Xiangtat F405 V5

Xiangtat F405 V5 Flight Controller Stack Instruction Manual

Model: F405 V5

1. Introduction

This manual provides detailed instructions for the installation, operation, and maintenance of the Xiangtat F405 V5 Flight Controller Stack. This integrated unit combines an F405 V5 Flight Controller with a 55A 4-in-1 Electronic Speed Controller (ESC), designed for FPV drone applications. Key features include Bluetooth connectivity for wireless configuration, a built-in barometer, Blackbox functionality, and compatibility with DJI O3 Air Units.

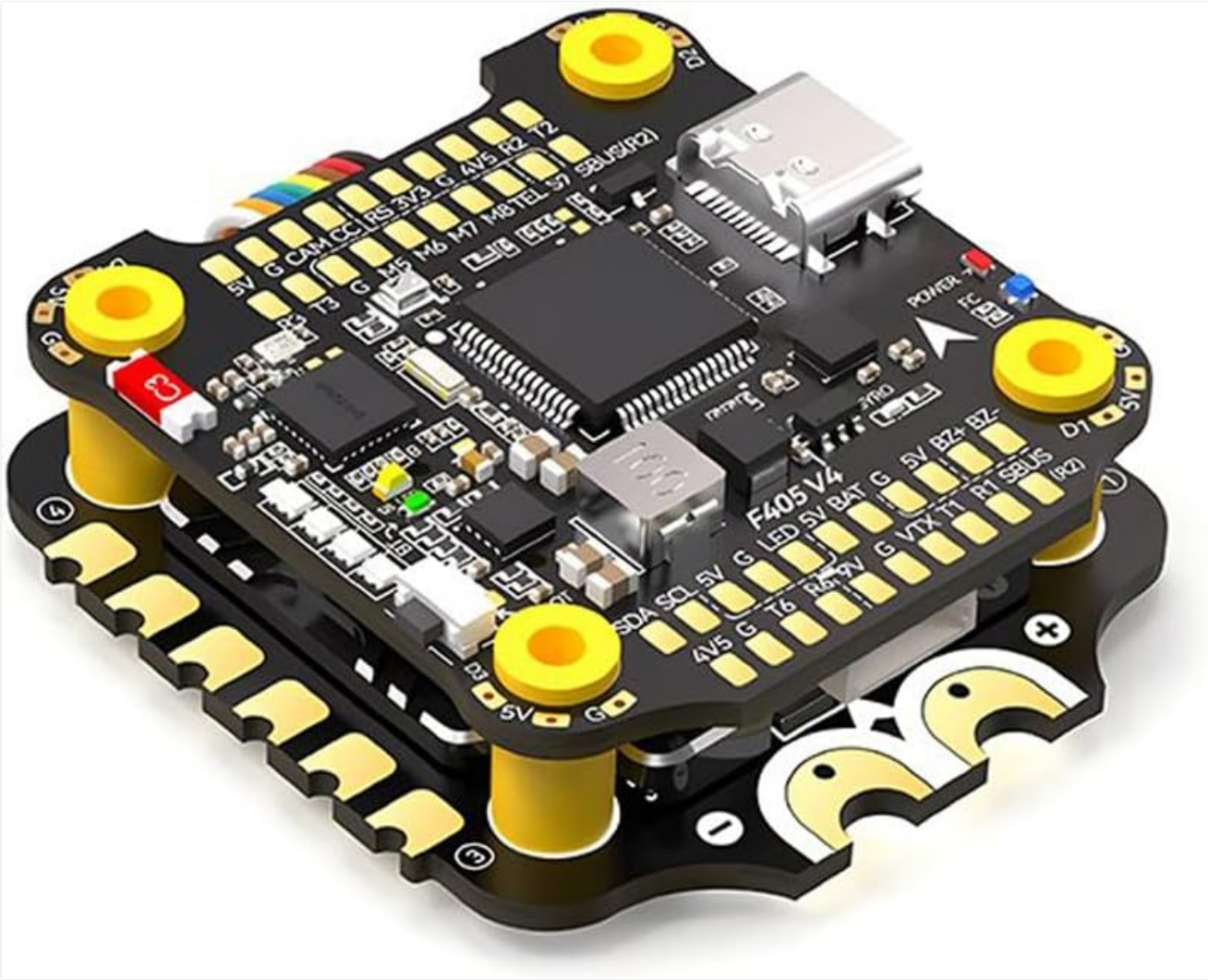

Figure 1: Xiangtat F405 V5 Flight Controller Stack. This image displays the stacked flight controller and ESC boards, highlighting various connection pads and the USB port.

2. Setup and Installation

2.1 Component Overview

The F405 V5 stack consists of two main boards: the Flight Controller (FC) and the 4-in-1 Electronic Speed Controller (ESC). Ensure all components are present and undamaged before proceeding with installation.

- **Flight Controller (FC):** F405 V5 with integrated Bluetooth, Barometer, and Blackbox (SD card slot).
- **Electronic Speed Controller (ESC):** 55A 4-in-1 ESC with BB21 MCU, large motor pads, filtering SMT capacitors, and onboard TVS protective diode.

2.2 Physical Installation

1. **Mounting:** The stack features a 30.5x30.5mm mounting pattern. Securely mount the FC and ESC to your drone frame using appropriate standoffs and screws. Ensure proper isolation from vibrations.
2. **Motor Connections:** Solder your motor wires to the large motor pads on the 55A 4-in-1 ESC. The ESC is designed for easy soldering. Refer to your motor's specifications for correct wiring.
3. **Power Connection:** Connect your LiPo battery to the designated battery pads on the ESC. The ESC supports up to 6S LiPo batteries.
4. **Receiver Connection:** Connect your receiver to the appropriate UART on the Flight Controller. The FC provides multiple UARTs for various peripherals.

5. **FPV Camera:** Utilize the cutouts and designated pads for FPV camera connections.
6. **DJI O3 Air Unit:** The FC supports DJI Plug & Play for seamless integration with DJI O3 Air Units. Connect according to the DJI O3 Air Unit's instructions.
7. **GPS Module:** A 4.5V output is available for connecting a GPS module.
8. **SD Card:** Insert a microSD card (up to 4GB) into the dedicated slot on the FC for Blackbox logging.

2.3 Initial Configuration (Betaflight)

The F405 V5 Flight Controller runs Betaflight firmware. Initial setup can be performed via USB connection to a computer or wirelessly via Bluetooth using the SpeedyBee app.

- **USB Connection:** Connect the FC to your computer using a USB-C cable. Open the Betaflight Configurator software.
- **Driver Installation:** Ensure all necessary drivers are installed for your operating system to recognize the FC.
- **Firmware Flashing:** It is recommended to flash the latest stable Betaflight firmware for the F405 target.
- **Basic Configuration:** Configure your receiver, modes, OSD, and other essential settings within Betaflight Configurator.

2.4 Wireless Configuration via Bluetooth

The F405 V5 features integrated Bluetooth for wireless configuration of both the FC and ESC using a compatible mobile application (e.g., SpeedyBee app).

1. **Download App:** Download and install the SpeedyBee app on your smartphone.
2. **Power On:** Power on your drone (connect battery).
3. **Connect via Bluetooth:** Open the app, search for your FC's Bluetooth signal, and connect.
4. **FC Configuration:** Adjust Betaflight settings wirelessly through the app interface.
5. **ESC Configuration:** The app supports wireless ESC configuration for BLHeli32, BLHeli_S, and BlueJay ESCs, allowing for easy motor direction adjustments and other ESC parameters.

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Video 1: Overview of the Xiangtat F405 V5 Flight Controller Stack features, including wireless configuration via Bluetooth, 55A 4-in-1 ESC, battery indicators, and various connection points. This video is provided by Lotus Mall, the seller.

3. Operation

3.1 Flight Controller Functions

- **Flight Modes:** Configure various flight modes (e.g., Acro, Angle, Horizon) in Betaflight to suit your flying style.
- **PID Tuning:** Adjust PID (Proportional-Integral-Derivative) values for optimal flight performance. This can be done wirelessly via the SpeedyBee app.
- **Blackbox Logging:** The integrated Blackbox records flight data to the microSD card, which can be analyzed later for tuning and troubleshooting.
- **Barometer:** The built-in barometer provides accurate altitude hold capabilities.

3.2 Electronic Speed Controller (ESC) Functions

- **Motor Control:** The 55A 4-in-1 ESC provides precise control over your drone's motors.
- **Motor Direction:** Easily reverse motor directions wirelessly using the SpeedyBee app, eliminating the need for physical rewiring or complex software procedures.

- **Battery Life Indicator:** The ESC features a 4-level LED battery indicator, providing real-time visual feedback on your battery's charge status (25%, 50%, 75%, 100%).

4. Maintenance

- **Regular Inspection:** Periodically inspect all solder joints and connections for integrity. Check for any signs of physical damage to the boards or components.
- **Cleaning:** Keep the flight controller and ESC free from dust, dirt, and moisture. Use a soft brush or compressed air for cleaning. Avoid using liquids directly on the electronics.
- **Firmware Updates:** Regularly check for and apply the latest Betaflight firmware updates for the F405 target to ensure optimal performance and access to new features.
- **SD Card Management:** Periodically offload and clear Blackbox logs from the microSD card to ensure continuous recording capability.

5. Troubleshooting

Problem	Possible Cause	Solution
Flight Controller not recognized by Betaflight Configurator	Missing or incorrect USB drivers; faulty USB cable; FC not powered correctly.	Install Zadig or ImpulseRC Driver Fixer. Try a different USB cable. Ensure battery is connected if external power is required for full functionality.
Motors not spinning or erratic behavior	Incorrect motor wiring; ESC calibration issues; faulty ESC or motor; incorrect motor protocol in Betaflight.	Check motor wiring and solder joints. Calibrate ESCs (if applicable). Verify motor protocol (e.g., DShot600) in Betaflight. Use the SpeedyBee app to check and adjust motor directions. Reflash ESC firmware if necessary.
No Bluetooth connection to app	FC not powered; Bluetooth module disabled; app permissions; interference.	Ensure the drone is powered on. Check Betaflight configuration for Bluetooth settings. Grant necessary permissions to the app. Try connecting in an area with less wireless interference.
Inaccurate altitude hold	Barometer exposed to airflow or light; calibration issues.	Ensure the barometer is covered with foam or tape to shield it from airflow and light. Recalibrate the barometer in Betaflight.
ESC not functioning (e.g., specific motor ports dead)	Firmware issue; hardware failure.	As noted in user feedback, reflashing the ESC firmware multiple times can sometimes resolve issues. If the problem persists after reflashing and checking connections, it may indicate a hardware fault requiring replacement.

6. Specifications

Feature	Detail
Brand	Xiangtat
Model Name	F405 V5 Flight Controller Stack
Mounting Pattern	30.5x30.5mm

Feature	Detail
Flight Controller MCU	F405
ESC Current	55A (4-in-1)
ESC MCU	BB21
Input Voltage	Up to 6S LiPo
Connectivity	Bluetooth, USB-C
Sensors	Barometer
Blackbox	MicroSD card slot (up to 4GB)
BEC Output	5V 2A, 9V 2A (Individual BECs)
GPS Output	4.5V
UARTs	4x
DJI Compatibility	DJI Plug & Play for O3 Air Unit
Item Weight	0.02 Kilograms (approx. 0.704 ounces)
Product Dimensions	1"L x 1"W x 1"H (approx.)
UPC	762210657732

7. Warranty and Support

For technical support, firmware updates, and detailed wiring diagrams, please refer to the official Xiangtat website or contact their customer service. While this product may be offered with optional extended protection plans from third-party providers, any direct product warranty claims should be directed to the manufacturer, Xiangtat, or the original point of purchase.

It is recommended to consult online communities and forums for FPV enthusiasts for additional tips and troubleshooting advice, as these resources often provide valuable user-generated content and solutions.

Question

Example: How do I reset this device or fix this error?

Details

Model number, symptoms, what you tried, or the section of the manual you are using.

Submit question