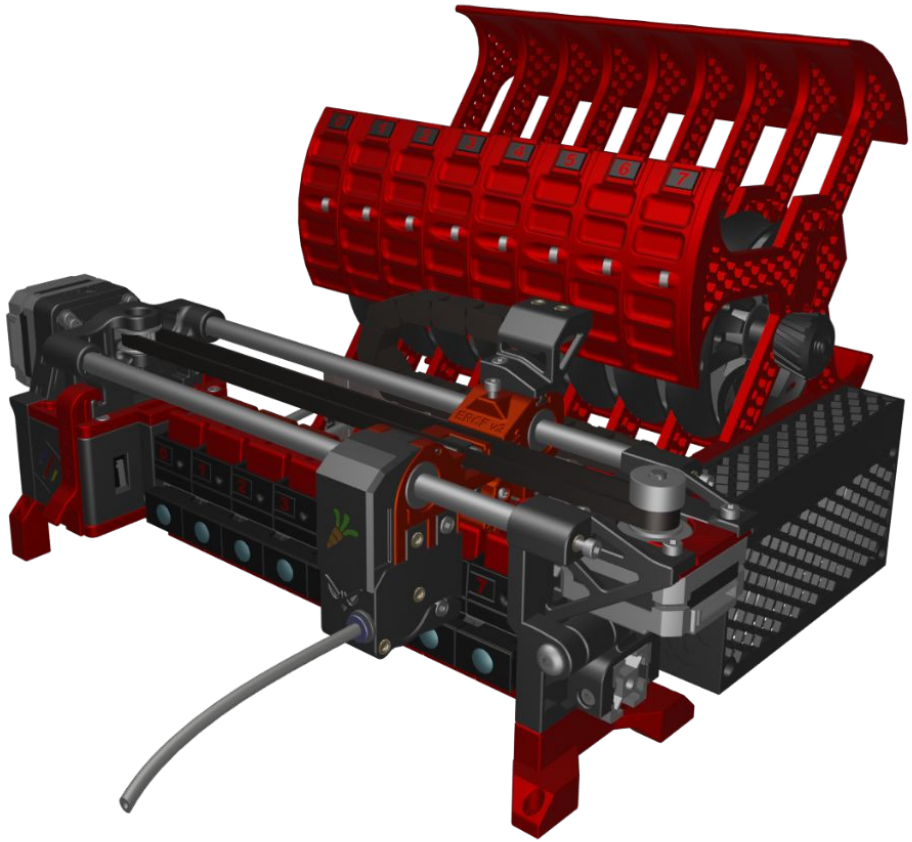
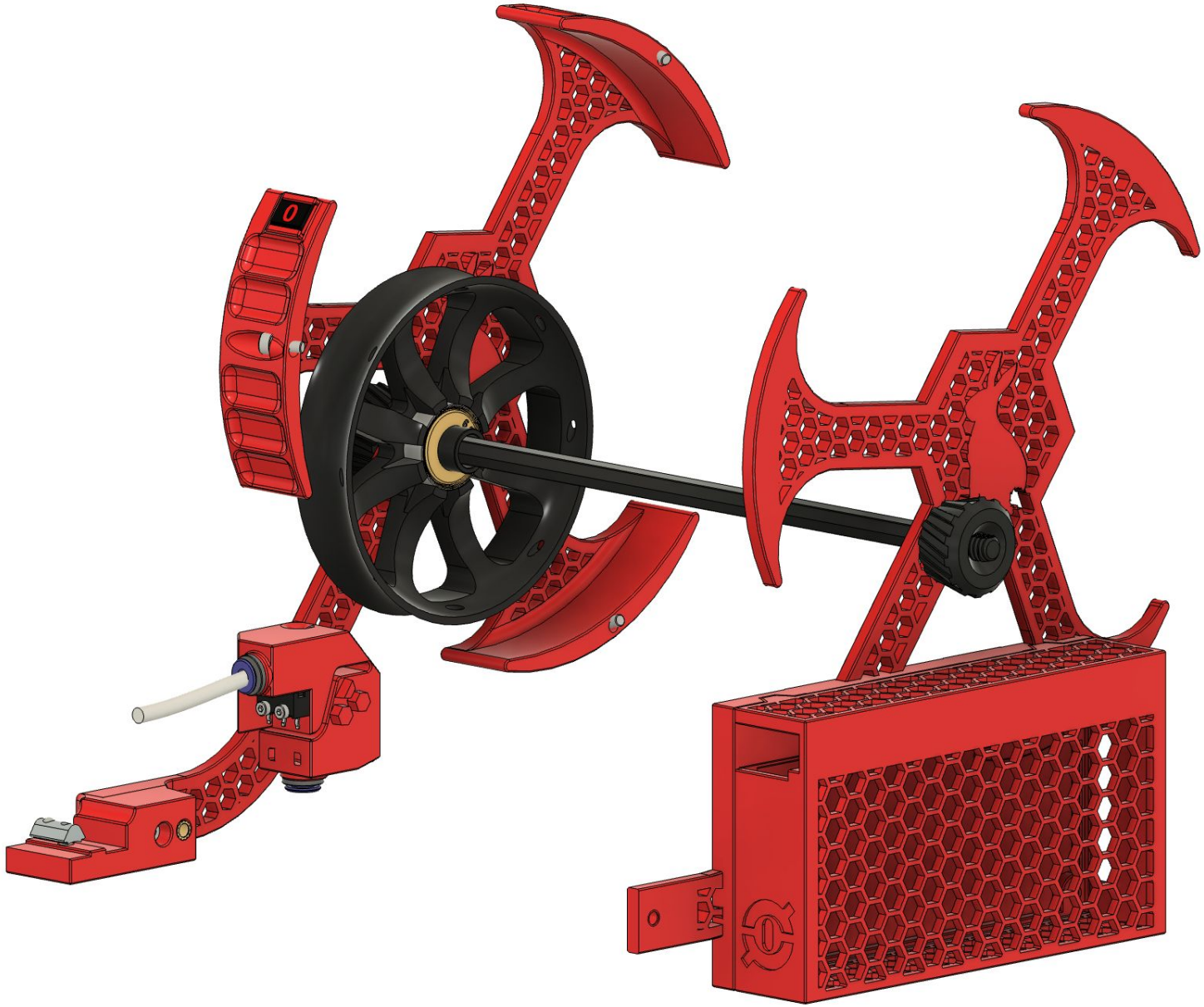


COTTONTAIL BUILD GUIDE

Even the smallest one can change the world.
–Peter Rabbit

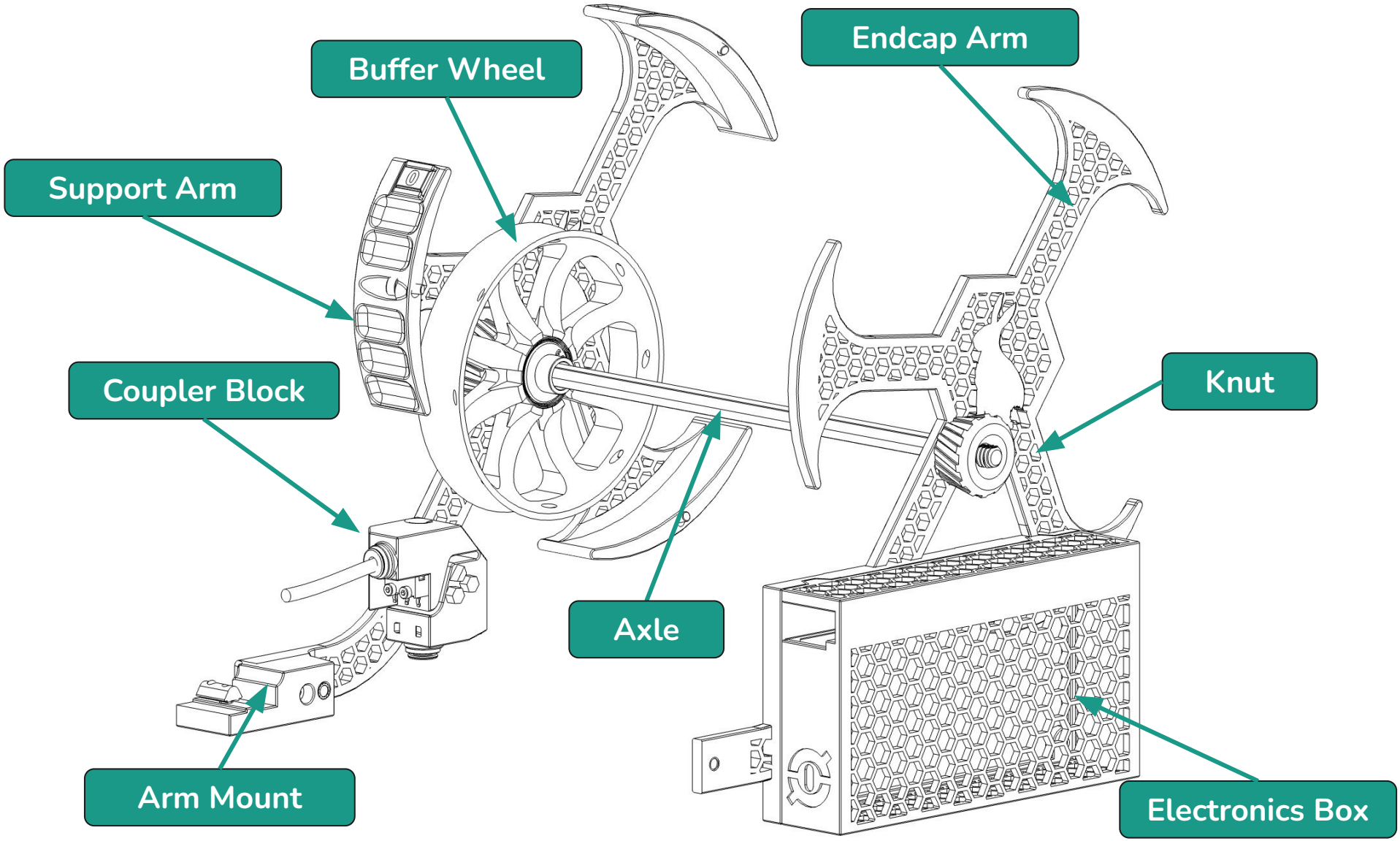
VERSION 2023-12-21

COTTON TAIL BUFFER ASSEMBLY



COTTON TAIL BUFFER ASSEMBLY

OVERVIEW



ARM GROUPS

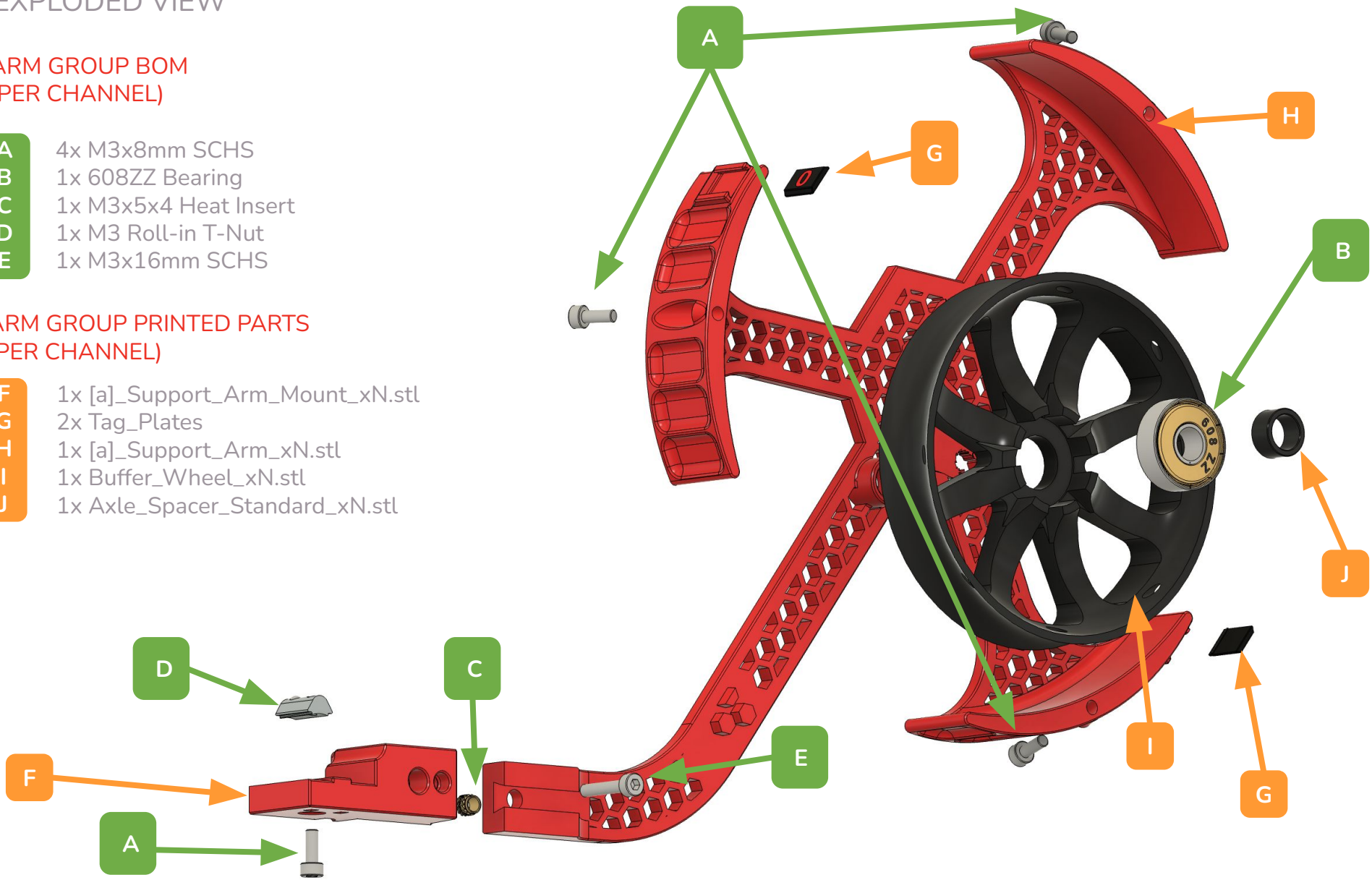
EXPLODED VIEW

ARM GROUP BOM (PER CHANNEL)

A	4x M3x8mm SCHS
B	1x 608ZZ Bearing
C	1x M3x5x4 Heat Insert
D	1x M3 Roll-in T-Nut
E	1x M3x16mm SCHS

ARM GROUP PRINTED PARTS (PER CHANNEL)

F	1x [a]_Support_Arm_Mount_xN.stl
G	2x Tag_Plates
H	1x [a]_Support_Arm_xN.stl
I	1x Buffer_Wheel_xN.stl
J	1x Axle_Spacer_Standard_xN.stl



COUPLER BLOCKS

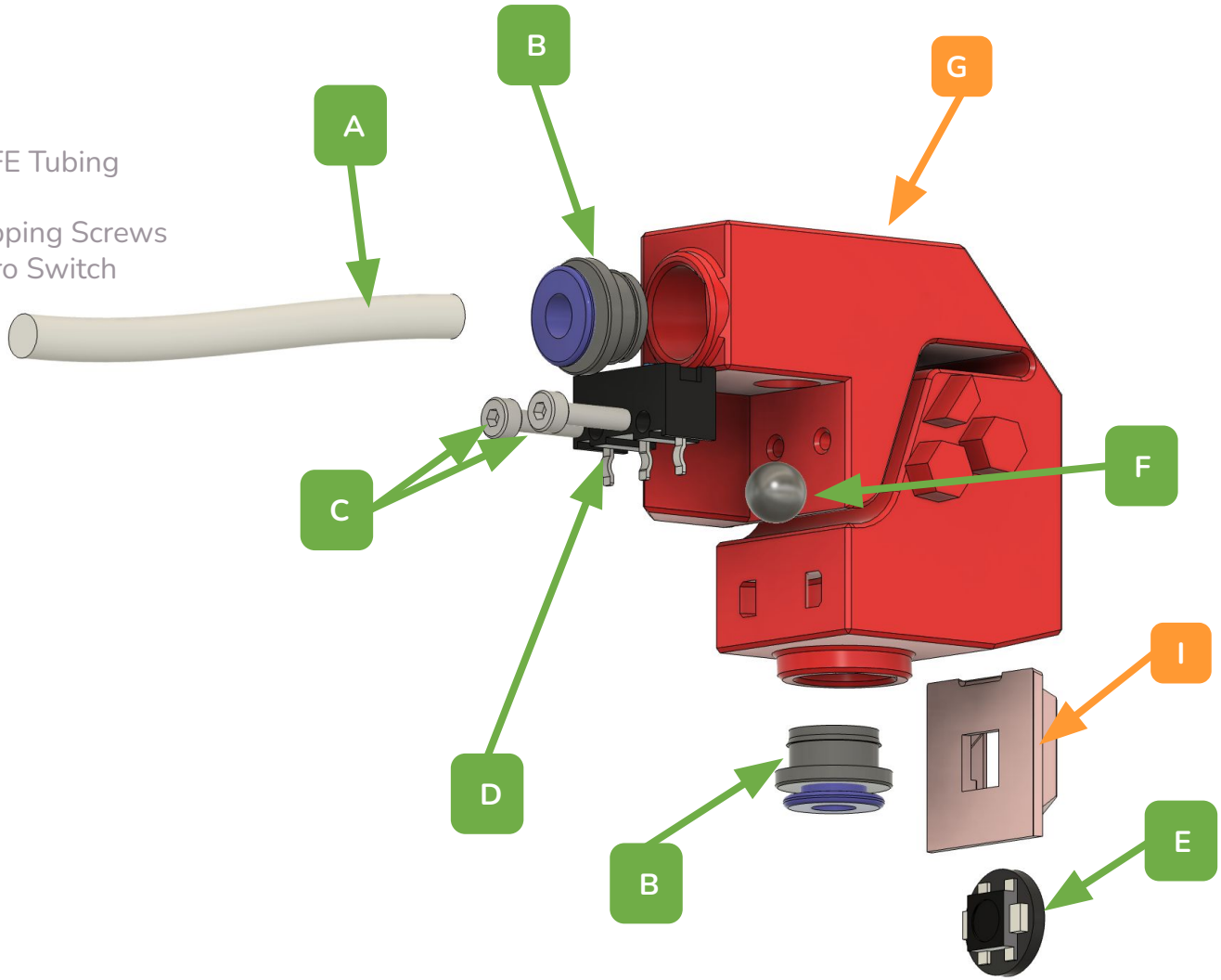
EXPLODED VIEW

COUPLER BLOCK BOM (PER CHANNEL)

A	1x 48mm OD4.0mmxID3.0mm PTFE Tubing
B	2x ECAS Coupler (2 piece)
C	4x M2x8mm or M2x10mm Self Tapping Screws
D	1x Omron D2F-5L or D2F-01L Micro Switch
E	1x Neopixel
F	1x 5.5mm Steel Ball Bearing

COUPLER BLOCK PRINTED PARTS (PER CHANNEL)

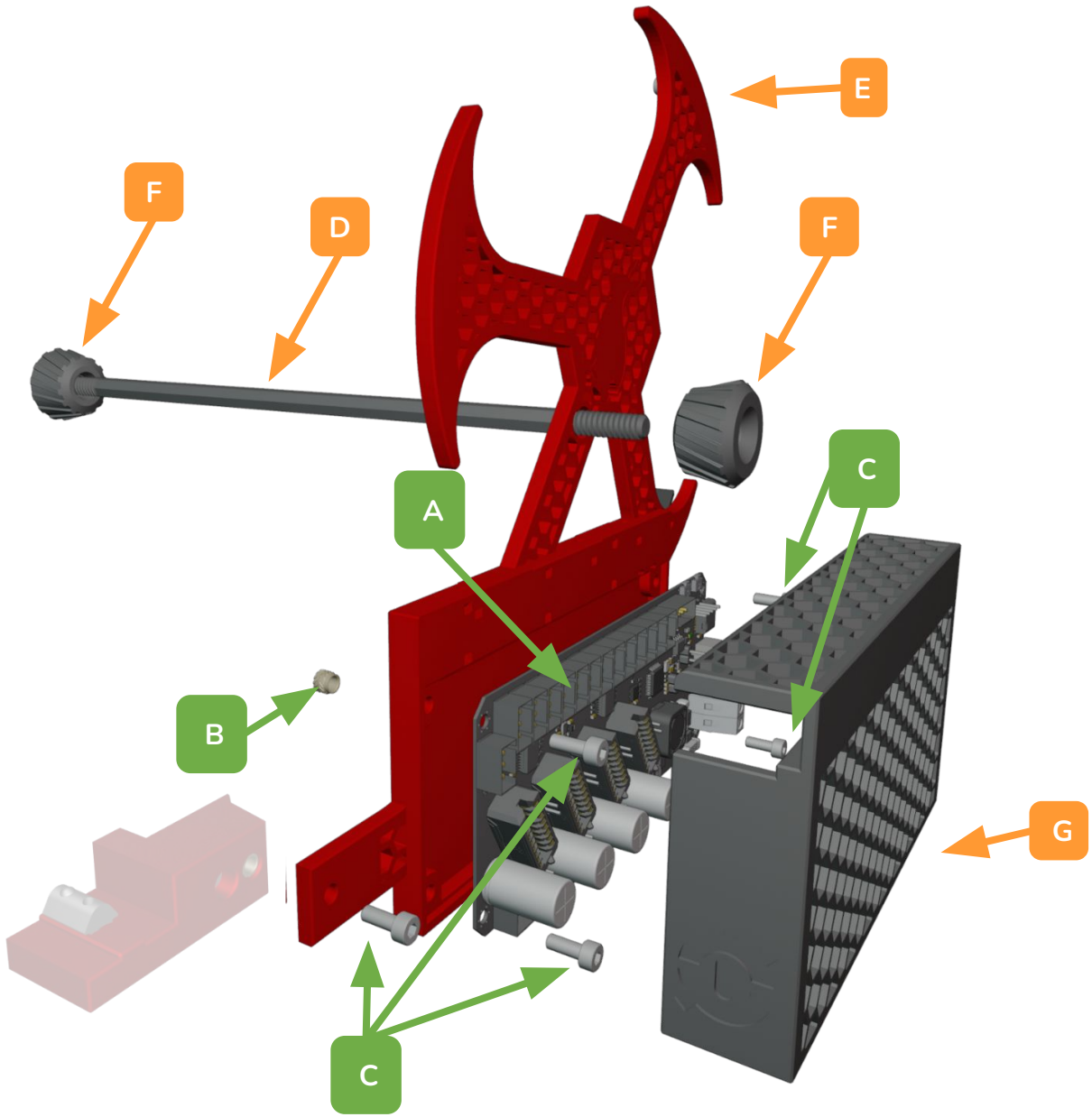
G	Coupler_Block_xN.stl
I	[a]_LED_Carrier_xN.stl



Although the LED uses the entire Coupler_Block as a diffuser for the light, it isn't required to use translucent or clear filament to print it. Choose a filament that allows it to be backlit or illuminated.

ENDCAP ARM

EXPLODED VIEW



END CAP ARM BOM

A
B
C

1x BTT MMB Controller Board
4x M3x5x4 Heat Insert (3 not pictured)
5x M3x8mm SCHS

END CAP ARM PRINTED PARTS

D
E
F
G

Axle_N_Double_Thread.stl
[a]_BTT_MMB_Support_Arm_Endcap.stl
Knut_x2.stl
[a]_BTT_MMB_Box_Lid.stl

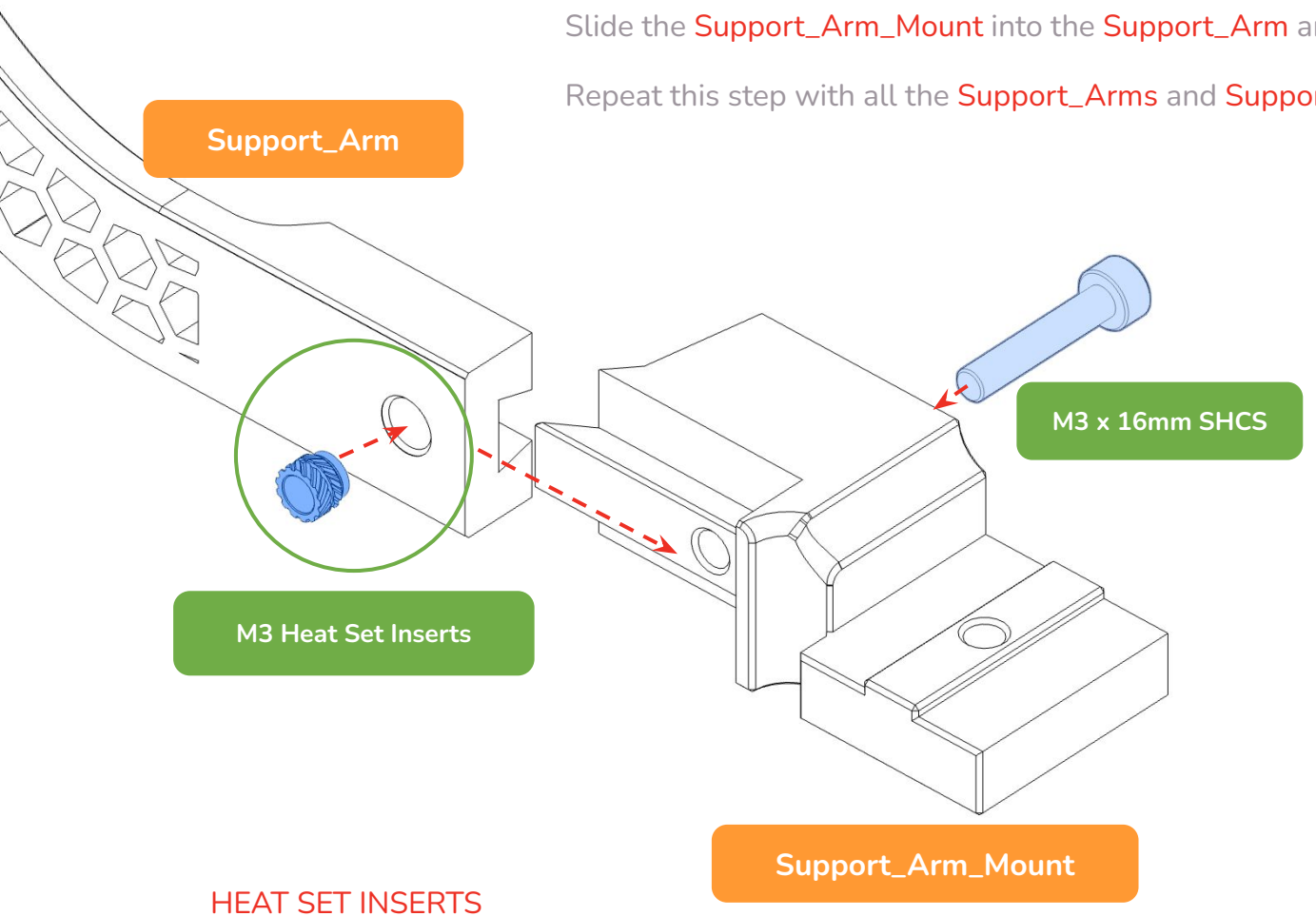
ARM AND MOUNT

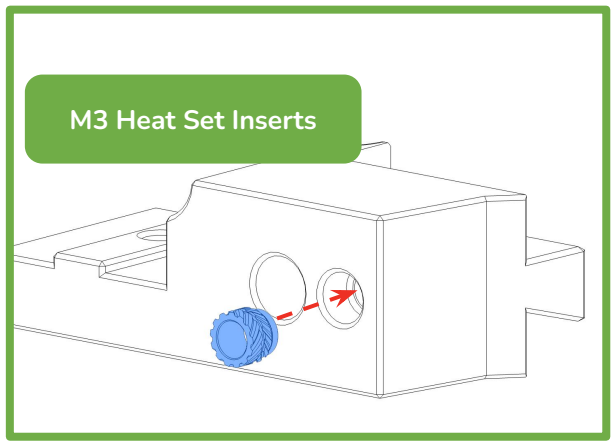
ASSEMBLY (PER ARM GROUP)

Start by adding the heat insert into each of the Support_Arms, Be careful not to go to far into the arm to obstruct the dovetail receiver on the other side. The heat set can sit slightly proud on the insertion side, to be cautious.

Slide the Support_Arm_Mount into the Support_Arm and insert a single M3x16mm screw to secure it.

Repeat this step with all the Support_Arms and Support_Arm_Mounts.





Set aside one of the Support_Arm_Mounts for the end, and insert a single Heat Set into the second hole. This will be used to hold the Support_Arm_Endcap.

HEAT SET INSERTS

The list of pages with heat set inserts is on Page 15.

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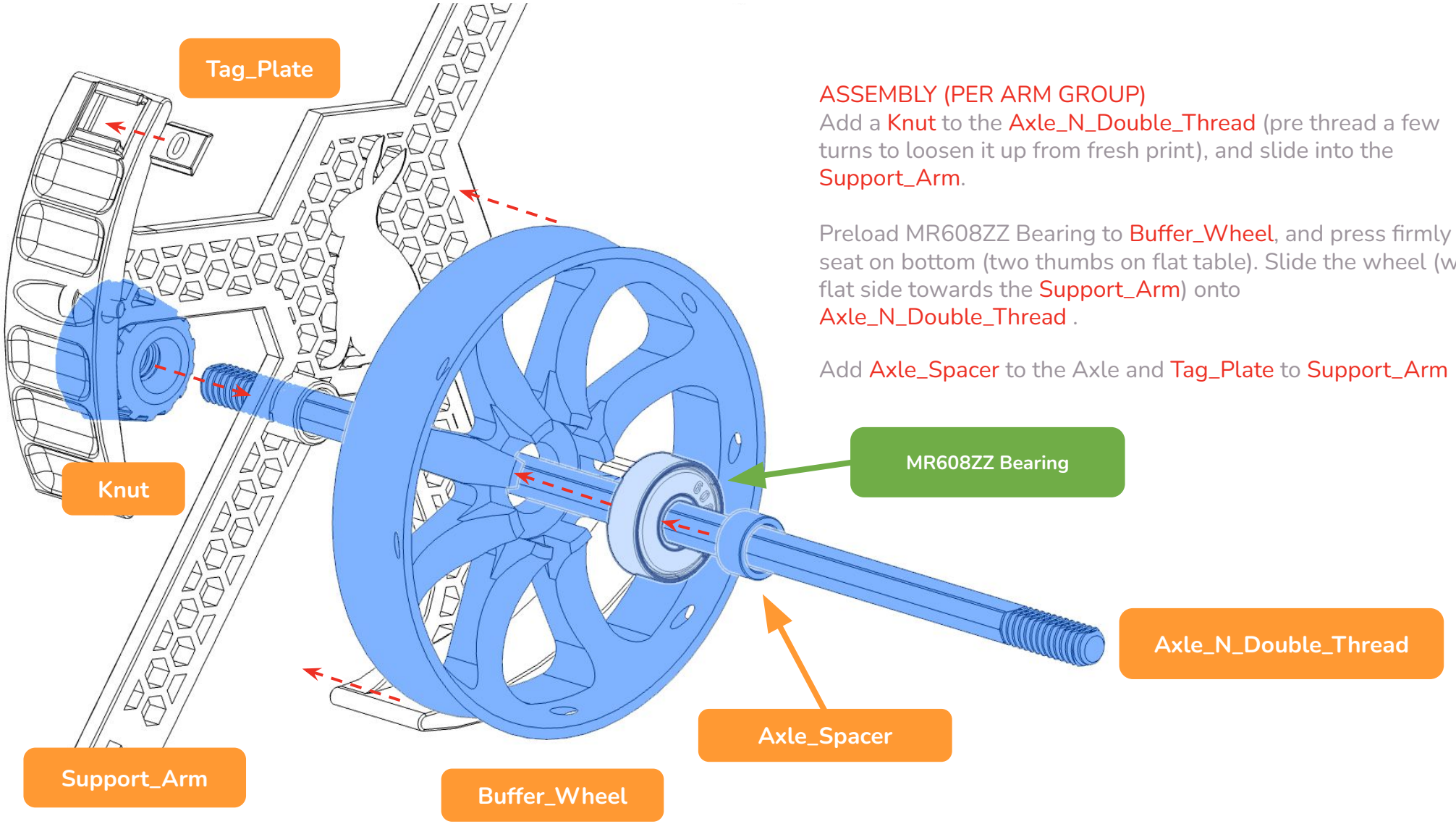
ARM GROUPS PREPARATION

AXLE AND WHEEL



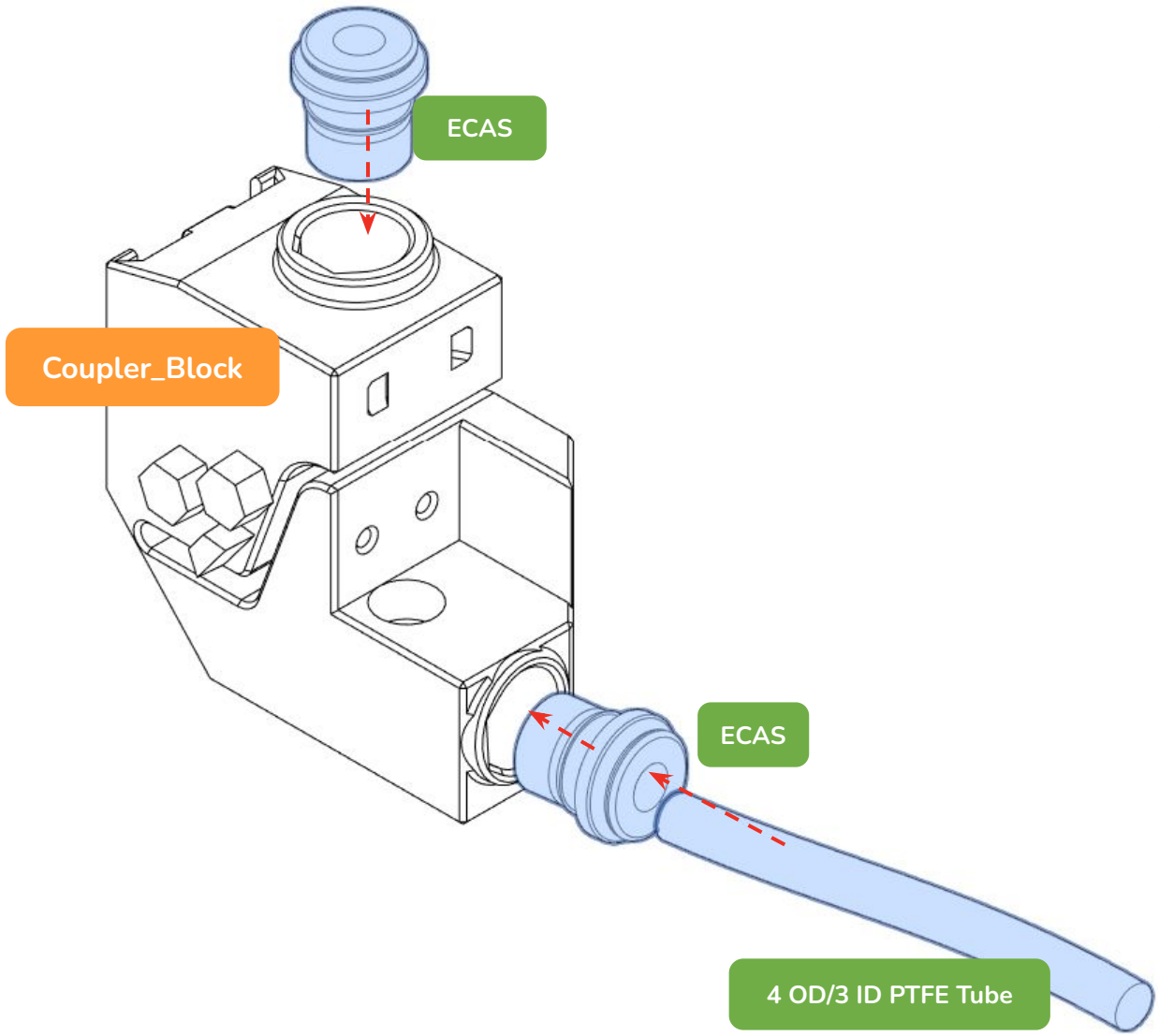
ASSEMBLY (PER ARM GROUP)

Add a Knut to the Axle_N_Double_Thread (pre thread a few turns to loosen it up from fresh print), and slide into the Support_Arm.

Preload MR608ZZ Bearing to Buffer_Wheel, and press firmly to seat on bottom (two thumbs on flat table). Slide the wheel (with flat side towards the Support_Arm) onto Axle_N_Double_Thread .

Add Axle_Spacer to the Axle and Tag_Plate to Support_Arm

COUPLER BLOCK



ASSEMBLY (PER ARM GROUP)

Start your assembly by inserting the ECAS collet into the two positions of the Coupler_Block. Use a flat surface to press in, or use a ratchet bar clamp to apply even pressure.

Use the cutting jig to cut 48.5mm of 4mm OD/3mm ID PTFE Tube. Insert into the sprung ECAS coupler. Make sure it's seated all the way in and the natural curve of the tube is curling downwards.

Repeat for all Coupler_Blocks.

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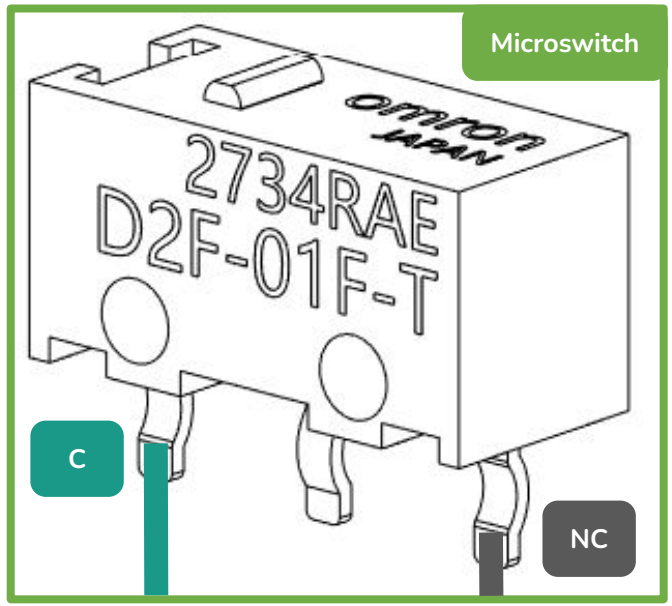
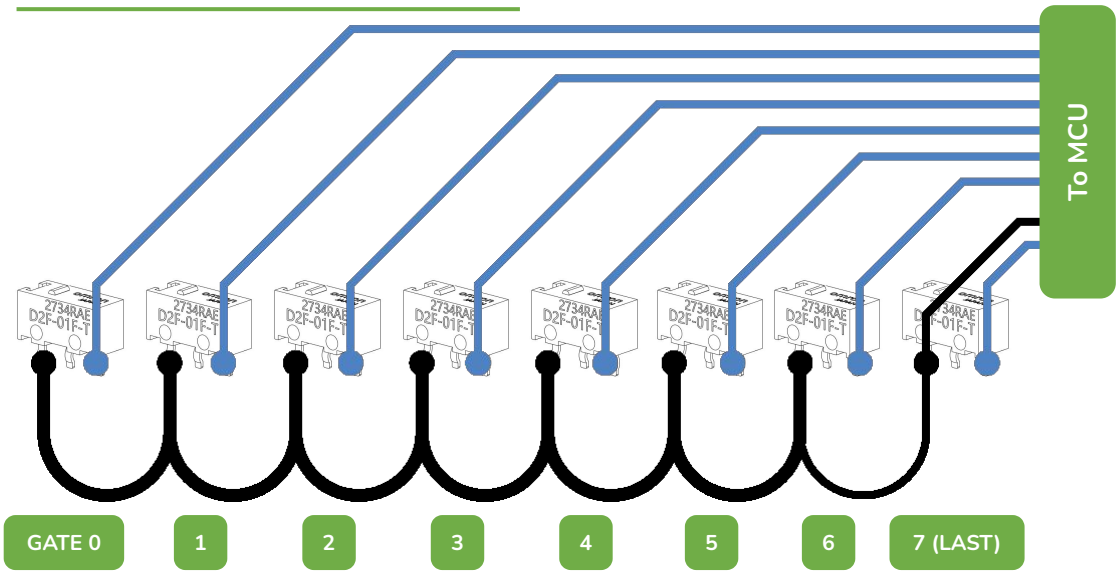
ARM GROUPS PREPARATION

Gate	NC Wire Length (mm)
LAST (N)	110
N+1	145
N+2	179
N+3	214
N+4	249
N+5	284
N+6	319
N+7	354
N+8	389
N+9	424
N+10	459
N+11	494
N+12	529
N+13	564
N+14	599

MICROSWITCH WIRING HARNESS





WIRING SENSORS

First, solder a wire (26-28 AWG recommended) to the Normally Closed (NC) leg of each microswitch, matching the length for each gate to the table to the left. **Last (N) is gate closest to the MMB,**

Next, connect the Common (C) legs of each neighboring switch with a piece of wire 70mm long.

For the last microswitch in the chain, solder an additional 110mm wire to the Common leg, to feed to the MCU.

Your end result should look like the second picture.

Make sure you follow the recommended lengths to ensure that the switches are not binding the Coupler_Block's upper sprung section.

This takes into account extra length so you can trim the wire to be as tidy as possible.

Use cable ties to keep bundles together.

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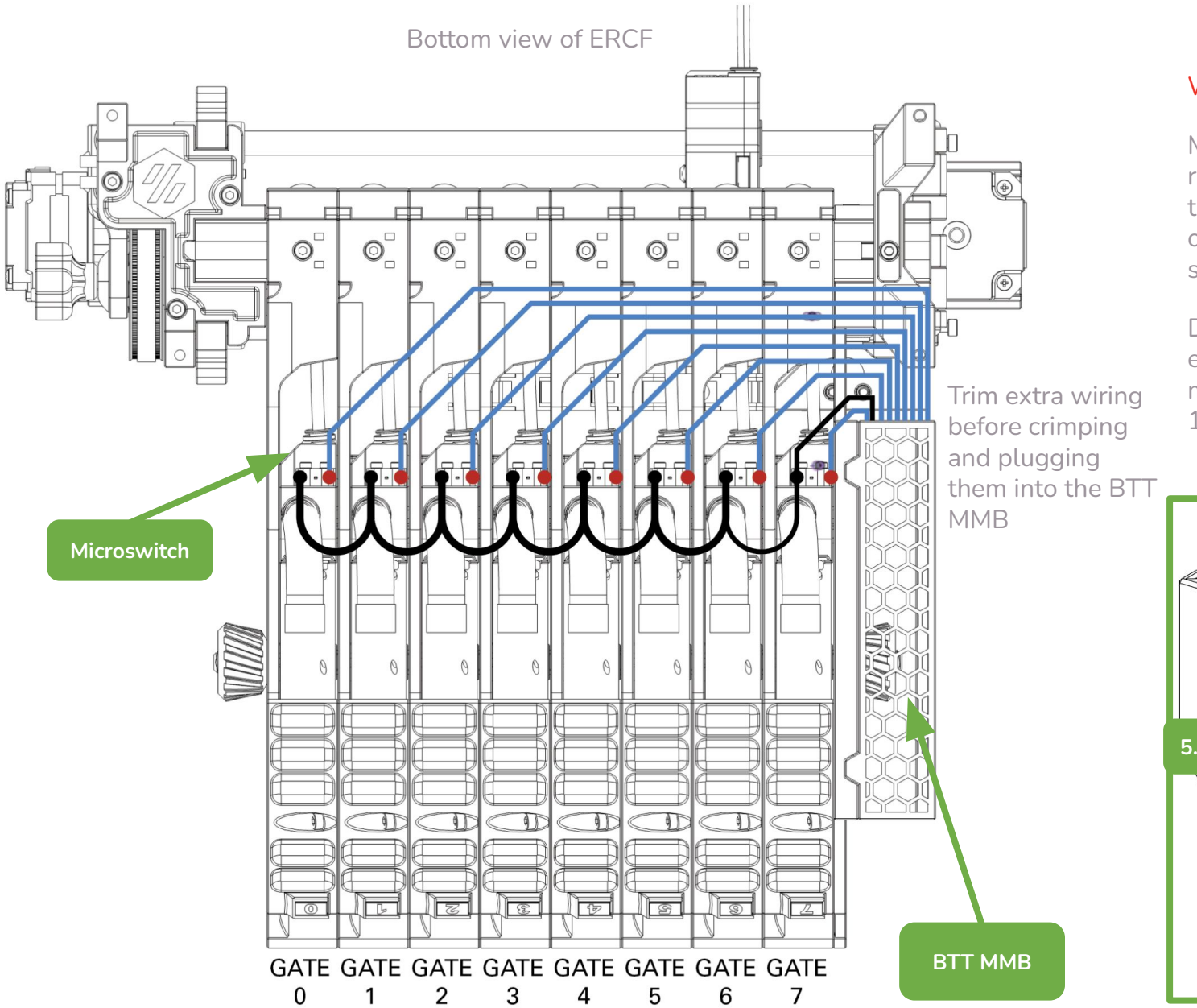
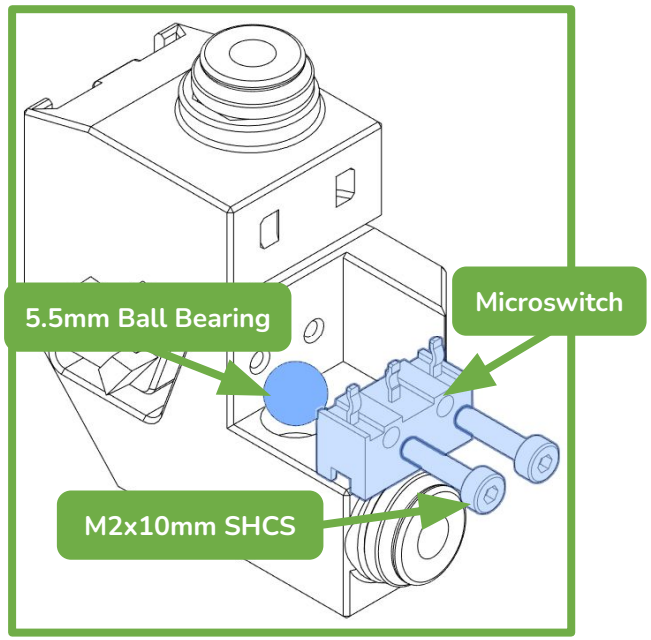
WIRING PRE-GATE SWITCHES



WIRING SENSORS

Make sure you follow the recommended lengths to ensure that the switches are not binding on the Coupler_Block's upper sprung section.

Drop a 5.5mm ball bearing into each Coupler and install each of the microswitches with 2x M2x8 or 10mm SHCS.



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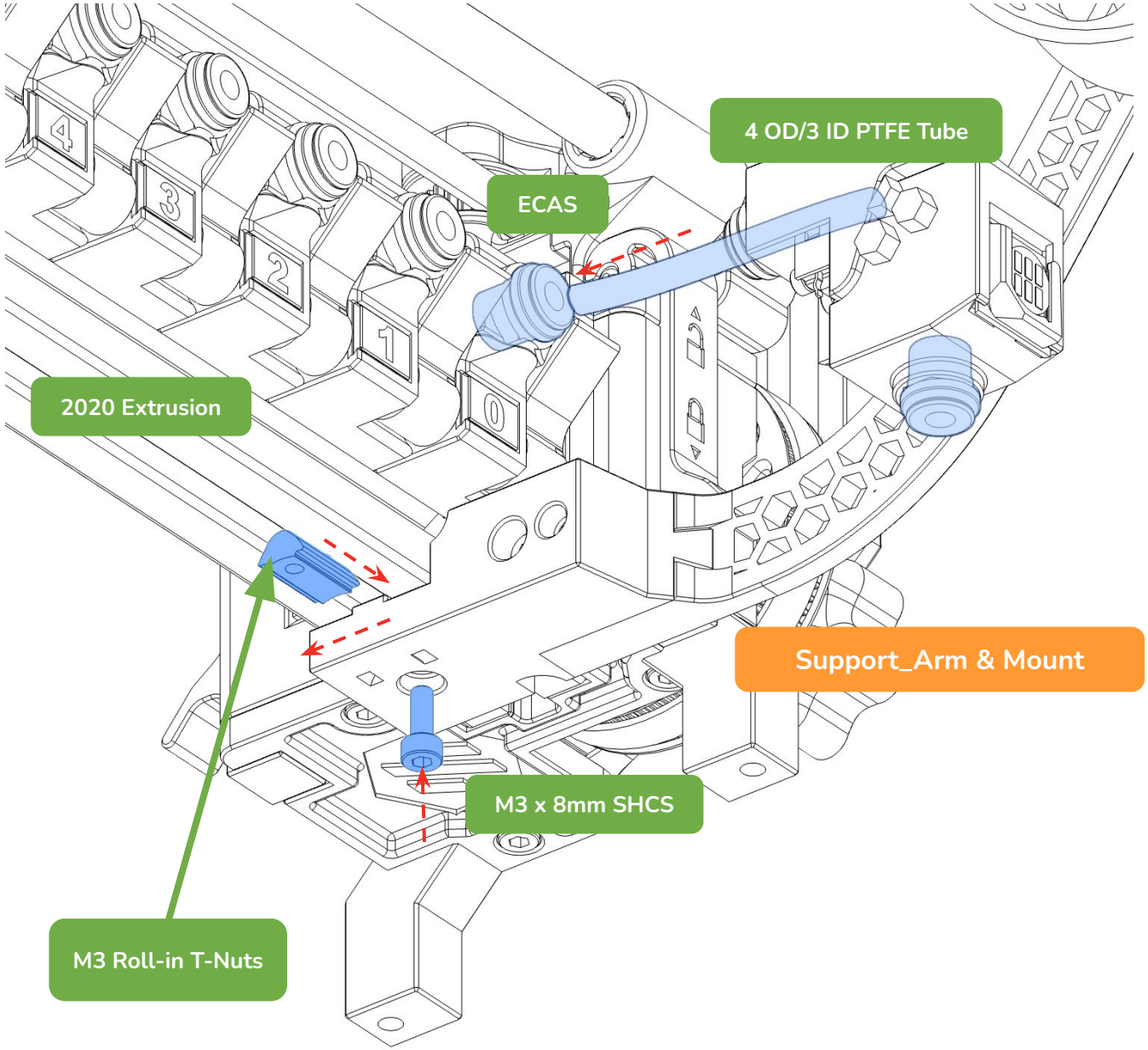


MOUNTING ARMS (PER ARM GROUP)

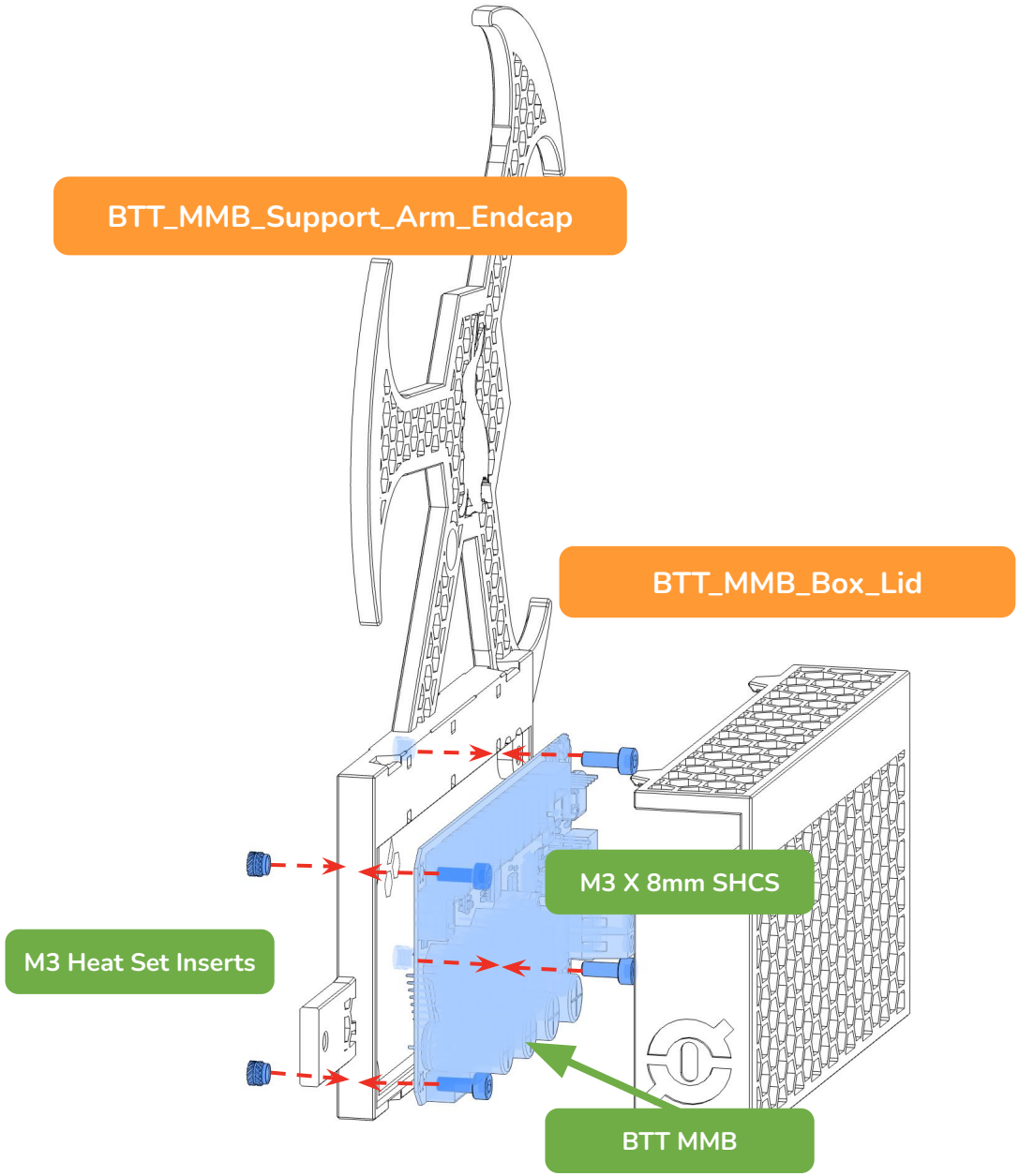
Preload the M3 Roll-in T-nuts into the bottom of the 2020 Extrusion.

Take the Support_Arm assembly, and line up the PTFE tube to the ECAS on the Filament Block. Mount the Arm onto the 2020 extrusion by lining up the T-nut, then tightening down the M3 x 8mm SHCS screw. Slide the assembly along the 202 to align the arm.

Alternatively you can align the arm to the T-nuts without the Coupler_Block unattached. After it's aligned, add the Coupler_Block with the PTFE Tube.

Repeat these steps with each arm.

ELECTRONICS BOX ASSEMBLY



ARM END CAP ASSEMBLY

END CAP ASSEMBLY

Insert (4) M3 Heat Set inserts into the holes on the flat side of the Support_Arm_Endcap.

Add the BTT MMB Control board into the inset on the opposite side. There are two indents for the BOOT and RESET buttons on the board to give you the correct orientation.

Add (4) M3 x 8mm SHCS screws to secure the board.

Set aside Box_Lid for snap installation after wiring is completed.

HEAT SET INSERTS

The list of pages with heat set inserts is on Page 15.

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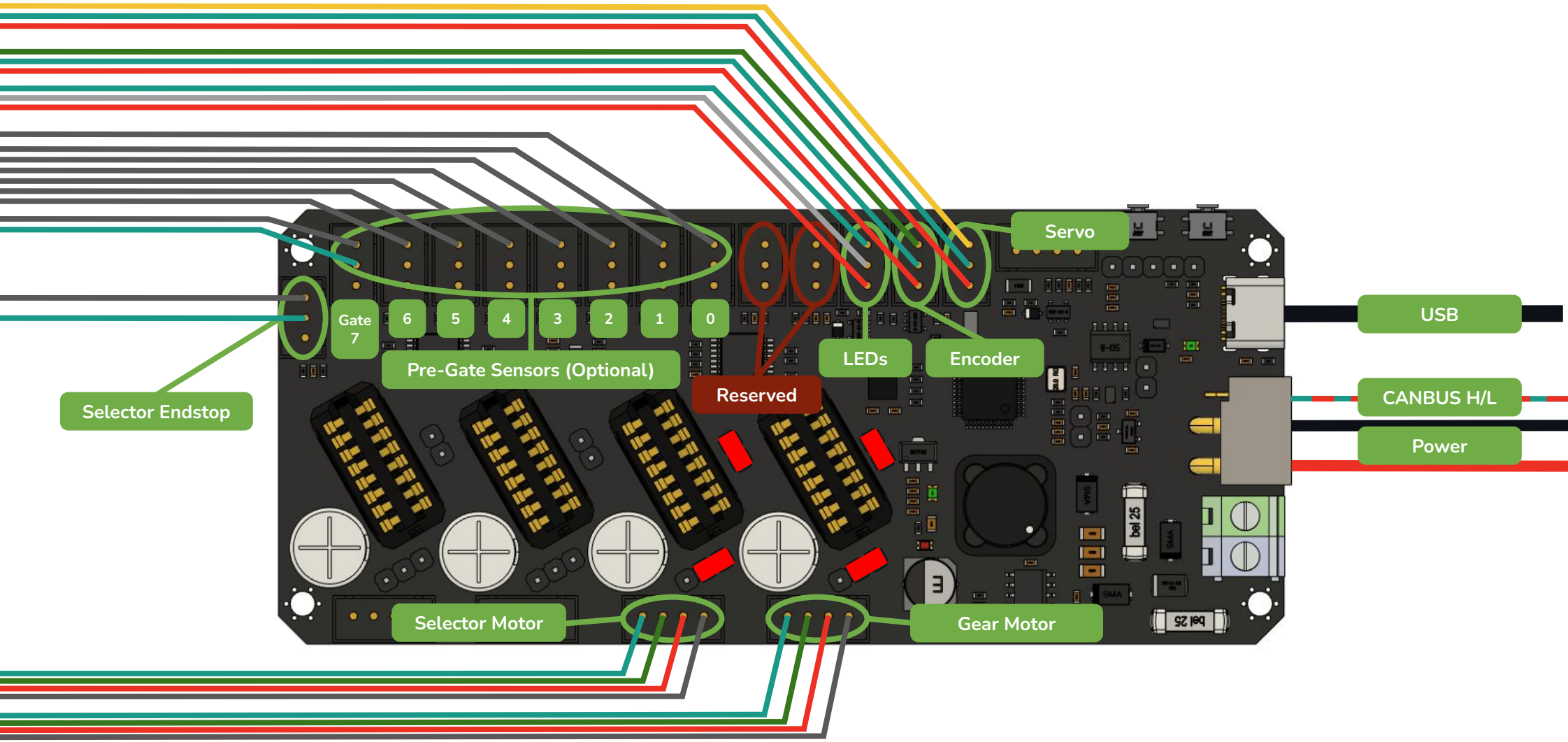
WIRING THE MMB



MMB WIRING

Connect the Selector Endstop and optional Pre-Gate Sensor wires (**do not use reserved ports**). Connect the Servo and Encoder wires. Connect the Selector Motor and Gear Motor wires. Wiring color order may vary between manufacturers for stepper motors Keep a few cms of wires in the MMB box, it will be helpful in case you have to disassemble/reassemble.

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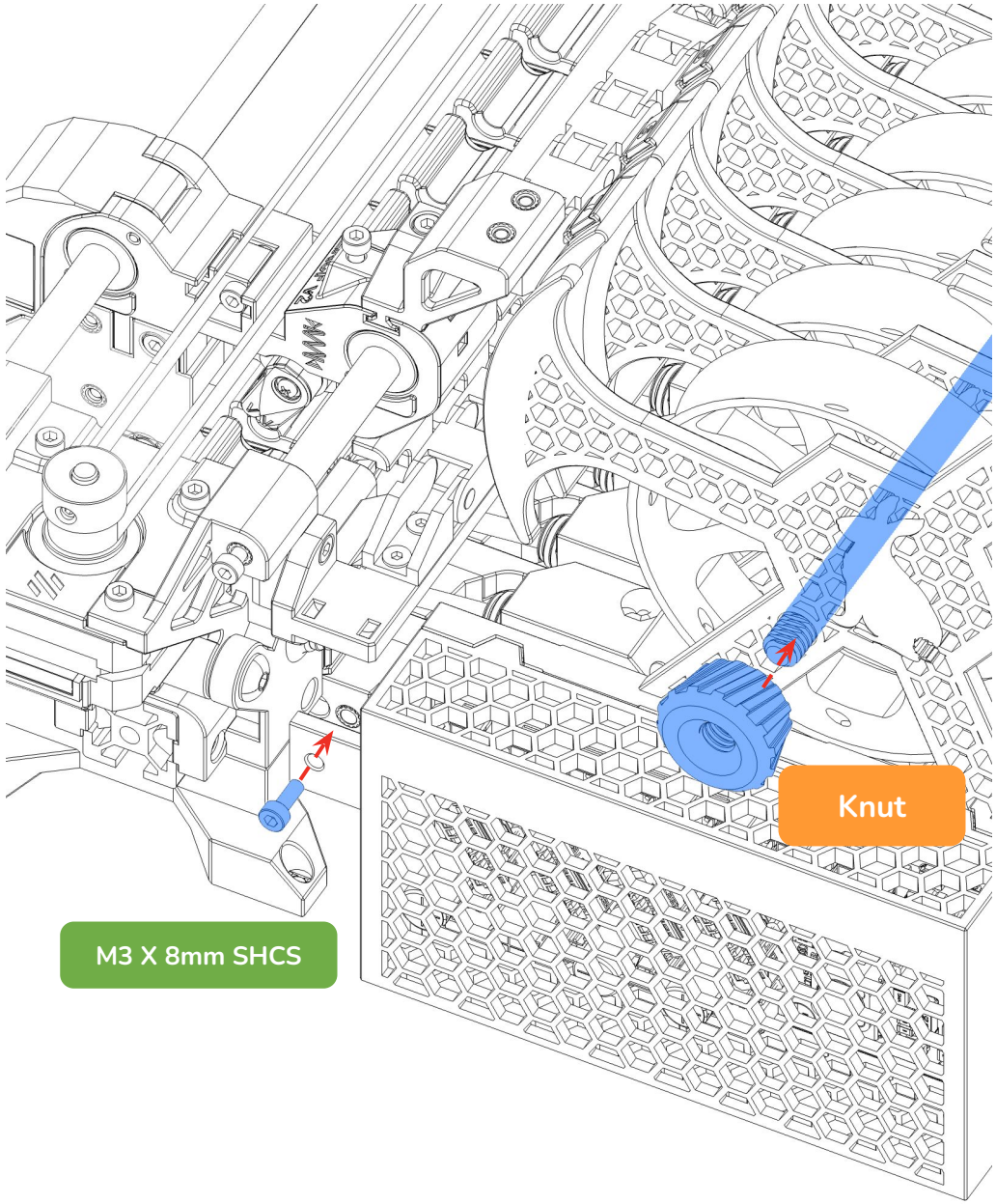
ARM END CAP ASSEMBLY



END CAP ASSEMBLY

Next step is to put the Support_Arm_Endcap and electronics box onto the axle.

Line up the screw to the secondary hole on the Support_Arm_Mount you have set aside with the single heat set for the end cap.

Add the second Knut, but don't over tighten. It only needs to hold the axle from wiggling back and forth.

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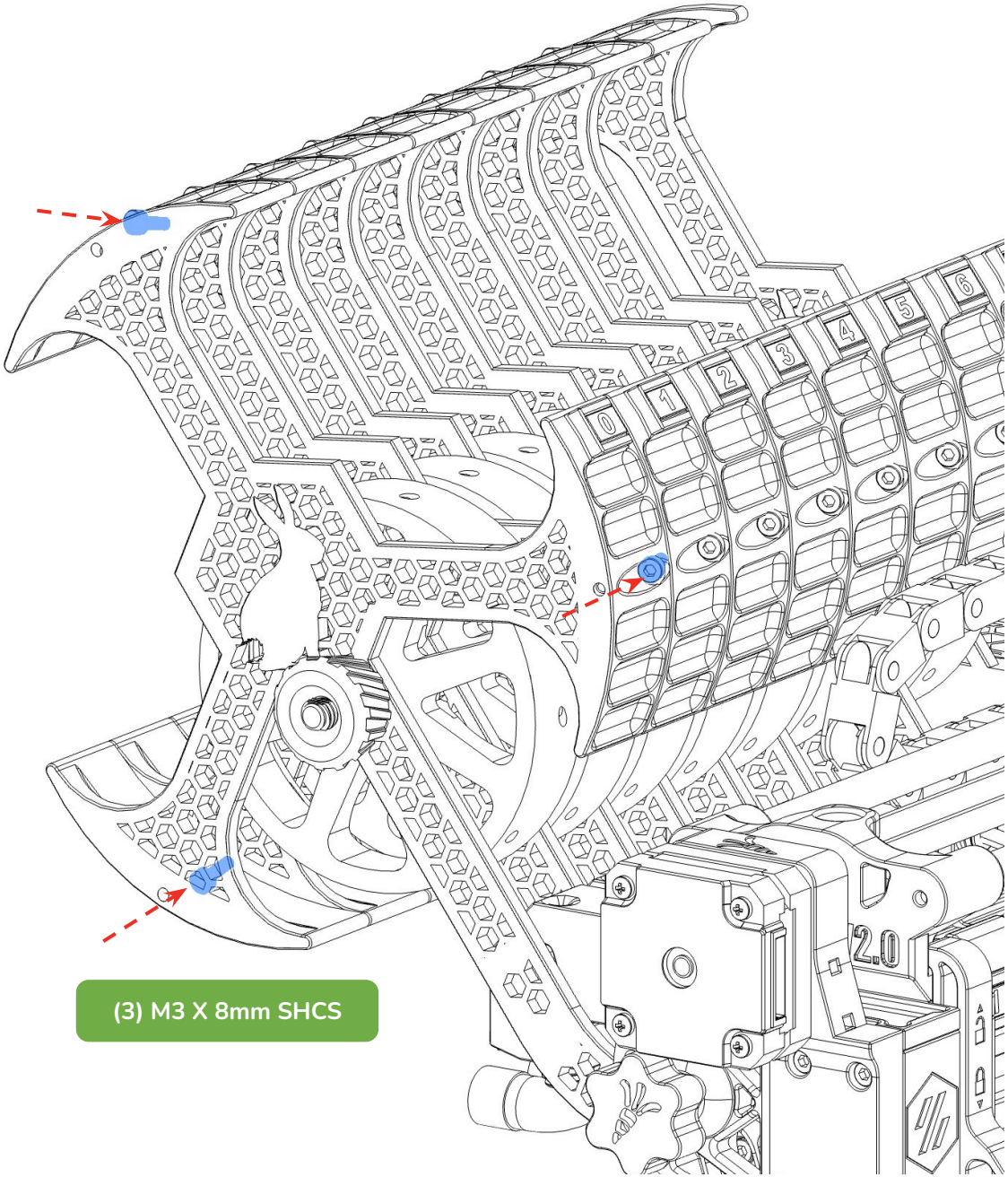

SECURE ARMS

The final step is to install (3) M3 X 8mm SHCS screws into each of the angled holes. Do not over tighten or it will strip the plastic.

Check each of the Buffer_Wheels as you secure each arm and ensure they spin relatively freely. There is always a small amount of friction, but as long as it spins without too much restriction, it will not be affected by the light contact.

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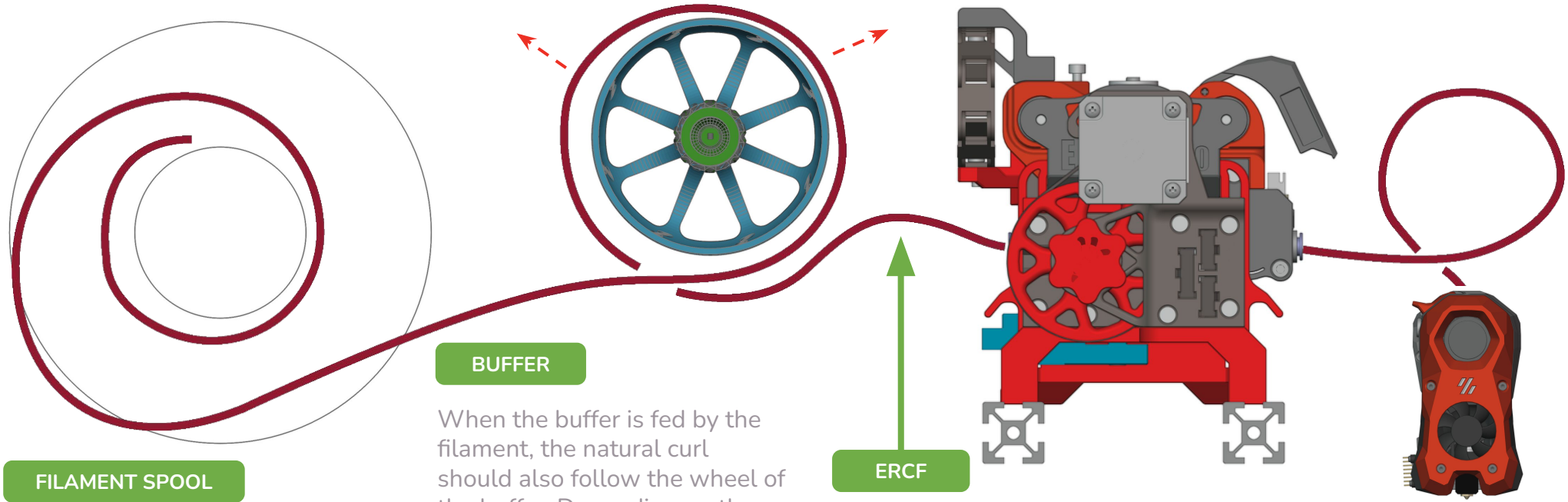
FILAMENT TUBE MANAGEMENT

BEST PRACTICES FOR FILAMENT TUBE MANAGEMENT

It is important to optimize your tube path to reduce any resistance for your MMU setup. This is to ensure that the path you choose does not go against the natural curl of your filament. ERCT, as an example is designed to support many of these best practices.



FILAMENT SPOOL

The ideal location for your filament spool will depend on how it feeds the buffer. The curl should naturally work with the path (filament and tube) that goes into the buffer. In this example feeding around to the back and below allows for the natural curl to remain in the tube to the buffer.

BUFFER

When the buffer is fed by the filament, the natural curl should also follow the wheel of the buffer. Depending on the choice of buffer design, this should be configured in such way, to follow the buffering expansion. It is essential that the buffer does not pull back filament on the encoder.

ERCF

Many buffer designs require optimal paths that come into the ERCF to reduce pressure on the filament blocks. It is important in reducing that pressure by not allowing downward orientations. The tube as well should not be too long or it meets additional resistance.

TOOLHEAD

A final turn to the toolhead can help maintain the natural curl. This doesn't have to be small, and can be a large radius but shouldn't be too long that will introduce additional resistance.

SOFTWARE SETUP AND CALIBRATION

ASSEMBLY COMPLETED! ... NEXT STEP: SETUP & CALIBRATION

This manual is designed to be a reference manual for the build process of an Enraged Rabbit Carrot Feeder v2 MultiMaterial System. Additional details about the build and background on advanced topics can be found on our documentation page linked below. The software setup and other initial setup steps with your new printer can also be found on our documentation page. We recommend starting here.

GitHub

https://github.com/moggieuk/Happy-Hare/blob/main/doc/ercf_v2.md

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HOW TO GET HELP

If you need assistance with your build you can head over the VORON Discord group and post your questions in the ercf_questions channel. It is the primary medium to help people with their ERCF build and tuning! You can also check the Github page for the latest releases.

https://discord.com/channels/460117602945990666/909743915475816458

REPORTING ISSUES

Should you find an issue in this document or have a suggestion for an improvement please consider opening an issue on GitHub:

(https://github.com/Enraged-Rabbit-Community/ERCF_v2/issues).

When raising an issue please include the relevant page numbers and a short description; annotated screenshots are also very welcome.

We will update the manual based on the feedback we get for the next release (ERCFv2.1).

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Enjoy your MMU.

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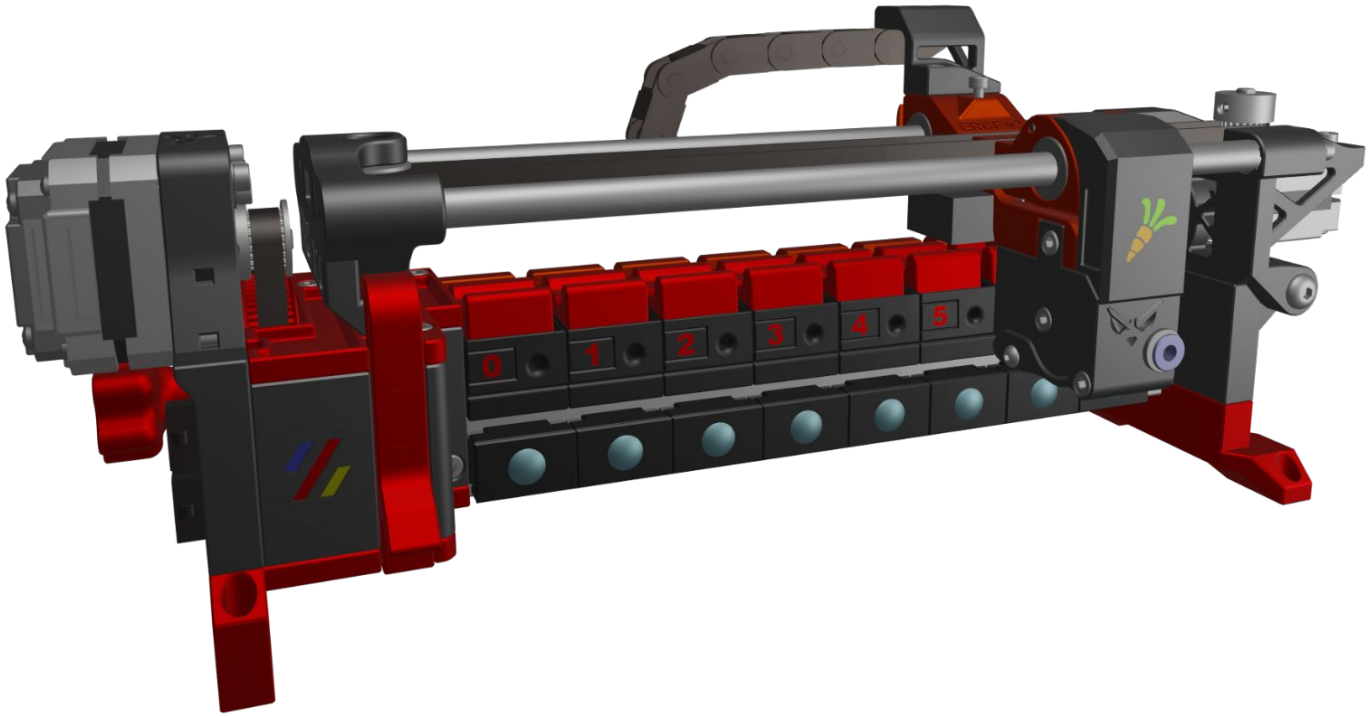
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