MatekSys H743-SLIM V3

MATEKSYS H743-SLIM V3 Flight Controller User Manual

Model: H743-SLIM V3

1. Introduction

This manual provides comprehensive instructions for the installation, setup, operation, and maintenance of the MATEKSYS H743-SLIM V3 Flight Controller. Designed for advanced drone and robotics applications, this flight controller offers robust performance and extensive connectivity. Please read this manual thoroughly before use to ensure proper functionality and safety.

2. Safety Information

Always observe the following safety precautions:

- Ensure all connections are secure and correct before applying power. Incorrect wiring can damage the flight controller and connected components.
- Operate in a well-ventilated area.
- Avoid contact with water or excessive moisture.
- Do not attempt to modify the hardware beyond the scope of this manual.
- Always disconnect power before performing any maintenance or wiring changes.
- This device is intended for users with experience in electronics and drone building.

3. Package Contents

The MATEKSYS H743-SLIM V3 Flight Controller package typically includes:

- MATEKSYS H743-SLIM V3 Flight Controller board
- Mounting grommets (if included by manufacturer)
- (Note: Additional accessories like cables or connectors may be sold separately.)

4. Product Overview

The H743-SLIM V3 is a high-performance flight controller featuring a powerful STM32H743VI microcontroller. It integrates multiple sensors and interfaces for comprehensive control and data logging.

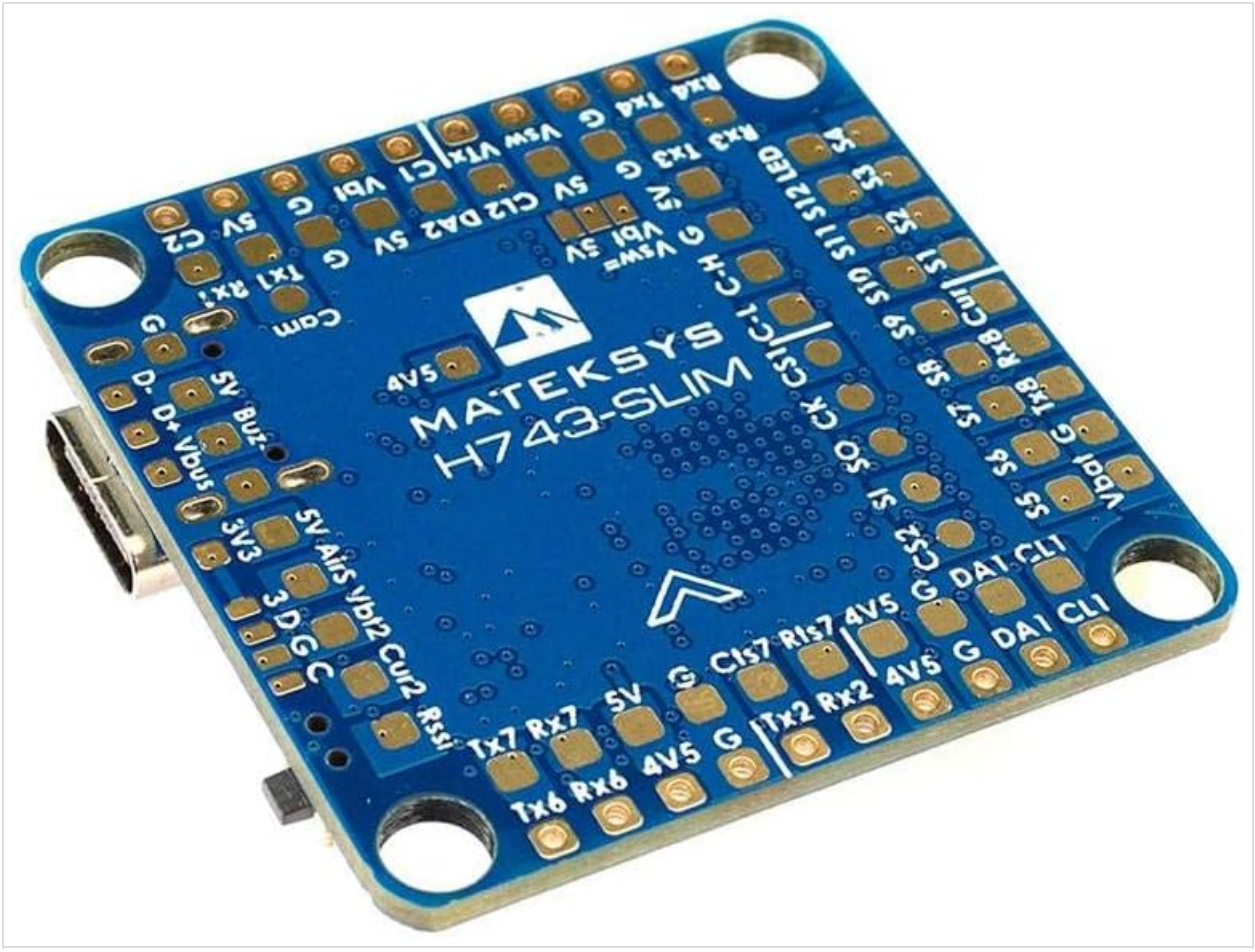


Figure 4.1: Top view of the MATEKSYS H743-SLIM V3 Flight Controller, showing the main chip, various pads for connections, and the USB-C port. Key labels for UARTs, PWM outputs, and power pads are visible.

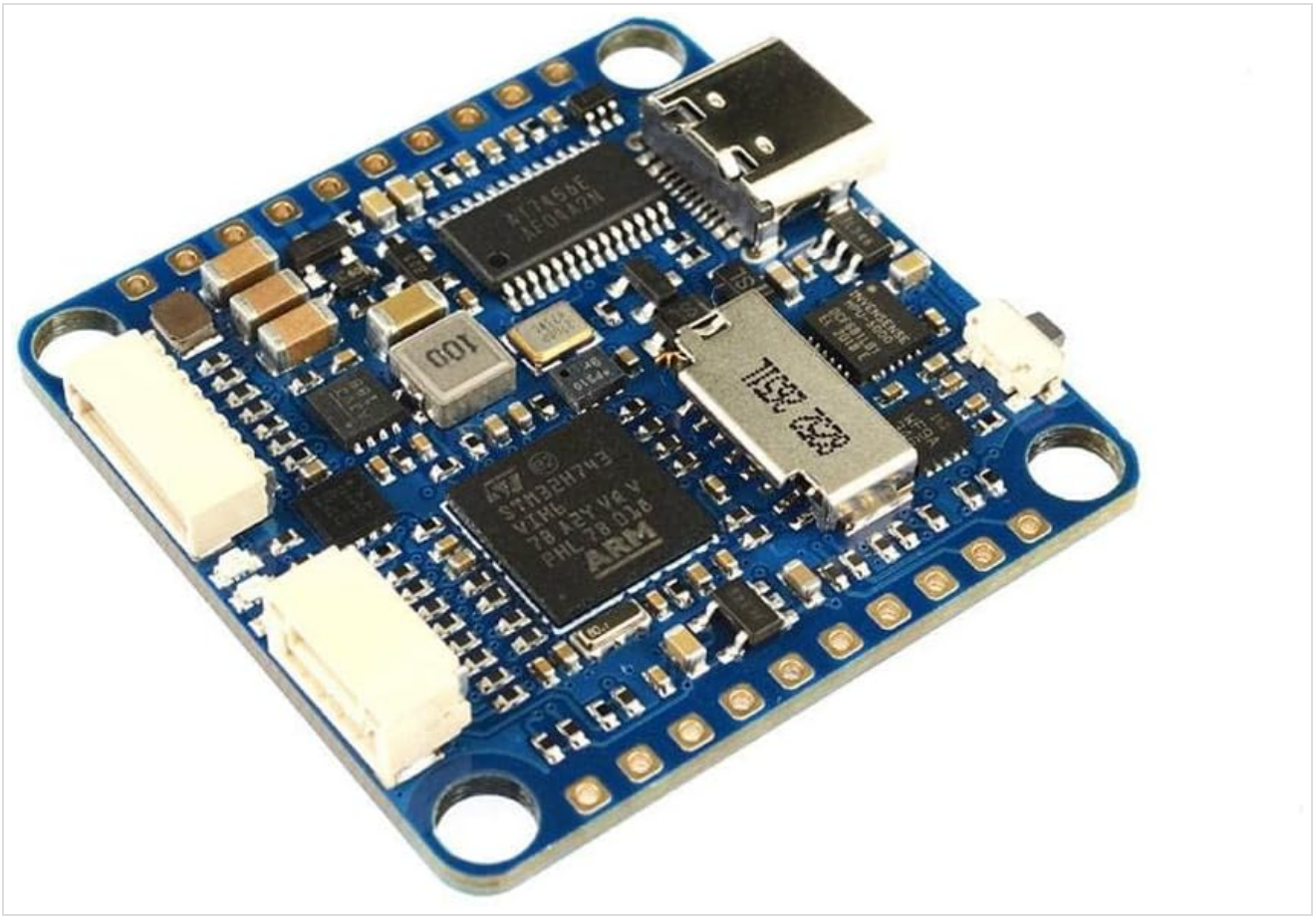


Figure 4.2: Angled view of the MATEKSYS H743-SLIM V3 Flight Controller, highlighting the various surface-mounted components, including the STM32H743VI microcontroller, IMUs, and connectors like the JST-SH and JST-GH.

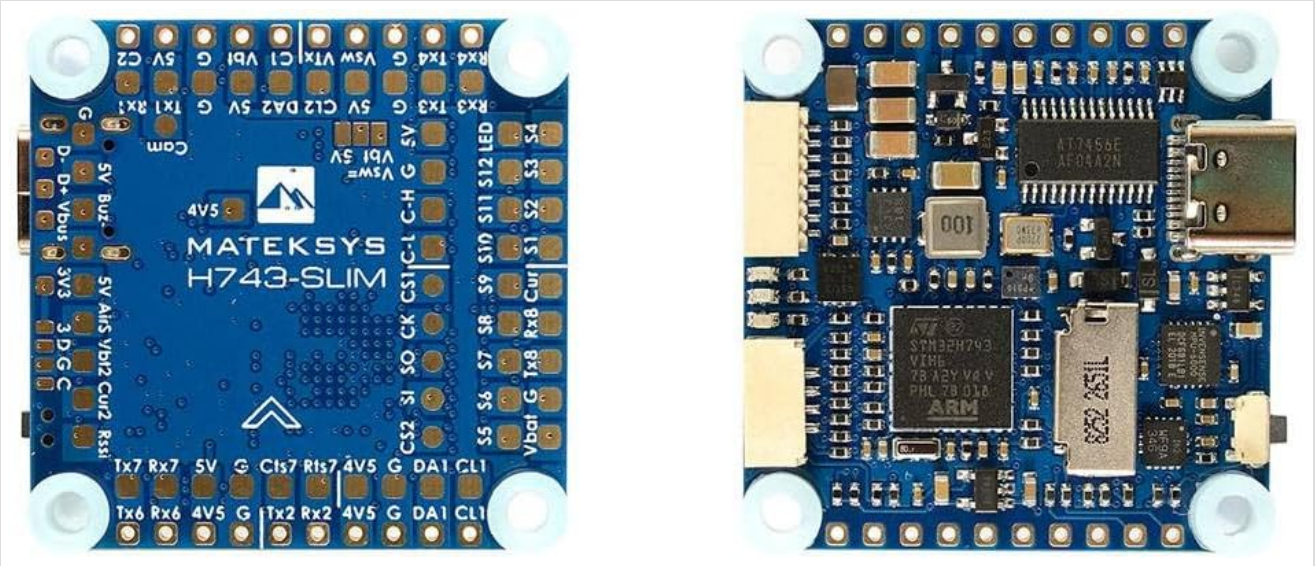


Figure 4.3: Combined top and bottom views of the MATEKSYS H743-SLIM V3 Flight Controller. The top view shows the main connection pads, while the bottom view reveals the microSD card slot and additional components.

Figure 4.4: Side views of the MATEKSYS H743-SLIM V3 Flight Controller, illustrating the various connectors such as the USB Type-C port, JST-SH1.0_8pin, and JST-GH1.25_4pin connectors.

Key Features:

- MCU: STM32H743VIH6, 480MHz, 1MB RAM, 2MB Flash
- IMU: ICM42688P, ICM42605 (V3 update)
- Barometer: Infineon DPS310
- OSD: AT7456E
- Blackbox: MicroSD card socket
- 7x UARTs with built-in inversion
- 13x PWM outputs
- 2x I2C, 1x CAN, 6x ADC
- USB Type-C (USB2.0)
- Dual Camera Inputs switch
- Power: 6~36V (2~8S LiPo) input, BEC 5V 2A, LDO 3.3V 200mA

5. Setup

5.1 Wiring and Connections

Carefully connect your components to the flight controller. Refer to the pinout diagrams (typically available on the manufacturer's website or detailed product pages) for precise connections. Common connections include:

- **Power Input (VBAT):** Connect your LiPo battery (6~36V, 2~8S) to the VBAT and GND pads.
- **ESCs:** Connect ESC signal wires to the PWM output pads (S1-S13). Ensure correct motor order.

- **Receiver (RX):** Connect your receiver to one of the UARTs (e.g., RX1, RX2, etc.) and provide 5V power.
- **GPS:** Connect GPS module to a dedicated UART (e.g., UART4) and I2C for compass.
- **Video Transmitter (VTX) & Camera:** Connect VTX to a 5V or VBAT source and a video output pad. Connect camera to a video input pad. The FC supports dual camera inputs.
- **Peripherals:** Connect other peripherals like LED strips, buzzers, or external sensors to appropriate pads (e.g., LED pad, Buzzer pad, I2C, CAN).

Important: Double-check all wiring before applying power to prevent damage.

5.2 Firmware Installation and Configuration

The H743-SLIM V3 supports popular flight control firmwares:

- **BetaFlight:** Download the latest BetaFlight Configurator. Connect the FC via USB-C. Flash the "MATEKSYSH743" target firmware. Configure settings according to your build.
- **ArduPilot (ChiBiOS):** Download the appropriate ArduPilot firmware for "MATEKSYSH743" target. Use Mission Planner or QGroundControl for configuration.
- **INAV:** Download the latest INAV Configurator. Flash the "MATEKSYSH743" target firmware. Configure settings as required.

Refer to the specific firmware documentation for detailed configuration steps, PID tuning, and mode setup.

6. Operating

Once the flight controller is wired and configured with your chosen firmware, follow these general operating principles:

- **Pre-Flight Checks:** Before each flight, verify all connections, check propeller direction, and ensure battery is fully charged.
- **Arming:** Arm the motors using your configured switch or stick command. Ensure you are in a safe environment.
- **Flight Modes:** Utilize the configured flight modes (e.g., Acro, Angle, GPS Hold) as per your application.
- **Monitoring:** Use OSD (On-Screen Display) or telemetry to monitor battery voltage, current, GPS status, and other critical flight data.
- **Disarming:** Disarm the motors immediately after landing or in an emergency.

7. Maintenance

Proper maintenance ensures the longevity and reliability of your flight controller:

- **Cleaning:** Keep the board clean and free from dust, dirt, and debris. Use a soft brush or compressed air. Avoid liquids.
- **Inspection:** Regularly inspect solder joints for cracks or cold joints. Check connectors for wear or damage.
- **Storage:** Store the flight controller in an anti-static bag in a dry, cool environment when not in use.
- **Firmware Updates:** Periodically check for and apply firmware updates to benefit from bug fixes and new features.

8. Troubleshooting

This section addresses common issues you might encounter:

- **No Power/LEDs Off:**

    - Check battery connection and voltage.
    - Verify power input polarity.
    - Inspect for short circuits on the board or connected components.
- **FC Not Detected by PC (USB):**
    - Try a different USB cable and port.
    - Install necessary VCP (Virtual COM Port) drivers.
    - Ensure the FC is powered (either via USB or main battery if required by firmware).
- **Sensors Not Working (IMU/Baro):**
    - Ensure firmware is correctly flashed for the specific board version (V1.0 vs V1.5 IMU).
    - Check for physical damage to the sensor chips.
- **Motors Not Spinning/Incorrectly:**
    - Verify ESC connections and calibration.
    - Check motor output mapping in firmware.
    - Ensure arming conditions are met.

For more detailed troubleshooting, consult the specific firmware documentation or online community forums for MatekSys products.

9. Specifications

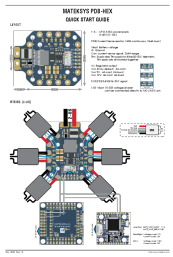
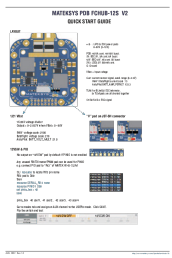
Category	Specification
MCU	STM32H743VIH6, 480MHz, 1MB RAM, 2MB Flash
IMU (V1.0)	MPU6000 (SPI1) & ICM20602 (SPI4)
IMU (V1.5/V3)	ICM42688P, ICM42605
Barometer	Infineon DPS310 (I2C2)
OSD	AT7456E (SPI2)
Blackbox	MicroSD card socket (SDIO)
UARTs	7x (1,2,3,4,6,7,8) with built-in inversion
PWM Outputs	13x (including "LED" pad)
I2C	2x
CAN	1x
ADC	6x (VBAT, Current, RSSI, Analog AirSpeed, Vbat2, Cur2)
LEDs	3x (FC STATUS: Blue, Red; 3.3V indicator: Red)
USB Port	Type-C (USB2.0)

Category	Specification
Connectors	1x JST-SH1.0_8pin, 1x JST-GH1.25_4pin
Camera Inputs	Dual Camera Inputs switch
Power Input	6~36V (2~8S LiPo)
BEC	5V 2A cont. (Max.3A)
LDO	3.3V: Max.200mA
Current Sensor	No built-in sensor (ADC Vbat2 pad supports Max. 69V)
Mounting	30.5 x 30.5mm, Φ4mm with Grommets Φ3mm
Dimensions	36 x 36 x 5 mm
Weight	7g

10. Warranty and Support

For warranty information and technical support, please refer to the official MatekSys website or contact your authorized dealer. Keep your proof of purchase for warranty claims.
Official MatekSys Website: www.mateksys.com

Related Documents - H743-SLIM V3

	Mateksys PDB-HEX Quick Start Guide A quick start guide for the Mateksys PDB-HEX, detailing its layout, wiring for 2-8S and 9-12S configurations, and configuration notes for BetaFlight, ArduPilot, and INAV.
	Mateksys PDB FCHUB-12S V2 Quick Start Guide A quick start guide for the Mateksys PDB FCHUB-12S V2, detailing layout, wiring, and configuration for various flight controllers like MATEK H743-SLIM and F405-HDTE. Includes information on power inputs, BEC outputs, current sensing, telemetry, and programmable I/O pins.

	[MATEKSYS H743-WING Flight Controller: Quick Start Guide & Wiring] Comprehensive quick start guide for the MATEKSYS H743-WING flight controller. Includes specifications, pinout diagrams, and detailed wiring instructions for ArduPilot and INAV systems, covering UAVCAN peripherals.
	[MatekSys H743-WING Flight Controller Quick Start Guide] A quick start guide for the MatekSys H743-WING flight controller, detailing its specifications, layout, and wiring for airplane configurations. Includes information on MCU, IMU, power inputs, outputs, and peripheral connections like GPS and airspeed sensors.
	[MATEKSYS F765-WSE Flight Controller Quick Start Guide] A concise quick start guide for the MATEKSYS F765-WSE Flight Controller, detailing its features, hardware layout, wiring connections, and I/O mapping for both ArduPilot and INAV firmware.
	[MatekSys F722-HD Flight Controller Quick Start Guide] A quick start guide for the MatekSys F722-HD flight controller, detailing its features, specifications, and wiring diagrams for various drone configurations.