ROTORAMA

XR4 Gemini Xrossband

RadioMaster · dual-band ExpressLRS receiver
2.4 GHz / 868 MHz · User manual



Read the entire manual before installation and use, especially the safety instructions and Chapter 2.6 on permitted frequencies.

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 for remote control of RC models and drones and is suitable for experienced users.

- Always install and wire the receiver **with the flight battery disconnected** and the propellers removed.
- Connect power only to an output matching the **5V** pad marking on the receiver. Reverse polarity or connection to a higher voltage may permanently damage the receiver.
- Do not power the receiver without the antennas connected – transmitting telemetry without an antenna can damage the RF circuits.
- The U.FL (IPEX-1) connectors are mechanically fragile. Attach and detach the antennas by pressing/pulling straight, never by levering on the cable.
- Protect the receiver from moisture, dust, conductive debris and mechanical damage. Do not use it if it is visibly damaged.
- Follow safe soldering practice; do not overheat the solder pads.
- Before every flight, check the link with the radio, the function of all control channels and correct failsafe operation (safe behaviour of the model on signal loss).
- Observe the regulations of the country of operation, in particular the rules for unmanned aircraft and the permitted frequency bands and transmit powers (Chapter 2.6).
- The product contains small parts – keep it out of the reach of children and animals.

2. Product description

2.1 Introduction

The RadioMaster XR4 is a true diversity dual-band receiver for the **ExpressLRS** (ELRS) system. It uses two independent Semtech LR1121 RF transceivers and supports both the **2.4 GHz** and **Sub-G 868/915 MHz** bands. Thanks to two separate RF circuits it can operate in Gemini mode (both circuits in the same band) or Gemini Xrossband mode (Gem-X – simultaneous reception in two bands).

The integrated Wi-Fi module simplifies firmware updates and configuration via a web interface (WebUI) on a PC or mobile device. The receiver has a secondary UART port for advanced functionality and castellated pads for easy soldering.

2.2 Specifications

Parameter	Value
Item	XR4 Gemini Xrossband Dual-Band Receiver
MCU	ESP32D4
RF chip	LR1121 × 2
RF connector	IPEX-1 (U.FL) × 2
Antenna	Dual-Band T antenna × 2 (included)
Frequency range	2.4 GHz / Sub-G 900 MHz
Telemetry power	100 mW
Max. receive refresh rate	DK500Hz / K1000Hz
Min. receive refresh rate	50 Hz
Working voltage	DC 5.0–12.6 V
Weight	1.7 g (without antennas)
Dimensions	22 × 18 × 4 mm
Firmware	ExpressLRS (pre-installed)
Firmware target	RadioMaster XR4 2.4/900 Gemini RX
Bus interface 1	CRSF
Bus interface 2	UART

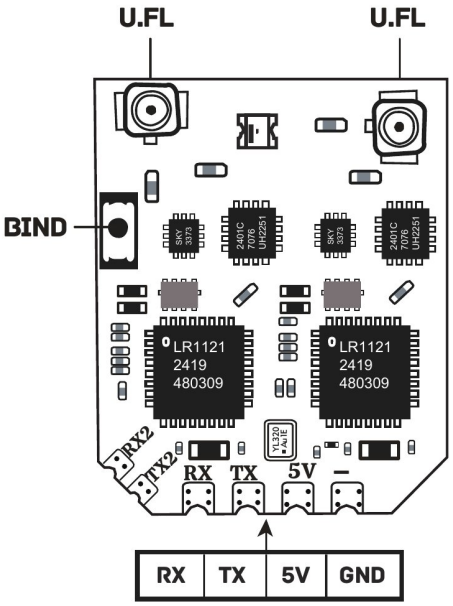
2.3 Package contents

- 1× XR4 Gemini Xrossband Dual-Band Receiver
- 2× Dual-Band T antenna
- 1× CRSF wire
- 3× heat-shrinkable tube
- 1× manual card

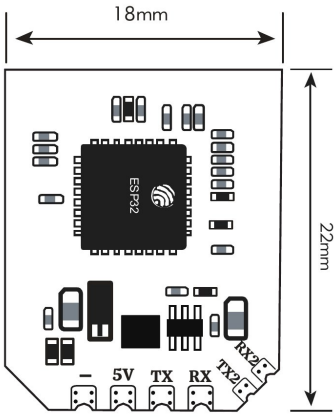
The package does **not** include a radio or ExpressLRS transmitter module, a flight controller (FC) or installation tools.

2.4 Receiver layout

The top side (TOP) carries two U.FL antenna connectors, the BIND button and the main solder pads **RX, TX, 5V and GND (−)**. The pads of the secondary UART port, **RX2 and TX2**, are on the bevelled corners of the board. The ESP32 processor is on the bottom side (BOTTOM).



Top side (TOP): U.FL connectors, BIND button, RX / TX / 5V / GND and RX2 / TX2 pads

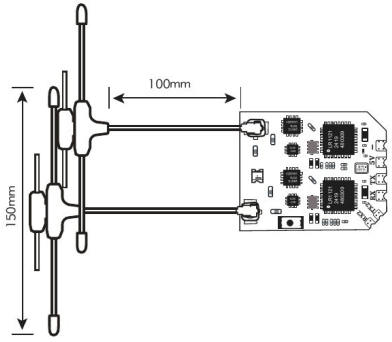


Bottom side (BOTTOM), dimensions 18 × 22 mm

2.5 Operating modes and antennas

Both supplied antennas are dual-band (2.4 GHz and Sub-G 868/915 MHz). Depending on the selected firmware mode, the antenna inputs operate as follows:

Mode	Ant 1	Ant 2
Gemini 2.4 GHz	2.4 GHz	2.4 GHz
Gemini SubG	868/915 MHz	868/915 MHz
Gemini Xrossband (Gem-X)	868/915 MHz	2.4 GHz



Supplied dual-band T antennas (dimensions per manufacturer: 100 mm, 150 mm)

2.6 Radio parameters and operating restrictions

The receiver is radio equipment. It operates in the 2.4 GHz ISM band and in the Sub-G 868/915 MHz band (ExpressLRS) and contains a 2.4 GHz Wi-Fi module for configuration. The manufacturer specifies a maximum telemetry power of **100 mW**.

The manufacturer offers the receiver in **FCC** and **LBT** versions. Limits in the Czech Republic according to the general authorisations of the Czech Telecommunication Office (ČTÚ) at the time of publication:

Band	Max. power	Conditions
2400–2483.5 MHz	100 mW e.i.r.p.	wideband data transmission, VO-R/12
868.0–868.6 MHz	25 mW e.r.p.	1 % duty cycle or spectrum access technique (LBT), VO-R/10
869.4–869.65 MHz	500 mW e.r.p.	10 % duty cycle or LBT, VO-R/10
902–928 MHz (915 MHz)	—	**not permitted** in the Czech Republic and the EU

※ In Europe, use only the 868 MHz band and settings complying with European regulations (LBT). The 915 MHz band (FCC version) must not be used in the Czech Republic or the EU. The user is responsible for the band and telemetry power settings; outside the Czech Republic, the limits of the country of operation apply.

3. Installation

3.1 Connecting to the flight controller

The receiver connects to the flight controller (FC) via a UART serial port using the CRSF protocol. Use the supplied CRSF wire or wires soldered to the pads:

XR4 pad	Connect to flight controller (FC)
5V	5 V output
GND (−)	ground (GND)
TX	RX of the selected UART (e.g. RX2)
RX	TX of the selected UART (e.g. TX2)

- TX and RX are wired **crossed**: receiver TX to FC RX and receiver RX to FC TX.
- The **RX2 / TX2** pads are for the secondary UART port (advanced functionality); they are not used for the standard connection to the FC.
- After soldering, insulate the receiver with the supplied heat-shrinkable tube and mount it so that it cannot move freely and does not touch conductive parts (carbon frame).

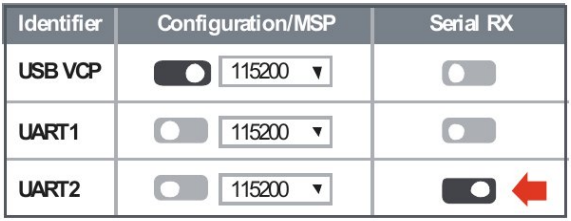
3.2 Mounting the antennas

- Connect the antennas to both U.FL connectors before powering up for the first time.
- Route the active elements of the antennas outside the frame, as far as possible from carbon, metal parts, motors and the video transmitter (VTX).
- For best reception, orient the antennas differently from each other (ideally perpendicular) and secure them so that they cannot reach the propellers.
- Do not kink the antenna coaxial cables at sharp angles and prevent chafing.

4. Betaflight setup

4.1 Ports tab

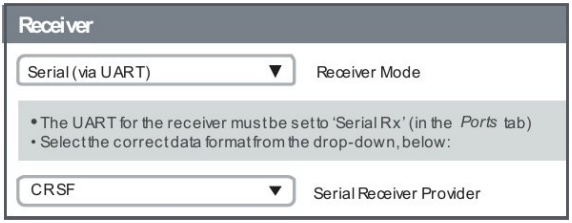
Open *Betaflight Configurator*, go to the *Ports* tab and enable the corresponding UART as a **Serial RX** (e.g. UART2 as shown below). Click *Save and Reboot*.



Ports tab – Serial RX enabled on UART2

4.2 Configuration / Receiver tab

On the *Configuration* tab (on the *Receiver* tab in newer Betaflight versions), click on **Serial-based receiver** (*Serial (via UART)*) on the *Receiver* panel and select **CRSF** as the *Serial Receiver Provider*. Save the settings.



Receiver panel – Serial (via UART), provider CRSF

5. Binding with the radio

5.1 Traditional binding

Requirement: the *Binding Phrase* field must not be active in the receiver settings (*Device options*) – a fixed binding phrase takes precedence over traditional binding.

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 in the ExpressLRS Lua script, which sends out a binding pulse.

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

5.2 Binding with a binding phrase

Alternatively, the same *binding phrase* can be set in the transmitter module and in the receiver (e.g. via the web interface, Chapter 6.2). Devices with the same binding phrase then connect automatically after power-up. A detailed procedure can be found in the guides listed in Chapter 6.3.

※ After binding, always check the function of all channels on the Receiver tab in Betaflight, and set up and test failsafe.

6. Firmware and further guides

6.1 Default firmware

The receiver is supplied with ExpressLRS firmware pre-installed. The firmware target for updates is **RadioMaster XR4 2.4/900 Gemini RX**. The receiver firmware version must be compatible with the firmware of the ExpressLRS transmitter module in the radio.

6.2 Updates and configuration via Wi-Fi

The firmware can be updated and the receiver configured via the integrated Wi-Fi module in the web interface (WebUI) – for example with the *ExpressLRS Configurator* or by uploading the firmware file in a web browser. The receiver's Wi-Fi mode can be enabled from the ExpressLRS Lua script on the radio. Do not interrupt power to the receiver during an update.

6.3 Further guides

Official ExpressLRS documentation: www.expresslrs.org · EdgeTX documentation (radios, Lua scripts): www.edgetx.org

7. Troubleshooting

Problem	Possible cause and solution
LED does not light up	Check the 5V and GND supply and the quality of the solder joints.
Receiver does not bind	Check bind mode (quick double blink), that the binding phrase is disabled in the receiver and that the receiver and transmitter module firmware versions are compatible.
Bound, but Betaflight shows no channels	Check the crossed TX/RX wiring, Serial RX enabled on the correct UART and the CRSF provider.
Short range, dropouts	Check the antenna connection and condition, their placement away from carbon and metal parts, and the selected band and mode.
Receiver Wi-Fi cannot be found	Enable Wi-Fi mode from the Lua script; see the ExpressLRS documentation (Chapter 6.3).

※ If the problem persists, contact the seller (Chapter 8.1).

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 (XR4) is printed on the receiver's circuit board; the firmware version is shown in the receiver's web interface (WebUI) or 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.