X500 Frame

Full carbon fiber twill; Arm diameter 16mm; It is perfectly compatible with the *Holybro* Pixhawk4 and Pixhawk4 Mini kits. (No soldering required)

Bill of materials

- Pixhawk 4 autopilot
- Pixhawk 4 GPS
- Battery Strap
- Propellers - 1045
- Motors - 2216 KV880
- Power and Radio Cables
- Power Management - PM07
- Wheelbase - 500 mm
- Dimensions - 410*410*300 mm
- 433 MHz Telemetry Radio / 915 MHz Telemetry Radio

Note: No LiPo battery included. In addition, we use a FrSky Taranis controller.

The image above shows both frame and electronic components.

Hardware
This section lists all hardware for the frame and autopilot installation.

| Item	Description	Quantity
Socket cap screw	Used for motor fixing, stainless steel screw M3*5	16
Carbon fiber tube - ARM	Diameter: 16mm length: 200mm	4
Motor base	Consists of 6 parts and 4 screws 4 nuts	4
Slide bar	Diameter: 10mm length: 250mm	2
Battery mounting board	Thickness: 2mm	1
Battery pad	3mm Silicone sheet black	1
Pylons	Engineering plastic embedded with copper nut	2
Cross countersunk head screw	Stainless steel M2.5*5mm	12
PAN/TILT platform board	Thickness: 2mm	1
Hanger rubber ring gasket	Inner hole diameter: 10mm black	8
Hanger	Engineering plastic embedded with copper nut	8
Carbon fiber - Bottom plate	The thickness of 2mm	1
Socket cap screw	Stainless steel M2.5*6mm	8
Nylon stud	Black M3*6+6	4
Nylon screw	Black M3*6	4
Carbon fiber - Top plate	Thickness: 1.5mm	1
Pan head screw	Metal black M3*30mm	16
Nylon strap	U- shape, of 16mm carbon fiber tube	16
Nylon nut	Black M3	4
Locknut	Metal black M3	16
Socket cap screw	Metal black M3*8mm	8
Landing gear- Vertical pole	Carbon fiber tube+engineering plastic+fastener	2
Landing gear- Cross bar	Composed of carbon fiber tube and multiple parts	2

Pixhawk 4 Package Detail

Items	Package
Pixhawk 4	1
Pixhawk4 GPS MODULE	1
I2C splitter Board	2
6 to 6 pin cable (power)	3
4 to 4 pin cable (CAN)	2
6 to 4 pin cable (Data)	1
10 to 10 pin cable (PWM)	2
8 to 8 pin cable(AUX)	1
7 to 7 pin cable(SPI)	1
6 to 6 pin cable(Debug)	1
PPM/SBUS out cable	1
XSR receiver cable	1
DSMX receiver cable	1
SBUS receiver cable	1
USB cable	1
'X'type folding pedestal mount	1
70mm & 140mm carbon rod standoff	2
6*3 2.54mm pitch Horizontal Pin	1
8*3 2.54mm pitch Horizontal Pin	2
Foam Set	1
Pixhawk4 Quick Start Guide	1
Pixhawk4 Pinouts	1
GPS Quick Start Guide	1
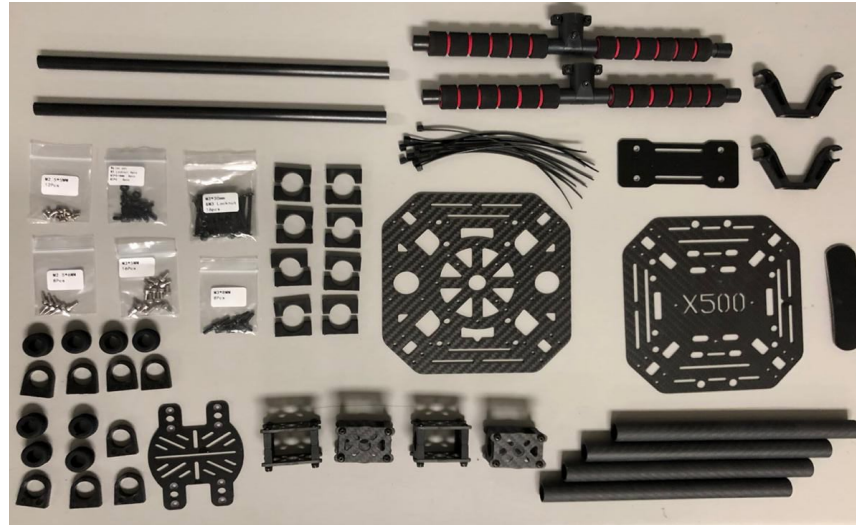
Electronics

Item Description	Quantity
Pixhawk 4 autopilot（PM06 not included）	1
Power Management PM02（Assembled)	1
Motors - 2216 KV880 （V2 Update	4
Pixhawk 4 GPS	1
Fully assembled Power Management Board with ESCs	1
433MHz Telemetry Radio / 915MHz Telemetry Radio	1
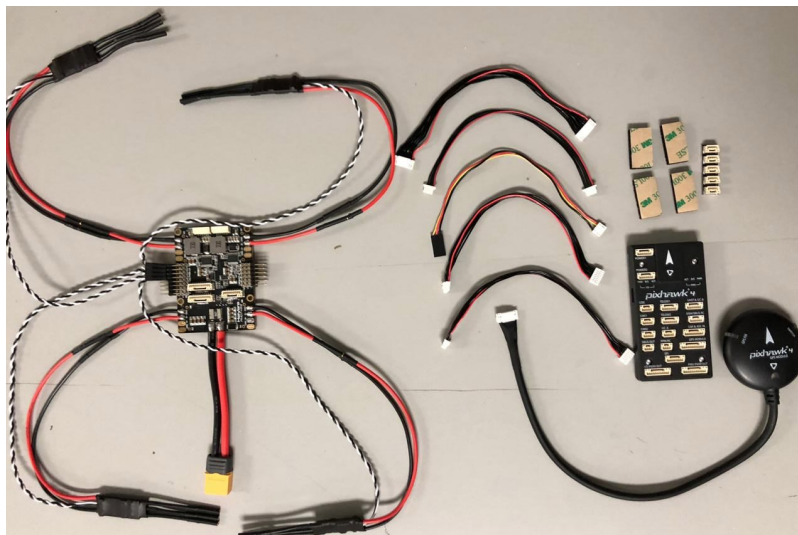
Tools Needed

- 1.5 mm Hex screwdriver
- 2.0 mm Hex screwdriver
- 2.5 mm Hex screwdriver
- 3mm Phillips screwdriver
- Wire cutters
- Precision tweezers

Estimate time to assemble is 120 minutes, about 75 minutes for frame assembly and 45 minutes installing and configuring the autopilot in QGroundControl.

Assembly Process

Step 1: We are going to start by assembling the landing gear to the vertical pole.
Unscrew the landing gear screws and insert the vertical pole, see figures 1 and 2.

Figure 1 & 2

Step 2: We proceed to arm the motor holder by using 4 U-shaped nylon straps to attach the holder to the carbon fiber arm as shown in figure 3.

Figure 3

Step 3: Attach the power management PM02 to the bottom plate as shown in Figures 4 and 5.
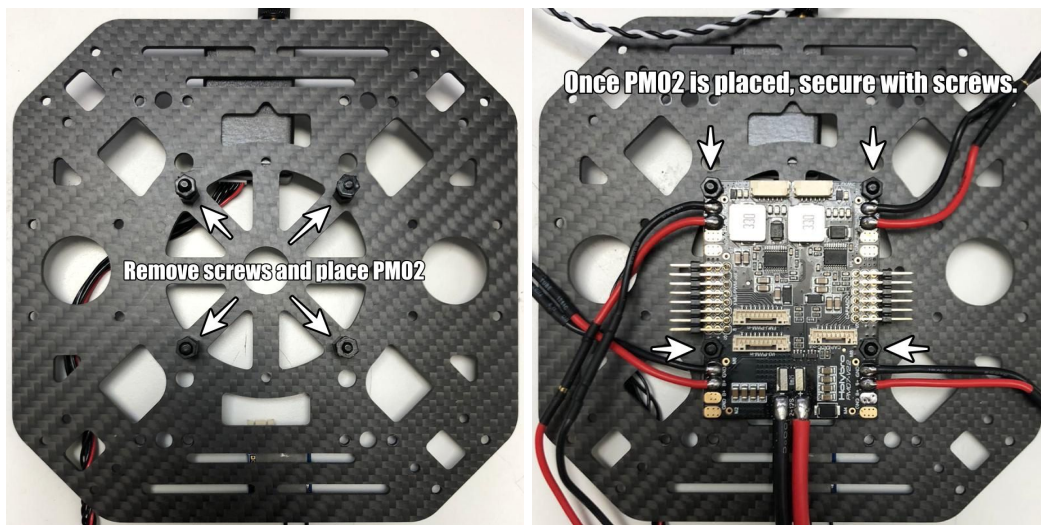
Figure 4 & 5

Step 4: Assemble the lower plate to the landing gears.
Screw the landing gear with a vertical pole to the bottom plate. The lower plate has 4 holes (see Figure 4 arrows) use the M3X8 screws, a total of 8 pieces, 4 on each side.

Figure 6

Step 5: Assembling the Battery Mount to the frame.
For this we will need the M2 5X6 screws and the battery mount see Figure 7. Insert the long rods to the small rings see Figure 8 and 9. Also, with the battery holder completely armed, screw it where arrow shown in the image as shown in Figure 10; keep in mind GPS module will be facing front.

Figure 7
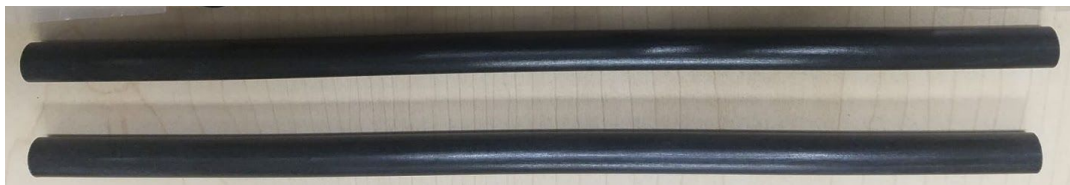
Figure 8
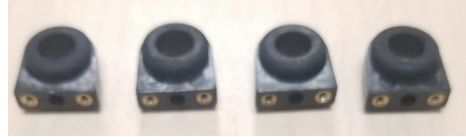
Figure 9
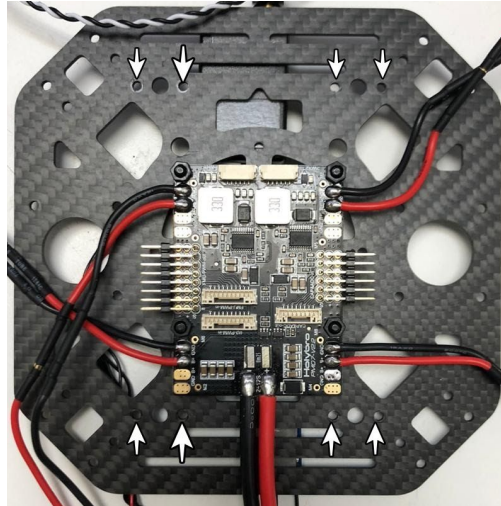
Figure 10

Step 6: Assemble the 8*3 2.54mm pitch Horizontal Pin to the 10 to 10 pin cable (PWM) to the Power Management Board.

Connect the 10 to 10 pin cable (PWM) to the 8*3 2.54mm pitch Horizontal Pin, see Figure 11. Cut a piece of 3M Tape and attach to the bottom of the Horizontal Pin, see Figure 12 stick the Horizontal Pin to the Power Management Board, see Figure 13.
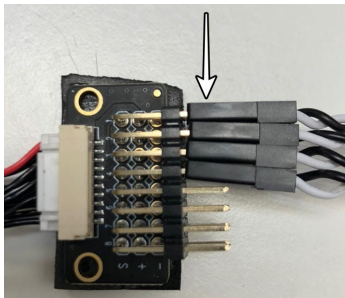

10 to 10 pin cable (PWM)

8*3 2.54mm pitch Horizontal Pin

Figure 11 & 12

Figure 13

Step 7: Install vehicle Arms to the main body.

Take the ESC and push it in the Arm tube as shown in FIgure 14 and make sure that the ESC cables are not too long since we will push them back in as shown in Figure 15.
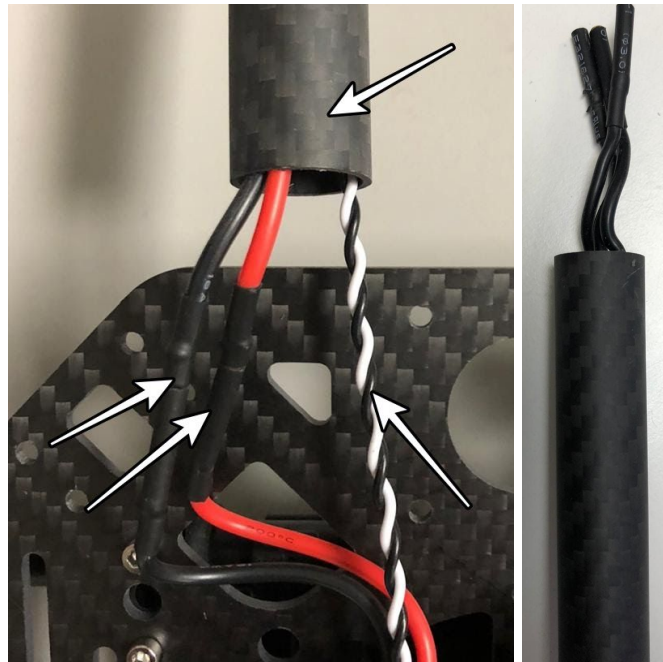
Figure 14 & 15

Step 8: Assemble arm to main body.
With 4 more U-shaped nylon straps attach the arm with the motor installed to the body of the vehicle as shown in Figure 16, this way you also attach the bottom plate to the top plate. Also keep in mind to have the arm tube a bit pushed in to that it can be kept securely in place as shown in the Red Square from Figure 16.
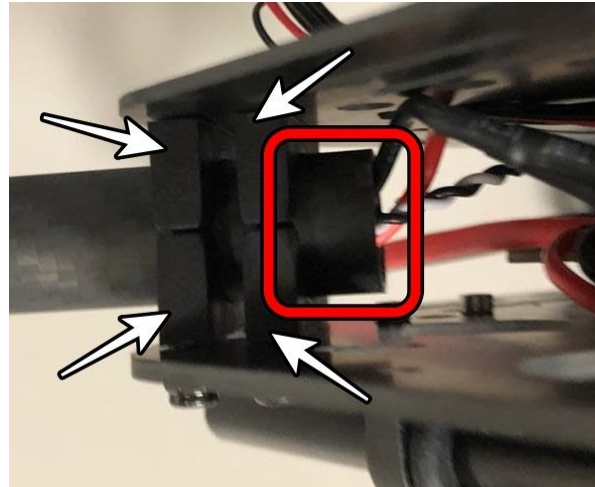
Figure 16

Step 9: Connect Motors cables.
After the 4 arms are mounted on to the main body, connect the cables (**red**, **blue**, **black**) and push them into the arm tube, see Figures 17. The 3 cables that are color-coded go connected to the ESC.
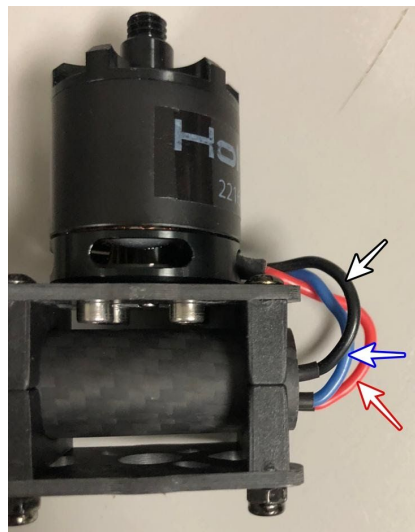
Figure 17.

Step 10: Mounting the GPS on the frame.

For this, we will need the Pixhawk 4 GPS and the mounting plate. Mount GPS mast to the plate, use the 4 screws see the red circle in Figure 18, keep in mind that the plate is mounted to the battery holder tubes as indicated by the arrows in Figure 18. Use the tape and stick the GPS to the top of the GPS mast, see Figure 19.
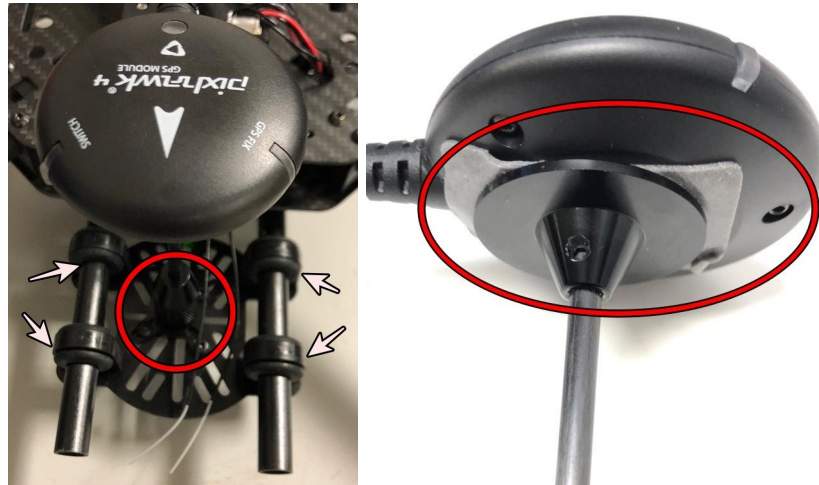

Figure 18 & 19

Step 11: Pixhawk 4 wiring

The Pixhawk 4, which has several different wires and connections with it. Included below is a picture of every wire needed with the Pixhawk and how it looks when connected.

Plugin Telemetry and GPS module to the flight controller as seen in Figure 20; plug in the RC receiver, all 4 ESCs to the flight controller as well as the power module as shown in Figure 21.
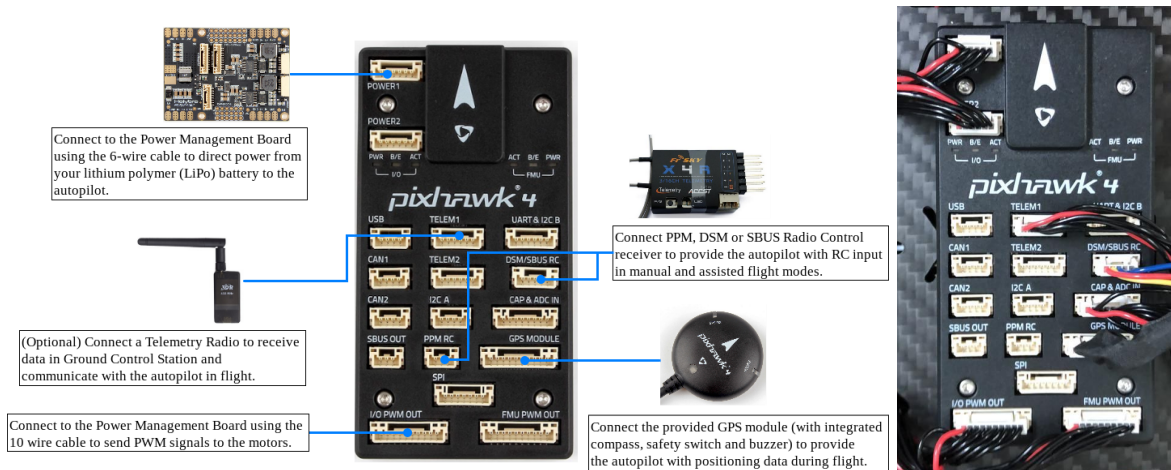

Figure 20 & 21
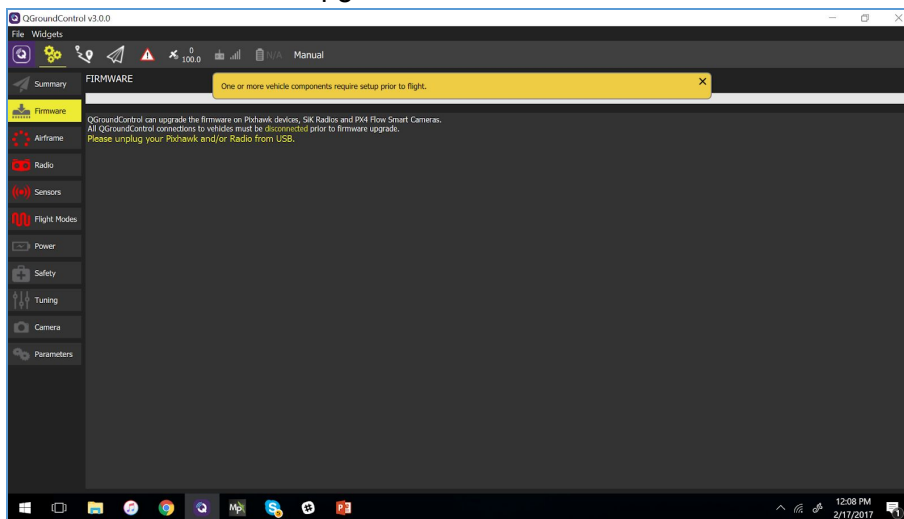
That's it! The final build is shown below:

Calibration
Requirements: QGroundControl Installed. (Link: http://qgroundcontrol.com/)
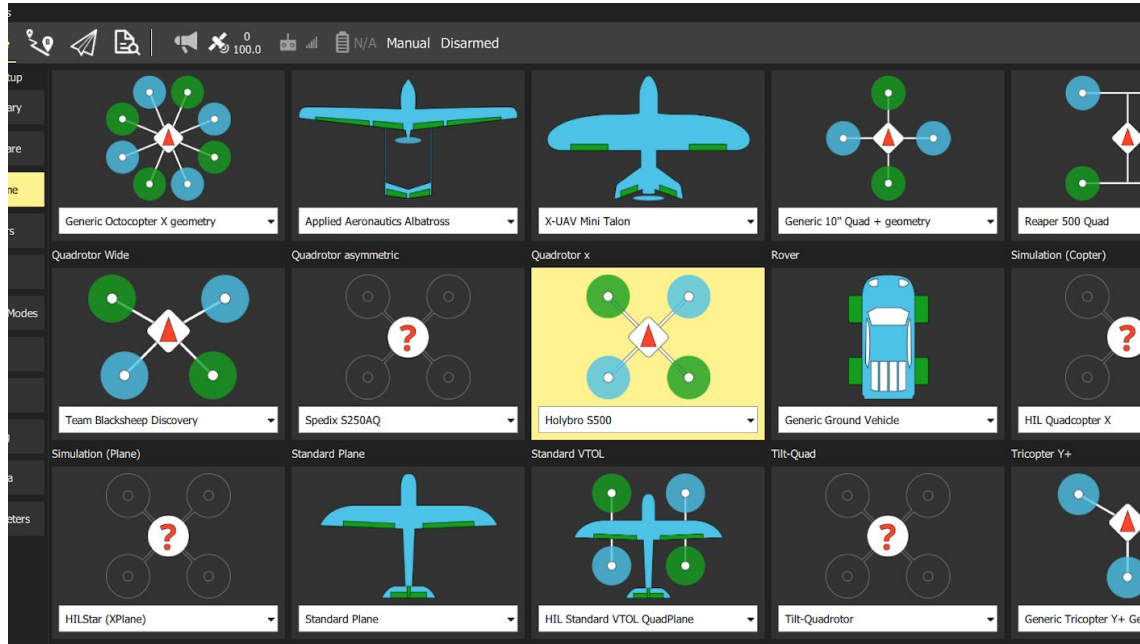
Step 1
-Connect your vehicle to the USB port.
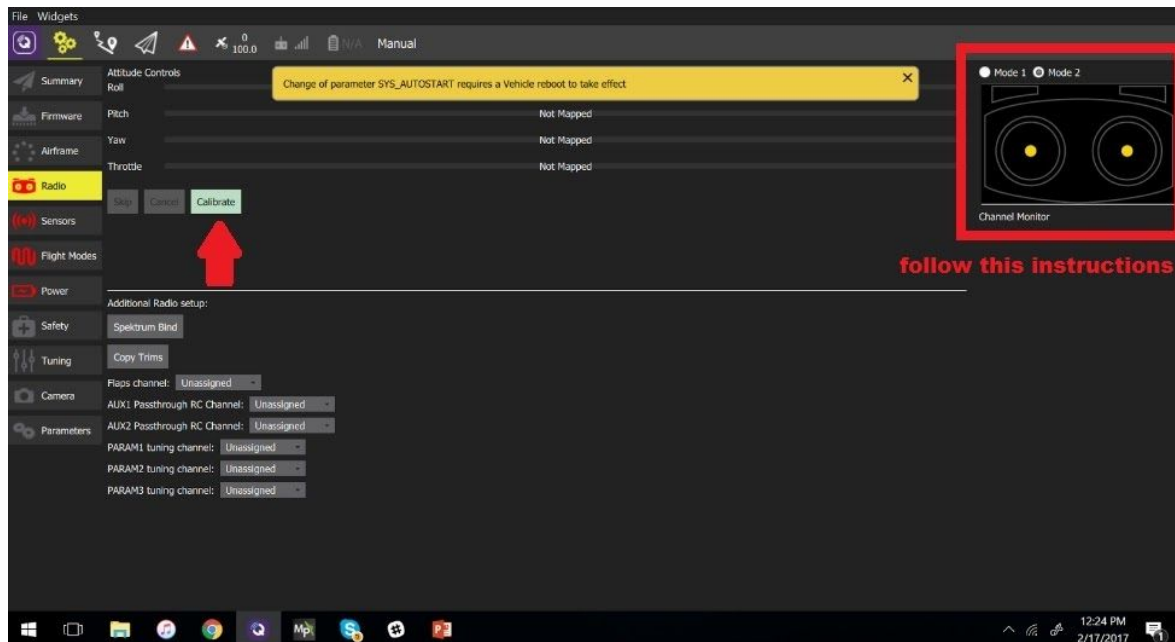-Select firmware for an upgrade.

Step 2
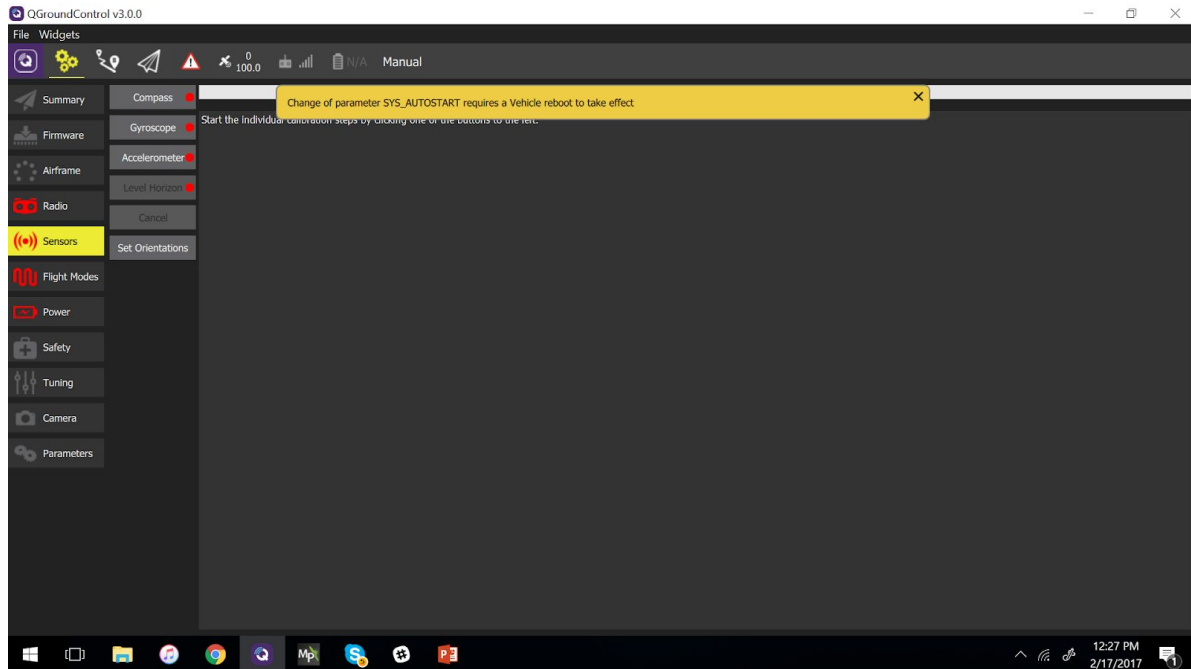Select the airframe Holybro S500 in QGC > Airframe > Quadrotor X.

Step 3
-Radio calibration

For calibration of the radio turn on your radio, click in calibrating and follow the instructions.
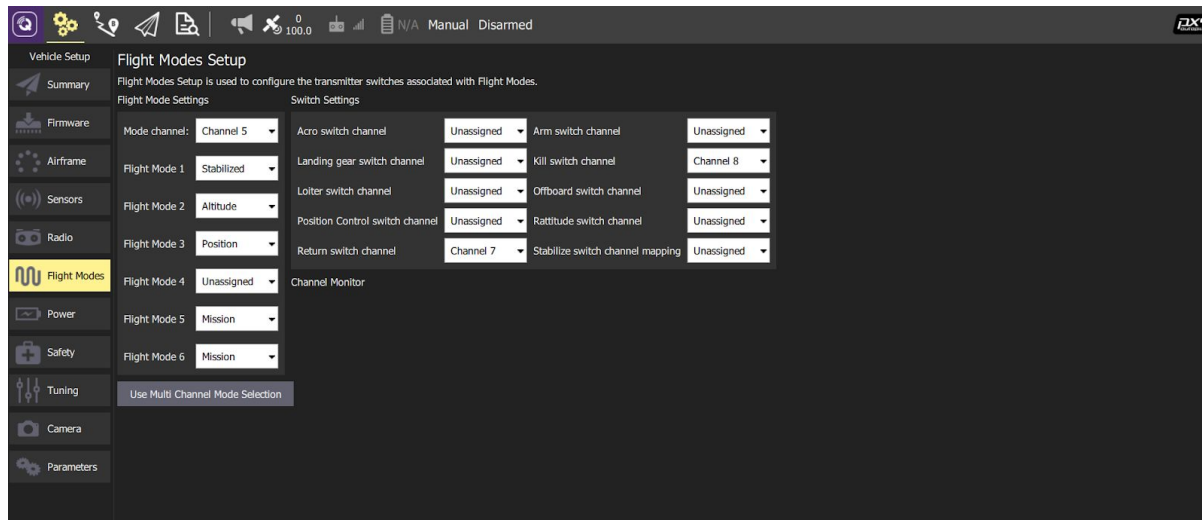
Step 4
Calibrate sensors

For calibrate, sensors follow the instructions given.
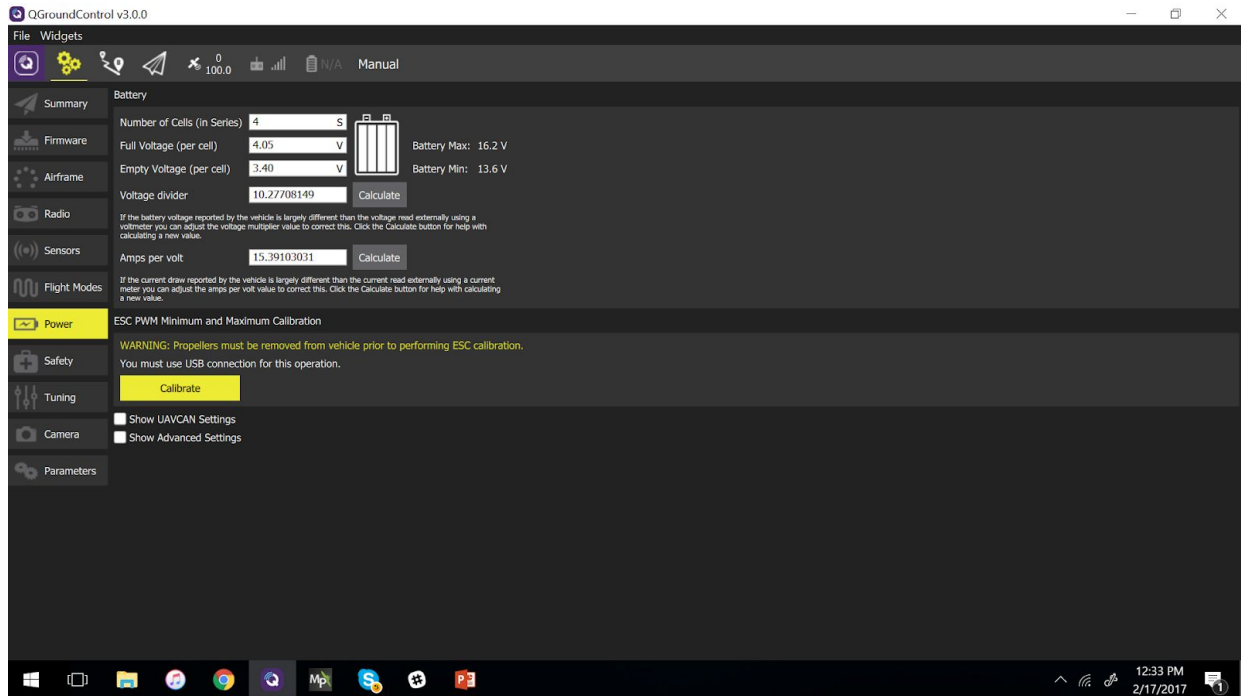
Step 5
Select flight modes

For select flight modes use the single channel. For beginners is recommendable to start with these three modes. Mode 1= Stabilized. Mode 2= Altitude. Mode 3=Position
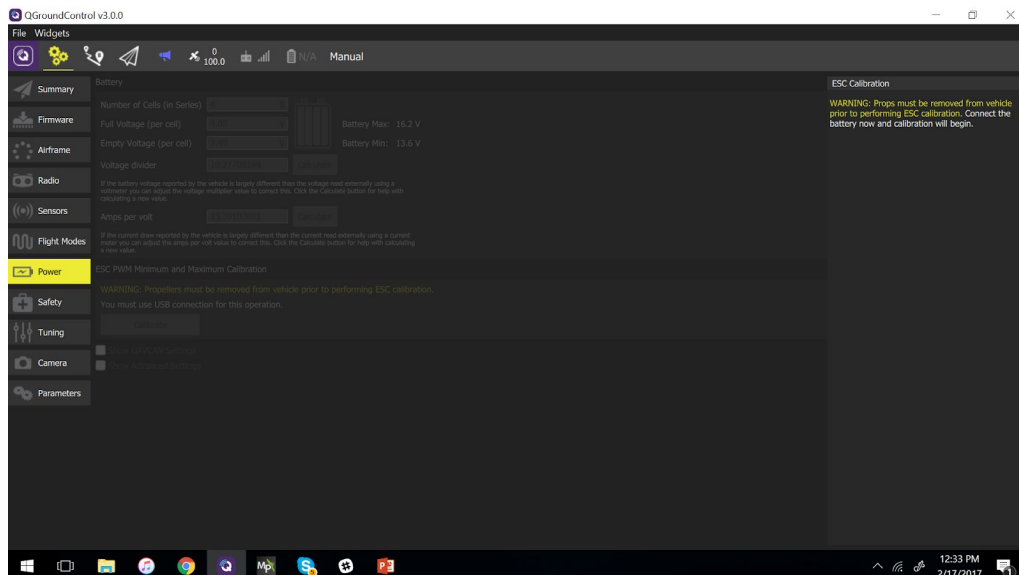
For more information about the flight, modes visit this link.
https://donlakeflyer.gitbooks.io/qgroundcontrol-user-guide/content/SetupView/FlightModes.html

Step 6
Calibrate ESC

Step 7
Press calibrate.

Connect your battery and when the end of the tone, press ok and unplug the battery.
Warning: propellers must be removed from the vehicle prior to performing ESC calibration!