PR02

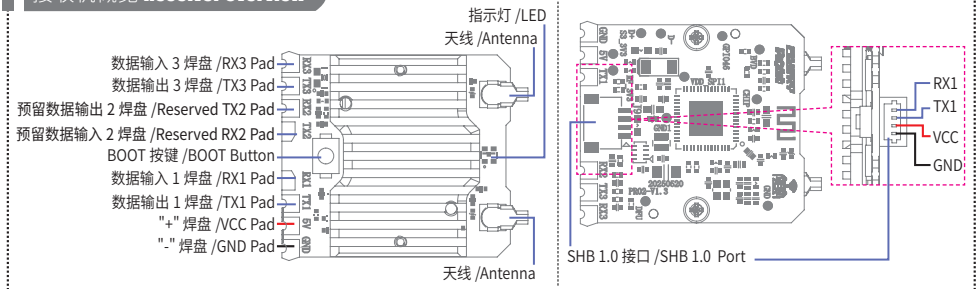
接收机 Receiver

产品介绍 Introduction

PR02 是一款基于 ExpressLRS 协议的 16 通道微型接收机。它配备了两个 T 型扣式天线，支持真分集模式与双子星模式，支持双向通信。它可以输出 CRSF 或 S.BUS 信号，内置双温补晶振（TCXO），适用于固定翼和穿越机等模型；此外，它还能灵活配置为发射模块使用。

The PR02 is a 16-channel ExpressLRS micro receiver featuring two T-shaped button antennas. It supports True Diversity and Gemini modes, and offers bidirectional communication. Outputting either CRSF or S.BUS signals, it includes two TCXOs and is designed for fixed-wing aircraft, racing drones, and other RC models. Additionally, it can be configured as a RF module.

接收机概览 Receiver Overview



产品规格 Product Specifications

- 产品型号：PR02
- 适配发射机：支持所有 ELRS 协议的发射机和高频头
- 适配模型：穿越机、固定翼、滑翔机、直升机、车、船、机器人等
- 通道个数：16
- 发射功率：<20dBm
- 无线频率：2.4GHz ISM
- 无线协议：ExpressLRS
- 传输模式：天线分集 / 真分集 / 双子星模式
- 天线类型：T 型双天线
- 工作电压：4.5~12.6V/DC
- 数据：CRSF/S.BUS
- 支持最大刷新率： 500Hz/F1000Hz/D500Hz
- 支持最小刷新率：50Hz
- 温度范围：-10°C～ +60°C
- 湿度范围：20% ～ 95%
- 固件更新：支持 Wi-Fi 无线更新或串口有线更新
- 外形尺寸：23.0*26.0*8.2mm
- 机身重量：4.55g（不带天线）
- 认证：CE，FCC ID: 2A2UNPR020

- Product Model: PR02
- Compatible Transmitters: Compatible with all ELRS protocol transmitters and RF modules
- Compatible RC Models: Racing drones, fixed-wing aircraft, gliders, helicopters, cars, boats, robots, and etc.
- Number of Channels: 16
- Maximum Power: <20dBm (e.i.r.p.) (EU)
- RF: 2.4GHz ISM
- RF Protocol: ExpressLRS
- Transmission Mode: Antenna Diversity, True Diversity, Gemini
- Antenna: Two T-shaped Antennas
- Operating Voltage: 4.5~12.6V/DC
- Data: CRSF, S.BUS
- Max Refresh Rate: 500Hz/F1000Hz/D500Hz
- Min Refresh Rate: 50Hz
- Temperature Range: -10°C～ +60°C
- Humidity Range: 20% ～ 95%
- Firmware Update: Supports Wi-Fi update or wired serial update
- Dimensions: 23.0*26.0*8.2mm
- Weight: 4.55g (without antennas)
- Certification: CE, FCC ID: 2A2UNPR020

指示灯状态 LED STATUS

接收机状态指示灯用于指示接收机的电源及工作状态。

- 指示灯灭：接收机电源未接通
- 指示灯橙色两闪一灭：接收机处于对码状态中
- 指示灯常亮：已连接发射机
- 指示灯慢闪：等待与发射机建立连接
- 指示灯红色快闪： 接收机未检测到 RF 芯片
- 指示灯绿色和橙色交替循环快闪：接收机进入 Wi-Fi 模式
- 指示灯橙色三闪一灭：已连接发射机，但模型不匹配

The status LED indicates power and operational states of the receiver:

- Off: The receiver is not powered on.
- Two-flash-one-off in Orange: The receiver is in the binding mode.
- Solid On: The receiver is connected to a transmitter.
- Slow Flashing: The receiver is attempting to establish a connection with the transmitter.
- Fast Flashing in Red : The receiver detects no RF chip.
- Alternating Rapid Flashing Between Green and Orange: The receiver enters Wi-Fi mode.
- Three-flash-one-off in Orange: The receiver is connected to a transmitter but has a mismatched model-match configuration.

对码 Binding

PR02 接收机支持与 ELRS 协议的发射机和高频头对码，对码步骤如下所述。

1. 关闭发射机，以 PA01（ELRS 版本固件）为例；
2. 使接收机进入对码状态：
   接收机连续三次上电且上电时间间隔必须≤ 1 秒，即：

Binding the PR02 receiver to an ExpressLRS transmitter or RF module:

1. Turn off the transmitter (for example, using PA01 with ELRS firmware).
2. Put the receiver into binding mode.
   Power cycle the receiver 3 times rapidly (each cycle ≤ 1 second):
   - Power on the receiver (LED lights up).

ExpressLRS

对码 Binding

- 给接收机供电 （LED 亮起）；
- 在 1 秒内断电；
- 重复上述步骤 2 次（每次间隔≤ 1 秒）；
- 当接收机指示灯为两闪一灭（橙色），表示已进入对码状态。

3. 打开发射机，使发射机进入对码状态：
   - 通过主界面 >[系统设置]>[硬件]>[内置发射机]，设置模式为 [CRSF]；
   - 进入 [系统设置]>[拓展工具]>[ExpressLRS], 选择 [Bind]，使发射机进入对码状态。
4. 接收机 LED 灯变为常亮，即对码成功；
5. 检查发射机、接收机是否正常工作。如需重新对码，请重复以上步骤。

本接收机也支持对码密钥对码，对码密钥通过接收机进入 Wi-Fi 模式后连接 ELRS 网页设置，可以是任意 8 个字符组合，但须确保发射机 (高频头) 和接收机的对码密钥一致。

注：推荐发射机与接收机对码采用对码密钥对码方式。所有设置为同一对码密钥的接收机，通电后都会与同一对码密钥的发射机自动连接，不要将多台同一对码密钥的接收机一起通电，以避免发生危险。

以通过 Wi-Fi 设置对码密钥为例（更多方法请参阅 ELRS 官网），步骤如下：

1. 设置接收机对码密钥：
   - 接收机通电并保持未连接发射机状态等待 60 秒后，LED 由慢闪变为绿色和橙色交替循环快闪即进入 Wi-Fi 模式；
   - 手机端连接 Wi-Fi：Wi-Fi 名称 : ExpressLRS RX；Wi-Fi 密码 : expresslrs；
   - 连接成功后，将自动跳转页面，选择“MODEL”后，在“Binding Phrase”输入要设置的对码密钥。
   - 点击 "SAVE”后，弹出界面提示，按照提示点击“OK”即可。
   - 将接收机重启退出 Wi-Fi 模式。
2. 设置发射机对码密钥，以 PA01(ELRS 版本固件) 为例：
   - 发射机端，进入 [系统设置]>[拓展工具]>[ExpressLRS]>[WiFi Connectivity]，选择 [Enable WiFi]，使发射机进入 Wi-Fi 模式；
   - 手机端重新连接发射机 Wi-Fi：Wi-Fi 名称 : ExpressLRS TX；Wi-Fi 密码 : expresslrs；
   - 连接成功后，将自动跳转页面，选择“MODEL”后，在“Binding Phrase”输入相同的对码密钥。
   - 点击“SAVE”后，弹出界面提示，按照提示点击“REBOOT”，发射机即退出 Wi-Fi 模式。
3. 发射机与接收机会自动连接上。此时接收机 LED 常亮。

- Power it off within 1 second.
- Repeat the above cycle two more times, for a total of three cycles, each interval ≤ 1 second.
- Once the LED operates in an orange two-flash-one-off state repeatedly, the receiver will enter the binding mode.

3. Turn on the transmitter and put it into binding mode.
   - Main interface > [System Setup] > [Hardware] > [Internal RF] > set mode to CRSF.
   - [System Setup] > [Tools] > [ExpressLRS] > select Bind
4. When the receiver LED turns solid on, binding is successful.
5. Confirm that the transmitter and the receiver are operating correctly; if not, repeat the steps above.

This receiver also supports BINDING PHRASE binding. When the receiver enters Wi-Fi mode and connects to the ELRS web interface, the BINDING PHRASE can be set through it. It can be any combination of 8 characters, but you must ensure that the BINDING PHRASE on the transmitter /RF module and the receiver are the same.

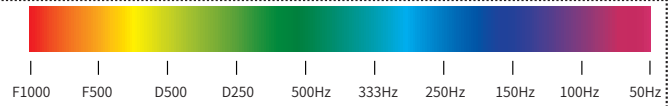
Note: It is recommended to use BINDING PHRASE binding way for the transmitter and the receiver. All receivers with the same BINDING PHRASE will automatically connect to the transmitter with the same BINDING PHRASE upon power-on. Do not power on multiple receivers with the same BINDING PHRASE at the same time to avoid potential hazards.

Here are the steps for setting up a BINDING PHRASE via Wi-Fi (for more methods, please refer to the ELRS official website).

1. Setting the Receiver BINDING PHRASE:
   - With the receiver powered on and left unconnected from the transmitter for 60 seconds. The LED will change from slow flashing to alternating rapid flashing between green and orange, indicating that the receiver has entered Wi-Fi mode.
   - On your smartphone, connect to the Wi-Fi network named "ExpressLRS RX" with the password "expresslrs".
   - After a successful connection, the webpage will automatically redirect. Select "MODEL", and then enter the desired BINDING PHRASE in the "Binding Phrase" field.
   - Click "SAVE". A prompt will appear; follow the prompt and click "OK".
   - Restart the receiver to exit Wi-Fi mode.
2. Setting the Transmitter BINDING PHRASE (for example, using PA01 with ELRS firmware):
   - On the transmitter, navigate to [System Setup] > [Tools] > [ExpressLRS] > [WiFi Connectivity] and select [Enable WiFi] to put the transmitter into Wi-Fi mode.
   - On your smartphone, reconnect to the transmitter's Wi-Fi network named "ExpressLRS TX" with the password "expresslrs".
   - After a successful connection, the webpage will automatically redirect. Select "MODEL", and then enter the same BINDING PHRASE in the "Binding Phrase" field.
   - Click "SAVE". A prompt will appear; follow the instructions and click "REBOOT". The transmitter will then exit Wi-Fi mode.
3. Then the transmitter and the receiver will automatically connect. At this point, the receiver's LED will remain solid on.

高频刷新率 RF PACKRET RATE

PR02 接收机 LED 指示灯可以显示发射机端当前所设置的刷新率，不同刷新率对应不同颜色，如右图所示：



The status LED of the PR02 receiver indicates the transmitter's Packet rate configured via color codes, as shown in the figure.

安装相关 Installation

注意： 为确保最佳信号接收效果，请将接收机天线面朝向发射机方向，并远离导电材料（如金属棒、碳物质等）。同时，天线与导电材料之间应保持至少 1 厘米的距离，以避免干扰正常工作。

将接收机焊盘与线缆焊接完成后，用热缩套管包裹接收机，确保电气绝缘。

使用 3M 双面胶将接收机固件在模型合适位置（如穿越机碳板）；也可使用扎带将其固定在模型上，注意力度需适中，避免扎带勒坏产品。

安装相关 Installation

Note: For optimal signal reception: Point the receiver antenna directly toward the transmitter and keep it away from conductive materials (such as metal rods, carbon materials, etc.). Additionally, maintain a minimum 1 cm gap between the antenna and conductive objects to prevent interference.

After soldering wires to the receiver pads, cover the receiver with heat shrink tubing to ensure electrical insulation.

Secure the receiver to a suitable location (e.g., carbon fiber plate on an racing drone) using 3M tape for vibration-resistant attachment. Alternatively, you can use a cable tie to fasten it to the model, ensure that the force applied is controlled to avoid damaging the receiver or the model.

数据输出接口介绍 Description of the TX Interface

出厂默认配置：TX1 输出 CRSF； TX3 默认无输出；SHB1.0 接口共用 RX1/TX1 串口；而 TX2 为预留数据输出接口。

可在发射机端设置输出为 S.BUS（发射机与接收机对码完成后，通过 [系统设置]>[拓展工具]>[ExpressLRS]>[Other Devices]> [Protocol]/[Protocol2]）设置。

Default factory settings: TX1 outputs CRSF; TX3 has no output by default; the SHB1.0 interface shares the RX1/TX1 serial port. TX2 is reserved for data output.

It can be set to output S.BUS. After the transmitter and receiver binding is completed, navigate to [System Setup] > [Tools] > [ExpressLRS] > [Other Devices] > [Protocol] / [Protocol2] to configure it.

功能介绍 Function Description

本接收机与发射机完成对码后，可通过发射机端的 Lua 脚本菜单配置接收机相关功能参数。可设置 [刷新率]、[回传比]、[开关模式]、[接收机模式]、[连接模式]、[模型匹配]、[图传管理]、[其他设备]（串口输出协议）等。

本接收机支持 True Diversity 真分集模式与 Gemini 双子星模式。

- True Diversity 真分集模式：接收机双路射频芯片同频工作。智能选择信号质量最佳的一路传输，确保最优接收效果。双天线，双芯片配置有效避免天线死区，提供稳定可靠的信号接收。
- Gemini 双子星模式：接收机与高频头双路射频芯片异频工作，数据包在两个独立频率上传输，显著增强抗干扰性能，提升连接质量。双子星模式为用户提供更稳定、可靠的通信链路。注意本模式需搭配支持双子星模式的高频头一起使用。

当刷新率设置为 D250 或 D500 时，数据传输将自动切换支持 DVDA 模式，在这种模式下，数据包会被反复多次传输，当 DVDA 模式与双子星模式同时开启时数据包的冗余度加倍，在不同频率下实现发送多个重复数据包，增强数据传输的可靠性和稳定性详细功能介绍参见电子说明书）。

本接收机还支持配置为发射模块使用（相关介绍参见电子说明书）。

After the receiver and the transmitter are bound, you can configure receiver's parameters via the Lua script menu on the transmitter. Available settings include: [Packet Rate], [Telem Ratio], [Switch Mode], [RX Mode], [Link Mode], [Model Match], [>VTX Administrator], [Other Device] (Serial Protocol), etc.

This receiver supports True Diversity mode and Gemini mode.

- True Diversity Mode: The receiver's dual RF chips operate on the same frequency. It intelligently selects the best signal quality for transmission, ensuring optimal reception. The dual-antenna, dual-chip configuration effectively avoids antenna dead zones and provides stable and reliable signal reception.
- Gemini Mode: The dual RF chips in the receiver and transmitter (RF module) operate on different frequencies. Data packets are transmitted simultaneously over these two independent frequencys, significantly enhancing resistance to interference and improving overall connection quality. This mode provides a more stable and reliable communication link. Note: Gemini mode requires a transmitter module that also supports Gemini.

When the packet rate is set to D250 or D500, the system automatically enables DVDA mode. In this mode, data packets are transmitted multiple times for redundancy. When DVDA is used in conjunction with Gemini mode, packet redundancy is doubled, as packets are repeated across two different frequencies. This combination maximizes the reliability and stability of the data link. (For detailed functionality, please refer to e-manual.)

This receiver also supports being configured as a RF module (for details, refer to the e-manual).

固件更新 Firmware Update

接收机固件支持有多种更新方式，具体可查询 ELRS 官网，本说明书仅介绍通过 Wi-Fi 模式无线更新或通过串口有线更新：

注 : 刷写过程中，请耐心等待，请勿断电或中断操作。

通过 Wi-Fi 模式更新

可以通过有 Wi-Fi 模块的电脑或手机来完成更新。

以与手机刷写固件为例：

1. 请先将从 ELRS 官网下载的当前版本固件（.bin 格式）保存到手机里；
2. 接收机通电等待 60 秒后，LED 由慢闪变为绿色和橙色交替循环快闪即进入 Wi-Fi 模式；
3. 手机端连接 Wi-Fi：Wi-Fi 名称 : ExpressLRS RX；Wi-Fi 密码 : expresslrs
4. 连接成功后，将自动跳转页面，选择“UPDATE”；
5. 点击“SELECT FIRMWARE FILE”找到当前固件，点击“完成”即开始刷写固件（自动上传并刷写）；

The receiver's firmware supports multiple update methods. For the detailed, please visit the ELRS official website. This manual covers only the following two: wireless update via Wi-Fi mode and wired update via a serial port:

Note: Do not power-cycle or interrupt the process while flashing.

Updating via Wi-Fi Mode

Use a computer or smartphone that has Wi-Fi capability.

Example steps for a phone:

1. Download the latest firmware file (.bin) from the ELRS official website and save it to the phone.
2. Power on the receiver and wait for 60 seconds. The LED will change from slow flashing to alternating rapid flashing between green and orange, indicating it has entered Wi-Fi mode.
3. On your smartphone, connect to the Wi-Fi network named "ExpressLRS RX" with the password "expresslrs".
4. Once connected, the browser will automatically redirect to a page. Then select "UPDATE".
5. Click "SELECT FIRMWARE FILE", locate the firmware file, and tap "Done" to start the firmware upload and flashing process (automatic).
6. After a successful update, the message "Update Succeeded" will appear.

固件更新 Firmware Update

6. 刷写成功后，将提示“Update Succeeded”，点击“OK”即完成。随后接收机将自动重启。

通过串口有线更新固件

按住 BOOT 按键并给接收机通电，使接收机进入串口更新模式（UART 刷写方式），然后，通过串口转 USB 模块将接收机连接至电脑，进行固件更新（详情参见电子说明书）。

Click "OK" to complete the process. The receiver will then reboot automatically.

Updating via Wired Serial Port

Hold the BOOT button during power-up to put the receiver into UART flash mode. The firmware can then be updated by connecting the device to a computer via a USB-to-serial module. (see the e-manual for full details).

注意事项：

- 使用前必须确保本产品与模型安装正确，否则可能导致模型发生严重损坏。
- 为了一切正常，请养成先开发射机再接收机通电以及先接收机断电再关闭发射机的习惯。
- 确保接收机安装在远离电机，电子调速器或电子噪声过多的区域。
- 接收机天线需远离导电材料，例如金属棒和碳物质。为了避免影响正常工作，请确保接收机天线和导电材料之间至少有 1 厘米以上的距离。
- 准备过程中，请勿连接接收机电源，避免造成不必要的损失。

Attention:

- Make sure the product is installed and calibrated correctly, failure to do so may result in serious injury.
- Normally, you must power on the transmitter and then receiver, and power off the receiver and then the transmitter.
- Make sure the receiver is mounted away from motors, electronic speed controllers or any device that emits excessive electrical noise.
- Keep the receiver's antenna at least 1cm away from conductive materials such as carbon or metal.
- Do not power on the receiver during the setup process to prevent loss of control.

认证相关 Certification

FCC Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Warning: changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.
If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-- Reorient or relocate the receiving antenna.
-- Increase the separation between the equipment and receiver.
-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-- Consult the dealer or an experienced radio/TV technician for help.

EU DoC Declaration

Hereby, [ShenZhen FLYSKY Technology Co., Ltd.] declares that the Radio Equipment [PR02] is in compliance with RED 2014/53/EU.
The full text of the EU DoC is available at the following internet address: www.flyskytech.com/info_detail/10.html

RF Exposure Compliance

This equipment complies with FCC/ISED RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

Environmentally friendly disposal

Old electrical appliances must not be disposed of together with the residual waste, but have to be disposed of separately. The disposal at the communal collecting point via private persons is for free. The owner of old appliances is responsible to bring the appliances to these collecting points or to similar collection points. With this little personal effort, you contribute to recycle valuable raw materials and the treatment of toxic substances.

微信公众号 Bilibili Website Facebook

FCC ID: 2A2UNPR020

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