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HGLRC Zeus Mini F722 Flight Controller User Manual

Comprehensive guide for setup, operation, and maintenance of your HGLRC Zeus Mini F722 Flight Controller.

1. Introduction

This user manual provides detailed instructions for the HGLRC Zeus Mini F722 Flight Controller. Designed for FPV racing drones, RC quadcopters, and multirotors, this flight controller integrates advanced features for stable and high-performance flight. Please read this manual thoroughly before installation and operation to ensure proper functionality and safety.

2. Product Overview

The HGLRC Zeus Mini F722 is a compact yet powerful flight controller featuring an F722 chip, integrated barometer, and 16M black box. It is designed for easy integration into various drone builds, particularly those utilizing DJI digital FPV systems.



Figure 2.1: Top view of the HGLRC Zeus Mini F722 Flight Controller, showcasing its compact design and component layout.



Figure 2.2: Diagram highlighting key features such as the F722 chip, BMP280 barometer, enlarged solder pads, and direct DJI plug-in compatibility.



Figure 2.3: Illustration demonstrating the plug-and-play compatibility with DJI and Vista Digital VTX systems, eliminating the need for soldering for these connections.

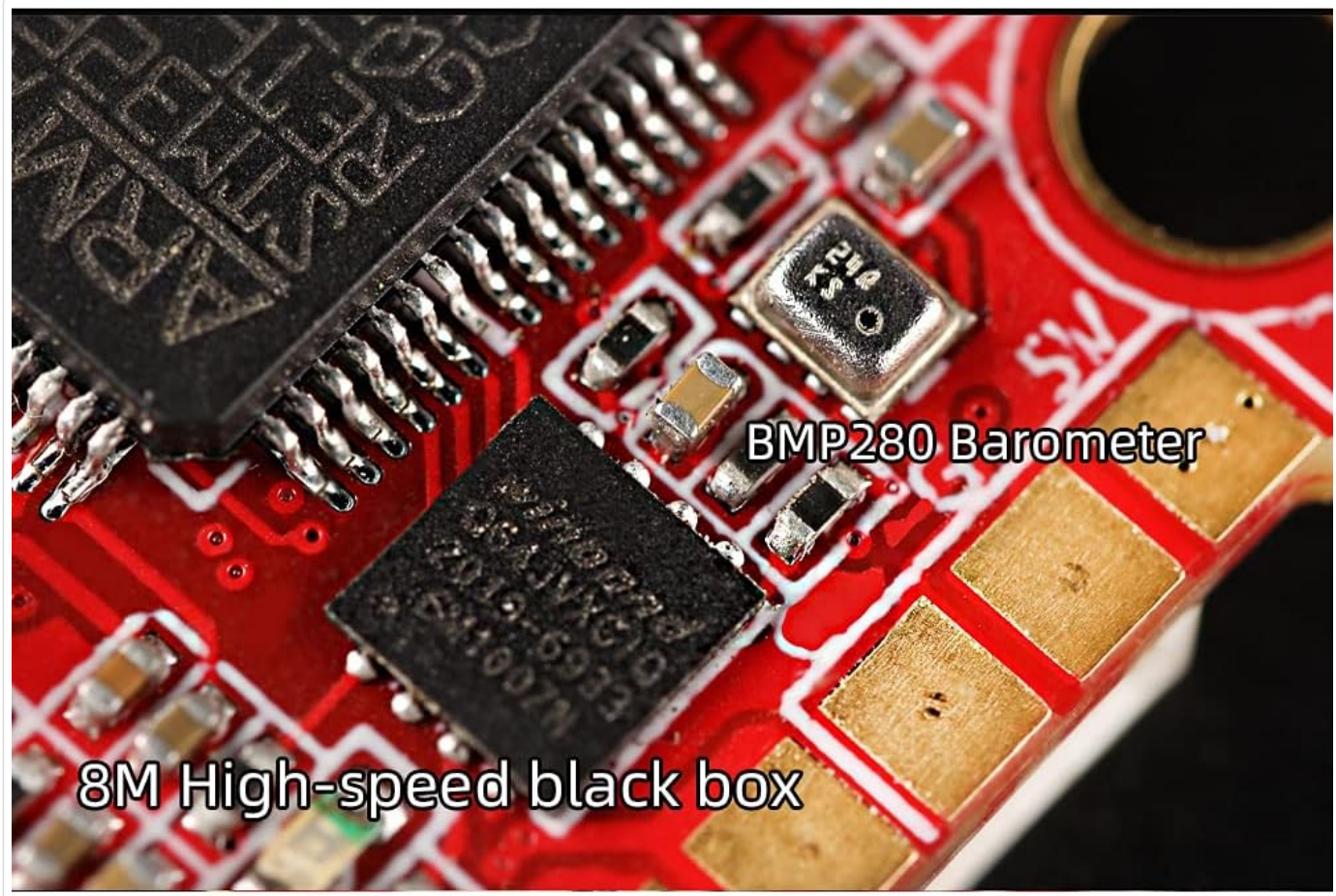


Figure 2.4: Detailed view of the integrated BMP280 Barometer for altitude hold and the 8M high-speed black box for flight data logging.

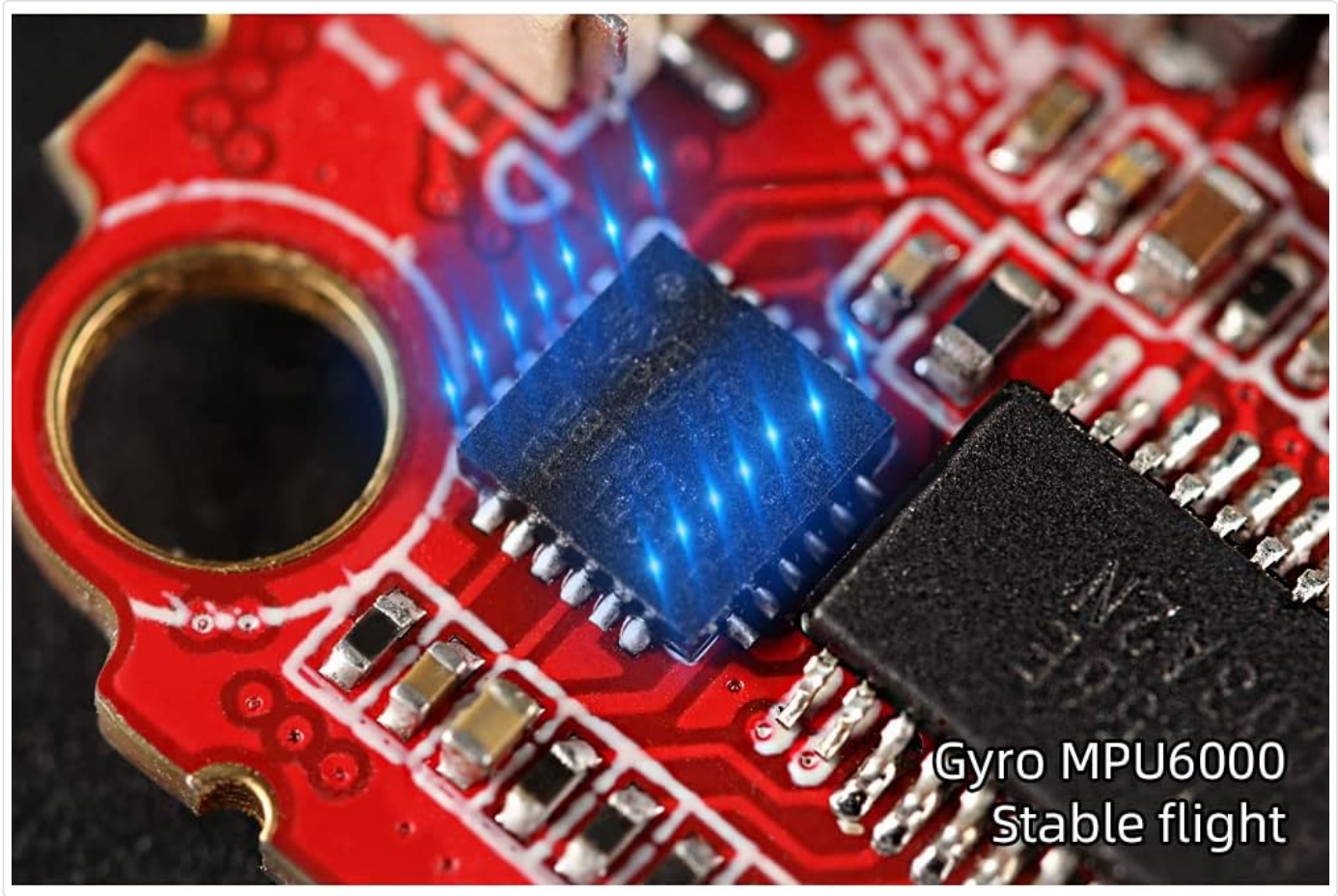


Figure 2.5: Close-up of the Gyro MPU6000, essential for stable flight performance and accurate motion sensing.

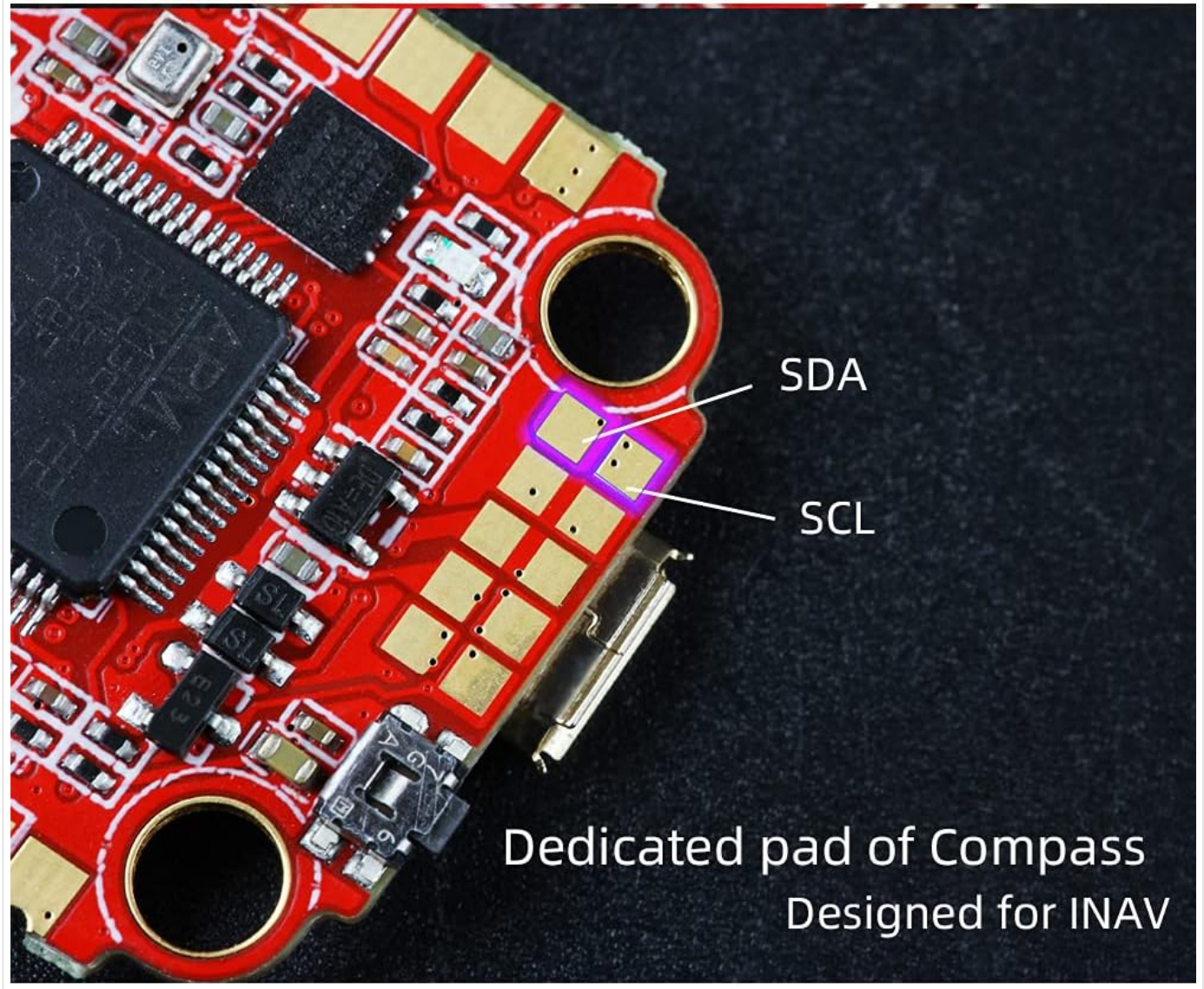


Figure 2.6: View of the dedicated SDA and SCL pads for connecting an external compass, designed for INAV compatibility.

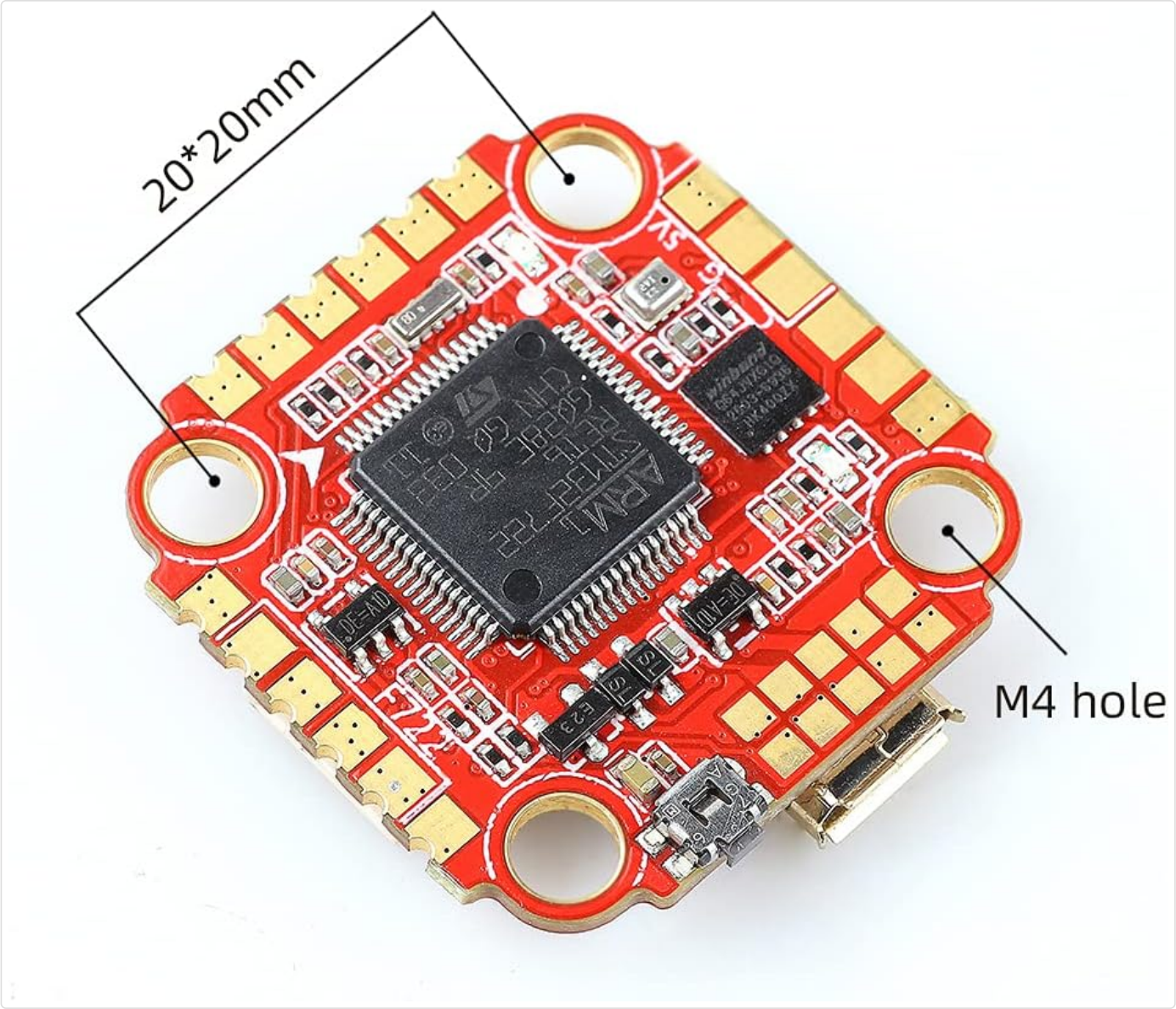


Figure 2.7: Image showing the 20x20mm mounting hole pattern with M4 holes, indicating the compact size suitable for mini drones.

3. Features

- Integrated barometer and 16M black box for flight data logging and altitude stability.
- Built-in Betaflight OSD (On-Screen Display) for real-time PID adjustments and flight information.
- Zeus F722 mini FC operating at a higher frequency for smooth and responsive control.
- Compact 20x20mm M2 mounting hole pattern (Note: Product image shows M4 holes, please verify actual product for M2 or M4).
- Easy direct soldering for TBS NANO VTX, XM+, and TBS CROSSFIRE NANO Receiver.
- STM32F722 RET6 CPU for powerful processing.

4. Setup

4.1 Wiring Diagram

Refer to the following diagrams for proper wiring of the flight controller with various components such as cameras, VTX, GPS, and receivers.

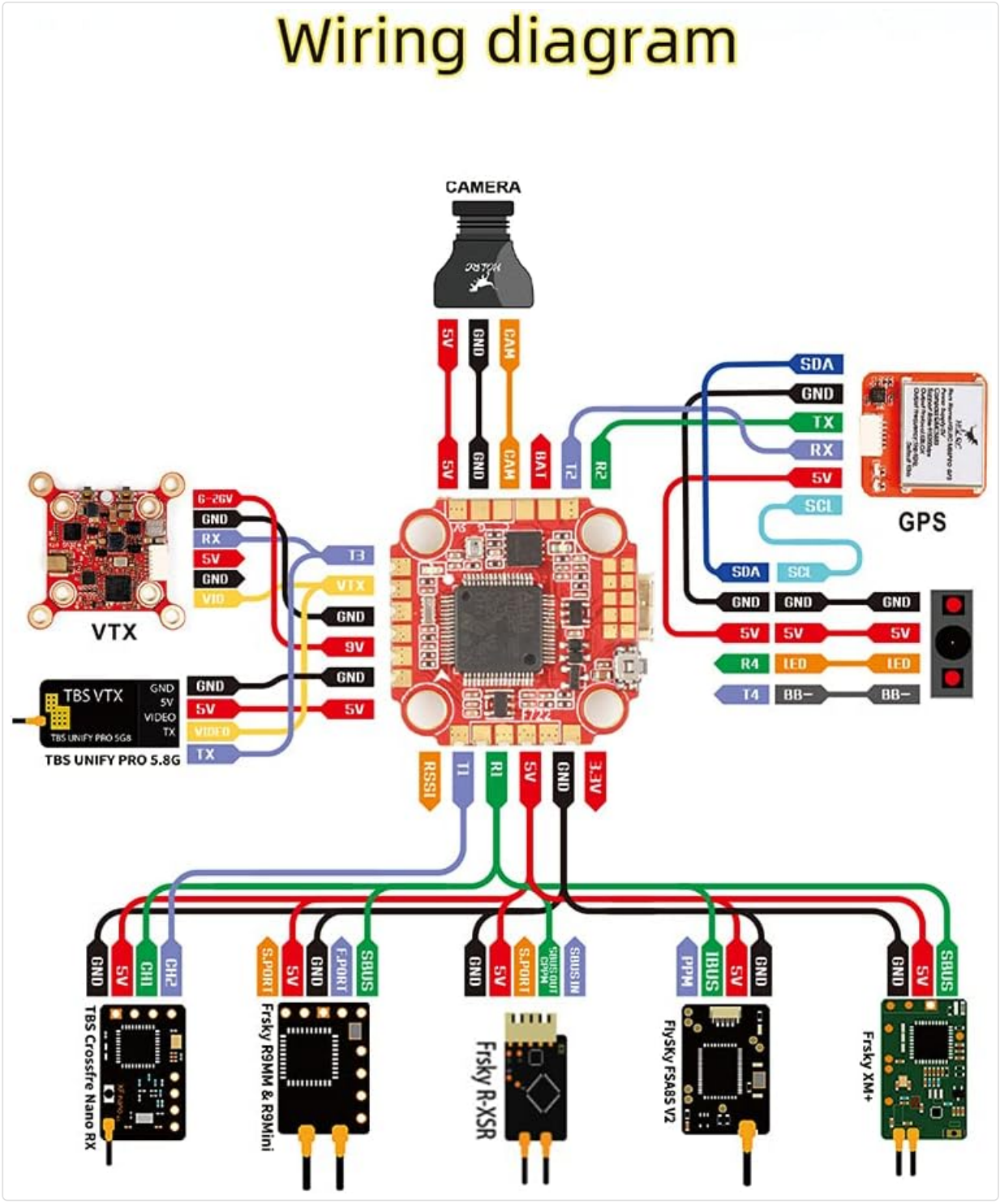


Figure 4.1: Comprehensive wiring diagram showing connections for camera, VTX, GPS, and various receiver types (TBS Crossfire Nano RX, Frsky R9MM & R9mini, Frsky R-XSR, Flysky FS-iA6B, Frsky XM+).

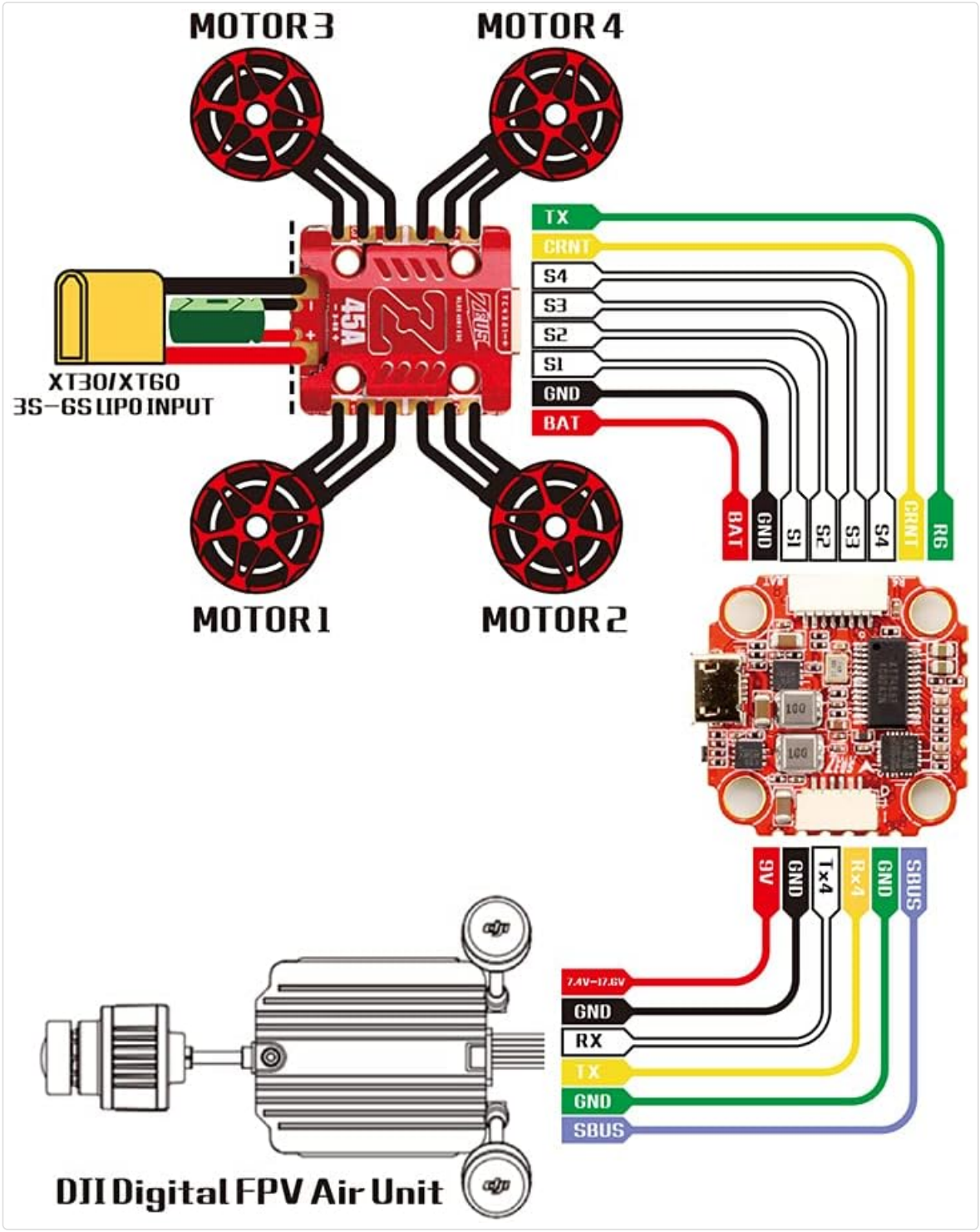


Figure 4.2: Wiring diagram specifically for motor connections (to a 4-in-1 ESC) and the DJI Digital FPV Air Unit, including power input (3S-6S LiPo).

4.2 Installation Steps

1. **Mounting:** Secure the flight controller to your drone frame using appropriate standoffs and screws. Ensure the arrow on the FC points towards the front of the drone. The mounting hole pattern is 20x20mm.
2. **Power Connection:** Connect the main power input from your ESC or PDB to the designated VBAT pads on the flight controller. Ensure correct polarity. The FC supports 3S-6S LiPo input.
3. **ESC Connection:** Connect the signal wires from your 4-in-1 ESC to the corresponding motor output pads (S1-S4) on the flight controller.
4. **Receiver Connection:** Solder your receiver (e.g., TBS Crossfire Nano RX, Frsky XM+) to the appropriate UART pads (e.g., RX1, TX1 for SBUS/CRSF).
5. **Video System Connection:** For DJI Digital FPV Air Unit, connect directly to the dedicated port. For analog VTX, connect video in/out, ground, and 5V/VBAT power as per the wiring diagram.

6. **Peripheral Connections:** Connect any additional peripherals such as GPS, buzzer, or LED strips to their respective pads as shown in the wiring diagram.
7. **Firmware Flashing:** Connect the flight controller to your computer via USB. Use Betaflight Configurator to flash the latest stable firmware for the HGLRC F722 target.
8. **Configuration:** Configure the flight controller settings in Betaflight Configurator, including accelerometer calibration, port setup, receiver protocol, ESC protocol (e.g., DShot), OSD elements, and PID tuning.

5. Operating Instructions

Once the flight controller is installed and configured, follow these general steps for operation:

1. **Pre-Flight Check:** Before each flight, ensure all connections are secure, propellers are correctly installed, and battery is fully charged.
2. **Arming:** Arm the drone using the configured switch on your radio transmitter. The motors will spin up to idle speed.
3. **Takeoff:** Slowly increase throttle to lift off. Maintain smooth control inputs.
4. **Flight Modes:** Utilize different flight modes (e.g., Angle, Acro, Horizon) as configured in Betaflight to suit your flying style and conditions.
5. **OSD Monitoring:** Monitor critical flight data (battery voltage, current, flight time, RSSI) via the Betaflight OSD displayed in your FPV goggles or monitor.
6. **Landing:** Reduce throttle gradually to land. Disarm the drone once it is safely on the ground.
7. **Post-Flight:** Disconnect the battery immediately after landing. Review black box logs if needed for performance analysis.

6. Maintenance

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

- **Regular Inspection:** Periodically inspect the flight controller for any visible damage, loose connections, or solder joint cracks.
- **Cleaning:** Keep the FC clean from dust, dirt, and debris. Use a soft brush or compressed air. Avoid using liquids directly on the board.
- **Firmware Updates:** Regularly check for and apply the latest Betaflight firmware updates to benefit from performance improvements and bug fixes.
- **Environmental Protection:** Protect the flight controller from moisture, extreme temperatures, and static discharge. Consider conformal coating for water resistance in wet environments.
- **Storage:** Store the flight controller in a dry, anti-static environment when not in use.

7. Troubleshooting

If you encounter issues with your HGLRC Zeus Mini F722 Flight Controller, consider the following troubleshooting steps:

Problem	Possible Cause	Solution
FC not powering on	Incorrect wiring, short circuit, faulty USB cable/port	Check power connections and polarity. Inspect for shorts. Try a different USB cable or port.
No connection in Betaflight Configurator	Missing VCP drivers, incorrect COM port, faulty FC	Install STM32 VCP drivers. Select correct COM port. Try DFU mode for flashing.

Problem	Possible Cause	Solution
Drone not arming	Pre-arm checks failed (e.g., low battery, no receiver signal, accelerometer not calibrated)	Check Betaflight OSD or Modes tab for arming flags. Calibrate accelerometer. Ensure receiver is bound and connected.
Unstable flight / Drifting	Incorrect PID tuning, motor/propeller issues, vibration	Adjust PID values. Check for bent propellers or damaged motors. Soft-mount FC to reduce vibrations.
OSD not displaying	OSD not enabled, incorrect video format, faulty camera/VTX	Enable OSD in Betaflight. Set correct video format (PAL/NTSC). Check camera and VTX connections.

8. Specifications

Feature	Detail
Brand	HGLRC
Model Name	Zeus Mini F722
CPU	STM32F722 RET6
Input Voltage	3S-6S LiPo
Barometer	Integrated
Black Box	16M (onboard)
OSD	Betaflight OSD
Mounting Hole	20x20mm M2 (Note: Product image shows M4, please verify)
Dimensions	Approx. 28x28mm (based on 20x20mm mounting)
Item Weight	0.81 ounces (approx. 23g)

9. Warranty and Support

HGLRC stands behind the quality of its products. For any questions, technical assistance, or support needs, please contact HGLRC customer service. The manufacturer is committed to providing support within 24 hours.
Please refer to the official HGLRC website or your point of purchase for specific warranty terms and conditions.

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