ELRS DUAL 868M

GEPRC – ExpressLRS 868 MHz true diversity receiver
User manual



Read this entire manual carefully before installation and first use, and keep it for future reference.

Importer: Rotorama, s.r.o. · www.rotorama.com

Contents

1. Safety instructions

2. Product description

2.1 Product introduction

2.2 Specifications

2.3 Package contents

2.4 Receiver diagram

3. Radio operation in the Czech Republic and the EU

3.1 The law of the country of operation applies

3.2 Frequency bands and transmit power

3.3 Use in a drone

4. Installation and connection

4.1 Connection to the flight controller (FC)

4.2 Antennas and receiver placement

4.3 Betaflight setup

5. Binding

6. LED status indication

6.1 LED status meaning

6.2 Colour by packet rate

7. Firmware and further documentation

7.1 Firmware update

7.2 Further information

8. Information for the EU and Czech Market

9. Warranty and rights arising from defective performance

1. Safety instructions

- Install and wire the receiver **only with the flight battery disconnected**. Check the wiring of all four wires before connecting the battery for the first time.
- Power the receiver **only with 5 V** from the flight controller (FC) or another 5 V source. Never connect it directly to the battery – the receiver would be permanently damaged.
- Always connect **both antennas** before powering on. Operating without antennas may damage the RF section of the receiver and greatly reduces range.
- After installation, protect the receiver with the heat shrink tube (included) against short circuits to a carbon frame or other conductive parts.
- Before the first flight with a new receiver, set up and test the **failsafe** (model behaviour on signal loss) and perform a range check on the ground – with the propellers removed.
- If your radio reports a weak signal or loss of telemetry, end the flight safely at once.
- The receiver is an electronic component intended to be built into an RC model. Keep it away from children; small parts may be swallowed.
- Protect the receiver from moisture, dust, mechanical damage and overheating. Do not use a damaged receiver.

※ Radio operation must comply with the regulations of the country in which you operate the model – see chapter 3.

2. Product description

2.1 Product introduction

The GEPRC ELRS DUAL Diversity Receiver is a new generation of true dual-antenna diversity receiver system based on the **ExpressLRS** open source project. ExpressLRS features long range operation, low latency and low price; this receiver operates at a maximum refresh rate of 200 Hz.

The receiver has two independent RF chips and two antennas. The reasonable placement of the dual antennas provides wider signal reception and a more stable connection than ordinary single antenna receiver systems. It uses a TCXO temperature compensated crystal oscillator to avoid frequency shifts caused by temperature changes. The telemetry power is up to 50 mW. The built-in WiFi antenna makes firmware upgrades easy.

2.2 Specifications

Parameter	Value
Model	GEPRC ELRS DUAL – 868 MHz variant
Size	18 × 25 × 5.5 mm
Weight	1.7 g (RX only)
Chips	ESP32-PICO-D4, 2× SX1276
Crystal oscillator	TCXO
Frequency band	868 MHz (EU)
Refresh rate	25–200 Hz
Input voltage	5 V
Antenna connector	IPEX1 (u.FL)
Indicator light	RGB LED
TLM power	50 mW
Firmware (target)	GEPRC True Diversity 900MHz RX
Protocol to FC	CRSF (serial receiver)

Data according to the manufacturer. CRSF protocol according to the setup procedure in chapter 4.3.

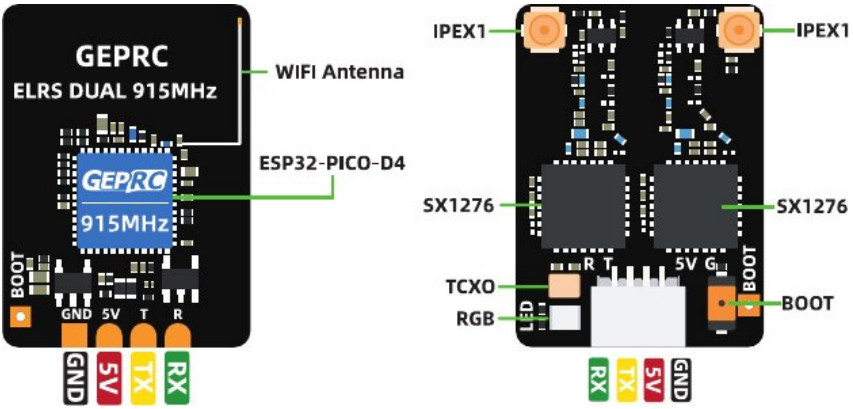
2.3 Package contents

- 1× ELRS DUAL receiver
- 2× antenna
- 1× heat shrink tube
- 1× 4-pin silicone cable

- 1× manufacturer's instruction manual

The package does **not** include a flight controller (FC), a radio or an ExpressLRS transmitter module.

2.4 Receiver diagram



Top (left) and bottom (right) side of the receiver. Manufacturer's illustration – the board print of the 868 MHz variant may differ.

Label	Meaning
IPEX1	Two antenna connectors (u.FL), one for each RF chip
SX1276	Two RF chips – two independent receiving links (true diversity)
ESP32-PICO-D4	Main processor of the receiver
WIFI Antenna	Built-in WiFi antenna for firmware updates
TCXO	Temperature compensated crystal oscillator
RGB	Status LED (see chapter 6)
BOOT	BOOT button
GND / 5V / T / R	Solder pads and connector: ground, 5 V power, receiver TX and RX

3. Radio operation in the Czech Republic and the EU

3.1 The law of the country of operation applies

Directive 2014/53/EU on radio equipment and Regulations (EU) 2019/947 and 2019/945 on unmanned aircraft systems apply in all Member States of the European Union, but national rules differ from country to country – in particular permitted frequency bands, maximum transmit power and duty cycle, but also operator registration, geographical zones and compulsory insurance. The information in this chapter describes the situation in the Czech Republic. If you operate the receiver in another country, you must follow the regulations of the country in which you operate the model.

3.2 Frequency bands and transmit power

The receiver operates in the **868 MHz** band (ExpressLRS radio link and telemetry) and uses **WiFi in the 2.4 GHz band** for firmware updates. The manufacturer states a telemetry power of up to 50 mW.

In the Czech Republic, the operation of such equipment is governed by the general authorisations of the Czech Telecommunication Office (ČTÚ). Selected conditions:

Band	Max. power	Condition	Authorisation
863–870 MHz	25 mW e.r.p.	spectrum access technique or duty cycle ≤ 1 %	VO-R/10
869.40–869.65 MHz	500 mW e.r.p.	duty cycle ≤ 10 %	VO-R/10
2400–2483.5 MHz	100 mW e.i.r.p.	wideband data transmission (WiFi)	VO-R/12

Selected conditions; the full and current wording of the general authorisations is available at www.ctu.cz.

- The user is responsible for the power and mode settings of the system (transmitter module and receiver). Choose settings that comply with the regulations of the country of operation.
- Use only the antennas supplied with the receiver or antennas designed for the 868 MHz band; additional amplifiers are not permitted.

3.3 Use in a drone

The receiver is a component of an RC model or drone. The operation of a drone is subject to Regulation (EU) 2019/947 – in particular operator registration, remote pilot competency, visual line of sight (VLOS), a maximum height of 120 m and respecting geographical zones. In the Czech Republic, information is provided by the Civil Aviation Authority (www.caa.gov.cz).

4. Installation and connection

4.1 Connection to the flight controller (FC)

The receiver connects to a free serial port (UART) of the flight controller. The TX and RX signals are wired **crossed**: receiver TX to FC RX and vice versa. Use the supplied 4-pin cable with an SH1.0 connector, or solder the wires to the solder pads.

Receiver	Flight controller (FC)	Function
R (RX)	TX	data from FC
T (TX)	RX	data to FC
5V	5V	5 V power
G (GND)	GND	ground

※ Never connect the receiver to solder pads carrying battery voltage (VBAT) or to a 9 V / 10 V output.

4.2 Antennas and receiver placement

- Connect both antennas to the IPEX1 connectors before powering the receiver for the first time. Press the connector on straight and gently – it is fragile.
- Ideally, route the antennas **rotated 90° to each other**. This allows the receiver to better compensate for losses caused by different polarisation and makes the link more reliable.
- Route the active parts of the antennas away from the carbon frame, wires, motors and the video transmitter (VTX), and secure them so that they cannot get into the propellers.
- Wrap the receiver in the heat shrink tube and mount it so that it cannot move freely and does not touch conductive parts.

4.3 Betaflight setup

① Connect the flight controller to a computer and start *Betaflight Configurator*.

② Go to the *Ports* tab and enable *Serial Rx* for the UART the receiver is connected to (e.g. UART2). Save with *Save and Reboot*.

③ On the *Configuration* tab (*Receiver* in newer versions), in the *Receiver* panel, set *Receiver Mode* to **Serial-based receiver (SPEKSAT, SBUS, SUMD)** and select **CRSF** as the *Serial Receiver Provider*.

④ Save the settings and restart the flight controller.

※ Remember to configure a serial port (via the Ports tab) and choose a serial receiver provider when using a serial receiver – without both, the receiver will not work.

5. Binding

The factory firmware of the receiver is ExpressLRS 3.x. According to the manufacturer, 3.x and 2.x firmware are not compatible, so a transmitter module running 2.x firmware must be upgraded before binding. The transmitter module must operate in the 868 MHz band.

① Power the receiver on and off three times with approximately 1 second between each cycle. The receiver enters binding mode.

② After start-up (rainbow fade), the RGB LED of the receiver changes to an **orange double flash** – the receiver is in binding mode.

③ Start binding (Bind) on your radio or ExpressLRS transmitter module. When the receiver LED changes from double flash to **solid on**, the receiver has been successfully bound.

※ After binding, check on the Receiver tab in Betaflight that the stick movements match the channels, and set up the failsafe.

6. LED status indication

6.1 LED status meaning

Colour	LED status	Description
rainbow	fade effect	power on, receiver start-up
green	quick flash	WiFi upgrade mode
red	quick flash	no RF chip detected
orange	double flash	binding mode
orange	triple flash	connected, but mismatched Model Match configuration
orange	slow flash	waiting for connection (no signal from the transmitter)
colour by packet rate	solid on	connected; the colour indicates the packet rate (chapter 6.2)

6.2 Colour by packet rate

When the link is established, the LED is solid on in a colour corresponding to the set packet rate:



LED colour by packet rate in the 900 MHz band (868 MHz).

- **D50** is a unique mode of ExpressLRS Team900: at the 200 Hz refresh rate in LoRa mode, the same data packet is sent four times.
- **100Hz Full** provides 16-channel full resolution output at the 200 Hz refresh rate in LoRa mode; the reception range is comparable to 200 Hz.

7. Firmware and further documentation

7.1 Firmware update

- The firmware can be updated via the built-in WiFi. In WiFi mode, the LED flashes green quickly.
- When building the firmware (e.g. in *ExpressLRS Configurator*), select the target **GEPRC True Diversity 900MHz RX** and the **868 MHz (EU)** band.
- The update and configuration procedure is described in the ExpressLRS documentation (chapter 7.2).
- Do not interrupt the power supply during an update.

7.2 Further information

The ExpressLRS project is being constantly updated and the contents of this manual may not reflect the latest versions. For current information, please visit the official pages:

- ExpressLRS: www.expresslrs.org
- ExpressLRS source code: github.com/ExpressLRS/ExpressLRS
- EdgeTX (radio firmware): www.edgetx.org

Manufacturer: GEPRC, geprc.com

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 manufacturer and type designation (GEPRC ELRS DUAL) are printed on the receiver 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.