HAPPYMODEL ES900RX

HAPPYMODEL ExpressLRS ES900RX 868MHz Long Range Receiver Module Instruction Manual

1. Introduction

This manual provides detailed instructions for the HAPPYMODEL ExpressLRS ES900RX 868MHz Long Range Receiver Module. The ES900RX is a component of a wireless transmission system developed based on the open-source ExpressLRS software, designed for ultra-long range, stable operation, and low latency in FPV applications.
This module is compatible with most OpenTX remote controllers, including the Radiomaster TX16S and Jumper T12, T16, and T18 series. It is generally plug-and-play with these systems.
Important Note: The ES900RX is a new version of ExpressLRS hardware, replacing the ES915RX due to a shortage of SMT32 chips. ExpressLRS firmware is continuously updated, and it is highly recommended to use the ExpressLRS configurator to update the firmware for optimal performance and access to the latest features.

Image 1: The HAPPYMODEL ExpressLRS ES900RX 868MHz Receiver Module shown with its associated antennas.

2. Setup and Configuration

2.1 Binding Procedure

Follow these steps to bind your ES900RX receiver module to your transmitter:

1. Supply power to the ES900RX. Wait until the red LED on the ES900RX turns off. Immediately disconnect the power.
2. Repeat the above step (power on, wait for LED off, power off) two more times.
3. When the ES900RX is powered on for the third time, the red LED light will begin to double flash quickly. This indicates that the ES900RX has entered binding mode.
4. Insert the ES900TX or ES915TX module into your radio transmitter. Select 'External RF mode' and set it to 'CRSF protocol'.
5. Navigate to the ELRS menu within your radio's system settings. Select and press the 'Bind' option.
6. The red LED on the ES900RX module will turn off, then start blinking slowly, and finally become solid. This sequence confirms a successful binding.

2.2 Firmware Update by Wi-Fi

The ES900RX supports firmware updates via Wi-Fi. Follow these steps:

1. Place the ES900RX into binding mode (as described in step 1-3 of the binding procedure).
2. Wait approximately 1 minute without attempting to bind. The ES900RX will automatically enter Wi-Fi mode.
3. On your computer or mobile device, connect to the Wi-Fi hotspot named 'ExpressLRS RX'. The password is 'expresslrs'.
4. Open a web browser and navigate to the firmware update website by entering '10.0.0.1' in the address bar.
5. On the webpage, choose the correct firmware file for your ES900RX and click 'update'.
6. Allow 1 to 2 minutes for the update process to complete. A message indicating 'firmware update successful and reboot' will confirm the update is finished.

Image 2: Visual comparison highlighting the differences between the older ES915RX and the newer ES900RX receiver modules.

3. Operating Instructions

Once the ES900RX module is successfully bound to your ES900TX or ES915TX transmitter module, it will establish a reliable long-range control link for your FPV drone. Ensure your flight controller is configured to receive CRSF protocol input from the receiver.
For detailed operation of the ExpressLRS system, refer to the official ExpressLRS documentation and your specific flight controller's manual for integration and configuration.

4. Maintenance

Regular maintenance for your ES900RX module primarily involves keeping its firmware updated. As the ExpressLRS project is actively developed, new features, performance improvements, and bug fixes are frequently released.

- **Firmware Updates:** Periodically check the official ExpressLRS project for new firmware releases. Use the ExpressLRS configurator or the Wi-Fi update procedure detailed in Section 2.2 to keep your module's firmware current.
- **Physical Inspection:** Regularly inspect the module and antenna connections for any signs of damage or wear. Ensure the antenna is securely connected to the IPEX1 connector.

5. Troubleshooting

If you encounter issues with your ES900RX module, consider the following:

- **Binding Issues:** Ensure the binding procedure (Section 2.1) is followed precisely. Verify that your transmitter module (ES900TX/ES915TX) is also running compatible ExpressLRS firmware.
- **No Link/Poor Range:** Confirm both the transmitter and receiver have the correct firmware version for your region (e.g., 868MHz for EU). Check antenna connections on both the TX and RX modules. Ensure no obstructions are blocking the signal path.
- **Firmware Update Failure:** Double-check the Wi-Fi password ('expresslrs') and the IP address ('10.0.0.1'). Ensure the correct firmware file is selected for your specific module. Try a different device or browser for the update.
- **Incompatible Firmware:** Always ensure that the firmware on your ES900TX/ES915TX and ES900RX modules are from the same major ExpressLRS version to ensure compatibility.

6. Specifications

6.1 ES900RX Receiver Module

- **MCU:** ESP8285
- **VCC Input:** 5V
- **Operation Current:** ~100mA
- **Rx To FC Protocol:** CRSF
- **RF Frequency:** 868MHz (EU)
- **Dimension:** 12mm x 12mm x 3mm
- **Weight:** 0.60 gram (excluding antenna)
- **Antenna Connector:** IPEX1
- **Telemetry Output Power:** <17dBm

Image 3: A detailed close-up view of the compact HAPPYMODEL ES900RX Receiver Module.

6.2 ES900TX Transmitter Module (for reference)

While this manual focuses on the ES900RX, the ES900TX is its companion transmitter module. Its specifications are provided for context:

- **MCU:** ESP32+ESP8285
- **Dimension:** 55mm x 39mm x 11mm
- **Weight:** 9.2 gram (module only)
- **Antenna Connector:** SMA
- **VCC Input:** 5~13V (Recommended 5~9V)
- **RF Frequency:** 915MHz (default, other frequencies optional)
- **Maximum Output Power:** <33dBm (For operation above 27dBm, a fan for forced cooling is recommended)
- **Firmware Update:** Wi-Fi update function available in v1.0.0 firmware and later.

7. Warranty and Support

Specific warranty information for the HAPPYMODEL ExpressLRS ES900RX module is not provided within the product details. For warranty claims, technical support, or further assistance, please contact your retailer or the manufacturer directly.