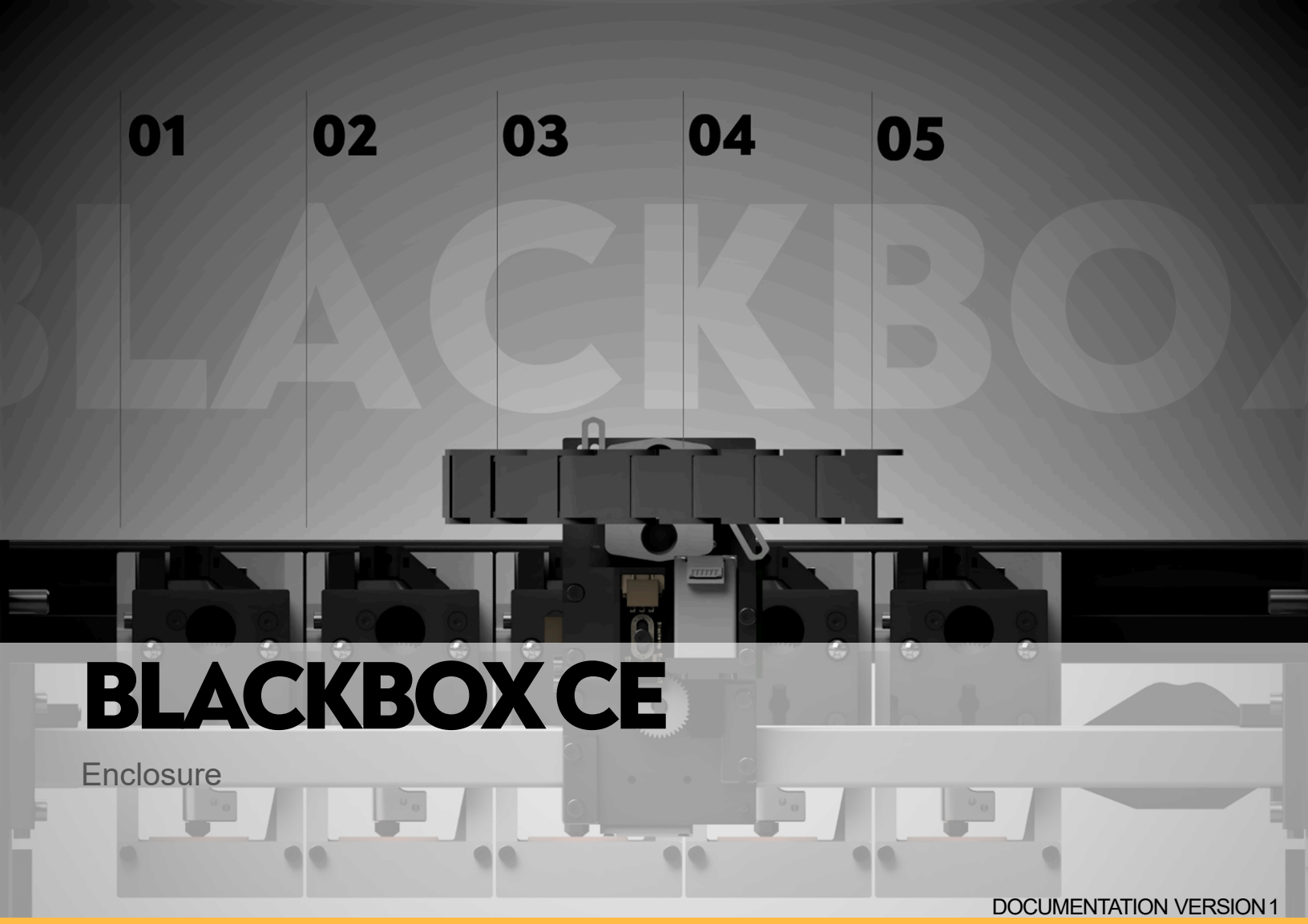


BLACKBOX CE

Enclosure

DOCUMENTATION VERSION 1

Blackbox CE Mechanical Assembly:

10. Enclosure

Change Log

Version	Notes
1	Initial Release
2	Added Aux Fan - Reformatted for new bowden inlets

Tools

Hex Wrenches
Reamers
Soldering Iron with Heatset insert tip

Parts

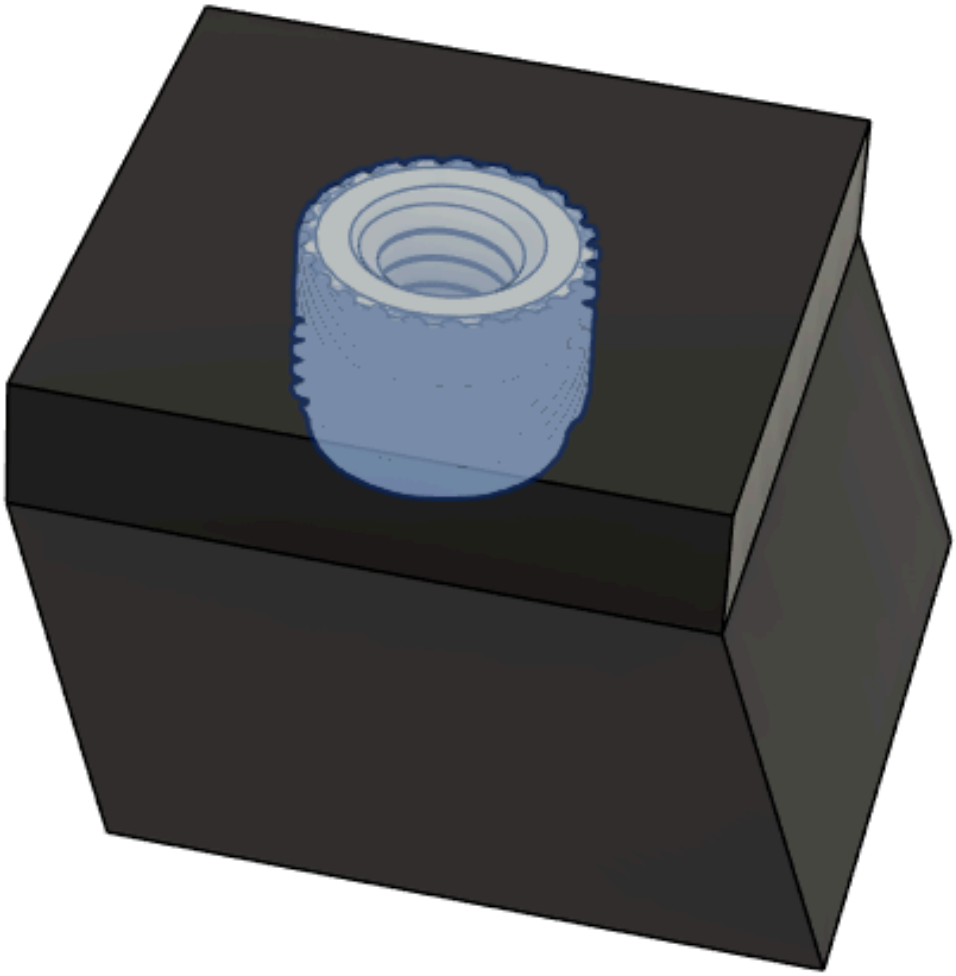
QTY	Description
1	AcrylFrontDoor
2	Linear_Shaft_5x45mm
4	DIN916_M3_4mm_Set_Screw
16	Tnut_40Series_M4
27	M4_6x5mm_Heat_Set_Insert
4	DIN7991_M4_14mm_FHHS
4	DIN7991_M4_20mm_FHHS
1	CNC_Acrylic_Front_With_PanelDue7i
1	Magnetic Latch
6	M3_4.6x4mm_Heat_Set_Insert
2	DIN7991_M3_8mm_FHHS
2	DIN7991_M4_8mm_FHHS
1	DIN912_M4_8mm_SHCS
1	DIN912_M4_10mm_SHCS
2	DIN912_M4_12mm_SHCS
10	DIN912_M4_14mm_SHCS
3	DIN912_M4_20mm_SHCS
14	ISO7380_M4_8mm_BHHS
3	ISO7380_M4_8mm_BHHS
1	PanelDue 7i
4	DIN912_M3_8mm_SHCS
4	DIN985_M3_Nylon_Lock_Washer
4	DIN912_M3_12mm_SHCS
2	Tnut_40Series_M3
2	DIN125_M3_Washer
3	DIN7349_M4_Thick_Washer
2	ISO7380_M3_8mm_BHHS
2	M2_3.4x2.5 Heat Set Insert
2	ISO7380_M2_6mm_BHHS
2	DIN912_M3_14mm_SHCS
1	CNC_Acrylic_Panel_Left_CE
1	CNC_Acrylic_Panel_Rear
1	CNC_Acrylic_Panel_Right
1	CNC_Acrylic_Floor_Left_WithPanelDue7i_R2
1	CNC_Acrylic_Floor_Right_WithPanelDue7i_R2
1	Foam Tape (3mm Thick)
2	Fitting_WC_Coupler_4x6mm
1	120x32 Blower Fan
5	PC4-M6 Pass-Thru Bowden Couplings

Printed Parts

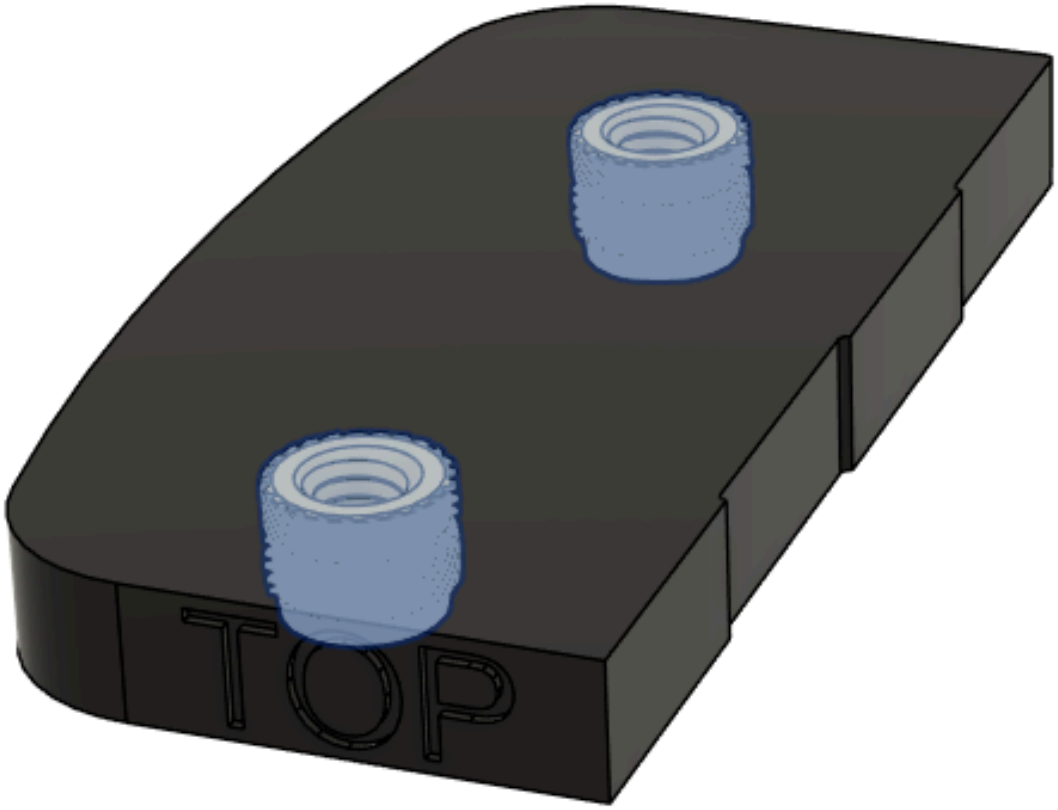
QTY	Description	Material	Ver
2	Print_Door_Hinge_Left	>=ABS	1
2	Print_Door_Hinge_Right	>=ABS	1
2	Print_Door_Hinge_Spacer	>=ABS	1
2	Print_Door_Hinge_Support	>=ABS	1
1	Print_DoorHingeKnob	>=ABS	1
1	Print_DoorMagnetHolder	>=ABS	1
1	Print_DoorMagnetMount	>=ABS	1
16	Print_Acrylic_Panel_Lock	>=ABS	1
1	Print_PanelDue7iMountCover	>=ABS	1
1	Print_PanelDue7iMount	>=ABS	1
1	Print_HosePlug_Front	>=ABS	1
1	Print_HosePlug_Rear	>=ABS	1
1	Print_Aux_PartCooling_Part01	>=ABS	3
1	Print_Aux_PartCooling_Part02	>=ABS	2
1	Print_Aux_PartCooling_Part03	>=ABS	2
1	Print_Aux_PartCooling_Part04	>=ABS	2
5	Print_Bowden_Inlet	>=ABS	3

Step 1 – Printed Parts Preparation:

Locate (16) Print_Acrylic_Panel_Lock and install an M4 heat set insert into the location shown on all pieces. Note the printed part orientation!



Locate (2) Print_Door_Hinge_Support and install (2) M4 heat set inserts into the location shown. Note the printed part orientation!



Locate (2) Print_Door_Hinge_Left and (2) Print_Door_Hinge_Right.

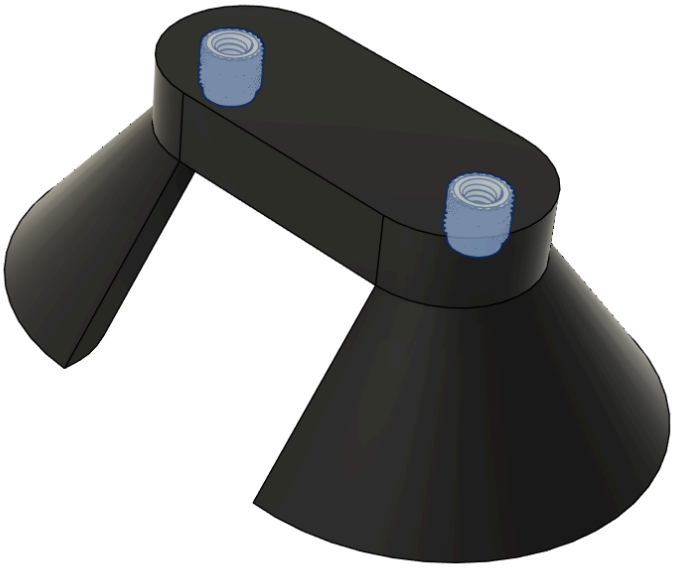
As these are vertically printed and fully closed holes, we expect that a 5mm reamer will be needed to achieve proper concentrically. Before proceeding, be sure that a 5mm steel shaft can be inserted and removed with relative ease. Excess force required during assembly will result in a stiff hinge!

Note: Not using printed hinges? Skip this step!

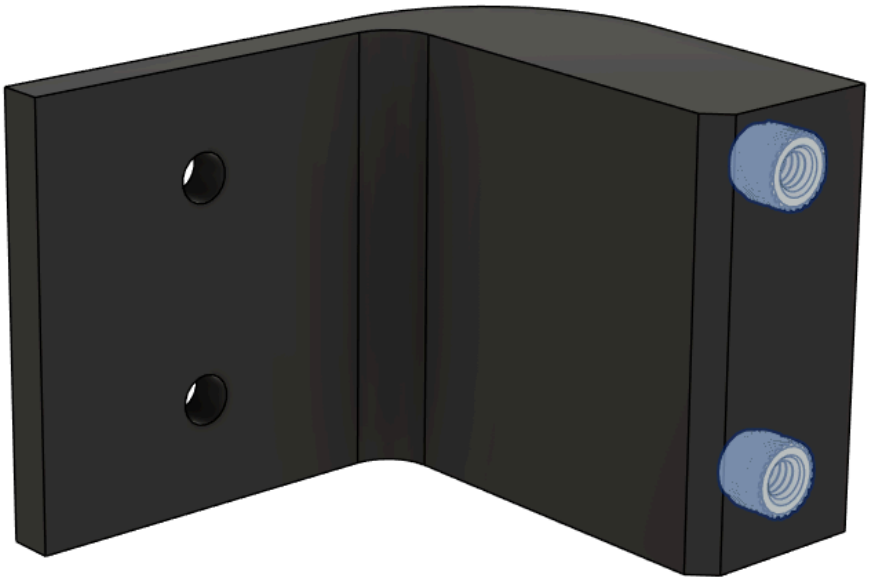
Fully assemble (2) complete hinges using the previously prepared parts.

There are locations in each printed part that will accept an M3x4mm Set screw if the fit is too loose. These are typically not necessary!

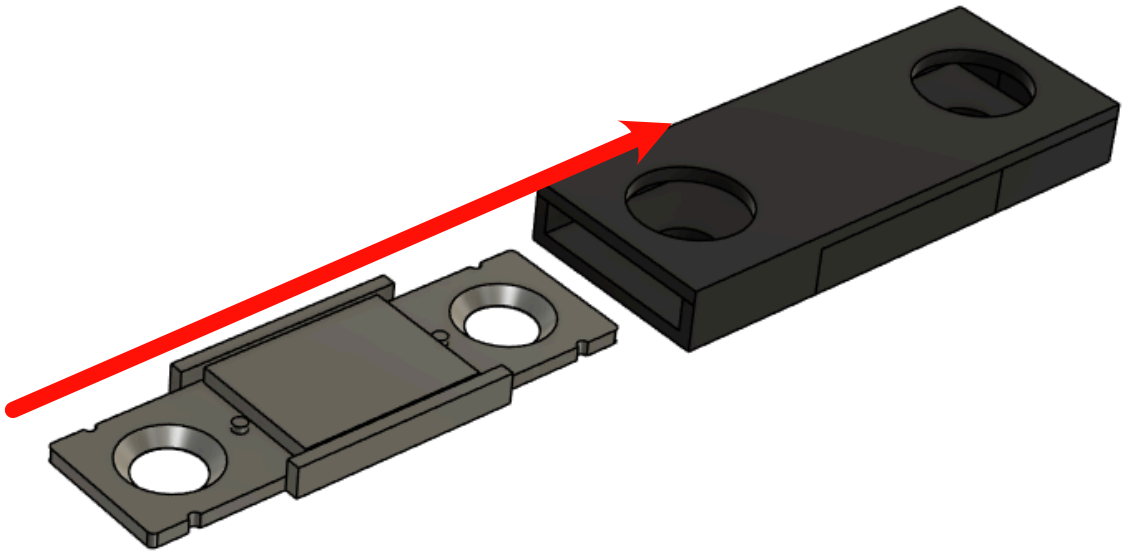
Locate Print_DoorHingeKnob and install (2) M3 heat set inserts.



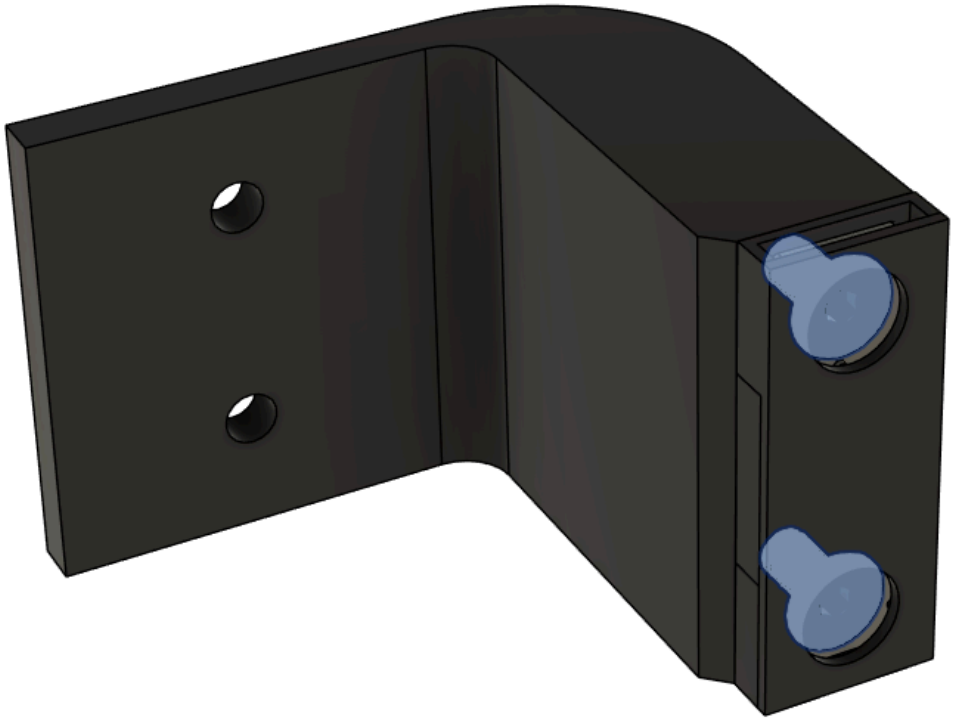
Locate Print_DoorMagnetMount and install (2) M4 heat set inserts as shown.



Locate Print_DoorMagnetHolder and insert Part A of the door latch assembly into the end as shown below.



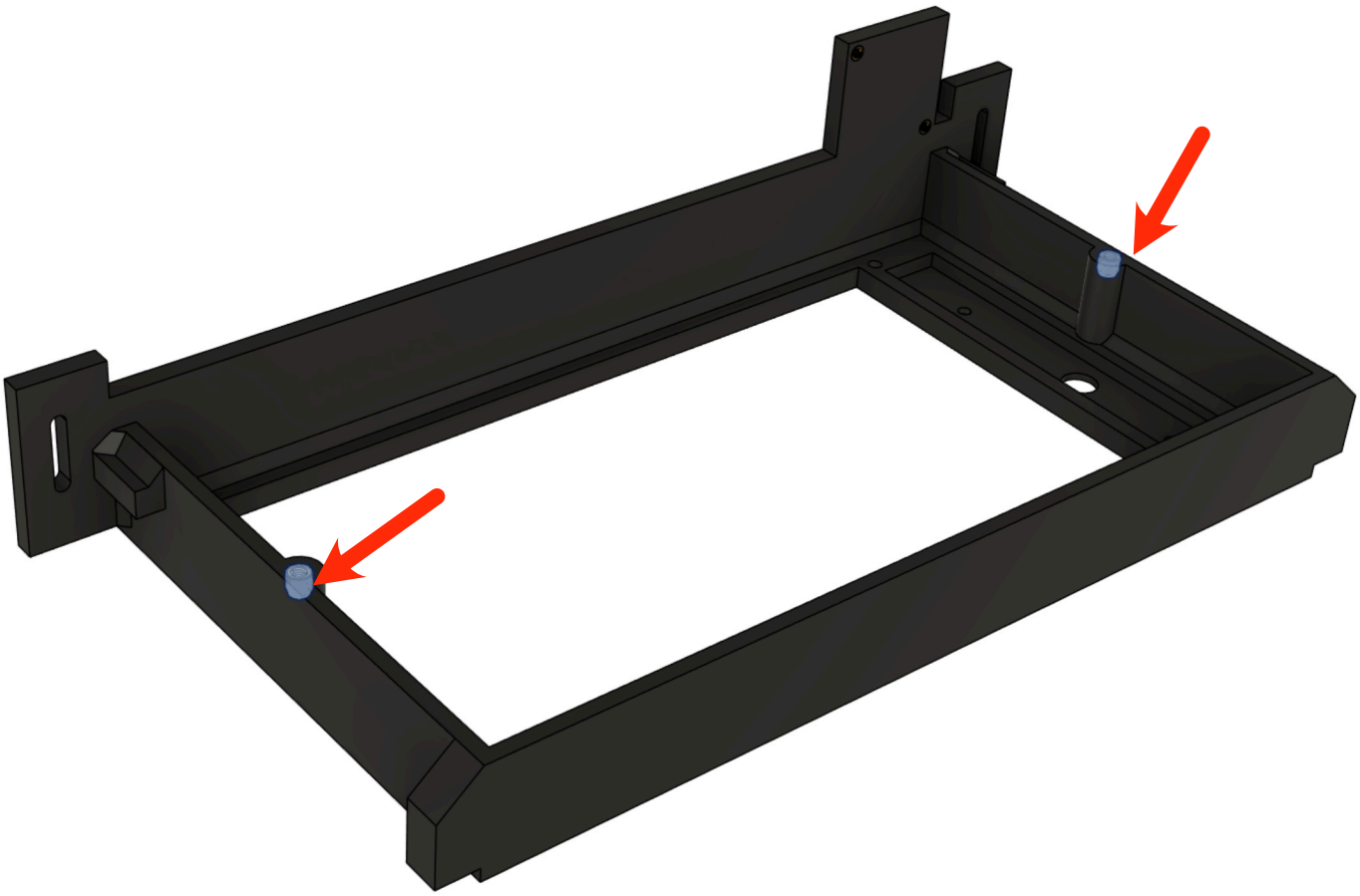
Secure the magnet holder to the magnet mount using (2) M4x8mm FHHS



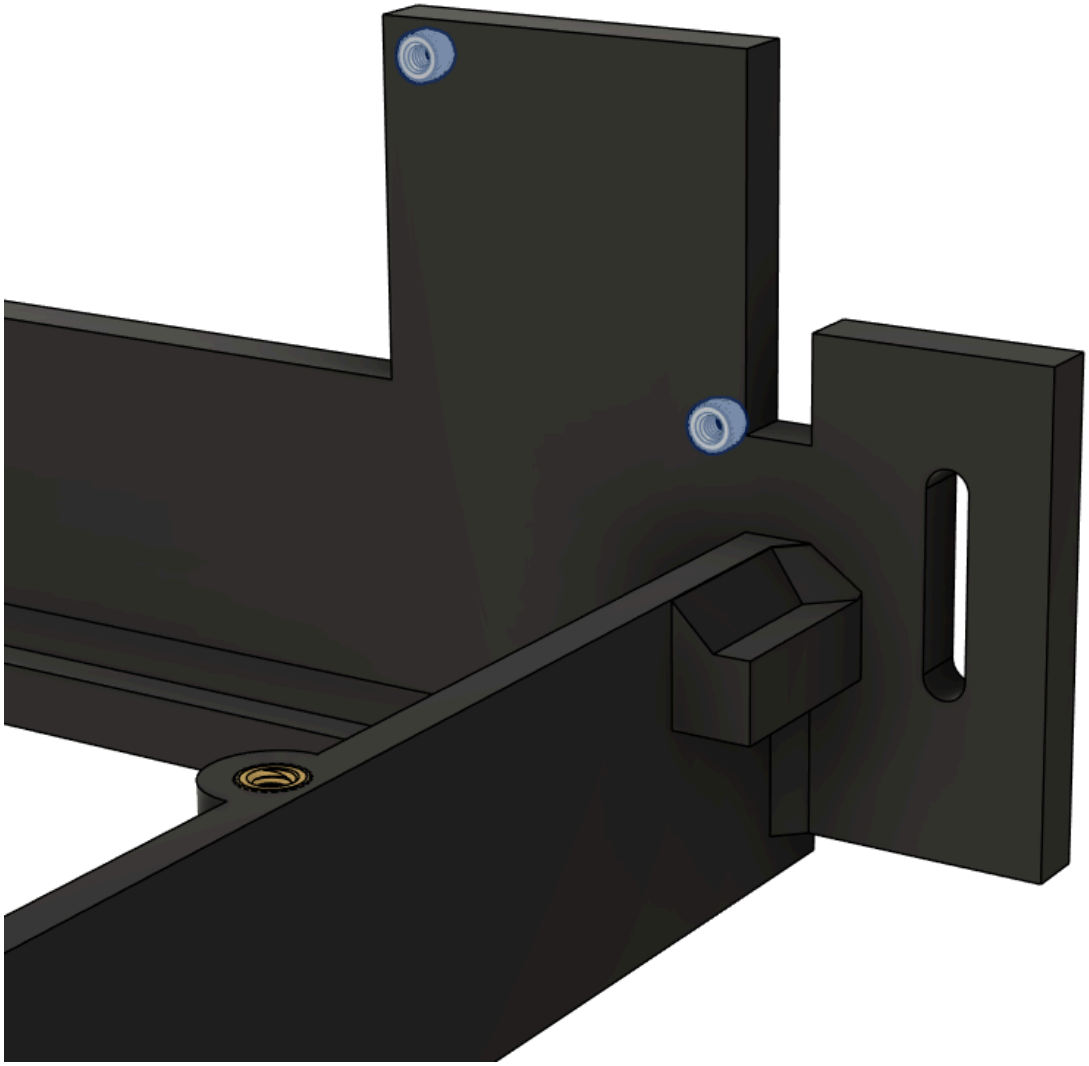
Step 2 (Optional) – PanelDue 7i:

Not fitting your machine with the PanelDue 7i display? Skip to Step 3!

Install (4) M3 heat set inserts into the locations shown below

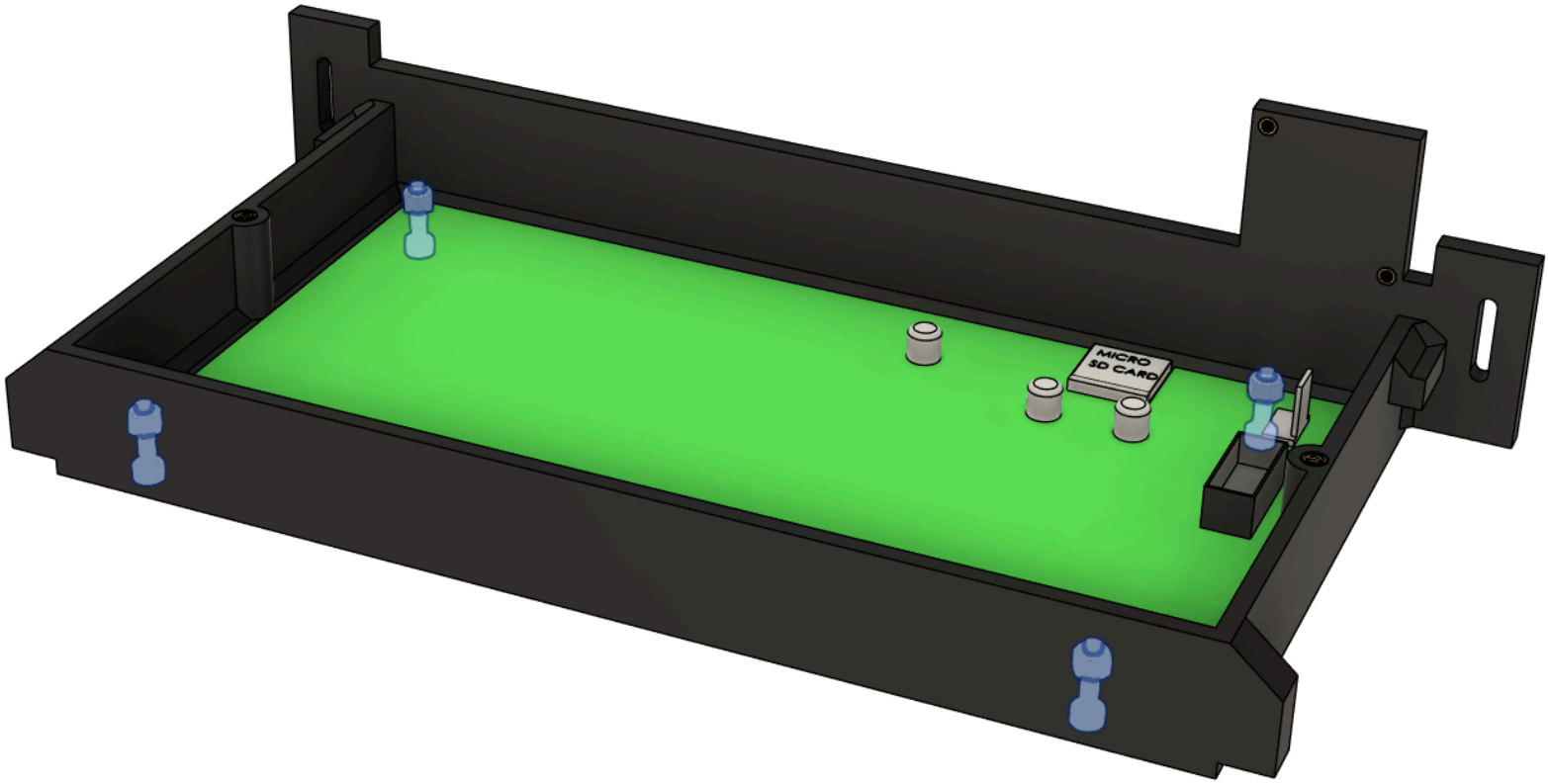


Install (2) M2 heat set inserts into the locations shown below



Fit the Panel Due into the housing from the back side of the mount. Note that the fit is meant to be on the tighter side overall. Take care to avoid damage to the LCD ribbon during installation!

Secure the display to the mount using (4) M3x12 SHCS and (4) M3 Nylon Lock Nuts. Note the direction below!

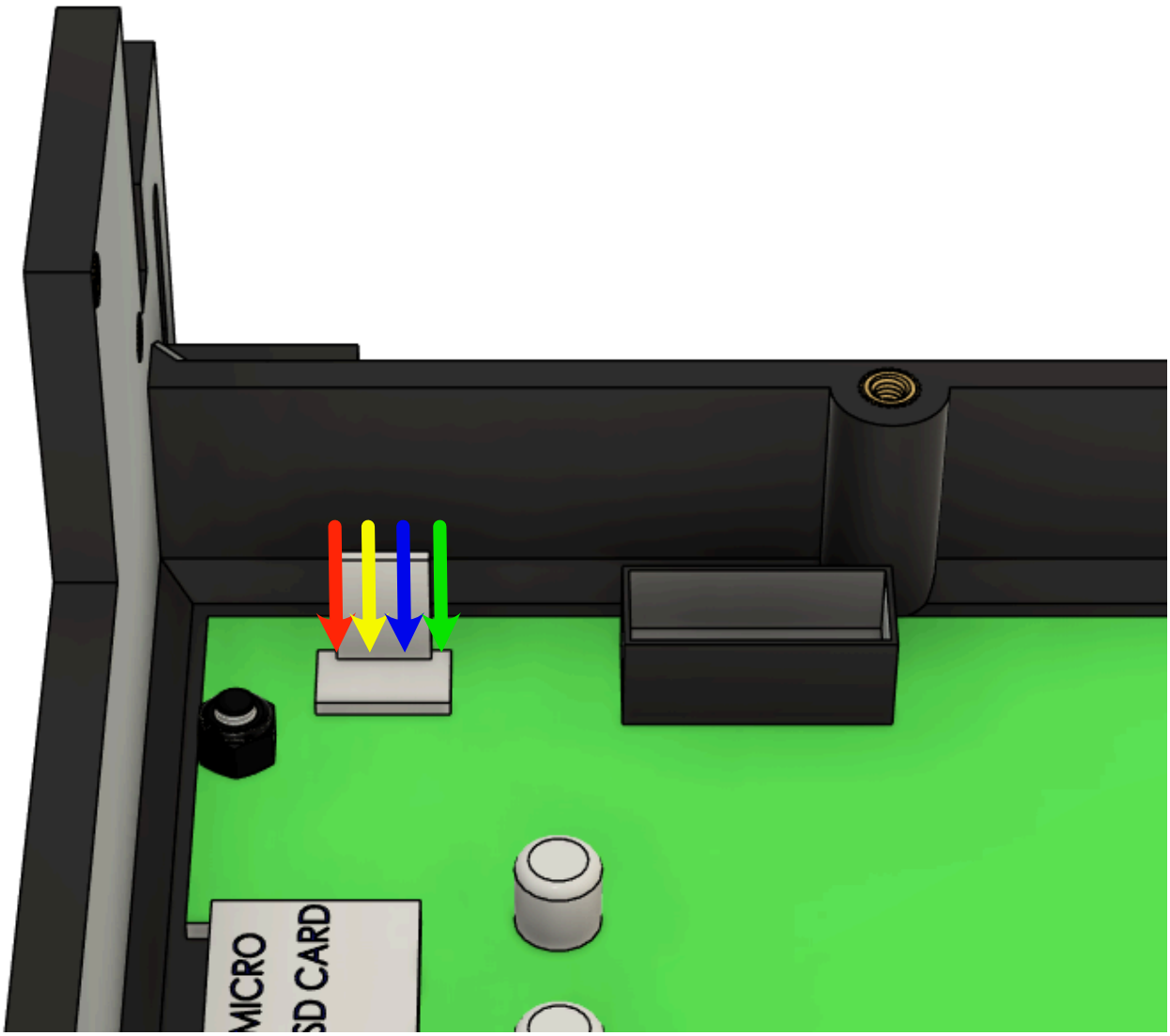


Take this opportunity to install the display's wiring now!

It is important to note that Panel Due when used with Duet 3 6HC requires a different pinout at each end of the cable.

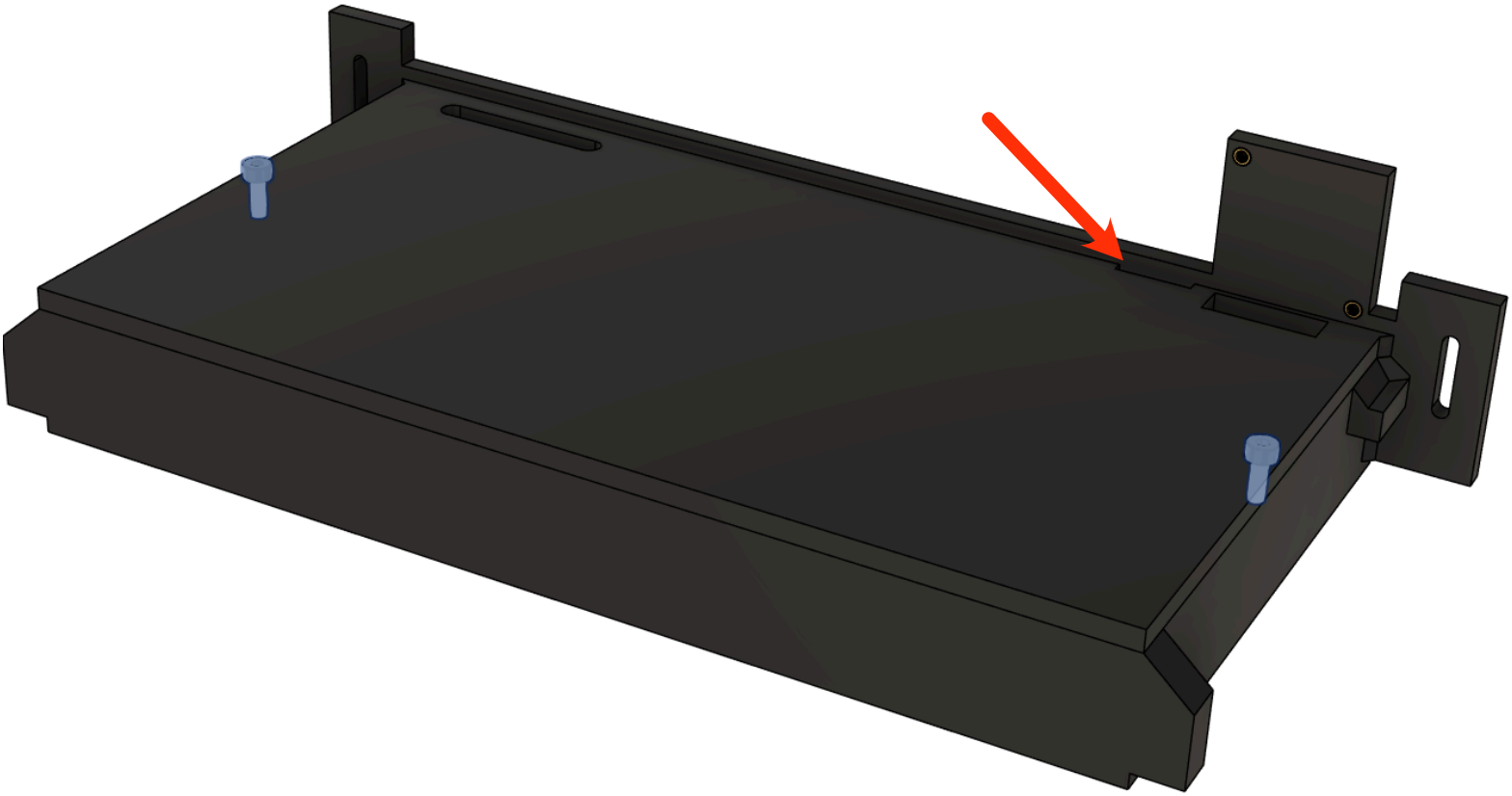
Display Data 1	Duet 3 6HC	Molex KK Pin 1 of 5	PanelDue	Molex KK Pin 1 of 4	62CM	24	RED	N	IO_0
Display Data 2	Duet 3 6HC	Molex KK Pin 2 of 5	PanelDue	Molex KK Pin 4 of 4	62CM	24	GREEN	N	IO_0
Display Data 3	Duet 3 6HC	Molex KK Pin 3 of 5	PanelDue	Molex KK Pin 2 of 4	62CM	24	BLACK	N	IO_0
Display Data 4	Duet 3 6HC	Molex KK Pin 4 of 5	PanelDue	Molex KK Pin 3 of 4	62CM	24	BLUE	N	IO_0

The correct end of the Panel Due sub harness will be 4-pins versus 5 pins!

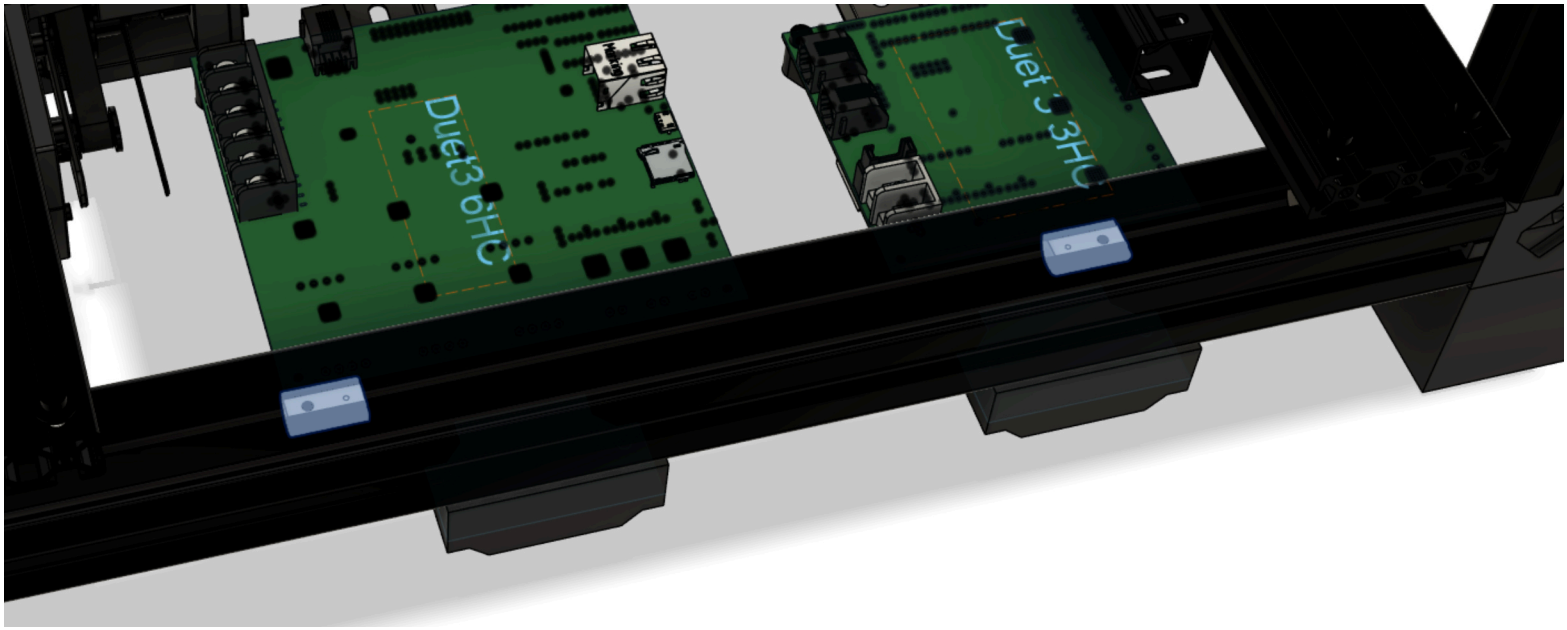


Route the panel due wires to exit the location shown in RED

Secure Print_PanelDue7*i*MountCover using (2) M3x8mm SHCS



Install (2) 40 series M3 Tnuts into the top slot of the front lower extrusion



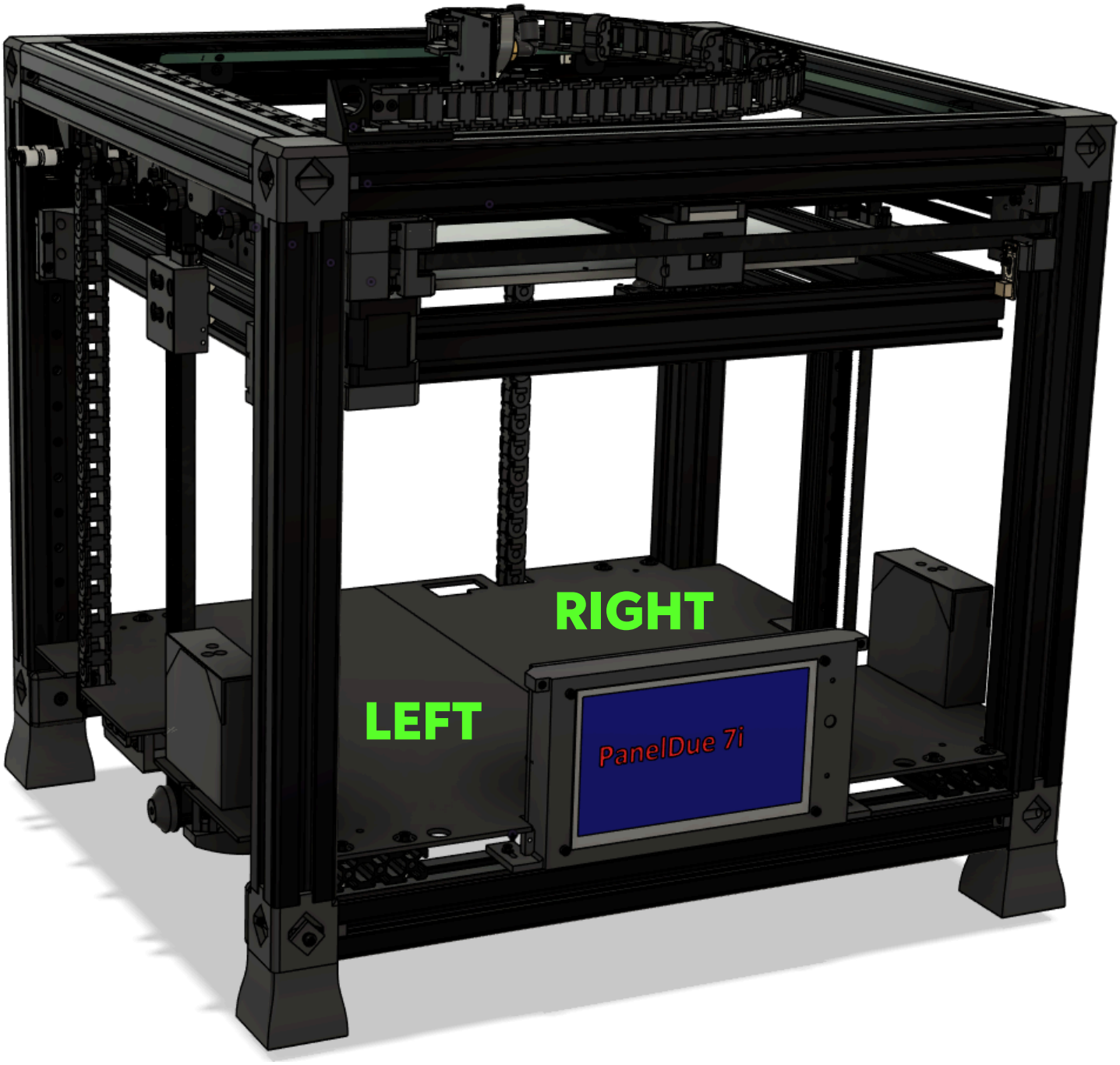
Loosely secure the display to the machine using (2) M3 washers and (2) M3x14mm SHCS

Step 3 – Floor Panels:

Installation of the floor panels is straight forward as they are not physically secured. Removal of these panels will be the way that electronics are accessed for future repairs or maintenance!

These panels only fit in one orientation and include slots to allow the counterweight cord to pass into them.

If you are working with a Panel Due display, slide the mount left or right until it is centered within the relief of the floor panels. The display can be tightened for now, but will likely need and additional fore/aft adjustment once the front panel is fitted.

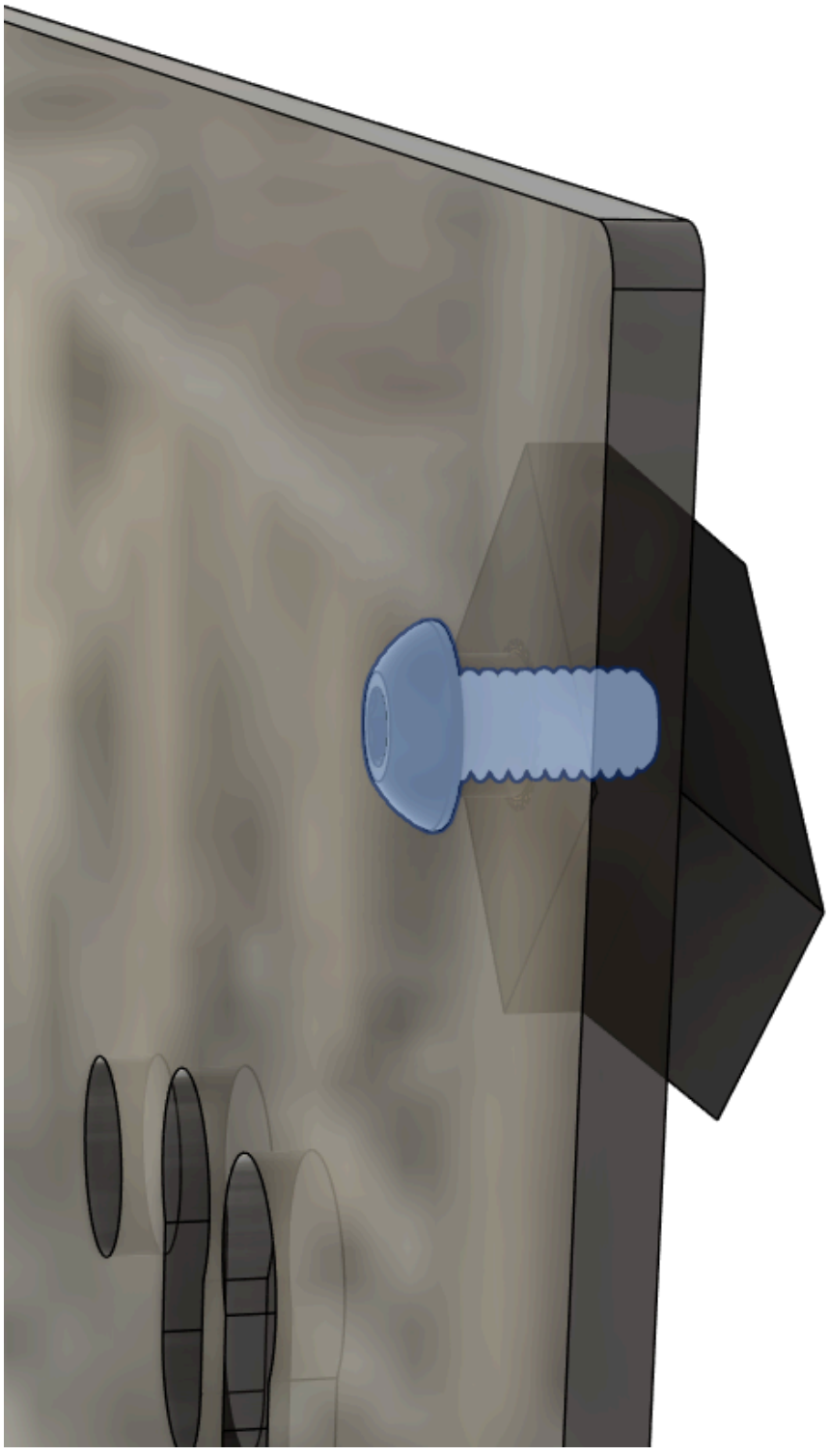


Step 4 – Left & Right Panels:

This step will focus on the left side enclosure panel while also being used as a reference for installation of the back and right side panels.

Note the below panel orientation of the left side panel!

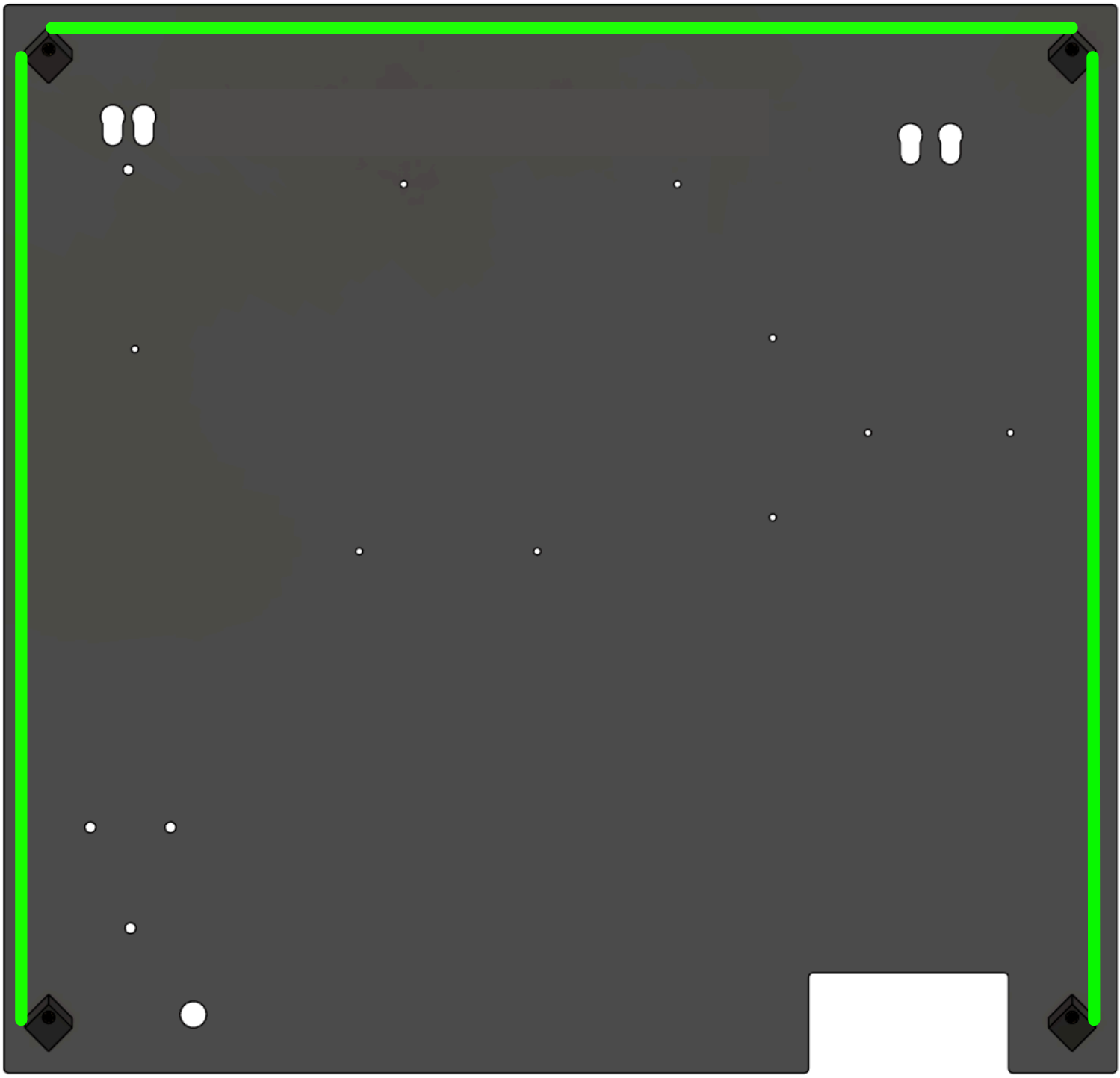
Mount and loosely secure one panel lock at each of the 4 corners of the panel using (4) M4x8mm BHHS. The sharp point of the diamond should face downward, and the head of the fastener will meet the front of the panel. Remember to leave them loose for the time-being!



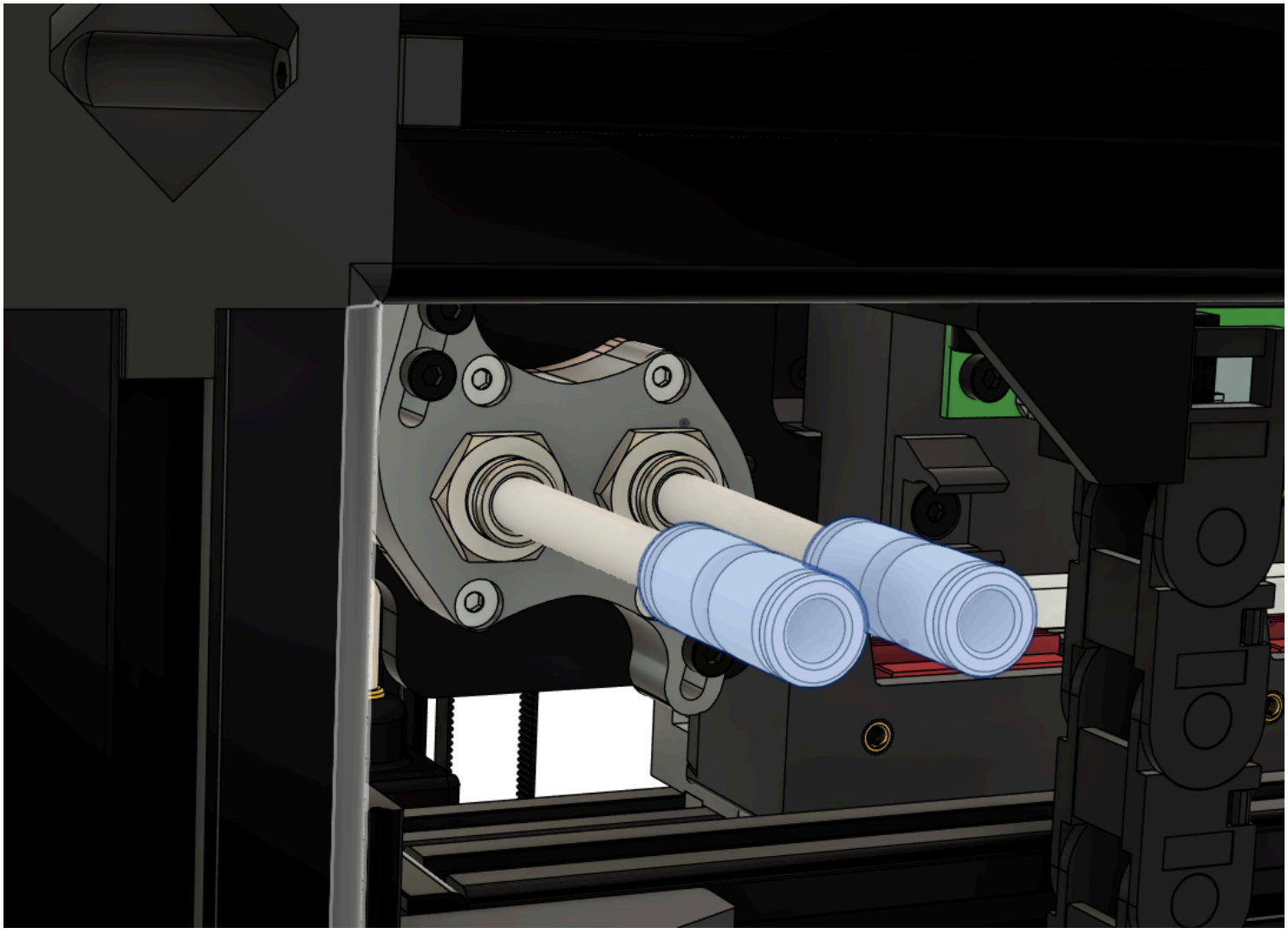
Prepare 3 lengths of 3mm thick foam tape and apply to the backside of the panel at the locations shown in GREEN below.

OR

The foam tape can also be applied to the frame side of the machine! While tougher to work with, this can be aesthetically cleaner and allow for panel replacement in the future without the need for more foam tape.

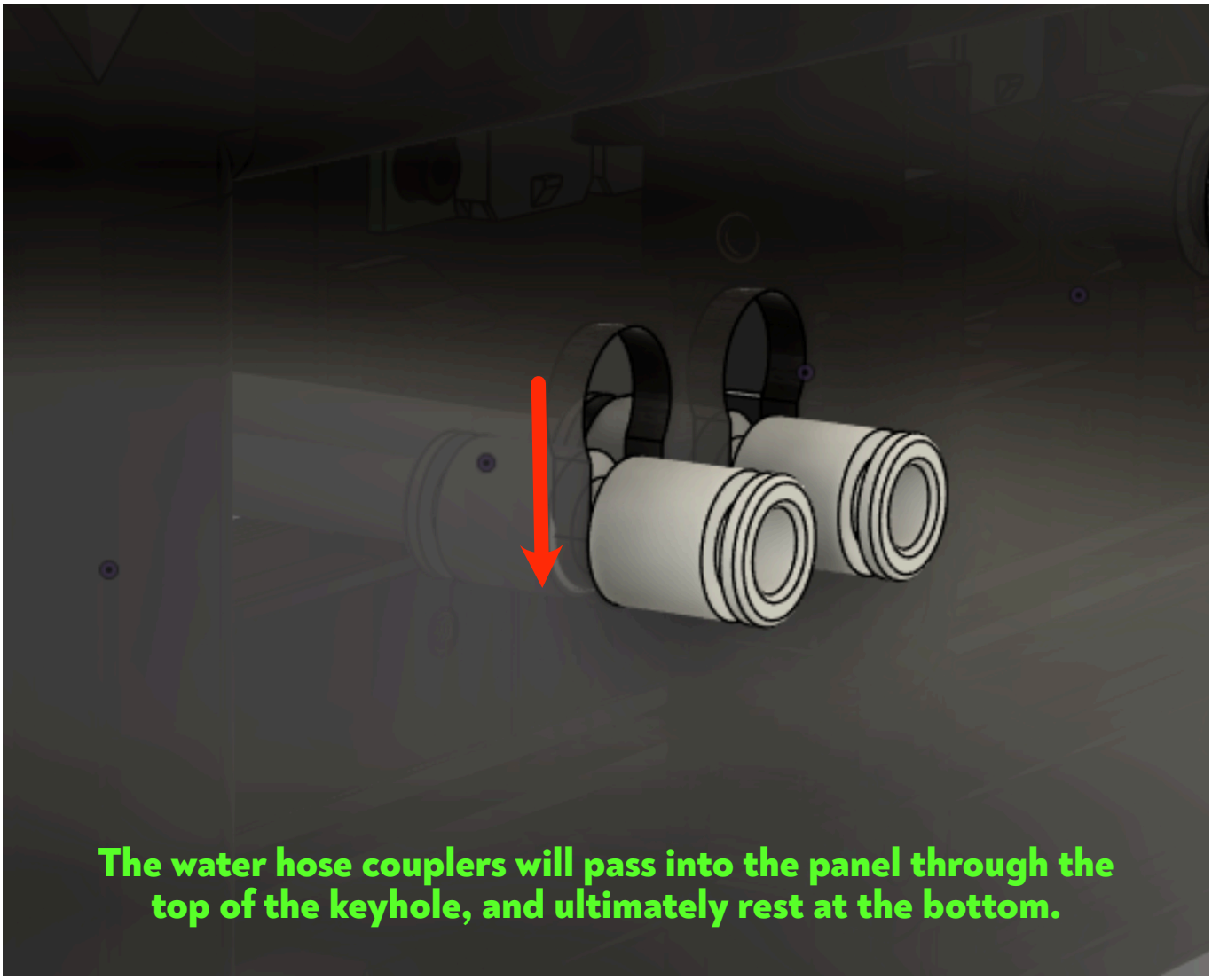


Push (1) 4x6mm Push_Fit Coupler onto each of the (2) idle cooler water block hoses.

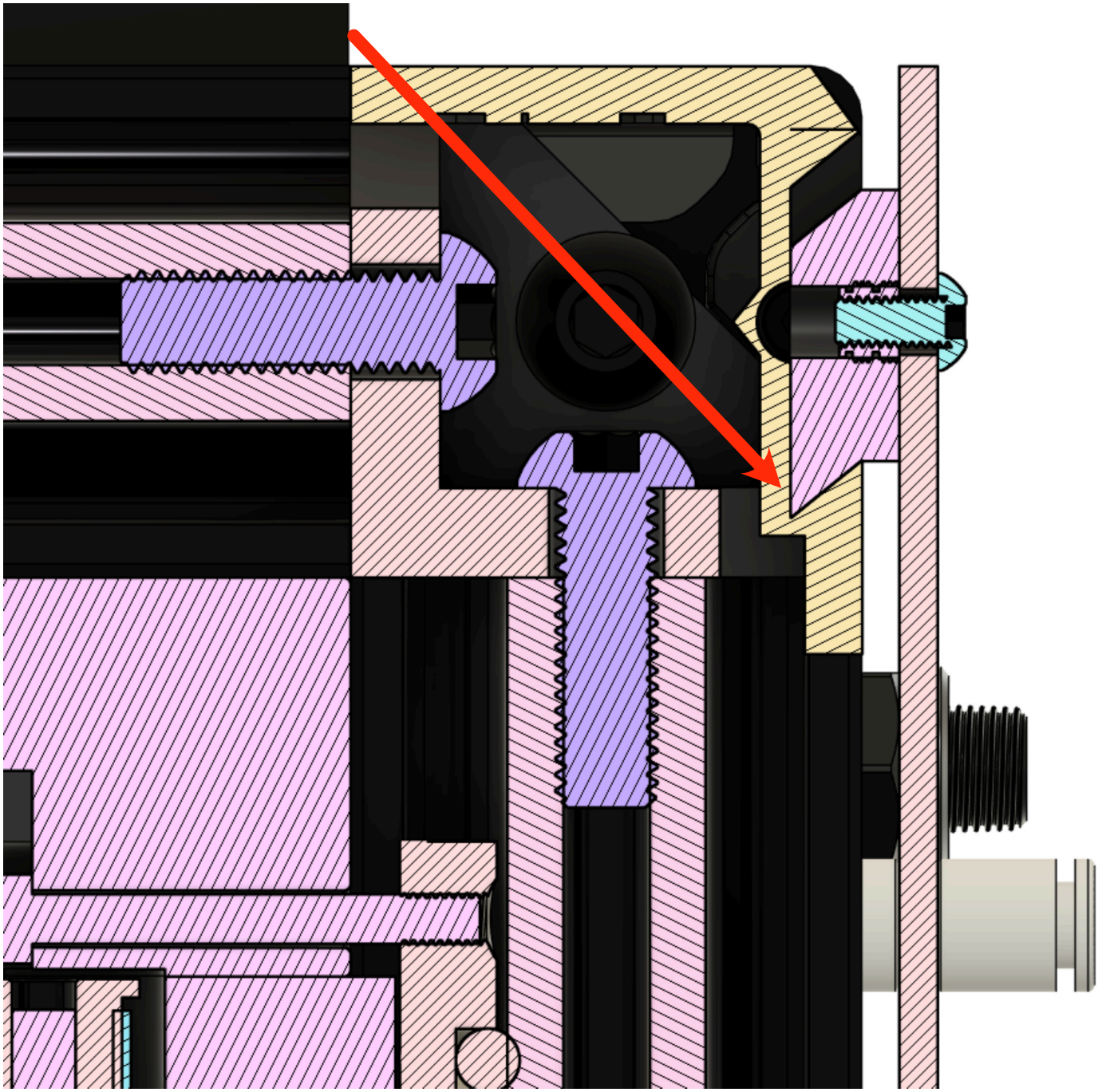


Once you are about 15mm away from the panel seating against the frame, use the below images to guide you the rest of the way.

Fitting the left side enclosure panel can be tricky! Reading ahead just a bit will help you better visualize the end goal.



The panels are retained with a downward motion into the pocket on the corner bracket that received the diamond shape. The below section analysis shows the final position of all components.



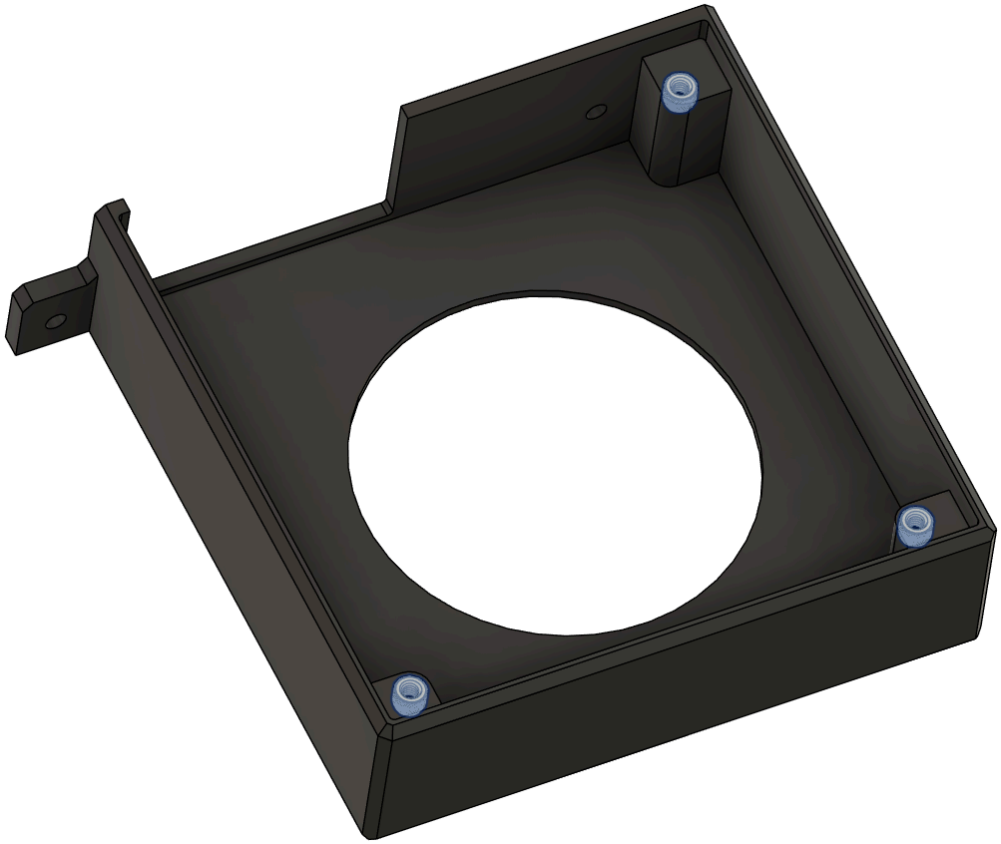
Applying slight inward pressure at the locations shown while tightening the locking lug fasteners can pre-load the panel under light tension - resulting in the best seal.

Installation of the right panel is identical to the left panel, but is much simpler due to the lack of pass-thru components.

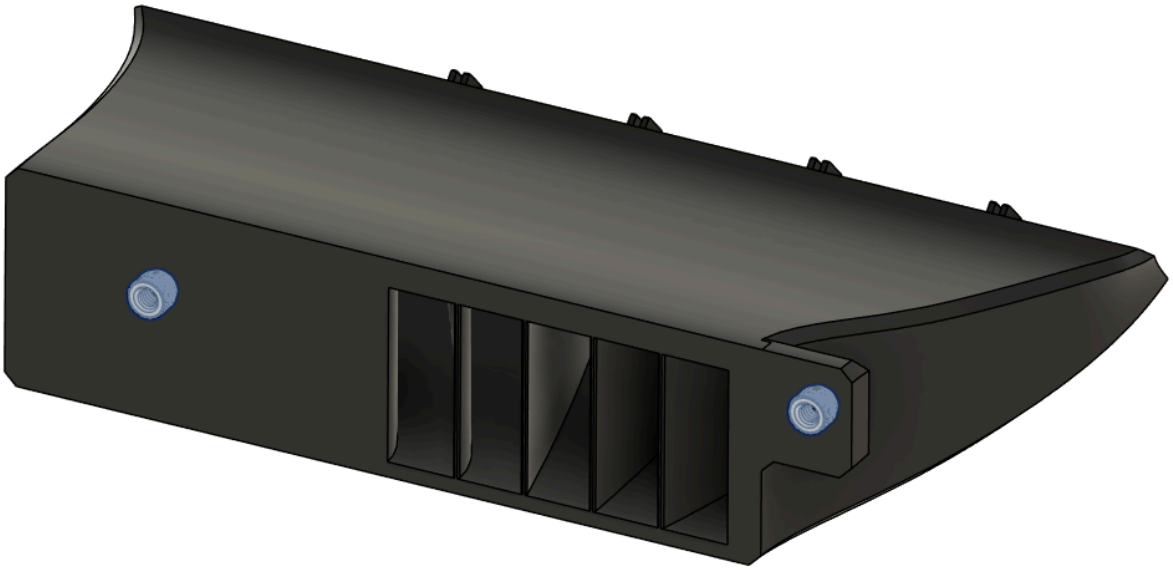
Proceed with installation of the right panel using the above steps in repeat where applicable.

Step 4B – Back Panel & Aux Part Cooling:

Begin with Print_Aux_PartCooling_Part 01 in the orientation below and install (3) M4 heat set inserts into the shown locations.



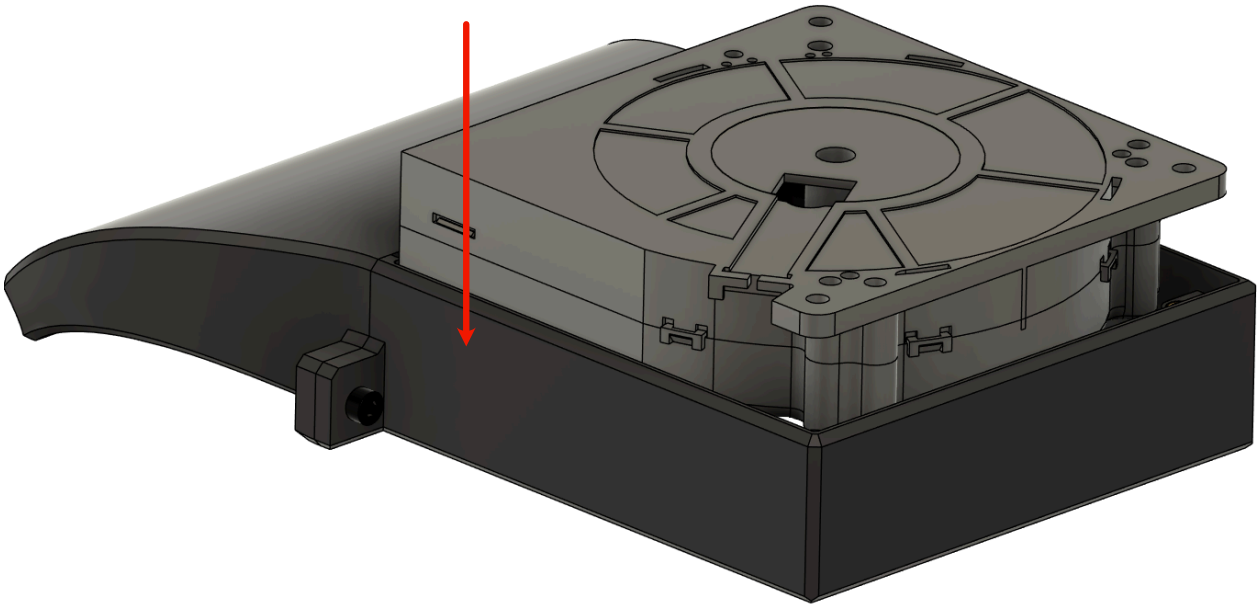
Locate Print_Aux_PartCooling_Duct and install (2) M4 heat set inserts into the shown locations.



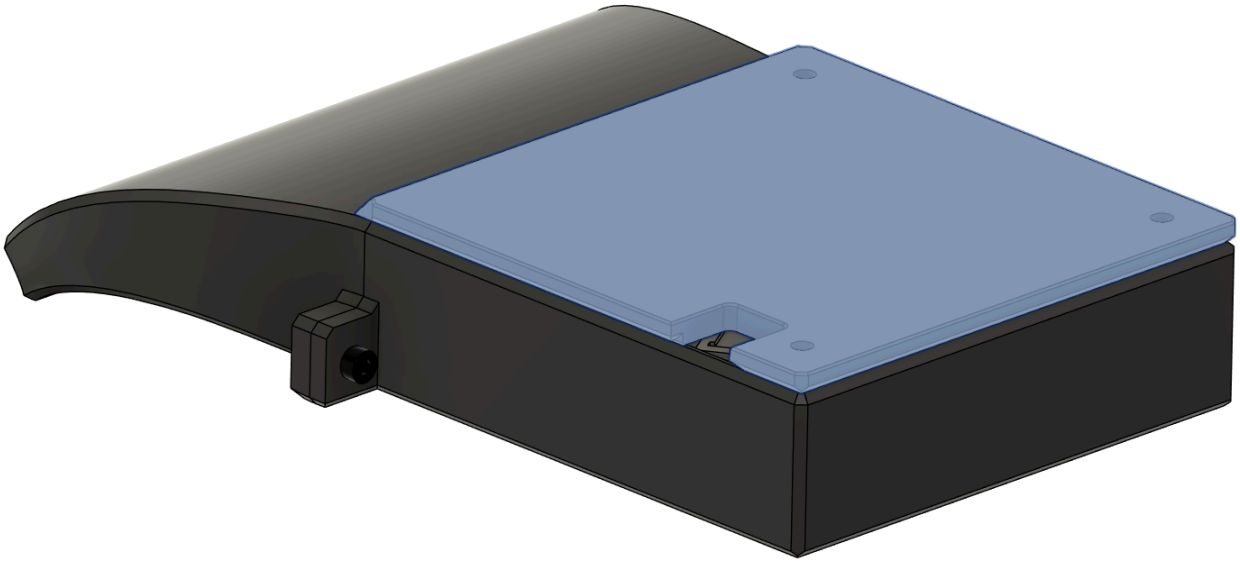
Mate the two previously handled parts as shown below and secure at the outside fastening location using an M4x10mm SHCS

Follow with a M4x8mm SHCS tightened into the inboard mounting location

Seat the 120x32mm Blower fan into the housing fully



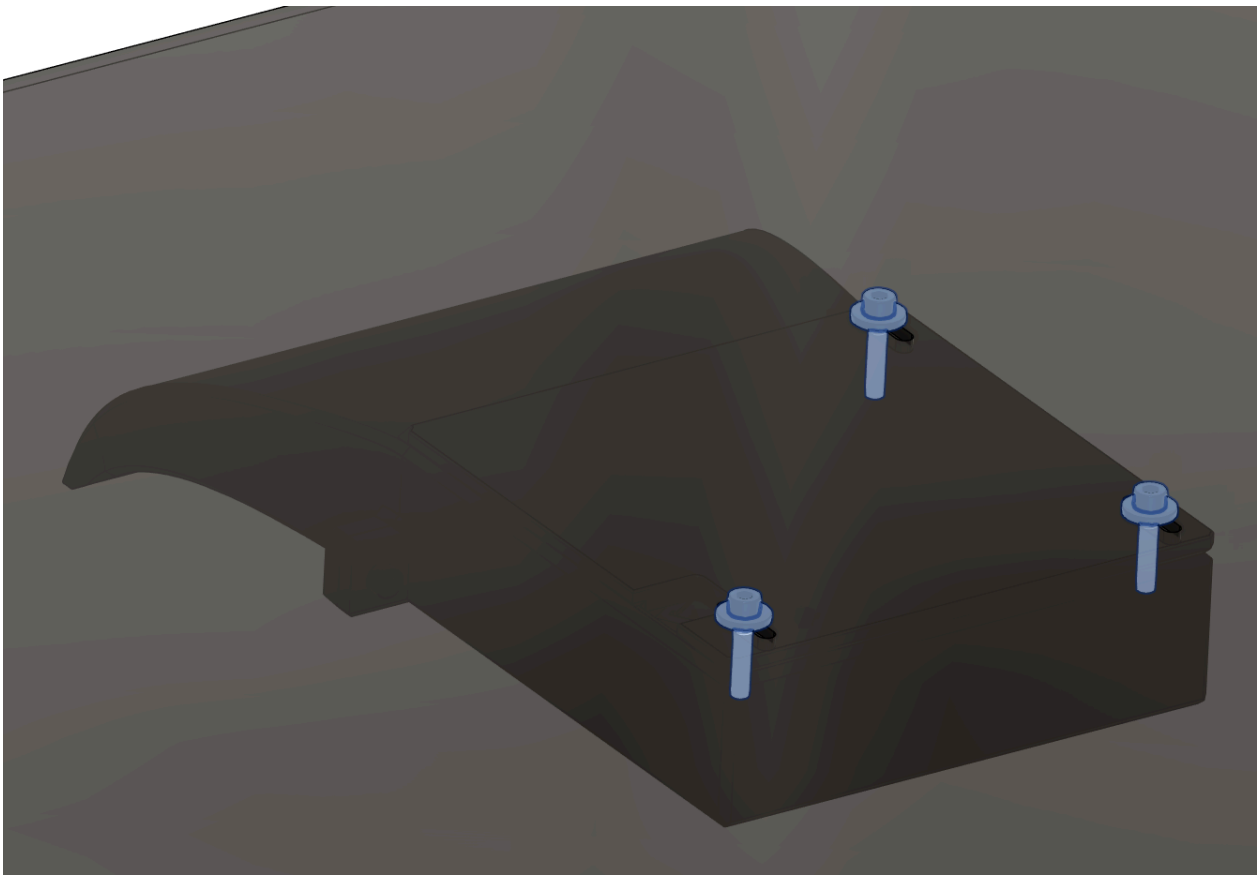
Place Print_AuxPartCooling_Cover over the housing as shown below



Place the rear acrylic panel over top of the previously assembled fan as shown below. Note the panel orientation for proper fitment!

Secure the fan assembly to the acrylic using (3) M4 Thick Fender Washers under (3) M4x20mm SHCS.

NOTE: Do not over tighten!



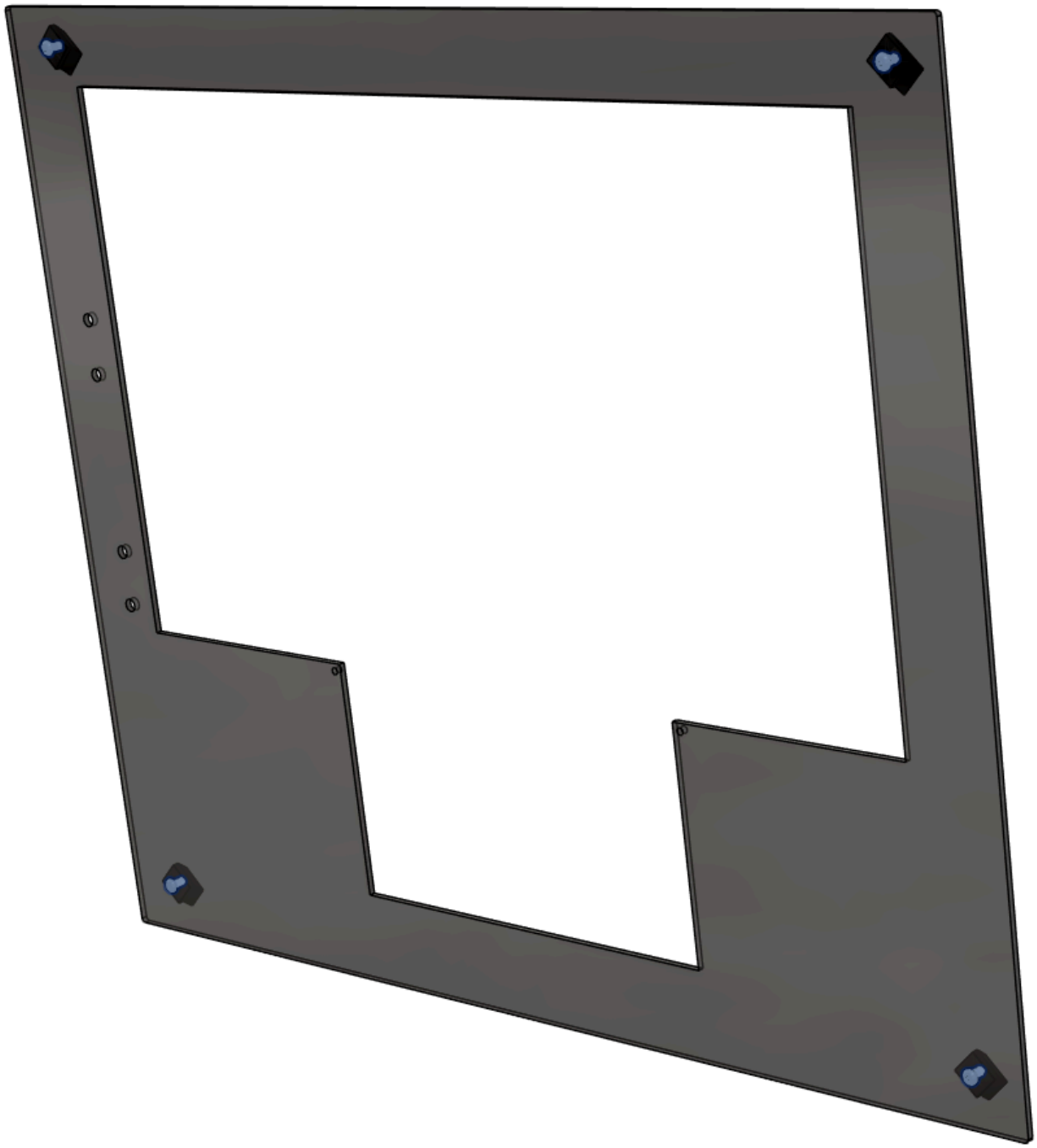
Flip the panel over and install the printed mounts.

Apply foam tape as performed in the previous steps.

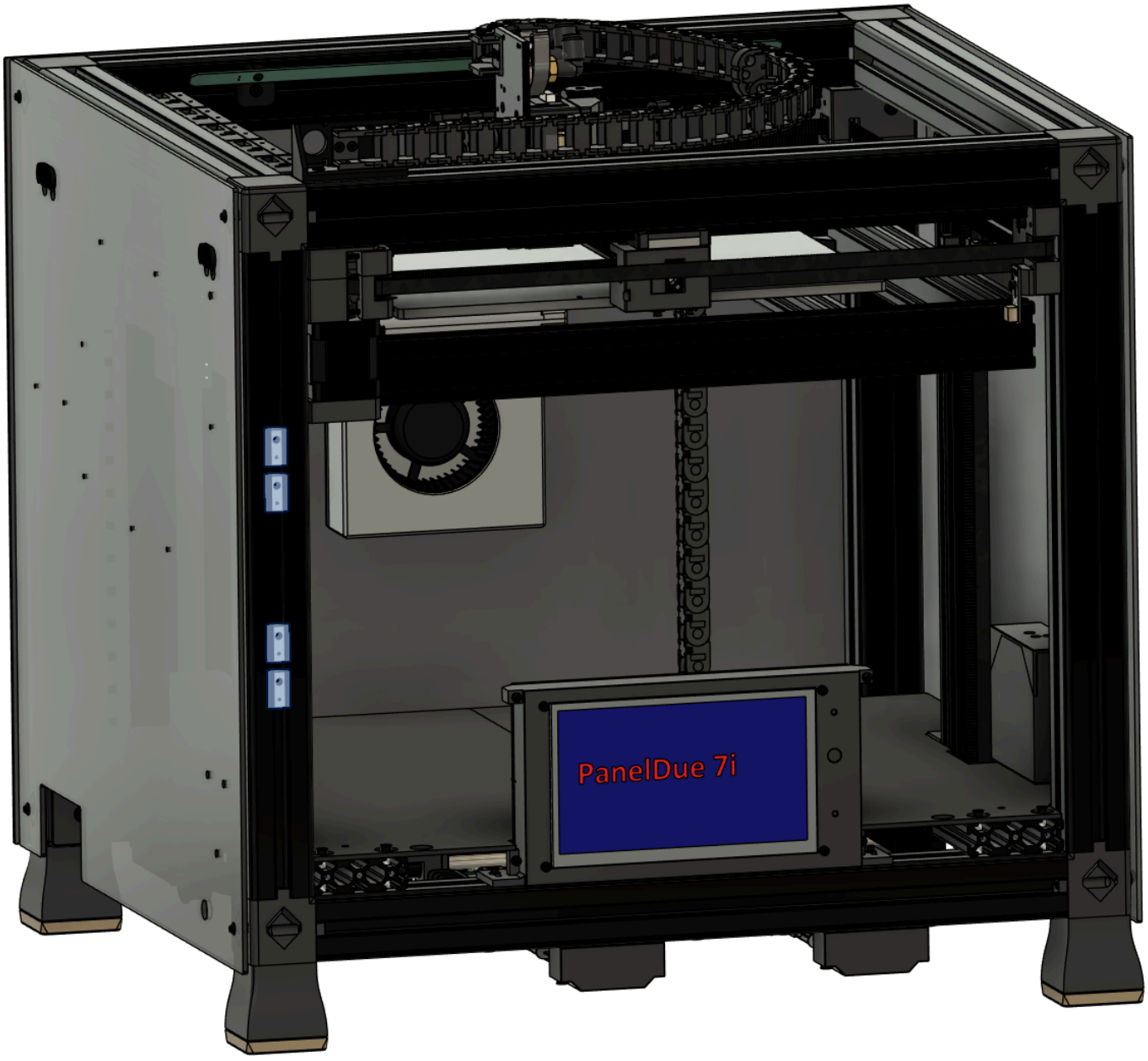
Step 5 – Front Panel + Hinged Door:

Loosely install (4) Panel Lock assemblies as described in step 4

Fit foam tape to the back side of the panel as described in step 4

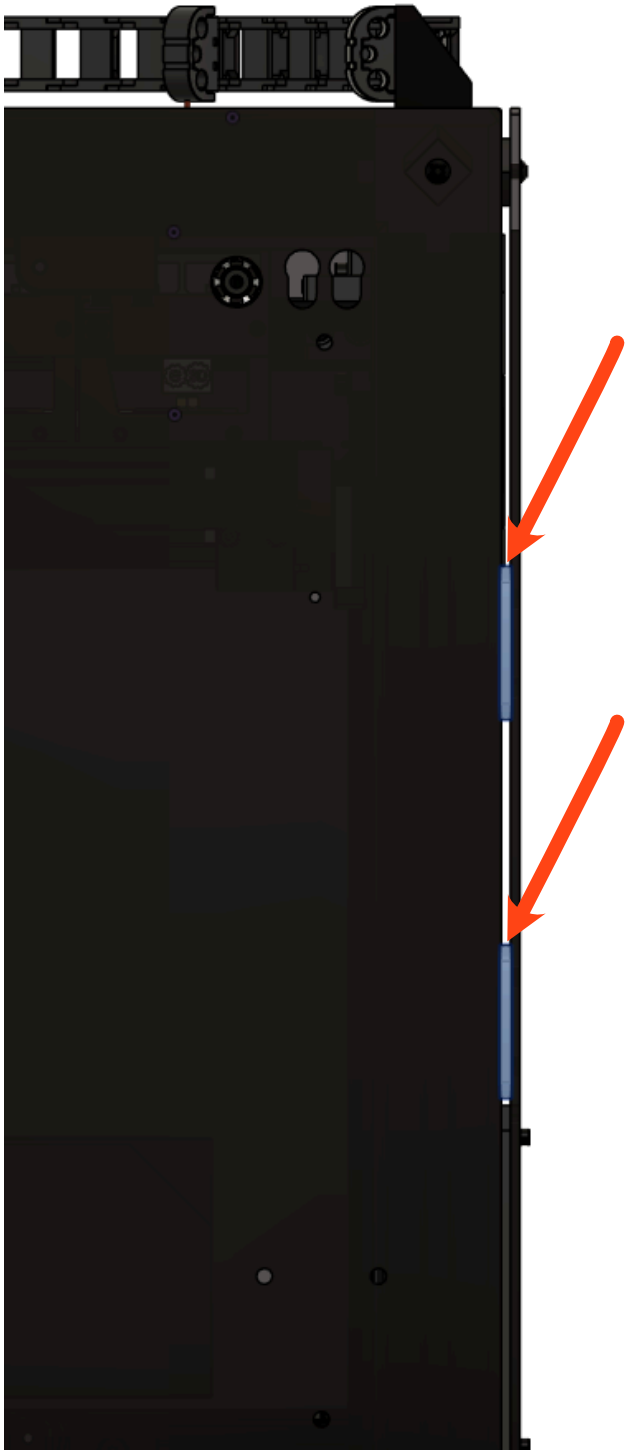


Insert (4) 40 series M4 Tnuts into the outer face of the left front extrusion.

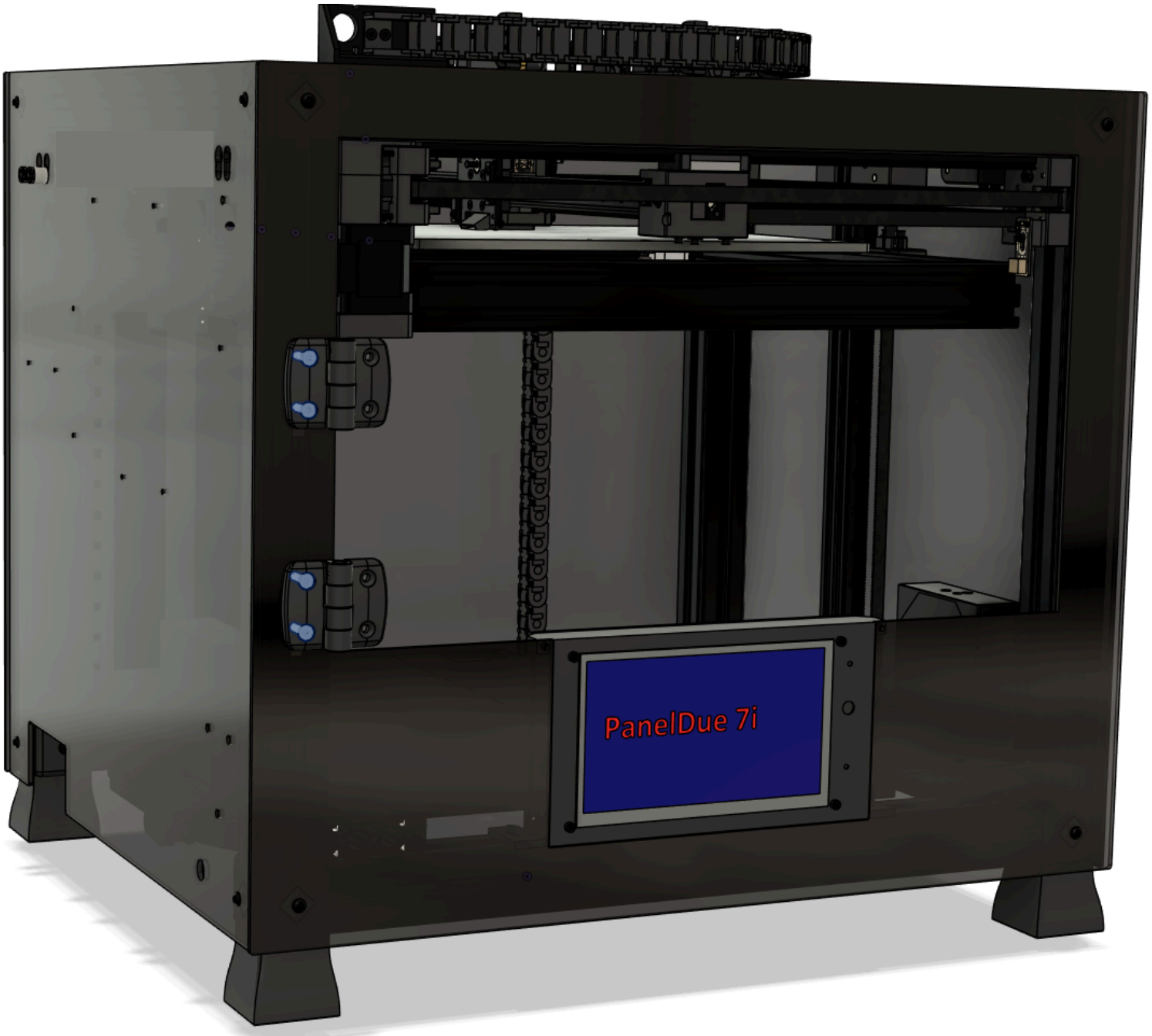


Fit the front panel into place and adjust the position of the installed Tnuts to align with the through holes in the panel

Locate (2) Print_Door_Hinge_Spacer and slide them between the front panel and extrusion frame



Install (2) previously prepared door hinge assemblies and loosely secure using (4) M4x20mm FHHS

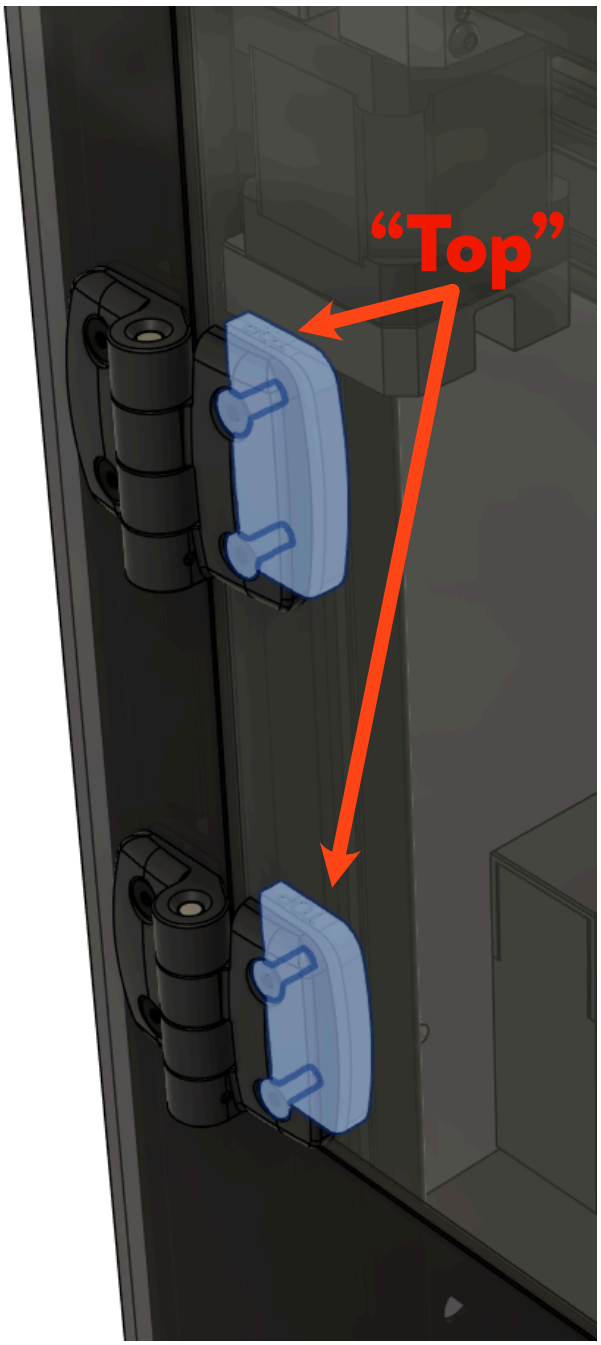


Locate (2) Print_Door_Hinge_Support and use (4) M4x14mm FHHS to capture the open hinge, acrylic door and door hinge supports. Loosely secure these fasteners for now.

NOTE: The door hinge supports are direction specific - and "top" is printed appropriately!

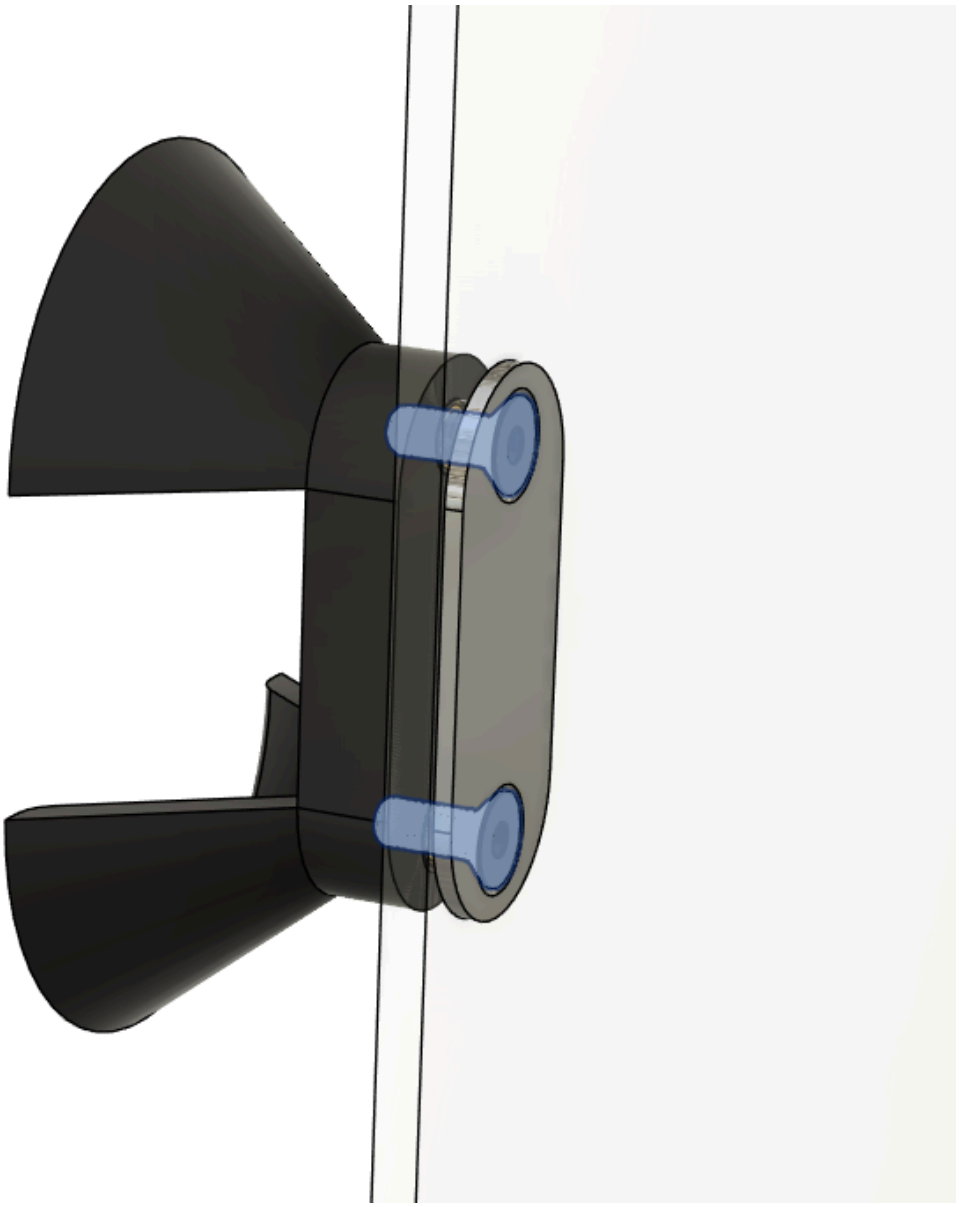
NOTE: Be careful with the acrylic door! Until these fasteners are tightened later in the guide, closing the door too quickly can result in cracked acrylics!

Front View



Backside View

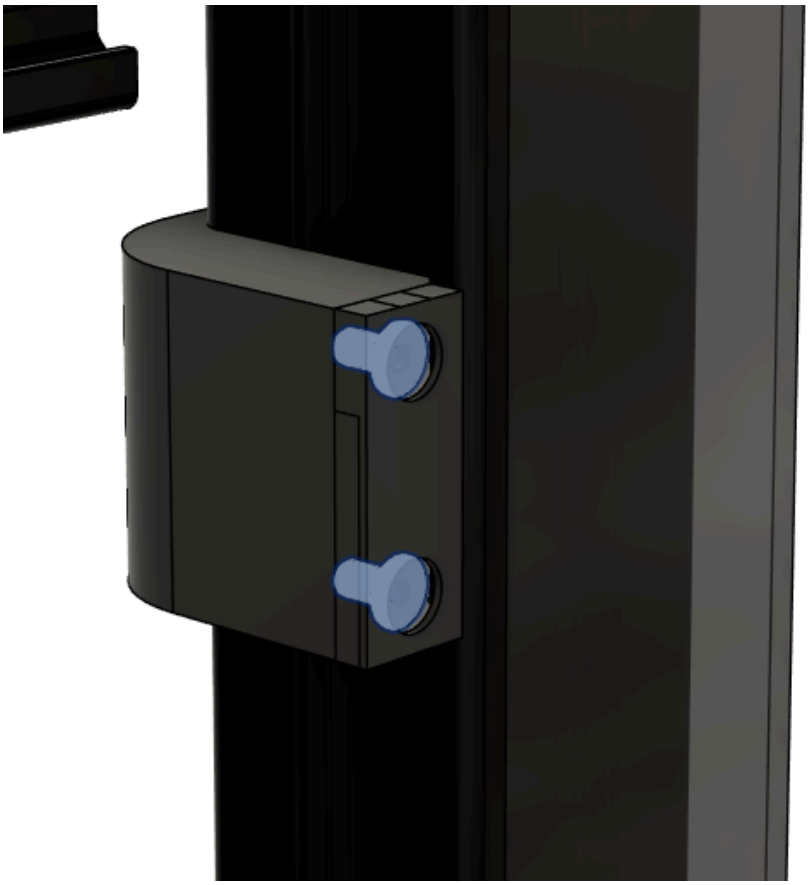
Locate Magnetic_Latch_PartB and use (2) M3x8mm FHHS to capture Part B, the door panel and the door handle as shown below.



Insert (2) 40 series M4 Tnuts into the rear slot of the left front extrusion as shown.

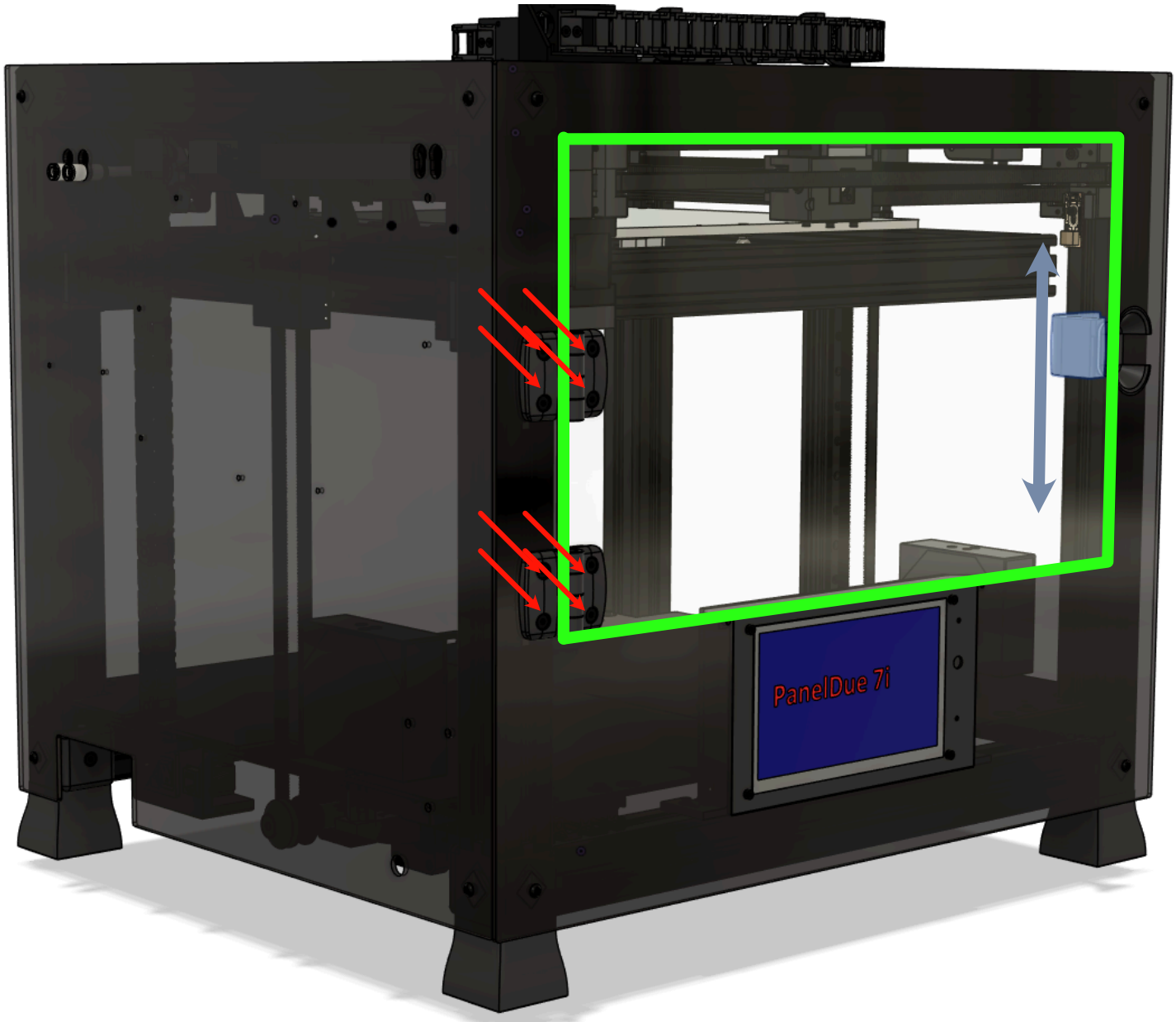
Loosely install the previously prepared door latch mount using (2) M4x12mm SHCS

Install the previously assembled latch magnet holder to the mount using (2) M4x8mm FHHS



The first step in adjusting the hinged door is to slide the magnet mount up or down as needed to be centered with the latch handle and tighten the fasteners fully. This will then allow you to follow with adjustments to the hinge side for a perfect fit.

Maintain an even gap around the perimeter marked in GREEN while fully tightening the hinge fasteners marked in RED.



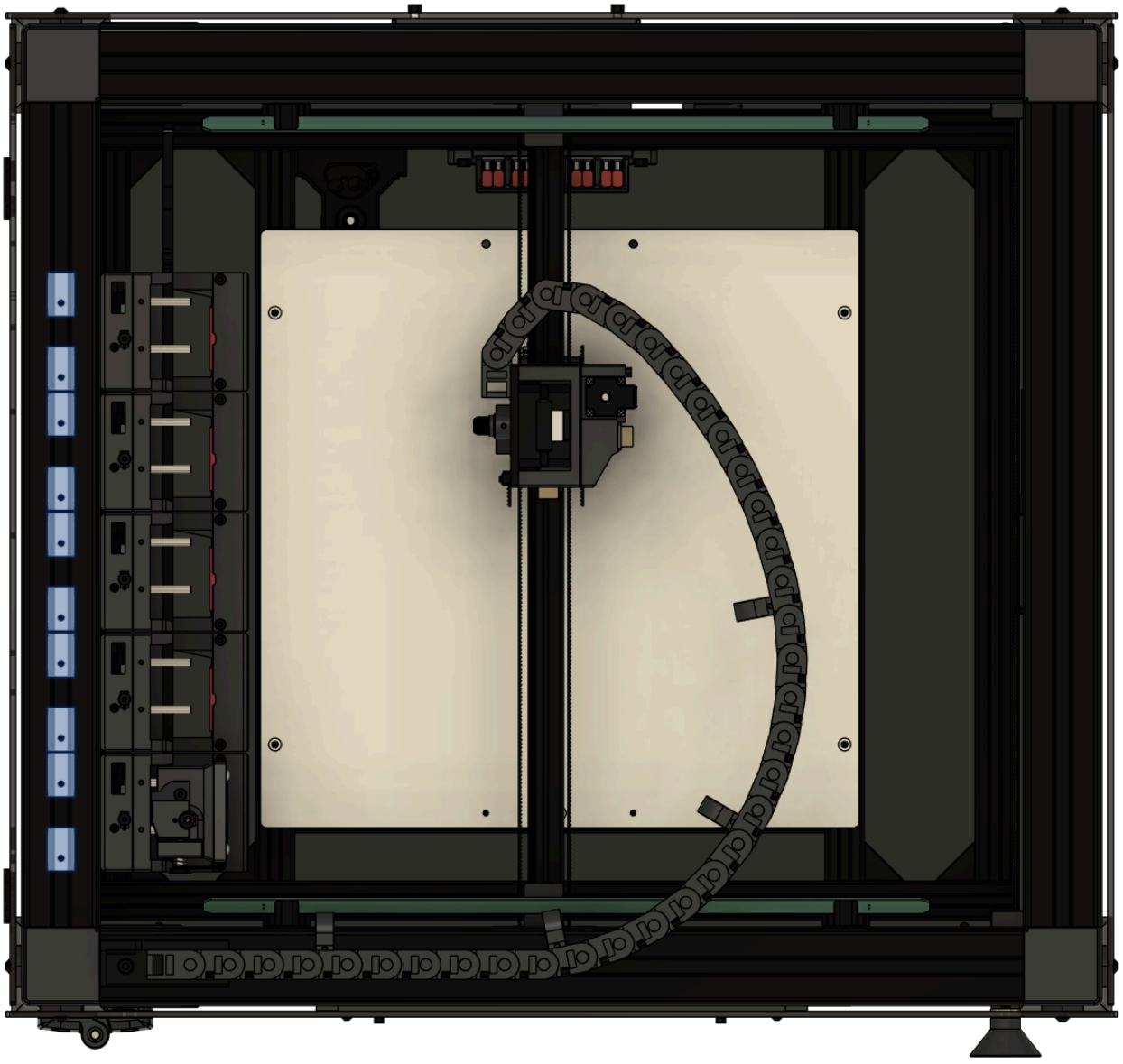
Step 6 – Bowden Inlets:

Locate (5) Print_Bowden_Inlets and (5) PC4-M6 Fittings. Thread the fittings into the printed parts and seat fully.

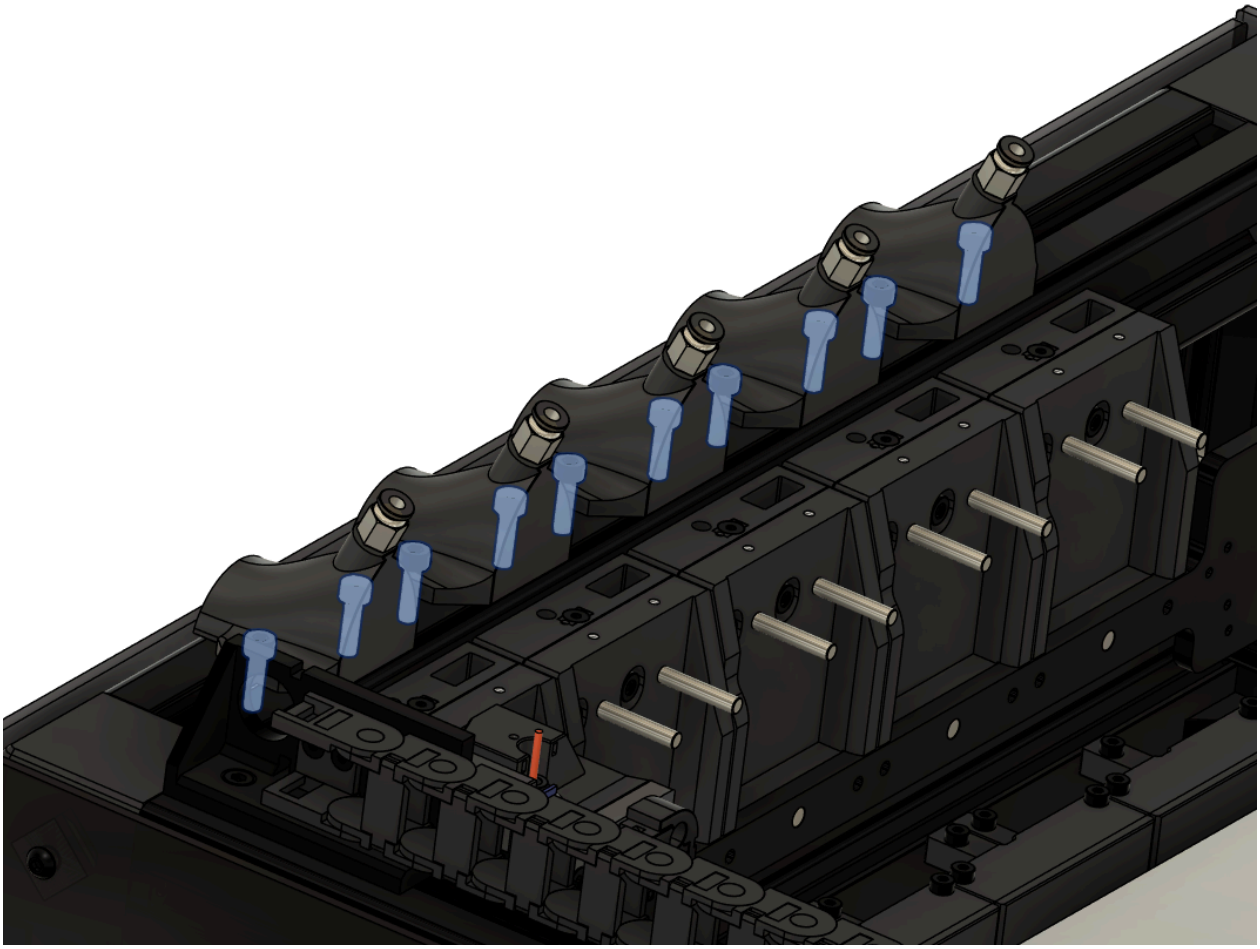
NOTE: The printed part is sized such that the threads should cut into the part during installation - be sure to keep the fitting perpendicular to the bore during assembly.

Install (10) 40 series M4 T nuts into the top slot of the upper-left 4040 extrusion as shown below

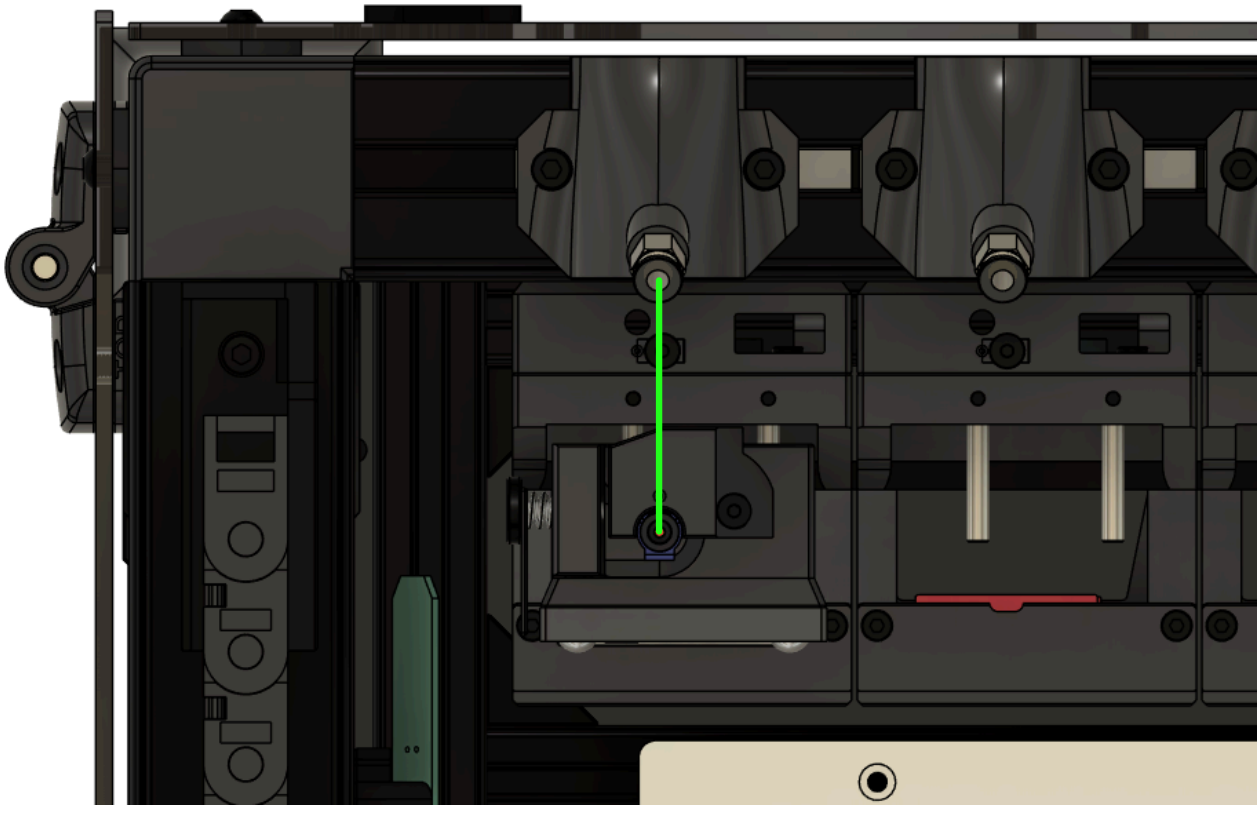
Note the orientation of the M4 threads!

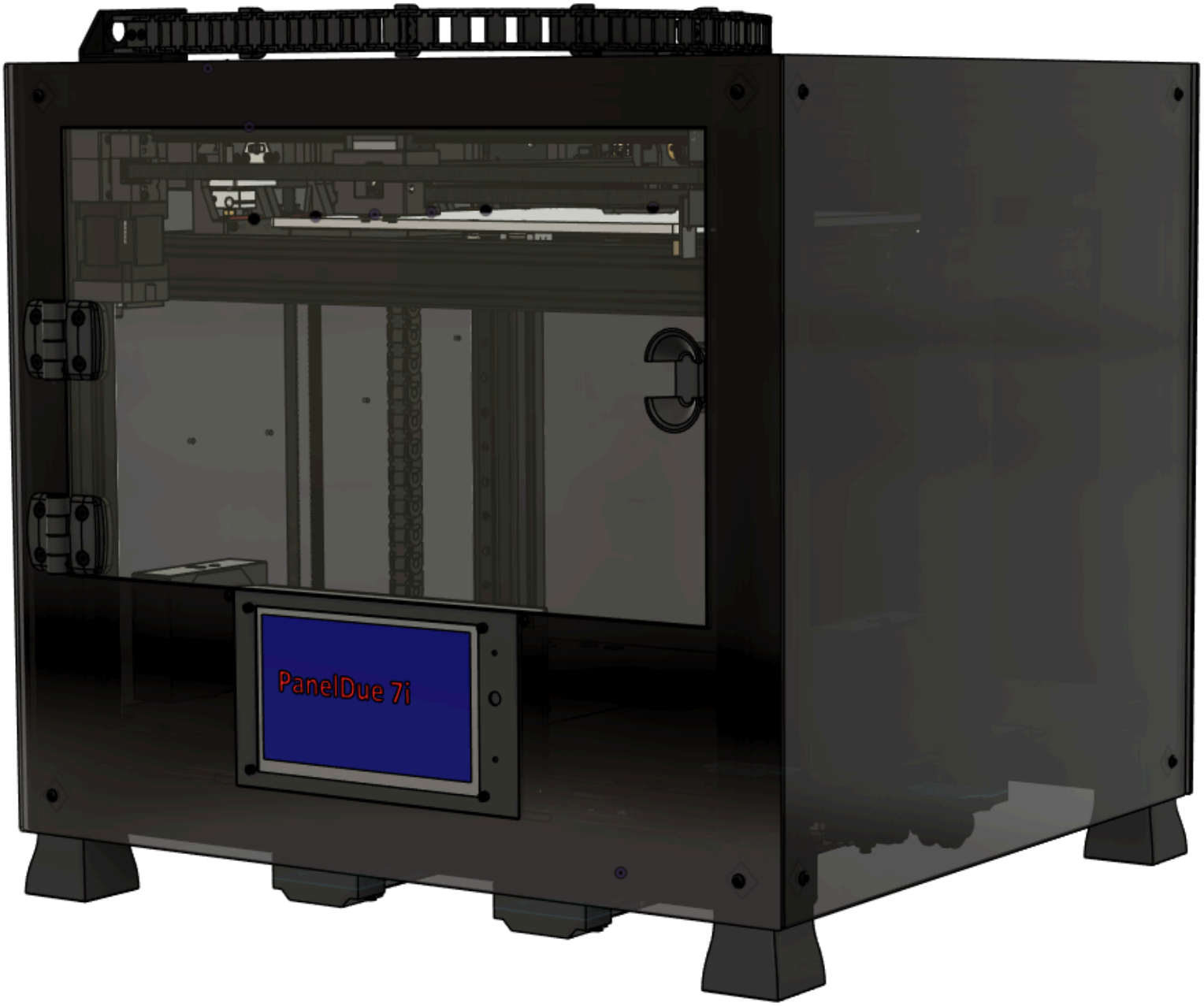


Secure all 5 inlets using (10) M4x14mm SHCS



Ensure that the bowen fittings of both the inlet and each FDM tool are roughly in-line





Just one guide left!