Taker F722 BLS 50A

GEPRC Taker F722 BLS 50A Stack
Flight controller GEP-F722-HD V2 + ESC
GEP-BLS50A-4IN1



Read this manual carefully before assembly and first power-up.

www.rotorama.com

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1. Safety instructions

1.1 Before you start

This product is an electronics set (a so-called stack) for building an FPV drone: a flight controller (FC) and a four-in-one electronic speed controller (4-in-1 ESC). It is intended for users experienced in building and tuning FPV drones. The product is not a toy and must be kept away from children.

- Read the entire manual and keep it. Do not connect a damaged product.
- Work on a non-conductive, dry and clean surface, away from flammable materials.

1.2 Electrical safety and soldering

- Power the product exclusively from a **3S to 6S** Li-Po battery. A higher voltage will irreversibly damage the boards.
- Before connecting the battery for the first time, check the **polarity** of the power lead (red +, black −) and use a multimeter to verify there is no short circuit between + and −.
- For the first power-up, use a smoke stopper or a current-limited bench supply.
- Solder the supplied capacitor with correct polarity; a reversed capacitor may burst.
- Use a temperature-controlled soldering iron and do not heat the pads longer than necessary. After soldering, check that there are no solder bridges between adjacent pads.
- Never connect or disconnect peripherals (receiver, camera, video transmitter, GPS) with the battery connected.

1.3 Li-Po batteries

- Charge the battery only with a Li-Po charger, under supervision and on a non-flammable surface. Do not use swollen or otherwise damaged batteries.
- Do not discharge the battery below 3.5 V per cell; for storage set it to 3.8 V per cell.
- Disconnect the battery after a flight or test; never leave a connected battery unattended.

1.4 Propellers and motor tests

- Keep the **propellers removed** during all setup work, motor tests and firmware updates.
- Before the first flight, check the motor rotation direction and the Arm/Disarm and failsafe functions (chapter 6).
- The ESC and the flight controller get hot during operation. Do not touch them after a flight until they have cooled down.

2. Product description

2.1 Intended use

The GEPRC Taker F722 BLS 50A Stack forms the electronic core of an FPV drone with a frame for a 30.5 × 30.5 mm mounting pattern. The **GEP-F722-HD V2** flight controller with an STM32F722 processor and an ICM42688-P gyroscope controls the flight of the drone running Betaflight firmware. The **GEP-BLS50A-4IN1** four-in-one ESC powers and drives four brushless motors.

The flight controller is ready for direct connection of the DJI Air Unit digital system using the cable supplied and offers connectors for a receiver, camera, video transmitter and LED, so the build requires minimal soldering. Conventional solder pads are also available on the bottom side. It connects to a computer via a USB-C connector.

2.2 Package contents

Item	Qty
Flight controller GEP-F722-HD V2	1×
ESC GEP-BLS50A-4IN1	1×
Capacitor	1×
DJI Air Unit adapter cable	1×
Flight controller – ESC adapter cable	1×
XT60 power cable	1×
Screw M3 × 30	4×
Screw M3 × 24	4×
Nylon nut	8×
Silicone damping grommet	8×
SH1.0 4-pin silicone cable	2×
Camera connection cable	1×

※ Battery, motors, frame, propellers, receiver, camera and video transmitter are not included.

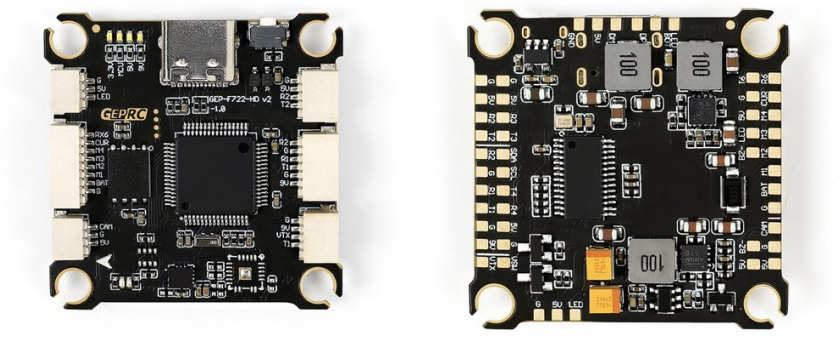
2.3 Specifications – flight controller

Parameter	Value
Model	GEP-F722-HD V2
Processor (MCU)	STM32F722
Gyroscope (IMU)	ICM42688-P (SPI)
Blackbox memory	16 MB, onboard
OSD	Betaflight OSD, AT7456E chip
BEC	5 V / 3 A and 9 V / 2.5 A (two independent outputs)
Input voltage	3–6S Li-Po
Serial ports (UART)	5
Power filtering	integrated LC filter
PC connection	USB-C
DJI Air Unit connection	direct plug-in (cable included)
Firmware / target	Betaflight / GEPRCF722
Dimensions	36.85 × 36.85 mm
Mounting holes	30.5 × 30.5 mm, hole ⌀ 4 mm; ⌀ 3 mm with damping grommet (M3)
Weight	8.1 g

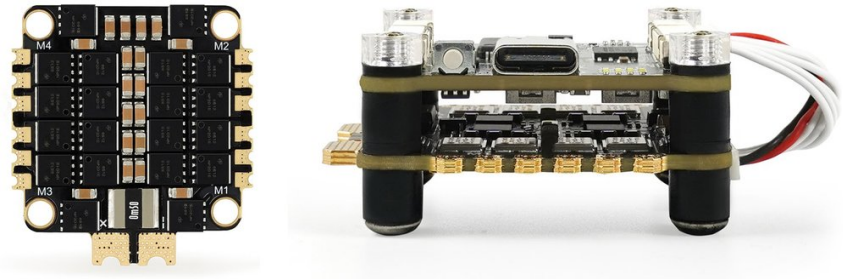
2.4 Specifications – ESC

Parameter	Value
Model	GEP-BLS50A-4IN1
Input voltage	3–6S Li-Po
Continuous current	50 A
Burst current	55 A (5 s)
Current sensor	yes
Firmware / target	BLHeli_S / G_H_30
Supported protocols	DShot150/300/600, Oneshot125, Oneshot42, Multishot
Dimensions	42.9 × 39.7 mm
Mounting holes	30.5 × 30.5 mm, hole ⌀ 4 mm; ⌀ 3 mm with damping grommet (M3)
Weight	13.7 g

2.5 Board layout



GEP-F722-HD V2 flight controller – top side with connectors (left) and bottom side with solder pads (right)



GEP-BLS50A-4IN1 ESC with motor outputs M1–M4 marked (left) and the assembled stack from the side (right)

The top side of the flight controller carries the USB-C connector, status LEDs (3.3V, MCU, 5V, 9V) and connectors for the ESC, LED, camera, receiver, DJI Air Unit and analog video transmitter. The bottom side has solder pads for the same signals plus the buzzer, GPS module (UART4 and I²C), UART3 and UART6. The ESC has solder pads for four motors (M1–M4) and power pads for the battery.

3. Legal conditions of operation in the Czech Republic and the EU

3.1 The law of the country where you fly applies

Regulations (EU) 2019/947 and 2019/945 apply in all EU member states, but national implementing rules differ from country to country — registration portals, minimum pilot age, geographical zones, mandatory insurance, permitted frequency bands and maximum transmit power. The information in this chapter describes the situation in the Czech Republic. If you operate a drone in another country, you must follow the regulations of the country in which you fly.

3.2 A drone built with this product

- The product itself is not a drone but a part of one. Whoever builds and operates the finished drone is responsible for its compliance with the operating rules.
- A drone built from individual components is a **privately built unmanned aircraft system** without a class label. It may be operated in the open category – in subcategory A1 with a take-off mass below 250 g, otherwise in subcategory A3 – or within a model aircraft club or association.
- If the drone carries a camera, its operator must **register** regardless of the drone's mass and display the registration number on the drone. In the Czech Republic, registration is handled by the Civil Aviation Authority (ÚCL).
- The pilot must hold the appropriate competency (online course and test depending on the subcategory) and observe the operating limits: maximum height 120 m, flight within visual line of sight, no flying over assemblies of people.
- Flying with FPV goggles in the open category is only possible with an **observer** standing next to the pilot and keeping the drone in visual line of sight.
- The video transmitter and receiver you connect to the product must operate in the frequency bands and at the power permitted in the country of operation. The user is responsible for the power setting.

Current information on drone operating rules in the Czech Republic is available on the ÚCL website www.caa.gov.cz.

4. Assembly

4.1 What else you need

- a frame with a 30.5 × 30.5 mm mounting pattern and four brushless motors suitable for 3–6S,
- a 3S to 6S Li-Po battery with an XT60 connector,
- an RC receiver with a serial protocol (e.g. CRSF / ExpressLRS) or a DJI digital system with an SBUS receiver,
- a camera and video transmitter (analog, or a DJI Air Unit / Caddx Vista digital system),
- a soldering iron, solder, a USB-C cable and a computer with Betaflight Configurator.

4.2 Assembling the stack

① Insert the silicone damping grommets into the mounting holes of both the flight controller and the ESC. This reduces the ⌀ 4 mm hole to ⌀ 3 mm for M3 screws.

② Place the ESC in the frame as the bottom board and the flight controller above it. Depending on the frame height, use the M3 × 24 or M3 × 30 screws supplied and secure the boards with the nylon nuts.

③ Orient the flight controller with the arrow on the board pointing in the direction of flight. If you have to rotate it, set the rotation in Betaflight Configurator (*Configuration* tab → *Board and Sensor Alignment*).

④ Tighten the nuts only enough to stop the boards from moving. Over-compressed grommets lose their damping effect.

4.3 Power and capacitor

① Solder the XT60 power cable to the battery pads on the ESC: red wire to +, black to −.

② Solder the capacitor supplied to the same pads – the longer lead (+) to the positive pad, the negative lead (marked with a stripe on the body) to the negative pad. Keep the capacitor leads as short as possible.

③ Before connecting the battery, use a multimeter to confirm there is no short circuit between + and −.

4.4 Motors

Solder the motor wires to the pad groups marked **M1** to **M4**. The motor numbering must match the motor layout in Betaflight (*Motors* tab). The order of the three wires of a motor only determines its direction of rotation, which can later be changed in software (chapter 6.5).

4.5 Connecting the ESC and the flight controller

Connect the ESC and the flight controller with the adapter cable supplied. The cable carries these signals:

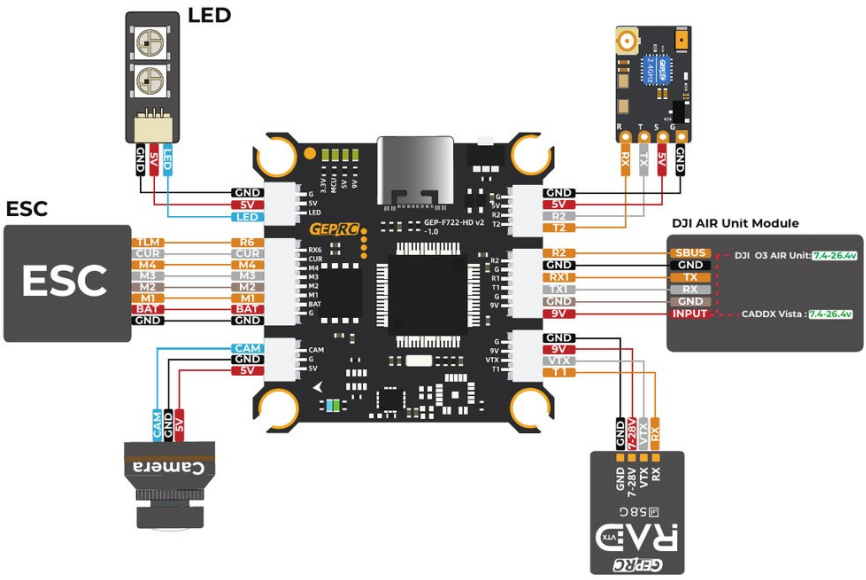
ESC	Flight controller	Function
TLM	R6	ESC telemetry (UART6 input)
CUR	CUR	current sensor signal
M1–M4	M1–M4	motor control signals
BAT	BAT	battery voltage to power the FC
GND	GND	ground

※ Check the cable before connecting it – the leads must connect the pins as listed in the table.

5. Connecting peripherals

5.1 Wiring diagram – top side

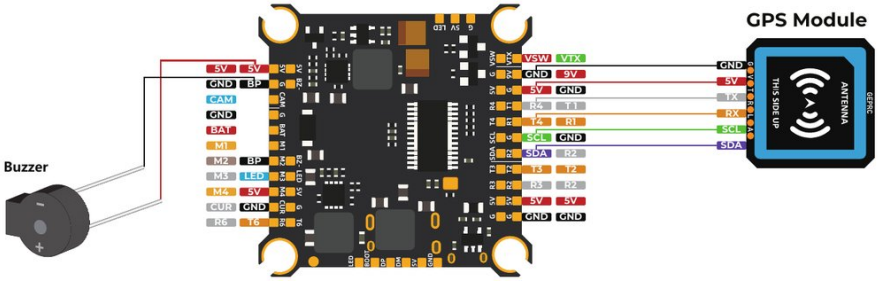
The connectors on the top side of the flight controller are designed for plug-in accessories. Diagram according to the manufacturer:



Top-side connectors: LED, ESC, camera, receiver, DJI Air Unit and analog video transmitter

Connector	Pins	Connection
LED	G, 5V, LED	LED strip / module
ESC	RX6, CUR, M4–M1, BAT, G	ESC (chapter 4.5)
Camera	CAM, G, 5V	analog camera, 5 V supply
Receiver	G, 5V, R2, T2	receiver TX → R2, receiver RX → T2
DJI	R2, G, R1, T1, G, 9V	DJI Air Unit / Caddx Vista
VTX	G, 9V, VTX, T1	analog video transmitter, 9 V supply

5.2 Wiring diagram – bottom side



Solder pads on the bottom side – connecting the buzzer and GPS module

- **Buzzer:** positive lead (+) to the **5V** pad, negative (−) to the **BZ−** pad.
- **GPS module:** GND → G, 5V → 5V, module TX → **R4**, module RX → **T4**; if the module has a compass, SCL → **SCL** and SDA → **SDA**.
- The bottom side also provides UART3 pads (**T3**, **R3**), **T6**, additional 5V, 9V and G pads, and the VSW and VTX pads.
- Do not use the **BOOT**, DP and DM pads in normal operation.

5.3 Receiver

Connect a receiver with a serial protocol (e.g. ExpressLRS / CRSF) to the receiver connector: G, 5V, receiver TX to **R2** and receiver RX to **T2**. In Betaflight set:

- *Ports* tab: enable *Serial Rx* on **UART2**,
- *Receiver* tab: *Receiver Mode* = *Serial-based receiver*, *Serial Receiver Provider* = **CRSF** (for ExpressLRS and Crossfire receivers).

※ The R2 signal is routed to both the receiver connector and the DJI connector. Always connect the receiver through only one of them.

5.4 DJI Air Unit / Caddx Vista digital system

Connect the DJI Air Unit to the DJI connector with the adapter cable supplied. The connector powers the unit from the **9V** BEC output and links it to UART1 (OSD via MSP). According to the manufacturer, the input voltage of the DJI O3 Air Unit and Caddx Vista is 7.4–26.4 V.

- *Ports* tab: enable *Configuration/MSP* on **UART1**,
- if you use the receiver of the DJI system (SBUS on the R2 pin): enable *Serial Rx* on **UART2**, *Receiver Mode* = *Serial (via UART)*, *Serial Receiver Provider* = **SBUS**.

5.5 Analog video transmitter

Connect the analog video transmitter to the VTX connector: G, **9V** (power), VTX (video signal) and T1 (transmitter control). Connect the camera to the camera connector (CAM, G, 5V).

- Use the 9 V supply only for a transmitter that supports this input voltage – check its manual.
- *Ports* tab: on **UART1** in the *Peripherals* column select **VTX (IRC Tramp)**, or the protocol your transmitter uses.
- Never power on the video transmitter without an antenna connected.

5.6 GPS, buzzer and LED

- Wire the GPS module as described in chapter 5.2 and in the *Ports* tab set **GPS** on **UART4** in the *Sensor Input* column.
- Wire the buzzer as described in chapter 5.2 – it helps you find the drone after a crash.
- Connect addressable LEDs to the LED connector (G, 5V, LED) and configure them in the *LED Strip* tab.

6. Setup and commissioning

6.1 Connecting to a computer

- Download **Betaflight Configurator** from the official Betaflight project website.
- Connect the flight controller to the computer with a USB-C cable (a battery is not needed for configuration; it is needed for motor tests – always without propellers).
- If the computer does not recognise the board, install the STM32 VCP driver or use Zadig (links are provided by the manufacturer on the *Downloads* page of its website).

6.2 Recommended port settings

Port	Use	Setting in the Ports tab
USB VCP	PC connection	Configuration/MSP
UART1	DJI Air Unit / analog VTX	MSP (DJI) or VTX (IRC Tramp)
UART2	receiver (CRSF / SBUS)	Serial Rx
UART4	GPS module	Sensor Input: GPS
UART6	ESC telemetry (R6)	as required

According to the manufacturer's documentation, the **AIRMODE** (permanently enabled Airmode) and **OSD** features are enabled in the *Configuration* tab.

6.3 ESC

- The ESC runs **BLHeli_S** firmware (target G_H_30).
- In the *Configuration* tab select the **DShot** protocol (DShot150, DShot300 or DShot600).
- ESC settings (rotation direction, timing) can be changed with a compatible BLHeli_S configuration tool via the flight controller (passthrough).

6.4 Current sensor

The ESC has a current sensor whose signal goes to the flight controller (CUR). In the *Power & Battery* tab select *Onboard ADC* as the current meter source and calibrate the sensor scale against the actual consumption (by comparing the capacity put back by the charger with the value measured by the flight controller).

6.5 Motor check – without propellers

① Remove the propellers and connect the battery.

② In the *Motors* tab confirm the warning and briefly spin each motor using the individual sliders.

③ Check that the correct motor spins (M1–M4 according to the diagram) and in the correct direction.

④ Correct a wrong direction in the ESC configuration tool or by swapping two motor wires.

6.6 Arm, Disarm and failsafe

- Assign **Arm** (motors on) and **Disarm** (motors off) to a switch on the radio in the *Modes* tab, not to a stick combination.
- Check that the drone enters **failsafe** and the motors stop when the radio is switched off – always without propellers.
- Before the first flight, calibrate the accelerometer (*Setup* → *Calibrate Accelerometer*) on a level surface.

6.7 Firmware update

Update the flight controller firmware in the *Firmware Flasher* tab of Betaflight Configurator using the **GEPRCF722** target. Back up your settings before the update (the *diff all* command in the *CLI* tab). Do not interrupt power or the USB connection while flashing.

7. Maintenance and troubleshooting

7.1 Maintenance

- After every crash, inspect the boards, solder joints, cables and connectors.
- Protect the boards from moisture, dust and metal debris (e.g. from a carbon frame). After flying in damp conditions, let the electronics dry thoroughly before powering on again.
- Regularly check the damping grommets and the tightness of the nuts.
- Store the product in a dry place at room temperature with the battery disconnected.

7.2 Troubleshooting

Problem	Possible cause and solution
Computer does not recognise the board	Try another USB-C cable (must carry data) and another port; install drivers (chapter 6.1).
Motors do not spin	Check the FC – ESC adapter cable, the DShot protocol in the *Configuration* tab and the battery power.
Motor spins the wrong way	Change the direction in the ESC configuration tool or swap two motor wires.
Receiver does not respond	Check the wiring TX → R2 and RX → T2, *Serial Rx* on UART2 and the correct protocol.
No OSD in DJI goggles	Check the DJI cable and the MSP setting on UART1.
Inaccurate consumption	Calibrate the current sensor scale (chapter 6.4).
Drone unstable after Arm	Check the FC orientation, motor order and direction, and the accelerometer calibration.

8. Information for the EU and Czech Market

8.1 Importer and responsible person in the EU

The product is placed on the European Union market by the importer stated below, who is at the same time the responsible person within the meaning of Article 16 of Regulation (EU) 2023/988 of the European Parliament and of the Council on general product safety (GPSR).

Importer / responsible person in the EU	Rotorama, s.r.o.
Company ID (IČO)	051 57 692
VAT ID (DIČ)	CZ05157692
Registered office	Okrajová 1351, 674 01 Třebíč, Czech Republic
E-mail	info@rotorama.cz
Phone	+420 252 252 098
Website	www.rotorama.com

8.2 Product conformity

CE

- The product bears the **CE** marking and complies with the requirements of the applicable European Union harmonisation legislation.
- A copy of the **EU Declaration of Conformity** is available from the importer at the address stated above or at the e-mail address info@rotorama.cz.
- **Product identification:** the type designation (GEPRC Taker F722 BLS 50A Stack; flight controller GEP-F722-HD V2, ESC GEP-BLS50A-4IN1) is shown on the packaging; the flight controller designation is printed directly on the board. The target and firmware version of the flight controller are shown by Betaflight Configurator after connecting via USB.

8.3 Disposal of electrical equipment



- The crossed-out wheeled bin symbol on the product, its packaging or in the documentation means that at the end of its service life the product **must not be disposed of together with mixed municipal waste**.
- Hand it over at a take-back point for electrical equipment – at a collection yard, at a take-back point of a collective system, or at the retailer when purchasing a new equivalent product. Take-back is free of charge for the end user.
- The obligations under Act No. 542/2020 Coll., on end-of-life products, are fulfilled by the importer through a collective take-back system.
- Proper disposal helps prevent negative impacts on the environment and human health and contributes to the reuse of secondary raw materials.

Through its contractual partner **ASEKOL a.s.**, the company ensures the take-back of waste electrical equipment from households and the separate collection of waste electrical equipment, batteries and accumulators in accordance with the applicable legislation. The customer is entitled to hand over old electrical equipment or a battery or accumulator at any collection point of the above contractual partner. The addresses of these take-back points are listed at www.asekol.cz, www.ecobat.cz and also https://visoh2.mzp.cz/RegistrMistZO/RegistrMistZOPublic/MapaMistZpetOdberu.

9. Warranty and rights arising from defective performance

The rights and obligations of the contracting parties are governed by Czech law, in particular by Act No. 89/2012 Coll., the Civil Code, and Act No. 634/1992 Coll., on consumer protection.

- The seller is liable to the buyer for the product being free of defects on receipt. If the buyer is a consumer, a defect may be notified **within two years of receipt** of the product (Section 2165 of the Civil Code).
- If a defect appears within **one year** of receipt, the product is deemed to have been defective already at the time of receipt (Section 2161(5) of the Civil Code).
- When purchasing online, a consumer has the right to **withdraw from the contract within 14 days** of receiving the goods without giving a reason (Section 1829 of the Civil Code).
- Claims should be made with the retailer from whom you purchased the product. The importer's contact details are given in Chapter 8.1.
- The competent body for out-of-court settlement of consumer disputes is the **Czech Trade Inspection Authority**, Štěpánská 796/44, 110 00 Prague 1, www.coi.cz.