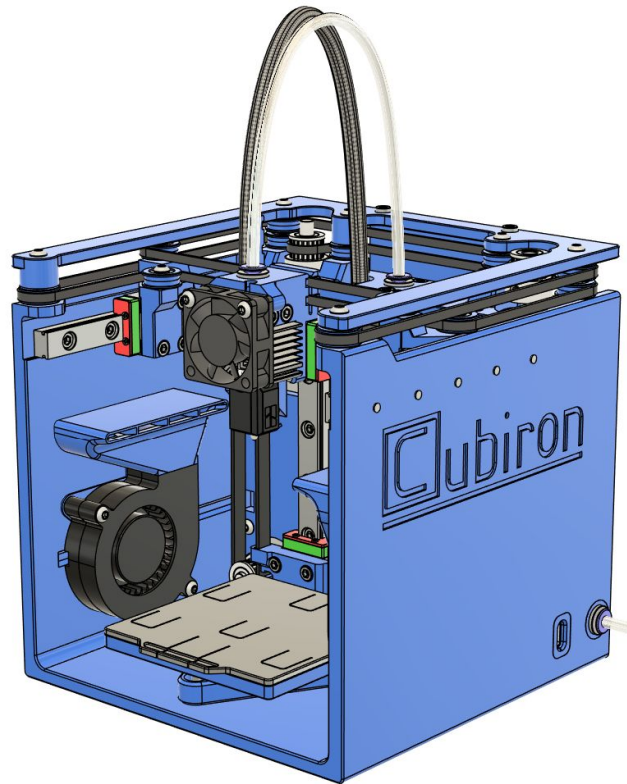




ASSEMBLY MANUAL

VERSION 0.1





Warning & Disclaimer

This 3D printer involves both mechanical and electrical assembly.

It operates on 20V DC from a USB-C PD source. Always disconnect power before assembly or maintenance, and take care when handling electronic parts to avoid damage.

Improper assembly or use may result in damage or personal injury.

This is an open-source project provided as-is, with no warranties, guarantees, or support. The creator assumes no responsibility for any damage, injury, or loss resulting from assembly, use, or modification of this device.

This build is **NOT beginner friendly**, some experience is required. You will be using soldering- and crimping tools.

“I wish you the best of luck. Have fun!” - RobertGcode

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4 - 5	PRINTING GUIDELINES
6	BUILDING GUIDELINES
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PRINTING GUIDELINES

RECOMMENDED PRINT SETTINGS:

The following print settings have been used and tested. Use the 3mf file for correctly oriented parts.

- **Printing process:** FDM
- **Material:** PETG
- **Layer height:** 0.2mm
- **Wall count:** 2 - 3
- **Infill:** 20%
- **Solid Top/Bottom Layers:** 4

THREAD TEST PART:

Some screws will be threaded straight into the 3d-printed plastic.

Use the “Thread_test_part” to test the fit.

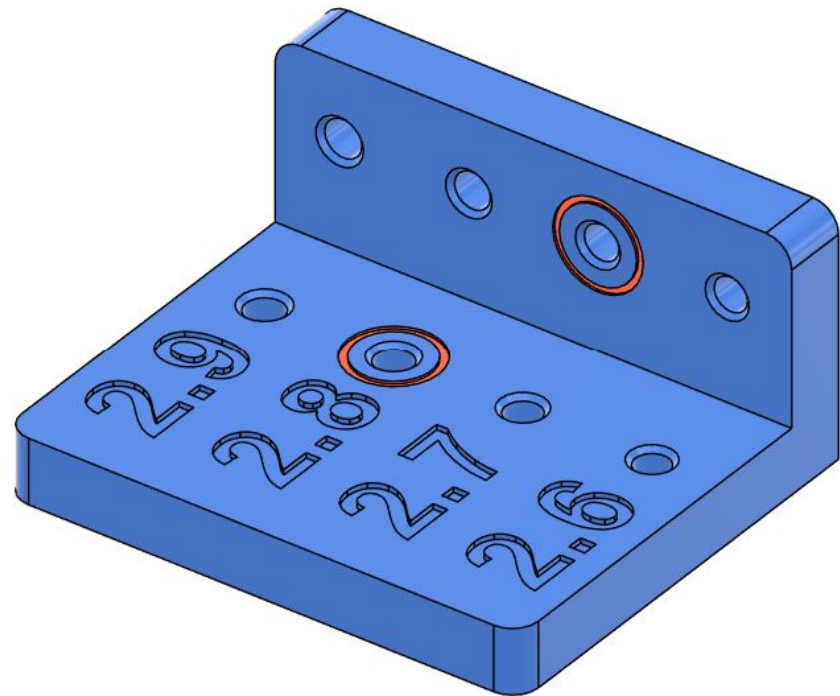
You should be able to drive the screws easily, when gripping the short side of the hex-key.

Make sure the circled holes fit correctly.

Use this part to test how much torque you can apply before the thread breaks.



During the build, tighten the screws carefully!
Overtightening can damage the plastic parts.



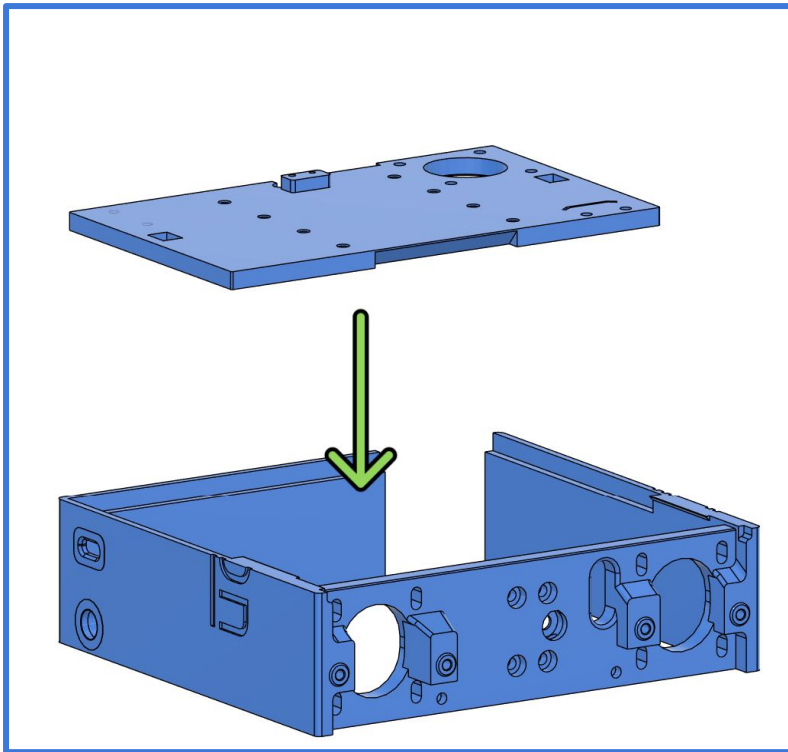
PRINTING GUIDELINES

PRINTING THE UNIBODY FRAME:

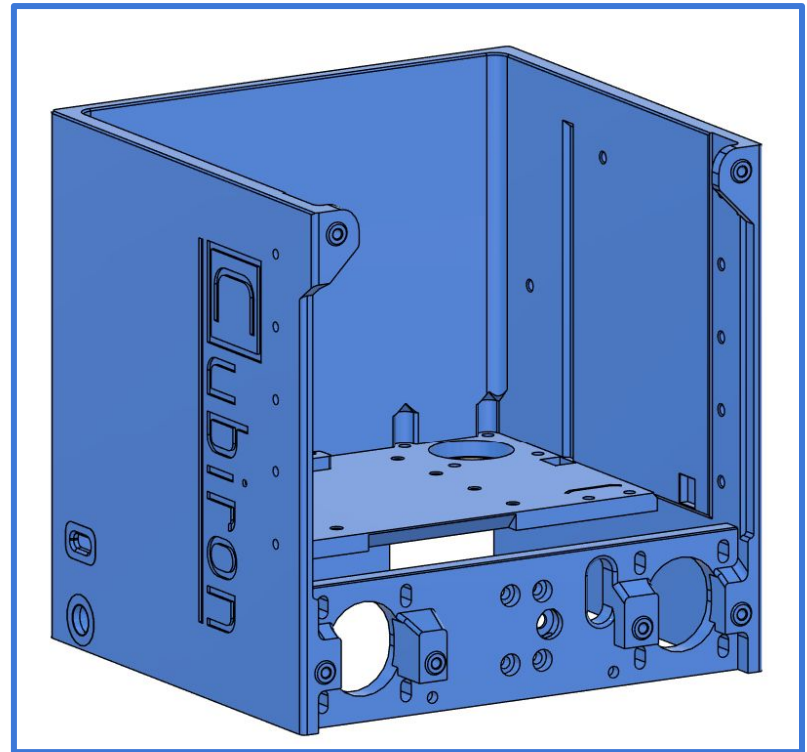
- Print the “Z_axis_backplate” first.
- While printing “main_frame”, set the print to pause at a height of 40.2mm.
- Insert the “Z_axis_backplate” into the “main_frame” and resume the print.

Pro Tip: To hide layer inconsistencies, use the **Fuzzy Skin Paint Tool** to apply fuzzy skin only to the outer faces with the "Cubiron" logo.

1)



2)



BUILDING GUIDELINES

- ❖ Avoid overtightening screws tapped into plastic parts. Grip the hex-key at the short end.
- ❖ Unless specified, you can use either a Socket Head Cap Screw (SHCS) or a Button Head Cap Screw (BHCS).
- ❖ Be careful when using superglue. Make sure it doesn't bind up any bearings.
- ❖ Some screws may be difficult to access by hand, if you have a precision screwdriver set, use the flex shaft extension.
- ❖ REQUIRED TOOLS:
 - 1.5, 2, 2.5mm hex-keys
 - Needle nose pliers
 - Flush cutters
 - Soldering iron
 - Wire stripping tool
 - JST-crimping tool
 - Multimeter
 - FDM 3D-printer
 - PC for flashing and configuring Klipper firmware
 - Optional:
 - Vise
 - Ferrule crimping set
 - Precision screwdriver set with flex shaft extension

PART PREPARATION

Idler Assembly:

2x "idler_flange"

2x 5x3

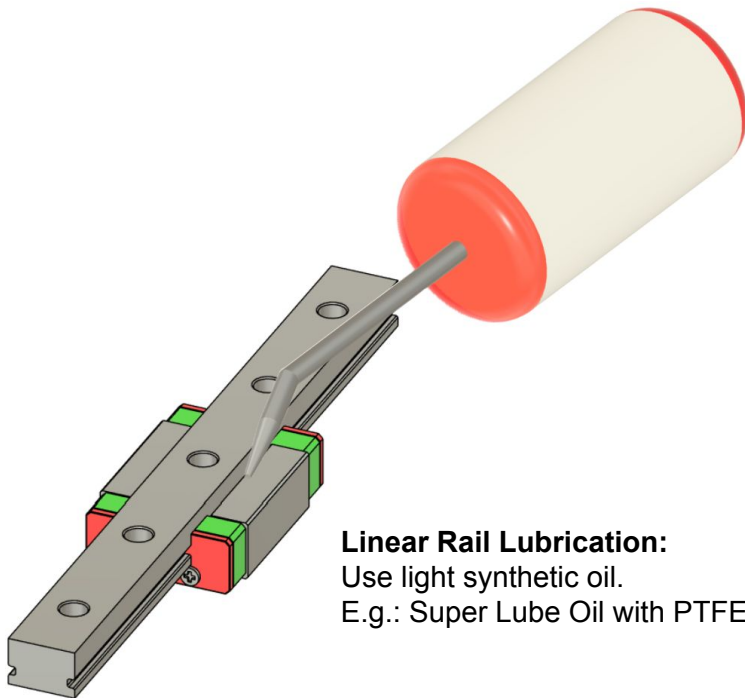
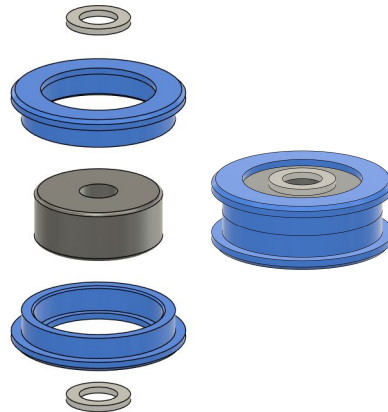
x0.5 spacer

1x 623-2RS bearing

Superglue the flanges together.

You will need 12pcs total.

Alternative: "Single-piece-idler.stl"



Linear Rail Lubrication:

Use light synthetic oil.

E.g.: Super Lube Oil with PTFE

2GT Belt Cutting Tool:

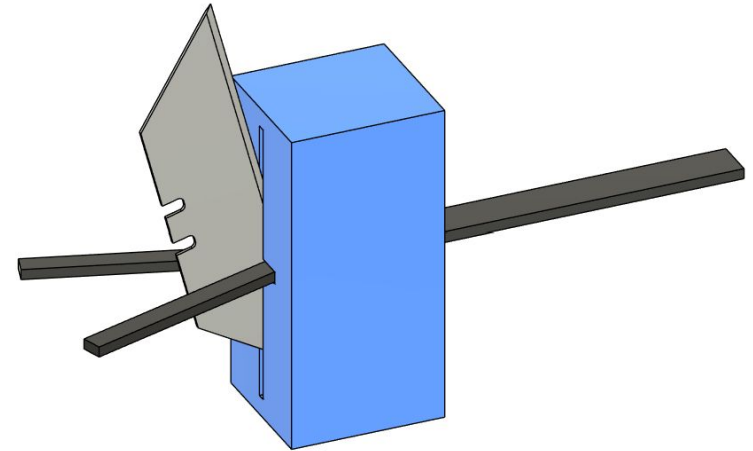
Insert a cutting blade into the slot.

Push the belt through the cutter.

You should be left with 1m each.

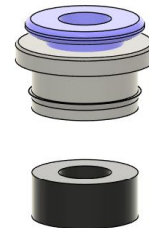


Be careful when using sharp blades!

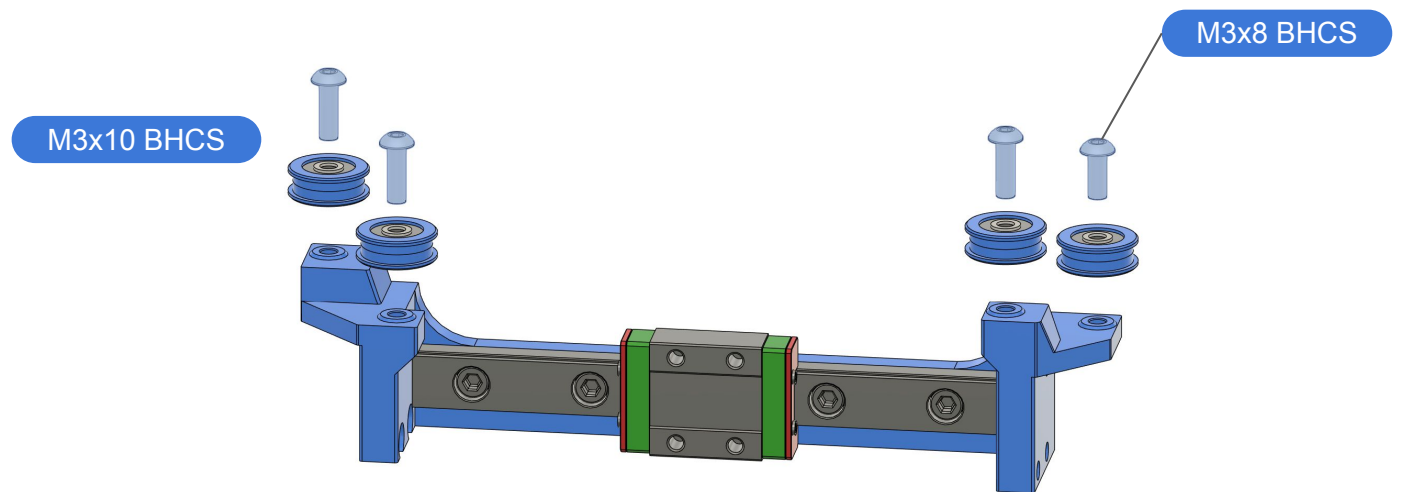
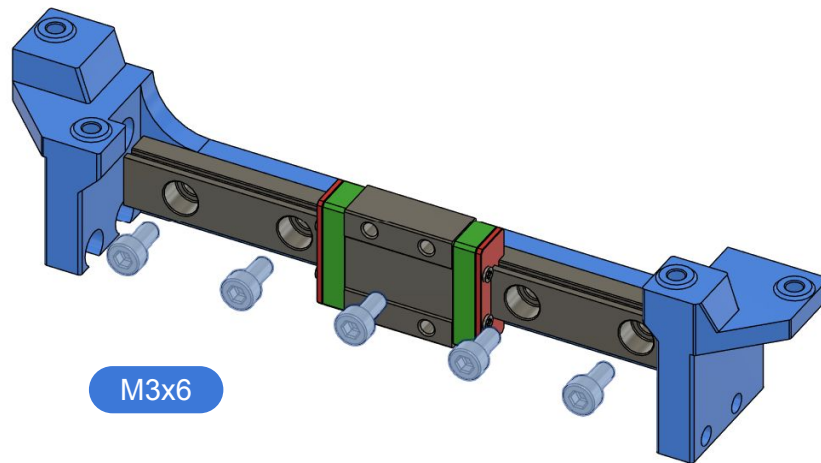


ECAS-04 Bowden coupler:

Remove the rubber seal.



X-AXIS

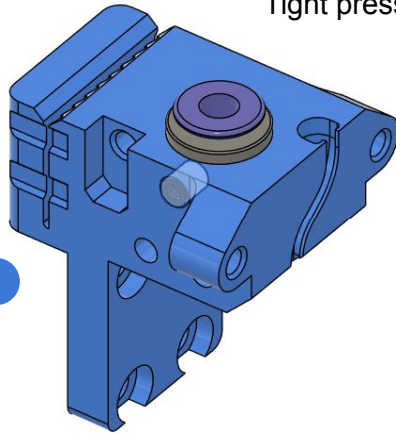


X-AXIS

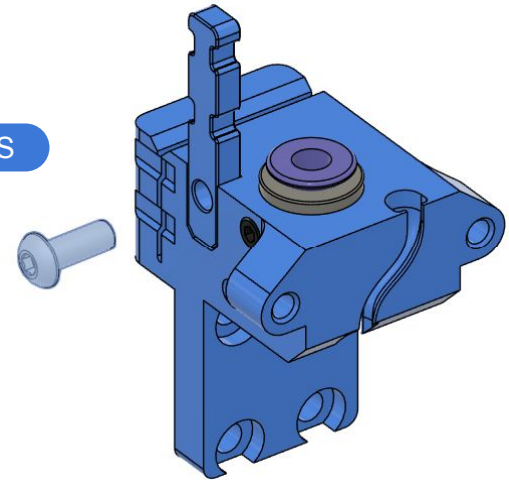
ECAS-04 bowden coupler

Tight press fit. Use vise.

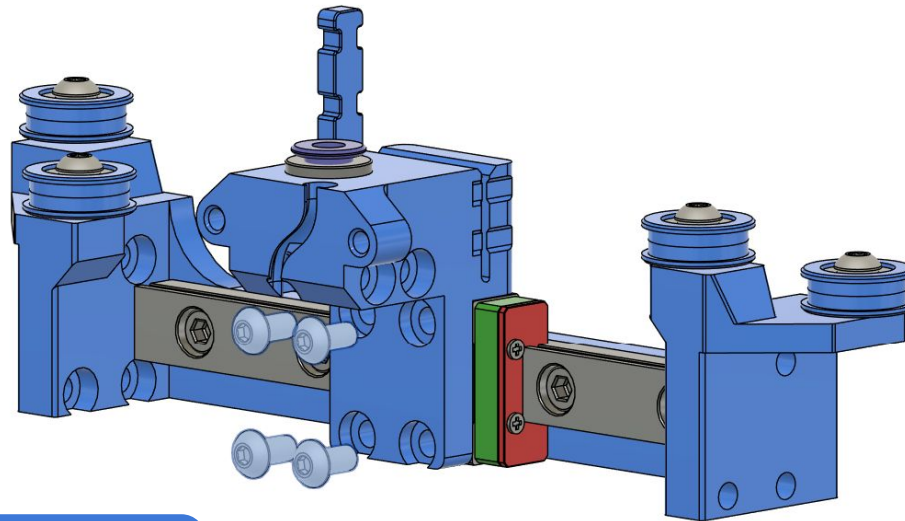
M3x4 grub screw



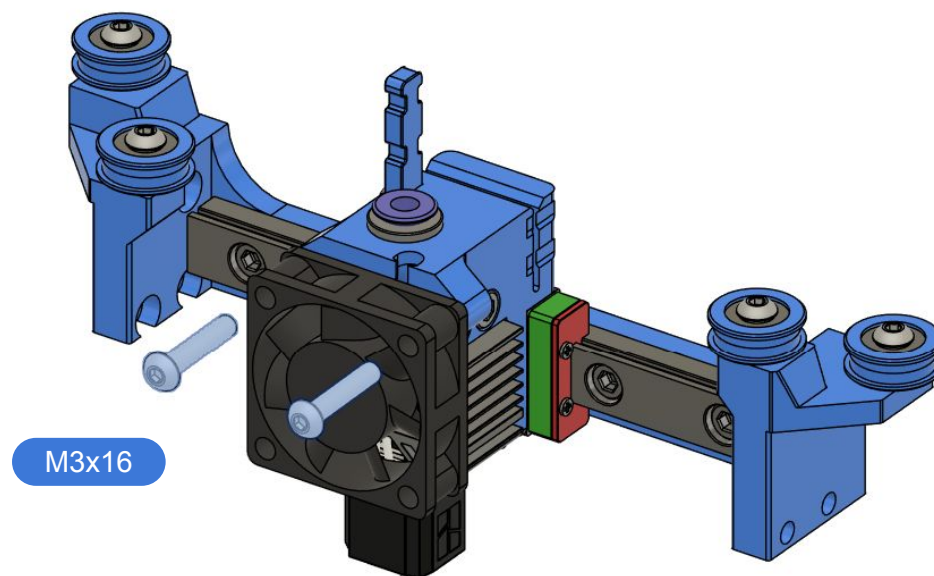
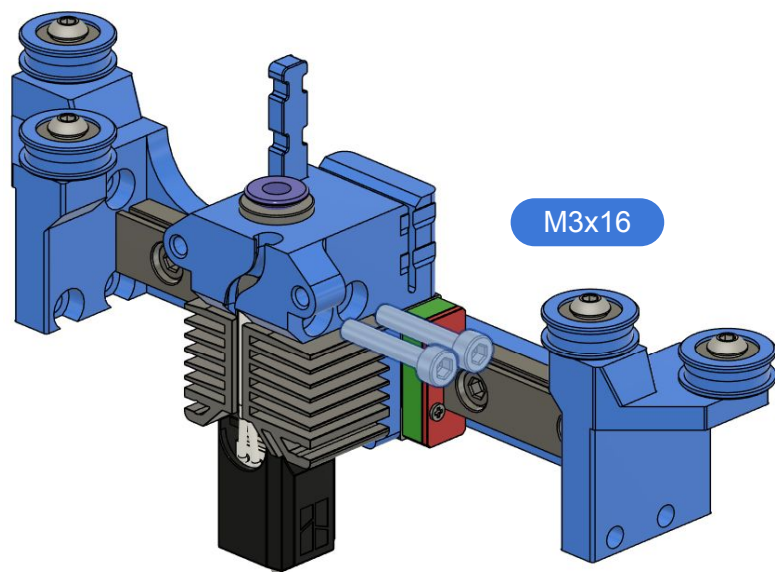
M3x8 BHCS



M3x6 BHCS

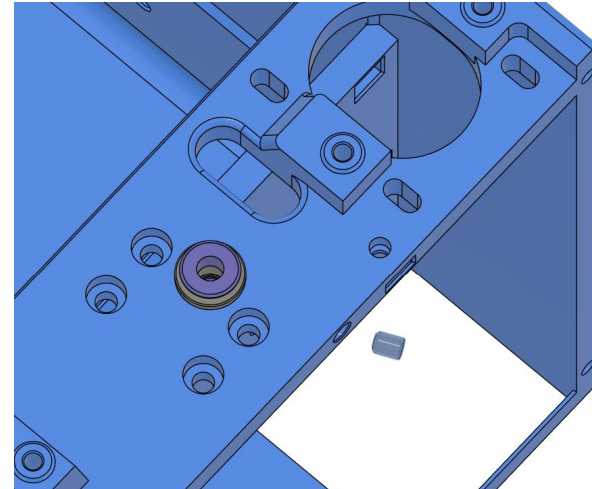
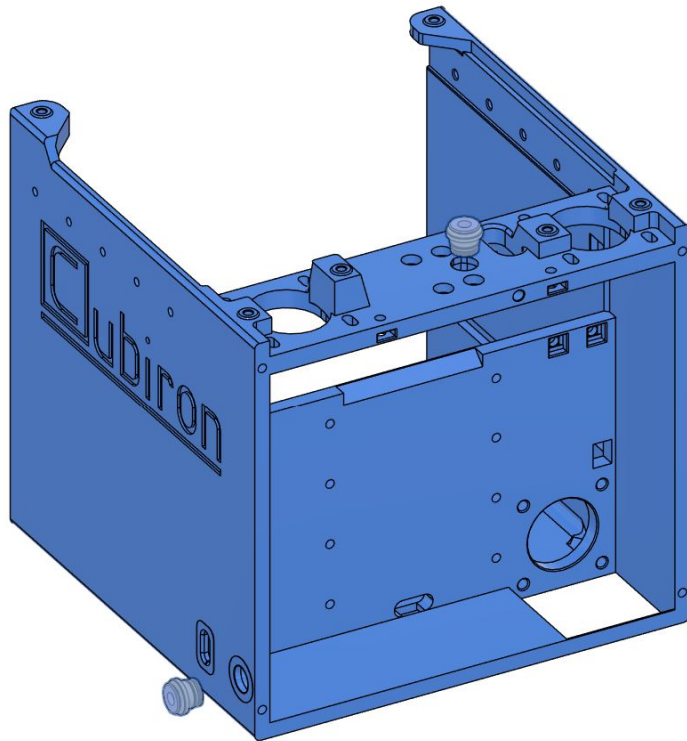


X-AXIS



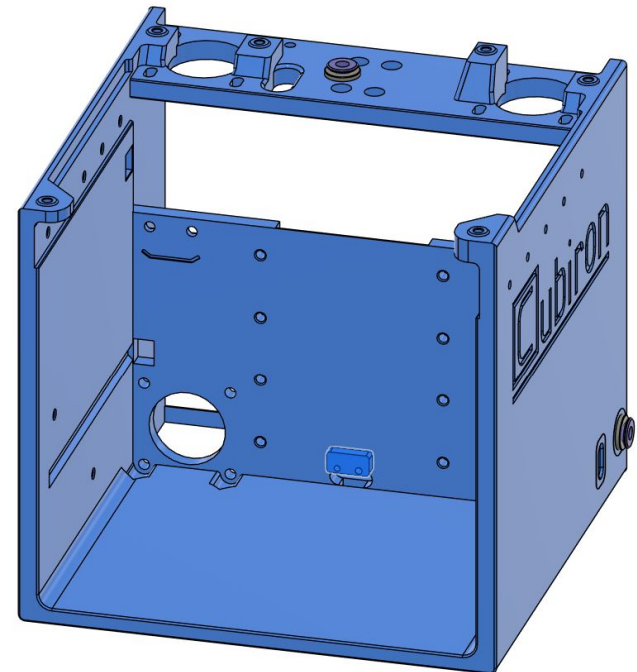
FRAME

ECAS-04 bowden couplers



M3x4 grub screw

Superglue the "Z_endstop_mount".



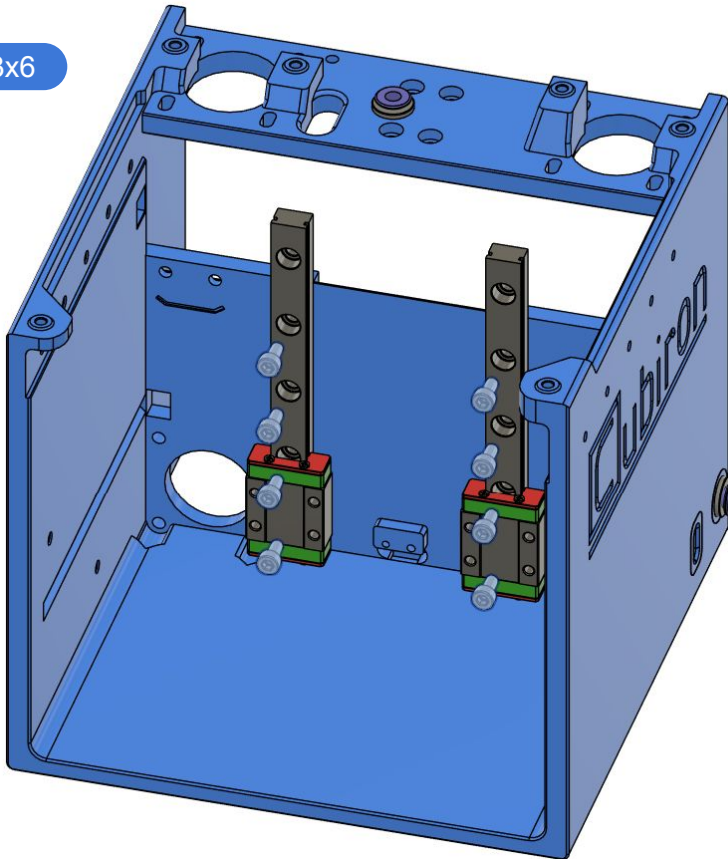
FRAME



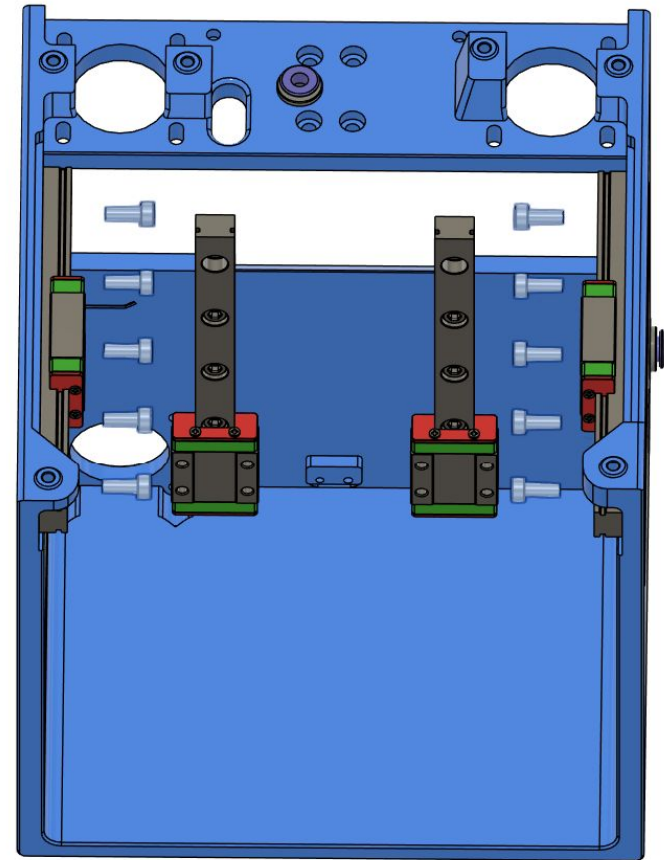
Make sure the carts don't slide off the linear rail when handling the printer!

M3x6

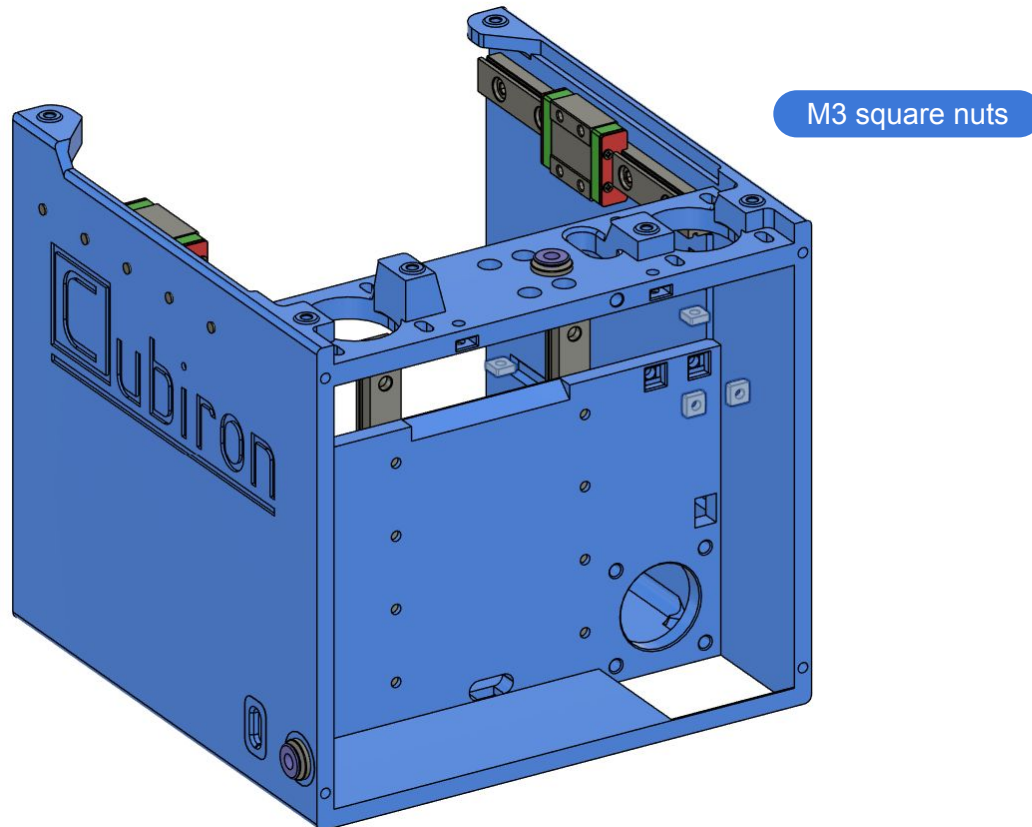
Loosen the z-rail screws $\frac{1}{4}$ of a turn after tightening. Final tightening will be done later.



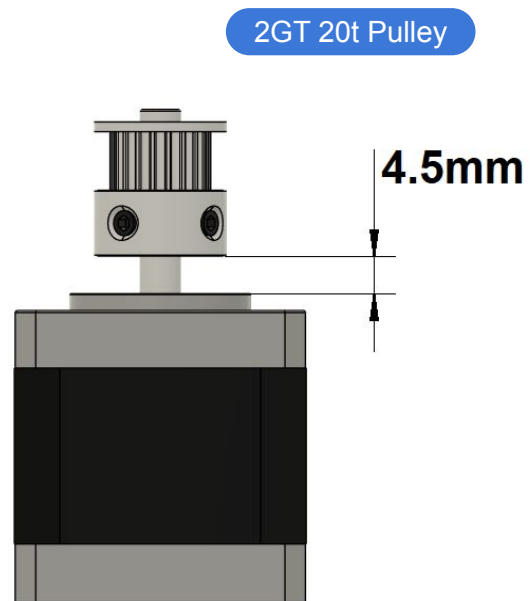
M3x8



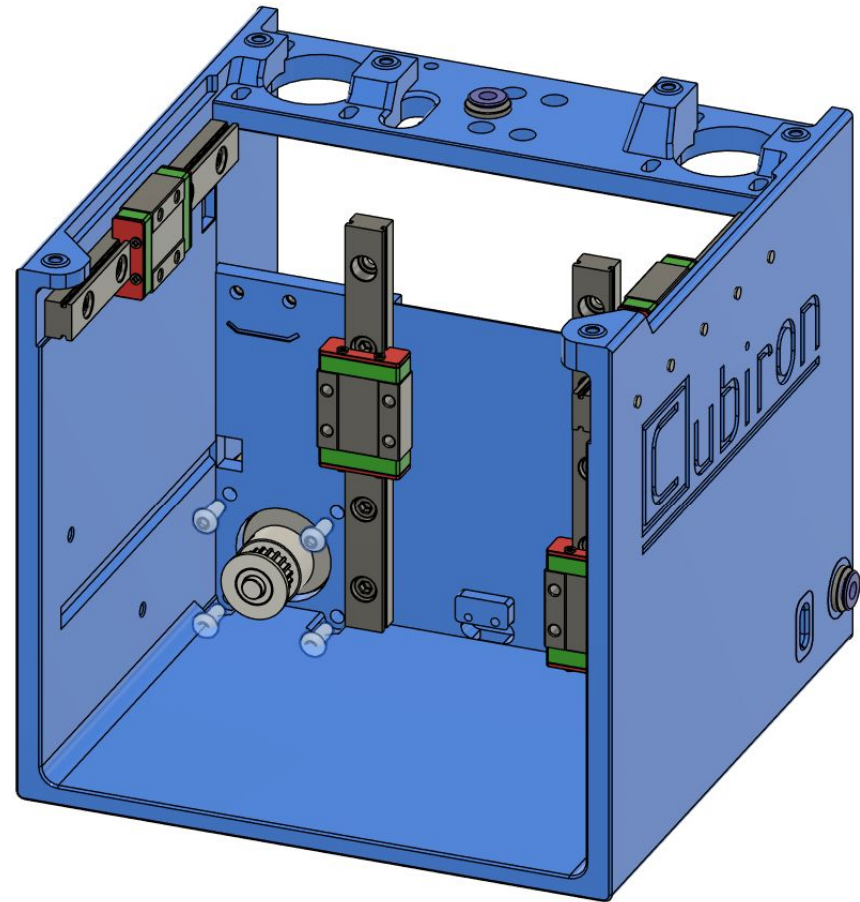
FRAME



Z-AXIS



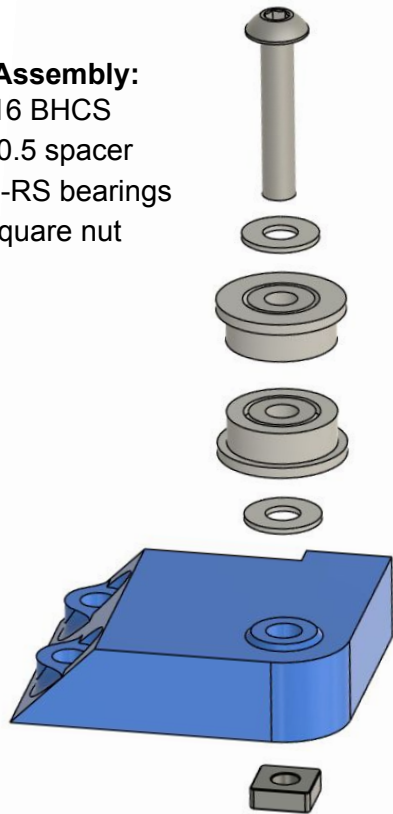
M3x8 BHCS



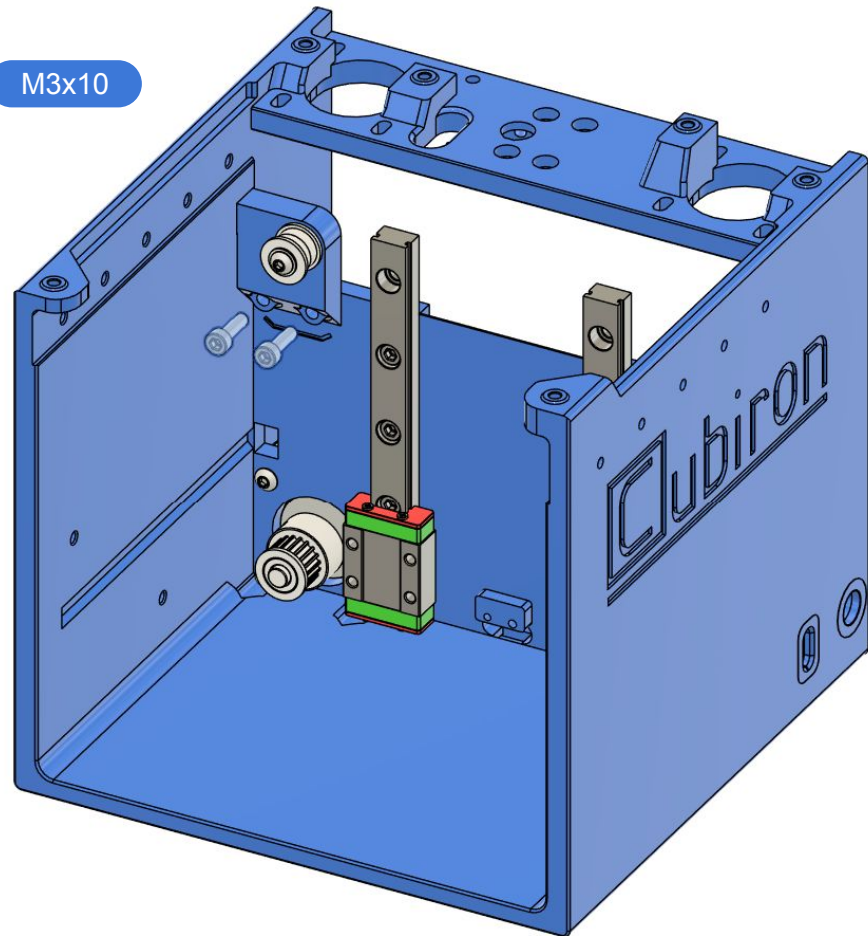
Z-AXIS

Z-Idler Assembly:

- 1x M3x16 BHCS
- 2x 5x3x0.5 spacer
- 2x F623-RS bearings
- 1x M3 square nut



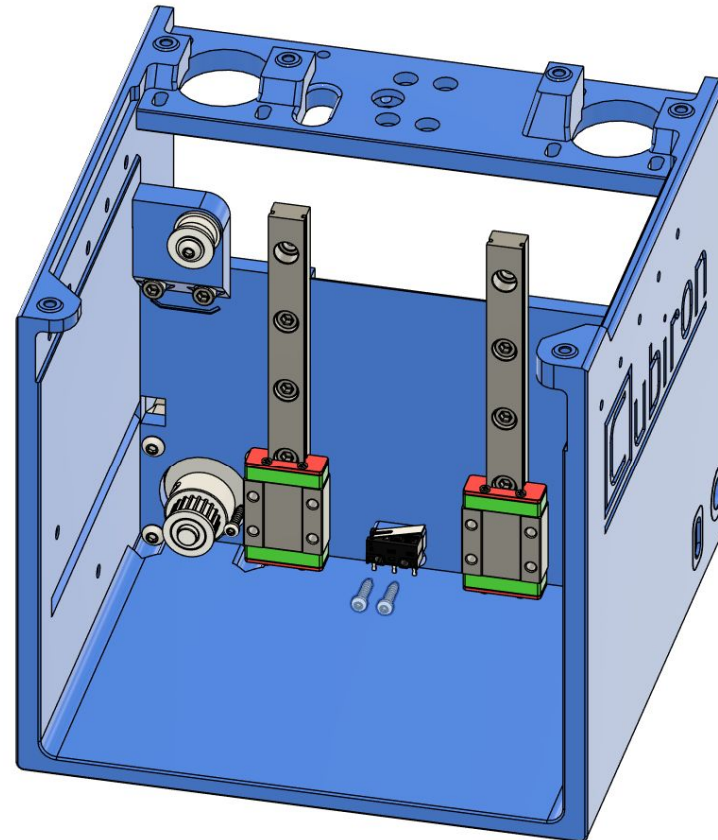
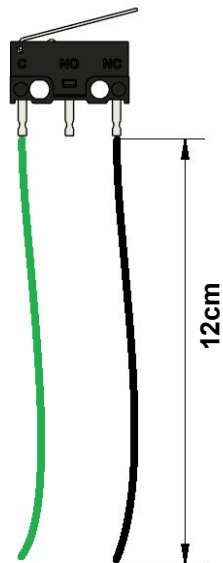
M3x10



Z-AXIS

Solder about 12cm of wire to the micro endstop switch in NC configuration.

Wires are not shown in 3d-models.



M2x10 self tapping

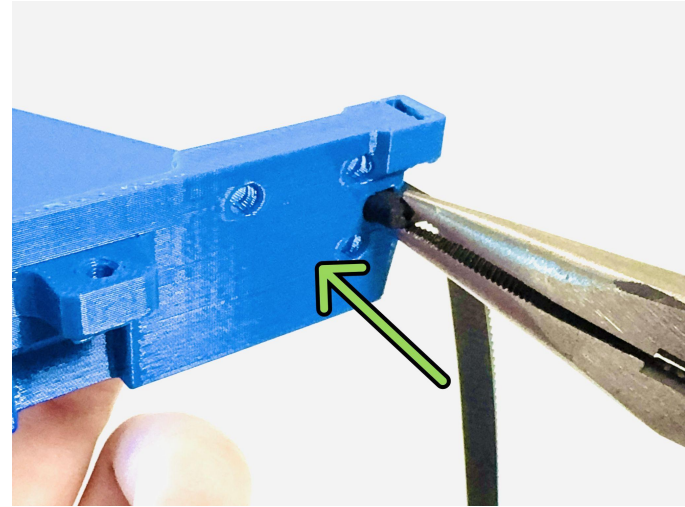
Z-AXIS BELT

This step is very nuanced. Please follow the steps carefully.

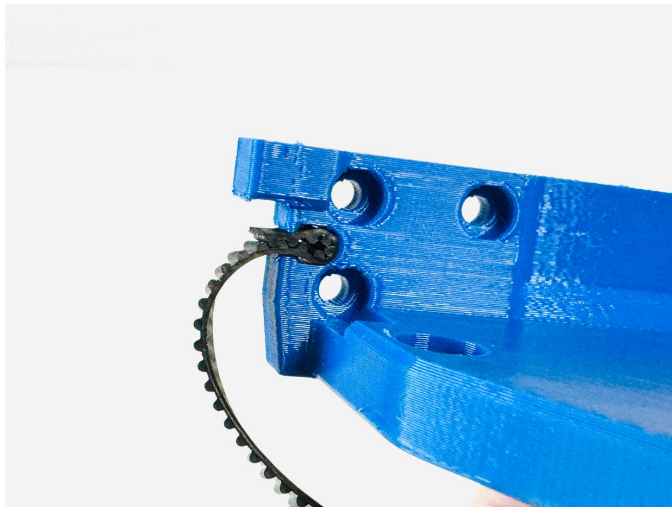
1) Fold over 3 teeth of the belt and hold it with pliers.



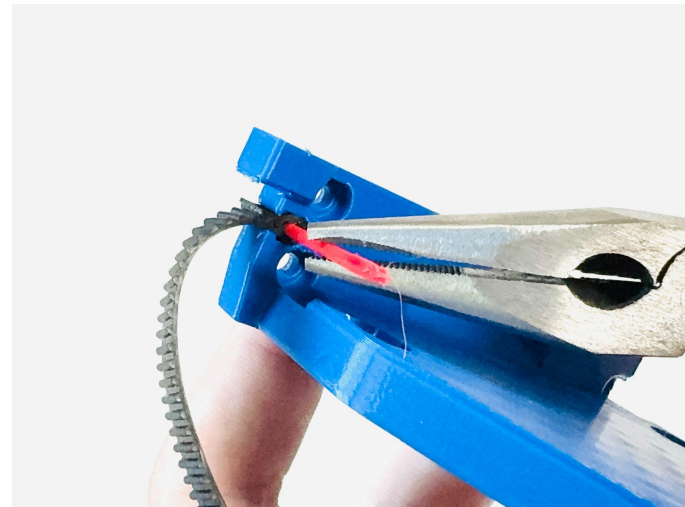
2) Push the belt into the "Bed_Frame".



3) It should look like this.



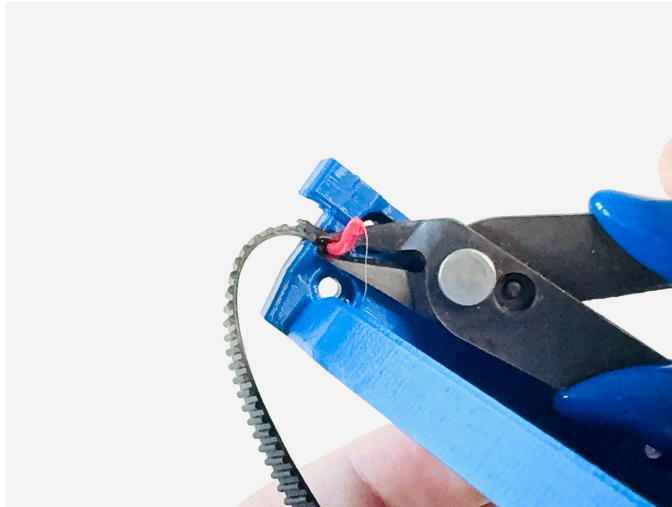
4) Push a piece of filament into the belt loop.



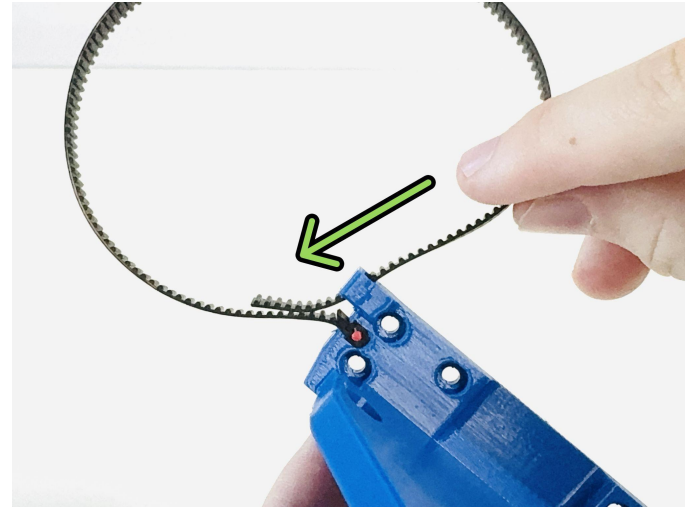
Z-AXIS BELT

Repeat step 7-8 until the belt loop fits correctly on the Z-axis pulleys.

5) Cut off the excess filament.



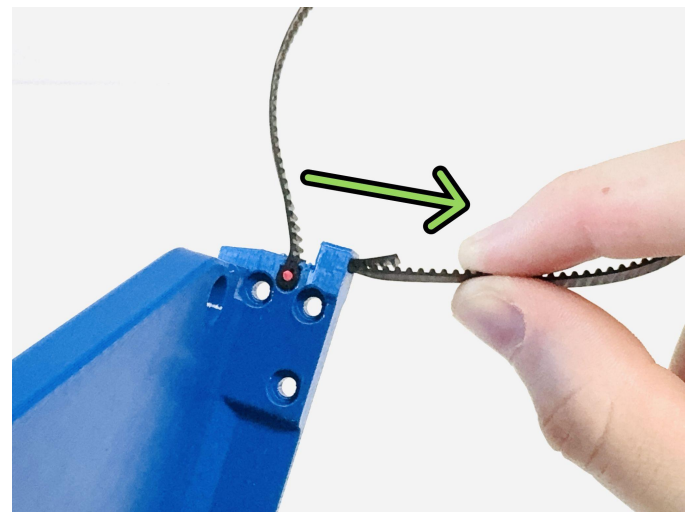
6) Slide the other end of the belt into the slot at the top.



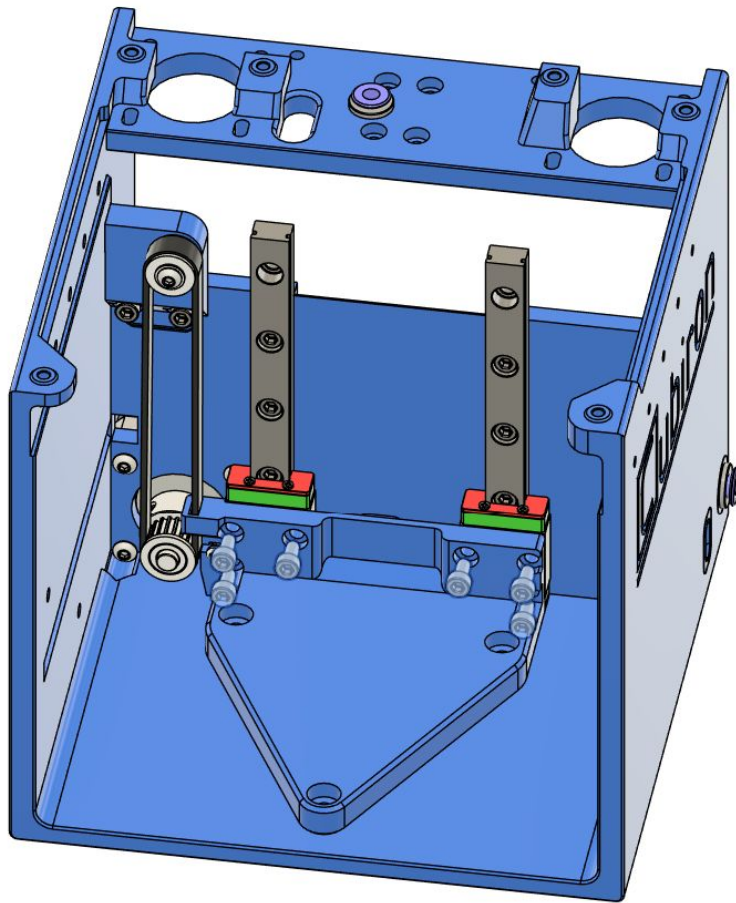
7) Fold the belt over with pliers.



8) Pull the folded belt through the slot until snug.

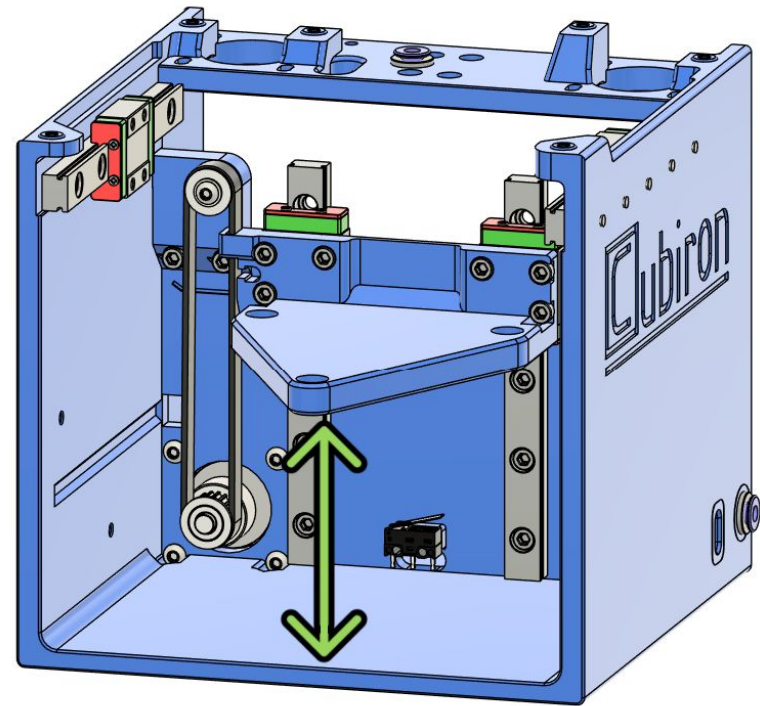


Z-AXIS

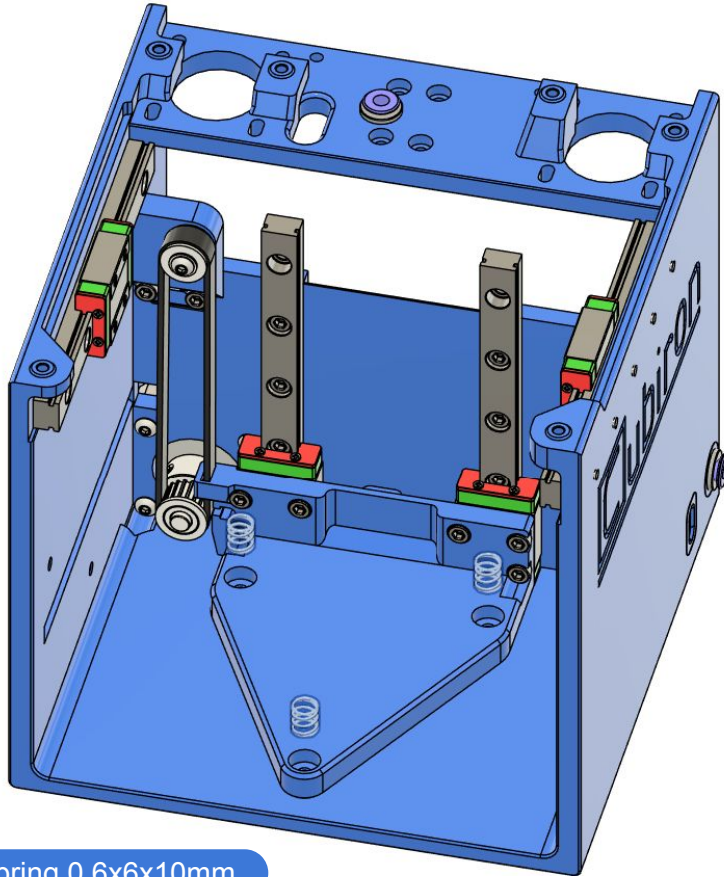


M3x6

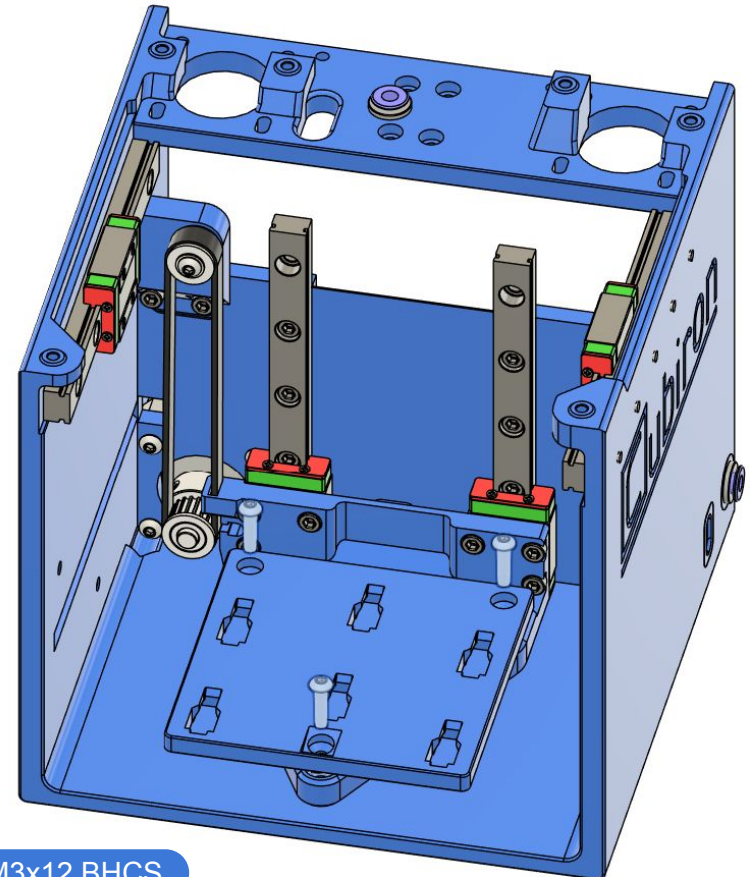
Final tightening of z-rail screws:
Make sure the z-axis moves smoothly.



Z-AXIS



Spring 0.6x6x10mm

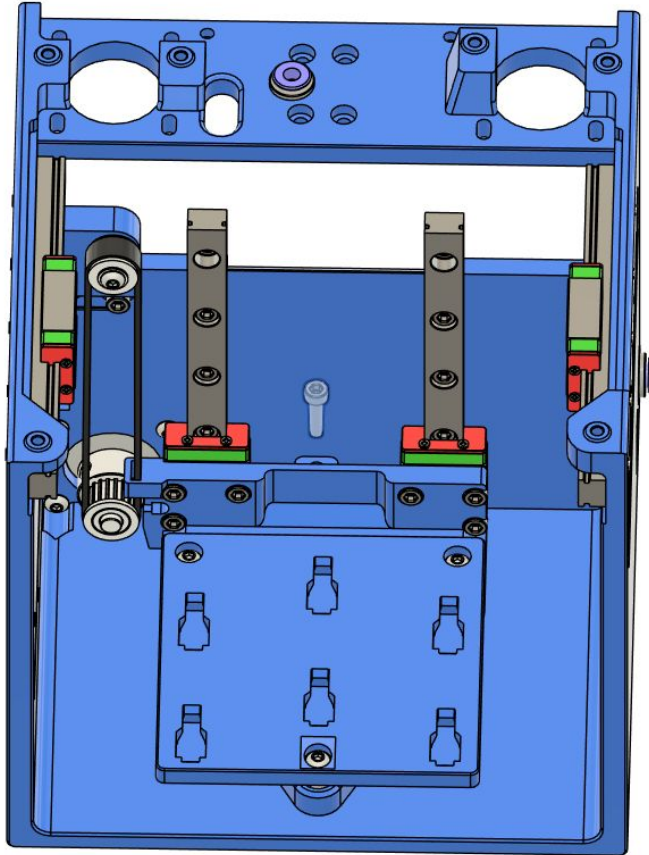


M3x12 BHCS

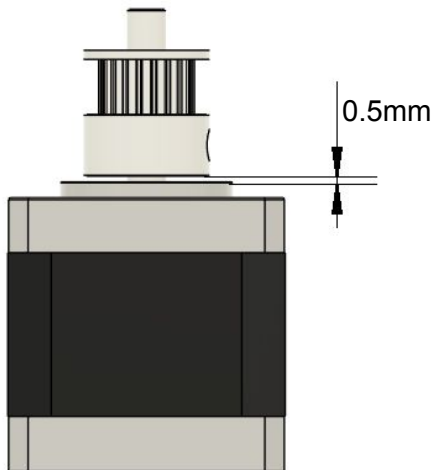
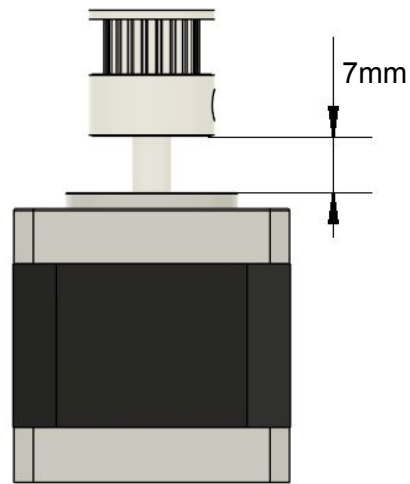
Z-AXIS

M3x12

Z-endstop screw.

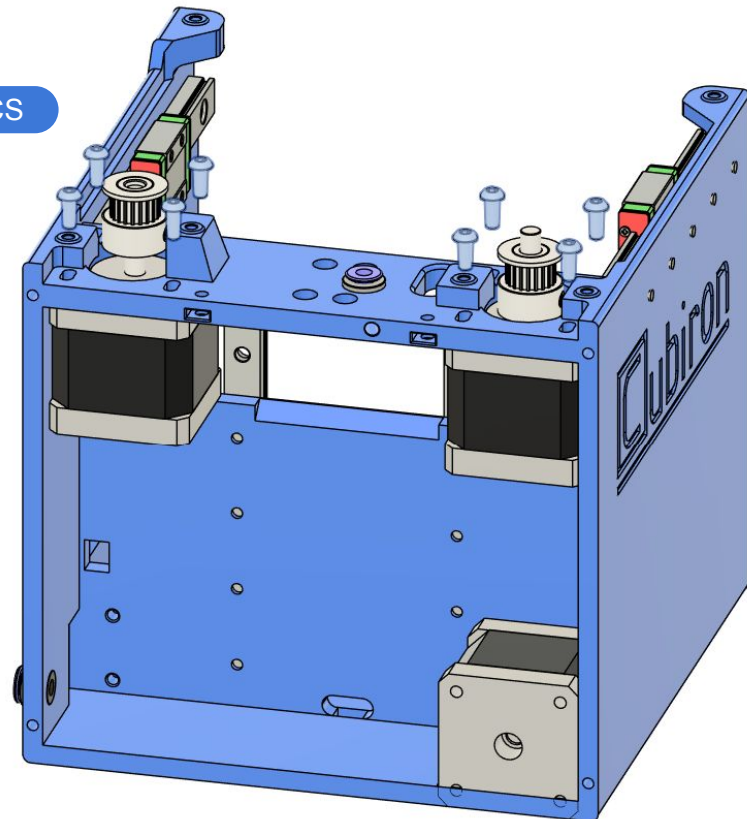


CORE-XY

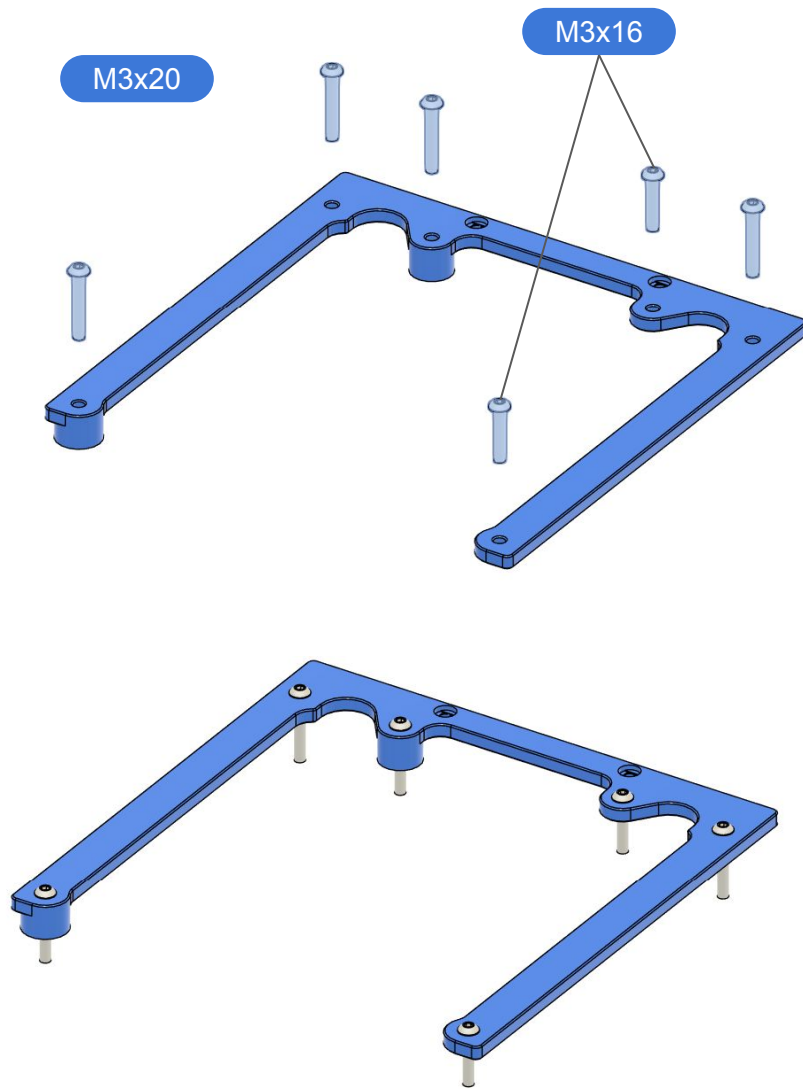


Note the pulley position on each stepper motor!
Leave the M3x8 screws loose for final belt tensioning.

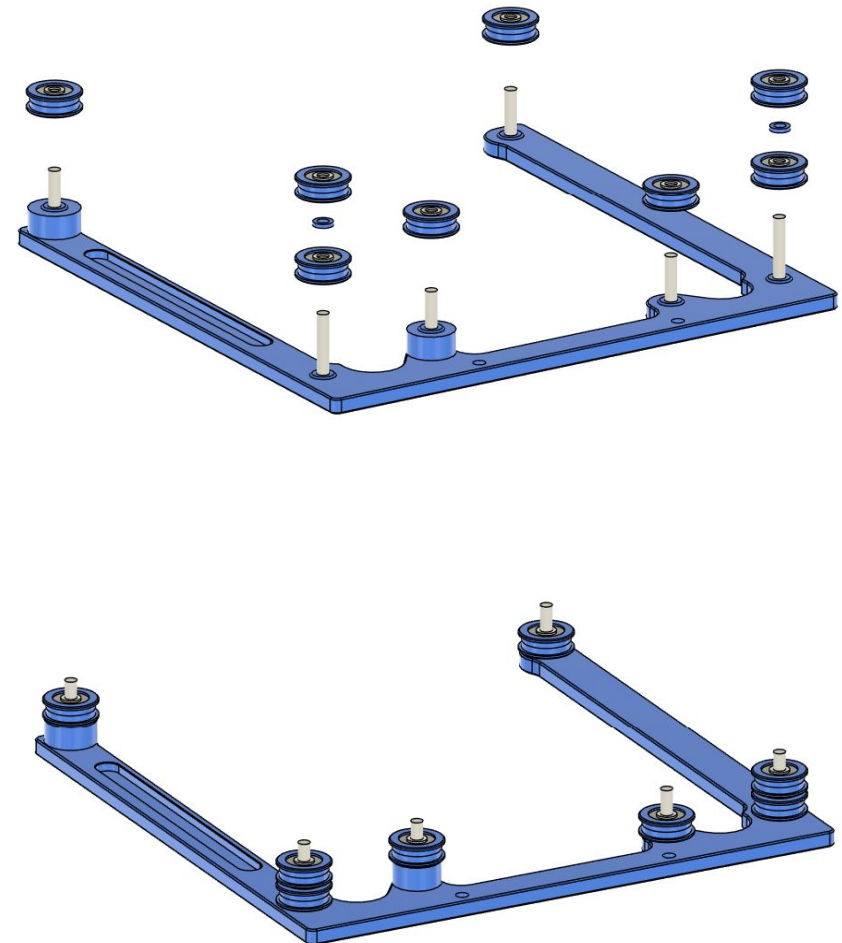
M3x8 BHCS



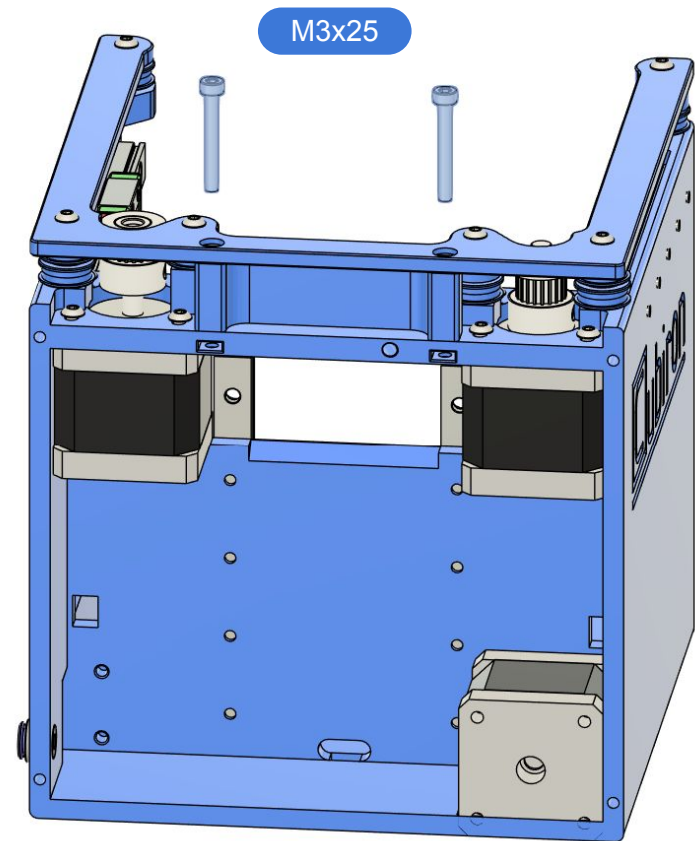
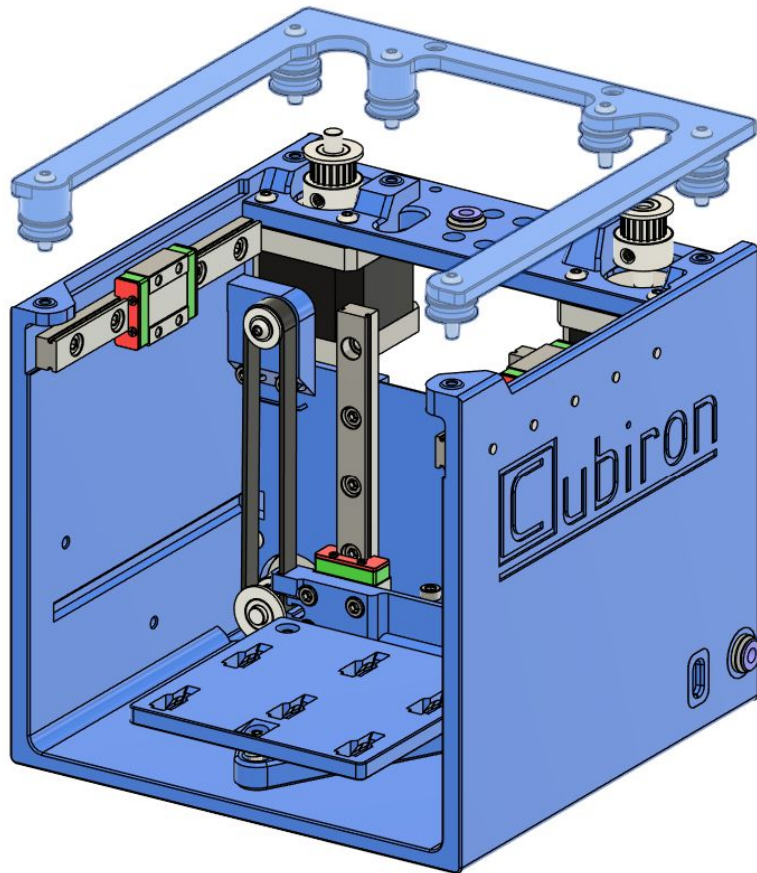
CORE-XY



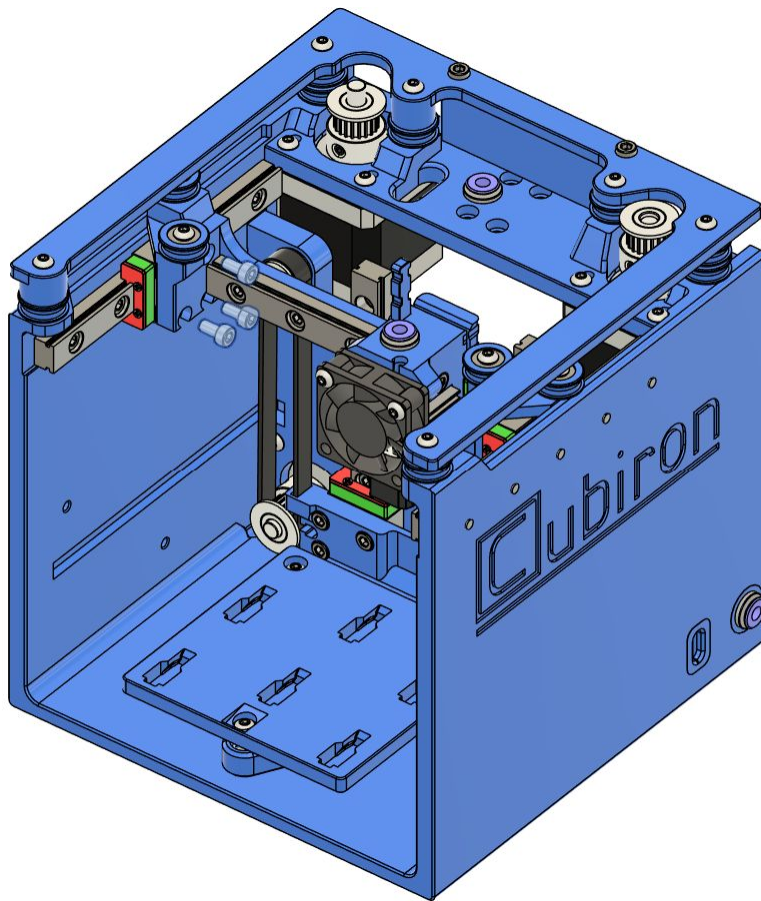
Idlers as assembled previously.
Don't forget the 5x3x0.5 spacers!



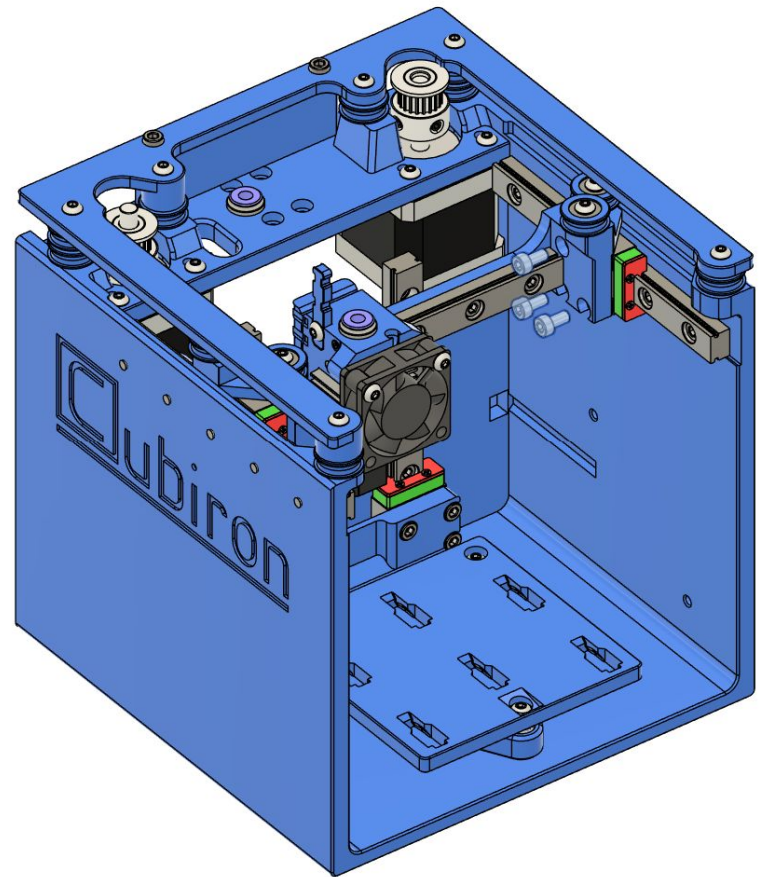
CORE-XY



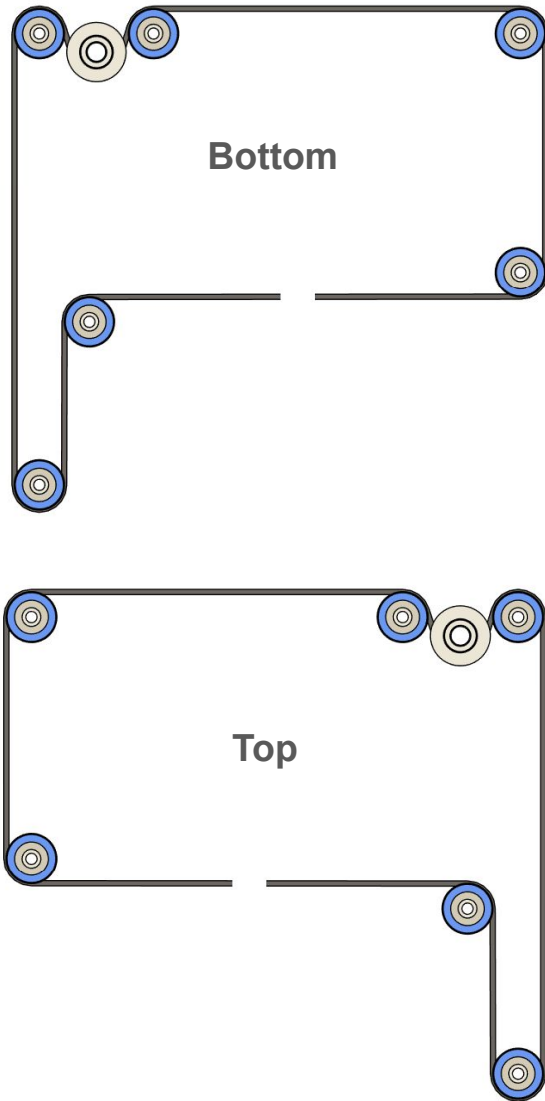
CORE-XY



M3x6



CORE-XY BELT



Belt clamp:

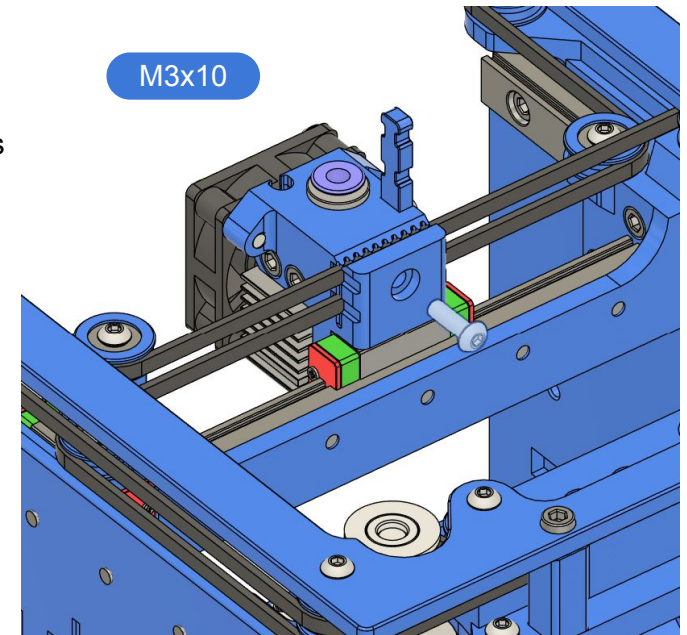
Align the belts with the markers on the side of the print head.

A minimum of 3-teeth of belt should be engaged with the clamp!

Cutting the final length:

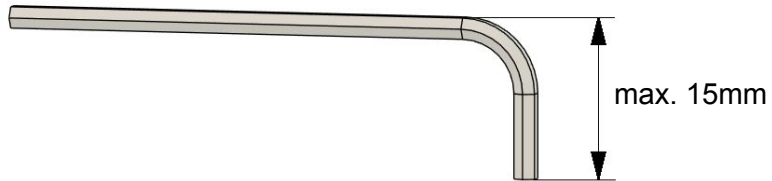
Both belts must be cut equally long!

Finally, use a M3x10 screw to clamp the belts.



CORE-XY BELT

Prepare a 2mm hex-key for hard to reach places.



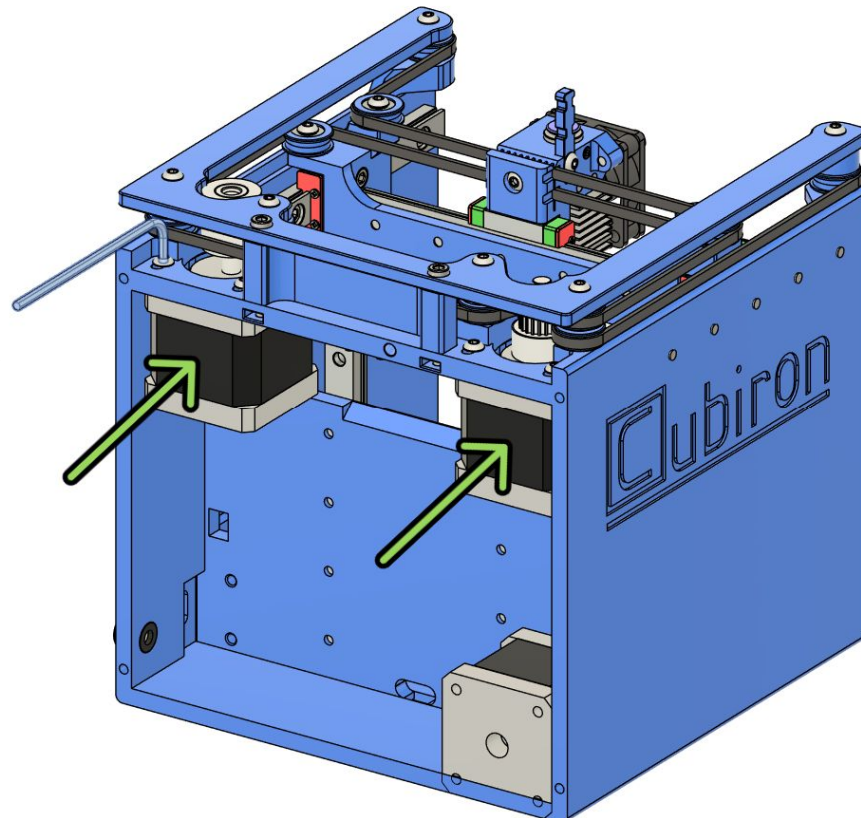
Belt tensioning:

Apply a light force on the stepper motor to tension the belt with one hand.

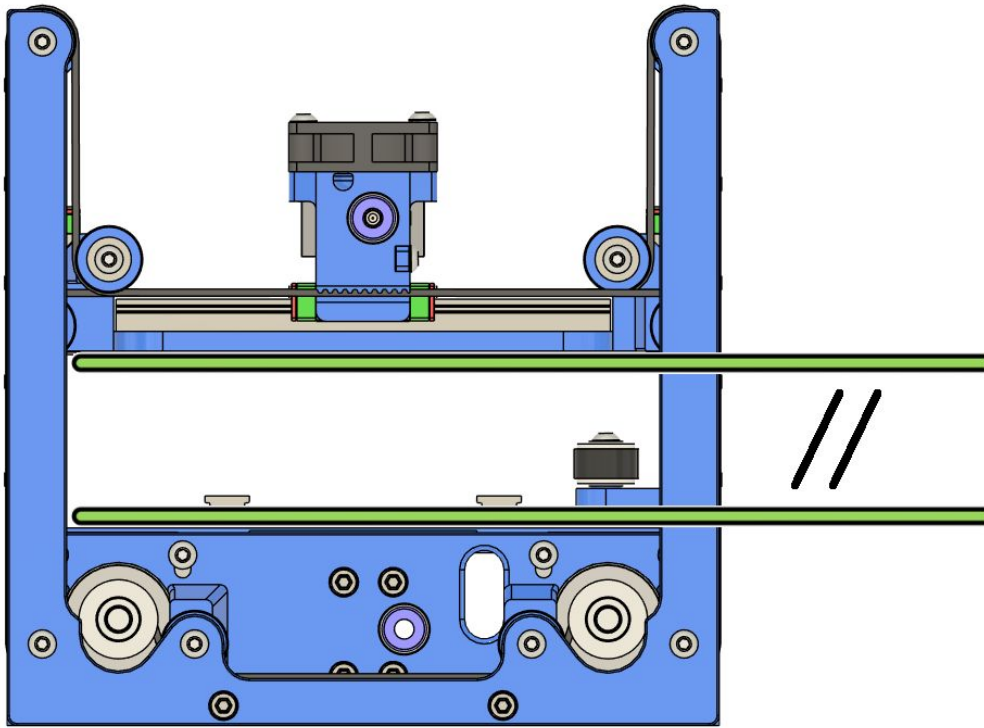
Use your other hand to tighten the M3x8 screws on the stepper motor.

Repeat this step on both stepper motors.

The final belt tension is much less than machines with 6mm belts.



CORE-XY BELT



Gantry racking:

Check that the X-Beam is parallel to the printer frame by moving it all the way back and look for play on either side of the X-Beam.

Anything below **0.5mm of play is good enough**, as it will result in ≤ 0.3 degrees of skew.

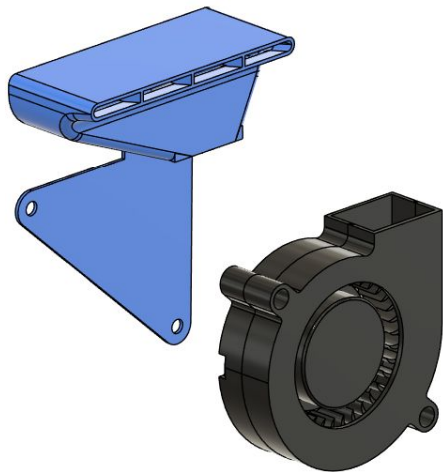
If the skew is too big, the problem may be:

- Unequal belt length or
- Improperly tensioned belts

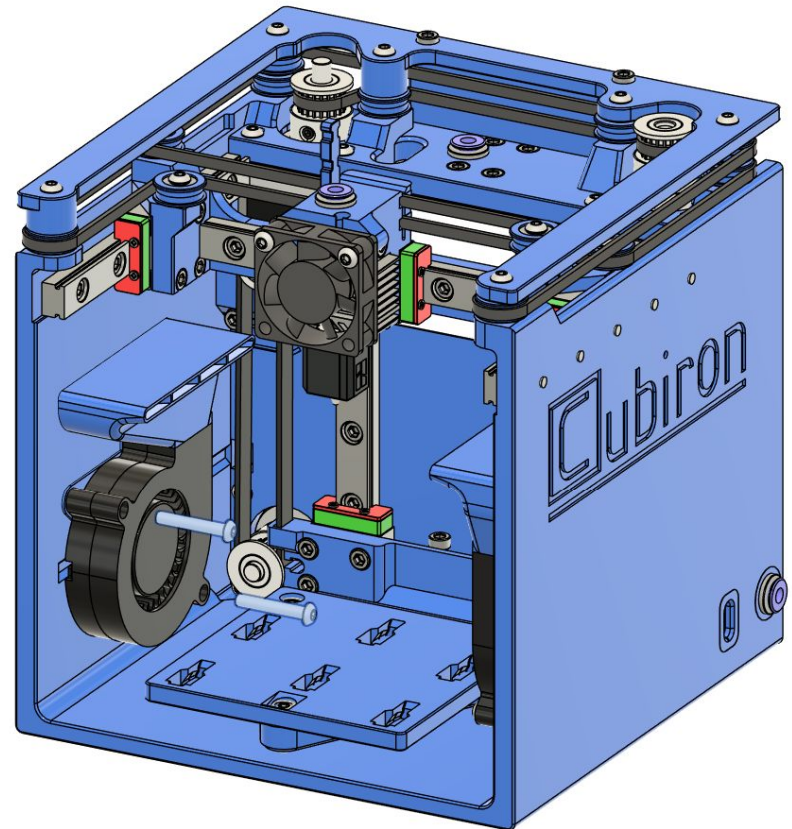
Retry the previous steps if necessary.

PART COOLING FANS

Use two 5015 radial blower fans for part cooling.
Route the lefthand fan wires through the channel.
Be careful to not pinch any wires!

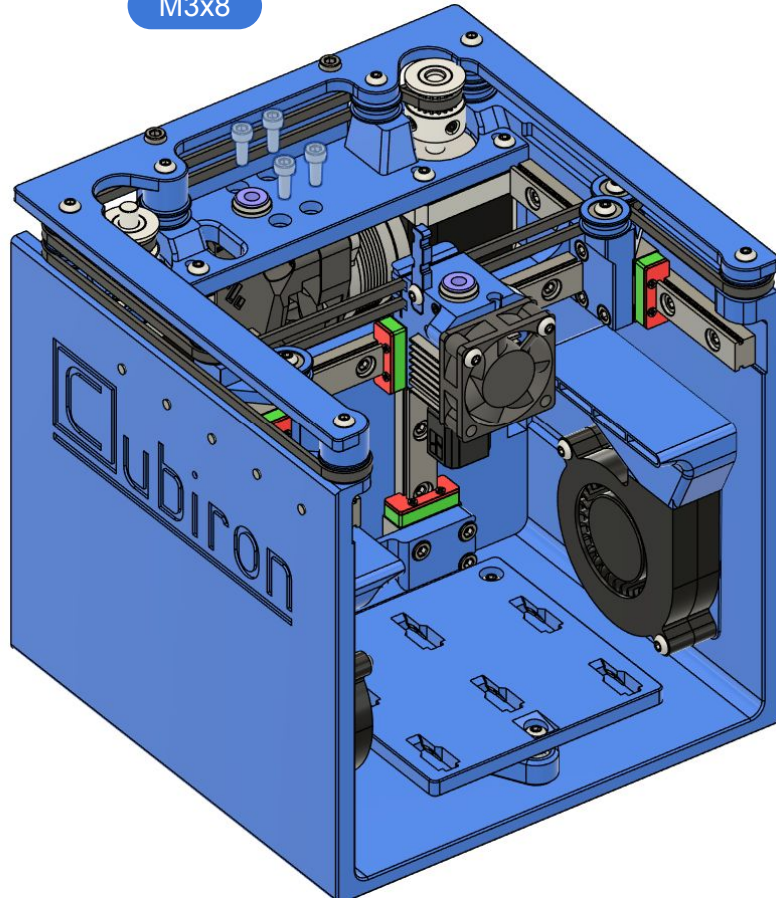


M3x20



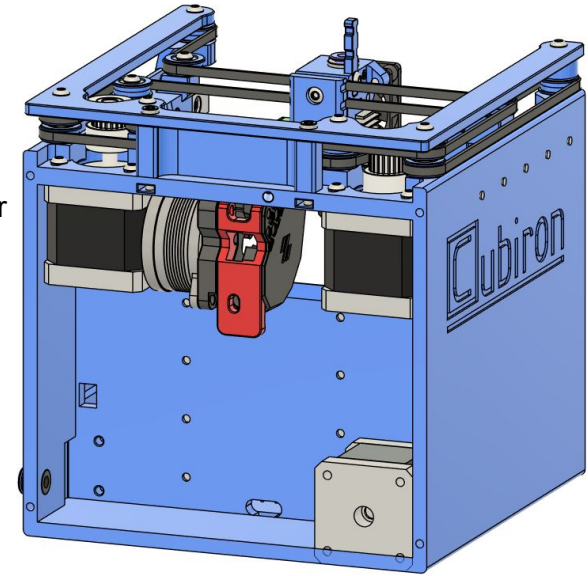
EXTRUDER

M3x8

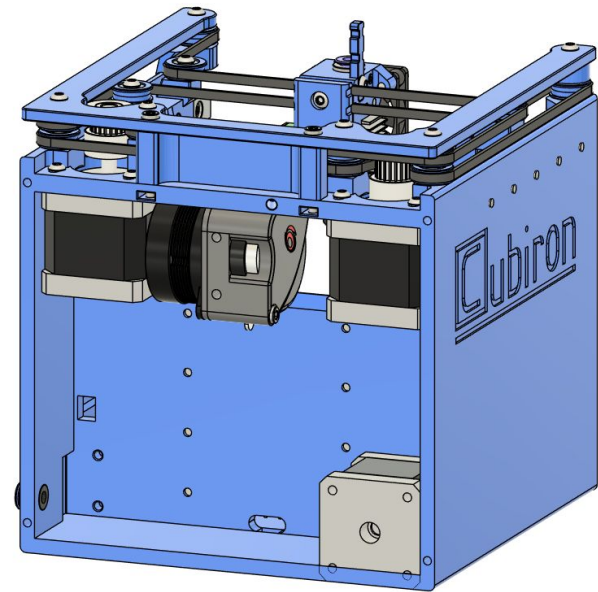


Compatible with:

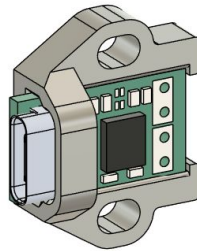
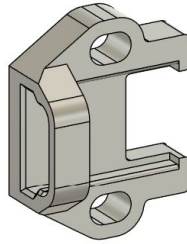
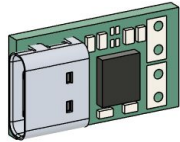
Hummingbird extruder



LGX-Lite extruder

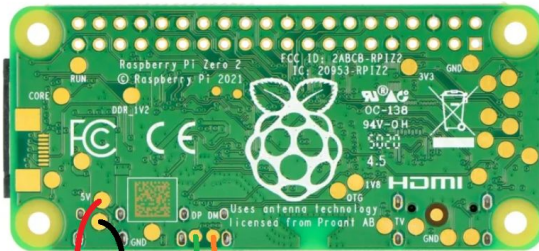
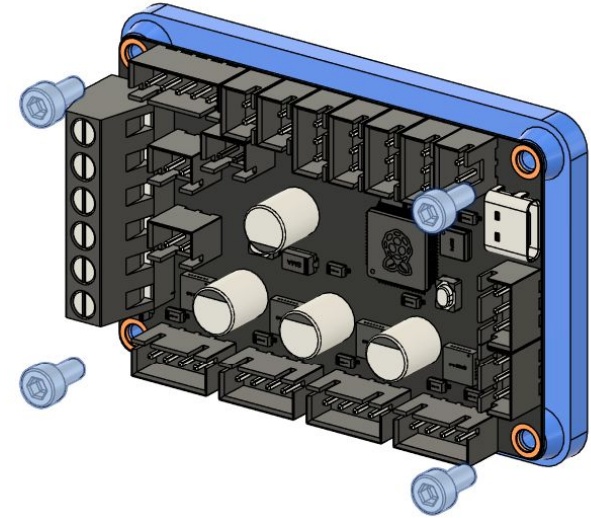


ELECTRONICS



PDC004-PD 20V

M3x6



USB-signal -
USB-signal +

> USB-C cable for
Micro4

GND
+5V DC

< Power input from
MP1584EN

For Mellow FLY Micro4 users:

Due to lack of UART pins, you need to connect a micro-USB to USB-C data cable.

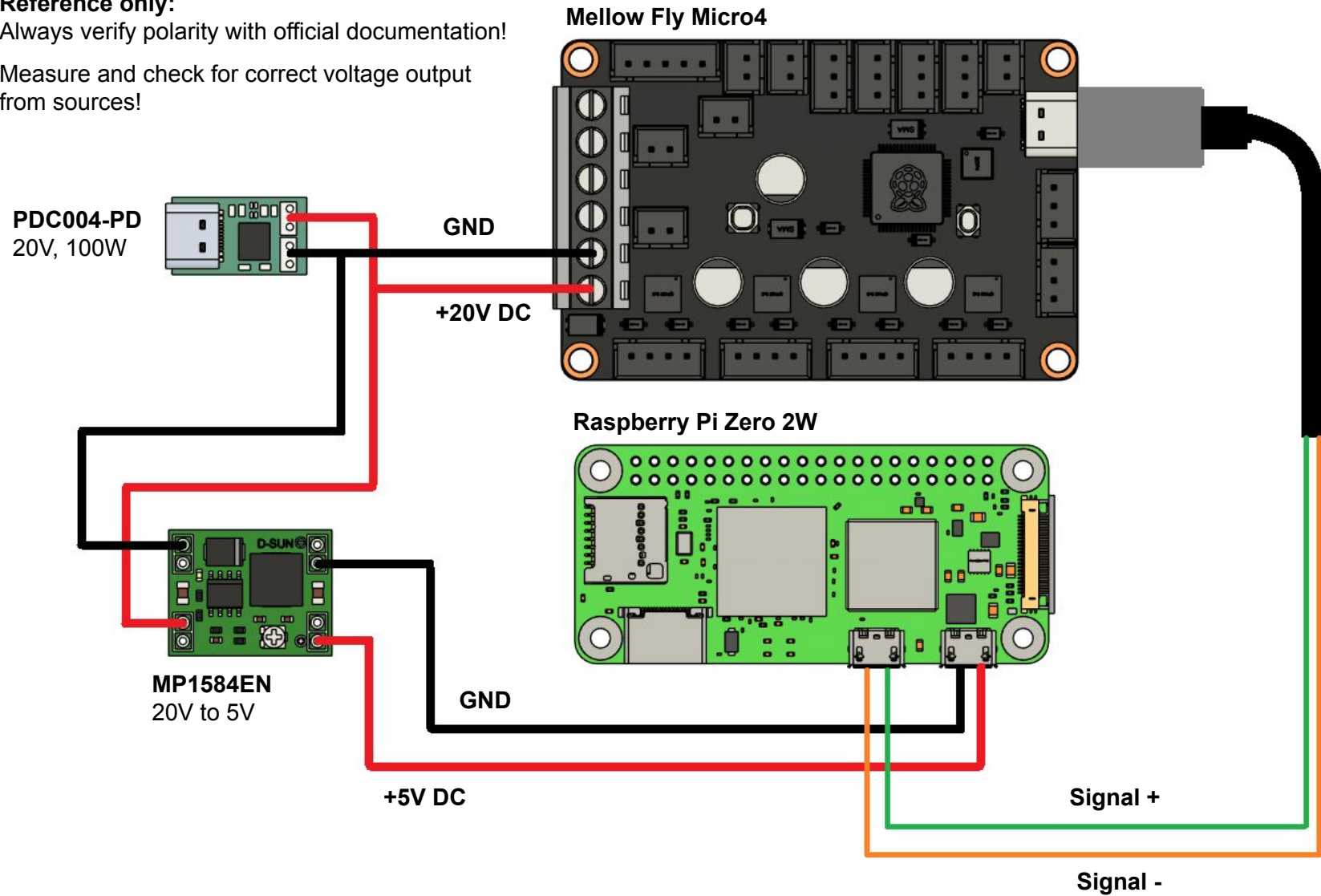
It is also possible to solder to the test pads of the Raspberry Pi Zero 2w.

ELECTRONICS

Reference only:

Always verify polarity with official documentation!

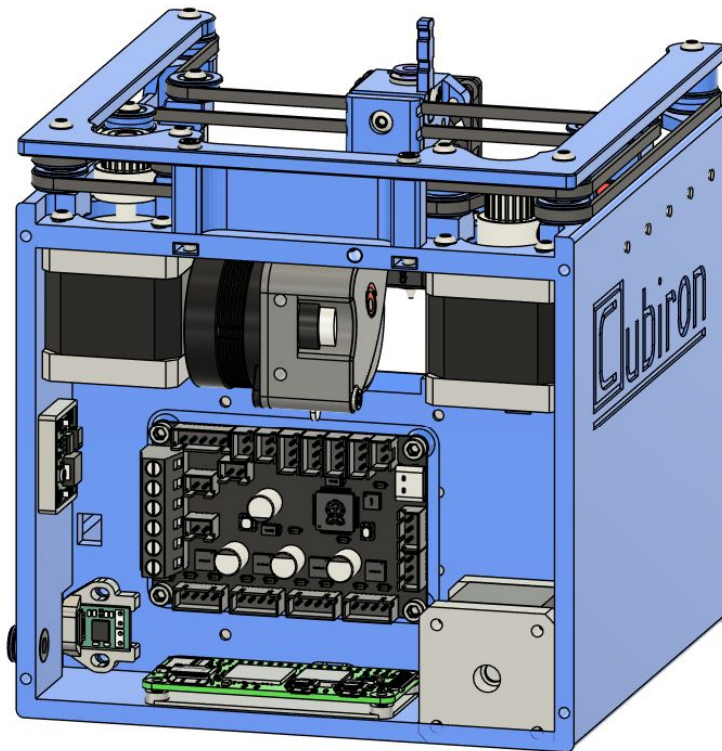
Measure and check for correct voltage output from sources!



ELECTRONICS

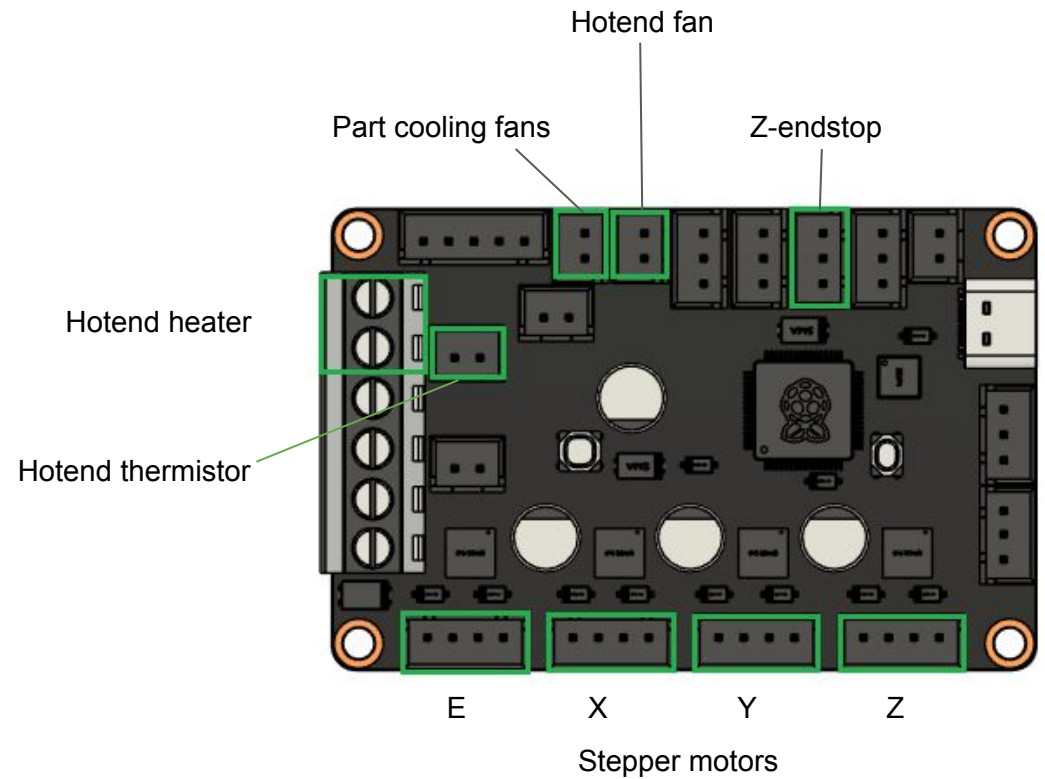
Approximate layout of electronics.

Use double sided VHB tape to attach the mounts.

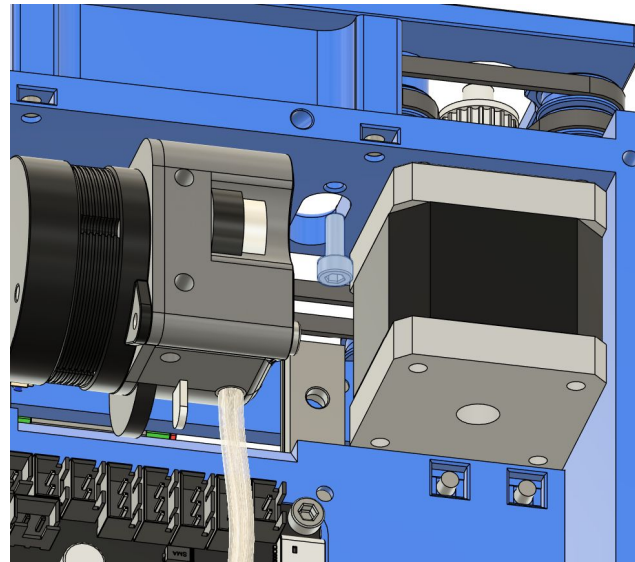
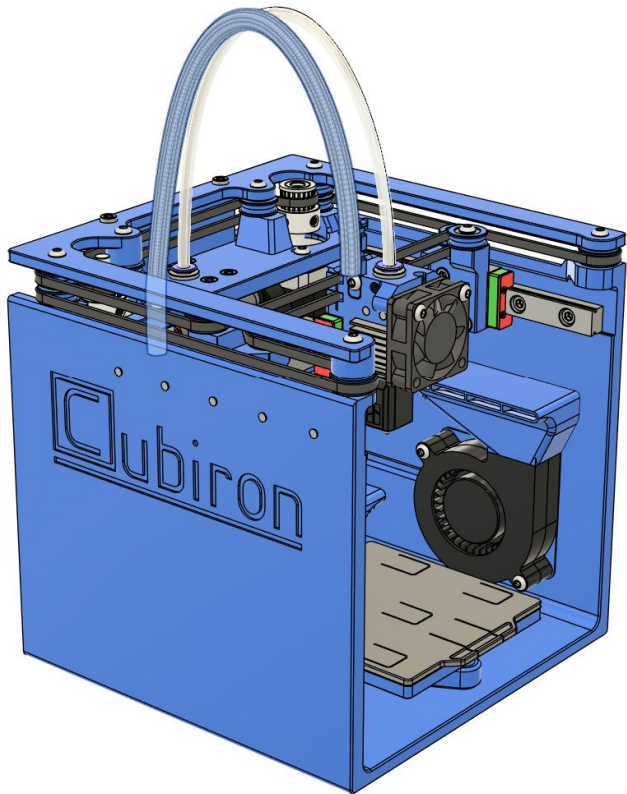


Please refer to official documentation for exact pinout.

To enable sensorless homing, put jumpers on the DIAG pins for the X and Y drivers.



UMBILICAL



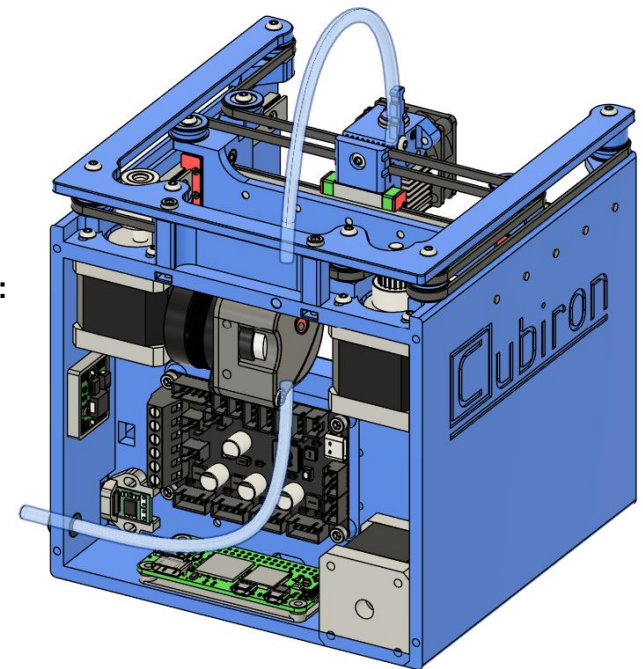
M3x10

Use it to zip-tie the wire loom to it.

Lengths for bowden tubes:

Upper tube: 20 - 25cm

Lower tube: 12 - 15cm



FINALIZING

There are plenty of resources online to configuring Klipper firmware for your Cubiron.

I recommend the software installation guide from Voron:

<https://docs.vorondesign.com/build/software/>

You can also download the printer.cfg file from my Github.

Thank you for building the Cubiron.
Happy printing!

- RobertGcode

