FlyskyRC FRM303 Multi Function High Performance RF Module Instruction Manual
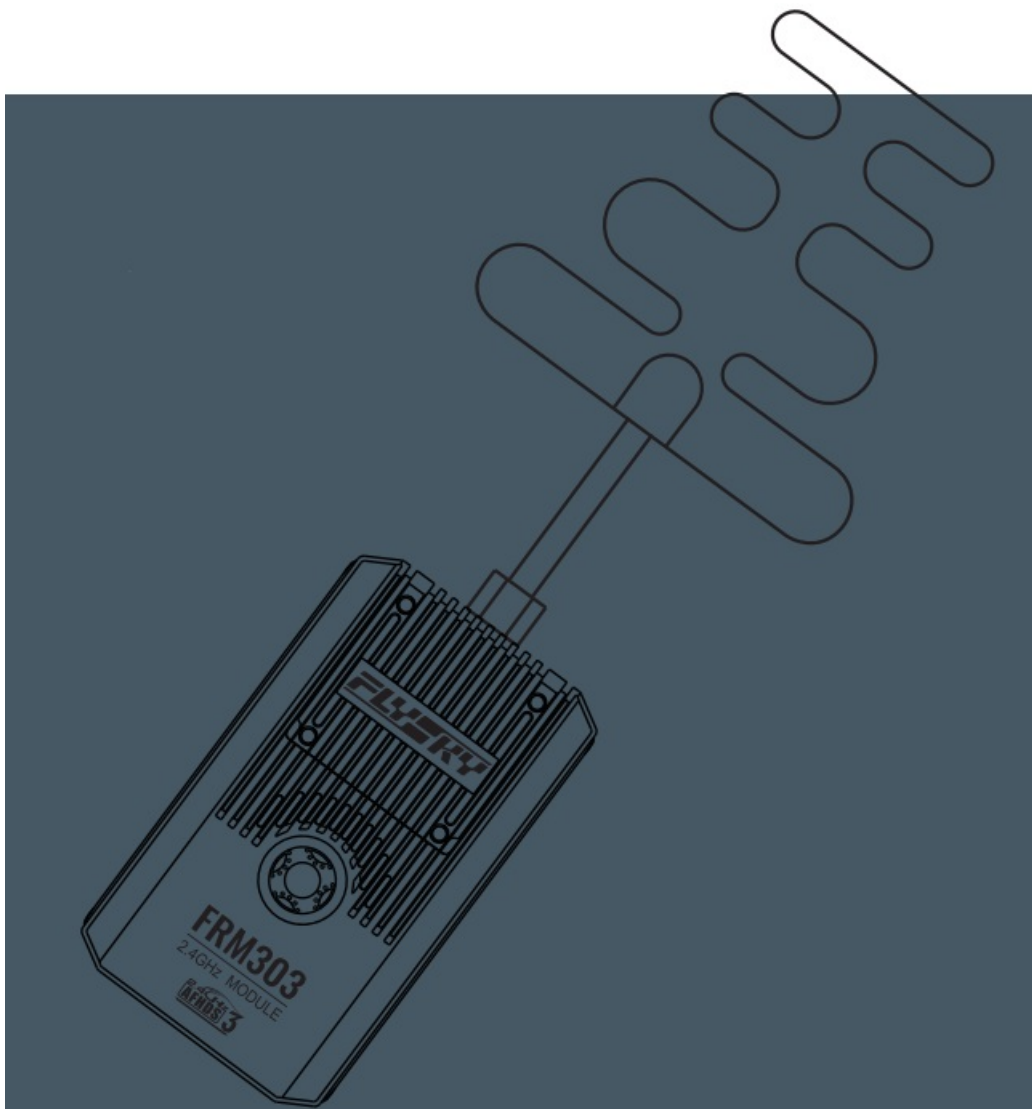
FRM303 Multi Function High Performance RF Module Instruction Manual

Contents

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

Up key
Center key
Left key
Right key
Down key

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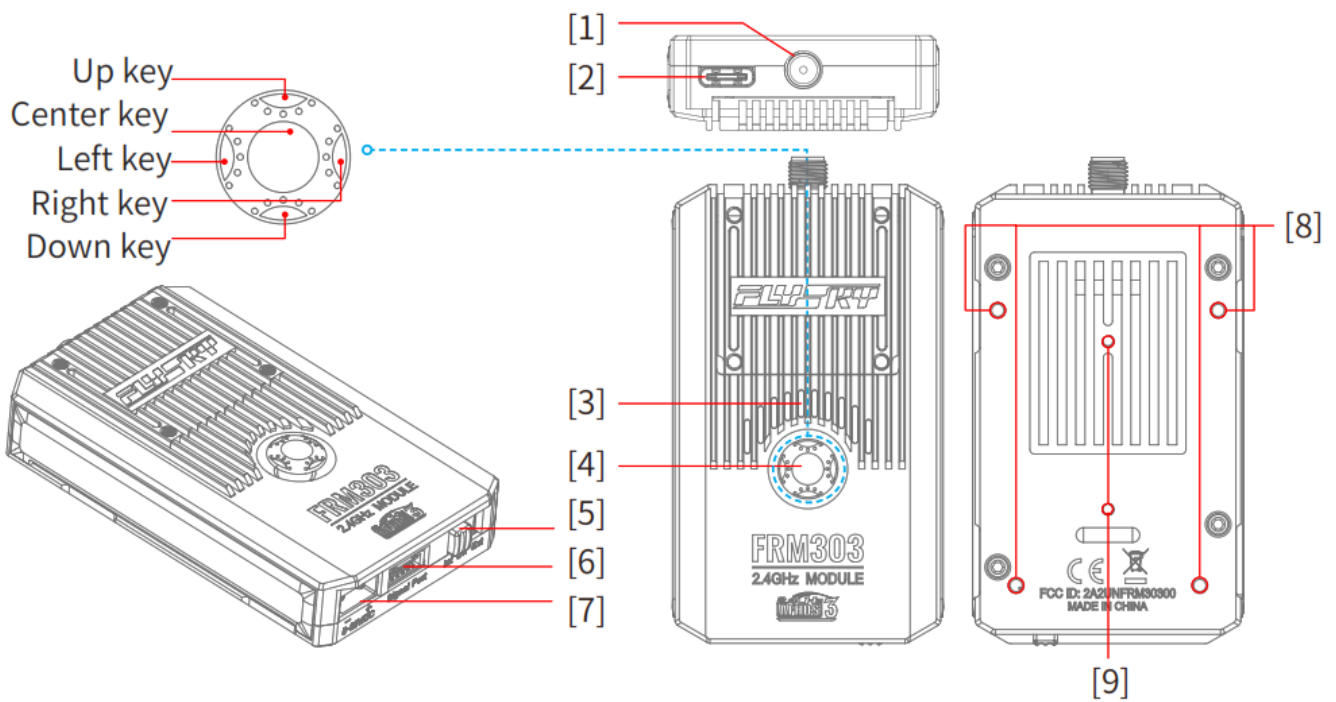
[1] SMA Antenna Connector	[6] Signal Interface
[2] Type-C USB Port	[7] XT30 Power Supply Interface(Ext)
[3] LED	[8] Location Holes of the Adapter
[4] Five-way Key	[9] Screw Holes for Fixing the Adapter(M2)
[5] Three-position Power Switch(Int/Off/Ext)	

FGPZ01 Adapter Compatible with PL18

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[2]
[1]
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S.port
GND
VCC
Head/TX
PPM/S.BUS/RX
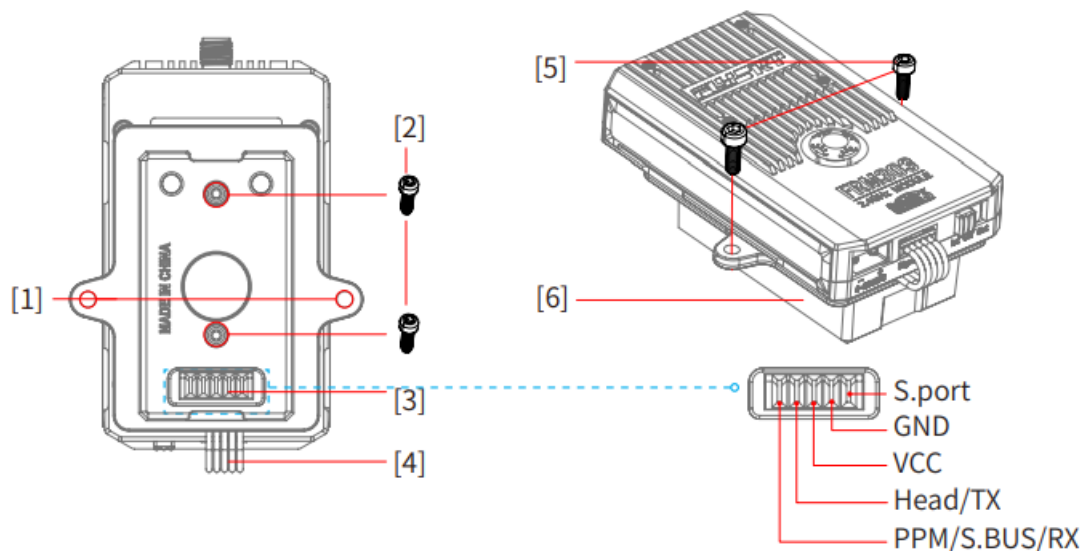
1. Screw holes for Fixing the FGPZ01 Adapter and TX(M3)
2. Screws for Fixing the FGPZ01 Adapter and the RF Module
3. RF Connector of the FGPZ01 Adapter
4. Cable for Connecting the FGPZ01 Adapter and the RF Module
5. M3 Screws for Fixing the FGPZ01 Adapter to TX
6. The FGPZ01 Adapter

FGPZ02 Adapter Compatible with JR RF Module

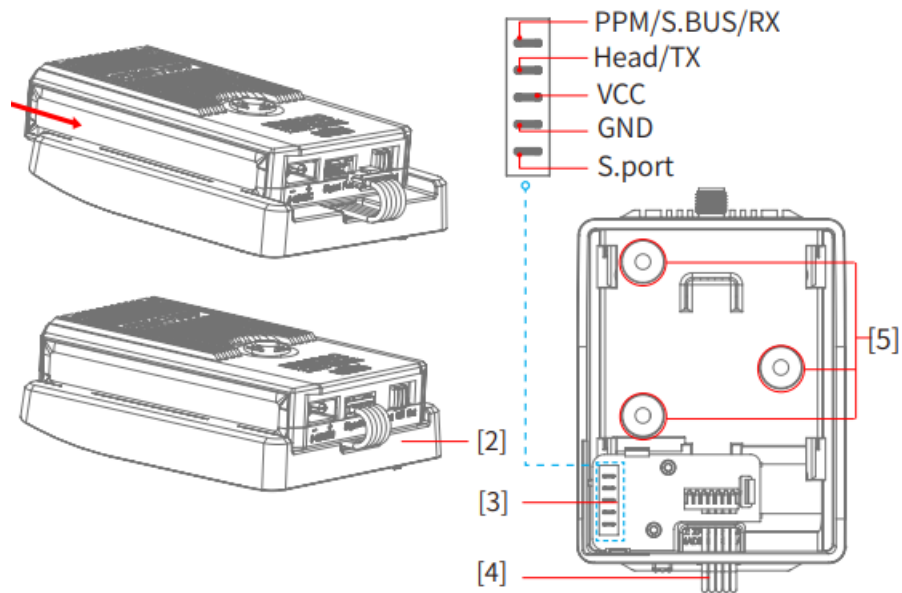PPM/S.BUS/RX
Head/TX
VCC
GND
S.port
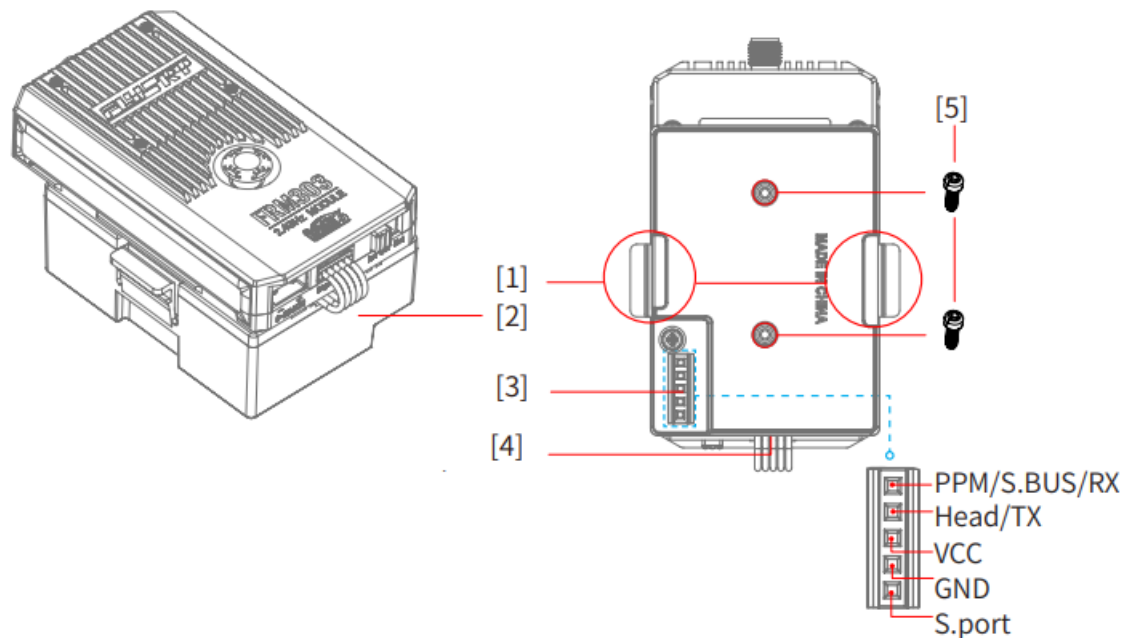
1. Solts for Fixing the FGPZ02 Adapter
2. The FGPZ02 Adapter
3. RF Connector of the FGPZ02 Adapter
4. Cable for Connecting the FGPZ02 Adapter and the RF Module
5. M2 Screws for Fixing the FGPZ02 Adapter to the RF Module

FGPZ03 Adapter Compatible with Stealth I/O Module
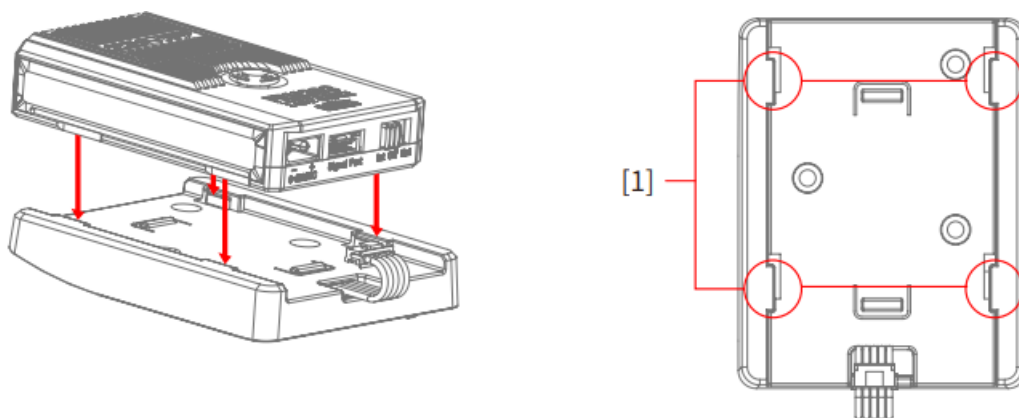
1. Solts of he FGPZ03 Adapter for Fixing the RF Module

- PPM/S.BUS/RX
- Head/TX
- VCC
- GND
- S.port

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2. The FGPZ03 Adapter

3. RF Connector of the FGPZ03 Adapter

4. Cable for Connecting the FGPZ03 Adapter and the RF Module

5. Screws holes for Fixing the FGPZ03 Adapter to TX

Several Cables Connecting Signal Connector of FRM303
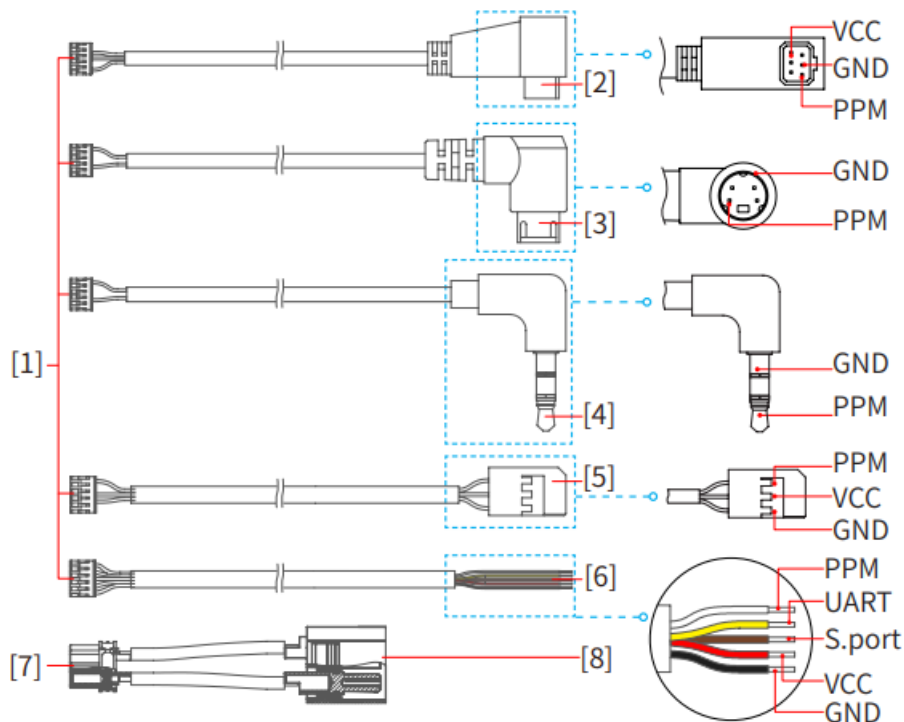
1. To Connect the Signal Interface of the FRM303 RF Module

2. FUTABA Trainer Interface(FS-XC501 Cable)

3. S Terminal Connector Interface(FS-XC502 Cable)

4. 3.5MM Audio Head (FS-XC503 Cable)

5. Servo Interface (FS-XC504 Cable)

6. DIY Interface (FS-XC505 Cable)

7. To Connect to XT30 Interface of FRM303

8. Battery Interface (FS-XC601 Cable)

SMA Antenna Adapter
Note: If it is difficult to install the antenna due to the transmitter structure, you can use this SMA antenna adapter to make the antenna installation more convenient.
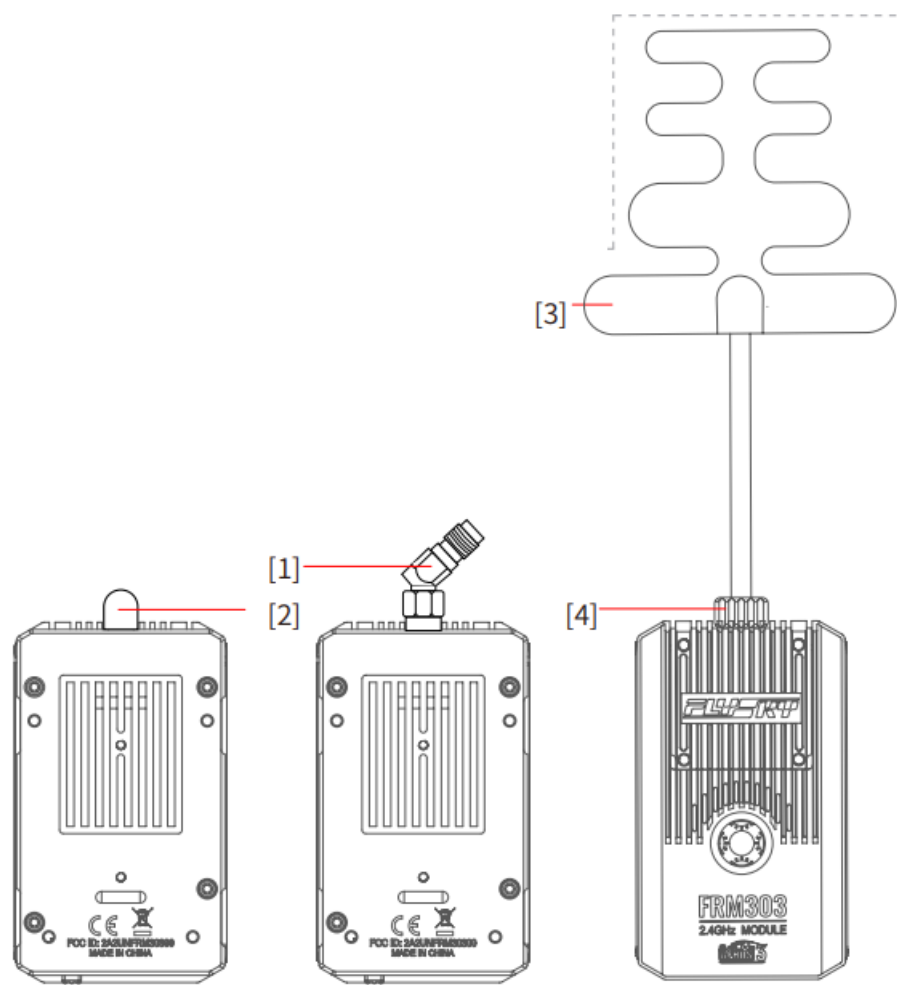

[1] 45-degree SMA Antenna Adapter	[3] FS-FRA01 2.4G Antenna
[2] SMA Antenna Interface Protection Cap	[4] Mounting Aid Ratchet

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 Models: Fixed-wing aircraft, racing drones, relays, etc.
- Number of Channels: 18
- Resolution: 4096
- RF: 2.4GHz ISM

- 2.4G Protocol AFHDS 3

- Maximum Power < 20dBm (e.i.r.p.) EU

- Distance: > 3500m (Air distance without interference)

- Antenna: External sigle SMA antenna (Outer-screw-inner-pin

- Input Power: XT30 Interfac:5~28V/DC Signal Interface: 5~10V/DC USB Port: 4.5~5.5V/DC

- Working Current: 98mA/8.4V(External power supply) 138mA/5.8V (Internal power supply) 135mA/5V(USB)

- Data Interface: PPM, UART and S.BUS

- Temperature Range: -10℃ ~ +60℃

- Humidity Range: 20% ~ 95%

- Online Update: Yes

- 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 (Int), 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.
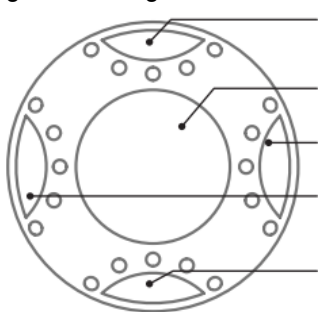
Up: Forced update and input signal settings

Center: Switching RF system and Binding

Right: Switching RF Models & Searching a receiver automatically

Left: Setting RX interface protocol

Down: Reset to factory and Failsafe

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.

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	Corresponding 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 S 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 through 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, then start it.

2. After connecting the RF module to the PC with Type-C cable, finish the update through the FlySkyAssistant.

LED Color	LED State	Corresponding RF Module State
Red	Two-flash-one-off	Waiting for firmware upgrade 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:

Press or push upwards the Up key over 9S while powering on the RF module. The red LED is in 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 setting 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.

LED Color 🔵	LED State	Corresponding 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, 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 for <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.

LED Color 🔴🔵	LED State	Corresponding 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 module states as shown in below.

LED Color 🟢 🔵 🔴	LED State	Corresponding 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

Model functions (PPM or S.BUS)

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

LED Color	LED 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.

LED color ●	LED State	Corresponding 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.
3. Press the Center key for 3S to save the settings. Push leftwards the Left key to exit the protocol setting state.

LED Color 🔴	LED State	Corresponding 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.

Option	Classic receivers only one interface can be set with the interface protocol, for example, FTr4, FGr4P and FGr4s.	Classic receivers only two interfaces can be set with the interface protocol, for example, FTr16S, FGr4 and FTr10.	Enhanced receivers enhanced receivers such as FTr12B and FTr8B with Newport interface NPA, NPB, etc.
PWM	The CH1 interface outputs PWM, and i-BUS interface outputs i-BUS out.	The CH1 interface outputs PWM, and i-BUS interface outputs i-BUS out.	The NPA interface outputs PWM, the rest Newport interface output PWM.
i-BUS out	The CH1 interface outputs PPM, and i-BUS interface outputs i-BUS out.	The CH1 interface outputs PPM, and i-BUS interface outputs i-BUS out.	The NPA interface outputs i-BUS out, the rest Newport interface output PWM.
S.BUS	The CH1 interface outputs PWM, and i-BUS interface outputs S.BUS.	The CH1 interface outputs PWM, and i-BUS interface outputs S.BUS.	The NPA interface outputs S.BUS, the rest Newport interface output PWM.
PPM	The CH1 interface outputs PPM, and i-BUS interface outputs S.BUS.	The CH1 interface outputs PPM, and i-BUS interface outputs S.BUS.	The 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.

LED Color 🔴	LED State	Corresponding Failsafe Setting Item
Red	One-flash-one-off	No output for all channels
Red	Two-flash-one-off	All channels keep the last output before failsafe.
Red	Three-flash-one-off	The current output channel 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

- 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, [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.flyskytech.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 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.

Disclaimer: The factory preset transmission power of this product is ≤ 20dBm. Please adjust it in accordance your local laws. The consequences of damage caused by improper adjustments shall be borne by the user.

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Website |

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| **http://weixin.qq.com/r/8UiKkvbEAKt-rbLx9x3j** | **https://www.facebook.com/flyskyrc/** | **https://space.bilibili.com/4́0** | |

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

Documents / Resources

	FlyskyRC FRM303 Multi Function High Performance RF Module [pdf] Instruction Manual FRM303 Multi Function High Performance RF Module, FRM303, Multi Function High Performance RF Module, High Performance RF Module, Performance RF Module, RF Module

References

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