ELRS 868MHz True Diversity

iFlight ExpressLRS receiver 868/915 MHz
User manual



Read the safety instructions and chapter 3 before installation – a transmit power limit of 25 mW e.r.p. applies in the Czech Republic.

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1. Safety instructions

1.1 Before you start

The receiver is intended for installation in radio-controlled models (FPV drones, aircraft and others) and for receiving commands from an ExpressLRS radio in the 868/915 MHz band. Read the entire manual before installation and first use, and keep it for future reference.

- This product is not a toy. It is not intended for children; installing and operating a model requires basic knowledge of electronics and soldering.
- The reliability of the radio link directly affects flight safety. Incorrect wiring, configuration or antenna placement may result in loss of control of the model.
- Do not tamper with or modify the receiver. Use only the antennas supplied by the manufacturer (see chapter 3).

1.2 Electrical connection

- Power the receiver only from the **5 V** output of the flight controller (FC) or another regulated 5 V source. Never connect it directly to the flight battery.
- Before applying power, check that there are no shorts between the solder pads and remove any flux residue.
- Solder and change wiring only with the power disconnected. Do not touch conductive parts once the battery is connected.
- If the receiver LED does not light up at all after power is applied, disconnect the power immediately and check the wiring.
- Do not expose the receiver to moisture, dust, direct heat or mechanical stress. Do not pull the antenna connectors off by the cable.

1.3 Radio operation and flying

- Before every flight, check the link and the failsafe function (chapter 6.3). Do not change receiver parameters while the motors are armed (Arm).
- The user is responsible for setting the regulatory domain and transmit power and for complying with the regulations of the country of use (chapter 3).
- When operating the model, follow the rules for unmanned aircraft that apply in the country where you fly.

2. Product description

2.1 What the receiver is for

The iFlight ELRS 868MHz True Diversity is an **ExpressLRS** receiver for the 868/915 MHz band. ExpressLRS is an open-source RC system with long range, low latency and two-way telemetry. The receiver is a **True Diversity** type – it has two antenna inputs and two radio chips, so it receives the signal through two antennas at the same time. It also supports **Gemini** mode, in which a Gemini-capable transmitter module sends each packet simultaneously on two frequencies.

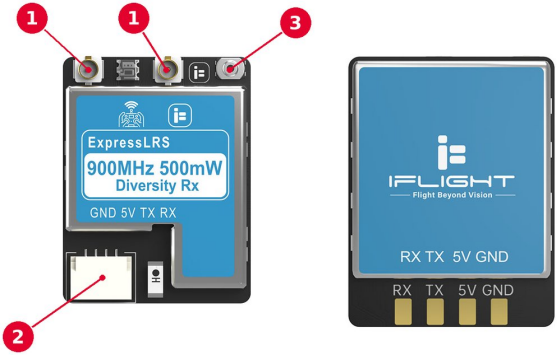
The receiver contains a temperature-compensated crystal oscillator (TCXO), which limits frequency drift caused by temperature changes, and a shielding cover for the electronics. It communicates with the flight controller using the **CRSF** protocol over a serial port (UART). The manufacturer recommends it for drones of 5 inches and larger and for long-range flights.

2.2 Package contents

Qty	Item
1	ExpressLRS 900MHz 500mW Diversity Rx receiver
2	868/915 MHz antenna, 70 mm T dipole, IPEX1 connector

※ The package does **not** include a connection cable for the receiver connector, a radio or an ExpressLRS transmitter module.

2.3 Parts description



Top side (left) and bottom side with solder pads (right)

① IPEX1 antenna connectors for two antennas (True Diversity).

② Connector for the flight controller; pin order as printed: GND, 5V, TX, RX.

③ Button (Boot) – used to enter bind mode or WiFi mode manually and to flash firmware via a USB-UART adapter.

The bottom side has four solder pads carrying the same signals as connector ②. The receiver can be connected either with a cable to the connector or by soldering wires to the pads.

2.4 Specifications

Type designation	900MHz 500mW Diversity Rx
Receiver type	Gemini / True Diversity
Processor (MCU)	ESP32-Pico D4
Frequency band	868 MHz (EU) / 915 MHz (FCC) – according to the firmware regulatory domain
Telemetry power	100–500 mW (20–27 dBm), selectable levels 100 / 250 / 500 mW
Protocol to FC	CRSF
LNA (low-noise amplifier)	no
Oscillator	TCXO
Power supply	5 V
Antenna connectors	2× IPEX1
Antennas included	2× 70 mm T dipole
Dimensions	24.3 × 18.5 × 6.5 mm
Weight	4.2 g
Firmware target	iFlight 900MHz 500mW Diversity RX
Name in Lua script	iF 900 500mW GRX

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

3.1 The law of the country of use applies

The receiver is a radio device that not only receives commands but also transmits (telemetry). The framework rules are harmonised within the European Union, but the permitted frequency bands, maximum transmit power and other conditions differ from country to country. The information in this chapter describes the situation in the Czech Republic. If you operate the receiver in another country, you must comply with the regulations of the country in which you use it.

3.2 Frequencies and transmit power in the Czech Republic

In the Czech Republic, short-range devices are operated under the general authorisation of the Czech Telecommunication Office **VO-R/10** (No. VO-R/10/05.2025-5, effective from 15 June 2025). For non-specific short-range devices (telemetry, remote control) it sets out, among other things:

Band	Max. power	Conditions
863.0–870.0 MHz	25 mW e.r.p.	for frequency-hopping devices (FHSS); duty cycle max. 0.1 % or spectrum access techniques (e.g. LBT)
869.40–869.65 MHz	500 mW e.r.p.	only in this narrow band; duty cycle max. 10 % or spectrum access techniques
915.0–919.4 MHz	25 mW e.r.p.	duty cycle max. 0.1 %

- The ExpressLRS **EU868** regulatory domain hops within 863.275–869.575 MHz and therefore falls under the 863.0–870.0 MHz band with a limit of **25 mW e.r.p.** The 500 mW level of the 869.40–869.65 MHz band therefore cannot be used.
- The **FCC915** regulatory domain operates within 903.5–926.9 MHz, which is not permitted in the Czech Republic. In the Czech Republic and the EU use only the **EU868** domain.
- Only the antenna specified by the manufacturer may be used; additional RF amplifiers and modifications of the device are prohibited. Operation takes place on shared frequencies without protection against interference.

The lowest selectable telemetry power of this receiver is 100 mW, i.e. more than the 25 mW e.r.p. limit. Operation with telemetry active therefore does not meet the conditions of general authorisation VO-R/10 in the Czech Republic. Telemetry can be switched off in the Lua script with *Telem Ratio → Off* **(chapter 5.4). The same limit also applies to the transmitter module of your radio.**

3.3 Information under the Radio Equipment Directive

Frequency band: 868 MHz (EU868 domain, 863.275–869.575 MHz) or 915 MHz (FCC915 domain, 903.5–926.9 MHz). Maximum transmitted power (telemetry) according to the manufacturer: 500 mW (27 dBm). Restrictions: neither the FCC915 domain nor power above 25 mW e.r.p. may be used in the Czech Republic. Conformity information is given in chapter 8.2.

4. Installation and wiring

4.1 What else you need

- an **ExpressLRS 868/915 MHz** radio or transmitter module (2.4 GHz and 868/915 MHz receivers and transmitters cannot be bound to each other); for Gemini mode a Gemini-capable transmitter module,
- a flight controller (FC) with a free full serial port (UART),
- soldering equipment or a suitable connection cable,
- a computer with ExpressLRS Configurator and the configurator for your FC (e.g. Betaflight Configurator).

4.2 Connecting to the flight controller

Connect the receiver to any free full UART of the flight controller. This is a serial connection, so the signals are crossed:

Receiver	Flight controller (FC)
GND	any GND pad
5V	5 V pad (or 4.5 V)
TX	RX of the same UART (non-inverted)
RX	TX of the same UART

- UARTs that the FC manufacturer marks as “for receiver” (SBUS) often have a pull-down resistor on the RX pin. An ESP32-based receiver may then unintentionally enter bootloader mode – the LED stays off or lights solid even with the radio switched off. In that case, move the receiver to another UART.
- Flight controllers running KISS firmware may label their UARTs differently. Always follow the wiring diagram of your FC.
- Do not heat-shrink or permanently mount the receiver yet – first check that it works (chapter 5). Heat-shrink must not press on button ③.

4.3 Antennas

- Connect both supplied antennas to connectors ①. Press the IPEX1 connector on squarely until it clicks; when disconnecting, pull the connector, not the cable.
- Never switch on telemetry (transmission) without the antennas connected.
- Place the active parts of the antennas as far as possible from conductive and magnetic parts – the carbon frame, metal and motors – and away from the propellers.
- For the best reception, point the two antennas in different directions, ideally rotated 90° to each other.

4.4 Flight controller setup

The procedure applies to Betaflight; in INAV and other software the settings are similar but may have different names.

① On the *Ports* tab, enable *Serial RX* on 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*. Leave *RSSI Channel* and *RSSI ADC* disabled.

④ In the CLI, use *get serialrx* to check that *serialrx_inverted = off* and *serialrx_halfduplex = off*; if necessary set them and store them with *save*.

⑤ Close the configurator and unplug the USB cable to release the connection before the next steps.

The default baud rate of the receiver serial line is 420000 Bd. Only for an FC running KISS firmware, set 400000 Bd in the receiver web interface.

5. Getting started

5.1 Firmware and compatibility

- The receiver and transmitter module will only connect if they have the same **major version** of ExpressLRS firmware (same first number of the version), the same **regulatory domain** and the same binding phrase (if used).
- When flashing firmware, always select the correct target: category *iFlight 900 MHz*, device *iFlight 900MHz 500mW Diversity RX* (receiver with two antennas). A wrong target causes very short range or no connection.
- Select the regulatory domain according to the country of use – **EU868** in the Czech Republic and the EU (chapter 3).

5.2 Binding

Method 1 – binding phrase (recommended). In ExpressLRS Configurator enter the same binding phrase for the receiver and for the transmitter module when flashing the firmware (or set it in the web interface). Devices with the same phrase and compatible firmware connect automatically after power-up. The phrase serves to distinguish you from other pilots; it is not a password. At least 8 alphanumeric characters are recommended.

Method 2 – manual binding.

① Switch off the radio.

② Put the receiver into bind mode in one of these ways: power the receiver on and off again within 2 seconds three times in a row (leave it on the third time); or hold button ③ for about 1.5 s; or use the *Bind Receiver* button on the *Receiver* tab of Betaflight Configurator (CLI command *bind_rx*) – newer Betaflight versions only.

③ The receiver LED blinks orange twice and then pauses – the receiver is in bind mode.

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

⑤ When the LED lights solid, the receiver is bound.

To cancel bind mode, power the receiver off and on again; the previous binding information then remains valid. For manual binding with older firmware versions, the receiver must not have a binding phrase set.

5.3 Checking the link

Once connected, the letter **C** (Connected) appears in the top right corner of the ExpressLRS Lua script. On the *Receiver* tab of the FC configurator, check that stick and switch movements match the channels. To load telemetry, select *Discover new sensors* on the telemetry page of the radio.

5.4 Receiver settings in the Lua script

Item	Meaning
Packet Rate	Packet rate for 900 MHz: 25, 50, 100, 100 Full, 200 Hz and D50. Higher rate = lower latency at the expense of sensitivity. The manufacturer recommends 200 Hz. Never change it in flight.
Telem Ratio	Share of packets used for telemetry: Off, 1:128 to 1:2, Std, Race. **Off** switches telemetry off.
Tlm Power	Receiver telemetry power 100 / 250 / 500 mW, or MatchTX (according to the transmitter power).
Receiver Mode / Antenna Mode	Gemini or Diversity (both antennas active, the receiver selects the better signal), or a single antenna only. In newer firmware versions the mode is negotiated automatically with the transmitter module.
Model Match	The receiver passes commands to the FC only if the receiver number in the radio model matches the number stored in the receiver. Protects against controlling the wrong model.
Bind Storage	Persistent – binding is kept after power-off; Volatile – it is forgotten after power-off.

- **Gemini** mode works only with a Gemini-capable transmitter module. Gemini improves link quality (LQ) but does not increase range.
- Do not change parameters while the motors are armed (Arm) – a change may cause a brief loss of link and failsafe.

5.5 Firmware update and web interface

Firmware can be flashed via WiFi, through the flight controller (Betaflight Passthrough) or with a USB-UART adapter with button ③ pressed. WiFi procedure:

① Switch off the radio and power the receiver. After about 60 s without a link it enters WiFi mode (the LED pulses green). WiFi mode can also be entered by holding button ③ for about 5 s or in the Lua script via *Wifi Connectivity* → *Enable RX WiFi*.

② Connect to the WiFi network **ExpressLRS RX** with the password **expresslrs** and open **http://10.0.0.1** in a browser. If the receiver is set up for your home network, use **http://elrs_rx.local**.

③ In ExpressLRS Configurator select the target (chapter 5.1), the *WiFi* method, the regulatory domain and the binding phrase, and click *Build*.

④ In the web interface, on the *Update* tab, upload the generated file *firmware.bin.gz* (do not unzip it) and click *Update*.

⑤ When finished, the LED blinks slowly again – the receiver is waiting for a link.

The web interface also lets you change the binding phrase, Model Match, regulatory domain, serial baud rate and the time until WiFi switches on automatically.

5.6 Further guides

Official ExpressLRS documentation – wiring, firmware flashing, binding, LED status, troubleshooting.

www.expresslrs.org

6. Operation

6.1 LED status

LED	Status
rainbow fade	starting up
slow blink (500 ms)	waiting for connection from the transmitter
orange, 2 blinks and pause	bind mode
orange, 3 blinks and pause	connected, but Model Match mismatch
solid single colour	connected; colour indicates the packet rate
green pulsing	WiFi mode (update)
red fast blinking (100 ms)	radio chip not detected
off	off or bootloader mode

Colour when connected	Packet Rate (868/915 MHz)
red	200 Hz
yellow-green	100 Hz Full
green	100 Hz
light blue	50 Hz
blue	25 Hz
purple	D50

6.2 Signal loss and failsafe

When the signal is lost, the receiver stops updating the channels and the flight controller treats this as failsafe. The behaviour of the model in failsafe (motor stop, landing etc.) is set in the FC configurator on the *Failsafe* tab.

6.3 Pre-flight check

- The antennas are connected, undamaged and out of reach of the propellers; the receiver is firmly mounted.
- The Lua script shows the link (C); all channels respond correctly in the FC configurator.
- The failsafe function has been checked: with the **propellers removed**, arm the motors (Arm) and switch off the radio – the motors must stop or the model must react according to the failsafe setting.
- The regulatory domain and transmit power comply with the regulations of the country of use (chapter 3).

7. Maintenance and troubleshooting

7.1 Maintenance and storage

- After a crash, check the antennas, their cables and the IPEX1 connectors. Replace a damaged antenna with one of the same type.
- Keep the receiver dry and clean. Store it in a dry place, away from direct sunlight and heat sources.

7.2 Troubleshooting

Problem	Cause and solution
LED does not light after power-up	Check the power supply and wiring. The receiver may be in bootloader mode: make sure button ③ is not pressed (e.g. by heat-shrink), disconnect the RX and TX wires from the FC – if the LED starts blinking slowly, move the receiver to another UART.
LED lights solid even with the radio off	Bootloader mode, see above – most often a UART with an SBUS pull-down resistor.
Receiver does not connect to the transmitter	Different major firmware version, regulatory domain or binding phrase; transmitter in the 2.4 GHz band. Align the settings or bind the receiver again.
LED blinks 3× and pauses, FC receives no commands	Model Match mismatch. In the Lua script switch Model Match Off and back On, or switch it off.
Link established but channels in the FC do not respond	Check TX/RX crossing, Serial RX on the correct UART, CRSF protocol and inversion and half duplex switched off.
Short range	Wrong firmware target, damaged or poorly placed antenna (near carbon, metal, motors).
“Not Enough Space” error during WiFi update	Check that the WiFi method is selected in the Configurator. Alternatively flash the firmware via Betaflight Passthrough or a USB-UART adapter.

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 (900MHz 500mW Diversity Rx) is printed on the receiver's shielding cover.

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.