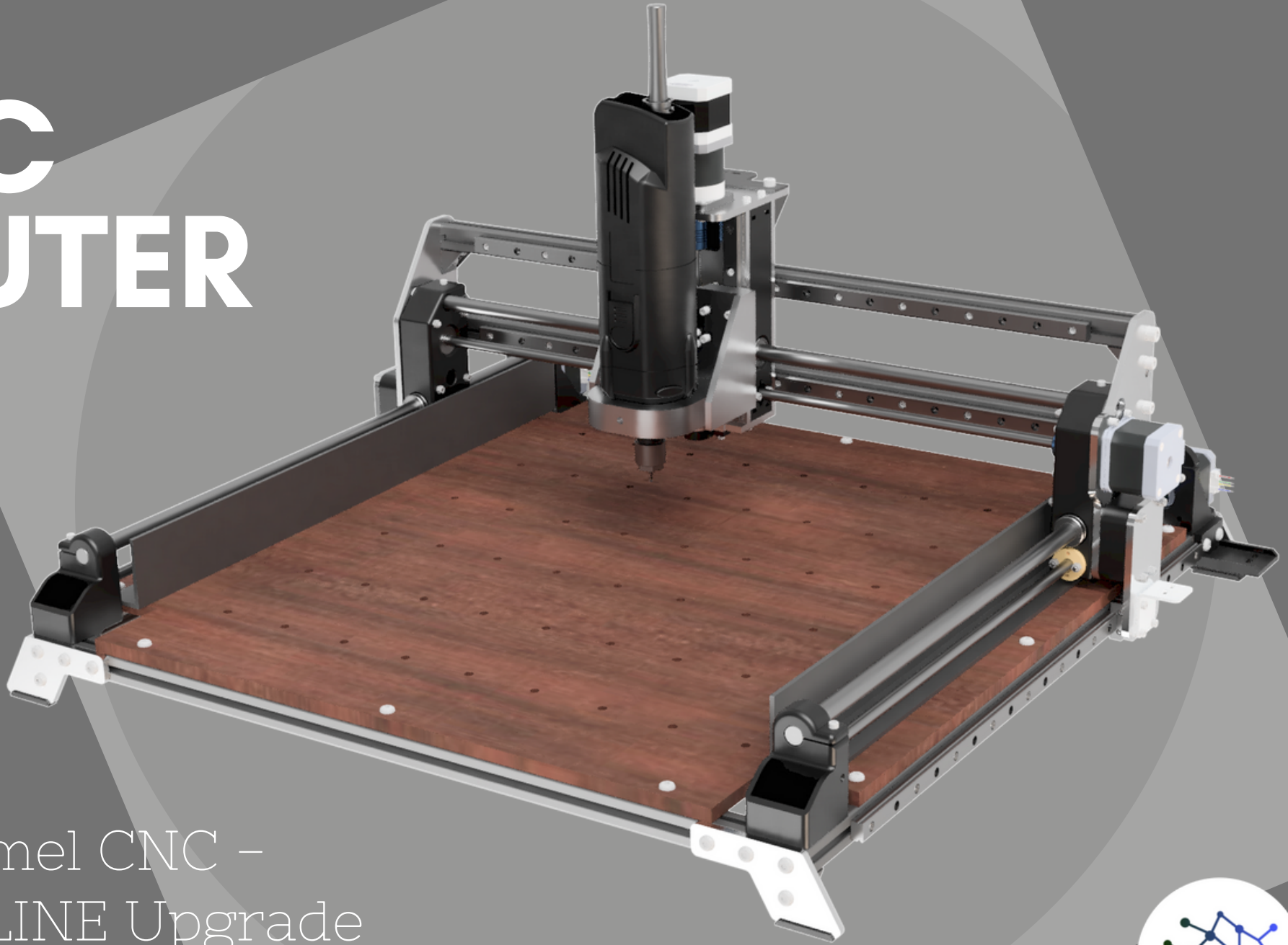


DIY CNC ROUTER

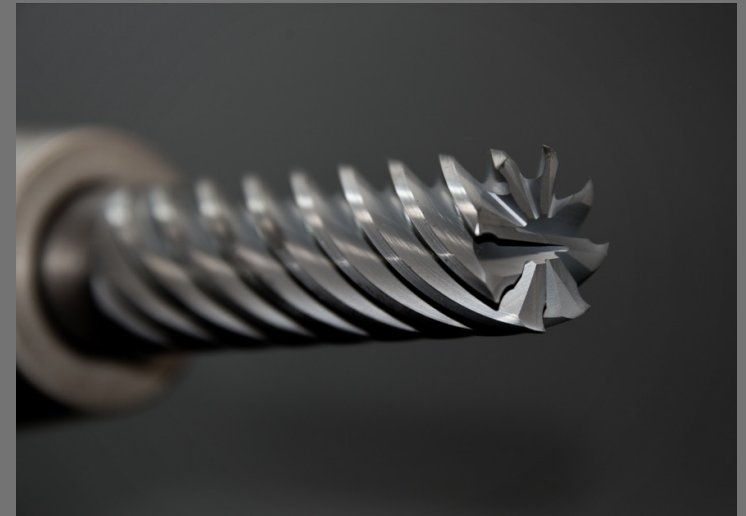


DIY Dremel CNC –
HEAVY LINE Upgrade
Building Manual



CONTENT

03	editors note
04	purpose of the building manual
06	3D printed parts for the upgrade
07	aluminium parts for the upgrade
09	first 3 upgrades to mill the aluminum parts
10	extra parts that you will have to buy
11	detailed building: 1. Leg reinforcement
12	detailed building: 2. Y- axis reinforcement parts
14	detailed building: 3. X- axis reinforcement parts
15	detailed building: 4. Z-axis Reinforced parts
17	exploration view assembly
19	detailed Rework & Tipps
21	photos
22	summary



EDITORS NOTE

I just want to thank Nikodem Bartnik for the original Design of the Dremel CNC.

Link to the Original design is here: <https://bit.ly/3s2LLg9>

The purpose of this document is to explain every step **for the upgrade** as good as I can.
For the build of the original DIY Dremel Design please check out Nikodem`s Project.

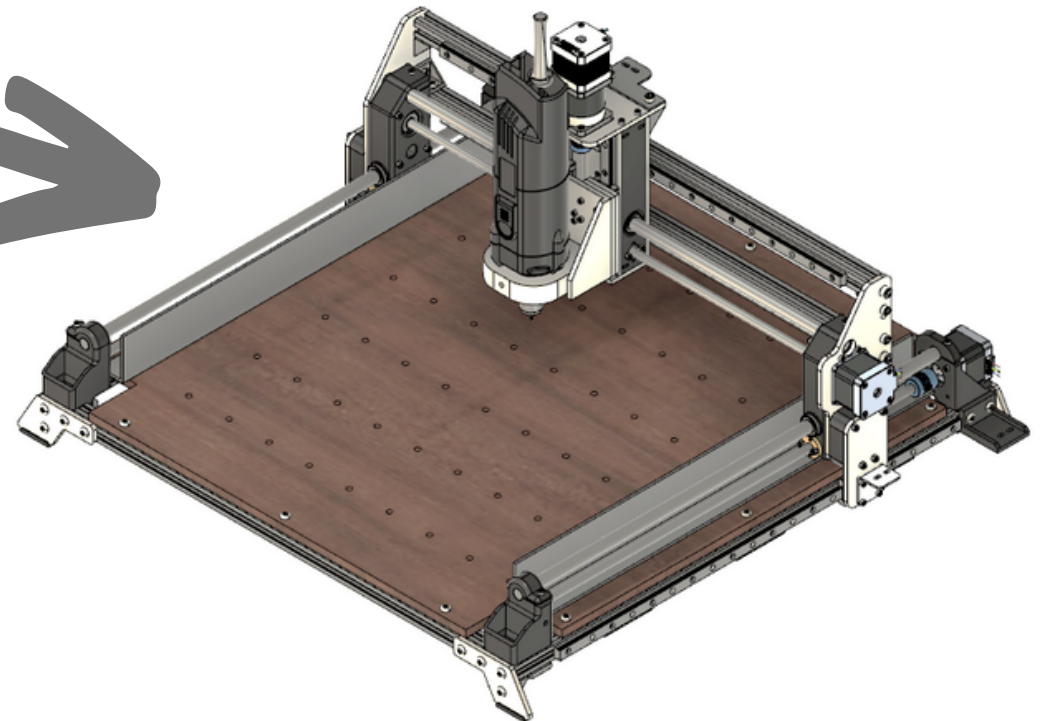
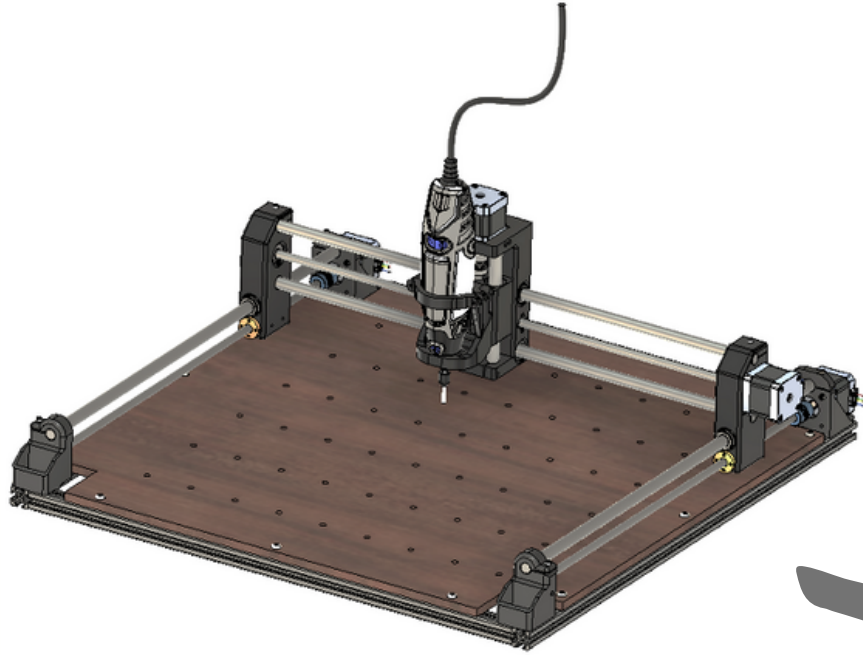
The reason why I designed an upgrade is because I made the machine bigger than the original design and therefore it was to weak to mill. So I wanted to improve the original design without making a complete new CNC. It is important to understand if you start from zero there are maybe some better solutions for building a DIY CNC, but basically the end result is pretty good. I used mainly 5mm aluminium plates and aluminium extrusions to become the proper stiffness. The accuracy and reliability is pretty amazing for this DIY improvement. I´m now able to mill everything I want in my workshop. It was a lot work of trial and error but in the end I think it turned out pretty good.

Nevertheless thanks to Nikodem and all other makers to be so kind and share their ideas.

Enjoy the building manual and if you have any questions feel free to ask: c.weinkum@hotmail.com

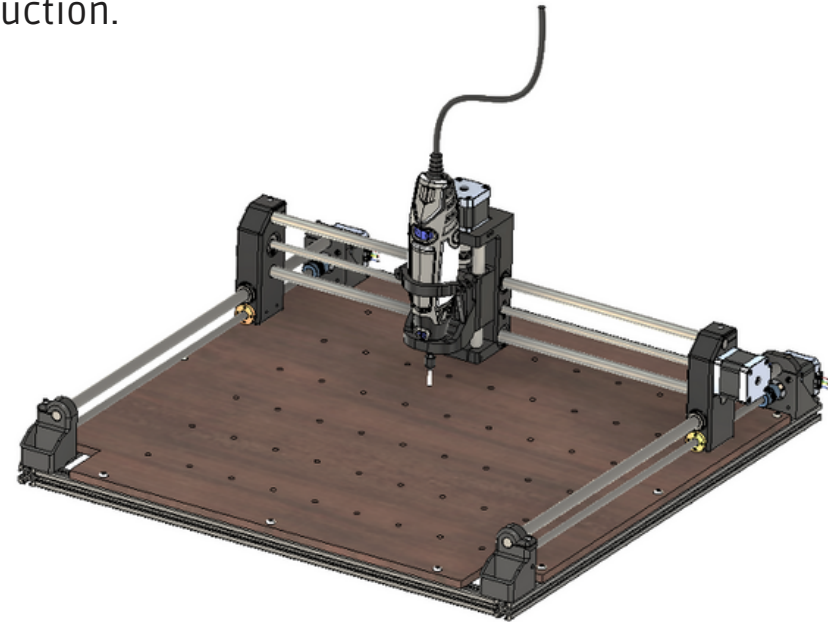
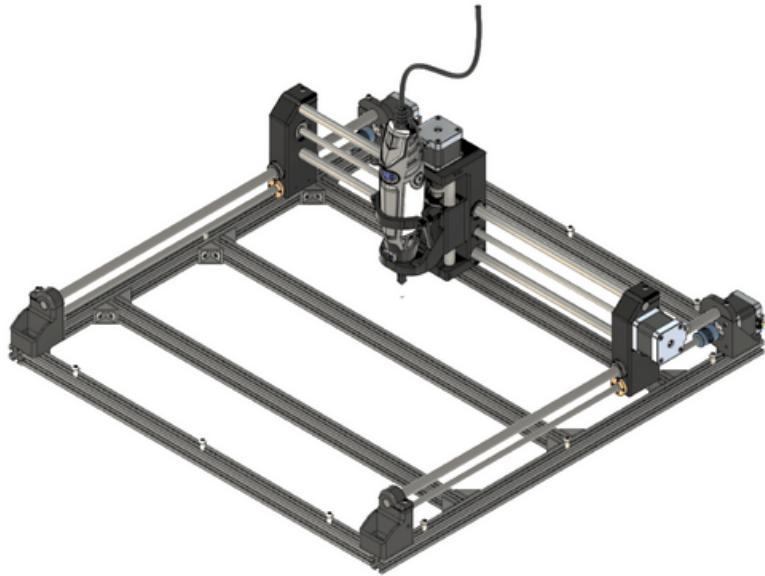
Best Regards
Christoph

PURPOSE OF THE BUILDING MANUAL



LEVEL
UP

You should already have a standard Dremel CNC with your customized size.
If not, check out his Thingiverse project again for the build instruction.



3D PRINTED PARTS YOU NEED FROM THE ORIGINAL DESIGN



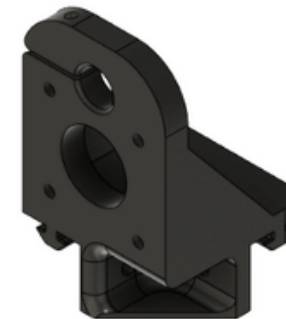
1x Y axis rod holder right



1x Y axis rod holder left



1x Y axis Y axis motor holder right



1x Y axis Y axis motor holder left

3D PRINTED PARTS FOR THE UPGRADE

Print Settings:

Material: PET

Infill: 60-80%

Walls: 3

Layer height: 0.25 mm

Print speed: 50 mm/sec



1x brace x-axis right down spacer



1x x-axis carriage right



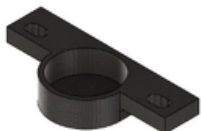
1x x-axis carriage right



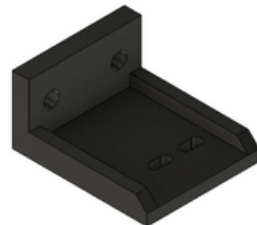
1x x-axis carriage left



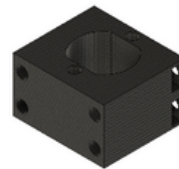
1x brace x-axis left down spacer



1x 688 bearing holder



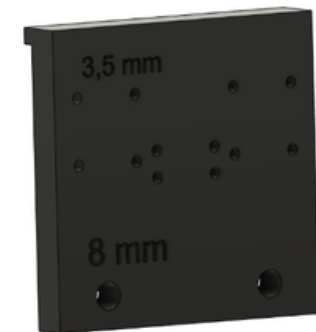
1x energy chain holder



1x T8-anti backlash nut mount

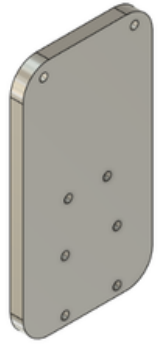


4x anti-vibration damper (TPU 70 Shore A)

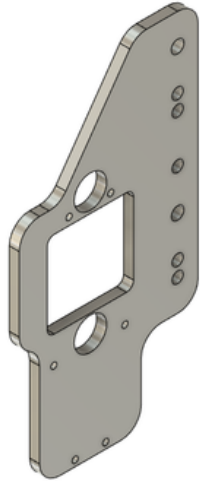


1x drill template z-axis plate

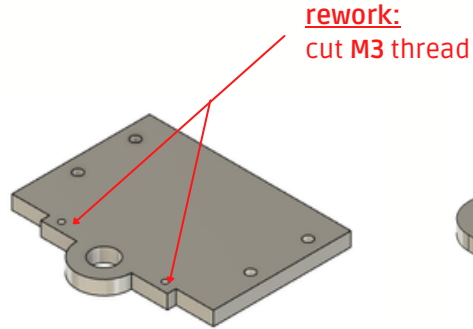
ALUMINIUM PARTS FOR THE UPGRADE



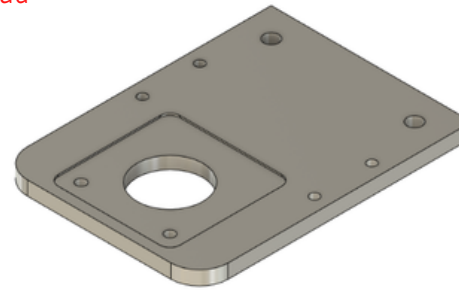
1x brace x-axis
right down



1x brace x-axis
right

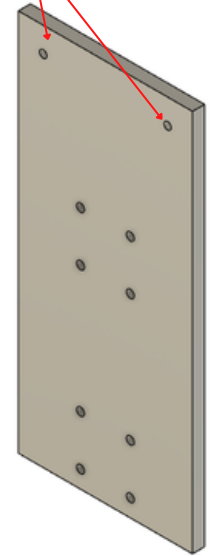


1x z-axis down
plate



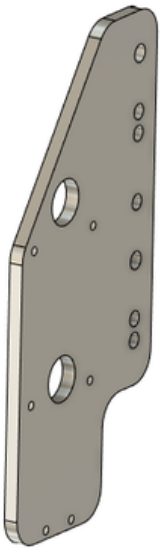
1x z-axis upper
plate

rework:
cut M5 thread

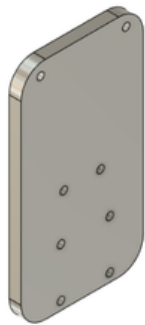


1x z-axis back
plate

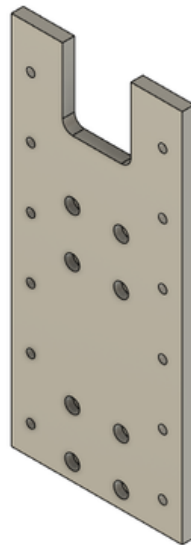
Note:
brace x-axis down left &
right
are not symmetric!



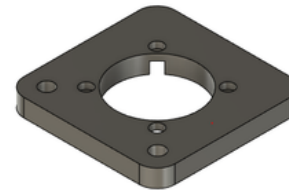
1x brace x-axis
left



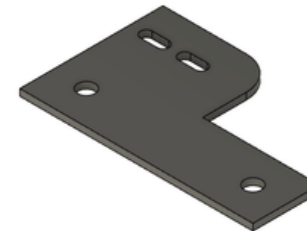
1x brace x-axis
left down



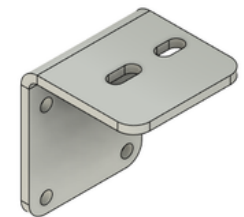
1x z-axis front
plate



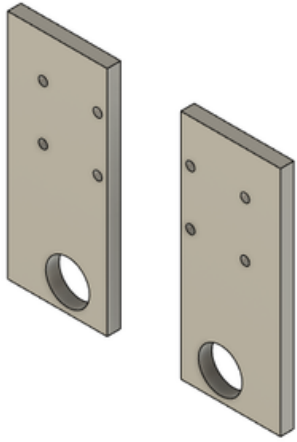
1x nema 17 PG
mounting adapter



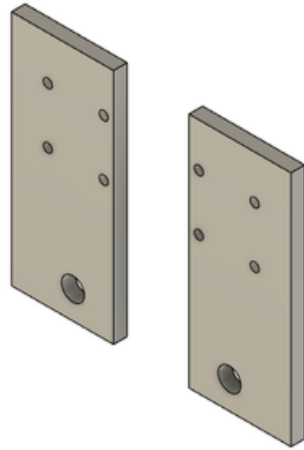
1x z-axis energy
chain holder plate



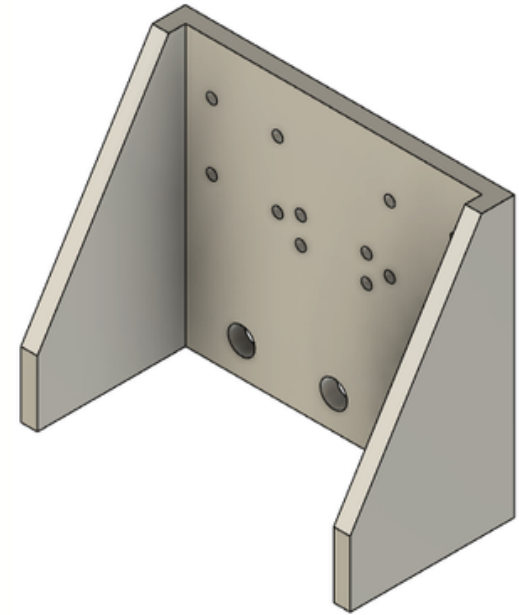
1x brace x-axis right
down energy



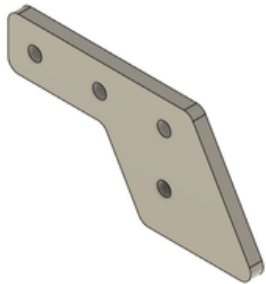
1x z-axis plate 1 front left
1x z-axis plate 1 front right



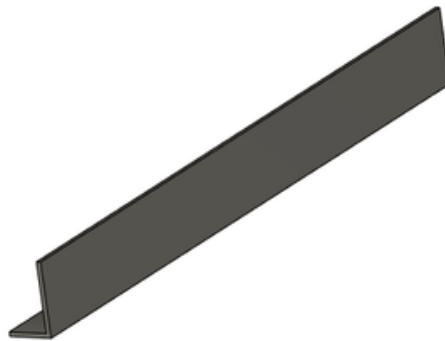
1x z-axis plate 1 front smaller diameter left
1x z-axis plate 1 front smaller diameter right



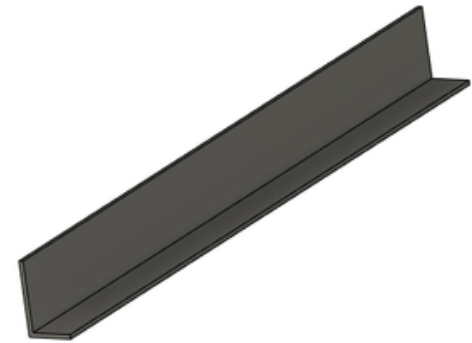
1x z-axis plate front 2



4x legs Aluminium



1x leadscrew cover left

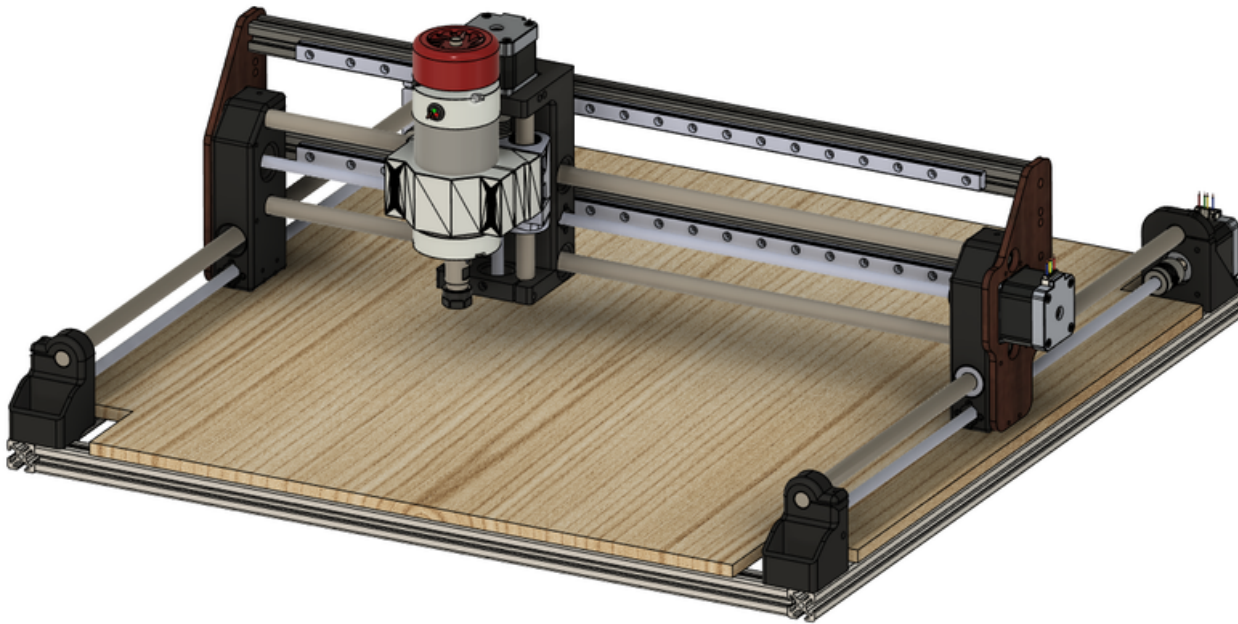


1x leadscrew cover right

FIRST 3 UPGRADES TO MILL THE ALUMINUM PARTS

I milled the 2 braces out of wood!
Printed the modified spindle carriage!
And add 20 20 aluminum profiles and 2x 500mm mgn12h rails

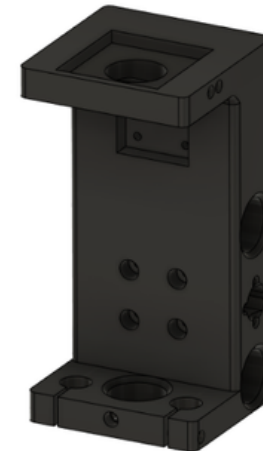
Important note:
These braces are not the same as the aluminum ones because here I used the old z-axis and therefore the holes are moved by 5mm!



1x FIRST UPGRADE
brace x-axis left



1x FIRST UPGRADE
brace x-axis right



1x FIRST UPGRADE
spindle carriage

At this moment I used this spindle: <https://bit.ly/3s6mLoq>

EXTRA PARTS THAT YOU WILL HAVE TO BUY:



switched to a google drive online sheet to do updates faster:

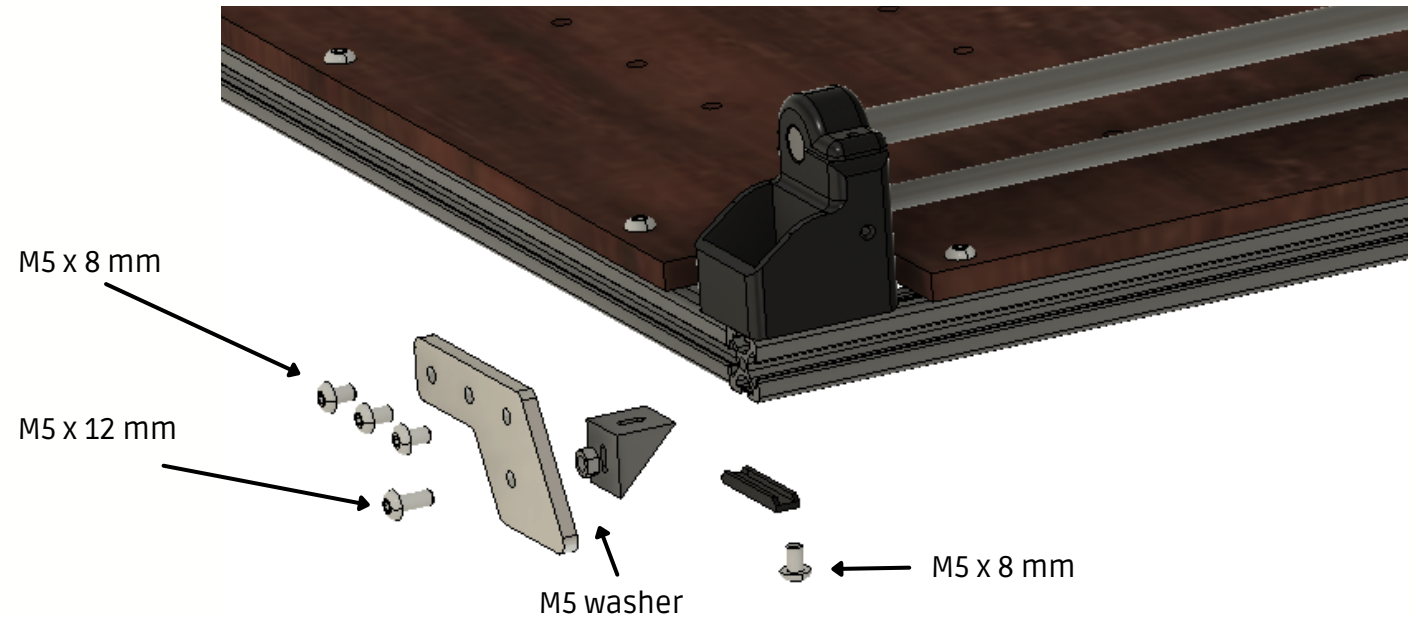


DETAILED BUILDING: 1. LEG REINFORCEMENT

4 corners

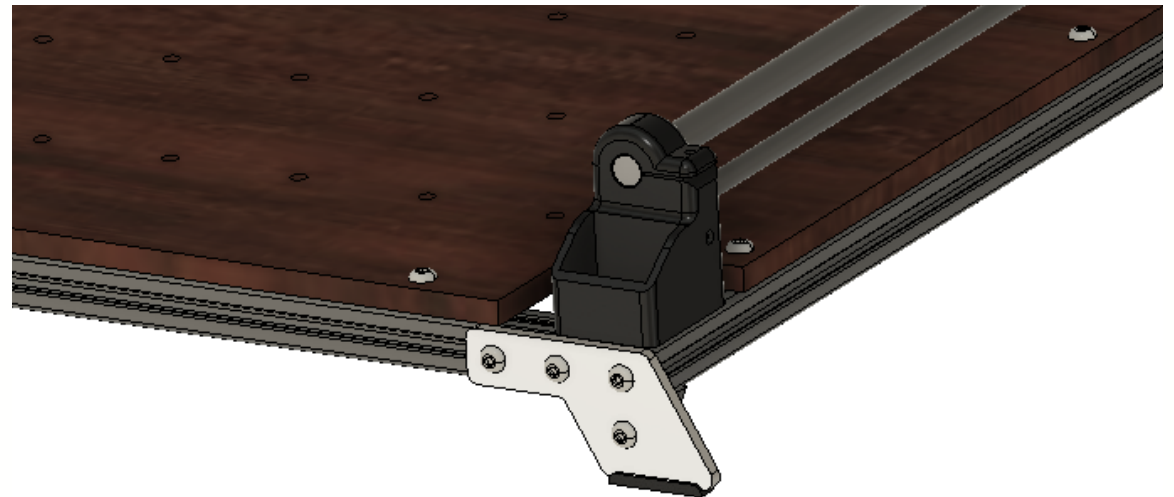
BOM for each corner:

- 1x legs Aluminum
- 1x 20/20 aluminum profile angle
- 4x m5 x 8 mm screw
- 1x m5 x 12 mm screw
- 1 x m5 washer
- 1x TPUprinted vibration dampers



Notes:

Just screw everything together



DETAILED BUILDING: 2.Y- AXIS REINFORCEMENT PARTS:

2 sides (left & right)

BOM for each corner:

1x mgn12h block

1x mgn12h rail

1x brace x-axis right down

1x brace x-axis right down spacer

1x x axis carriage

1x T8 anti backlash nut reworked

1x brace x-axis right

1x brace x-axis right down energy chain holder

1x leadscrew cover right

Few M3x6mm & 20/20 M3 t nuts for the linear rail

6x M3 threaded rod 65mm long

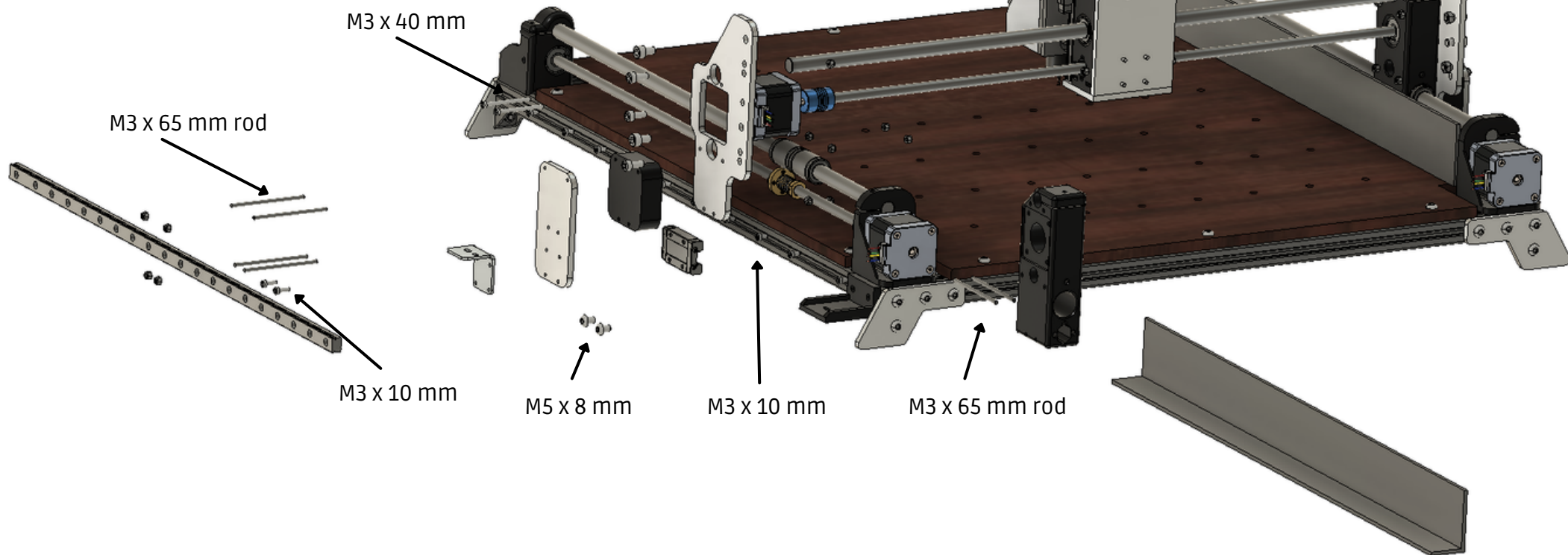
2x M3 x 40mm screws

4x M3 x 10mm screws

2x M5 x 8 mm

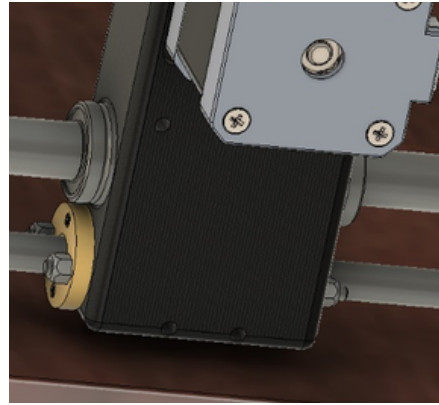
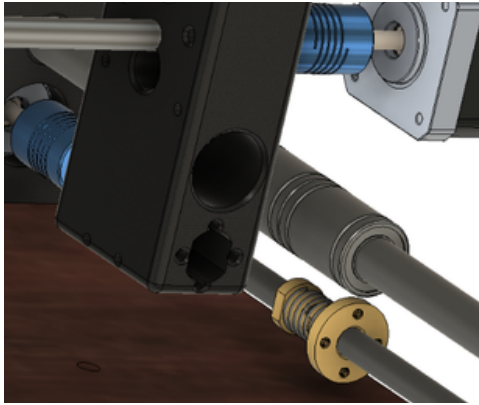
Few M3 nuts

M3 washer



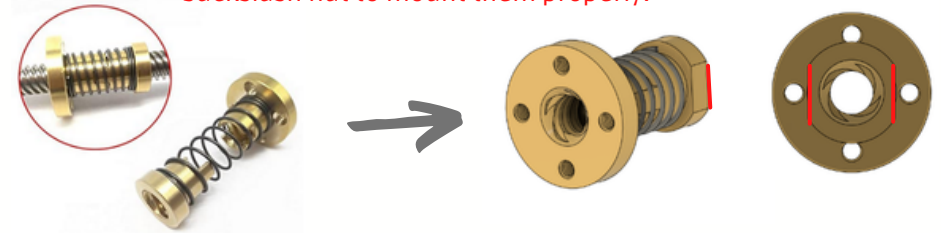
Notes:

Just screw everything together like in the photos!



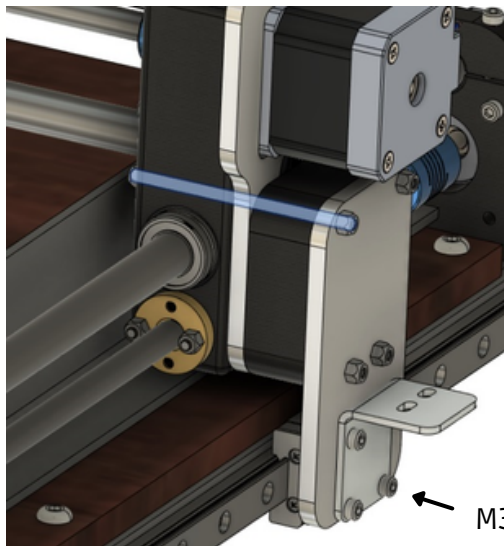
Important note:

You must sand 2 edges in the 2nd part of the T8 anti backlash nut to mount them properly!



do that for every T8 antibackslash nut you are mounting (4 x)

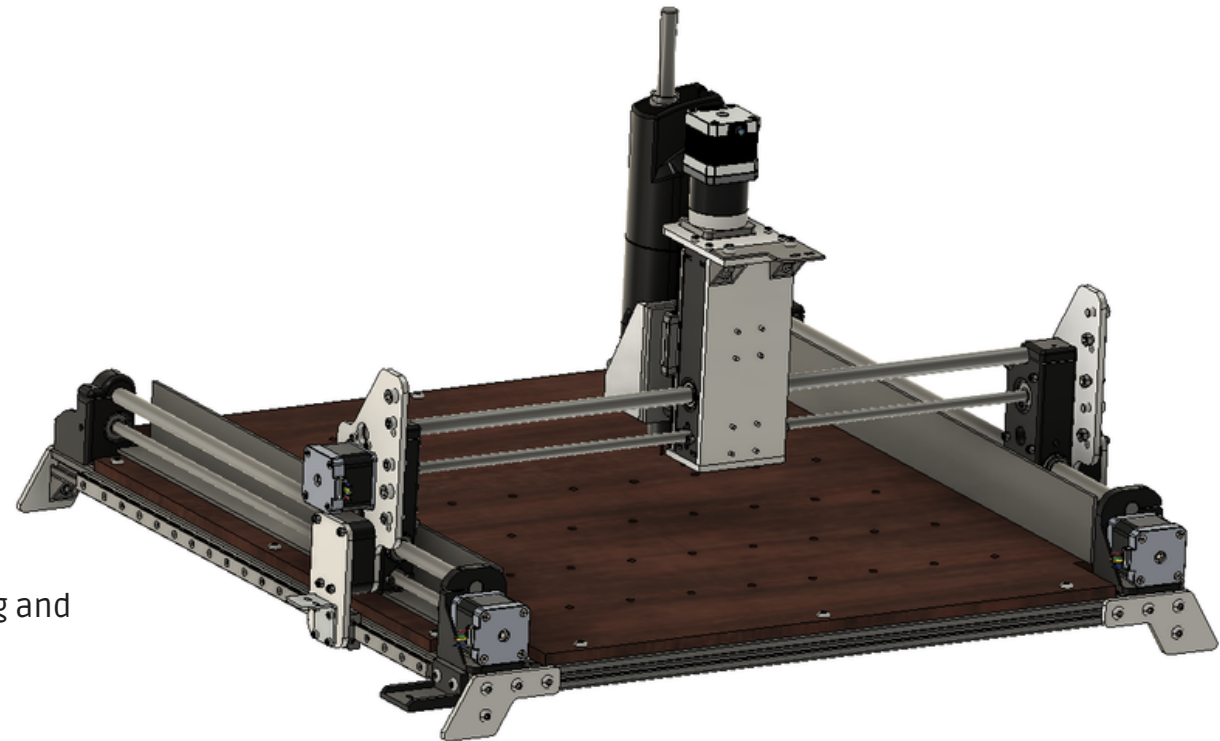
JT8 anti backlash nut fixed with 2x M3 threaded rod 65mm long and m3 washers



M3 x 10 mm

Main parts were fixed with 4x M3 threaded rod 65mm long and m3 washers

Do the same mounting on the left side too!



DETAILED BUILDING: 3.X- AXIS REINFORCEMENT PARTS:

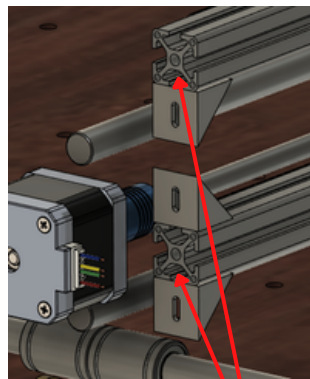
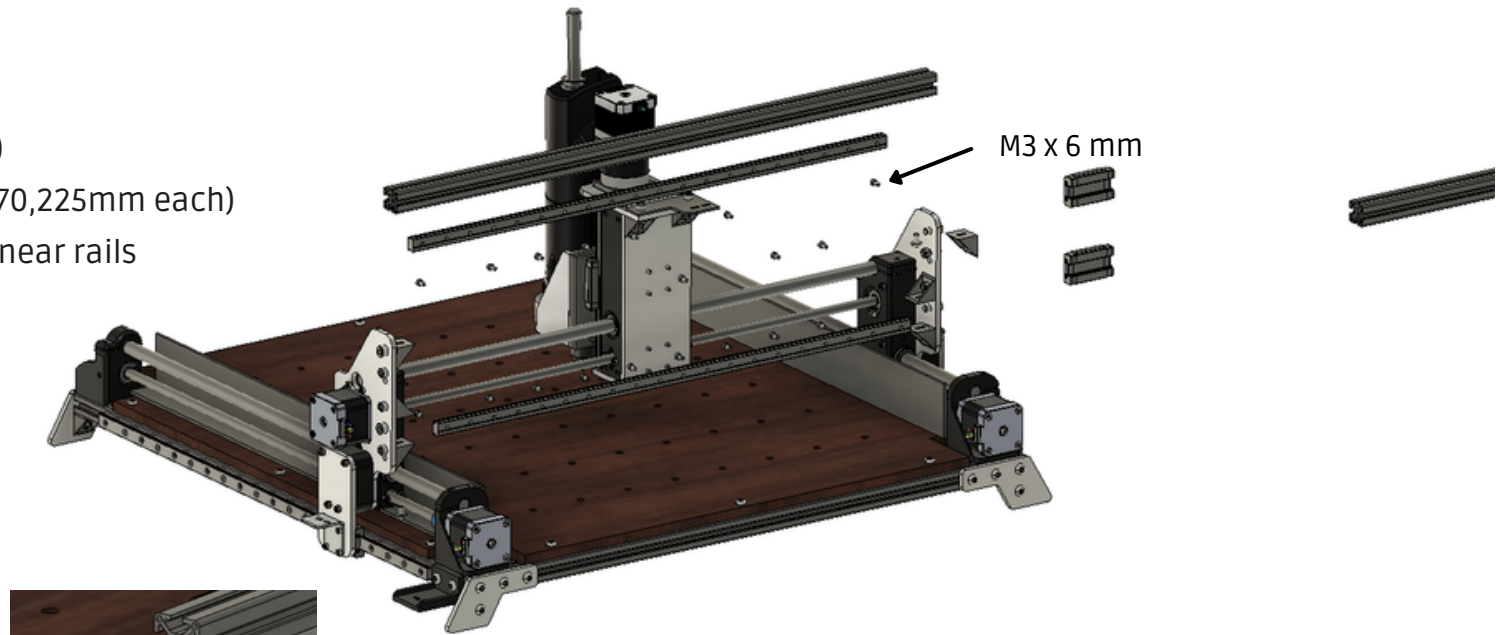
BOM for each corner:

- 2x mgn12h block
- 2x mgn12h rail (in my case 500mm each)
- 2x 2020 Aluminum profiles (in my case 570,225mm each)
- Few M3x6mm & 20/20 M3 t nuts for the linear rails
- 6x 20/20 aluminum profile angle
- 6x M5 x 12mm screws
- 6x M5 x 8mm screws
- 6x M5 20/20 T-nuts
- 6x M5 washers
- 2x M6 x 10mm screws

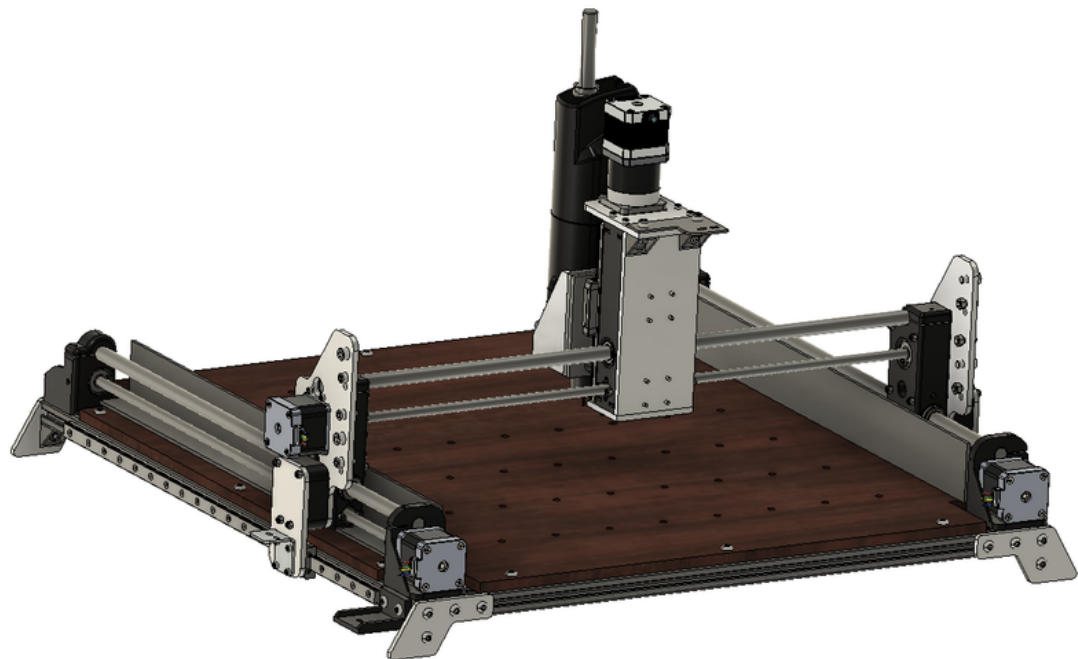
Notes:

Screw the linear rails on the 2020 aluminum profiles (M3x6 mm screws and 2020 t-nuts)

Screw the aluminum profiles on the braces on the side with m6 and m5 screws and profile angles.



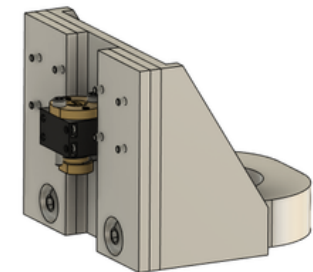
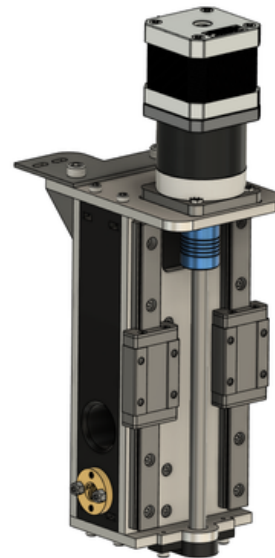
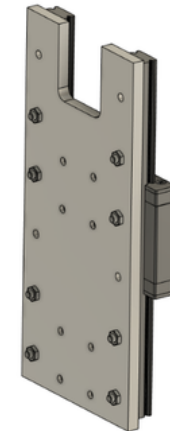
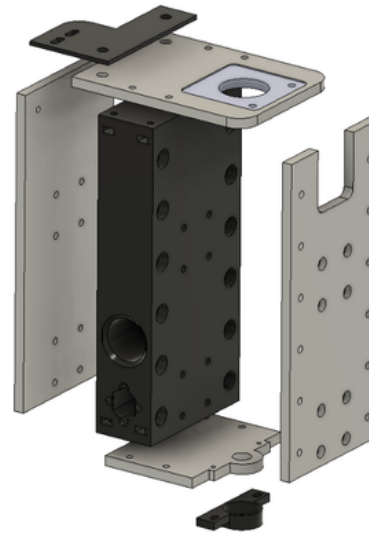
Important note:
cut a M6 thread in the holes
of the 20/20 profiles



DETAILED BUILDING: 4.Z-AXIS REINFORCED PARTS

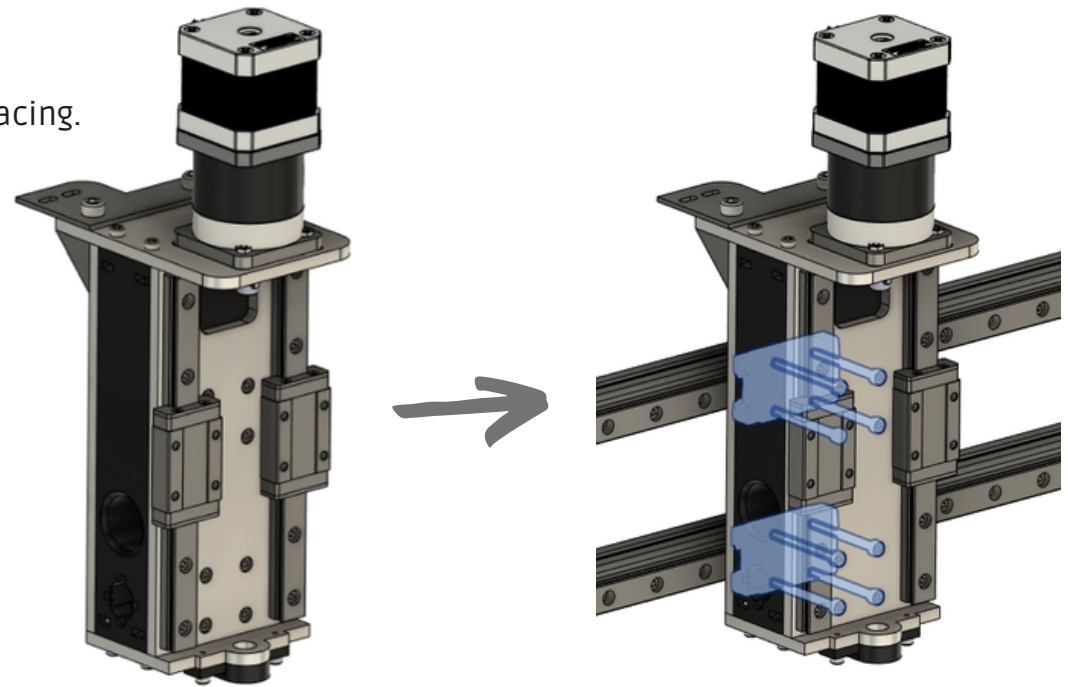
BOM:

- 2x mgn12h block
- 2x mgn12h rail (in my case 150mm each)
- 1x z-axis backplate
- 1x z-axis front plate
- 1x z-axis upper plate
- 1x z-axis down plate
- 1x z-axis energy chain holder plate
- 1x Nema 17 PG mounting adapter
- 1x Nema 17 PG 5,18:1 ratio
- 1x z-axis block
- 1x 688 bearing holder
- 1x 688 bearing
- Few M3x6mm & M3 nuts for the linear rails
- 2 x 20/20 aluminum profile angle
- 2x M5 x 12mm screws
- 2x M5 x 8mm screws
- 2x M5 washers
- 10x M3 x 12mm
- 8x M3 x 40mm
- 8x M3 x 18mm
- 6x M3 x 25 mm
- 2x T8 anti backlash nut reworked
- 2x M3 threaded rod 80mm long
- 2x M8 x 16mm
- 1x T8 anti backlash nut mount
- 1x z-axis plate 1 front left & right
- 1x z-axis plate 1 front smaller diameter left & right
- 1x z-axis plate front 2
- 1x 43mm spindle mount
- 1x 43mm spindle
- 1x drill template z-axis plate front 2

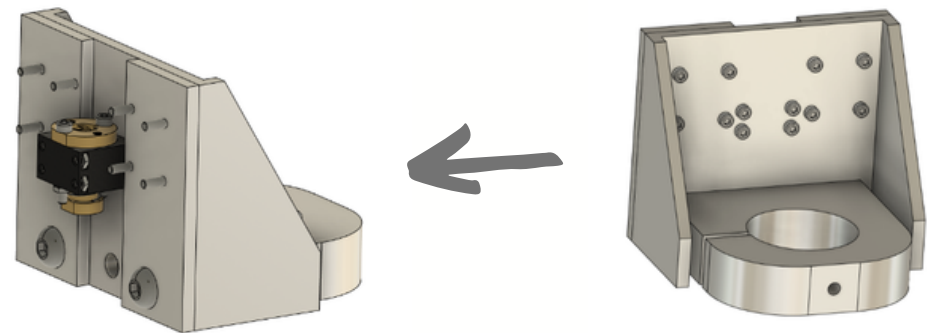


Notes:

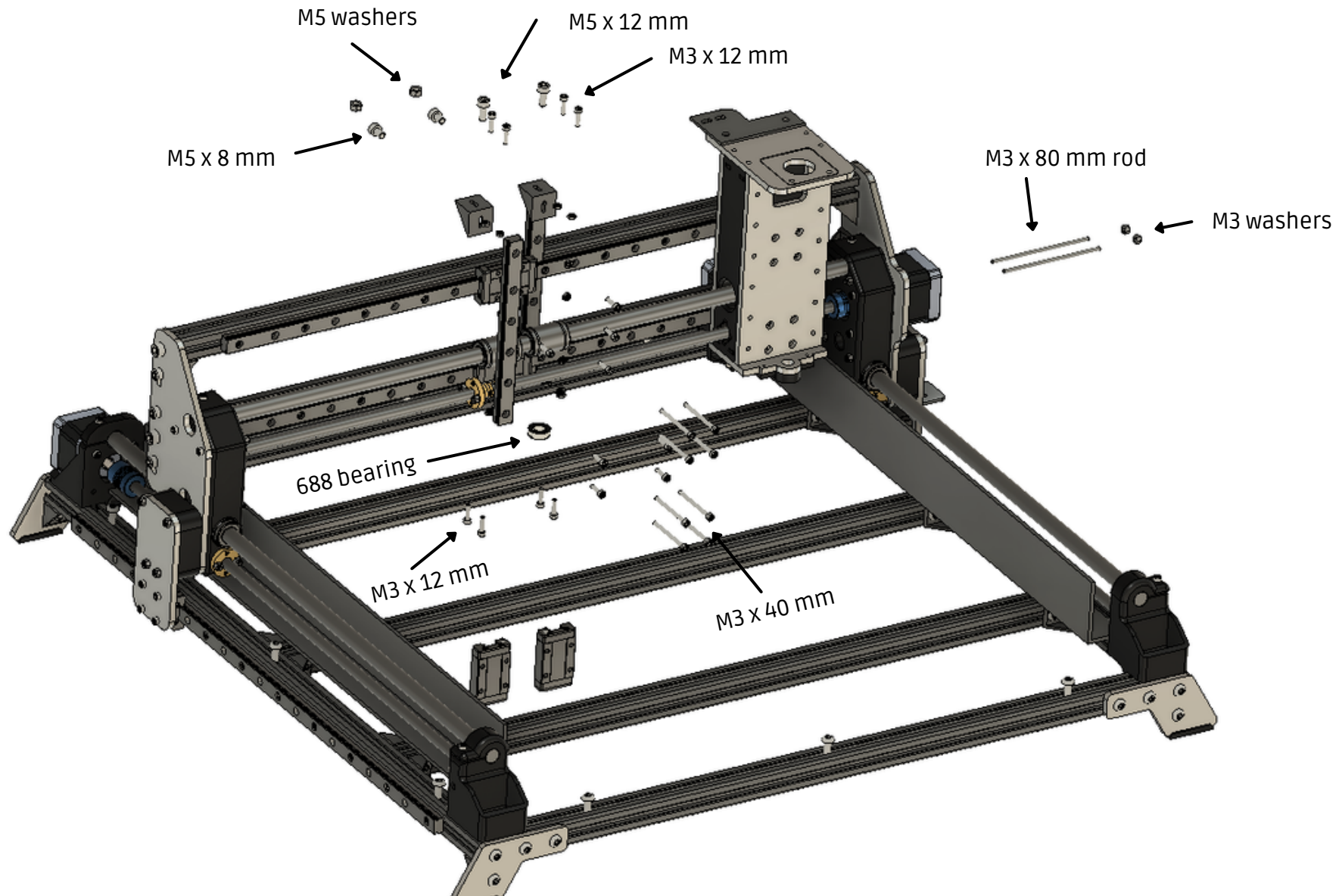
Just screw everything together to get this complex!
Then screw it with the M3 x 40mm screws on the x-axis bracing.

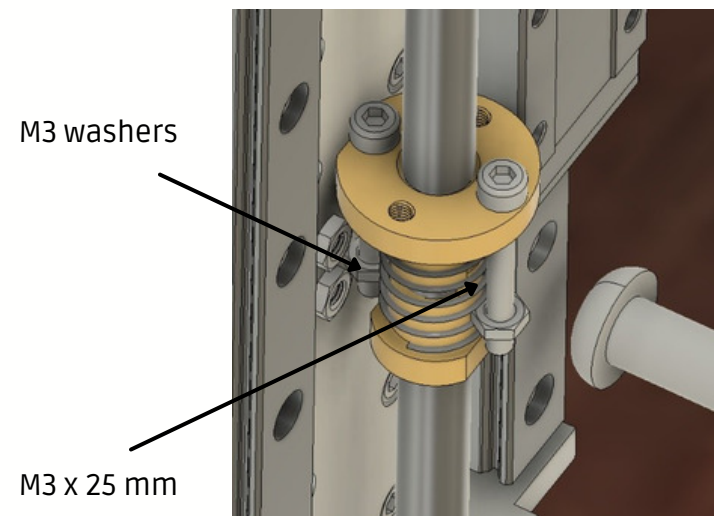
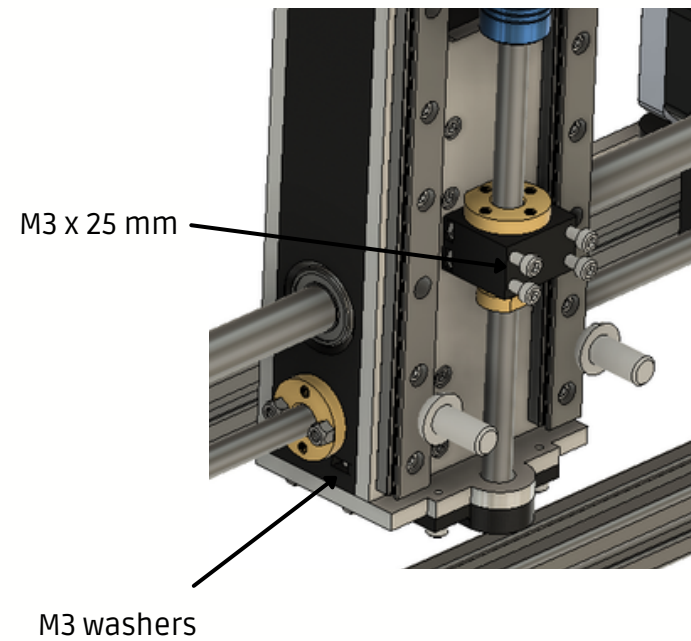
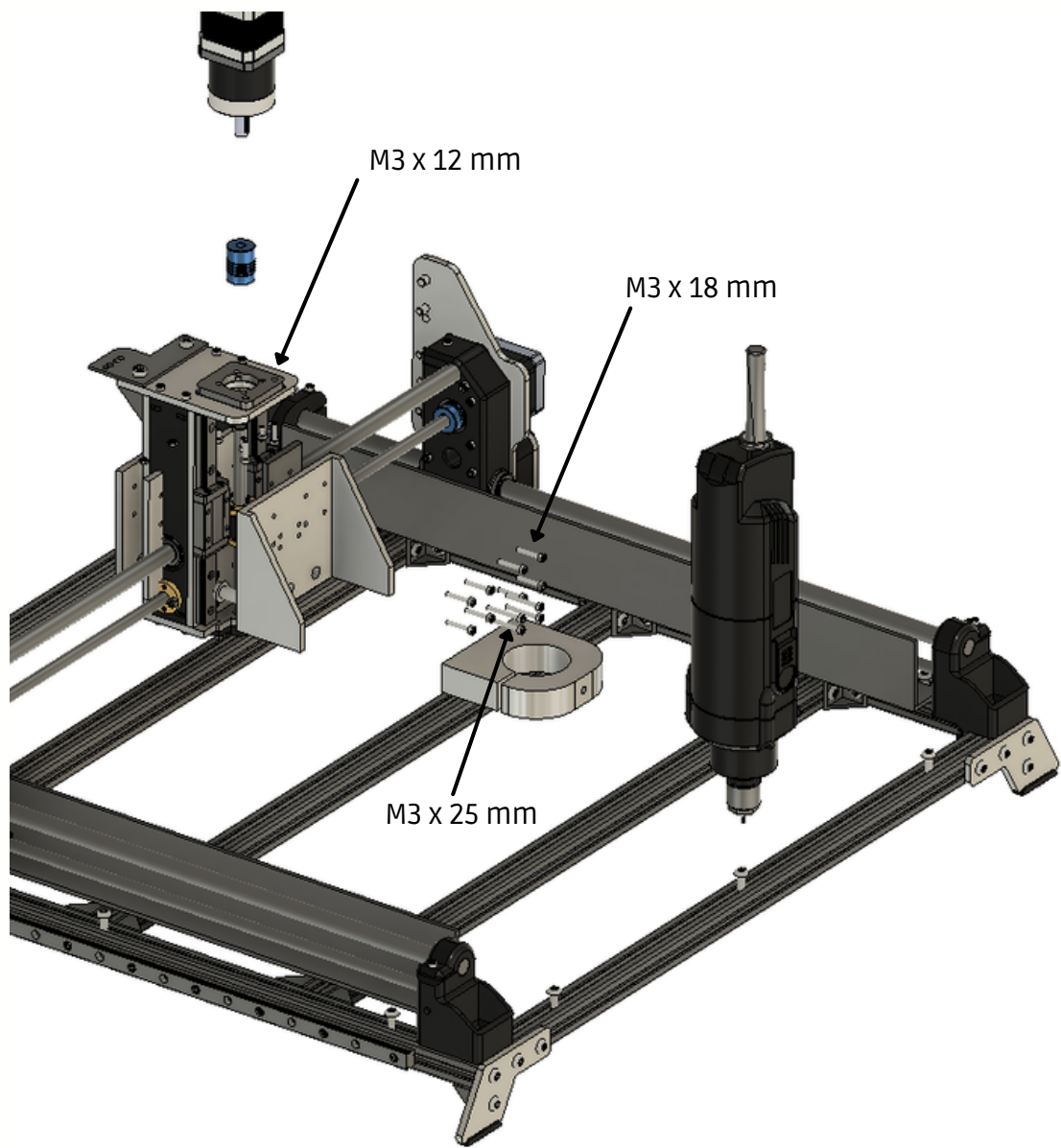


Screw the z-axis plates 1 front smaller diameter left & right on the z-axis plate front 2 with the 43mm spindle mount with the M8x16mm screws



EXPLORATION VIEW ASSEMBLY

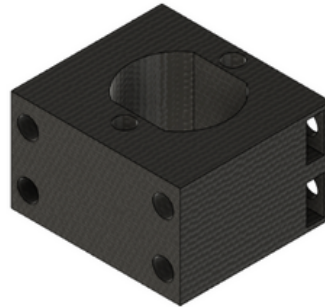




DETAILED REWORK & TIPPS

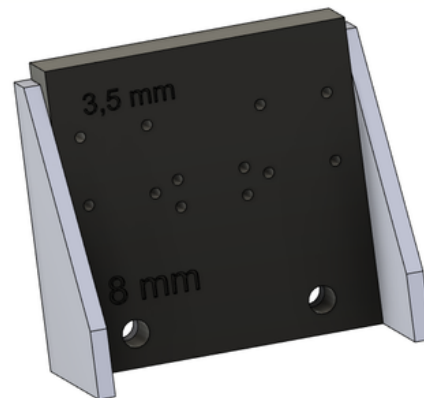
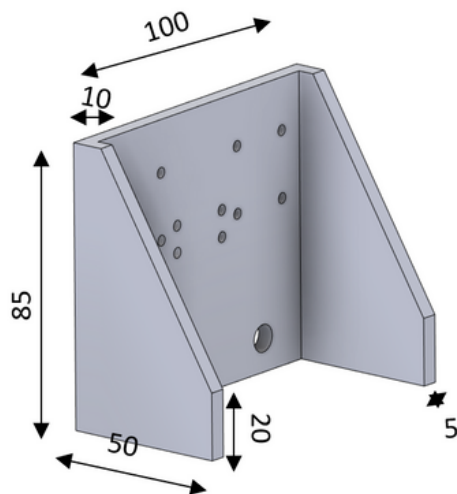
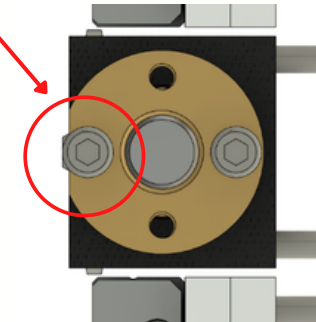
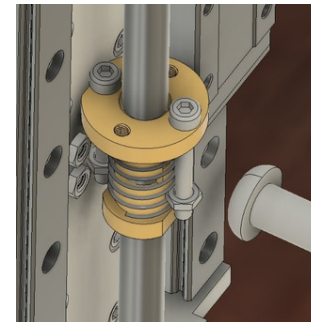
Notes:

for the T8 anti backlash nut mount you must print it -> insert the M3 washers and screw everything together.



Important note:

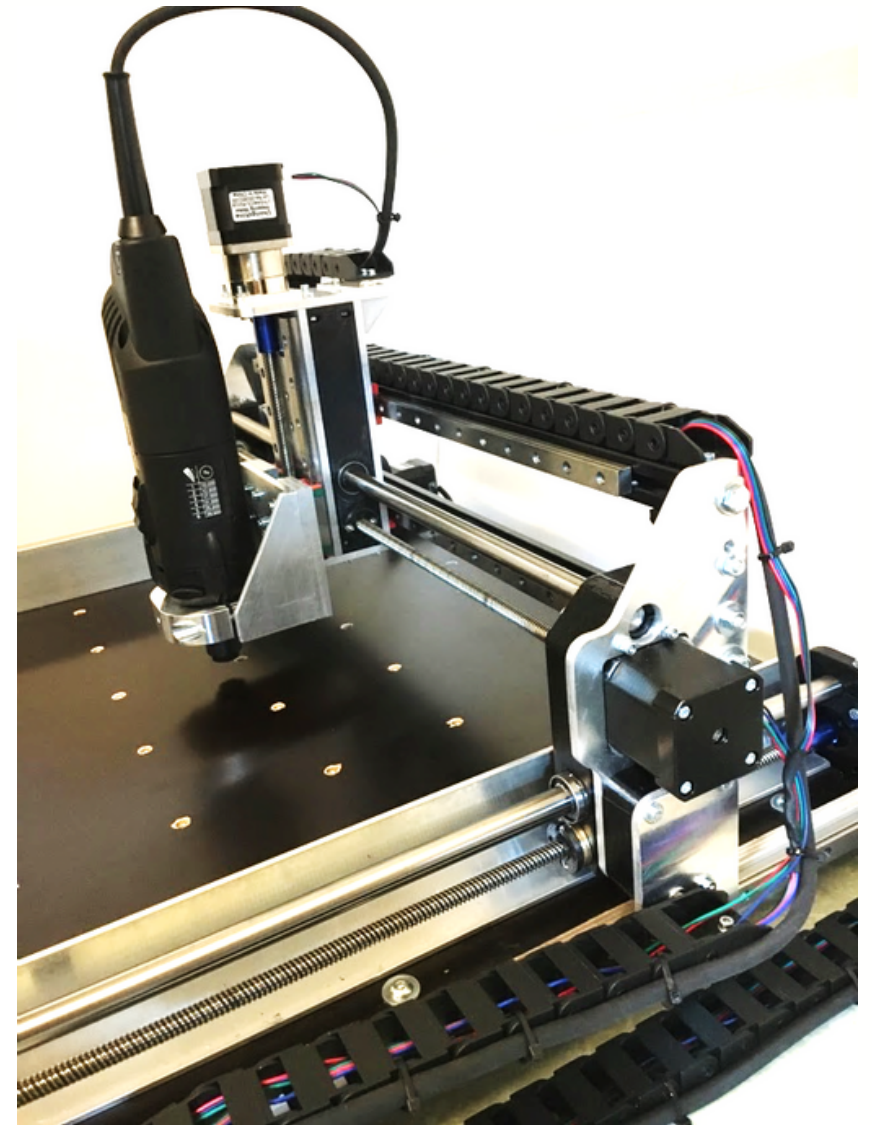
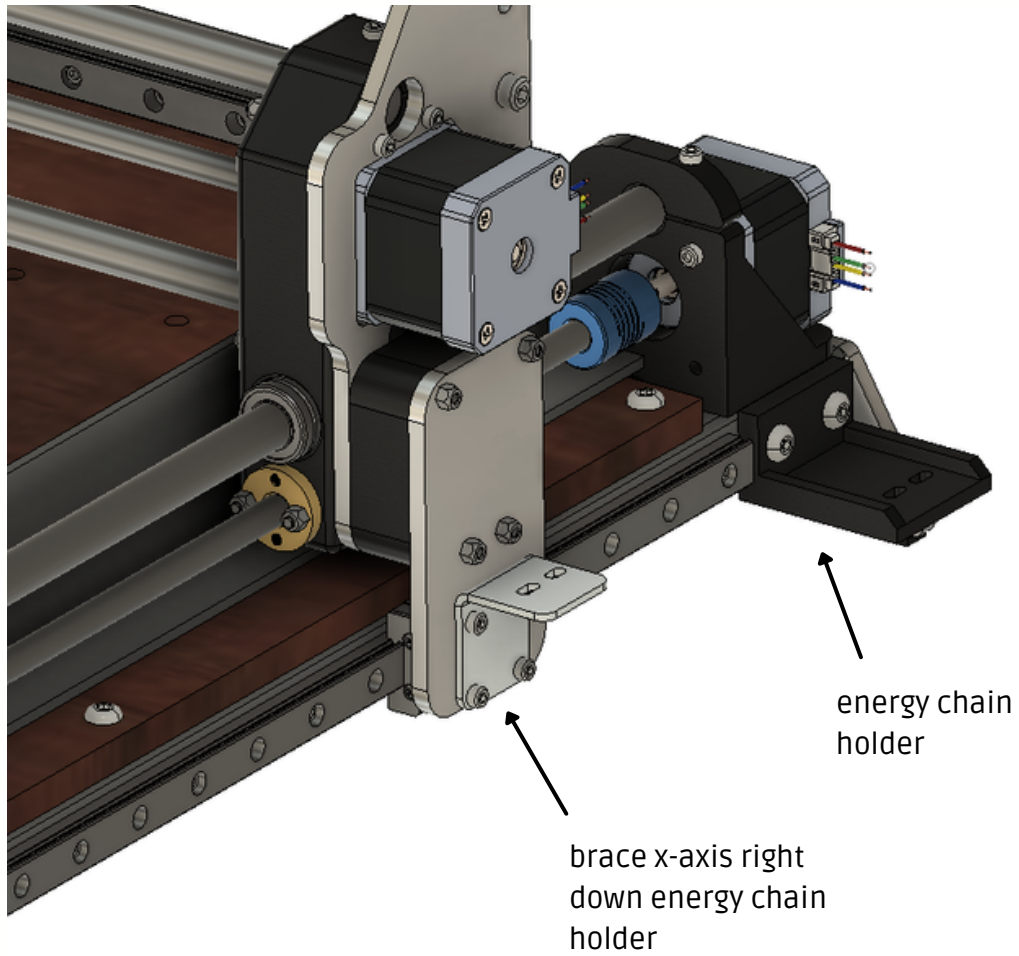
You have to sand 2 edges of the screw and washer to mount them properly!



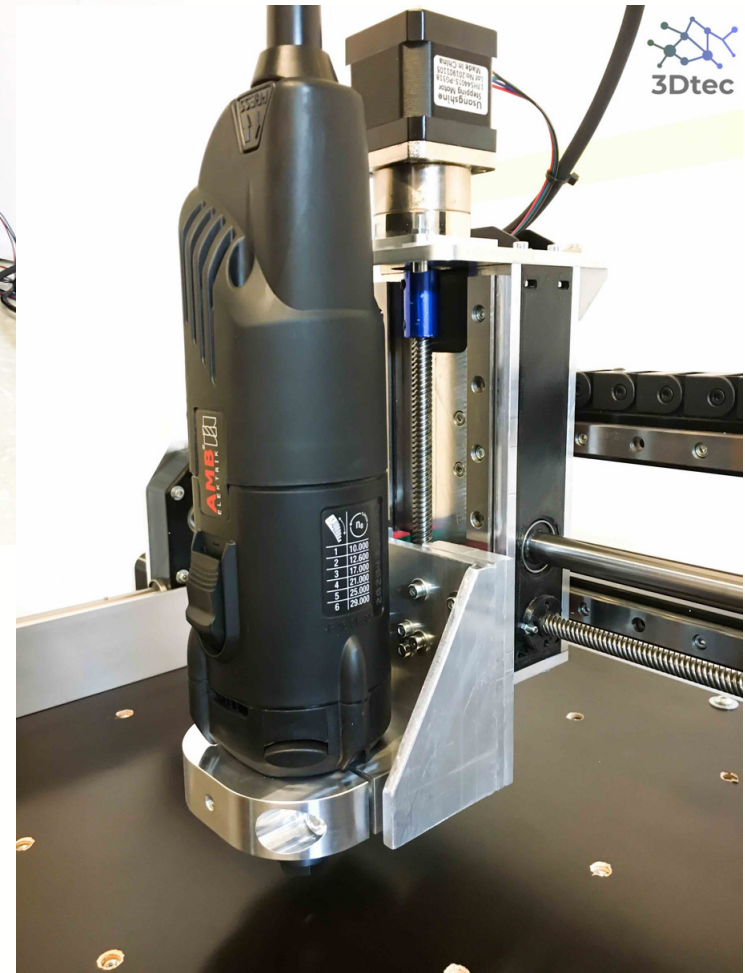
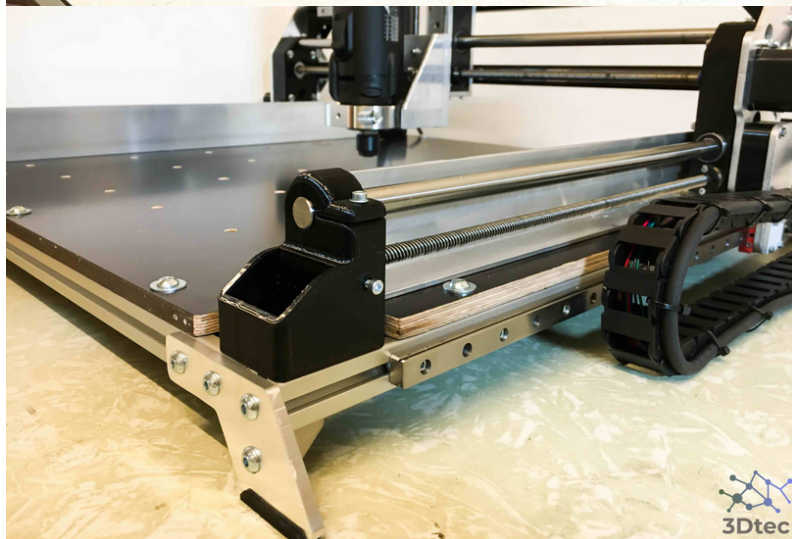
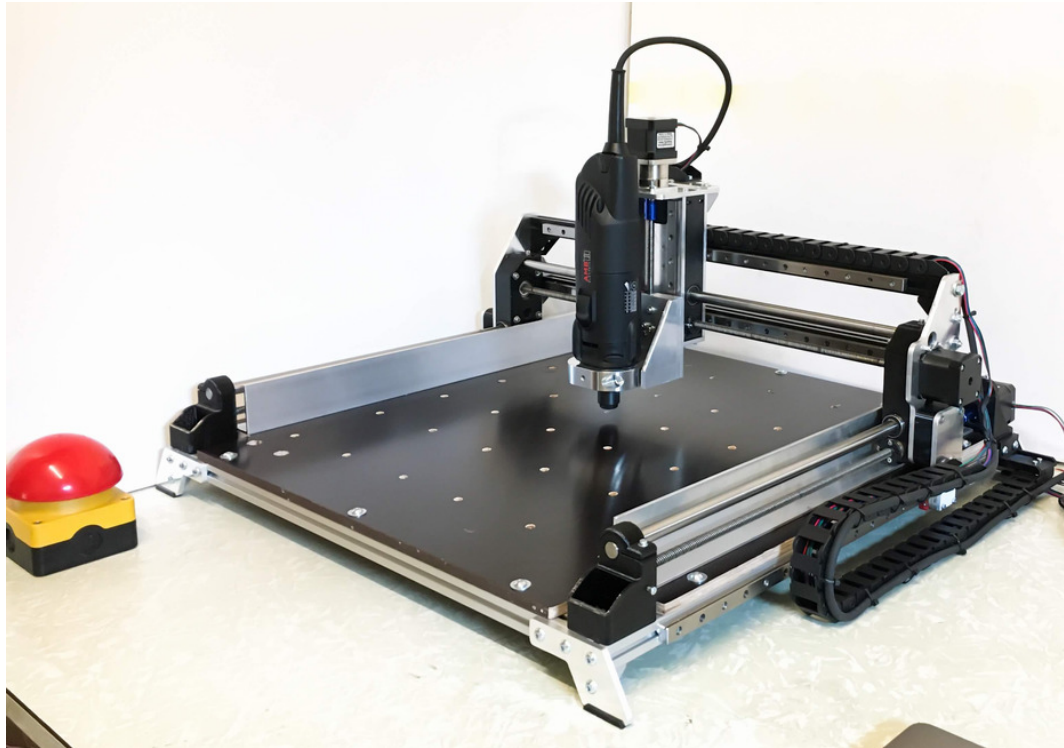
for the z-axis plate front 2 -> I ordered a **100 x 50 x 5 Aluminum U-Profile** cut them according the drawing left, printed the drilling plate and drilled them with a 3,5 mm driller and 8mm driller.

Notes:

For the energy chain I printed the energy chain holder and milled the brace x-axis right down energy chain holder bended it and mounted it.

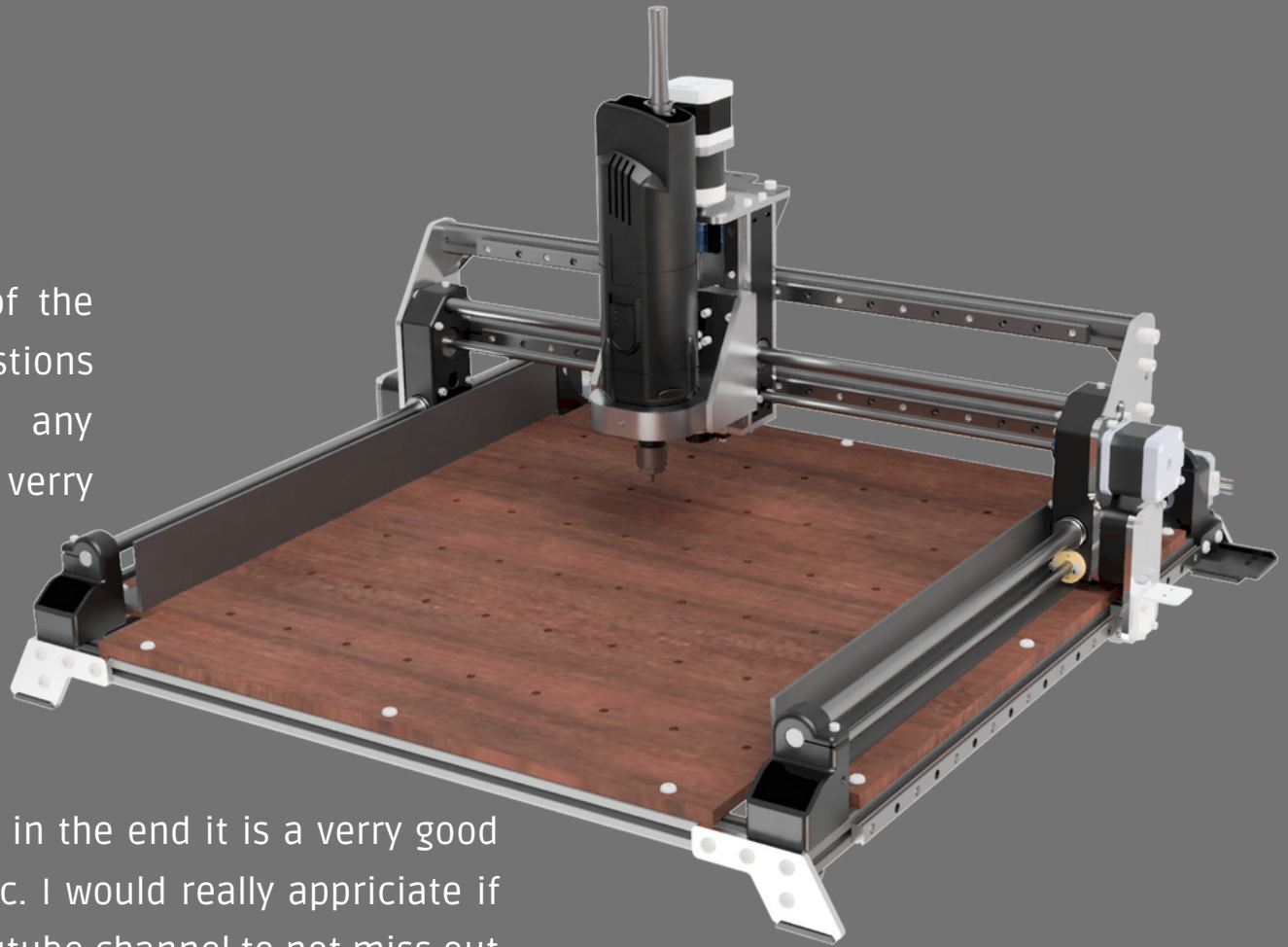


PHOTOS



SUMMARY

I hope you liked the documentation of the building process. If you have any questions feel free to ask. Also if you have any suggestions for improvement i would be very happy.



It was a lot of trial and error but i think in the end it is a verry good upgrade for the standard diy dremel cnc. I would really appreciate if you support me by subscribing to my youtube channel to not miss out any projects in the future.

Supporting Links:



**THANK
YOU!**

**HAPPY
BUILDING**