

P2_{Pro}

FLIGHT CONTROLLER

USER MANUAL

Ver. 1.00

Last updated: May 7. 2015

Thank you for choosing P2 Pro flight controller, hope you will have a good flight with P2 Pro. We strongly recommend you read this manual carefully before you install P2 Pro flight controller. The following instructions will help you to make your P2 Pro flight controller working perfectly.

Note: this manual shall be used together with the P2 Pro assistant software, if there is any discrepancy between this manual guide and the assistant software, the assistant software shall prevail.

If you meet any difficulty during the usage, please contact with JIYI Robotic Co. Ltd. at support@jiyuav.com

Content:

1. Disclaimer.....	3
2. Technical Terms and Abbreviations.....	3
3. Packing List.....	4
4. Installation Guide.....	4
4.1 Frame Type.....	4
4.2 Flight Controller Installation.....	5
4.3 GPS Installation.....	5
5. Wire Connect Guide.....	6
5.1 Connection.....	6
5.2 Wiring Diagram.....	7
6. Configuration and Preparation.....	8
6.1 Driver and Assistant Software Installation.....	8
6.2 User Interface.....	8
6.3 Aircraft Type Selection.....	9
6.4 Remote Controller Calibration.....	10
6.5 Accelerometer Calibration:.....	11
6.6 Battery Setting.....	12
6.7 Compass Calibration.....	13
6.8 Firmware Upgrade.....	15
6.9 Stability Sensitivity Setting.....	16
7. Flight mode.....	17
7.1 Disarm & Arm.....	17
7.2 Stable Mode (Attitude Mode).....	17
7.3 GPS Flight Mode.....	18
7.3.1 GPS Mode.....	18
7.3.2 Go Home under GPS mode.....	18
7.4 Smart Circling Mode.....	19
7.5 Lost Control Protection (Fail Safe).....	21
7.6 Sports Mode.....	21
Appendix.....	23
Appendix 1: Product Specification.....	23
Appendix 2 : LED Light Indicator and Meaning.....	24
Appendix 3 JIYI Technical Support.....	25

1. Disclaimer

First of all, thank you for using JIYI product. **This is not a toy, please read the manual carefully before you use this product. Upon reading this, you're deemed to agree with the disclaimer, this products is not suitable for people aged below 18 years old.**

This entry-level flight controller is specially designed by JIYI for multi-rotor hobbyists. Under the normal electric supply and instant condition, this controller can satisfy the leisure, FPV, Aerial photography usage. JIYI is always aiming high quality, reliable and stable products. **As safety consideration, we strongly recommend you to remove the propeller during the configuration, ensure the wiring connection and electric supply are in place, and stay away from crowd, fragile and dangerous objects during the flight.**

If any of below reason (not limited to below reason) occur during the use of our products, JIYI shall not be liable for any direct or indirect loss, damages and injuries that result from the usage of our products. JIYI shall only be responsible for flight controller damaged which is caused by the controller itself. **JIYI shall not be liable for any other form of Liability and Compensation.**

1. User do not follow the manual during the usage;
2. Weak structure of aircraft or damage on aircraft structure;
3. User using third party product which caused the abnormal flight;
4. User's wrong judgment or improper handling;
5. User intended to against others;
6. User continue with the flight even though knew that the product is function abnormally;
7. Flying under the condition of strong interference, radio interference and prohibited area or vision unclear or blocked or unable to judge and identify the flight condition;
8. Under bad weather condition or not suitable flight condition;
9. Abnormal working condition of flight controller where caused by user tearing or modifying the JIYI product and accessories;
10. Flight where user under drunk, drug abuse or any other unhealthy condition;
11. Any others products defects which is not caused by JIYI products.

2. Technical Terms and Abbreviations

CH	Channel
FS	Fail Safe (Loss Control Protection)
JIYI	JIYI Robotics Co. Ltd.

3. Packing List

JIYI P2 Pro Flight controller x 1

GPS/ Compass Module x 1

GPS Stand x 1

LED/USB Module x1

POW Module x1

Servo wire x6

USB Cable (Micro-USB) x1

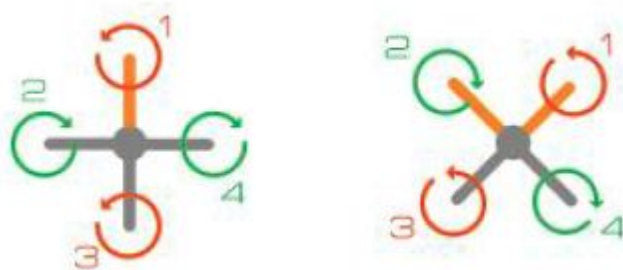
Some 3M adhesive

4. Installation Guide

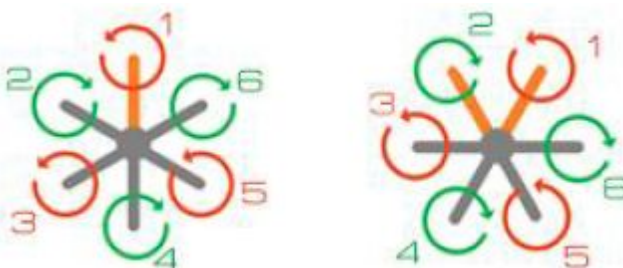
4.1 Frame Type

P2 Pro Flight controller support nine types of frame including + type, X type, Y type, as follow:

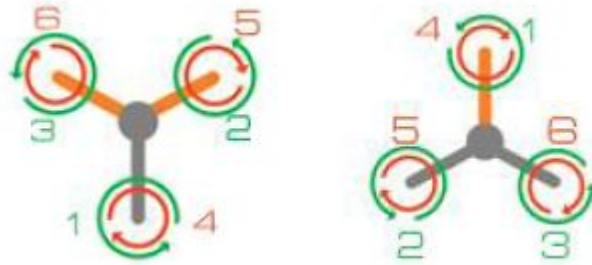
a. Quad-rotor + type and X type



b.) Hexa-rotor + type and X type



c.) Hexa-rotor Y type and IY type



d.) Octo-rotor + type, X type and X8 type



4.2 Flight Controller Installation

In order to get the excellent flying experience, Install the P2 Pro flight controller to the weight center of the aircraft, ensure the flight controller is install horizontally on flat surface, the arrow on controller should points to the nose of aircraft. The flight controller has built-in bumper, you only need to use the 3M adhesive to fix the flight controller on aircraft.

Precaution:

- Do not install the P2 Pro flight controller to any aircraft which wheelbase is more than 1200mm;
- If you install any FPV transmitter, please keep it away from flight controller.

4.3 GPS Installation

Please ensure the GPS/Compass module is installed horizontally on the GPS Stand, arrow on GPS points to the nose of aircraft. Ensure the module is installed away from motors and ESCs.

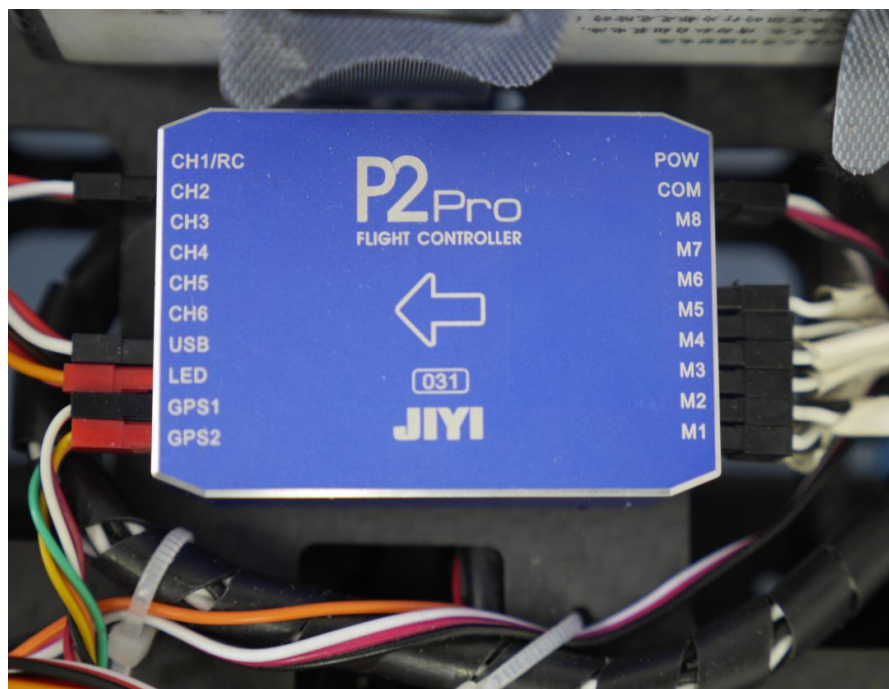
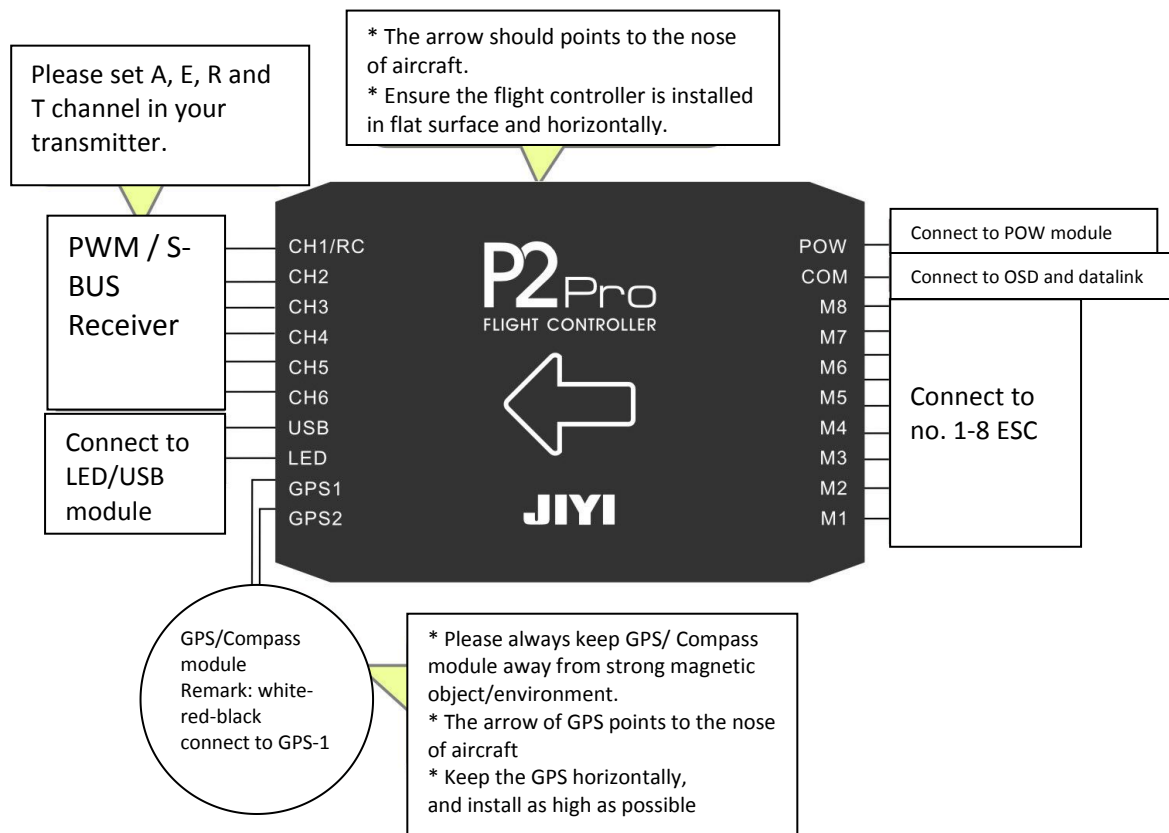
5. Wire Connect Guide

5.1 Connection

P2 Pro flight controller connect ports definition as below:

CH1	Aileron control	POW	Connect to POW Module
CH2	Elevation control	COM	Connect to OSD and datalink
CH3	Throttle control	M8	Connect to no 8 ESC
CH4	Rudder control	M7	Connect to no 7 ESC
CH5	Flight mode switching (Stable Mode, GPS mode, OIC mode)	M6	Connect to no 6 ESC
CH6	Switching between Flight mode and Go Home mode	M5	Connect to no 5 ESC
USB	Connect to LED/USB module	M4	Connect to no 4 ESC
LED		M3	Connect to no 3 ESC
GPS-1	Connect to GPS/ Compass Module – GPS	M2	Connect to no 2 ESC
GPS-2	Connect to GPS/ Compass Module – Compass	M1	Connect to no 1 ESC

5.2 Wiring Diagram



Notes : Please ensure white wire (signal wire) is on top when connection, except LED and GPS-2 is yellow wire on top.

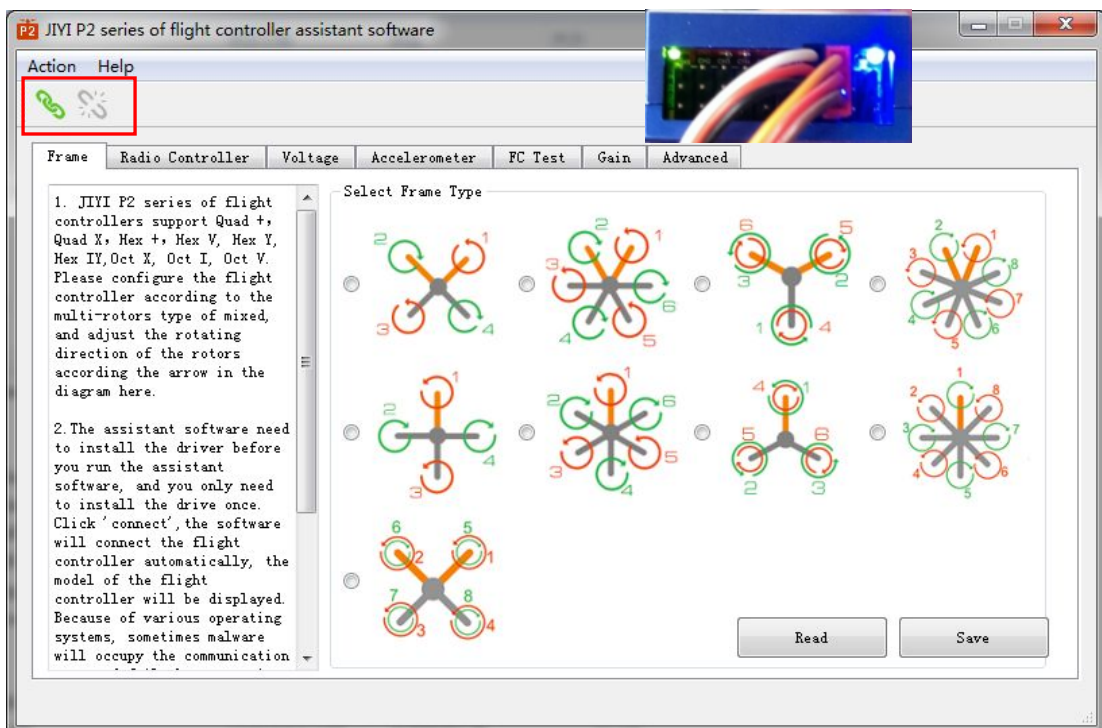
6. Configuration and Preparation

6.1 Driver and Assistant Software Installation

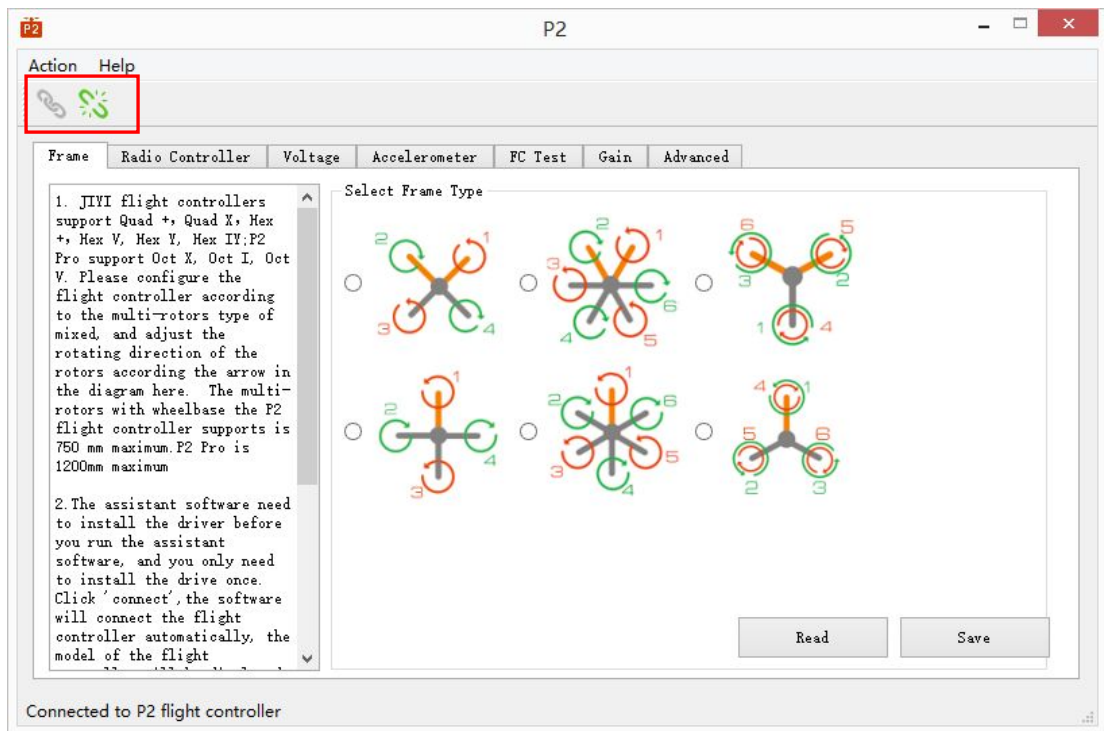
1. Visit to JIYI official website: www.jiyiuav.com, download the software according to your product. Unzip the file to your specific folder
2. Open the folder you just unzipped, find “driver” folder and open, install the driver according to your operation system.
3. Connect the P2 Pro flight controller to PC, wait till driver install successfully, execute “gcs.exe” in the software folder.

6.2 User Interface

After open the software, you will see the software interface below, click the green connect button at left top of software. **Make sure the red LED inside flight controller(pic below) is off before click connect.**

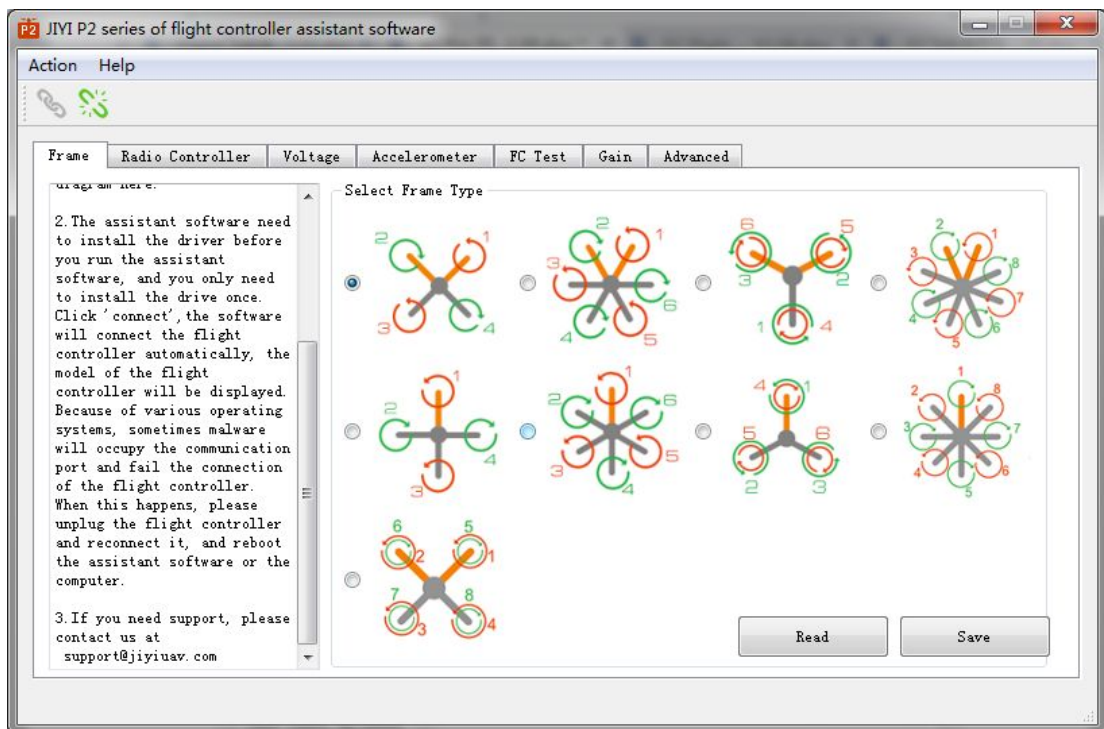


If you install the driver and software correctly, you will see below:



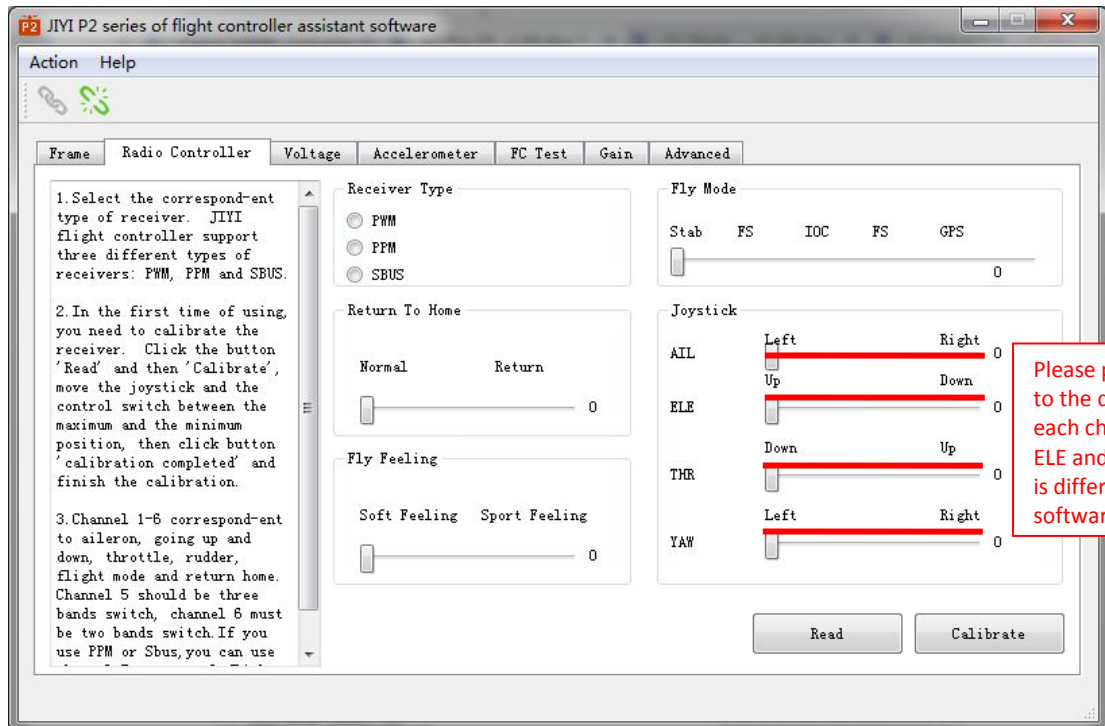
6.3 Aircraft Type Selection

Choose your aircraft mixer type, and click “Save” button.



6.4 Remote Controller Calibration

After selection of frame type, click “Radio Controller” to enter into RC calibration.



P2 Pro supports PPM, PWM and S-BUS receiver, choose relevant receiver type, and then click “Calibrate” to start calibration. Make sure the connect is correct: CH1 AIL, CH2 ELE, CH3 THRO, CH4 RUDD, CH5 Flight mode switching (Stable Mode, GPS mode, Smart Circling (IOC) mode (3 step switch required), CH6 Switching between Flight Mode and Go Home mode (2 step switch required). Please move each stick max. and min. for CH1 to 4, and switch each step for CH5 to 6, and then CH1 to 4 return to middle, click “Calibrate Complete”.

Notes:

1. Please calibrate the transmitter for first usage or radio controller changing.
2. Please set your radio control at airplane mode, and do not set mix control.

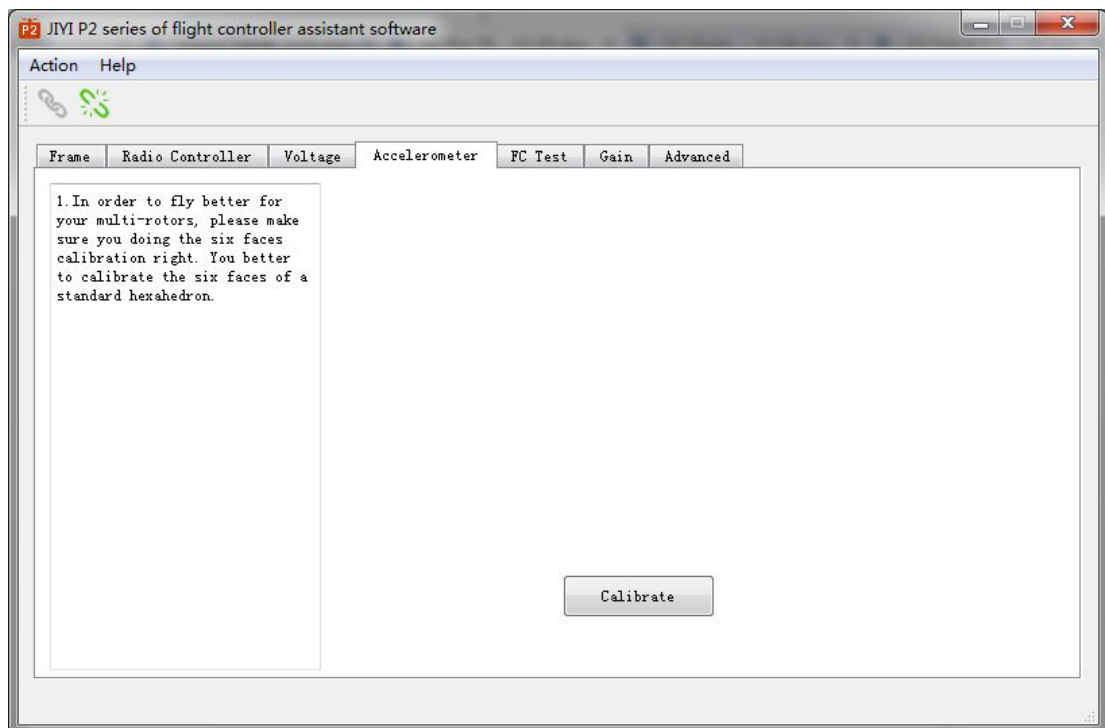
3. Please make sure the transmitter sticks' moving direction of each channel is the same the same as software shown.

6.5 Accelerometer Calibration:

Reminder: The accelerometer calibration must be performed before first usage of flight controller. If you experience below condition, it is suggested to re-calibrate the accelerometer sensor.

- a.) In stable flight mode, the aircraft is tilting during take off
- b.) Drifting occurs in stable flight mode, i.e. the aircraft doesn't fly in straight line.

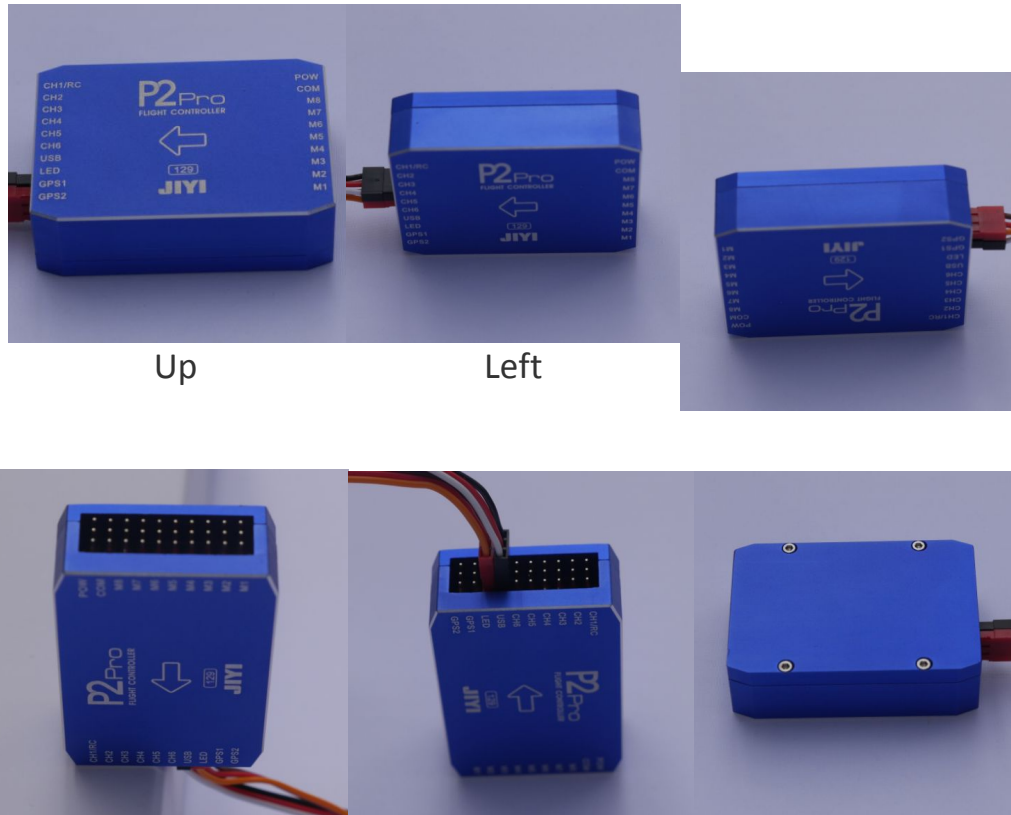
Accelerometer calibration method:



Suggest to perform the calibration in indoor. First, click “accelerometer” in the software, make sure you connect the flight controller correctly, then click “Calibrate”. Follow software instruction, place the flight controller facing up, left, right, front,

back & down (total 6 faces) on a leveling surface in sequence. Total 6 surface of calibration.

Diagram for reference below:



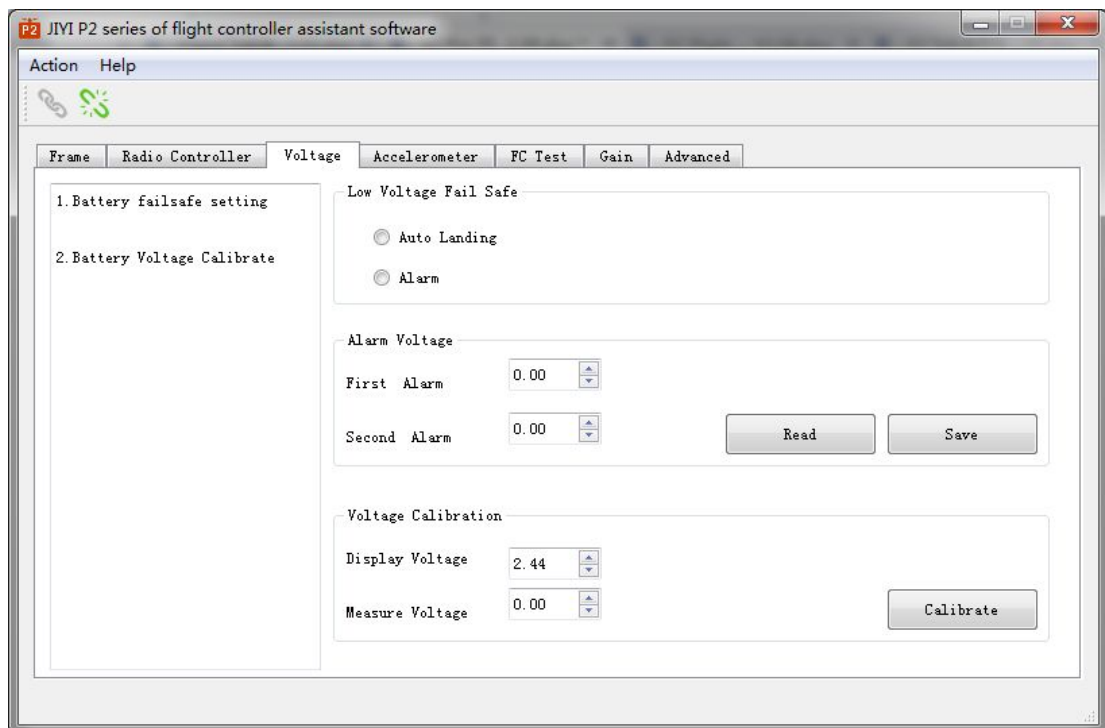
Caution: In order to get the best calibration results. Every direction calibration must be leveling. If any surface is not in leveling position (vertically & horizontally), you need to perform the calibration again. Suggest to perform the flight controller accelerometer calibration before installing in aircraft. You may need some assist tools a to ensure the good calibration results after flight controller installed in aircraft.

6.6 Battery Setting

JIIYI P2 Pro flight controller monitors the battery voltage through the power module, equipped with the low voltage protection. You can select the auto-landing or LED alarm. There is two levels of low voltage warning. If alarm mode is chosen, the LED will be triple blinking for the first level alarm, and fast blinking fast for second level alarm. You must land the aircraft immediately when second level alarm. If auto-landing is chosen, the aircraft will automatically landing right below when voltage downs to second level alarm. To

eliminate the battery measurement tolerance, you need to calibrate your battery voltage for the first usage, using the battery checker to measure the actual battery voltage, fill the figure into the measure voltage and click “Calibrate”.

Caution: Please set a reasonable voltage level for low voltage alarm to avoid any damages caused by the aircraft low power.

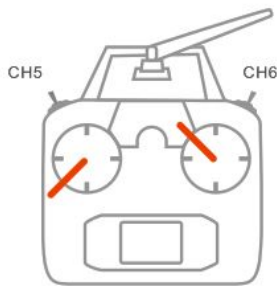


6.7 Compass Calibration

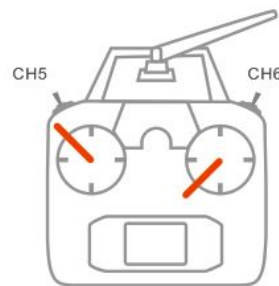
GPS/Compass module must be connected when using the P2 Pro flight controller. Prior to your first flight, you must calibrate the compass. During the calibration, please stay away from any of strong magnetic field interference, an empty & spacious open space area outdoor is recommended. Before the calibration, make sure the GPS/Compass is installed correct and firm, the arrow of GPS should point to the nose of aircraft.

Method of calibration:

JIIYI P2 Pro flight controller Compass calibration method is easy. First, switch the CH6 to “Go Home” mode, put the throttle stick to bottom, rudder to left, aileron to left, elevator to top. For US mode controller (left hand throttle) as shown in pic 1. For Japanese Mode Controller (right hand throttle) as shown in pic 2.



Pic 1 (left hand throttle)



Pic 2 (right hand throttle)

Wait for 2 seconds, the LED will light continuously (means entering Compass calibration mode). After that follow by picture 3 for the calibration, P2 Pro flight controller takes approximate 2 minutes of calibration data collection. When the LED change from continuous light to slow blinking, the calibration is completed.

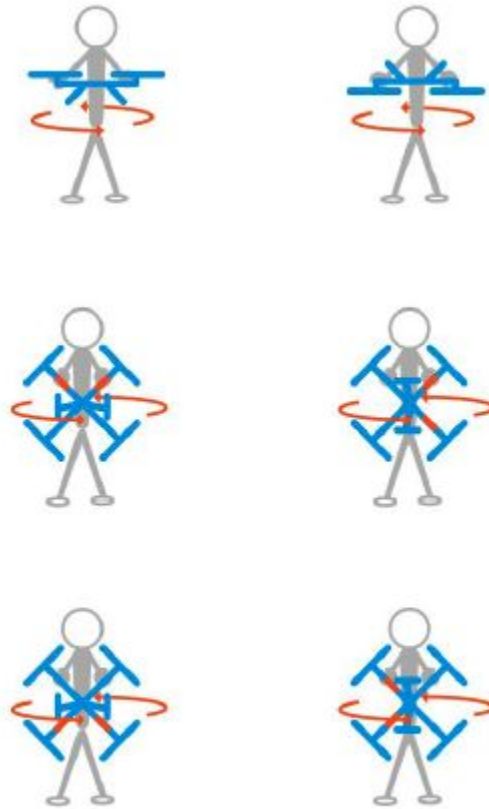


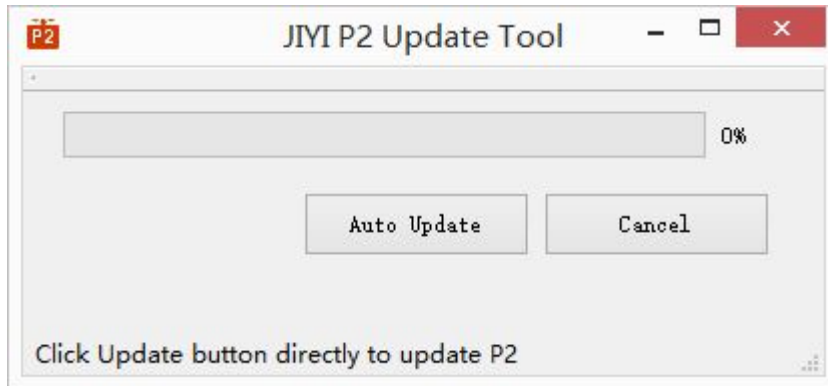
图 3

Caution: GPS/Compass device is sensitive to ambient environment. In order to get the best flight experience, it is advisable to calibrate the compass again when you change the flight location.

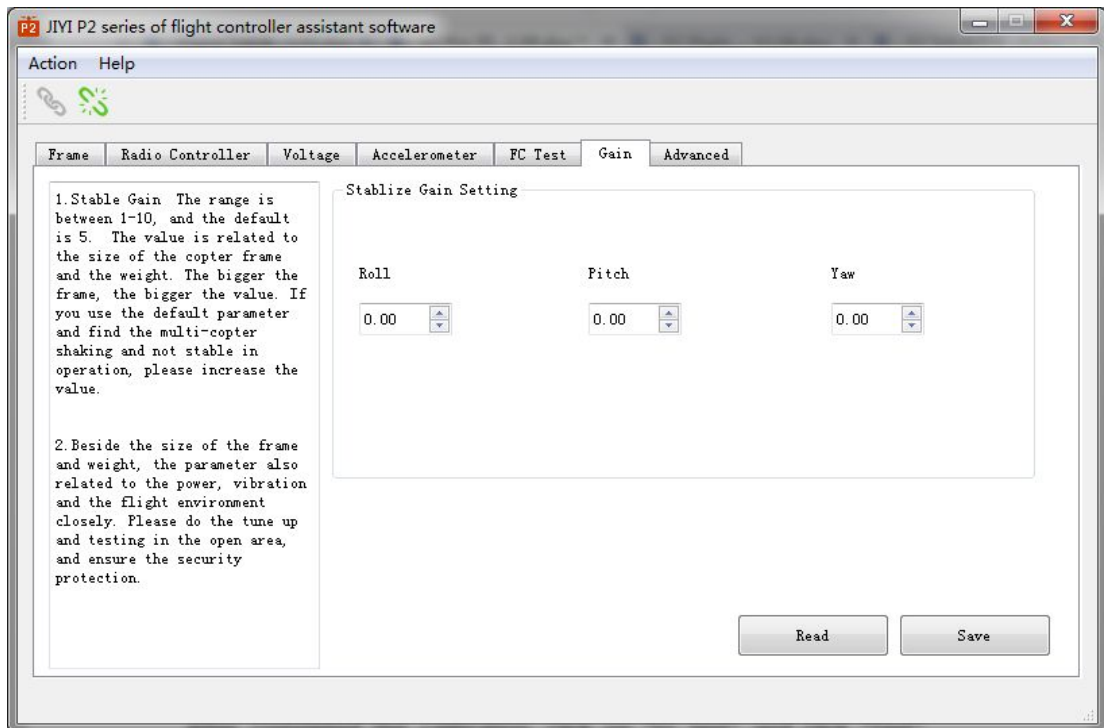
6.8 Firmware Upgrade

In order to get the best flying experience, JYI will release the latest firmware from time to time, please update the latest firmware timely.

The firmware upgrade guide as below: Connect the flight controller to computer, make sure internet access available, open "P2 ProUploader" in the P2 Pro software folding, click "Auto Update" and wait till download completed. The upgrade program may require power off the flight controller and re-connect during the upgrade. Please make sure the flight controller is totally power off including the main power from aircraft. And then connect to computer again. Wait till upgrade finished. **After upgrade finished, please calibrate the transmitter and accelerometer again.**



6.9 Stability Sensitivity Setting



To pursue the stability and reliability, you can adjust parameter in Gain. Under gain, you can adjust the Roll, Pitch and Yaw. The adjustable range 1-10, the default setting of flight controller is adjusted based on aircraft 450mm. If you aircraft frame is bigger than 450mm, or the aircraft is swinging or shaking when flying, you need to adjust the roll sensitivity and pitch sensitivity to a higher value.

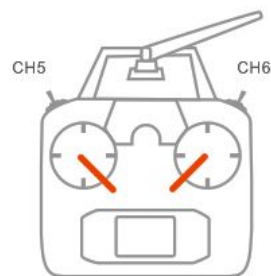
7. Flight mode

7.1 Disarm & Arm

After completed the calibration, click on “FC test” and click “Test” button. If no further error notification, you may proceed for arming. If any error message shown, you need to re-calibrate it before you’re able to arm.

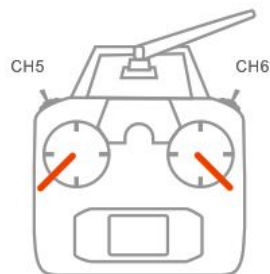
To arming P2 Pro, just put the throttle stick to bottom, rudder to right, aileron to left, elevator to bottom, hold for 3 seconds.

For most left hand throttle or right hand throttle, switch the mode switch to Stable mode, keeping the aircraft static, adjust the remote controller sticks as shown in pic 1 for at least 3 seconds to arm. Adjust the controller sticks as shown in pic 2 for 3 seconds to disarm it. After arming, if the throttle stick is in minimum position for 3 seconds or longer, P2 Pro flight controller will automatically locked the aircraft. If arming in GPS mode, good GPS signal is needed to arm the aircraft. Suggest arm in Stable mode and switch to GPS mode after arming.



Arm

Pic 1



Disarm

Pic2

Caution: After the aircraft landed, please disarm the aircraft to prevent the unintentionally touch on throttle stick, which can caused serious injuries.

7.2 Stable Mode (Attitude Mode)

Switch the remote controller CH5 to Stable mode, arm the aircraft, and increase the throttle softly till the aircraft lift up the ground (depend on your throttle setting), the aircraft will take off steady. Thanks to advance algorithm of P2 Pro Flight controller, during the indoor or breeze-less

condition, you can get the stable hovering flight or excellent fixed height flying.

Caution: 1. GPS/Compass module is not working in Stable mode flight.
2. The throttle control way is different between Stable mode and GPS mode, please pay attention to throttle control when switching between these 2 modes.

7.3 GPS Flight Mode

7.3.1 GPS Mode

Choose an open area outdoor where do not have any high-rise building and no magnetic interference environment, connect the aircraft with power, LED light shall double blink to entering satellite searching mode, wait about 1 minute, when the LED change to slow blinking, the satellite searching is completed and the position locating is successful.

Switch the remote control CH5 Stable mode to GPS mode position and arm your aircraft (user can also switch stable mode to GPS mode during flight), increase the throttle to 50% and above to make the aircraft lifting from the ground, aircraft shall be lifting vertically. After the aircraft reaches the desired altitude, keep the throttle at 50% level, the aircraft shall hovering at the height automatically, if the user adjust the aileron and elevation, the aircraft will fly at the keeping height.

Caution: Compass module is involved as assist when P2 Pro flight controller working under GPS flight mode, you must stay away from strong magnetic field. While the GPS module is also involved in this mode, you need to choose a good GPS, and Satellite signal area (shall stay away from high rise building).

7.3.2 Go Home under GPS mode

P2 Pro flight controller will record the location where the user arm the aircraft as home location, switch your remote controller CH6 to Go Home mode, the aircraft shall automatically lifting to 20 meter height, keep the previous flying course and fly back to home location. During the return flight, aircraft will not be controlled. Once the aircraft reach the home point, it will hover at the air for about 2 seconds before descending slowly, in this period you can adjust transmitter stick to

adjust the landing point (but throttle is not working). After the aircraft landed, the motor shall spin slowly and stop. User shall put the throttle at minimum level, the flight controller will automatically disarm after 3 seconds.

Caution: 1. The precondition of Go Home is GPS module records the home point location (The location of arming) successfully. Home point may be not recorded correctly if armed in stable mode. Suggest to arm under GPS mode if you need to use Go Home.

2. To prevent from any injury, when the aircraft is near to human, it is advisable not to switch to Go Home mode.

7.4 Smart Circling Mode

Make sure with good GPS signal during the flight, switch the remote controller CH5 to IOC to enter Smart Circling mode. After switch to Smart Circling, the aircraft will not start to circle flying immediately, first it will be hovering, then start to circle flying, default circle center is 10 meter away from nose of aircraft. In this mode, radio controller only control the aircraft flying radius and speed and will not control the flying direction. Please see below compare table of GPS mode and Smart Circling mode:

GPS Mode	
CH1	Control the roll of aircraft (ROLL)
CH2	Control the pitch of aircraft (PITCH)
CH3	Control the altitude of aircraft (ALT)
CH4	Control the yaw of aircraft (YAW)

Smart Circling Mode		
Channel Setting		Description
CH1	Control the circling rate	Stick left and right control the circling speed and direction
CH2	Control the circling radius	Stick up and down control the circling radius
CH3	Control the flying altitude	Same as GPS mode
CH4	Control the aircraft yaw	In circling mode, the nose of aircraft default facing to the circle center always. Once move the yaw stick manually, FC will not control the yaw and operator can control the yaw by radio controller.

CH1 controls the aircraft circling speed and direction. When the aircraft hovering, move stick to left, aircraft will start circling with default radius (10 meters) clockwise. Keep stick on left, the circling speed will become faster. The speed increase is decided by the controller stick. Stick returns to center, the aircraft will be circling at current speed. Stick moves to right, aircraft circling speed will slow down till stop (hovering). Keep stick on right, the aircraft starts circling counter-clockwise. The control way is the same as clockwise circling.

CH2 controls the circling radius. Moving the stick up, the circling radius will decrease. Moving the stick down, the circling radius will increase. Stick in middle, aircraft keeps current radius circling. When the circling radius is 0, the aircraft is in pan-shot mode, it will be hovering and rotating. CH1 will control the rotating speed and direction.

Caution: 1. Do not take off in Smart Circling mode to prevent accident, because the control way is different with Stable and GPS mode.
2. Before switch to Stable and GPS mode, please make sure you are clear about nose of aircraft, to prevent from any accident because of not clear of nose of aircraft.

7.5 Lost Control Protection (Fail Safe)

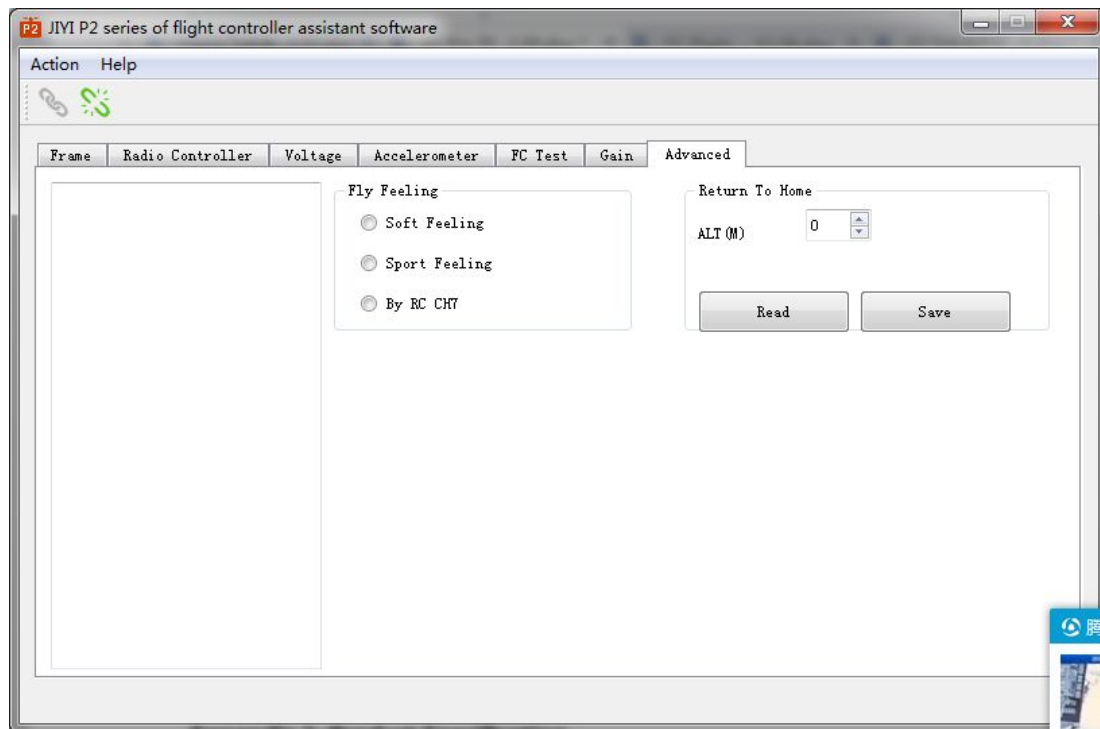
P2 Pro flight controller support lost control protection (fail safe). First of all, your receiver must support FS setting, and you set your remote controller correctly according to your remote controller manual.

In the good GPS satellite signal condition, once the receiver lost the signal, the P2 Pro Controller shall activate the auto pilot and return to home location (no matter in stable mode or GPS mode). The auto pilot home will be same with the Go Home mode.

During the return flight, if the remote control is restarted and user wants to re-control the aircraft, you need to switch the CH5 from Stable mode and GPS mode one time, at the same time you should ensure the throttle stick is not at the lowest position in order to gain control over the aircraft again. If the remote control receiver encounter signal lost under the bad GPS signal, the aircraft shall auto-landing at right below ground.

7.6 Sports Mode

P2 Pro flight controller is built in with two type of operation mode - soft mode and sport mode. The default setting is soft mode. Only PPM and S-BUS receiver are able to switch between this two modes by transmitter, CH7 will be used as the switch for soft and sport mode. During the flight, you can switch between two modes in order to have different flying experience.



Caution: it is advisable that beginner user shall not change to the sport mode during the flight. Suggest switch to this mode once the user flying become skillful.

Appendix

Appendix 1: Product Specification

General Characteristic	
Function:	PPM, PWM, S-BUS receiver support Superior Stable flight against interference Gentle throttle setting Precise spot GPS hovering Low voltage protection Lost control protection
Peripheral Equipment	
Multi-Rotor supported:	Quad-rotor I4, X4 / Hex-rotor I6, X6, IY6, Y6 / Oct-rotor I8, V8, X8, not exceed 1200mm wheelbase
ESC supported:	PWM ESC below 490HZ
Recommended transmitter:	PWM and S-BUS. 6 channels
System requirement:	Windows XP SP3, Window 7, Windows 8, IOS X
Basic Parameter:	
Working voltage:	Main controller 4.8V-5.5V
LED/ POW module:	Input 7.4v-26V (recommend 2S-6S LiPo); Output 2A @ 5V
Power Consumption:	< 2W
Working environment temperature:	-10 °C – 60 °C
Storage environment Temperature:	-40 °C - 60 °C
Weight:	Main controller: 36g GPS/Compass Module: 45g LED/USB Module: 7g POW Module: 11g
Flight Feature (Depending on aircraft frame and power unit)	
Hovering tolerance (GPS Mode):	Horizontal: $\pm 2.0\text{m}$ Vertical: $\pm 0.8\text{m}$

Max Tilt Angle:	45°
Max Yaw Angular Velocity	150°/s
Ascent/Descent	6m/s
Wind Resistance	<8m/s (17.9mph/28.8km/h)
Built in Flight mode:	Attitude Mode GPS Mode Smart Circling Mode Failsafe Mode Low Voltage Protection One key take off, Click and fly, Waypoint (Groundstation function) Remote/Cell phone adjustment

Appendix 2 : LED Light Indicator and Meaning

P2 Pro Flight controller only provide “red light” as indication of to flight controller working status, indication as below table:

LED Light	LED status	P2 Pro working status
Red Light	Slow blinking (Disarmed)	Standby
	Double blinking (Armed/disarmed)	Bad GPS signal
	Triple blinking (Armed)	First level low voltage
	Off (Armed)	Working normal
	Fast blinking (Armed)	Second level low voltage

Appendix 3 JIYI Technical Support

If you have any problem during your usage, please contact JIYI for technical support. You can download relevant information from JIYI official website.

JIYI official website: www.jiyiuav.com

Technical support: support@jiyiuav.com

Again, thank you for choosing JIYI P2 Pro!