RP4TD

RadioMaster – ExpressLRS 2.4 GHz receiver
True Diversity · user manual



Read the safety instructions in Chapter 1 before installation. For operation in the EU, use firmware with the EU regulatory domain (LBT).

Rotorama, s.r.o. · www.rotorama.com

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1. Safety instructions

Read this entire manual carefully before installation and first use, and keep it for future reference. The receiver is intended to be built into RC models and FPV drones. Installation requires basic knowledge of electronics and soldering.

- The receiver is an electronic component without a housing. Protect it from moisture, water, dust, metal chips and mechanical damage.
- Carry out all soldering and wiring **only with the battery disconnected**. Before connecting the battery, check the polarity and correct wiring – reverse polarity or a short circuit can permanently damage the receiver and the flight controller (FC).
- The supply voltage must not exceed the range given in the specifications (Chapter 2.4).
- Do not connect a battery directly to the receiver – power the receiver from the 5 V output of the flight controller (FC) or another suitable regulated source.
- **Always remove the propellers** during bench tests and whenever working on a model with the battery connected.
- Before every flight, check the link to the radio and the correct function of the failsafe (safe state on signal loss).
- Never power the receiver without antennas connected and do not use damaged antennas – range and link reliability will be reduced.
- This product is not a toy. Keep it out of the reach of children – small parts can be swallowed.

2. Product description

2.1 Intended use

RadioMaster RP4TD is a miniature **ExpressLRS** receiver for the 2.4 GHz band with true diversity – it has two SX1281 RF chips and two antennas. The receiver connects to the flight controller (FC) via a serial link (UART) using the CRSF protocol and sends telemetry back to the radio.

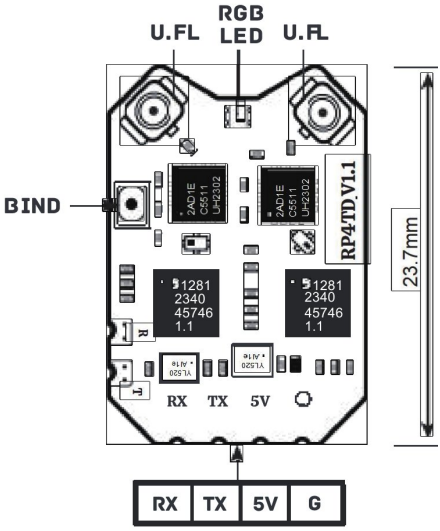
According to the manufacturer, the receiver features a DC-DC power supply circuit, dual temperature compensated crystal oscillators (TCXO) for frequency stability under temperature changes, and built-in WiFi that lets you upgrade the firmware and configure the receiver via the built-in WebUI from a PC or mobile phone. The receiver is Gemini mode compatible and works with all 2.4 GHz ExpressLRS modules and transmitters with built-in 2.4 GHz ExpressLRS.

2.2 Package contents

Qty	Item
1×	RP4TD ExpressLRS 2.4 GHz receiver
2×	65 mm U.FL 2.4 GHz T-antenna (installed on the receiver at the factory)
1×	CRSF wire
3×	heat-shrink tube
1×	manufacturer's user manual

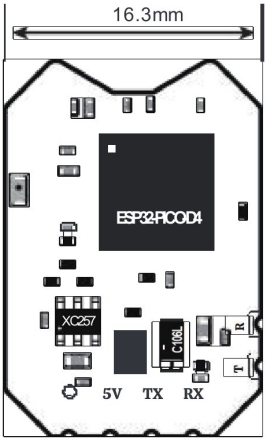
The package does **not** include a flight controller (FC), a radio or an ExpressLRS transmitter module.

2.3 Parts overview



Top side of the receiver

- **U.FL** – two antenna connectors (antenna 1 and antenna 2).
- **RGB LED** – status indicator (see Chapter 5.2).
- **BIND** – bind button.
- **RX, TX, 5V, G** – solder pads for connection to the flight controller (FC); G = GND (ground).



Bottom side of the receiver with 5V, TX, RX pads and the ESP32 module

2.4 Specifications

Item	RadioMaster RP4TD ExpressLRS 2.4GHz Diversity Receiver
Type	ISM
Frequency band	2400–2483 MHz (2.4 GHz)
Radio system	ExpressLRS
MCU	ESP32 (ESP32-PICO-D4)
RF chip	SX1281 × 2 (true diversity)
Maximum refresh rate	500 Hz / F1000 Hz
Telemetry power	20 dBm (max. 2 × 100 mW)
Input voltage	4.5–12 V DC
Receiver protocol (bus)	CRSF; extension interface UART
Antenna connector	U.FL
Antennas	2 × 2.4 GHz T-antenna, 65 mm
Size	23.7 × 16.3 × 4.0 mm
Weight	1.4 g (without antennas)
Firmware (target)	RadioMaster RP4TD Diversity 2400 RX

※ The receiver comes with ExpressLRS firmware pre-installed. The firmware version varies between production batches.

2.5 FCC and LBT variants

The manufacturer supplies the receiver in two firmware variants: **FCC** and **LBT**. The hardware is identical; the variants differ in the regulatory domain of the ExpressLRS firmware. The LBT variant (Listen Before Talk – transmitting only after checking that the channel is free) corresponds to the requirements for operation in the European Union.

- For operation in the EU and the Czech Republic, use firmware with the EU regulatory domain (LBT).
- The transmitter (ExpressLRS module) and the receiver must run ExpressLRS firmware with the **same major version** and the **same regulatory domain** – otherwise they will not bind.
- The regulatory domain can be changed by flashing the corresponding firmware (Chapter 6).

3. Installation

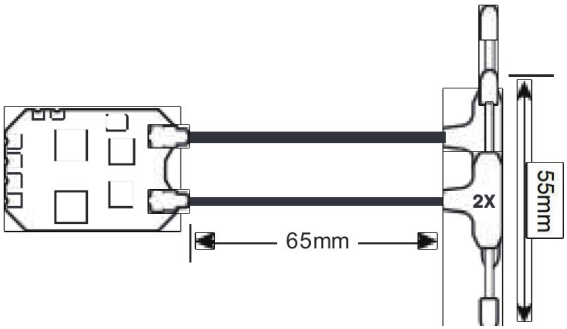
3.1 Connecting to the flight controller (FC)

The receiver connects to any free hardware UART of the flight controller (FC). Use the supplied CRSF wire or solder the wires directly to the pads. The signal wires are connected **crosswise**:

RP4TD receiver		Flight controller (FC)
TX	→	RX (e.g. RX2)
RX	→	TX (e.g. TX2)
5V	→	5 V
G	→	GND

- Solder with the battery disconnected, quickly and with a sufficiently powerful soldering iron so as not to overheat the board.
- After wiring, insulate the receiver with the supplied heat-shrink tube and mount it so that it cannot move freely and does not touch the carbon frame or other conductive parts.
- Do not apply a voltage higher than stated in the specifications to the pads.

3.2 Antennas



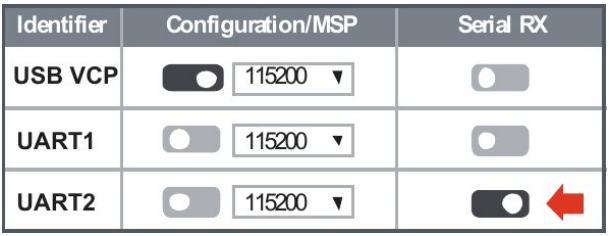
2.4 GHz T-antennas: cable length 65 mm, antenna width 55 mm

- U.FL connectors are fragile. Attach and remove the antenna perpendicular to the board, without levering and without pulling on the cable.
- Route the active ends of both antennas away from the carbon frame, motors, video transmitter (VTX) and power wires.
- For best diversity, point the antennas in different directions (for example one horizontal and one vertical).
- Secure the antennas (with heat-shrink, a cable tie or a holder) so that they cannot get into the propellers.

4. Betaflight setup

4.1 Ports tab

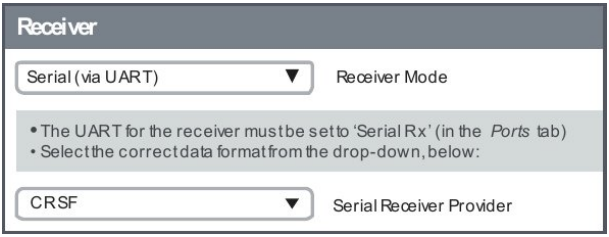
Open **Betaflight Configurator**, go to the *Ports* tab and enable the corresponding UART as a *Serial RX* (e.g. UART2 as shown below). Save and restart the flight controller (*Save and Reboot* button).



Ports tab – Serial RX enabled on UART2

4.2 Configuration / Receiver tab

- The UART for the receiver must be set to *Serial RX* (in the *Ports* tab).
- On the *Configuration* tab, click on *Serial-based receiver* on the *Receiver* panel, and select **CRSF** as the *Serial Receiver Provider*. Save the settings.



Receiver panel – Serial (via UART) and CRSF protocol

※ In newer versions of Betaflight Configurator the receiver settings may be on a separate *Receiver* tab. Check the receiver on the *Receiver* tab – the values of the corresponding channels must change when you move the sticks.

5. Binding to the radio

5.1 Traditional binding

According to the manufacturer, the *Binding Phrase* field must be uncommented in *Device options* on the RX for this procedure. If the transmitter and the receiver have the same binding phrase set, they bind automatically and this procedure is not necessary.

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!

5.2 LED indication

LED state	Meaning
quick double blink	receiver is in bind mode
solid light	receiver is bound and connected

Other LED states are described in the ExpressLRS documentation (Chapter 6.3).

5.3 Checks after binding

- On the *Receiver* tab in Betaflight, check that the channels respond to stick and switch movements and are in the correct order.
- Set up and test the failsafe: **with the propellers removed**, switch off the radio and check that the flight controller (FC) enters failsafe.
- Perform a range check before the first flight.

6. Firmware and further documentation

6.1 Receiver firmware

The receiver comes with ExpressLRS firmware. When updating the firmware (for example in ExpressLRS Configurator), select the target **RadioMaster RP4TD Diversity 2400 RX** and the regulatory domain that corresponds to the country of operation (Chapter 2.5). According to the manufacturer, the receiver is also compatible with mLRS.

6.2 WiFi and WebUI

The receiver has built-in WiFi. In the built-in WebUI you can wirelessly upgrade the firmware and configure the receiver from a PC or mobile phone. How to activate WiFi mode is described in the ExpressLRS documentation. After finishing the configuration, exit WiFi mode – it should not be active during flight.

6.3 ExpressLRS and EdgeTX documentation

Detailed procedures (binding phrase, telemetry power setting, firmware updates, Lua script) can be found on the official project websites.

ExpressLRS – official documentation
www.expresslrs.org

EdgeTX – official website – for radios running EdgeTX, in which the ExpressLRS Lua script is run
edgetx.org

7. Radio operation and troubleshooting

7.1 The law of the country of operation applies

Frequency bands and maximum transmit powers are governed by harmonised regulations in the European Union, but national conditions differ from country to country. The information in this chapter describes the situation in the Czech Republic. If you operate the product in another country, you must comply with the regulations of the country in which you use it.

7.2 Frequencies and transmit power

Frequency band	2400–2483 MHz (2.4 GHz ISM band)
Receiver transmissions	telemetry to the radio; built-in WiFi (2.4 GHz) for configuration
Max. telemetry power	20 dBm (100 mW) – manufacturer's data

- In the Czech Republic, the 2400–2483.5 MHz band is used under the general authorisations of the Czech Telecommunication Office: **VO-R/10** (short-range devices, 25 mW e.i.r.p.) and **VO-R/12** (wideband data transmission, 100 mW e.i.r.p.). The e.i.r.p. limit applies to the combination of transmitter and antenna.
- The user is responsible for the transmit power setting. Set the telemetry power so that it does not exceed the limit valid in the country of operation.
- Do not use additional amplifiers or antennas with a higher gain than intended.
- For operation in the EU, use firmware with the EU regulatory domain (LBT) – see Chapter 2.5.

7.3 Troubleshooting

Problem	Possible cause and solution
LED does not light up	Check the 5V and GND connection and that the flight controller (FC) is powered.
Receiver will not bind	The transmitter and receiver firmware do not have the same major version or regulatory domain (FCC / LBT); the binding phrases differ; the receiver is not in bind mode (repeat the procedure in Chapter 5.1).
Bound, but Betaflight shows no channels	TX and RX wires swapped; *Serial RX* not enabled on the correct UART in the *Ports* tab; protocol not set to CRSF.
Short range, signal dropouts	Damaged or incorrectly routed antenna, loose U.FL connector, antennas shielded by carbon or close to the VTX.

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 (RP4TD) is marked on the printed circuit board of the receiver.

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.