



## ASSEMBLY INSTRUCTIONS FOR THE MILLRIGHT CNC MEGA V FS

Version 1.02

For additional resources, see [www.millrightcnc.com/resources](http://www.millrightcnc.com/resources)

Be sure to check the resources page for the most updated assembly instructions.

**The resources page has a parts picture guide to further assist you in assembly.**

Contact [support@millrightcnc.com](mailto:support@millrightcnc.com) if you have questions.

We have a big online community. Be sure to join in the discussion.

Facebook MillRight CNC User Group

Facebook MillRight CNC Mega V Group

MillRight CNC Forum at [www.millrightcnc.proboards.com](http://www.millrightcnc.proboards.com)

### Important safety rules for operating your MillRight CNC Mega V FS:

Never place your hands near a spinning end mill or bit. Keep your hands off the gear rack!

Always wear eye and ear protection while operating your machine.

Always run a dust collector or wear a mask while performing a milling operation.

Do not leave the machine unattended while running a milling operation.

Do not operate your machine while under the influence of alcohol or drugs.

Secure long hair and loose clothing so it is not caught in spinning mechanisms.

Ensure work pieces are properly secured before running a milling operation.

Keep a fire extinguisher nearby.

Visually inspect wires prior to power up to prevent short circuits.

The Mega V FS is a big, heavy machine. Plan on spending a full weekend in assembly and seeking help with moving or flipping heavy assemblies.

***We recommend using a blue thread locker on any fastener not secured with a lock washer or lock nut.***

## V-Wheels

### Parts

#### V-Wheel Kit

- V Wheel Body (12)
- 608 Bearing (24)

### Hardware

#### V-Wheel Kit

- M8 Washer (12)

### Tools

#### Hard Surface

#### Something Flat to Press Bearing



Place the v-wheel body on a flat, hard surface. Place (1) 608 bearing on top of the v-wheel body. Using something flat, like a scrap block of wood, press the bearing into the v-wheel body.



Flip the v-wheel over. Place a M8 washer on the 608 bearing inside the v-wheel. If you forget this step the bearing will not spin correctly. Fixing this will be difficult.



Place a second 608 bearing on top of the v-wheel. Press the bearing into the v-wheel using your impromptu tool. Pinch the inner races of both bearings with your fingers and test that the v-wheel spins freely. Repeat this process with the remaining v-wheel bodies. Set the v-wheels to the side.



## Gantry End Plates

### Parts

Left Gantry End Plate

Right Gantry End Plate

X/Y Motor Mount (2)

Assembled V-Wheel (4)

### Hardware

M4x12 Machine Screw (4)

M4 Split lock Washer (4)

V-Wheel Kit

- M8x40 Machine Screw (4)
- M8 Nylock (4)
- Eccentric Spacer (4)



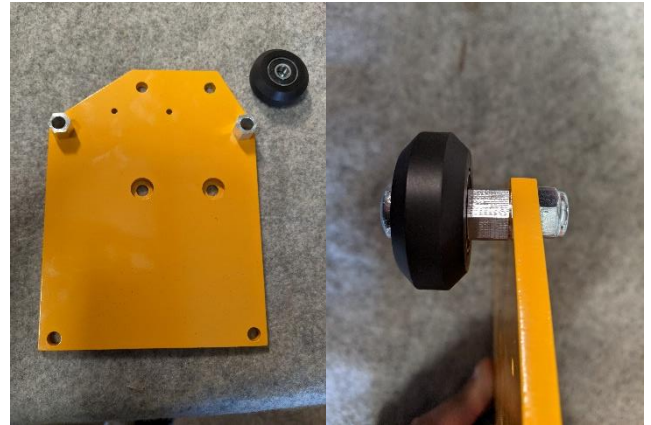
### Tools

Phillips-Head Screwdriver

Needle Nose Pliers

13mm Socket or Wrench

Locate the right gantry end plate. Place eccentric spacers (2) in the large holes on the top of the gantry end plate. The recessed pockets should be face up. Place a v-wheel on a M8x40 machine screw. Spinning the wheel on the screw will help to align the washer that is between the bearings. Insert the M8x40 machine screw through the eccentric spacer and secure with a M8 nylock nut. The v-wheel should turn freely. The eccentric should turn with a 13mm wrench. Repeat for the second eccentric spacer.



Repeat the process with the left gantry end plate. The recessed pockets on the plate should be face up.



Locate a X/Z motor mount. The mount will be installed on the same side of the gantry end plates as the v-wheels. Place (2) M4x12 machine screws with a M4 split lock washer each through the back of the gantry end plate (opposite the v-wheels) using the two small holes located between the v-wheels and install the motor mount. Repeat the process on the other gantry end plate. Place both to the side





## Z Plate

### Parts

Z Plate

Router Mount and Cap

Anti Backlash Nut with Hardware

Z Rail and Bearings (2) (inside box 2 single wrapped 6060 extrusion)

Homing Kit

- Z Engager Bracket

### Hardware

M3x10 Button Cap (14)

M3x16 Machine Screw (2)

M5x20 Machine Screw (2)

5/16x3/4 Button Cap Screw (2)

5/16x3/4 Button Cap Screw (2)

### Tools

2mm Hex Key

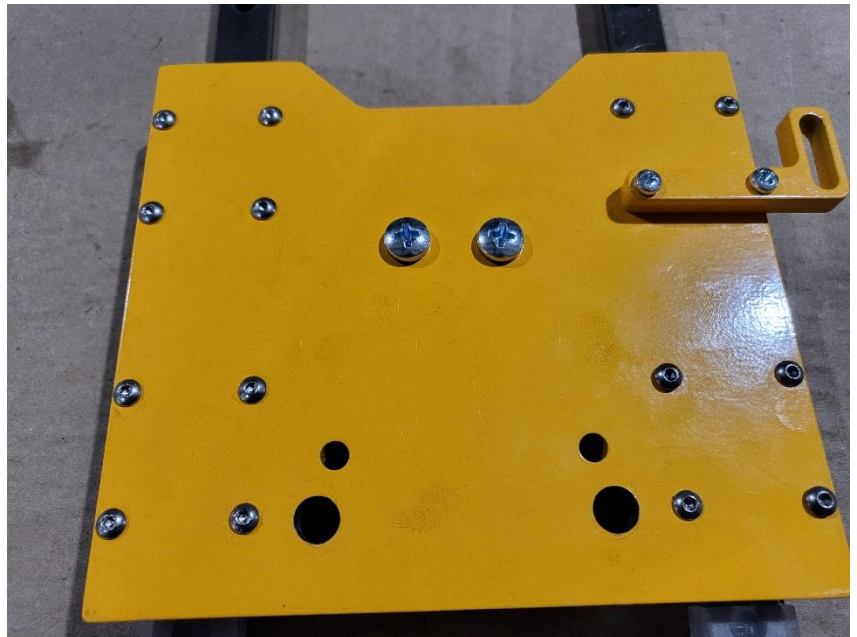
2.5mm Hex Key

3mm Hex Key

3/16 Hex Key

Phillips-Head Screwdriver

Masking/Painters Tape



Locate the anti backlash nut (ABN). The ABN will come with (2) M5 nylock nuts, a M5 grub screw, and a M5 jam nut in the bag. Push the nylocks into the hexagonal holes on the face of the ABN with the nylon facing up. Screw the grub screw into the top of the ABN until it touches the bottom through the gap.



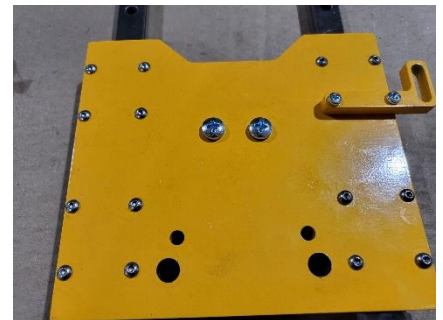
Cap the grub screw with the M5 jam nut. Place the ABN on the z plate and secure using the (2) M5x20 machine screws. Make sure the nylocks can be seen.



Locate the Z rails with bearings. **The bearings will slide off the rails expelling all ball bearings. Please proceed with caution.** The rails will have plastic or rubber blocks to keep the bearings from sliding off. Leave them in place until told to remove them. If the blocks are not present, tape both ends of the rails to keep the bearings from sliding off. Place the Z rails on a flat surface with the bearings face up.



Place the Z plate on top of the bearings lining up the bearings with the 4-hole groups on the corners of the Z plate. The ABN should be on the same side of the Z plate as the bearings. Secure the Z plate to the bearings using the M3x10 button cap screws. If you have purchased the Homing Switch Option, Locate the Z engager bracket. Secure the bracket to the Z plate with M3x16 machine screws using the two bottom holes of the 4-hole group at the top right of the Z plate. The indentation on the Z plate is the top.



Locate the router mount. Carefully turn the Z plate on its side making sure the bearings stay on the rails. Place (2) 5/16x3/4 button cap screws through the back of the plate using the 2 large holes at the bottom of the Z plate. Attach the router mount to the Z plate and tighten the router mount screws. Use (2) 5/16x1 button caps to attach the router cap to the router mount. Place the Z plate to the side.



## X Plate

### Parts

X Plate

Z Motor Mount

Screw Seat Plate

UHMW Screw Seat

178mm Lead Screw

Assembled V-Wheel (4)

4750 Motor (1)

### Hardware

M5x16 Machine Screw (2)

M5 Nylock Nut (2)

M4x12 Machine Screw (6)

M4 Split Lock Washer (6)

M3x16 Machine Screw (6)

M3 Nylock Nut (6)

8x6.35 Coupler

V-Wheel Kit

- Eccentric Spacer (2)
- Standard Spacer (2)
- 8x40 Machine Screw (4)
- M8 Nylock (4)



## Tools

Phillips-Head Screwdriver

Needle Nose Pliers

2.5mm Hex Key

8mm Socket or Wrench

10mm Socket or Wrench

Locate your Z screw seat plate and UHMW screw seat. Place the UHMW screw seat on top of the screw seat plate. Make sure the pocket of the UHMW screw seat is facing up as shown.



Secure the UHMW screw seat to the screw seat plate using (2) M5x16 machine screws and (2) M5 nylock nuts. Do not over tighten or you may deform the UHMW screw seat.

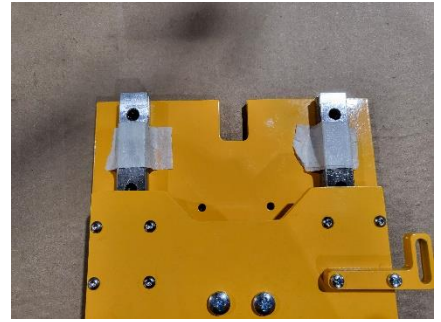


The front of the X plate is the face with the recessed pockets. The top of the X plate is the section with the "U" cutout, as shown above. Place the screw seat plate on the X plate near the bottom center set of holes. Make sure the UHMW screw seat is pointing towards the top of the X plate. Place a M4 split lock washer on (2) M4x12 machine screw and insert the screws through the back of the X plate to secure the screw seat plate to the X plate.





Place the Z plate on the front of the X plate. Line up the holes on the Z rails with the (3) holes on each side of the X plate. (2) holes on the top on each side and (1) hole on the bottom on each side. Carefully remove the top plastic/rubber bearing block or tape on both rails. Insert a M3x16 machine screw in the top hole on both rails and finger tighten a M3 nylock. Repeat the process with the second hole on the rails. Carefully remove the plastic/rubber bearing block or tape from the bottom of the Z rails. Insert a M3x16 machine screw in the bottom hole on both rails and finger tighten a M3 nylock.



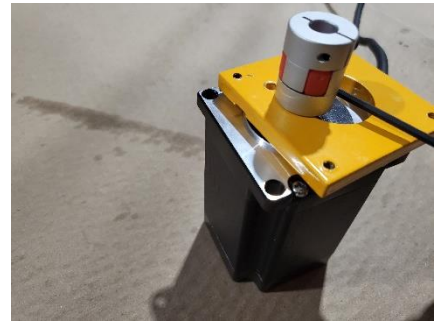
Prop the X plate on its bottom using the router mount. Place (2) eccentric spacers in the top, large holes on the back of the X plate. Insert (2) M8x40 machine screws into the large holes in the front of the X plate and through the eccentric spacers. Place an assembled v-wheel on the M8x40 machine screws and secure with (2) M8 nylock nuts.



Place (2) M8x40 machine screws in the large holes in the front of the X plate at the bottom. Place standard spacers on the M8x40 machine screws, assembled v-wheels, and secure with a M8 nylock nut.



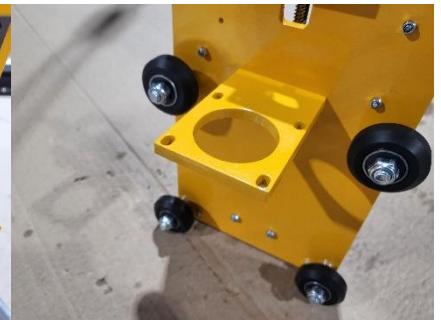
Locate the Z motor mount. Use the Z motor mount as a spacer for installing the coupler onto the 4750mm motor. Tighten the pinch screw on the 6.35mm side of the coupler to attach the coupler to the motor shaft.



Thread the 178mm lead screw into the ABN. Using (2) M4x12 machine screws with M4 split lock washers, attach the Z motor mount to the top of the X plate.



Locate the X/Y motor mount and lower the Z plate to expose the two holes near the center top of the X plate. Place a M4 split lock washer on (2) M4x12 machine screws. Insert the screws through the front of the X plate and attach the X/Y motor mount to the back of the X plate.



## Z Motor

### Parts

4750mm Motor w/Coupler

### Hardware

6.35mm Spacer (4)

M4x16 Machine Screw (4)

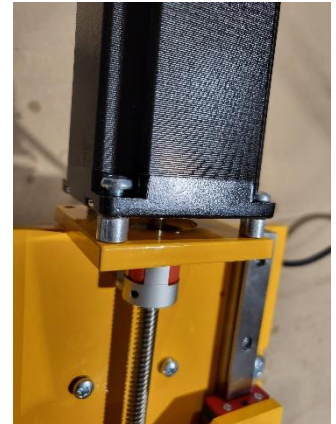
### Tools

Phillips-Head Screwdriver

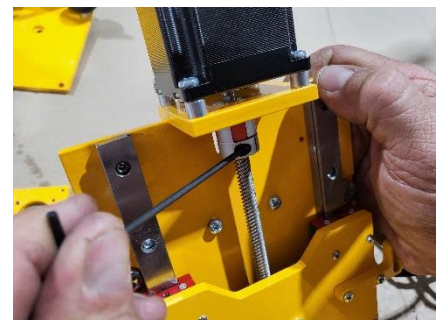
2.5mm Hex Key



Locate the 4750mm Motor with coupler. Place 6.35mm spacers (4) on the mounting holes of the Z motor mount. Place the 4750mm motor with the motor wire positioned to the back of the X/Z assembly, opposite of the router mount, onto the spacers. Secure with (4) M4x16 machine screws.



Using a 2mm hex key, tighten the bottom screw of the coupler. This will connect the coupler to the lead screw. Make sure the lead screw is fully engaged with UHMW screw seat and apply light downward pressure. Place the X/Z assembly to the side.



## Mega V Extrusion/Rack

### Parts

1465 Mega V Extrusion w/Logo

2650 Mega V Extrusion (2)

Gear Rack Long (2)

Gear Rack Short

Drag Chain Mount (3)

Left Gantry End Plate

Right Gantry End Plate

X/Z Assembly

Y Mid-Span Support (2)



### Hardware

Drop-In T Nut (13)

Large T Nut (32)

M5x12 Button Cap (9)

M5 Split lock Washer (13)

M5x20 Button Cap (32)

M5x25 Button Cap (4)

5/16x3/4 Button Cap (8)

### Tools

Phillips-Head Screwdriver

10mm Wrench



Get one section of long gear rack. Place M5x20 Button cap screw through the holes (12) of the gear rack keeping the screws uniform. Spin a large t nut a few turns on each screw. Leave the t nuts loose. Repeat process for the remaining long gear rack and the short gear rack.



Slide the t nuts into the top of the Mega V extrusion with the gear rack teeth pointing out from the extrusion, away from the v groove. Leave the rack loose. The (2) 2650 Mega V extrusions will get the long rack. The 1465 Mega V Extrusion w/logo will get the short rack.



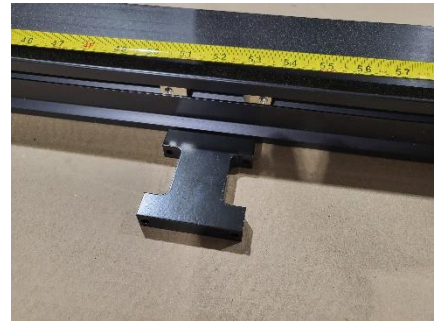
Designate one 2650 Mega V Extrusion as the right extrusion. Lay the extrusion on it's side with the rack teeth facing up. Locate a drag chain mount. Place (3) drop-in t nuts in the groove on the opposite side of the extrusion from the gear rack, near the left end of the extrusion. Put M5 split lock washers on (3) M5x12 button cap screws. Position the drag chain mount with the slot facing to the left and attach the mount to the extrusion using the M5x12 Button caps with lock washers and the drop in t nuts.



Locate the 1465 Mega V Extrusion with the logo. Lay the extrusion on it's side with the logo down and the rack teeth pointing up. Locate (2) drag chain mounts. Place (6) drop-in t nuts in the groove on the opposite side of the extrusion from the gear rack, near the right end of the extrusion. Put M5 split lock washers on (6) M5x12 button cap screws. Position the drag chain mounts with the slot facing to the right and attach the mounts to the extrusion using the M5x12 Button caps with lock washers and the drop in t nuts.



Locate the (2) Y mid-span supports. In the middle of the 2650 Mega V extrusion (1325mm), opposite the rack, place (2) drop-in t nuts in each extrusion. Place M5 split lock washers on (4) M5x25 button cap screws. Attach the Y mid-span supports to the 2650 extrusion using the M5x25 button caps with split lock washers and the drop-in t nuts. Orientation of the Y mid-span support does not matter.



Retrieve the X/Z assembly. The mount is the bottom of the assembly, and the motor is the top. The v-wheels will pinch the outside of the Mega V extrusion using the v shaped slots on the top and bottom. If the v-wheels are too tight to slide on the extrusion, use a 13mm wrench to turn the eccentrics until the assembly slides onto the extrusion. Slide the X/Z assembly onto the same side of the 1465 extrusion as the logo. Set the 2650 extrusion to the side being careful not to bend the drag chain mount.



Retrieve the left end plate. On the left side of the extrusion, use (4) 5/16 x 3/4 button cap screws to attach the left end plate to the extrusion. Repeat the process on the right side with the right end plate. The end plates should extend more from the front of the extrusion than the back. Set the 1460 Gantry to the side being careful not to bend the drag chain mounts.



## Frame Top

### Parts

2650 6060 Extrusion (2)

1465 6060 Extrusion (7)

Gusset (14)

### Hardware

Inside Corner Joiner (28)

Corner Joiner Set Screw (56)

M5x8 Button Cap (56)

Drop-in T Nut (56)



### Tools

3mm Hex Key

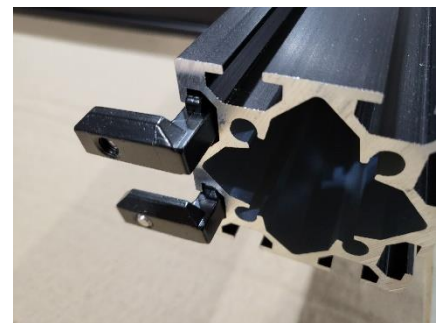
3/16 Hex Key

Square

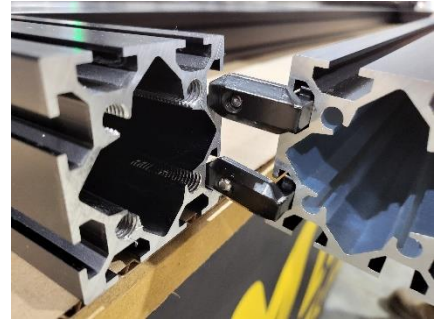
Preload the set screws in the inside corner joiners. (2) Set screws for each corner joiner. Screw them in from the inside of the v of the joiner. Make sure the set screw is not sticking out the back (outside v) of the corner joiner or they will not slide down the extrusion slots.



lat surface or table, lay out the (2) 2650 6060 extrusion with space for the 1465 extrusion between them. Take (1) 1465 extrusion and place (2) inside corner joiners on each side of the extrusion (4 total for each 1465 extrusion). Make sure all corner joiners are on the same face of the extrusion. The corner joiners will slide down the slot with one end in the extrusion and stop at the edge of the extrusion with the other end. Make sure the corner joiners stop at the edge of the 1465 extrusion. If they slide down the slot, the orientation is wrong.



Slide the 1465 extrusion into the 2650 extrusion. Repeat the process with (5) of the remaining (6) 1465 extrusion. Keep the corner joiners pointing the same way, towards the opposite end of the 2650 extrusion. The spacing of the extrusion is about 371.66mm (14 5/8") between the extrusions. The last extrusion should be inserted into the other end of the 2650 extrusion with the corner joiners pointing towards the opposite end.



Make sure the frame is square. Make sure the 1465 extrusion is flush with the top of the 2650 extrusion. In the case of the front and rear 1465 extrusion, make sure the outside is flush with the ends of the 2650 extrusion. Tighten the set screws for the inside corner joiners.



The gussets will connect the 1465 extrusion to the 2650 extrusion on the side opposite of the inside corner joiners. Place (2) drop-in t nuts, one in each slot, on each end of the 1465 extrusions for a total of 4 drop-ins for each extrusion. The front and back extrusions will have the gussets on the same side as the inside corner joiners. Place (2) corresponding drop-in t nuts in the 2650 extrusion for each set in the 1465 extrusion.



Using the M5x8 Button cap screws, attach the gussets to the 1465 Extrusion and the 2650 extrusion. There will be (2) gussets for each 1465 extrusion, one on either end, for a total of (14) gussets.





## Legs

### Parts

Y End Plate (4)

760 6060 Extrusion (6)

Gusset (12)

### Hardware

Large T Nut (8)

Drop-in T Nut (48)

Inside Corner Joiner (4)

Set Screw (8)

M5x8 Button Cap Screw (48)

M5x16 Button Cap Screw (8)

5/16x3/4" Button Cap Screw (16)



### Tools

3mm Hex Key

3/16 Hex Key

Block/Brace (about 7")

Square

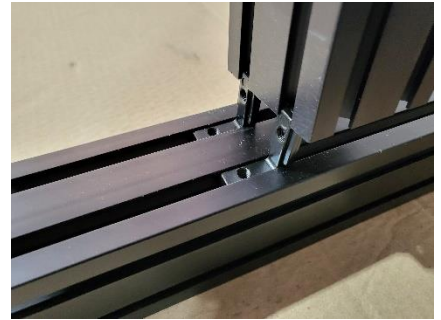
Preload the set screws into the inside corner joiners, (2) for each joiner. Slide (2) inside corner joiners into the top face of a 2650 extrusion, one corner joiner in each slot. Repeat for the other 2650 extrusion for a total of (4) inside corner joiners. Slide the corner joiners near the center of the 2650 extrusions.



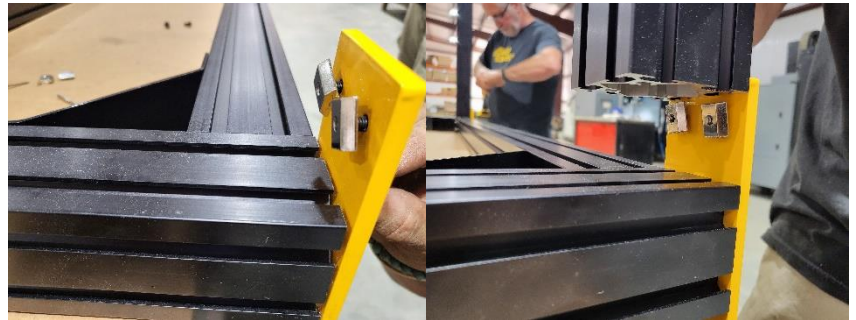
Pick up one end of the frame and block it up. If on a table, hang one end of the frame (2650 extrusion) off the table. Locate a Y end plate. Using (4) 5/16x3/4 screws, attach the Y end plate to the end of the 2650 extrusion using the 4 holes close to the smaller M5 holes. The smaller holes should be pointed up. Repeat the process for the other 2650 extrusion. The Y end plates will act as feet. Place something underneath to keep from scratching the end plates. Block up the other end of the frame and repeat the process for the other side. Check square throughout the process.



Slide (2) 760 leg extrusions onto the inside corner joiners, one leg extrusion for each 2650. There are two tapped holes diagonally from each other on one end of the 760 extrusions. Make sure the tapped holes on the 760 extrusions are pointing up. Leave the legs loose. The legs will need to be adjusted when installing the subframe. Leave the legs near the center of the 2650 extrusion.



Place (2) M5x16 button cap screws through the outside of the y end plate and lightly thread on a large t nut to each screw. Slide a 760 leg extrusion onto the t nuts. Tighten the M5x12 button caps while making sure the leg is flush with the outside of the 2650 extrusion. Repeat for the other y end plates and legs.



Place (2) drop-in t nuts in the grooves of the legs, one in each slot, for each face of the leg that is perpendicular to the 2650 extrusion and the front/rear 1450 extrusion. There will be (4) drop-in t nuts for each leg total. Use M5x8 button caps to install gussets on the legs using the drop-in t nuts. There will be 2 gussets for each leg.



The 2650 Extrusion and the front/rear 1465 extrusion will need (2) corresponding t nuts for each set on the legs.

**Do not connect the middle legs to the 1465 extrusion. The middle legs will only be attached by gusset to the 2650 extrusion. Leave the gussets loose as the legs will need to be adjusted when installing the subframe.**

## Subframe

### Parts

1235 6060 Extrusion (4)

1465 606 Extrusion (3)

Gusset (14)

Foot Plate (6)

Leveling Feet (6)

### Hardware

M5x8 Button Cap Screw (56)

5/16x3/4 Button Cap Screw (12)

Drop in T Nut (56)

Inside Corner Joiner (28)

Set Screw (56)



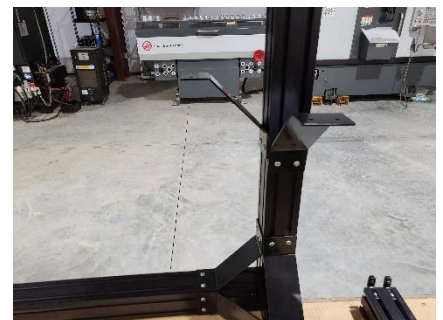
### Tools

3mm Hex Key

3/16 Hex Key

Square

Place (2) drop-in t nuts, one in each slot, in the inside faces of each leg. There will be (4) drop-in t nuts for each outside leg, and (6) drop-in t nuts for each middle leg; (2) each on the left, right, and inside of the middle legs. Attach gussets to the legs using M5x8 button caps and the drop-in t nuts. There will be (2) gussets for each corner leg, and (3) for each middle leg. The gussets should point up making a shelf for the subframe. The gussets should be 430mm (about 17") above the bed frame.





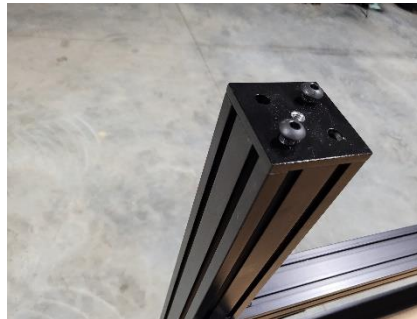
Preload the set screws in the inside corner joiners. (2) set screws for each corner joiner. Side the corner joiners, (2) on each side - (4) in total, in the 1456 extrusion oriented where they terminate against the end of the 1465 extrusion. Repeat this process with the 1235 extrusion.



Slide the 1465 extrusion into the front set, middle set, and rear set of legs. Sit them on the gussets. Slide the 1235 extrusion on the left and right, between the front and middle legs, and the rear and middle legs. You may have to adjust the middle legs to allow the 1235 extrusion to fit. Place (2) drop-in t nuts in each 1465 and 1235 extrusion to correspond with each gusset. Push the drop-in t nuts to align with the gusset holes and secure with M5x8 button caps. Tighten all gussets and inside corner joiner while checking square. Tighten the lower gussets and inside corner joiners for the middle legs.



Locate the foot plate. Attach the foot plate using (2) 5/16x3/4 button cap screws for each leg. Locate the leveling feet. Screw one into the center of each foot plate.



Get some help and flip the frame onto the leveling feet. Please do not attempt to do this without assistance from others.



## Mega V Y Rails

### Parts

2650 Mega V Rail (2)

Drag Chain Mount (3)

### Hardware

M5x25 Button Cap Screw (4)

M5x12 Button Cap Screw (9)

M5 Split lock Washer (13)

5/16x3/4 Button Cap Screw (16)

Drop-in T Nut (13)



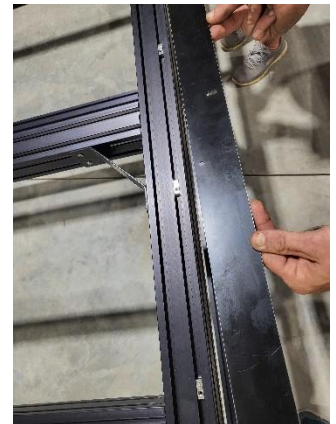
### Tools

3mm Hex Key

3/16 Hex Key

Square

Designate one side of the machine as the front. On the top of the right 2650 6060 frame rail, insert (9) drop-in t nuts in the outside slot. Locate the (3) drag chain mounts. Using (9) M5x12 button cap screws with M5 split lock washers, attach the drag chain mounts to the 2650 frame rail with the slots pointing towards the front of the machine. Slide one drag chain mount to the front of the machine and the other two to the back of the machine.



Loosen the (4) 5/16x3/4 button cap screws on each of the Y end plates. Locate the right Mega V Y rail (with the drag chain mount installed). Place between the right Y end plate, with the rack on the outside of the rail and the rack teeth pointing out, and secure with (4) 5/16x3/4 button cap screws (pictured at top). Repeat the process with the other end of the Y end plate. While tightening the 5/16x3/4 button cap screws, check for

square. Locate the left Mega V Y rail and place it between the left Y end plates. The rack should be on the outside of the rail with the teeth pointing out. Secure both ends with 5/16x3/4 button caps. Check Square.

Insert (2) drop-in t nuts on the left 2650 6060 extrusion. The drop-ins will go on either side of the Y midspan support. Carefully push the t nuts to line up with the holes on the Y midspan support and secure with (2) M5x25 button cap screws with M5 split lock washers. Repeat the process on the right side of the machine.



## Gantry to Rails

### Parts

Assembled V-Wheel (4)

Completed Gantry

### Hardware

V-Wheel Kit

- Standard Spacer (4)
- M8x40 Machine Screw (4)
- M8 Nylock Nut (4)

### Tools

13mm Wrench or Socket

Needle Nose Pliers

Phillips-Head Screwdriver



Place the Gantry onto the Y rails of the machine. The logo on the gantry should face the front of the machine as pictured above.

Place a v-wheel on a M8x40 machine screw. Spinning the v-wheel will help align the washer between the bearing. Place a standard spacer on the screw next. Place the screw in the hole in the gantry endplate under the Mega V Y rail. Secure with a M8 nylock nut.



You may need to adjust the eccentric spacers on the top v wheels to allow the bottom v-wheels to be installed. Use a 13mm wrench to rotate the eccentric spacer to allow the plate to drop to the lowest point. The eccentric spacers have a flat spot on one corner to denote the highest position of the plate. Put the flat spot on the bottom for the lowest plate position. Continue installation with the remaining v-wheels.



Once the wheels are installed. Move the gantry back and forth. The travel should be smooth. If one side lags, the wheels are too tight. Each v-wheel should rotate when the gantry is moved, but you should be able to rotate each wheel individually with your fingers.

If you cannot rotate a wheel without moving the gantry, you will need to loosen the eccentric a bit. Make sure the wheels are still in contact with the Mega V Y extrusions when the gantry is moved.

If travel still lags, you may have to loosen the M8x40 machine screw holding the wheel to the gantry end plate. The screw can compress the bearings if too tight restriction rotation of the bearings.

If movement is still lagging, check square.



## X/Y Motors

### Parts

4750 Motor (2)

2550 Motor

Drag Chain Bracket (2)

### Hardware

Pinion Gear w/Set Screws (3)

M4x16 Machine Screw (8)

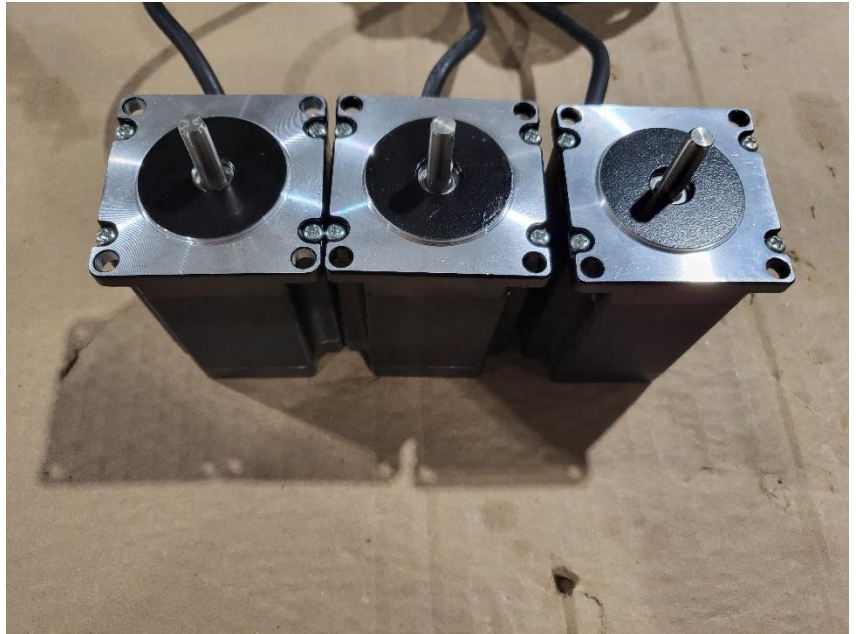
M4x20 Machine Screw (4)

M4 Nylock Nut (12)

### Tools

Needle Nose Pliers

Phillips-Head Screwdriver

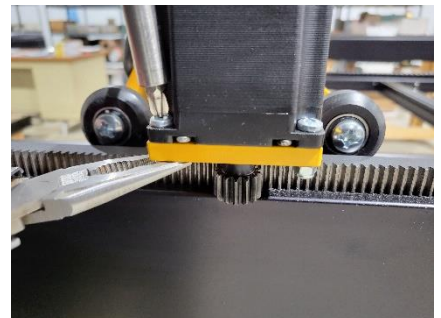


Locate your pinion gears. Preload the pinion gears with the included set screws. (2) set screws for each pinion gear. Fully seat the pinion gear onto the motor shaft and tighten the set screws. One set screw should be against the flat of the motor shaft.



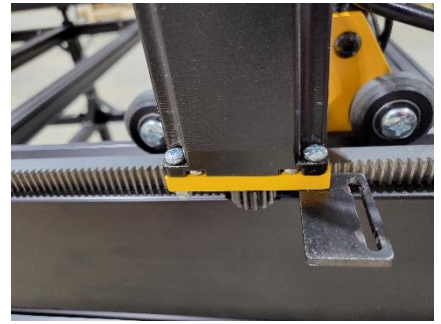
The 4750 motors will go on the left Y axis and the X axis on the back of the gantry. The 2550 motor will go on the right Y axis.

Set a 4750 Motor on the left Y axis motor mount with the wire pointing towards the rear of the machine. Secure the motor with (4) M5x16 machine screws and (4) M5 nylock nuts. Leave loose to adjust the rack.



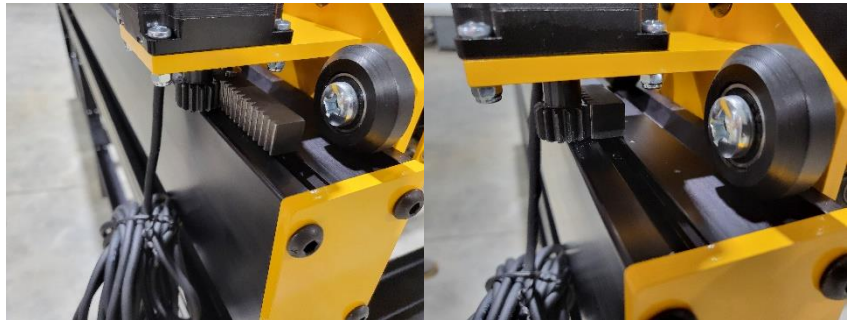


Set a 4750 motor on the X motor mount on the back of the gantry with the wire facing the rear of the machine. When looking at the motor from the back of the machine, the two motor holes on the left will receive M5x16 machine screws. The two motor holes on the right will receive M5x20 Machine Screws. Slip the Drag Chain Mount onto the M5x20 machine screws with the slot facing to the right. Secure with M5 Nylocks. Leave loose to adjust the rack.

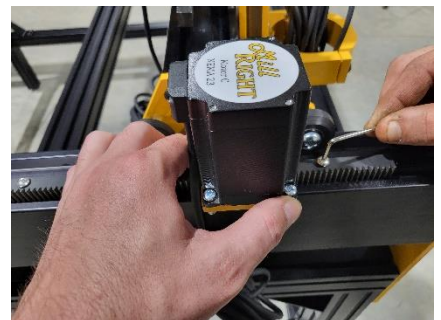


Place the 2550 motor on the right Y motor mount with the wire pointing to the rear of the machine. When looking at the motor from the right of the machine, the two motor holes on the left will receive M5x16 machine screws. The two motor holes on the right will receive M5x20 machine screws. Slip the Drag Chain Mount onto the M5x20 machine screws with the slot facing to the right. Secure with M5 Nylocks. Leave loose to adjust the rack.

Move the gantry all the way to the front. Make sure the rack is engaging the pinion gear. Adjust the rack until the pinion gear is almost to the end of the rack when all the way forward.



Starting with the left Y motor, gently push the motor to the rack and tighten the motor. Gently pull the rack to the motor and tighten the front screw on the rack. Continue moving the gantry down while gently pulling the rack to the motor and tightening the rack as you go. Repeat the process with the right Y motor, and then the X motor starting at the right as seen from the back of the back of the machine.



Once the rack is tightened, move the gantry back and forth checking for smoothness. If you feel any tight spots in the travel, loosen the screws near the tight spot and apply a bit of pressure to the rack to move it away from the pinion gear slightly. Retighten the rack and continue checking the travel.

## Homing Switches

### Parts

Homing Kit (parts listed on homing sheet inventory)

### Hardware

Homing Kit

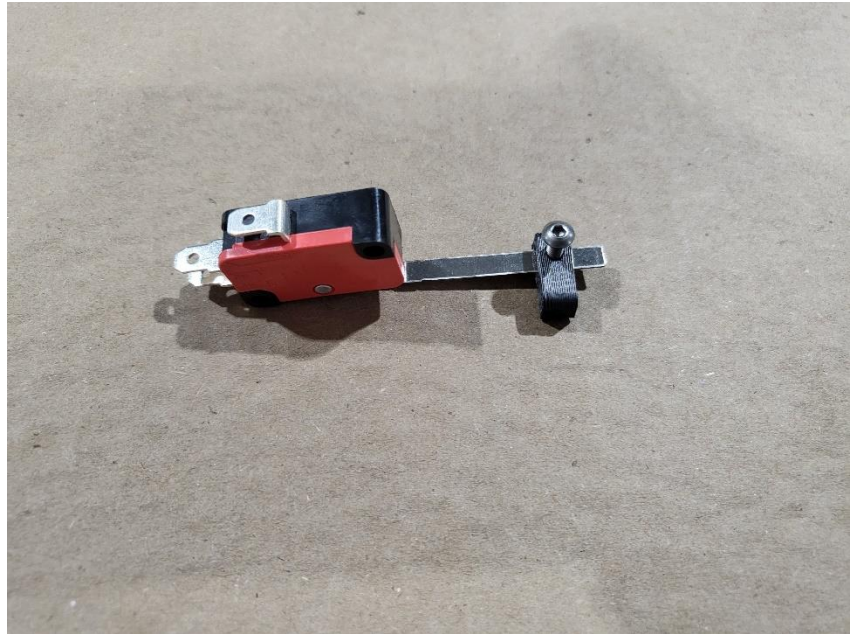
### Tools

2mm Hex Key

3mm Hex Key

Phillips-Head Screwdriver

Needle Nose Pliers



Locate the long paddle switch. Locate printed extender piece. Slide the extender onto the paddle with the screw hole facing the switch and the printed extender out towards the red side of the switch (shown above). Insert a M3x8 button cap screw to secure the printed extender to the paddle.

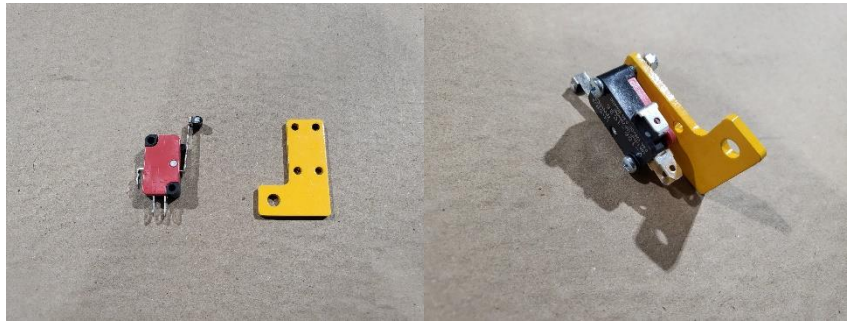
Run the Z axis down by rotating the coupler. There will be two holes at the top right of the X plate on either side of the right Z rail. Insert (2) M3x20 machines screw in the holes. Place the long paddle switch on the M3x20 screws on the back of the X plate as shown (red side of the switch against the plate). Secure with M3 nylock nuts.



Insert the M5x35 machine screw into the Z engager bracket on the Z plate. Place a M5 split lock washer on the screw and thread the M5 hex nut on. Tighten the screw near the top of the engager bracket. Move the Z axis up and line up the printed extender with the M5x35 screw and tighten the printed extender. This is the Z switch.



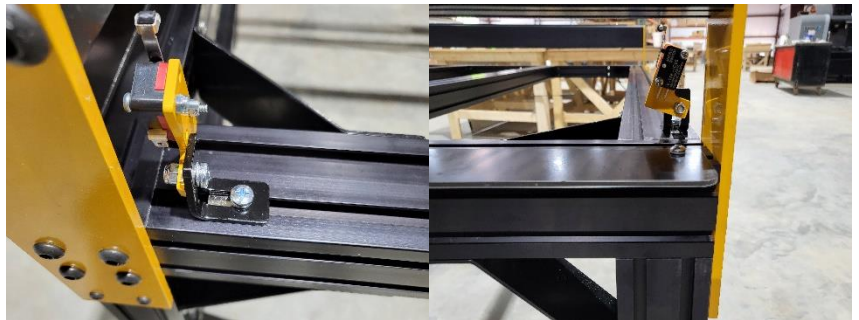
Locate the long roller switch and a L bracket. Place the red part of the switch on the L bracket with the roller facing the flat side of the L bracket. Place (2) M3x20 machine screws through the black side of the switch and secure with (2) M3 nylock nuts.



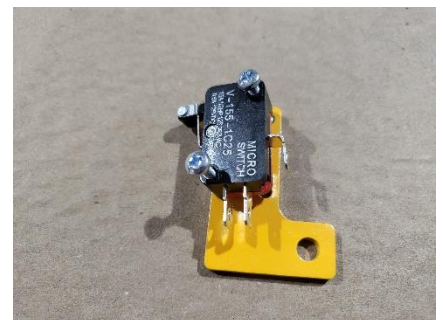
Place an M5x12 machine screw through the slot on the 90° bracket and then through the hole in the L bracket and secure with a M5 nylock nut. The 90° bracket is opposite the switch.



In the top of the rear 1465 Extrusion, in the first slot, place a drop-in t nut. Secure the 90° slot to the 1465 extrusion using a M5x12 machine screw with a M5 split lock washer. The edge of the right gantry end plate (on the left as viewed from the rear of the machine) should engage the switch near the end of travel. This is the Y switch.

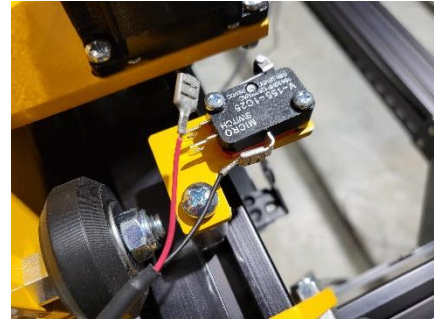


Locate the short roller switch and a L bracket. Place the red part of the switch on the L bracket with the roller facing the flat side of the L bracket. Place (2) M3x20 machine screws through the black side of the switch and secure with (2) M3 nylock nuts.





On the right side of the Mega V X extrusion, place a drop-in t nut. Put a split lock washer on the M5x30 machine screw. Put the screw through the L bracket (same side as the switch), then through the large homing spacer and secure it to the Mega V X extrusion. The switch should be positioned so the edge of the X motor mount will engage the switch before end of travel. This is the X switch.



The homing wires are marked near the end close to the spade connectors. The black wire will connect to the terminal exiting the side of the switch and curving down, pictured above. The red wire will connect to the terminal closest to the black terminal. Connect the Z and X switches. Leave the Y switch alone for now.

## DeWalt Router

### Parts

DeWalt 618 Router

### Hardware

Needed Hardware is already installed

### Tools

3/16 Hex Key



Take the DW618 router from the box and remove all plastic pieces from the barrel. Loosen the 5/16x1 button cap screws on the front of the router mount. Slide the 618 router into the router mount about 1/3 of the way up the barrel of the router. Make sure the on/off switch of the router is accessible from the front of the machine. Tighten the 5/16x1 button cap screws a little at a time until fully secure. Do not tighten one side down completely before tightening the other side.



## Drag Chains

### Parts

Long Drag Chain

Short Drag Chain

Drag Chain Mount (2)

### Hardware

M4x12 Machine Screw (6)

M4 Nylock Nut (6)

Zip Ties

### Tools

Philips Screwdriver

Flathead Screwdriver



Locate the short drag chain. Disconnect the last link on one side, flip the link over, and reattach the link to the chain. Attach that end to the top of the drag chain bracket on the X motor mount with (2) M4x12 Machine Screws and (2) M4 nylock nuts. Stretch out the drag chain and open all the gates on the back of the drag chain. If the gates come off, just store them somewhere until needed.

The wires you will need to run through the X drag chain are:

Z Motor Wire

X Motor Wire

Router Power Cord

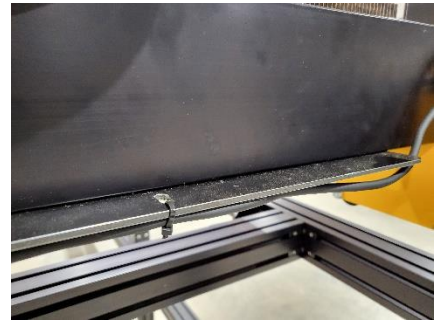
Z Homing Switch



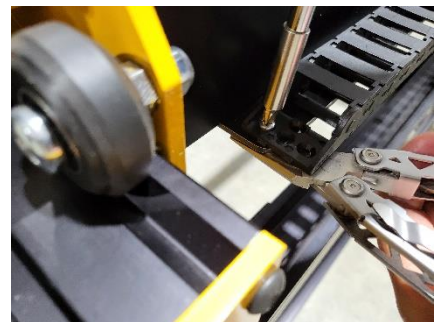
Do not run the left Y Motor Wire through the X Drag Chain. Close the gates.

On the back of the X Extrusion, make sure your drag chain mount on the left of the machine (as viewed from the rear of the machine) is about 1.5" from the left of the extrusion.

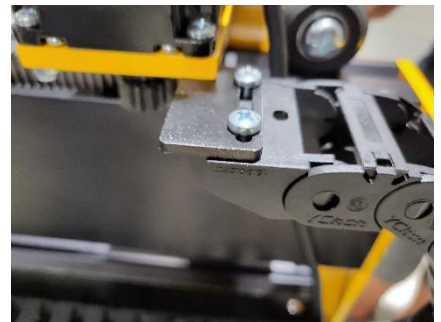
The left Y motor wire (on the right as viewed from the rear of the machine) will be zip tied to the bottom of the X drag chain mount.



Curl the X drag chain around to the left (as viewed from the rear of the machine) and attach the end of the drag chain to the slot in the left most drag chain mount with a M4x12 machine screw and a M4 Nylock nut. Move the X/Z assembly all the way to the left. Zip Tie the drag chain to the slot in the second drag chain mount before the drag chain curls up.

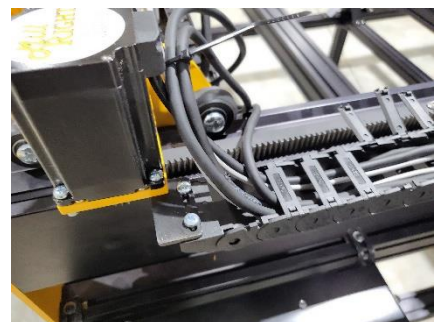


Locate the long drag chain. Attach the drag chain to the underside of the drag chain bracket on the right Y motor mount using (2) M4x12 machine screws and (2) M4 nylock nuts. Open the gates on the back of the drag chain and stretch out the chain.



The wires that will run through the Y drag chain are:

- |                             |                    |
|-----------------------------|--------------------|
| Z Motor Wire                | Left Y Motor Wire  |
| X Motor Wire                | Right Y Motor Wire |
| Router Power Cord Extension | X Homing Switch    |
| Z Homing Switch             |                    |



The Y homing wire will **not** run through the Y drag chain.

Check the placement of your drag chain mounts on the right 2650 frame extrusion. The drag chain that is in front of the Y midspan support should be 16" from the Y end plate at the front of the machine. The drag chain behind the Y mid span support should be 1" from the Y midspan and 1" from the rear Y end Plate respectively.

The drag chain mount on the underside of the right Mega V Y extrusion should be 24" from the front Y end plate.

The Y homing wire will be zip tied to the underside of the Y drag chain mounts attached to the 2650 frame. Attached the homing wires to the Y homing switch and secure the wire to the drag chain mounts. (the angle of the switch pictured right is to aid in connecting the wires to the switch and not how the switch should be positioned).



Curl The drag chain towards the front of the machine. Connect the end of the drag chain to the slot in the front most drag chain mount using a M4x12 machine screw and a M4 nylock nut.



Move the gantry all the way forward. Zip tie the drag chain to the slot on the second drag chain mount attached to the 2650 frame extrusion before the chain curls up.

## Box and Dust Shield

### Parts

Control Box

Dust Shield

AC Wire Extender

### Hardware

Drop-in T Nut (4)

M5x12 Button Cap (2)

M5x8 Button Cap (2)

M6 Washer (2)

### Tools

3mm Hex Key



Place (4) Drop-in t nuts in the top outside slot of the right 2650 frame extrusion near the front of the machine. Using (2) M5x12 button caps with M6 washers, attach the box to the side of the machine using the first and last drop in t nuts. The Red estop button on the box should be facing the front of the machine.

With the remaining t nuts, attach the dust shield to the rail, in between the box attachment point, using (2) M5x8 button cap screws.

Plug the motor wires into the labeled AC ports on the back of the box. Use the zip ties provided to bundle the wires appropriately. The 2550 motor wire will need an extension (included).





# **Congratulations on the build of the Mega V FS!**

**For tips on start-up and to learn more about operating the machine,  
check out the Operating and Troubleshooting Guide at  
<https://millrightcnc.com/wp-content/uploads/2021/08/Operating-and-Troubleshooting-Guide-version-1p00.pdf>**

**Also see [www.millrightcnc.com/resources](http://www.millrightcnc.com/resources) for more information**

**Have questions or comments? Contact [support@millrightcnc.com](mailto:support@millrightcnc.com) or call 229-439-6569**