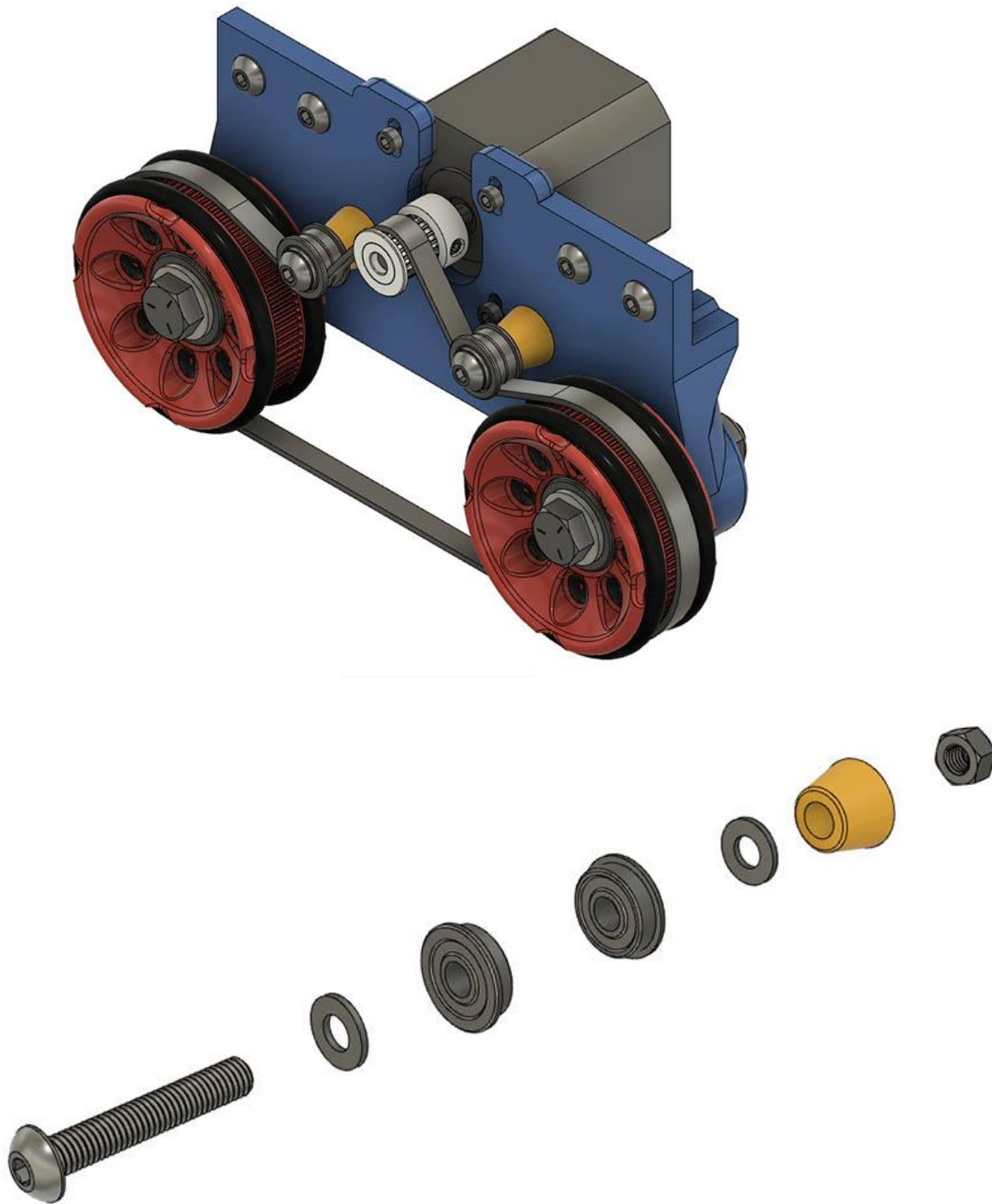


## Assembly Guide for Rolling Plotter

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There are 2 Idler Bearing assemblies on each plate and 4 total.

For each Idler Bearing assembly

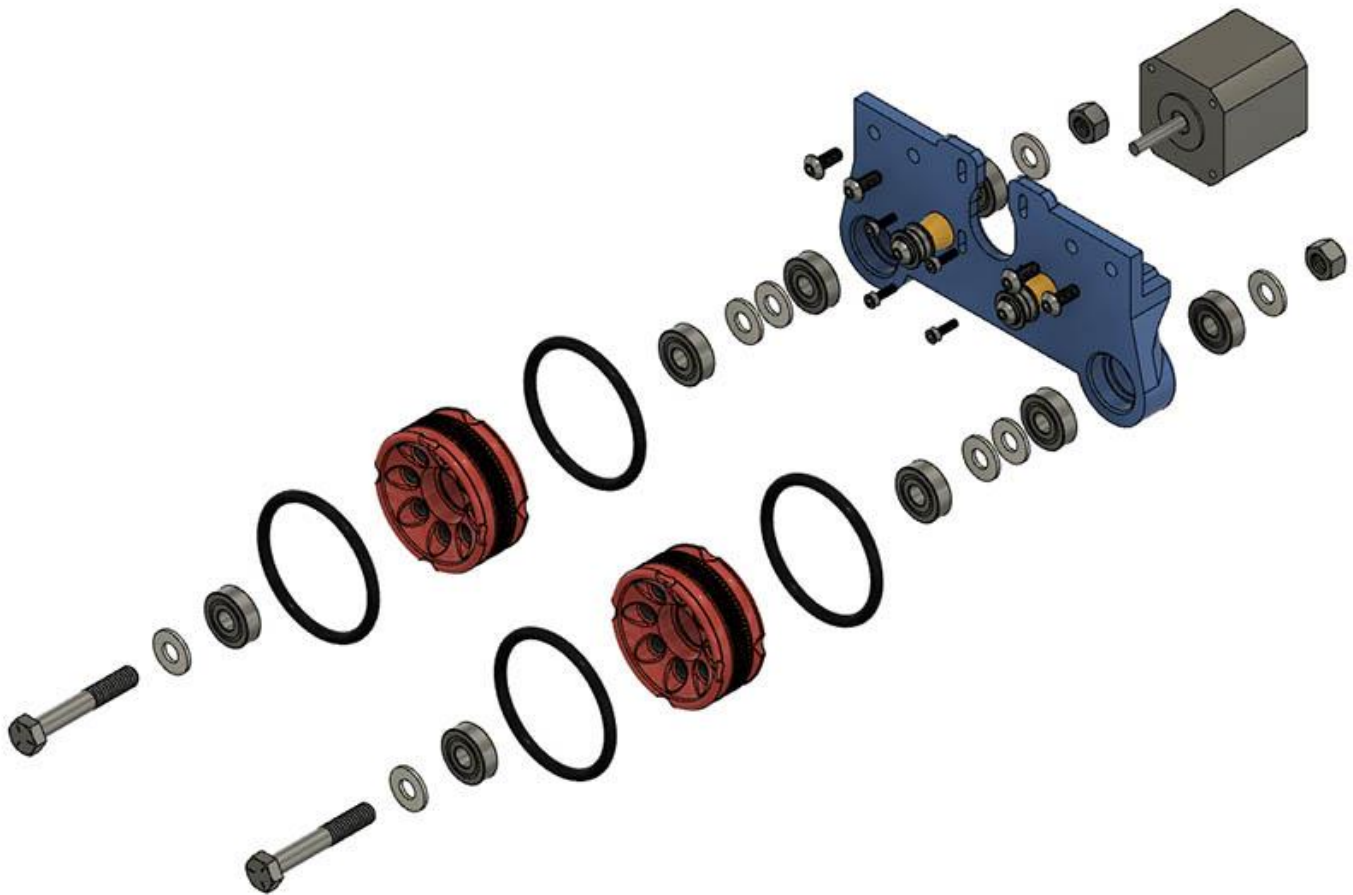
1 - 3d printed Taper\_9mmHt\_Shim\_4x.stl (This prints all four of the ones you need for the 4 assemblies)

1 - M5x30mm (4 total)

2 - Precision Shim 10 x 5 x 1

4 - M5 Locknuts (4 total)

2 - F695zz bearings



### Wheel Plate Assembly

You can use either 5/16"x2" hex screws, 5/16" washers & 5/16" locknuts or M8x50mm hex screws, M8 washers & M8 locknuts.

This is the only part where metric hardware is not used. This example use 5/16" hardware

1. Attach the 2 Idler Bearing Assemblies in 2 angled slotted holes beside motor mounts
2. Insert 2 608-2RS bearings into each side of the wheels.
3. Insert 4 608-2RS bearings into each side of the Wheel End Plate
4. Insert 2 #328 or #327 O-Rings into O-ring grooves on wheels.
5. Add 2- 5/16" washers between bearings on plate & Wheel. Put finish side of washer against bearings
6. Add 1 – 5/16" washer on outside of wheel with finish side against bearing
7. Add 1 -5/16"x2" Hex screw to outside of wheel
8. Add 1 – 5/16" washer against bearing on inside of wheel plate with finish side against bearing
9. Add 1 – 5/16" locknut & tighten. Make sure wheel s will move after tightening. Loosen a little at a time until they turn nicely.
10. Do the same for other wheel assembly on this side.
11. Add 444mm Length closed loop GT 2 belt.
12. Attach 20T timing pulley to motor & leave grub screws a little loose
13. Slip motor pulley thru the belt as shown in complete assembly at beginning of this procedure.
14. Add 4 – M3x10mm screws to mount the motor, but leave loose.
15. Align the 20T timing pulley with idler pulleys & tighten the grub screws
16. Push motor upwards in motor mount slots until belt is a good tightness & tighten the 4 – M3x10 screws
17. Repeat this procedure for the other wheel plate assembly.

Before adding the corner brackets, make sure you add 2 T-nuts to 2060 as shown in this photo, making note of where the carriage is located. These are needed for the Meanwell 12V P/S mount or the 18v Ryobi P/S mount.



Assemble the 2 – 2040x500mm & 1 – 2060x250mm V-Slot

1<sup>st</sup> you will need to tap 12 holes. Tap all 8 holes in the ends of the 2040 V-Slot & the outside 4 end holes in the 2060.

For this assembly you will need:

2 – 2040x500mm & 1 -2060x250mm V-Slot

4 - VSlot\_Corner.stl or you can use purchased corners.

8 – M5x12mm screws

4 - M5 T-Nuts

1. Attach all 4 corners to the ends of the 2060 with M5x12 screws
2. Put the other 4 M5x12mm screws in the corners
3. Place the 2060 centered between the 2040's as shown in image above.
4. Install each T-nut in the slots & you will probably need a ball ended Allen wrench to tighten them.
5. After you are finished put this aside.



Assemble the V-Slot carriage.

Use either the openbuilds Gantry Plate for 20mm V-Slot or use the 3d printed version.

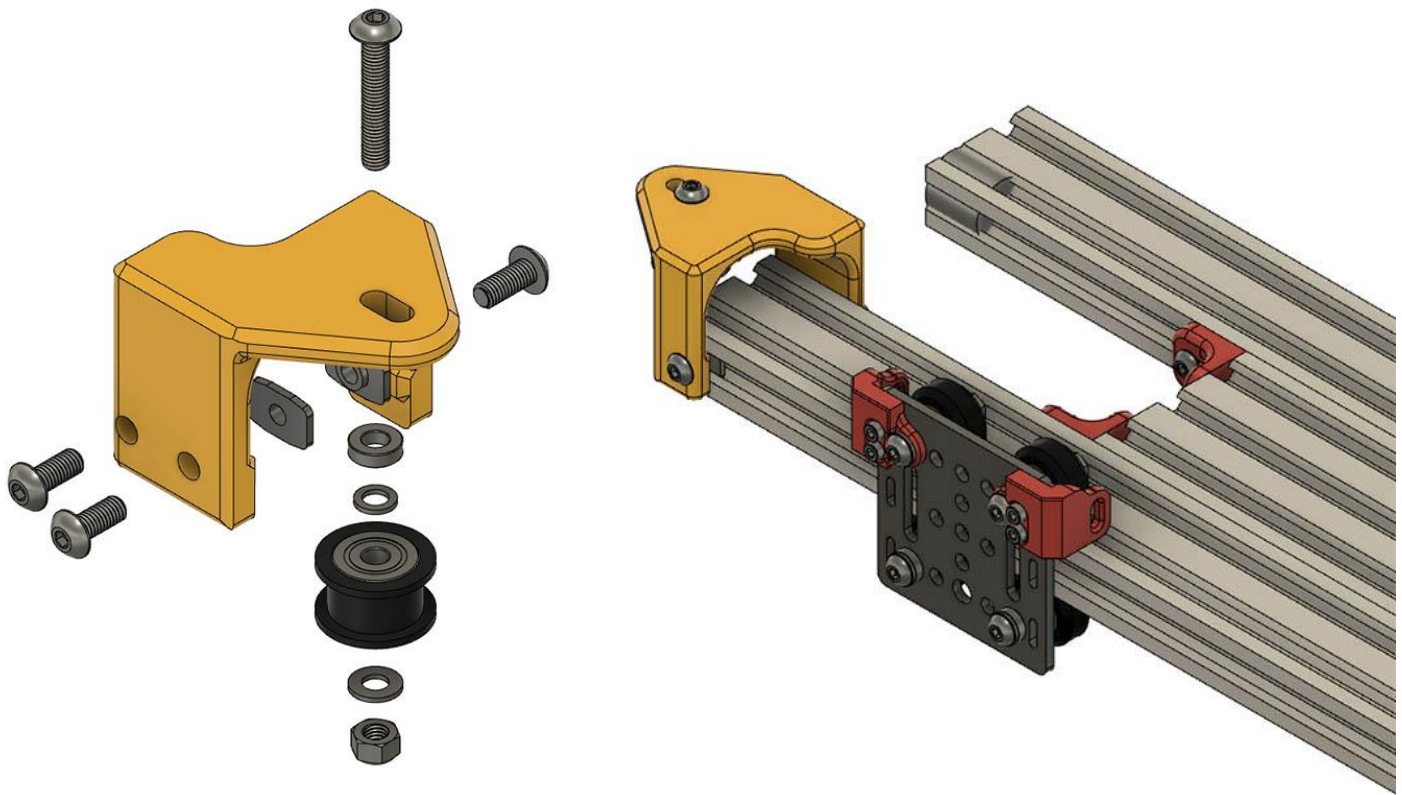
You will also need:

- 4 - M5x30mm screws
- 4 - Precision Shim 10 x 5 x 1
- 2 - 6mm Shims
- 2 - Eccentric washers
- 4 - Wheel kits that include bearings and precision shims
  1. Attach Wheel Assemblies as shown above & keep eccentric washers loose

If you are using openbuilds Gantry Plate, you will also need:

- 1 - Carriage\_BeltConnect.stl
- 1 - Carriage\_BeltConnect\_M.stl
- 2 - M3x12mm screws
- 2 - M3 Locknuts
  2. Attach the 2 printed belt connects to the top slot holes of the plate with M3 hardware
  3. Slide the carriage on one side of the 2040 V-Slot making note of the side as shown in a previous photo.
  4. Tighten eccentrics as needed so carriage slides nicely.



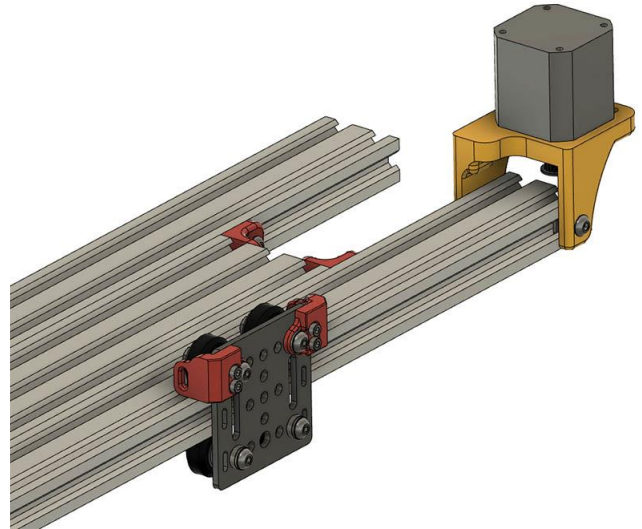
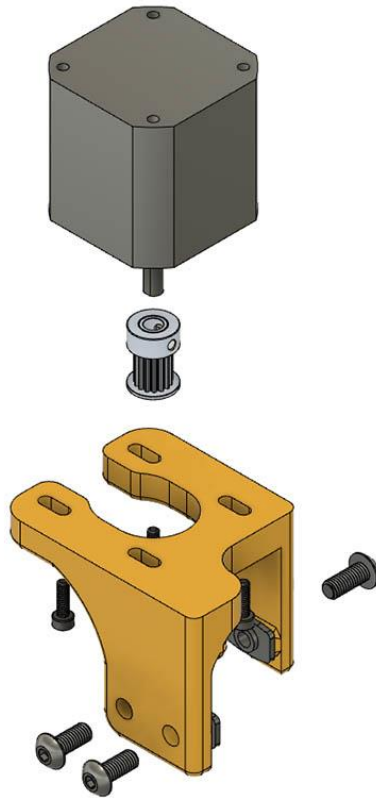


#### Assemble Carriage Idler Mount

You will need:

- 1 - Carriage\_IdlerPlate\_Top.stl
- 1 – openbuilds idler pulley kit (The M5x25mm screw included in kit will not be used)
- 1 – M5x30mm screw
- 1 – 3mm Spacer
- 2 - Precision Shim 10 x 5 x 1 (1 shim included with kit)
- 1 – M5 Locknut (included in kit)
- 3 – M5x12mm screws
- 3 – M5 T-Nuts

Assemble and mount to V-Slot as show in pictures above.

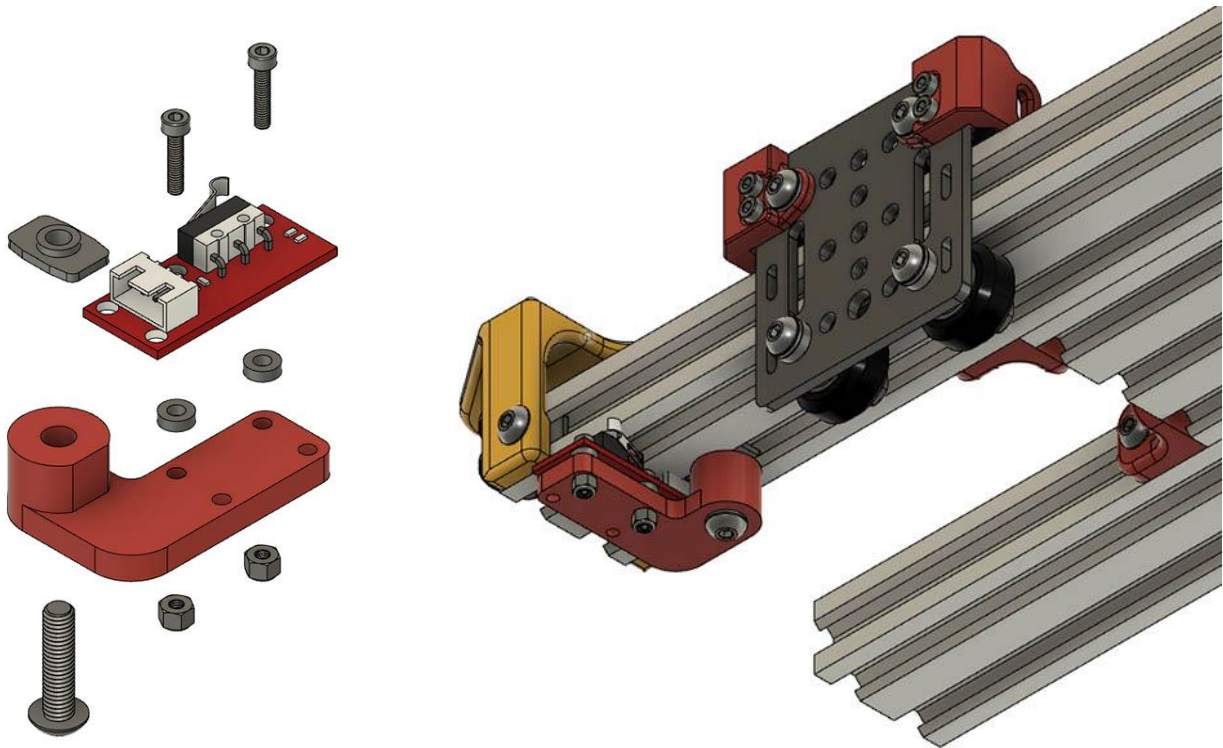


#### Assemble Carriage Motor Mount (Y-Axis)

Gather:

- 1 - Carriage\_MotorMount\_Top.stl
- 1 – Nema17 motor
- 1 – 20T Timing Pulley
- 4 – M3x10mm screws
- 3 – M5x12mm screws
- 3 – T-nuts

1. Attach 20T Timing pulley to motor. You will have to adjust the height of this later. Align at same height as Idler pulley in previous assembly and tighten grub screws.
2. Tighten the 4 – M3x10mm screws to attach motor to mount thru the slotted holes. There is no way to adjust these later, so tighten all the way down with motor closest to V-slot .
3. Add the 3 – M5x12mm screws to the same side of V-Slot 2040 as carriage is on with this orientation.
4. Install with M5 T-nuts in orientation as 2nd photo above.

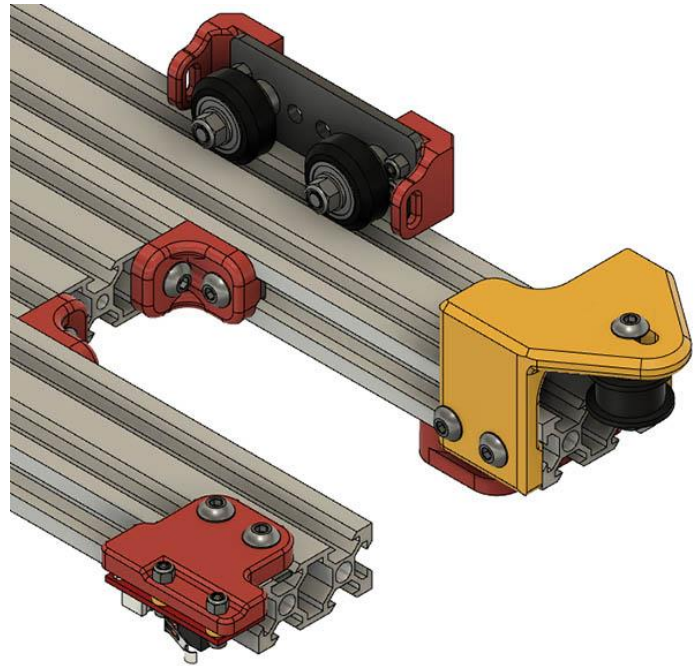
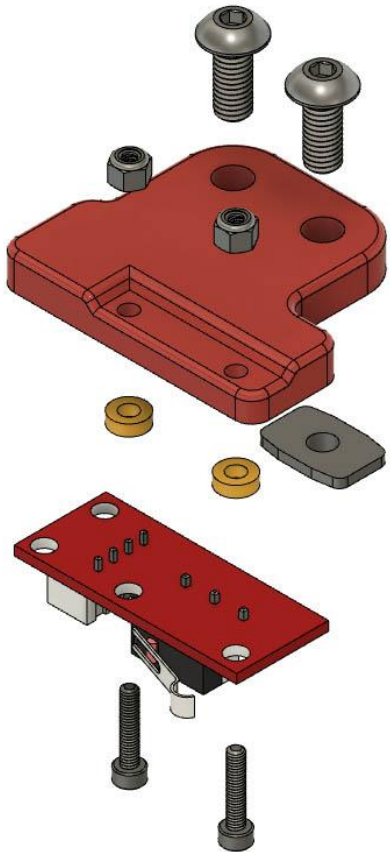


#### Assemble Carriage Limit Switch Mount Assembly

You will need:

- 1 - Carriage\_LimitSwitchBottomMount.stl
- 2 - LimitSwitch\_Spacer\_1.stl (or print all 4 at once with LimitSwitch\_Spacer\_4x.stl)
- 1 - Limit Switch Board
- 2 - M2.5x12mm screws
- 2 - M2.5 Locknuts
- 1 - M5x20mm Screw
- 1 - M5 T-nut

Install as shown in photos above.



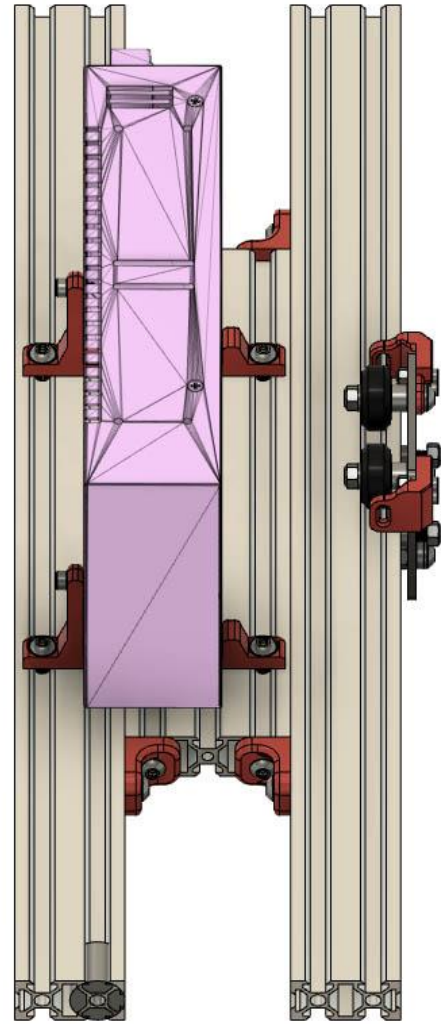
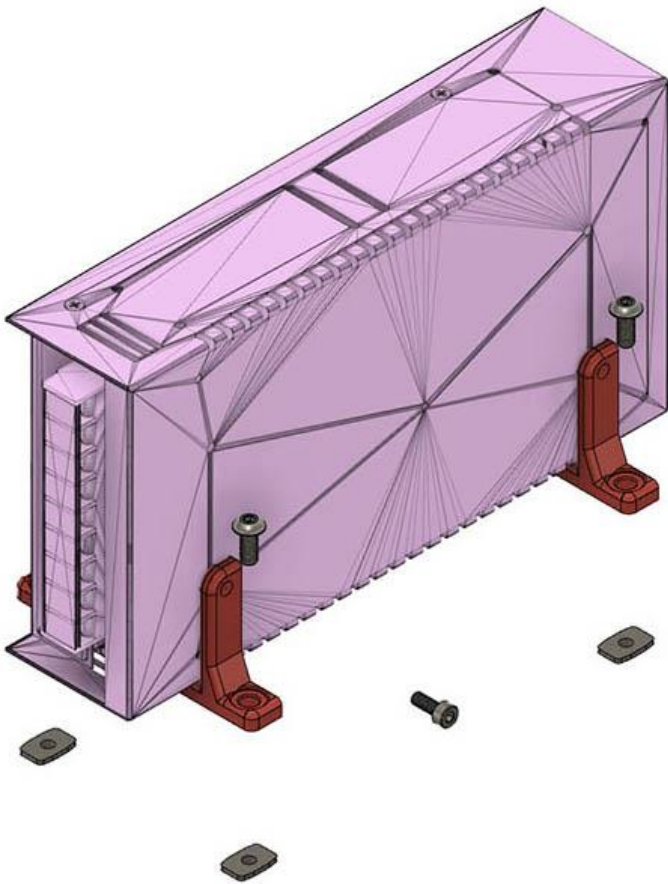
#### Assemble Wheel\_Limit Switch Mount

You will need:

- 1 - Wheel\_LimitSwitchMount.stl
- 2 - LimitSwitch\_Spacer\_1.stl ( or 2 of the 4 you printed in previous step)
- 2 - M2.5x12mm screws
- 2 - M2.5 Locknuts
- 2 - M5x212mm Screw
- 1 - M5 T-nut

Install as shown in photos above.

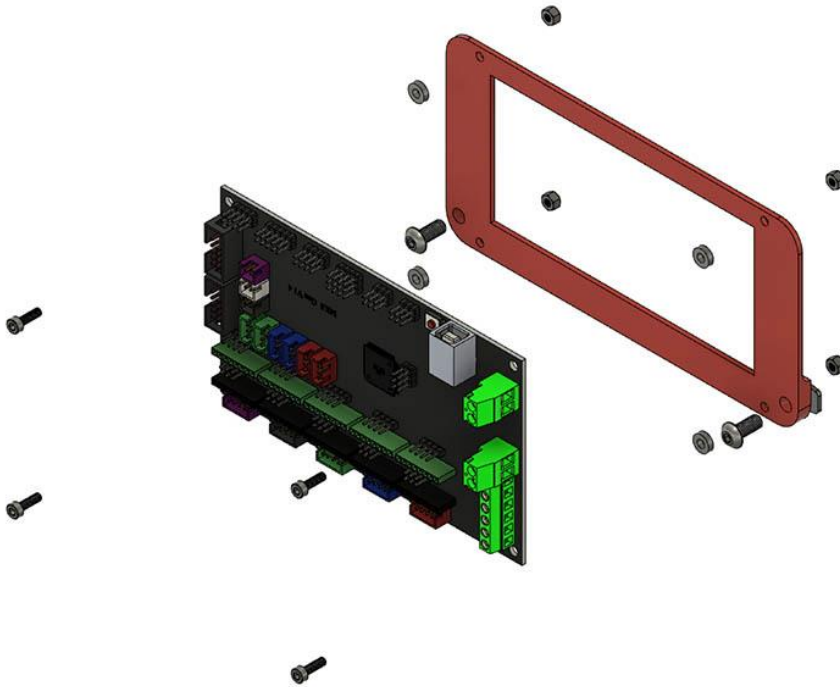




If you are installing a Meanwell P/S with this build, follow these instructions for assembling onto the Rolling Plotter. You will need:

- 1 – Meanwell NES-350-12 P/S
- 2 - NES\_350\_V\_Support.stl parts
- 2 - M4x10mm screws to mount brackets to P/S
- 4 - M5x12mm screw
- 4 - M5 T-Nuts

Assemble as shown in previous 2 photos.

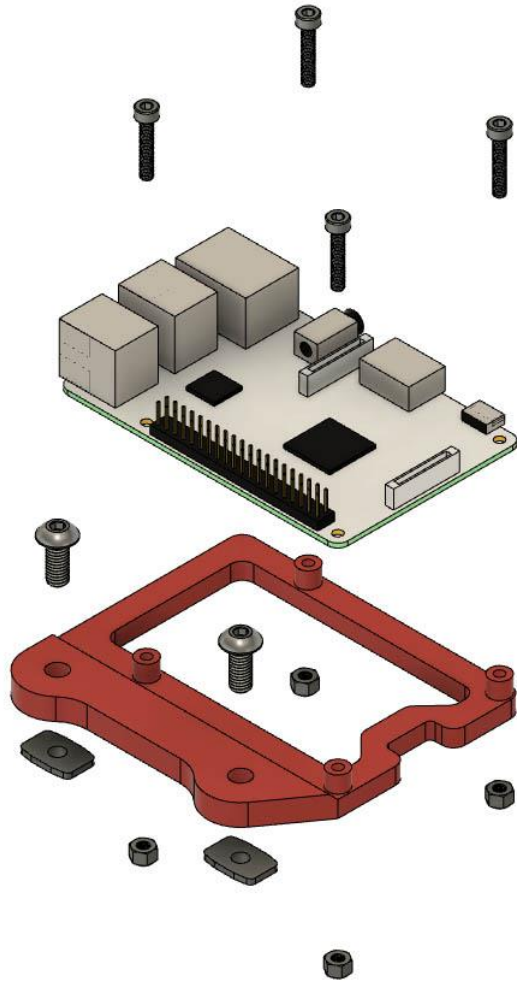


If you are using a MKS Gen 1.4 board here is simple bracket to use. I didn't make an enclosure for it yet.

For this you will need:

- 1 - MKS Gen 1.4 board
- 1 - MKS\_V\_Mount.stl
- 4 - M3\_Spacer.stl
- 2 - M5x12mm screws
- 2 - M5 T-Nuts

Assemble as show in image above

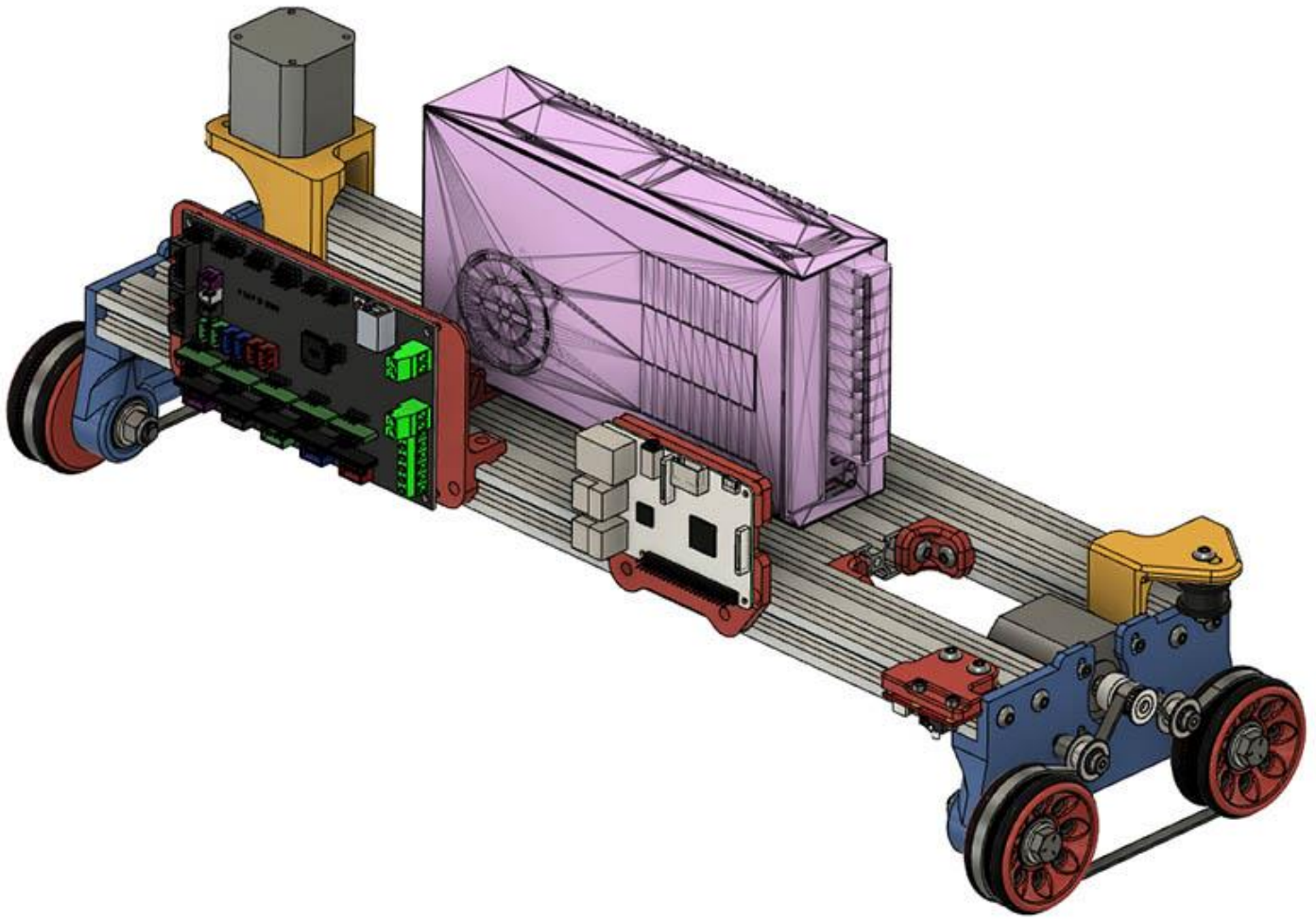


#### Assemble Raspberry Pi Bracket

You will need:

- 1 - Raspberry Pi
- 1 - RiPi3B\_Mount\_M.stl
- 4 – M3x16 screws
- 4 – M3 Locknuts
- 2 – M5 screws
- 2 – M5 T-Nuts

Assemble as shown above

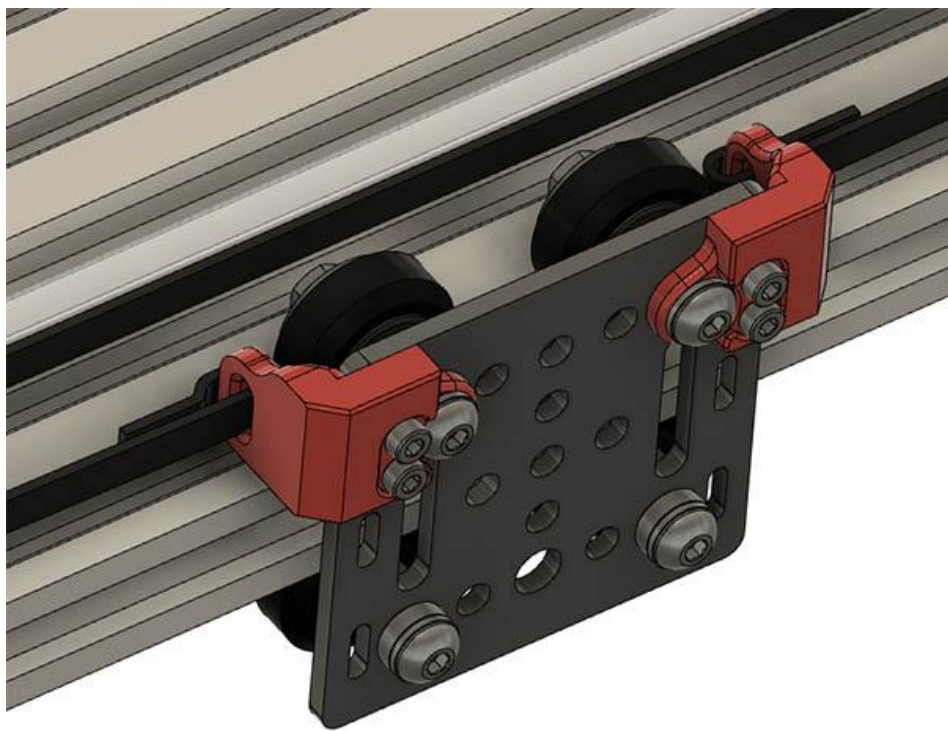
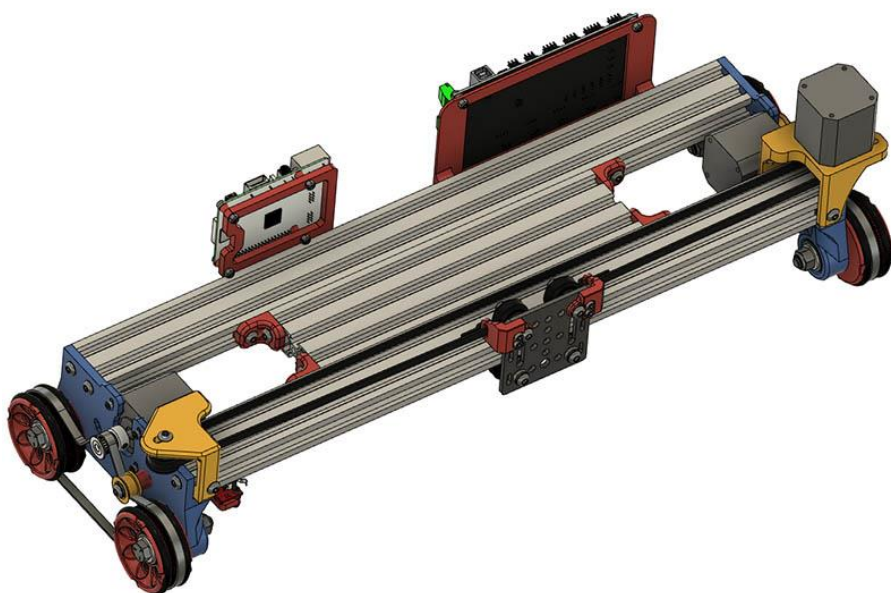


Next step is to install the MKS board & Raspberry Pi board as shown above.

Then install the end plates using:

8 – M5x12mm screws or longer if you want.





Route the carriage belt as shown in previous 2 images using wire ties at the carriage. Tighten as best you can. The belt length should be around 100mm longer than twice the 2040 V-slot length you used. This was 1100mm for me.

The Pen mount I used for this design is located: <https://www.thingiverse.com/thing:4276609>

The Ryobi portable P/S I used for this design is located: <https://www.thingiverse.com/thing:4226726>

If you are using my electronics configuration with Klipper firmware, you need to wire one of the wheel drive steppers to the X stepper motor & the other one to E0 extruder stepper motor with DRV8825. If you are using different steppers, your klipper configuration might need to be a little different.

Install klipper on the raspberry pi with my printer.cfg file & you should be ready to go. If your Wheel drive motors do not move the machine, you might have to reverse the direction of one of the steppers in the configuration.