RP1 V2

RadioMaster · ExpressLRS 2.4 GHz receiver
User manual



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

Rotorama, s.r.o. · www.rotorama.com

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1. Safety instructions

1.1 Before you start

- Before installation, read this entire manual and the manuals for the flight controller (FC), the radio and the model in which you are installing the receiver.
- The receiver is a component intended to be built into an RC model or FPV drone. Installation and setup should be carried out by a user with basic soldering skills and knowledge of configuring RC equipment.
- This product is not a toy. Keep it out of the reach of children – small parts can be swallowed.
- Loss of the radio link means loss of control of the model. Check the link and the failsafe settings before every flight (Chapter 5.4).

1.2 Electrical safety

- Power the receiver **only with 5 V** from the flight controller (FC) output or from a regulated BEC. Never connect it directly to a battery.
- Solder only with the power disconnected. Before powering on for the first time, check the wiring according to Chapter 4.1 – swapping the 5 V and G (GND) wires will permanently damage the receiver.
- The receiver board has no housing. Protect it with heat-shrink tubing or other insulation against short circuits with a carbon frame, metal parts and wires.
- Do not power the receiver without an antenna connected, and protect it from moisture, dust and mechanical stress on the U.FL connector.
- Always remove the propellers when working on a model with the flight battery connected.

2. Product description

2.1 What the receiver is for

The RadioMaster RP1 V2 is a nano-sized receiver for the open-source **ExpressLRS** radio system in the 2.4 GHz band. It features an ESP8285 MCU and an SX1281 RF chip, a U.FL antenna socket and a TCXO (temperature-compensated crystal oscillator) for stable frequency even with large temperature changes.

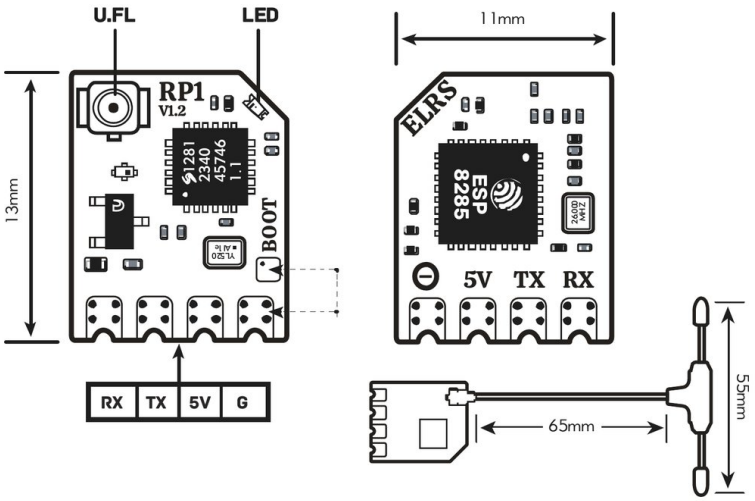
It communicates with the flight controller (FC) via the **CRSF** bus over a serial port (UART). It is compatible with all 2.4 GHz ExpressLRS modules and transmitters. Built-in WiFi lets you upgrade the firmware and configure the receiver via the web interface (WebUI).

2.2 Package contents

- 1× RadioMaster RP1 V2 receiver
- 1× 2.4 GHz T antenna with U.FL connector, 65 mm
- silicone wires for connecting to the flight controller (FC)
- 1× manufacturer's user manual card

Not included: 2.4 GHz ExpressLRS radio or transmitter module, flight controller (FC), heat-shrink tubing, soldering tools.

2.3 Parts overview



Top side (left) and bottom side of the receiver (right), T antenna

Item	Description
U.FL	2.4 GHz antenna connector

Item	Description
LED	status LED (Chapter 5.3)
BOOT	pad for entering the firmware bootloader (Chapter 6.2)
RX · TX · 5V · G	solder pads: RX data input, TX data output, 5 V power, ground (GND); marked RX · TX · 5V · ⊖ on the bottom side
13 × 11 mm	board dimensions; antenna: cable length 65 mm, T width 55 mm

2.4 Specifications

Parameter	Value
Size	13 × 11 × 3 mm
Weight	2.2 g (with antenna)
MCU	ESP8285
RF chip	Semtech SX1281
Frequency band	2.4 GHz ISM, 2400–2483 MHz
Frequency range	2.404–2.479 GHz
Telemetry RF power	10 mW
Input voltage	5 V
Receiver protocol	CRSF
Max. refresh rate	500 Hz / F1000 Hz
Min. refresh rate	25 Hz
Oscillator	TCXO (temperature-compensated)
Antenna	2.4 GHz T, U.FL connector, 65 mm
Firmware	ExpressLRS, target **RadioMaster RP1/2 2400 RX**
Wireless interface	WiFi (updates, WebUI)

※ The factory-installed firmware version varies by production batch.

2.5 FCC and LBT variants

The manufacturer supplies the receiver in two variants that differ in the regulatory domain of the pre-installed ExpressLRS firmware: **FCC** (ISM 2400 domain) and **LBT** (EU CE 2400 domain with Listen Before Talk). This manual covers both.

- The regulatory domain must be **the same on the transmitter module and the receiver**, otherwise they will not bind.
- For operation in EU countries, select the **EU CE 2400 (LBT)** domain. To change it, reflash the firmware (Chapter 6).

3. Radio frequencies and legal conditions

3.1 The law of the country of use applies

European Union legislation applies in all member states, but national implementing regulations differ from country to country – permitted frequency bands, maximum transmit power, rules for operating unmanned aircraft, registration and insurance. The information in this chapter describes the situation in the Czech Republic. If you use the product in another country, you must follow the regulations of the country in which you use it.

3.2 Frequencies and transmit power

Item	Value
Frequency band	2400–2483 MHz (2.4 GHz ISM band)
Receiver transmit power (telemetry)	10 mW
Conditions of use in the Czech Republic	general authorisations of the Czech Telecommunication Office (www.ctu.cz)

- The receiver transmits only the telemetry downlink. The transmit power of the control signal is set by the radio or transmitter module – the user is responsible for setting it in accordance with local regulations.
- In EU countries, use firmware with the **EU CE 2400 (LBT)** regulatory domain (Chapter 2.5).

3.3 Operating a model or drone

The receiver is part of the control chain of an unmanned aircraft or RC model. Operation of unmanned aircraft in the EU is governed by Regulations (EU) 2019/945 and 2019/947 and by national regulations. The conditions of operation (operator registration, pilot competency, operational limits) are given in the manual of the model or drone and on the website of the Czech Civil Aviation Authority (www.caa.cz).

4. Installation

4.1 Connecting to the flight controller (FC)

Connect the receiver to a free serial port (UART) on the flight controller. The data wires are crossed – the output of one device goes to the input of the other:

RP1 receiver	Flight controller (FC)	Function
RX	TX (UARTx)	data from FC to receiver
TX	RX (UARTx)	data from receiver to FC
5V	5 V	power
G (⊖)	GND	ground

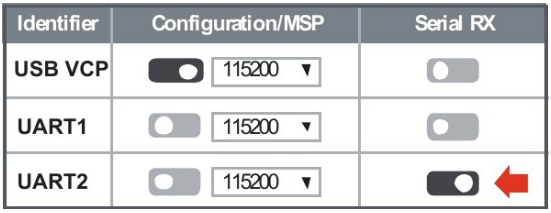
- Solder the wires quickly and with flux so that the pads do not overheat and lift off.
- After soldering, check that there is no solder bridge between neighbouring pads.
- Insulate the board (Chapter 1.2) and secure it so that the wires do not pull on the solder pads.

4.2 Antenna

- Fit the U.FL connector straight on and press until it clicks. When disconnecting, pull on the connector, never on the cable.
- Route both elements of the T antenna as far as possible from carbon parts, metal, motors and the video transmitter; carbon and metal block the signal.
- The antenna elements must not reach into the propellers. Secure them with a cable tie or an antenna mount.
- Replace a damaged antenna – it significantly reduces the range.

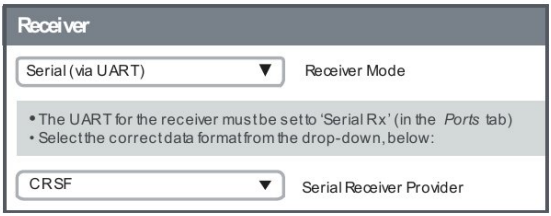
4.3 Setup in Betaflight Configurator

① Open Betaflight Configurator, go to the *Ports* tab and enable the corresponding UART as a *Serial RX* (e.g. UART2 as shown below). Click *Save and Reboot*.



Ports tab – Serial RX enabled on UART2

② On the *Configuration* tab, click on *Serial-based receiver* in the *Receiver* panel and select **CRSF** as the *Serial Receiver Provider*. Save the settings.



Receiver panel – Serial (via UART) mode, CRSF protocol

5. Binding to the radio

5.1 Binding with a binding phrase

A binding phrase is a text entered into the firmware of both the transmitter module and the receiver. Devices with the same phrase connect automatically and the traditional binding step is not needed. The phrase can be set when flashing the firmware or in the receiver's web interface (Chapter 6.1).

- Use only Latin letters and numbers.
- Choose a unique phrase – any transmitter with the same phrase will connect to the receiver.

5.2 Traditional binding

Traditional binding is available when no binding phrase is set in the receiver.

① Power OFF your transmitter/radio.

② Plug in and unplug your receiver 3 times.

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

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

⑤ If the receiver has a solid light, it's bound!

5.3 LED indication

LED	Receiver status
quick double blink	bind mode
solid light	bound, link to the transmitter established
fast blinking	WiFi mode (Chapter 6.1)

5.4 Function check and failsafe

- Without propellers, switch on the radio and the model, and in Betaflight Configurator on the *Receiver* tab check that all channels respond to stick movements in the correct direction and range.
- Check the failsafe: with the model armed (Arm) and without propellers, switch off the radio – the motors must stop, or the behaviour set on the *Failsafe* tab must take effect.
- Perform a range check on the ground before the first flight.

6. Firmware and further guides

6.1 Updating and configuring via WiFi

To flash firmware, use the target **RadioMaster RP1/2 2400 RX**, e.g. in ExpressLRS Configurator.

① Power on the receiver with the radio switched off and wait until it switches to WiFi mode after the set interval (the LED blinks fast).

② On your PC or phone, connect to the WiFi network **ExpressLRS RX**, password **expresslrs**.

③ Open **http://10.0.0.1/** in your browser. The receiver's web interface (WebUI) with the settings and the firmware version is displayed.

④ Select the firmware file with the *Choose File* button and click *Update*. Wait for the result message.

⑤ Keep the receiver powered until the LED starts blinking again or the receiver returns to WiFi mode.

※ The receiver's WiFi antenna is weak – stay close to the receiver when connecting.

6.2 Updating via serial port (BOOT)

If a WiFi update is not possible, the firmware can be flashed via the serial port (UART), e.g. via flight controller (FC) passthrough or a USB–UART adapter. The receiver must be put into bootloader mode:

- use a metal object to short-circuit the **BOOT** pad to ground (G pad) and power the receiver ON **while shorted**,
- then flash the firmware in ExpressLRS Configurator using the UART method.

6.3 Official documentation

Detailed guides to the ExpressLRS system and the EdgeTX radio firmware (binding, Lua script, power settings, updates) are available on the official websites:

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

7. Maintenance and troubleshooting

7.1 Maintenance

- After a crash, check the antenna, the U.FL connector, the solder joints and the board insulation.
- Keep the receiver dry and clean. Moisture and dirt can cause a short circuit.
- Keep the firmware of the transmitter module and the receiver at mutually compatible versions.

7.2 Troubleshooting

Problem	Possible cause and solution
LED is off	the receiver is not powered – check the 5 V supply and the 5V and G wiring
receiver will not bind	different binding phrase or regulatory domain (FCC / LBT) on transmitter and receiver; incompatible firmware versions; repeat the procedure in Chapter 5
bound, but the FC does not see the channels	RX and TX wires swapped; Serial RX enabled on a different UART; CRSF protocol not selected (Chapter 4.3)
short range, link dropouts	damaged or disconnected antenna; antenna shielded by carbon or metal; low power set in the transmitter
receiver does not switch to WiFi	the radio is on and the link is established – switch it off and wait

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 (RP1) and the board revision (V1.2) are printed on the top side of the receiver's circuit board; the firmware version is shown in the receiver's web interface (WebUI).

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.