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## Versatile F405 5IN1 AIO

1-2S 12A 400mw  
Bulit-in ELRS 2.4G

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# User Manual v1

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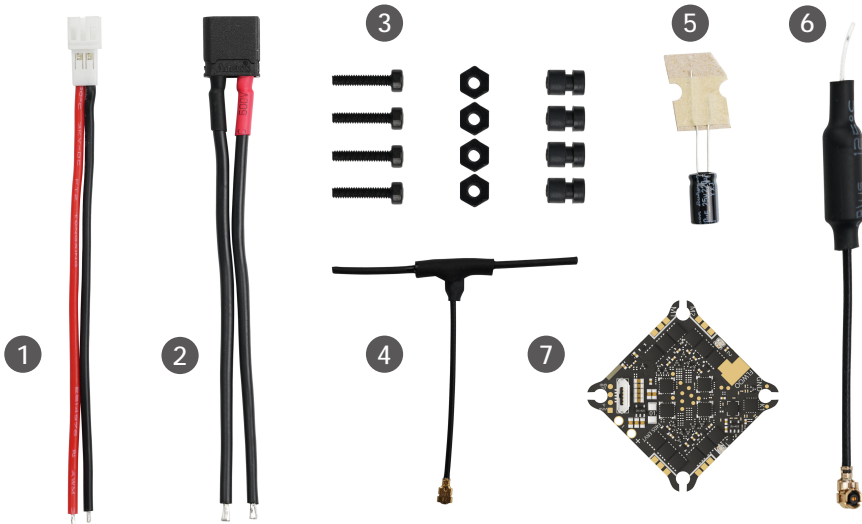
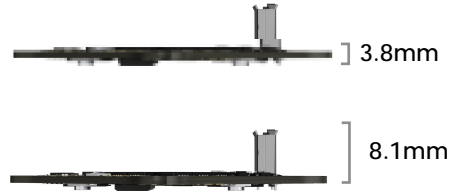
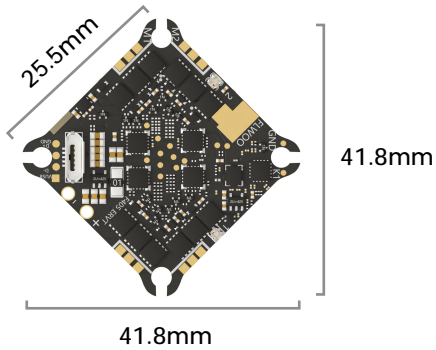
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# Specs Overview

<b>Product Name</b>	<b>Versatile F405 5IN1 AIO</b> 1-2S 12A 400mw Bult-in ELRS 2.4G
<b>MCU</b>	STM32F405 BGA
<b>GYRO</b>	ICM42688
<b>Barometer</b>	SPL06
<b>Black Box</b>	8M
<b>LED</b>	Supported
<b>OSD</b>	Supported
<b>Buzzer</b>	Supported
<b>UART</b>	1,2,3,4,6
<b>Built-in Receiver</b>	ExpressLRS 2.4G
<b>Built-in VTX</b>	25/50/100/200/400mw
<b>VTX Protocol</b>	IRC Tramp
<b>ESC Protocol</b>	Oneshot125,Oneshot42,Multishot, Dshot150,Dshot300,Dshot600.
<b>Continuous Current</b>	12A*4
<b>Input Voltage</b>	1S-2S (3V-8.7V)
<b>BF Firmware Target</b>	FLYWOO F405S_AIO
<b>ELRS Firmware</b>	Flywoo EL24E 2400 RX 3.0.0
<b>ESC Firmware</b>	Z_H_30_REV16.7(BLHELI_S)
<b>Size</b>	30.3*30.3mm
<b>Mounting</b>	25.5*25.5-3mm
<b>Weight</b>	4.6g (Without Antenna) 5.7g (With Antenna)

# Dimensions + Package



1 1x PH2.0 Connector

2 1x Amass XT30 Connector

3 1x Hardware Set

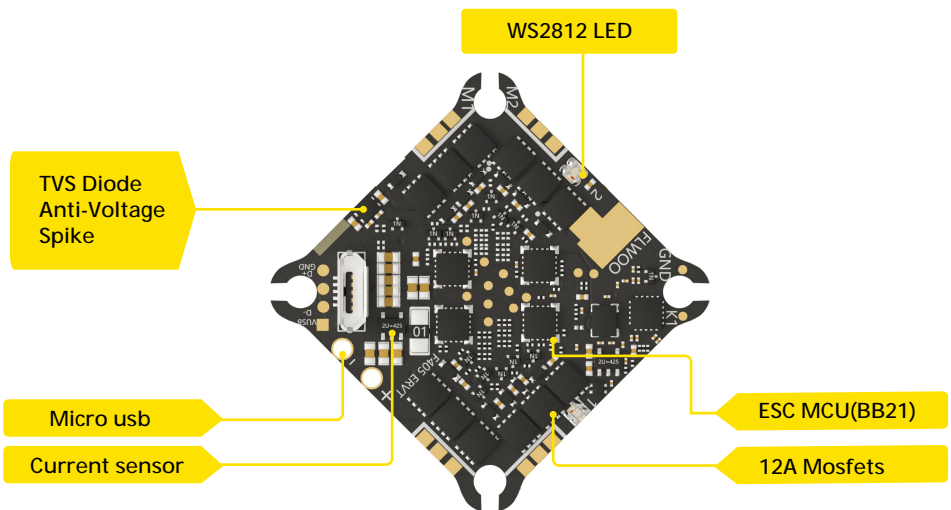
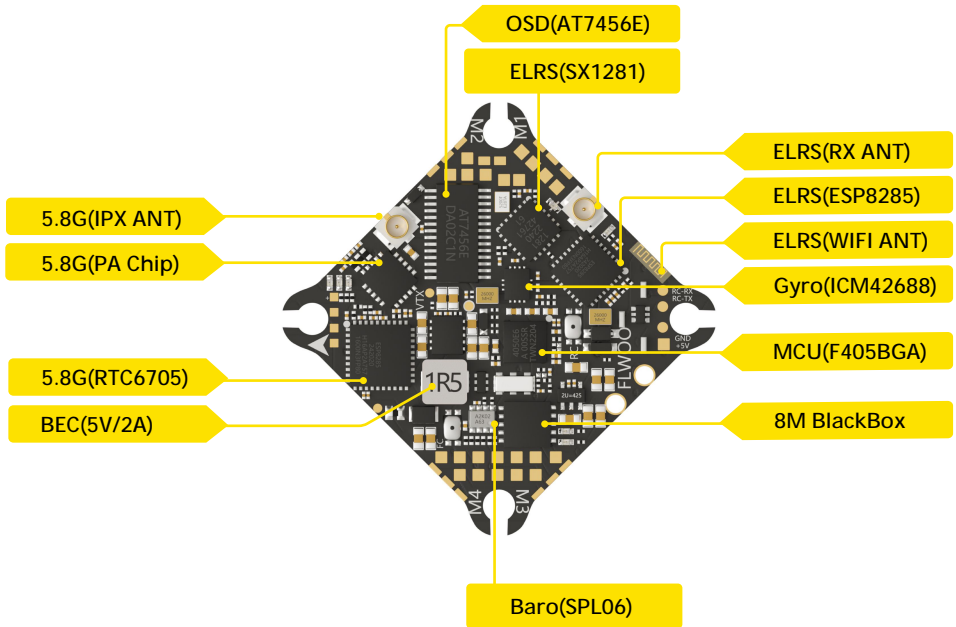
4 1x ELRS 2.4g T Antenna

5 1x 25V 220UF Capacitor

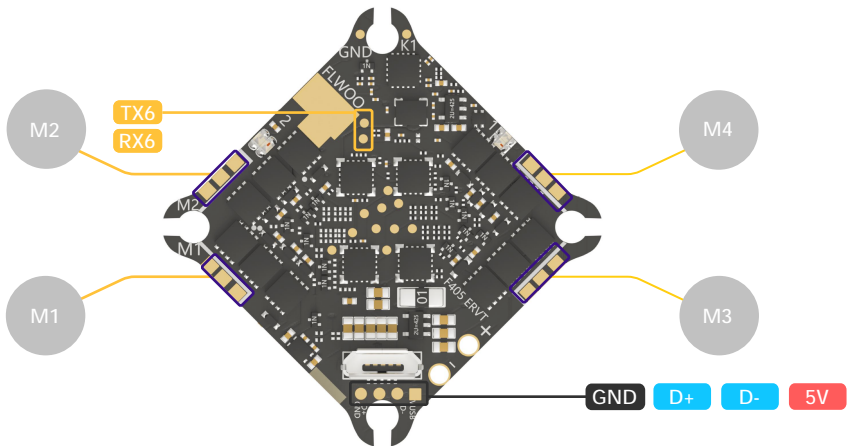
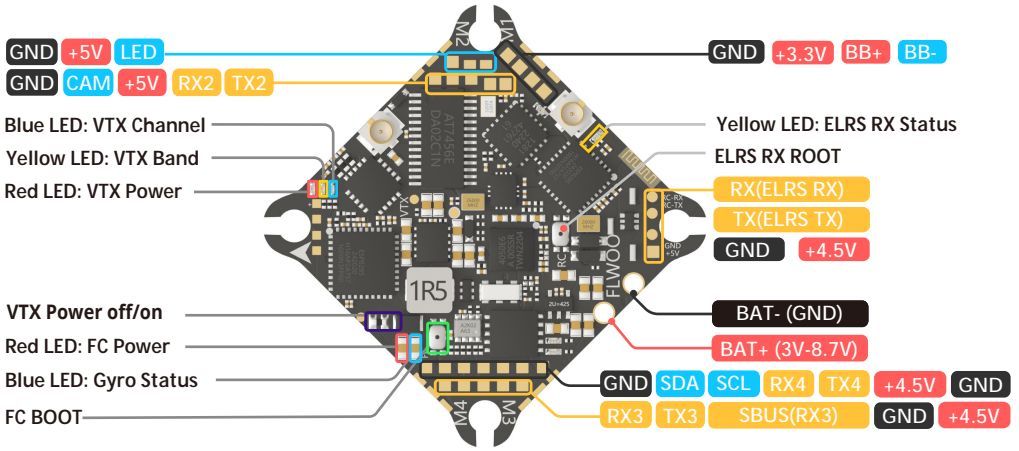
6 1x 5.8G Antenna

7 1x GOKU Versatile F405 5IN1 AIO

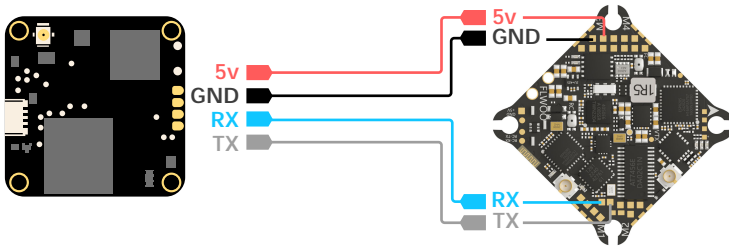
# Chip Layout



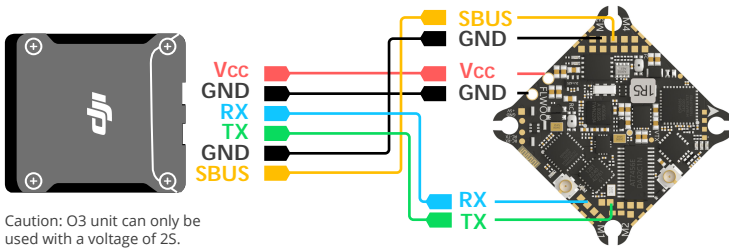
# Pad Layout



# Wiring Diagram

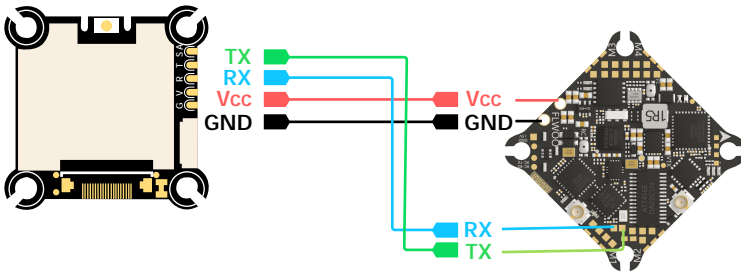


Identifier	Configuration/MSP	Serial Rx	Telemetry Output	Sensor Input	Peripherals
USB VCP	<input checked="" type="checkbox"/> 115200	<input type="checkbox"/>	Disabled   AUTO	Disabled   AUTO	Disabled   AUTO
UART1	<input type="checkbox"/> 115200	<input type="checkbox"/>	Disabled   AUTO	Disabled   AUTO	Disabled   AUTO
UART2	<input checked="" type="checkbox"/> 115200	<input type="checkbox"/>	Disabled   AUTO	Disabled   AUTO	VTX (MSP + D)   AUTO



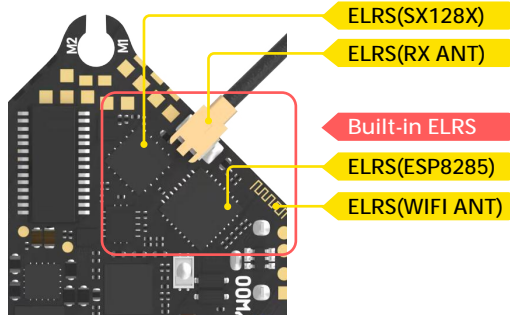
Caution: O3 unit can only be used with a voltage of 2S.

Identifier	Configuration/MSP	Serial Rx	Telemetry Output	Sensor Input	Peripherals
USB VCP	<input checked="" type="checkbox"/> 115200	<input type="checkbox"/>	Disabled   AUTO	Disabled   AUTO	Disabled   AUTO
UART1	<input type="checkbox"/> 115200	<input type="checkbox"/>	Disabled   AUTO	Disabled   AUTO	Disabled   AUTO
UART2	<input checked="" type="checkbox"/> 115200	<input type="checkbox"/>	Disabled   AUTO	Disabled   AUTO	VTX (MSP + D)   AUTO
UART3	<input type="checkbox"/> 115200	<input checked="" type="checkbox"/>	Disabled   AUTO	Disabled   AUTO	Disabled   AUTO



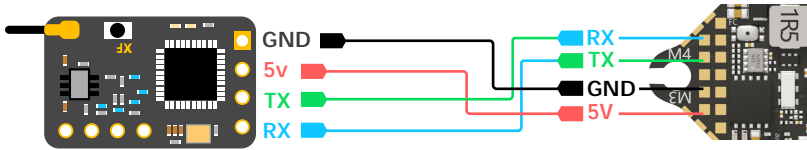
Identifier	Configuration/MSP	Serial Rx	Telemetry Output	Sensor Input	Peripherals
USB VCP	<input checked="" type="checkbox"/> 115200	<input type="checkbox"/>	Disabled   AUTO	Disabled   AUTO	Disabled   AUTO
UART1	<input type="checkbox"/> 115200	<input type="checkbox"/>	Disabled   AUTO	Disabled   AUTO	Disabled   AUTO
UART2	<input checked="" type="checkbox"/> 115200	<input type="checkbox"/>	Disabled   AUTO	Disabled   AUTO	VTX (MSP + D)   AUTO

# Receiver Wiring Configuration Diagram



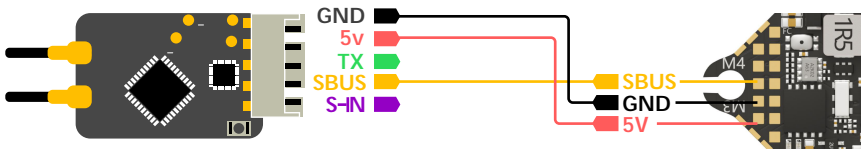
Identifier	Configuration/MSP	Serial Rx	Telemetry Output	Sensor Input	Peripherals	Receiver
USB VCP	<input checked="" type="checkbox"/> 115200	<input type="checkbox"/>	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	Serial (via UART) ▾ Receiver Mode
UART1	<input type="checkbox"/> 115200	<input checked="" type="checkbox"/>	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	<ul style="list-style-type: none"> <li>The UART for the receiver must be set to 'Serial Rx' (in the Ports tab)</li> <li>Select the correct data format from the drop-down, below:</li> </ul>
UART2	<input type="checkbox"/> 115200	<input type="checkbox"/>	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	
UART3	<input type="checkbox"/> 115200	<input type="checkbox"/>	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	
						CRSF ▾ Serial Receiver Provider

## TBS Nano RX



Identifier	Configuration/MSP	Serial Rx	Telemetry Output	Sensor Input	Peripherals	Receiver
USB VCP	<input checked="" type="checkbox"/> 115200	<input type="checkbox"/>	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	Serial (via UART) ▾ Receiver Mode
UART1	<input type="checkbox"/> 115200	<input type="checkbox"/>	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	<ul style="list-style-type: none"> <li>The UART for the receiver must be set to 'Serial Rx' (in the Ports tab)</li> <li>Select the correct data format from the drop-down, below:</li> </ul>
UART2	<input type="checkbox"/> 115200	<input type="checkbox"/>	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	
UART3	<input type="checkbox"/> 115200	<input checked="" type="checkbox"/>	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	
						CRSF ▾ Serial Receiver Provider

## Frsky R-XSR

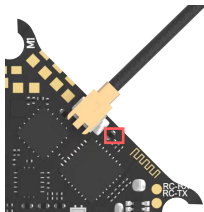


Identifier	Configuration/MSP	Serial Rx	Telemetry Output	Sensor Input	Peripherals	Receiver
USB VCP	<input checked="" type="checkbox"/> 115200	<input type="checkbox"/>	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	Serial (via UART) ▾ Receiver Mode
UART1	<input type="checkbox"/> 115200	<input type="checkbox"/>	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	<ul style="list-style-type: none"> <li>The UART for the receiver must be set to 'Serial Rx' (in the Ports tab)</li> <li>Select the correct data format from the drop-down, below:</li> </ul>
UART2	<input type="checkbox"/> 115200	<input type="checkbox"/>	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	
UART3	<input type="checkbox"/> 115200	<input checked="" type="checkbox"/>	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	Disabled ▾ AUTO ▾	
						SBUS ▾ Serial Receiver Provider

# Receiver Frequency Calibration Steps

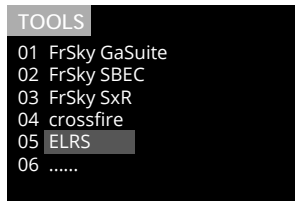
## 1.1

The FC quickly turns on and off the power three times, with the yellow light flashing twice.



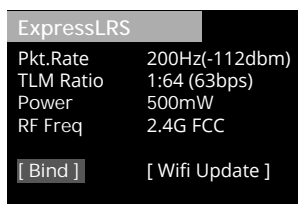
## 1.2

Open the tool menu on the remote controller and select ExpressLRS.



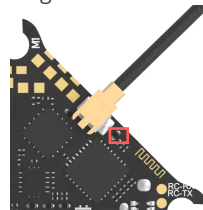
## 1.3

Click on BIND.



## 1.4

The yellow light stays on, indicating a successful BIND.



## Tips:

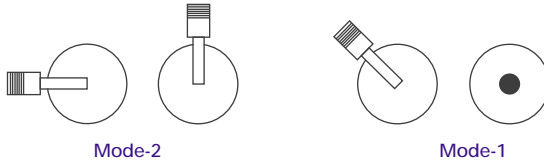
1. Please make sure that the ELRS TX and RX are on the same firmware version, otherwise binding will not be possible.
2. ELRS RX yellow status LED:
  - Steady LED indicates successful frequency calibration or normal communication.
  - Fast flashing LED indicates that the receiver is in frequency calibration mode.
  - Slow flashing LED indicates that the receiver has no transmitter signal or has not been frequency calibrated.
  - Rapid flashing LED indicates that it is in Wi-Fi flashing mode, and you can connect to Wi-Fi to flash the firmware in this state.



# Adjustment of VTX Power and Channels

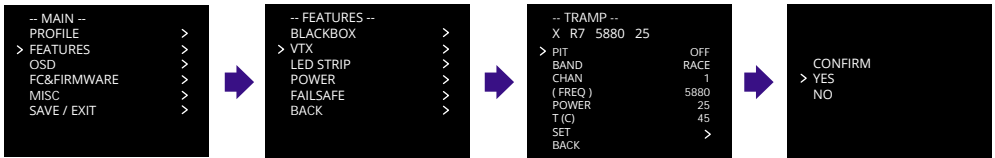
## 1.1

Turn on the transmitter, THR middle, YAW left, PITCH up, enter the OSD menu.



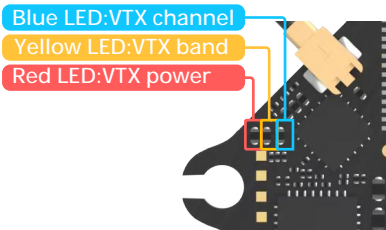
## 1.2

The PITCH moves the cursor up and down, and the ELE right to enter the next item. Now, save and exit.



## 1.3

Definition of VTX LEDs.



- The number of blue light flashes represents the channel.
- The number of yellow light flashes represents the frequency band.
- The number of red light flashes represents the power level.

## Frequency table:

FR/CH	CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
A	5865	5845	5825	5805	5785	5765	5745	5725
b	5733	5752	5771	5790	5809	5828	5847	5866
E	5705	5685	5665	5645	5885	5905	5925	5945
F	5740	5760	5780	5800	5820	5840	5860	5880
r	5658	5695	5732	5769	5806	5843	5880	5917

## Usage Precautions:

1. Before powering on, make sure to install the antenna for the VTX.
2. Do not keep the power on when the device is on the ground for an extended period of time to avoid hardware damage caused by high temperatures.
3. Pay attention to the input voltage of the flight controller and ensure it is within the specified range.
4. The flight controller generates high temperature during continuous operation, so avoid touching it to prevent burns.

## *Troubleshooting FAQ:*

**Q** : Why does the flight controller get hot when plugged into the computer for tuning ?

**A** : The flight controller board has a built-in video transmitter and receiver. When connected with a micro USB cable, it starts working and generates heat, which is a normal phenomenon. If the flight controller gets too hot, it is recommended to let it sit for a few minutes to allow for heat dissipation.

**Q** : Can the built-in ELRS be turned off ?

**A** : Yes, when using a Black Sheep receiver, you need to change the receiver serial port in the ground station. The built-in receiver will not interfere with the signal transmission and reception of an external receiver.

**Q** : Can other versions of ELRS firmware be flashed to the built-in receiver ?

**A** : Yes, it is possible. This flight controller has a complete receiver serial port and Wi-Fi flashing capability. You can use the ELRS ground station or connect to the receiver's Wi-Fi for firmware flashing.