

Pilotix F405 V3 ICM42688 CZ

User manual



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1. Product overview

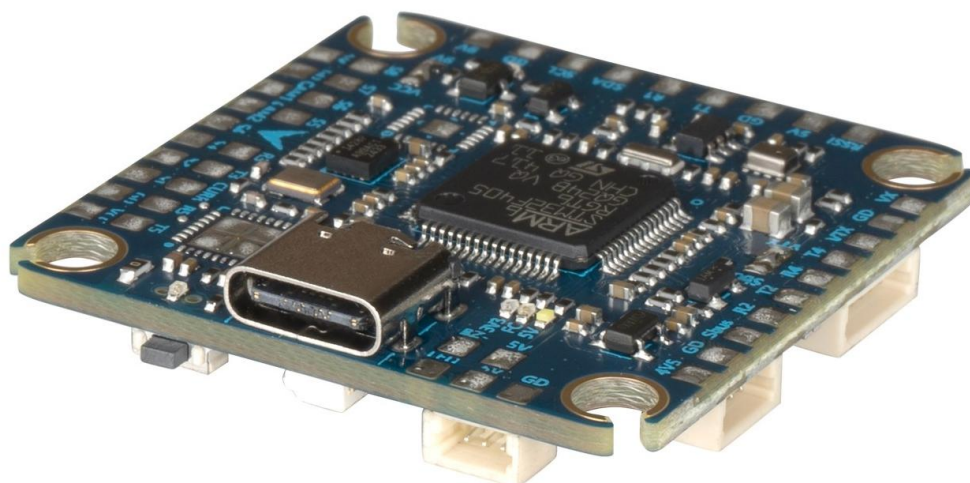


Fig.1. Pilotix F405 V3 ICM42688 CZ

The Pilotix F405 V3 ICM42688 CZ is a flight controller for FPV drones. It is based on the STM32F405 MCU, supports Betaflight (firmware target PILOTIXF405V3), and features an analog OSD. The board is equipped with the high-speed ICM42688-P gyro connected via SPI, a built-in accelerometer and magnetometer, and an SPL06 barometer. It provides 4 motor control outputs, 5 UART ports, 1 I2C port, an LED strip output, a buzzer output, a USB Type-C port, dual analog camera inputs, and BEC outputs of 5V @ 2.5A and 9V @ 2.5A. The board measures 36 x 36 mm with a 30.5 x 30.5 mm (M3) mounting pattern and weighs 9.6 g.

2. Wiring guide

2.1. Power and FC connection

The flight controller (FC) is the core of your build.

- **FC link:** Use the supplied wiring harness to bridge the ESC and FC. This cable carries the battery voltage (Vbat), ground, motor signals (S1-S4), and telemetry data.

2.2. Peripheral wiring (UARTs)

The Universal Serial Port layout for this FC is standardized as follows:

- **UART 1 (GPS):** Connect your GPS module here. Match TX to R1 and RX to T1. Use the 5V and GND pads for power.
- **UART 2 (Receiver):** Solder your ELRS or Crossfire receiver here. (Receiver TX to R2, Receiver RX to T2).
- **UART 3 (ESC Telemetry):** This is usually handled by the ESC harness connector (T3 / R3 pads) to provide motor RPM and temperature data.
- **UART 4 (VTX):** Connect the control wire (SmartAudio/IRC Tramp) of your video transmitter to the T4 pad.
- **UART 5 (Free):** Available on the T5 and R5 pads for any additional peripheral.

2.3. Video and camera setup

This FC features advanced camera switching and voltage management.

Camera connections

- **Dual camera support:** You can solder two cameras. Connect the signal wire of the first to CAM1 and the second to CAM2.
- **Switching:** Camera 1 is active by default. You can toggle to Camera 2 using a switch on your transmitter (configured as USER3).

Video transmitter (VTX)

- **Signal:** Connect the VTX video wire to the VTX pad.
- **Power:** The VX pad supplies the VTX (VCC or 9V, depending on the voltage jumper position).
- **Voltage jumper (right edge, VCC / 9V):** (Crucial) Check the bridge on the board before wiring.
 - Solder the bridge to VCC for 3-4S voltage.
 - Solder the bridge to 9V for 6S-8S setups (recommended to prevent VTX burnout).
- **Sbus / VTX jumper (bottom edge):** Bridge the VTX pads for an analog video transmitter connector (T4, R4, GD, VTX), or the Sbus pads for a DJI Air Unit connector (T4, R4, GD, Sbus).

- Switching: You can remotely turn the 9V VTX power on or off using USER1.

2.4. Additional components

- Buzzer: Solder an active 5V buzzer to the 5V and BZ- pads.
- LED indicators: The board features diagnostic LEDs to show the status of the FC (blue) and the 3V/5V/9V power rails (red/white/green).
- LED strip: Connect an LED strip to the LED pad and use the adjacent 5V and GD pads for power.
- I2C (Compass): If your GPS has a compass, connect SCL to SCL and SDA to SDA (located near UART 1)

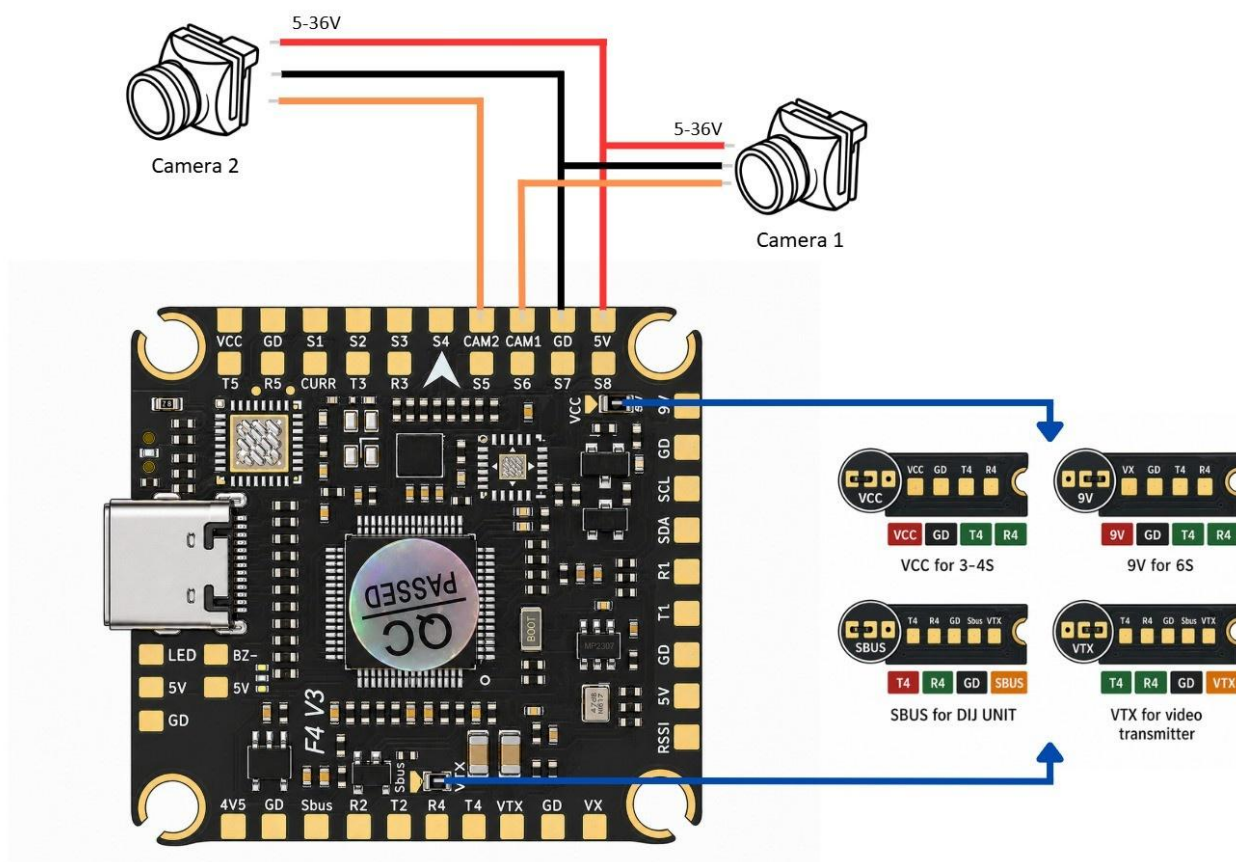


Fig.2. Wiring diagram

3. Safety & usage rules

- Voltage jumper check: Before connecting any peripheral, verify the jumper pads (VCC/9V and VTX/SBUS). The default is often 9V, but if your VTX or camera requires 5V or full battery voltage, miswiring will result in instant hardware failure.
- Smoke stopper: Always use a current-limiting "Smoke Stopper" during the first power-up after soldering. This is your only line of defense against a short circuit caused by a solder bridge.
- Polarity: Ensure the VCC (Vbat) and GD pads are wired correctly. The FC does not have reverse polarity protection; swapping plus and minus will destroy the board immediately.
- Vibration isolation: The ICM42688 is a high-performance gyro but is extremely sensitive to mechanical noise. Always use the supplied shock-absorbing balls (4x) and ensure no wires are pressing tightly against the gyro chip (the small black square in the center).
- Airflow: The onboard 9V and 5V regulators (becs) generate heat, especially when powering high-output video transmitters or multiple leds. Ensure the FC is mounted in a way that allows active airflow during flight.
- Solder quality: Use high-quality leaded or lead-free solder with flux. "Cold" solder joints (dull, grainy appearance) can fail under the high-frequency vibrations of an FPV drone.
- Bench cooling: Do not leave the FC powered by a battery on your workbench for more than 2-3 minutes without a fan. The regulators can reach temperatures over 80°C very quickly.

Contacts:

WhatsApp: +420 777 054 888

Email: support@pilotix.eu

Telegram: https://t.me/PilotixSupport_bot