

# C O N T E N T S

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SECTION 01

# BILL OF MATERIAL

QUANTITY	PART DESCRIPTION
1	Top Fuselage Plate (1.5mm CF)
1	Main Frame Plate (3mm CF)
1	FPV Camera Cage Top Plate (3mm CF)
2	FPV Camera Cage, Side Plate (1.5mm CF)
1	PDB Bay Cover Plate (1.5mm CF)
1	PDB Bay Guard (Black 3D Printed ABS Plastic)
1	Antenna Mount (Black 3D Printed TPU)
2	Antenna Tubes (Blue Plastic 1/8" Diameter)
1	FPV Camera Adjustment Mount (Black 3D Printed ABS Plastic)
2	Standoff (Black aluminum M3 thread x 32mm long)
4	Standoff (Black aluminum M3 thread x 18mm long)
4	Standoff (Black aluminum M3 thread x 12.5mm long)
1	XT60 Passthrough Grommet (Black Rubber)
1	Velcro Lipo Strap – Catalyst Machineworks
4	Flight Controller Hex Standoff (Black plastic M3 thread x 10mm long) – <i>*standard FC mounting*</i>
4	Flight Controller Hex Standoff (Black plastic M3 thread x 6mm long) – <i>*low profile FC mounting*</i>
4	Flight Controller Nut (Black plastic M3 thread)
4	Flight Controller/PDB Mount Screw (Black plastic M3 thread x 10mm long)
4	PDB Spacer (Black plastic M3 hole)
4	PDB Guard Inserts (Silver Aluminum M3 Hole x 4.5mm OD x 6mm long)
2	Antenna Mount Inserts (Silver Aluminum M3 Hole x 4.5mm OD x 5mm long)
2	FPV Camera Mount Adjustment Screw (Phillips head #4 x 3/8" long x stainless steel)
2	FPV Camera Mount Screws (Phillips head #2 x 3/8" long x stainless steel)
20	Washer (M3 x aluminum) - <i>*3mm 210-R or 180-R*</i>
4	Washer (M3 x aluminum) - <i>*4mm 210-R*</i>

- 4 Socket Head Screw (M3 x 10mm long x **blue 7075 aluminum**)
- 8 Socket Head Screw (M3 x 8mm long x **blue 7075 aluminum**)
- 4 Socket Head Screw (M3 x 16mm long x **blue 7075 aluminum**)
- 2 Button Head Screw (M3 x 8mm long x **blue 7075 aluminum**)
- 2 Socket Head Screw (M3 x 12mm long x **blue 7075 aluminum**)
- 16 Socket Head Screw (M3 x 6mm long x **blue 7075 aluminum**)
- 4 Nut (M3 x **blue 7075 aluminum**)
- 2 Set Screw (M3 x 10mm long x steel)
- 1 GoPro Camera Mount (Black 3D Printed TPU) - *\*Optional - Not Included. Sold separately\**
- 1 Xiaomi Yi Camera Mount (Black 3D Printed TPU) - *\*Optional - Not Included. Sold separately\**
- 1 Mobius / Runcam Camera Mount (Black 3D Printed TPU) - *\*Optional - Not Included. Sold separately\**
- 1 GoPro Session Camera Mount (Black 3D Printed TPU) - *\*Optional - Not Included. Sold separately\**

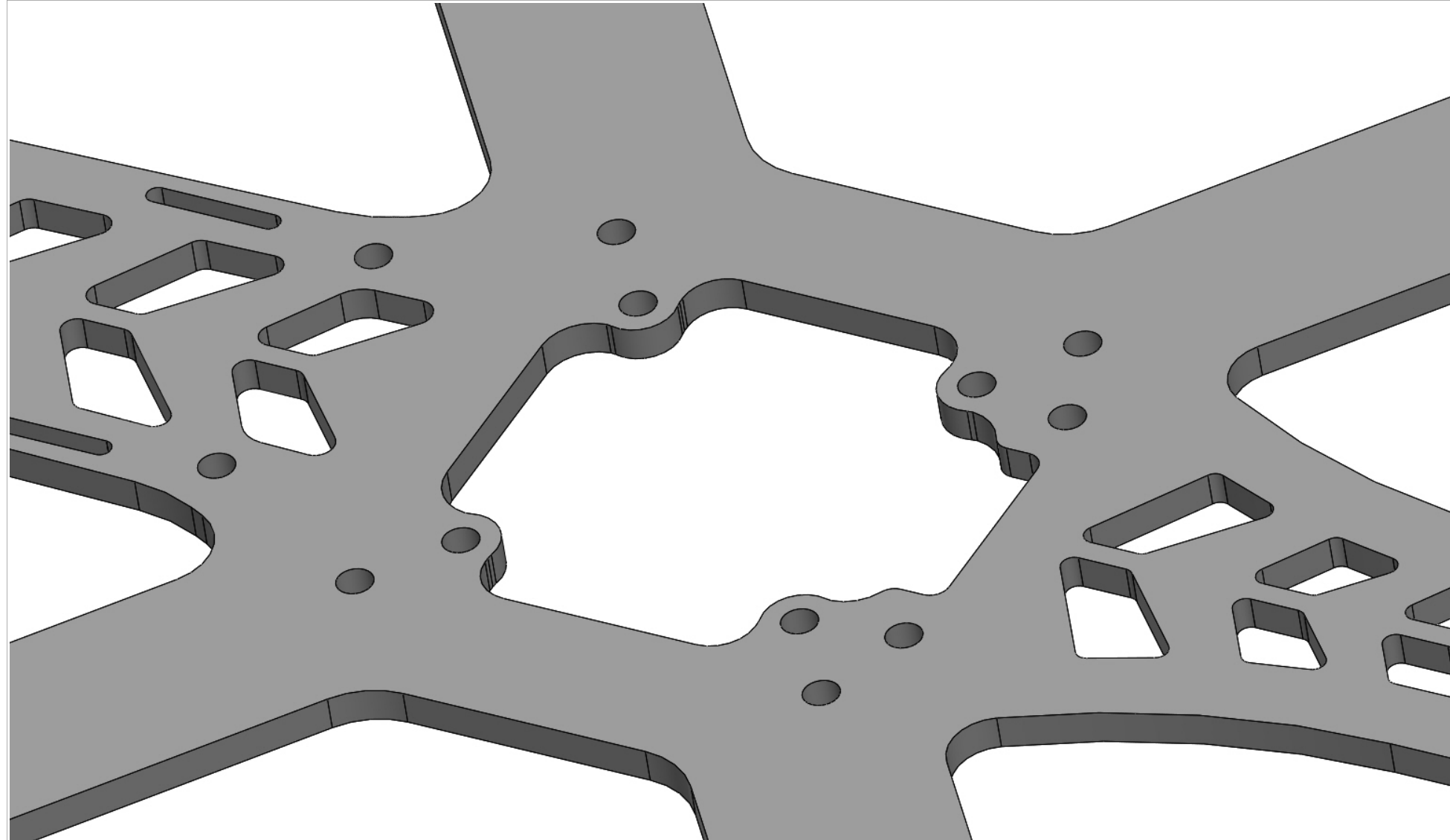
# REQUIRED TOOLS

QUANTITY	TOOL DESCRIPTION
1	File (not required but suggested)
1	Sandpaper (not required but suggested)
1	2mm allen driver or allen wrench
1	2.5mm allen driver or allen wrench
1	5.5mm socket driver
1	Small phillips head screw driver
1	Needle Nose Pliers
1	Open face wrenches (5.5mm) and (6.5mm), or adjustable
1	Loctite
3	Adult beverage of choice or apple juice if you are under 21

# BUILD PREPARATION

Build preparation involves rounding off the corners of the large interior 'PDB hole' in the main frame plate. This is not absolutely necessary to fly your Speed Addict 210-R or 180-R, but it is highly recommended and standard practice among top builders and racers. Catalyst Machineworks carbon fiber plate parts are cut by state of the art CNC machines. Cutting the raw material could leave a sharp edge on parts and it is possible this sharp edge could rub against wiring insulation, resulting in wiring shorts against the frame. Rounding the edges is quite easy to do, but does take some time as the process must be done with caution. Take your time and do it right, scratches on the flat surface will show. Keep that carbon fiber looking good!

To round the edge of the carbon fiber simply take a file or sanding block and hold the sanding edge at a 45° angle to the sharp edge. Work the sanding surface along the edge of the part until the sharp edge is gone. You want a smooth, rounded edge along the entire interior perimeter of the hole. Below is a picture of the PDB hole.





# ASSEMBLY PROCESS

**Note:** This assembly manual applies to both the Speed Addict 210-R and 180-R. The 180-R has shorter arms and a slightly shorter fuselage. Assembly steps will be identical.

## STEP 1

### Parts Required:

1 X Main Frame Plate (3mm CF)

8 X Socket Head Screw (M3 x 8mm long x **blue 7075 aluminum**)

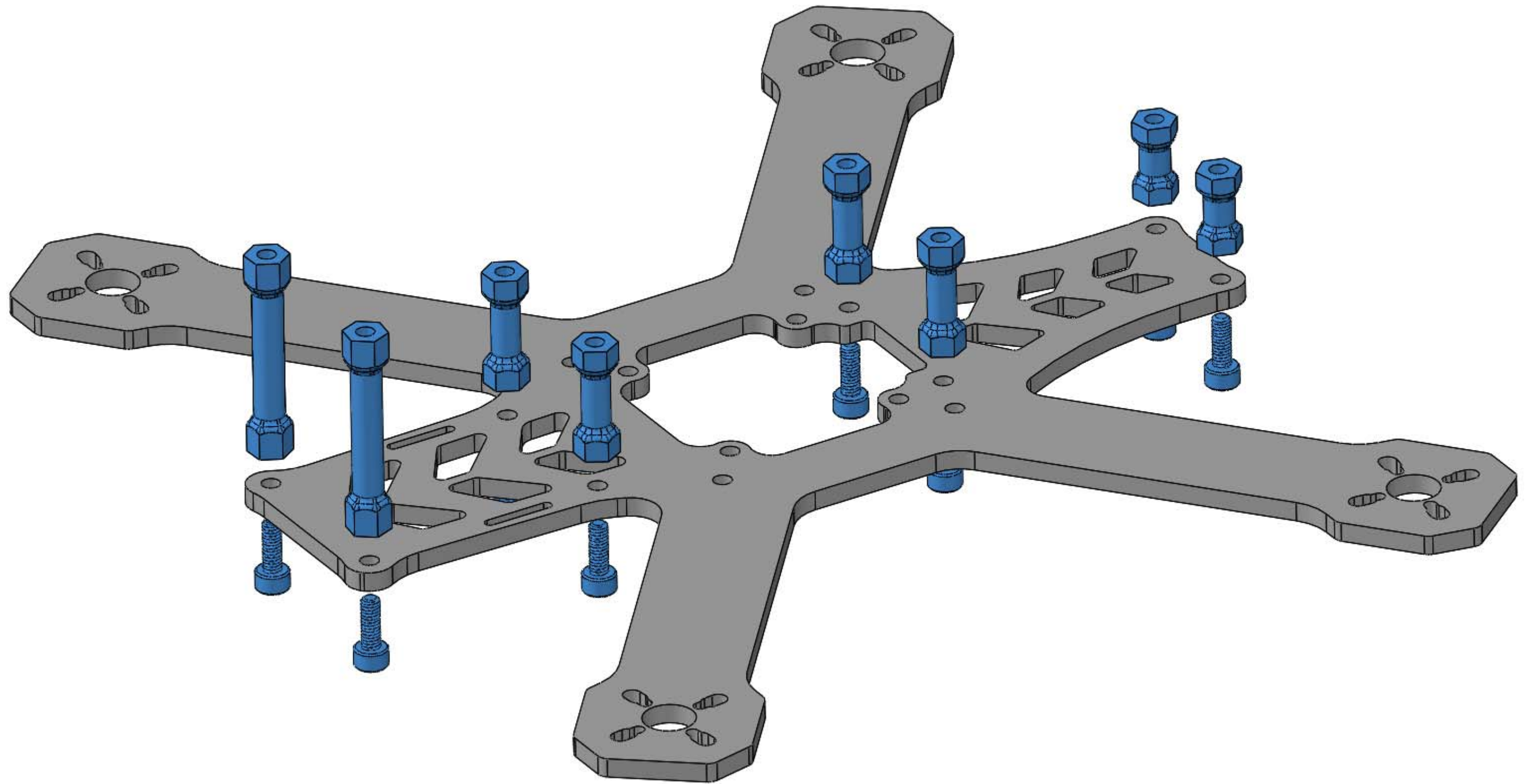
2 X Standoff (Black aluminum M3 thread x 32mm long)

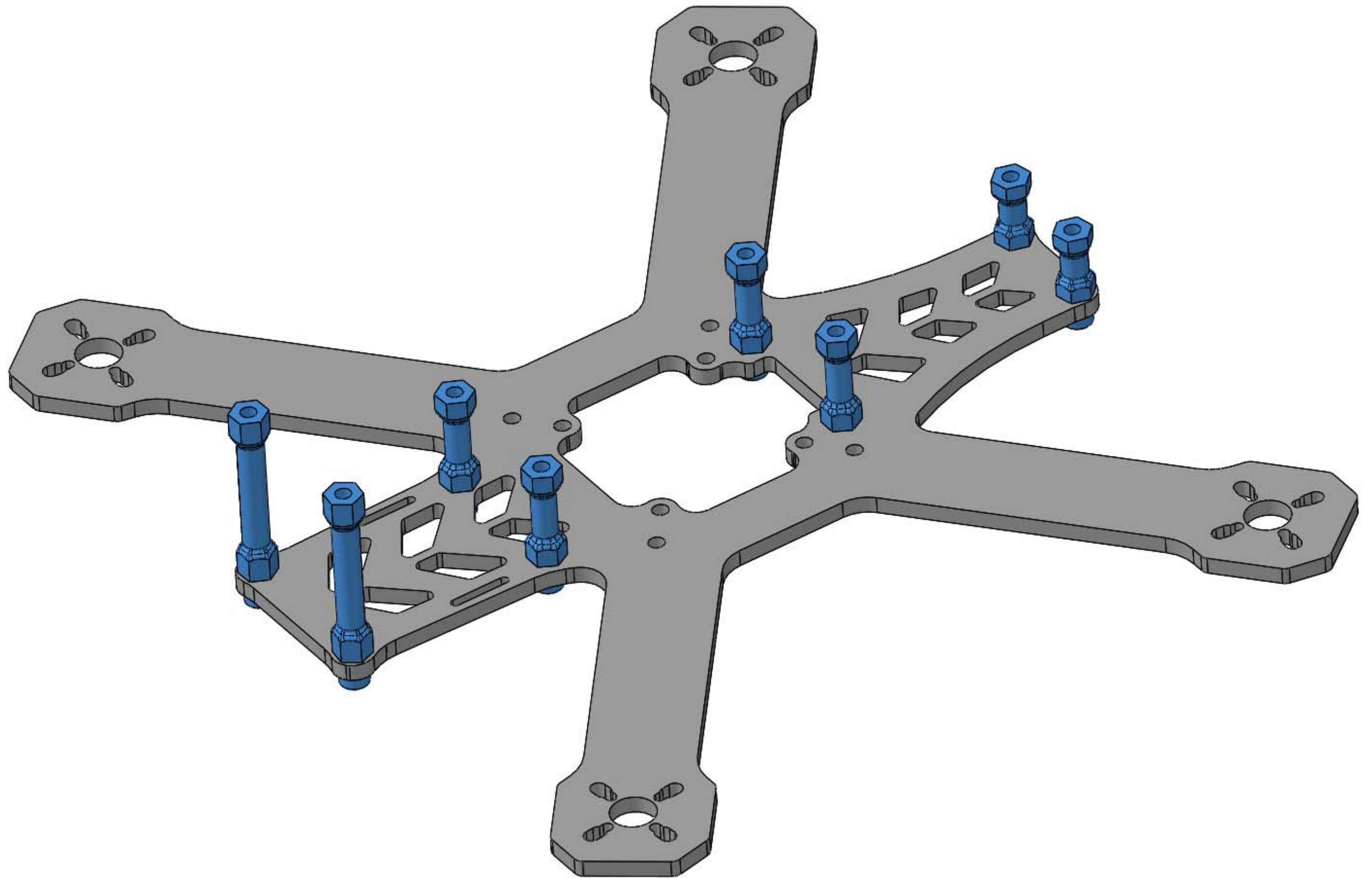
4 X Standoff (Black aluminum M3 thread x 18mm long)

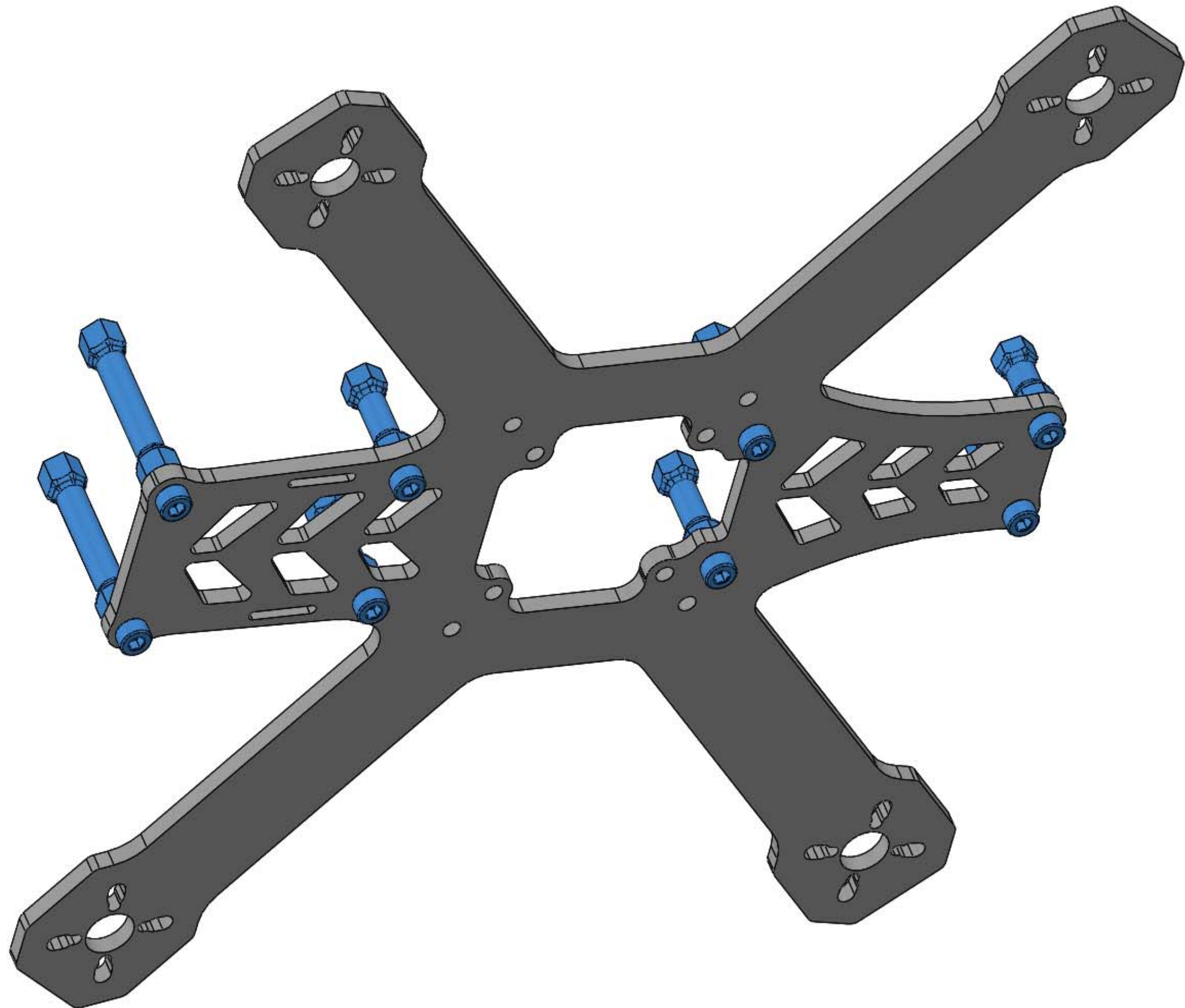
2 X Standoff (Black aluminum M3 thread x 12.5mm long)

### Assembly Process:

Join the standoffs to the Main Frame Plate as shown below. Use one screw per standoff.







## STEP 2

### Parts Required:

4 X Outrunner Brushless Motor (Sold Separately)

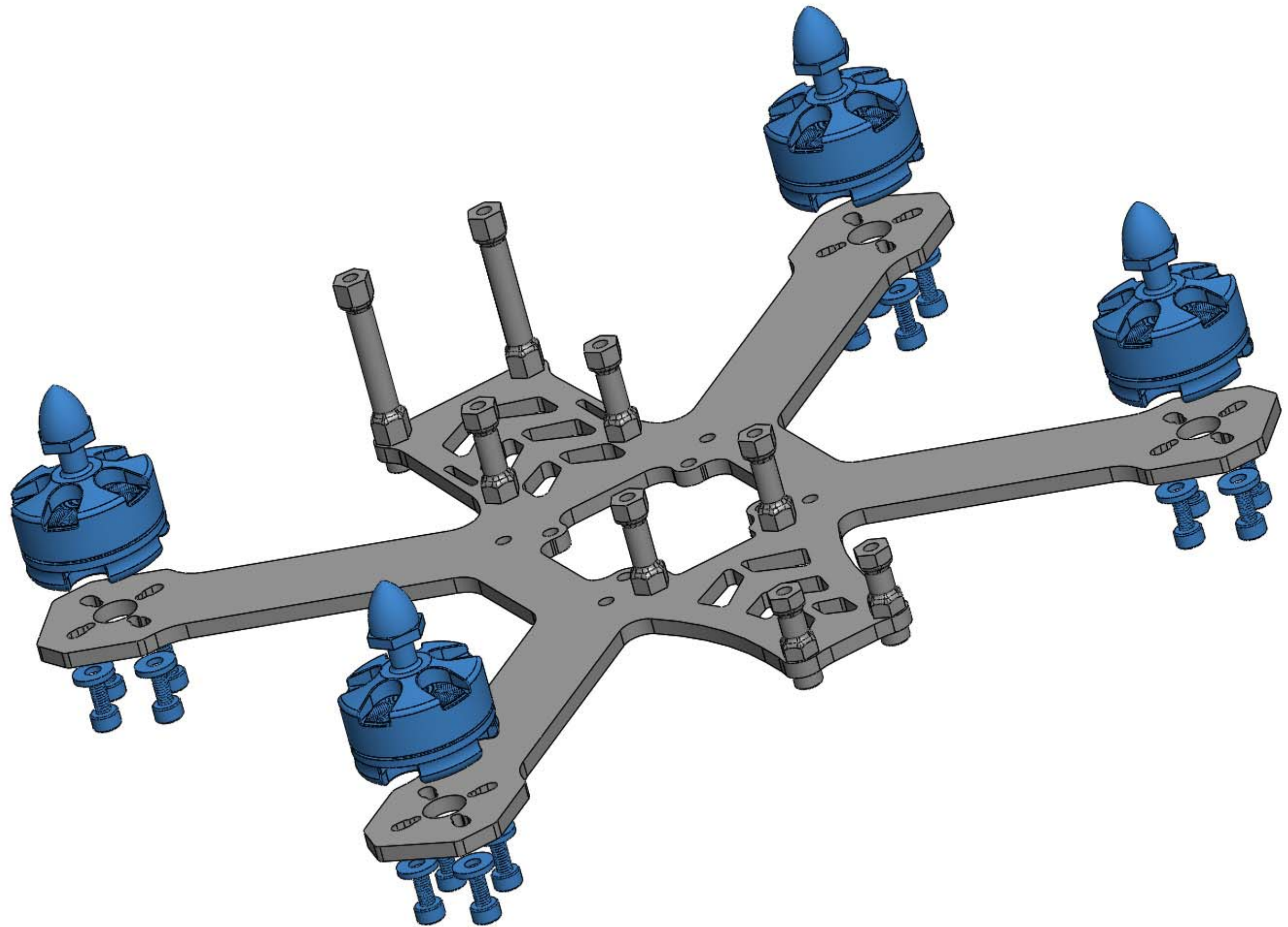
16 X Socket Head Screw (M3 x 6mm long x [blue 7075 aluminum](#))

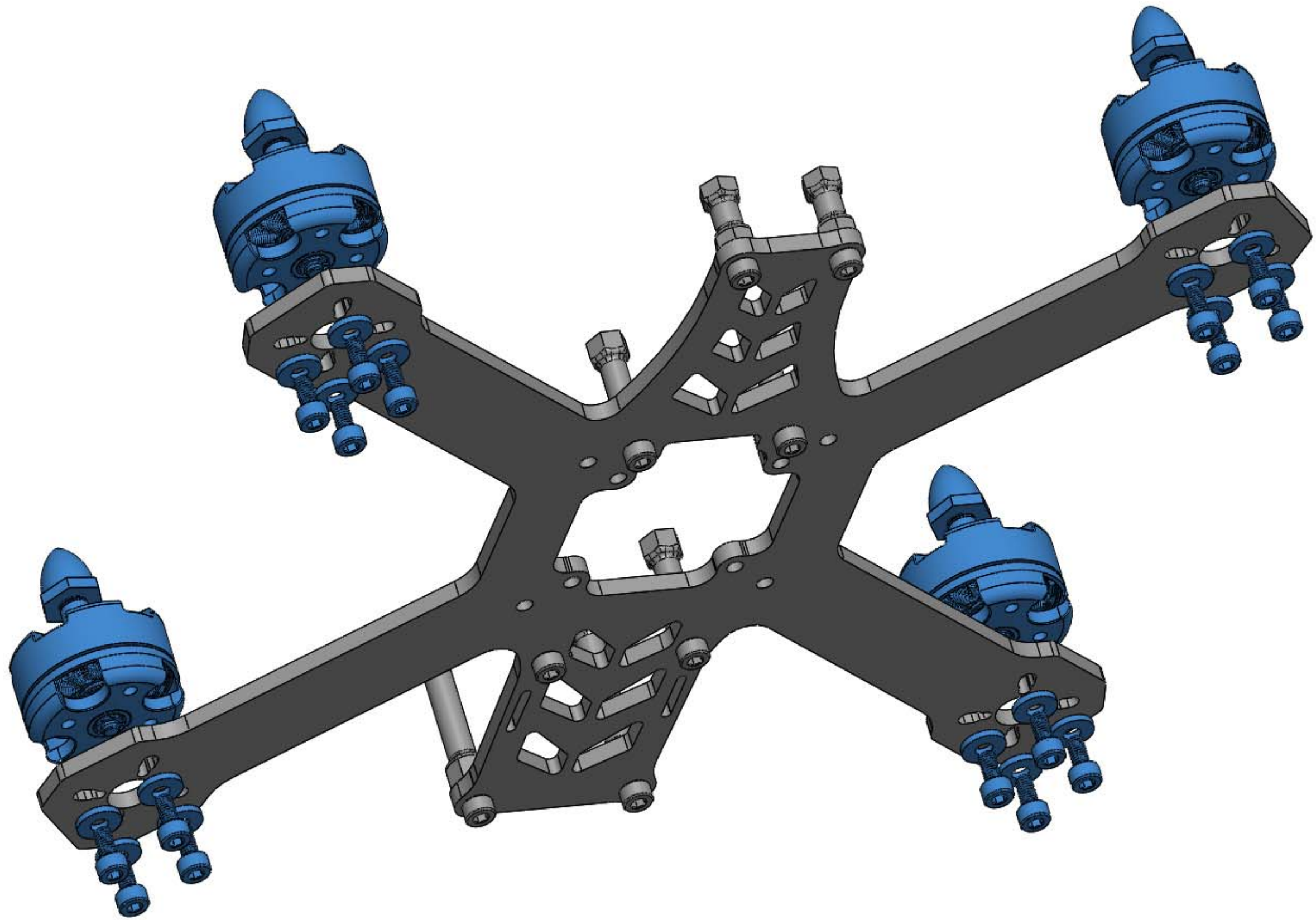
16 X Washer (M3 x aluminum) **\*If you are using a 3mm thick main frame plate\***

### Assembly Process:

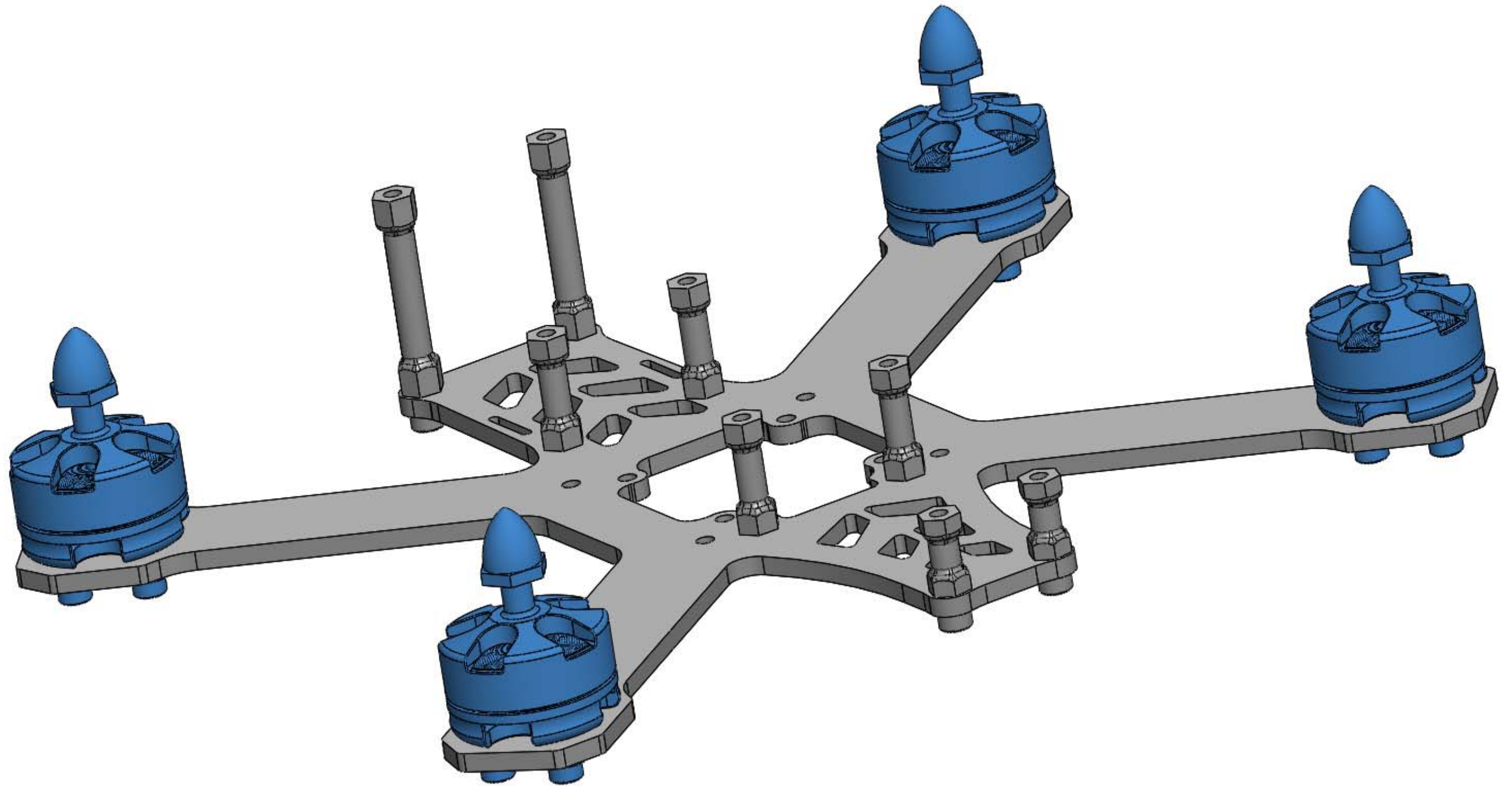
Join your motors to the Main Frame Plate as shown below. Use 4 screws and 4 washers per motor. Included in your kit are M3 screws for this purpose. But, the main frame plate will accept M2 screws for use on smaller 1806 or similar sized motors. We do not include this size motor mount screw in your kit. You will need to source these on your own. Orient the motor such that it's wire lead runs straight down the arm.

**\*PLEASE NOTE: If you are using our 4mm thick main frame plate upgrade DO NOT use the included washers to mount your motors\***









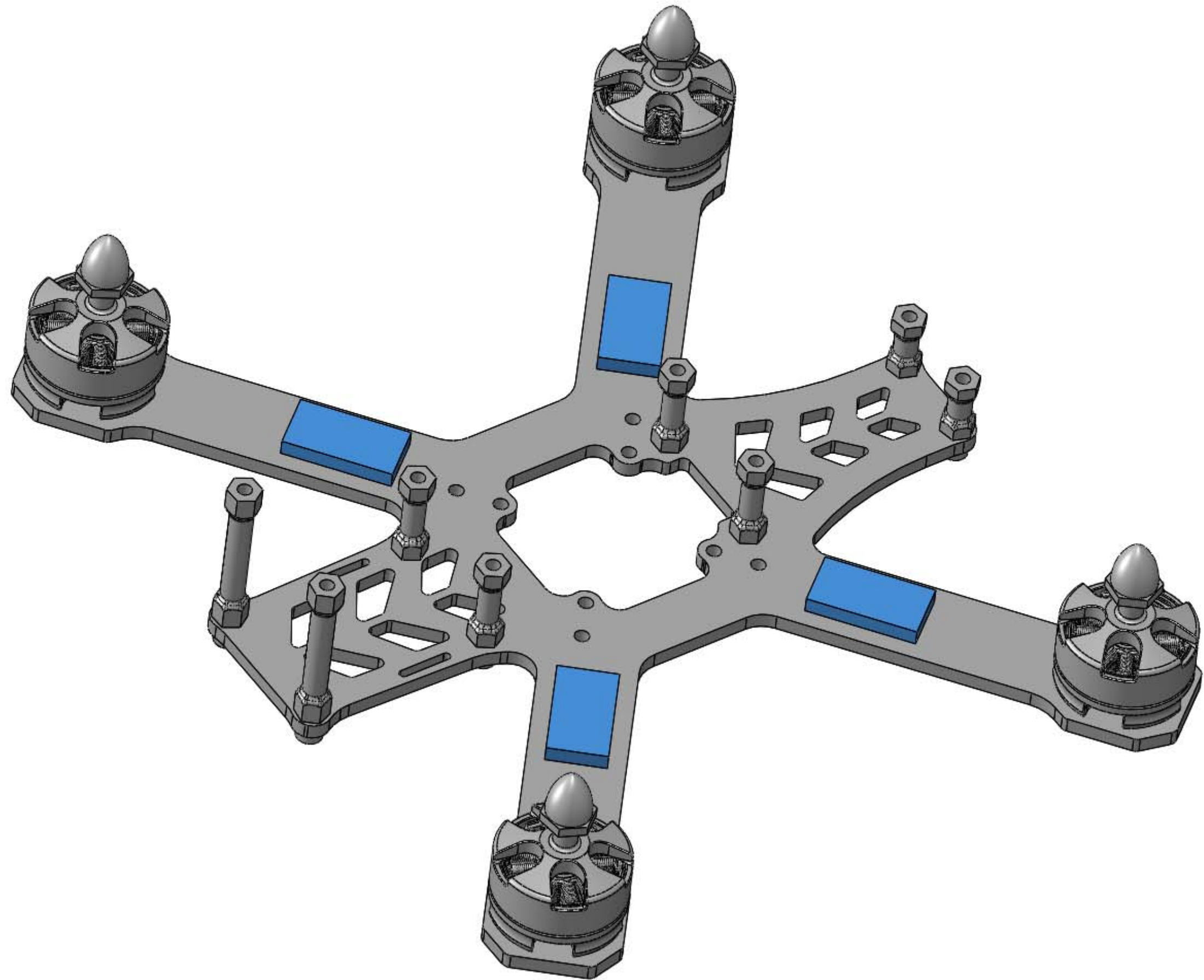
## STEP 3

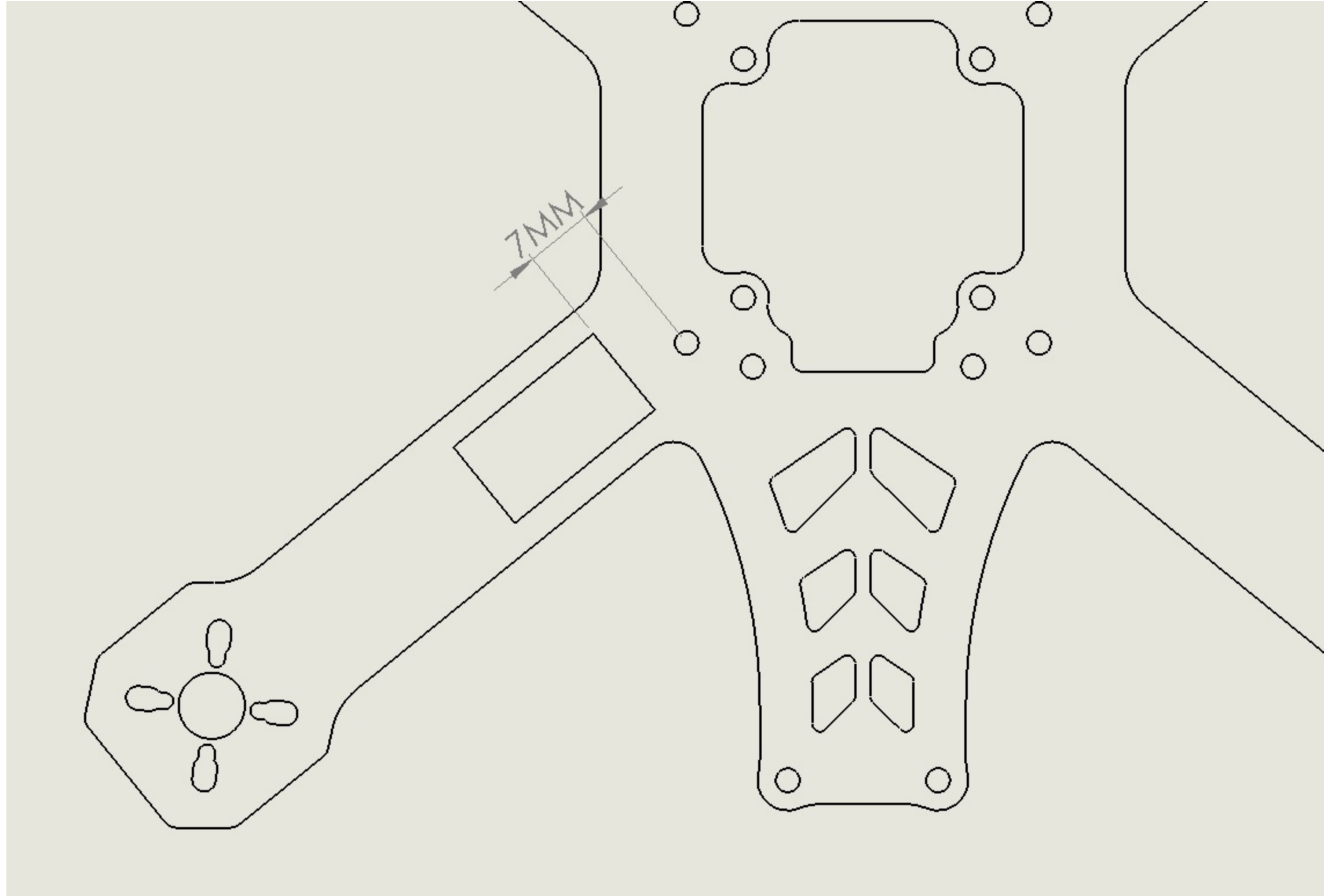
### Parts Required:

4 X Electronic Speed Controller (Sold Separately)

### Assembly Process:

Please note the ESC's are represented below by the blue rectangles. See our product page for ESC selection requirements or email us for more information as to what ESC type is best for your 210-R/180-R build. Mount the ESC's using double sized stick tape. Locate the ESC's so their interior edge is **7mm** from the hole shown below. Solder the motor to the ESC. But, leave the positive and negative power leads uncut and unsoldered at this step.





## STEP 4

### Parts Required:

1 X Catalyst Machineworks FPV PRO Power Distribution Board

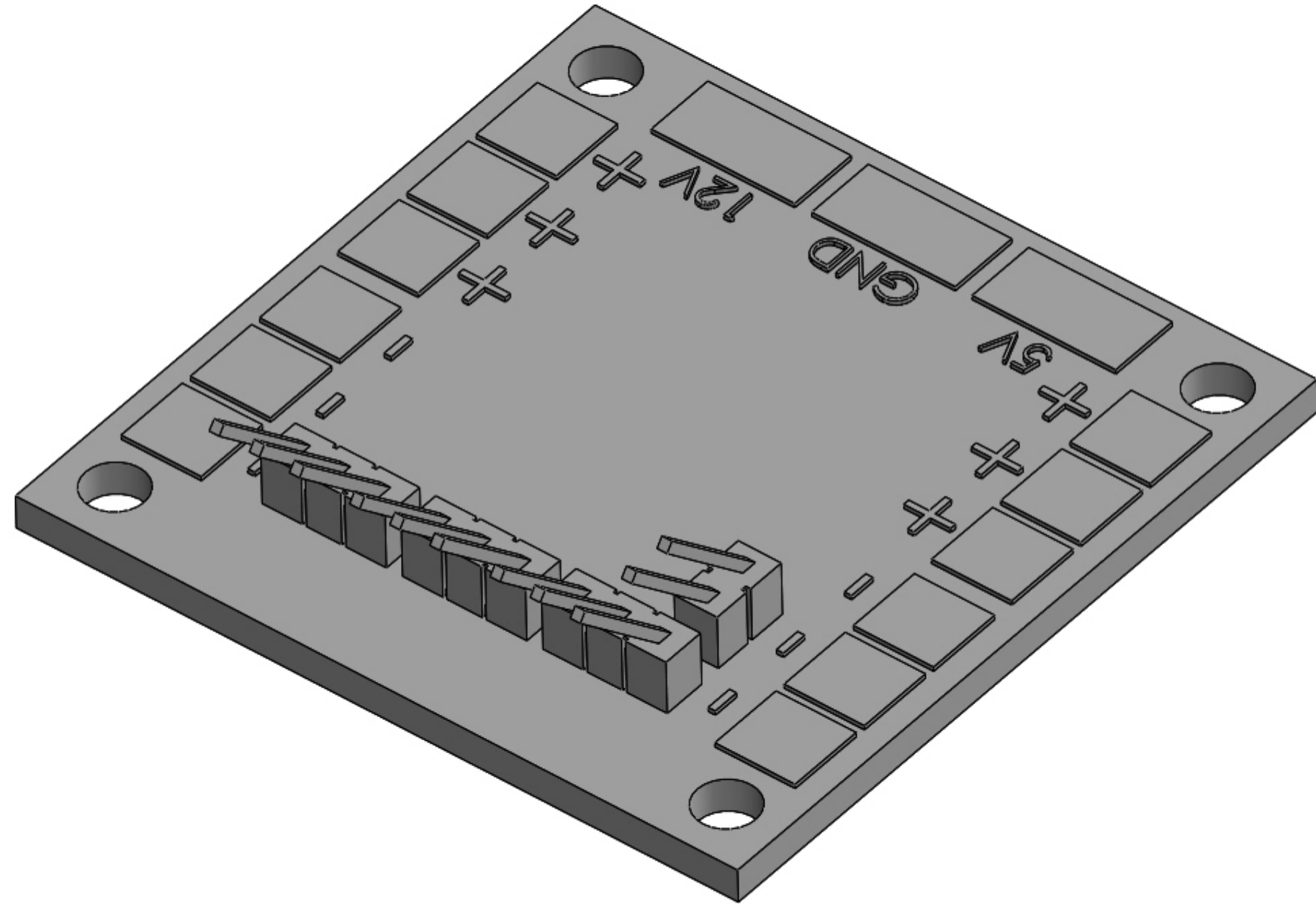
1 X 90° Pin Header Set (included with your PDB)

### Assembly Process:

We sell the 210-R and 180-R with or without PDB. This assembly step only applies to the included PDB. If you use another PDB other than our brand you are on your own. If you are using the included Catalyst Machineworks PDB, reference the manual on our website at:

<http://www.catalystmachineworks.com/collections/fpv-racing-equipment/products/catalyst-machineworks-fpv-racing-pdb>

After you have soldered the pin headers per the PDB manual it will be necessary to bend them slightly upwards as shown in the graphic below. You can use some needle nose pliers to bend each header up by 20 degrees or so. This will aid in wire management later in the build.



## STEP 5

### Parts Required:

1 X Lipo Pigtail and XT60 Connector (Sold Separately)

1 X Grommet for XT60

### Assembly Process:

Solder your lipo battery pigtail (positive and negative wire leads) to the PDB board positive and negative pads. Be sure to install the XT60 grommet over your wires as shown below **prior** to soldering on your XT60 connector. Make sure the pigtail is located on the right side of the board as shown in the graphic below. You should use 14 gage wires. The wires should be cut to 60mm. Your wire ends should come straight off the PDB pads, pointing straight up. It may be necessary to install some extra shrink tubing around the base of the wires to protect them from any sharp edges in the main frame plate.





## STEP 6

### Parts Required:

1 X Assembled PDB (from previous step)

1 X Assembled Main Frame Plate (from step 1)

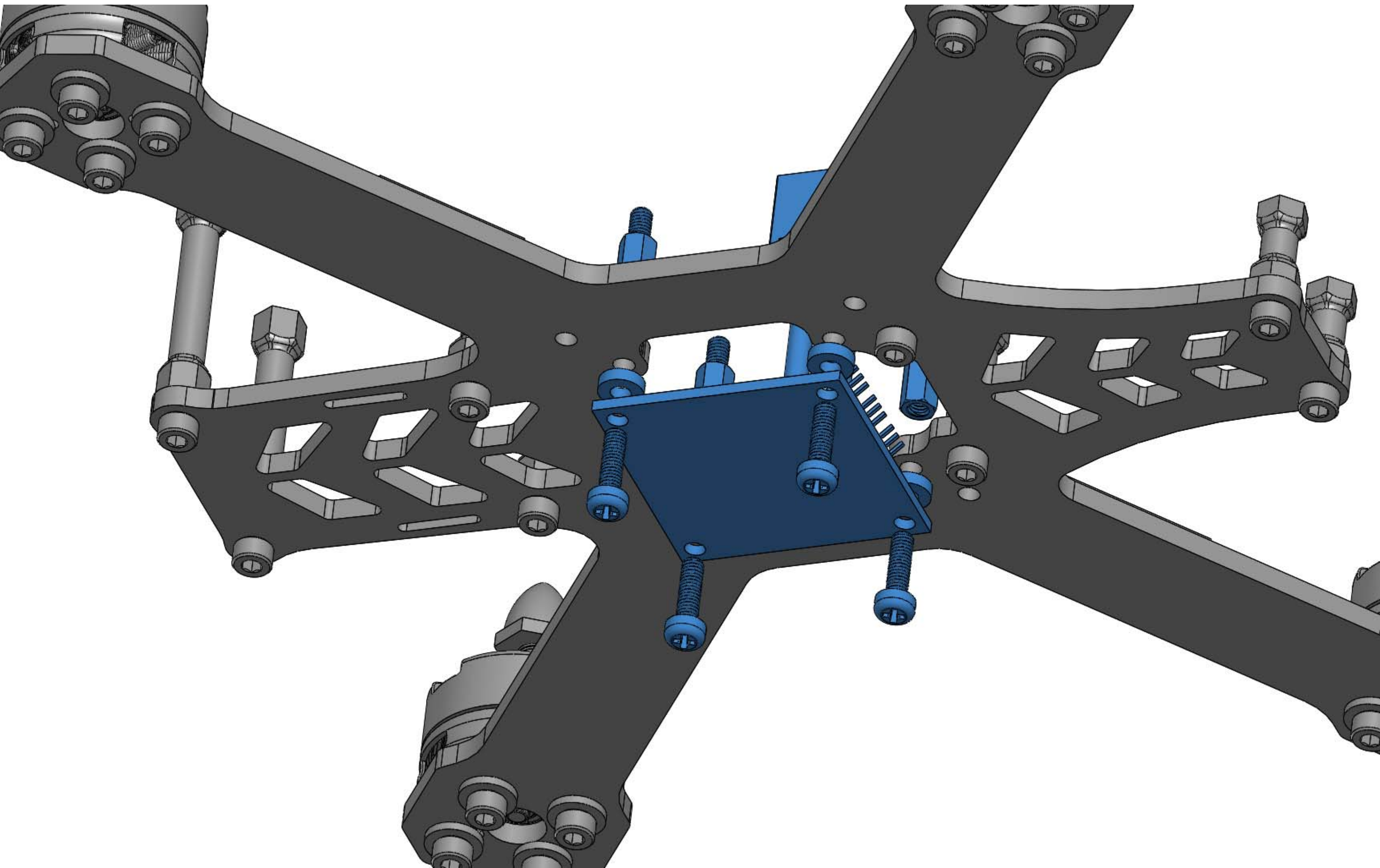
4 X Flight Controller/FC Mount Screw (Black plastic M3 thread x 10mm long)

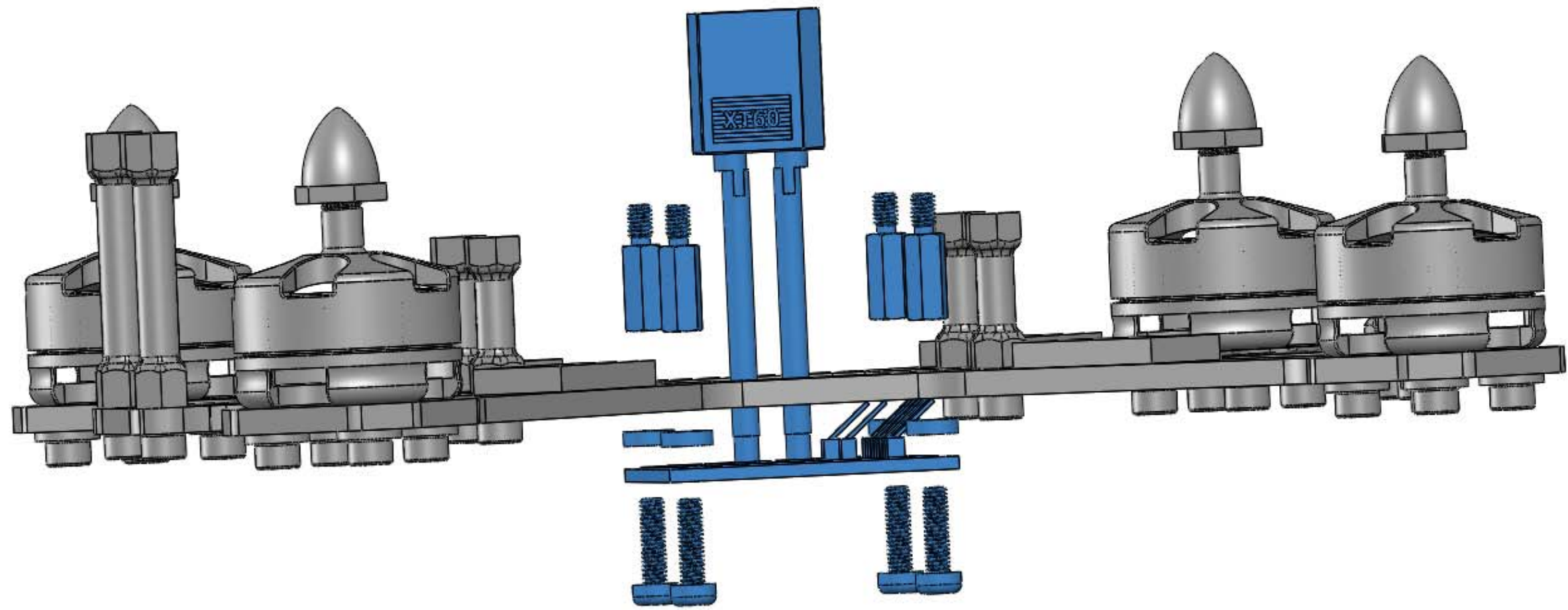
4 X PDB Spacer (Black plastic M3 hole)

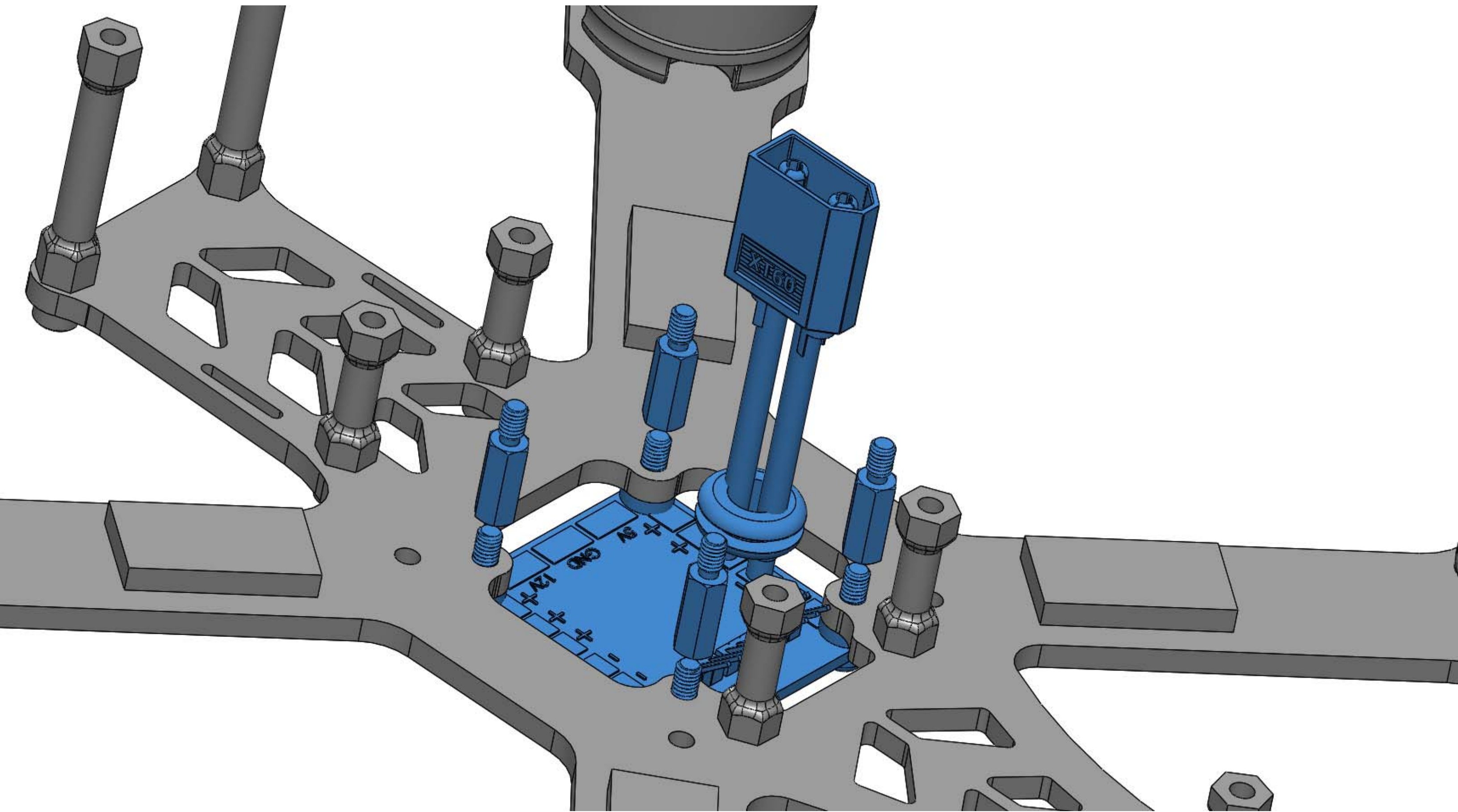
4 X Flight Controller Hex Standoff (Black plastic M3 thread x 10mm long)

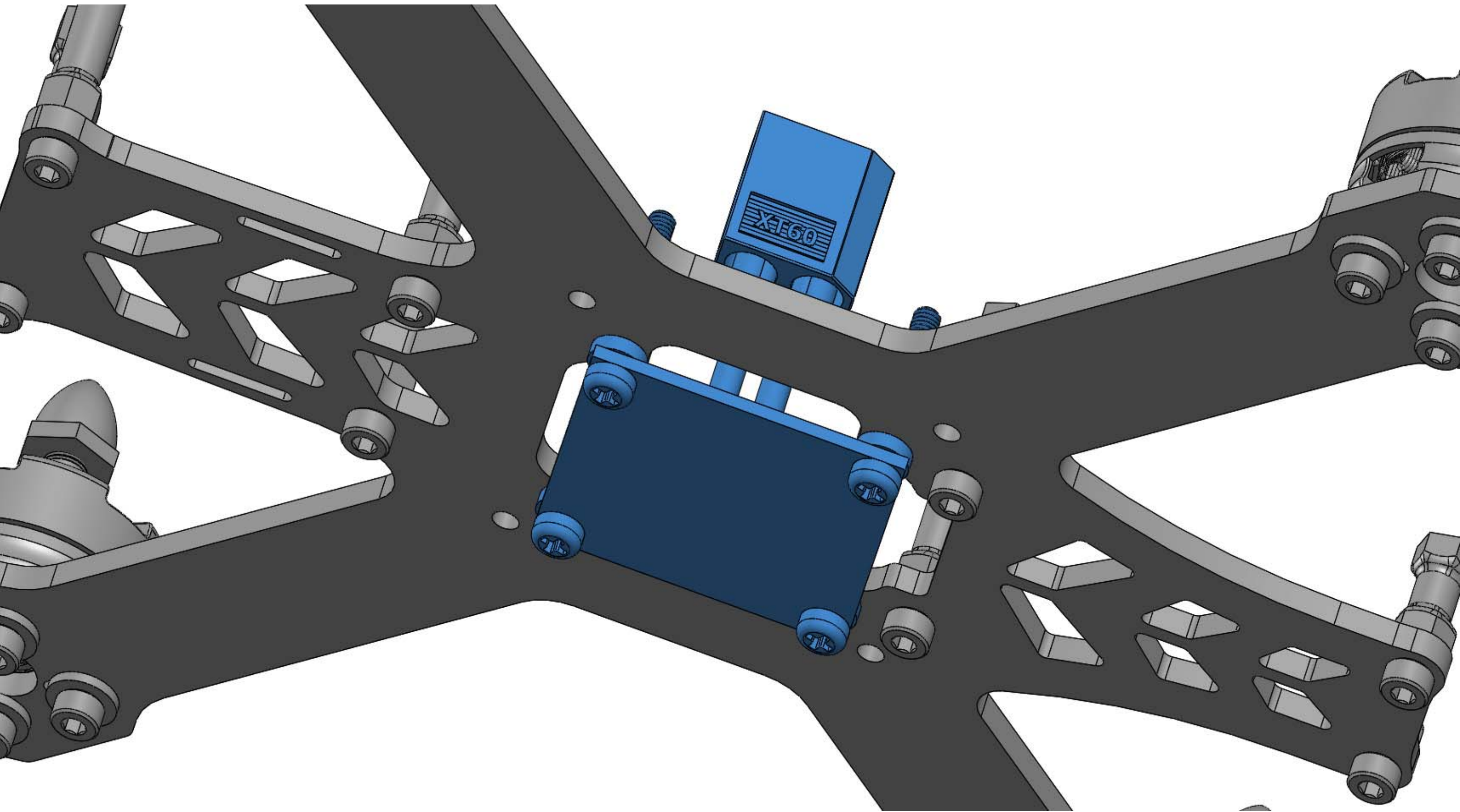
### Assembly Process:

Install the PDB to the bottom of the main frame plate as shown. Be sure to use the PDB spacers to separate the PDB from your carbon fiber main frame plate or you may short out the board.





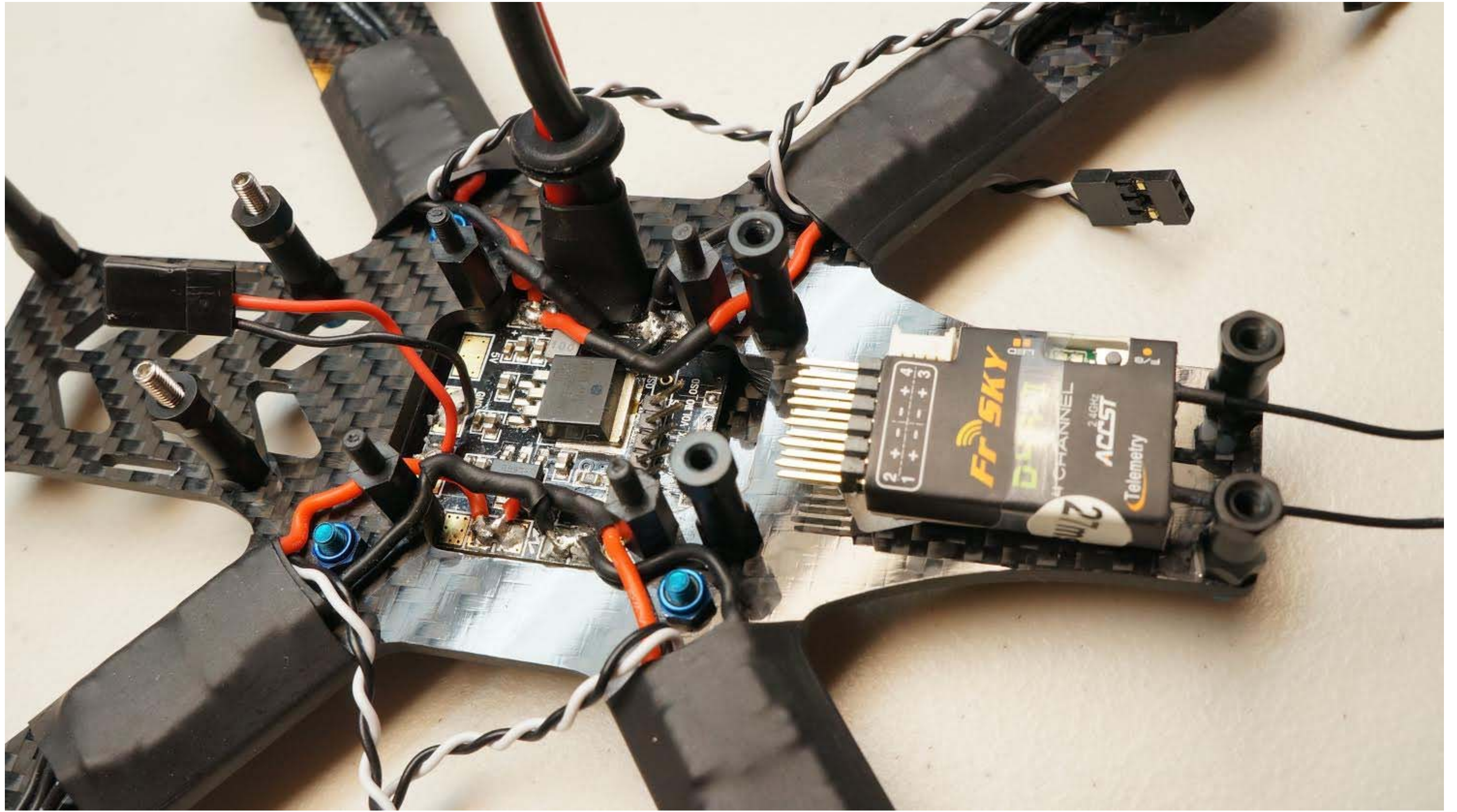




## STEP 7

### Assembly Process:

This is a very important step in your build. Here you will solder the open leads from the ESC's to the PDB. **Take your time and plan this out.** Wire management is very important. Provide enough slack on each ESC wire lead so it doesn't rub up against the main frame plate. But, not too much excess slack as to result in a messy build! If your wires are too long you may find it difficult to install the rest of the components later in the build. Since you are soldering the ESC leads with the PDB installed it helps greatly to use a solder gun with a fine tip. BE CAREFUL not to get too close to the plastic FC standoffs or you may damage them with your solder gun. At this step you can also cut down the ESC signal leads that run to your flight controller (black and white wires in the picture below). This is important, because most ESC's come with signal leads that are too long resulting in excess wire. Test fit your FC and determine how long you want these signal leads to be. Cut then re-solder the leads to reduce their length.



## STEP 8

### Parts Required:

1 X PDB Bay Guard (Black 3D Printed ABS Plastic)

1 X PDB Bay Cover Plate (1.5mm CF)

4 X PDB Guard Inserts (Silver Aluminum M3 Hole x 4.5mm OD x 6mm long)

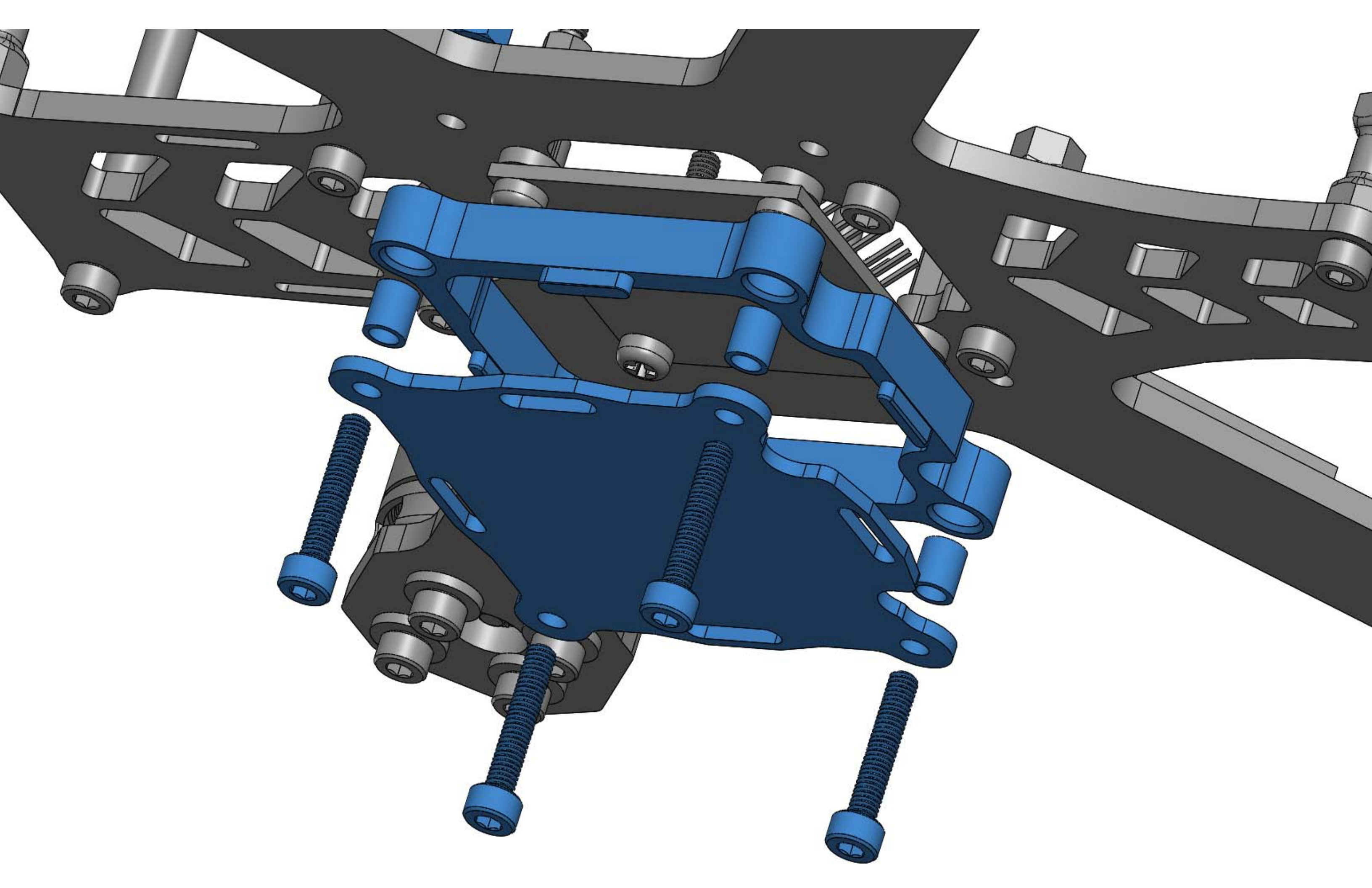
4 X Socket Head Screw (M3 x 16mm long x **blue 7075 aluminum**)

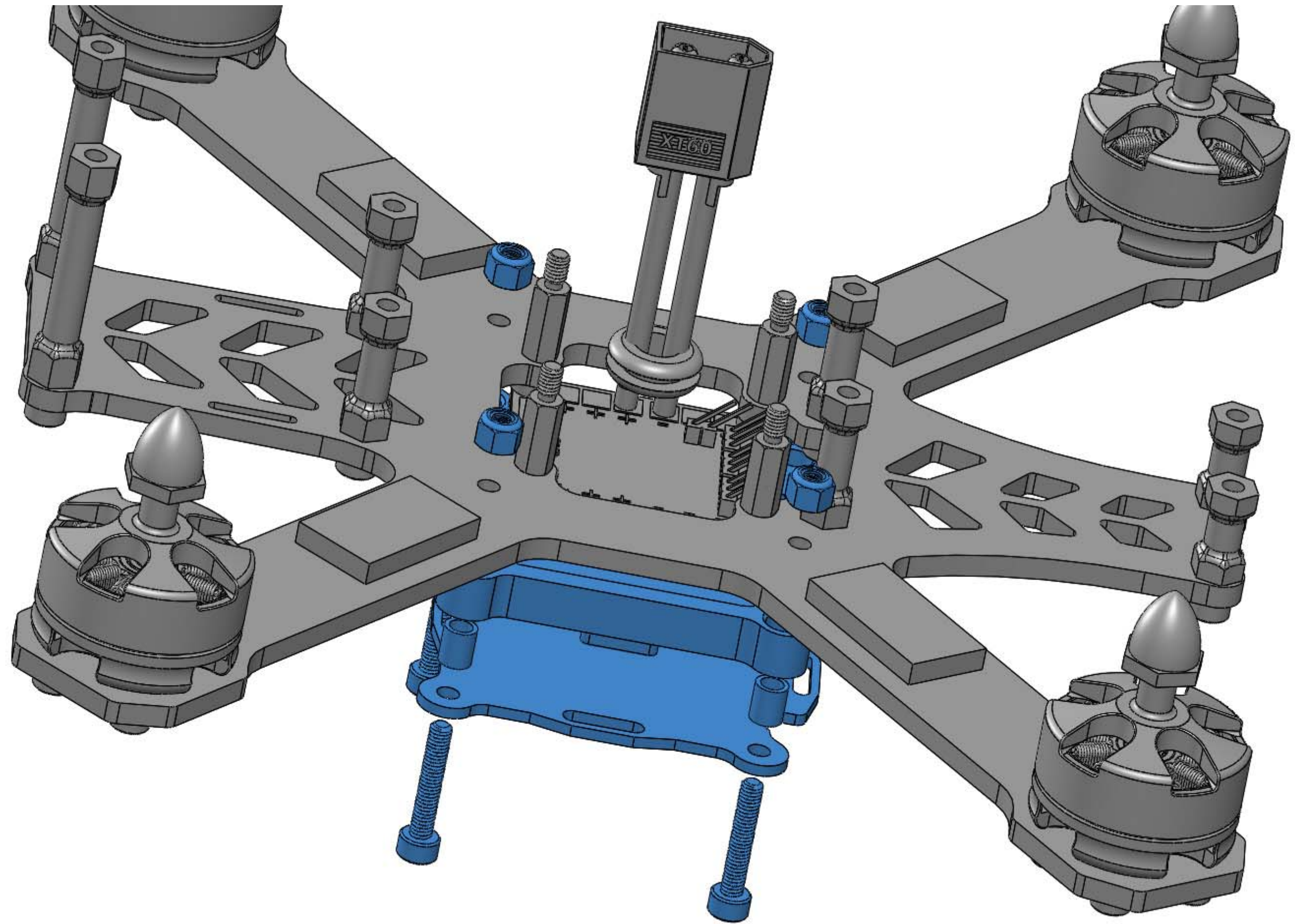
4 X Nut (M3 x **blue 7075 aluminum**)

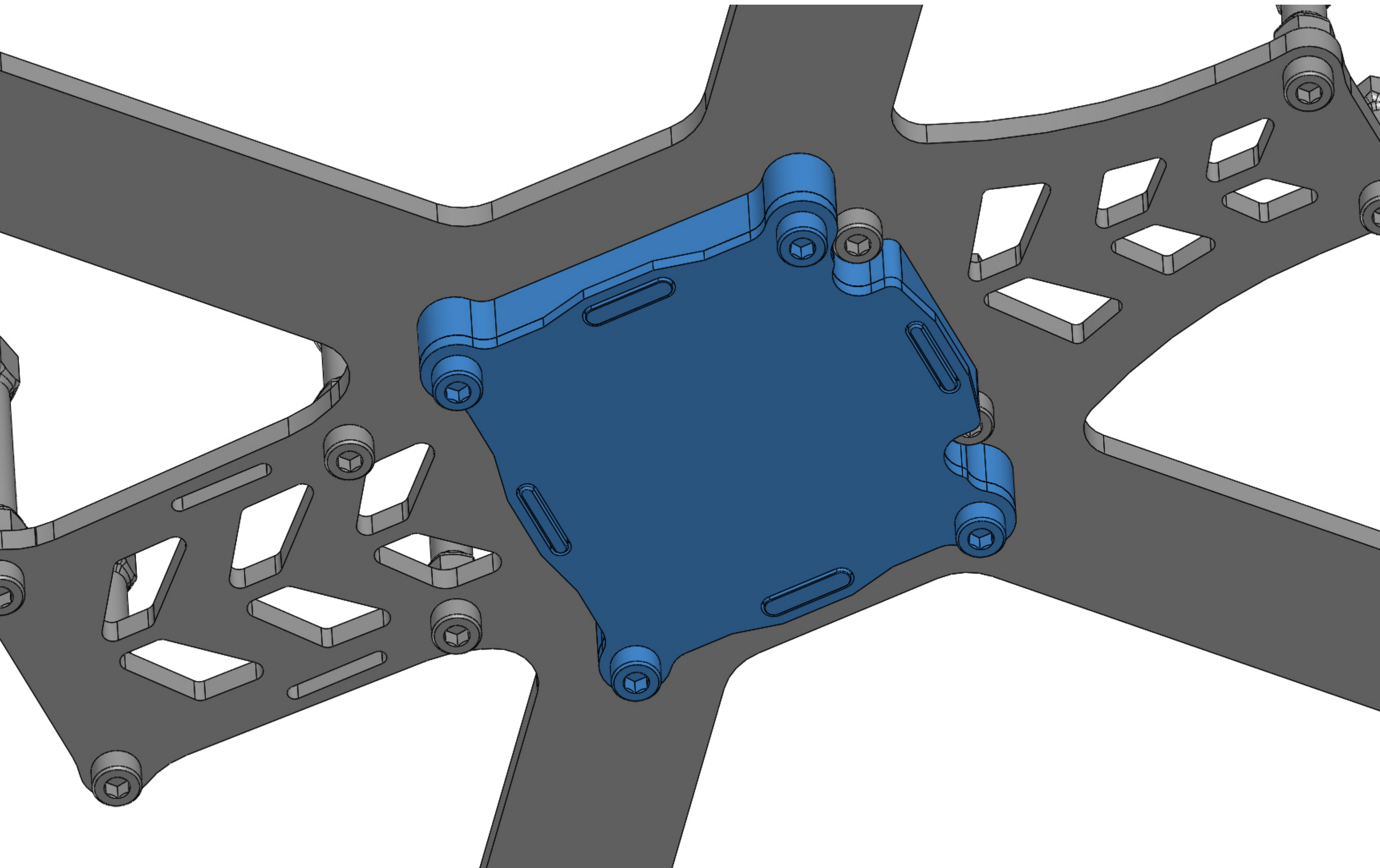
### Assembly Process:

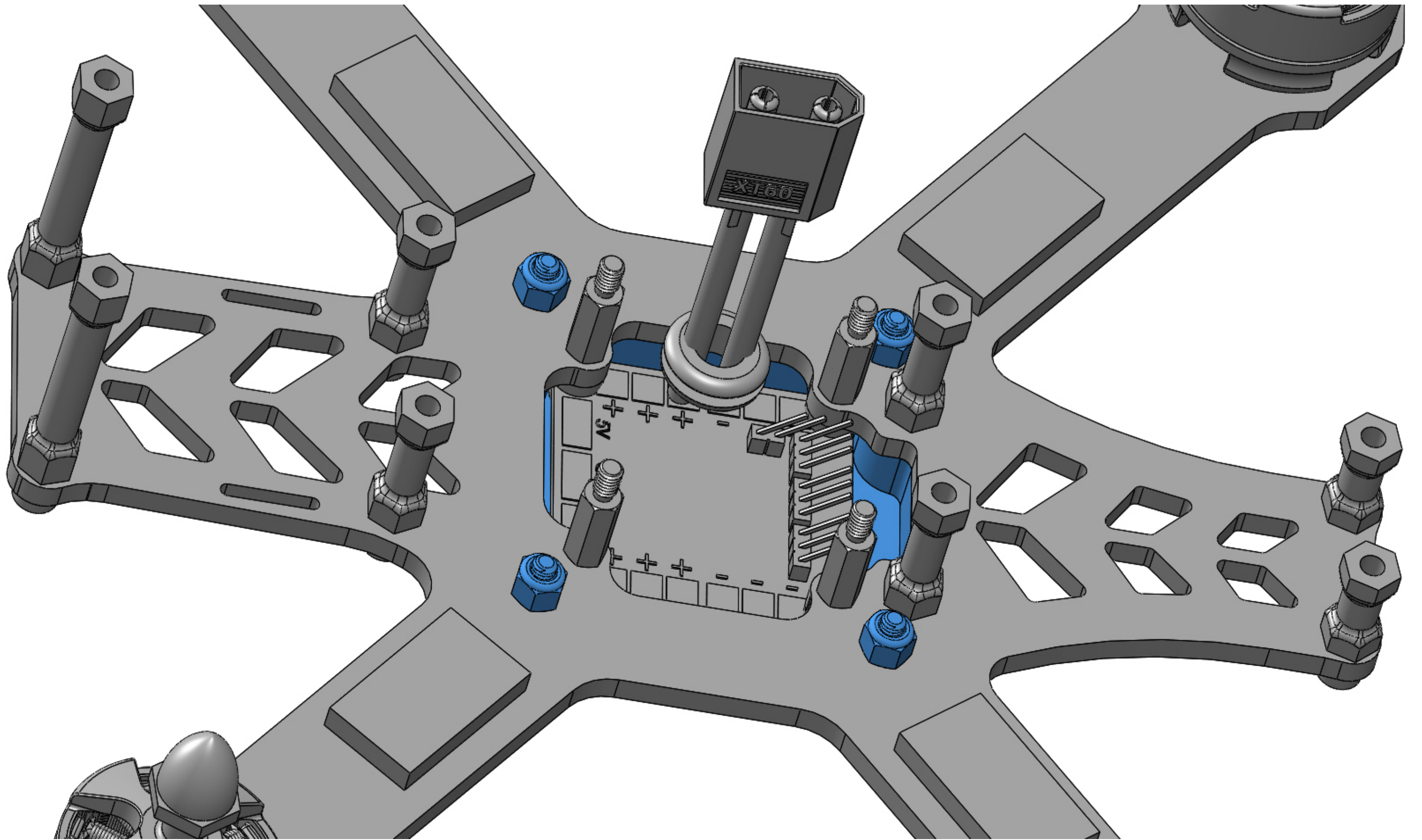
Press the 4 PDB Guard Inserts into the 4 PDB Bay Guard holes. Then install the PDB Bay Guard onto the main frame plate as shown using the supplied fasteners.











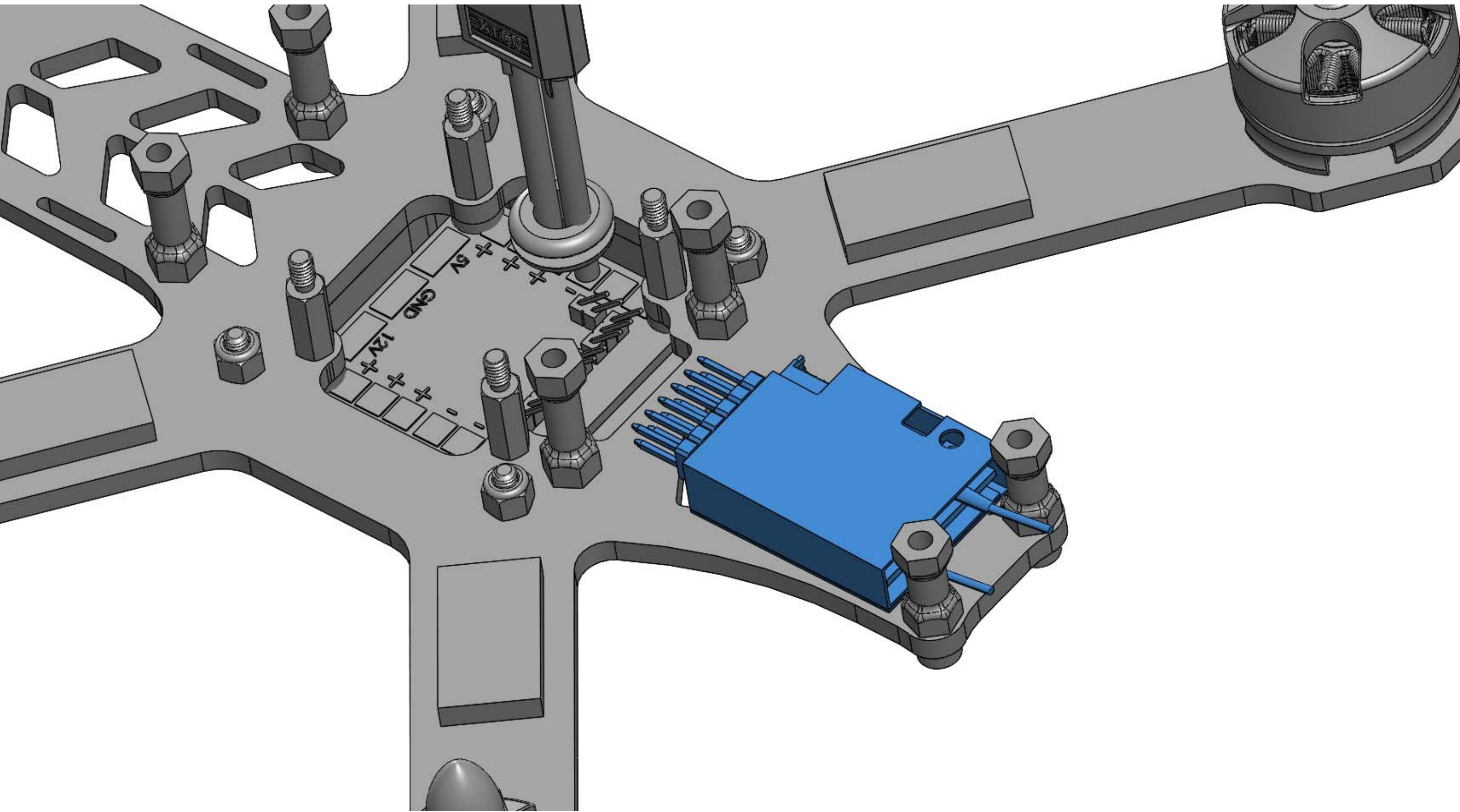
## STEP 9

### Parts Required:

1 X RC Receiver (Sold Separately)

### Assembly Process:

Install your receiver using double sided stick tape as shown. Be sure to orient the antenna toward the rear of the craft.



## STEP 10

### Parts Required:

1 X Top Fuselage Plate (1.5mm CF)

1 X FPV Video Transmitter (Sold Separately)

1 X SMA right angle connector and pigtail (If using a Vtx without integrated SMA pigtail)

### Assembly Process:

Install the FPV Vtx onto the Top Fuselage Plate as shown using double sided stick tape. A zip tie may be necessary to hold the SMA pigtail to the plate. A Vtx such as the Hawkeye unit is ideal due to it's integrated 10cm SMA pigtail. You can use a Vtx without an integrated SMA pigtail, but your adapter must be the proper length to reach the FPV antenna mount hole.





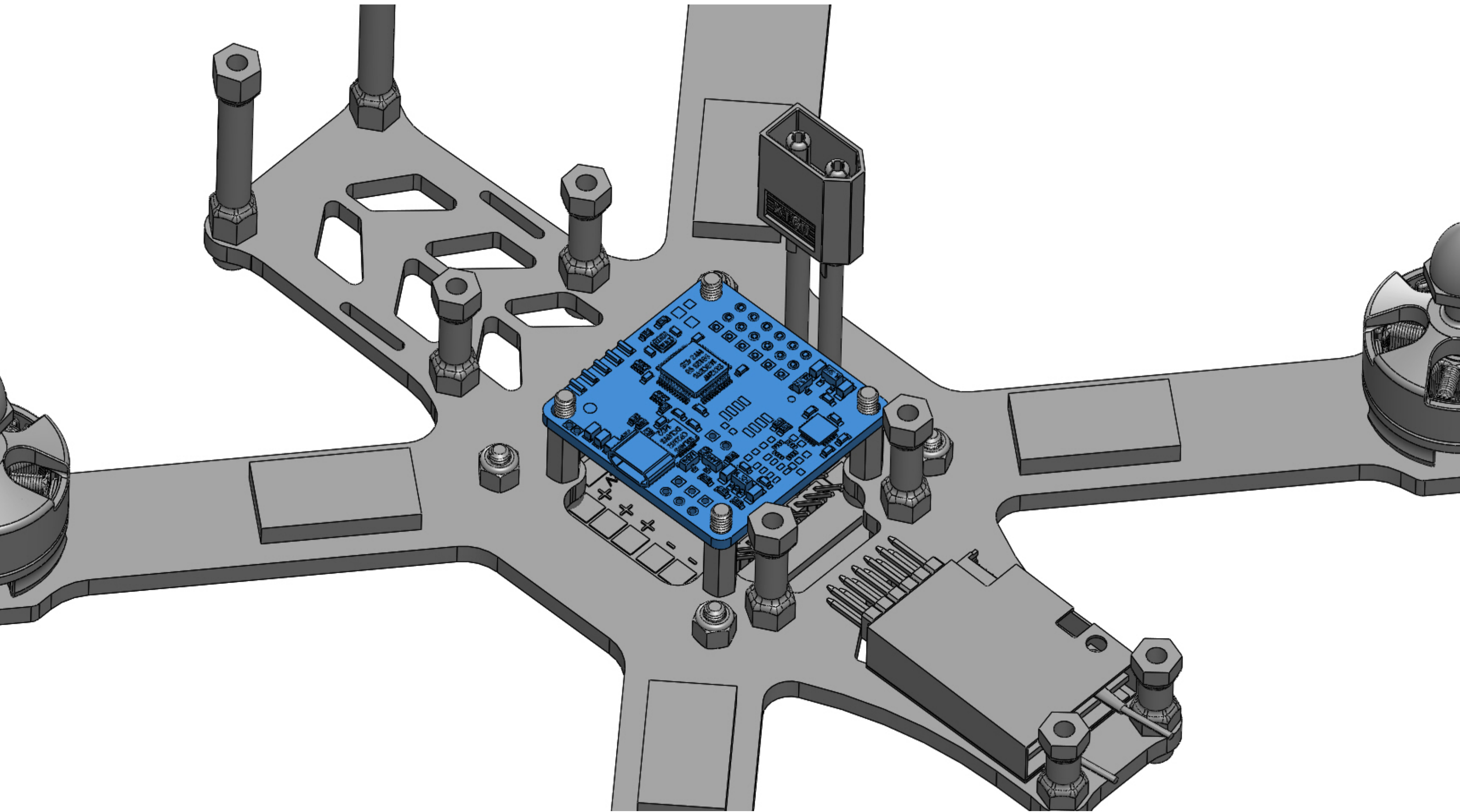
## STEP 11

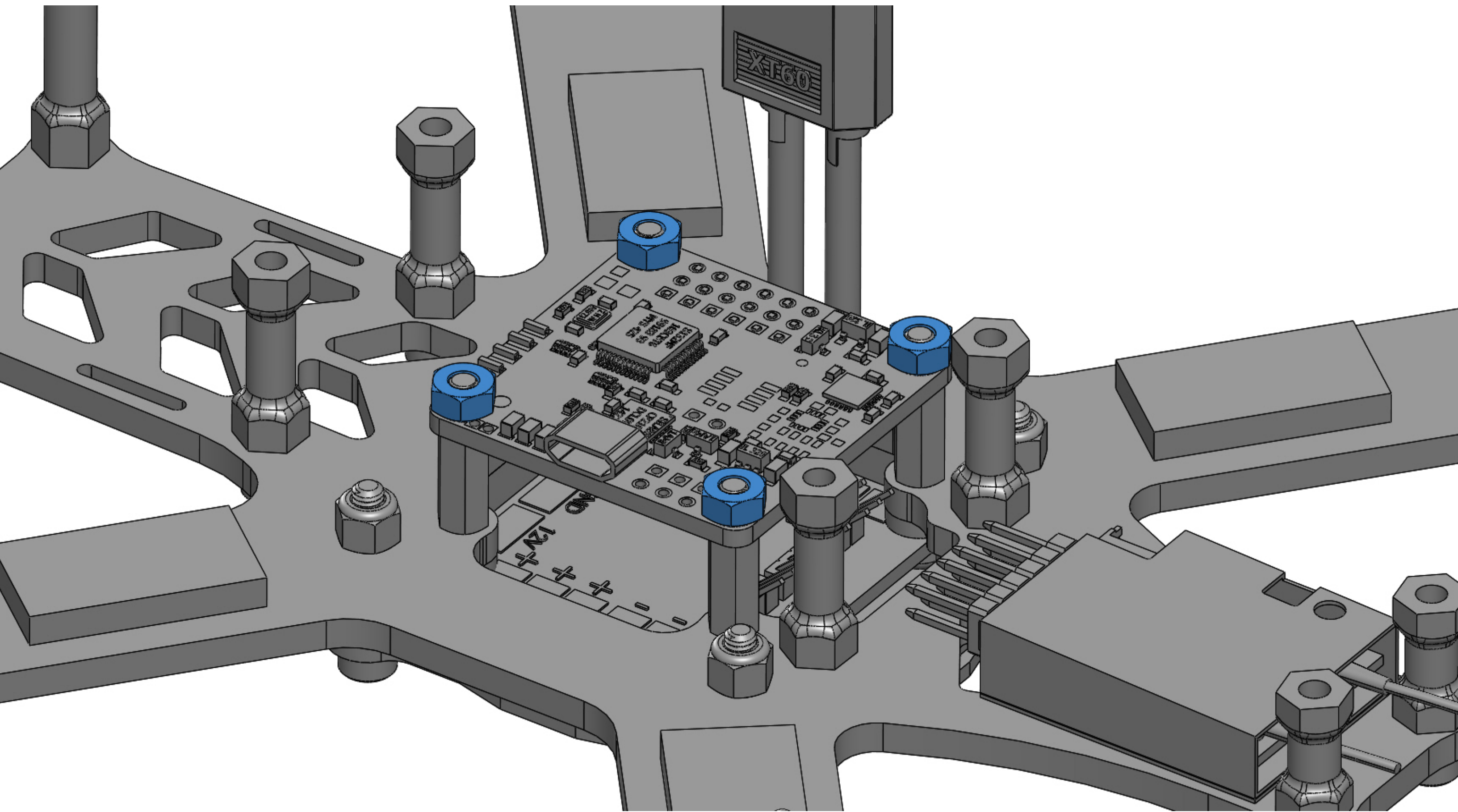
### Parts Required:

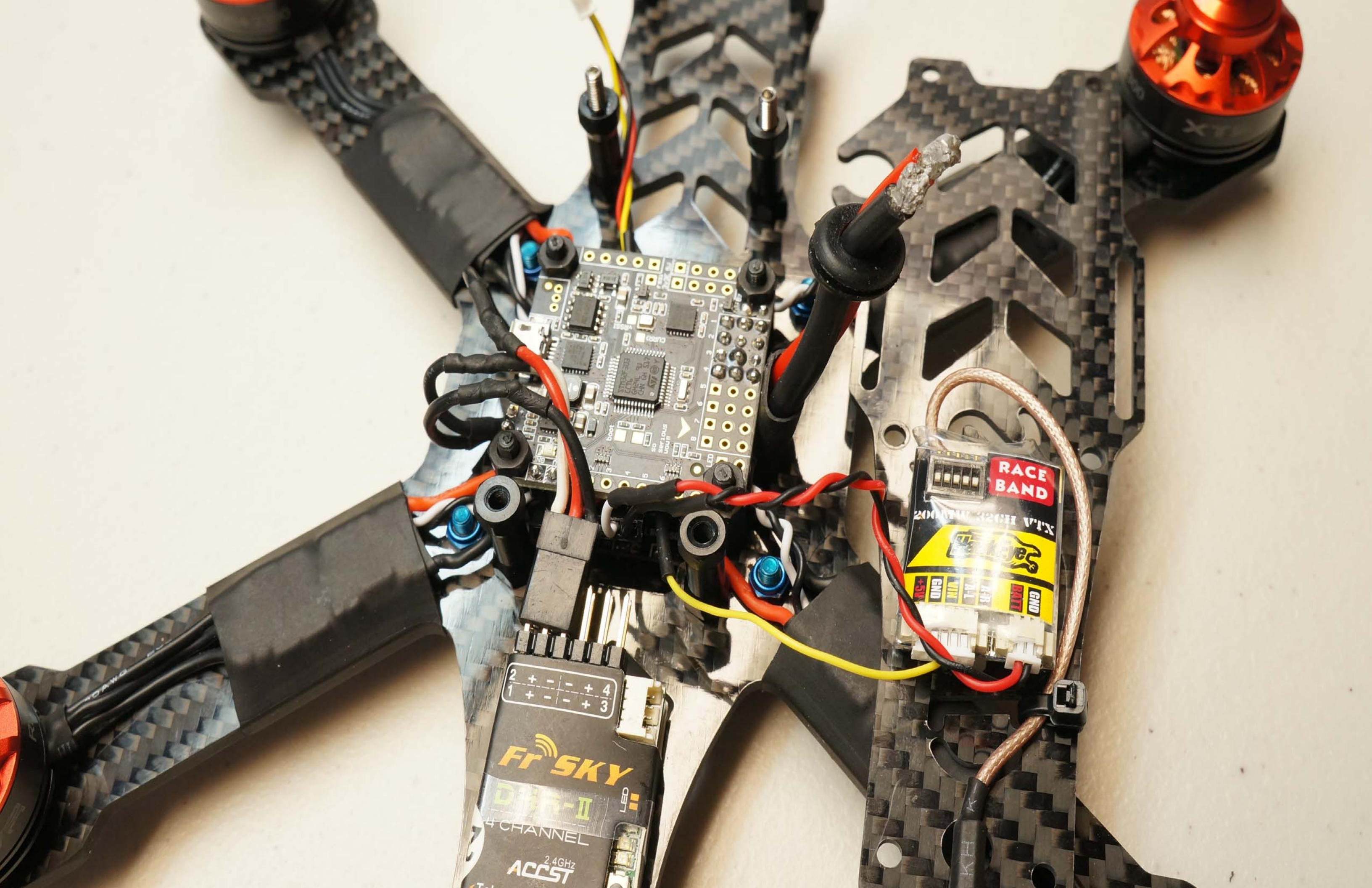
- 1 X Flight Controller (Sold Separately)
- 4 X Flight Controller Nut (Black plastic M3 thread)
- 1 X Assembled Top Fuselage Plate (from previous step)

### Assembly Process:

Once you have all your wiring connected to the PDB and FC, install the FC down onto the standoffs as shown using the 4 plastic M3 nuts.







2 + - - + 4  
1 + - - + 3

**Fr SKY**  
DHF-II  
4 CHANNEL  
2.4GHz  
ACCST

**RACE BAND**  
200mW 2.4GHz VTX

+5V	GND	VIN	V1	R/B	DATA	GND
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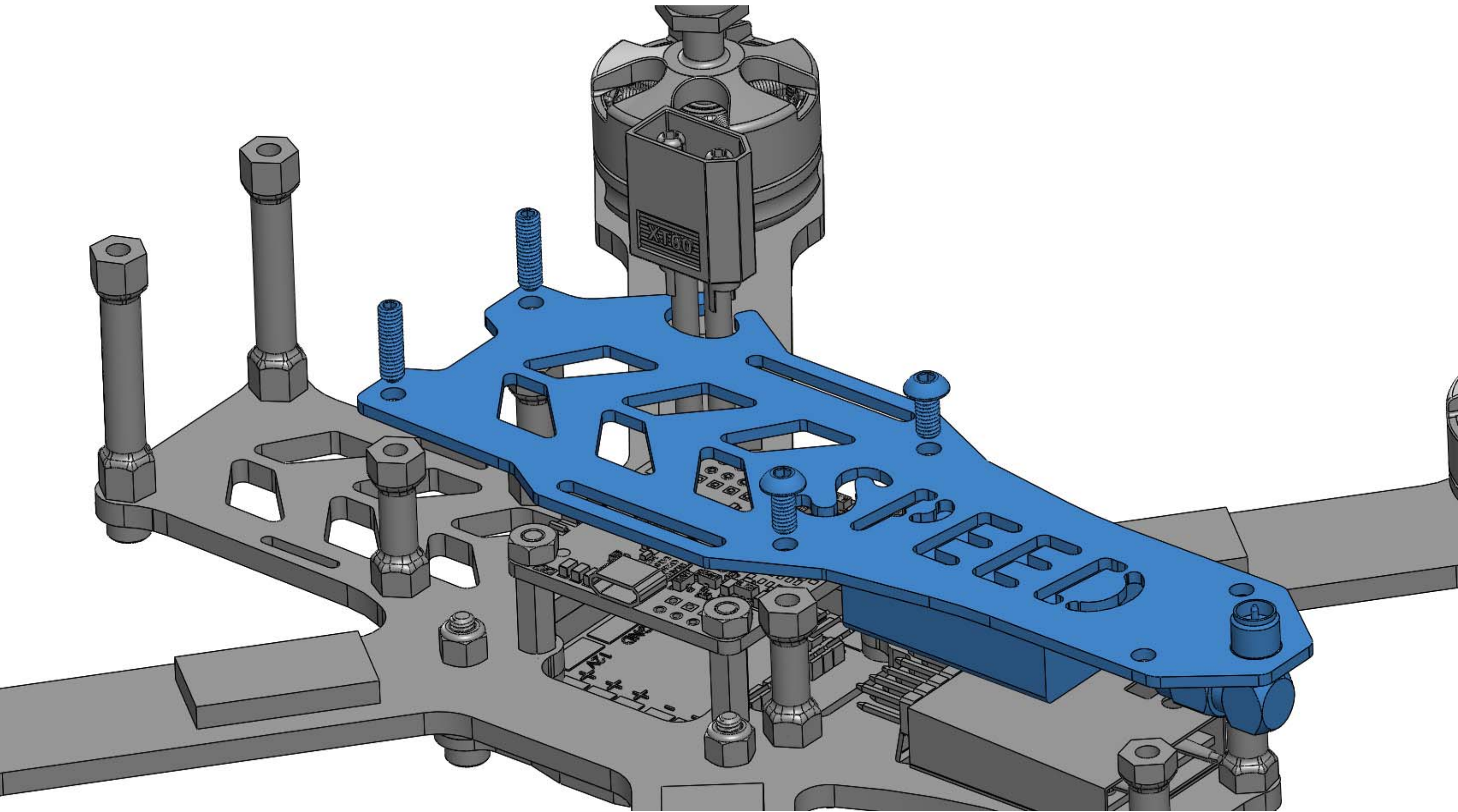
## STEP 12

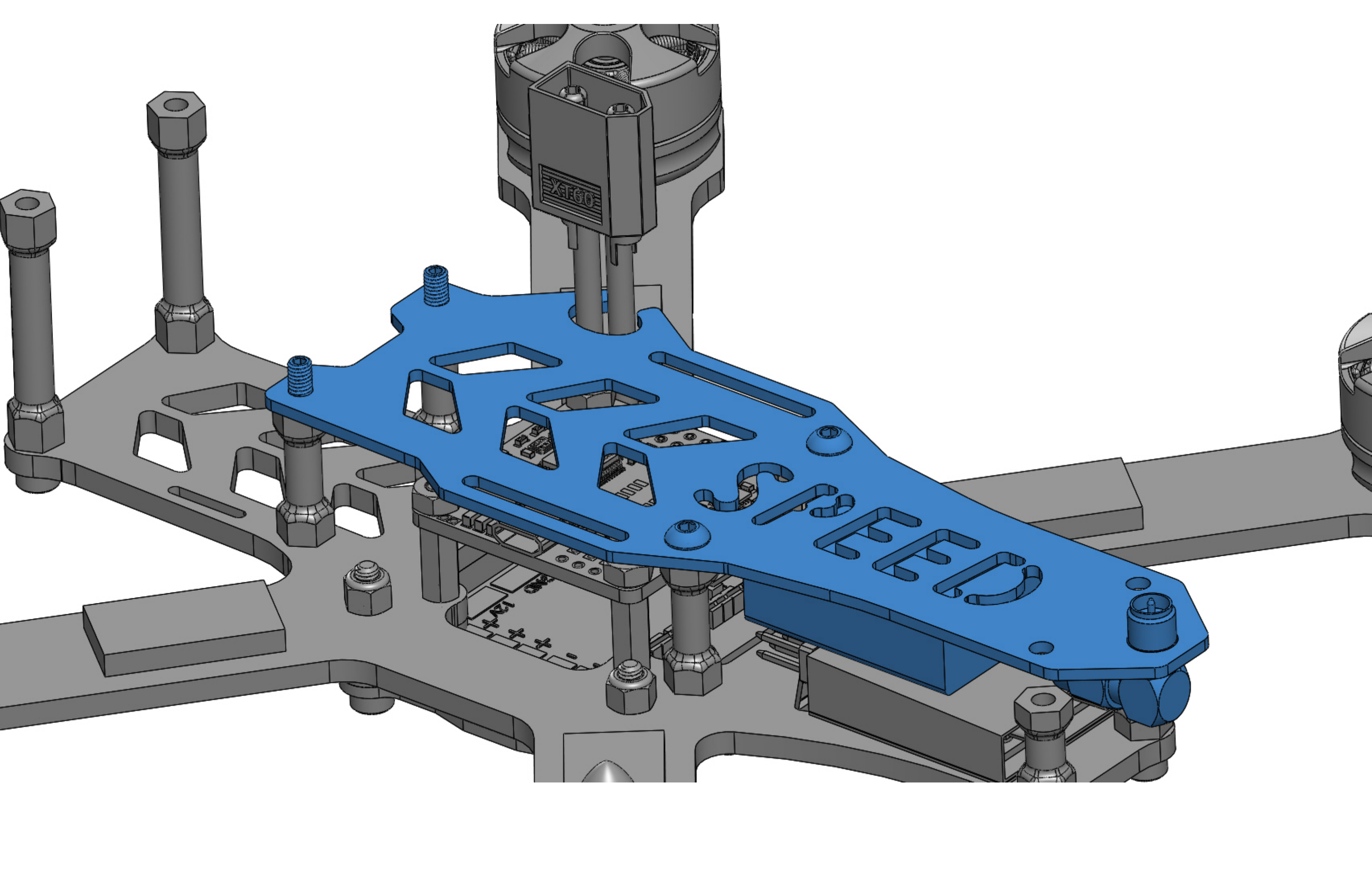
### Parts Required:

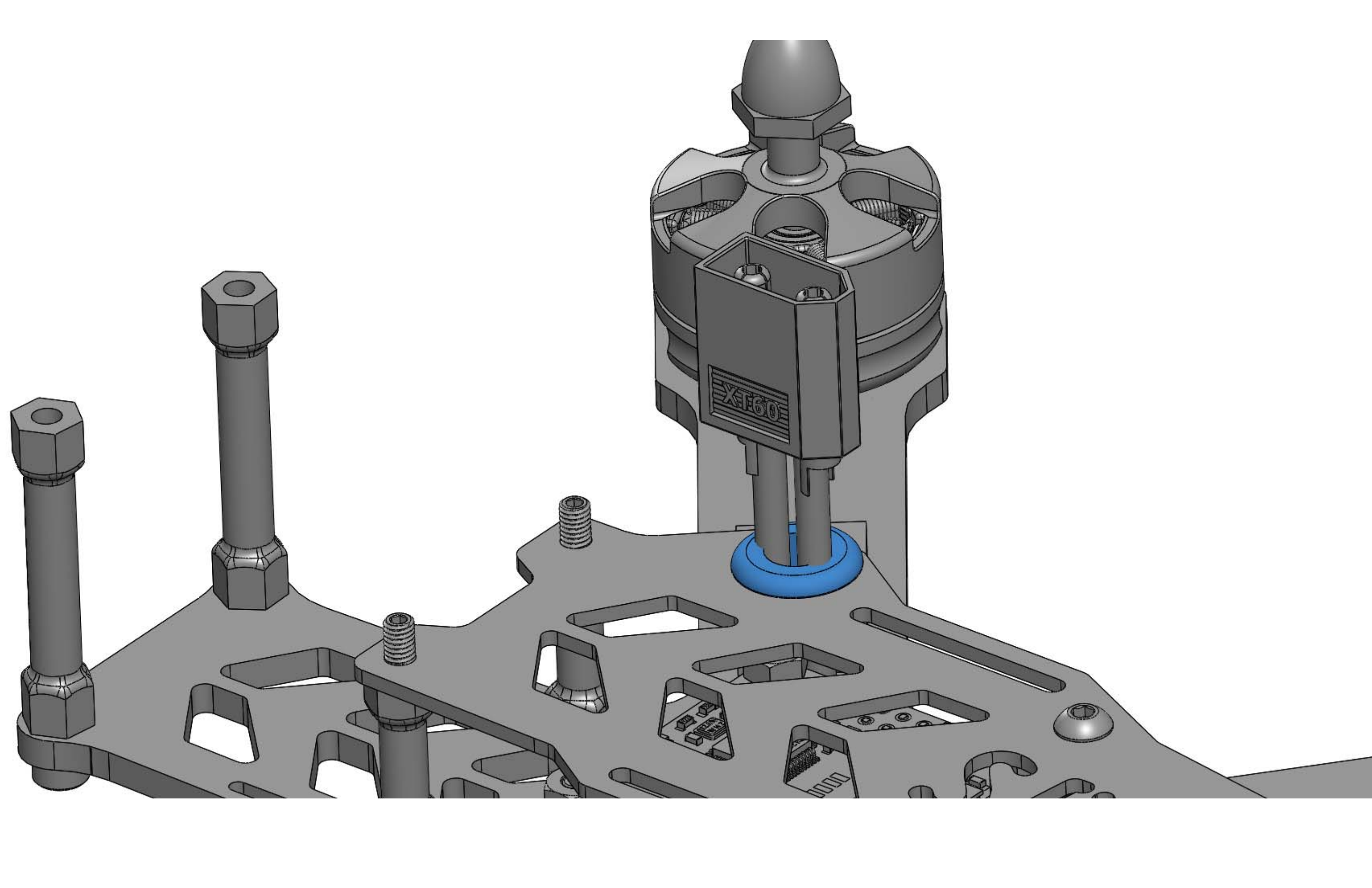
- 1 X Assembled Top Fuselage Plate (from previous step)
- 2 X Set Screw (M3 x 10mm long x steel)
- 2 X Button Head Screw (M3 x 6mm long x **blue 7075 aluminum**)
- 2 X Standoff (Black aluminum M3 thread x 12.5mm long)
- 1 X Velcro Lipo Strap – Catalyst Machineworks

### Assembly Process:

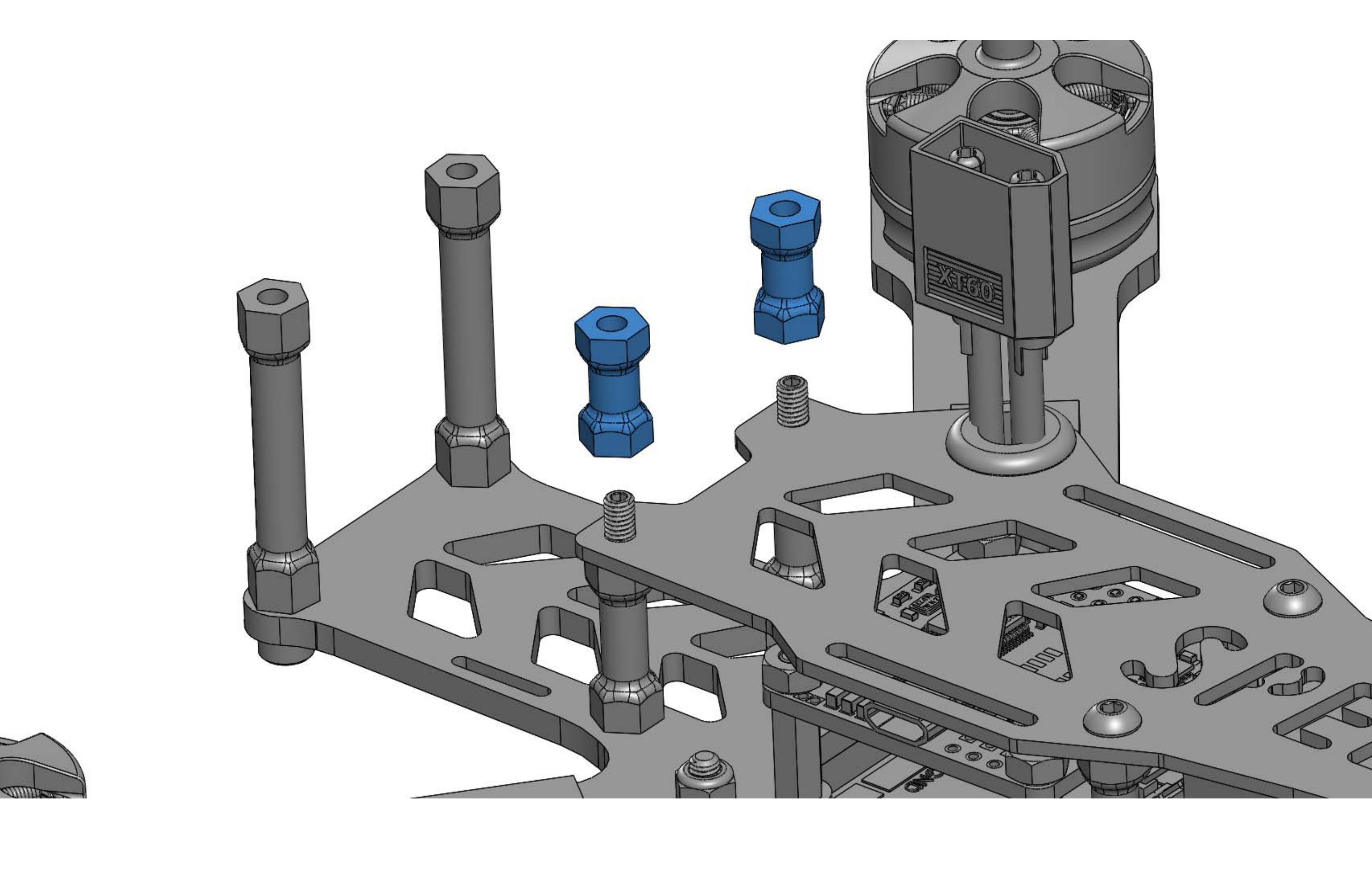
Run the included velcro strap through the slots in the Top Fuselage Plate (not shown pictorially below). With the Vtx wired up, install the Top Fuselage Plate onto the main frame as shown. Install the set screws so 4mm of thread length is exposed and use loctite on these screws. Install the M3 button head screws as shown. Press the XT60 grommet into the oval slot in the side of the Top Fuselage Plate. This grommet works to hold your lipo pigtail in the correct location. Install both standoffs as shown.

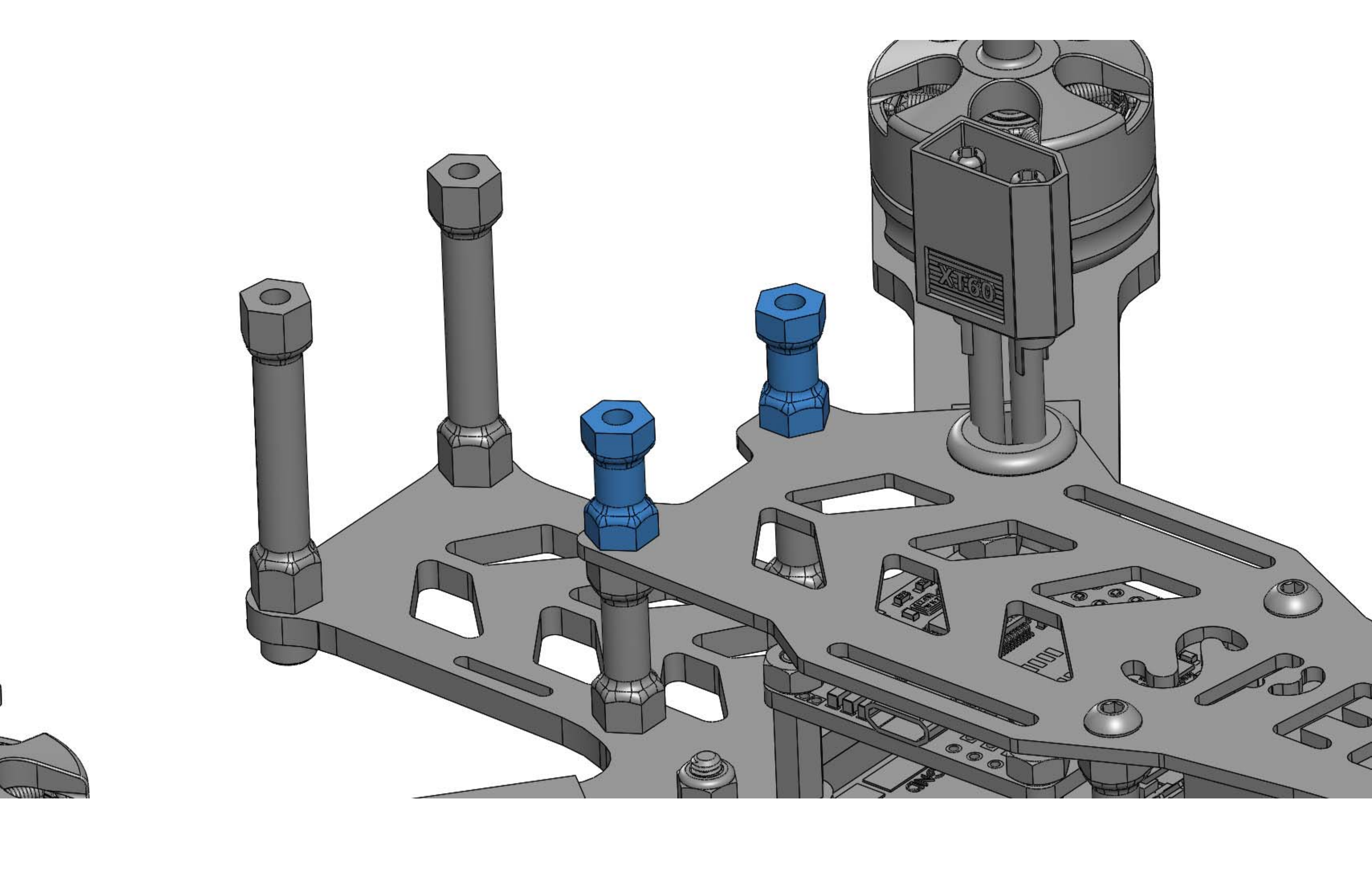












## STEP 13

### Parts Required:

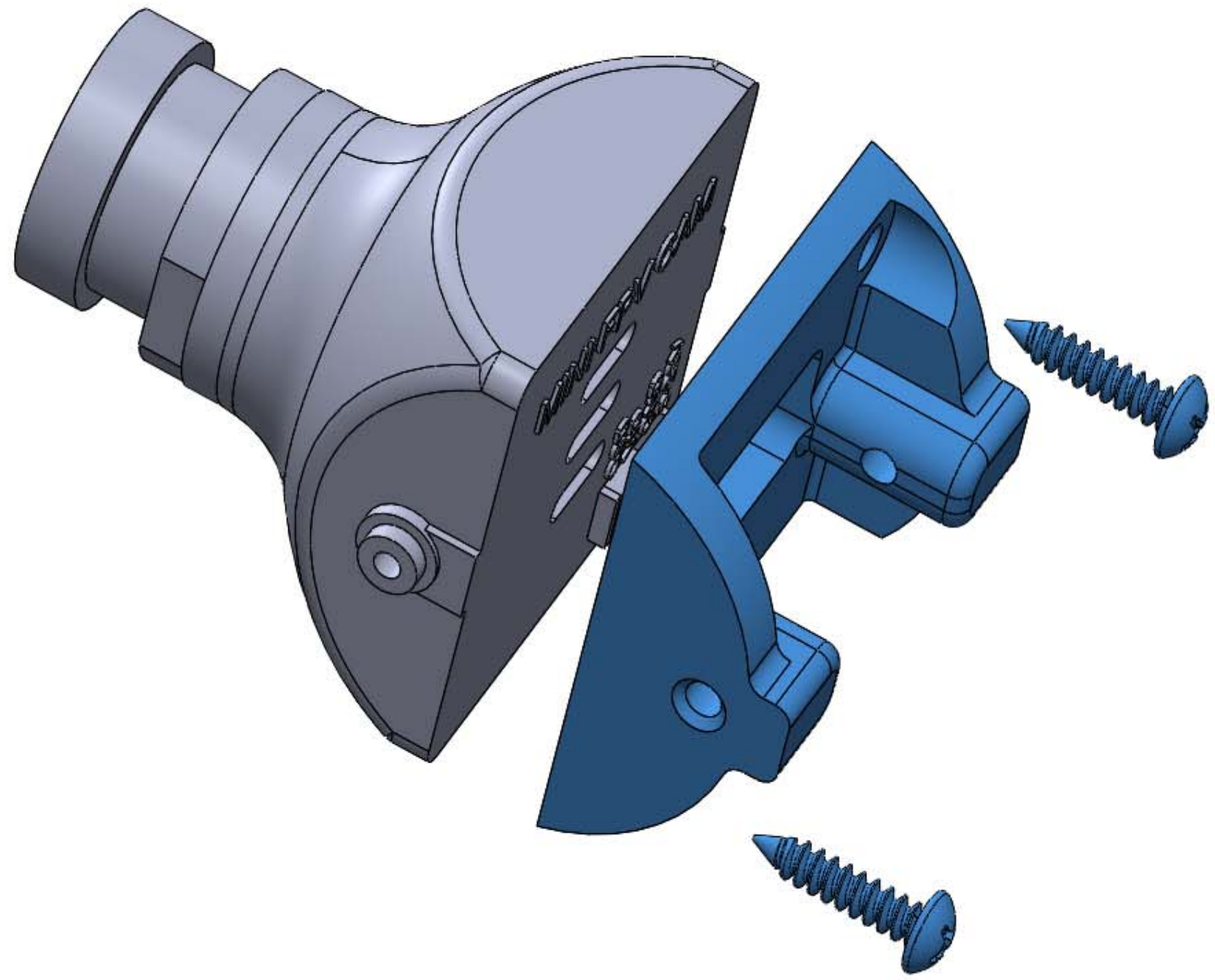
1 X HS1177 FPV Camera (Sold Separately)

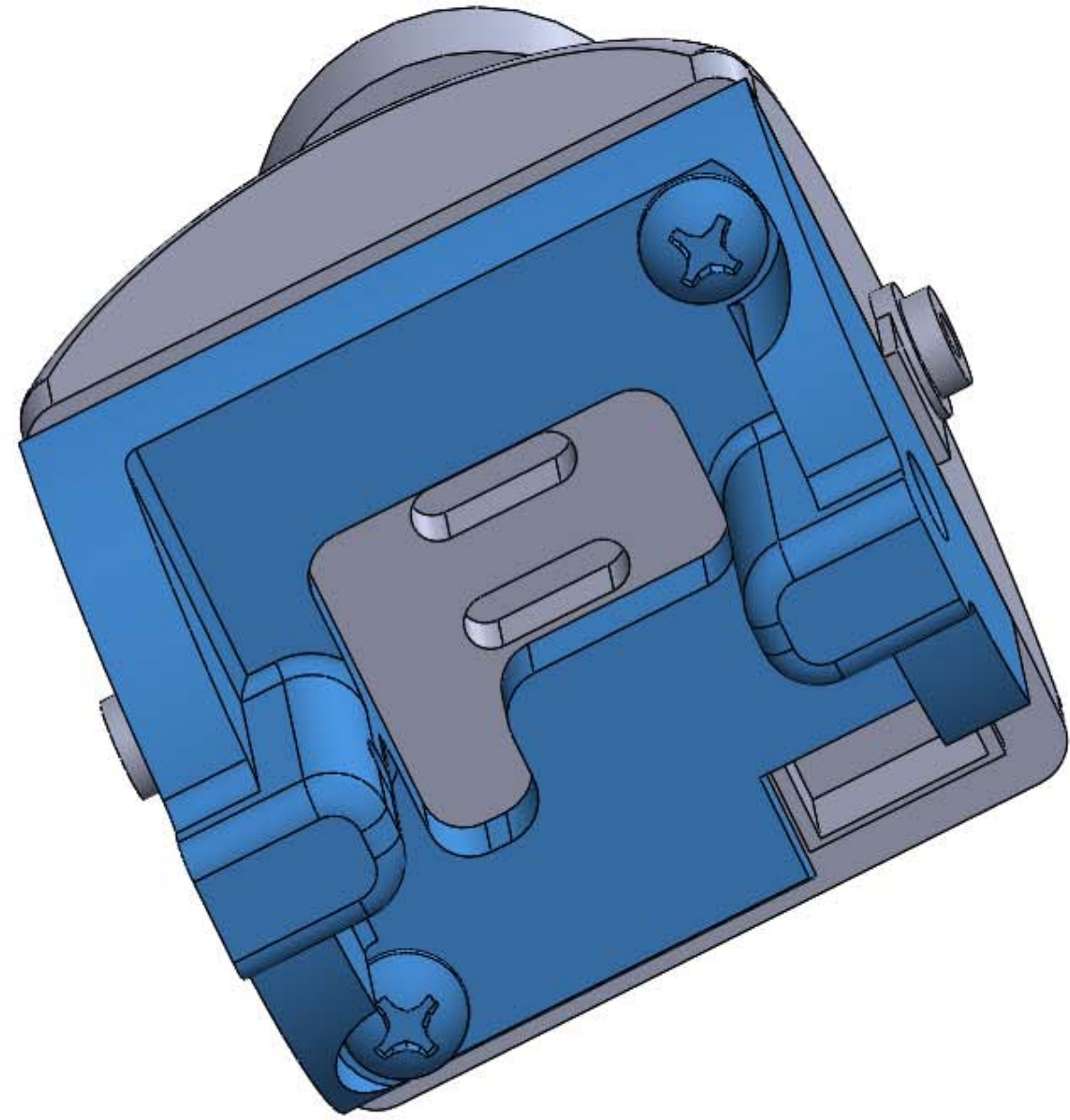
2 X FPV Camera Mount Screws (Phillips head #2 x 3/8" long x stainless steel)

1 X FPV Camera Adjustment Mount (Black 3D Printed ABS Plastic)

### Assembly Process:

Remove the 2 existing screws from the back of the camera. Install the Camera Adjustment Mount onto the back of the camera as shown using the 2 included FPV Camera Mount Screws.





## STEP 14

### Parts Required:

1 X Assembled HS1177 FPV Camera (from previous step)

2 X FPV Camera Cage, Side Plate (1.5mm CF)

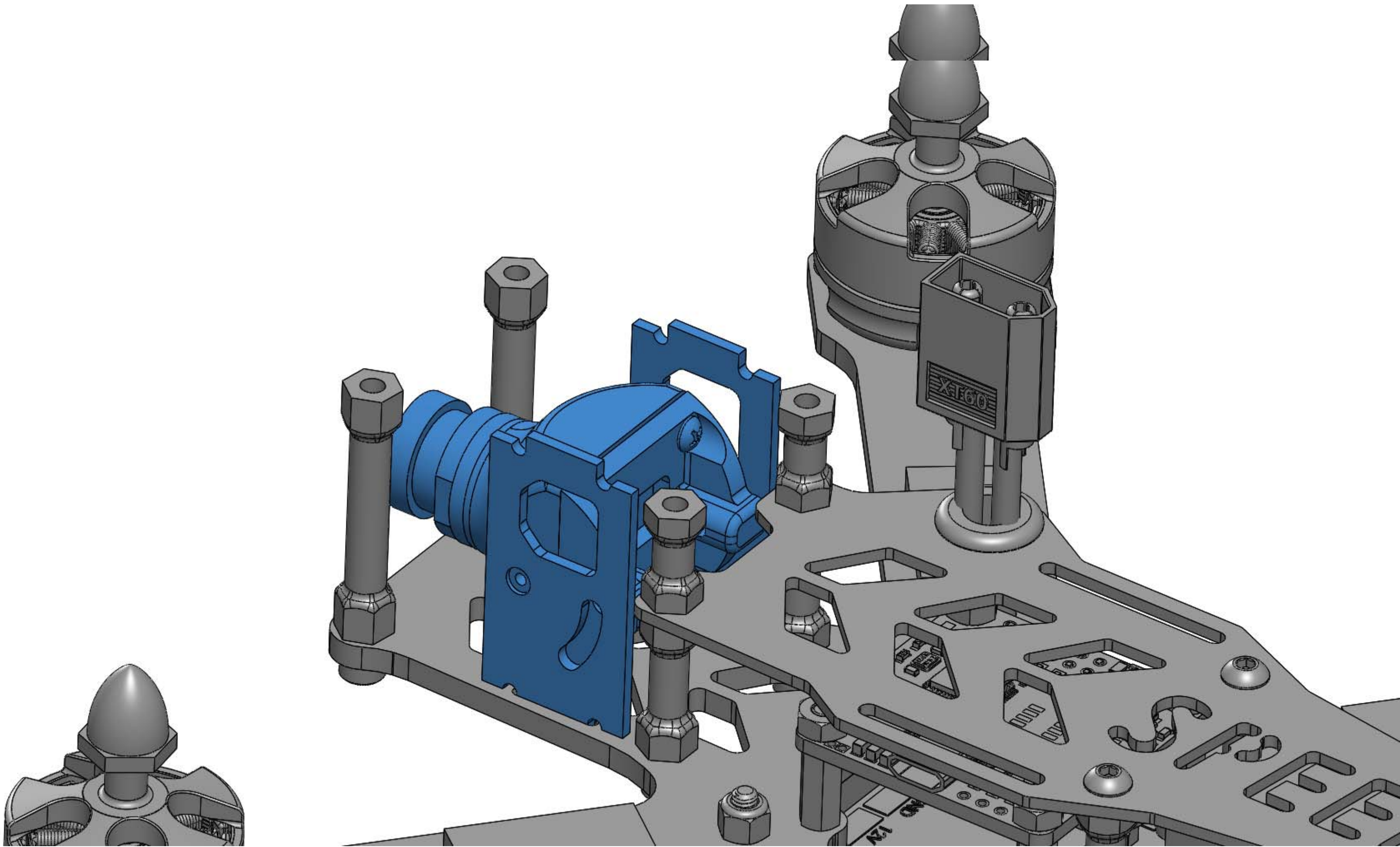
1 X FPV Camera Cage Top Plate (3mm CF)

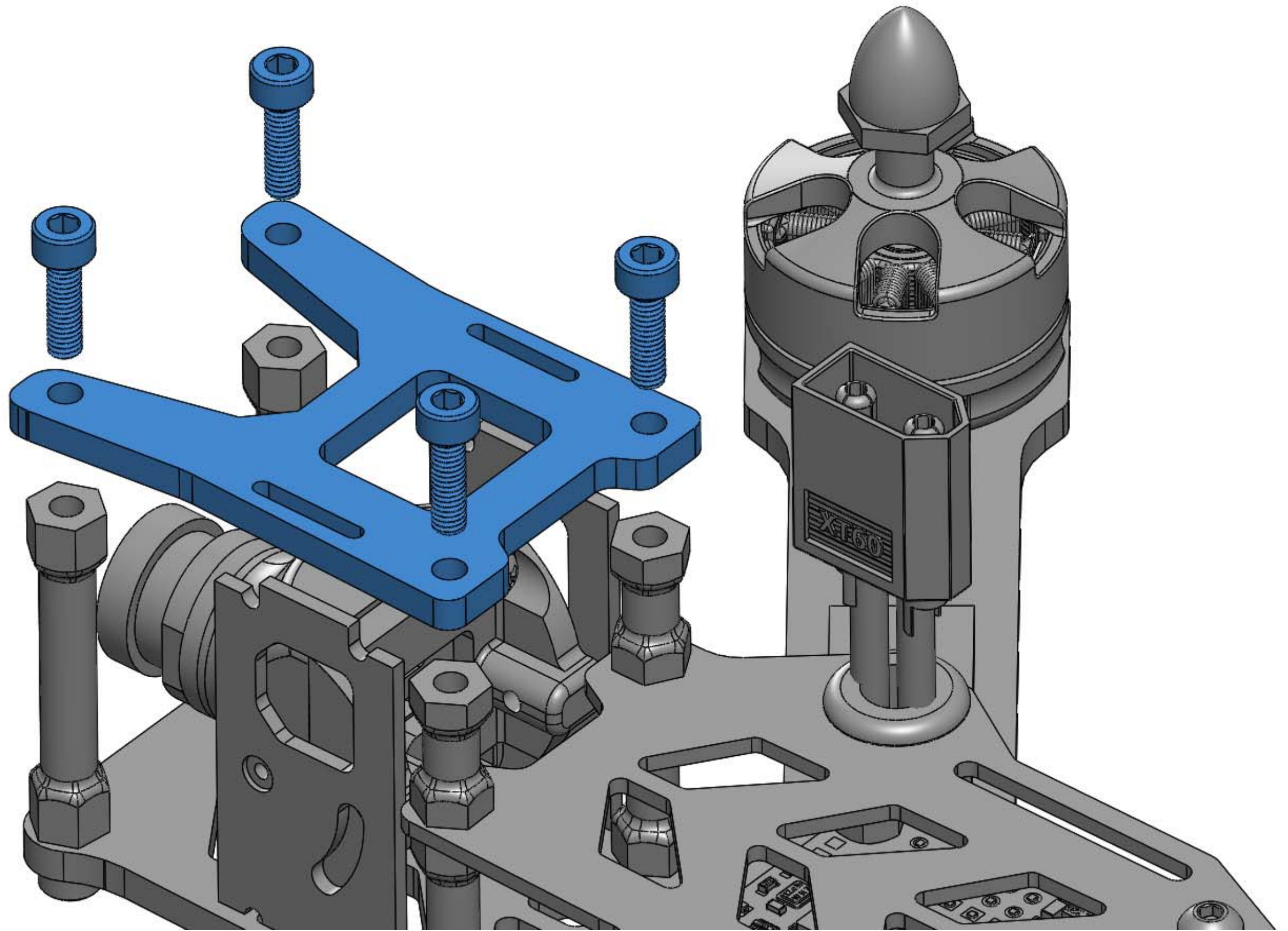
4 X Socket Head Screw (M3 x 10mm long x **blue 7075 aluminum**)

2 X FPV Camera Mount Adjustment Screw (Phillips head #4 x 3/8" long x stainless steel)

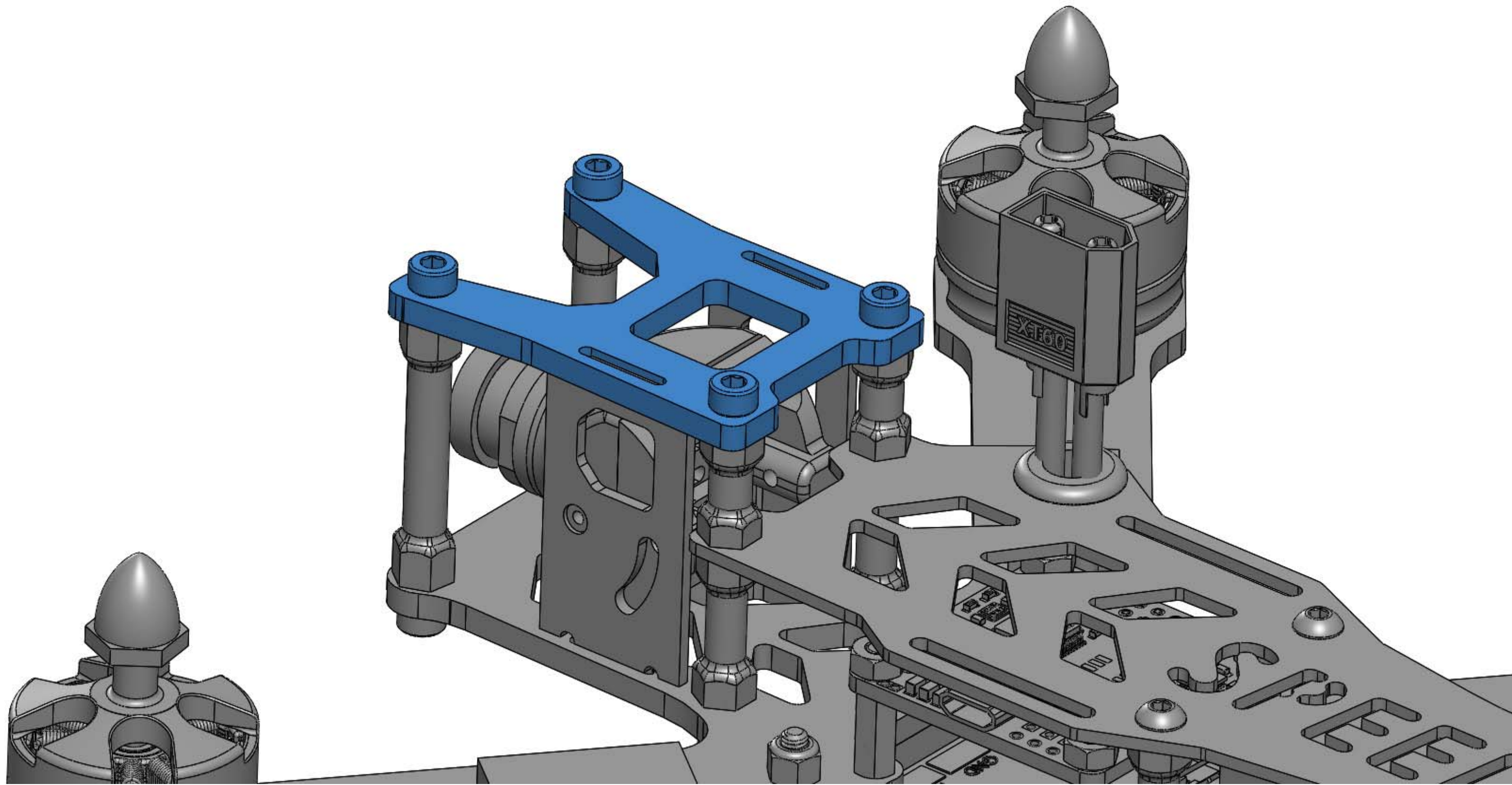
### Assembly Process:

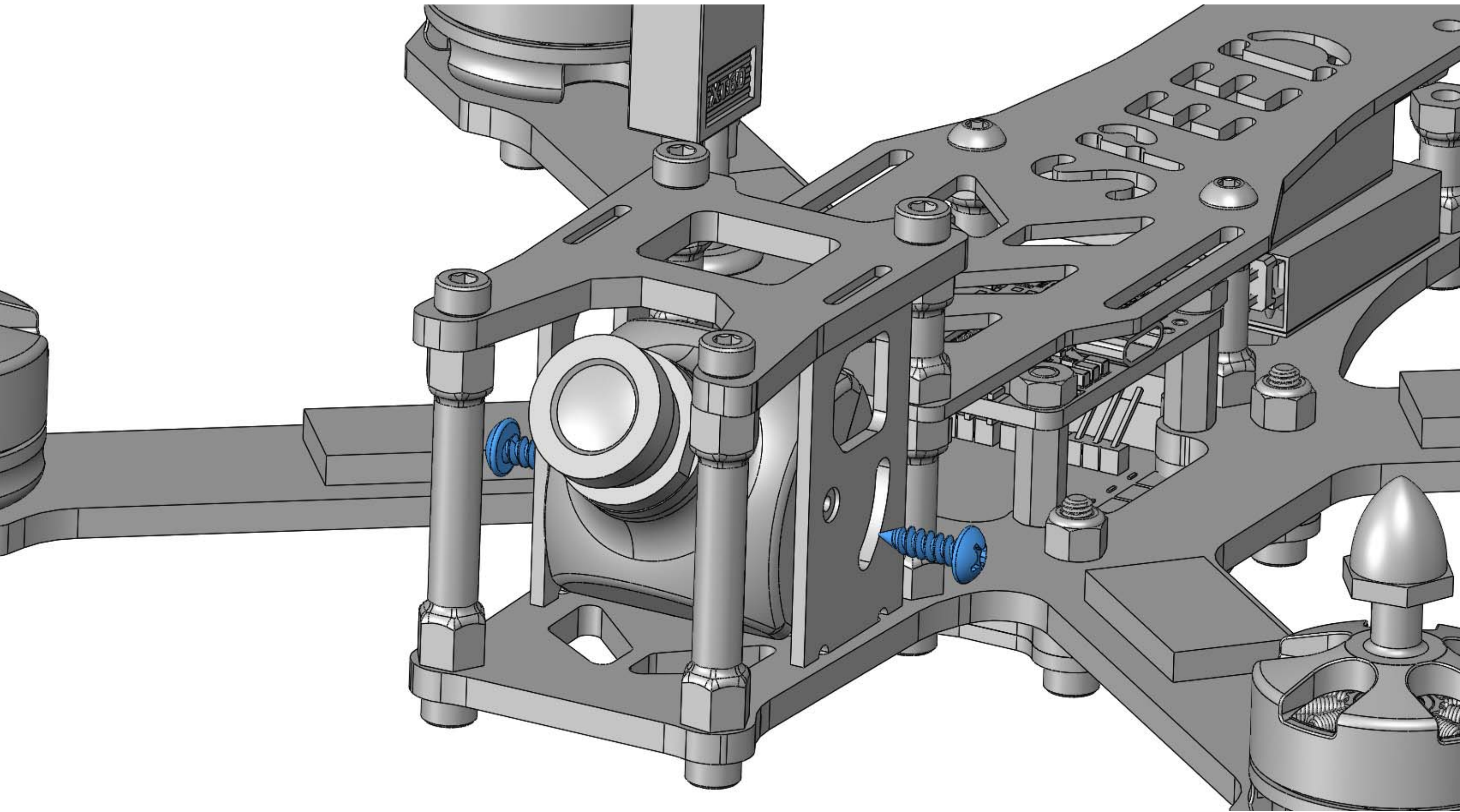
Insert the signal/power wire into the FPV camera. Position the holes in the Camera Cage Side Plates onto the nubs on the sides of the camera housing. While pressing the assembly together with your hands, feed the Camera Cage Side Plates down into the slots in the Main Frame Plate. Press the Camera Cage Top Plate in place then install the 4 M3 socket head screws as shown. Set your FPV camera at the desired angle (0° - 45°) then install the 2 Camera Mount Adjustment Screws. You should not use much torque on these screws! Only enough to hold the camera in place.

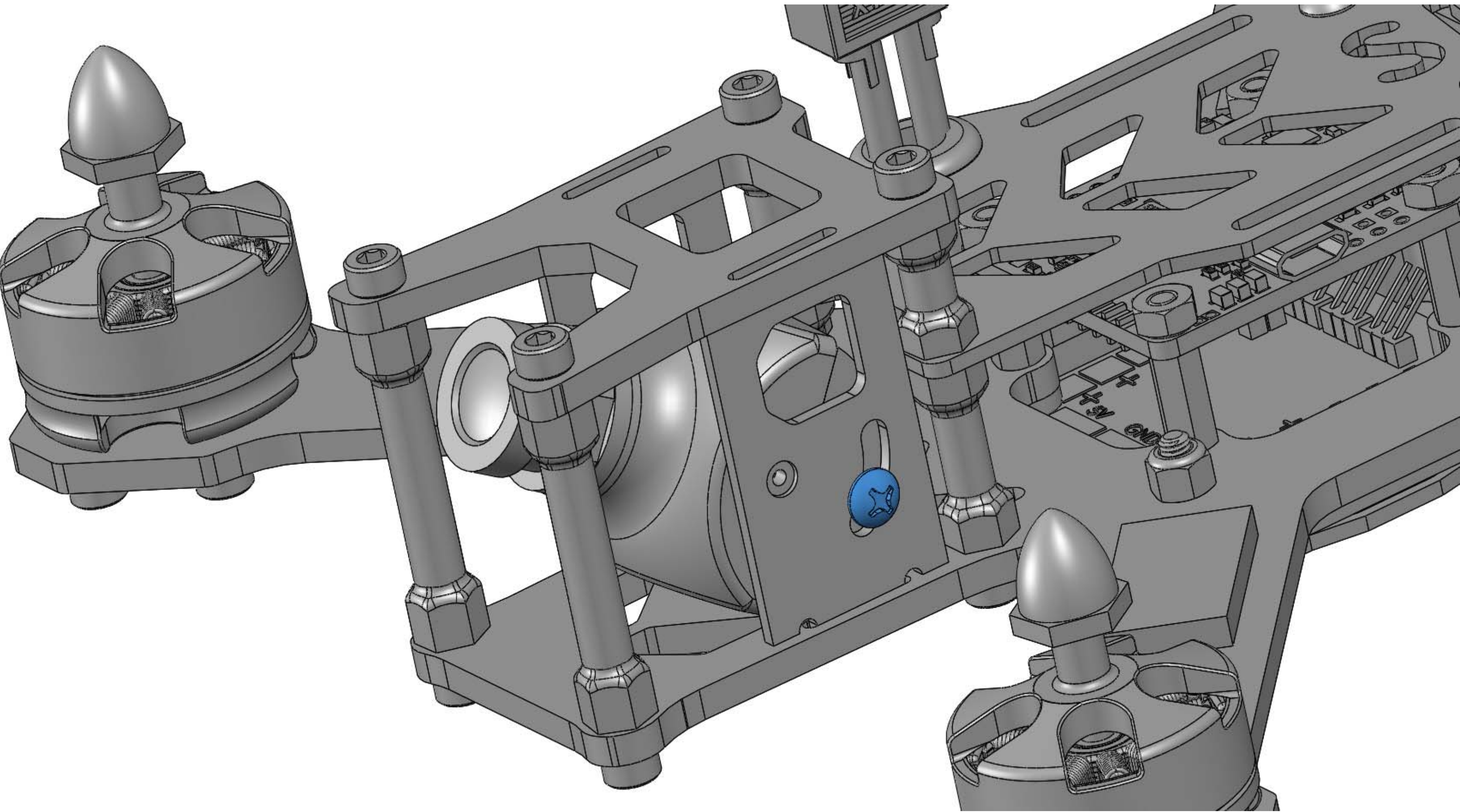












## STEP 15

### Parts Required:

1 X Antenna Mount (Black 3D Printed TPU)

2 X Antenna Tubes (Blue Plastic 1/8" Diameter)

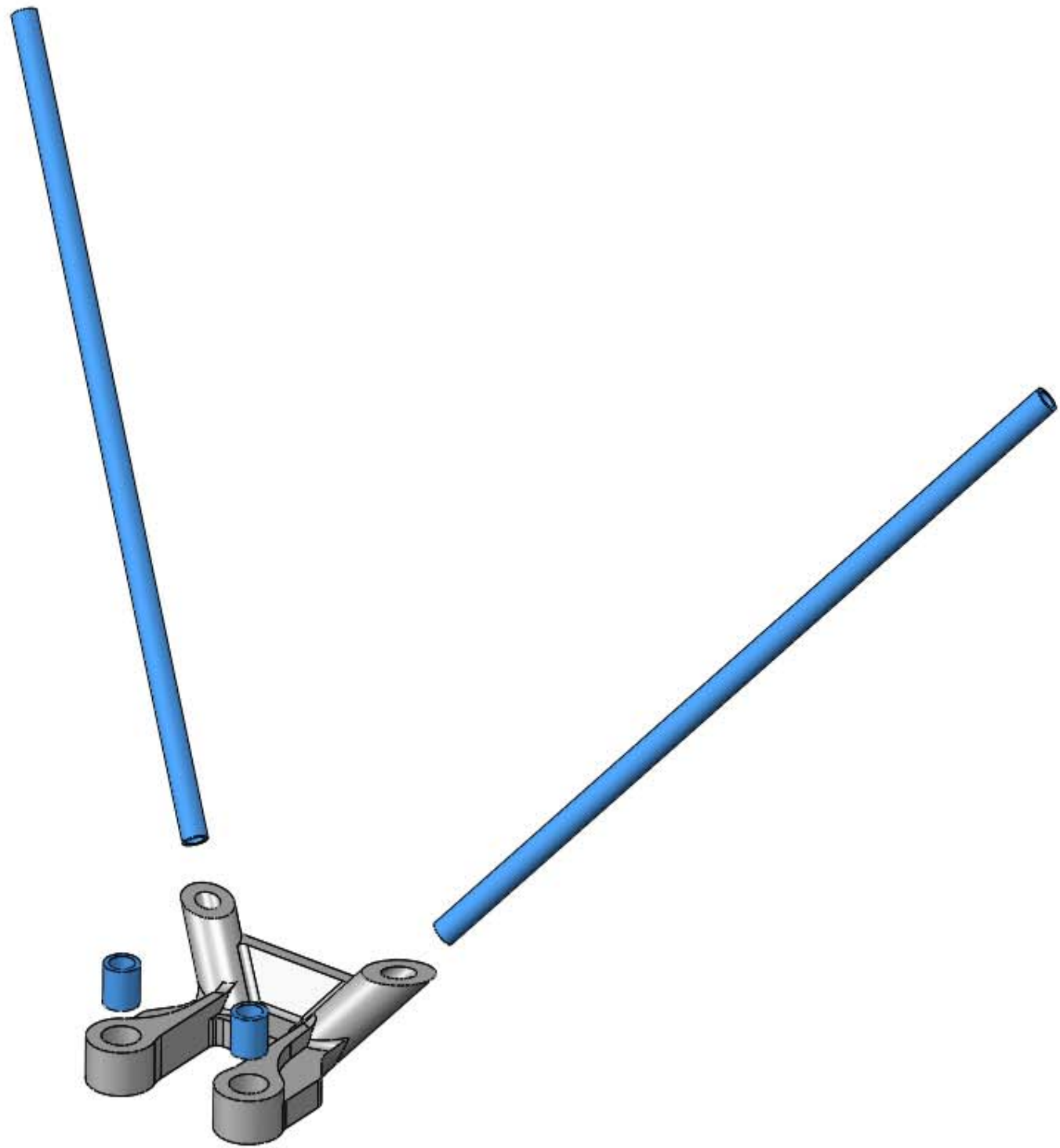
2 X Antenna Mount Inserts (Silver Aluminum M3 Hole x 4.5mm OD x 5mm long)

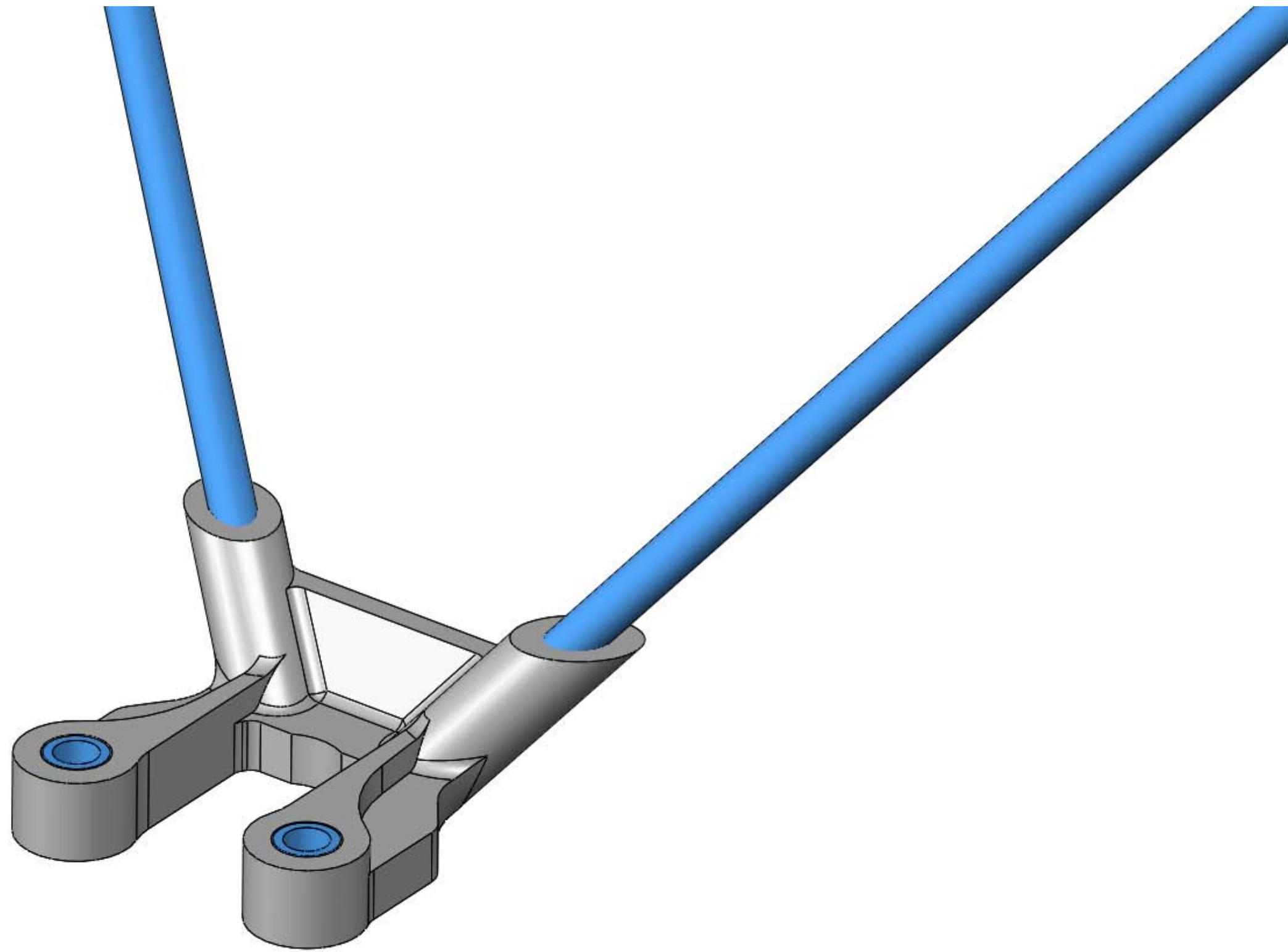
2 X Socket Head Screw (M3 x 12mm long x **blue 7075 aluminum**)

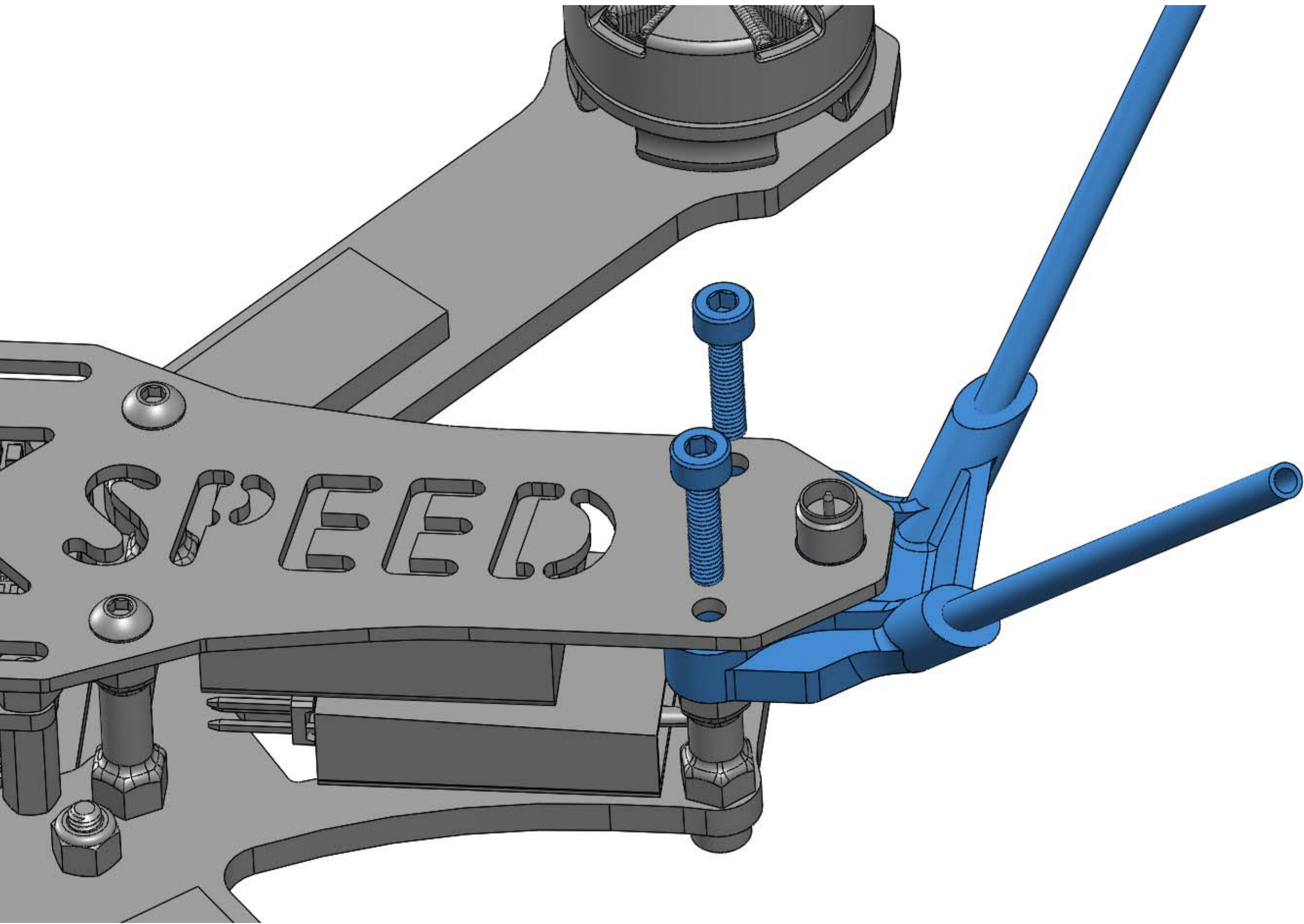
1 X FPV Antenna (Sold Separately)

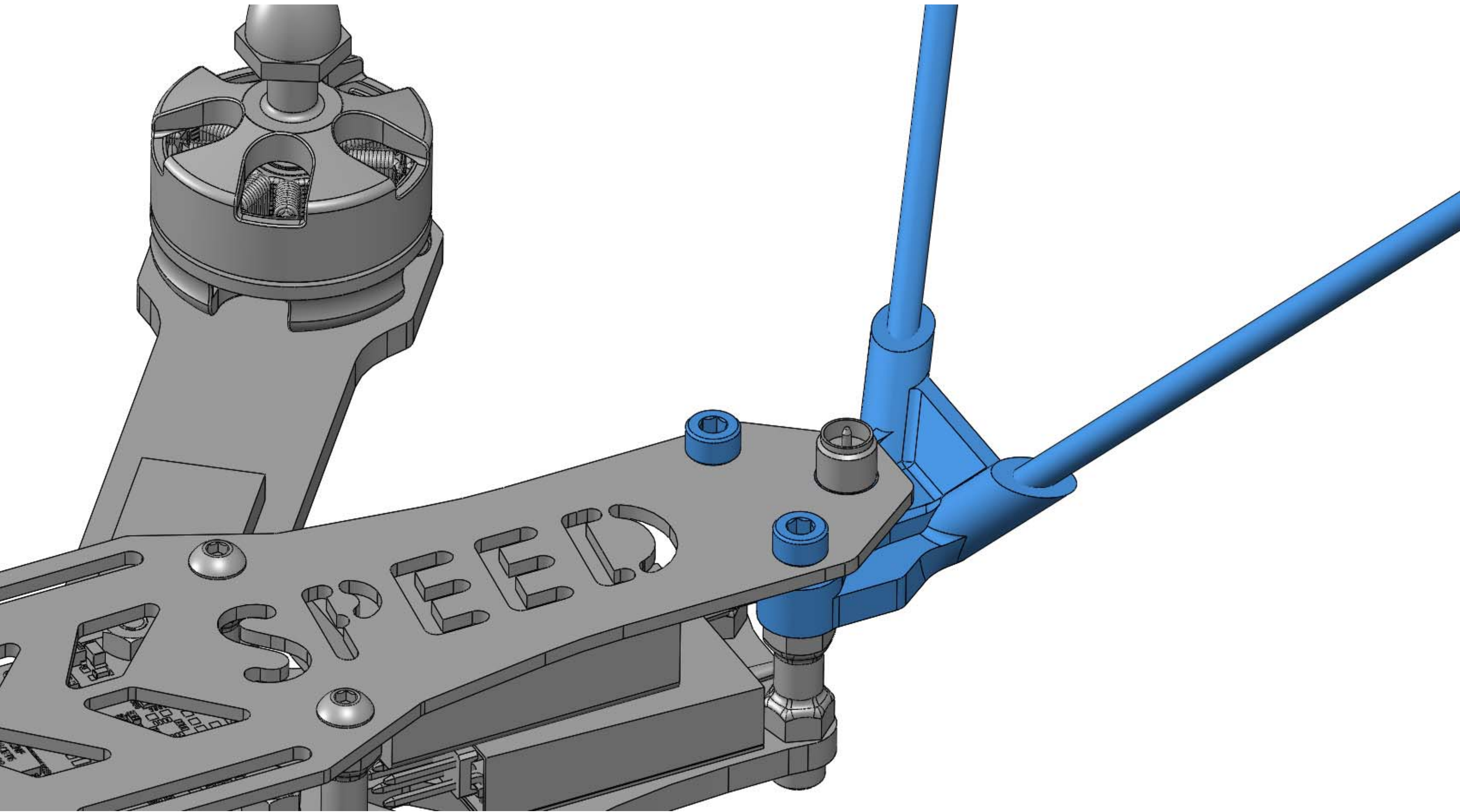
### Assembly Process:

Press the Antenna Tubes into the Antenna Mount as shown. Press in the Antenna Mount Inserts as shown. Feed your receiver's antenna wires up through the bottom mount holes and install the mount as shown. Use the two Socket Head Screws to hold the assembly in place. Finally, install your FPV antenna.

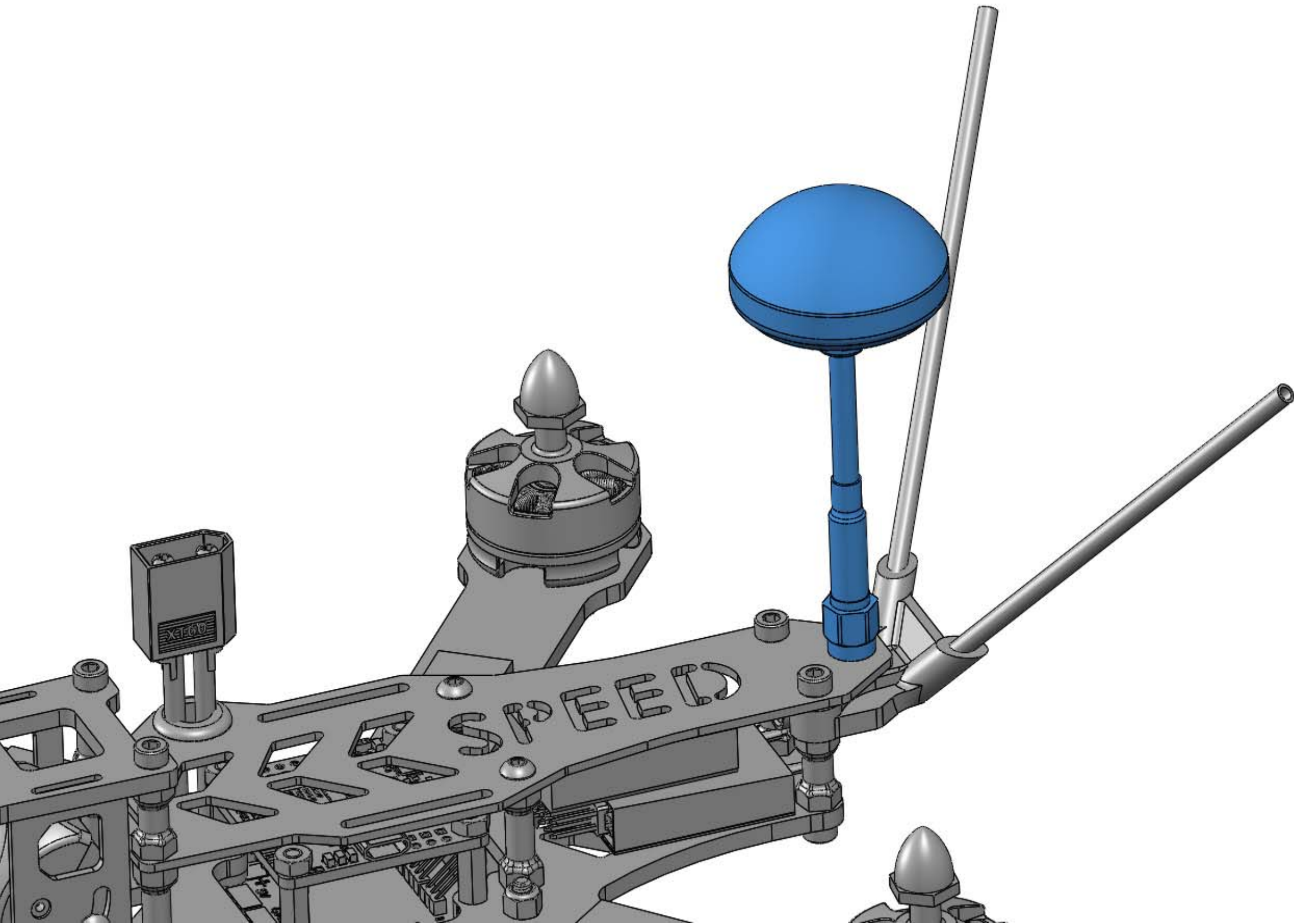












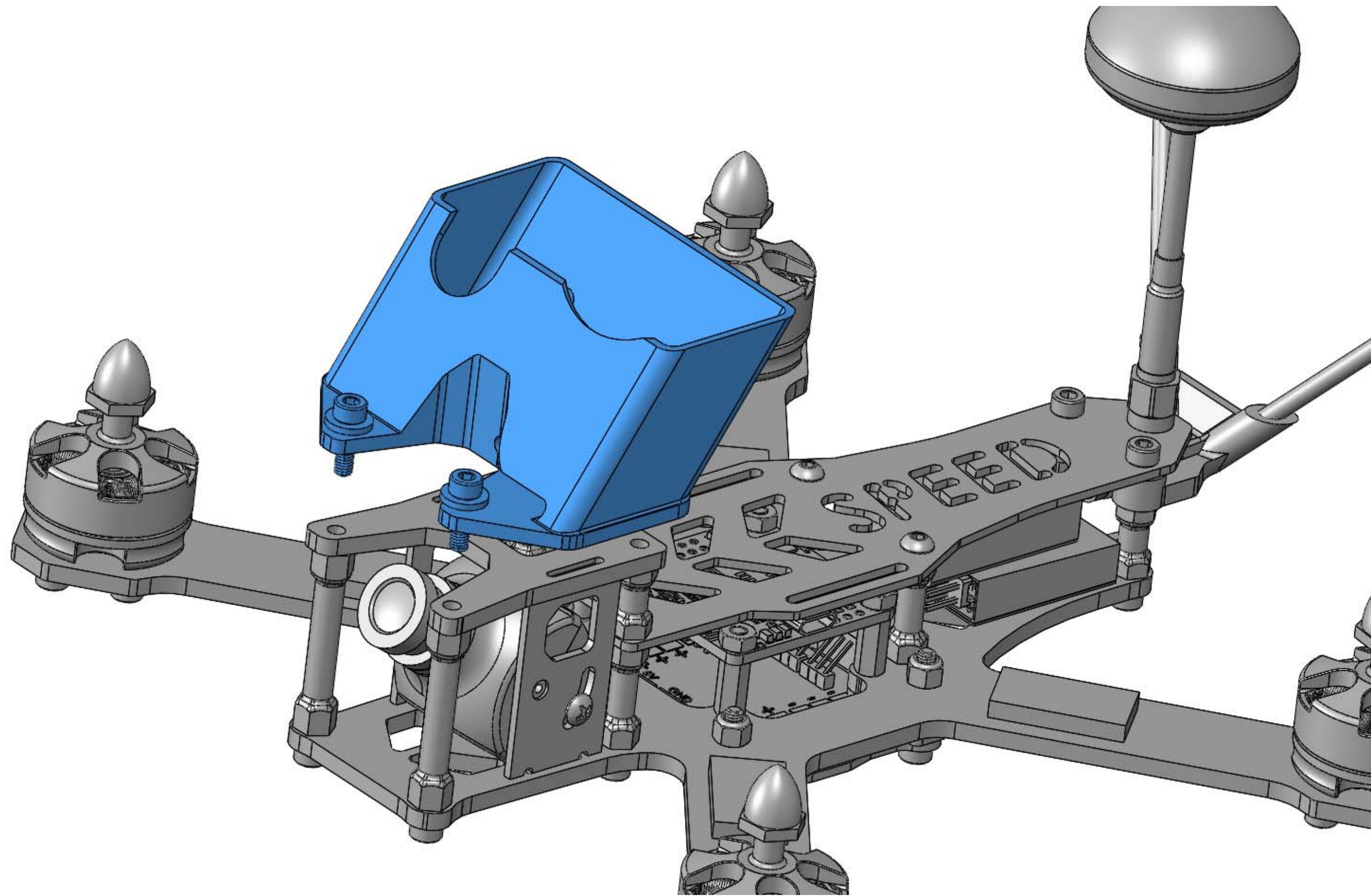
HD CAMERA MOUNT INSTALL  
(OPTIONAL)

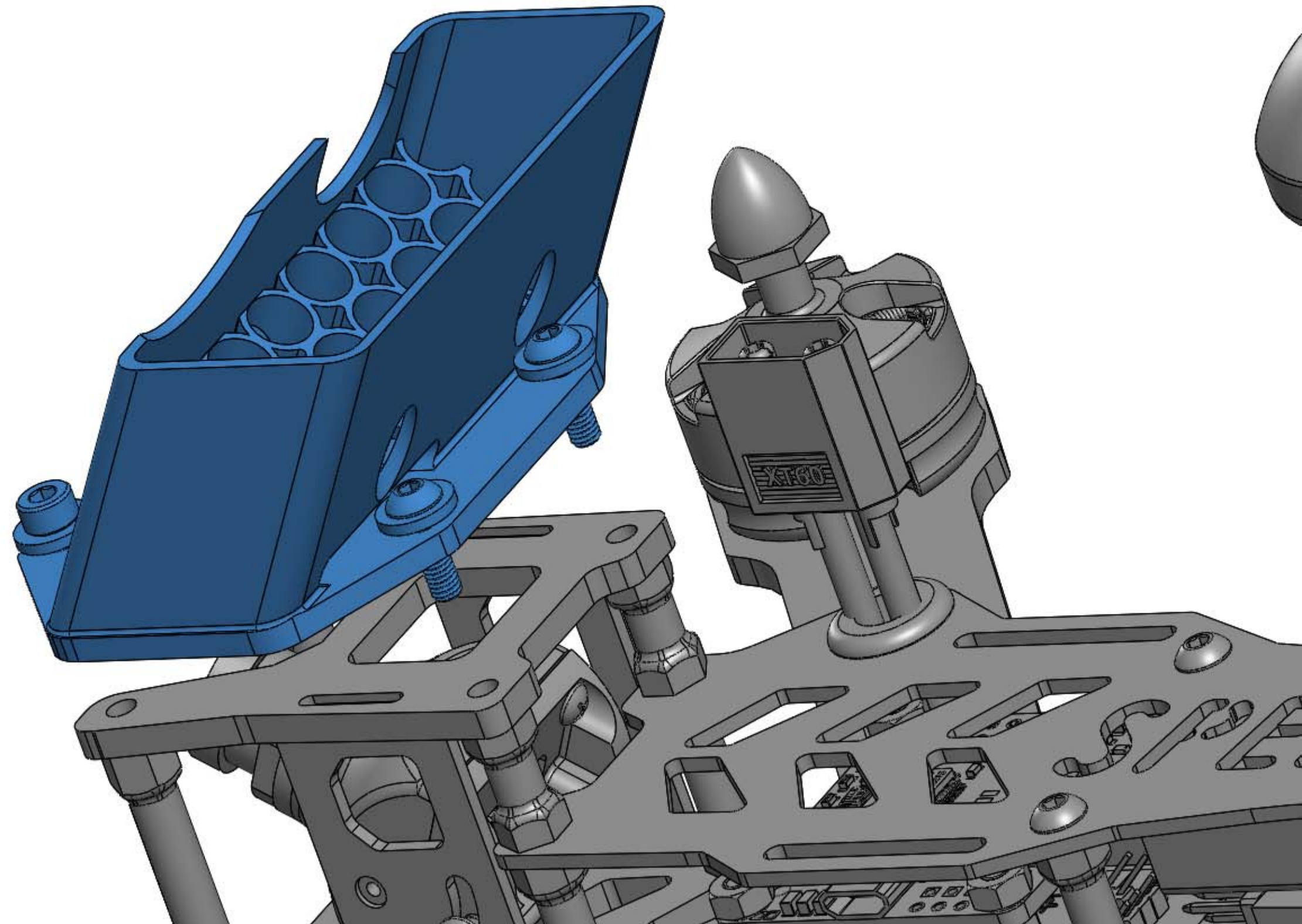
### Parts Required:

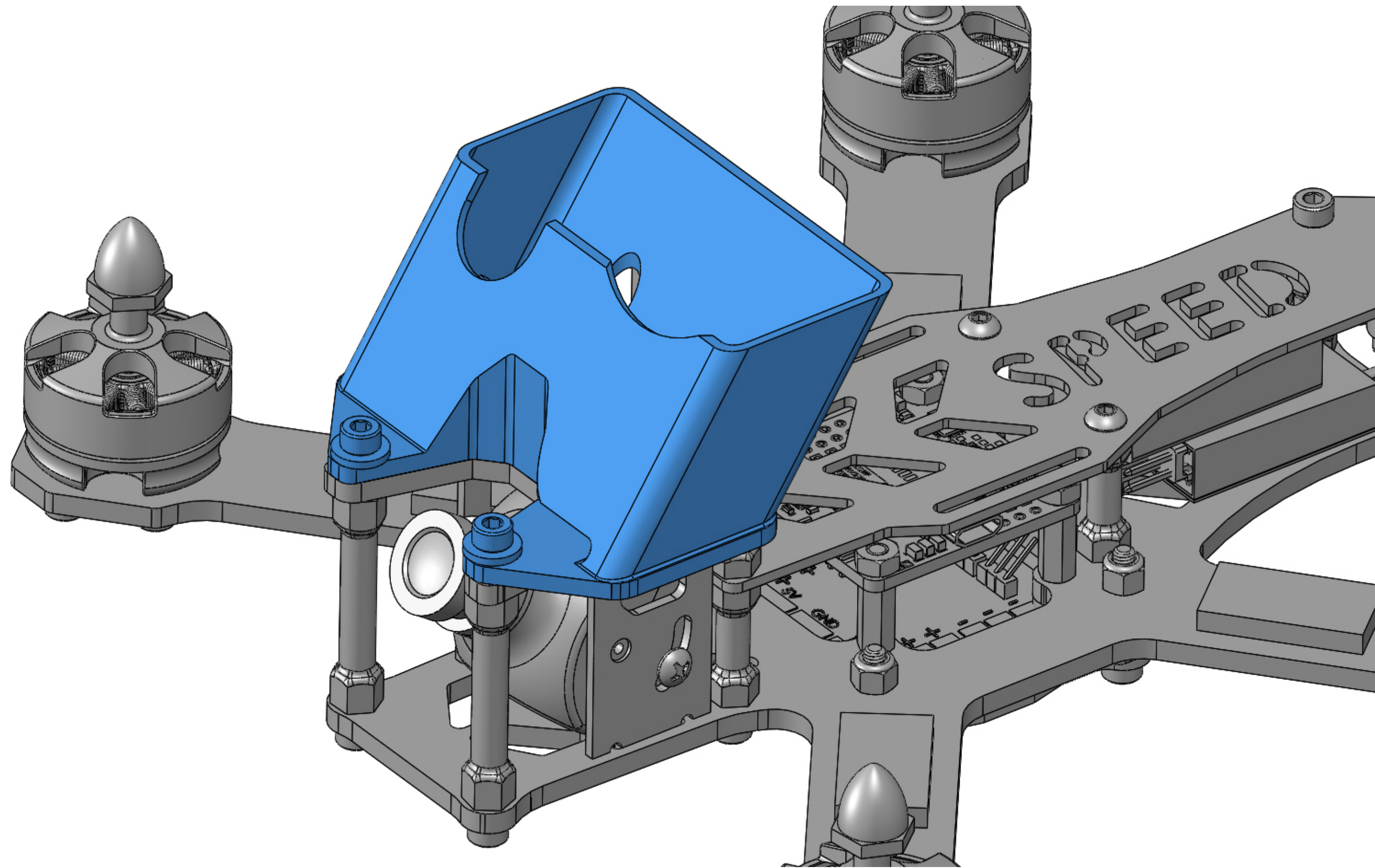
- 1 X HD Camera Mount (Black 3D Printed TPU)
- 2 X Button Head Screw (M3 x 10mm long x Steel)
- 2 X Socket Head Screw (M3 x 10mm long x **blue 7075 aluminum**)
- 4 X Washer (M3 x aluminum or steel)
- 1 X Velcro Strap – Catalyst Machineworks

### Assembly Process:

Use the two existing socket head screws located at the front of the FPV camera cage, and the two steel button head screws (which are included with your camera mount) to fasten the mount down. Use one washer per screw. Install your camera into the mount then run the Velcro Strap through the slot in the camera cage and around the camera. Make sure the strap is nice and tight. At 70 MPH your camera might tend to move a bit in flight!









# LIPO INSTALLATION



## Lipo Installation:

Install a velcro strip along the top of the upper fuselage plate. Install a velcro strip on bottom of your Lipo. If you are running the 210-R or 180-R without HD camera, mount the lipo as far forward as possible. Check center of gravity after the lipo is installed and readjust as needed. If you are running the 210-R or 180-R with an HD camera it will be necessary to mount the Lipo farther back on the fuselage top plate to achieve proper center of gravity. Check center of gravity after the lipo is installed and readjust as needed. Mount the lip such that it's pigtail wires are facing towards the front of the craft. Route the pigtail through the velcro strap as shown below. It is VERY important to make sure the lipo is strapped down tight and positioned exactly between the right and left prop sets. There isn't much space between the edge of the lipo and the ends of the props. Do not use a lipo that is wider than 35mm.

