

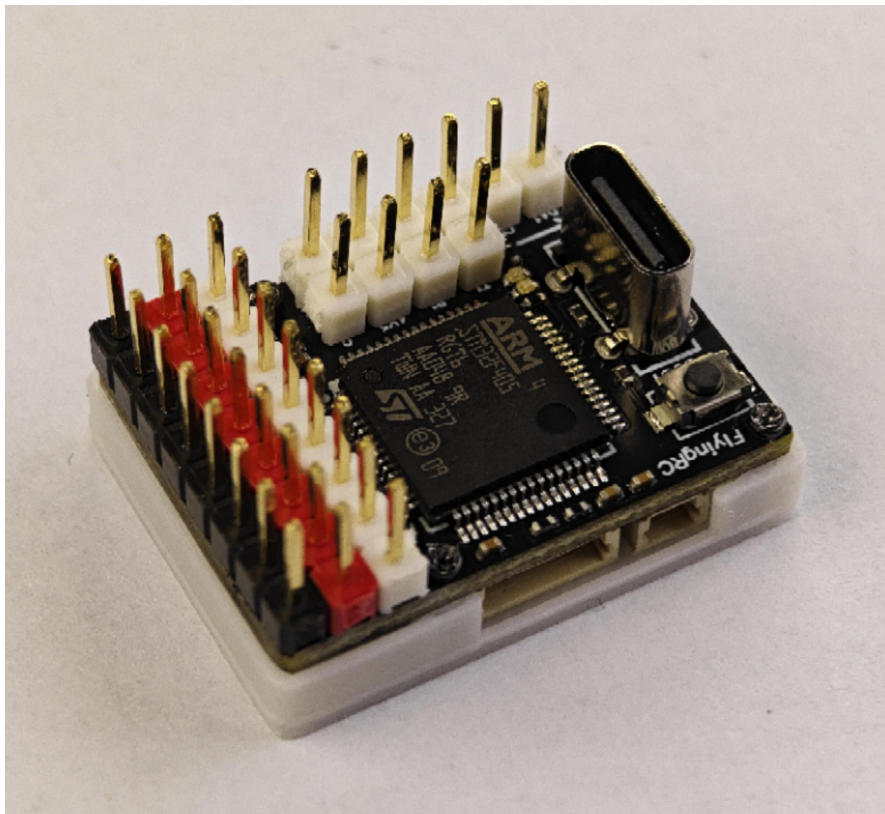
# Product Manual for FlyingRC® F4Wing Mini MK1



## Flight Controller Overview:

- ◆ Main Controller: STM32F405RGT6
- ◆ Gyroscope: ICM42605
- ◆ Barometer: SPL06-001
- ◆ On-board dual LDO (Low Dropout Regulator), independent power supply for sensors, ensuring more stable flight.
- ◆ HD OSD (On-Screen Display), 3×UARTs, 1×SBUS, 6×PWM, 1×I2C
- ◆ Current Meter: External I2C current meter
- ◆ 2.5~30V, 1~6S LiPo Voltage Range: 2.5 – 30V, 1 – 6S LiPo

- ◆ 5V Power Input: 5V
- ◆ Dimensions: 27.9mm×20.3mm×11.2mm
- ◆ Weight: 2.8g (without soldered headers), 5.3g (with soldered headers)



Solder headers, mount the base

### **Product Features:**

- ◆ Ultra-Mini Size: 27.9×20.3×11.2mm, weighing only 2.8g (excluding headers) / ~5.3g with soldered headers.
- ◆ Suitable for small and micro fixed-wing aircraft (e.g., F80, Micro Claw, modified hand-launched planes, Arwing Mini, etc.).

- ◆ Main Controller STM32F405RGT6 (M4 core, 168MHz clock speed, 1MB Flash): Over 5× stronger performance than other closed-source mini flight controllers (using STM32F0 series) from competitors.
- ◆ Gyroscope ICM42605 (3rd-gen TDK sensor), optimized for UAV applications.
- ◆ Barometer SPL06 , a high-precision domestic barometer.
- ◆ Dual on-board LDOs with independent sensor power supply for more stable flight.
- ◆ 7×PWM outputs, 3.5×UARTs (SBUS only occupies half of a UART's resources).
- ◆ Type-C direct plug-in design: Stable connection, longer lifespan; supports mobile ground station parameter tuning via dual-C cable connection to smartphones. (For AP firmware, QGroundControl App is recommended.)
- ◆ No built-in analog current meter (supports external I2C current meter);  
[Battery voltage output via SH1.0 2P interface powers HD Video Transmitter direct port and supports up to 6S input.](#)
- ◆ Supports HD video transmission direct plug-in (SH1.0 6P interface) and HD OSD (e.g., DJI HD, Snail HD, OpenIPC, etc.), excluding analog OSD.
- ◆ Direct plug-in ELRS receiver for extreme size reduction.
- ◆ Supports open-source firmwares (AP, BF, INAV, etc.). AP firmware is

recommended for fixed-wing aircraft, with detailed tutorials and expert support in [the official FlyingRC® group](#).

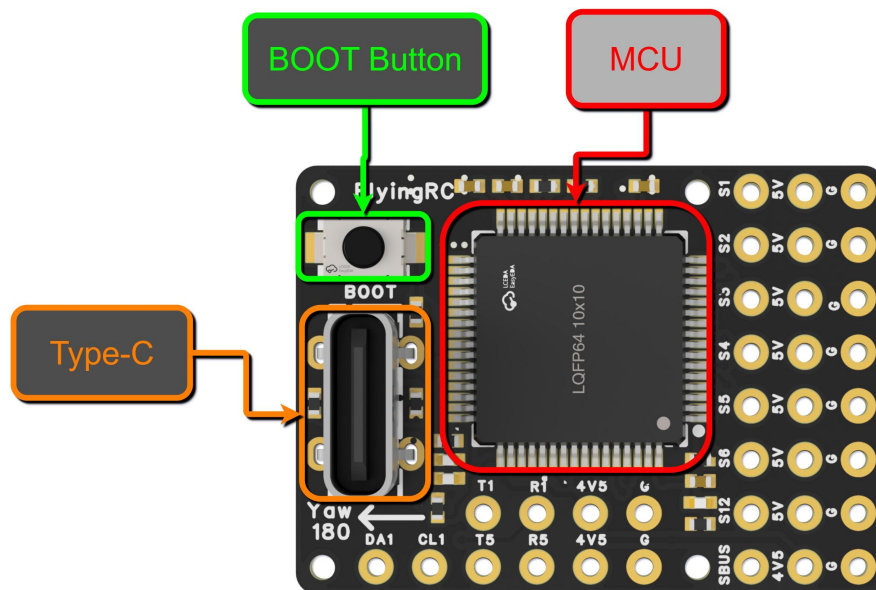
- ◆ Mass production: Black solder mask, immersion gold, resin plugging, 4-layer board, JLC PCB&SMT.

Basic Parameters		Sensors	
Model	FlyingRC® F4Wing Mini	IIMU (Gyroscope & Accelerometer)	ICM42688 / ICM42605
Dimensions	27.9mm*20.3mm*11.2mm	Barometer	SPA06 / SPL06
Mounting Holes	17.8mm*17.8mm M1.2	Magnetometer	None
Weight (Unpopulated Pins)	2.8g	Analog OSD	None
Weight (Soldered Pins)	5.3g		
Weight (Soldered Pins + Base)	6.4g		
MCU		Power Output	
MCU	STM32F405RGT6	Onboard Step-Down Module (BEC)	None
Core Clock Frequency	168MHz		
Flash	1MB		
RAM	192k		
Interfaces		Firmware Support	
UART	3 Ports (UART1, UART4-DJI HD VTX Port, UART5)	Ardupilot	Supported
PWM	7 Channels (1 dedicated to LED)	INAV	Supported
I2C	1	Betaflight	Supported

Current ADC Sampling	None	PX4	Not Supported
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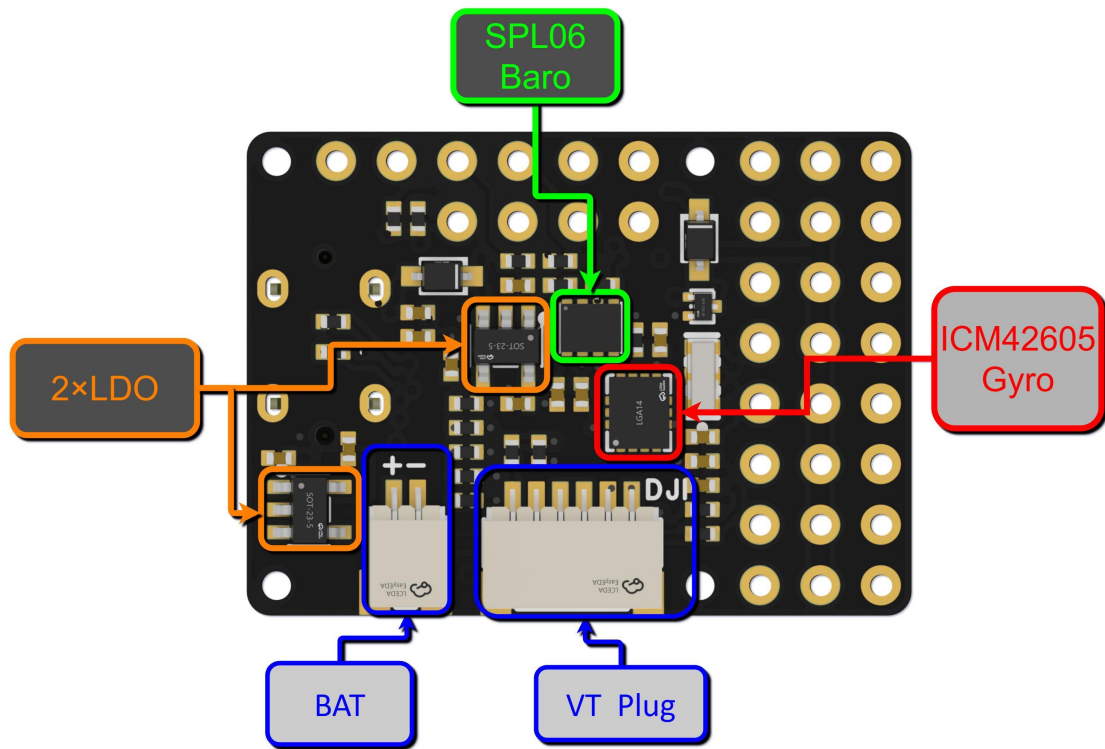
SWD Debug	None	<b>Operating Environment</b>	
Buzzer Port	None		
LED Strip Port	WS2812 Supported	VBAT Input Range	2.5-30V, 1-6S LiPo
USB - TYPE - C	Onboard Direct Plug	Power Input	5V
Black Box Storage	None	Operating Temperature Range	-10-100°C
SBUS	1	Storage Temperature Range	0-40°C

## LAYOUT:



**3D Schematic Diagram of the Flight Controller - Front**

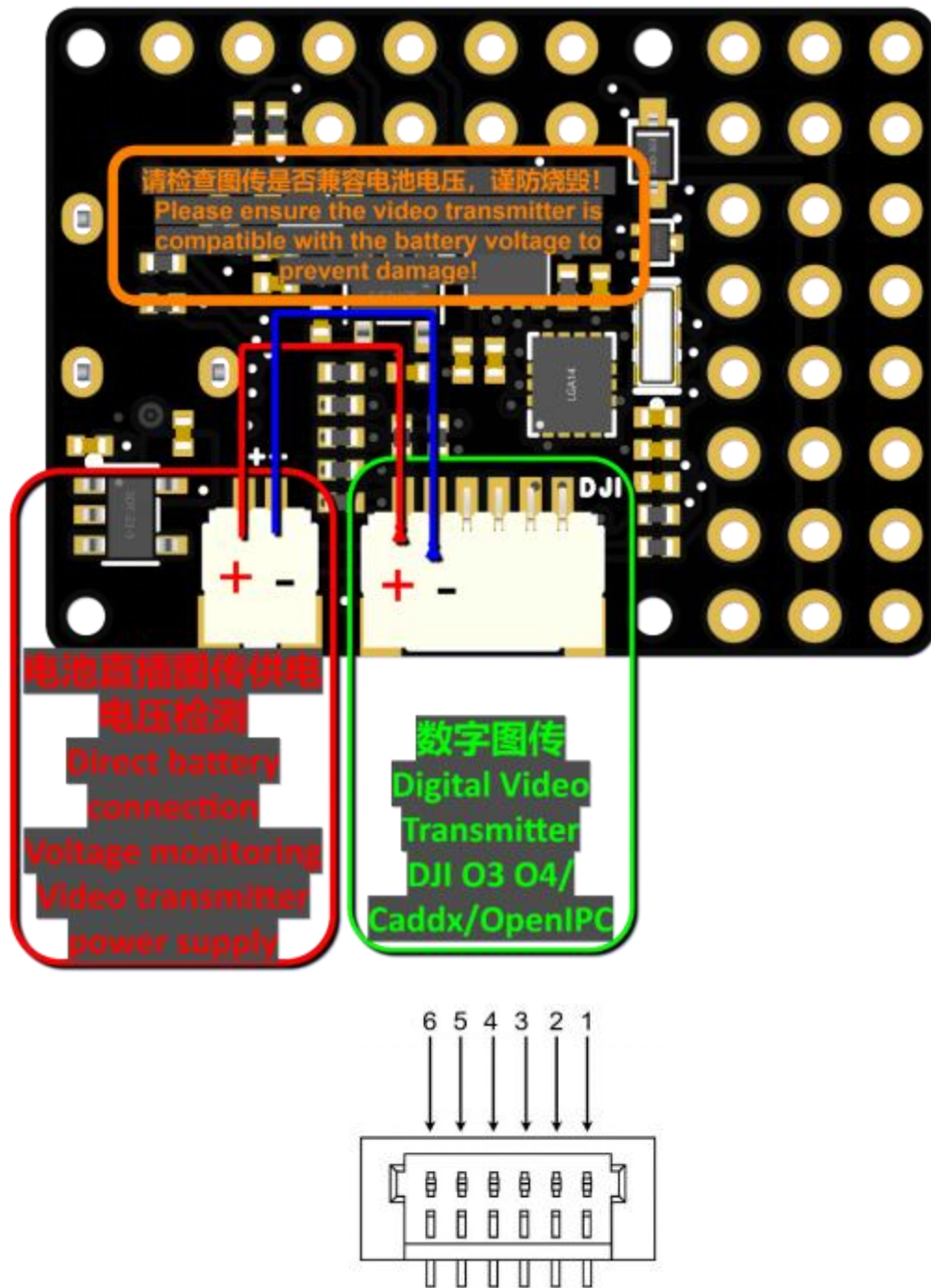
## View



## 3D Schematic Diagram of the Flight Controller - Rear

## View





### 1. Battery Voltage Input Pin Definition。

Pin Number	Pin Name	Pin Definition
1	-	Connect to the battery negative terminal
2	+	Connect to the battery positive terminal

## 2. HD Video Transmission Direct Plug Pin Definition

Pin Number	Pin Name	Pin Definition
1	SBUS	DJI SBUS Remote Control Signal Input (UART8)
2	G	GND
3	R4	OSD MSP RX (UART4)
4	T4	OSD MSP
5	G	GND
6	V	Battery Direct Connection Power Supply

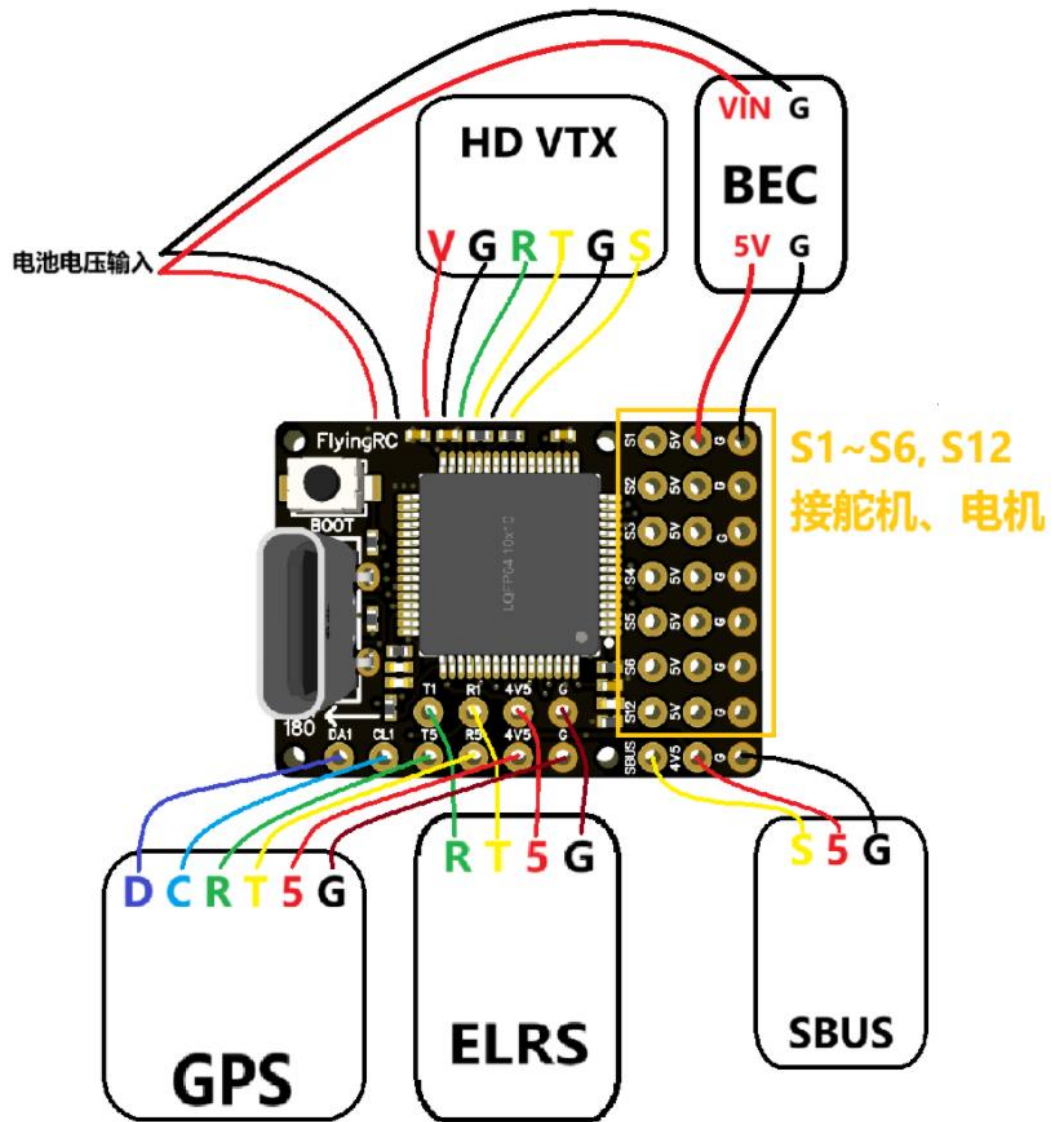
### **Flight Controller Wiring and Partial Settings:**

INAV firmware can be downloaded from the group files (with instructions on joining the group at the end of the manual).

ArduPlane firmware (AP) is recommended for fixed-wing aircraft. AP is pre-flashed as default upon factory shipment.

Download link for the latest stable firmware (as of 2025/01/06): [AP4.5.7](#)

The following wiring examples will use AP firmware.

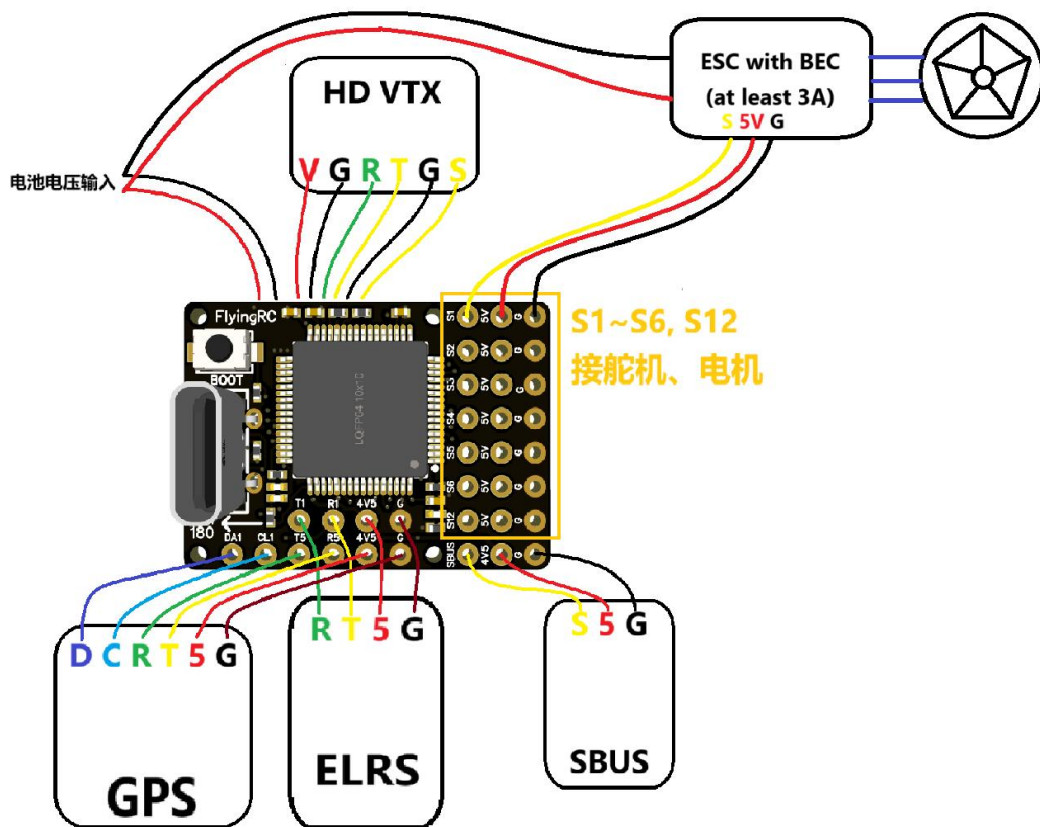


## Wiring Diagram for External Independent BEC

For SBUS receivers or ELRS receivers with Compass GPS and HD Video

Transmitter

*independent BEC option includes the FlyingRC® 5A BEC V1 available in our online store.*



## Wiring Schematic for ESC-Integrated BEC

Compatible with SBUS/ELRS Receivers with Compass GPS and HD Video

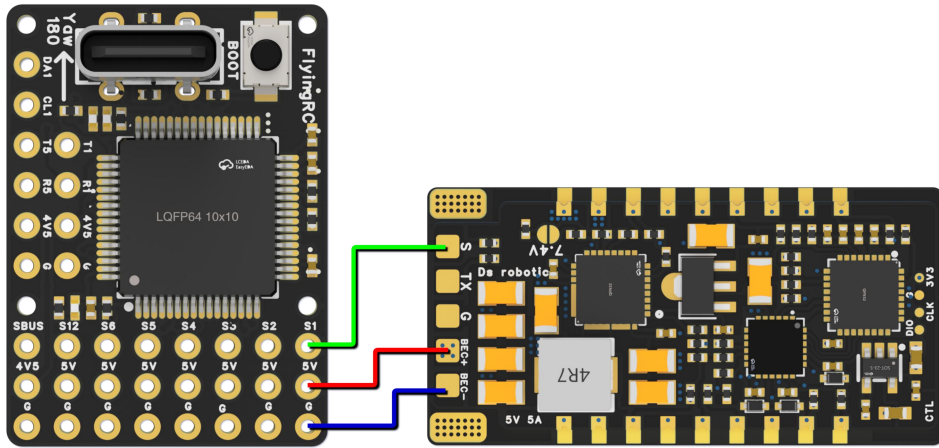
Transmitter

Key notes:

- ESC BEC output must exceed 3A.
- 3A BEC: Supports 2 – 3 × 9g servos; 5A BEC: Supports 4 – 5 × 9g servos.

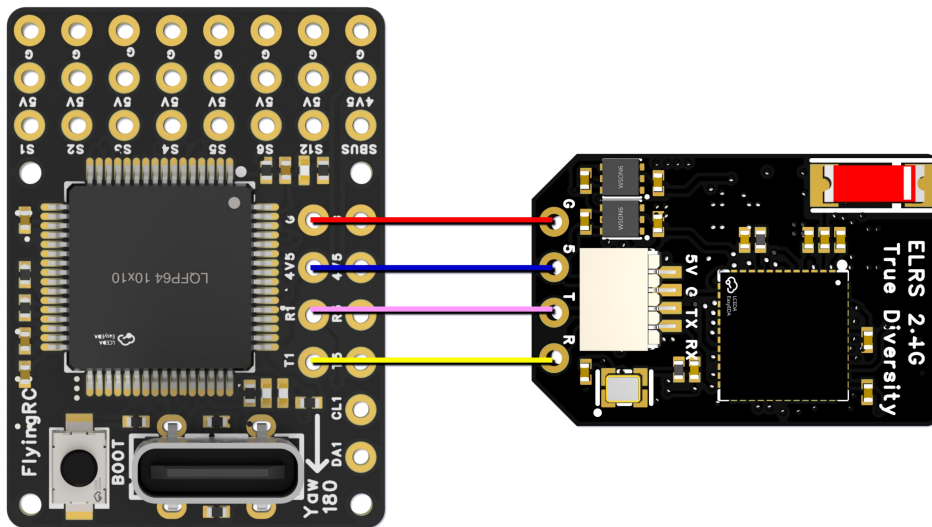
*Recommended option: FlyingRC® 75A ESC V2.5 (BEC version) available in our online store, featuring an onboard 4.5A BEC.*

## (1) Connection of ESC with BEC



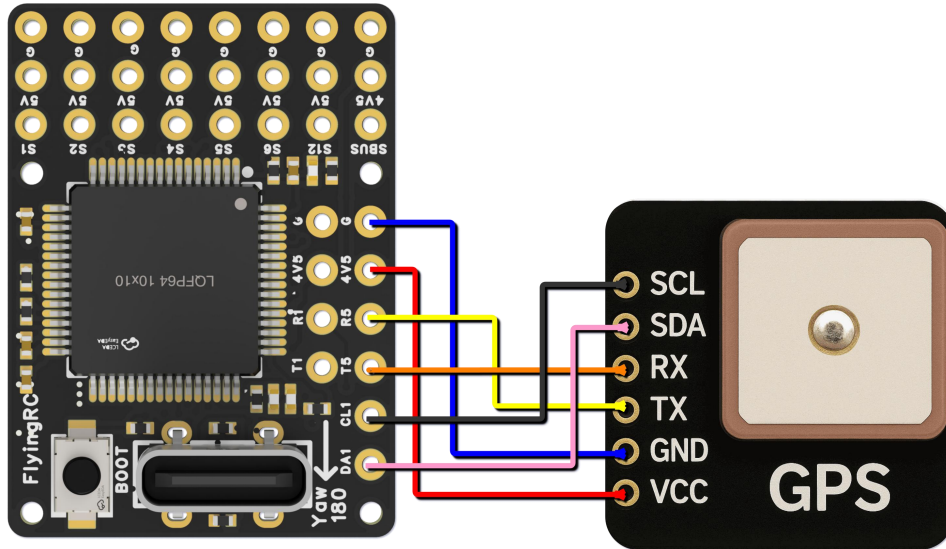
Wiring Diagram for Connection with FlyingRC® AM32 75A Gold-Packed ESC

## (2) ELRS Receiver



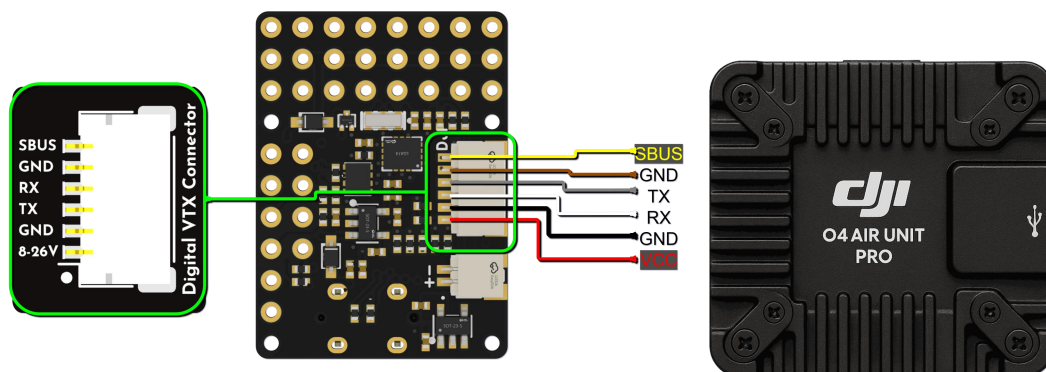
Wiring Diagram for Connection with FlyingRC® ELRS

### (3) GPS



Wiring Diagram for Connection with FlyingRC® GPS

### (4) HD Digital Video Transmission



Connect to Digital Video Transmission



## 1. PWM Output Function

Group1	PWM 5V tolerant I/O	S1	PWM1 GPIO50	TIM8_CH4	DMA/DShot
		S2	PWM2 GPIO51	TIM8_CH3	DMA/DShot
Group2		S3	PWM3 GPIO52	TIM1_CH3N	DMA/DShot
		S4	PWM4 GPIO53	TIM1_CH1	DMA/DShot
Goup3		S5	PWM5 GPIO54	TIM2_CH4	DMA/DShot
		S6	PWM6 GPIO55	TIM2_CH3	DMA/DShot
		S7	PWM7 GPIO56	TIM2_CH2	DMA/DShot
Goup7	LED pad	PWM12 GPIO61	TIM3_CH4	DMA/DShot	
		SERVO12_FUNCTION 120, NTF_LED_TYPES neopixel			

Mixing Dshot and normal PWM operation for outputs is restricted into groups, ie, enabling Dshot for an output in a group requires that ALL outputs in that group be configured and used as Dshot, rather than PWM outputs.

If servo and motor are mixed in same group, make sure this group run lowest PWM frequency according to the servo specification. ie. Servo supports Max. 50Hz, ESC must run at 50Hz in this group.

S12 port can connect to LED, displaying the status of the Flight Controller (AP firmware) through WS2812 light strips.

**PWM ports in the same Group cannot be used for Dshot ESCs and 50Hz PWM servos simultaneously.**

DSHOT All interfaces are compatible with DSHOT.

## 2. Serial Port Mapping

UART 5V tolerant I/O	USB	USB		console	SERIAL0	
	TX1 RX1	USART1	with DMA	telem1	SERIAL1	
	TX5 RX5	UART5	NO DMA	GPS1	SERIAL3	
	TX4 RX4	UART4	NO DMA	USER	SERIAL4	
	SBUS		USART2	with DMA	RC input/Receiver	SERIAL6
					BRD_ALT_CONFIG 0	
Sbs pad		SBUS		Default		

Correspondence between Ardupilot Firmware UART/USART and SERIAL, and Their  
Default Functions

RX4, TX4 (Serial4) The serial port of the HD video transmission direct  
plug-in interface on the rear side of the Flight Controller is RX4/TX4  
(Serial4).

Recommended Device Connections:

- ELRS: Connect to RX1, TX1 (Serial1).
- GPS: Connect to RX5, TX5 (Serial3).

### 3. I2C Devices

I2C	I2C1	5V tolerant I/O	Compass	COMPASS_AUTOD EC	1
			onboard Baro SPL06 - 001	Address	0x76
			Digital Airspeed I2C	ARSPD_BUS	1
			MS4525	ARSPD_TYPE	1
			DLVLR - L10D	ARSPD_TYPE	9

The built-in barometer occupies the 0x76 address. Do not externally connect any device with the address 0x76.

### Pin Header Soldering Guide:

#### Tools and Consumables Preparation:

Digital soldering iron/soldering station (recommended: T12 series or 936 series), solder wire (recommended: 63% tin content), several pin headers (included with the Flight Controller)

## **Soldering Tips:**

1. A "k" soldering tip is more efficient for soldering than a pointed tip.
2. Prioritize high-quality solder – it is more critical than the soldering iron itself.
3. A premium soldering iron (e.g., T12 series) is still recommended for optimal performance.
4. If solder fluidity decreases, use soldering flux (search "BGA soldering flux" on Taobao, recommended brand: Anlixin).
5. Ensure no solder bridges form between adjacent components during soldering.
6. Pre-soldered pin headers are recommended for convenience.

[You can scan the QR code to join the official FlyingRC® group for technical communication, firmware downloads and other resources.](#)

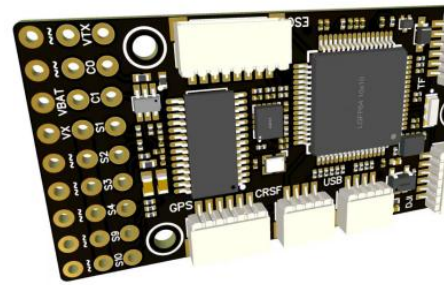
## Other FlyingRC® Products

① FlyingRC® F4WSE Pro – F405 Fixed-Wing Flight

Controller

Upgraded Version | Enhanced Performance

Manual: <https://www.kdocs.cn/l/cavm9EoVEq5A>

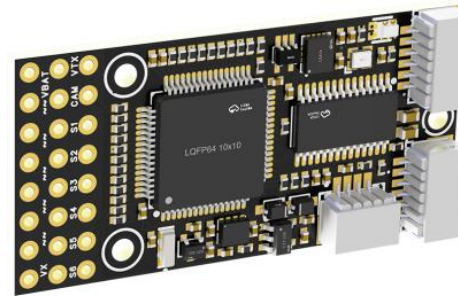


② FlyingRC® F4WSE MK1.5 – F405 Fixed-Wing Flight

Controller

Classic model, unique design, highly acclaimed.

Manual: <https://kdocs.cn/l/cpyd8MTS56DD>

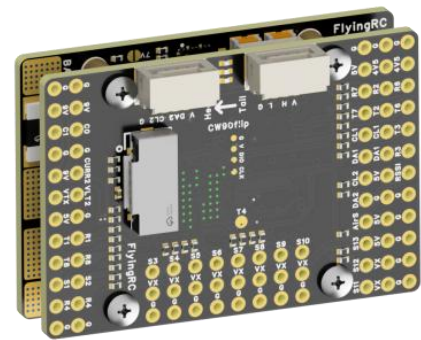


③ FlyingRC® H7Wlite MK1 H743 Fixed-Wing Flight

Controller

Flagship performance, full expansion, high-power BEC.

Manual: <https://kdocs.cn/l/cpYaBiFKh8U1>



④ FlyingRC® F4Wing Mini MK1 F405 Fixed-Wing Flight

Controller

2025 bestseller, ultra-compact, smallest on the market, great value.

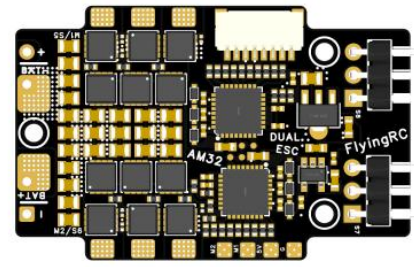
Manual: <https://kdocs.cn/l/cdUIDmpSpW7J>



⑤ FlyingRC® AM32 Dual ESC 40A 2-in-1 ESC

Unique design for dual-power aerial, land and water vehicles including drones.

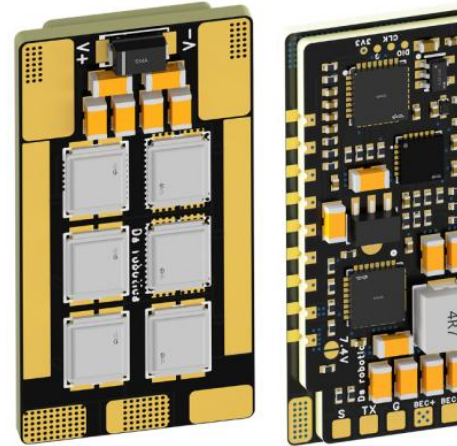
Manual: <https://www.kdocs.cn/l/cjwNtsKK6HeR>



⑥ FlyingRC® AM32 ESC V2.5 75A - Single ESC

Infineon gold-package MOSFETs, premium materials, superior heat dissipation.

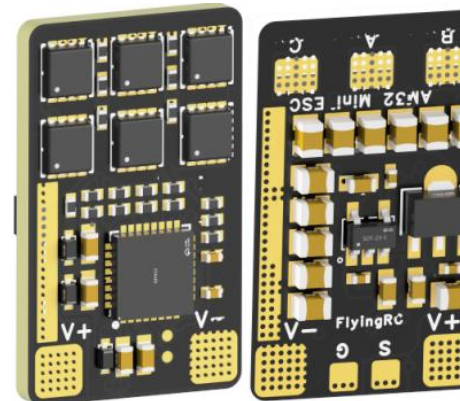
Manual: <https://kdocs.cn/l/cv6hUy67IdTJ>



⑦ FlyingRC® AM32 Mini ESC 40A V1.0 - Single ESC

Ultra-miniature, ideal for micro drones, high over-current capability, stable operation.

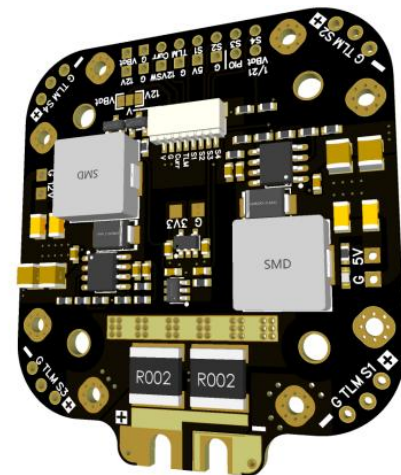
Manual: <https://kdocs.cn/l/cqdLSysEyWFh>



⑧ FlyingRC® 10A 12S 440A Power Distribution Board for FPV Drones

Industry top choice, excellent quality and affordable price.

Manual: <https://kdocs.cn/l/coel7OgrICBP>



- ⑨ FlyingRC® H7D MK1 H743 FPV Flight Controller with Dual Gyro

Powerful computing, stable and precise flight, rich interfaces, smooth control.

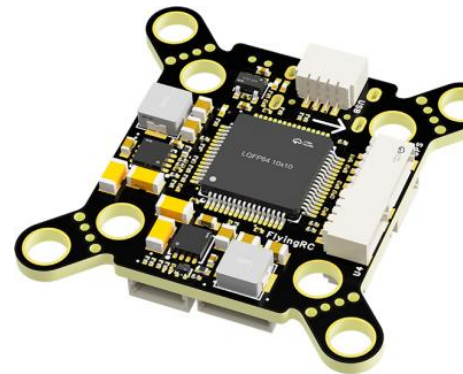
Manual: <https://kdocs.cn/l/cqMh1I0RwAoD>



- ⑩ FlyingRC® F420 MK1 F405 FPV Flight Controller (20/30.5mm Mounting)

Dual mounting holes, all connectors, no soldering required, compliant with Betaflight interface standards.

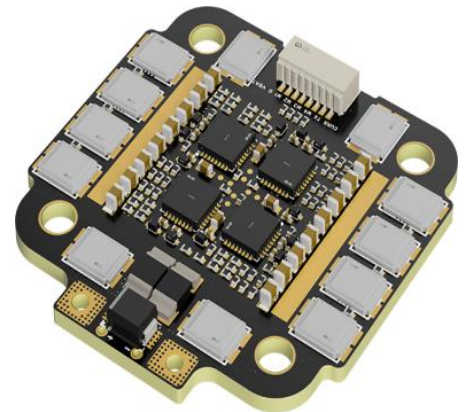
Manual: <https://kdocs.cn/l/ctGeLiN9ZYKj>



- ⑪ FlyingRC® 4-in-1 75A V3.2 Gold-Sealed FPV ESC

Infinion gold-package MOSFETs, superior heat dissipation & over-current capability, premium choice.

Manual: <https://kdocs.cn/l/ceLilc8Gaa21>



- ⑫ FlyingRC® Stack Combo: H743 Flight Controller + 4-in-1 75A Gold-Sealed ESC

Professional flight choice, flagship materials & craftsmanship, reasonable price.

Manual: <https://kdocs.cn/l/cqMh1I0RwAoD>

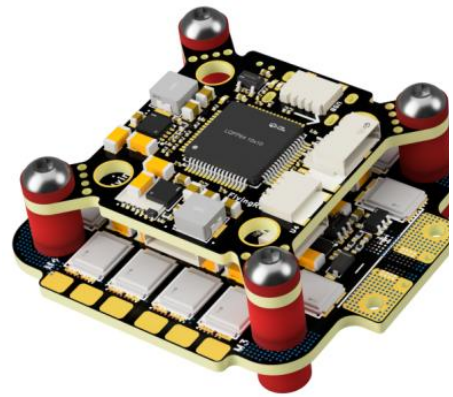
<https://kdocs.cn/l/ceLilc8Gaa21>



- ⑬ FlyingRC® Stack Combo: F405 Flight Controller + 4-in-1  
75A Gold-Sealed ESC

Best-selling combo, excellent performance, affordable price.

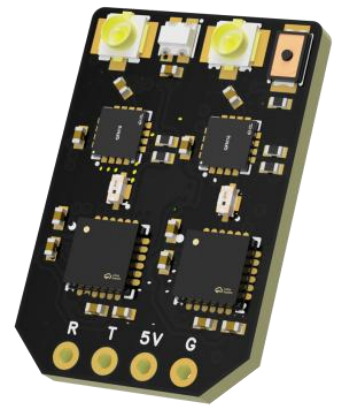
Manual: <https://kdocs.cn/l/ctGeLiN9ZYKj>  
<https://kdocs.cn/l/ceLilc8Gaa21>



- ⑭ FlyingRC® ELRS 2.4G Diversity Receiver

True diversity reception, temperature compensation, high-sensitivity reception.

Manual: <https://kdocs.cn/l/cbvlOlShmsPS>



- ⑮ FlyingRC® 10A 12S BEC Step-Down Module

Wide voltage input, high power, compact size, multiple voltages available, 10A continuous output.

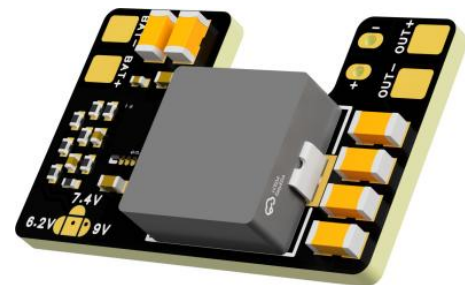
Manual: <https://kdocs.cn/l/clssNCKgNhLV>



- ⑯ FlyingRC® 5A BEC Step-Down Module

Ultra-small size, multiple voltages available, 5A continuous output.

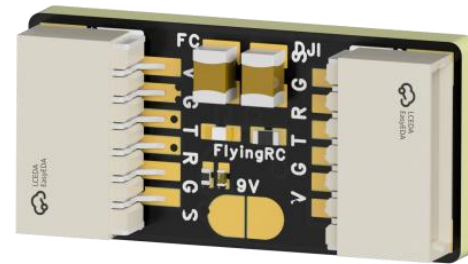
Manual: <https://kdocs.cn/l/cb9VdNywqCKA>



⑰ FlyingRC® Mini BEC For DJI O4

Easy wiring, ultra-small size, stable power supply.

Manual: <https://www.kdocs.cn/l/ckkebieur37K>



⑱ FlyingRC® CAN Bus Serial & PWM Expansion Board

Long-distance transmission, high speed, excellent stability.

Manual: <https://www.kdocs.cn/l/cmXRyBnU4BXj>



⑲ FlyingRC® AM3 2ESC Programmer

Supports BL, BL32, AM32. Simple and easy to use.

Manual: <https://kdocs.cn/l/cogBSEBe67mE>



⑳ FlyingRC® Digital Airspeed Sensor without Pitot Tube

Integrated design, smallest on the market. MS4525D protocol, I2C interface.

Manual: <https://www.kdocs.cn/l/clPvEEEcJgCC>



②1 FlyingRC® U-Blox M10 GPS

Compatible with all open-source flight controllers.

Manual: <https://www.kdocs.cn/l/cdSYQrzx7408>

