ELRS Nano 868M/2.4G Dual-Band

GEPRC – dual-band ExpressLRS receiver 868 MHz / 2.4 GHz

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

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1. Safety instructions

- Install and wire the receiver only with the **flight battery disconnected**. Before connecting the battery for the first time, check the wiring of all four wires.
- 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 the **antenna** before powering on. Operating without an antenna can damage the RF section of the receiver and significantly reduces range.
- After installation and testing, protect the receiver with the heat-shrink tube (included) against short circuits with the carbon frame or other conductive parts.
- Before the first flight with a new receiver, set up and test **failsafe** (the model's behaviour on signal loss) and perform a range test on the ground – always **without propellers**.
- If the radio reports a weak signal or loss of telemetry, end the flight safely immediately.
- Do not change the radio link settings (packet rate, power, band) while the model is in the Arm state (motors enabled) – the link may be lost.
- The receiver is an electronic component intended for installation in an RC model. Keep it out of the reach of children – small parts can 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 overview

The GEPRC ELRS Nano 868M/2.4G Dual-Band is a small single-antenna receiver for the **ExpressLRS** (ELRS) radio system – an open-source RC system with long range, low latency and a high update rate. The manufacturer sells it under the name *ELRS Nano 915M/2.4G Dual-Band Receiver*.

The receiver is built around the **Semtech LR1121** RF chip, which can operate in both the **868/915 MHz** and **2.4 GHz** bands. With a single antenna it receives in only one band at a time, but you can easily switch between bands without changing the antenna. The receiver is compatible with common ELRS transmitter modules for both 900 MHz and 2.4 GHz. A temperature-compensated crystal oscillator (TCXO) ensures a stable link even as the temperature changes. Telemetry power is up to 100 mW, and the firmware can be updated via the built-in WiFi.

2.2 Specifications

Parameter	Value
Model	GEPRC ELRS Nano 868M/2.4G Dual-Band
Dimensions	11.1 × 20.4 × 5.2 mm
Weight	0.95 g (receiver only)
Chips	ESP32-C3, LR1121
Crystal oscillator	TCXO
Frequency bands	868 MHz (EU), 915 MHz (FCC), 2.4 GHz (ISM)
Update rate	25–1000 Hz
Supply voltage	5 V
Antenna connector	IPEX1
Telemetry power	100 mW
Indication	RGB LED
Firmware (target)	GEPRC 900/2400 Single Dual-Band RX
Protocol to FC	CRSF (serial receiver)

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

2.3 Package contents

- 1× ELRS Nano 868M/2.4G Dual-Band receiver
- 1× dual-band T antenna (labelled 915M/2.4G by the manufacturer) with IPEX1 connector
- 1× heat-shrink tube

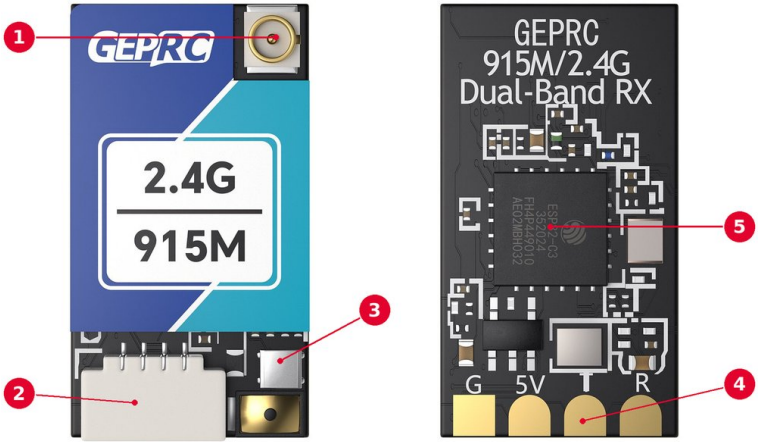
- 1× four-wire silicone connection cable
- 1× manufacturer's manual



Package contents (manufacturer's illustration).

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

2.4 Receiver layout



Top (left) and bottom (right) side of the receiver. Manufacturer's illustration.

① **IPEX1 antenna connector** – for the supplied dual-band antenna.

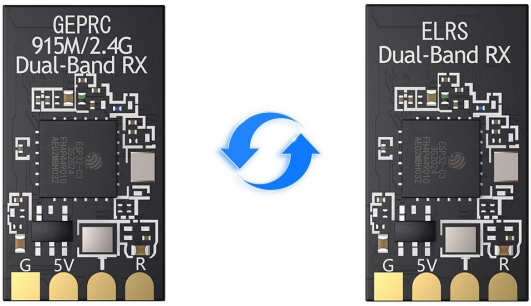
② **SH1.0 connector** (4-pin) – for the supplied connection cable.

③ **RGB LED** – receiver status indication (chapter 6).

④ **Solder pads G, 5V, T, R** – ground, 5 V power, receiver TX and RX.

⑤ **ESP32-C3 processor** – controls the receiver; its WiFi is used for firmware updates.

The manufacturer supplies two board versions interchangeably, differing only in the print on the bottom side: the older version reads *GEPRC 915M/2.4G Dual-Band RX*, the newer one *ELRS Dual-Band RX*. The layout and labelling of the solder pads are the same on both versions.



Older (left) and newer (right) board print version.
Manufacturer's illustration.

※ The “915M” print on the receiver label is the manufacturer's designation. The band in which the receiver actually operates is determined by the flashed firmware and the regulatory domain – see chapters 3.2 and 7.1.

3. Radio operation in CZ and the EU

3.1 The law of the country of operation applies

Directive 2014/53/EU and Regulations (EU) 2019/947 and 2019/945 apply throughout the EU, but national rules differ – e.g. permitted bands, transmit power, duty cycle, operator registration or insurance. 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

Depending on the transmitter module settings, the receiver operates in the **868 MHz** or **2.4 GHz** band (ExpressLRS link and telemetry), only one at a time. Firmware updates use 2.4 GHz WiFi. The manufacturer specifies telemetry power of up to 100 mW.

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

Band	Max. power	Condition	Permit
863–870 MHz	25 mW e.r.p.	spectrum access technique or duty cycle ≤ 0.1 % (≤ 1 % in the 865–868 MHz sub-band)	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 systems	VO-R/12

Selected conditions; full and current wording at www.ctu.cz.

- The **915 MHz (FCC)** band is not permitted in the Czech Republic. In the Czech Republic and the EU, use only the **EU 868** regulatory domain or the 2.4 GHz band.
- The regulatory domain is selected when flashing the firmware (chapter 7.1); the transmitter module and receiver must use the same domain.
- The user is responsible for the power and mode settings of the whole system (transmitter module and receiver) complying with the regulations of the country of operation.
- Use only the supplied antenna or one designed for the band; additional amplifiers are not permitted.

3.3 Use in a drone

The receiver is part of an RC model or drone. Drone operation is subject to Regulation (EU) 2019/947 (operator registration, pilot competency, VLOS, max. height 120 m, geographical zones). In the Czech Republic, see the Civil Aviation Authority (www.caa.gov.cz).

4. Installation and connection

4.1 Connecting to the flight controller (FC)

The receiver connects to a free serial port (UART) of the flight controller. TX and RX are wired **crossed** (receiver TX to FC RX and vice versa), both on the same UART. Use the supplied cable with the SH1.0 connector, or solder the wires to the 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

- When using the cable, check that the wires match the G, 5V, T and R pads on the receiver and the flight controller.
- An FC UART intended for receivers often has an SBUS pull-down resistor, causing a solid LED without a link – if in doubt, use another UART.

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

4.2 Antenna and receiver placement

- Connect the antenna before powering on for the first time. Press the IPEX1 connector on straight and gently – it is fragile.
- Route the active part of the antenna away from the carbon frame, cables, motors and video transmitter (VTX), and secure it so it cannot reach the propellers.
- Heat-shrink and mount the receiver permanently only after setup and a link test (chapters 4.3 and 5); it must not move freely or touch conductive parts.

4.3 Betaflight setup

① Connect the FC to the computer and launch Betaflight Configurator.

② On the *Ports* tab, enable *Serial Rx* on the receiver's UART (e.g. UART2) and click *Save and Reboot*.

③ On the *Receiver* tab, set *Receiver Mode* to *Serial*, *Serial Receiver Provider* to *CRSF* and enable *Telemetry*.

④ For analogue video or systems with MSP DisplayPort, set *RSSI Channel* to *Disabled* and disable *RSSI ADC*.

⑤ CRSF needs a non-inverted full-duplex UART – if needed, enter *set serialrx_inverted = off*, *set serialrx_halfduplex = off* and *save* in the *CLI*.

5. Binding and operation

5.1 Compatible transmitter modules and band selection

- According to the manufacturer, the receiver is compatible with ExpressLRS transmitter modules (TX modules) for both 900 MHz (868/915 MHz) and 2.4 GHz.
- The band and update rate (packet rate) are determined by the **transmitter module**. Without a link, the receiver cycles through the supported modes in both bands until it finds a link.
- The **Gemini Xrossband** mode (X-Band, simultaneous operation in both bands) is **not supported** by a receiver with a single LR1121 chip. On a dual-band transmitter module, select the 900 MHz or 2.4 GHz band in the *RF Band* setting.
- The first number of the ExpressLRS firmware version (major version) must be the same in the transmitter module and the receiver.
- The regulatory domain of the transmitter module and the receiver must match (chapter 3.2).

5.2 Binding (Bind)

The receiver and the transmitter module can be bound in two ways:

▶ Binding phrase – recommended

If the transmitter module and the receiver share the same binding phrase (set when flashing the firmware or in the receiver's web interface), they connect automatically without separate binding. Choose a unique phrase – any transmitter with the same phrase will connect to any receiver with it.

▶ Binding by powering the receiver on three times

① Turn off the radio and the transmitter module.

② Apply power to the receiver – the LED lights up. Disconnect the power again within 2 seconds. Repeat this two more times.

③ After the third power-on, leave the receiver powered. The LED flashes rapidly in double blinks – the receiver is in binding mode.

④ Turn on the radio and run *[Bind]* in the ExpressLRS Lua script.

⑤ Once the receiver LED is solid, the receiver is bound.

- With newer Betaflight, binding can also be started with the *Bind Receiver* button on the *Receiver* tab (or *bind_rx* in the CLI).
- To cancel binding mode, restart the receiver; the previous binding then remains in effect.
- With older firmware, a receiver with a binding phrase set will not enter binding mode – use the phrase, or flash the firmware without it.

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

5.3 Failsafe and pre-flight check

- On the *Failsafe* tab in Betaflight, set how the model should behave on signal loss, and verify the function by turning off the radio – always **without propellers**.
- Before the first flight, perform a range test on the ground and monitor link quality (LQ) and signal strength in the radio's telemetry.
- Do not change the packet rate or other link parameters in flight.

6. LED indication

6.1 Meaning of LED states

LED state	Meaning
smooth colour cycling (rainbow)	power-on, receiver start-up
slow flashing (500 ms)	waiting for a link with the transmitter module
orange – double blink and pause	binding mode
orange – triple blink and pause	connected, but Model Match settings do not match
solid single colour	connected; colour indicates packet rate (chapter 6.2)
green – pulsing	WiFi mode for firmware update
red – fast flashing (100 ms)	RF chip not detected
off	powered off or bootloader mode

According to the ExpressLRS documentation.

6.2 Colour by packet rate

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

Colour	2.4 GHz	868 MHz
red	F1000	200
yellow	F500	–
yellow-green	D500	100 Full
green	D250	100
turquoise	333 Full	–
light blue	500	50
blue	250	25
blue-violet	150	–
violet	100 Full	D50
magenta	50	–

According to the ExpressLRS documentation. Available modes depend on the transmitter module and firmware version.

7. Firmware and troubleshooting

7.1 Firmware update

- Build the firmware in **ExpressLRS Configurator**. Select the **GEPRC 900/2400 Single Dual-Band RX** target and the regulatory domain for the country of operation – **EU 868** in the Czech Republic and the EU. We also recommend entering a binding phrase.
- For this target, ExpressLRS supports flashing via WiFi, via UART and via Betaflight passthrough. Updating via WiFi is the easiest.

▶ Updating via WiFi

① Turn off the radio and apply power to the receiver. By default, a receiver without a link switches to WiFi mode after 60 s (the LED pulses green). A bound receiver can also be switched to WiFi mode from the Lua script: *WiFi Connectivity → Enable RX WiFi*.

② Using a computer or phone, connect to the WiFi network **ExpressLRS RX**, password **expresslrs**.

③ Open **10.0.0.1** in a browser and go to the *Update* tab.

④ Select the firmware file (*firmware.bin.gz* – do not unzip it) and press *Update*.

⑤ Do not disconnect the power until the receiver LED starts flashing again.

※ Disconnecting the power prematurely during the update may leave the receiver non-functional. In that case, repeat the update.

7.2 Troubleshooting

Problem	Possible cause and solution
LED is off	Check the 5 V power supply and wiring. An unlit LED with correct wiring may mean that the receiver is in bootloader mode.
LED is solid, but the radio is off	The flight controller UART has a pull-down resistor (for SBUS). Connect the receiver to a different UART.
LED flashes slowly, no link is established	Different binding phrase, regulatory domain or major firmware version; transmitter module in X-Band mode. Check the settings or bind the receiver again.
LED triple-blinks	Model Match settings do not match. Adjust the model ID in the radio or disable Model Match.
Betaflight does not respond to the sticks	Serial Rx enabled on a different UART, TX/RX swapped, CRSF protocol not selected, inversion or half-duplex enabled (chapter 4.3).
LED flashes red rapidly	The RF chip was not detected. Contact the seller.

7.3 Further guides

The ExpressLRS project is constantly evolving, and the content of this manual may not reflect the latest versions. Up-to-date information is available on the official websites below.

Official websites:

- 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 type designation (GEPRC ELRS Nano 868M/2.4G Dual-Band) is given on the product packaging; the receiver board bears the manufacturer's print (see chapter 2.4).

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.