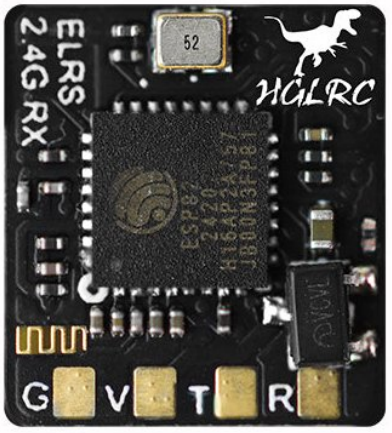
HGLRC ELRS 2.4GHz

ExpressLRS 2.4 GHz receiver
User manual



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

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1. Safety instructions

1.1 General principles

- The receiver is intended for installation in radio-controlled models and FPV drones. **It is not a toy** and must be kept away from children.
- Installation requires basic knowledge of electrical wiring and soldering. If you are unsure, have the receiver installed by an experienced modeller.
- **Always attach the antenna before applying power.** Operating the receiver without an antenna may damage its internal circuits.
- Power the receiver **with 5 V only** and check the wiring before switching on for the first time. Incorrect voltage or swapped wires may destroy the receiver.
- Disconnect the model's battery and the USB cable before soldering and before any change to the wiring.
- Protect the board against moisture, dust and short circuits with conductive parts of the model, especially a carbon frame. Insulate it with heat-shrink tubing or tape – the insulation **must not permanently press the BOOT button**.

1.2 Operating the model

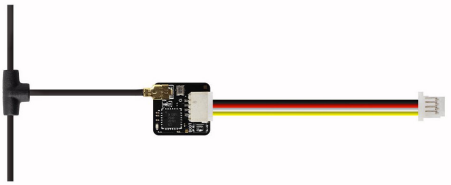
- **Remove the propellers** while configuring on a computer and during all bench tests.
- Before every flight, check that the link to the radio works and that failsafe (the model's behaviour on signal loss) is set correctly – see Chapter 5.3.
- Do not fly the model beyond the range of a reliable link and observe the operating rules of the country in which you fly (Chapter 3).
- Handle the model's battery according to its manufacturer's instructions. Charge Li-Po batteries under supervision on a non-flammable surface.

2. Product description

2.1 What the receiver is for

The HGLRC ELRS 2.4G RX is a miniature **ExpressLRS** (ELRS) receiver for the 2.4 GHz band. ExpressLRS is an open-source RC system with long range, low latency and a high refresh rate. The receiver receives control commands from the radio and passes them to the model's flight controller (FC) over a serial line using the **CRSF** protocol. In the opposite direction it sends telemetry to the radio – for example battery voltage or link quality.

The receiver can be connected to the flight controller with the supplied cable and connector, or the wires can be soldered directly to the solder pads.



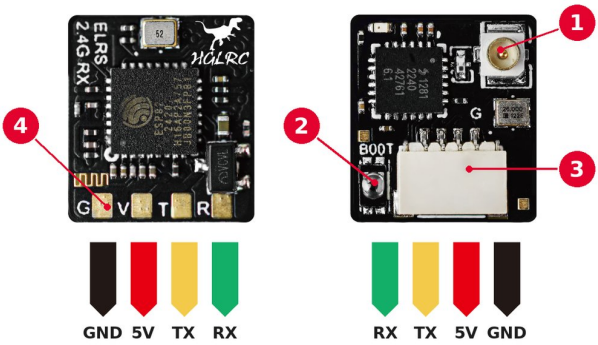
Receiver with the T antenna and connection cable attached

2.2 Package contents

Item	Qty
HGLRC ELRS 2.4G RX receiver	1×
T dipole antenna with IPEX connector – long	1×
T dipole antenna with IPEX connector – short	1×
SH1.0 4-pin connection cable with connectors on both ends	1×

※ The package does **not** include a radio or ExpressLRS 2.4 GHz transmitter module, a flight controller (FC) or a battery.

2.3 Parts description



Left: top side with solder pads; right: bottom side with connectors. Colours follow the manufacturer's diagram.

① **IPEX antenna connector** (1st generation, also u.FL) – for the supplied T antenna.

② **BOOT button** – starts bootloader mode when flashing firmware via UART and manually enters binding or Wi-Fi mode (Chapters 5.2 and 6).

③ **SH1.0 4-pin connector** – signal order RX, TX, 5V, GND (from the left, as shown in the picture).

④ **Solder pads G, V, T, R** – G = GND (ground), V = 5 V supply, T = TX (receiver output), R = RX (receiver input).

※ Always follow the signal name (GND, 5V, TX, RX), not the wire colour – wire colours differ between cable manufacturers.

2.4 Specifications

System	ExpressLRS (ELRS), 2.4 GHz
Frequency band	2.4 GHz ISM
Microcontroller (MCU)	ESP8285
RF module	SX1280IMLTRT
Protocol to flight controller	CRSF (UART serial line)
Max. refresh rate	1000 Hz
Supply voltage	5 V
Antenna connector	IPEX 1st generation
Antenna	omnidirectional T dipole, peak gain 2.23 dB
Dimensions	11.18 × 12.45 mm, height 5 mm
Weight	0.66 g without antenna; 1.2 g with antenna
Firmware (target in ExpressLRS Configurator)	HGLRC Hermes 2.4GHz RX
Indication	status LED

※ The actual refresh rate (packet rate) is set on the radio and cannot exceed what the transmitter module allows.

3. Legal conditions of operation

3.1 The law of the country of operation applies

The receiver is a radio device and, once installed, becomes part of a drone or model. Regulations (EU) 2019/947 and 2019/945 and the Radio Equipment Directive 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 the model in another country, **you must follow the regulations of the country in which you fly**.

3.2 Frequencies and transmit power

The receiver operates in the 2.4 GHz band. Besides receiving commands it also **transmits** – it sends telemetry back to the radio and in Wi-Fi mode (firmware update) creates its own Wi-Fi network in the same band. In the Czech Republic this band is governed by the general authorisations of the Czech Telecommunication Office (ČTÚ):

Band	Limit	Conditions (ČTÚ)
2400–2483.5 MHz	25 mW e.i.r.p.	short-range devices, VO-R/10/05.2025-5, Art. 3(j)
2400–2483.5 MHz	100 mW e.i.r.p.	wideband data transmission devices compliant with ČSN ETSI EN 300 328, VO-R/12/11.2021-11

- The e.i.r.p. limits include the antenna gain. Use only the supplied or manufacturer-specified antenna and do not modify the device in any way or add amplifiers.
- You set the transmit power of the radio's transmitter module and the telemetry power yourself (ExpressLRS Lua script). **The user is responsible for complying with the limits.** ExpressLRS transmitter modules allow higher power settings than the Czech limits permit.
- For operation in the EU, ExpressLRS Configurator offers the **EU_CE_2400** regulatory domain (LBT – listen before talk) when building the firmware.
- The manufacturer does not state the maximum transmit power of the receiver in the available documentation. You can request this information from the importer (Chapter 8.1).

3.3 The receiver as part of a drone

Under Regulation (EU) 2019/947, a drone you build with this receiver is a **privately built unmanned aircraft system without a class label**. In the Czech Republic the following applies in particular:

- operation in the open category – subcategory A1 with a take-off mass below 250 g and a speed below 19 m/s, otherwise A3,
- registration of the operator with the Civil Aviation Authority (ÚCL) is mandatory if the drone carries a camera or another sensor able to capture personal data, and always from a mass of 250 g,
- flight at a maximum of 120 m above ground, within visual line of sight, not over assemblies of people; when flying with FPV goggles an observer must stand next to the pilot.

4. Installation

4.1 What else you need

- A radio with a built-in or external **ExpressLRS 2.4 GHz** transmitter module. The major firmware version (first number of the version) of the transmitter module and the receiver must be the same.
- A flight controller (FC) with a free full serial port (UART), for example running Betaflight firmware.
- A soldering iron and solder if you do not use the supplied cable with connector.
- A computer with Betaflight Configurator (or the configurator of another FC firmware) and ExpressLRS Configurator.

4.2 Connecting to the flight controller

The receiver is connected with four wires. The signal wires are **crossed**: the receiver's TX output goes to the flight controller's RX input and vice versa. TX and RX must be on the **same UART number**.

Receiver	Flight controller (FC)
G (GND)	any GND pad
V (5V)	any 5 V pad
T (TX)	RX pad of the selected UART (e.g. R2)
R (RX)	TX pad of the same UART (e.g. T2)

- Use either the connector or the solder pads – not both at the same time.
- A UART that the flight controller manufacturer labels as an “SBUS receiver port” often has a pull-down resistor for SBUS signal inversion. On such a port the receiver LED stays **solid** after power-up and no link is established. If you are unsure, use a different UART.
- The CRSF protocol requires a full UART in full-duplex mode without signal inversion.

4.3 Mounting the antenna

- Snap the antenna's IPEX connector on vertically from above without force. When removing it, lift it by the connector, never pull on the cable.
- Choose the long or short antenna according to the space available in the model.
- Place the active part of the antenna (T dipole) as far as possible from carbon parts, metal, power wires and the video transmitter, ideally outside the frame, and secure it with a cable tie or tubing so that it cannot get into the propellers.
- Do not bend the antenna cable sharply or pinch it between frame parts.

5. Setup

5.1 Flight controller configuration (Betaflight)

① On the *Ports* tab, enable *Serial Rx* for the UART the receiver is connected to.

② On the *Receiver* tab, set *Receiver Mode* to *Serial (via UART)* and *Serial Receiver Provider* to **CRSF**.

③ Enable telemetry (*Telemetry* → Enabled).

④ If you use analogue video or a system with MSP DisplayPort support, set *RSSI Channel* to *Disabled* and also disable *RSSI ADC*.

⑤ On the *CLI* tab, make sure inversion and half duplex are off: *set serialrx_inverted = off*, *set serialrx_halfduplex = off*, and confirm with *save*.

5.2 Binding to the radio

The receiver is supplied from the factory **without a binding phrase**, so bind it using the traditional procedure:

① Switch off the radio.

② Connect and disconnect the receiver's power three times in quick succession – disconnect it within 2 seconds after each connection.

③ After the third connection the receiver LED repeatedly **blinks twice and pauses** – the receiver is in binding mode.

④ Switch on the radio, run the *ExpressLRS* Lua script and select *[Bind]*.

⑤ When the receiver LED turns **solid**, binding is complete and the radio receives telemetry.

▶ Other binding options

- **Binding phrase** – enter the same phrase when flashing firmware to the receiver and to the transmitter module (at least 8 characters recommended). Devices with the same phrase connect automatically. The phrase is not a password; it only separates your devices from others.
- The *Bind Receiver* button on the *Receiver* tab in newer versions of Betaflight Configurator (or the *bind_rx* command in the CLI).
- Holding the BOOT button on the receiver for approximately 1.5 s.

※ Binding mode is cancelled by restarting the receiver or by successful binding.

5.3 Function check and failsafe

- With the propellers removed, check on the *Receiver* tab that stick and switch movements correspond to the correct channels and directions.
- Set failsafe on the *Failsafe* tab and test it: after switching off the radio, the flight controller must enter failsafe and the motors must stop.
- Set up a switch for Arm (motors on) and Disarm (motors off) and check that Disarm reliably stops the motors.

6. Firmware update

6.1 Before you start

- Firmware is built and flashed with **ExpressLRS Configurator**. Select the category *HGLRC 2.4 GHz* and the device *HGLRC Hermes 2.4GHz RX* (the manufacturer refers to it in its documentation as “HGLRC Hermes 2400RX”).
- Select the regulatory domain (mandatory), and optionally a binding phrase and your Wi-Fi network details.
- The major firmware version of the receiver must match the major firmware version of the transmitter module. If you update one, update the other as well.

6.2 Updating via Wi-Fi

① Switch on the receiver and leave it running without a link to the radio. After the *Auto WiFi On Interval* has elapsed, it switches to Wi-Fi mode by itself and the LED starts **blinking fast**. Wi-Fi mode can also be enabled in the Lua script (*WiFi Connectivity → Enable RX WiFi*) or by holding the BOOT button for about 5 s.

② Connect your phone or computer to the **ExpressLRS RX** network, password **expresslrs**.

③ If the update page does not open by itself, enter **http://10.0.0.1/** in your browser.

④ Upload the firmware file from ExpressLRS Configurator (*firmware.bin.gz* – do not unpack the file).

⑤ Do not disconnect the receiver until the LED starts blinking again.

※ Wi-Fi mode ends when the receiver is next switched on.

6.3 Updating via the flight controller (passthrough)

- Leave the receiver connected to the flight controller with the port configured (Chapter 5.1). Close Betaflight Configurator, then disconnect and reconnect the USB cable.
- In ExpressLRS Configurator select the *BetaflightPassthrough* method and flash the firmware.
- When finished, the receiver LED returns to slow blinking within a few seconds.

6.4 Recovery via a UART adapter and the BOOT button

If the firmware is corrupted and the previous methods do not work, disconnect the receiver from the flight controller and connect it to a USB–UART adapter (CP210x, FTDI FT232, CH340 or CH9102 drivers): GND to GND, 5V to 5V, adapter TX to receiver R and adapter RX to receiver T. Press and hold the BOOT button, plug the adapter into the computer and release the button as soon as the LED is solid. In ExpressLRS Configurator select the *UART* method.

6.5 Further guides

A detailed description of the ExpressLRS system and of radios running EdgeTX can be found in the official documentation:

ExpressLRS documentation
www.expresslrs.org

EdgeTX documentation
edgetx.org

Both projects are open source; their websites also contain the current firmware and configurator downloads.

7. LED indication and troubleshooting

7.1 LED meaning

LED	Meaning
slow blinking (500 ms)	waiting for connection to the radio
double blink, then pause	binding mode
triple blink, then pause	connected to the radio, but the Model Match configuration does not match
fast blinking (25 ms)	Wi-Fi mode
medium blinking (100 ms)	radio chip not detected
solid on	connected to the radio, or bootloader mode is active

※ On a triple blink, adjust the Model Match setting in the ExpressLRS Lua script. On medium-speed blinking, contact the seller.

7.2 Troubleshooting

Problem	Cause and solution
LED is solid immediately after power-up, receiver is not bound	The receiver is in bootloader mode. Check whether the TX and RX wires are swapped, whether the UART has a pull-down resistor for SBUS (use a different UART) and whether the insulation presses the BOOT button. On flight controllers for DJI, disconnect the SBUS wire.
LED blinks slowly, no link is established	The receiver is not bound, the binding phrase differs, or the major firmware versions of the receiver and transmitter module differ. Repeat binding (Chapter 5.2).
LED blinks fast	The receiver has entered Wi-Fi mode because it received no signal from the radio. Switch on the radio and restart the receiver.
Linked, but nothing moves on the *Receiver* tab	Check *Serial Rx* on the correct UART, the CRSF protocol, TX/RX crossing and that inversion and half duplex are off (Chapter 5.1).

7.3 Maintenance and storage

- After a crash, check the antenna, its cable and the seating of the IPEX connector. Replace a damaged antenna.
- Check the solder joints and the insulation of the board.
- Store in a dry place, out of the reach of children and direct sunlight.

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 (ELRS 2.4G RX) is printed on the receiver board; the firmware version can be found in the ExpressLRS Lua script on the radio.

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.