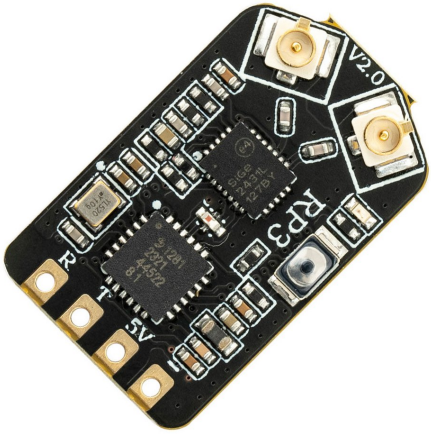
RP3 V2

RadioMaster – ExpressLRS 2.4 GHz receiver
Nano receiver with two antennas (diversity)



Read this entire manual carefully before installation and first use, and keep it for future reference. Always remove the propellers when working on the drone.

www.rotorama.com

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1. Safety instructions

1.1 General rules

- The receiver is intended for installation in radio-controlled models and drones. Incorrect installation or setup can lead to loss of control of the model, damage to property or injury.
- During installation, wiring, setup and binding on the bench, always **remove the propellers** and do not connect the flight battery unless the step requires it.
- This product is not a toy. Keep it and its small accessories out of the reach of children.
- Do not make any modifications to the receiver that are not described in this manual or in the ExpressLRS documentation.

1.2 Power supply and installation

- Power the receiver only with **5 V** from the flight controller (FC) or another regulated 5 V source. Never connect it directly to the flight battery.
- Observe the polarity: the 5V pad to a 5 V output, the − (GND) pad to ground. Reversing them can permanently damage the receiver.
- Solder briefly and at a suitable temperature to avoid damaging the board and components. After wiring, check that there is no short circuit between the pads.
- Protect the receiver from moisture, dust, vibration and mechanical stress, e.g. with suitable heat-shrink tubing. Do not cover it in a way that causes overheating.

1.3 Antennas and radio operation

- Always operate the receiver with **both antennas connected and undamaged**. A damaged antenna cable or a loose U.FL connector significantly reduces range.
- U.FL connectors are fragile. Attach and remove the antennas perpendicular to the board, without levering or pulling on the cable.
- The user is responsible for the transmit power setting and the regulatory domain. Observe the regulations of the country in which you operate the model (chapter 3).
- Check the link and the failsafe function before every flight (chapter 6).

2. Product description

2.1 What the receiver is for

The RadioMaster RP3 V2 is a miniature RC receiver for the open-source **ExpressLRS** (ELRS) system in the 2.4 GHz band. It receives control commands from an ExpressLRS 2.4 GHz radio or transmitter module and passes them to the flight controller (FC) using the **CRSF** protocol. It sends telemetry back to the radio.

The receiver uses two antennas with antenna switching (antenna diversity), a low-noise amplifier (LNA) for better reception, a power amplifier (PA) for telemetry and a temperature-compensated crystal oscillator (TCXO). The firmware can be updated via WiFi directly in the model, without removing the receiver. It is compatible with all ExpressLRS 2.4 GHz modules and transmitters.

2.2 Package contents

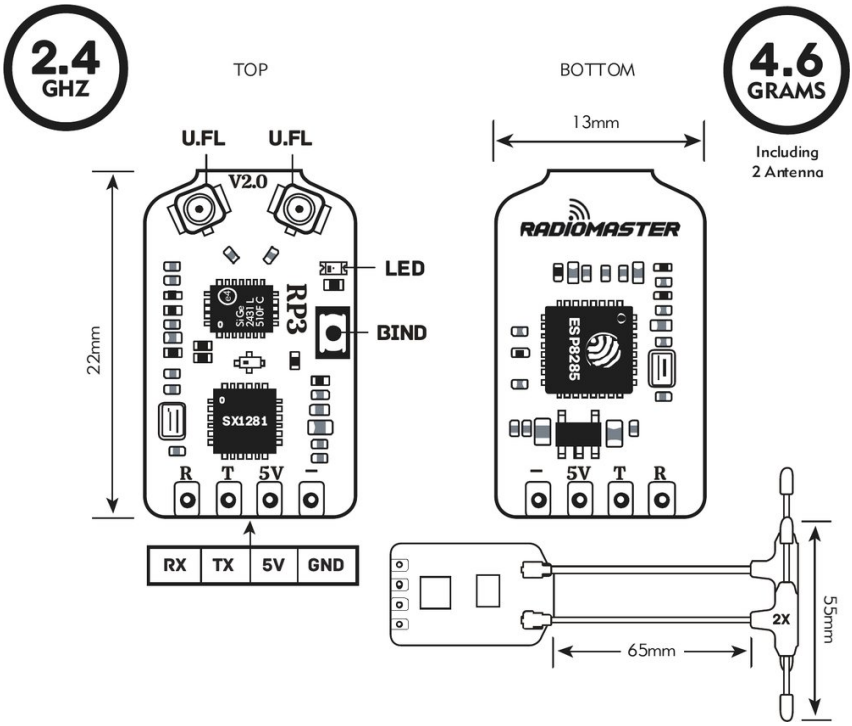
- 1× RadioMaster RP3 V2 receiver (ExpressLRS 2.4 GHz)
- 2× 65 mm 2.4 GHz T antenna, U.FL connector
- 1× CRSF wire
- 1× printed manufacturer's manual

Not included: radio or ExpressLRS transmitter module, flight controller (FC) and flight battery.



Receiver with antennas and connecting wire (manufacturer's illustrative photo)

2.3 Parts overview



Top and bottom view, board and antenna dimensions (manufacturer's drawing)

Part	Description
U.FL (2×)	connectors for the two antennas
LED	status indicator (chapter 5.4)
BIND	receiver button (binding, WiFi mode – chapters 5.3 and 5.5)
R / RX	receiver data input – connect to TX on the flight controller
T / TX	receiver data output – connect to RX on the flight controller
5V	5 V power supply
– / GND	ground
V2.0	board revision marking (silkscreen)

2.4 Specifications

Parameter	Value
Size	22 × 13 × 4 mm
Weight	4.6 g (including two antennas)
MCU	ESP8285
RF chip	SX1281
LNA / PA	Skyworks SE2431L
Oscillator	TCXO
Frequency band	2400–2483 MHz (ISM)
Channel range	2.404–2.479 GHz
Telemetry power	max. 100 mW
Input voltage	5 V DC
Protocol (bus)	CRSF
Max. refresh rate	500 Hz / F1000 Hz
Min. refresh rate	25 Hz
Antennas	2× T 65 mm, 2.4 GHz, U.FL (diversity)
Firmware	ExpressLRS (pre-installed)
Firmware target	RadioMaster RP3 Diversity 2400 RX

2.5 FCC and LBT versions

The manufacturer supplies the receiver in two firmware versions that differ in the regulatory domain:

Version	Description
FCC	ISM 2400 domain – intended for countries outside the EU (e.g. USA)
LBT	EU CE 2400 domain with LBT (Listen Before Talk – checks that the channel is free before transmitting); intended for use in the EU

※ The transmitter and the receiver must be set to the same regulatory domain, otherwise they will not bind. For use in the EU, use the EU CE (LBT) domain on both the transmitter and the receiver.

3. Radio frequencies and legal conditions of use

3.1 The law of the country of use applies

European Union regulations apply in all member states, but national implementing rules differ from country to country – permitted frequency bands, maximum transmit power, registration of drone operators, 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 it.

3.2 Frequency band and transmit power

Frequency band	2400–2483 MHz
Max. transmitted power (telemetry)	100 mW (manufacturer's data)

In the Czech Republic, operation in the 2400–2483.5 MHz band is governed by the general authorisations of the Czech Telecommunication Office (ČTÚ). For non-specific short-range devices the limit is **25 mW e.i.r.p.** (VO-R/10); for wideband data transmission equipment complying with ETSI EN 300 328 the limit is **100 mW e.i.r.p.** (VO-R/12). The current wording is available at www.ctu.cz.

The user is responsible for setting the transmit power of the transmitter and of the receiver telemetry and for selecting the regulatory domain. Outside the Czech Republic, the limits of the respective country apply.

3.3 The receiver as part of a drone

If the receiver is installed in an unmanned aircraft (drone), the operation of the drone is governed by Regulations (EU) 2019/947 and 2019/945 and by the national regulations of the country of operation – in particular the rules for operator registration, pilot competency, operational limits and geographical zones. Information for the Czech Republic is provided by the Civil Aviation Authority (www.caa.gov.cz).

4. Installation

4.1 Connecting to the flight controller (FC)

Connect the receiver to a free hardware UART of the flight controller. The data wires are connected **crosswise**:

Receiver	Flight controller (FC)
R (RX)	TX of the selected UART
T (TX)	RX of the same UART (uninverted)
5V	5 V output
– (GND)	GND

- The CRSF protocol requires a full UART pair (RX and TX), uninverted and in full-duplex mode.
- Avoid the UART that the flight controller manufacturer recommends for SBUS receivers – it often has a resistor on the RX input for the inverted signal, with which the receiver will not establish a link (the LED then stays solid without a connection to the transmitter).
- You can use the supplied CRSF wire or wires soldered directly to the pads.

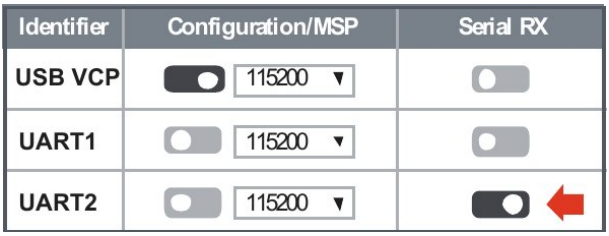
4.2 Antenna placement

- Route the antenna tips (active part) as far as possible from carbon parts, motors, electronic speed controllers (ESC), the video transmitter (VTX) and power wires.
- Orient the two antennas differently from each other (ideally perpendicular) to take advantage of antenna diversity.
- Secure the antennas so that they cannot get into the propellers, and do not bend the cables at sharp angles.

5. Setup and binding

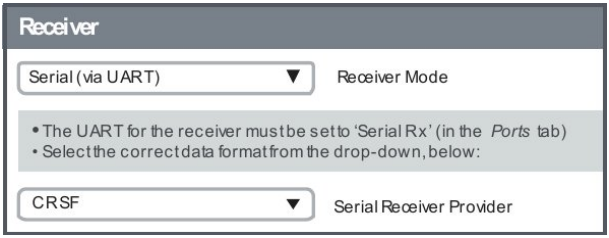
5.1 Betaflight setup

① Open *Betaflight Configurator*, go to the *Ports* tab and enable *Serial RX* on the UART to which the receiver is connected (UART2 as shown in the example). Click *Save and Reboot*.



Ports tab – Serial RX enabled on UART2

② On the *Configuration* tab (*Receiver* in newer versions), set *Receiver Mode* to *Serial (via UART)* and *Serial Receiver Provider* to **CRSF**. Enable *Telemetry* and save the settings.



Receiver panel – Serial (via UART) and CRSF

※ If the receiver does not communicate, check in the CLI that *set serialrx_inverted = off* and *set serialrx_halfduplex = off* are set, and save with the *save* command.

5.2 Binding with a binding phrase

The recommended binding method in ExpressLRS is the **binding phrase**. Choose your own unique phrase (at least 8 alphanumeric characters recommended) and set **the same phrase** in both the transmitter module and the receiver – when flashing the firmware with *ExpressLRS Configurator* or in the receiver's web interface (chapter 5.5). Devices with the same phrase, the same major firmware version and the same regulatory domain connect automatically after power-up, without buttons or bind plugs.

※ The binding phrase is not for security; it prevents your receiver from connecting to someone else's transmitter.

5.3 Traditional binding

Traditional binding works if **no binding phrase is set** in the receiver. A receiver with a binding phrase set (with older firmware versions) will not enter bind mode – first reflash it with the binding phrase field disabled.

① Power OFF your radio / transmitter module.

② Power-cycle the receiver three times: connect power, and as soon as the LED lights up, disconnect it within 2 seconds. Three times in total. Then power the receiver on and leave it on.

③ Make sure the LED is doing a quick double blink, which indicates the receiver is in bind mode.

④ Power ON your radio and use the **[Bind]** button in the ExpressLRS Lua script, which sends out a binding pulse.

⑤ If the receiver LED is solid, it is bound.

※ In newer ExpressLRS firmware versions, bind mode can also be entered by pressing the BIND button on the receiver for about 1.5 s. Details can be found at expresslrs.org.

5.4 LED status

LED	Meaning
solid on	connected to a transmitter, or bootloader mode enabled
double blink then pause	bind mode
slow blink (500 ms)	waiting for connection from the transmitter
triple blink then pause	connected, but Model Match configuration mismatched
medium speed blink (100 ms)	RF chip not detected
fast blink (25 ms)	WiFi mode enabled

5.5 WiFi mode and firmware update

The receiver has built-in WiFi, which can be used to update the firmware and change settings (e.g. the binding phrase) without removing it from the model. WiFi mode is enabled in one of the following ways:

- automatically – a powered receiver without a link to a transmitter switches to WiFi after about 60 seconds (default setting),
- in the ExpressLRS Lua script: *WiFi Connectivity* → *Enable RX WiFi* (bound receiver only),
- by holding the BIND button for about 5 seconds (if supported by the firmware version).

Connect to the WiFi network **ExpressLRS RX** (password **expresslrs**) and open **http://10.0.0.1/** in your browser. If the receiver has a home WiFi network stored, it connects to it and the web interface is then available at http://elrs_rx.local.

When updating with *ExpressLRS Configurator*, select the target **RadioMaster RP3 Diversity 2400 RX** and the regulatory domain appropriate for the country of use. The major firmware version (first number of the version) of the receiver and the transmitter module must match.

❋ Do not disconnect power from the receiver during a firmware update. Keep the propellers removed when working on the model.

5.6 Further guides

Detailed documentation on the ExpressLRS system and on radios running EdgeTX (Lua script, binding, setup) is available on the official websites:

- ExpressLRS documentation: www.expresslrs.org
- EdgeTX documentation: www.edgetx.org

6. Before flight

- With the **propellers removed**, check on the *Receiver* tab in Betaflight that all channels respond to stick and switch movements in the correct direction.
- Check the failsafe function: with the drone ready to fly but without propellers, switch off the radio – the flight controller must enter failsafe and the motors must stop or behave according to the failsafe settings.
- Check that the antennas are firmly attached, undamaged and out of reach of the propellers.
- Before the first flight, perform a range test in a safe place; during flight, monitor the link quality telemetry (LQ, RSSI).

7. Maintenance and troubleshooting

7.1 Maintenance and storage

- After a crash, check the antennas, U.FL connectors and solder joints.
- Replace damaged antennas with 2.4 GHz antennas with a U.FL connector.
- Store the receiver in a dry place, away from direct sunlight and extreme temperatures.

7.2 Troubleshooting

Problem	Possible cause and solution
LED off	no 5 V power or reversed polarity – check the wiring
LED blinks slowly, no link	different binding phrase, regulatory domain (FCC × LBT) or major firmware version on transmitter and receiver – align the settings, or bind again
LED solid, but the FC receives no data	R/T wires swapped, wrong Betaflight setup or a UART with an inverted SBUS input – see chapters 4.1 and 5.1
LED triple blinks	Model Match configuration mismatched – adjust it in the radio
short range	damaged or poorly placed antenna, low transmitter power – see chapter 4.2
receiver is in WiFi mode after power-up	no transmitter found within 60 s – switch on the transmitter, or restart the receiver

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 (RadioMaster RP3, board revision V2.0) is printed on the receiver's circuit 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.