

MINDPX

Autopilot System

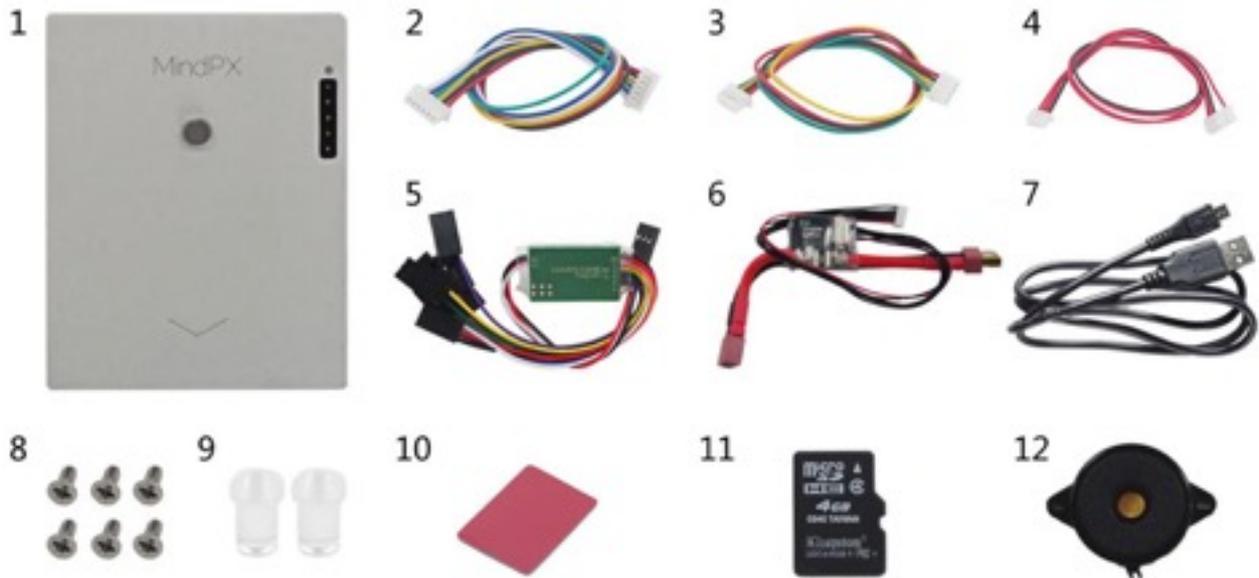


User Guide

V1.2

AirMind

Component List



1. MindPX

2. 6-pin cable

3. 4-pin cable

4. 4 to 6 pin convertor cable

5. PPM encoder

6. Voltage/Current detector

7. USB cable

8. M2 countersink screw × 6

9. Light pipe × 2 (removed after v2.6)

10. 3M tape

11. TF card

12. Buzz

Quick self check

Before mounting please perform following quick check for any potential damages to MindPX during logistic:

1. Check if any pin headers on the rear are bended or contacted
2. Check if the enclosed case is broken or damaged
3. Check if accessories are intact

If any situation above, please contact your local sales representatives for replacement.

<ol style="list-style-type: none">1. Mounting2. Wiring3. Calibrating	<p>Quick Start MindPX can control 2-rotors, 3 rotors, 4 rotors, 6 rotors and 8 rotors. Follow the instructions to quickly start your air journey!</p>
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Table of Content

1. Mounting	5
2. Wiring	7
3. Radio Receiver	11
1) PPM	11
2) SBUS (supported in V2.6 and after)	11
3) DSM (supported in V2.6 and after)	12
4) FrSky (supported in V2.6 and after)	12
4. Calibrating	13
1) Install QGroundControl	13
2) The calibration process	18
3) Caliberating remote controller	20
4) Configure Channels	23
5) Sensor Calibration	24
FAQ	29

1. Mounting



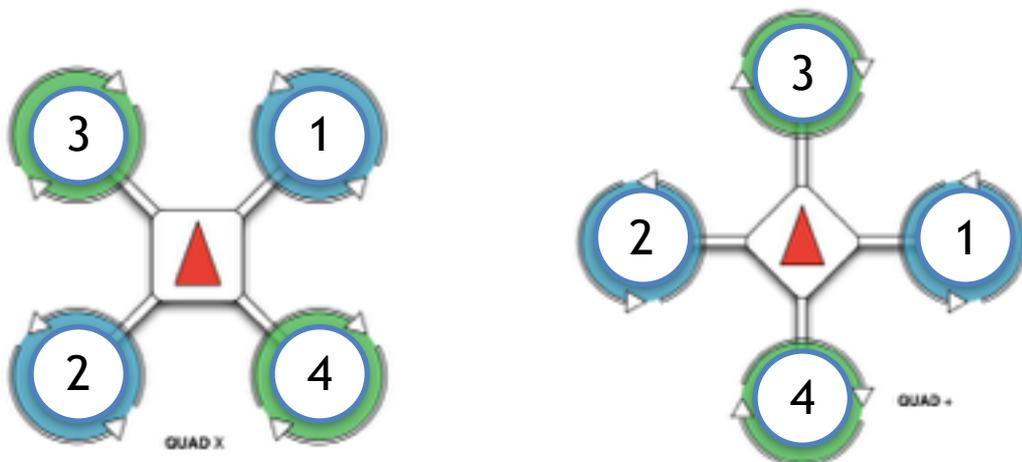
Adhere 3M tape here

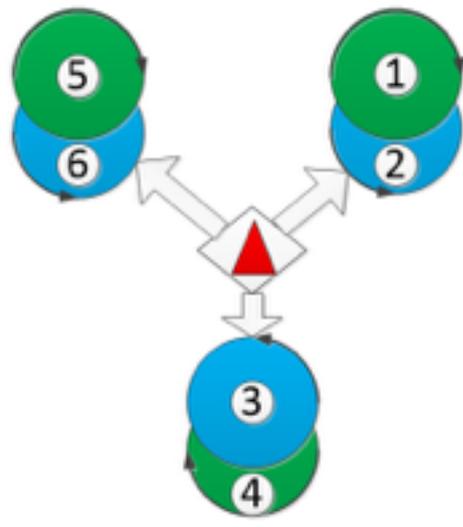
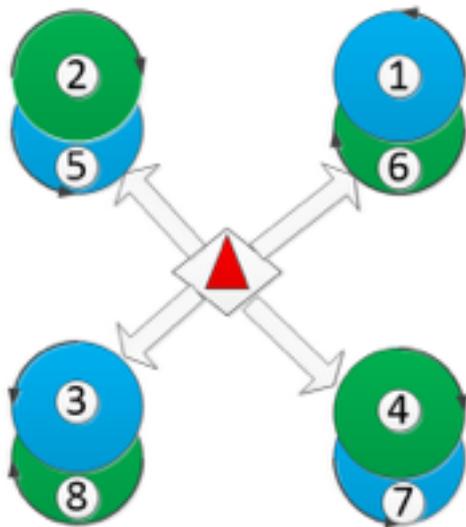
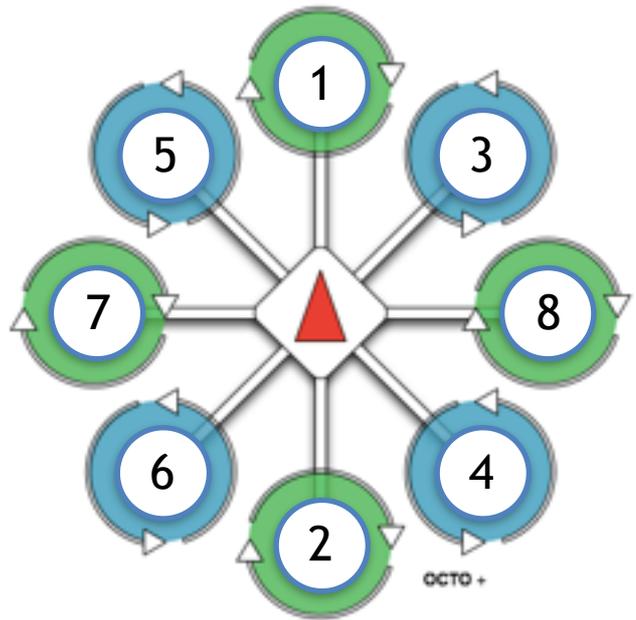
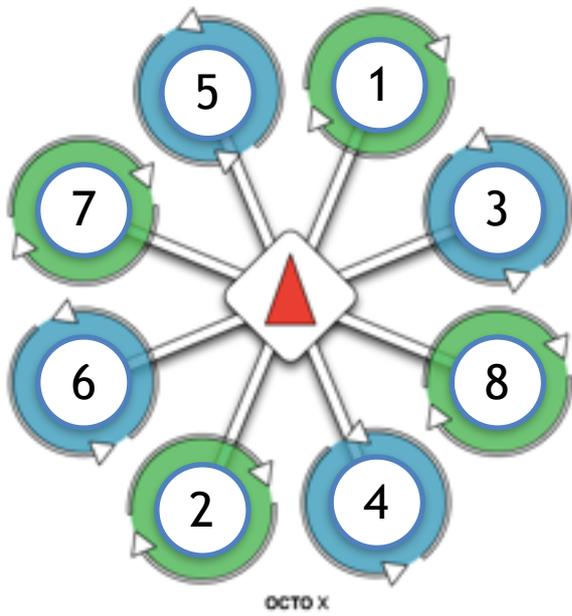
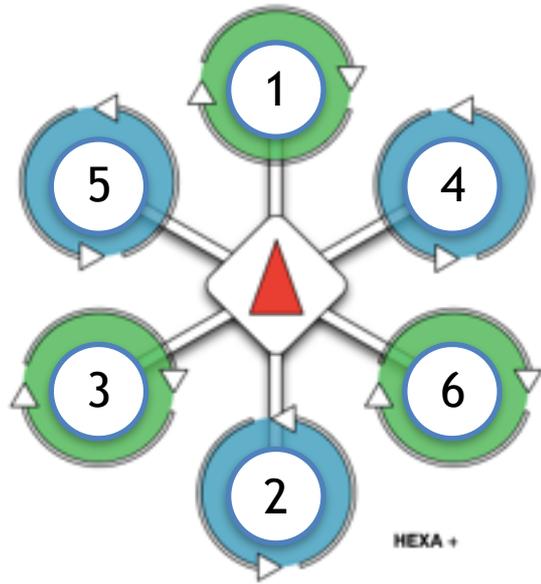
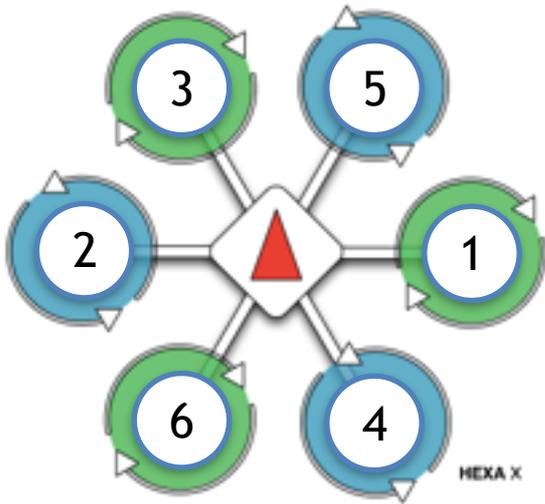


Heading

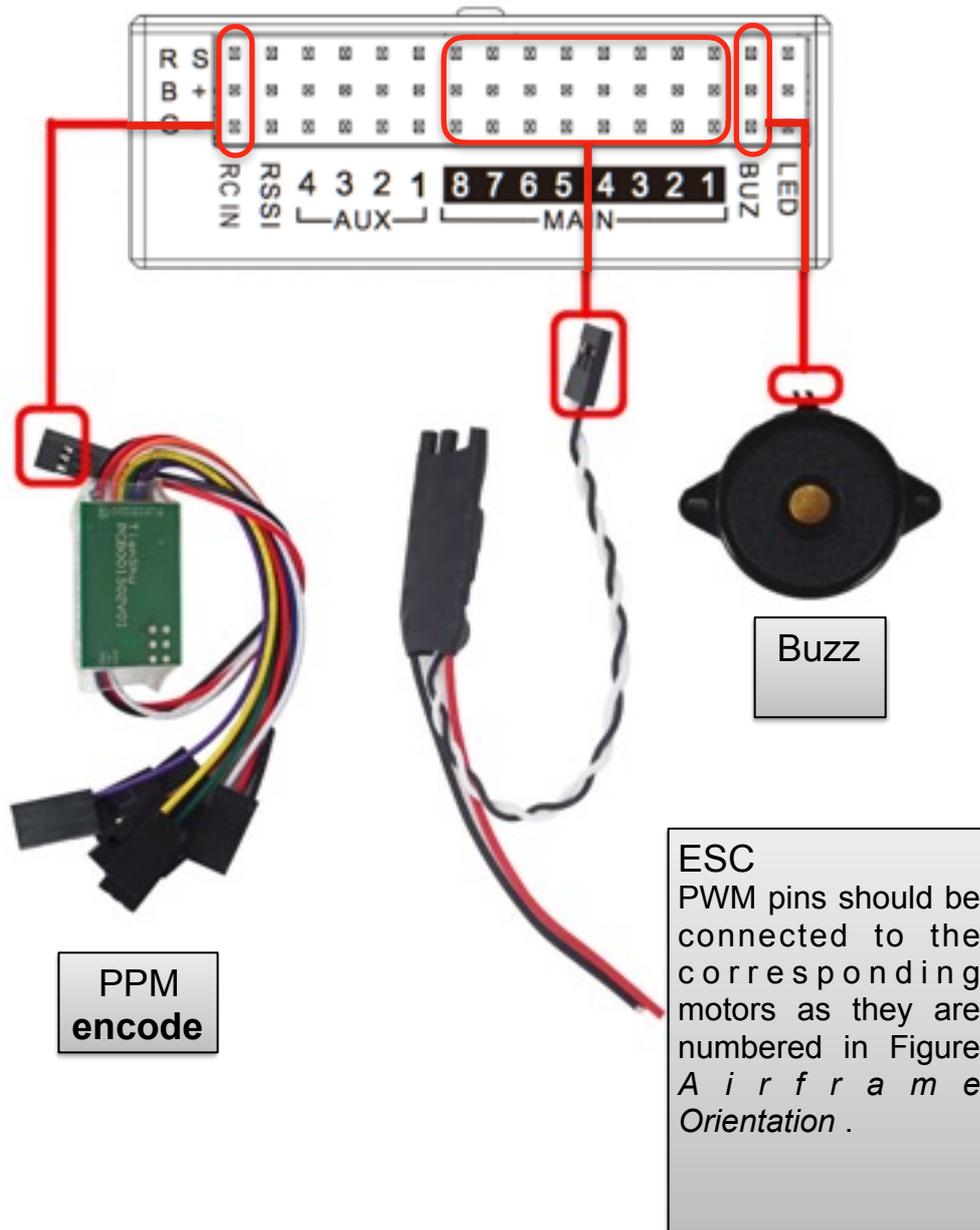
- Adhere on the bottom of MindPX as illustrated
- Attach MindPX to the frame. Please keep the front of MindPX consistent with frame's front.
- Attach MindPX to the frame. Please keep the front of MindPX consistent with frame's front.

■ Airframe Orientation





2. Wiring



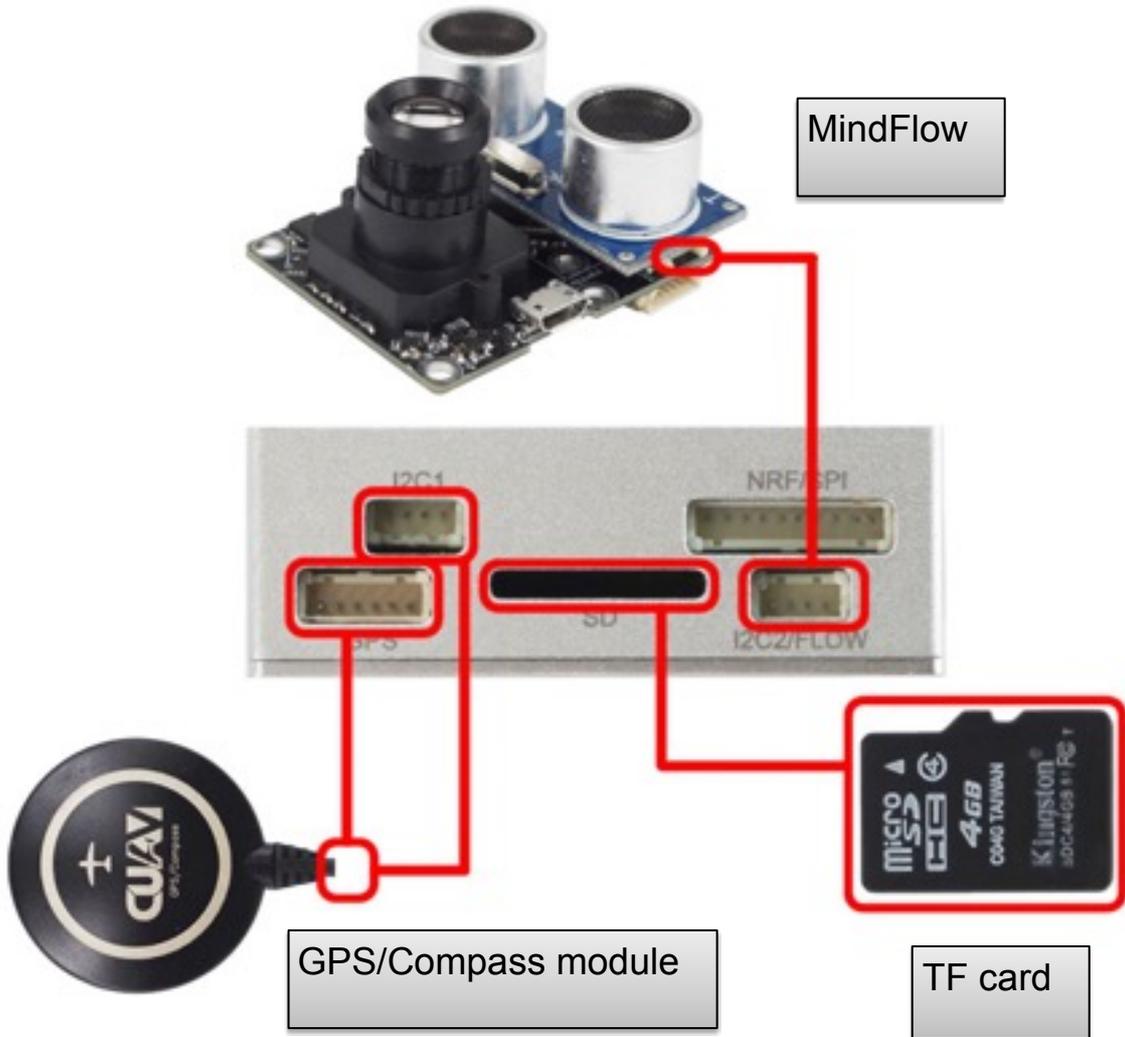
Note: the rear connector panel may look different from the pictures above in different versions of MindPX hardware. Before V2.6, only 6 PWM outputs are supported. If your version is earlier than V2.6, please use only 1~6 PWM outputs.



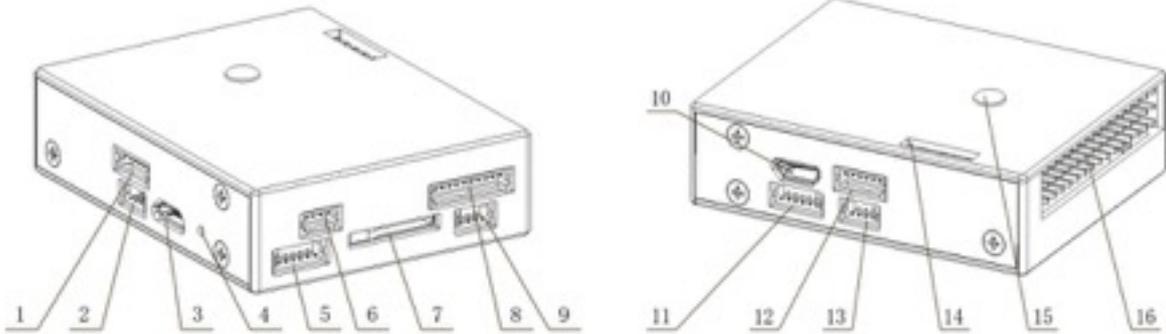
Power module



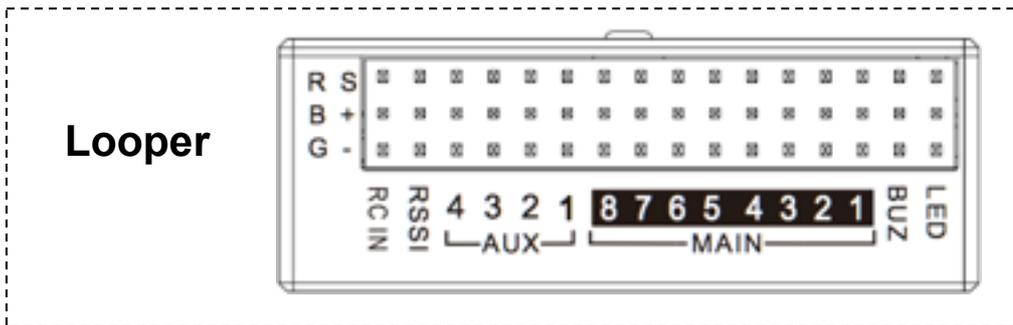
Data transmission



PIN



- | | |
|-------------------------------|----------------------------|
| 1. Power | 9. I2C2 (MindFlow) |
| 2. Debug (refresh bootloader) | 10. USB2 (Serial 2 to USB) |
| 3. USB1 (refresh firmware) | 11. UART4,5 |
| 4. Reset | 12. UART1 (Telemetry) |
| 5. UART3 (GPS) | 13. CAN |
| 6. I2C1(external compass) | 14. ADC |
| 7. TF card slot | 15. Tricolor Light |
| 8. NRF/SPI(Remote Control) | 16. Looper |

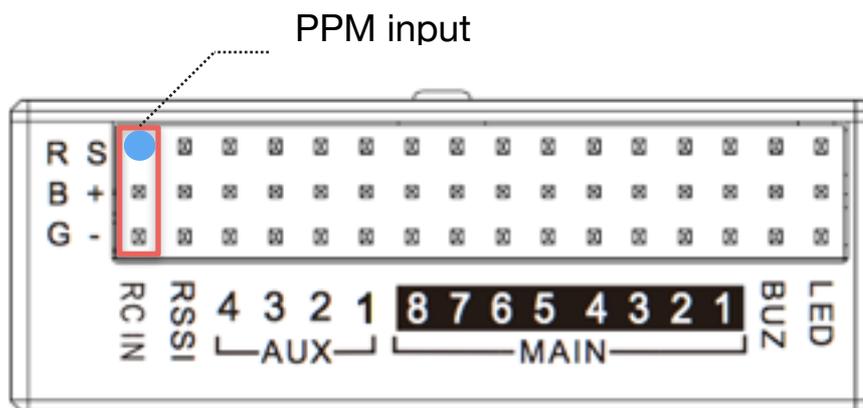


3. Radio Receiver

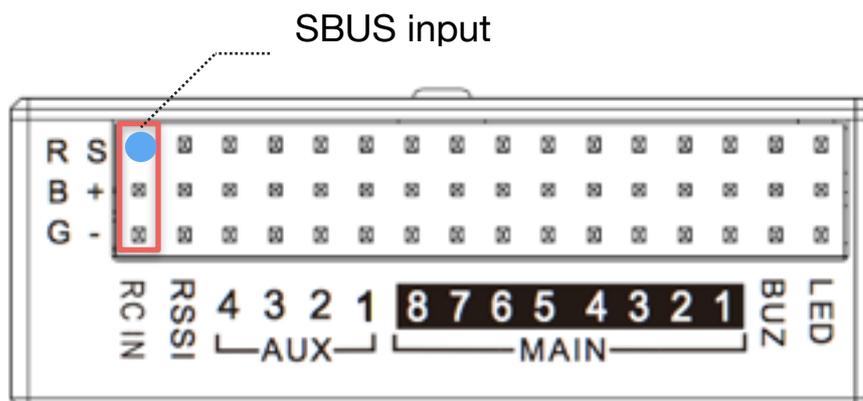
MindPX supports a wide variety of radio receivers (since V2.6) including: PPM/SBUS/DSM/DSM2/DSMX.

MindPX also support FrSky bi-direction telemetry D and S.Port.

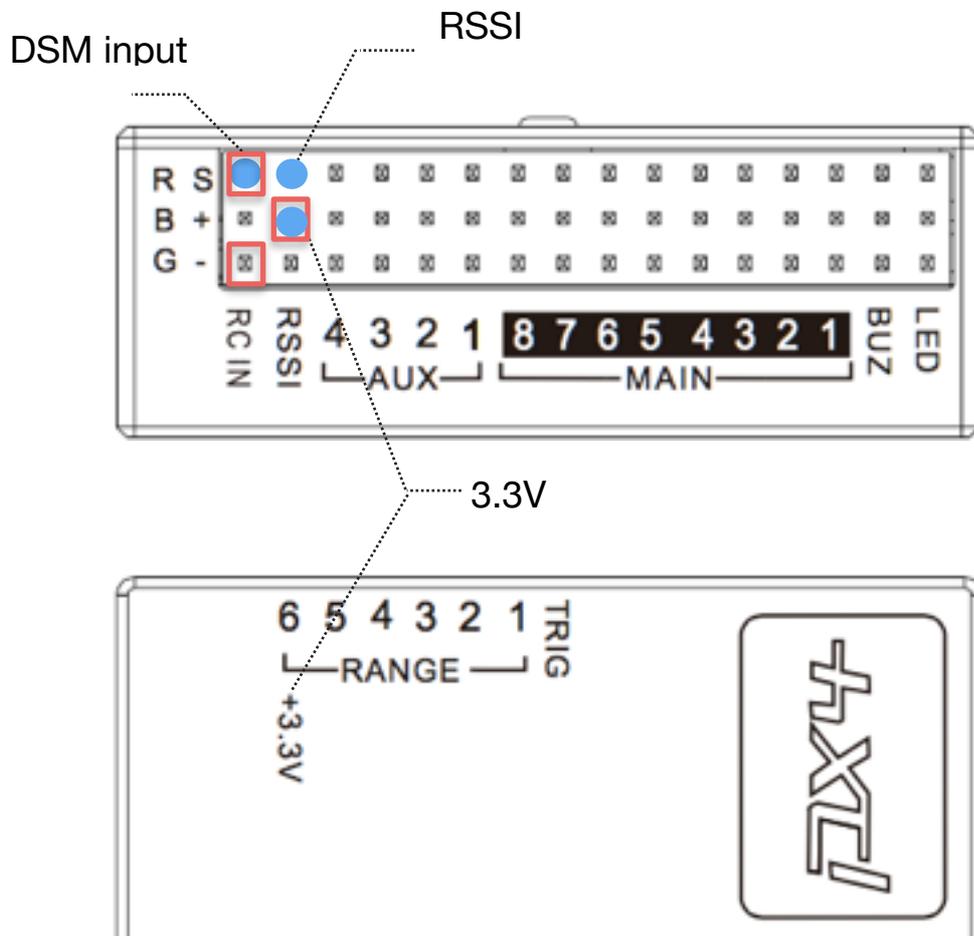
1) PPM



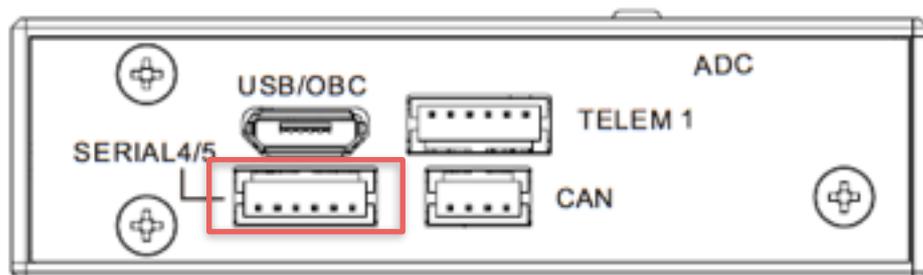
2) SBUS (supported in V2.6 and after)



3) DSM (supported in V2.6 and after)



4) FrSky (supported in V2.6 and after)



- For D series with D.port
Connect Serial 4 TX to D.port RX. Connect also GND.
- For X series with S.port (smart port)
Sold Serial 4 TX/RX together, and connect to S.port pin. Connect also GND.

4. Calibrating

Before you take off you need to calibrate the copter first. QGroundControl needs to be installed first which can be downloaded from:

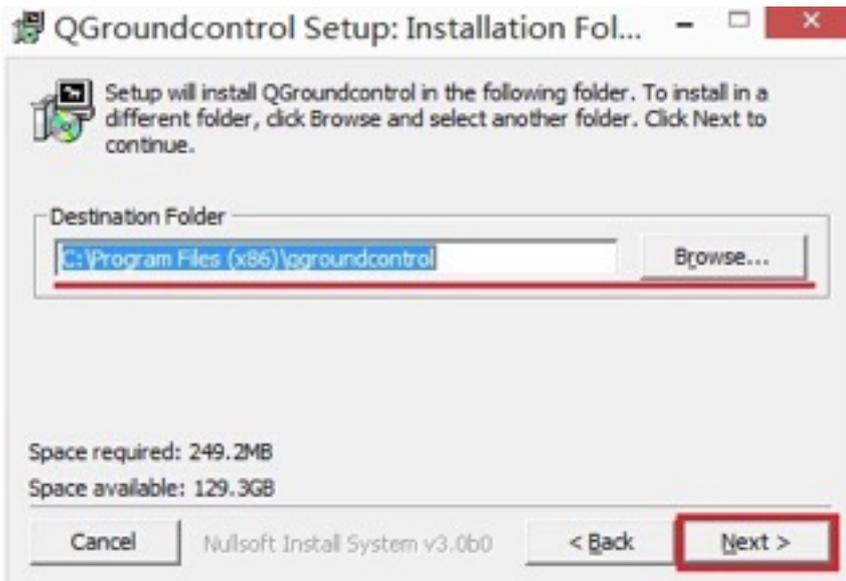
<http://www.qgroundcontrol.org/downloads>

1) Install QGroundControl

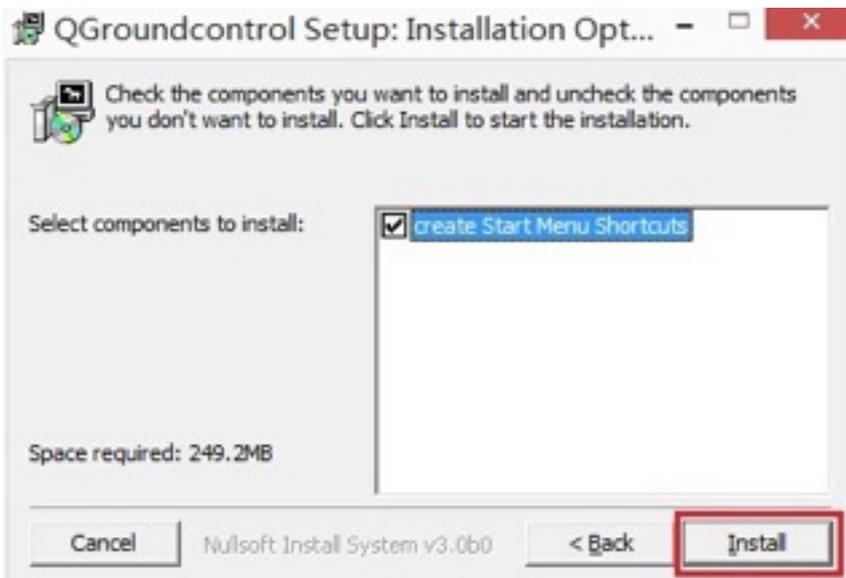
1. Agree License



2. Select installation path



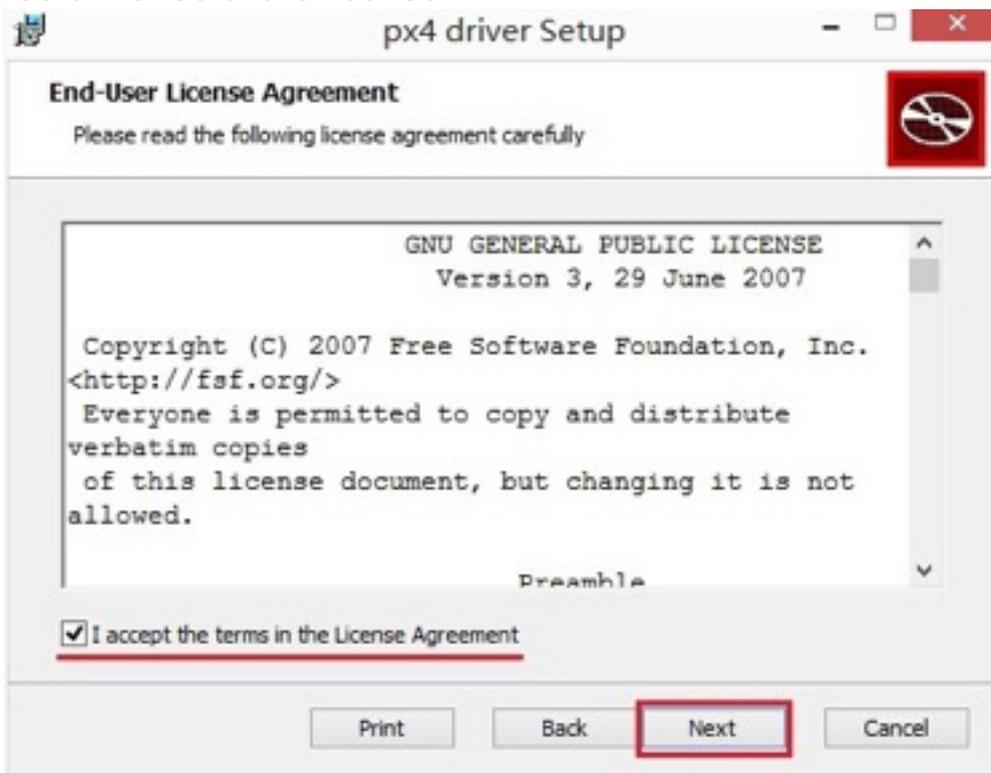
3. Start installation



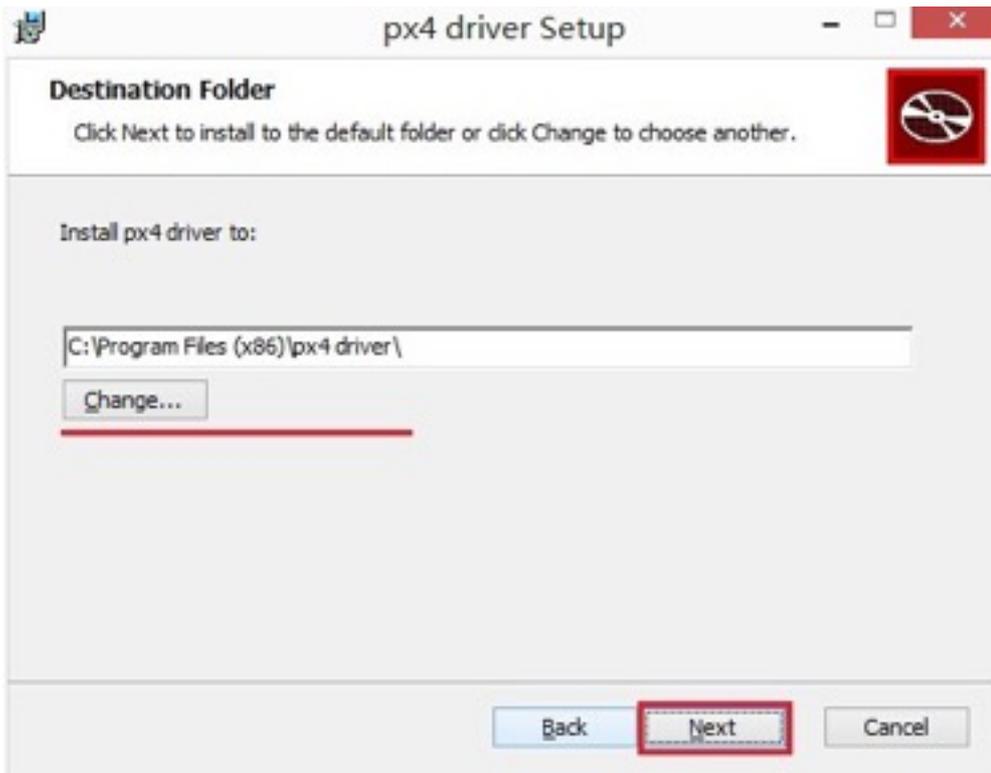
4. Install PX4 driver



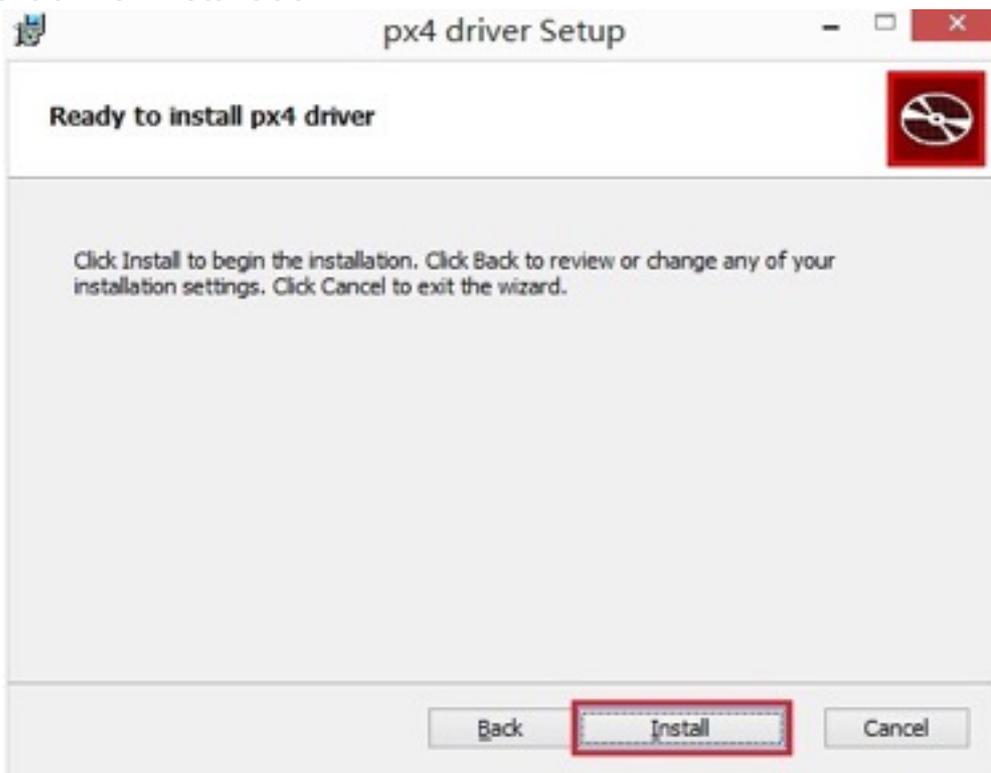
5. Agree driver software license



6. Select driver installation path



7. Start driver installation

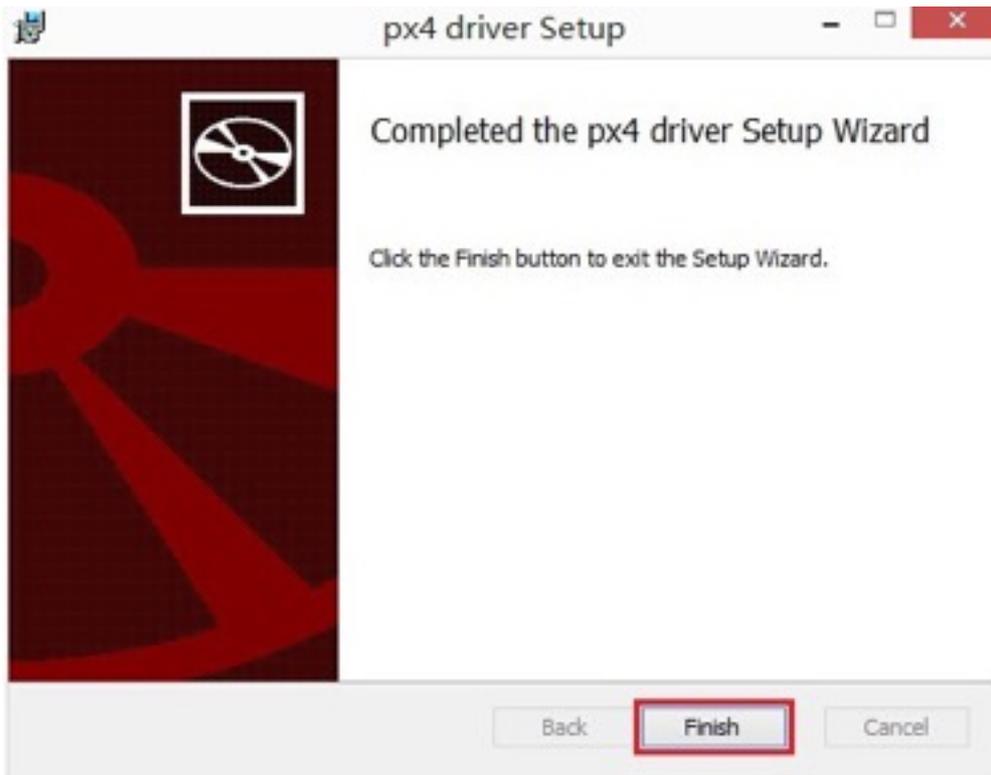


8. Continue driver installation

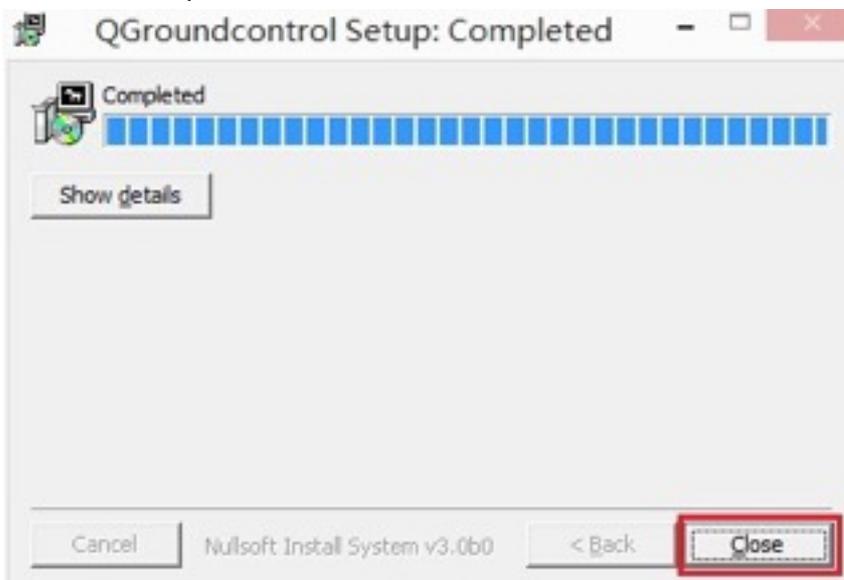


9. Finish PX4 driver installation





10. finish QGroundcontrol installation

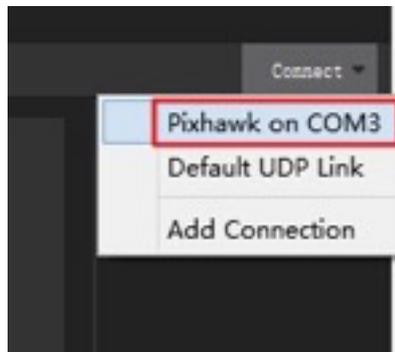


2) The calibration process

Connect MindPX USB1 port to your PC with USB cable, and start QGroundcontrol.

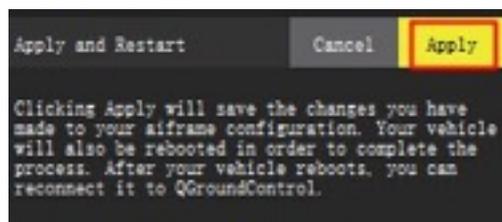
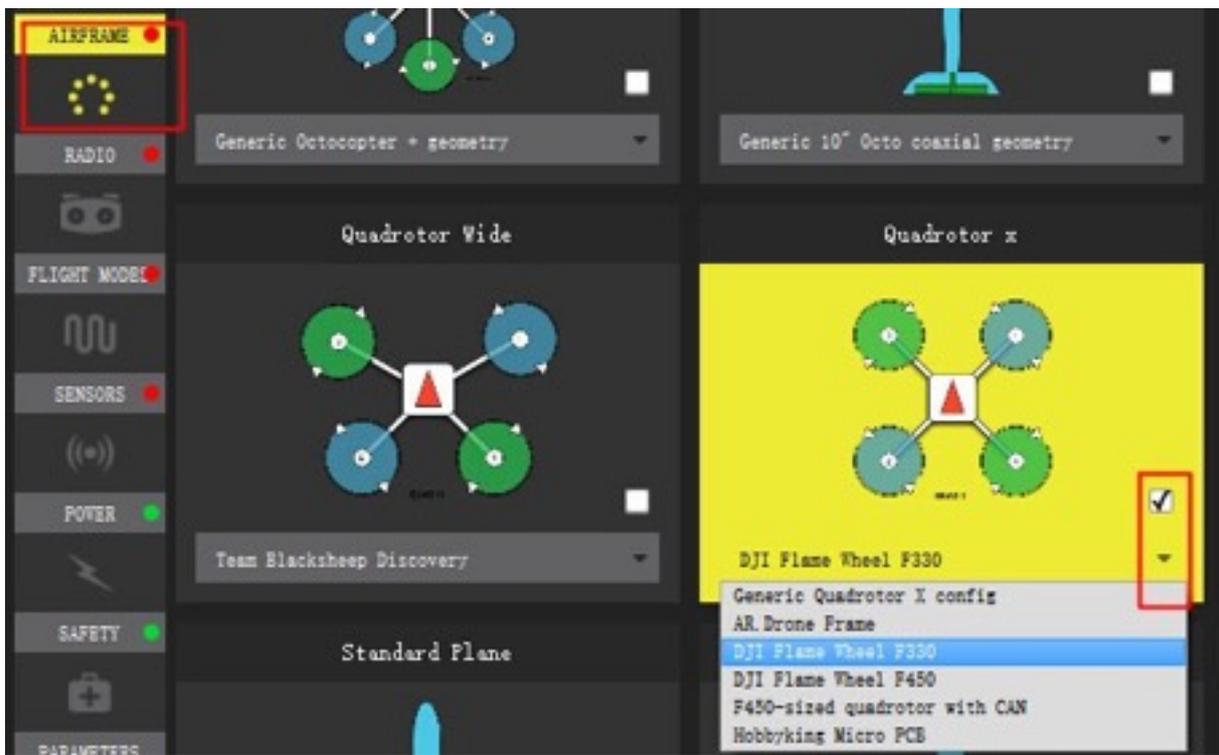
1. Drop down "connect" menu on top right corner, and select pixhawk on

COMx(depending on your computer configuration)



2. Select frame type

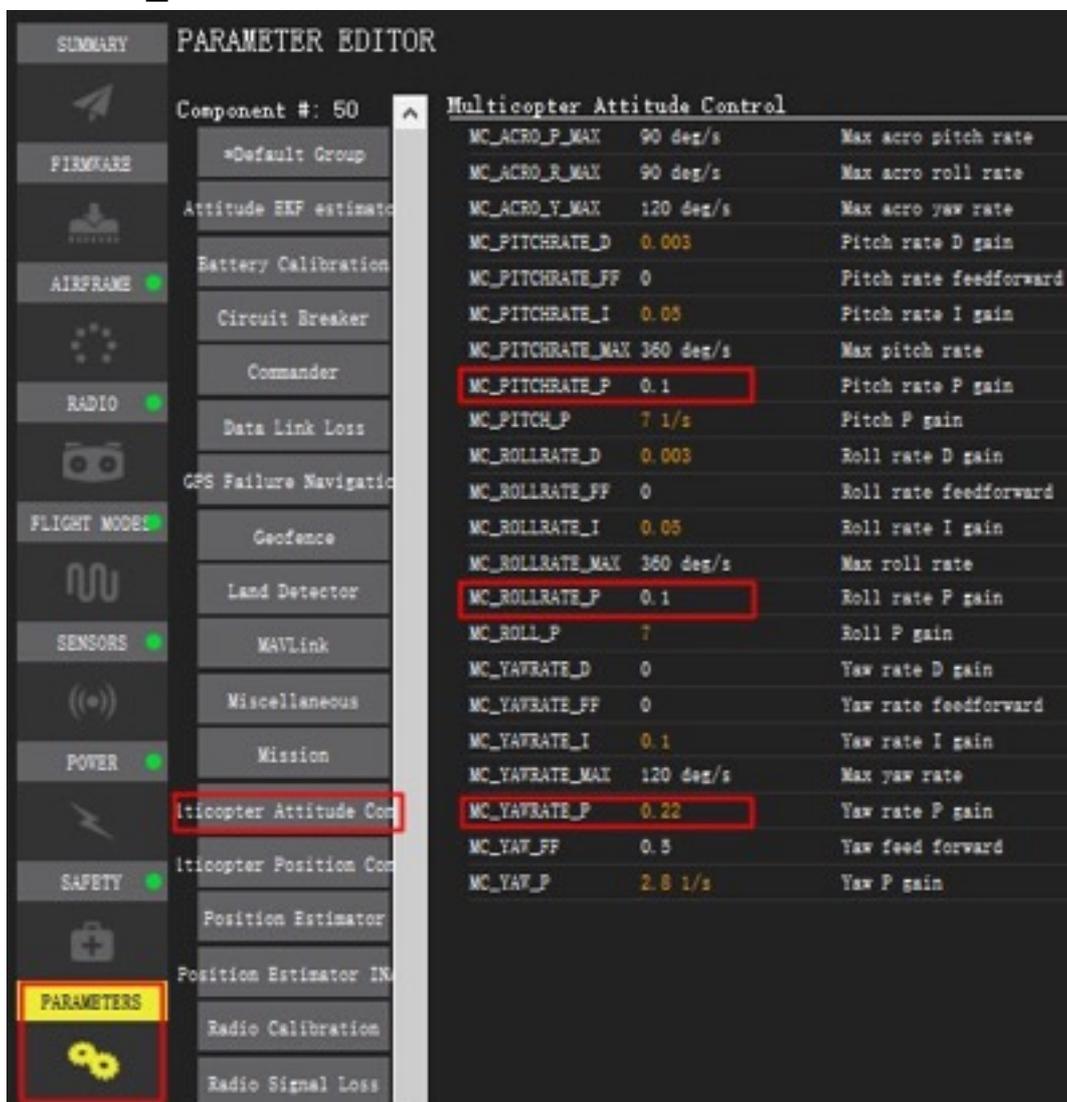
- After frame selected, the “airframe” label on the left will turn from red to green, indicating setting is successful. The corresponding label will turn to green after each calibration succeeds.



■ Calibration for 250 frames

Because QGroundControl doesn't originally support 250 frames, at the first step of calibration, you should choose DJI Flame Wheel 330 as a replacement. Before taking off, it is necessary to adjust parameter of airframe 330.

Choose PARAMETER Tab, adjust PID parameters in Multicopter Attitude Control, set MC_PITCHRATE_P, MC_ROLLRATE_P to 0.1 , MC_YAWRATE_P to 0.22.

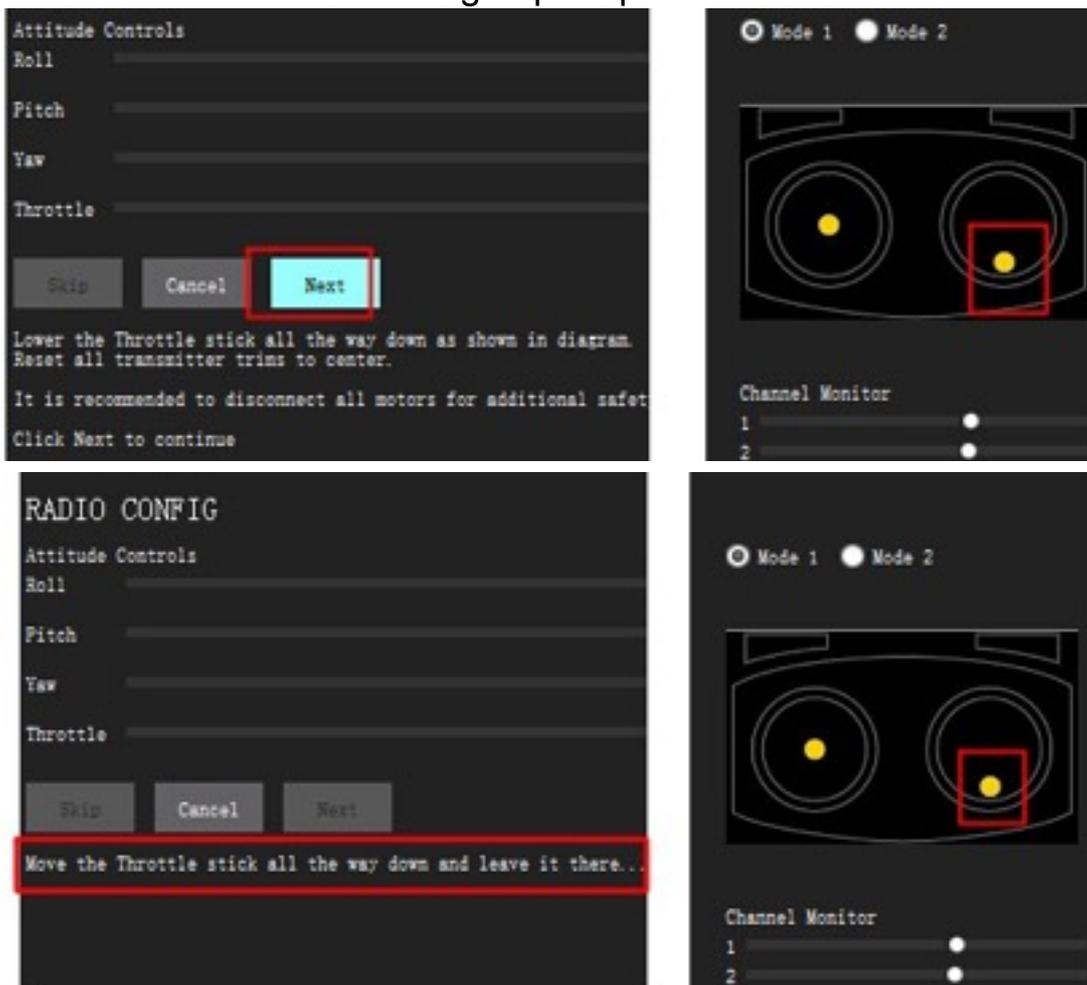


3) Caliberating remote controller

- Mode 1 is set to left throttle, Mode 2 is set to right throttle.



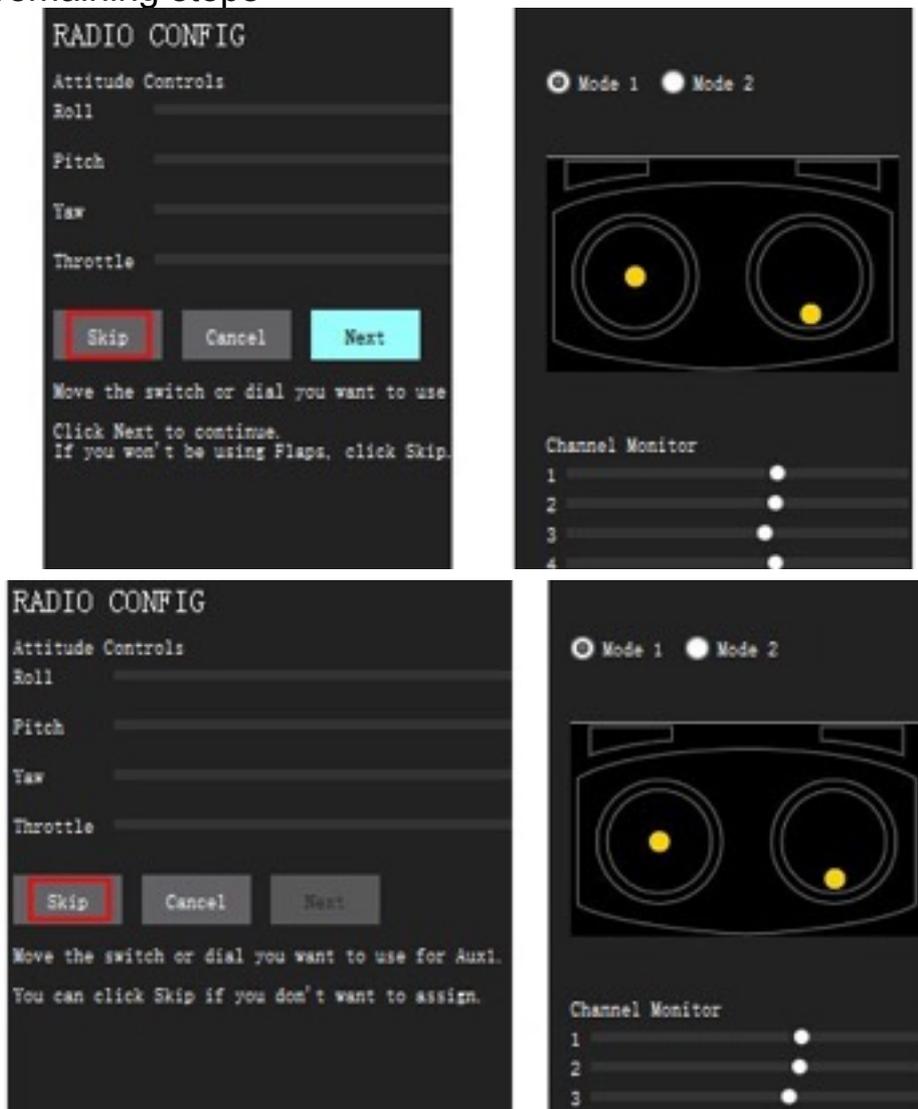
- Move throttle stick according to prompts in software

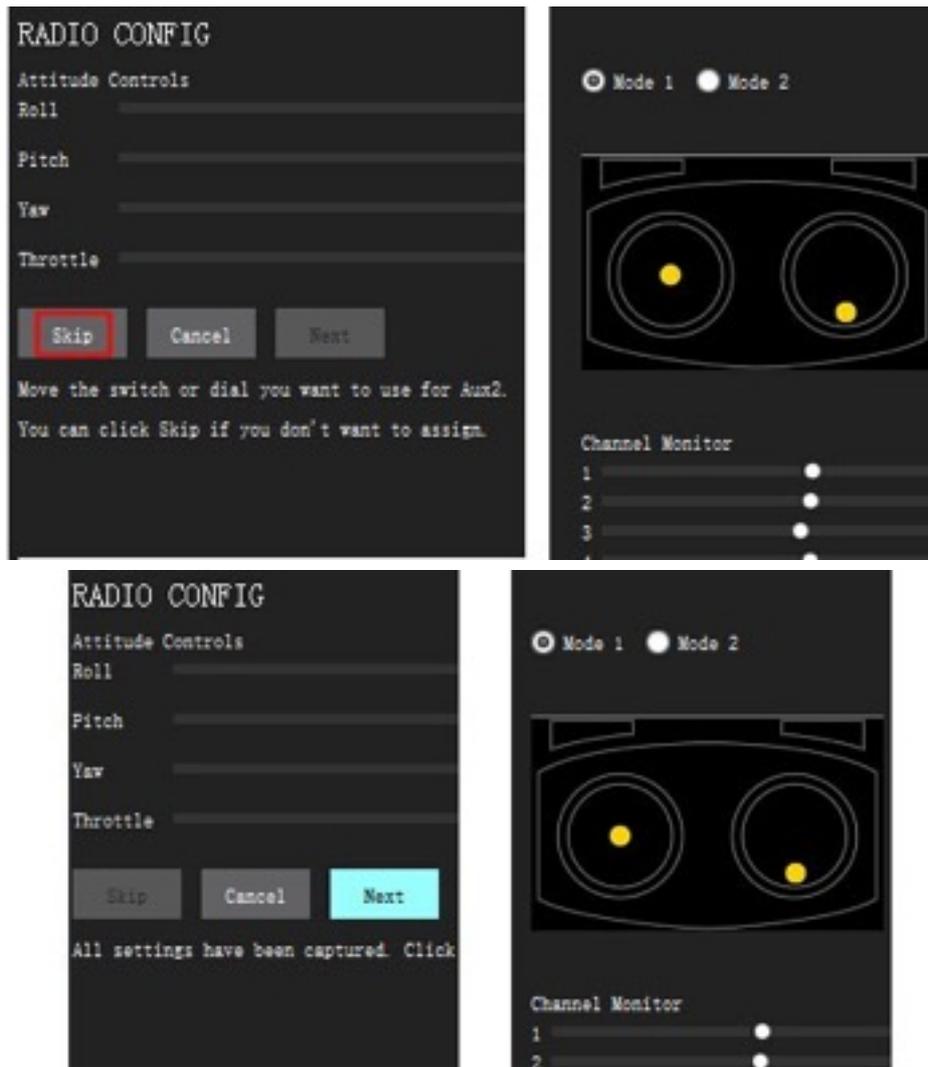


- Move all the transmitter switches/dials to their extreme position



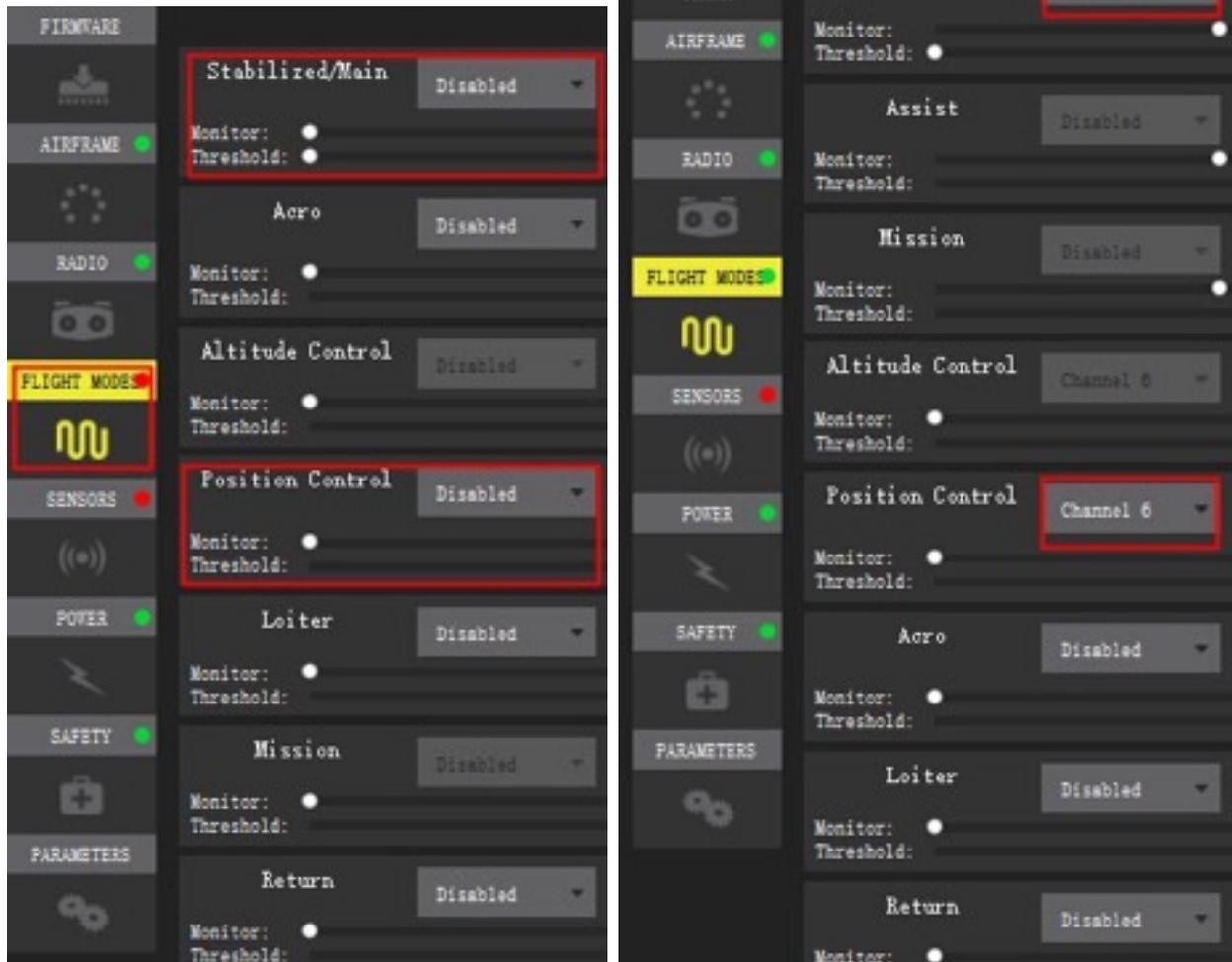
- Skip remaining steps





4) Configure Channels

- Set main mode to channel 5, set position control to channel 6 (channel number may vary depending on your remote controller)



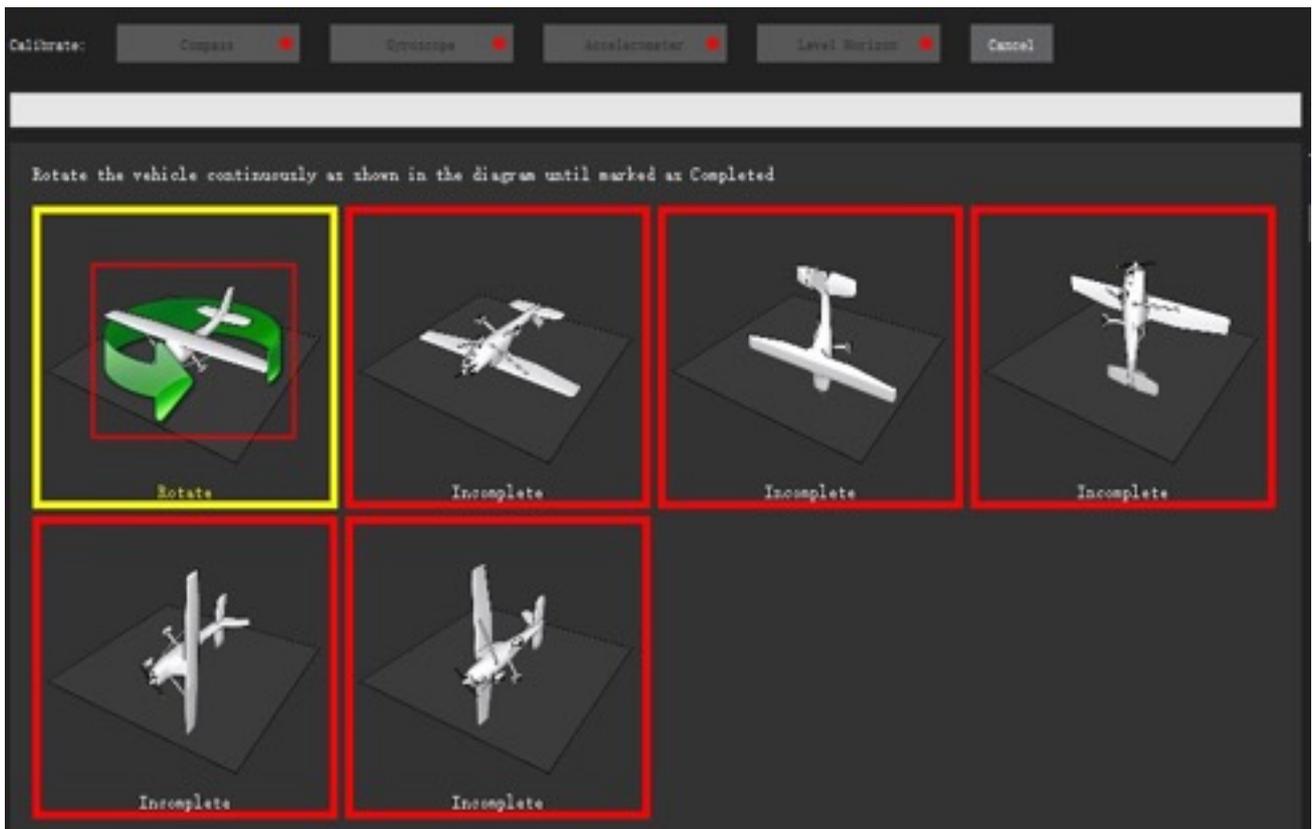
- Use channel 5 to select between 3 modes: manual mode, assist mode, and auto mode.
- Under assist mode, use channel 6 to switch between altitude-control mode or position-control mode

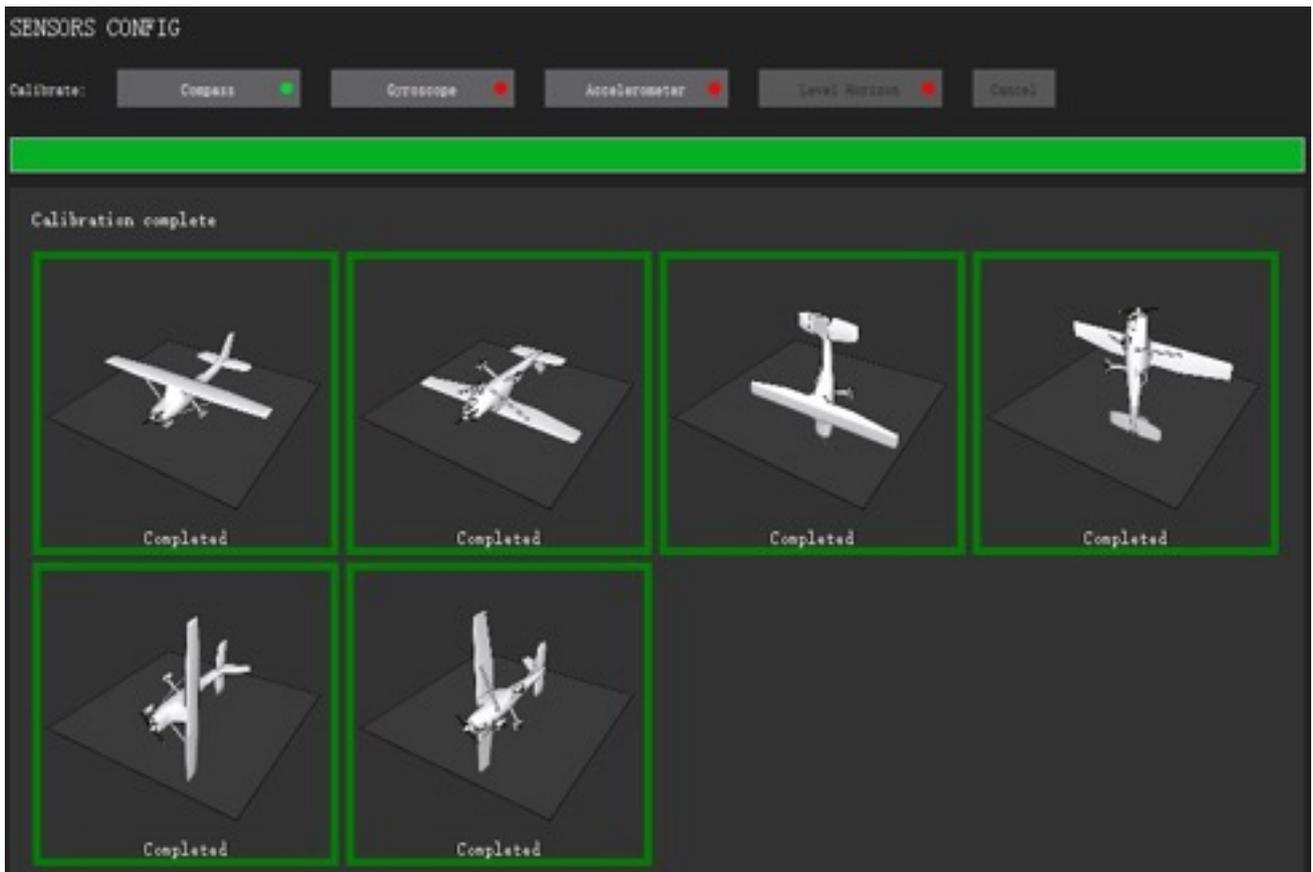
5) Sensor Calibration

Compass



- Rotate frame to specified orientation according to software prompts.

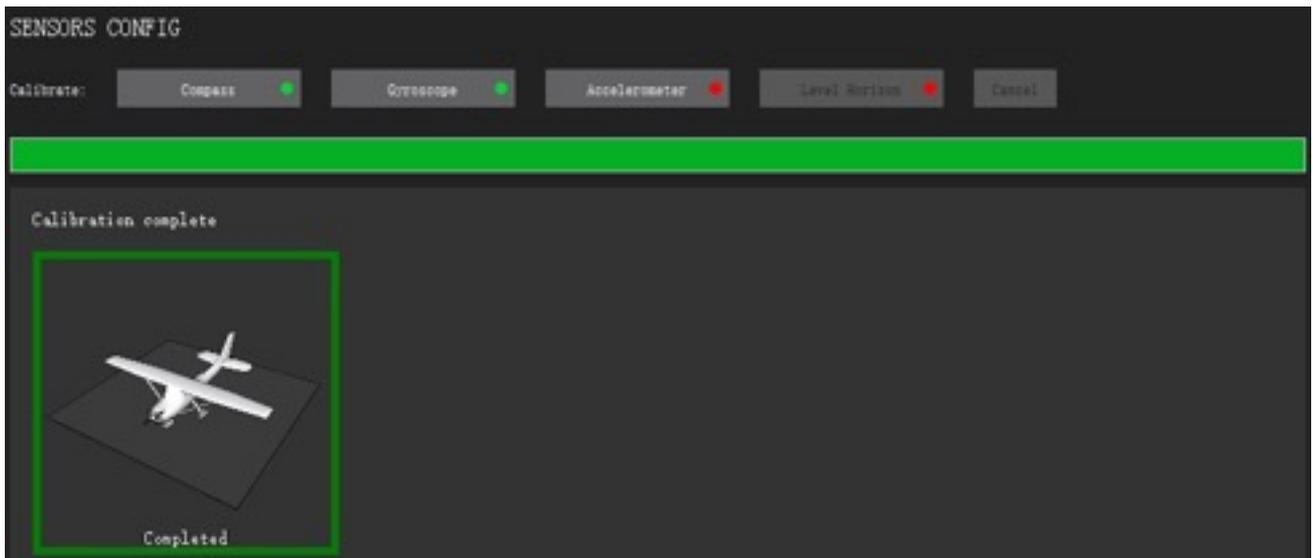




Gyro

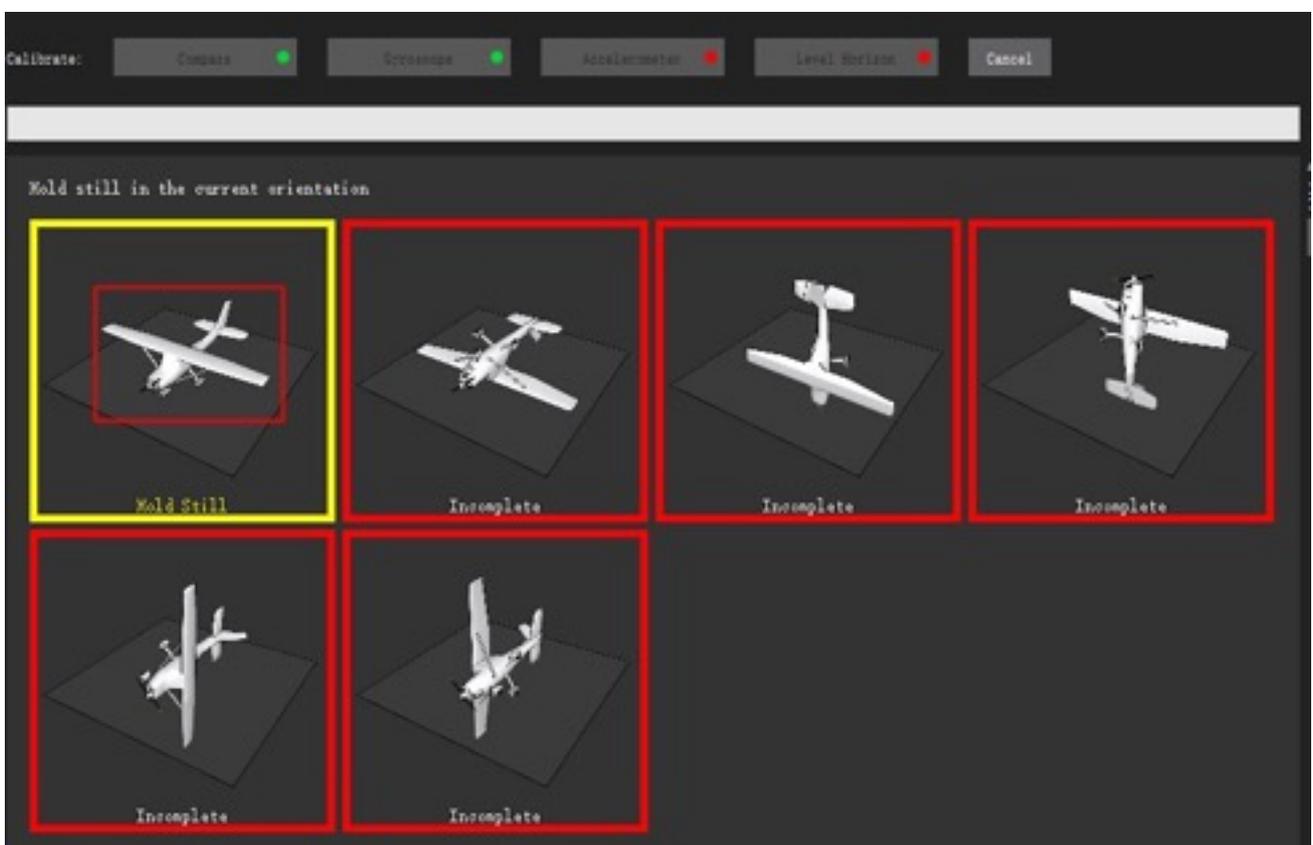
- Place frame into one of the incomplete orientation show on software screen, and hold it still. Proceeds according to software prompts.





Accelerometer

- Place frame into one of the incomplete orientation show on software screen, and hold it still. Proceeds according to software prompts.



SENSORS CONFIG

Calibrate: Compass ● Gyroscope ● Accelerometer ● Level Horizon ● Cancel



Hold still in the current orientation.



FAQ

1. MindPX

Q: What is the environments requirements for MindPX?

A: MindPX working temperature range: -10C ~ 100C;
MindPX working humidity range: 10%~90% RH

Q: What is the maximum controllable range of MindPX

A: 1~2km, depending on transmitting power of your remote controller

Q: What is the maximum flight speed?

A: About 100km/h (depends on your rotors and frames)

Q: What is the hardware requirements for hardware ground station?

A: MindPX can be connected to ground station via a USB cable, or a wireless data transmission module.

Q: Can navigation mode be interrupted?

A: You can switch mode using remote controller.

Q: What if MindPX loosing connection with remote controller during flight?

A: MindPX will control the copter return to where it launches automatically in this case. Or you can also set it to auto landing as you demanded.

Q: How to retrieve MindPX source code and hardware schematics/layouts?

A: You can download *source code* from:

<https://github.com/airmind/MindPX>

You can download *schematics/layouts* from:

<https://github.com/airmind/Hardware>

2. Accessories

Q: What is the cruise time of battery in one charge, and how long it takes to charge a battery?

A: Typically for a 1500mah battery, the cruise time is about 15 minutes for normal load. It takes about 2 hrs to charge the battery to full.

Q: What if the copter ran out of battery?

A: MindPX will trigger alarm when battery level goes down below threshold. The flashing LED will turn yellow and buzzer beeps.

Q: Can MindPX filming from the air and transmit video back to ground?

A: You can purchase additional video capture and transmitting devices and mount it onto the frame.