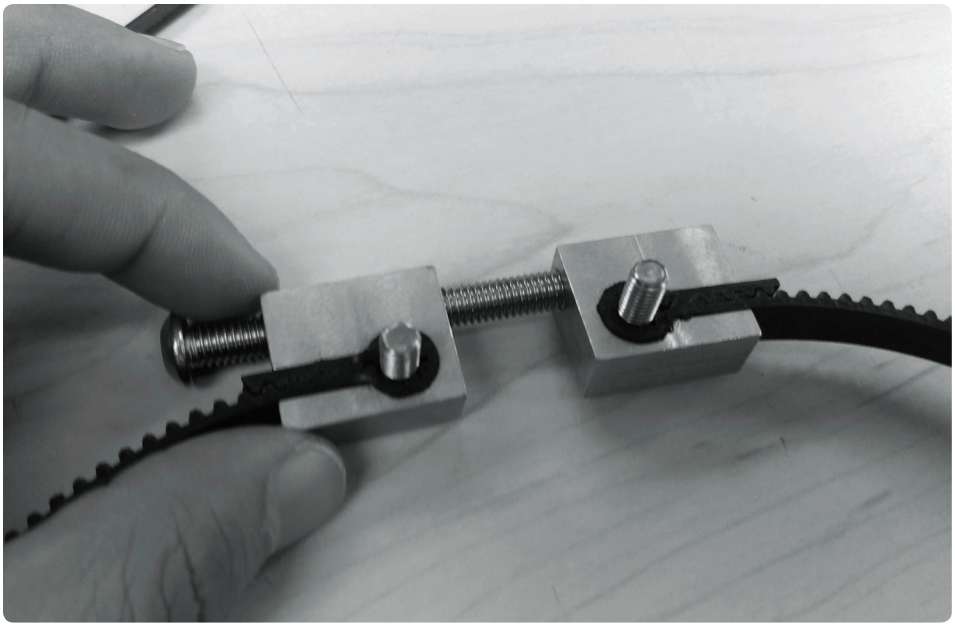


A3

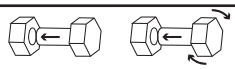


Use the 3mm Allen Key to screw the M5x20mm FHCS all the way through

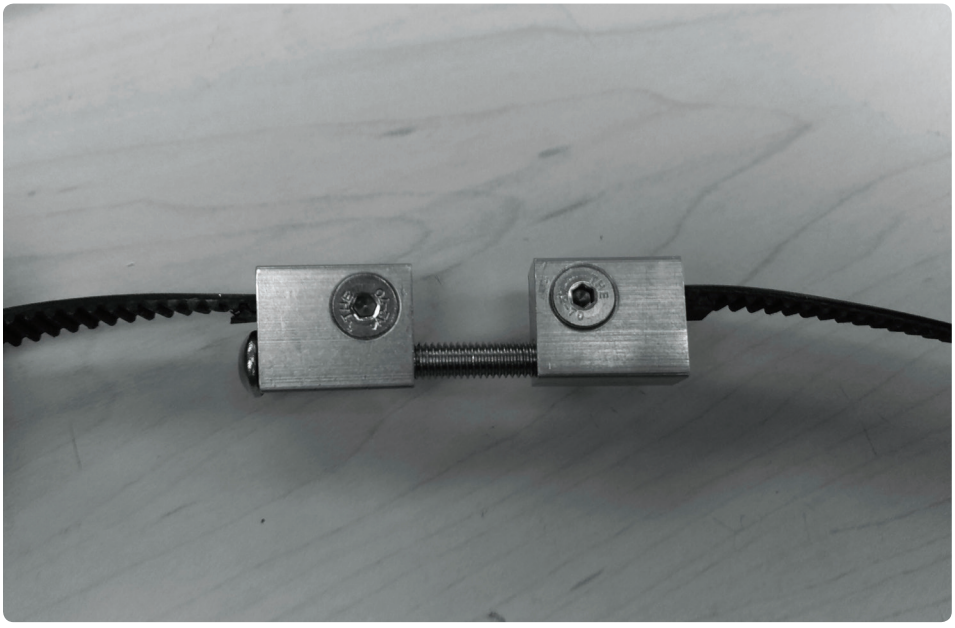




A4

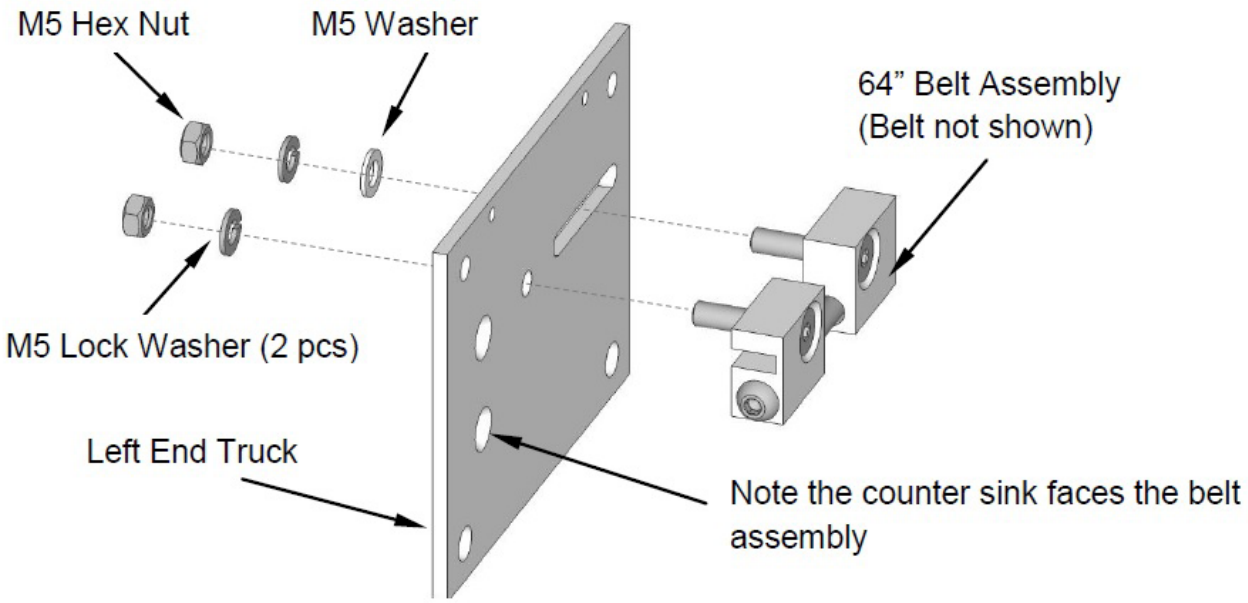


Keeping in mind the orientation of the belt within the tensioning block, repeat for the other block. Connect these together with a M6x60mm BHCS



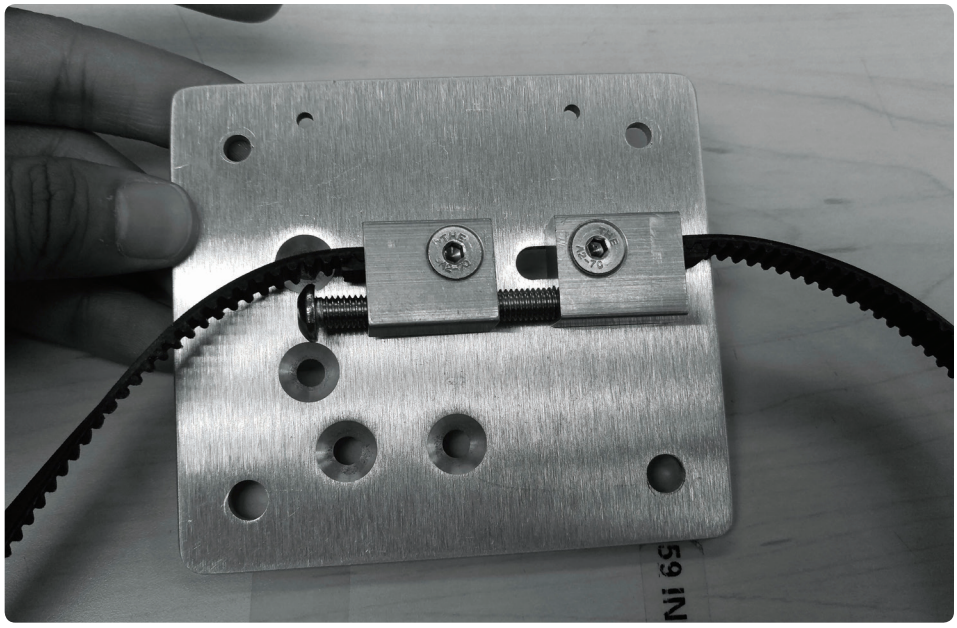
A5

Repeat this process until you have a complete X belt (61.75”) and 2 complete Y belts (64”)

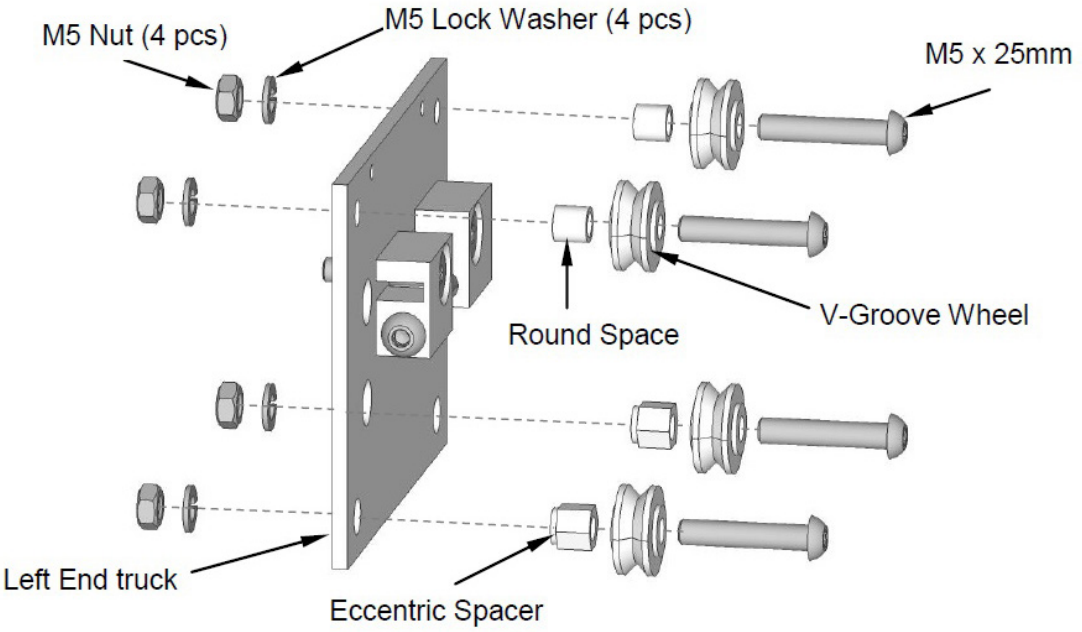


A7

Connect to left end truck plate as shown above

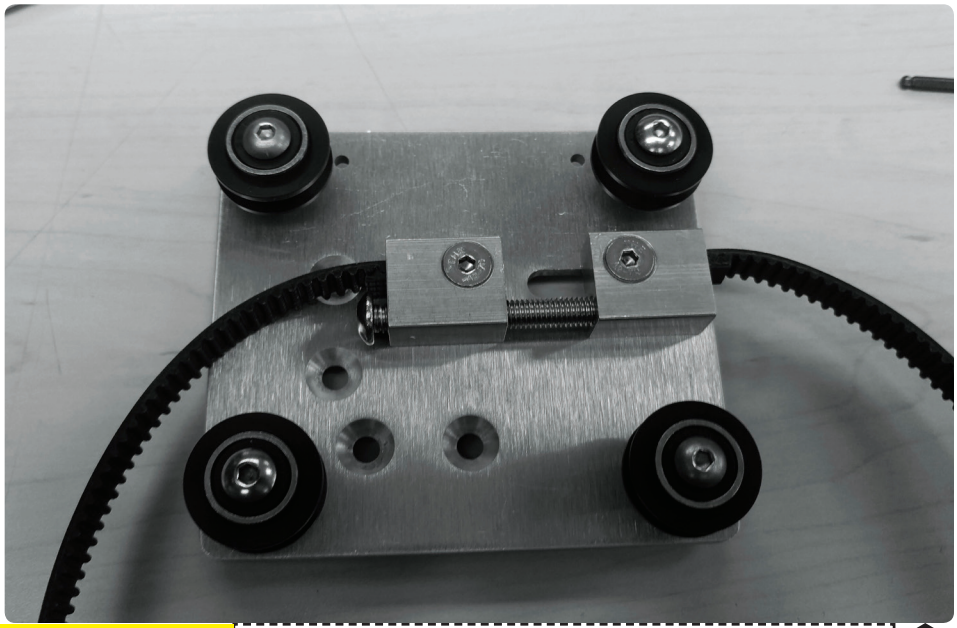


Repeat for right end truck plate using the other assembled Y axis belt

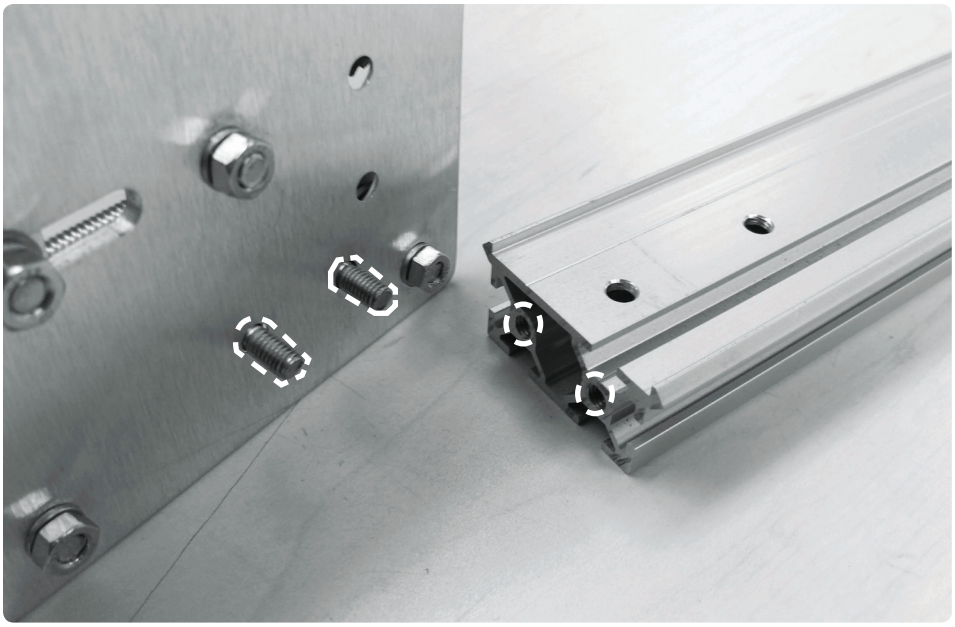


A9

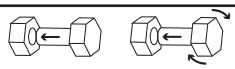
Assemble 4 V-groove wheels onto the end truck plate as shown above



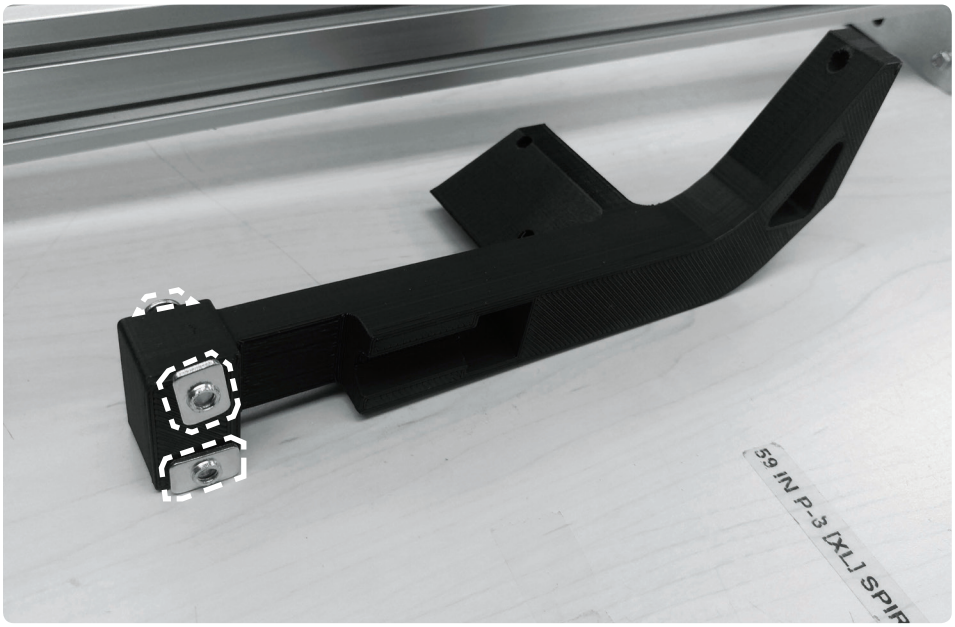
Repeat for the right end truck plate



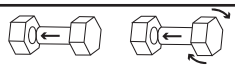
A10



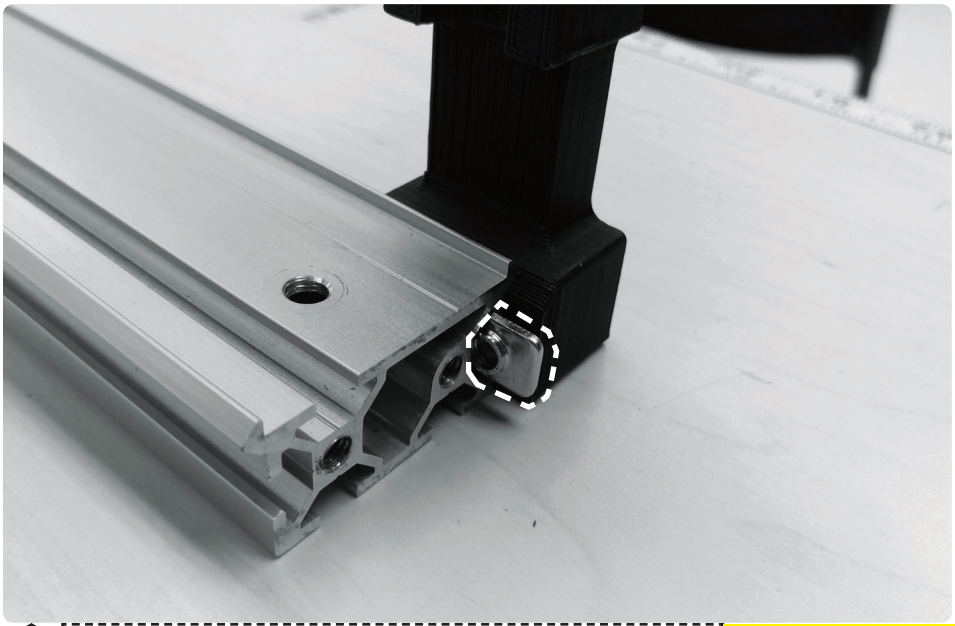
Use 3mm Allen Key and 2 M5x12mm FHCS to fasten left end truck to bridge rail. Note the orientation of the rail (X motor holes must be on this side)



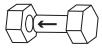
A11



Add 2 M5x25mm BHCS and 2 T-nuts to the X/Y support bracket

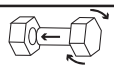


A12

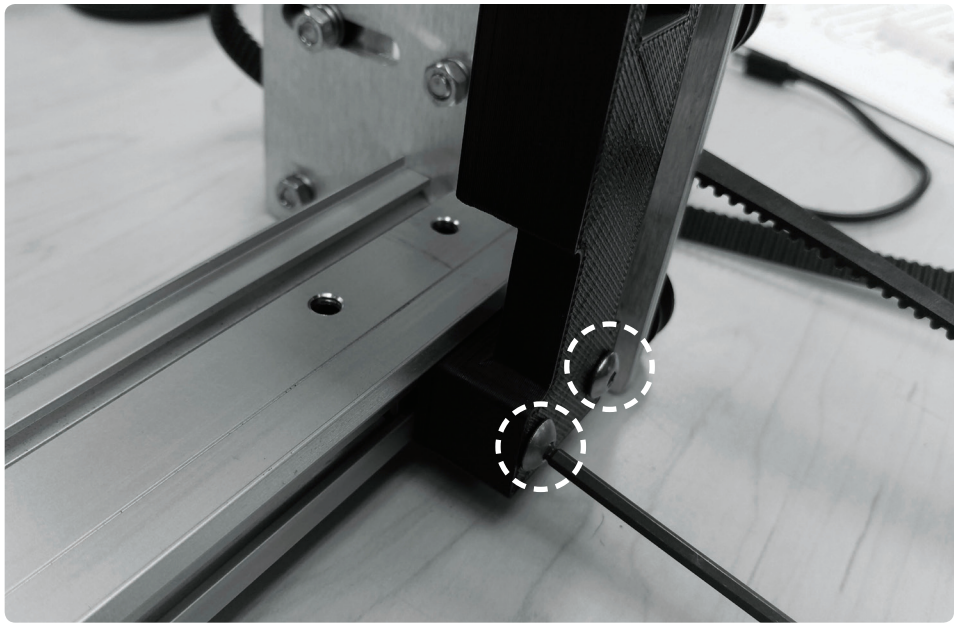


Slide into back slot of bridge rail

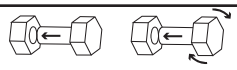
A13



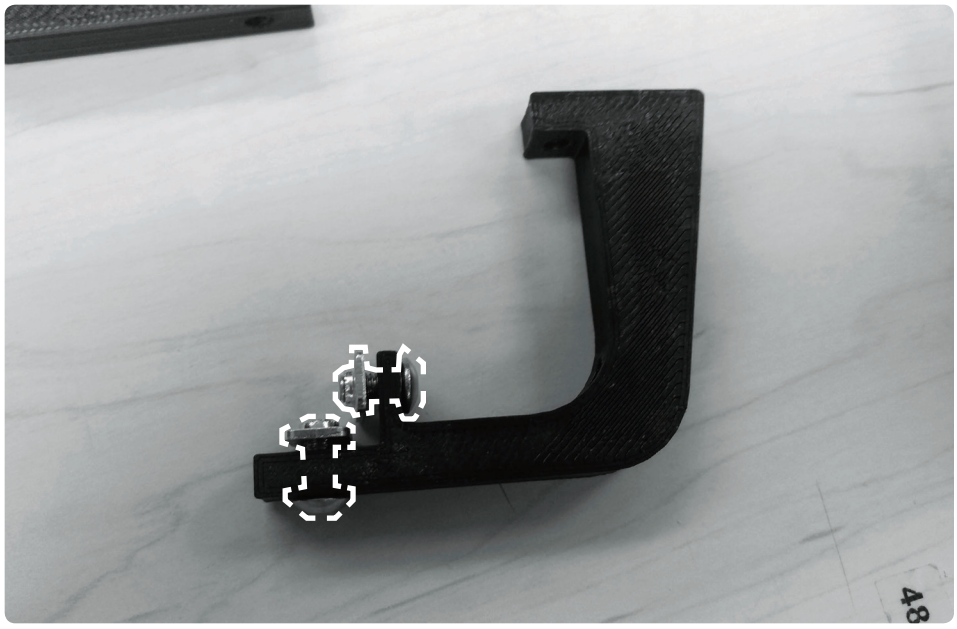
Use 3mm Allen Key to fasten near left end truck, behind where the X motor will mount



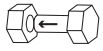
A14



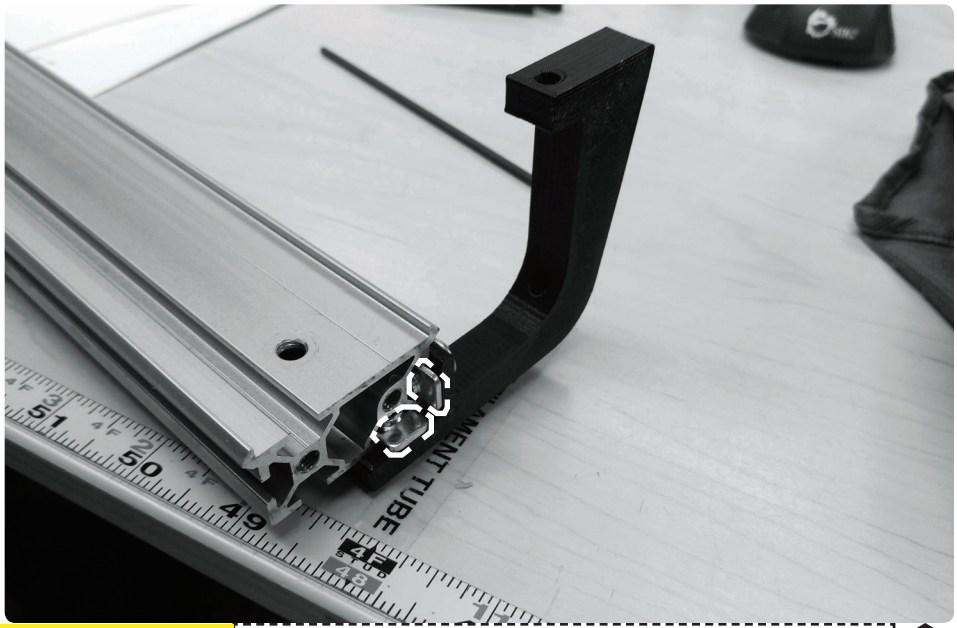
Prepare each X cable carrier support with 1 M5x8mm BHCS and 1 M5x10mm BHCS and 2 T-nuts. There are three X axis supports

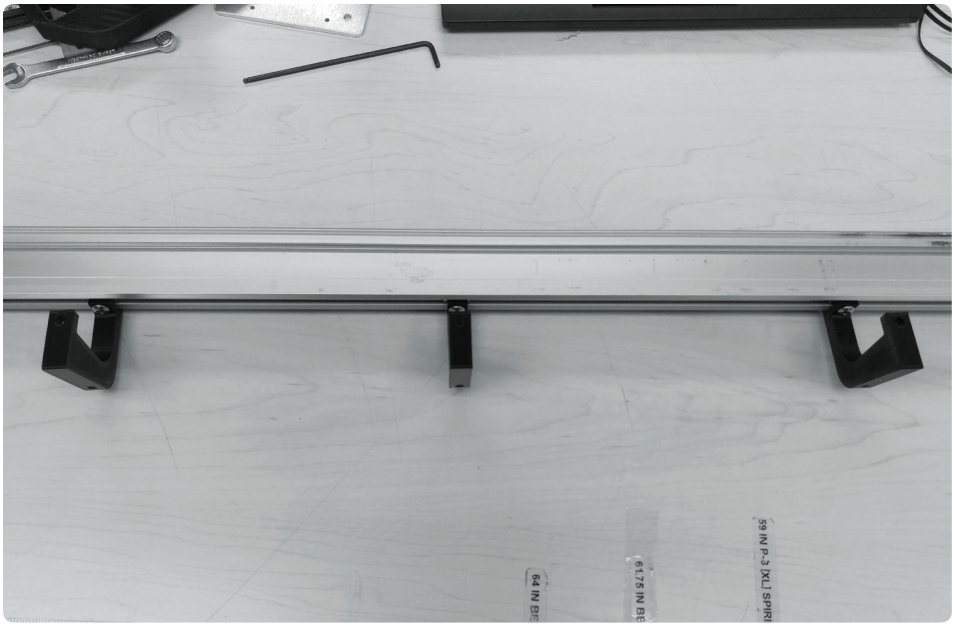


A15



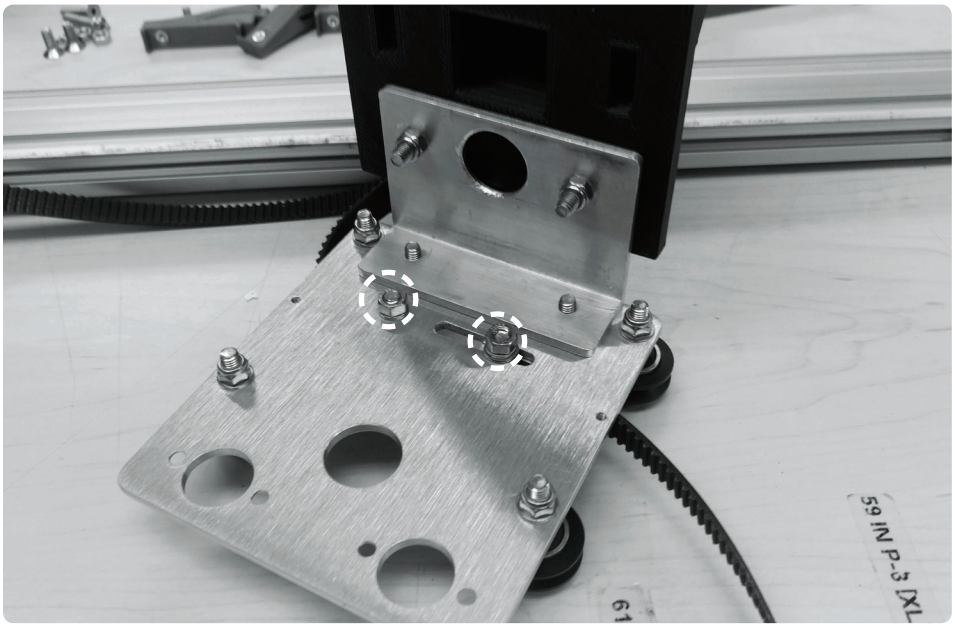
Slide each support into the back of the bridge rail, similar to the X/Y support bracket





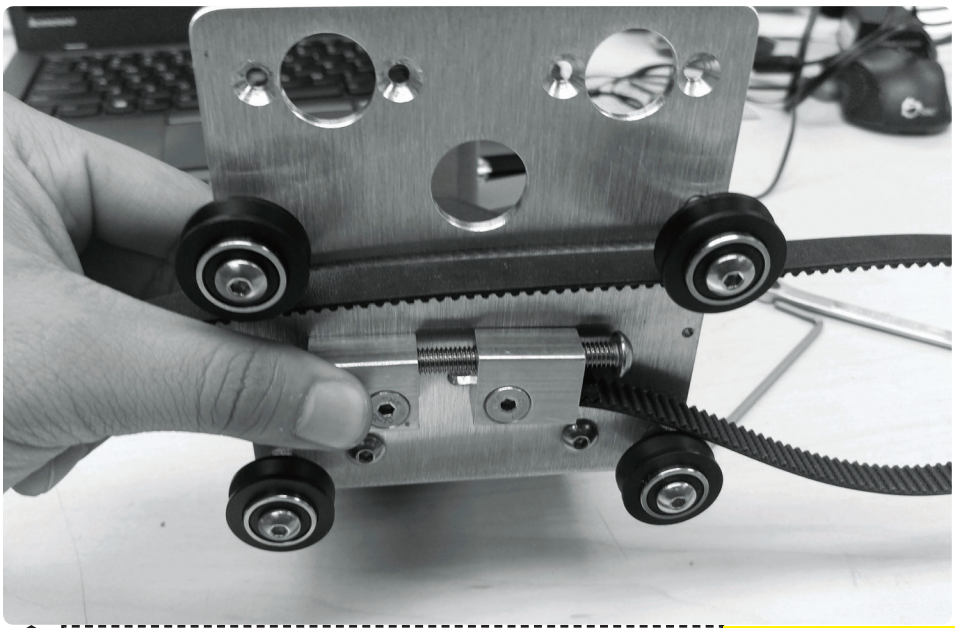
A16

Measuring from the inside surface of the left end truck to the right face of each support, mark 5 1/4”, 15 9/16”, and 25 7/16”. These are general placements for the supports. They can be adjusted once X cable carriers are added.



A17

After removing the cover and extruders from the trolley, fasten the X tensioning blocks and belt to the bottom plate, similar to above

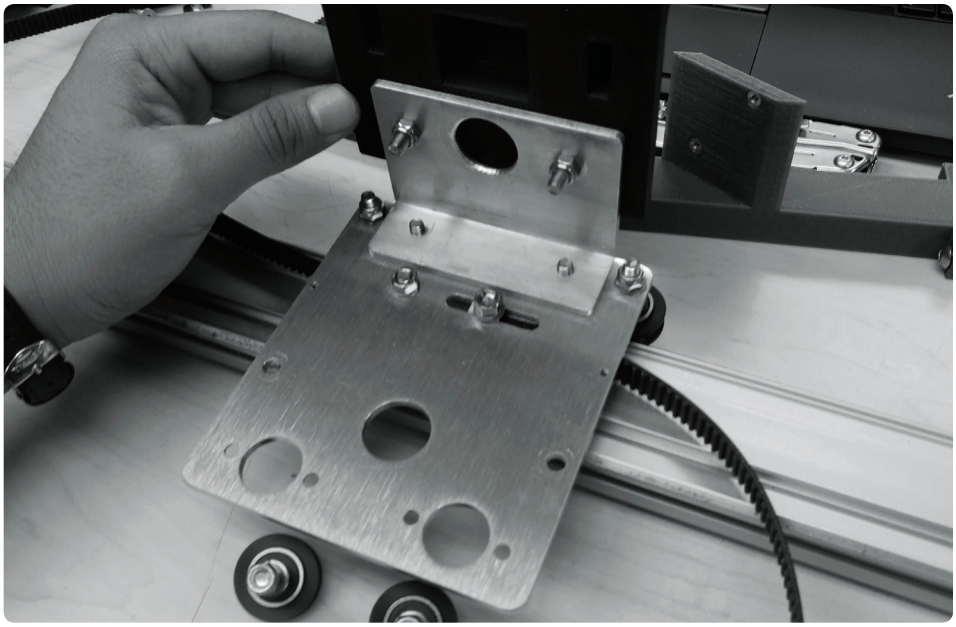


A18

Make sure the belt stays between the wheels before attaching to bridge rail

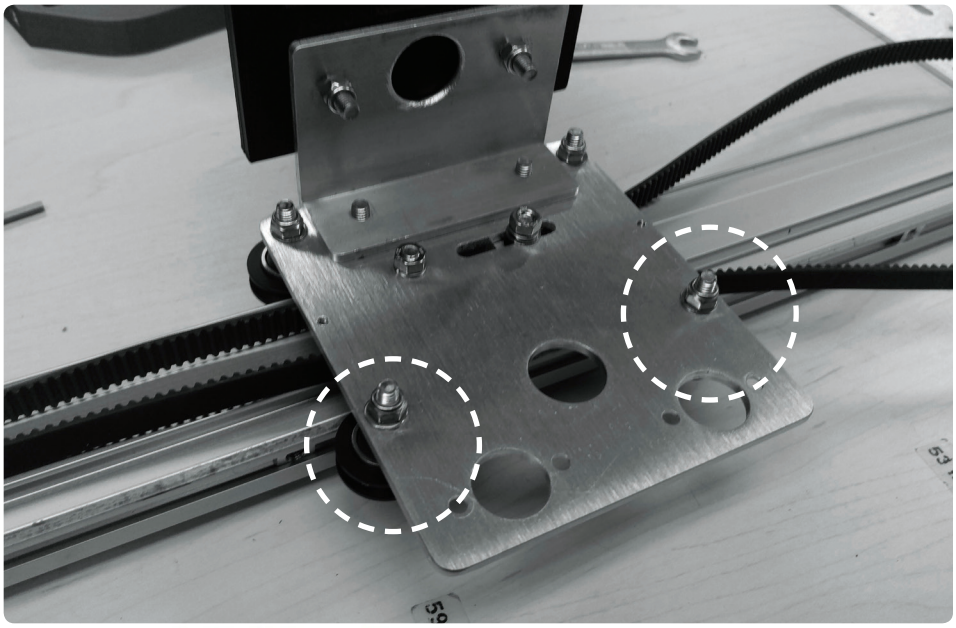
A19

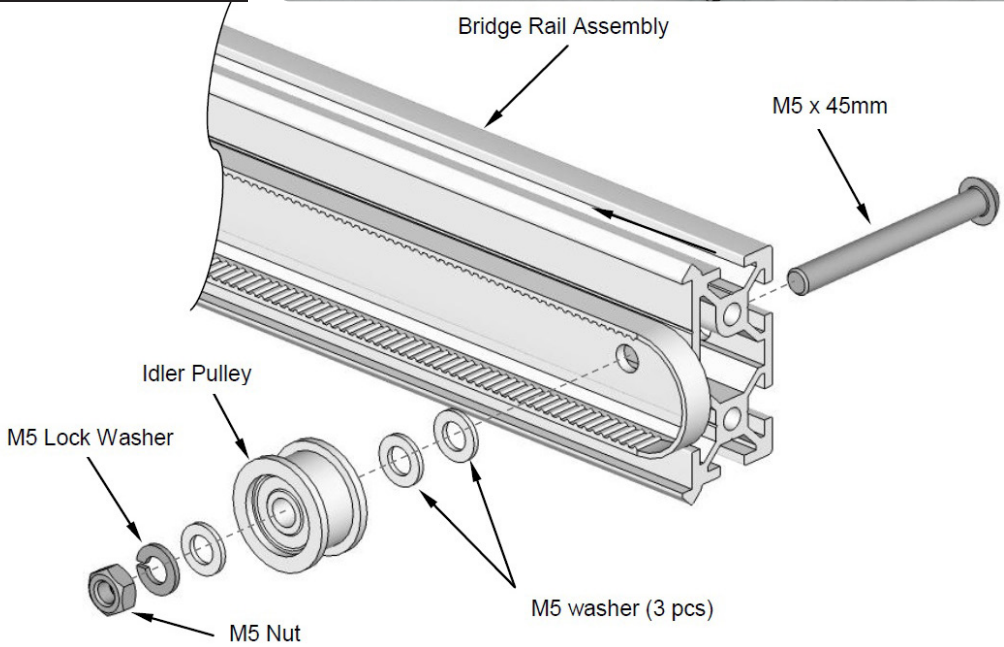
Remove the front wheels in order to place the trolley onto the bridge rail

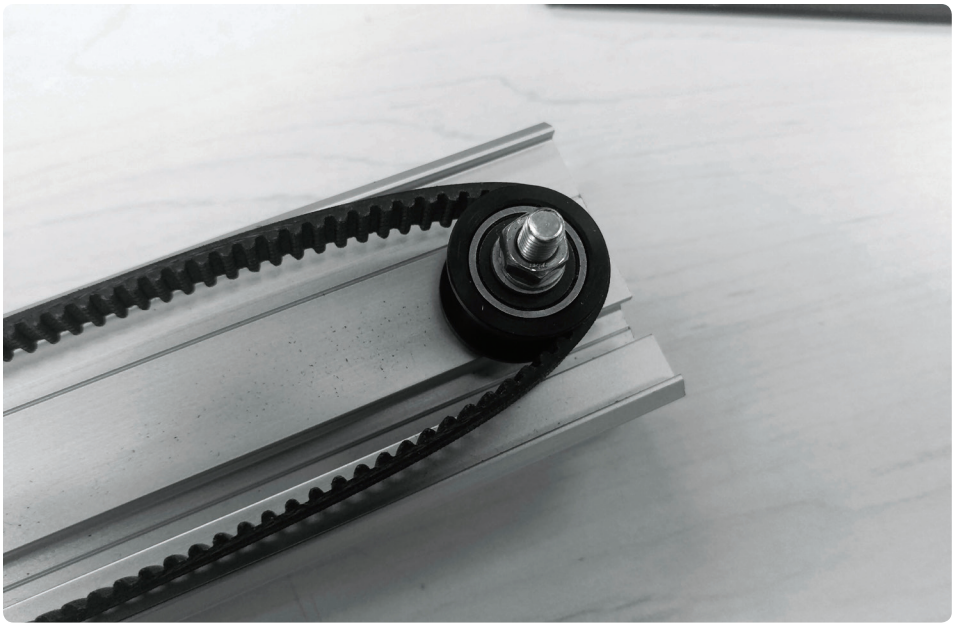


A20

Reattach the front wheels

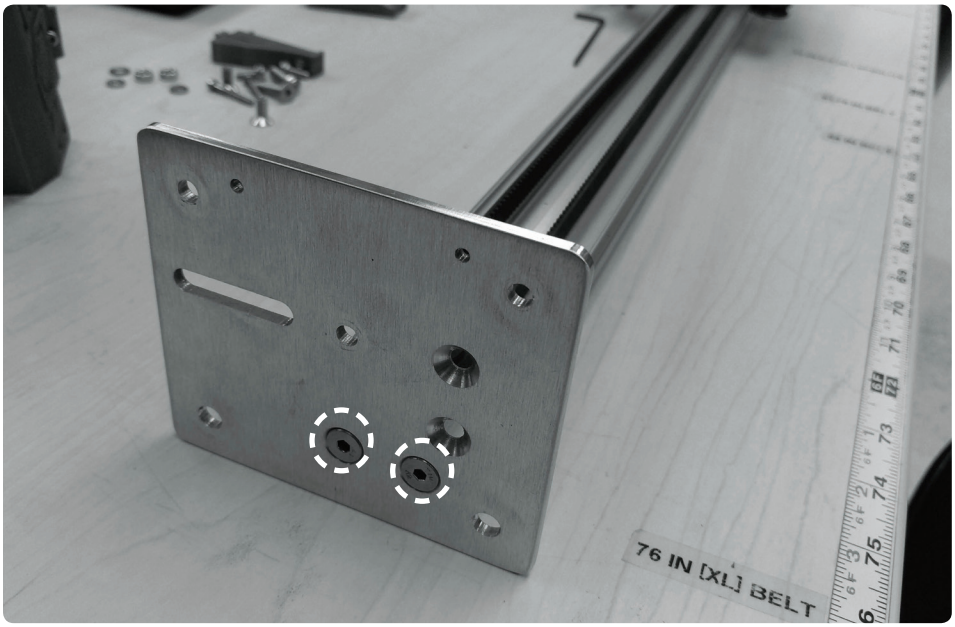


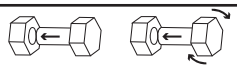




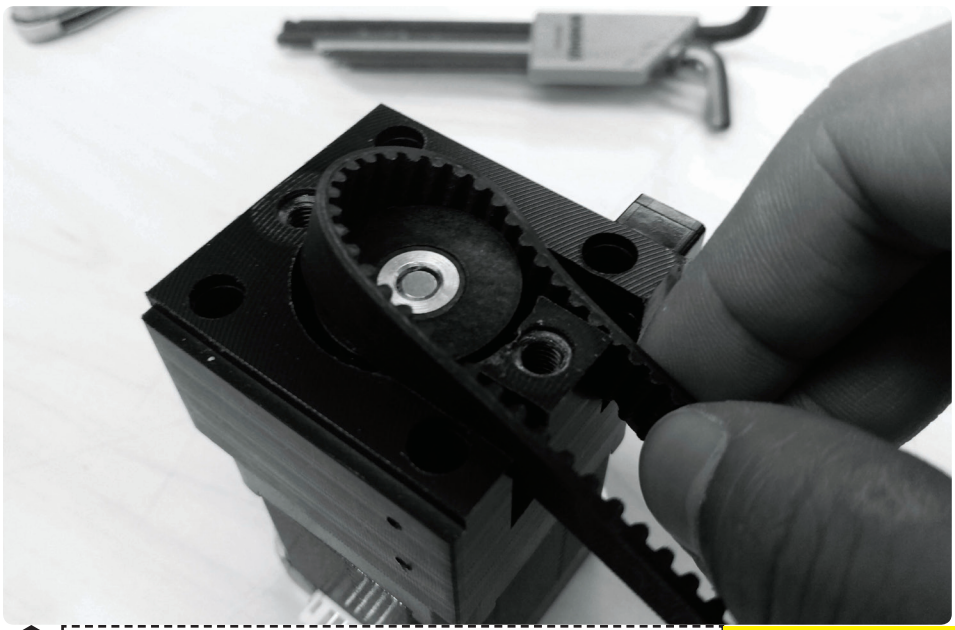
A22

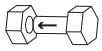
After attaching idler pulley as shown above, loop X belt around idler pulley



A23 

Fasten right end truck to bridge rail with 2 M5x12 FHCS. Install V-groove wheels as shown above if you have not yet done so



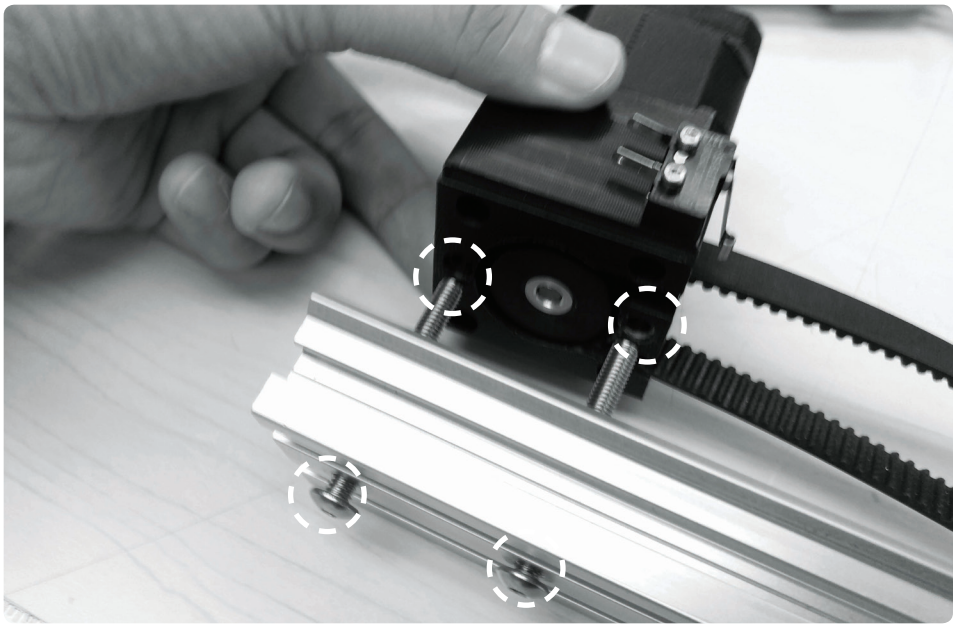
A24 

Add belt to the X motor by lightly pulling the belt around the pulley until it is guided into the motor mount assembly. Be careful not to accidentally break the cover on the X motor pulley

A25

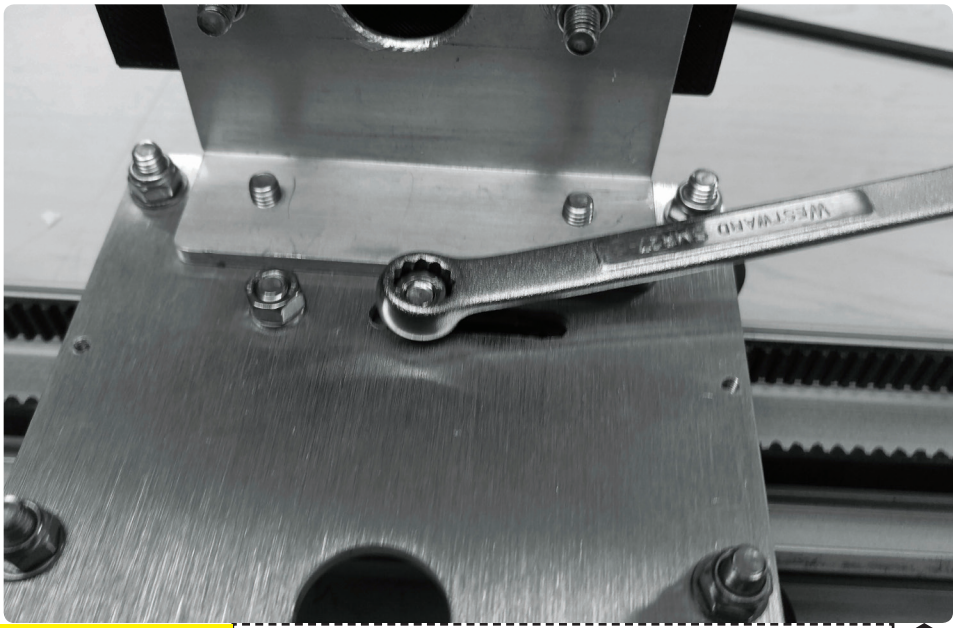
Use 1.5mm Allen Key and 2 M2x10mm SHCS to fasten the X limit switch to the X motor, oriented as shown

A26

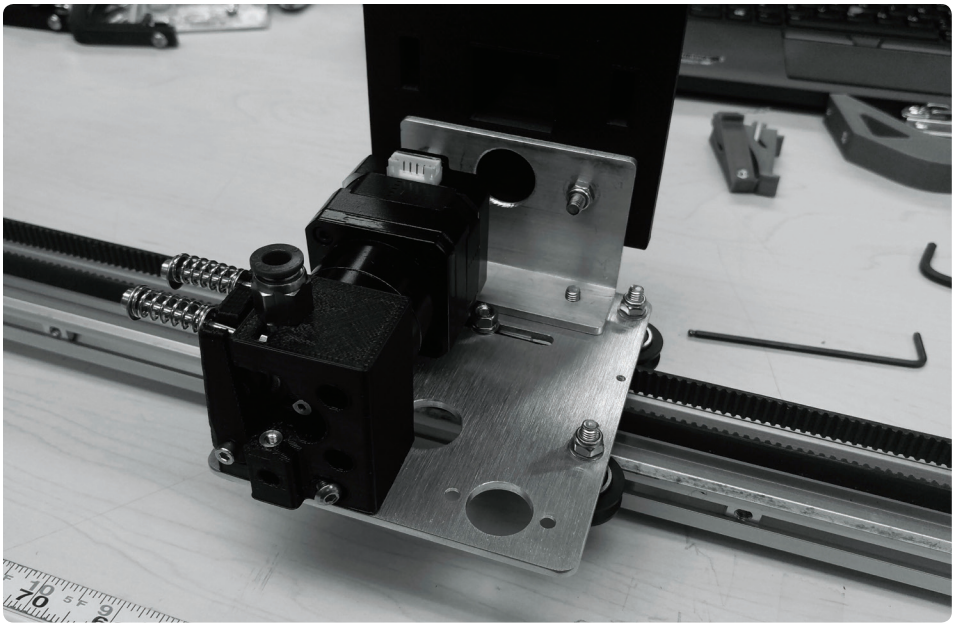


Use 3mm Allen Key to fasten X motor with belt and limit switch to bridge rail with 2 M5x45mm BHCS. Left end truck was temporarily removed for visibility's sake--it should still be attached here

A27

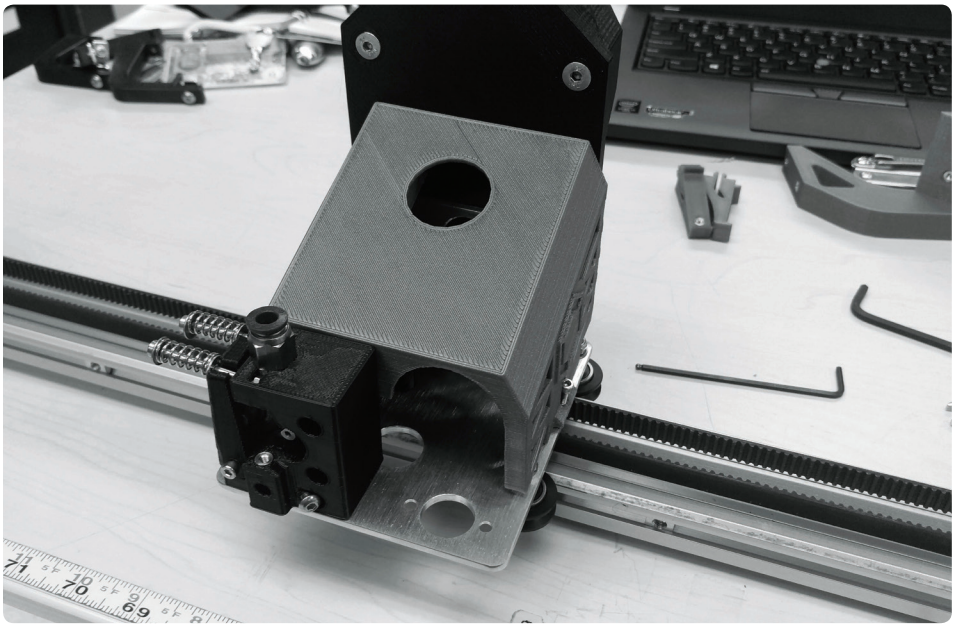


Tension the belt by adjusting the M6 BHCS in the tensioning blocks with a 4mm Allen Key. Once the belt is tensioned, tighten the tensioning block to the trolley with the 8mm wrench



A28

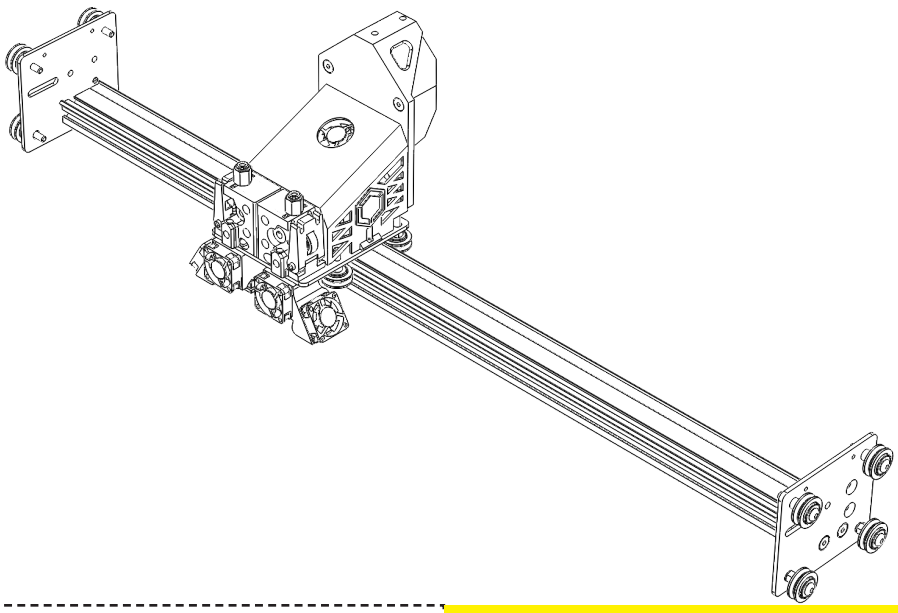
Reassemble extruders on top of trolley plate be fastening them with 2 M4 FHCS each



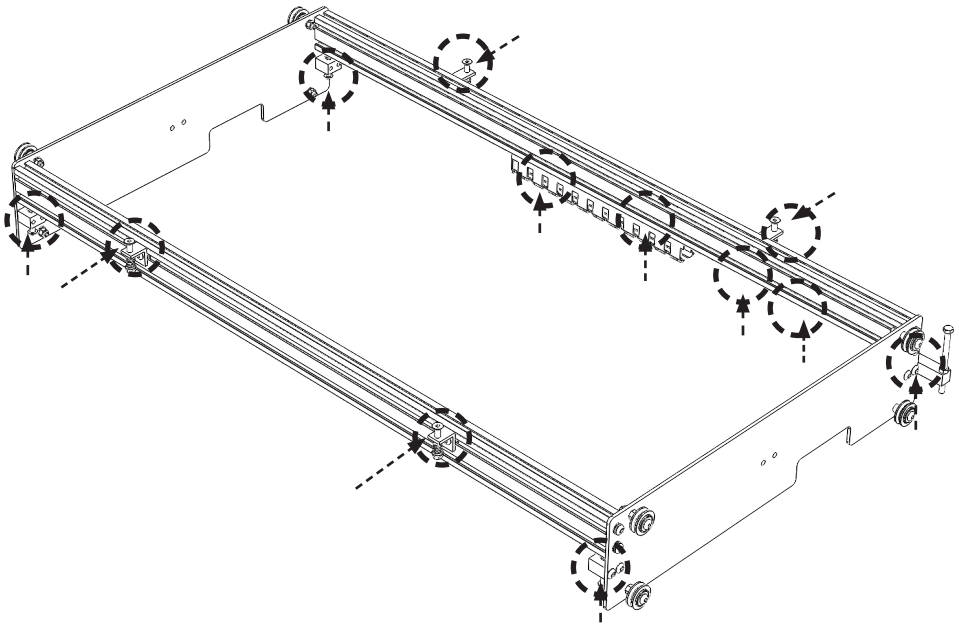
A29

Route any wires to the back of the trolley and place the cover. Fasten the 2 M3 FHCS to fully attach

Bridge rail should now include trolley, X and Y axis belts, X motor with limit switch, and end trucks with wheels

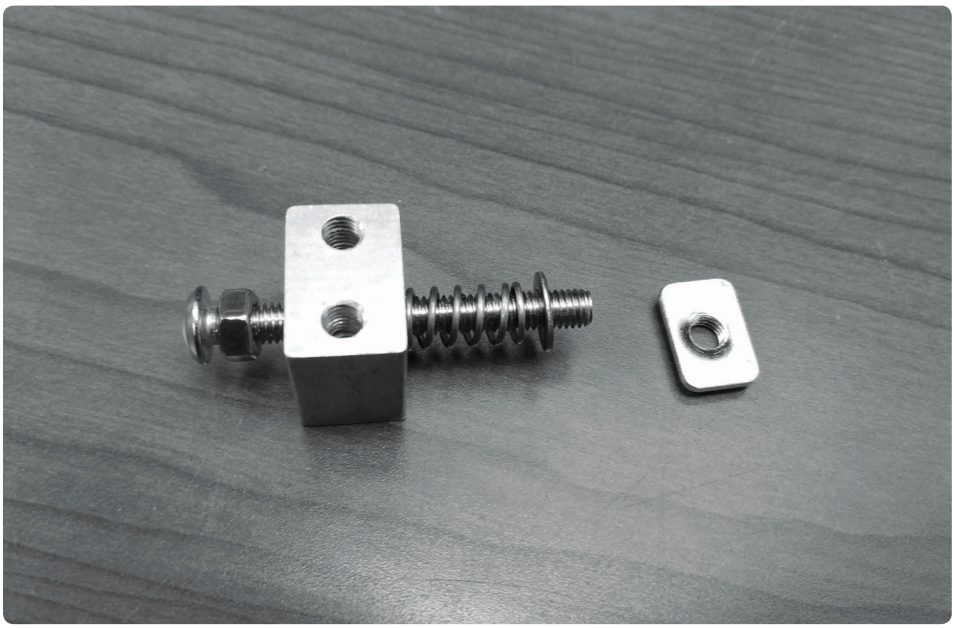


B : BED FRAME



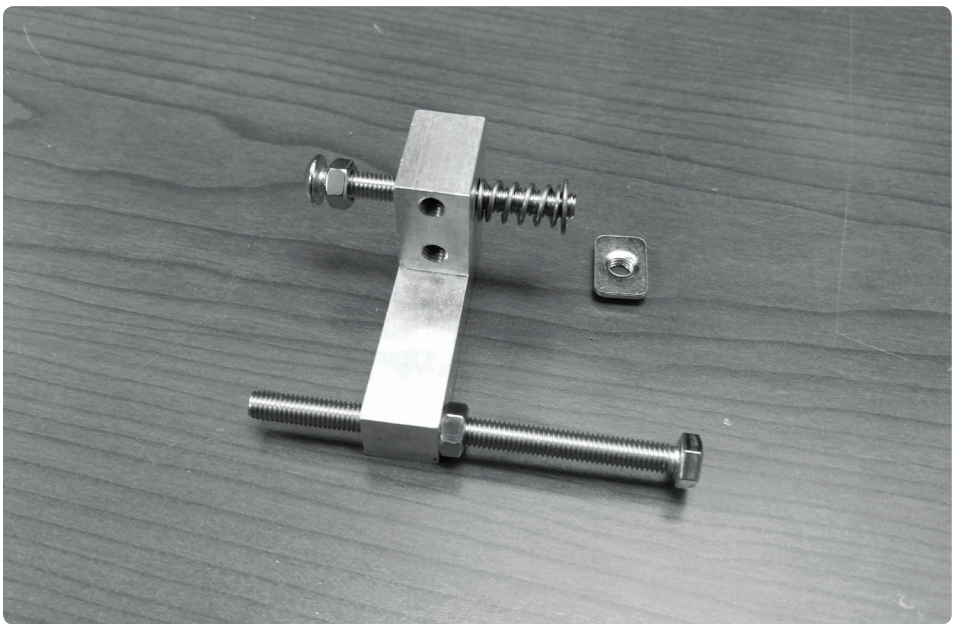
B1

Insert T-nuts in indicated locations (12 in total). Each cross rail needs 2 in the upper row of the outside faces and 2 in the bottom slots. Add 4 more to the bottom slot of the rear cross rail for the Panduit and Z cable carrier bracket



B2

Assemble 2 leveling blocks as shown -- M5x45mm BHCS, M5 hex nut all the way to the screw head, leveling block, spring, M5 washer. The corresponding T-nut should have just been placed into the bed frame cross rails

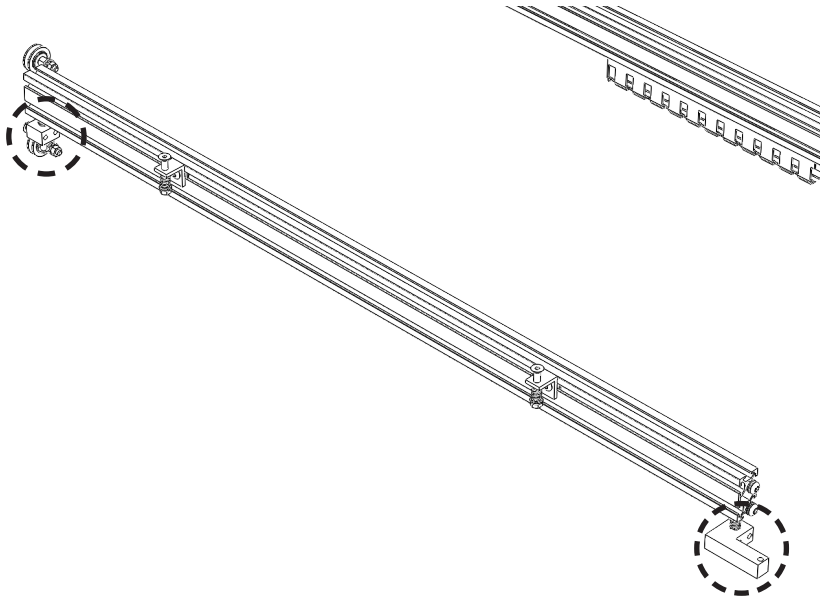


B3

Repeat same process for 2 Z limit switch leveling blocks, but be sure mirror them (make one upside down). Thread M5x70mm Hex head and M5 nut into leveling block

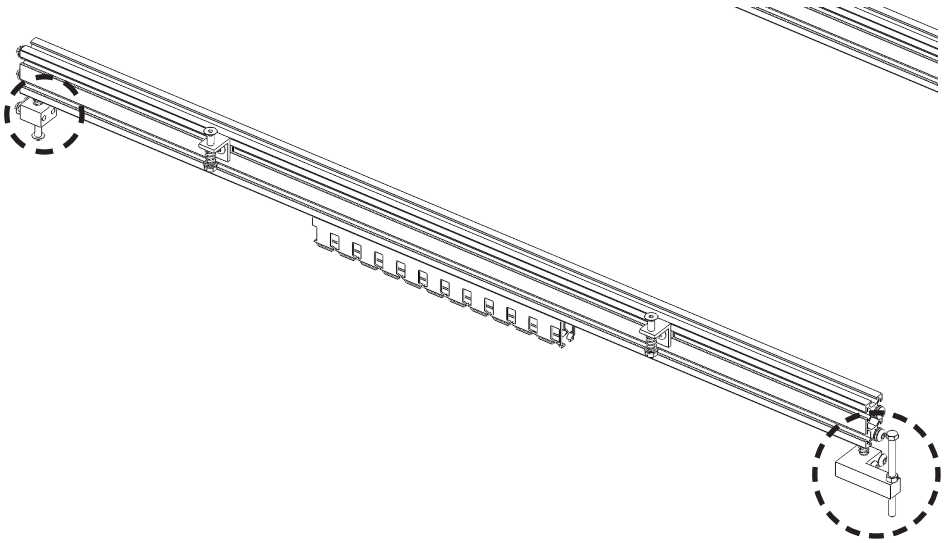
B4

On front cross rail, fasten normal leveling block to left side and Z limit switch leveling block to right side by tightening M5x45mm BHCS. Drive the M5x45mm BHCS into the rail so that they do not move for now. Spring compression can be adjusted with the M5 nut



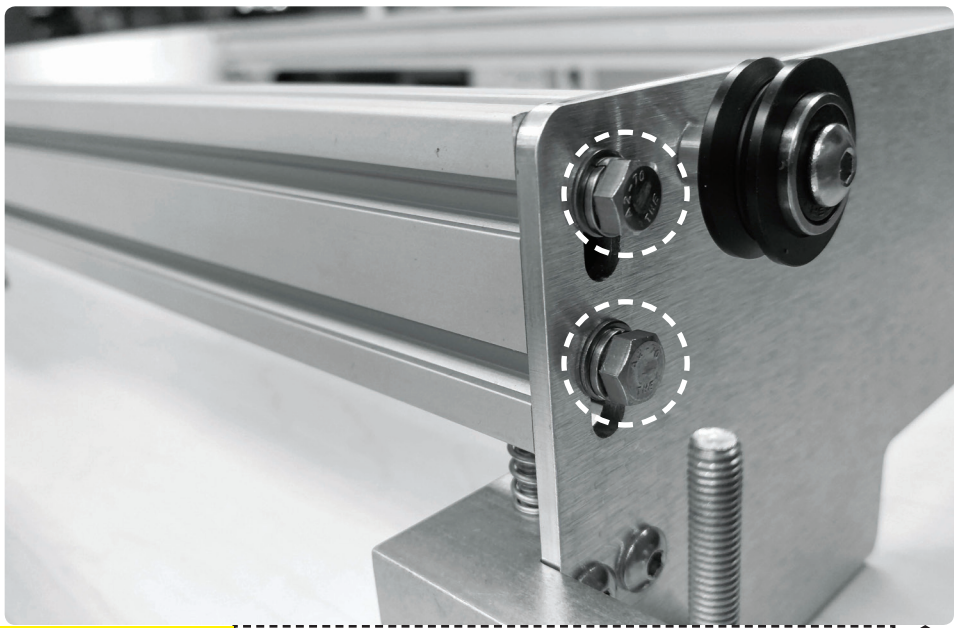
B5

On back cross rail, fasten normal leveling block to right side and Z limit switch leveling block to left side (opposite of front cross rail). Drive them into the rail in the same fashion as above

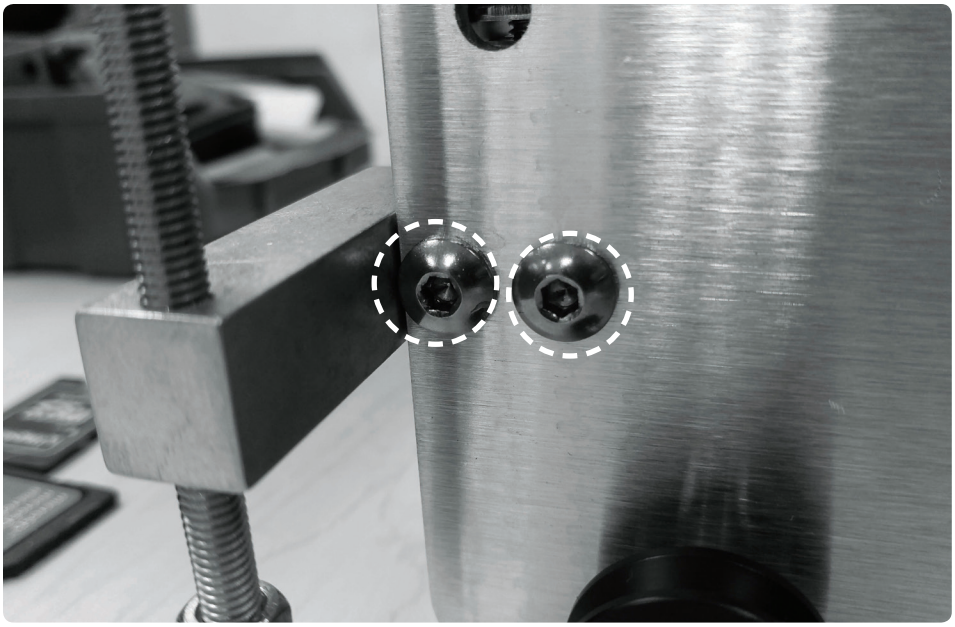


B6

Connect left side plate to rear rail with 2 sets of M5x12mm Hex head, M5 lock washers, and M5 washers

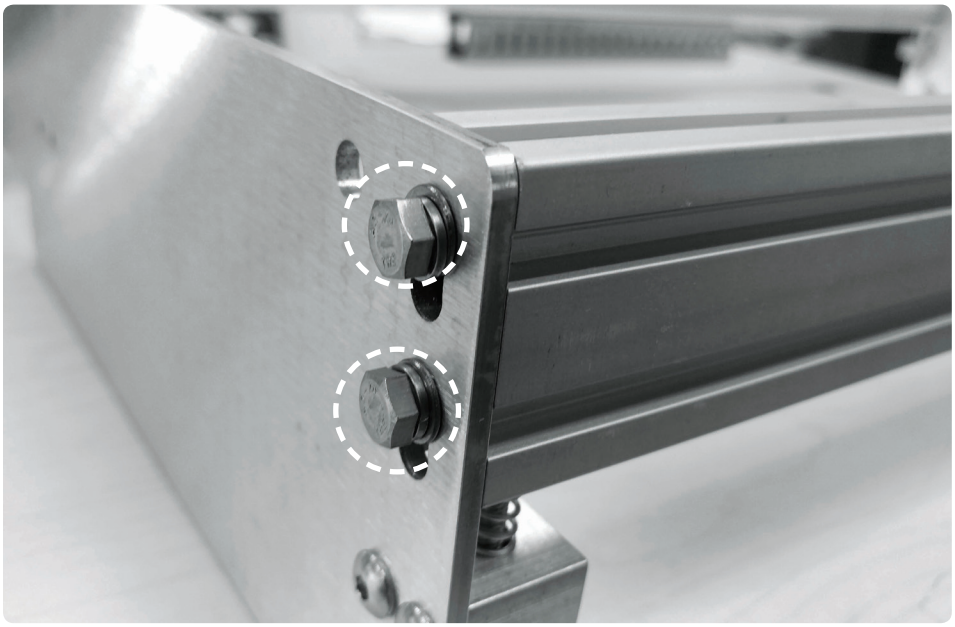


Work on a flat surface and use square to make sure bed frame is assembled properly



B7

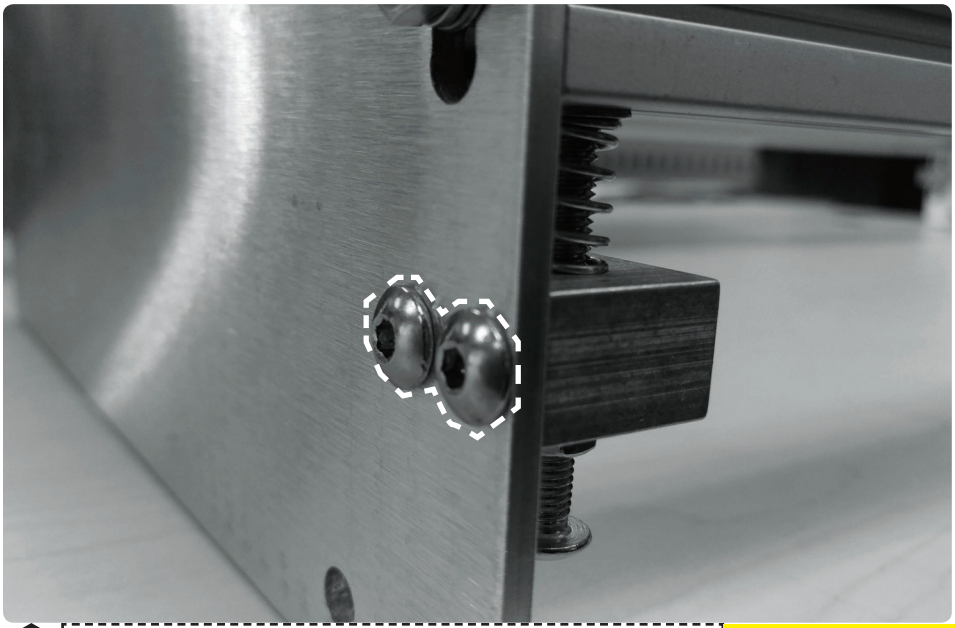
Adjust nut on Z limit switch leveling block and align it to the side plate holes. Fasten with 2 M5x12mm BHCS using the 3mm Allen Key



B8

Add front cross rail and fasten to left side plate in same way as above, with 2 sets of M5x12mm Hex head, M5 lock washers, and M5 washers

Work on a flat surface and use square to make sure bed frame is assembled properly



B9

Also align and fasten the front bed leveling block with 2 M5x12mm BHCS using the 3mm Allen Key

B10

Connect right side plate to rear cross rail with 2 sets of M5x12mm Hex head, M5 lock washers, and M5 washers

Work on a flat surface and use square to make sure bed frame is assembled properly

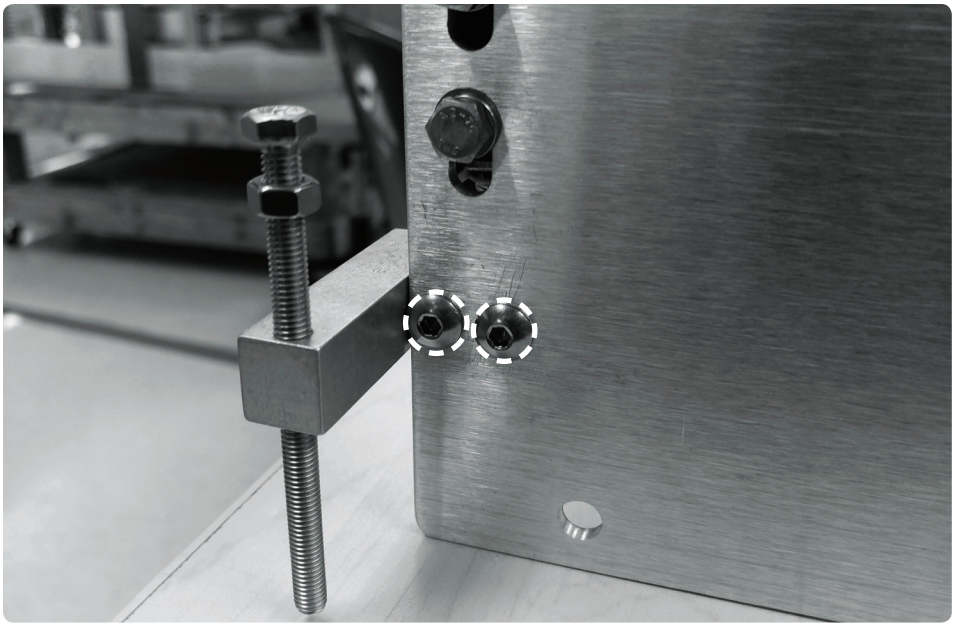
B11

Also align and fasten the rear bed leveling block with 2 M5x12mm BHCS using the 3mm Allen Key

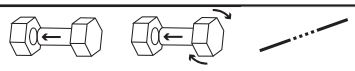
B12

Connect the front cross rail to the right side plate with 2 sets of M5x12mm Hex head, M5 lock washers, and M5 washers

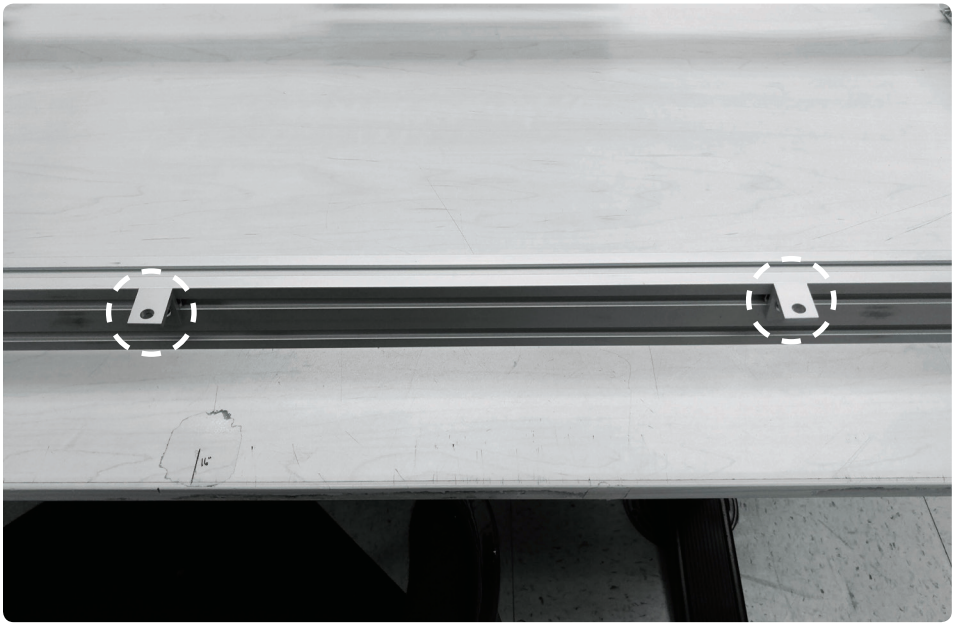
Work on a flat surface and use square to make sure bed frame is assembled properly



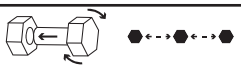
B13



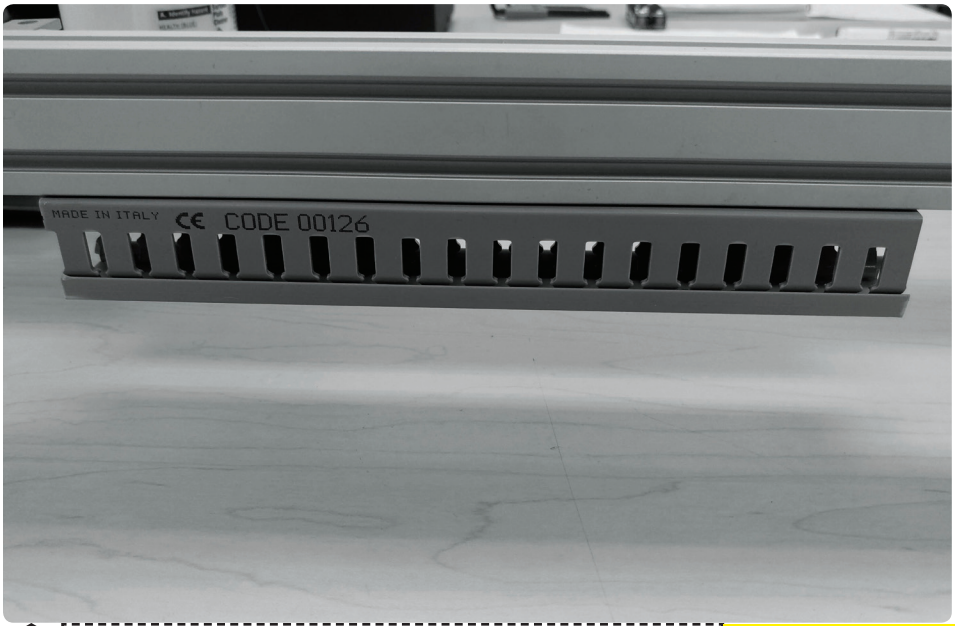
Adjust nut on Z limit switch leveling block and align it to the side plate holes. Fasten with 2 M5x12mm BHCS using the 3mm Allen Key



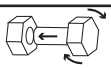
B14



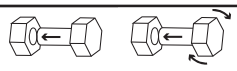
Mount and evenly space 2 bed mounting brackets to the outside of each cross rail



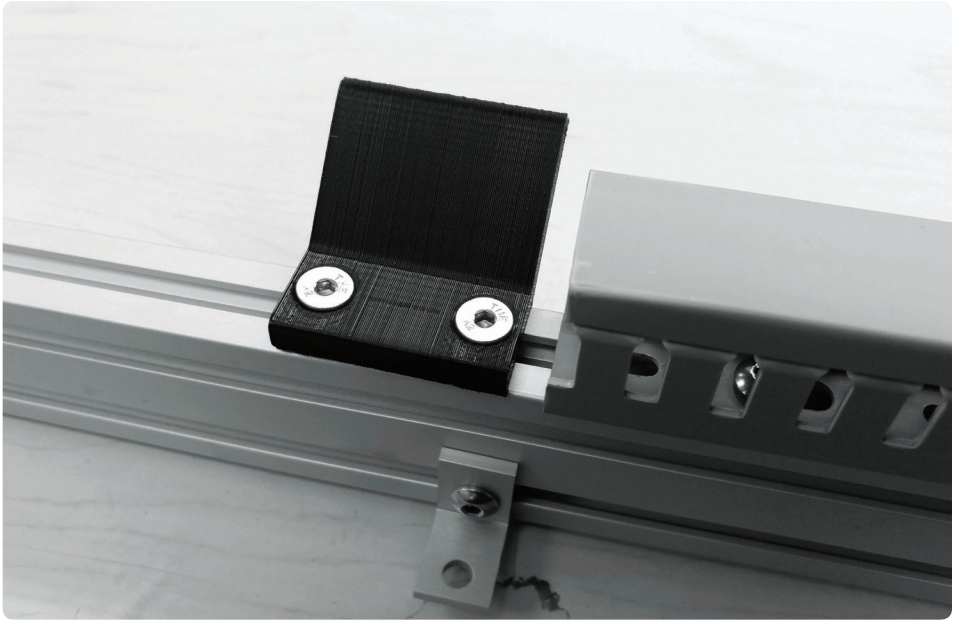
B15

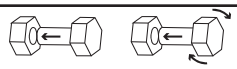


Fasten the 11.75” Panduit to the rear cross rail with 2 M5x8mm BHCS

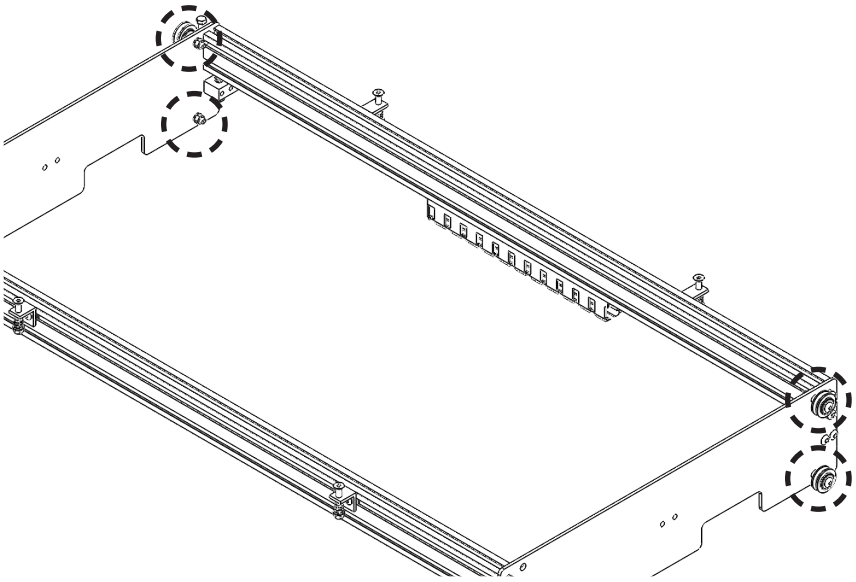
B16 

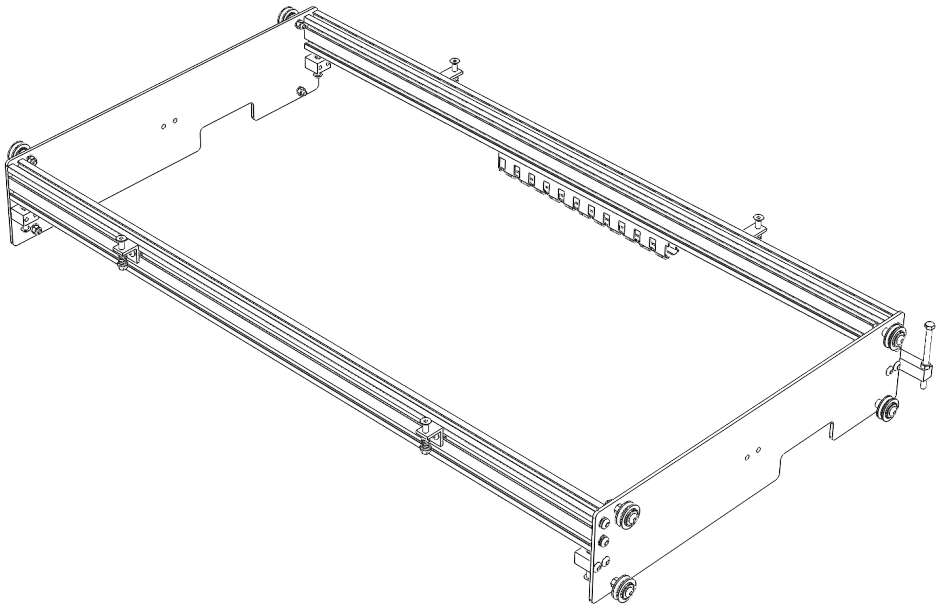
Install the Z cable carrier bed rail bracket on the rear cross rail with 2 M5x12mm FHCS. Mount this to the right of the Panduit when viewed from the front. The bracket should point towards the rear of the frame



B17 

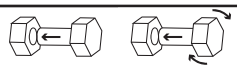
Finally, install all 4 back V-groove wheel assemblies in the same fashion as in A8. Use 1 M5x30mm BHCS, V-groove wheel, eccentric spacer up to the side plate, and then an M5 washer, M5 lock washer and M5 hex nut after. Do this for each wheel



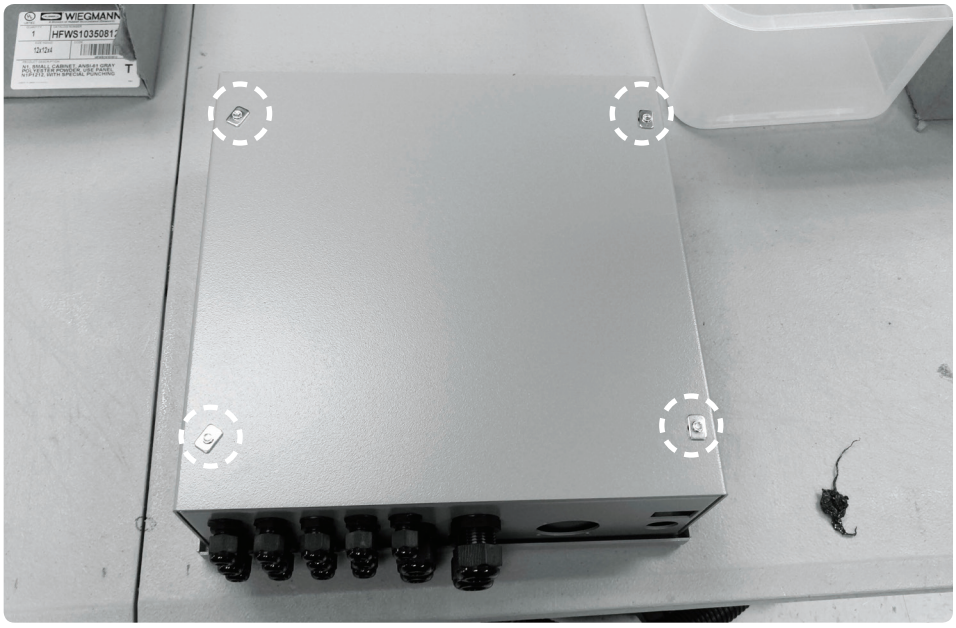


C : MOUNT ELECTRICAL BOX

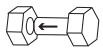
C1



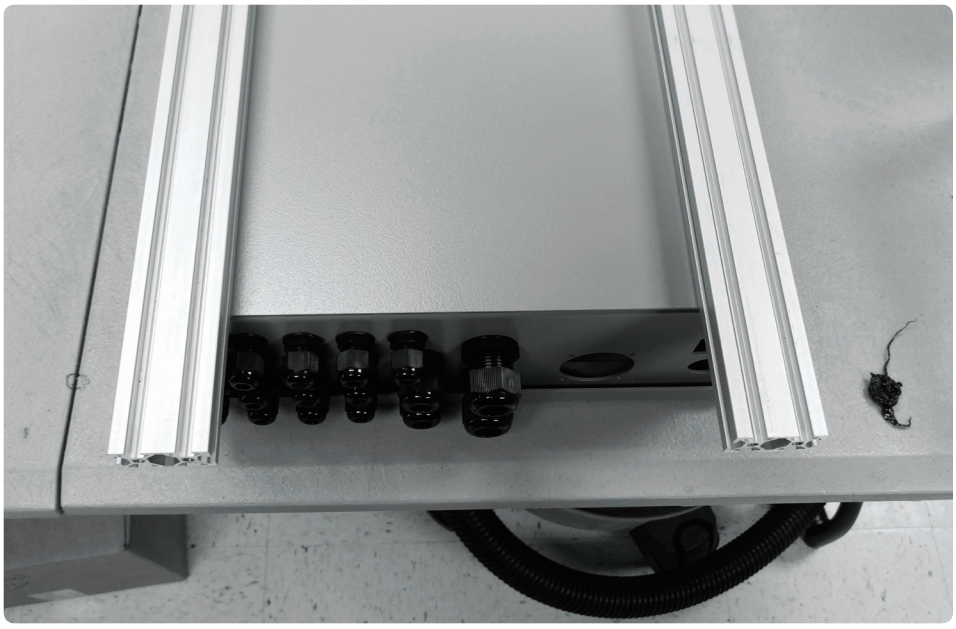
Add 4 M5x8mm BHCS and 4 T-nuts to electrical box if it hasn't been done already



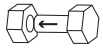
C2



Slide upright common rails onto electrical box (make outside edges in line with the electrical box). Leave about 3" from the bottom of each rail to the bottom of the electrical box

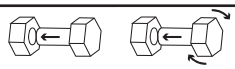


C3

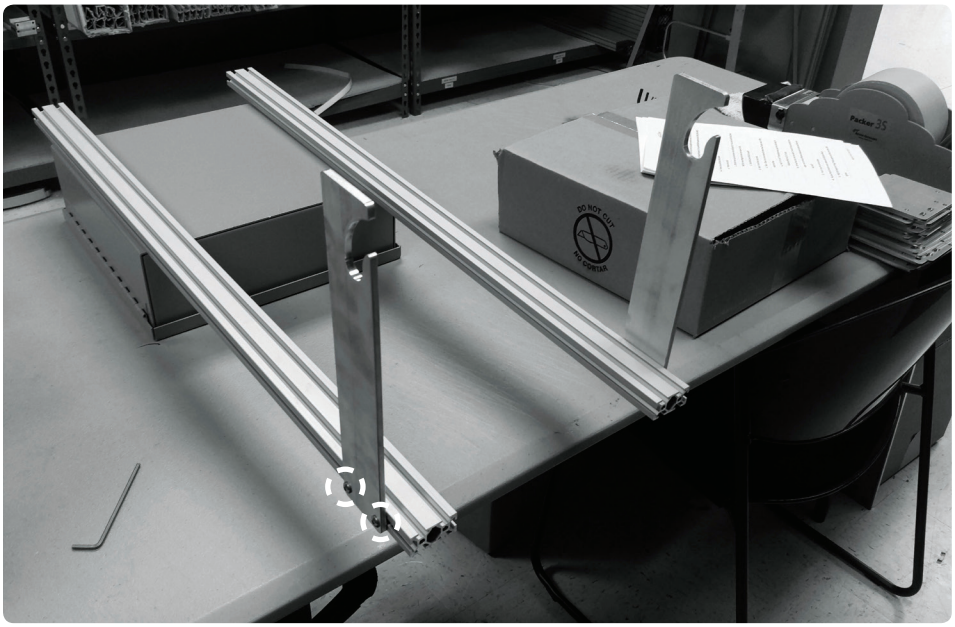


Slide 2 T-nuts into the outside slide of each common rail

C4

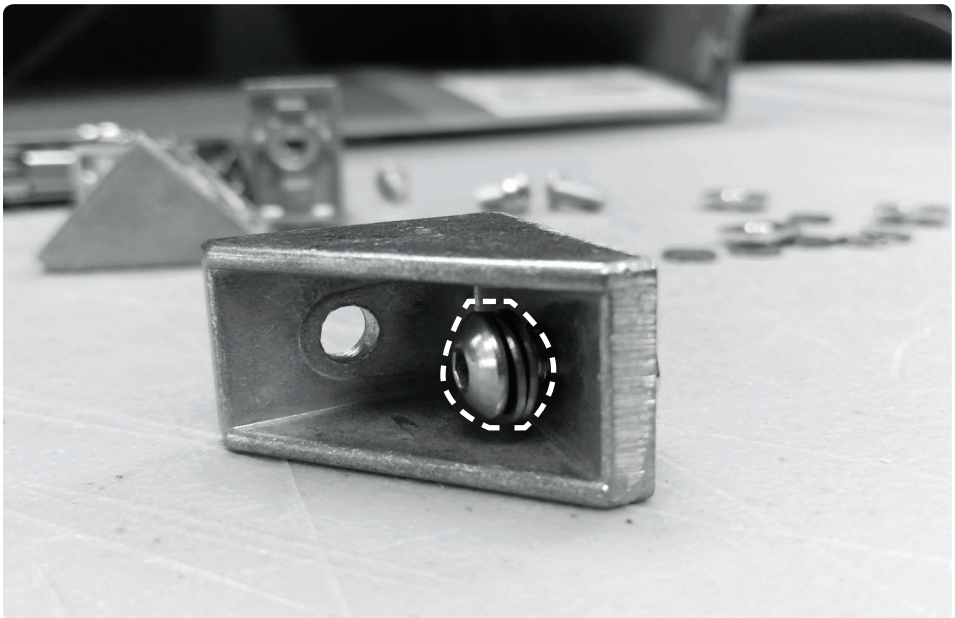


Use M5x10mm BHCS and 3mm Allen Key to fasten a filament rod shelf to the top of the common rail

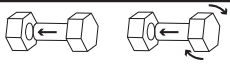


C5

Repeat for the other side



C6

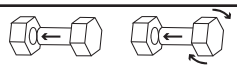


Prepare a triangle bracket by inserting a M5x12mm BHCS with 2 M5 washers through one of the holes and fastening a T-nut to the other side

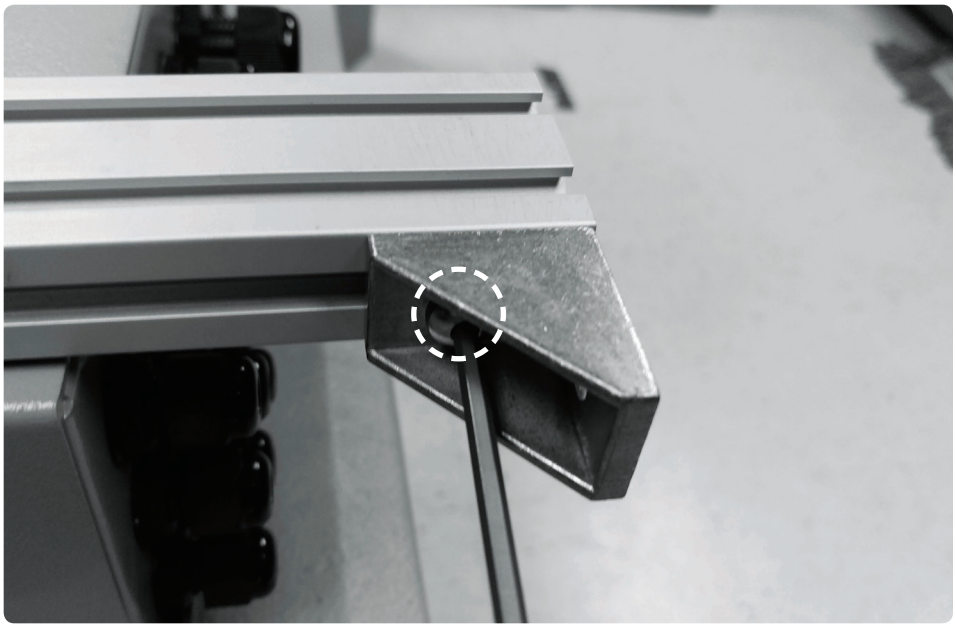
C7

Do this for 4 triangle brackets

C8

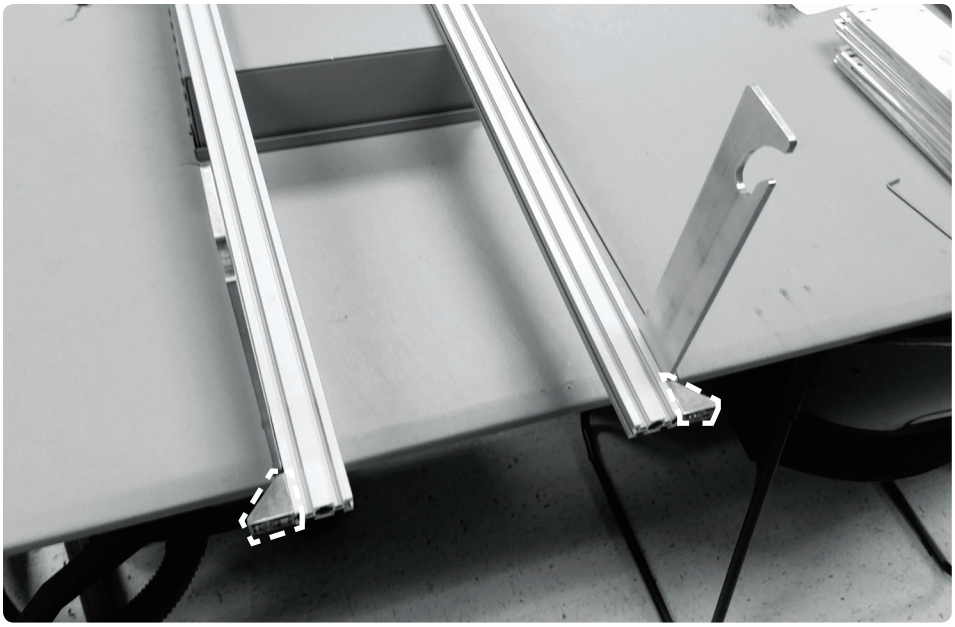


Slide them into the outside slots of each common rail, on both ends. Fasten with the 3mm Allen Key



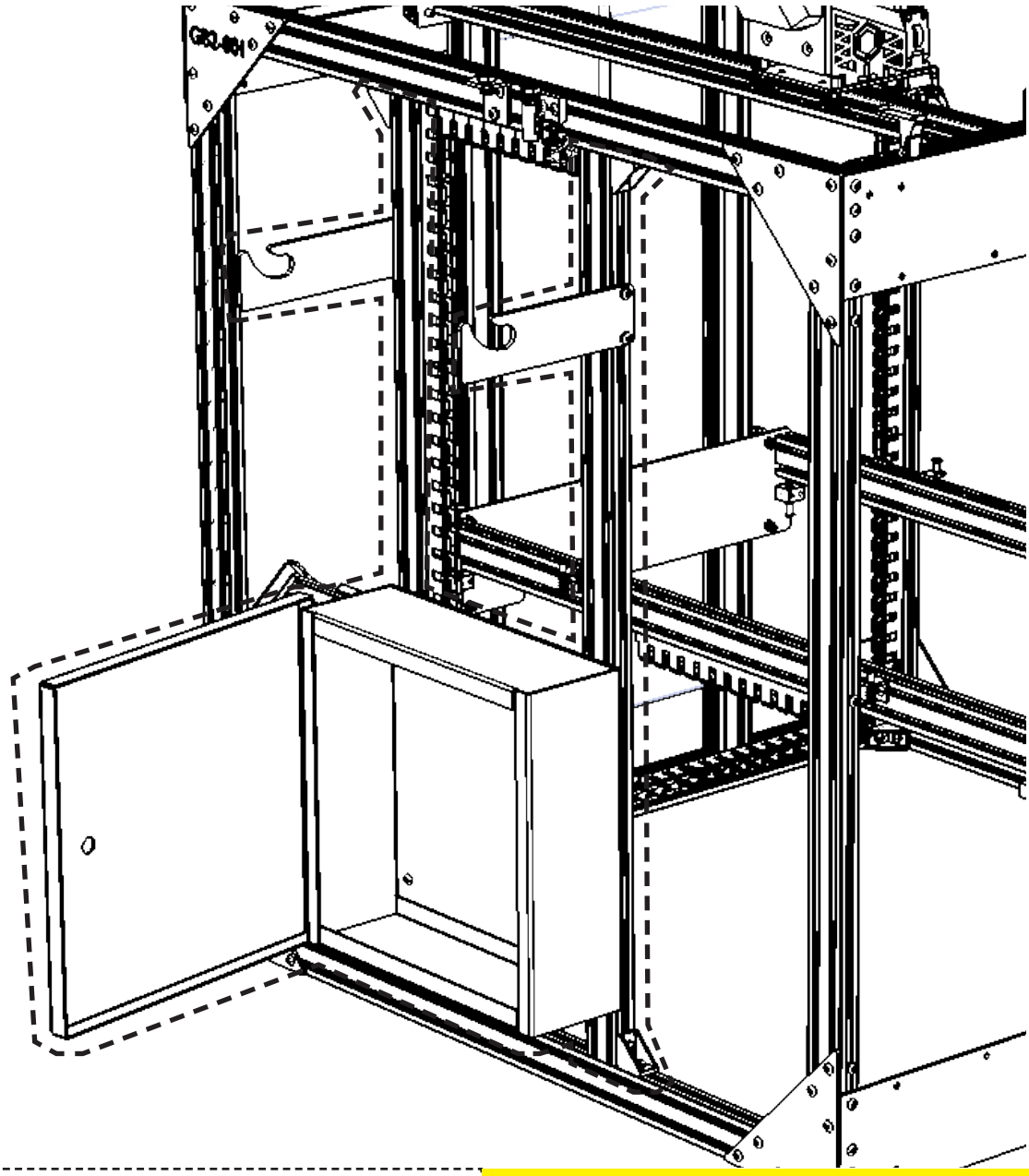
C9

Triangle brackets fastened at bottom



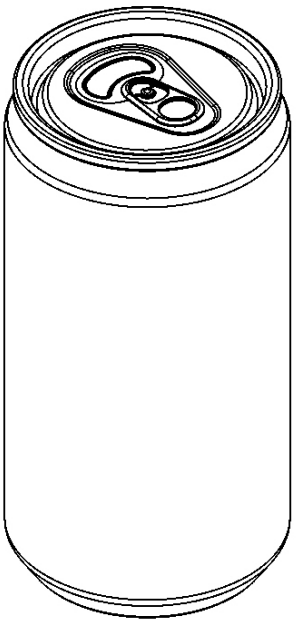
C10

Triangle brackets fastened at top

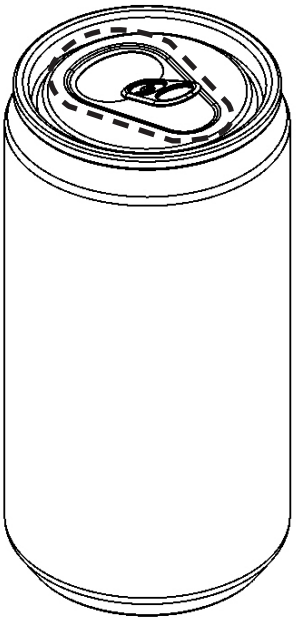


NOW IS A GOOD STOPPING POINT...

Acquire beverage of your choice

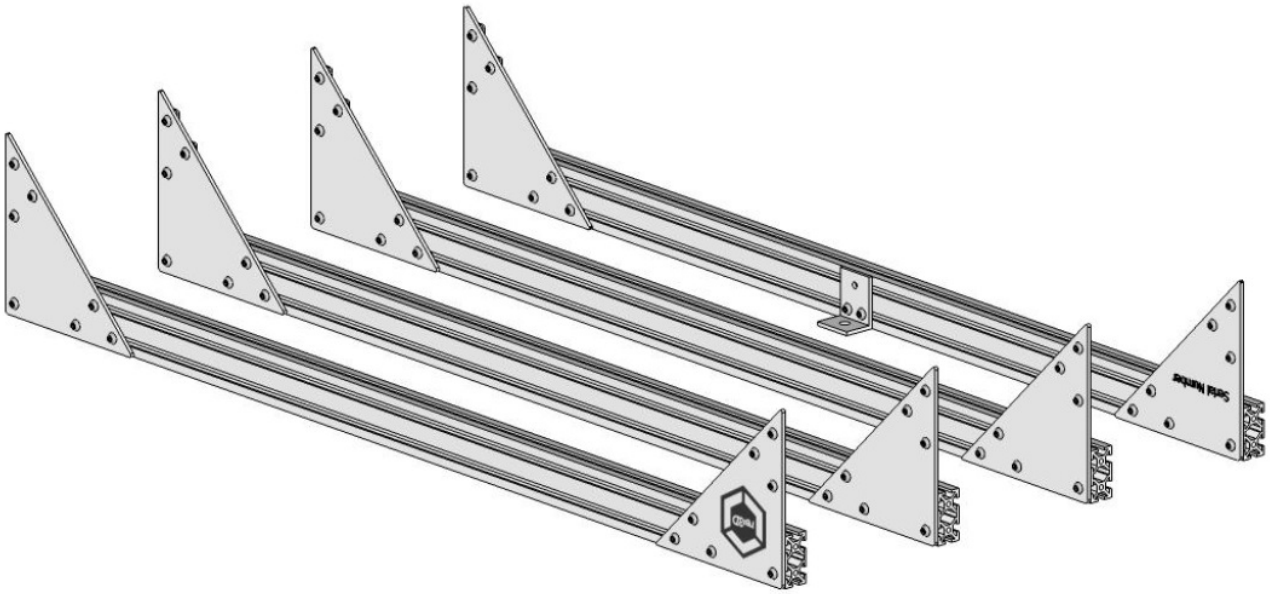


Actuate pull tab

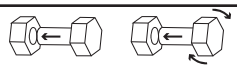


Consume

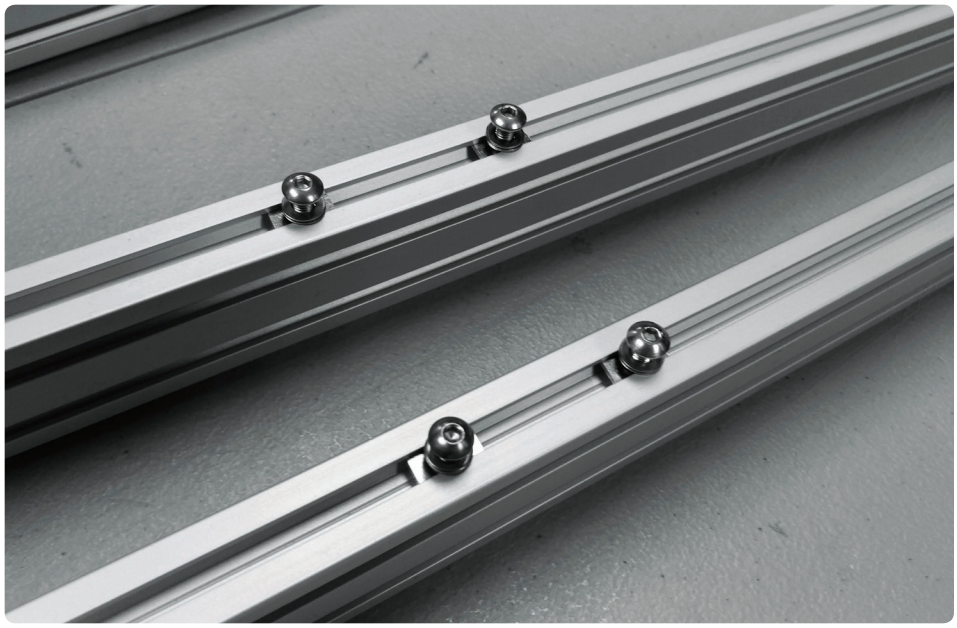
D : FRAME CROSS RAILS AND SIDE PLATES



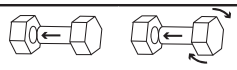
D2



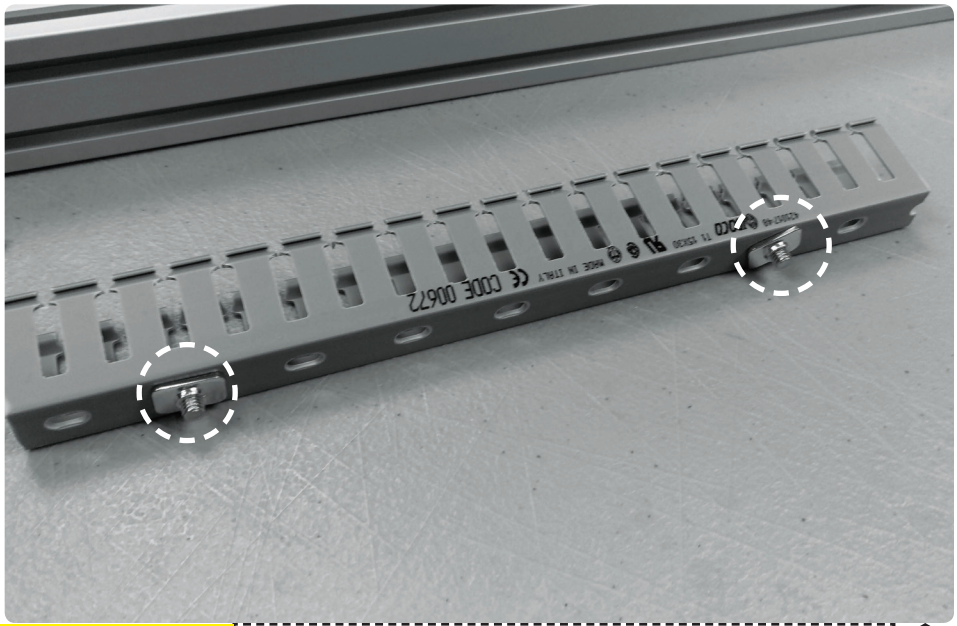
Cross rails will eventually be assembled as shown above. Prepare an M5x12mm BHCS with 2 M5 washers and a T-nut. Insert two of these into both rear cross rails--they will be used for mounting the electrical box

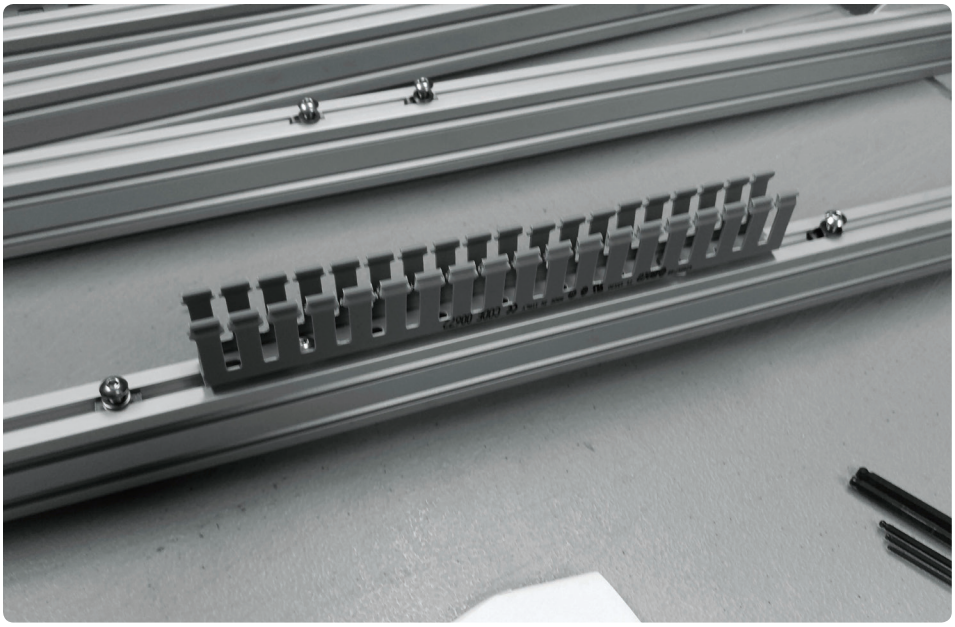


D3

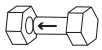


Prepare the 8” Panduit by inserting 2 M5x8mm BHCS and loosely fastening T-nuts.



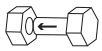


D4



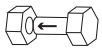
Slide the Panduit in between the two M5x12mm BHCS on the rear top cross rail

D5



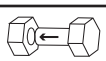
On the rear cross rails, insert 4 T-nuts on each end as shown--these will be for fastening the corner plates.

D6



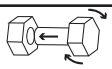
Also, add 5 more T-nuts to the middle of the rear top cross rail as shown to accommodate the rear filament shelf and filament detection bracket. For dual extruders, simply add 2 T-nuts alongside the row that already has 4--this will make a total of 7 T-nuts

D7

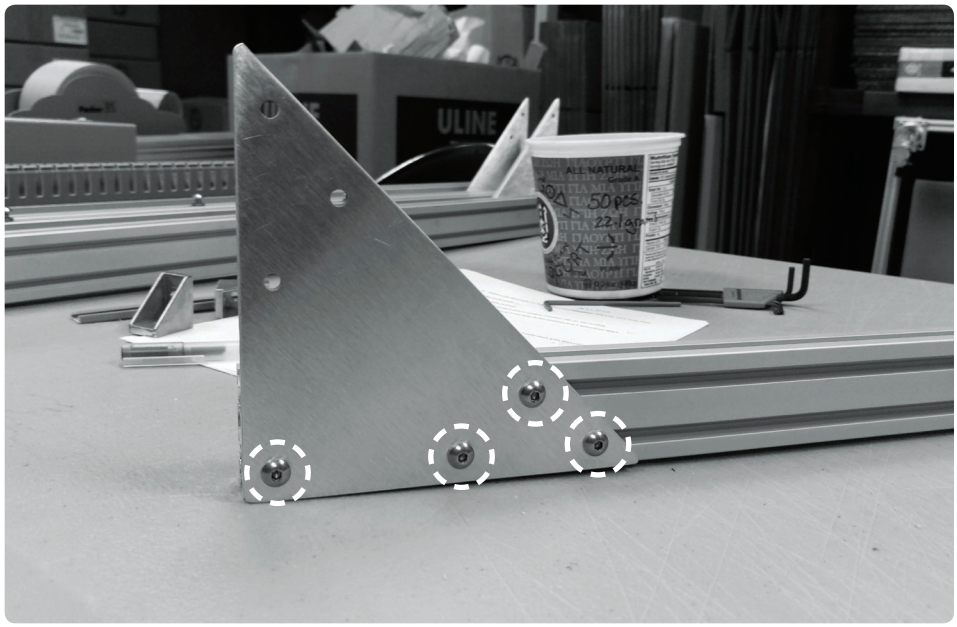


On the front cross rails, insert 4 T-nuts on each end as shown--these will also be for fastening corner plates.

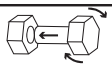
D8



Loosely fasten, or “snug,” the corner plates to the cross rails



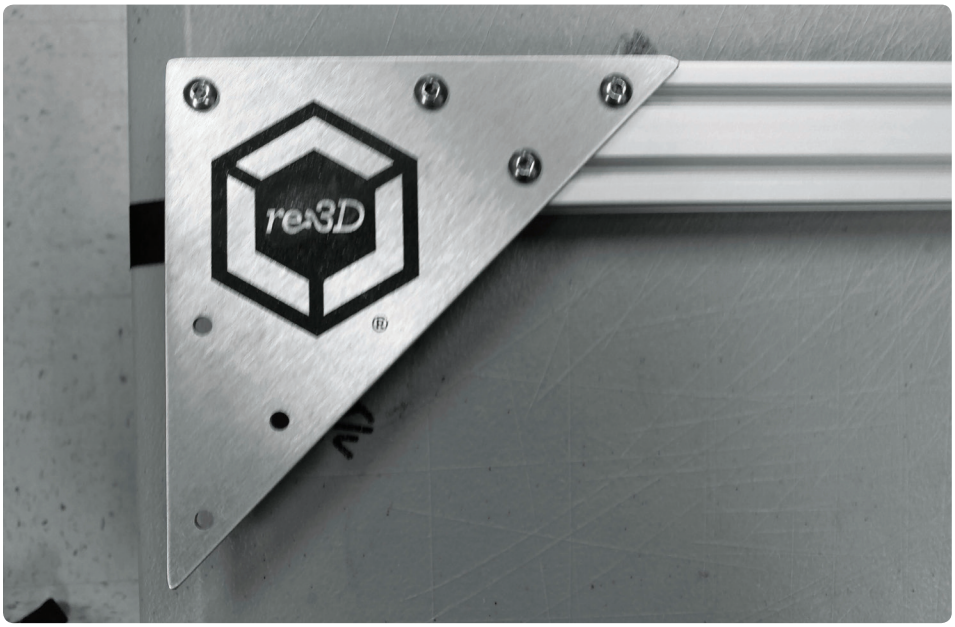
D9



Square and flush the corner plates as best as you can, and then fully tighten the M5x8mm BHCS with the 3mm Allen Key

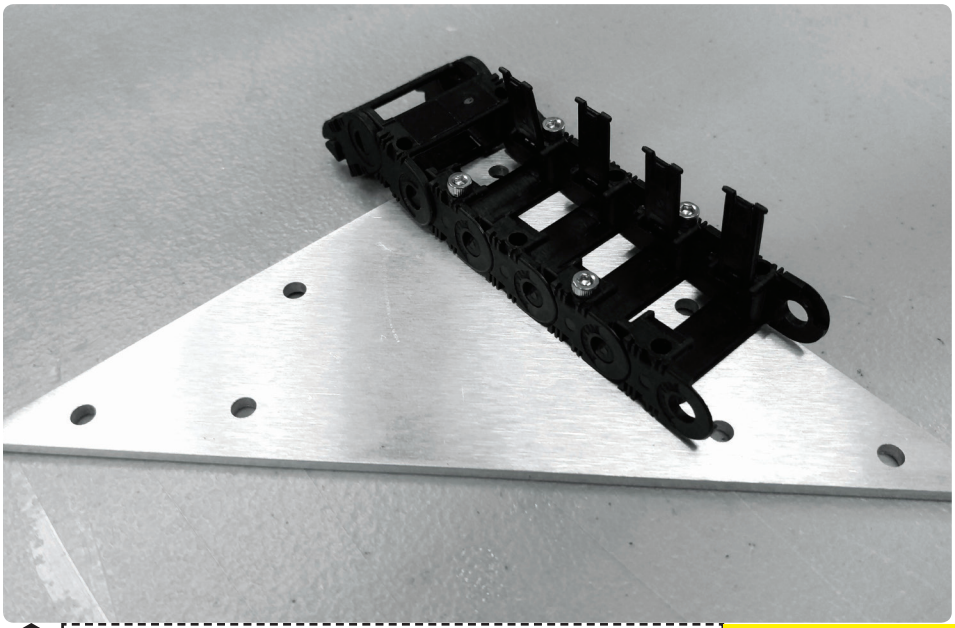
D10

1 corner plate will have a serial number--this must go on the rear top cross rail for what will eventually the rear right corner when viewed from the front of the Gigabot®



D11

1 corner plate will have the re:3D Inc.® logo--this must go on the front top cross rail in what will become the front left corner when viewed from the front of the Gigabot®

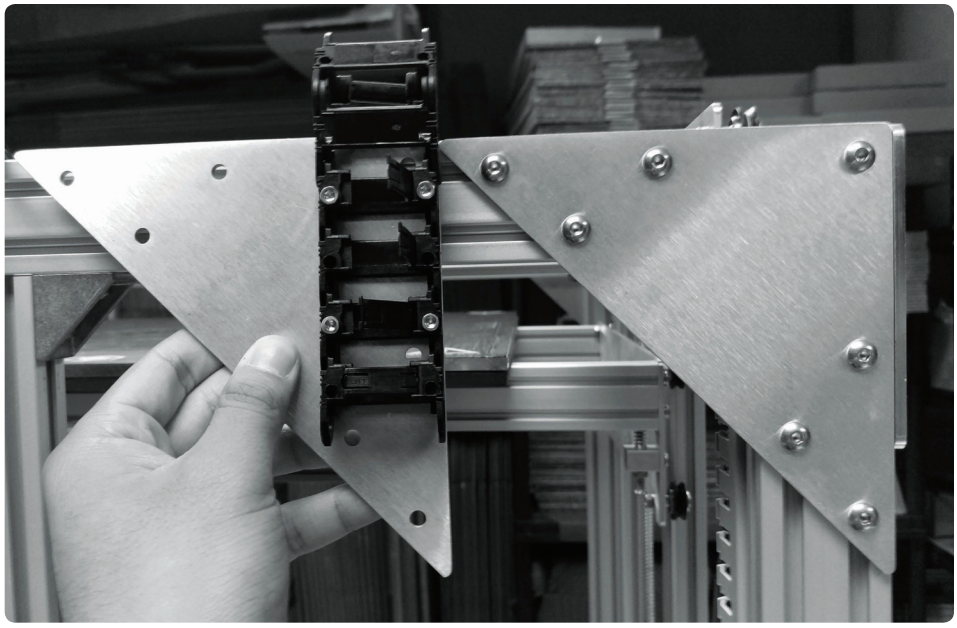


D12

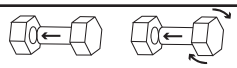
1 corner plate will already have 8 Y axis cable carrier links attached. This must attach to the rear top cross rail on the opposite end of the serial number plate. This will become the rear left corner when viewed from the front of the Gigabot®

D13

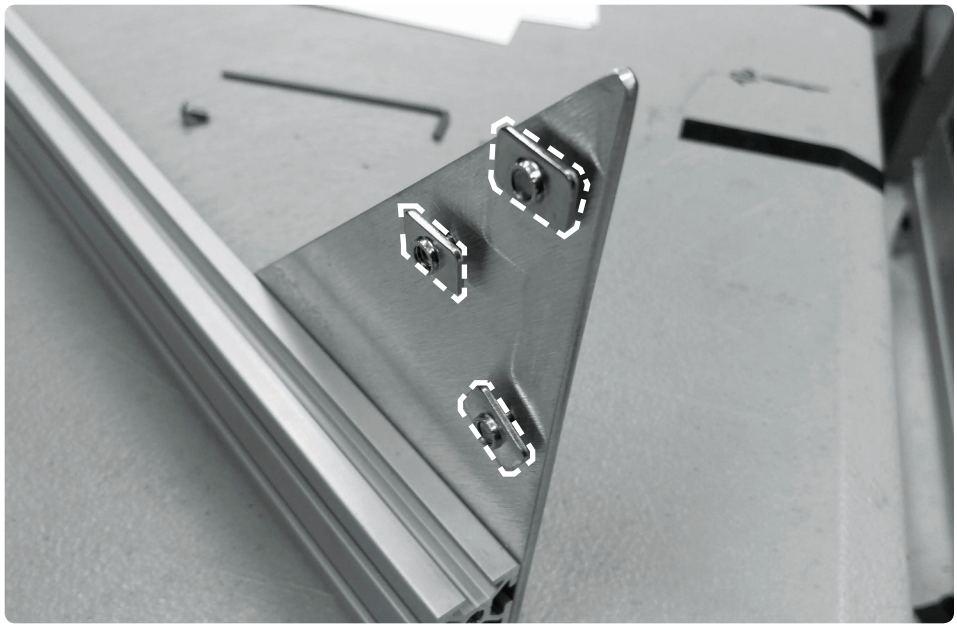
All remaining corner plates are plain, as shown here



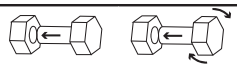
D14



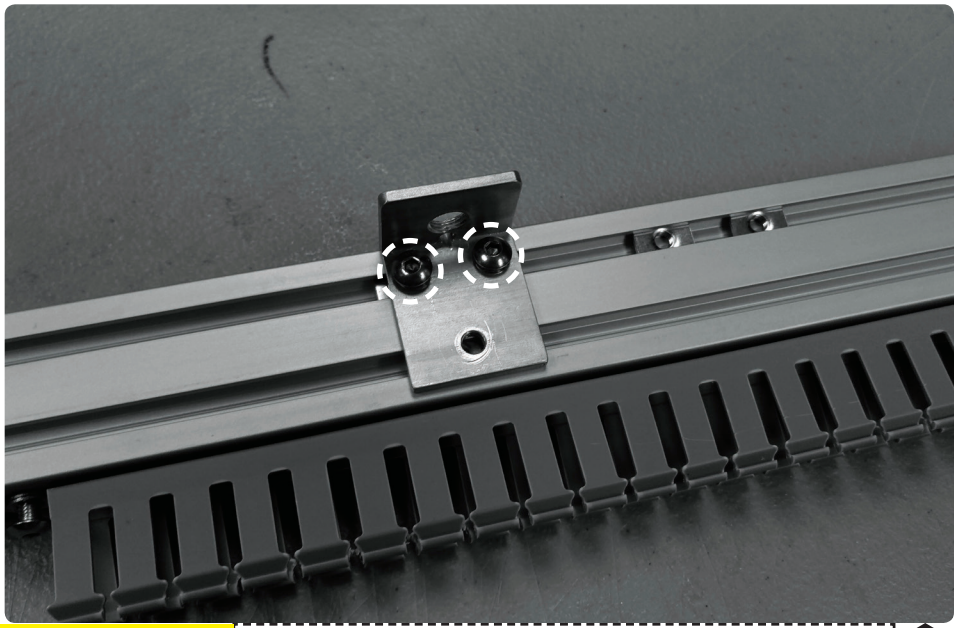
After squaring, flushing, and fastening all corner plates to the cross rails, add 3 M5x8mm BHCS to the remaining corner plate holes and fasten T-nuts accordingly. Do this for every corner plate



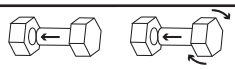
D15



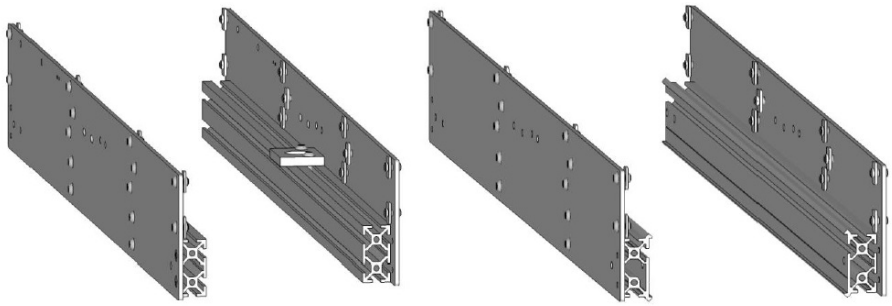
Attach the rear filament guide shelf to the rear top cross rail with 2 M5x8mm BHCS



D16

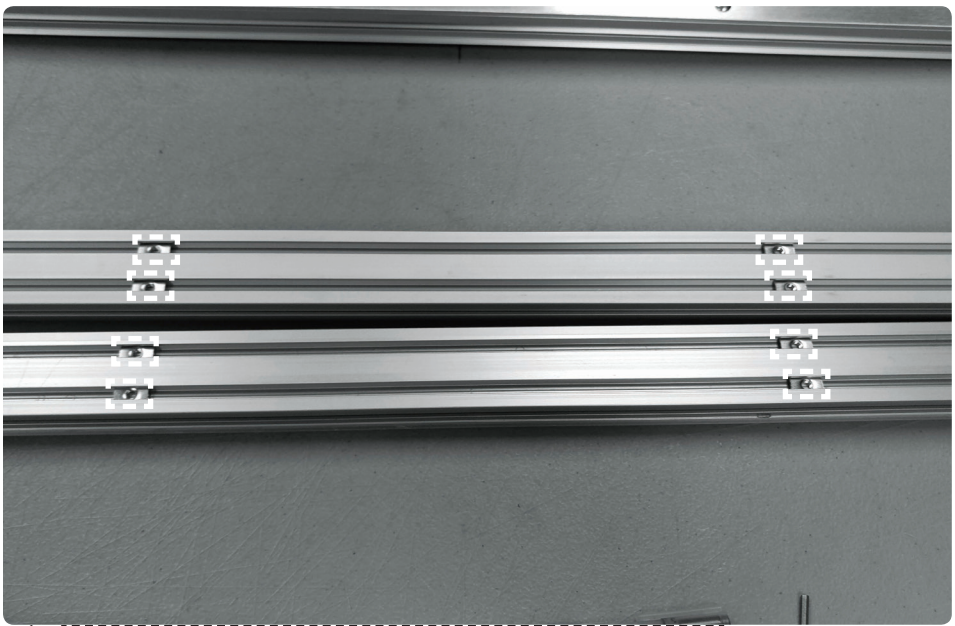


Attach the 10” filament guide rod with 1 M5x12mm BHCS and 2 M5 washers

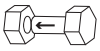


D17

The side plates are mirrored, but they are not symmetric front to back. Also, the lower subassemblies use normal common rails while the upper subassemblies use the runway rails (Maker Slide), which are used with the V-groove wheels

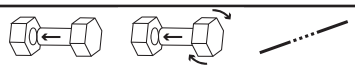


D18

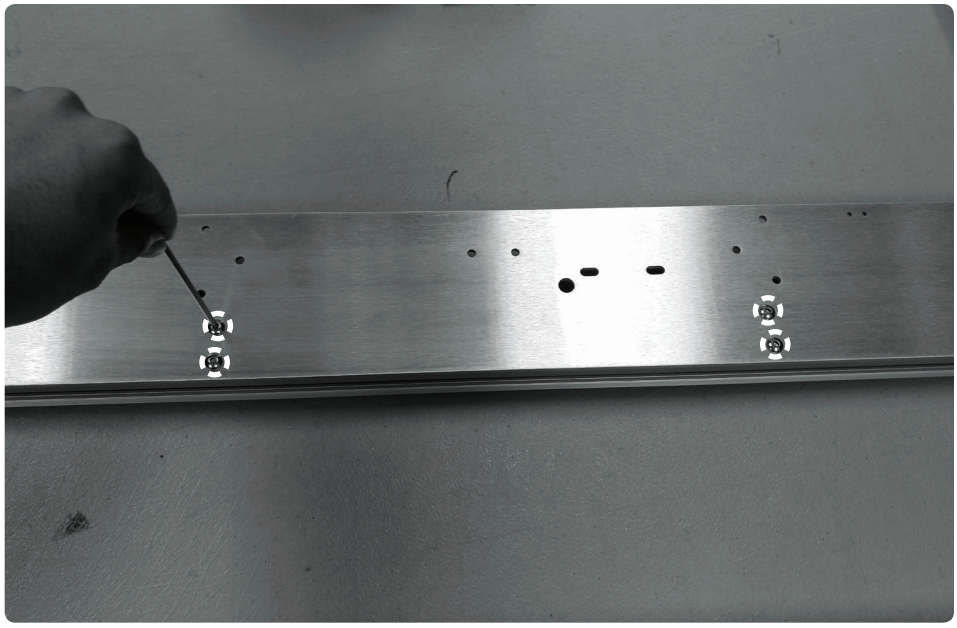


Insert the lower 4 T-nuts into the common rails first

D19

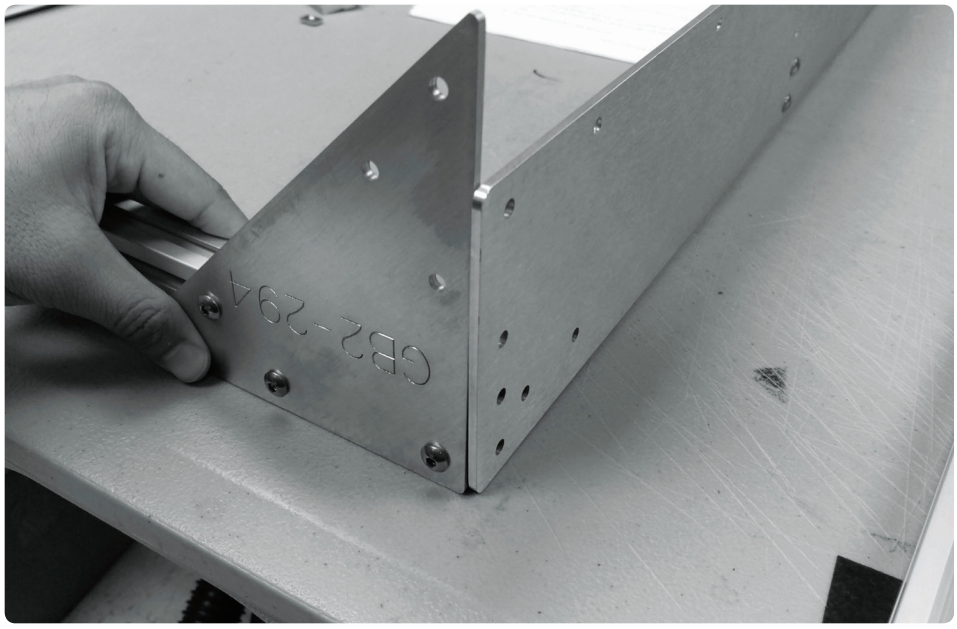


Align the T-nuts to the holes on a lower side plate and loosely fasten, or “snug,” them together with 4 M5x8mm BHCS

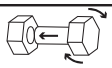


D20

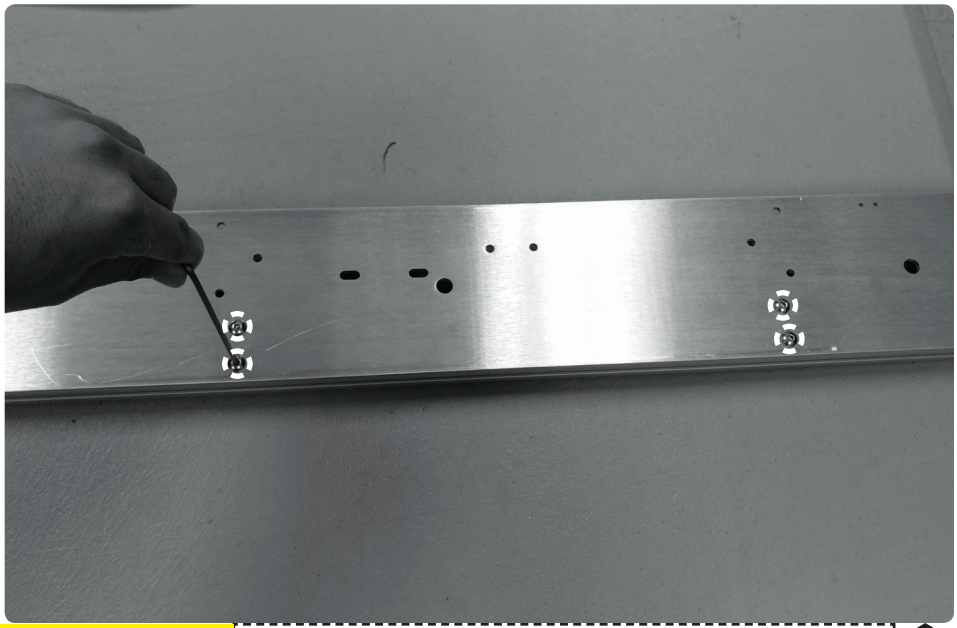
Set the subassembly on a flat surface and use a previously squared and flushed cross rail to properly space the common rail along the side plate. Start from what will be the front edge of the side plate when it is fully assembled



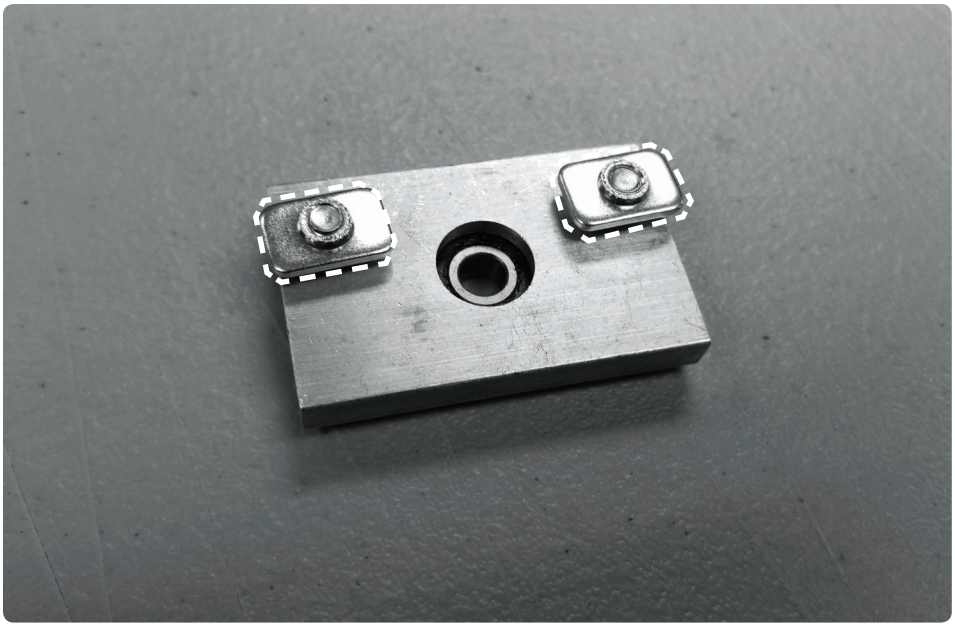
D21



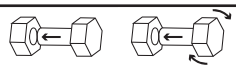
If it is hard to align, just center the common rail as best as possible. Once spaced correctly, fully tighten the M5x8mm BHCS with 3mm Allen Key



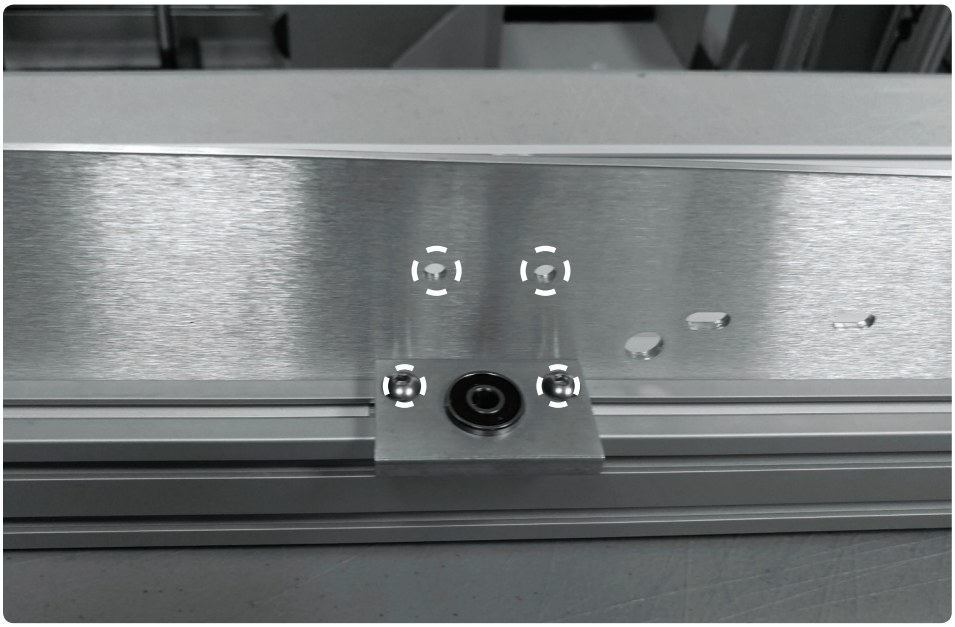
Repeat this for the other common rail



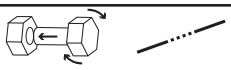
D22



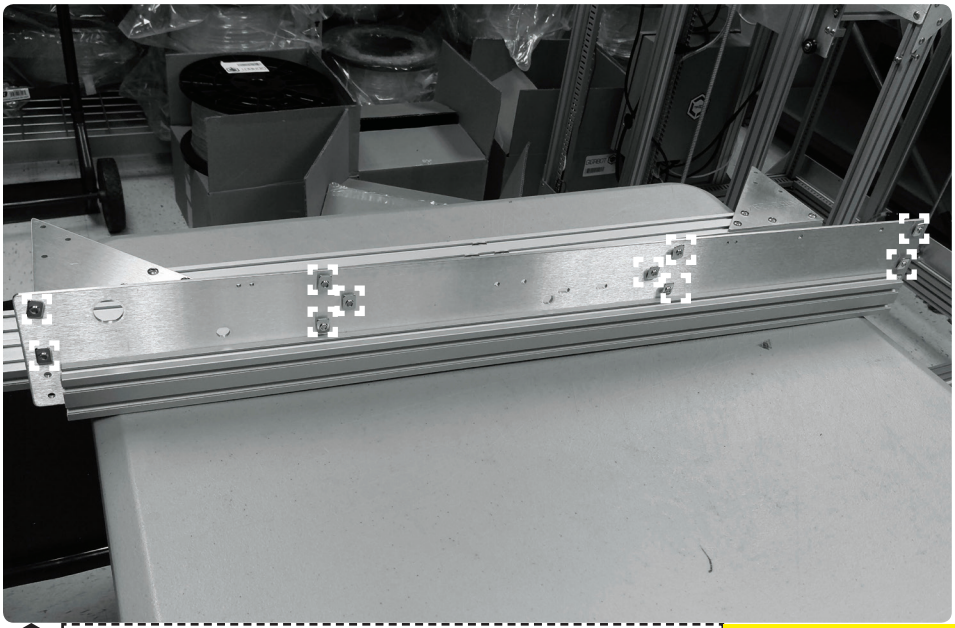
Insert 2 M5x12mm BHCS into a lower bearing block and loosely fasten 2 T-nuts



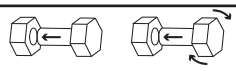
D23



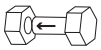
Slide lower bearing block onto common rail and center it between the alignment holes for the ACME threaded rod. This is near the Z motor mounting holes. Fasten with 3mm Allen Key



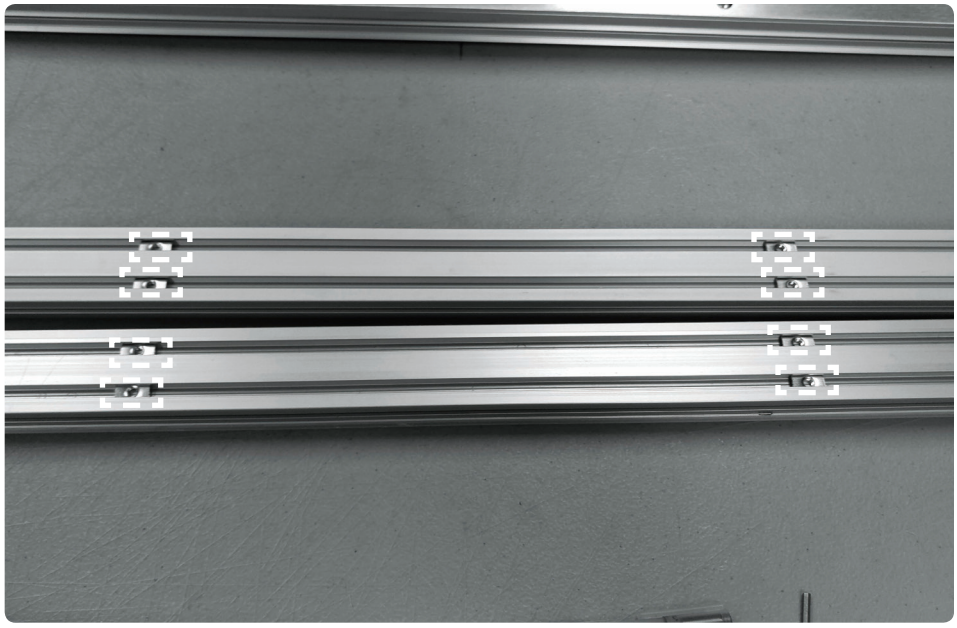
D24

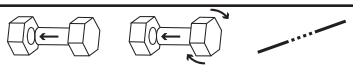


Once lower bearing block has been fastened, add 10 M5x8mm BHCS and 10 T-nuts to accommodate the upright common rails on the ends and Z uprights in the middle. Repeat this assembly, including the lower bearing block, with the other common rail (be sure to mirror them!)

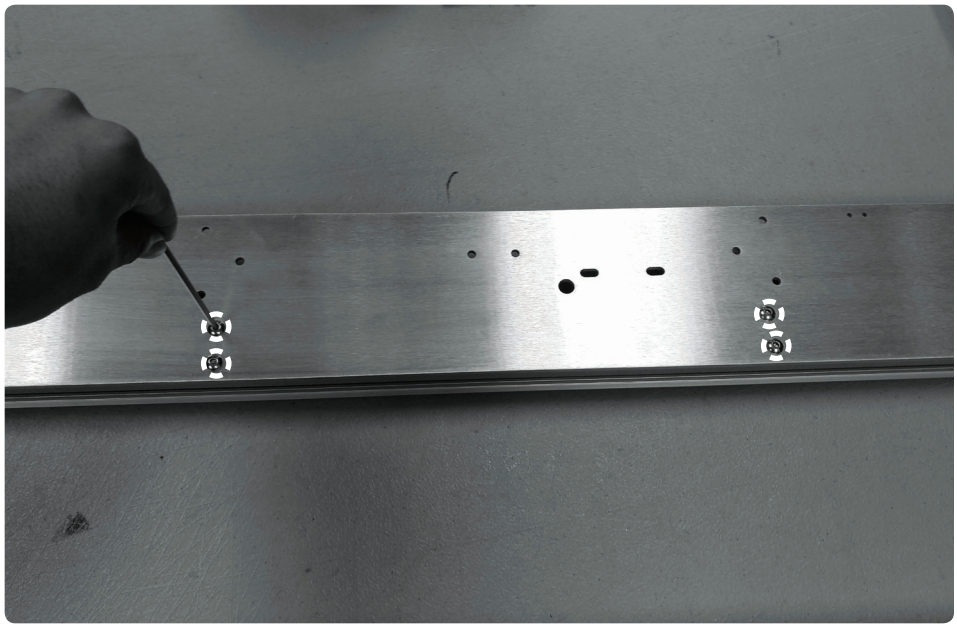
D25 

Insert 4 T-nuts into runway rails as shown--do not place these on the same side that has the runners for the V-groove wheels



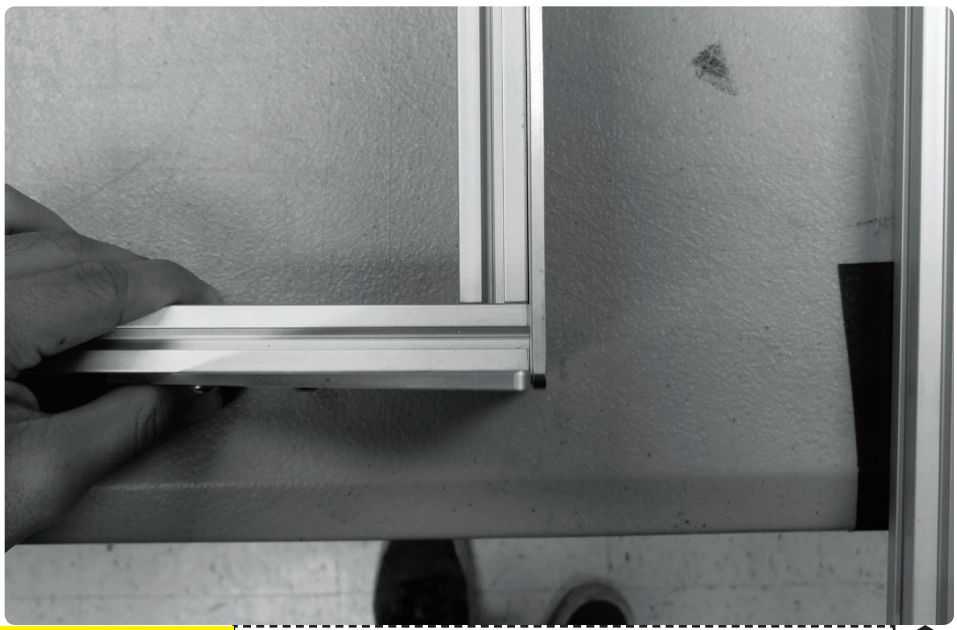
D26 

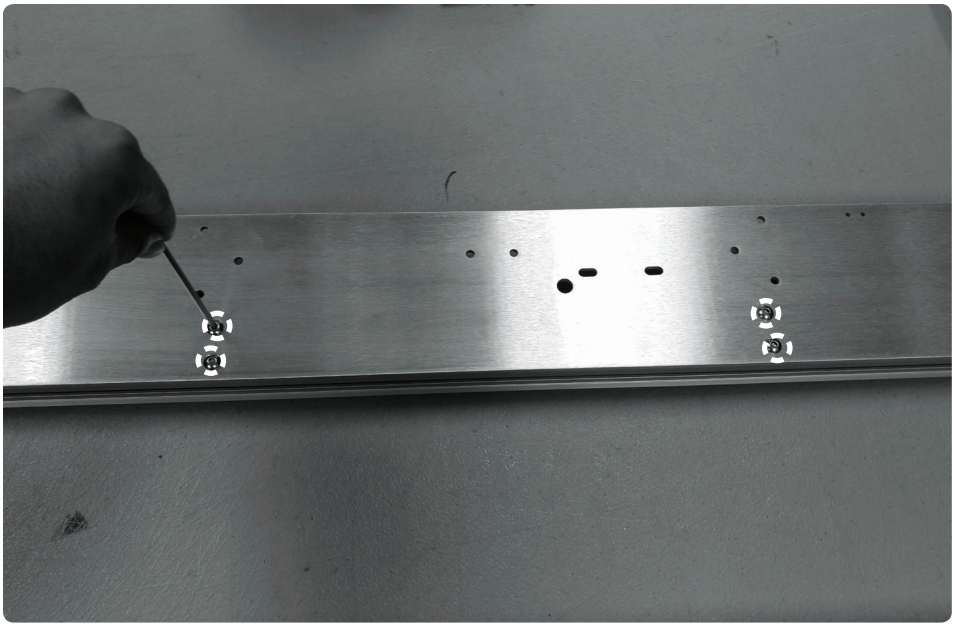
Align the T-nuts to the holes on an upper side plate and loosely fasten, or “snug,” them together with 4 M5x8mm BHCS

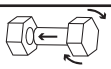


D27

Set the subassembly on a flat surface and use a previously squared and flushed cross rail to properly space the common rail along the side plate. Start from what will be the front edge of the side plate when it is fully assembled. Same as D20, top view shown

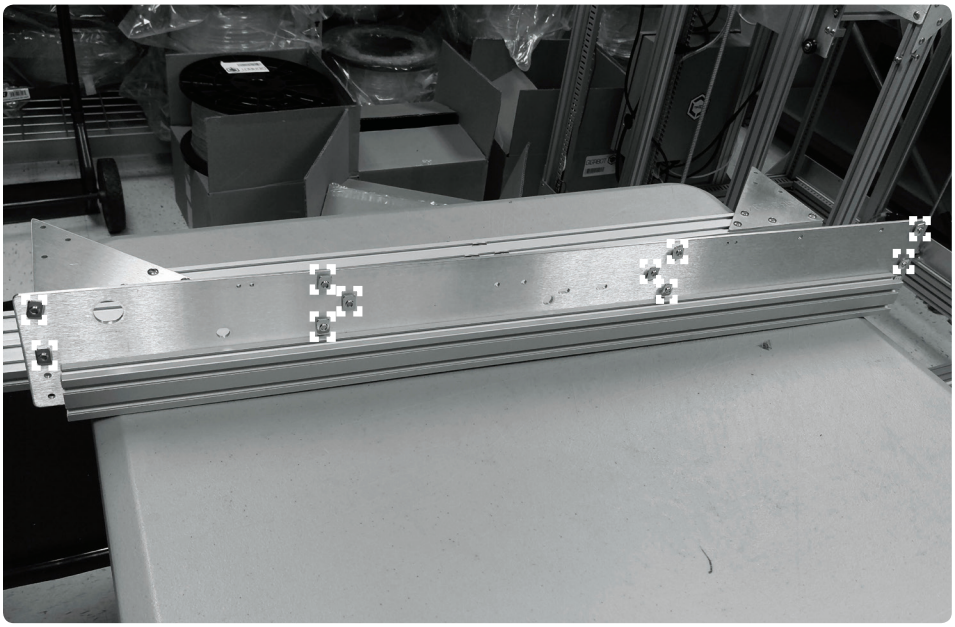


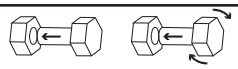


D28 

If it is hard to align, just center the common rail as best as possible. Once spaced correctly, fully tighten the M5x8mm BHCS with 3mm Allen Key

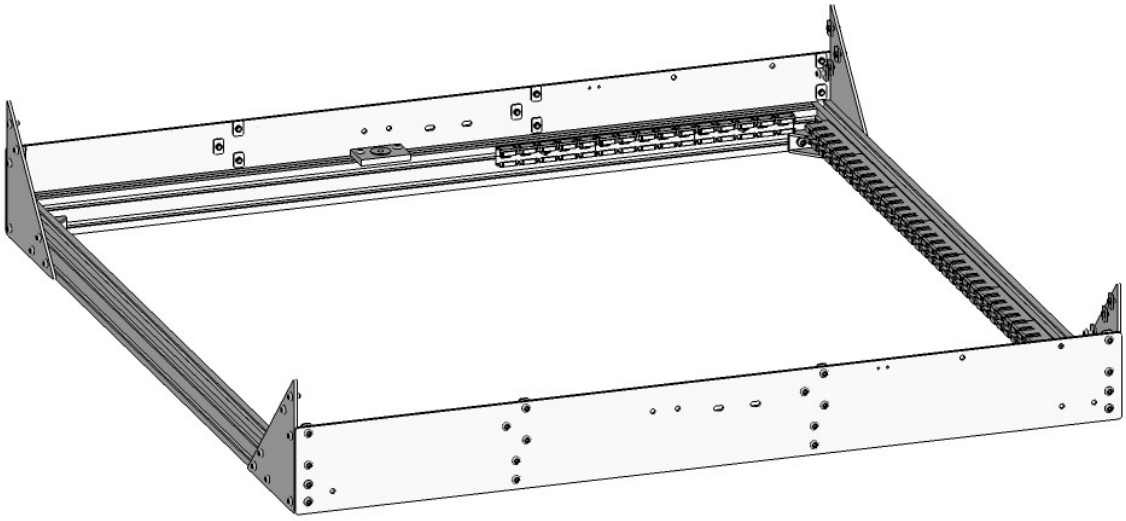
Repeat this for the other common rail

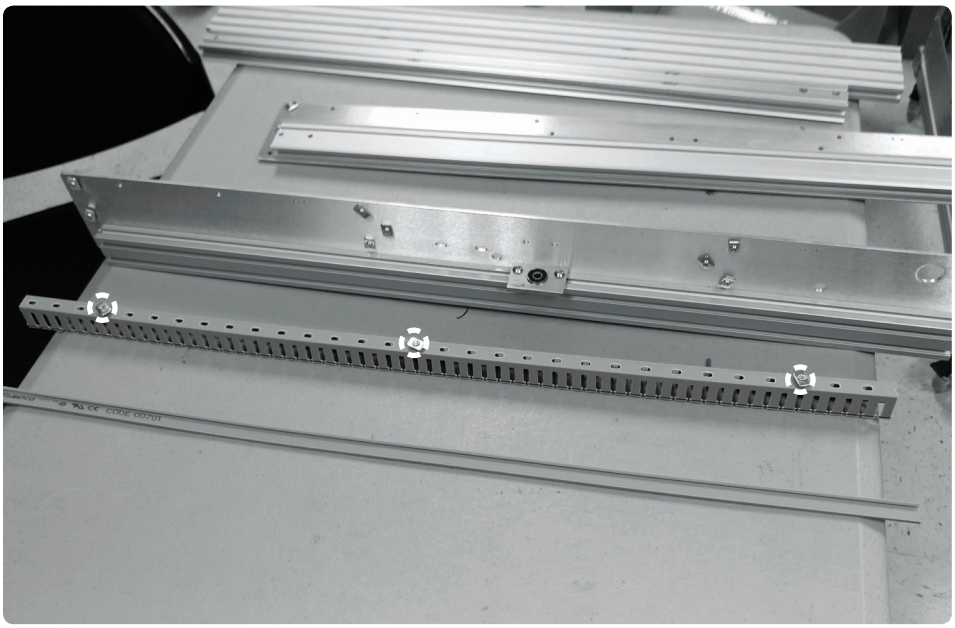


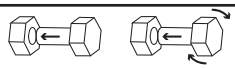
D29 

Once lower bearing block has been fastened, add 10 M5x8mm BHCS and 10 T-nuts to accommodate the upright common rails on the ends and Z uprights in the middle. Repeat this assembly with the other runway rail (be sure to mirror them!)

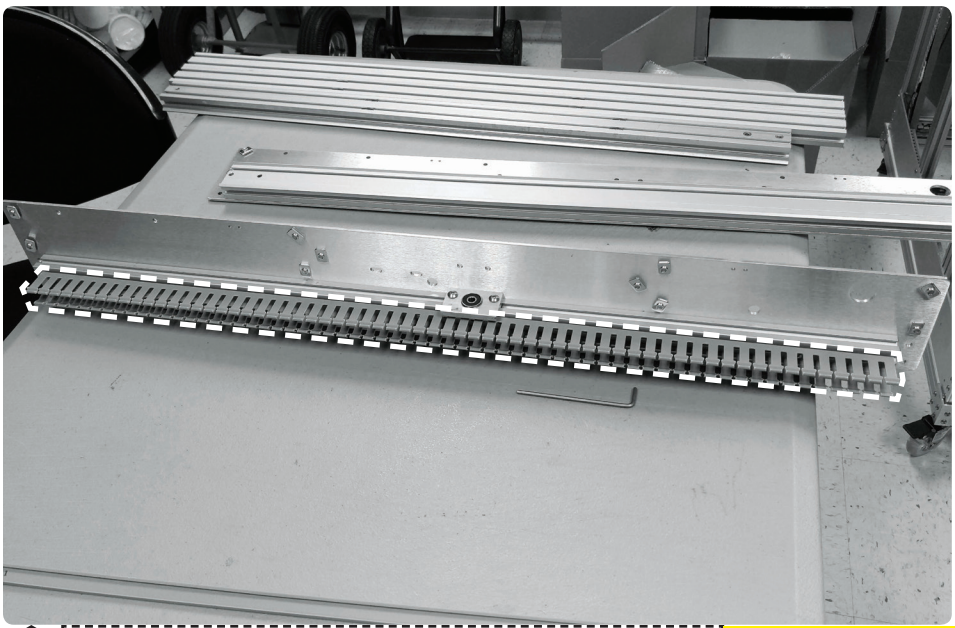
E : LOWER FRAME

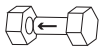




E2 

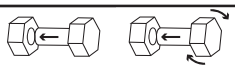
Lower frame will be assembled from cross rails and common rails as shown above. Prepare a 30” Panduit with 3 M5x8mm BHCS and 3 T-nuts



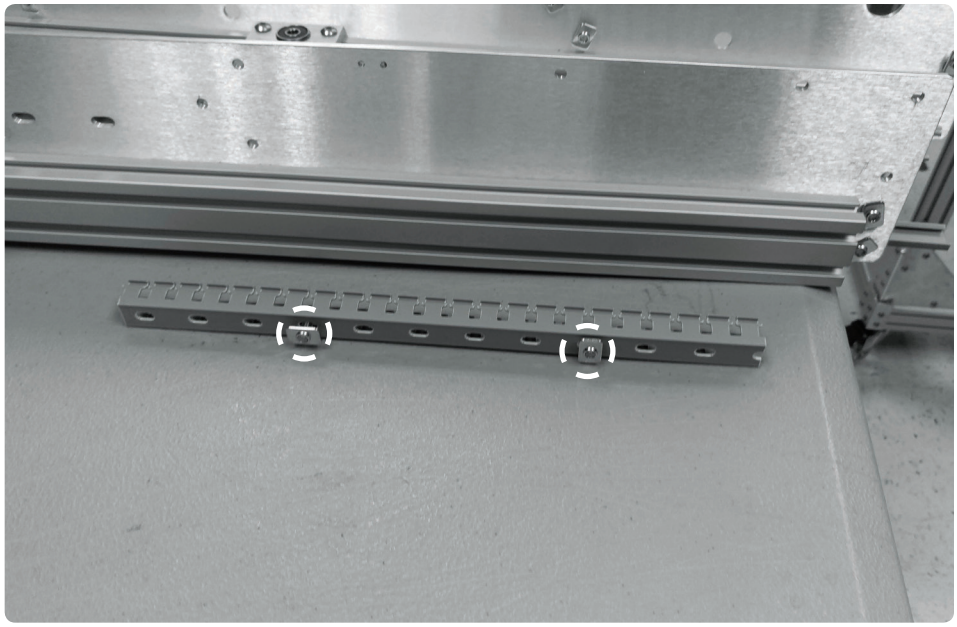
E3 

Slide Panduit into right lower common rail and fasten with 3mm Allen Key. This will enclose wiring for right Z motor, upper Z limit switch, and power switch

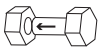
E4



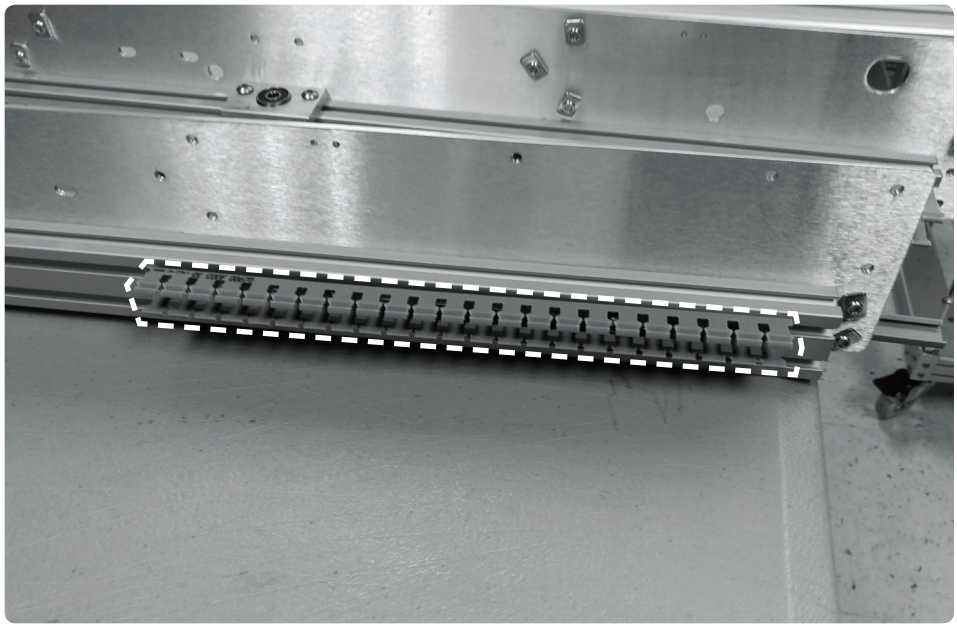
Prepare a 11.75” Panduit with 2 M5x8mm BHCS and 2 T-nuts



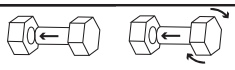
E5



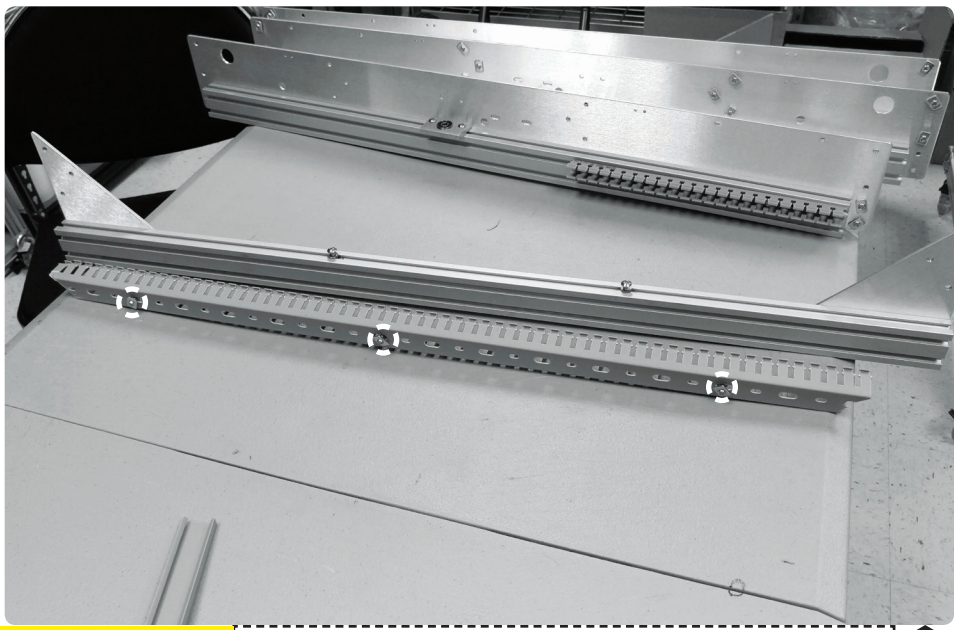
Slide Panduit into left lower common rail towards the rear and fasten with 3mm Allen Key. This will enclose wiring for left Z motor and lower Z limit switch

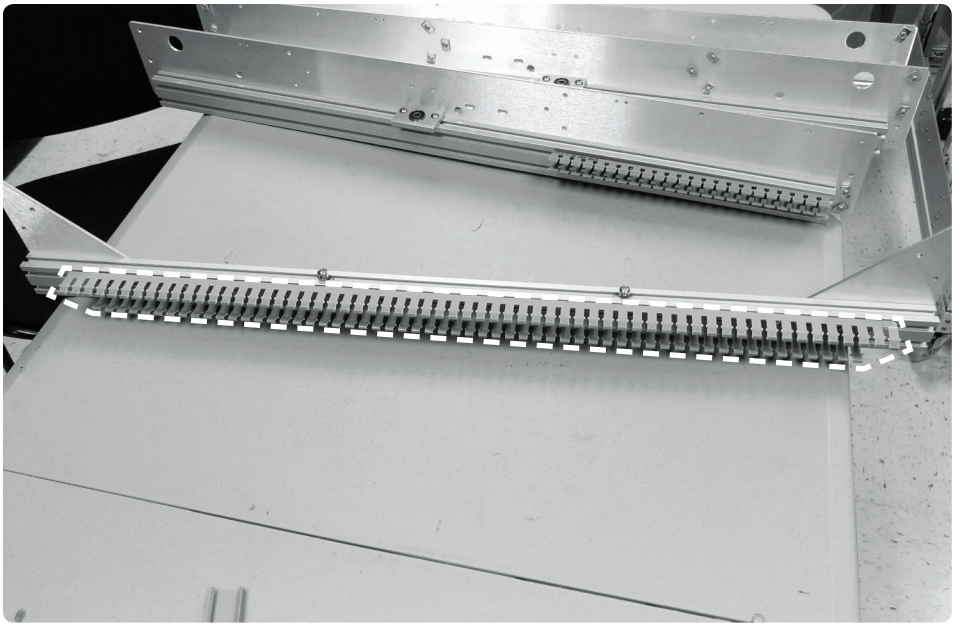


E6



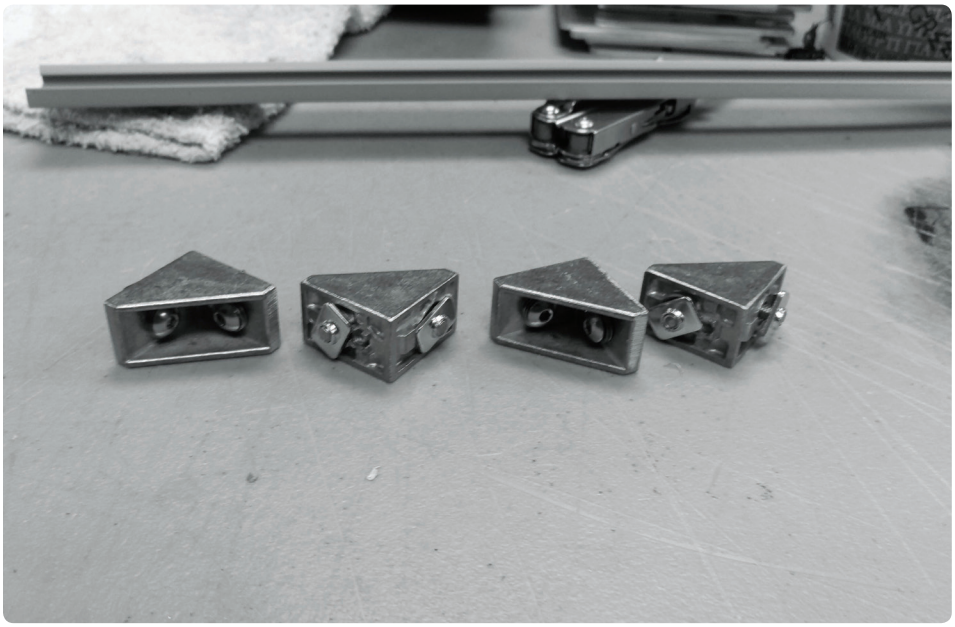
Prepare a 1”x1.5”x30” Panduit with 3 M5x8mm BHCS and 3 T-nuts





E7

Slide Panduit into rear lower cross rail and fasten with 3mm Allen Key. This will enclose all wiring before connecting back to the electrical box



E8

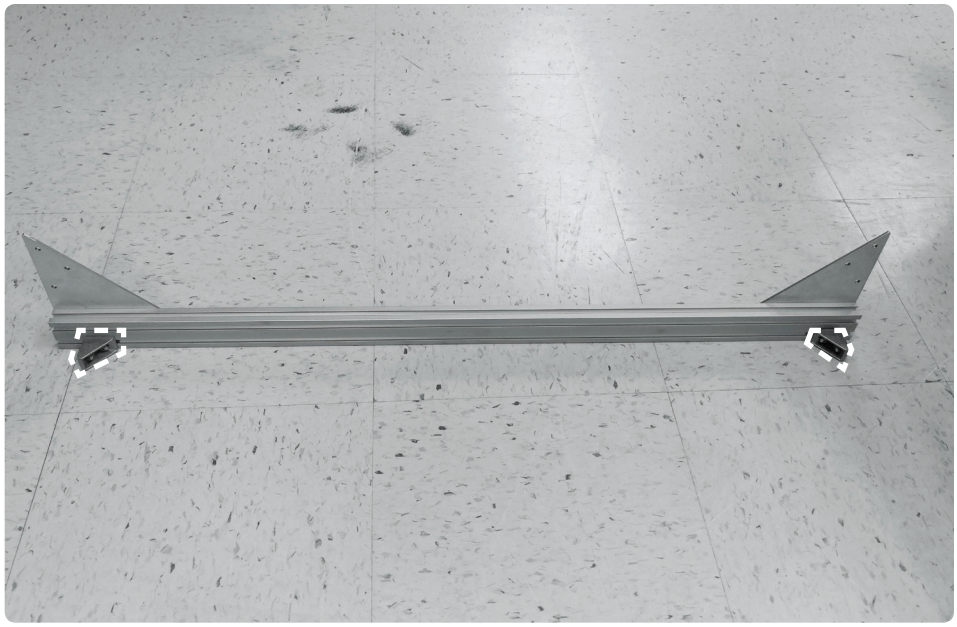
Similar to step C6, prepare 4 triangle brackets. This time, include M5x12mm BHCS, 2 washers, and a T-nut for both ends of the bracket

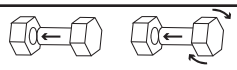
E9

Add a triangle bracket to each end of both cross rails. Insert these in the lower slots

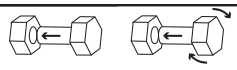
E10

Lower cross rails should look like this

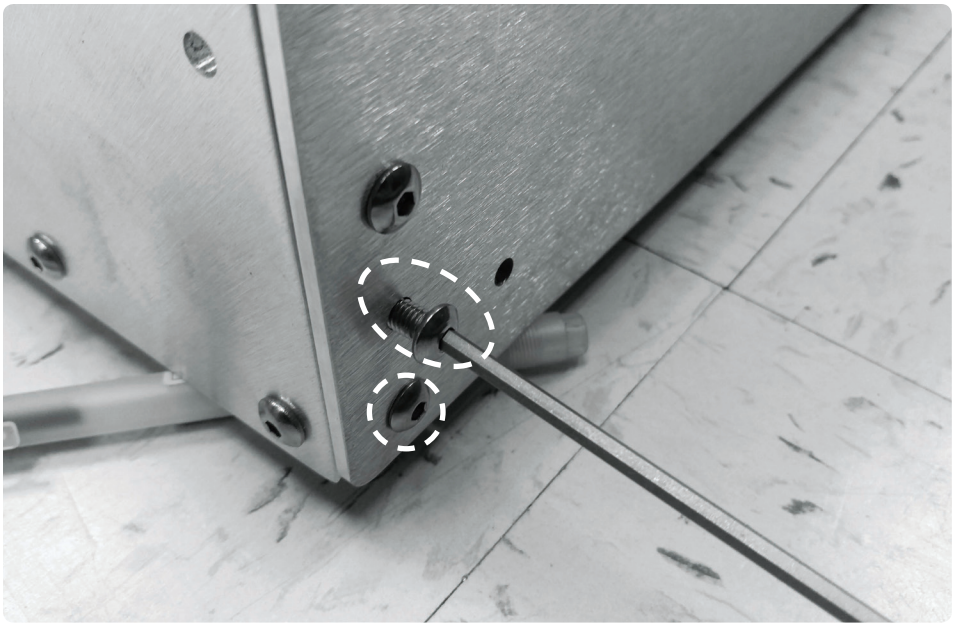


E11 

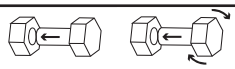
Attach lower side panels to rear bottom cross rail by sliding T-nut into cross rail slot and tightening M5x12mm BHCS with 3mm Allen Key. Be mindful to place the cross rail over the end of the common rail as shown

E12 

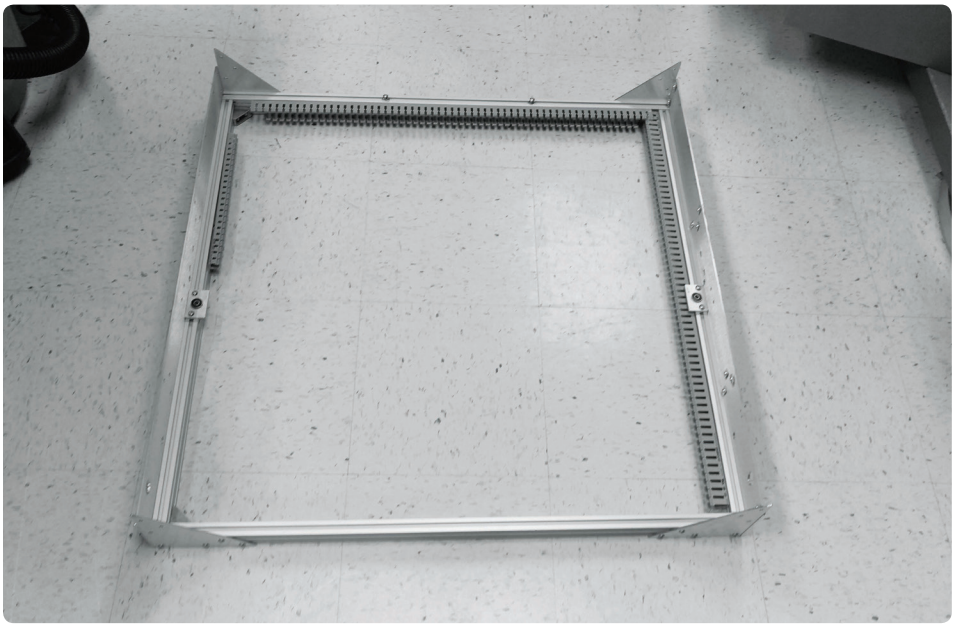
Attach the front lower cross rail in the same way. Again, place the cross rail over the end of the common rail



E13



Loosely fasten cross rails to side plates with M5x12mm BHCS. If holes are not lining up, it may help to drill them out with a 15/64” or 6mm drill bit. It is more important to achieve a square frame than to get the rail spacing exactly right.



E14

Take the time to make sure the lower frame is totally square and use the 3mm Allen Key to fully tighten all M5x12mm BHCS on cross rails