

## 2.4GHz Two-Way Radio System

### 1. Introduction:

The Two-way Radio System developed by FrSky provides an additional return link that would be used for monitoring the Rx's voltage, temperature, location, speed and so on.

### 2. Overview

#### 2.1 Transmitter modules:

- a) Model: DFT

Compatible with the following transmitters:

Futaba: 3PM, 3PK, 7U, 8U, 8J, 9C, 9Z, 10C, FN series, T10C, FC-18, FC-28.

Hitec: Optic 6, Eclipse 7, Prism 7.

WFLY: WFT09, WFT08.

- b) Model: DJT

Compatible with the following transmitters:

JR: 347/388/783/U8/PCM10/PCM10S/PCM10SX/

PCM10IIS/8103/J9303/MX-22/MX-24S/PX/9XII.

#### 2.2 Receiver module:

- a) Model: D8R, D8RHV

Compatible with FrSky Two Way module DFT/DJT.

- b) Model: V8R, V8RHV, V8R7, V8R7HV, V8R4

V8 receivers work with DFT/DJT, just in receive-only mode.

### 3. Features

- Advanced Continuous Channel Shifting Technology (ACCST SYSTEM) achieves high reliable link in interference rich environments.
- Easy to bind and instant link-up.
- Excellent reboot times.
- All channels failsafe.
- Quick response.

- Very smooth servo movement.
- Alarm on events of receiver (low battery voltages, poor reception, etc.)
- Error-free link, by using 48bits CRC algorithm.
- Low power consumption.
- True two-antenna diversity.
- Firmware upgradable.

### 4. Function of Two Way communication

- Two way communication between receiver and transmitter
- Receiver is able to accept 2 analog inputs, which can be used to monitor battery voltage, temperature sensor, etc., and transfer them to transmitter. Users can set the Alarm Level of these analog voltages, when exceed or below these levers, sound alarm is issued.
- Receiver is able to accept serial data streams from simple 3-wire RS232 port, such information as GPS, altitude, and user developed data can be transferred to Tx without error, and sent at the RS232 port on the Tx.

### 5. Specifications

#### 5.1 Receiver specifications:

Model: D8R

Weight: 16.2g

Dimension: 54\*27\*17mm

Operating Voltage Range: 4.0V-7.2V

Operating Current: 100mA

Specified Range: 1.5km (Ground Range)

Resolution: 11bit (3072)

Latency: 22ms

Number of Channels: 8CH

Analog voltage: 0~3.3V

#### 5.2 Transmitter module specifications:

Model: DFT, DJT

Operating Voltage Range: 6.0V-13.0V

Operating Current: 50mA

Output Power: 60mW

Resolution: 11bit (3072)

### Important!

The effective range of control refers to the distance between the transmitter and the receiver clear of obstruction. All data was tested and verified by FrSky.

However this is not guaranteed due to many factors such as the flying environment and the weather, which can greatly affect the effective range of control.

**It is extremely important to range check your models prior to each flying session!**

## 6. How To Use

### 6.1 Setup

#### 6.1.1 Installation of the transmitting module:

- Remove the original transmitting module.
- Put the FrSky 2.4GHz transmitter module into the module port of your RC transmitter and screw on the transmitting antenna.
- Check the MODE switch to its corresponding position.

Mode	Switch 1	Switch 2	Mode
1	OFF	OFF	Two-way Mode
2	OFF	ON	V8 Mode
3	ON	OFF	Not Defined
4	ON	ON	Firmware Upgrade

- Turn the transmitter power on and check the LED status on the module.

#### 6.1.2 Installation of receivers:

The D8R receiver incorporates two separate antennas which enable them to receive the radio signal at two different locations. Please make sure that the two antennas are placed apart and oriented 90 degrees to each other.

#### Please note:

As the wave length of 2.4GHz is shorter than older RC systems, its ability to go around solid obstacles is weaker than 72 or 36 MHz. So the antennas must avoid objects with high conductivity, such as metal parts, servos, ESC's,

battery packs, wires, and carbon fiber structures. If possible put the tip of the antennas outside of the fuselage for maximum reception.

#### 6.1.3 Receiver and Transmitter Setup Instructions:

Follow the steps below to properly set up your system.

- Turn your FUTABA or JR transmitter on and switch it to PPM mode, power off the TX.
- Check the working mode of the Tx module.
- Turn the transmitter on while holding the programming button. Release it a few seconds later. The RED LED on the transmitter module will flash indicating the transmitter is ready to bind the receivers.
- Connect the battery to the receiver while holding the receiver's button. The LED on the receiver will flash indicating the binding process is complete. Turn off the receiver.
- Turn off the transmitter and receiver to finish the binding procedure.
- Turn on the transmitter.
- Connect the battery to the receiver, the Green LED on the receiver will indicate the receiver is receiving commands from the transmitter.

After the steps above are completed, both the transmitter and receiver are ready to be used.

### 6.2 Range check

For safe operation, it is necessary to perform pre-flight range check.

Caution must be paid when you perform check in an environment with metal fences, concrete buildings, or rows of trees. Loss of signal may be experienced.

Perform a range check as follows (Note: this would be done with the receiver installed in the model):

- Place the model at least two feet (60cm) above non-metal contaminated ground; for example a wooden bench.
- Place the receiver's antenna apart. Do NOT let the antenna touch the ground.
- Place the antenna of the transmitter in a vertical position.
- Turn on the transmitter and receiver.

- e) To enter Range Check Mode, press and hold the "F/S Range" button of the transmitter for 4 seconds, the RED LED of the transmitter module will be turned off, the effective distance will be decreased to 1/30.
- f) Walk away from the model while simultaneously operating the controls on the transmitter, confirm that all controls are completely and correctly operational at least 30 meters away.
- g) Press the "F/S Range" button for 1S-4S, the transmitter will exit Range Check Mode.

## 7 Safety range indicator

The Two-Way Radio System has a feature to show the RSSI (Received Signal Strength Indication) of the receiver. When the RSSI is low, the Tx module will issue three types of alarms.

**Red:** The receiver is very far from the Tx.

**Orange:** The receiver is sound, but would be far from Tx.

**Yellow:** The receiver is sound,

**Green:** The receiver is OK.

**Note:** Due to many environment factors, there may be casual alarm.

## 8 Failsafe

The receiver integrates the failsafe function for all channels.

**ROM A version:** This is FrSky acquiescent failsafe version.

To set failsafe positions, press briefly (less than 1 second) the "F/S Range" button of the Receiver, the Tx module will make a long "beep" indicating the failsafe position is remembered by the receiver.

**ROM B version:** Provided for users to upgrade FrSky two way transmitter modules' failsafe version. In this case, you can set failsafe position on the Tx module at any time during your flight.

Option1: To set failsafe positions, press briefly (less than 1 second) the "F/S Range" button of the Receiver, the Tx module will make a long "beep" indicating the failsafe position is remembered by the receiver.

Option2: To set failsafe position, press briefly (less than 1 second) the "F/S Range" button of the Tx module, the Tx module will make a long "beep" indicating the failsafe position is remembered by the receiver.

**Note:** Please kindly note that if you accidentally press the "F/S Range" button of the Tx module during your flight, you will change the failsafe state inadvertently.

## 9 Alarm operation

### 9.1 Alarm states

Tx module monitors the state of receiver and notify user by audible alarm.

There are three alarm states:

**Red** (Highest): constant three Beeps

**Orange** (Medium): constant two Beeps

**Yellow** (General): one Beep

Green: No Beep

Alarm sourced from:

-Rx interface 1: Analog Port 1 on Rx;

-Rx interface 2: Analog Port 2 on Rx;

-Rx interface 3: RSSI of Rx;

**Note:** The alarm threshold of Rx interface 1 and 2 could be set by user. Two alarm thresholds and three levels alarm state are available for both of Rx interface 1 and 2.

**And the RSSI alarm setting is default by factory.**

### 9.2 Pins Definition:

The Pin definition on receiver and Tx module:

It should be noted that the 3.3V voltage only have a limited driving current (1~10mA), should not be used for driving a MPU.

RXD	+5V	GND
AD2	×	GND
AD1	×	GND

RXD: input to receiver, RS232 level

AD2: Voltage: max 3.3V

AD1: Voltage: max 3.3V

Pins Definition at Rx

RXD	Input to Tx module
TXD	Output from Tx module
+5V	Not regulated voltage
GND	Ground

Pins Definition at Tx



## 10 LED Status:

### 10.1 LED status on Transmitter module:

- Red LED on and Green LED flashing: Working Mode.
- Red LED off and Green LED flashing: Range Check Mode.
- Red LED flashing: Binding Mode.

### 10.2 LED status on Receiver:

- Red LED on and Green LED glooming: Working Mode.
- Red LED flashing and Green LED off: No Signal.
- Red LED flashing and Green LED on: Binding OK.

## 11 Firmware Upgrade

Frsky have developed a mechanism of firmware upgrade. With it, user would like to upgrade to new version of software when available. And the Two-Way Radios System is supported by this mechanism.

Steps are the following:

- a) Set module to Upgrade Mode.
- b) Connect the module to PC through a RS232 cable.
- c) Start Upgrade software on PC.
- d) Select file and corresponding port.
- e) After the Serial No. is got, press Download.
- f) After the progress bar reached 100%, the software of the module is updated.

**\* For more information, please kindly refer to the Two Way Protocol.**