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MAMBA MK4 F722APP Stack

Diatone MAMBA MK4 F722APP Stack User Manual

Flight Controller & 4in1 Brushless ESC for FPV Drones

1. Product Overview

The Diatone MAMBA MK4 F722APP Stack is a high-performance integrated unit designed for FPV drones, combining a Flight Controller (FC) and a 4-in-1 Brushless Electronic Speed Controller (ESC). This stack provides robust control and power delivery for demanding FPV applications.
It features a powerful STM32F722 MCU, BMI270 gyroscope, and supports Dshot300/600/1200 protocols for precise motor control. The integrated WiFi module allows for convenient configuration via the SpeedyBee APP.

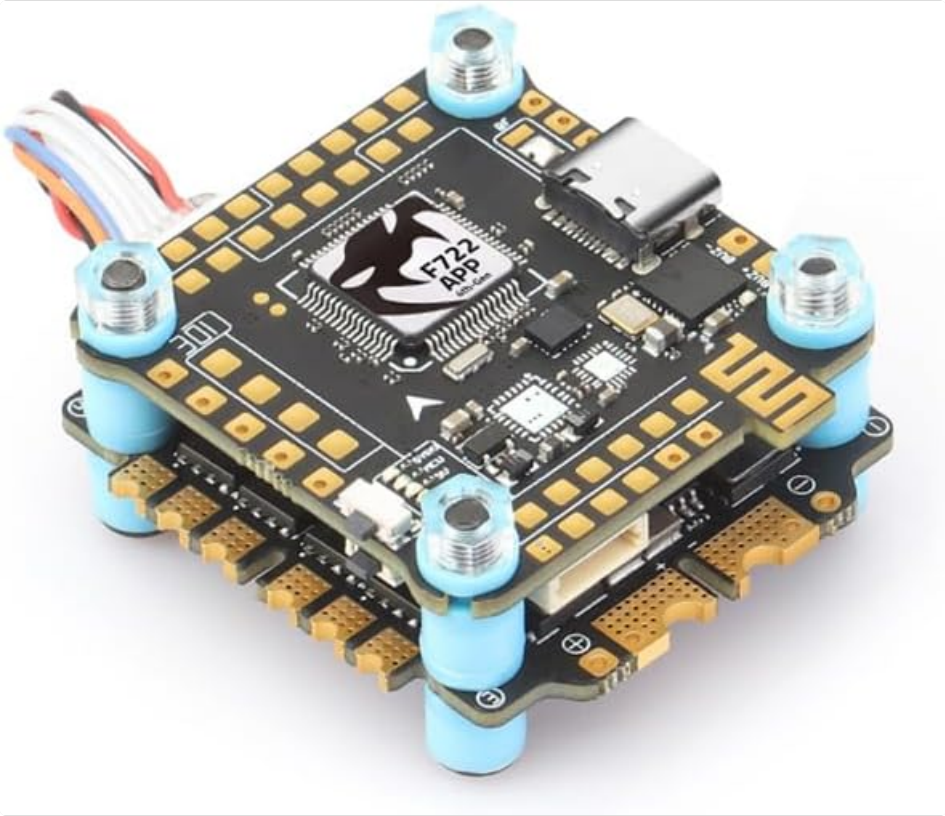


Figure 1: Top view of the Diatone MAMBA MK4 F722APP Stack, showing the flight controller board with the F722 APP chip and various connectors.

2. Package Contents

Verify that all items listed below are present in your package:

- MAMBA MK4 F722APP Flight Controller
- MAMBA F45_128K or MAMBA F55_128K 4in1 ESC (depending on variant)
- High frequency capacitor 1000uF/35V (x1)
- 8-pin SH1.0 cable (x2)
- AIR UNIT SH1.0 cable (x1)
- 12AWG 100mm silicone wire (x2)
- AMASS Original XT60 connector (x1)

3. Setup and Installation

3.1. Physical Installation

The MAMBA MK4 F722APP Stack features a 30.5mm mounting hole pattern with M3 screws, compatible with most FPV drone frames. Ensure proper orientation as indicated by the arrow on the flight controller board.

1. Mount the ESC board to your drone frame using the provided standoffs and screws.
2. Connect the flight controller to the ESC using the supplied 8-pin SH1.0 cable. Ensure the connector is fully seated and correctly oriented.
3. Secure the flight controller board on top of the ESC board using the remaining standoffs and screws.
4. Solder the motor wires to the designated pads on the ESC. Pay close attention to the motor numbering and rotation direction as per your flight controller software configuration.
5. Solder the main battery lead (XT60 connector) to the battery pads on the ESC. Ensure correct polarity (positive to positive, negative to negative).
6. Connect your receiver, VTX (Video Transmitter), camera, and GPS (if applicable) to the appropriate pads on the flight controller. Refer to the wiring diagram for detailed pinouts.

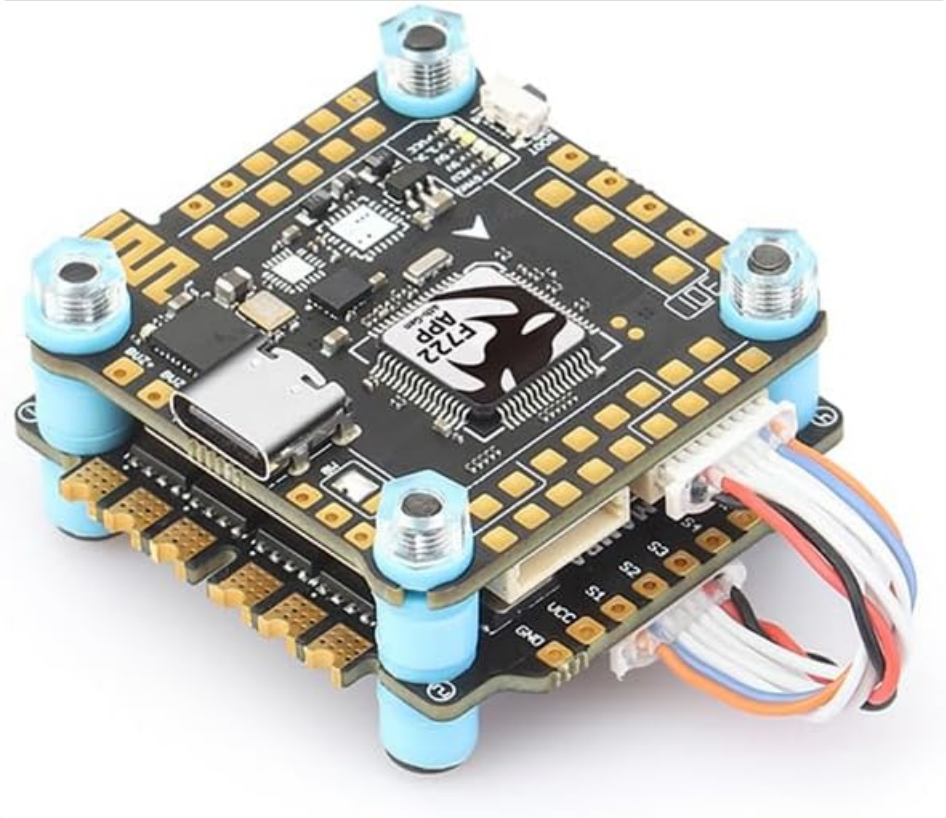


Figure 2: Side view of the stack, illustrating the various connection points for peripherals and the included wiring harness.

3.2. Initial Configuration (Betaflight/INAV)

The flight controller comes pre-flashed with firmware, but it is recommended to update to the latest stable version and perform initial configuration.

1. Download and install the latest Betaflight Configurator or INAV Configurator software on your computer.
2. Connect the flight controller to your computer using a USB-C cable.
3. Open the configurator software and connect to the flight controller.
4. Navigate to the "Firmware Flasher" tab and select the appropriate target for your board (e.g., DIATONEF722APP). Flash the latest firmware.
5. After flashing, go through the initial setup wizard, calibrating the accelerometer and setting up your receiver, modes, and OSD.
6. For ESC configuration, connect via passthrough in Betaflight/INAV and use BLHeli_32 Configurator to set motor direction, Dshot protocol, and other ESC parameters.

4. Operating Instructions

4.1. Powering On

Connect a 3-6S LiPo battery (12.6V~25.2V) to the XT60 connector. The flight control power indicator LED will illuminate, indicating successful power-on. Ensure all connections are secure before applying power.

4.2. WiFi Connectivity (SpeedyBee APP)

The MAMBA MK4 F722APP features integrated WiFi for wireless configuration via the SpeedyBee APP. This allows for

convenient field adjustments without needing a computer.

1. Download the SpeedyBee APP from your mobile device's app store.
2. Power on the flight controller.
3. On your mobile device, connect to the WiFi network broadcast by the flight controller (usually named "SpeedyBee" followed by some characters).
4. Open the SpeedyBee APP and connect to the flight controller. You can now adjust PID tuning, rates, OSD settings, and more wirelessly.

4.3. LED Control

The flight controller supports LED control via BF LED (Betaflight LED) or MB LED (Mamba LED). This allows for customizable LED patterns and colors for visual feedback.

5. Maintenance

- **Regular Inspection:** Periodically inspect all solder joints and connections for signs of fatigue, corrosion, or damage.
- **Cleaning:** Keep the boards free from dust, dirt, and debris. Use compressed air or a soft brush for cleaning. Avoid using liquids directly on the electronics.
- **Firmware Updates:** Regularly check for and apply the latest stable firmware updates for both the flight controller (Betaflight/INAV) and the ESC (BLHeli_32) to ensure optimal performance and access to new features.
- **Component Protection:** Ensure the stack is adequately protected from physical impact and moisture within your drone frame.

6. Troubleshooting

- **No Power/LEDs Off:**
  Check battery connection and polarity. Ensure the battery is charged. Inspect the main power leads for breaks or poor solder joints. Verify TVS power protection is not triggered due to overvoltage.
- **Cannot Connect to Configurator:**
  Ensure correct USB-C cable is used (data capable). Try a different USB port or computer. Install necessary VCP (Virtual COM Port) drivers. Ensure no other software is using the COM port. Try pressing the BOOT button while plugging in USB if the board is unresponsive.
- **Motors Not Spinning/Incorrectly:**
  Verify motor wiring to ESC pads. Check motor direction in BLHeli_32 Configurator. Ensure Dshot protocol is correctly set in both FC and ESC. Calibrate ESCs if necessary (though Dshot typically doesn't require it). Check for bent motor shafts or damaged propellers.
- **Unstable Flight/Oscillations:**
  Review PID tuning settings in Betaflight/INAV. Check for vibrations affecting the gyroscope (ensure soft mounting is effective). Inspect propellers for damage or imbalance. Ensure frame is rigid.
- **WiFi Connection Issues:**

Ensure the flight controller is powered on. Check that the SpeedyBee APP is updated. Try restarting the flight controller and your mobile device. Ensure no other devices are interfering with the WiFi signal.

7. Specifications

7.1. MAMBA MK4 F722APP Flight Controller

Feature	Specification
MCU	216MHz STM32F722
Gyroscope	BMI270
OSD	Yes
Black Box	16M Flash Memory
Barometer	SPL06
Serial Ports	6 Sets
I2C	Yes
F.Port	Yes
Buzzer	Yes
Galvanometer	Yes
ESC Signal Outputs	8 Sets
ESC Protocol	Dshot300/600/1200
ESC Port	Yes
Power Indicator	Yes
LED Control Switch	BF LED/MB LED
Air Terminal Interface	Yes
WiFi	SpeedyBee APP
Video Transmission Power Control	Yes
Receiver Short Circuit Protection	Yes
TVS Power Protection	Yes
BEC Output	3.3V 0.5A & 5V 3A & 9V 3A
Input Voltage	3~6S Lipo (12.6~25.2V)
Mounting Hole	30.5mm, M3

7.2. MAMBA F55_128K 4in1 ESC (for 55A Stack variant)

Feature	Specification
Input Voltage	3~6S Lipo (12.6V~25.2V)
Rated Current	55A×4
Peak Current	65A (10S)
BEC	No
Firmware	BLHeli_32 MAMBA F55_128K
Program	Dshot300/600/1200
PWM Frequency	24~128K
TVS Power Protection	Yes
Mounting Hole	30.5mm/M3

7.3. MAMBA F45_128K 4in1 ESC (for 45A Stack variant)

Feature	Specification
Input Voltage	3~6S Lipo (12.6V~25.2V)
Continuous Current	45A×4
Burst Current	55A (10S)
BEC	No
Firmware	BLHeli_32 MAMBA F45_128K
Program	Dshot300/600/1200
PWM Frequency	24~128K
TVS Protection	Yes
Mounting Hole	30.5mm/M3

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