



## 2.4GHz Two Way Radio System

### 1. Introduction:

FrSky is going to present a new 2.4GHz Two Way communication system which will make your hobby life rich and varied. It will provide you a reliable, fun experience of Duplex Communication.

### 2. Overviews

#### Transmitter modules:

- Model: DFT

Compatible with follow transmitter:

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

Hitec: Optic 6, Eclipse 7, Prism 7.

WFLY: WFT09, WFT08.

- Model: DJT

Compatible with follow transmitter:

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

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

#### Receiver module:

- Model: D8R

Compatible with FrSky Two Way module DFT/DJT

### 3. Features

- ACCST technology (Advanced Continuous Channel Shifting Technology) provides high interference rejection even in an interference rich environment .
- Voltage status of Rx delivery to Tx.
- Error-free user bytes delivery to Tx.
- Alarm on events of receiver (low battery voltages, poor reception, etc.)



- Universal transmitter and receiver for all 4ch – 8ch controllers.
- Quick and precise response.
- Error-free link, by using 48bits CRC algorithm.
- Low power consumption.
- Failsafe: 2 safety measures provided to user.
- Range check.
- Dual antennas diversity
- Transmitter modules are fitted with an alarm triggered by dangerous situations (low battery voltage, poor reception, etc.) of receiver.
- No crystals used

### 4. Function of Two Way communication

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

### 5. Specifications

#### 5.1 Transmitter Module is compatible with the following transmitters:

**Futaba/Hitec module:** Futaba: 3PK, 3PM, 7U, 8U, 8J, 9C, 9Z, 10C and FN series.

Hitec: Optic 6, Eclipse 7.

WFLY: WFT09, WFT 08.

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



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

## 5.2 Receiver specifications:

Operating Voltage Range: 4.8V-6V

Operating Current: 30mA

Specified Range: 1.2km

Resolution: 10bit

Latency: 22ms

Number of Channels: 8CH

## 5.3 Transmitter module specifications:

Operating Voltage Range: 6.0V-13.0V

Operating Current: 50mA

Output Power: 60mW

Resolution: 10bit

### 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 and Operation process

#### 6.1.1 Installation of the transmitting module:

- a) Remove the original transmitting module.
- b) Put the FrSky 2.4GHz transmitter module into the module port of your RC transmitter and screw on the transmitting antenna.



- c) Turn the transmitter power on and check the RF power indicators on the module and transmitter are working.

#### 6.1.2 Installation of receivers:

The D8R receiver incorporates two separate antennas into its design which enables it to receive the radio frequency transmission at two different locations. The tip of the antenna cable is the receiving portion (the thinner part). If possible, please make sure that the two antennas are placed at 90 degrees to each other.

#### **Please note:**

This is not a critical figure, however, the most important thing is to keep the antennas away from each other as much as possible. If possible place the antennas away from metal, wires or carbon parts of the airframe to avoid signal lost. Tape or glue them in place so they cannot move around.

As the wave length of 2.4GHz is shorter than older RC systems, its ability to go around solid obstacles is weaker than those with frequencies that are below the 100MHz. Therefore, when you locate the antennas you must avoid objects as much as practical 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.

- a) Turn your FUTABA OR JR transmitter on and switch it to PPM mode, power off the TX.
- b) 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.

- c) 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.
- d) Turn off the transmitter finish the binding procedure.
- e) Turn on the transmitter. Connect the battery to the receiver when GREEN LED on transmitter is on. The LED on the receiver will indicate the receiver is receiving commands from the transmitter. In a few seconds system is ready to work (communication is established).

After the steps above are completed, both the transmitter and receiver are ready to be used. Binding is required only to set up a new link (like new or additional receiver or transmitter module). Otherwise, just go to step e.

To control multi-receivers, every receiver should be programmed with the transmitter in binding state (step b). After all receivers are binded, turn off the transmitter.

## 6.2 Range check

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

Caution must be paid when flying the unit in the neighborhood of metal fences, concrete buildings, or rows of trees. If doing so, you may experience unexpected interferences.

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

- a) Place the model at least two feet (60cm) above non-metal contaminated ground; for example a wooden bench.



- b) Place the receiver's antenna horizontally. Don't let the antenna touch the ground.
- c) Place the antenna of the transmitter in a vertical position.
- d) Turn on the transmitter and receiver, then press and hold the "F/S Range" button of the transmitter for 4 second, the RED LED of the transmitter module will change into GREEN, this moment (please do not release the "F/S Range" button of the transmitter), the power of the transmitter module will be reduced to ab. 1/10-th of the nominal value, thus effective distance will be shortened to just above 60 meter.
- e) Walk away from the model while simultaneously operating the controls on the transmitter. Have an assistant stand to confirm that all controls are completely and correctly operational. You should be able to walk ab. 60m from the receiver without losing control.
- f) Release the "F/S Range" button, the range check will be finished.

### Please note:

The whole process( from step d to f )of Range check require constantly hold the "F/S Range" button of the transmitter.

## 6.3 Safety range indicator

When the model controlled by Two Way 2.4GHz radio control system is close to the maximum distance of control, the response of the model will slow down. It is the safety feature designed by FrSky. It means, the user should fly the model closer to the transmitter as soon, as the reactions are getting slower.

## 6.4 Signal loss indicator

In some special circumstances, such as a strong interference, the signal can be lost.

When signal lost in a short period, the receiver continues to try to search for the transmitter, at the same time, keeps the last command from transmitter, until a new command is received.



## 6.5 Failsafe

Our receivers support all the failsafe function for every channel. Just do it as bellow:

After the receiver has been bind, press briefly (less than 1 second) the "F/S Range" button of the transmitter module, and then, the transmitter module will make a sound "beep", the failsafe is set up successfully.

If you do not need the failsafe function any more, just briefly press the "F/S Range" button again.

## 6.6 Setup of Alarm state

Transmitter module monitors the state of receiver in order to caution users by audible alarm according to the situation.

The alarm state is made a distinction between three levels:

**RED** (Highest): Rapid "Beep", 100ms sound on and 100ms sound off.

**Orange** (Medium): 100ms sound on and 0.5s sound off.

**Yellow** (General): 100ms sound on and 0.25s sound off.

Monitor content:

-Rx interface 1: For voltage's monitor and alarm;

-Rx interface 2: For voltage's monitor and alarm;

-Rx interface 3: For BER (bit error rate)'s monitor and alarm;

**Note:** The alarm threshold of Rx interface 1 and 2 could be set by users. Users could set two alarm thresholds and any one of three levels alarm state for both of Rx interface 1 and 2.

And the BER alarm is always using the leave factory set.

## 6.7 Leave factory set:

Interface 1: Alarm when the voltage under 1.65V, **Yellow** alarm level;

Interface 2: Alarm when the voltage under 1.65V, **Orange** alarm level;



Interface 3: Three BER alarm level as below

**Yellow** alarm level: available, no problem.

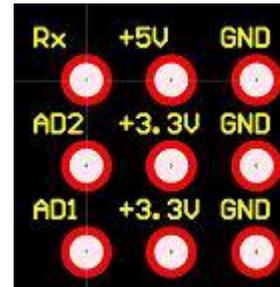
**Orange** alarm level: available, but fringe.

**RED** alarm level: over fringe, should fly the model closer to the transmitter as soon as possible.

**Note:** Due to many environment factors, maybe there will be unmeant and sudden BER alarm, but it will not affect the range of control. Users just need to pay attention to the alarm which continue exceed five seconds.

## 6.8 Pin Definition:

The Pin definition on receiver



The Pin definition on Transmitter module



Serial port speed: 4800bps, 8bit, No parity, 1 stopping bit.



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## 6.9 LED Status:

LED status on Transmitter module:

Red LED on and Green LED flashing: Normal Status

Red LED off and Green LED flashing: Range check Status

Red LED flashing and Green LED off: Binding Status

LED status on Receiver:

Red LED on and Green LED flashing: Normal Status

Red LED flashing and Green LED off: No signal receiving

Red LED on and Green LED flashing twice: Failsafe is set up successfully

**Attention:** Controlling distance is affected by the environment too. Please test it in an open field away from any obstacles. The controlling distance in the air is greater than that on the ground. Our controlling range is based on a conservative ground test.

We hope you enjoy our Two way 2.4GHz products. They have been designed and produced using the highest quality control measures available. If you have any questions please do not hesitate to contact us.