SPARROW 2

Manual v2.3

Description

On the basis of the *SPARROW* FC, *SPARROW 2* has updated the operation mode to simplify the user's use and enhance the operation experience. At the same time, it adds support for a variety of receiver signals, including PWM,PPM,SBUS,IBUS,CRSF and supports DJI-OSD,CRSF-TELE. For specific functions and usage, refer to the detailed description below.

WARNING

Please strictly abide by relevant national laws and regulations and fly safely. Before using the FC, you must fully understand the safety details. The equipment and any electronic products on the aircraft cannot be completely reliable. The necessary inspections must be carefully performed before the flight.

Content

1. PARAMRTER

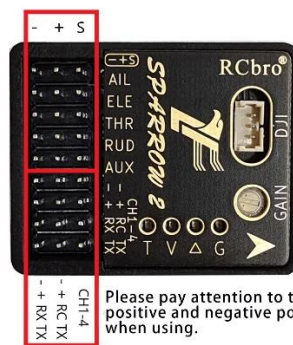|		
FC	Size	33*27*12mm
	Weight	11g
	Voltage	5V
GPS	Size	18*18*6mm
	Weight	6g
	Voltage	5V
Receiver	Type	PWM/PPM/SBUS/IBUS/ELRS
Others	Accessories	FC,GPS,Screwdriver,Wire
	Protocol	DJI-OSD/CRSF

2. INSTALLATION & WIRING

➢ **FC Installation Direction**

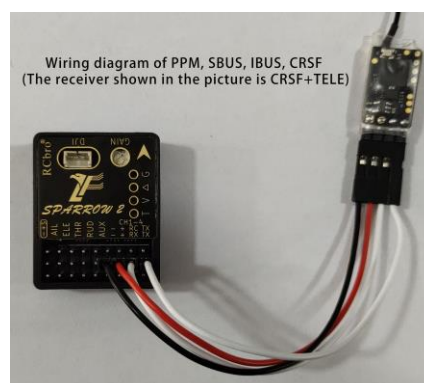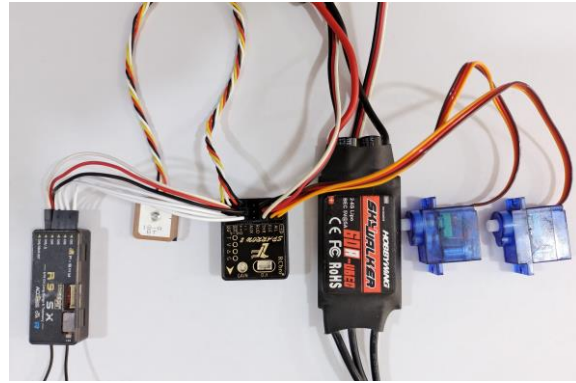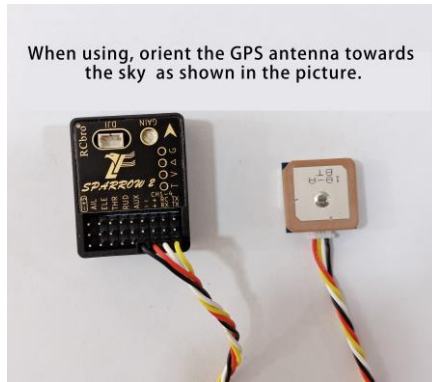Arrow points to the head,try to level.

➢ **Interface**

Please pay attention to the positive and negative poles when using.

PWM type receiver wiring diagram

Wiring diagram of PPM, SBUS, IBUS, CRSF
(The receiver shown in the picture is CRSF+TELE)

When using, orient the GPS antenna towards the sky as shown in the picture.

➀ PPM SBUS IBUS ELRS/CRSF

    Just connect the signal to the RC port on FC, the FC will automatically recognize it;the default channel sequence is A-E-T-R;The mode channel of PPM/SBUS/IBUS is CH5, and the mode channel of ELRS/CRSF is CH6.

➀ PWM

    The CH1-4 port on FC is only for PWM input and the corresponding receiver channel sequence is A-E-T-R, when using PWM, select a 3-pos switch as the mode channel and connect it to the RC port on FC.
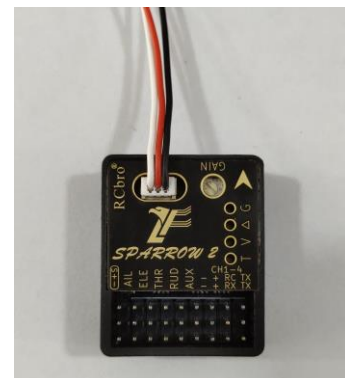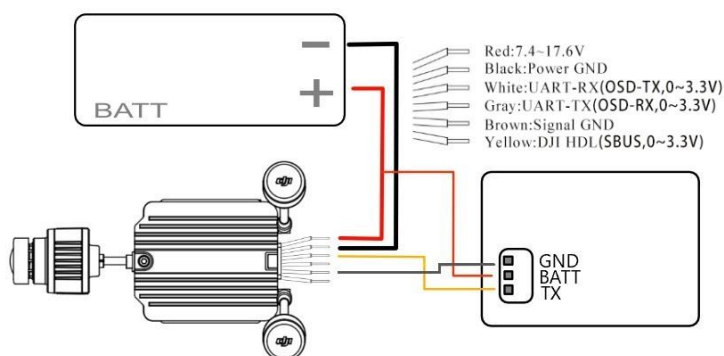
➀ AUX channel on FC

    The AUX channel is directly controlled by the RC, CH6 of PPM/SBUS/IBUS receiver is AUX, CH7 of ELRS/CRSF receiver is AUX, because the PWM receiver only has 5 channels connected to the FC, so the AUX channel cannot be used.

➢ **SERVOS CONNECTION**

	T-TAIL	V-TAIL	WING
AIL	AIL1/AIL2	AIL1/AIL2	AIL1
ELE	ELE	RUD1	AIL2
THR	ESC	ESC	ESC
RUD	RUD	RUD2	NO CONNECTION

➢ **DJI**

Red:7.4~17.6V
Black:Power GND
White:UART-RX(OSD-TX,0~3.3V)
Gray:UART-TX(OSD-RX,0~3.3V)
Brown:Signal GND
Yellow:DJI HDL(SBUS,0~3.3V)

GND
BATT
TX

*DJI port also supports voltage detection.

*DJI port voltage detection ranges from 2~6s, pay attention to the DJI supply voltage (7.4-17.6V) when wiring, so as not to burn equipment!

➢ **DJI V2-OSD**

①RSSI(NOT SUPPORT) ②FLIGHT MODE (MANUAL/ALTHOLD/STAB/RTH)
③FLIGHT SPEED ④ROLL ANGLE ⑤PITCH ANGLE ⑥LONGITUDE AND LATITUDE
⑦SATELLITES ⑧DISTANCE ⑨ALTITUDE ⑩RATE OF CLIMB
⑪BATTERY VOLTAGE ⑫BATTERY VOLTAGE⑬FLIGHT DIRECTION

*This FC does not support DJI O3, AVATAR, etc. If necessary, you can use SPARROW V2 Pro.

➢ **CRSF-TELE**

*If you need to display battery voltage, you must perform voltage detection on the DJI port.

3. REMOTE CONTROL

➢ **How to judge whether the RC is normal?**

After the flight controller is powered on, all LEDs will be on and GPS configuration will begin. When the three green LEDs flash quickly at the same time, it means that the configuration is completed but the RC is not recognized; when the green LED **T** and **V** flash quickly at the same time, it means that the RC has been recognized.

* When power-on, the sensor takes 15 seconds to initialize, please keep the FC level.

* The green LED **T** and **V** flash quickly and the △ is on, indicating that the RC signal has been recognized, but the roll or pitch has a large trim or the throttle is not at the lowest position.

➢ How to use the RC to unlock the FC?

Step 1: Keep the throttle at the lowest position after power on;

Step 2: Push the throttle to the highest position;

Step 3: Push the throttle to the lowest position, the green LED starts to indicate the type of plane and flight mode.

➢ How to use the FC to calibrate the ESC?

Step 1: Push the throttle to the highest position in **MANUAL** mode;

Step 2: Power on;

Step 3: Green LED **T** and △ flash, pull the throttle to the lowest after hearing the ESC tone, the green light starts to indicate the type of plane and flight mode.

➢ How to use the RC to set the type of plane?

After using the RC to unlock the flight controller, you can quickly dial the mode channel (CH5 or CH6) to switch type of plane.

T LED --> T-TAIL   V LED --> V-TAIL   △ LED --> WING

* When switching types continuously, you need to pause for 1s before continuing to switch.

* No need to set the mixing mode in your RC!

➢ How to use the RC to calibrate level?

After using the RC to unlock the flight controller, place the FC horizontally and still,,choose a way to dial the sticks as shown in the figure, until the three green LED flash at the same time.After the calibration is completed, the green LEDs return to normal.
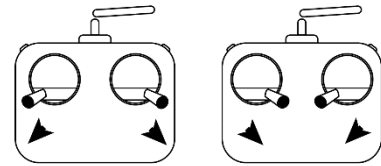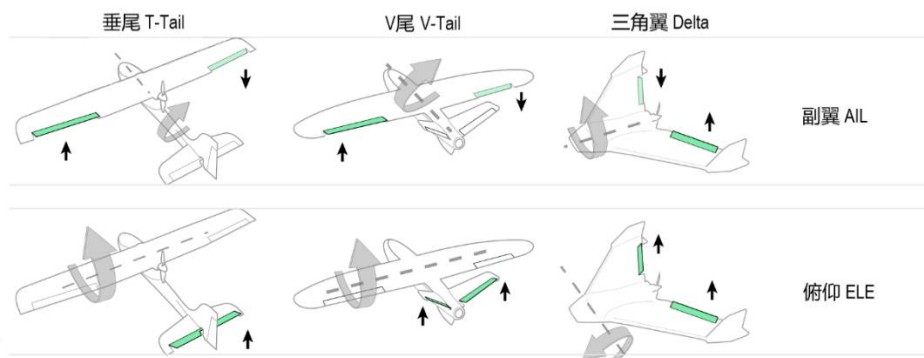
*The throttle is locked when calibrating level, and will be automatically unlocked after the calibration is completed!

➢ How to use the RC to set direction of the servo?

*The feedback direction setting must be completed before using the RC to unlock the FC.

Step 1: Check the feedback direction.

感度方向测试 Feedback direction

默认不支持航向通道自稳. NO Stabilization in YAW channel.

Step 2: If the AIL or ELE feedback direction is not correct, turn the AIL or ELE stick to the maximum position and hold it until the direction of the servo changes.

Step 3: Check the feedback direction again.

* For example, when you change the feedback direction of the ELE servo, pull the ELE stick down and the ELE rudder surface is upward. After the ELE stick is pulled to the maximum position and held for a few seconds, the rudder surface suddenly turns downward, indicating that the direction change is successful.

➤ How to set the RC control direction?

通道方向测试 Control direction
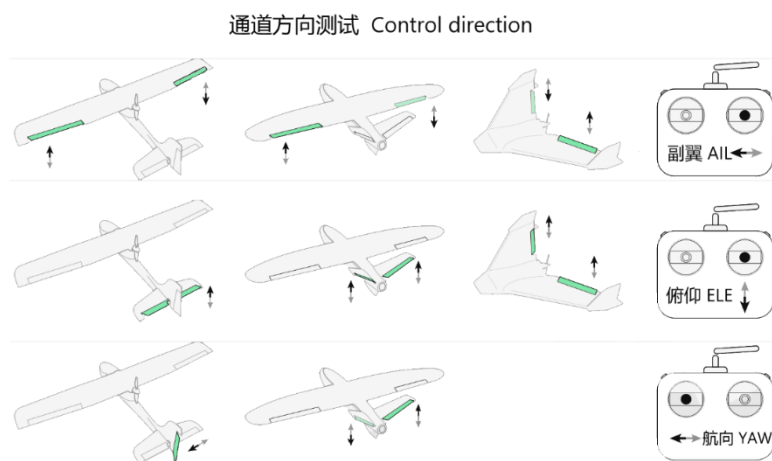
*If the control direction is not correct, you can set the channel output reverse in your RC.

➤ FailSafe

Type	Setting method
PWM	Set the mode channel output in the RC to ensure that the flight mode is RTH after the RC is turned off.
PPM	
IBUS	
ELRS/CRSF	
SBUS	Automatically recognize the failsafe.

When the RC that outputs PWM/PPM/IBUS/CRSF is failsafe, there are usually three states that can be set.They are: cut (no output), pos hold (hold the output at the last moment before failsafe), custom (the user sets the output when failsafe), of course, different RC will be different.

Cut mode: the FC can automatic recognition as failsafe,and switch to RTH;

Pos hold: this mode is not recommended.

Custom mode: the user sets the output data of each channel when the RC is failsafe, to ensure that the output of the mode channel(CH5/CH6) can make the FC switch to RTH when the RC is failsafe.

PPM/IBUS/CRSF: it is recommended to use cut mode or custom mode.

SBUS: the FC can automatic recognition as failsafe,and switch to RTH.
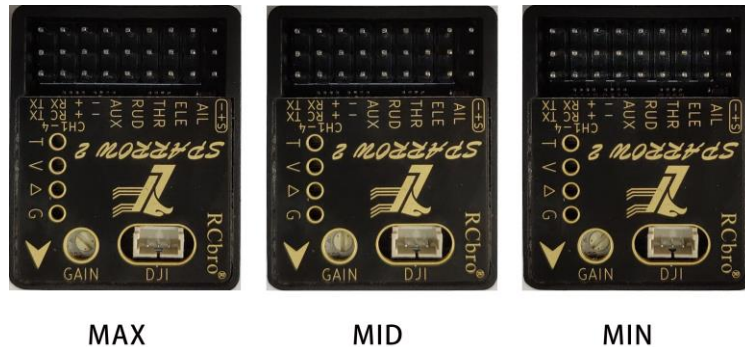
* There may be some SBUS receivers that are unable to automatically recognize the failsafe due to non-standard protocols.

4. GAIN
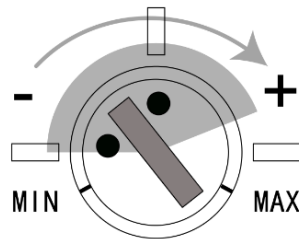
Adjust clockwise to increase the sensitivity, if the sensitivity is too large, the flight will jitter

*The knob adjusts the gain of ROLL and PITCH at the same time.

MAX   MID   MIN

5. Flight Mode & LED

MANUAL	The airplane is direct controled by RC.
STAB	Control the angle of airplane,and auto level when no RC input.
ALTHOLD	Plane holds altitude, 25m minimum altitude limit.
RTH	Auto Retun Home.

	Quick flash	RTH/ALTHOLD
GREEN	Slow Flash	MANUAL
	On	STAB
RED	Flash	GPS NoFix
	On	GPS Fixed
	Off	NO GPS

* RTH can only be used when the GPS is fixed, otherwise it will become ALTHOLD.

➢ **Assisted Takeoff**

ALTHOLD Mode: Push the throttle to enough power, after takeoff(throw it away), the airplane will climb to 20m automatically.

RTH Mode: Push the throttle to enough power, shake the airplane or run, then the motor starts slowly, and then take off after the power is enough(throw it away), the airplane automatically climbs and circles over HOME.

➢ **Takeoff/Landing State**

The motor is slowly activated only in the takeoff / landing state, when the altitude is above 30m, the speed is greater than 3m/s, then enter the normal flight state,at this time,

switch to the RTH mode, the motor is no longer started slowly; when the altitude is below 15m, the throttle is minimum, the speed is less than 1 m/s, then enter the landing state, at this time, switch to the RTH mode, the motor will start slowly.

➢ **Throttle Control**

Before using RC to unlock the FC, the throttle is locked,no output! After unlocking, the throttle output is determined by the GPS state, referring to the table below.

MODE	NO GPS	GPS NoFix	GPS Fixed
MANUAL	RC throttle	RC throttle	RC throttle
STAB		No Output	
ALTHOLD		At this time the mode changes to **RTH**	
RTH	**ALTHOLD**	No Output	*See below*

MAN/STAB/ALTHOLD: Throttle is direct controlled by RC.

RTH: Throttle is controlled by RC during assisted takeoff, after entering the circling state, the throttle is controlled by the FC, it automatically adjusts the throttle according to the cruise speed you set, you can manually push the throttle up (beyond the throttle calculated by the FC) to increase cruise speed, but you can't pull it down.

6. FAQ

Q. I don't know how to set up the flight controller after I get it.

A. ①**Install the flight controller in the correct direction;**

  ②**Connect the receiver, GPS, servo, ESC and other equipment correctly;**

  ③**Set the type of plane;**

  ④**Set the direction of servo(feedback direction);**

  ⑤**Set the RC control direction;**

  ⑥**Set failsafe;**

  ⑦**Use the RC to calibrate level;**

  ⑧**Use the FC to calibrate the ESC.**

Q. When using the FC for the first time, the servo responds abnormally.

A. When using it for the first time, you need to use the RC to unlock the FC, and then restart to perform other operations.

Q.Is the automatic action of the servos normal in RTH?

A.Yes. This is normal for RTH.

Q. Is there any throttle output in RTH during flight?

A. It is recommended to fly normally for more than 6 seconds before switching to RTH. At this time, the throttle is automatically controlled by the flight controller. If you switch to return mode just after takeoff in other modes, it is recommended to manually push the throttle to a point with sufficient power.

Q. Throttle problem in RTH.

A. If assisted takeoff is not performed, there will be no response when pushing the throttle; during assisted takeoff, after the aircraft is shaken or the run-up conditions are met, the throttle begins to slowly increase to the pos of the throttle stick (therefore, the throttle needs to be pushed to sufficient power at the beginning), after starting to hover, the throttle will be automatically controlled based on the cruising speed. At this time, the user can push the throttle up, but cannot pull it down. That is, the flight controller calculates the throttle value that meets the current cruising speed, and then compares it with the current actual throttle stick. The actual output value is the larger of the two.

Q. Why can't the SBUS automatically recognize the failsafe?

A. Because some receivers are not standard SBUS, the flight controller may not be able to automatically identify the failsafe. In this case, the user needs to manually set failsafe.

Q. The RC cannot control servos in RTH.

A. This is a normal phenomenon. In RTH, the servo is automatically controlled by the FC!

Q. The rudder surface response is too small in STAB or other modes.

A. Under normal flight conditions, you can increase the gain appropriately and the control surface response will increase.

Q.Why does the motor keep beeping?

A.*<Throttle control>.*