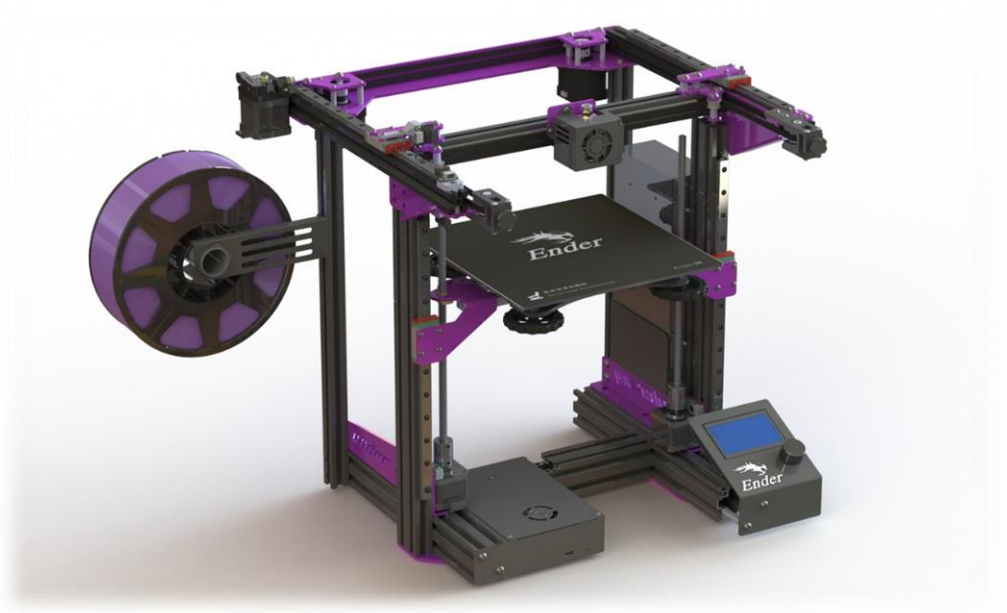
ENDERXY

(CoreXY conversion kit for the Ender 3 Series 3d printer)

ASSEMBLY MANUAL



STEP BY STEP INSTRUCTION MANUAL

BY ADITIVA 3D

V1.1

ADITIVA3D

Content

Chapter 1 Intro

Step 1.1 What is included in this kit?

Congratulations on purchasing the EnderXY Conversion Kit, designed to transform your regular stock 3D printer into a high-performance CoreXY 3D printer. With this kit, you will experience enhanced speed, accuracy, and overall print quality, thanks to the inclusion of high-quality CNC metal parts, linear rails, and extra stepper motors.

Compatibility:

The EnderXY Conversion Kit is specifically designed for Ender 3, Ender 3 Pro, and Ender 3 V2 versions. If you own any of these models, you are in the right place to upgrade your 3D printing experience.

Contents:

The EnderXY Conversion Kit includes all the required metal parts and additional hardware necessary to complete the assembly. We have taken care to ensure that all the components are of the highest quality to guarantee durability and optimal performance. However, please note that there are certain 3D printed parts essential to finishing the assembly. To assist you, we have provided the corresponding STL files for these parts that need to be printed.

Step-by-Step Instructions:

This manual serves as a comprehensive, easy-to-follow guide, providing you with step-by-step instructions for the entire assembly process. From the initial disassembly of your stock 3D printer to the installation of the EnderXY Conversion Kit components, each step is clearly explained and accompanied by detailed illustrations. By following these instructions closely, you will be able to complete the upgrade efficiently and effectively.

Enhanced Performance:

Once the EnderXY Conversion Kit is successfully installed, your 3D printer will be equipped with advanced features that allow for faster and more accurate prints. The addition of linear rails ensures smoother and more stable movement of the print head, minimizing vibrations and artifacts. The extra stepper motors contribute to improved performance, enabling precise control of multiple axes.

We are confident that the EnderXY Conversion Kit will elevate your 3D printing capabilities, bringing you closer to professional-grade results. Should you have any questions or encounter any difficulties during the assembly process, our customer support team is available to assist you.

Thank you for choosing the EnderXY Conversion Kit. Let's get started with the assembly and unlock the true potential of your 3D printer!

Step 1.2 Additional printable parts

There are few printable parts for finish this build, since they will be provided as STL digital format, they are subject to upgrades and few more will be added in the future, please check for regular updates.

- ✓ X endstop bracket

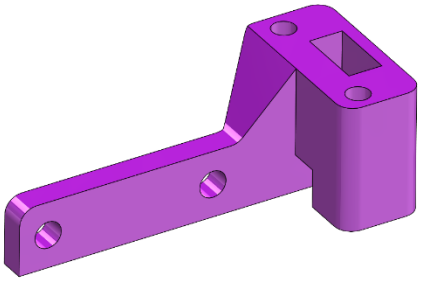


Figure 1 X axis endstop bracket

✓ Y endstop bracket

Figure 2 Y Axis endstop bracket

✓ Z endstop bracket + Z limit

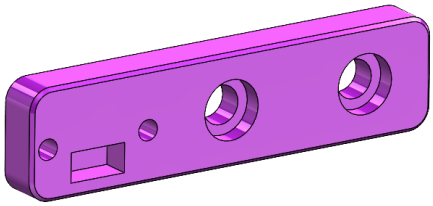


Figure 3 Z axis endstop bracket

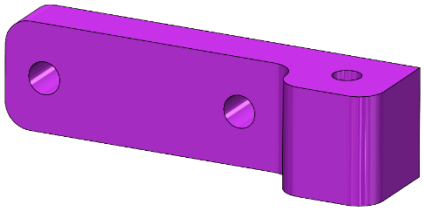


Figure 4 Z Limit bracket

✓ Power supply bracket

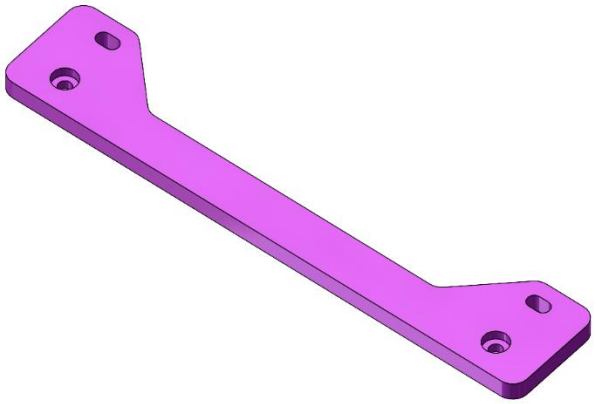


Figure 5 Power supply bracket

Step 1.3 Required tools

In order to fully install this kit, you will need the next tools:

- ✓ Set of Allen keys
- ✓ Adjustable wrench or wrench kit
- ✓ Measuring tape
- ✓ Flat file or low grit sandpaper (100 grit)
- ✓ Vernier caliper
- ✓ Metal ruler (for alignment)

Chapter 2 Disassembling ENDER 3

In order to get ready to install this kit, you have to disassembly various segments of the original 3d printer, this part will guide you through entire process of preparation and getting ready to install new parts.

In this part of the process, various electrical components will be temporarily disconnected for practical purposes, you must install them later though.

*Please be aware some original parts will be discarded and won't be installed.

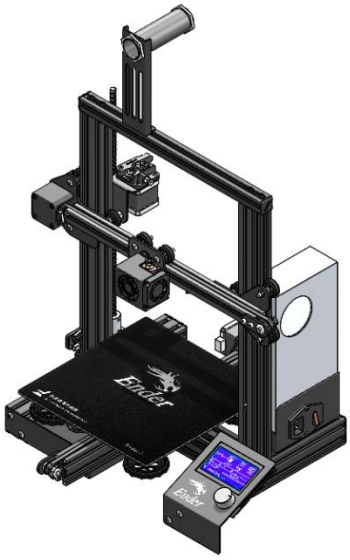


Figure 6. Assembled Ender 3

Step 2.1 Remove spool holder

- ✓ Remove spool holder using allen key, spool holder is reused later, save it along with its m4 screws and t-slot nuts.

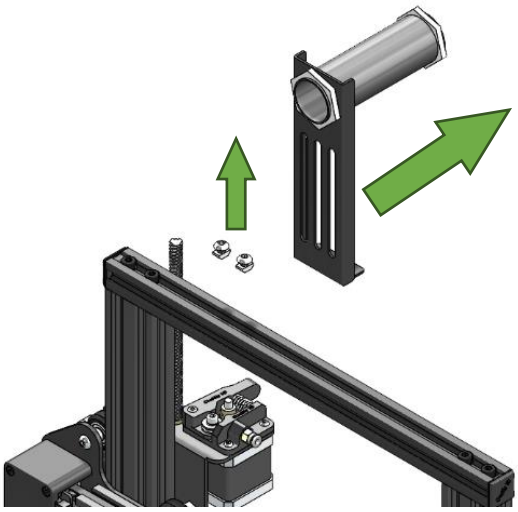


Figure 7 Removing spool holder

Step 2.2 Remove power supply

- ✓ DISCONNECT ELECTRICAL POWER FROM THE MACHINE BEFORE DOING THIS STEP.
- ✓ Disconnect power supply connector

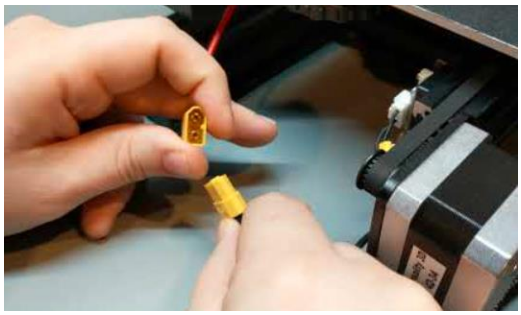


Figure 8 disconnecting power supply from motherboard

- ✓ Using an Allen key, remove the 2 x m4 screws that holds the power supply, save them for later, since those will be used.

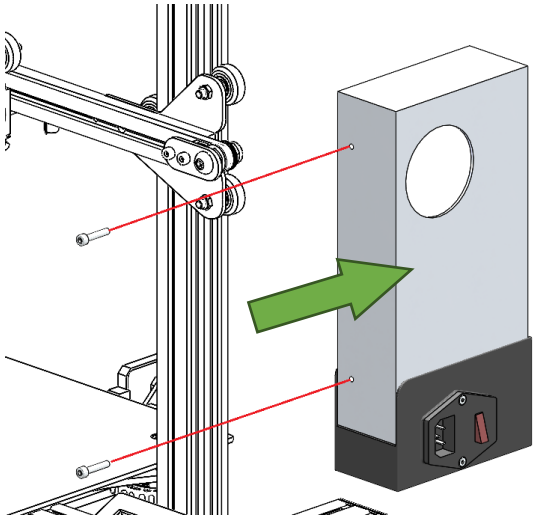


Figure 9 Removing power supply

Step 2.3 Disconnecting wires

- ✓ DISCONNECT ELECTRICAL POWER FROM THE MACHINE BEFORE DOING THIS STEP.
- ✓ Remove lid of electronics box and proceed to disconnect all wires going to the hotend harness, Z motor, extruder.
- ✓ *Tip: take as many pictures as possible of connectors and wires in order to reconnect later in assembly steps, labeling is also very useful.

Figure 10 Electronics box

- ✓ Put lid back on its place and secure with its own screws.

Step 2.4 Removing original Z axis system

- ✓ Disconnect Z motor cable.
- ✓ Using an allen key remove Z motor bracket (m3 screws), leadscrew and Z nut (2 x m3 screws).
- ✓ Also remove Z endstop (including plate), remove Z endstop cable as well.

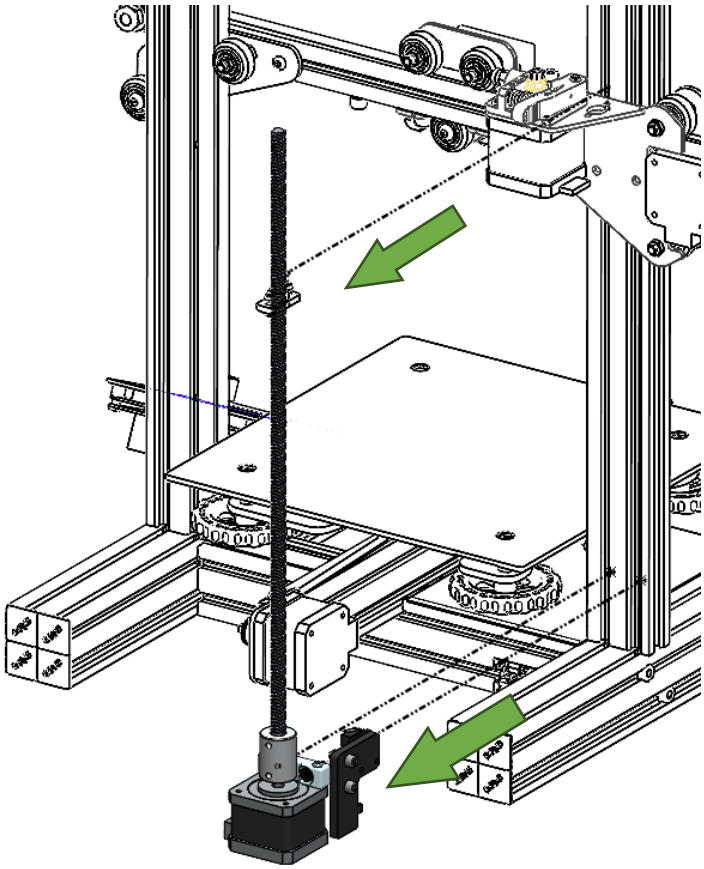


Figure 11 Removing Z axis moving system

- ✓ Items to discard: Z coupler, Z motor bracket, Z endstop bracket, leadscrew, brass nut.
- ✓ Items to save for later use: Z motor, Z endstop (including its 2 x m3 screws)

Step 2.5 Remove top side caps

- ✓ Remove aluminum bars caps, save them for later use.

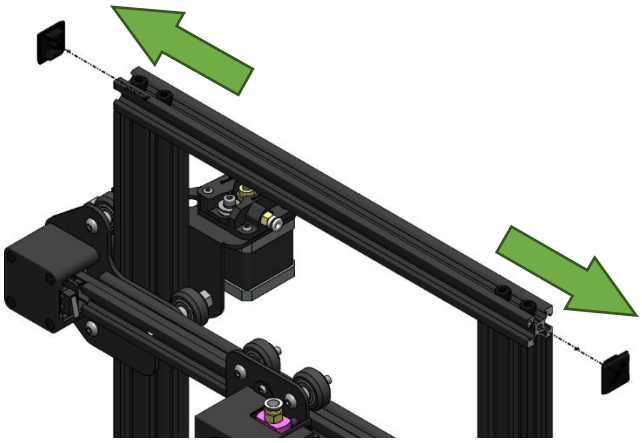


Figure 12 Remove end caps

Step 2.6 Removing original Top frame

- ✓ Using an Allen key, remove 4 M5 screws from the bottom of both Z columns.
- ✓ Top frame and X axis assembly will be used, discard removed 4 x M5 screws.

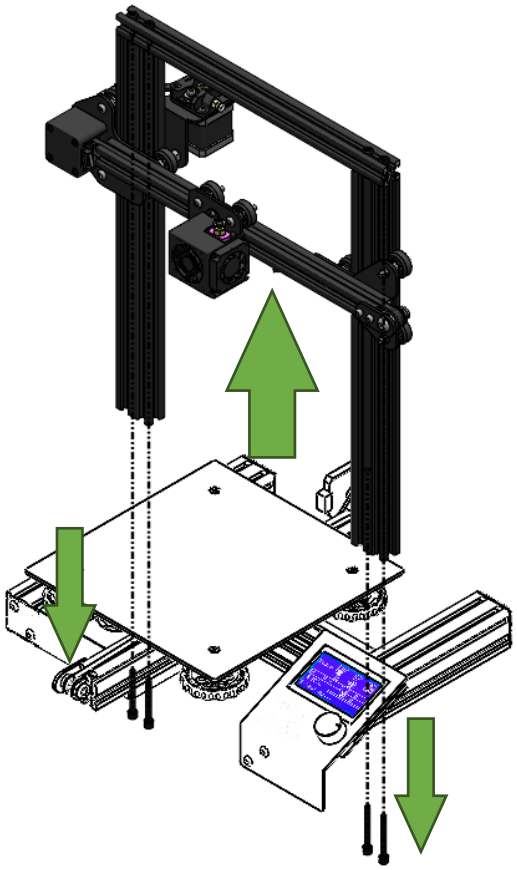


Figure 13 Removing top frame and X axis system

Step 2.7 Removing screen

- ✓ Remove cable from the back of the screen, please be aware of the connector position, since it will be connected later.

Figure 14 disconnecting screen

- ✓ Using an Allen key, remove 2 x m5 screws that holds screen in place.
- ✓ Save both, screen assembly and screws for later use.

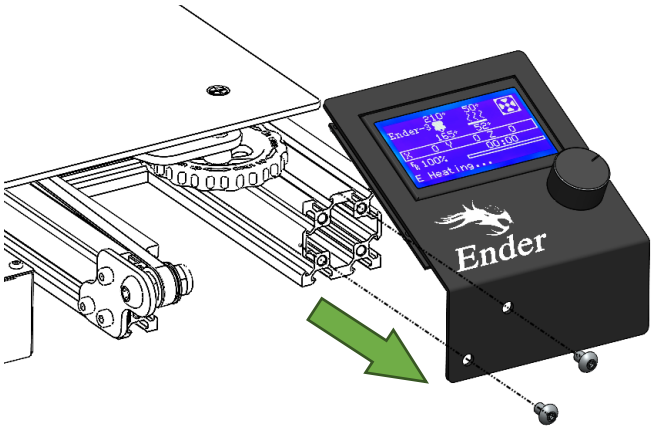


Figure 15 Removing screen

- ✓ NOTE: do the same procedure for V2 version

Step 2.8 Y axis and heatbed assembly

- ✓ Using an Allen key, remove 2 x m5 screws that holds Y axis system with heatbed assembly.
- ✓ Save Y axis and heatbed assembly for later use, discard 2 x m5 screws.

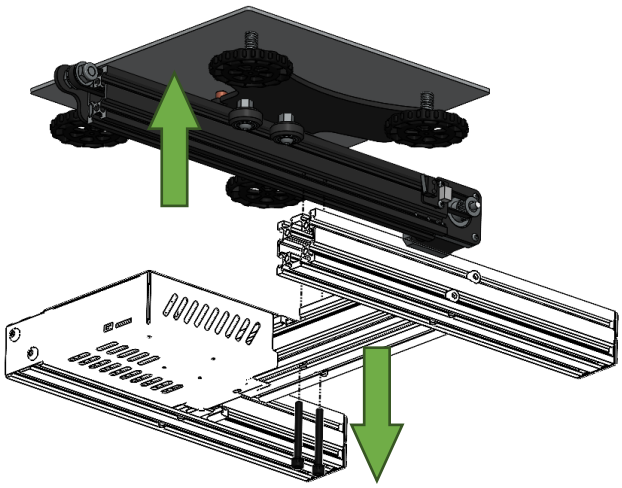


Figure 16 Removing Y axis and heatbed

Chapter 3 Preparing frame

Step 3.1 Building Bottom Frame

✓ Next items from the KIT and Original parts will be used:

ITEM	ITEM DESCRIPTION	Quantity	Type
1	Bottom Frame Assembly	1	Assembly
2	P3L bracket	1	Kit
3	P3R bracket	1	Kit
4	M5 x 8 mm Screw	12	Kit
5	M5 Spring nut	12	Kit
6	P5 bracket	2	Kit

✓ Mount **P3L** and **P3R** brackets to the ***Original Bottom Frame*** as shown in the next picture, please be sure that both external frame and bracket face are very well aligned, you can use a metal ruler or one of the aluminum extrusions provided in the kit, in order to check for alignment. Both ends of the frame and the brackets must be flush aligned.

✓ Using 03 units of M5x8 mm screws and M5 Spring nuts on each side, left and right sides must be assembled, as shown in the next picture:

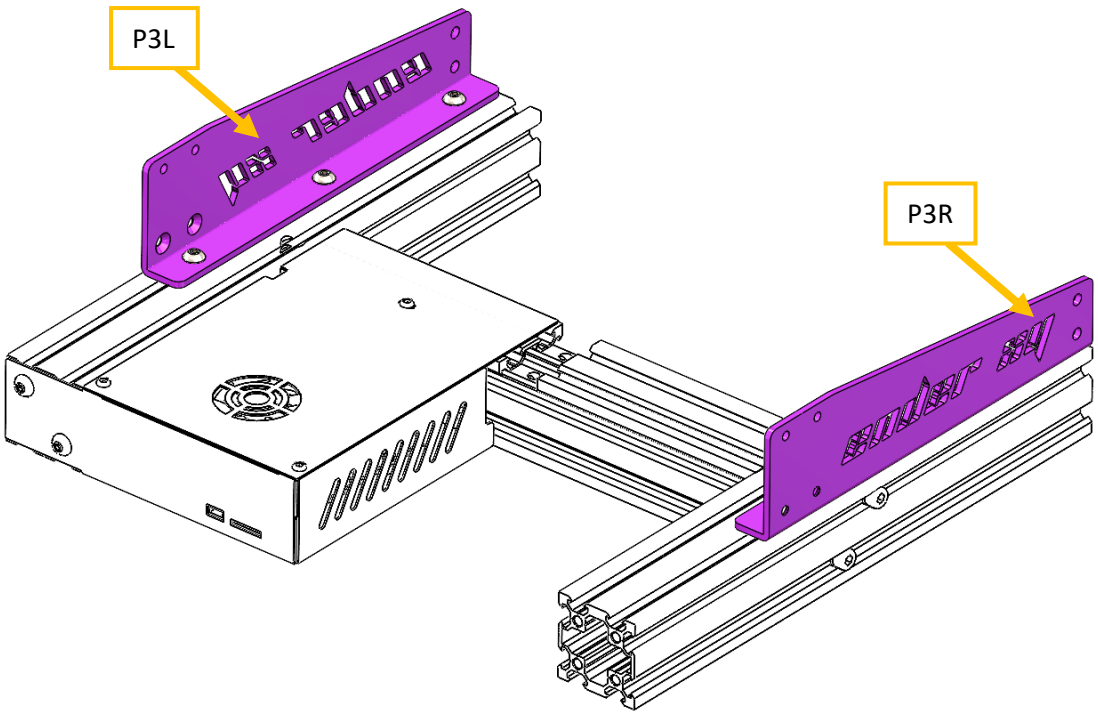


Figure 17 Bottom frame + P3 brackets

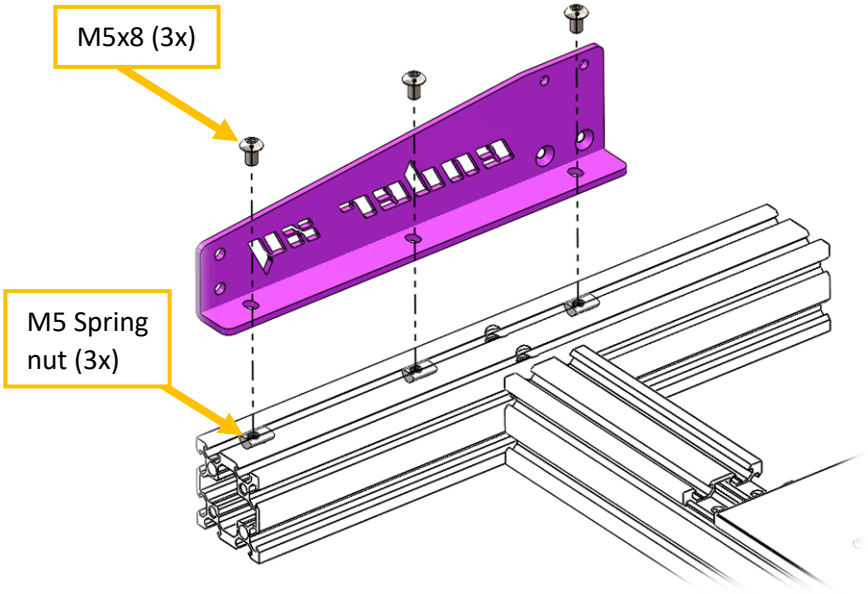


Figure 18 Joint detail with Screws and Spring nuts

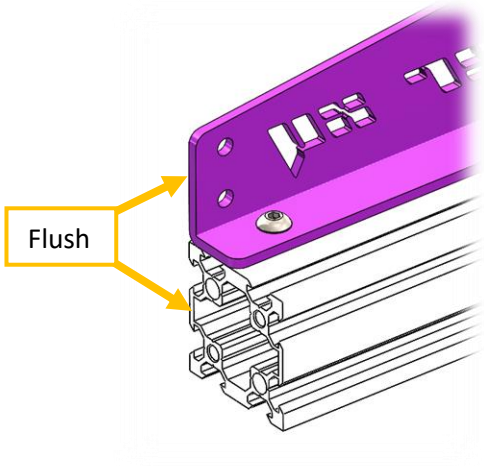


Figure 19 Edges must be aligned.

✓ Flip bottom frame, and install both sides P5 brackets, as shown, using M5x8 Screws and M5 Spring nuts, keeping 65mm from the front side, and 145mm from the back as shown:

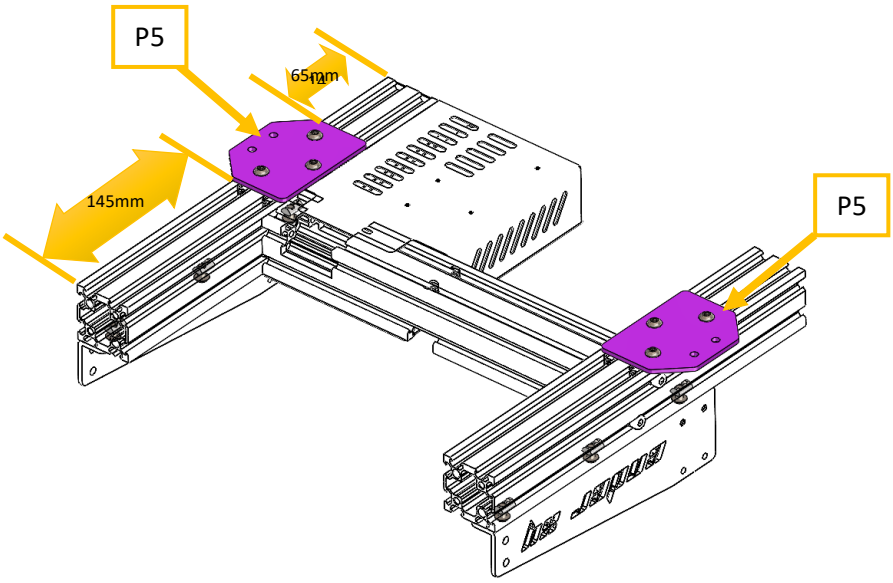


Figure 20 Bottom brackets mounting

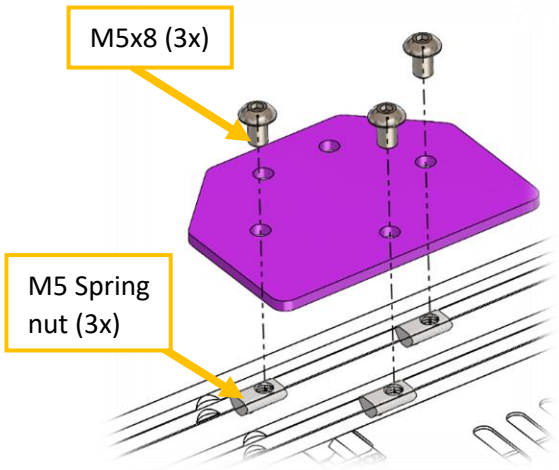


Figure 21 Fixing detail

Step 3.2 Installing other frame parts

✓ Next items from the KIT and Original parts will be used:

ITEM	ITEM DESCRIPTION	Quanti ty	Type
1	Bottom frame with brackets (previous step assembly)	1	Assembly
2	2040 Aluminum Extrusion L=400 mm	2	Original
3	2020 Aluminum Extrusion L=412 mm	2	Kit
4	M5 x 8 mm Screw	16	Kit
5	M5 x 20 mm Screw	4	Kit
6	M4 x 8 mm Countersunk Screw	4	Kit
7	M4 Spring nut	4	Kit
8	M5 Spring nut	16	Kit
9	P2L Bracket	1	Kit
10	P2R Bracket	1	Kit

✓ Install Stock 2040 Aluminum extrusions L=400mm as shown in the next picture, M4 x 8 mm Countersunk screws and M4 Spring nuts will be used, left and right sides must be assembled, extrusions doesn't really need to be correspondent to their original positions, repeat process on the opposite side:

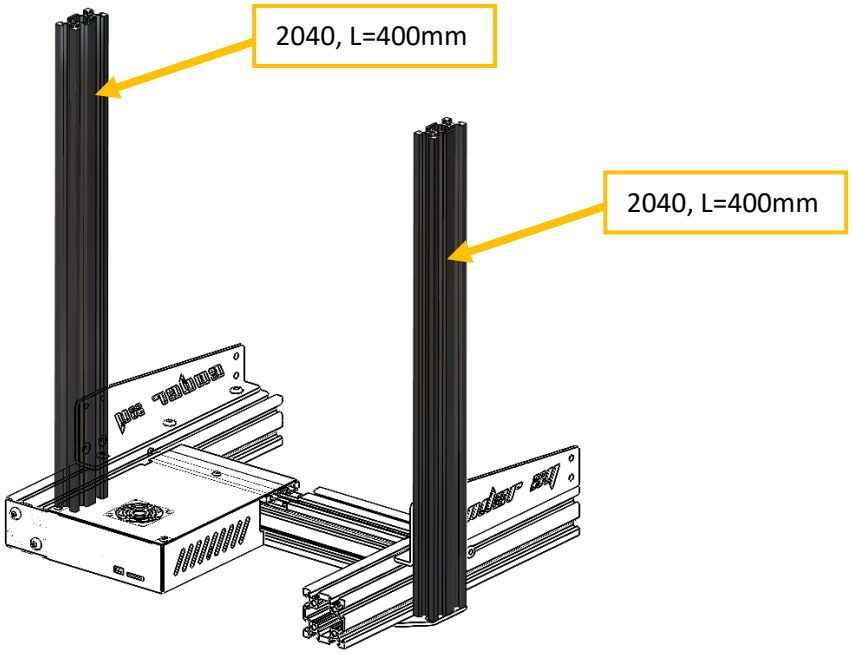


Figure 22 Installing 2040 Alu extrusions to the bottom frame

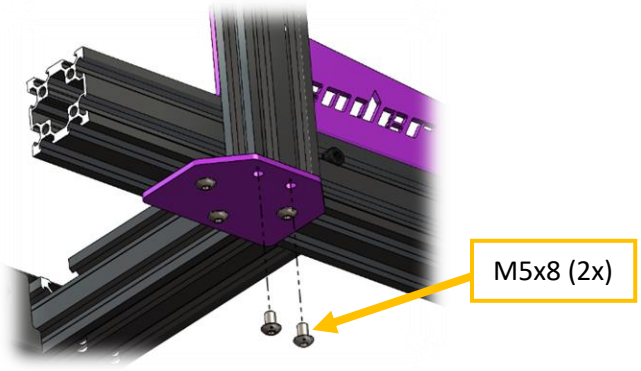
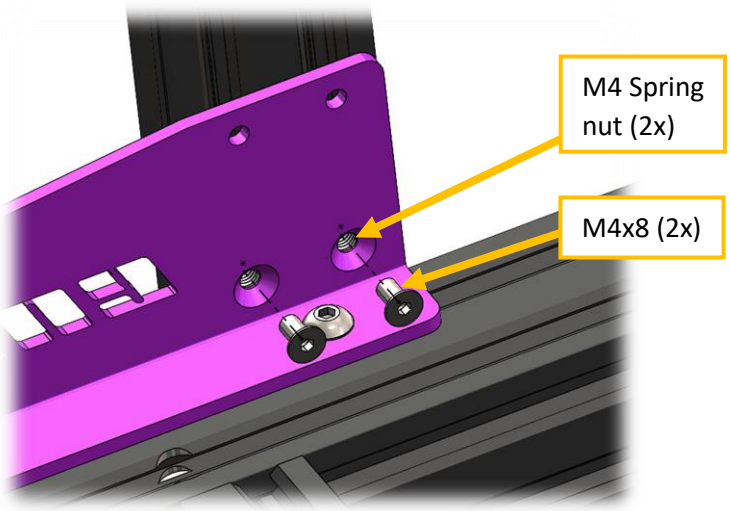


Figure 23 Mounting detail



✓ Mount 2020 Aluminum Extrusions L=412, using M5x20 Screw and M5 Spring Nuts to the bottom frame.

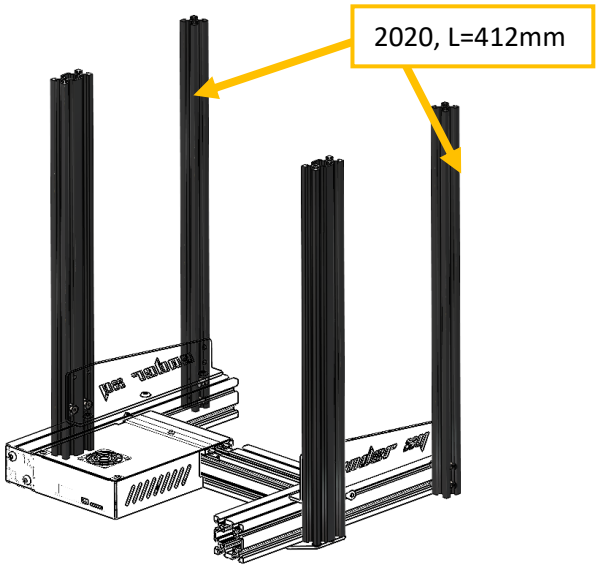


Figure 24 2020 Extrusions L=412mm mounting to bottom frame

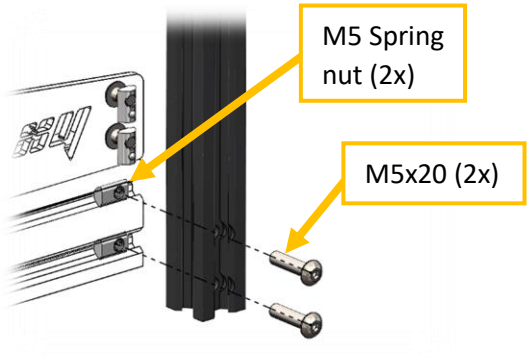


Figure 25 Detail of extrusion mounting (flush with frame)

✓ Secure the extrusion from the inside of the P3 bracket as shown next:

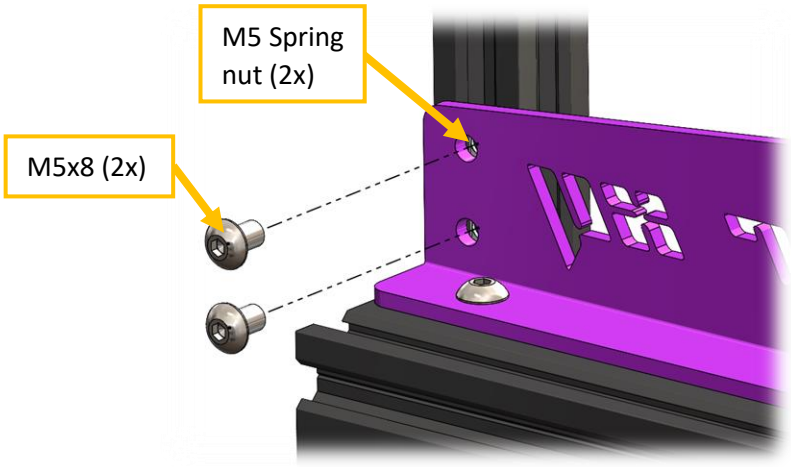


Figure 26 Detail of inner screws fixing

✓ Install P2R / P2L brackets as shown, using M5x8 Screws and M5 Spring nuts, repeat process on the left side:

Figure 27 P2R/L bracket position

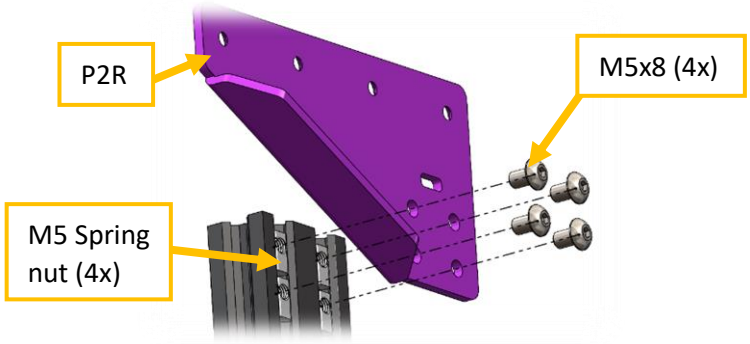


Figure 28 Mounting detail for P2R bracket

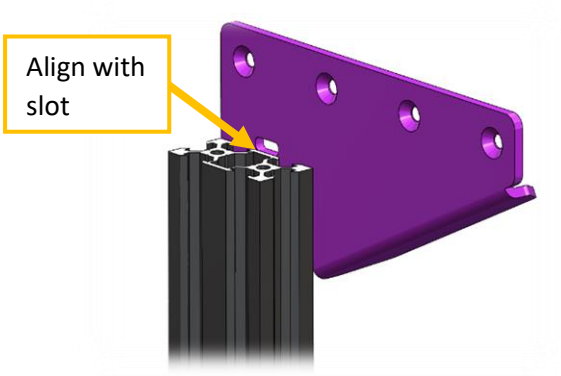


Figure 29 Bracket slot might be aligned with the end of extrusion

Step 3.3 Preparing Top frame

✓ Next items from the KIT will be used:

ITEM	ITEM DESCRIPTION	Quantity	Type
1	2020 Aluminum Extrusion L=370 mm	2	Kit
2	P1 Bracket	1	Kit
4	M5 x 8 mm Screw	6	Kit
5	M5 Spring nut	4	Kit

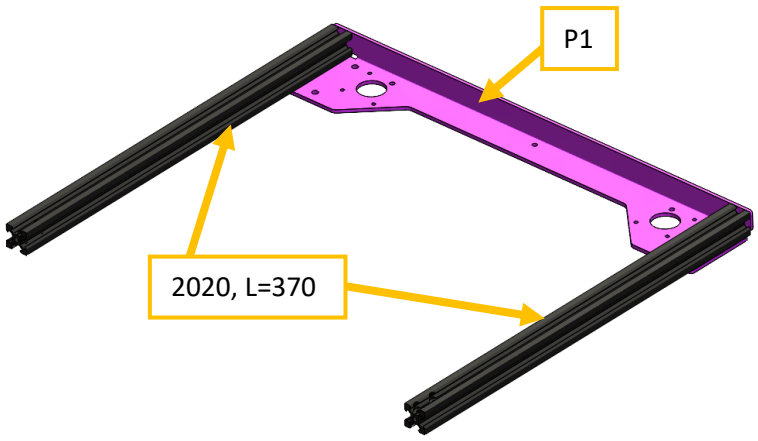


Figure 30 Top frame assembly

✓ Face each 2020 aluminum extrusion as shown:

Figure 31 Right side detail for the 2020 extrusion

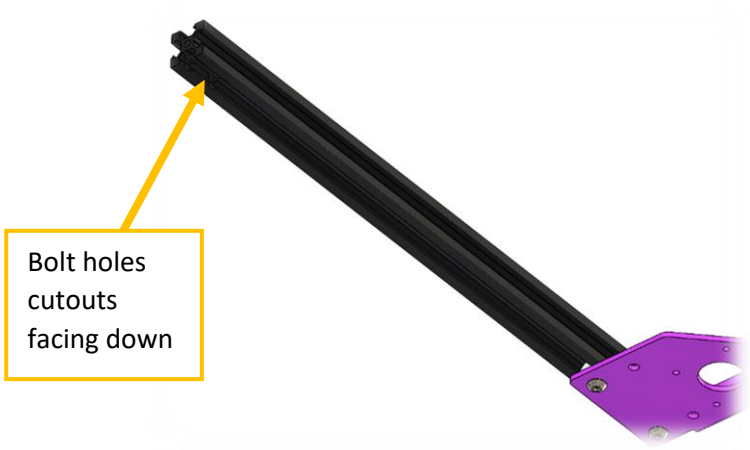


Figure 32 Left side 2020 extrusion detail

✓ Insert M5 spring nuts and fix 2020 extrusion to P1 bracket using M5x8mm Screws, repeat process on the left side:

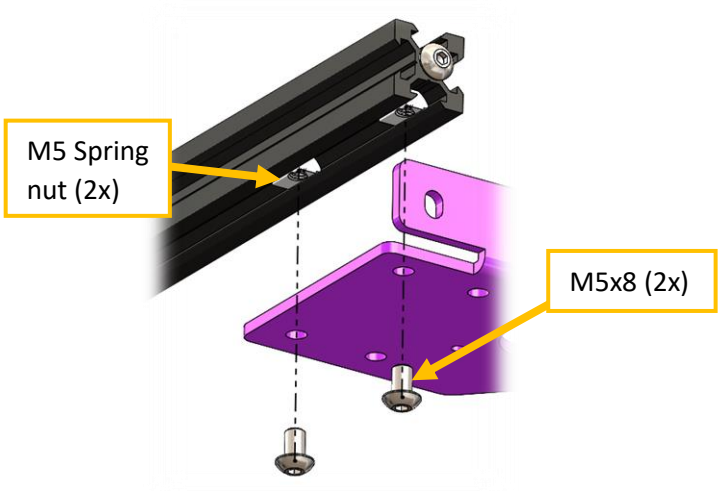


Figure 33 Fixing detail

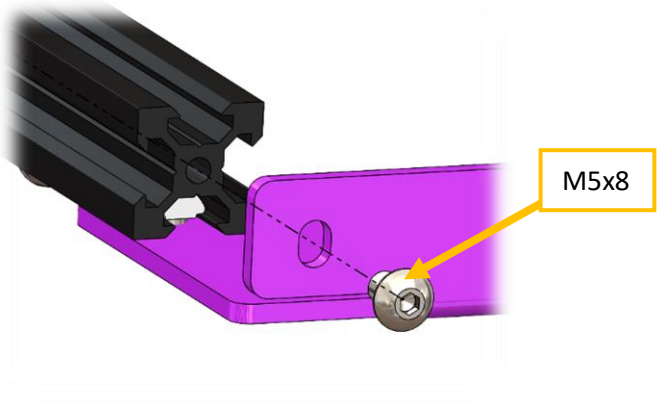


Figure 34 Back screw fixing detail

Step 3.4 Installing Top and Bottom frame

✓ Next items from the KIT and Original parts will be used:

ITEM	ITEM DESCRIPTION	Quantity	Type
1	Bottom frame assembly	1	-
2	Top frame assembly	1	-
3	M4 x 8 mm Countersunk Screw	8	Kit
4	M4 Spring Nut	8	Kit
5	M5 x 8 mm Screw	2	Kit

✓ Mount Top frame over bottom frame assembly as shown in the next picture:

Figure 35 Frame assembly

✓ Install top assembly frame using provided M4x8mm Countersunk Screws (8) and M4 Spring nuts (8), also M5x8mm Screws (4):

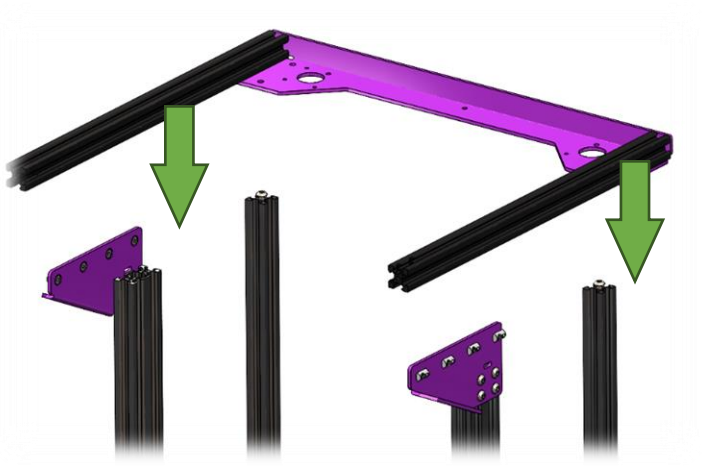


Figure 36 Assembly of top and bottom frames

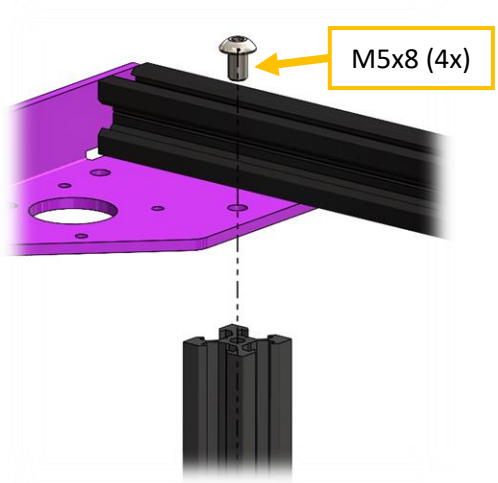


Figure 37 Back joint detail, M5x8 mm screw fixed to 2020 extrusion

Figure 38 Front joint detail, M4x8 mm screws and nuts

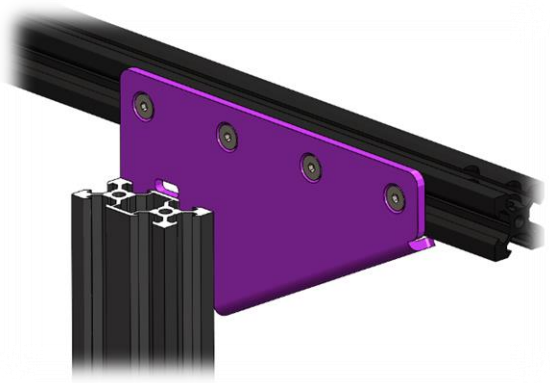


Figure 39 Final finish fixing detail, right side

Figure 40 Final finish fixing detail, left side

Chapter 4 CoreXY system

Step 4.1 Preparing X axis

✓ Next items from the KIT and ORIGINAL parts will be used:

ITEM	ITEM DESCRIPTION	Quantity	Origin
1	2020 Aluminum Extrusion, L=345mm	1	Original
2	300 mm Linear rail with slider	1	Kit
3	P8 Bracket	4	Kit
4	P7 Bracket	2	Kit
5	P10 Bracket	1	Kit
6	M5xD8XL10 Spacer	8	Kit
7	M5x8x1 Washer	8	Kit
8	M5x8 Screw	4	Kit
9	M5x20 Screw	4	Kit
10	M5x30 Screw	4	Kit
11	M5 Nylock nut	4	Kit
12	F695RS Bearing	8	Kit
13	M3x8 Socket screw	9	Kit
14	M3 Spring nut	5	Kit
15	M5 Spring nut	8	Kit

✓ Take the 2020 Aluminum Extrusion L=345mm (Original X axis bar) and perform a 2mm (approximately) chamfer on the front side, using a flat file or 100 grit sandpaper, as shown:

Figure 41 2020 Alu Extrusion (X axis) with 2mm chamfer on both sides

✓ Follow the next diagrams to build X axis assembly:

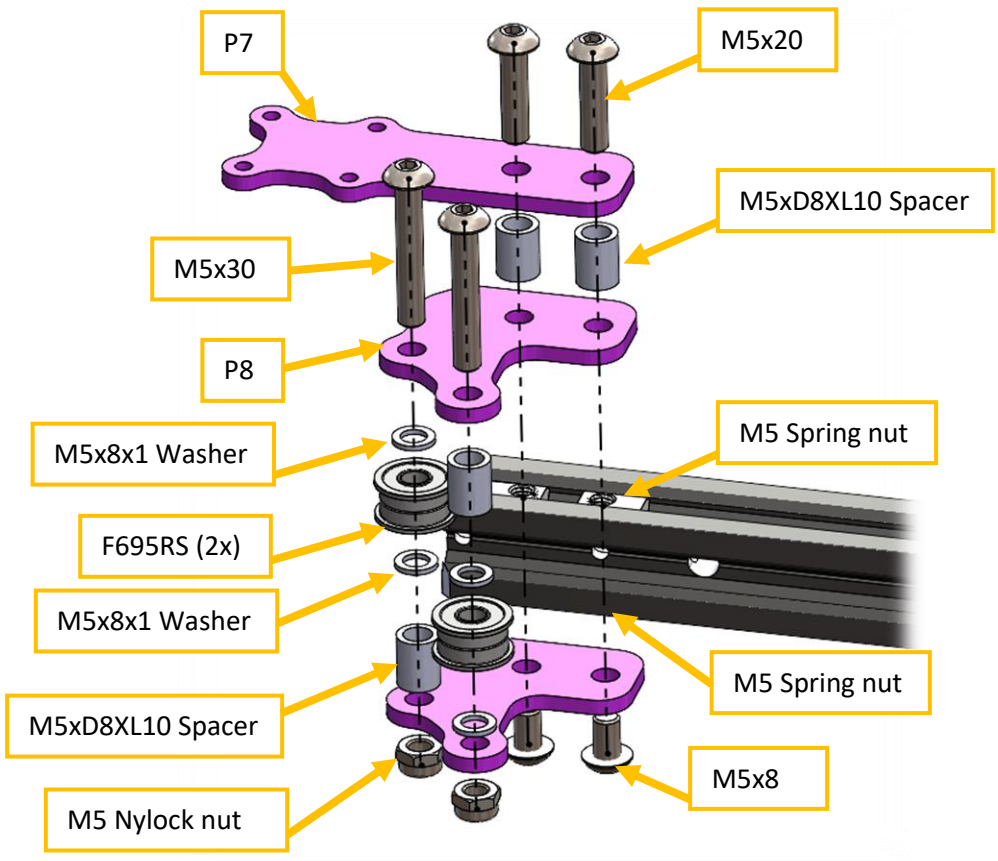


Figure 42 Left side X axis assembly scheme

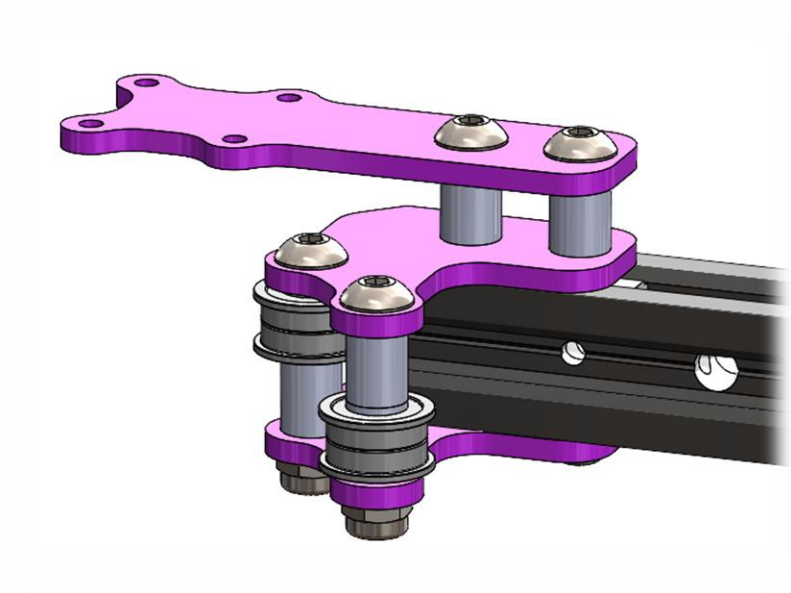


Figure 43 Left side mounted components

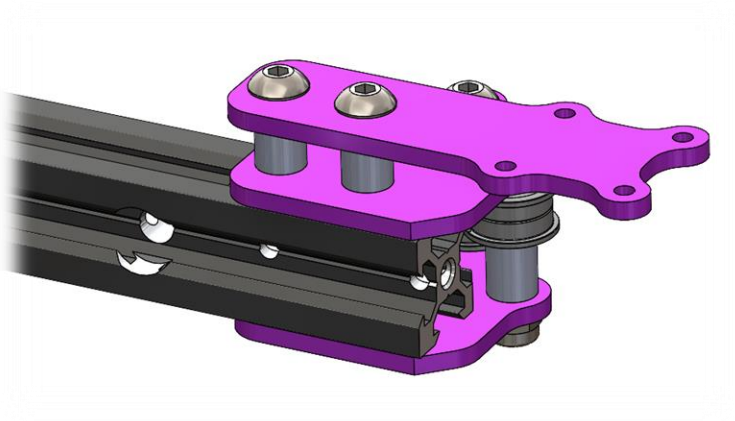


Figure 44 Left side, back view for reference

✓ Repeat process for the right side.

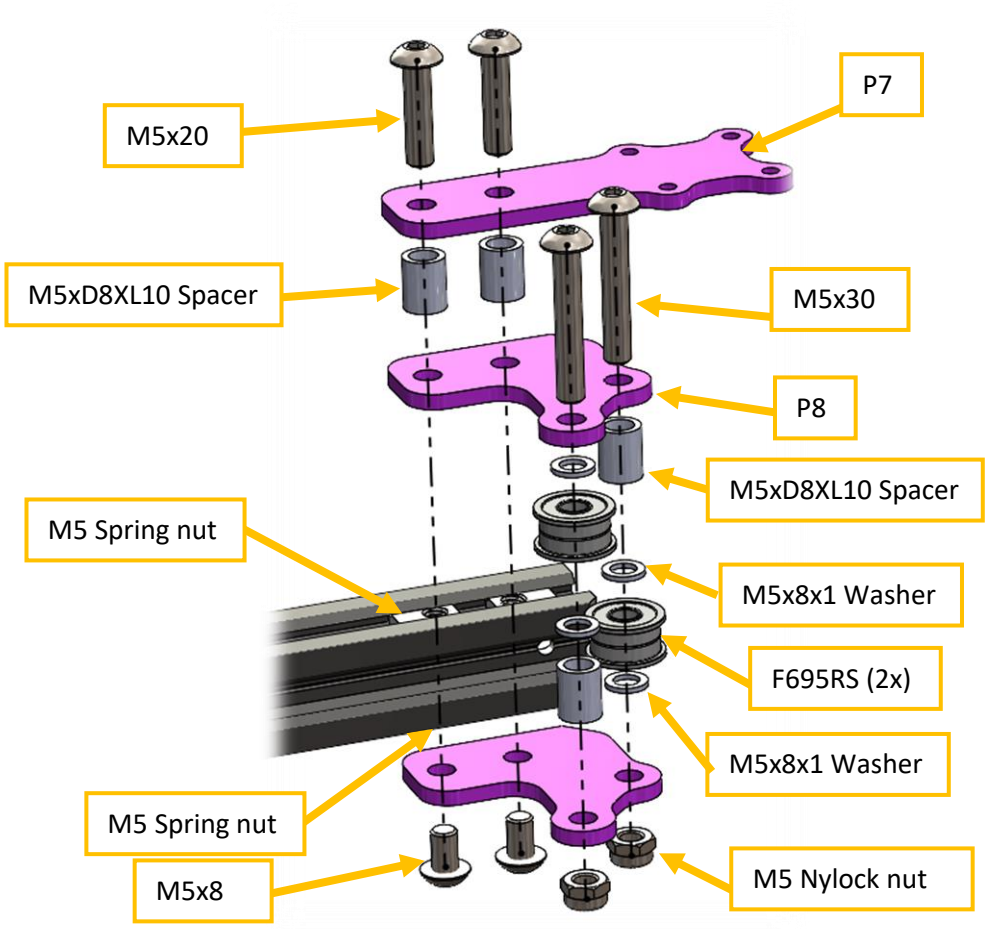


Figure 45 Right side X axis assembly scheme

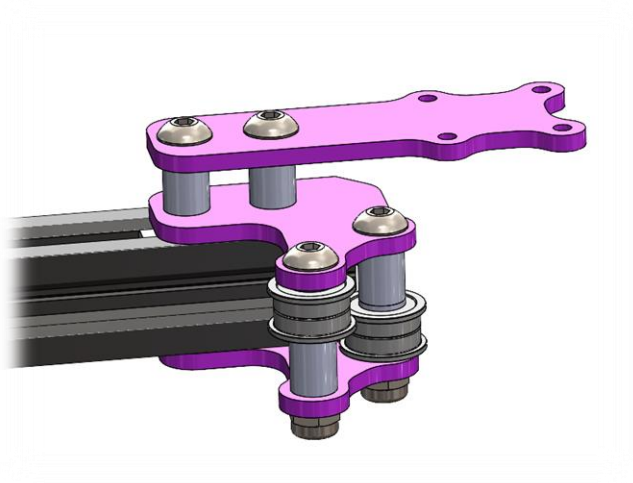


Figure 46 Right side mounted components

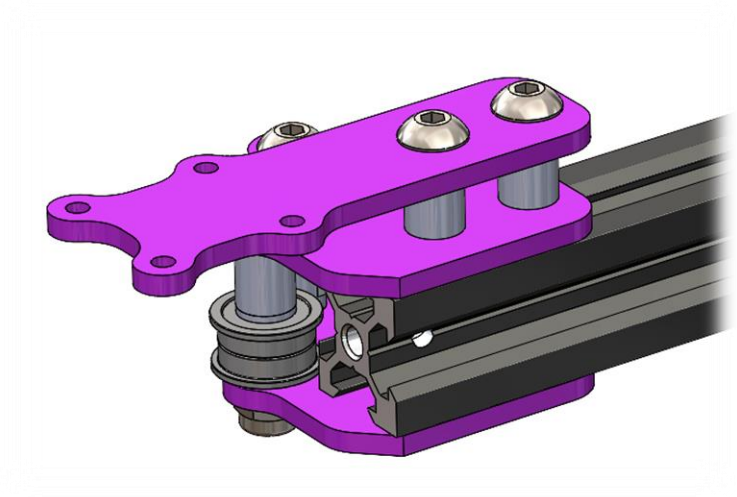


Figure 47 Right side, back view for reference

✓ Mount the 300 mm Linear rail with slider to the X axis assembly, using M3x8 Socket Screws and M3 Spring Nuts, Linear rail must be centered with the X aluminum extrusion:
NOTE: Be very careful when installing slider part of the rail, don't drop any ball, it might result in a damaged rail if 1 or 2 balls were dropped.

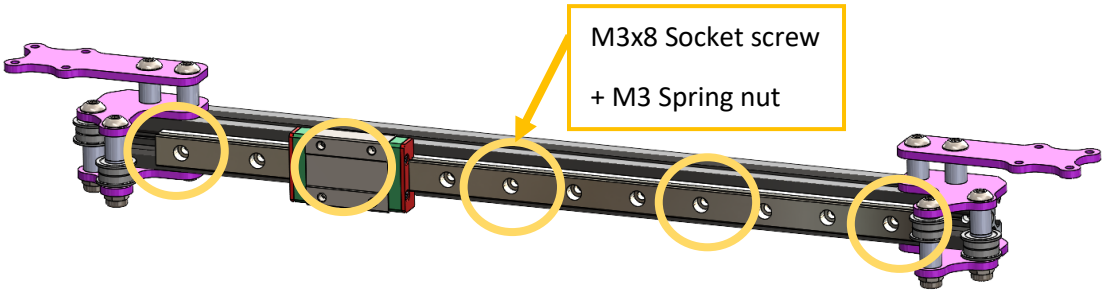
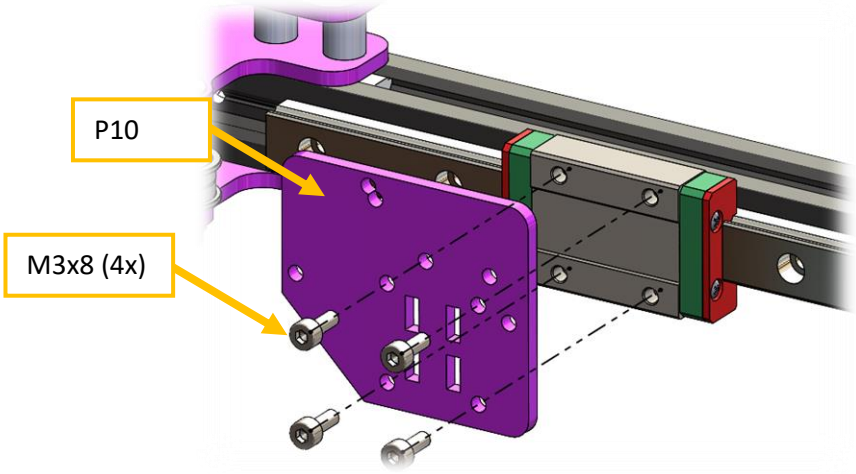


Figure 48 Fix rails with M3x8 Screws + M3 Spring nuts were indicated with circles

✓ Install temporarily P10 Bracket for hotend, using M3x8 Socket screws (4x), don't adjust it yet.



Step 4.2 CoreXY system installation

✓ Next items from the KIT will be used:

ITEM	ITEM DESCRIPTION	Quantity	Type
1	300 mm Linear rail with slider	2	Kit
2	GT2 Belt tensioner	2	Kit
3	P6 Bracket	2	Kit
4	P9 Bracket	2	Kit
5	Nema 17, 40mm Length motor	2	Kit
6	M5xD8XL8 Spacer	4	Kit
7	M5xD8XL10 Spacer	2	Kit
8	M3xD6XL20 Spacer	6	Kit
9	M5x8x1 Washer	12	Kit
10	M3x25 Screw	2	Kit
11	M3x30 Screw	6	Kit
12	Pulley 20T, Bore 5mm GT2	2	Kit
13	M5x25 Screw	6	Kit
14	M5x30 Screw	2	Kit
15	M4x12 Screw	4	Kit
16	M5 Spring Nut	4	Kit
17	M4 Nylock Nut	4	Kit
18	M5 Nylock Nut	2	Kit
19	F695RS Bearing	12	Kit
20	2GT Pulley 20T	2	Kit
21	2GT 6mm BELT	5 METERS	Kit
22	X axis endstop bracket	1	Printed part
23	M3x8 Socket screw	16	Kit
24	M3 Spring nut	10	Kit
25	M3x10 Socket screw	2	Kit
26	M3x6 Screw	4	Original
27	Y axis endstop bracket	1	Printed part
28	M4x8 Screw	1	Kit
29	M5x8 Screw	2	Kit
30	M4 Spring nut	1	Kit
31	Endstop PCB (X and Y)	2	Original

✓ Install Belt tensioners on both sides, using P9 Brackets, M5xD8XL8 Spacers, M5x25 Screws and M5 Spring Nuts as shown:

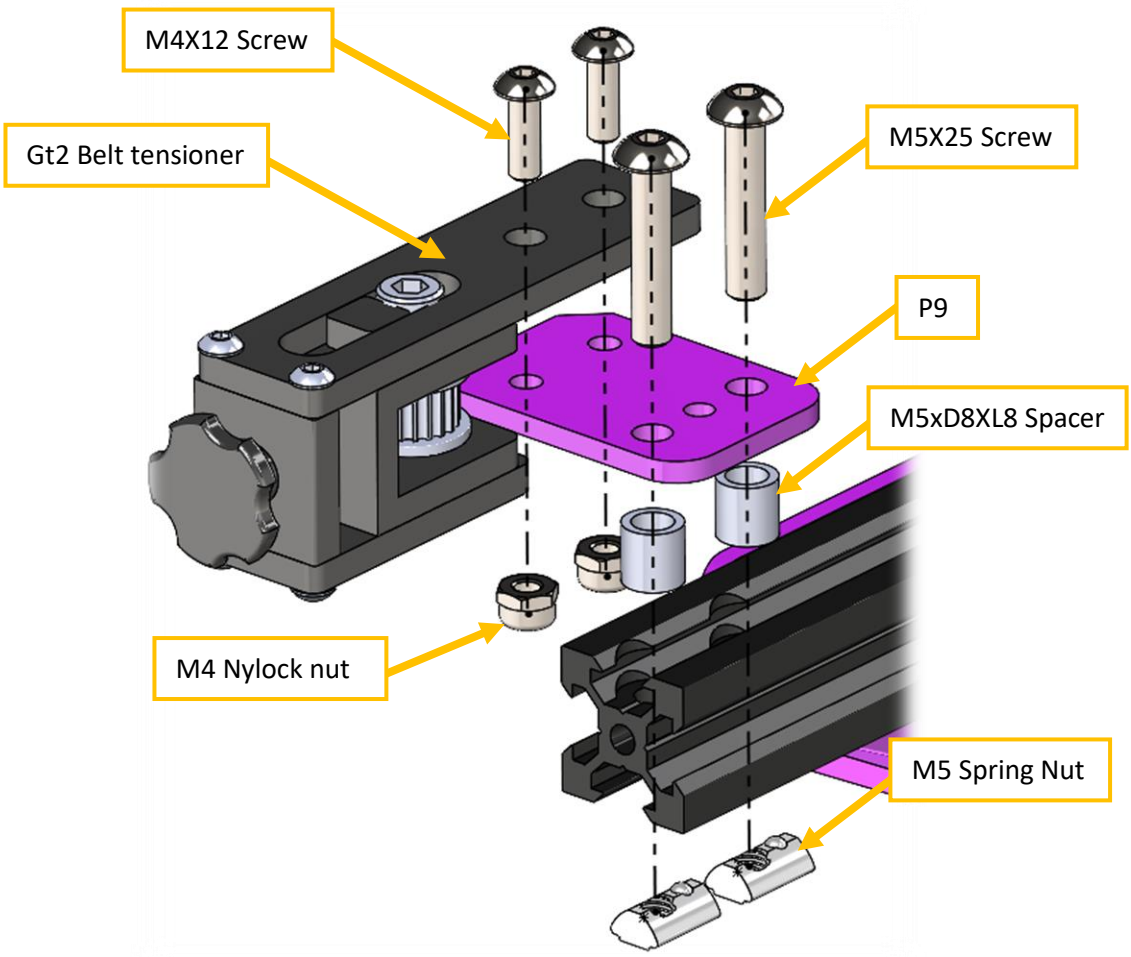


Figure 49 Right side belt tensioner mounting scheme

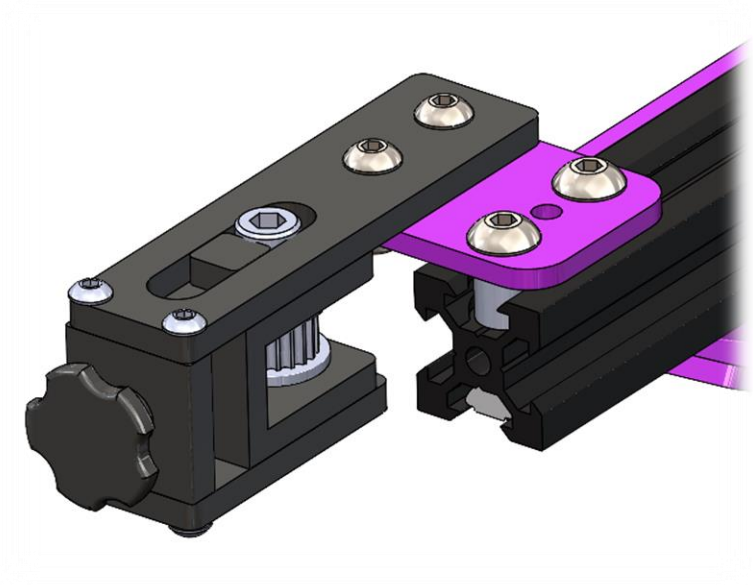


Figure 50 Right tensioner mount

✓ Follow the next scheme for the left side Gt2 Belt tensioner:

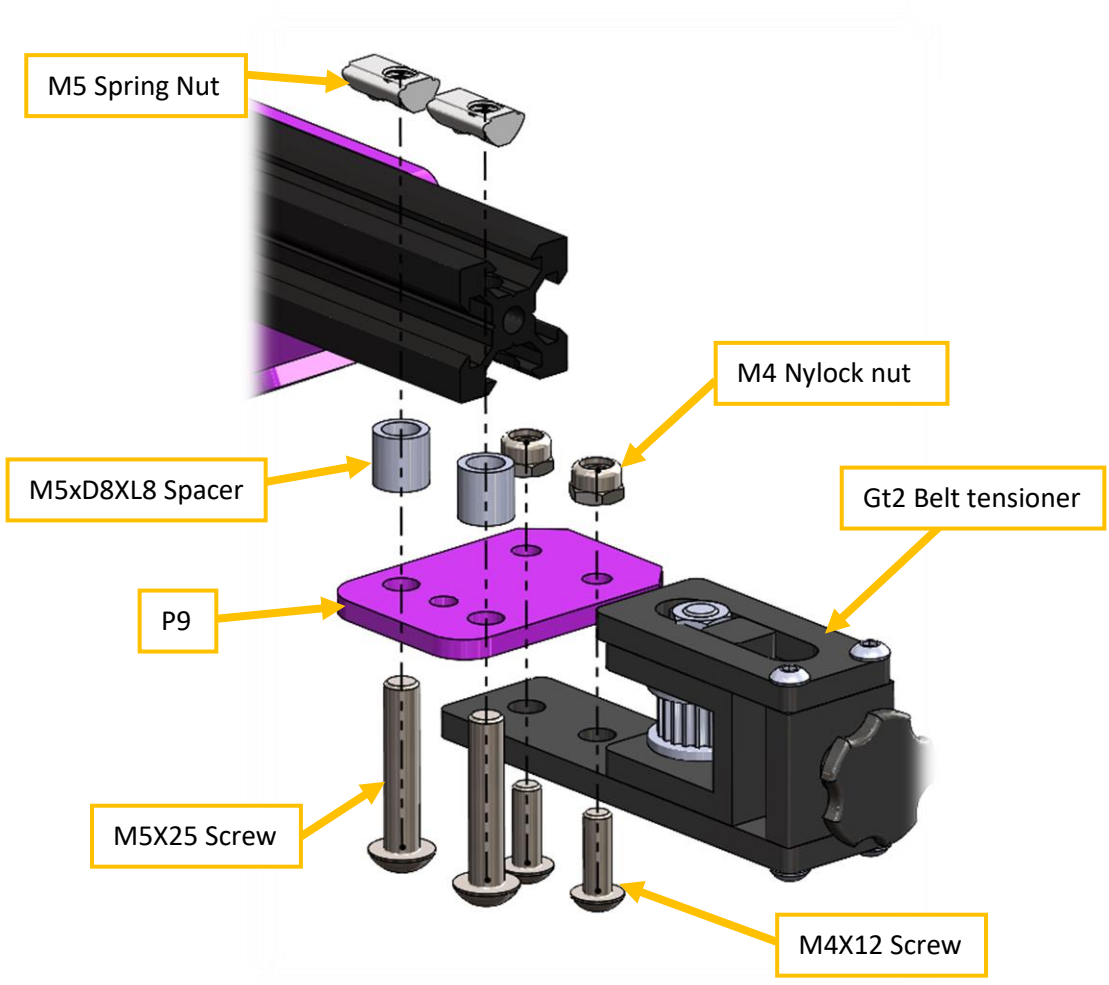


Figure 51 Left side belt tensioner mounting scheme

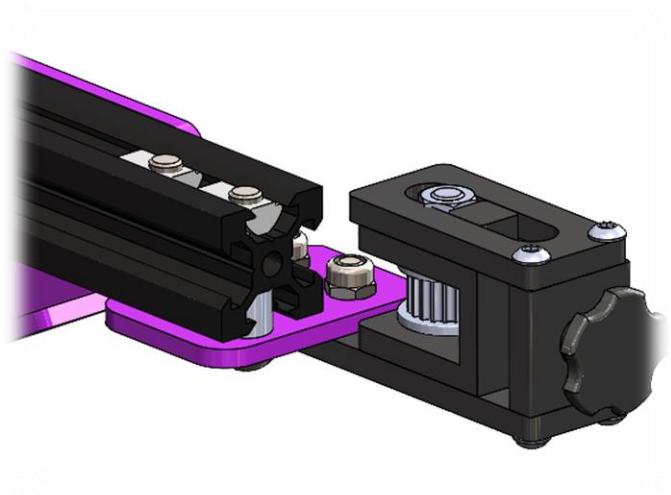


Figure 52 Left tensioner mount

✓ Mount the 300 mm Linear rail with slider to the Top frame, using M3x8 Socket Screws and M3 Spring Nuts, Linear rail must be centered with the X aluminum extrusion:

NOTE: Be very careful when installing slider part of the rail, don't drop any ball, it might result in a damaged rail if 1 or 2 balls were dropped:

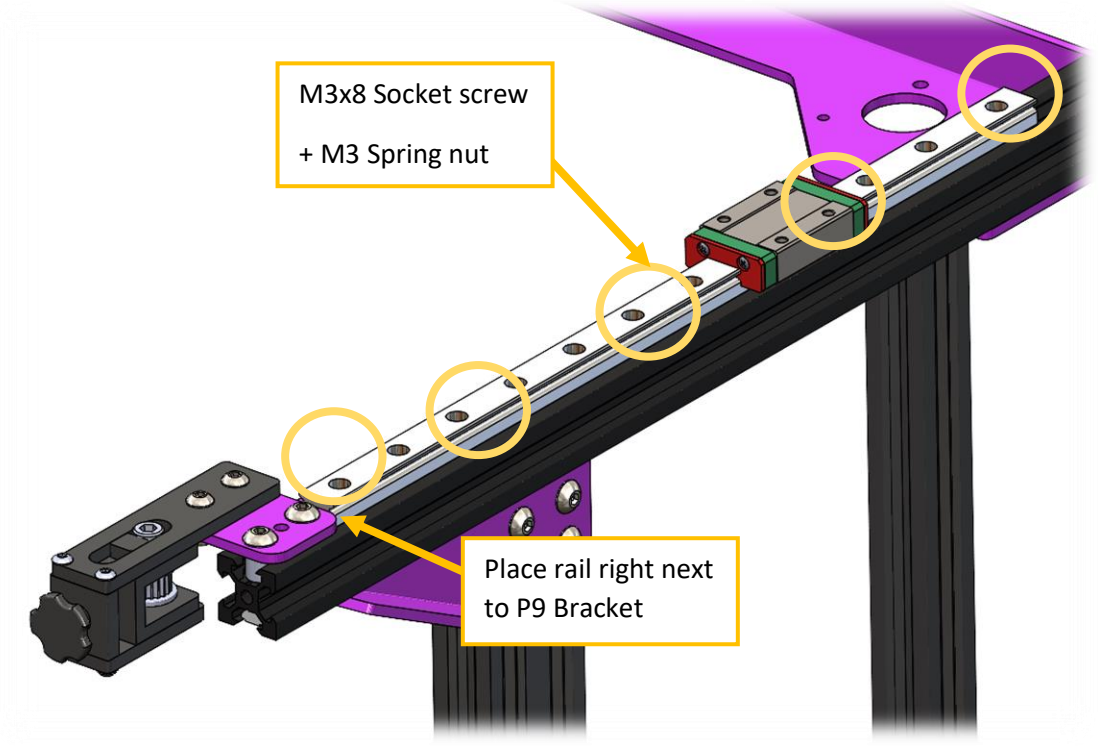


Figure 53 Right side, Fix rail with M3x8 Screws + M3 Spring nuts were indicated with circles

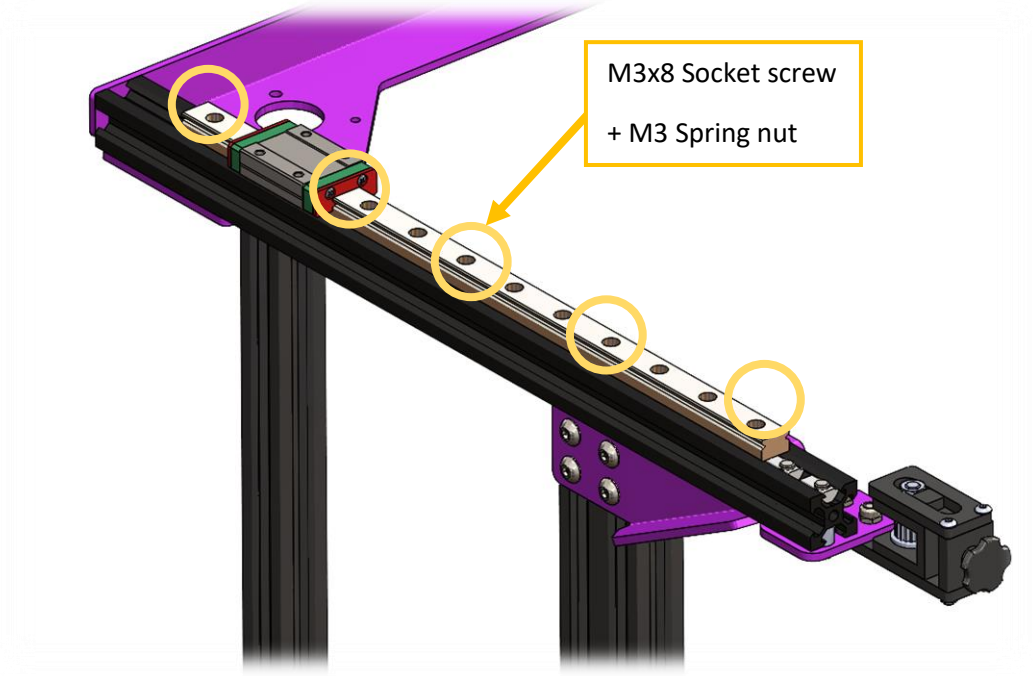


Figure 54 Left side, Fix rails with M3x8 Screws + M3 Spring nuts were indicated with circles

✓ Before mounting X axis, let's install the back components of the CoreXY system, P6 brackets, M3xD6XL20 Spacers, Nema 17 motors, Gt2 Pulley:

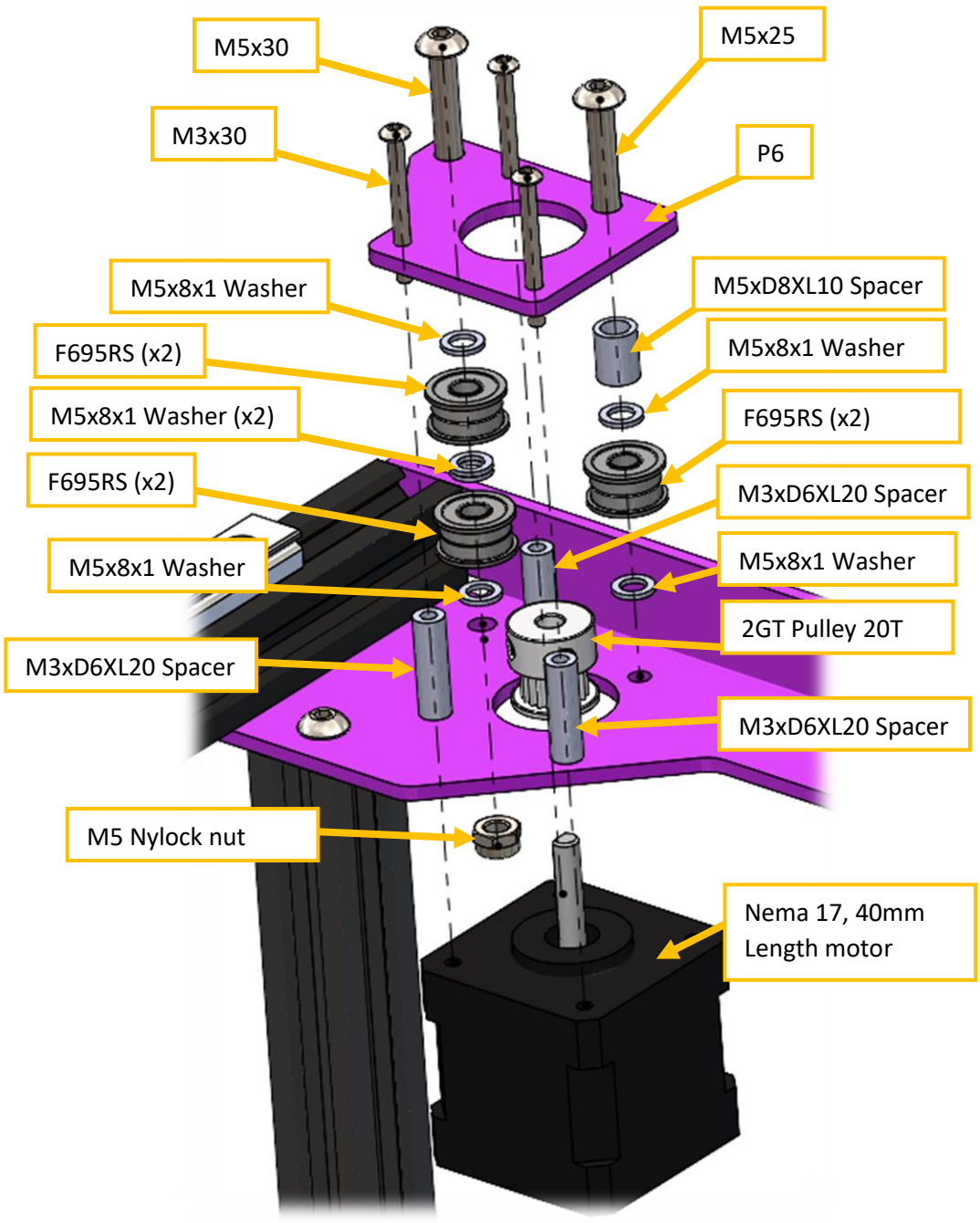


Figure 55 Left side Nema + Pulleys mount scheme

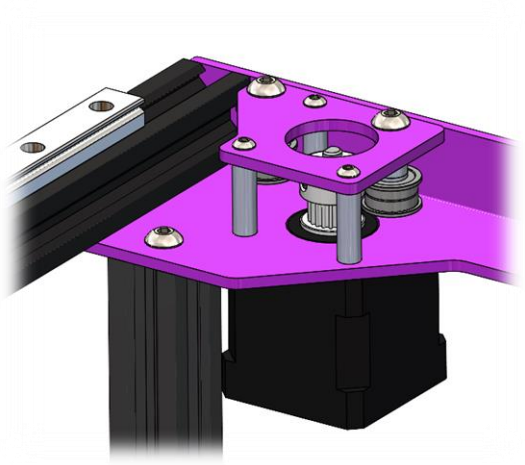


Figure 56 Left side motor mount finished

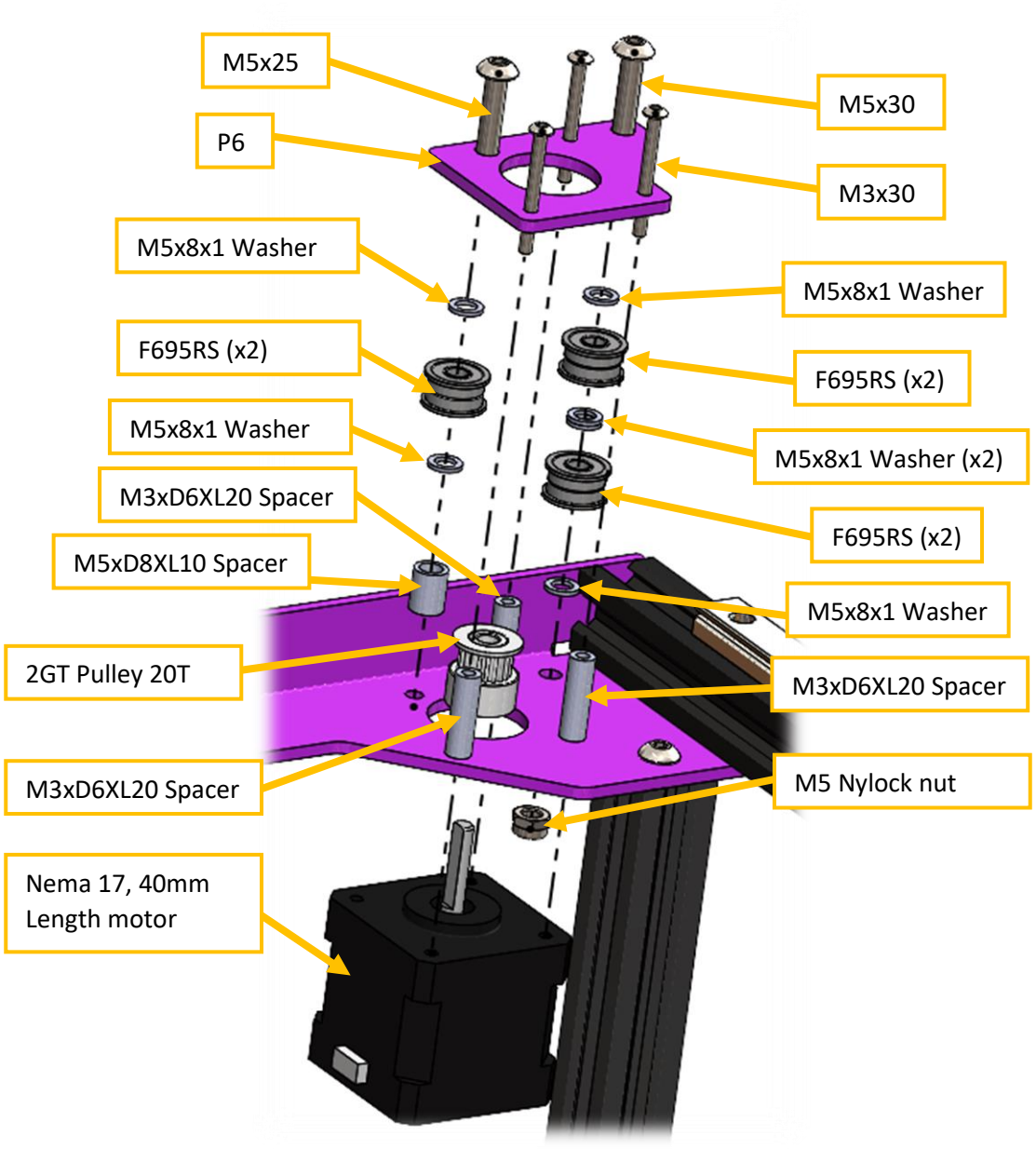


Figure 57 Right side Nema + Pulleys mount scheme

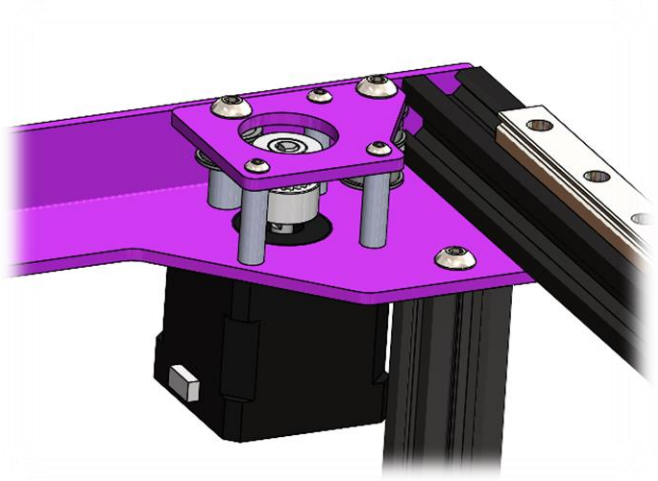


Figure 58 Right side motor mount finished

✓ Mount previous X axis assembly, using M3x8 Socket screws on both sides, at this point we will also install the X endstop bracket using M3x10 Socket screws, also it's a good time to mount the X endstop, fixed with M3x6 screws:

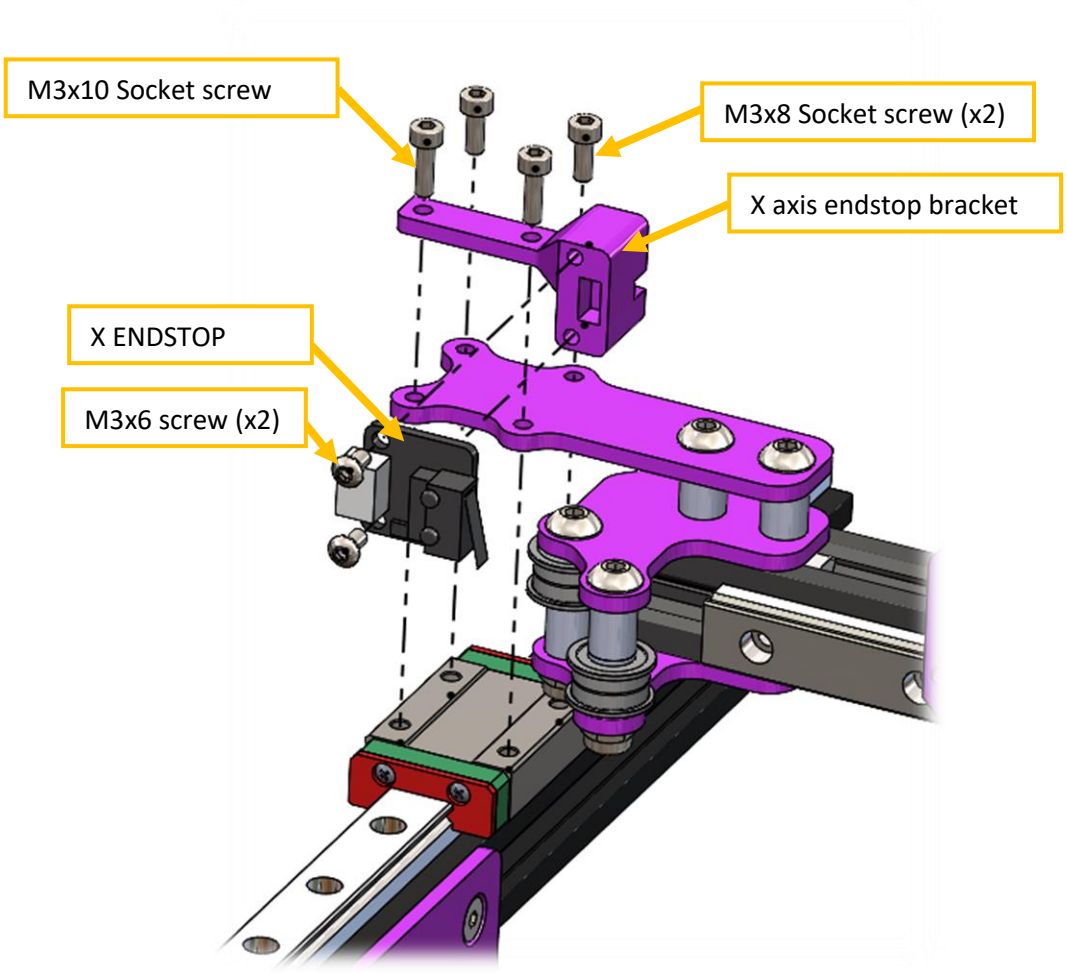


Figure 59 Left side X axis mount scheme

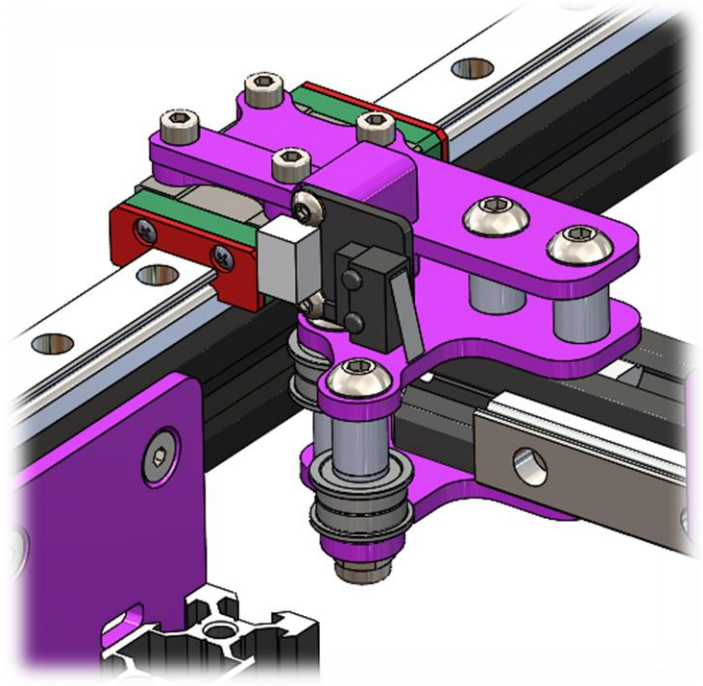


Figure 60 Left side detail of X mounting

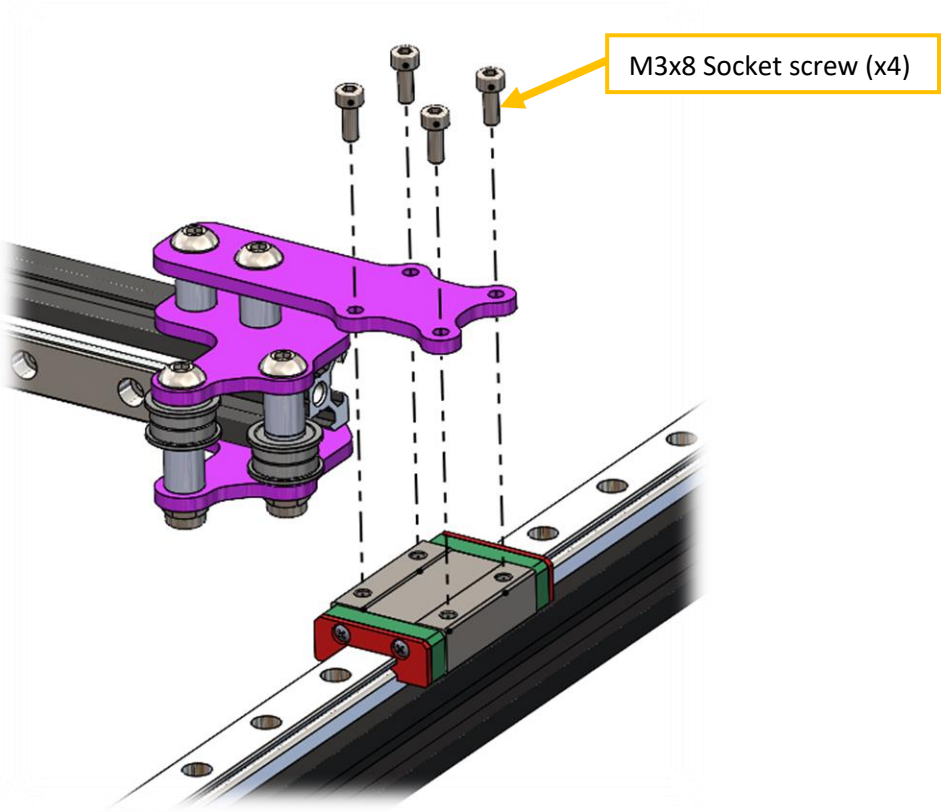


Figure 61 Right side X axis mount scheme

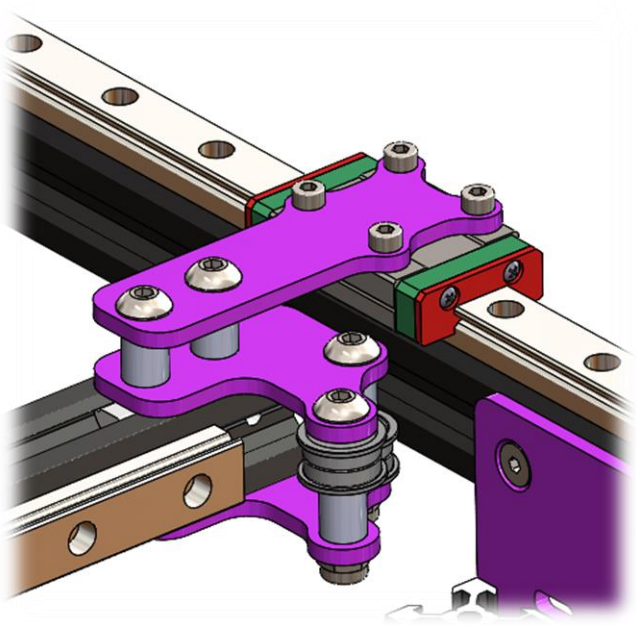


Figure 62 Right side detail of X mounting

✓ Install Y endstop bracket using M4x8 Screw and M4 Spring nut on the front left side of the top frame, also mount Y endstop, fixed with M3x6 screws:

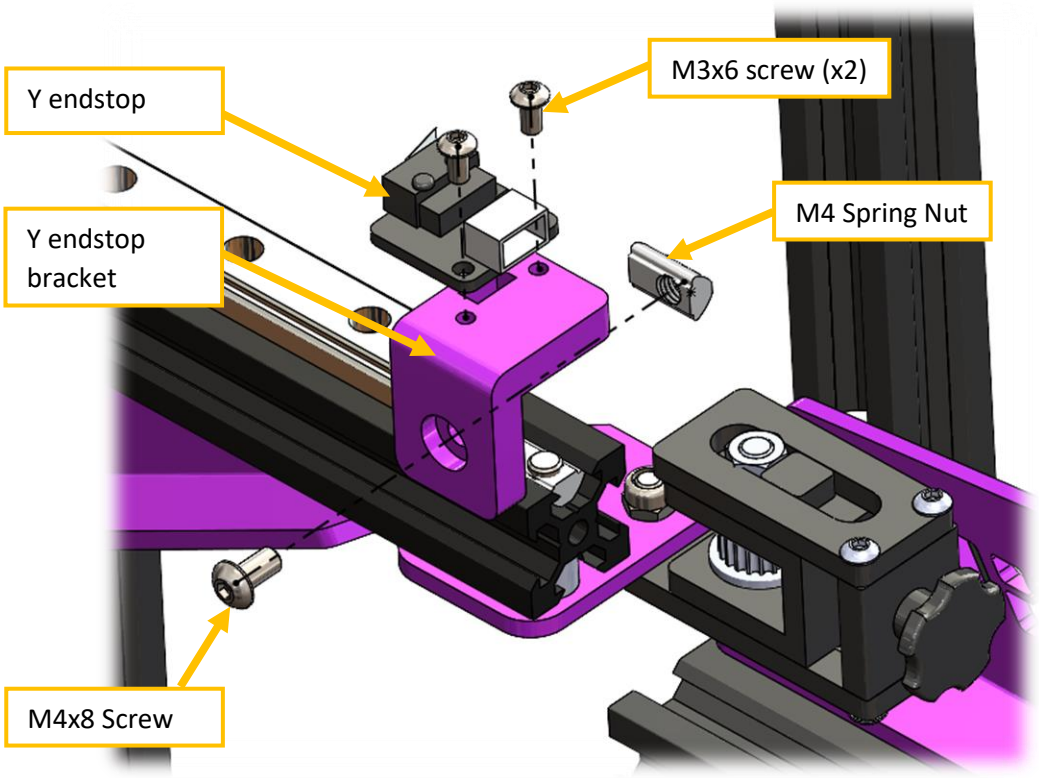


Figure 63 Y endstop mounting scheme

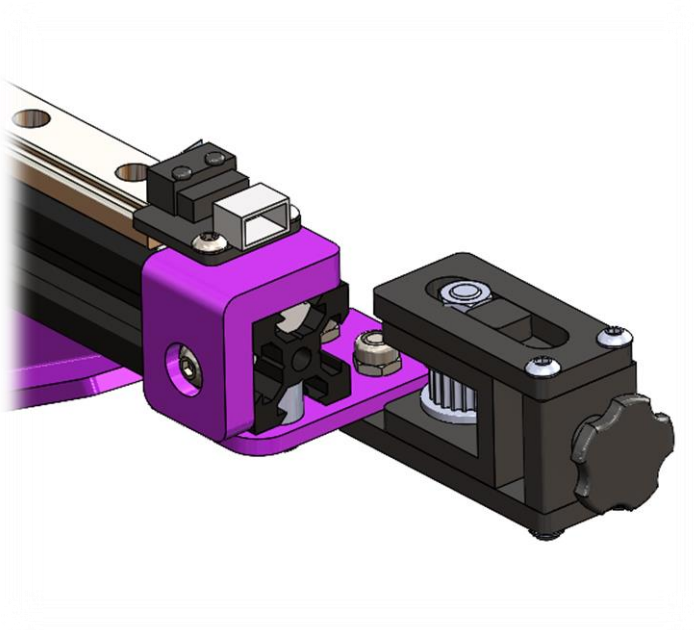


Figure 64 Y endstop mounting detail

✓ Install Gt2 Belt for the CoreXY system:

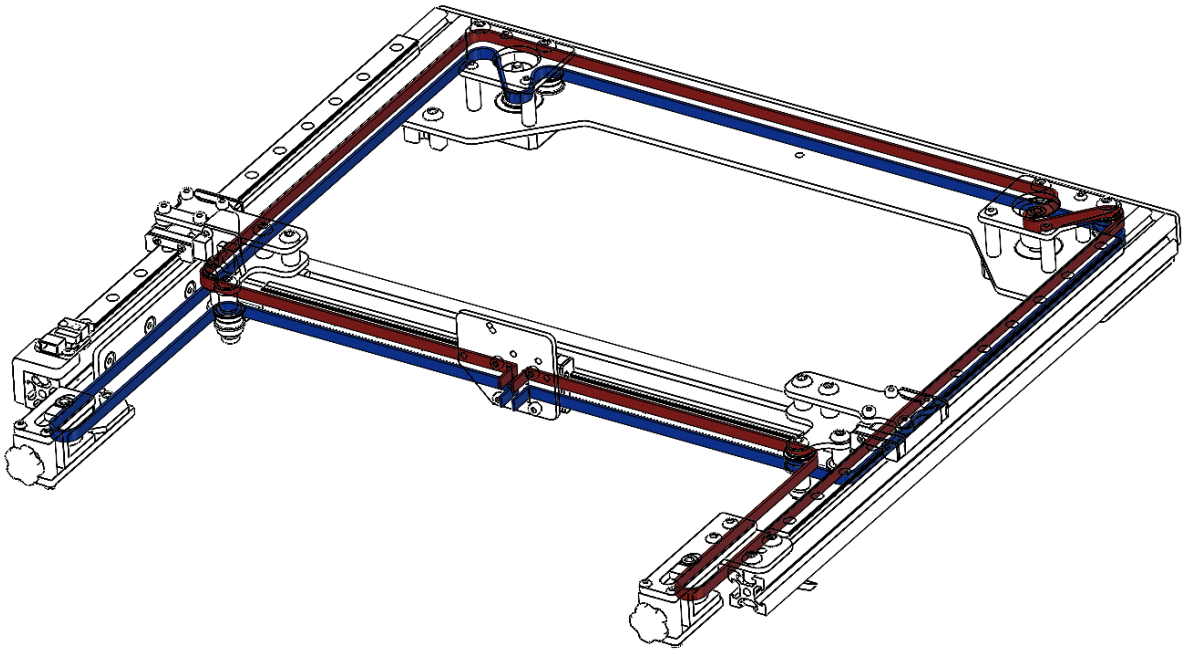


Figure 65 Belt Scheme, Blue: motor A, Red: motor B

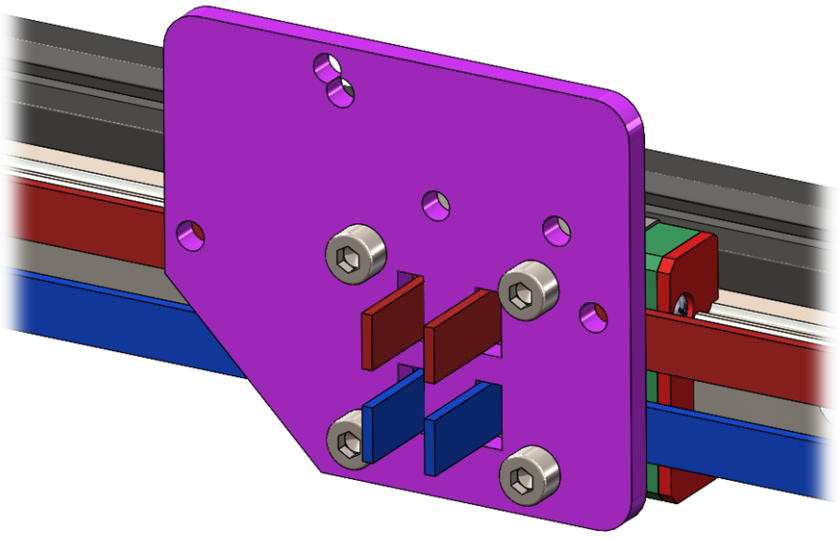


Figure 66 Secure belts using P10 bracket, adjust M3x8 Screws

✓ Using both belt tensioners, properly tension belts evenly:

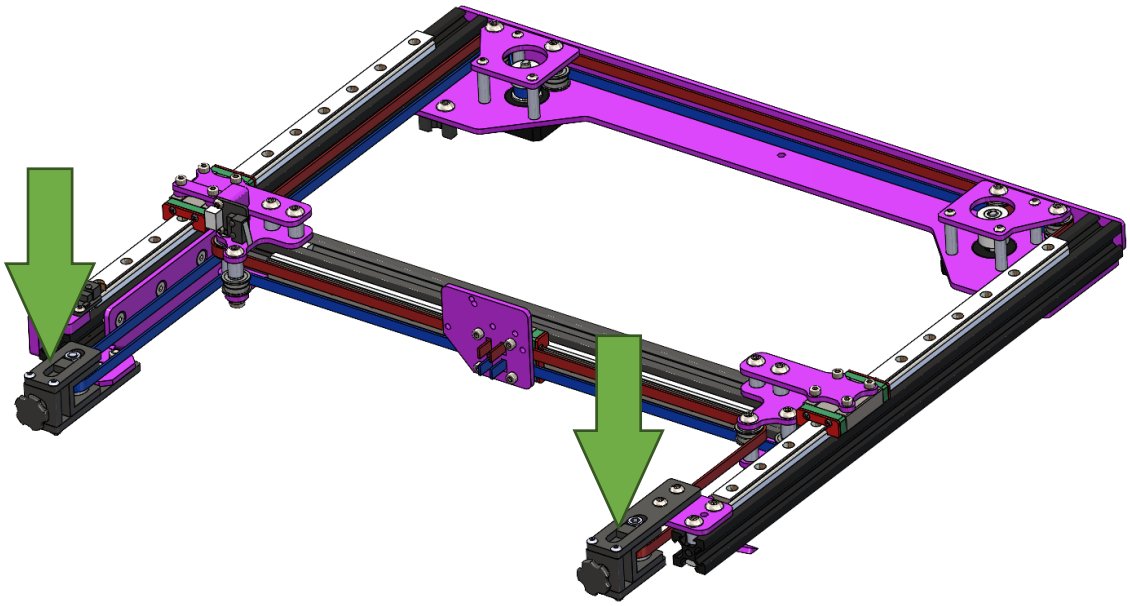


Figure 67 Using belt tensioners

Step 4.3 Hotend mount

This step depends on the actual Hotend / extruder setup you're using, we will cover the stock Hotend/extruder of Ender 3/ Pro and V2.

✓ Ender 3 / PRO versions:

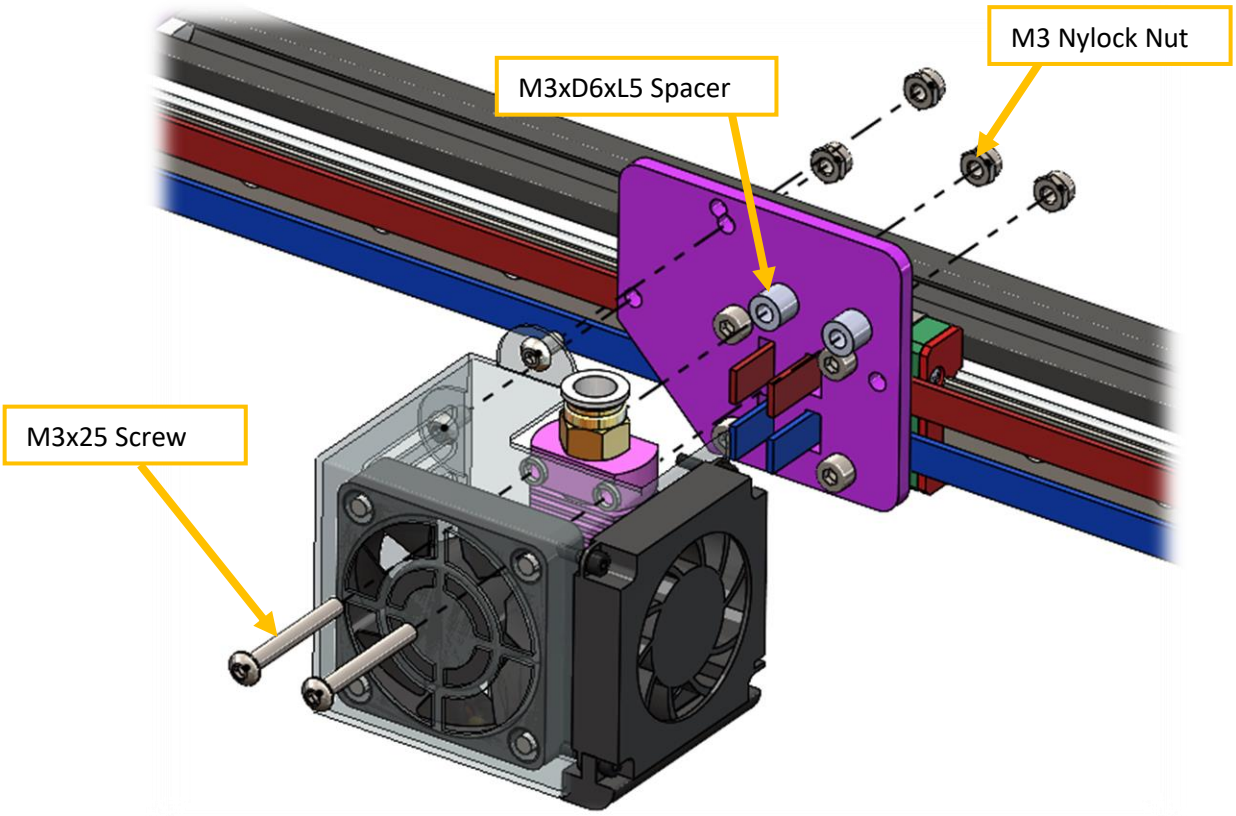


Figure 68 Stock Hotend Ender 3/PRO mounting scheme

✓ Ender 3 V2 version:

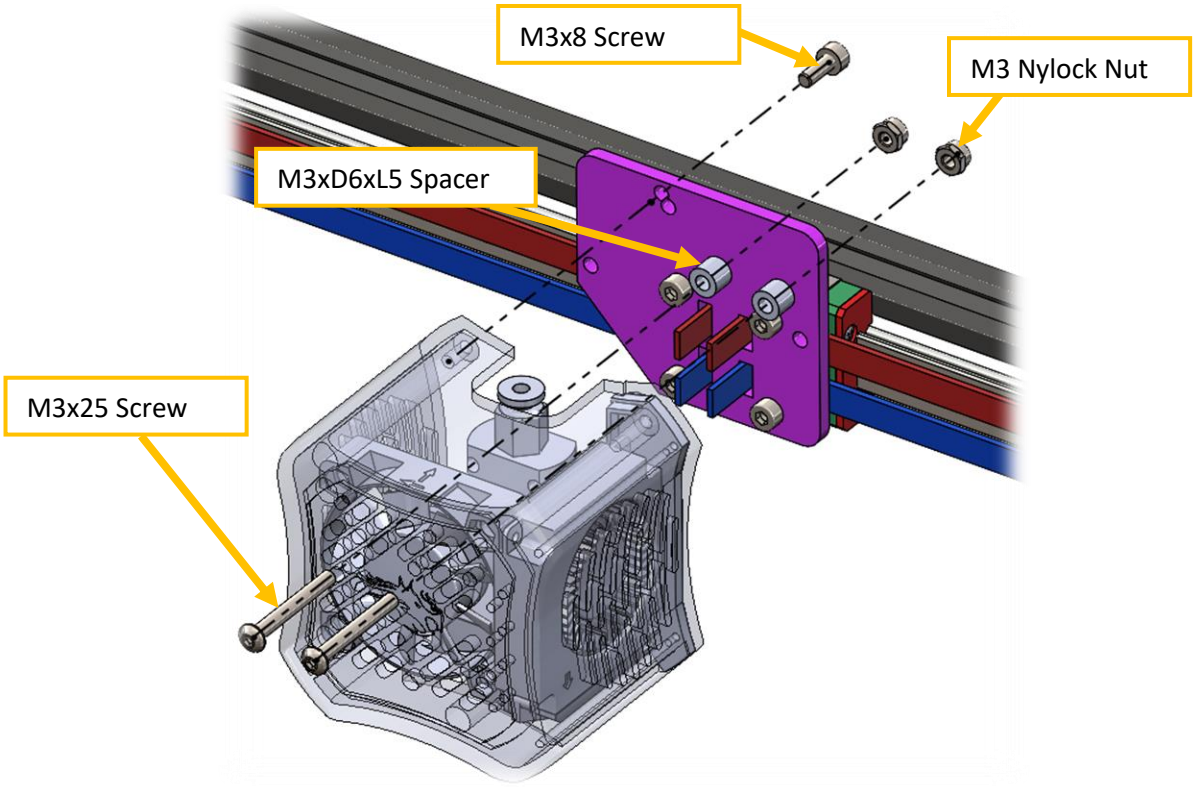


Figure 69 Ender 3 V2 Hotend mount

✓ Stock extruder mount, using supplied Nema17 metal bracket, and 2 units M5x8 Screws + M5 Spring nut:

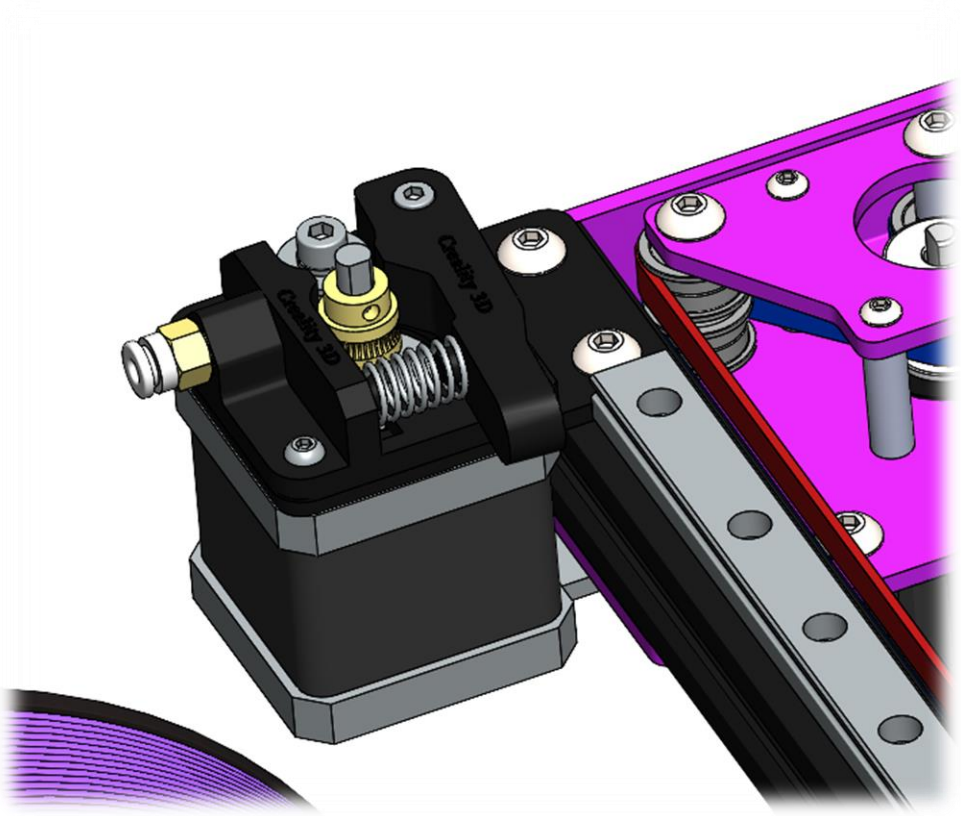


Figure 70 Suggested extruder position

Chapter 5 Installing Heatbed and Z axis

Step 5.1 Preparing Heatbed

✓ Next items from the KIT will be used:

ITEM	ITEM DESCRIPTION	Quantity	Type
1	Heat bed+ bracket + leveling nuts	1	Original Part
2	P4L Bracket	1	Kit
3	P4R Bracket	1	Kit
4	Yellow Springs	1 set	Kit
5	1020 ALU PROFILE 260mm	2	Kit
6	M5x8 mm SCREW	12	Kit
7	M5 Spring nut	12	Kit
8	T8 Brass nut	2	1 from Kit, 1 from Original parts
9	M3x8 Socket Screw	4	Kit

✓ **Preparing Heatbed base plate:** Take original Heatbed and temporarily remove heating element, then uninstall all Vslot Wheels from it, depending on your version of your 3d printer, holes position and quantity may vary, but they always have at least two pairs

of aligned holes, as shown in the next picture, be aware of those holes since they will be used to fix heatbed in the next steps:

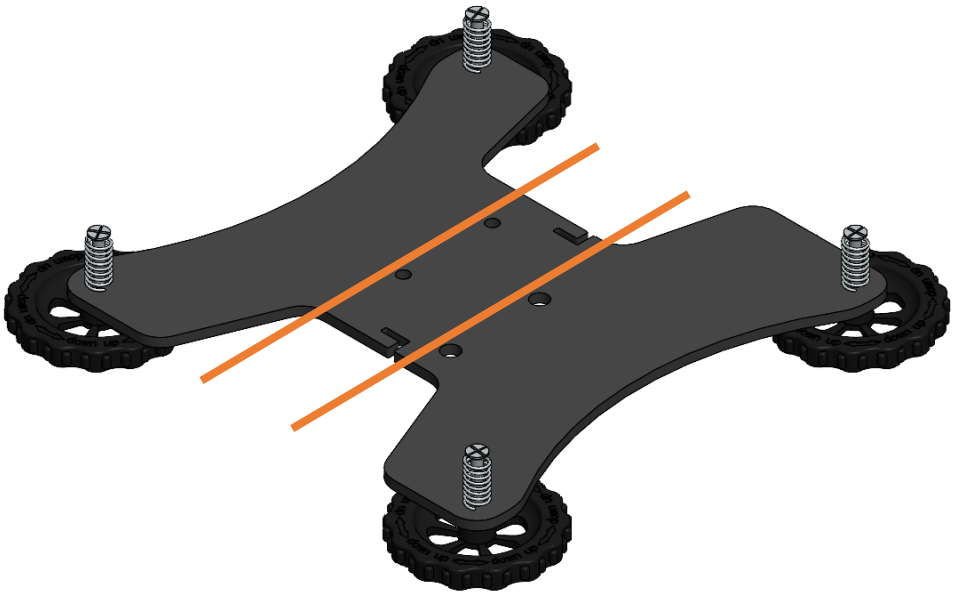


Figure 71 Heatbed base plate without wheels and showing aligned holes pairs.

- ✓ **Installing support bars for heatbed:** Using **1020 ALU PROFILE 326mm** and **M5x8 Screw** (04) and **M5 Slot Nuts** (04), fix the heated base plate with the mentioned bars, as shown in the next picture:
  Note: You might end up with a 90° rotated heatbed base plate (compared with its original direction), but that's totally fine.

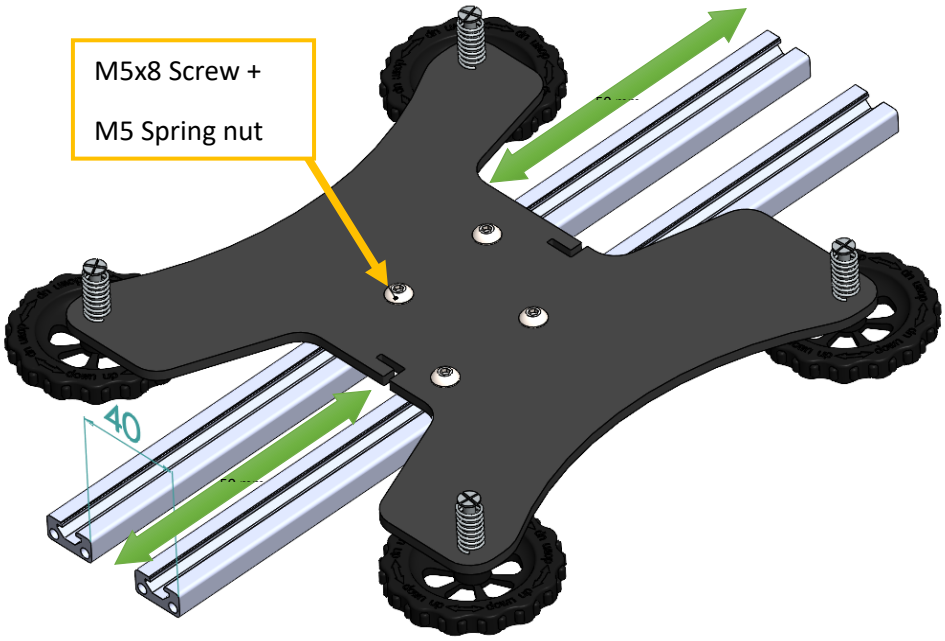


Figure 72 1020 Alu profiles must be centered with Heatbed base plate.Check for aligned holes pairs. Distance between Alu bars must be 40 mm.

✓ **Install** P4L and P4R brackets on both sides of the bed frame, fix it with M5x8 Screws and M5 Spring nuts, also at this point also install T8 Brass nut on both sides of the P4L/R brackets, both P4L/R brackets must be placed flush with the 1020 Alu extrusions:

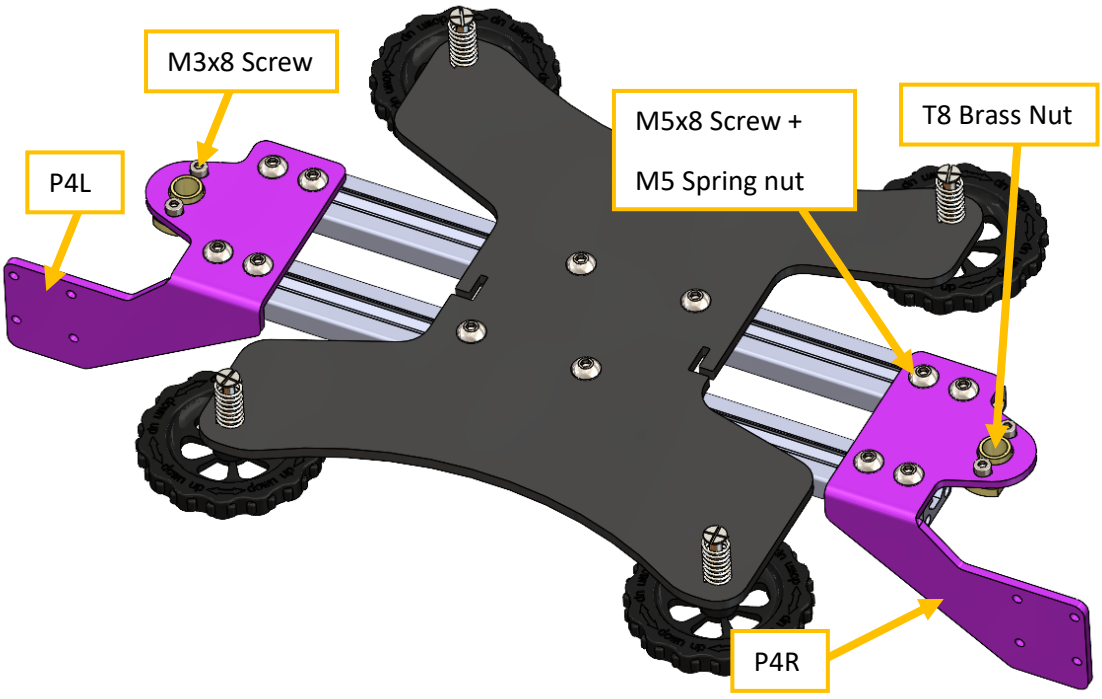


Figure 73 Heatbed assembly

✓ Install heat element and your preferred printing surface, at this point you might want to change stock bed springs to the Yellow supplied ones:

Figure 74 Heatbed assembly finished

Step 5.2 Installing Z axis elements + Heatbed

✓ Next items from the KIT will be used:

ITEM	ITEM DESCRIPTION	Quantity	Type
1	Heatbed Assembly	1	-
2	Z motor Mount block	2	Kit
3	Nema 17 motor L=34mm	2	1 from Kit, 1 from Original parts
4	Z motor coupler	2	1 from Kit, 1 from Original parts
5	300 mm Linear rail with slider	2	Kit
6	T8 Leadscrew, L=290mm	2	Kit
7	M3x8 mm Socket screw	16	Kit
8	M5x8 mm SCREW	2	Kit
9	M3 Spring nut	10	Kit
10	M5 Spring nut	2	Kit
11	T8 Brass nut	2	1 from Kit, 1 from Original parts
12	M3x6 Screw	2	Kit
13	M3x10 Socket Screw	2	Kit
14	M3x25 Socket Screw	1	Kit
15	M4x16 Flat Screw	4	Kit
16	M4 Spring Nut	4	Kit
17	Z axis endstop bracket	1	Printed part
18	Z Limit bracket	1	Printed part
19	Endstop PCB (Z)	1	Original

✓ Mount the 300 mm Linear rail with slider for the Z axis, using 05 units M3x8 Socket Screws and M3 Spring Nuts for each side, Linear rail must be centered with the X aluminum extrusion:
NOTE: Be very careful when installing slider part of the rail, don't drop any ball, it might result in a damaged rail if 1 or 2 balls were dropped, temporarily secure sliders with blue tape or similar:

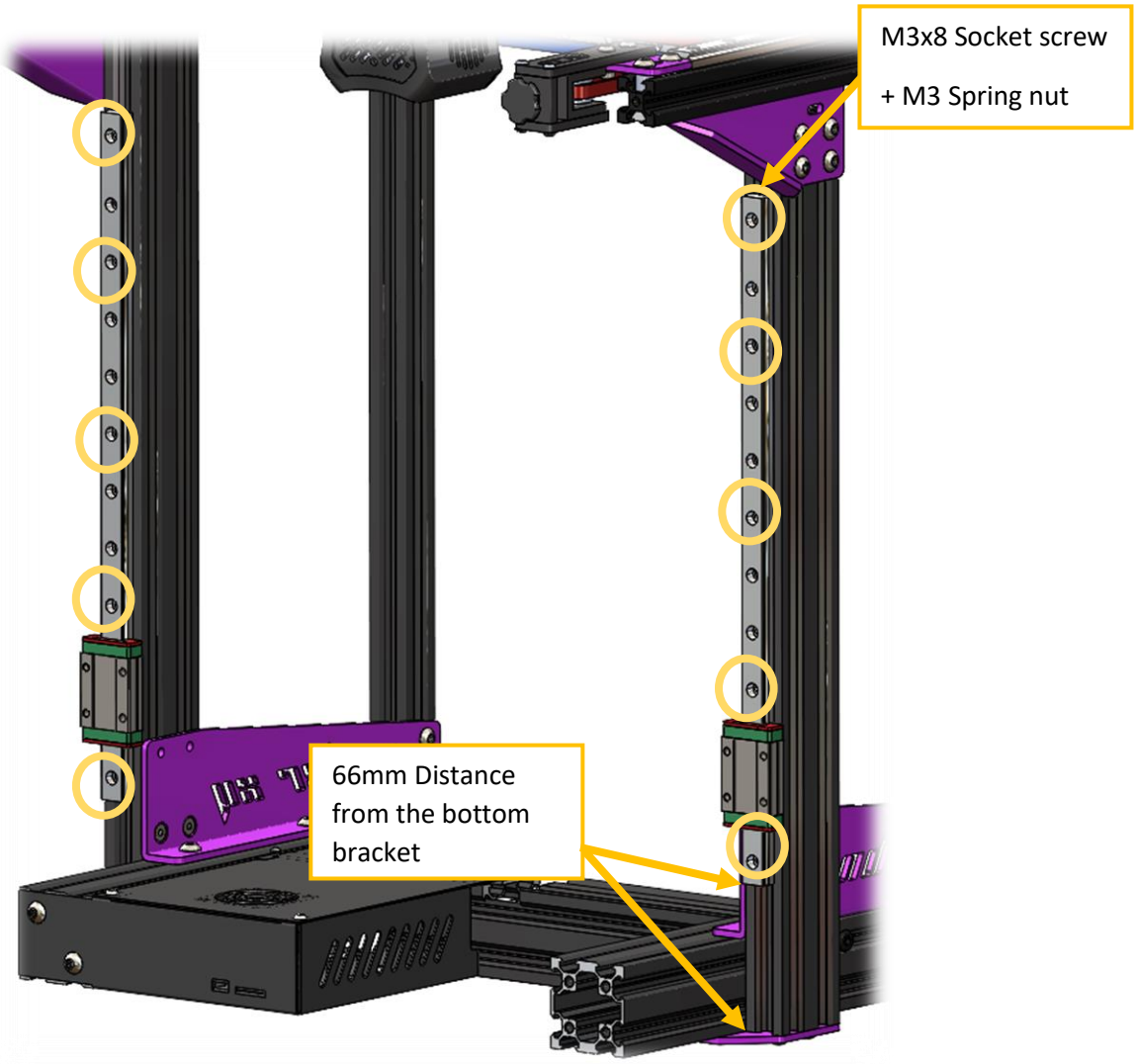


Figure 75 Z rails mounting

✓ Mount both Z motors as shown, repeat process on both sides:

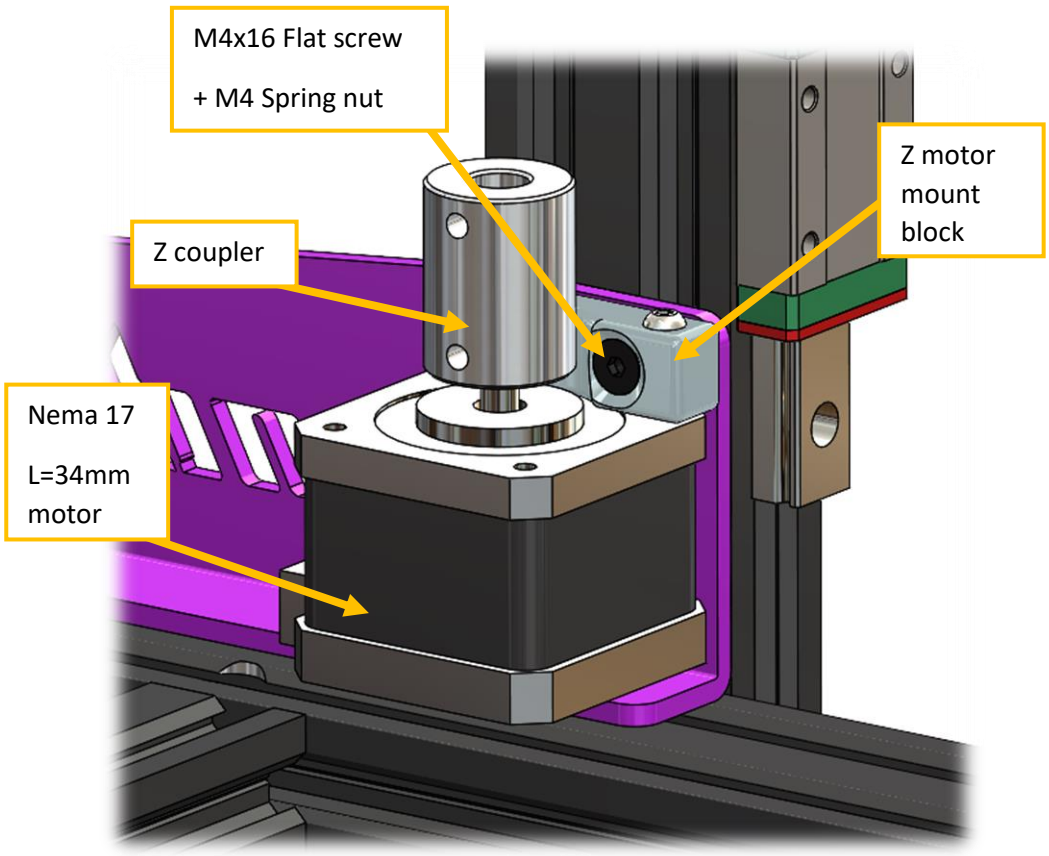


Figure 76 Z motor mount detail

✓ Install heatbed assembly and fix to linear rails sliders on both sides, also install Z limit bracket as shown, then install supplied T8 Leadscrews L=290mm on both sides:

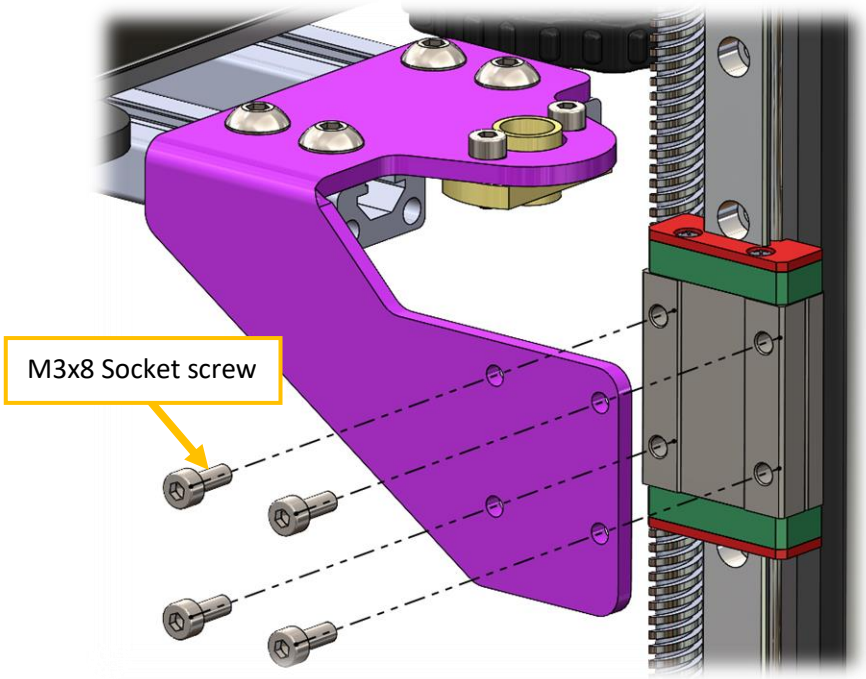


Figure 77 Right side detail

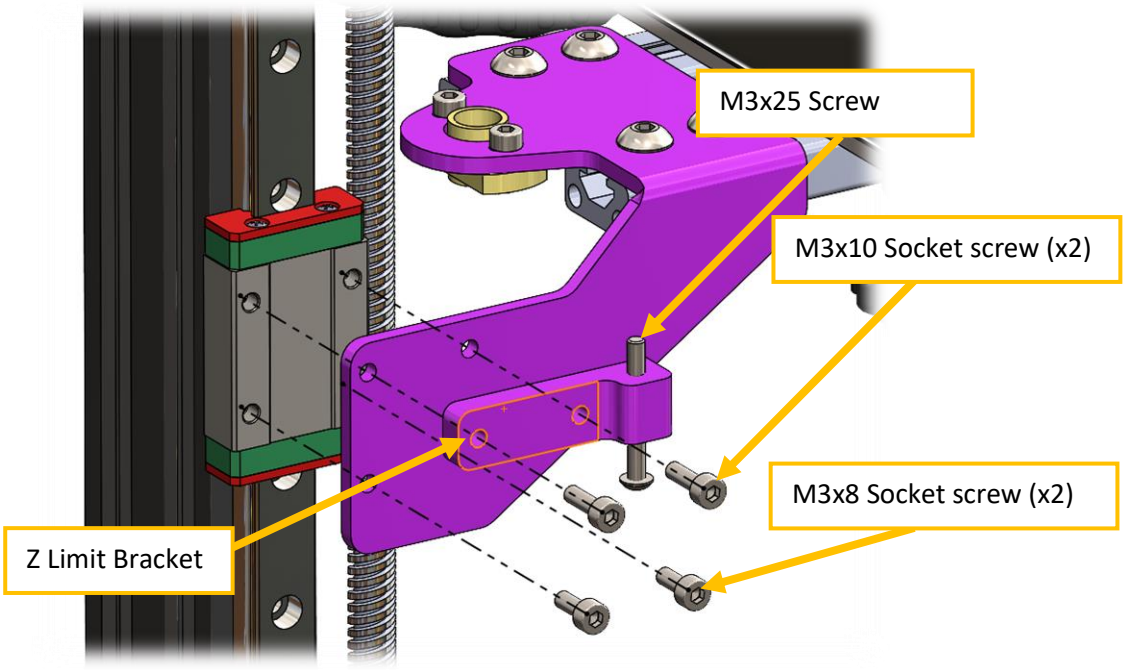
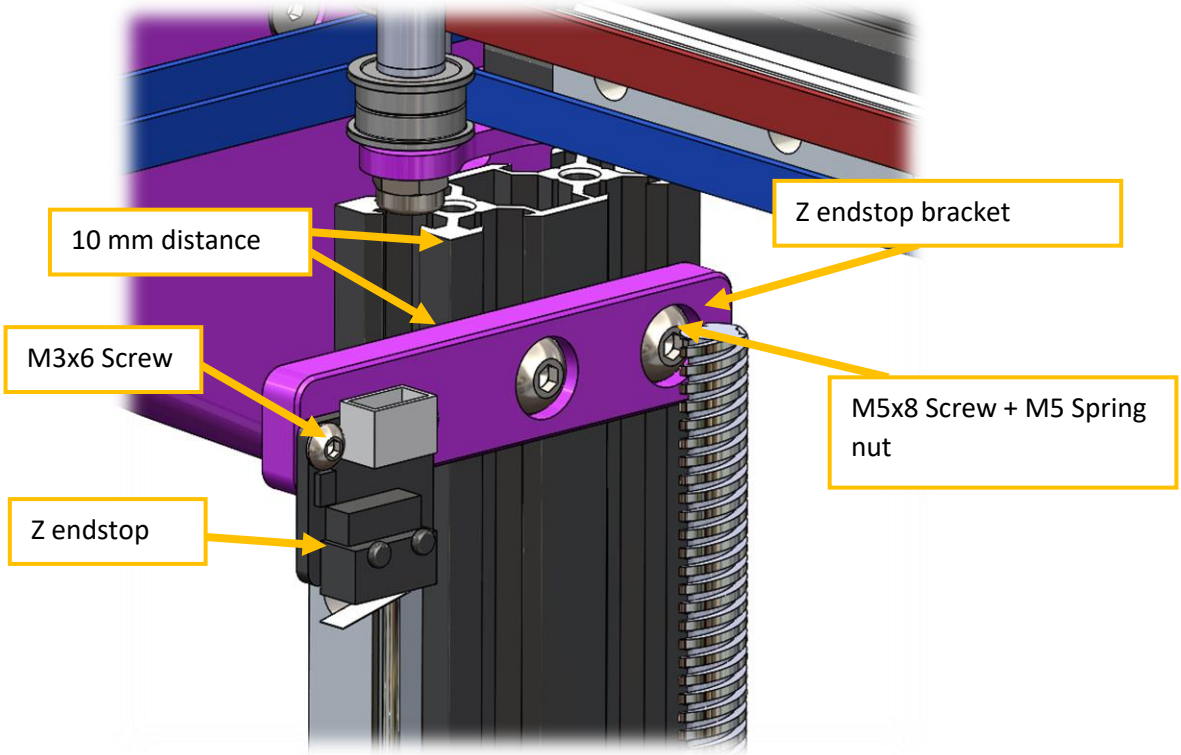


Figure 78 Left side detail



Chapter 6 Finishing installation

Step 6.1 Screen installation

- ✓ Install Screen on the right side of machine, using supplied M5x45mm Screws and M5xD8xL45 Spacers, at this point you can connect the screen cable:

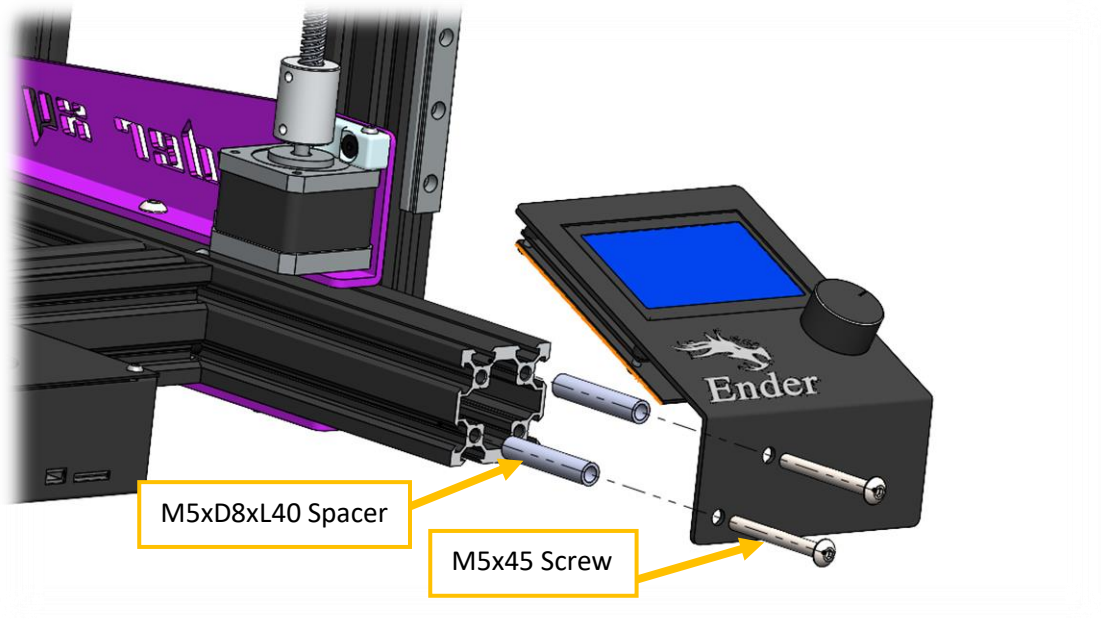


Figure 79 Install back Screen into right position

Step 6.2 Power Supply installation

✓ Install Power supply bracket printed part, with M4x8 Screws and M4 Spring Nuts:

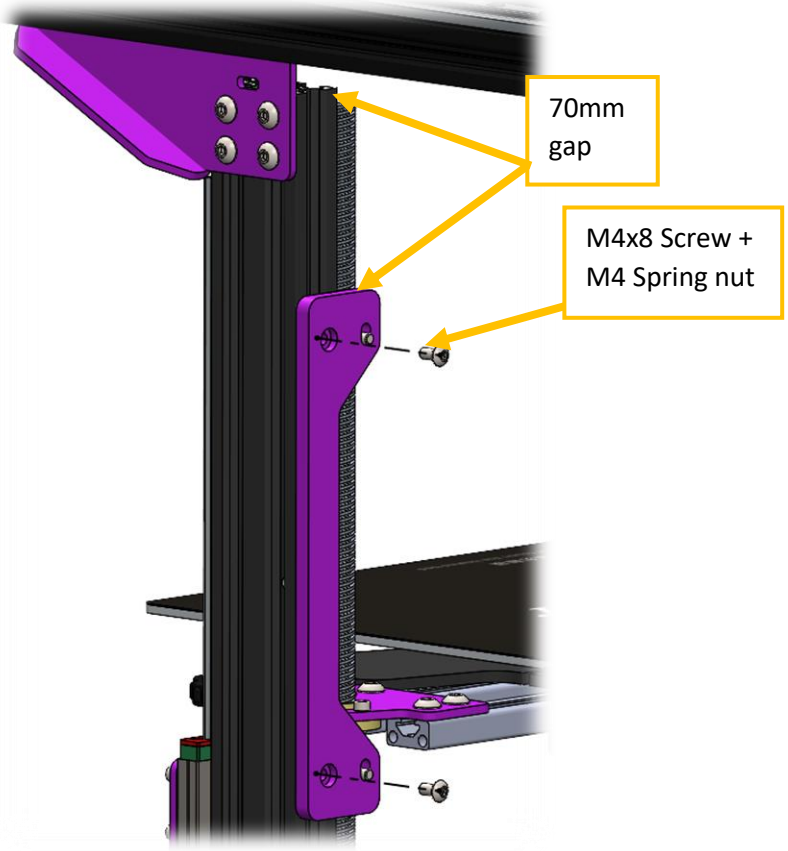


Figure 80 Power supply bracket

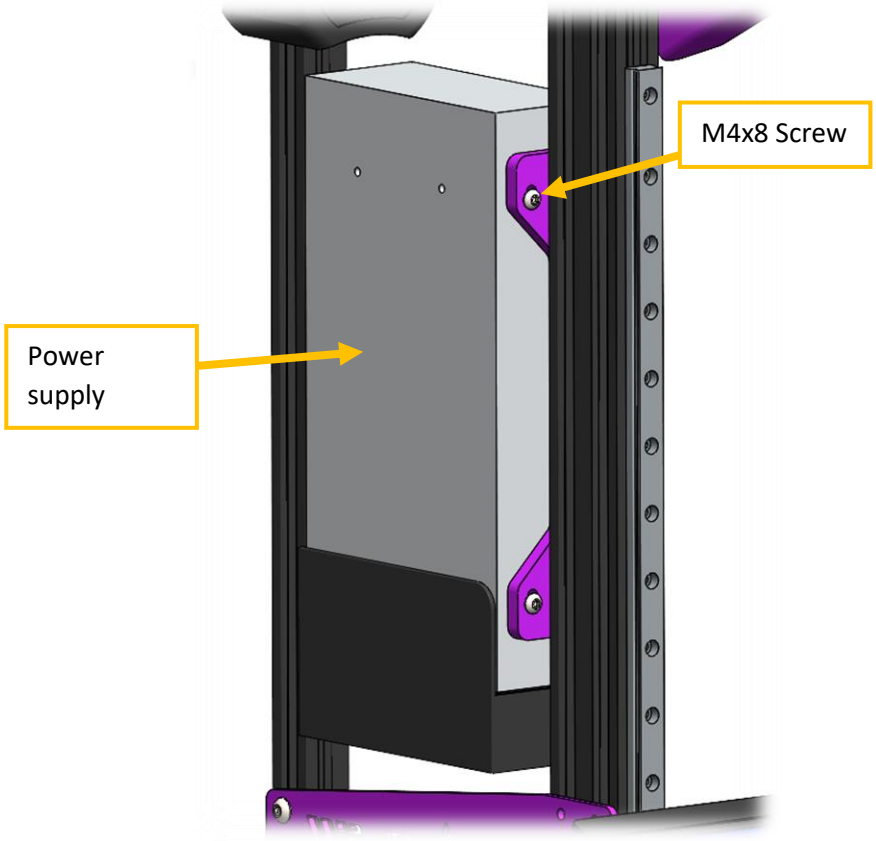


Figure 81 Power Supply mount detail

Step 6.3 Filament holder

✓ Install filament holder on the left side of machine, using its original M5x8mm Screws and M5 Slot nuts, suggested position is shown next:

Figure 82 Suggested position for filament holder

Chapter 7 Electronics and firmware

Step 7.1 Electronics

Wiring Scheme:

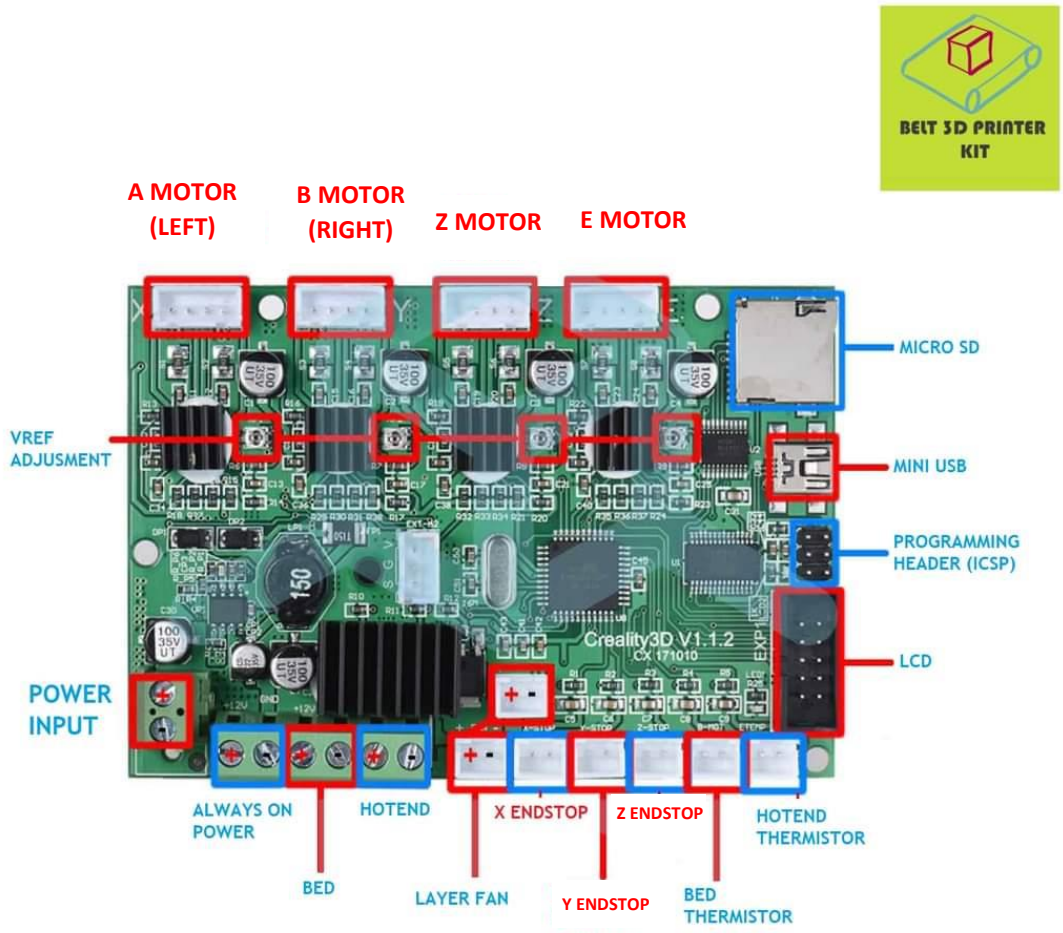


Figure 83 Wiring scheme for each component

✓ Connect all cables back to the motherboard, for stepper motors, use supplied 1-meter cable motors, instead of original ones:

✓ For X and Y axis endstops use supplied custom cable, since original one will be too short.

- ✓ Use supplied Zip ties for cable management

Step 7.2 Firmware

- ✓ Firmware will be provided for updating, there are a few methods out there to upgrade your ender 3 firmware, but we recommend checking out Teaching Tech method: https://youtu.be/fIl5X2ffdyo