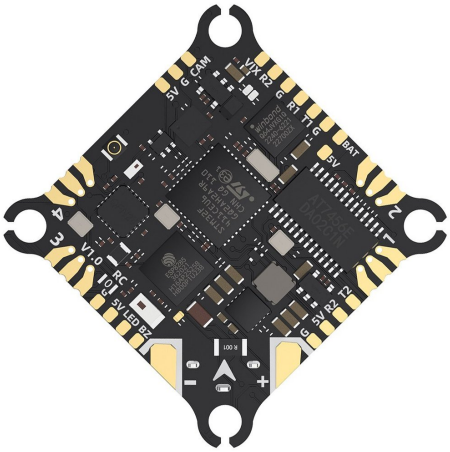
ROTORAMA

TAKER F411 12A AIO

GEPRC TAKER F411-12A-E 1~2S AIO
AIO board: FC + 4× 12 A ESC + ELRS 2.4 GHz receiver



Read this manual carefully before installation and first power-up. Always remove the propellers during setup.

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1. Safety instructions

1.1 Before you start

Thank you for choosing the GEPRC **TAKER F411-12A-E 1~2S AIO** board. The board is an electronic component for building a small FPV drone. Read this entire manual carefully before installation and first power-up, and keep it for future reference.

- Installation requires soldering skills and experience with building FPV drones. If you lack them, have the installation done by an experienced person.
- This product is not a toy and is not intended for children. Keep small parts out of the reach of children.
- Use the board only within the specifications given in chapter 2.3. Exceeding the voltage or current ratings can destroy the board and cause a fire.
- Always keep the **propellers removed** when working on the bench, when connected to a computer and during setup.

1.2 Handling electronics and soldering

- Solder in a well-ventilated area, on a non-flammable surface and with a suitable tip temperature. Prolonged or repeated heating can lift the pads off the board.
- After soldering, check that there are no solder bridges between adjacent pads and that no wire is damaged or pinched.
- Observe the power polarity: **+** to the positive and **−** to the negative battery terminal. Reverse polarity will destroy the board instantly.
- Do not power the board if it is wet, contaminated with conductive debris (e.g. metal filings, carbon dust) or mechanically damaged.
- For the first battery connection after installation, we recommend using a protective device (a so-called smoke stopper) or a current-limited bench power supply.

1.3 Li-Po and LiHV batteries

The board is designed to be powered by **1- to 2-cell (1S–2S) Li-Po or LiHV batteries**. The battery is not included.

Battery state	Per cell	1S	2S
Fully charged Li-Po	4.20 V	4.20 V	8.40 V
Fully charged LiHV	4.35 V	4.35 V	8.70 V
End the flight	3.5 V	3.5 V	7.0 V
Storage	3.8 V	3.8 V	7.6 V

- Charge only with a charger designed for the given battery type, never unattended and always on a non-flammable surface.

- Do not use puffed, mechanically damaged or overheated batteries.
- After flying, let the battery cool down and bring it to storage voltage before storing it.
- Always disconnect the battery when you are not working with the drone.

1.4 Spinning propellers

- The motors can spin up whenever a battery is connected – for example after Arm (motors enabled) or during a motor test in Betaflight.
- Install the propellers only after setup is complete and the motor direction has been verified (chapter 5.3).
- Never reach into the propeller area while a battery is connected.

2. Product description

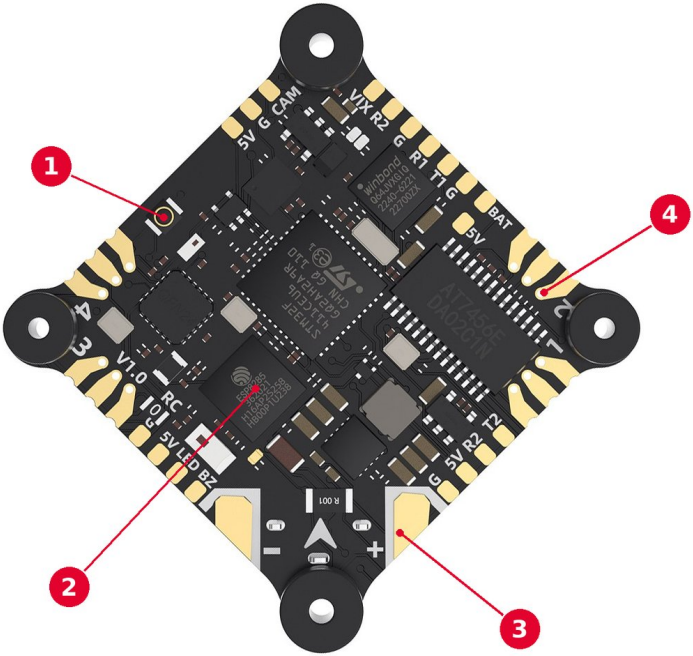
The TAKER F411-12A-E 1~2S AIO is a lightweight board that combines a flight controller (FC), four ESCs rated at 12 A continuous current and an integrated **ExpressLRS 2.4 GHz** receiver. The manufacturer specifies it for Whoop-style models with 1.2–2" propellers and for 3" Toothpick-style models.

2.1 Package contents

- 1× TAKER F411-12A-E 1~2S AIO board
- 1× cable set

※ The battery, motors, frame, camera, video transmitter (VTX) and receiver antenna are not listed in the package contents.

2.2 Board layout

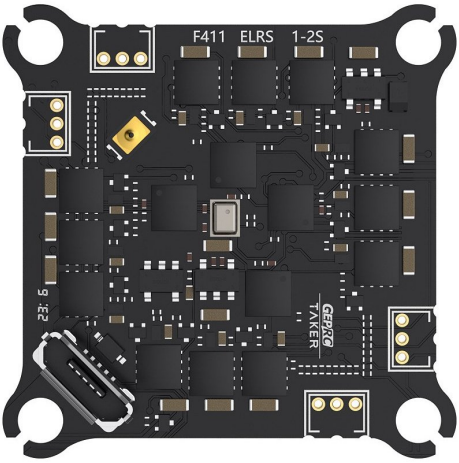


Top view – ① IPEX antenna connector, ② ExpressLRS receiver, ③ power pads (+ / −), ④ motor pads 1–4

The pads are labelled on the board silkscreen. Meaning of the labels:

Label	Meaning
+ / −	1S–2S battery power input (plus / minus)

Label	Meaning
1, 2, 3, 4	Motor outputs 1–4 (solder pads; SH1 connectors also on the bottom side)
5V, G, CAM	5 V camera power, ground, video input from the camera
VTX	Video output to the video transmitter
T1, R1	UART1 – transmit / receive
T2, R2	UART2 – transmit / receive; SBUS input is on R2 (the R2 pad is broken out twice on the board)
BAT	Battery voltage (e.g. for powering the VTX)
5V, G	5 V output and ground
LED	Data output for addressable LEDs
BZ	Buzzer connection
Arrow	Flight controller orientation – forward flight direction



Bottom view – Micro USB connector and SH1 motor connectors

2.3 Specifications

Model	TAKER F411-12A-E 1~2S AIO
Flight controller MCU	STM32F411
Betaflight firmware target	TAKERF411
OSD	Betaflight OSD (AT7456E)
Serial ports (UART)	T1 R1 / T2 R2
SBUS input	R2
Receiver	integrated ExpressLRS 2.4 GHz, IPEX antenna connector
Blackbox	8 MB
Buzzer / LED	supported / supported
Current sensor	yes
USB	Micro USB
ESC MCU	EFM8BB21F16G
ESC firmware target	C-X-30
ESC continuous current	12 A
ESC peak current	13 A
Input voltage	Li-Po / LiHV 1S–2S
ESC protocols	DShot300, DShot600, Oneshot, Multishot
Dimensions	30.5 × 30.5 mm
Mounting hole pattern	25.5 × 25.5 mm (M2)
Weight	4.2 g

※ Data provided by the manufacturer GEPRC. The manufacturer does not publicly state the receiver's transmit power (telemetry) – see chapter 3.2.

3. Legal conditions in the CZ and EU

3.1 The law of the country of operation is decisive

Regulations (EU) 2019/947 and 2019/945 apply in all member states of the European Union, 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 Radio receiver and frequencies

The integrated ExpressLRS receiver operates in the **2400–2483.5 MHz** band. In addition to receiving commands from the radio transmitter, it also transmits telemetry back to the radio, so it is radio equipment within the meaning of Directive 2014/53/EU (RED; in the Czech Republic Government Regulation No. 426/2016 Coll.).

- The receiver's maximum transmit power is stated in the EU declaration of conformity, which is available from the importer (chapter 8.2).
- In the Czech Republic, operation in the 2.4 GHz band is governed by the general authorisations of the Czech Telecommunication Office (ČTÚ) (VO-R/10 and VO-R/12). Depending on the type of equipment, the maximum permitted radiated power is **25 mW e.i.r.p.** or **100 mW e.i.r.p.**; the limit applies to the combination of transmitter and antenna.
- The ExpressLRS firmware allows the telemetry power to be changed. The user is responsible for the power setting and the choice of antenna. Outside the Czech Republic, the limits of the respective country apply.

3.3 Building and operating the drone

The board itself is not an unmanned aircraft. A drone you build with it for your own use is a **privately built UAS** within the meaning of Regulation (EU) 2019/947. The operator and the pilot are responsible for complying with the operating rules:

- If the drone has a camera, operator registration is required (in the Czech Republic with the Civil Aviation Authority (ÚCL)) regardless of weight; the registration number must be displayed on the drone.
- Observe the operating limits of the open category – in particular the max. height of 120 m, visual line of sight and the ban on flying over assemblies of people.
- Flying with FPV goggles in the open category is only allowed with an unmanned aircraft observer next to the pilot.
- Check the actual take-off mass of the finished drone including the battery – it determines the subcategory. Liability insurance is recommended.

4. Installation

4.1 What else you need

- a frame with a 25.5 × 25.5 mm (M2) mounting pattern,
- four brushless motors and propellers suited to the frame and to 1S–2S power,
- a 2.4 GHz antenna with an IPEX (u.FL) connector,
- a camera and video transmitter (VTX), or a digital FPV system,
- a radio transmitter with an ExpressLRS 2.4 GHz module,
- a 1S–2S Li-Po / LiHV battery with a suitable connector and a matching charger,
- a computer with Betaflight Configurator and a Micro USB cable with data lines.

4.2 Mounting in the frame

Mount the board in the frame with M2 screws using rubber dampers (soft mounts). The arrow on the board must point forward in the direction of flight. If you mount the board rotated, set the rotation in Betaflight (*Configuration → Board and Sensor Alignment* tab).

- No component or pad may come into contact with the carbon frame – carbon fibre is conductive.
- Do not overtighten the screws; the board must not bend.

4.3 Connecting the motors

The motors can be soldered directly to the sets of three pads labelled **1–4**, or plugged into the SH1 connectors on the bottom of the board. Motor numbering follows the standard Betaflight layout (*Motors* tab). Motor direction is set in software (chapter 5.3), so the order of the motor wires does not matter.

4.4 Power

Solder the power lead with the battery connector to the **+** and **−** pads. Use wire with a gauge suited to the motor current and observe the polarity.

Before connecting the battery for the first time, use a multimeter to check that there is no short circuit between + and −.

4.5 Camera and video transmitter

- Connect an analog camera to the **5V**, **G** and **CAM** pads.
- Connect an analog video transmitter with its video wire to the **VTX** pad, ground to **G** and power to **BAT** or **5V** according to the VTX specification.
- Connect VTX control (SmartAudio / Tramp) or a digital FPV system to a free UART (T1/R1 or T2/R2) and enable the corresponding function in the *Ports* tab.
- The manufacturer does not specify the current rating of the 5 V output. Check the current draw of any devices before connecting them.

4.6 Receiver antenna

Snap the 2.4 GHz antenna onto the **IPEX** connector (① in the figure in chapter 2.2). Route the antenna tip away from carbon parts, motors and high-current wires.

Do not power the board without the antenna connected – the receiver may be damaged when transmitting telemetry.

4.7 Buzzer and LEDs

Connect the buzzer to the **BZ** and **5V** pads, observing the buzzer polarity. Connect addressable LEDs with the data wire to **LED** and power to **5V** and **G**.

5. Setup

5.1 Connecting to a computer

① Remove the propellers.

② Launch Betaflight Configurator and connect the board with a Micro USB cable.

③ Select the serial port and click *Connect*.

④ In the *Setup* tab, check that the on-screen model moves in the same way as you tilt the drone.

To test the motors and video transmitter, a battery must also be connected – the motors are not powered from USB.

5.2 Binding the ExpressLRS receiver

The receiver and the transmitter module must run the same major version of the ExpressLRS firmware. The receiver can be bound in two ways:

▶ Binding using bind mode

① Connect the battery. Put the receiver into bind mode – power the board on and off three times in a row (connect and disconnect power) and leave it powered on; in newer Betaflight versions, bind mode can also be started with the **bind_rx** command in the *CLI* tab.

② On the radio, open the ExpressLRS script (*ExpressLRS Lua*) and select *Bind*.

③ After successful binding, the receiver LED is solid and the channels in the *Receiver* tab respond to stick movements.

▶ Binding using a binding phrase

Use ExpressLRS Configurator to flash the same *binding phrase* to both the receiver and the transmitter module. The devices will then bind automatically after power-up.

▶ Receiver setup in Betaflight

- *Ports* tab: *Serial RX* must be enabled on the UART the receiver is connected to (the default configuration of the TAKERF411 target usually includes this).
- *Receiver* tab: mode *Serial (via UART)*, protocol **CRSF**.
- Check the channel map and the stick endpoints.

5.3 Checking the motors

① With the propellers removed, connect the battery.

② In the *Motors* tab, acknowledge the safety warning and spin up each motor in turn.

③ Verify that the correct motor spins according to the diagram and in the correct direction.

④ Correct a wrong rotation direction in the *Motors* tab (motor direction function) or with an ESC configurator; fix a wrong order by remapping the motors.

Select the ESC protocol in the *Configuration* tab (we recommend DShot300 or DShot600).

5.4 Accelerometer calibration

Place the drone on a level surface and click *Calibrate Accelerometer* in the *Setup* tab. Do not move the drone during calibration.

5.5 Arm, Disarm and failsafe

- In the *Modes* tab, assign the **Arm** function (motors enabled) to a switch on the radio. Do not assign Arm to the sticks.
- **Disarm** (motors disabled) must be reachable at any time with a single flick of the switch.
- In the *Failsafe* tab, set the behaviour on signal loss. Test the failsafe with the propellers removed by switching off the radio.
- Before the first flight, verify that after Arm the motors respond correctly to throttle and that Disarm reliably stops the motors.

5.6 Firmware and further guides

- Flight controller: Betaflight firmware, target **TAKERF411**. Update it in the *Firmware Flasher* tab. Save your configuration before updating (*CLI* tab, command **diff all**).
- ESCs: EFM8BB21F16G MCU, firmware target **C-X-30**. Settings and updates are done with the configurator matching the firmware flashed on the ESC.
- Receiver: the ExpressLRS firmware is updated with ExpressLRS Configurator.
- Do not interrupt power during a firmware update.

Official documentation for ExpressLRS and for radios running EdgeTX:

ExpressLRS – official documentation
www.expresslrs.org

EdgeTX – official website
edgetx.org

6. Flying

6.1 Pre-flight check

- Insert a **fully charged** battery and check its voltage.
- Check that the board, motors and propellers are secure, and check the direction and condition of the propellers.
- Verify the link with the radio, the Arm/Disarm switch function and the failsafe settings.
- Check that the receiver antenna is not damaged and not within reach of the propellers.
- Make sure the flying site and operation comply with the regulations (chapter 3).

6.2 Voltage monitoring and ending the flight

Display the battery voltage in the OSD and set up a warning. End the flight at the latest at **3.5 V per cell** (1S: 3.5 V, 2S: 7.0 V) under light load.

The current sensor is supported; verify its calibration (*Scale*) and adjust it if necessary in the *Power & Battery* tab by comparing with the amount put back in by the charger.

7. Maintenance and troubleshooting

7.1 Maintenance and storage

- After each flight, disconnect the battery and inspect the board, solder joints and wires.
- Remove dust and dirt with a dry, soft brush. Do not use water.
- After a crash, check the components, the antenna connector and the antenna for damage.
- Store in a dry place, out of direct sunlight, with the battery disconnected.

7.2 Troubleshooting

Problem	Possible cause and solution
The board does not connect to the computer	Charge-only cable – use a Micro USB data cable. Try a different USB port and the STM32 drivers (Betaflight / ImpulseRC Driver Fixer).
Channels in the Receiver tab do not respond	Receiver not bound (chapter 5.2), different ExpressLRS major versions on the radio and receiver, incorrectly configured Serial RX or protocol (CRSF).
Short signal range	Missing or damaged antenna, antenna shielded by carbon, unsuitable power setting.
Motor does not spin or stutters	Cold solder joint or short circuit on the motor pads, damaged motor wire. Check the ESC protocol.
Motor spins in the wrong direction	Change the rotation direction in the Motors tab or with an ESC configurator.
Drone will not Arm	Check the reason shown in the Setup tab (Arming disable flags), e.g. tilt angle, missing signal or an active USB connection.
OSD not displayed	Check the CAM and VTX wiring and the video format setting in the OSD tab.

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 (TAKER F411-12A-E 1~2S AIO) is given on the product packaging; the board revision is marked in the silkscreen on the board.

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.