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FLASH HOBBY F405 V1

FLASH HOBBY F405 Flight Controller Stack with 60A 4-in-1 ESC User Manual

Model: F405 V1

1. Introduction

This manual provides detailed instructions for the installation, setup, and operation of the FLASH HOBBY F405 Flight Controller Stack. This integrated unit combines an F405 Flight Controller with a 60A 4-in-1 Brushless Electronic Speed Controller (ESC), designed for high-performance FPV quadcopters, fixed-wing aircraft, and drones. Please read this manual thoroughly before use to ensure proper functionality and safety.

2. Safety Information

When working with electronic components, especially those involving high current, it is crucial to observe safety precautions. This product is not a toy. Misuse can lead to property damage or injury. Always ensure proper insulation and soldering techniques. Avoid short circuits. Disconnect power before making any connections or adjustments.
It is recommended to wear an anti-static wrist strap when handling the flight controller stack to prevent damage from electrostatic discharge.

Image: An anti-static wrist strap, recommended for use when handling sensitive electronic components like the flight controller stack to prevent damage from static electricity.

3. Product Overview

The FLASH HOBBY F405 Flight Controller Stack integrates a powerful F405 MCU with a robust 60A 4-in-1 ESC, providing a compact and efficient solution for your drone builds. Key features include:

- **Integrated 60A 4-in-1 ESC:** Continuous current of 60A per motor, with a burst current of 65A for 5 seconds. Supports Dshot300 and Dshot600 PWM control signals.
- **Large Solder Pads:** Designed with spacious pads for motor connections, simplifying the soldering process.
- **LED Strip and GPS Support:** Dedicated pads for soldering LED strips and GPS modules, enhancing night flight visibility and navigation capabilities.
- **Type-C USB Connectivity:** Built-in Type-C socket for easy connection to a computer for firmware flashing and configuration.
- **Firmware Compatibility:** Supports Betaflight Configurator and INAV firmware.
- **STM32F405 MCU and MPU6000:** Equipped with a powerful microcontroller and gyroscope for stable flight performance.
- **Built-in 16M Blackbox:** For flight data logging and analysis.
- **Integrated Barometer:** For accurate altitude holding.
- **BEC Output:** 5V 3A & 9V 2.5A, 3.3V 300mA.

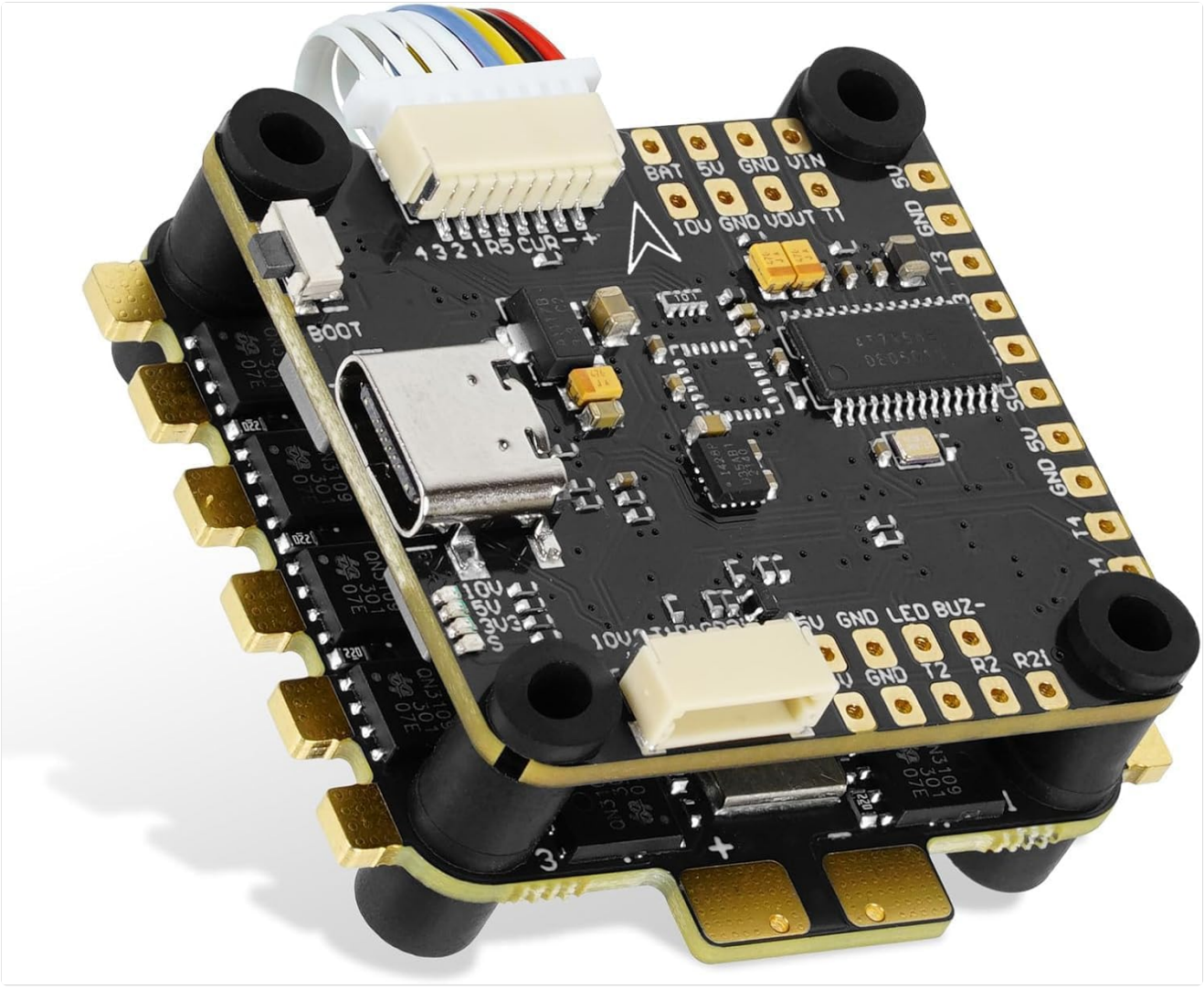


Image: The FLASH HOBBY F405 Flight Controller Stack, fully assembled, showcasing its compact design.

Image: A graphic highlighting the key features of the F405 Flight Controller Stack, including the 16M Blackbox, LED soldering pads, motor steering, barometer, BEC, battery indicators, 4 motor support, 35V 1000uF filtering capacitor, and GPS soldering pads.

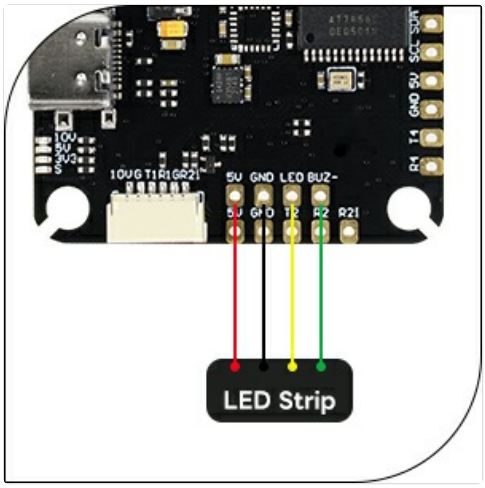


Image: A close-up view of the dedicated pads for connecting an LED strip, labeled 5V, GND, LED, and BUZ-.

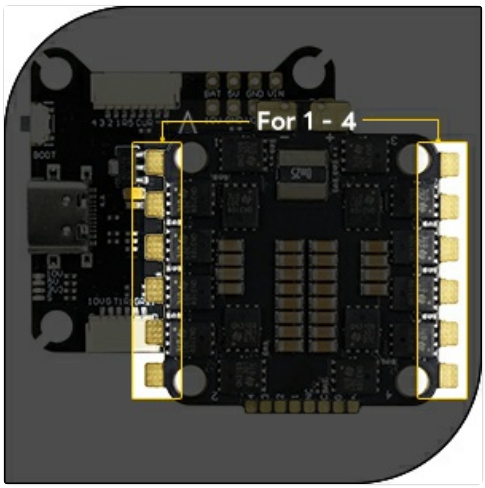


Image: A diagram illustrating the standard motor numbering and rotation for a quadcopter, with motors 1, 2, 3, and 4 indicated.

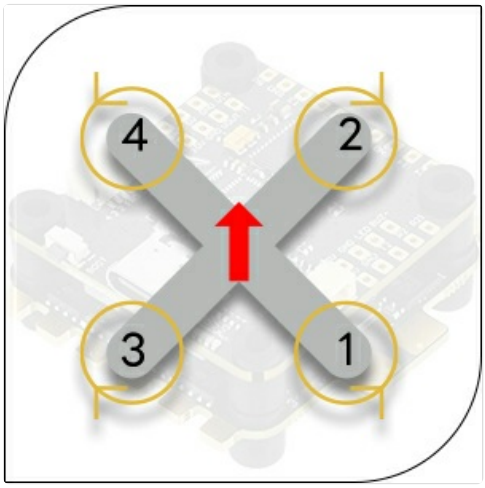


Image: A magnified view of the flight controller board, highlighting the built-in 16M Blackbox chip for flight data recording.

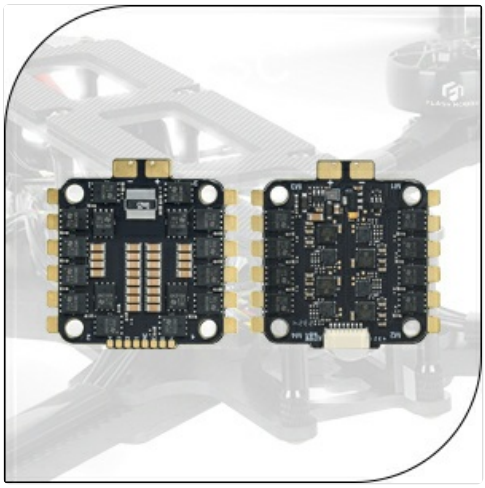


Image: A graphic illustrating the presence of GPS, Video, and Barometer pads, along with the included 35V 1000uF low ESR capacitor.

4. Package Contents

The FLASH HOBBY F405 Flight Controller Stack package includes the following items:

- F405 Flight Controller Stack (FC and ESC boards)
- 35V 1000uF Low ESR Capacitor
- A Set of Accessories (including wires, screws, and nuts)

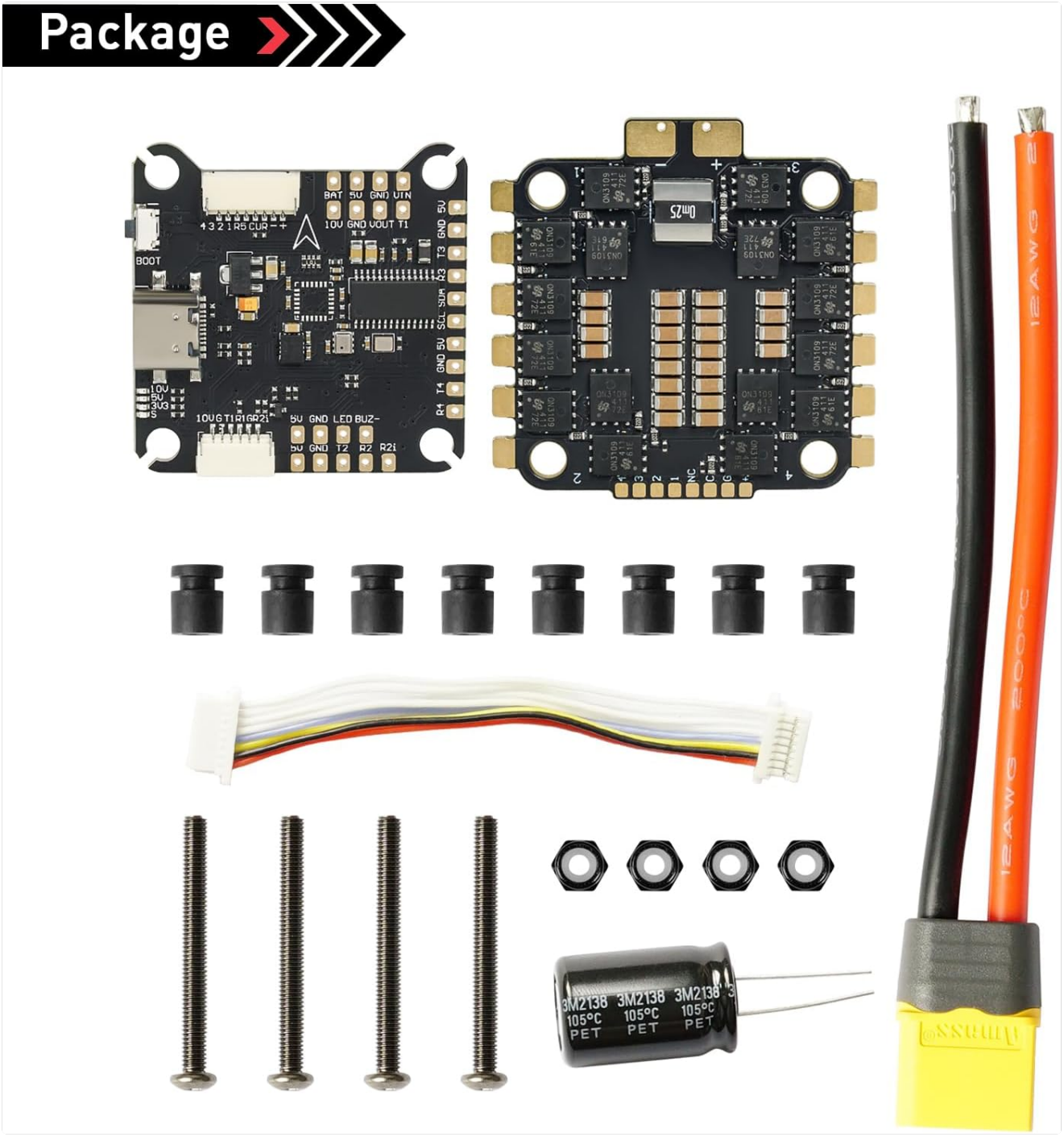


Image: All components included in the package: the F405 Flight Controller and 60A 4-in-1 ESC boards, a 35V 1000uF capacitor, power cables, mounting hardware, and connection cables.

5. Specifications

Brand	FLASH HOBBY
Model Name	F405 Flight Controller Stack
Item Model Number	F405 V1
Processor	STM32F405 MCU (ARMv7)
Gyroscope	MPU6000
ESC Continuous Current	60A * 4

ESC Burst Current	65A (5 seconds)
Input Voltage	3~6S LiPo
PWM Control Signal	Dshot300, Dshot600
Mounting Size	30.5 x 30.5mm
Hole Diameter	4mm
Connectivity Technology	USB (Type-C)
Operating System (Firmware)	Betaflight Configurator, INAV
Item Weight	0.64 ounces (approx. 18.14 grams)
Product Dimensions (LxWxH)	1.69 x 1.69 x 0.6 inches (approx. 43 x 43 x 15.2 mm)

Weight

Image: The flight controller stack being weighed on a digital scale, showing a reading of 21.2 grams (including mounting hardware,

which is slightly different from the listed item weight).

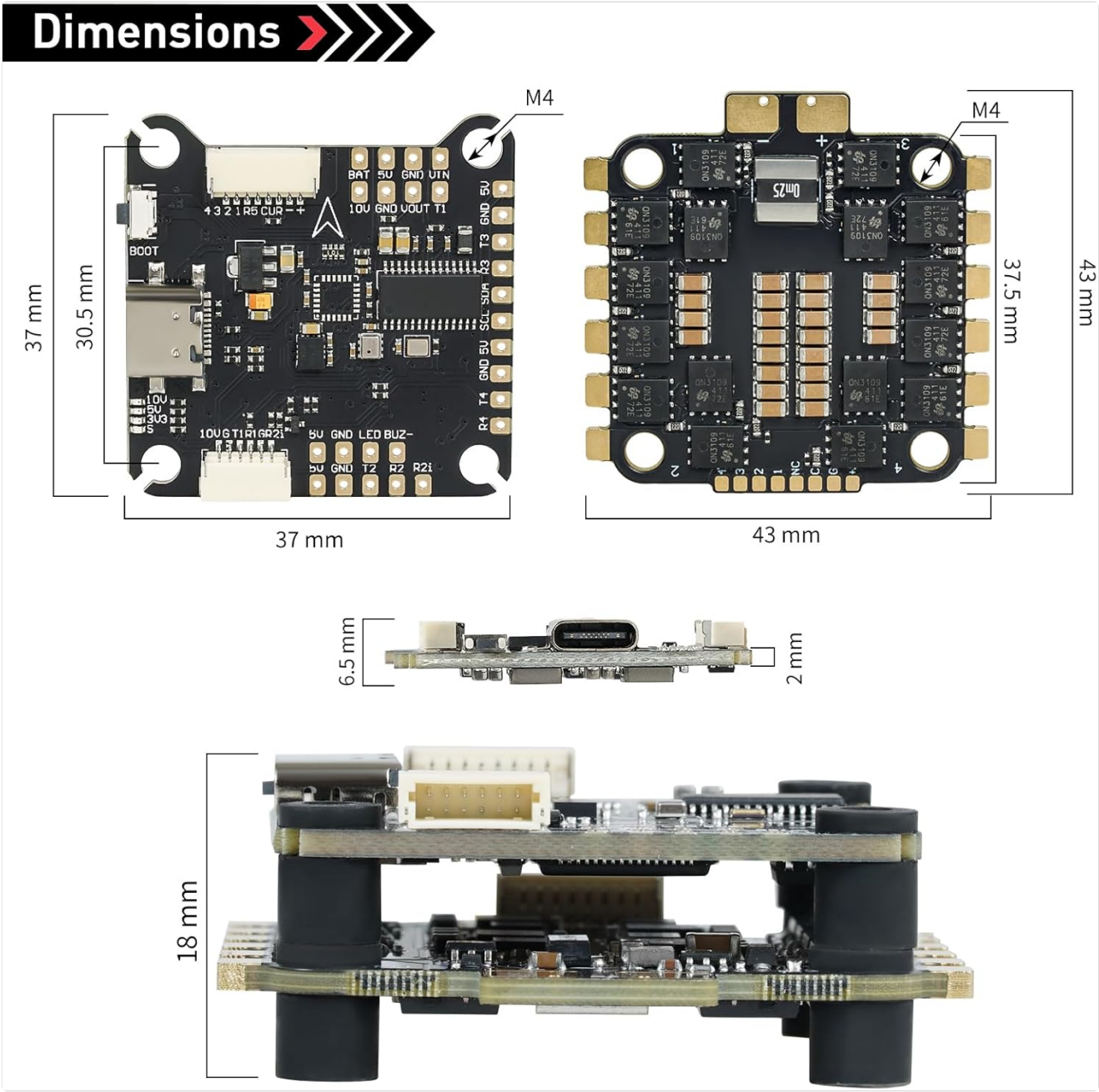


Image: A detailed diagram illustrating the dimensions of both the flight controller and ESC boards, including mounting hole spacing (30.5mm x 30.5mm) and overall stack height (18mm).

6. Setup and Wiring

Careful wiring is essential for the proper function and longevity of your flight controller stack. Refer to the wiring diagram below for connecting various components.

6.1 Wiring Diagram

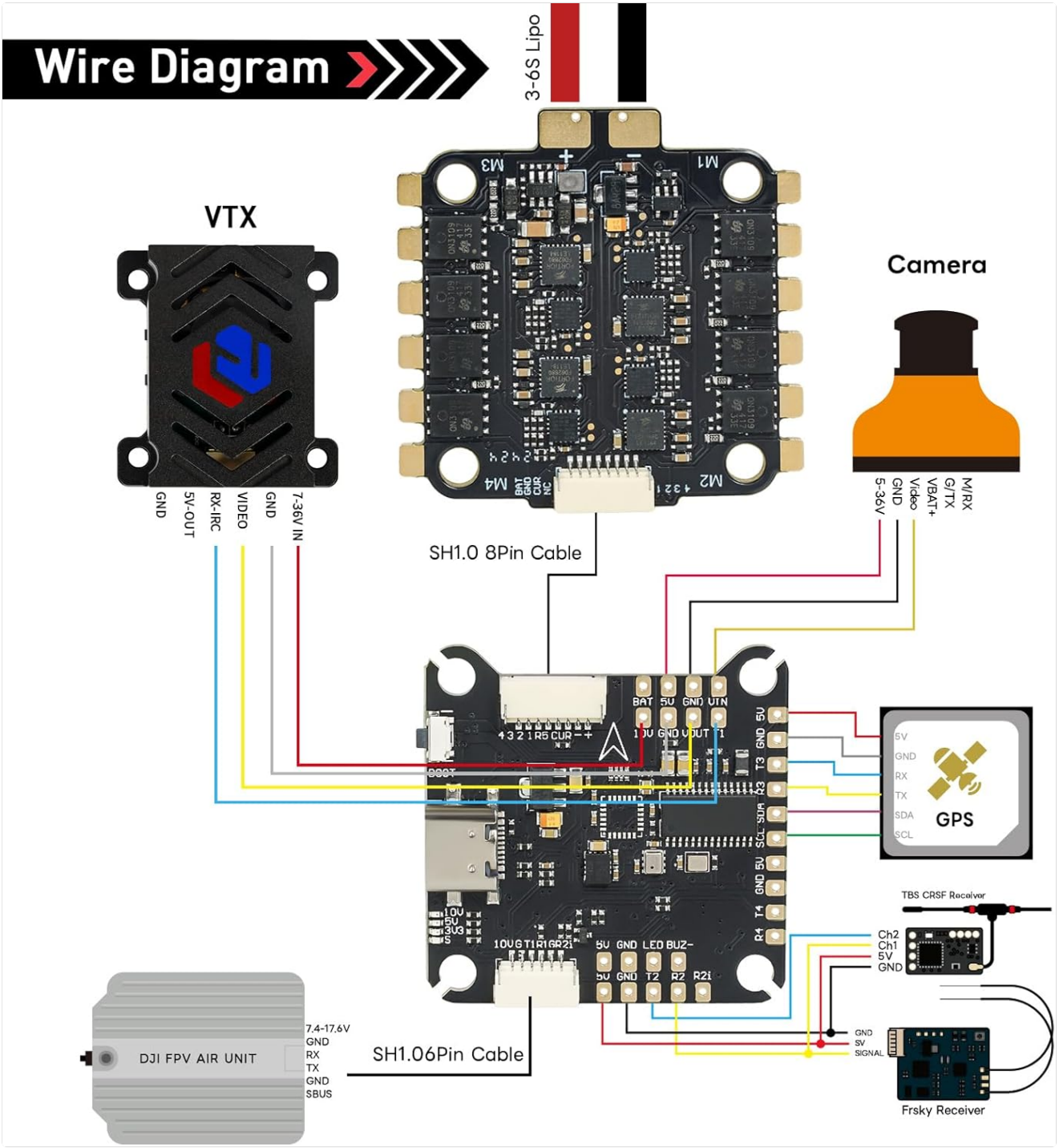


Image: A detailed wiring diagram showing connections for VTX, Camera, GPS, DJI FPV Air Unit, TBS Crossfire Receiver, Frsky Receiver, and the main battery input (3-6S LiPo) to the F405 Flight Controller Stack.

6.2 Component Connections

- **Battery:** Connect your 3-6S LiPo battery to the main battery pads on the ESC. Ensure correct polarity.
- **Motors:** Solder your motors to the large pads on the ESC, following the motor numbering and rotation diagram if applicable for your frame.
- **Receiver:** Connect your receiver (e.g., TBS Crossfire, Frsky) to the appropriate UART pads on the flight controller as indicated in the wiring diagram.
- **VTX (Video Transmitter):** Connect the VTX to the designated video output and power pads.
- **Camera:** Connect your FPV camera to the video input and power pads.
- **GPS:** Solder the GPS module to the dedicated GPS pads (TX, RX, 5V, GND).
- **LED Strip:** Connect LED strips to the LED pads for visual indicators.
- **Capacitor:** Solder the included 35V 1000uF Low ESR Capacitor to the main battery pads on the ESC to filter

power noise.

6.3 Firmware Configuration

The F405 Flight Controller Stack is compatible with Betaflight Configurator and INAV firmware. To configure your flight controller:

1. Download and install the latest version of Betaflight Configurator or INAV Configurator on your computer.
2. Connect the flight controller to your computer using a Type-C USB cable.
3. Launch the configurator software. The flight controller should be detected.
4. Flash the appropriate firmware for the F405 target.
5. Configure settings such as PID tuning, receiver protocols, OSD, and flight modes according to your preferences and drone setup.

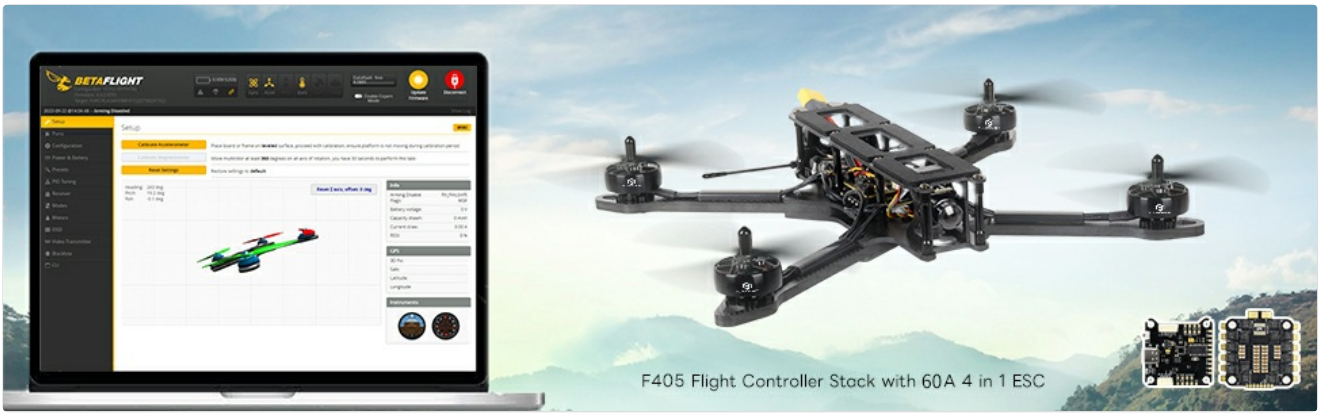


Image: A screenshot of the Betaflight Configurator software interface, showing a 3D model of a drone and various configuration options, demonstrating the software used for setting up the flight controller.

7. Operation

Once the flight controller stack is correctly installed and configured, you can proceed with operation. Always perform pre-flight checks to ensure all components are securely attached and functioning correctly.

- **Power On:** Connect the LiPo battery. The flight controller will initialize, indicated by LED lights.
- **Arming:** Arm your drone using the configured switch on your remote controller. Ensure propellers are clear before arming.
- **Flight:** Operate your drone according to your remote controller's instructions and your configured flight modes.
- **Disarming:** Disarm the drone after landing to prevent accidental motor spin-up.

8. Maintenance

Regular maintenance helps ensure the longevity and reliability of your flight controller stack.

- **Visual Inspection:** Periodically inspect the boards for any signs of damage, loose connections, or burnt components.
- **Cleaning:** Keep the boards free from dust, dirt, and moisture. Use compressed air or a soft brush for cleaning.
- **Firmware Updates:** Regularly check for and apply firmware updates for Betaflight or INAV to benefit from new features and bug fixes.
- **Component Check:** Ensure all screws and standoffs are tight and secure.

9. Troubleshooting

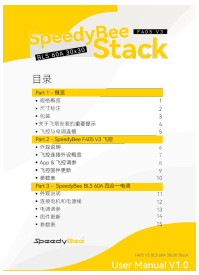
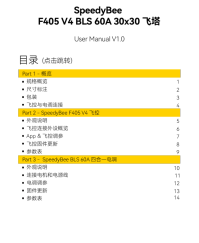
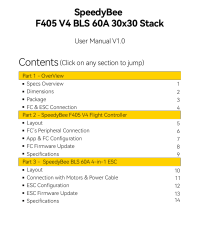
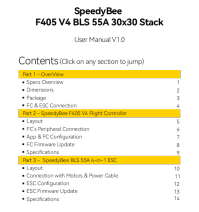
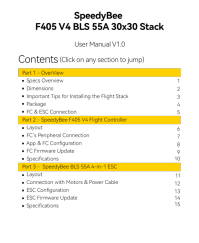
If you encounter issues with your FLASH HOBBY F405 Flight Controller Stack, consider the following troubleshooting steps:

- **No Power/No LEDs:**
  - Check battery connection and polarity.
  - Inspect for any short circuits on the board or connected components.
  - Ensure the main power cable is properly soldered.
- **Cannot Connect to Configurator (Betaflight/INAV):**
  - Ensure USB drivers are correctly installed (e.g., STM32 Virtual COM Port Driver, Zadig for DFU mode).
  - Try a different USB cable or port.
  - If in DFU mode, ensure the BOOT button is pressed during connection or use the DFU option in the configurator.
- **Motors Not Spinning/ESC Issues:**
  - Verify motor connections and soldering.
  - Check ESC firmware (e.g., BLHeli_S, BLHeli_32) and settings in the configurator.
  - Ensure motor protocol (Dshot) is correctly selected.
  - Use a smoke stopper during initial power-up to prevent damage from shorts.
- **Receiver Not Responding (UART Issue):**
  - Confirm correct wiring of the receiver to the designated UART pads.
  - Ensure the correct serial receiver protocol (e.g., SBUS, CRSF, iBUS) is selected for the corresponding UART in the configurator.
  - Check for proper binding between the receiver and your radio transmitter.
- **Unstable Flight:**
  - Review PID tuning settings.
  - Check for vibrations affecting the gyroscope.
  - Ensure propellers are balanced and undamaged.

10. Warranty and Support

For warranty information and technical support, please refer to the official FLASH HOBBY website or contact your retailer. Keep your proof of purchase for any warranty claims. This manual is intended as a guide; specific issues may require advanced troubleshooting or professional assistance.

Related Documents - F405 V1

	[SpeedyBee F405 V3 60A Stack: Flight Controller and ESC Manual] Comprehensive guide to the SpeedyBee F405 V3 Flight Controller and BLS 60A 4-in-1 ESC stack, covering specifications, installation, connections, firmware updates, and parameter tuning.
	[SpeedyBee F405 V4 BLS 60A 30x30 Stack User Manual] User manual for the SpeedyBee F405 V4 Flight Controller and BLS 60A 4-in-1 ESC Stack. Includes specifications, connection diagrams, setup instructions, and firmware update procedures.
	[SpeedyBee F405 V4 BLS 60A 30x30 Stack User Manual] User manual for the SpeedyBee F405 V4 BLS 60A 30x30 Stack, covering flight controller and ESC specifications, installation, connections, and configuration.
	[SpeedyBee F405 V3 BLS 60A 30x30 Stack User Manual] User manual for the SpeedyBee F405 V3 BLS 60A 30x30 Stack, covering overview, flight controller and ESC specifications, connections, and configuration.
	[SpeedyBee F405 V4 BLS 55A 30x30 Stack User Manual] User manual for the SpeedyBee F405 V4 Flight Controller and BLS 55A 4-in-1 ESC stack. Covers overview, specifications, package contents, connection methods, FC and ESC configuration, and firmware updates.
	[SpeedyBee F405 V4 BLS 55A 30x30 Stack User Manual] Comprehensive user manual for the SpeedyBee F405 V4 BLS 55A 30x30 Stack, detailing its specifications, installation, connections, configuration, and firmware updates for drone enthusiasts.