

FRM303

2.4GHz MODULE

产品说明书



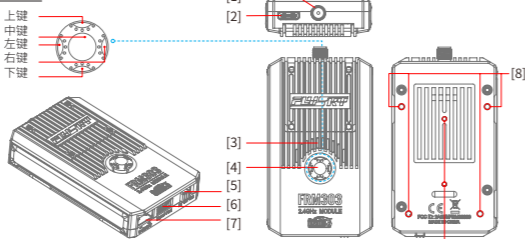
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产品介绍

FRM303 是一款搭载 AFHDS 3 (第三代自动跳频数字系统) 协议集多功能于一身的高性能高频头。外置可更换天线、支持双向传输、三种供电方式、外部供电时支持电压报警功能、支持输入 PPM、S.BUS 和 UART 信号。在 PPM 和 S.BUS 信号下, 支持设置对码、模型切换 (自动搜索接收机)、接收机接口协议设置及失控保护等功能。

产品概述

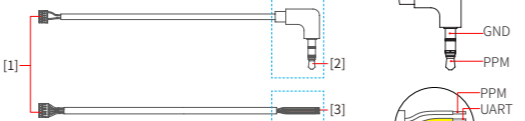
FRM303 高频头



- [1] SMA 天线接头
- [2] Type-C USB 接口
- [3] 指示灯
- [4] 五向按键
- [5] 三档电源切换开关 (Int/Off/Ext)
- [6] 信号接口
- [7] XT30 供电接口 (Ext)
- [8] 转接座定位孔
- [9] 固定转接座螺丝孔 (M2)

两款可接 FRM303 信号接口的转接线

注: 此两款转接线为本版本出厂附属附件。



- [1] 接 FRM303 高频头信号接口
- [2] 3.5MM 音频头接口 (FS-XC503 转接线)
- [3] DIV 接口 (FS-XC505 转接线)

产品规格

- 产品型号: FRM303
- 适配设备: 可输出标准 PPM 设备, 如 FS-TH9X、FS-ST8、FTr8B 接收机 (PPM); 可输出标准 S.BUS 设备, 如: FS-ST8、FTr8B 接收机 (S.BUS); 或 P.L18 (闭源协议-1.5M UART 信号); 或 EL18 (开源协议-1.5M UART 信号) 及可输出开源协议-115200 UART 信号设备
- 适配模型: 固定翼、穿越机或中継等
- 通道个数: 18
- 通道分辨率: 4096
- 无线频率: 2.4GHz ISM
- 无线协议: AFHDS 3
- 发射功率: <20dBm
- 遥控距离: > 3500 米 (空旷无干扰空中距离)
- 天线类型: 外置 SMA 单天线 (接头外螺内针)
- 输入电源: XT30 接口: 5-28V/DC 信号接口供电: 5-10V/DC USB 供电: 4.5-5.5V/DC
- 数据输出: PPM、UART 和 S.BUS
- 温度范围: -10°C ~ +60°C
- 湿度范围: 20% ~ 95%
- 固件更新: 支持
- 外形尺寸: 75*44*15.5mm (不含天线)
- 机身重量: 65g (不含天线及转接座)
- 认证: CE, FCC ID: 2A2UNFRM3030

基本功能

开关及按键介绍

三档电源开关 可通过此开关切换高频头供电方式: 内部供电 (Int)、关闭电源 (Off) 和外部供电 (Ext)。通过 XT30 接口实现外部供电。

五向按键 包含上键、下键、左键、右键和中键。

五向按键的功能如下所述, 请注意在输入信号识别为串口信号时无效。

- 上键功能: 强制更新、输入信号设置
 - 中键功能: RF 系统切换、对码设置
 - 右键功能: RF 模型切换、自动搜索接收机
 - 左键功能: RX 接口协议设置
 - 下键功能: 恢复出厂默认设置、失控保护
- 上键和下键切换选项; 右键确认选项; 左键退出选项。

注: 按键操作, 滴一声响起表示动作有效, 按键操作不循环。

高频头供电

高频头可通过 Type-C 接口供电及内部供电或 XT-30 外部供电三种方式供电。

- 通过 Type-C 接口供电为第一优先级。当通过 Type-C 接口供电时, 无论内部或外部是否供电, 切换供电开关都不会关闭高频头。
- 未通过 Type-C 接口供电而通过内部或外部同时供电时, 切换供电开关, 高频头会重启。

⚠ 当远离遥控设备时, 请勿采用 Type-C 接口为高频头供电, 以免设备失控。因高频头采用 Type-C 接口供电时, 为避免所接设备的 USB 接口损坏, 高频头会自动降低输出功率。功率降低后, 遥控距离会缩短。

外部电压报警

当高频头长时间通过 XT-30 接口连接锂电池供电时, 本高频头提供了电压报警功能, 以提醒您及时更换电池。当高频头上电后, 系统自动检测供电电压, 根据电压判断断电池节数及报警电压值, 当系统检测到电池电压低于相应的报警值后, 即发出报警提示。具体如下表所示。

| 检测电压 | 识别电池节数 | 报警电压值 |
|------------------|--------|---------|
| ≤ 6V | 1S 锂电池 | < 3.65V |
| >6V 且 ≤ 9V | 2S 锂电池 | < 7.3V |
| >9V 且 ≤ 13.5V | 3S 锂电池 | < 11V |
| >13.5V 且 ≤ 17.6V | 4S 锂电池 | < 14.5V |
| >17.6V 且 ≤ 21.3V | 5S 锂电池 | < 18.2V |
| >21.3V | 6S 锂电池 | < 22V |

高温报警

高频头因使用环境或长时间工作可能会导致高频头温度升高, 当系统检测到其内部温度 > 60°C 时, 即发出报警提示。若此时所控模型正在空中时, 请即控制返航后, 关闭高频头待冷却后继续使用。

低信号报警

当系统检测到接收的信号强度值低于预设值时, 系统即

发出报警提示。

固件更新

本高频头可通过 Type-C 接口与 PC 连接, 通过高频头遥控管家更新固件。更新过程中灯闪烁的状态 (具体如下表所示), 更新步骤如下:

- PC 端, 下载最新的高频头遥控管家 (V3.0.4 以上版本) 固件后并将其打开;
- 使用 Type-C 线将高频头与 PC 连接后, 通过高频头遥控管家完成更新。

| 颜色 | 状态 | 对应的高频头状态 |
|----|--------------|---------------|
| 红色 | 2 闪 1 灭 | 等待固件升级或强制更新状态 |
| 红色 | 3 闪 1 灭 (快闪) | 正在升级接收机固件 |
| 黄色 | 3 闪 1 灭 (快闪) | 正在升级高频头固件 |

若无法通过以上步骤更新 RF 固件, 则需通过以下步骤将其进入强制更新状态后, 再通过固件更新的步骤来完成更新。步骤如下:

上推上键上电且上推时间 > 9S 后, 红色指示灯 2 闪 1 灭, 即进入强制更新状态。

恢复出厂设置状态

将高频头恢复到出厂默认状态。设置步骤如下:

长按 (或下推) 下键上电 > 3S 即完成, 此时红色指示灯常亮, 之后高频头处于输入信号识别状态 (指示灯红色且亮 2S 灭 3S)。

输入信号设置

FRM303 支持 1.5M 串口信号、PPM 信号和 S.BUS 信号切换, 设置步骤如下:

- 上推上键上电且上推时间 > 3S 且 < 9S 时, 进入输入信号设置状态, 此时蓝色指示灯亮起;
- 上推上键或下推下键切换输入信号, 不同信号对应不同的灯闪状态 (具体如下表所示);
- 长按中键 3S 保存设置, 左推左键退出信号设置状态。

| 颜色 | 状态 | 对应的输入信号 |
|----|---------|------------------------|
| 蓝色 | 1 闪 1 灭 | PPM 信号 |
| 蓝色 | 2 闪 1 灭 | S.BUS 信号 |
| 蓝色 | 3 闪 1 灭 | 1.5M UART 信号 (闭源协议) 默认 |
| 蓝色 | 4 闪 1 灭 | 1.5M UART 信号 (开源协议) |
| 蓝色 | 5 闪 1 灭 | 115200 UART 信号 (开源协议) |

注:

- 若需适配 PL18 发射机, 则设置输入信号为 1.5M UART 信号 (闭源协议) 即可;
- 当输入信号识别为其他 UART 时, 相关的设置, 请参考相应发射机资料;
- 若输入信号设置为 PPM 或 S.BUS 时, 相关的设置, 请参考 [模型功能 (PPM 或 S.BUS 信号)] 部分;
- 若输入信号设置为 PPM 时, 可支持信号周期范围在 12.5-32ms 的非标 PPM 信号, 通道数范围为 4-18, 起始标识范围为 350-450us, 为避免 PPM 自动识别错误, 标识识别信号特征, 超出上述特征的 PPM 信号不识别。

输入信号识别

用于判断设置输入信号后, 高频头是否收到匹配的信号。当设置完输入信号后或不按按键 (或按下按键 <3s 时) 给高频头上电, 即进入输入信号识别状态。此时指示灯红色且亮 2S 灭 3S, 不同状态对应不同的灯闪状态 (具体如下表所示)。

| 颜色 | 状态 | 对应的高频头状态 |
|----|-----------|--------------------|
| 绿色 | 常亮 | 与接收机正常通信 (双向模式下) |
| 蓝色 | 慢闪 | 未与接收机通信 (单向或双向模式下) |
| 蓝色 | 亮 2S 灭 3S | 识别输入信号 (输入信号不匹配) |
| 蓝色 | 慢闪 | 输入信号识别成功后信号出现异常 |

模型功能

本节介绍 FRM303 高频头进入正常工作状态后, 在 S.BUS 或 PPM 信号下, 模型设置的相关内容。在 S.BUS 或 PPM 信号下设置方法相同, 以 PPM 信号下为例介绍如何设置, 请注意将 FRM303 输入信号设置为 PPM, 发射机的高频头类型为 PPM。

RF 模型切换与自动搜索接收机

对于输入信号为 PPM 和 S.BUS, 本高频头共提供了 10 组模型, 模型相关数据会保存在模型里, 如 RF 高频设置、双向对码后接收机的 ID、失控保护设置及 RX 接口协议。设置步骤如下:

- 长按 (或右推) 右键 3S, 滴一声后, 白色指示灯亮起, 进入 RF 模型切换设置状态, 不同模型对应不同的灯闪状态 (具体如下表所示);
- 上推上键或下推下键选择合适的模型;
- 长按中键 3S 保存设置, 左推左键退出模型切换状态。

| 颜色 | 状态 | 对应的模型 |
|------|----------------------|----------|
| 白色 | 1 闪 1 灭 | RF 模型 1 |
| 白色 | 2 闪 1 灭 | RF 模型 2 |
| 白色 | 3 闪 1 灭 | RF 模型 3 |
| 白色 | 4 闪 1 灭 | RF 模型 4 |
| 白色 | 5 闪 1 灭 | RF 模型 5 |
| 白色蓝色 | 白:1 闪 1 灭; 蓝:1 闪 1 灭 | RF 模型 6 |
| 白色蓝色 | 白:2 闪 1 灭; 蓝:1 闪 1 灭 | RF 模型 7 |
| 白色蓝色 | 白:3 闪 1 灭; 蓝:1 闪 1 灭 | RF 模型 8 |
| 白色蓝色 | 白:4 闪 1 灭; 蓝:1 闪 1 灭 | RF 模型 9 |
| 白色蓝色 | 白:5 闪 1 灭; 蓝:1 闪 1 灭 | RF 模型 10 |

当模型已与接收机双向对码后, 可通过此功能快速找到与相应接收机对码的模型, 找到后自动进入搜索状态, 并与接收机保持正常通信。搜索步骤如下:

- 在模型切换状态下, 右推右键进入搜索接收机模式, 此时指示灯蓝色快闪;
- 接收机上电, 搜索成功后, 自动退出搜索状态, 此时指示灯绿色常亮。
- 若接收机与高频头单向通信, 则不支持自动搜索接收机功能;
- 搜索从当前所在模型开始, 自动切换下一个模型, 若未找到一直循环搜索, 直至手动左推左键退出搜索状态。

RF 正常工作状态介绍

当高频头识别了输入信号后, 即进入正常工作状态, 指示灯状态对应不同的高频头状态 (具体如下表所示)。

| 颜色 | 状态 | 对应的高频头状态 |
|-----|-----------|--------------------|
| 绿色 | 常亮 | 与接收机正常通信 (双向模式下) |
| 蓝色 | 慢闪 | 未与接收机通信 (单向或双向模式下) |
| 蓝色 | 亮 2S 灭 3S | 输入信号识别成功后信号出现异常 |
| 红绿蓝 | 慢闪 | 报警状态 |

RF 系统与对码设置

设置 RF 系统及对码。RF 系统设置后, FRM303 高频头可与适配的接收机进行单向或双向对码。以双向对码为例, 设置步骤如下:

- 长按中键 3S, 滴一声后, 品红色指示灯亮起, 不同 RF 系统对应不同的灯闪状态 (具体如下表所示); 上推上键或下推下键选择合适的 RF 系统;
- 右推右键, 绿色指示灯闪烁, 高频头进入对码状态, 左推左键可退出对码状态;
- 使接收机进入对码状态;
- 对码成功后, 高频头自动退出对码状态。注: 若以单向方式进入对码状态, 当接收机 LED 灯由快闪变为慢闪时, 表示对码成功, 需左推左键使高频头退出对码状态。

| 颜色 | 状态 | 对应的 RF 系统 |
|-----|---------|-----------------|
| 品红色 | 1 闪 1 灭 | Classic 18CH 双向 |
| 品红色 | 2 闪 1 灭 | Classic 18CH 单向 |
| 品红色 | 3 闪 1 灭 | Routine 18CH 双向 |
| 品红色 | 4 闪 1 灭 | Routine 18CH 单向 |

RX 接口协议设置

设置接收机接口协议。此状态下指示灯为青色。

设置步骤如下:

- 长按 (或左推) 左键 3S, 滴一声后, 青色指示灯亮起, 进入 RX 接口协议设置状态, 不同协议对应不同的灯闪状态 (具体如下表所示);
- 上推上键或下推下键选择合适的协议;
- 长按中键 3S 保存设置, 左推左键退出协议设置状态。

| 颜色 | 状态 | 对应的 RX 接口协议 |
|----|---------|-------------|
| 青色 | 1 闪 1 灭 | PPM |
| 青色 | 2 闪 1 灭 | i-BUS out |
| 青色 | 3 闪 1 灭 | S.BUS |
| 青色 | 4 闪 1 灭 | PPM |

注: 双向模式下, 不管接收机是否通电, 此设置都可成功, 而对于单向模式, 设置后, 需与接收机重新对码, 此设置才可生效。

经典版接收机分为只有一个接口可设置接口协议, 2 个接口可设置接口协议。增强版接收机的 Newport 接口可以

设置接口协议。设置后, 接收机接口对应的输出信号如下表所示。

| 选项 | 经典版接收机 (仅 1 个接口可设置接口协议, 如 FTr4、FGr4P 和 FGr4s) | 经典版接收机 (仅 2 个接口可设置接口协议, 如 FTr16S、FGr4 和 FTr10) | 增强版接收机 (增强版接收机, 如 FTr12B 和 FTr8B 等, 带 Newport 接口 NPA、NPB 等) |
|-----------|---|--|---|
| PPM | CH1 接口输出 PPM, i-BUS 接口输出 i-BUS out | CH1 接口输出 PPM, CH1 接口输出 i-BUS out | NPA 接口输出 PPM, 其他 Newport 接口输出 PPM |
| i-BUS out | CH1 接口输出 PPM, i-BUS 接口输出 i-BUS out | CH1 接口输出 PPM, i-BUS 接口输出 i-BUS out | NPA 接口输出 i-BUS out, 其他 Newport 接口输出 PPM |
| S.BUS | CH1 接口输出 PPM, i-BUS 接口输出 S.BUS | CH1 接口输出 PPM, i-BUS 接口输出 S.BUS | NPA 接口输出 S.BUS, 其他 Newport 接口输出 PPM |
| PPM | CH1 接口输出 PPM, i-BUS 接口输出 S.BUS | CH1 接口输出 PPM, i-BUS 接口输出 S.BUS | NPA 接口输出 PPM, 其他 Newport 接口输出 PPM |

失控保护

设置失控保护。可设置为无输出、保持最后输出或固定值。设置步骤:

- 下推下键 3S, 滴一声后, 红色指示灯亮起, 不同失控保护设置对应不同的灯闪状态 (如图所示);
- 上推上键或下推下键选择合适的项;
- 长按中键 3S 保存设置, 左推左键退出失控保护设置状态。

| 颜色 | 状态 | 对应的失控保护设置项 |
|----|---------|------------------|
| 红色 | 1 闪 1 灭 | 所有通道无输出 |
| 红色 | 2 闪 1 灭 | 所有通道保持失控前最后输出 |
| 红色 | 3 闪 1 灭 | 当前输出通道值为各通道失控保护值 |

注意事项

- 使用前必须确保本产品与发射机安装正确, 否则可能导致模型发生严重损坏。
- 高频头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, 请确保高频头和导电材料之间至少有 1 厘米以上的距离。
- 在使用过程中, 严禁紧固高频头天线, 否则将会大大减弱无线电传播信号的质量和强度。
- 准备过程中, 请勿连接接收机电源, 否则造成不必要的损失。
- 当遥控距离持续较远时, 有发生失控的可能, 请适当缩短遥控距离。
- 建议使用外部电池为其供电, 以防供电不足导致高频头无法正常使用。
- 不使用高频头时, 请将电源开关拨至 Off 档处。若长期不使用, 请断开电源, 即使极小的电流, 也可能导致高频头电路损坏。
- 飞机模型飞行时, 请勿使用 Type-C 给高频头供电, 以免出现意外状况。



微信公众号 Bilibili Website Facebook

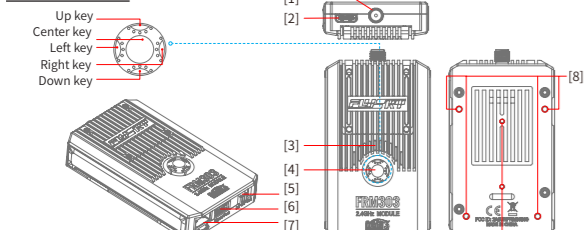
本说明书中的图片和插图仅供参考, 可能与实际产品外观有所不同。产品设计和规格可能会有所更改, 恕不另行通知。

Introduction

FRM303 is a multi-function high performance RF module in compliance with the AFHDS 3 third generation automatic frequency hopping digital system protocol. It features an external replaceable single antenna, support of bi-directional transmission, three power supply methods, support of voltage alarm function in case of external power supply, and support of inputting PPM, S.BUS and UART signals. In the PPM and S.BUS signals, it supports settings of binding, model switching (automatic search of a receiver), receiver interface protocol setting and failsafe.

Overview

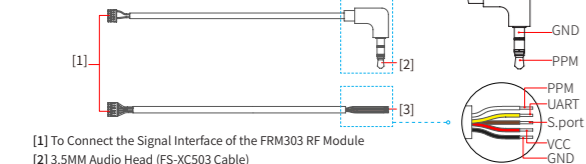
FRM303 RF Module



- [1] SMA Antenna Connector
- [2] Type-C USB Port
- [3] LED
- [4] Five-way Key
- [5] Three-position Power Switch(Intt/Off/Ext)
- [6] Signal Interface
- [7] XT30 Power Supply Interface(Ext)
- [8] Location Holes of the Adapter
- [9] Screw Holes for Fixing the Adapter(M2)

Two Cables Connecting Signal Connectors of FRM303

Note: These two cables are shipped with the transmitter as accessories for this version.



- [1] To Connect the Signal Interface of the FRM303 RF Module
- [2] 3.5MM Audio Head (FS-XC503 Cable)
- [3] DIY Interface (FS-XC505 Cable)

Specifications

- **Product Name:** FRM303
- **Adaptive Devices:** PPM: Devices that can output standard PPM signals, such as FS-Th9X, FS-ST8, FTr8B receiver; S.BUS: Devices that can output standard S.BUS signals, such as FS-ST8, FTr8B receiver; Closed Source Protocol-1.5M UART: PL18; Open Source Protocol-1.5M UART: EL18; Open source protocol-115200 UART: Devices that can output open source protocol-115200 UART signal.
- **Adaptive RC Models:** Fixed-wing aircraft, racing drones, relays, etc.
- **Number of Channels:** 18
- **Resolution:** 4096
- **RF:** 2.4GHz ISM
- **RF Protocol:** AFHDS 3
- **Maximum Power:** < 20dBm (e.i.r.p.) (EU)
- **Distance:** > 3500m (Air distance without interference)
- **Antenna:** External single SMA antenna (Outer-screw inner-pin)
- **Input Power:** XT30 Interface: 5~28V/DC Signal Interface: 5~10V/DC USB Port: 4.5~5.5V/DC
- **Data Output:** PPM, UART and S.BUS
- **Temperature Range:** -10°C ~ +60°C
- **Humidity Range:** 20% ~ 95%

- **Firmware Update:** Supported
- **Dimensions:** 75*44*15.5mm(Excluding antenna)
- **Weight:** 65g(Excluding antenna and adapter)
- **Certifications:** CE, FCC ID:2A2UNFRM30300

Basic functions

Introduction to Switches and Keys

Three-position power switch: This switch allows you to switch the power supply way of the RF module: internal power supply (Intt), power-off (OFF), and external power supply (Ext). The external power supply is realized through the XT30 interface.

Five-way key: Up, Down, Left, Right and Center.

The functions of the **Five-way key** are described below. It should be noted that a key is not valid when the input signal is recognized as a serial signal.

- Up:** Forced update, input signal settings
- Center:** Switching RF system and Binding
- Right:** Switching RF Models & Searching a receiver automatically
- Down:** Reset to factory and Failsafe
- Left:** Setting RX interface protocol
- Up and Down** are used for selection. The **Right** is used for confirmation. The **Left** is used for exit.

Note: In the key operations, if you hear a "Click", it indicates that the action is valid. And the key operation is not cyclic.

Power Supply of RF Module

The RF module can be powered in three modes: Type-C interface, and internal power supply or XT-30 external power supply.

- Powering through the Type-C interface is the first priority. In the power supply through the Type-C interface, the RF module is not off when you switch the power in case of internal power supply or external power supply.
- In the internal power supply or external power supply (instead of power supply through the Type-C interface), the RF module will restart when you switch the power.

- ① **When you remotely control a device, please do not use Type-C interface to supply power to the RF module to avoid losing control of the device.** When the RF module is powered by Type-C interface, the RF module will automatically reduce the output power to avoid damage to the USB interface of the connected device. After the power is reduced, the remote control distance will be shortened.

External Voltage Alarm

When the RF module is powered by a lithium battery connected through XT-30 interface for a long time, a voltage alarm function provided in the RF module will remind you of replacing the battery in time. When the RF module is powered on, the system automatically detects the power supply voltage and identifies the number of battery sections and the alarm voltage value according to the voltage. When the system detects that the battery voltage is lower than the corresponding alarm value, it will report an alarm. The specific table is

as follows.

| Detect voltage | Identify the number of battery sections | Alarm voltage |
|---------------------|---|---------------|
| ≤ 6V | 1S lithium battery | < 3.65V |
| > 6V and ≤ 9V | 2S lithium battery | < 7.3V |
| > 9V and ≤ 13.5V | 3S lithium battery | < 11V |
| > 13.5V and ≤ 17.6V | 4S lithium battery | < 14.5V |
| > 17.6V and ≤ 21.3V | 5S lithium battery | < 18.2V |
| > 21.3V | 6S lithium battery | < 22V |

High Temperature Alarm

The temperature of the RF module may rise due to the use environment or long time working. When the system detects the internal temperature ≥ 60°C, it will give an audible alarm. If the controlled model is in the air at this time, please turn off the RF module after the return. You can reuse the model after it cools down.

Low Signal Alarm

When the system detects that the received signal strength value is lower than the preset value, the system will give an audible alarm.

Firmware Update

The RF module can be connected to the PC via Type-C interface to update the firmware through the FlySky Assistant. The corresponding states of the LED flashing in the update process are described in the following table. The update steps are as follows:

1. At PC side, after downloading the latest FlySkyAssistant v3.0.4 or later firmware, start it.
2. After connecting the RF module to the PC with Type-C cable, finish the update through the FlySkyAssistant.

| Color | State | RF module state |
|--------|----------------------------|---|
| Red | Two-flash-one-off | Waiting for firmware update or in forced update state |
| Red | Three-flash-one-off (Fast) | Updating the receiver firmware |
| Yellow | Three-flash-one-off (Fast) | Updating the RF module firmware |

If you cannot update the RF firmware through the above steps, you need to update it after it is in the forced update state. Then, complete the update by following the firmware update steps. The steps are as follows: Push upwards the Up key over 9S while powering on the RF module. The red LED is in a two-flash-one-off state, that is, it enters the forced update state.

Restore the Factory Setting State

Restore the RF module to the factory default state. The setting steps are as follows: Press or push downwards the Down key over 3S and

meanwhile power it on. The LED is solid on in red. After that, the RF module is in the input signal identification state, the LED is red with ON for 2S and OFF for 3S.

Input Signal Settings

FRM303 supports switching between serial signals, PPM signals and S.BUS signals. The steps are as follows:

1. Push upwards the Up key for ≥ 3S and < 9S while powering on the RF module. It enters the input signal setting state. Now LED in blue is on.
2. Push upwards the Up key or push downwards the Down key to switch the input signal. LED flashing states vary with signals as shown in the table below.
3. Press the Center key for 3S to save the settings. Push leftwards the Left key to exit the signal setting state.

| Color | State | Input Signal |
|-------|---------------------|--|
| Blue | One-flash-one-off | PPM |
| Blue | Two-flash-one-off | S.BUS |
| Blue | Three-flash-one-off | Closed Source Protocol-1.5M UART (Default) |
| Blue | Four-flash-one-off | Open Source Protocol-1.5M UART |
| Blue | Five-flash-one-off | Open source protocol-115200 UART |

Notes:

1. Set the input signal to Closed Source Protocol-1.5M UART, when the PL18 transmitter is used.
2. Refer the documents of the corresponding transmitter for related setting, when Open Source Protocol-1.5M UART or Open source protocol-115200 UART is set.
3. When PPM or S.BUS is set, refer to Model functions(PPM or S.BUS) section for related setting.
4. When PPM is set, it can support non-standard PPM signals with a signal period range of 12.5~32ms, the number of channels is in the range of 4~18.

Model functions

This section introduces the model settings for S.BUS or PPM signals in the normal operations of the FRM303 RF module. The setting methods for S.BUS or PPM signals are the same. Take PPM signals as an instance. It should be noted that the FRM303 input signals should be set to PPM and the transmitter's RF type should be set to PPM.

Switching RF Model and Searching a Receiver Automatically

If the input signals are PPM and S.BUS, this RF module provides a total of 10 groups of models. The model related data will be saved in the model, such as RF setting, receiver ID after two-way binding, failsafe settings, and RX interface protocol. The setting steps are as follows:

1. Press or push rightwards the Right key for 3S. After a "click", the LED lights up in white. It enters the RF model switching setting state. The LED flashing states vary with models, see the table below.
2. Push upwards the Up key or push downwards the Down key to select the appropriate model.

and the initial identification range is 350~450us. To avoid automatic PPM identification errors, the identification of signal characteristics is limited, and PPM signals that exceed the above characteristics not recognize.

Input Signal Identification

Used to judge whether the RF module receives a matching signal source after setting the input signal. After setting the input signal or without pressing the key (or pressing the key < 3S) to power on the RF module, then it will enter the input signal identification state. The LED is red with ON for 2S and OFF for 3S. And the LED flashing states vary with signals as shown in the table below.

| Color | LED state | RF module state |
|-------|--------------------------|--|
| Red | ON for 2S and OFF for 3S | In input signal identification state (input signal mismatch) |
| Blue | flashing (slow) | Input signal match |

Introduction to RF normal working State

When the RF module recognizes the input signal, it enters the normal working state. The LED states correspond to different RF model states as shown in below.

| Color | State | RF module state |
|----------------|--------------------------|---|
| Green | Solid on | Normal communication with the receiver in two-way mode |
| Blue | flashing (slow) | No communication with the receiver in one-way or two-way mode |
| Blue | ON for 2S and OFF for 3S | Abnormal signal after successful input signal recognition |
| Red/Green/Blue | flashing (slow) | Alarm state |

3. Press the Center key for 3S to save the settings. Push leftwards the Left key to exit the model switching state.

| Color | State | Model |
|--------------|---|-------------|
| White | One-flash-one-off | RF model 1 |
| White | Two-flash-one-off | RF model 2 |
| White | Three-flash-one-off | RF model 3 |
| White | Four-flash-one-off | RF model 4 |
| White | Five-flash-one-off | RF model 5 |
| White & Blue | White: One-flash-one-off; Blue: One-flash-one-off | RF model 6 |
| White & Blue | White: Two-flash-one-off; Blue: One-flash-one-off | RF model 7 |
| White & Blue | White: Three-flash-one-off; Blue: One-flash-one-off | RF model 8 |
| White & Blue | White: Four-flash-one-off; Blue: One-flash-one-off | RF model 9 |
| White & Blue | White: Five-flash-one-off; Blue: One-flash-one-off | RF model 10 |

After the two-way binding between the model and the receiver, you can quickly find the model that is bound with the corresponding receiver through this function. It can automatically exit the search state after successful location, and keep normal communications with the receiver. The search steps are as follows:

1. In the model switching state, push rightwards the Right key to enter the receiver search mode. At this time, the LED is blue with quick flashing.
2. The receiver is powered on and the search is successful. Then, it automatically exits the search state. At this time, the LED is solid on in green.

Notes:

1. In case of one-way communications between the receiver and the RF module, the automatic search of a receiver is not supported.
2. The search starts from the model where it is currently located, to automatically switch to the next model. If not found, there is the cyclic search until you manually push leftwards the Left key to exit the search state.

Setting RF System and Binding

Set the RF system and binding. After the RF system is set, the FRM303 RF module can carry out the one-way or two-way binding with the receiver that it is compatible with. Take the two-way binding as an example. The setting steps are as follows:

1. Press the Center key for 3S. After a "click", the LED lights up in magenta. The LED flashing states vary with RF systems, see the table below. Push upwards the Up key or push downwards the Down key to select a proper RF system.
2. Push rightwards the Right key. The LED is flashing quickly green. The RF module enters the binding state. Push leftwards the Left key to exit the binding state.
3. Make the receiver enter the binding state.
4. After the successful binding, the RF module automatically exits the binding state.

Note: If the RF module will bind with the receiver in one-way mode, when the receiver LED becomes slow flashing from fast flashing, indicating the binding is successful. Push leftwards the Left key to exit the binding state.

| Color | State | RF System |
|---------|---------------------|-------------------------|
| Magenta | One-flash-one-off | Classic 18CH in two-way |
| Magenta | Two-flash-one-off | Classic 18CH in one-way |
| Magenta | Three-flash-one-off | Routine 18CH in two-way |
| Magenta | Four-flash-one-off | Routine 18CH in one-way |

Setting RX Interface Protocol

Set the receiver interface protocol. The LED is cyan in this state.

The setting steps are as follows:

1. Press or push leftwards the Left key for 3S. After a "click", the LED lights up in cyan. It enters the RX interface protocol setting state. The LED flashing states vary with protocols, see the table below.
2. Push upwards the Up key or push downwards the Down key to select the appropriate protocol.

| Color | State | Failsafe Setting Item |
|-------|-------------------|----------------------------|
| Red | One-flash-one-off | No output for all channels |

3. Press the Center key for 3S to save the settings. Push leftwards the Left key to exit the protocol setting state.

| Color | State | RX Interface Protocol |
|-------|---------------------|-----------------------|
| Cyan | One-flash-one-off | PWM |
| Cyan | Two-flash-one-off | i-BUS out |
| Cyan | Three-flash-one-off | S.BUS |
| Cyan | Four-flash-one-off | PPM |

Note: In the two-way mode, regardless of whether the receiver is powered on, this setting can be successful. In the one-way mode, this setting can take effect only in case of re-binding with the receiver.

In the classic receivers, there are two cases: Only one interface can be set with the interface protocol; two interfaces can be set with the interface protocol. In the enhanced receivers, the Newport interface can be set with the interface protocol. After setting, the output signals corresponding to the receiver interfaces are listed in the table below.

| Item | Classic receivers only one interface can be set with the interface protocol, for example, FT14, FG4P and FG4s. | Classic receivers only two interfaces can be set with the interface protocol, for example, FT16S, FG4 and FT10. | Enhanced receivers interface receivers such as FT12B and FT8B with Newport interface NPA, NP8, etc. |
|-----------|--|---|---|
| PWM | CH1 interface outputs PWM, and i-BUS interface outputs i-BUS | CH1 interface outputs PWM, and i-BUS interface outputs i-BUS out | NPA interface outputs PWM, the rest Newport interface output PWM. |
| i-BUS out | CH1 interface outputs PWM, and i-BUS interface outputs i-BUS | CH1 interface outputs PPM, and i-BUS interface outputs i-BUS out | NPA interface outputs i-BUS out, the rest Newport interface output PWM. |
| S.BUS | CH1 interface outputs PWM, and i-BUS interface outputs S.BUS. | CH1 interface outputs PWM, and i-BUS interface outputs S.BUS. | NPA interface outputs S.BUS, the rest Newport interface output PWM. |
| PPM | CH1 interface outputs PPM, and i-BUS interface outputs S.BUS. | CH1 interface outputs PPM, and i-BUS interface outputs S.BUS. | NPA interface outputs PPM, the rest Newport interface output PWM. |

Setting Failsafe

Set failsafe. There three options can be set: No output, Free and Fixed value. The setting steps are as follows:

1. Push downwards the Down key for 3S. After a "click", the LED lights up in red. The LED flashing states vary with Failsafe setting, see the table below.
2. Push upwards the Up key or push downwards the Down key to select the appropriate item.
3. Press the Center key for 3S to save the settings. Push leftwards the Left key to exit the failsafe setting state.

| | | |
|-----|---------------------|---|
| Red | Two-flash-one-off | All channels keep the last output before failsafe. |
| Red | Three-flash-one-off | The current output value is the failsafe value of each channel. |

Signal Strength Output

This RF module supports the signal strength output. By default, it is enabled Switch-off is not allowed. CH14 outputs the signal strength, instead of channel data sent by the transmitter.

Attentions

- ① **Make sure the RF module is installed and calibrated correctly, failure to do so may result in serious injury.**
- **Keep the RF's antenna at least 1cm away from conductive materials such as carbon or metal.**
- **In order to ensure good signal quality, do not hold the RF antenna during use.**
- **Do not power on the receiver during the setup process to prevent loss of control.**
- **Make sure to remain within range to prevent loss of control.**
- **It is recommended that an external power supply is used in order to make sure that the RF module is getting enough power to function correctly.**
- **When the RF module is not in use, please turn the power switch to the OFF position. If it is not used for a long time, please power it off. Even a very small current may cause damage to the RF module battery.**
- **It is not allowed to use Type-C to supply power to the RF module when the model aircraft is in flight to avoid accidental conditions.**

Certifications

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 (FRM303) is in compliance with RED 2014/53/EU.

The full text of the EU DoC is available at the following internet address: www.flyskytch.com/info_detail/10.html

RF Exposure Compliance

The device has been evaluated to meet general RF exposure requirement. The device can be used in portable exposure condition without restriction.

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 points via private persons is for free. The owner of old appliances is responsible for bringing 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.



FCC ID: 2A2UNFRM30300

Figures and illustrations in this manual are provided for reference only and may differ from actual product appearance. Product design and specifications may be changed without notice.