RADIOMASTER XR3

Radiomaster XR3 Nano Multi-Frequency ExpressLRS Receiver User Manual

Model: XR3

1. Introduction

The Radiomaster XR3 Nano Multi-Frequency ExpressLRS Receiver is a compact and versatile receiver designed for remote control applications, offering robust signal stability and extended range. It supports both 2.4GHz and Sub-G 900MHz frequency bands, making it suitable for various setups. This manual provides essential information for the proper installation, operation, and maintenance of your XR3 receiver.

Image 1.1: Radiomaster XR3 Nano Multi-Frequency ExpressLRS Receiver with connected dual-band antennas.

2. Safety Information

Please refer to this instruction manual before use. Improper handling or installation may lead to equipment damage or personal injury. Ensure all connections are correct and secure before powering on the device. This product is recommended for users aged 18 years and up.

3. Features

- **Antenna Diversity:** Utilizes two antennas for improved signal stability and extended range, featuring a Skyworks RFX2401C for enhanced receiver performance and telemetry.
- **Multi-Frequency Support:** Operates on both 2.4GHz and Sub-G 900MHz bands.
- **High-Performance MCU:** Equipped with an ESP32C3 microcontroller.
- **Advanced Transceiver:** Features a Semtech LR1121 transceiver.
- **Additional Connectivity:** Includes an additional UART port and secondary port for advanced functionality.
- **Easy Soldering:** Designed with castled pads for convenient soldering.
- **Integrated WiFi:** Built-in WiFi for effortless configuration and firmware updates via an intuitive WebUI.

- **Compact Design:** Ultra-compact dimensions (22mm x 15mm x 4mm) and lightweight (1.3g without antennas).

Image 3.1: Overview of the XR3 receiver highlighting its multi-frequency, antenna diversity, LR1121, and ExpressLRS features.

4. Package Contents

Verify that all items are present in your package:

- 1 * XR3 Nano Multi-Frequency Antenna Diversity ExpressLRS Receiver
- 2 * T Antenna (Either 2.4GHz, 900Mhz, or Dual-band, depending on selected package)
- 1 * CRSF Wire
- 3 * Heat-Shrinkable Tube
- 1 * Manual Card

5. Setup

5.1 Physical Connection

Connect the XR3 receiver to your flight controller or other compatible device using the provided CRSF wire. Ensure correct polarity and pin assignments for 5V, TX (Transmit), and RX (Receive).

- **5V:** Power input (DC 4.5-8.4V)
- **TX:** Telemetry data output from receiver
- **RX:** Control data input to receiver

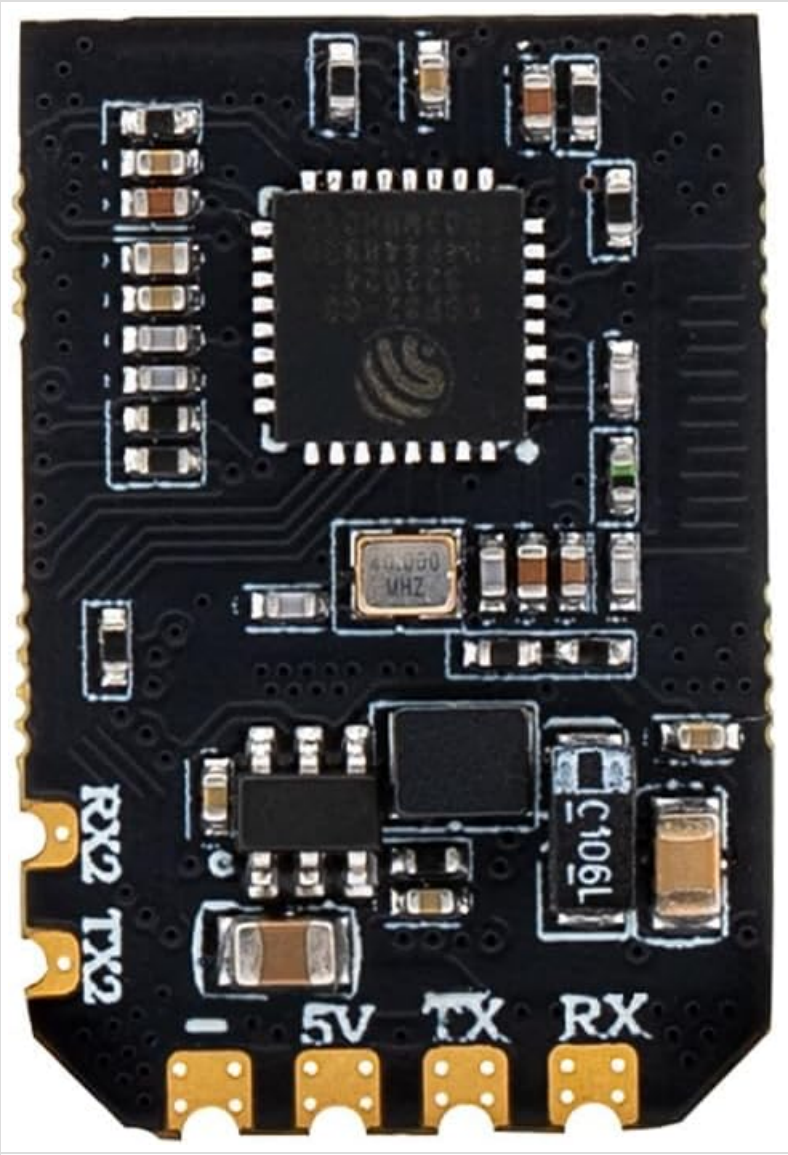

Image 5.1: Close-up view of the XR3 receiver board, indicating the 5V, TX, and RX pads for connection.

5.2 Antenna Installation

Carefully connect the two T-antennas to the IPEX-1 connectors on the receiver board. Ensure they are securely attached. Position the antennas to maximize signal reception, typically at a 90-degree angle to each other for optimal diversity.

5.3 Binding (Pairing)

The XR3 receiver uses the ExpressLRS protocol for binding. Follow these general steps:

1. Power on your receiver three times, cycling power quickly. The LED on the receiver should flash rapidly, indicating it is in bind mode.
2. On your ExpressLRS compatible transmitter, initiate the binding process. Refer to your transmitter's manual for specific instructions.
3. Once bound, the LED on the receiver will turn solid, indicating a successful connection.

Alternatively, the XR3 features a bind button. Press and hold the bind button while powering on the receiver to enter bind mode. The receiver also supports binding via WiFi.

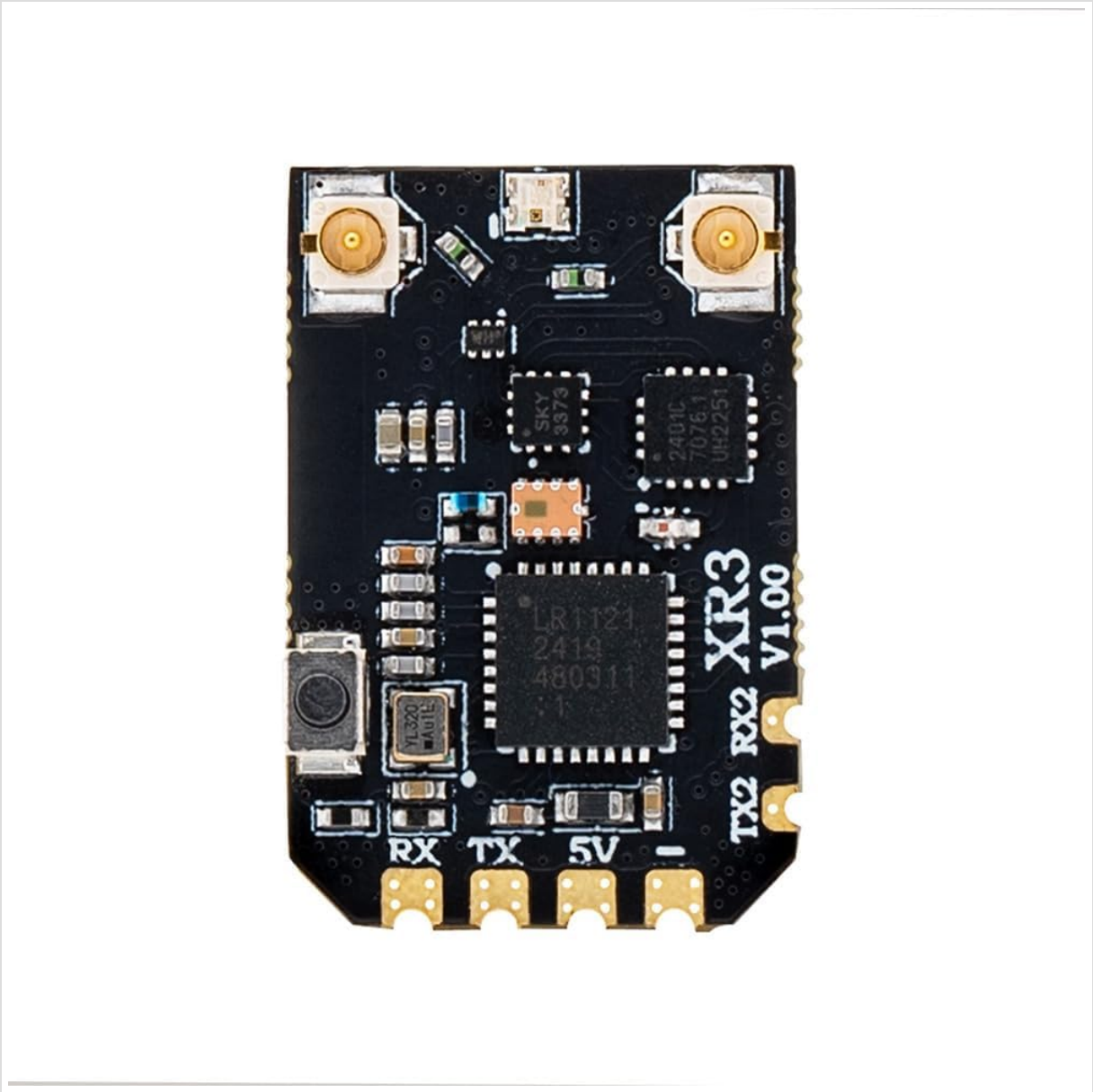

Image 5.2: Top-down view of the XR3 receiver board, showing the location of the bind button.

5.4 Firmware Updates

The XR3 receiver supports firmware updates via its built-in WiFi. Connect to the receiver's WiFi network using a PC or mobile device and access the WebUI to manage settings and update firmware. Ensure you are using the correct firmware target: "RadioMaster XR3 2.4/900 Diversity RX".

6. Operating

6.1 Frequency Selection

The XR3 receiver is capable of operating on either 2.4GHz or Sub-G 900MHz frequencies. The type of antenna included with your package determines the primary operating frequency. If you have a dual-band antenna, the receiver can switch between 2.4GHz and 900MHz without requiring an antenna change. Ensure your transmitter is configured to match the receiver's operating frequency.

Image 6.1: The XR3 receiver supports various antenna types for 2.4GHz, Sub-G 900MHz, or Dual-Band operation.

6.2 ExpressLRS Functionality

Once bound, the XR3 receiver will communicate with your ExpressLRS transmitter, providing control and telemetry data. The antenna diversity feature automatically selects the best signal from the two antennas, enhancing link quality and range, especially in challenging RF environments. The telemetry power output is 100mW.

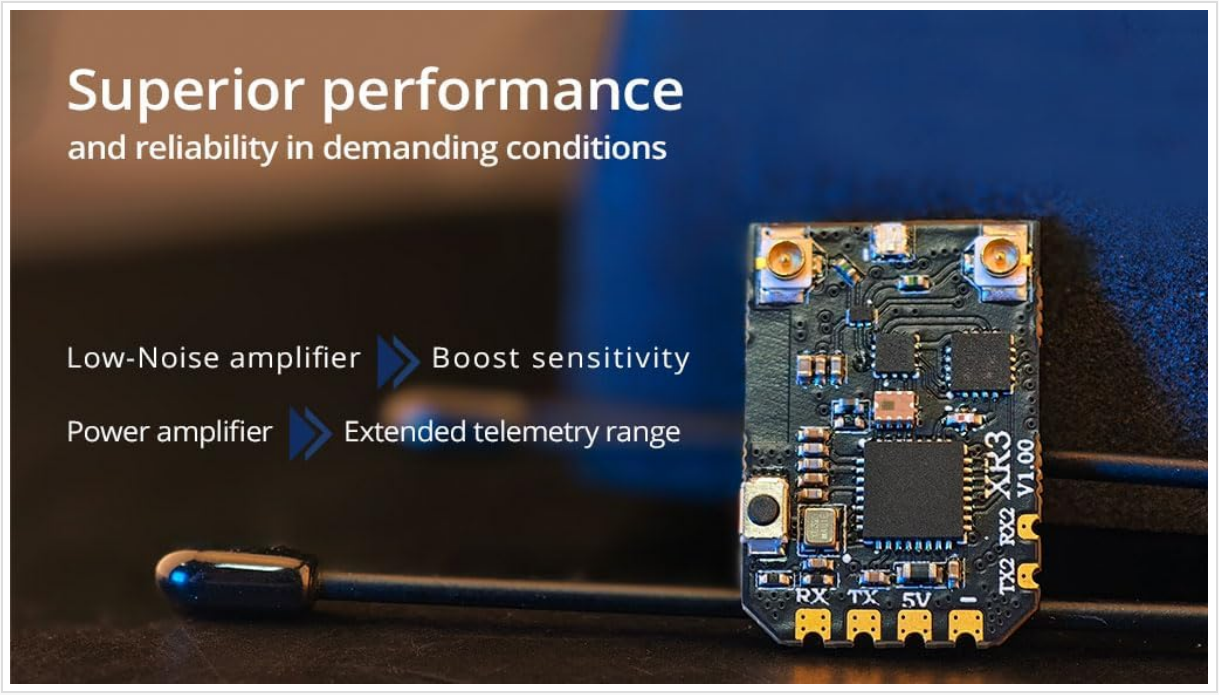

Image 6.2: The XR3 receiver incorporates a Low-Noise amplifier to boost sensitivity and a Power amplifier for extended telemetry range.

7. Maintenance

The XR3 receiver is designed for durability, but proper care can extend its lifespan:

- Keep the receiver clean and free from dust, dirt, and moisture.

- Avoid exposing the receiver to extreme temperatures or direct sunlight for prolonged periods.
- Ensure antenna connections are secure but do not overtighten.
- Regularly check for any visible damage to the board or antennas.

8. Troubleshooting

If you encounter issues with your XR3 receiver, consider the following:

- **No Bind:** Ensure the receiver is in bind mode (rapidly flashing LED) and your transmitter is attempting to bind on the correct ExpressLRS firmware version and frequency. Check power connections.
- **Poor Signal/Range:** Verify antenna connections and positioning. Ensure no obstructions are blocking the signal path. Check for local RF interference. Confirm the correct frequency band (2.4GHz or 900MHz) is selected on both receiver and transmitter.
- **No Telemetry:** Check the TX/RX wiring between the receiver and flight controller. Ensure CRSF protocol is correctly configured in your flight controller and transmitter.
- **Receiver Not Powering On:** Check power supply voltage (DC 4.5-8.4V) and polarity. Inspect for any short circuits or damaged components.

9. Specifications

Specification	Detail
Item	XR3 Nano Multi-Frequency Antenna Diversity ExpressLRS Receiver
Type	ISM2.4, FCC915
MCU	ESP32C3
RF Chip	LR1121
RF Connector	IPEX-1 X 2
Antenna	2x T-Antenna (2.4GHz, 900Mhz, or Dual-band)
Frequency Range	2.4GHz / Sub-G 900MHz
Telemetry Power	100mW
Maximum Receive Refresh Rate	DK500Hz / K1000Hz
Minimum Receiver Refresh Rate	25Hz
Working Voltage	DC 4.5-8.4V
Weight	1.3g (without antenna)
Dimension	22mm * 15mm * 4mm
Firmware Version	ExpressLRS v3.5.1 pre-installed
FW Target	RadioMaster XR3 2.4/900 Diversity RX
Bus Interface 1	CRSF

Bus Interface 2	UART

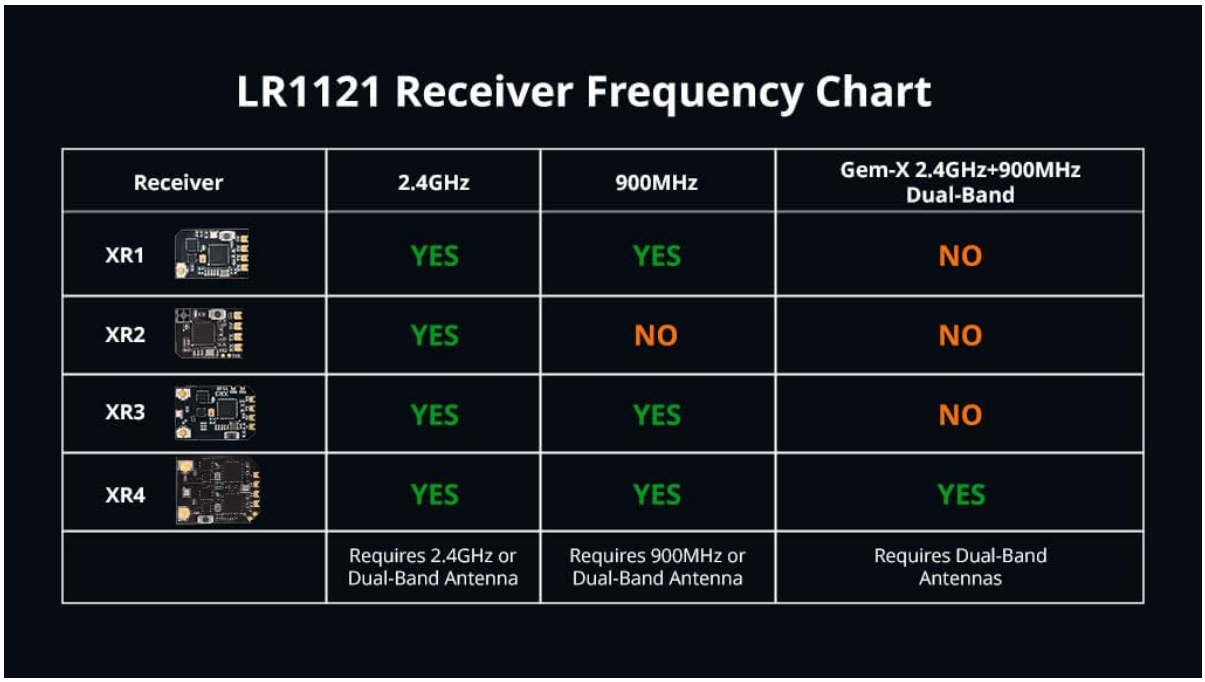

Image 9.1: LR1121 Receiver Frequency Chart, showing compatibility across different XR models.

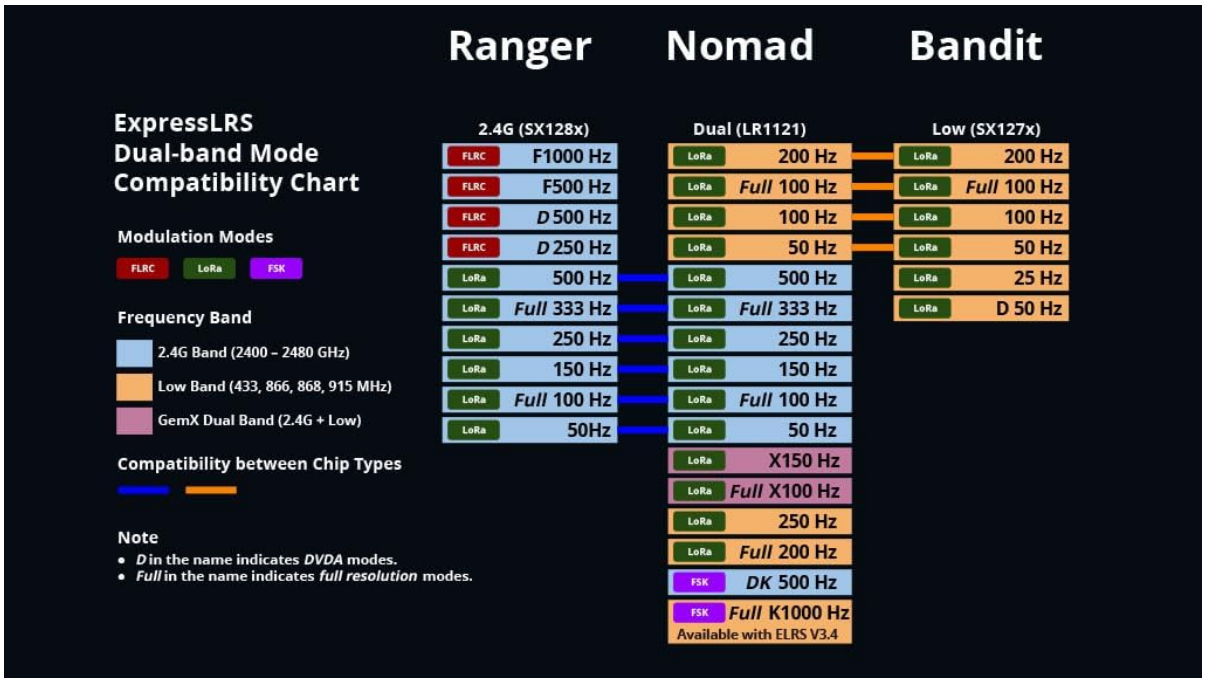

Image 9.2: ExpressLRS Dual-band Mode Compatibility Chart, detailing modulation modes and frequency bands for various modules.

10. Warranty and Support

For warranty information and technical support, please refer to the official Radiomaster website or contact your authorized dealer. Keep your proof of purchase for any warranty claims.