HAKRC F722 AIO Flight Controller with 40A ESC

HAKRC F722 AIO Flight Controller with 40A ESC and External USB - User Manual

Model: F722 AIO Flight Controller with 40A ESC

1. Introduction

This manual provides detailed instructions for the installation, configuration, and operation of your HAKRC F722 AIO Flight Controller with integrated 40A BLHeli_S ESC and external USB. Please read this manual thoroughly before use to ensure proper functionality and safety.

2. Product Overview

2.1 Key Features

- Integrated F722 Flight Controller and 40A BLHeli_S ESC.
- Supports 2-6S LiPo input voltage.
- Continuous current: 40A, Peak current: 50A.
- External Type-C USB board for convenient configuration.
- High-performance STM32F722RET6 CPU.
- Integrated MPU6000 IMU and AT7456E OSD.
- Built-in current sensor and barometer.
- BEC Output: 5V/3A.
- 5 UART ports available.
- Supports various receiver protocols: CRSF, Frsky, Futaba, Flysky, TBS Crossfire, DSMX/DSM2.
- High-quality PCB with 8-layer 2oz thick copper for enhanced current capability and heat dissipation.
- Compact size: 32x32mm, Mounting Pattern: 25.5mm-26.5mm.
- Lightweight design: 7g net weight.

2.2 Package Contents

- 1x HAKRC AIO Board - Brushless F722 FC + 40A 2-6S BLHeli_S ESC
- 1x 180mm External Type-C USB Board
- 1x SH1.0/7P Single-Head Cable

- 4x Shock-Absorbing Ball
- 1x 270uf/35V Capacitor
- 1x XT30 Power Cord

Image: Contents of the HAKRC F722 AIO Flight Controller package. This includes the main AIO board, an external USB-C board, various cables (SH1.0/7P, XT30 power cord), a 270uF/35V capacitor, and four shock-absorbing balls for mounting.

3. Specifications

Component	Specification
CPU	STM32F722RET6
IMU	MPU6000
OSD	AT7456E
Barometer	Integrated
Current Sensor	Built-in
BEC Output	5V/3A
UART Ports	5

LED Support	WS2812 and other programmable LEDs
Receiver Support	CRSF, Frsky, Futaba, Flysky, TBS Crossfire, DSMX/DSM2
Flight Control Firmware	HAKRC F722D (Betaflight compatible)
ESC Specifications	
Input Voltage	2S-6S Lipo
Continuous Current	40A
Peak Current	50A
ESC Firmware	BLHELI_S (G-H-30)
Protocol Support	PWM, Oneshot125, Oneshot42, Multishot, Dshot150, Dshot300, Dshot600
Current Meter Proportional Value	450
Physical Specifications	
Dimensions	32x32mm
Mounting Pattern	25.5mm-26.5mm
Net Weight	7g

4. Setup

4.1 Physical Installation

Carefully mount the HAKRC F722 AIO board onto your drone frame. Use the provided shock-absorbing balls to minimize vibrations, which can affect flight performance. Ensure the board is oriented correctly according to your flight controller software's settings.

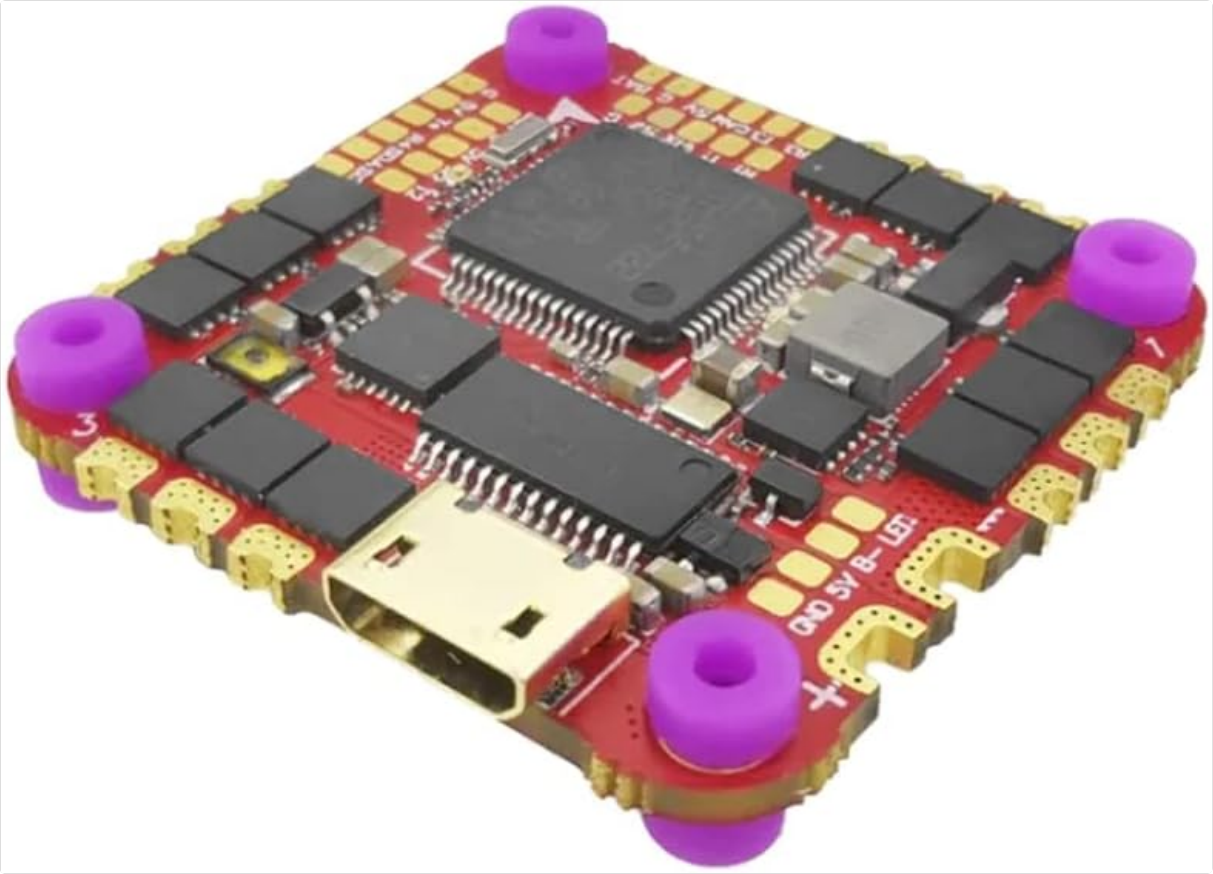

Image: Angled view of the HAKRC F722 AIO Flight Controller. This image shows the compact design and the mounting holes with purple shock-absorbing grommets, indicating how it should be installed on a drone frame.

The board features a 25.5mm-26.5mm mounting pattern, suitable for various micro and toothpick drone frames. Connect the external Type-C USB board using the provided SH1.0/7P cable for easy access to the flight controller's configuration port without needing to disassemble your drone.

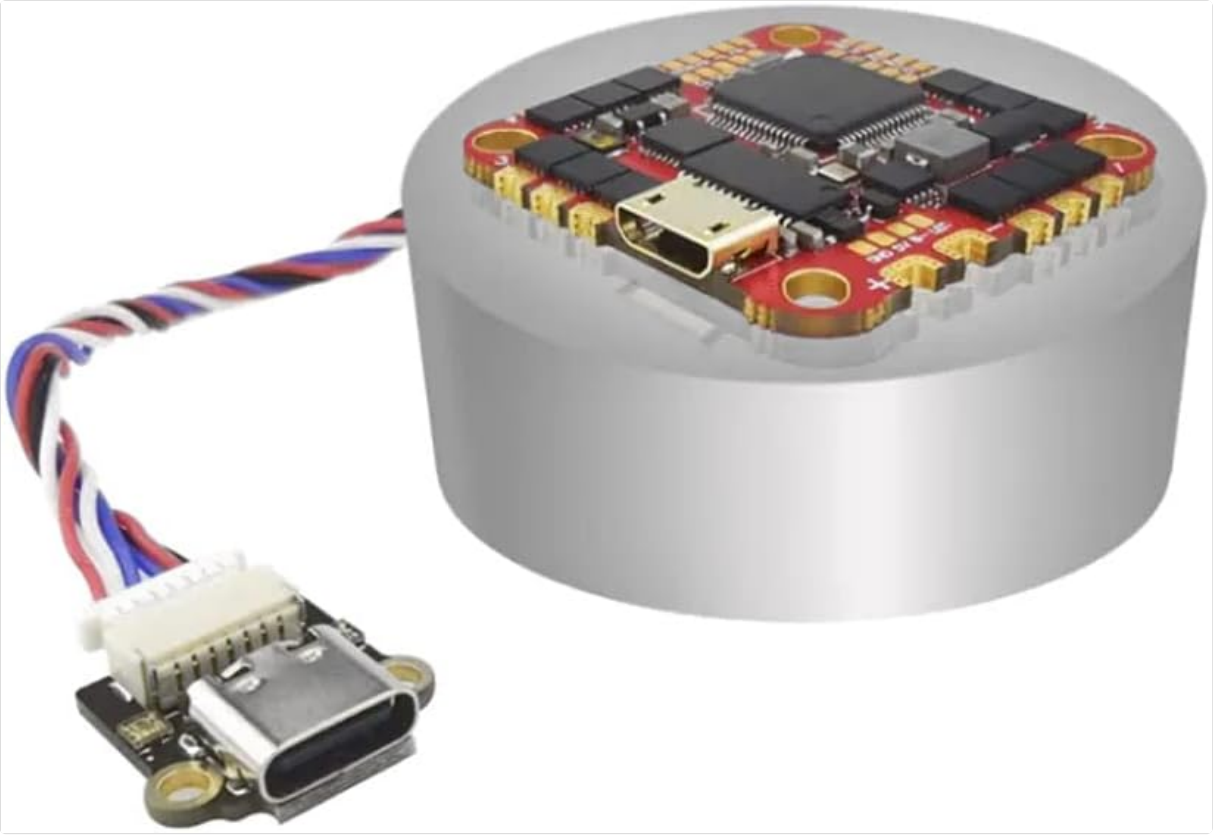

Image: HAKRC F722 AIO Flight Controller shown with its external USB-C board. The external USB board connects via a ribbon cable, allowing for convenient access to the flight controller's USB port for configuration and firmware updates, even

when the main board is installed in a tight space.

4.2 Wiring Diagram

Refer to the following diagrams for proper wiring connections. Ensure all connections are secure and correctly polarized to prevent damage.

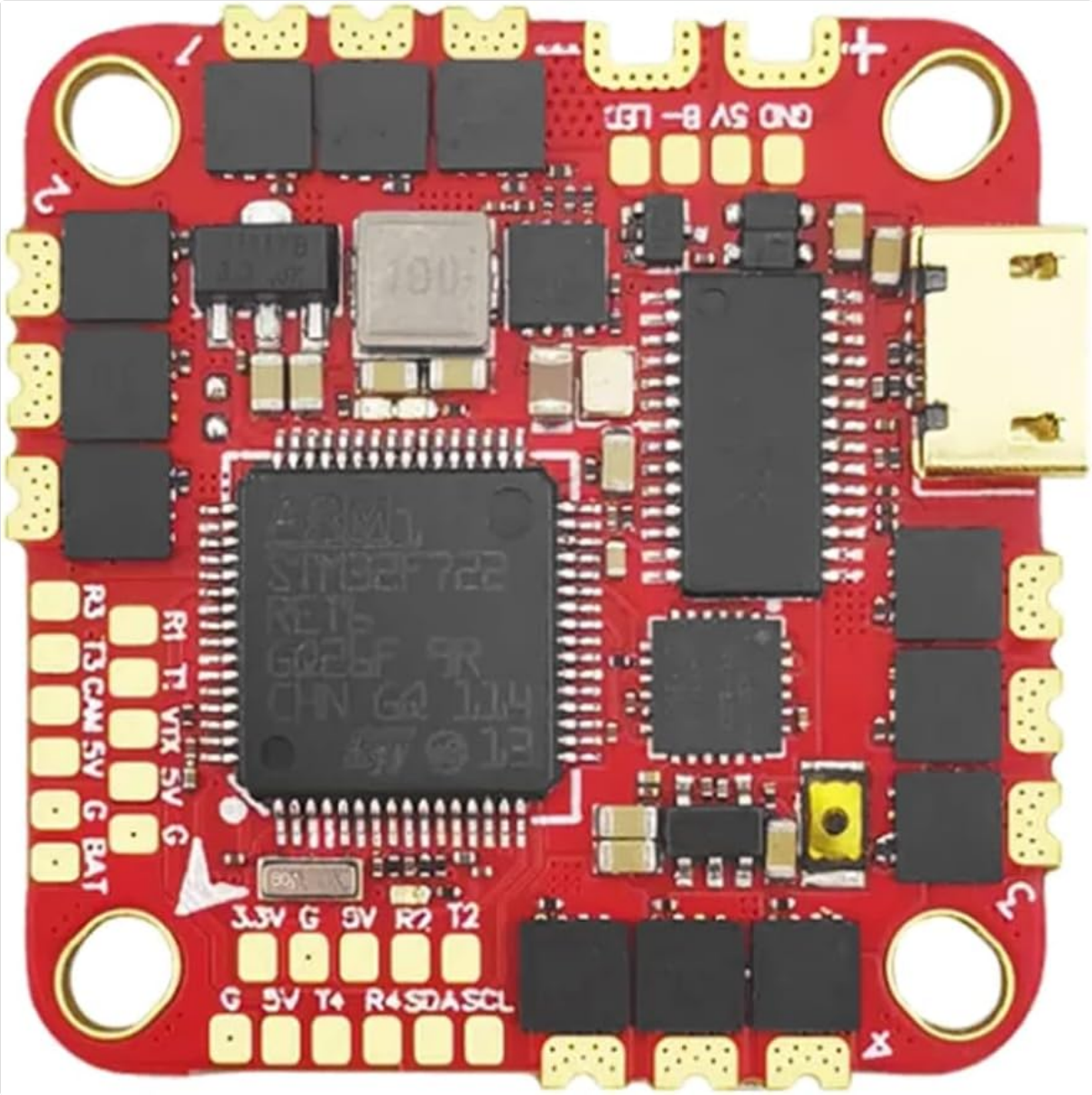

Image: Top view of the HAKRC F722 AIO Flight Controller. This view highlights the various solder pads and connectors for components such as receiver (e.g., CRSF, SBUS), video transmitter (VTX), camera, and motor signal outputs. Pay close attention to the labeled pads for correct wiring.

- **Power Input (BAT):** Connect your 2S-6S LiPo battery via the XT30 power cord to the designated BAT+ and BAT- pads. Ensure correct polarity.
- **Motors:** Solder motor wires to the M1-M4 pads. The ESC supports Dshot600 and other protocols.
- **Receiver:** Connect your receiver (e.g., CRSF, SBUS, DSMX) to the appropriate UART pads (e.g., R2, T2, R3, T3, R4, T4). Refer to the specific receiver's manual for its wiring.
- **Camera:** Connect your FPV camera to the CAM and GND pads.
- **Video Transmitter (VTX):** Connect your VTX to the VTX and GND pads.
- **LEDs:** Programmable LEDs (WS2812) can be connected to the LED pad.

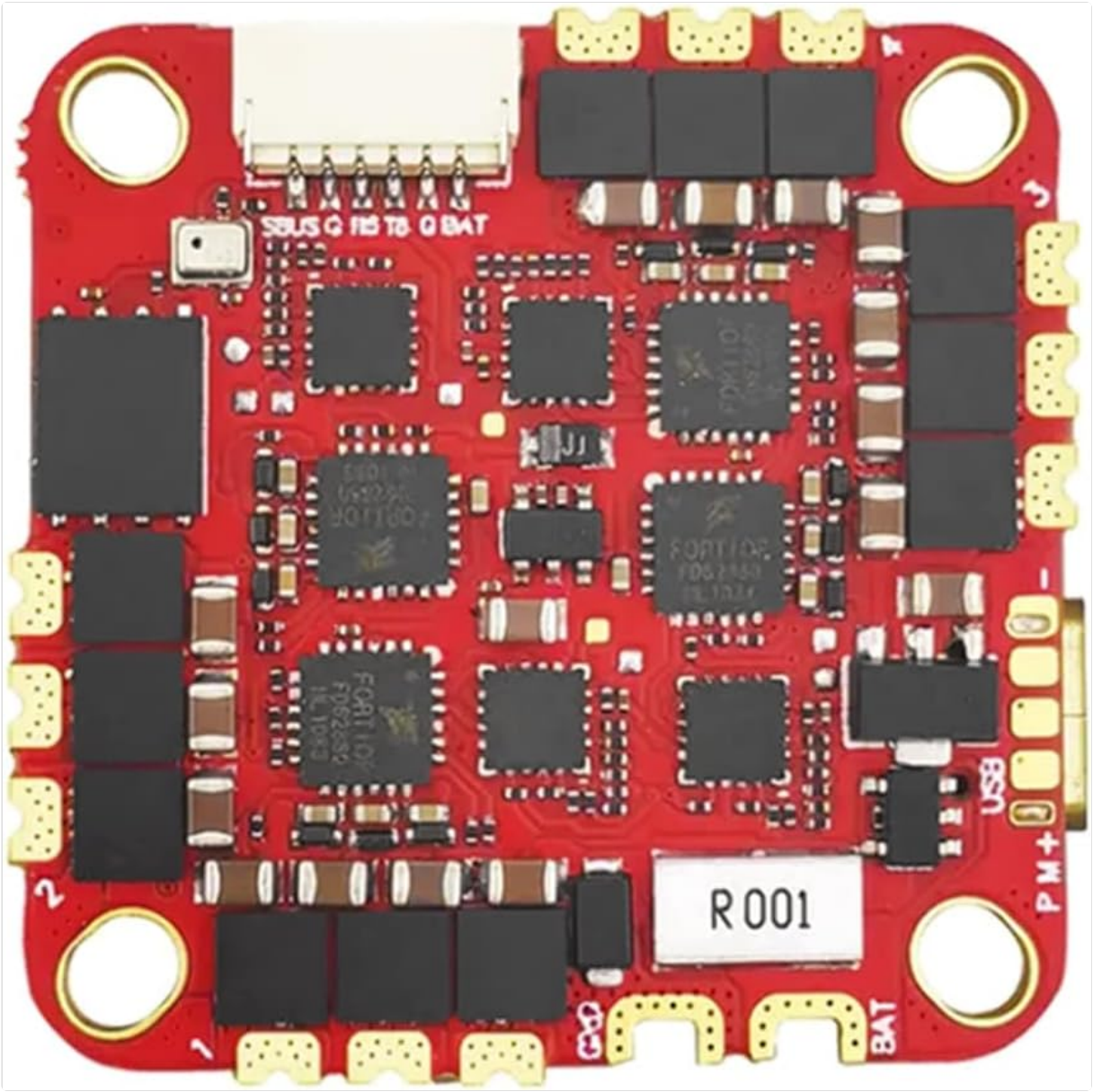

Image: Bottom view of the HAKRC F722 AIO Flight Controller. This side reveals additional components and solder pads, which may include connections for external sensors, buzzers, or other peripherals. Always consult the official wiring diagram for your specific setup.

4.3 Software Configuration

The HAKRC F722 AIO Flight Controller runs Betaflight firmware (HAKRC F722D target). The integrated ESC uses BLHeli_S firmware (G-H-30).

1. **Install Betaflight Configurator:** Download and install the latest Betaflight Configurator application on your computer from the official Betaflight website (betaflight.com).
2. **Connect to PC:** Connect the external Type-C USB board to your computer using a USB cable.
3. **Flash Firmware (Optional):** If necessary, flash the latest stable Betaflight firmware for the HAKRC F722D target. Follow the instructions within the Betaflight Configurator.
4. **Initial Setup:**
    - Calibrate Accelerometer.
    - Configure UARTs for your receiver, VTX, GPS (if applicable).
    - Set up your receiver protocol (e.g., Serial-based receiver for CRSF/SBUS).
    - Configure ESC protocols (Dshot600 is recommended).
    - Adjust PID settings and rates according to your preference and drone setup.

    - Enable OSD features as desired.
5. **BLHeli_S Configuration:** Use the BLHeliSuite32 or Betaflight Passthrough to configure ESC settings if needed. Ensure motor direction is correct.
6. **Test Motors:** With propellers removed, test motor functionality in the Motors tab of Betaflight Configurator.

5. Operating Instructions

Once the flight controller and ESC are properly installed and configured, follow these general steps for operation:

1. **Pre-Flight Check:** Ensure all connections are secure, propellers are correctly installed (if flying), and battery is fully charged.
2. **Power On:** Connect the LiPo battery to the XT30 connector. The flight controller will power up, and LEDs will indicate its status.
3. **Arming:** Arm the drone using your transmitter's assigned arming switch. Ensure you are in a safe environment with sufficient space.
4. **Flight:** Operate your drone using your radio transmitter. Start with gentle movements to familiarize yourself with its response.
5. **Disarming:** Disarm the drone using your transmitter's disarming switch after landing or in an emergency.
6. **Power Off:** Disconnect the LiPo battery immediately after disarming and before handling the drone.

Safety Warning: Always remove propellers before connecting the battery for configuration or testing motors. Operate drones responsibly and in accordance with local regulations.

6. Maintenance

Regular maintenance helps ensure the longevity and reliable performance of your HAKRC F722 AIO board.

- **Inspection:** Periodically inspect the board for any signs of physical damage, loose connections, or corrosion.
- **Cleaning:** Gently clean the board with isopropyl alcohol and a soft brush if dust or debris accumulates. Ensure the board is completely dry before powering on.
- **Firmware Updates:** Check the official Betaflight website for new firmware releases for the HAKRC F722D target. Updating firmware can provide new features, performance improvements, and bug fixes.
- **Capacitor Check:** Ensure the included 270uF/35V capacitor is properly installed on the main power leads to filter electrical noise, especially with higher cell count batteries.

7. Troubleshooting

If you encounter issues, refer to the following common troubleshooting steps:

- **No Power:**
    - Check battery connection and voltage.
    - Inspect power leads for shorts or breaks.
    - Verify correct polarity of power input.

- **Motors Not Spinning:**
  - Ensure the drone is armed.
  - Check motor wiring for correct soldering and continuity.
  - Verify ESC calibration and motor direction in Betaflight/BLHeliSuite.
  - Check for bent motor shafts or obstructions.
- **No Connection to Betaflight Configurator:**
  - Ensure USB drivers are installed (e.g., STM32 Virtual COM Port Driver, Zadig for DFU mode).
  - Try a different USB cable or port.
  - Ensure the external USB board is correctly connected to the AIO board.
  - If in DFU mode, ensure the correct bootloader drivers are installed.
- **Unstable Flight:**
  - Check for vibrations; ensure shock-absorbing balls are properly installed.
  - Review PID tuning settings.
  - Ensure propellers are balanced and undamaged.
  - Verify flight controller orientation in Betaflight.

For further assistance, consult online resources, community forums, or contact HAKRC support.

8. Warranty and Support

HAKRC products are designed for reliability and performance. For warranty information and technical support, please refer to the official HAKRC website or contact your retailer. Keep your proof of purchase for any warranty claims.
For general inquiries or troubleshooting, you may also find valuable information and community support on popular FPV forums and online groups.