

FIM-2430 User Manual



RX on Ground

TX on Board

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IWAVE COMMUNICATIONS CO., LIMITED

V2.0

I. Disclaimer

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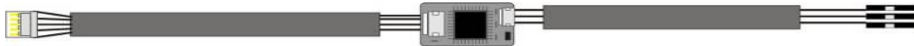


II. Precautions for integration

- 1) Be sure to use the parts provided by IWAVE.
- 2) Reverse connecting power line positive and negative will burn the device out.

- 3) Before powering on please make sure the antenna are in good connection and not install or remove the antennas with power on.
- 4) Given that the carbon fiber body and metal load may have shielding effects on antenna signals, they should not be installed between the antenna and ground terminal. Keep the antenna on board free from winding or blocking by obstacles. The antenna end should be vertically downward without bending to prevent shortening communication distance and failure communication.
- 5) Antennas on board should be kept away from other radio antennas to avoid electromagnetic noise and interference. We recommend to make full use of data and video transmitting function of FIM-2430 to minimize the radio devices quantity on board.
- 6) If using PTZ Camera, please do the PTZ self-testing firstly then connect HDMI cable.
- 7) HDMI cable and antenna on board may interfere with GPS. Please keep the HDMI cable and antenna away from the GPS module and its cables.
- 8) Do not disassemble or modify IWAVE FIM-2430. Any problem during installation, contact IWAVE or IWAVE local branch office.
- 9) Keep appropriate distances between different electronic devices during installation to minimize the electromagnetic interference.
- 10) Before using, please make sure all cables are in good connection and all components can work properly.
- 11) After starting the product, the self-test indicators of FIM-2430 will continuously blink for 30s and then keep bright. Only after the video from the camera shown on the display, then you can confirm that the device work properly now.
- 12) Check the surrounding environment to ensure there is no other 2.4GHz devices to cause interference.
- 13) If you use the Futaba remote controller, the controller should be adjusted into the French mode. Otherwise, the video transmission performance will be serious affected
- 14) Before using, please check the power of RX and TX. If the receiver power off, transmitter on board will lose connection.
- 15) Adjusting RX antenna inclination can improve the signal strength and image quality.
- 16) The camera should be fully charged to ensure normal video output.
- 17) FIM-2430 support video and duplex data communication. If the video stuck or stopped for more than 10s. It means the radio signal is weakened or the radio channel is narrowed. In this case, the aircraft need to fly back to short the distance between TX and RX. Otherwise, the TX will lose connection.
- 18) Please use good electromagnetic shielding accessories(HDMI Cable, HD display and so on)

Notes: Improper operation of FIM-2430 may cause personal injury or damage to properties. Please pay high attention to operation safety.

III. List of in-box items

On board x1	Ground terminal x1
	
On board antenna x1	Ground antenna x1
	
DC power cable x2	
	
TTL cable *3	
	
HDMI video cable x2	
	
Network cable x3	
	
TTL to RS232 cable x2(On request)	
	
USB TTL serial port x2	
	
SMA Cable(Copper wire tinned shield semi-soft line) x4	
	

IV. Interface Definition

4.1. TX and Rx Interface Definition(Tx and Rx have same interface definition)

4.1.1. Power Interface



Power on/off: Pull - type switch
 Power Connector: XT30PW-F(Female)
 Power Cable: One end XT30PW(Male), the other end DC(female)



4.1.2. S1 Serial Port: 5P GH with lock socket(GH 1.25mm, we only use 4P)

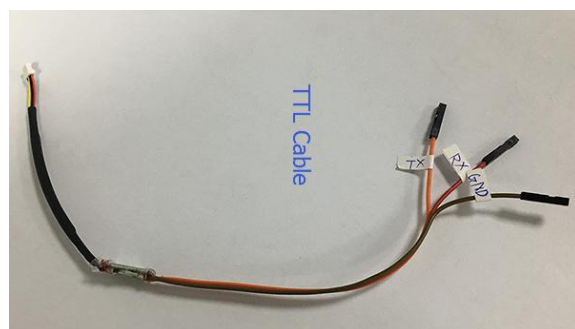


GH 5P	Signal Definition
1	TXD
2	RXD
3	3.3V
4	GND

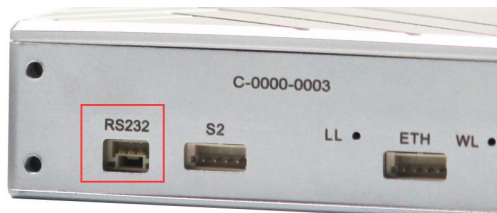


4.1.3. How to connect with Auto Pilot system on board by TTL cable

If your Auto pilot system is TTL interface for data. You can use the TTL cable to connect the transmitter's S1 port with auto pilot system.

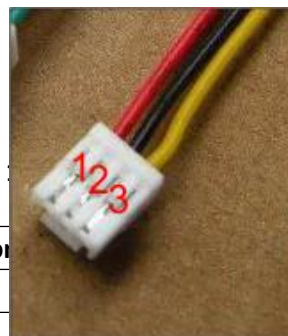


4.1.4. RS232 Interface

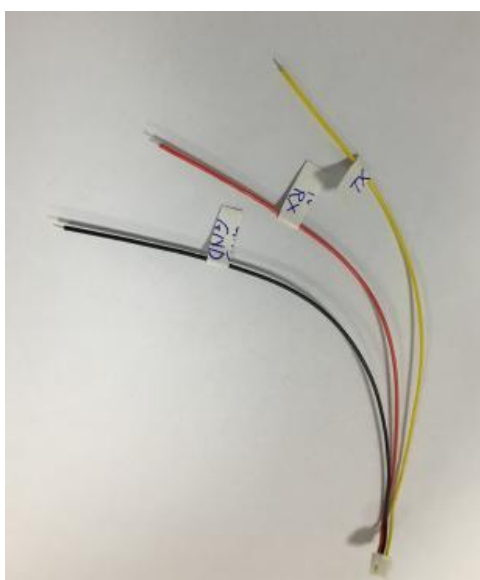


RS232: 3p GH with lock socket(GH 3P)

GH 3P	Signal Definition
1	TXD
2	GND
3	RXD



4.1.5. How to connect with Auto Pilot system on board by RS232 cable



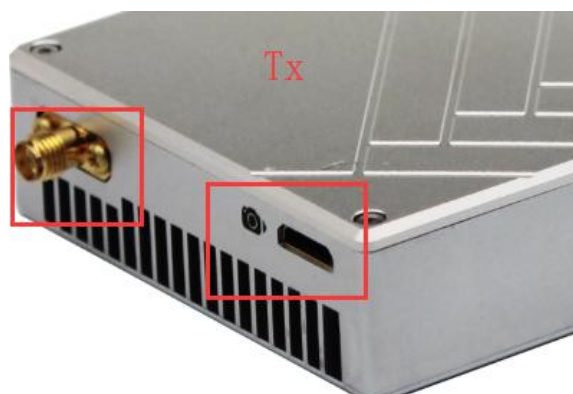
If your Auto pilot system is RS232 interface for data. You can use the RS232 cable to connect the transmitter's RS232 port with auto pilot system.

Remark: RS232 and S1 are options for fly control system. They can not be used at same time.

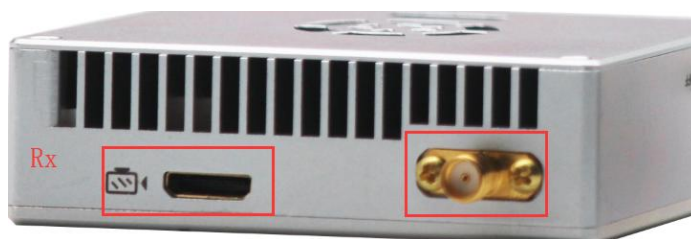
4.1.6. RF and HDMI Interface

RF: Standard SMA to connect with antenna or feeder cable

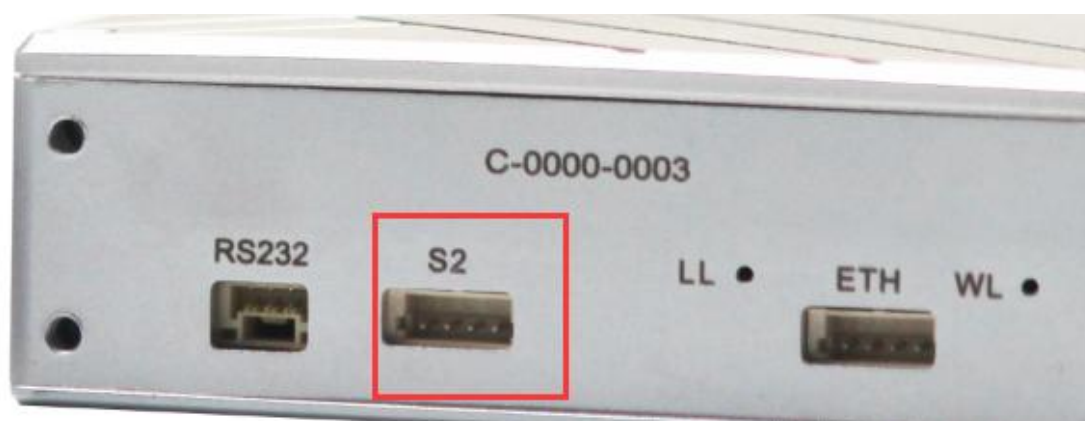
HDMI Interface: Mini HDMI



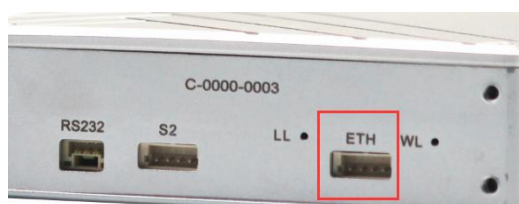
(Port with camera Marker is video input(Tx), Port with display marker is video output(RX))



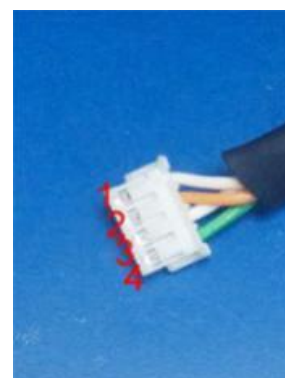
4.1.7. S2 Interface: EZH 4P 1.5mm(Not available now)



4.1.8. ETH: EZH 4P 1.5mm



NO	Ethernet Signal Definition
1	TX+
2	TX
3	RX+
4	RX



4.1.9. How connect Rx with GCS by TTL to USB Cable



For Receiver, to connect with GCS you can use the TTL to USB cable.

V. Operating Instructions & Steps

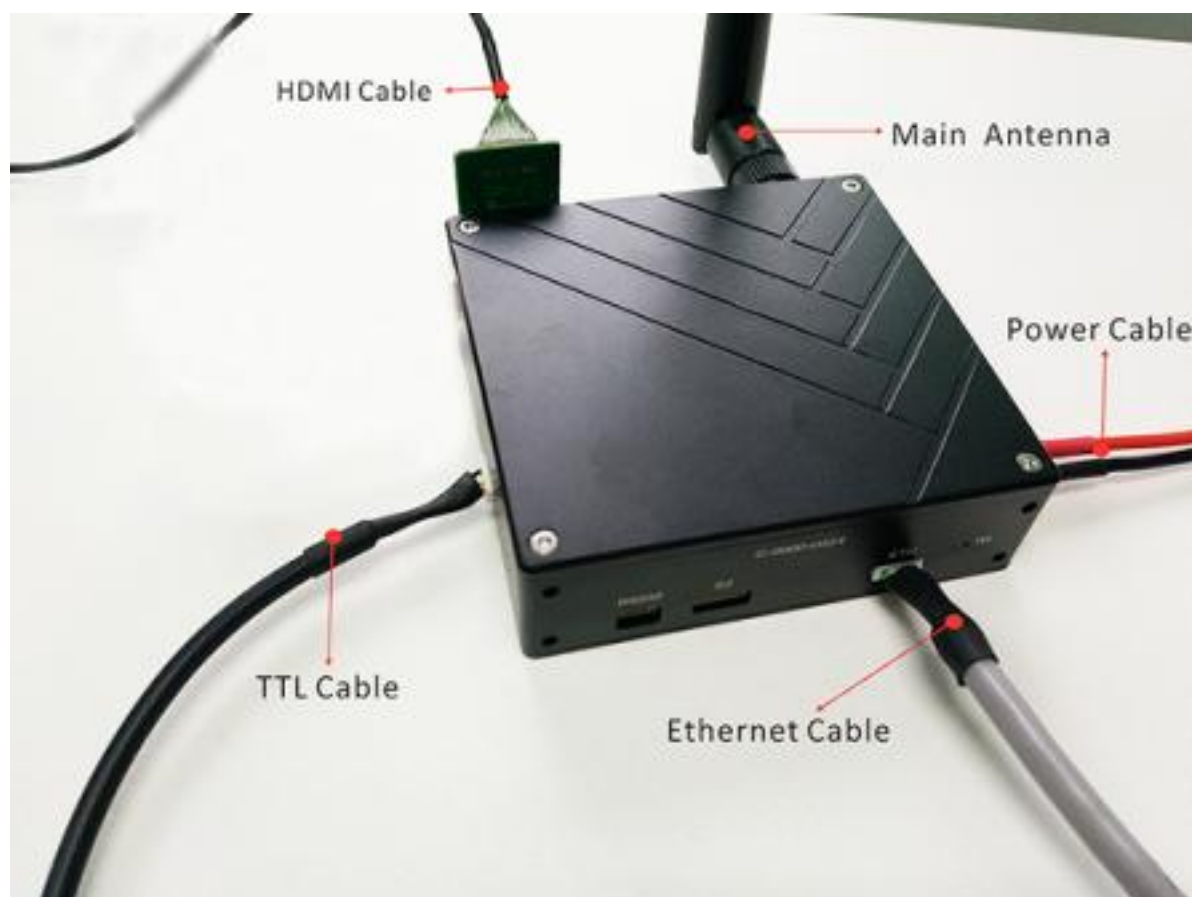
5.1. Make TX and RX and accessories ready.

Besides the whole equipment we supply, you also need to make sure the video source, display and power ready before operating.



5.2. Connection

Make the power cable, HDMI Cable, Ethernet cable, serial port cable and antenna in good connection.
(Ethernet cable is used to output video to PC or connect with PC to adjust parameters by our software, the serial port cable is for data links)



5.3. Power on

After checking all the connections are in good condition, turn on the the video source, LCD display, transmitter and receiver. The PWR indicator will bright and the whole system starts work.

5.4. The status of all indicators during starting



When the device begin to normally start work, all indicators status is described as follow:

- ① After power on, light 1,2,3 turn green, light 6 turns blue.
- ② After few seconds, light 1,2,3,6 start flashing. And light 5 green is normally on.

③ After the starting complete. Light 1(Green), 2(Green), 3(Green), 6(blue), 4(Red) are normally on. Light 5(Green) will fast blink.

④ When data transmission goes well, WL green light will flicker.

Remark: Light1, 2, 3 are indicator for signal strength.

① Light 1 on: Signal Weak

② Light 1,2 on: Signal Normal

③ Light 1,2,3 on: Signal Strong

④ When green light 1,2,3 repeatedly flash in sequence: No connection. The connection between TX and RX is failed

⑤ Light 4 is Data connection light. If light 4 not bright, which means no data connection.

⑥ When the transmission is normal, the WL light will normal on.

⑦ After the receiver powered, the "POWER ON" letters will be showed on the display bottom right corner



5.5. Boot up successfully

After successfully connection, the display will smoothly show the image.

Remark: In UAV application, please make the connection successfully and the video show on ground station smoothly then fly the UAV. About how to install the antenna on UAV please refer the following description.

VI. Antenna Installation

6.1. Multi-rotor UAV

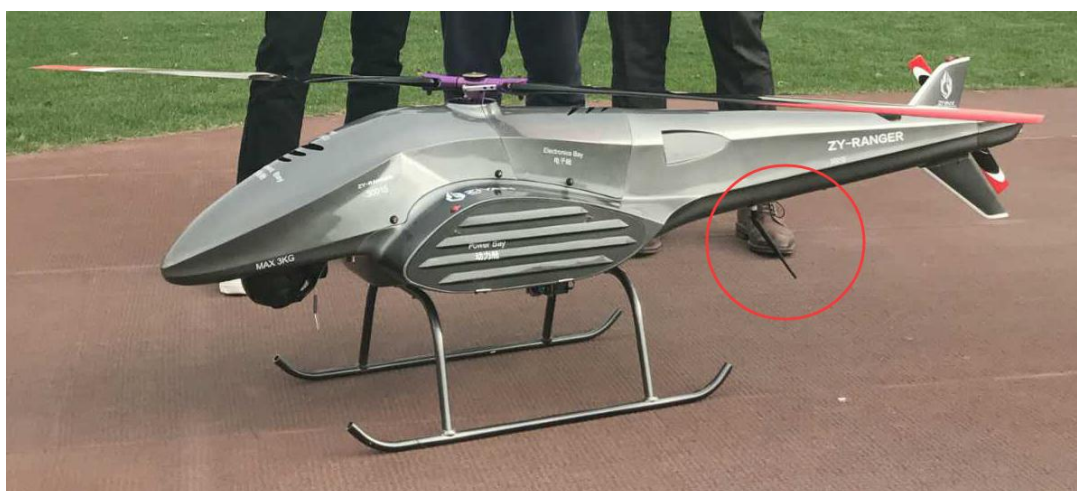


- 1) Using SMA metal shielded semi-flexible blue feeder cable provided by IWAVE to connect the TX SMA port with antenna.
- 2) The antenna needs to be mounted vertically downwards.
- 3) The best installation location is UAV ground bracket. With antenna inside, the bracket can only use fiberglass material.
- 4) If the ground bracket is automatically retracted, the antenna can be installed in the lower part of the aircraft.
- 5) If the antenna is intercepted by the camera or pod or the loudspeaker, the video on RX will appear image stuck or mosaic.



6.2. Fixed Wing UAV

- 1) Using SMA metal shielded semi-flexible blue feeder cable provided by IWAVE to connect the TX SMA port with antenna.
- 2) The antenna needs to be mounted vertically downwards.



- 3) The best installation position is center of UAV tail, prominent outside the body and vertical downward.
- 4) The second optional mounting position is located below the wing and body joints, vertical down, as far as possible away from the wing but near the machine abdomen, protruding below the abdomen level.



VII. Software Operation

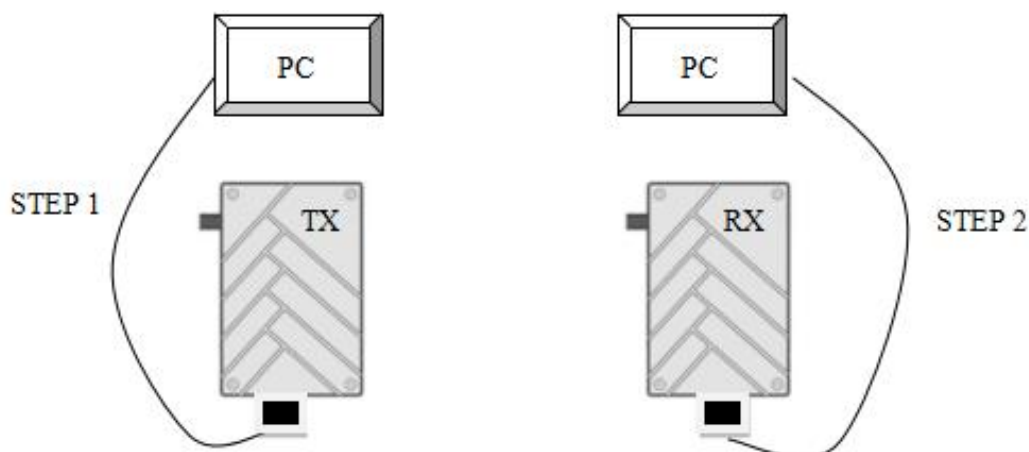
7.1. Two ways for changing the parameters

The parameters can be changed by software IWAVE supplied such as bandwidth, code stream and so on. Two windows for device on board and ground station can be operated at the same time to do monitoring or setting. The SNR (db) / RSSI (dbm) will be updated in real time.

Notes: As for one pair of our devices, their parameters should be consistent, which means when you change one of them, you have to change another one, or they will lose connection.

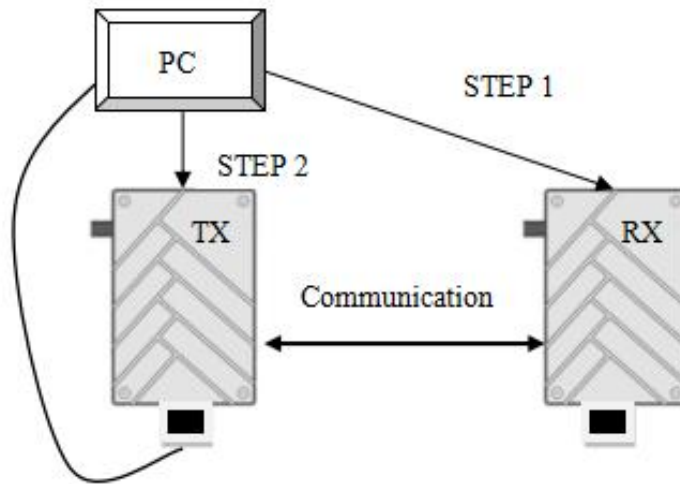
There are two ways to modify the parameters .

Solution 1. Connect Transmitter and Receiver separately to PC, then change their parameters one by one.



Solution 2. Make sure communication between TX and RX is successful, connect TX with PC to changing

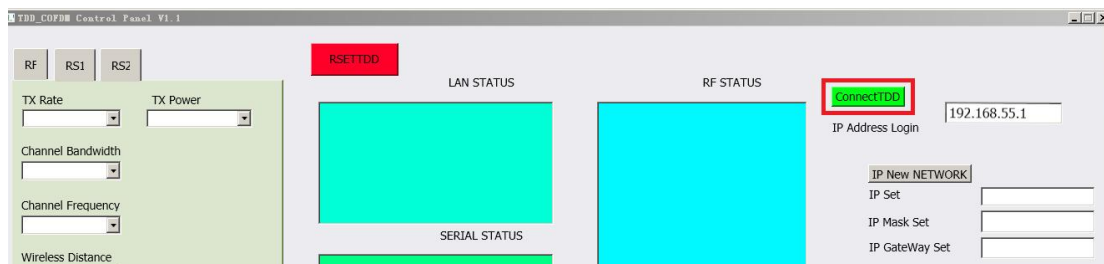
another one RX parameters by input its IP address firstly. After changing finish, the communication will fail. Because the parameters of TX and RX are different now. Secondly, change the TX parameters. After the changing is ok, the communication will be successful again. If you connect the PC with RX, you need to change the TX parameters firstly, then is the RX parameters.



7.2. How to use the software

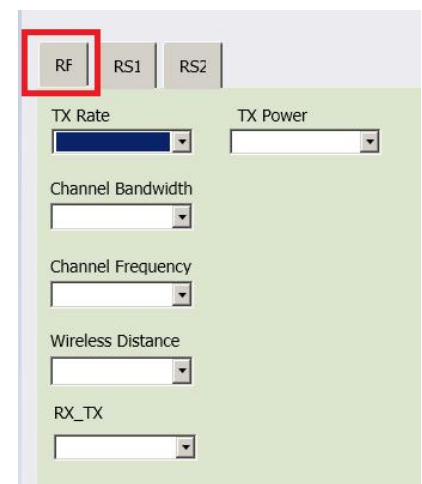
7.2.1. Login

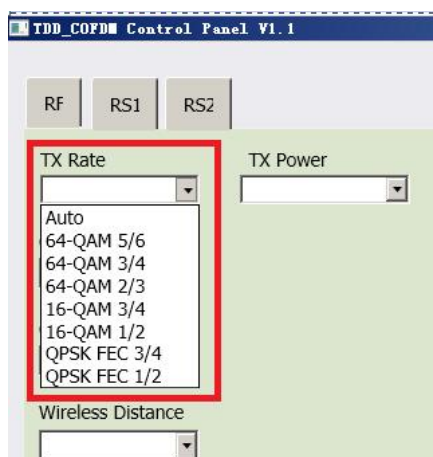
- ① Open the TDD software
- ② Input the IP address (TX Default IP: 192.168.55.1)(RX Default IP: 192.168.55.2)
- ③ Next click **Connect TDD** button.



7.2.2. RF Configuration

Take TX as a sample, In RF Part, you can modify six parameters listed in the following picture: TX Rate, TX Power, Channel Bandwidth, Channel Frequency, Wireless Distance, TX-RX as the follow pic.





TX Rate (Default: QPSK FEC 1/2)

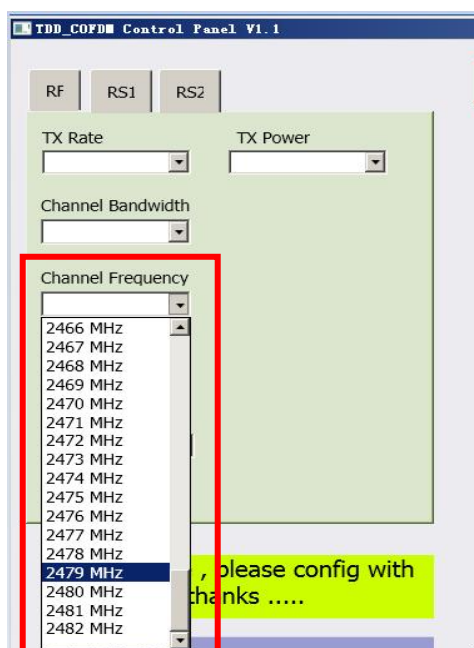
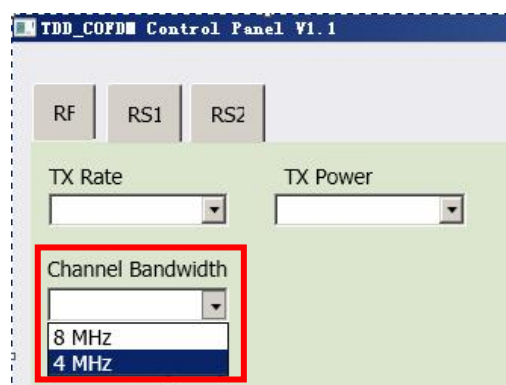
This setting determines the modulation type and rate that the data will be wirelessly transferred.

'Auto' means the system will transfer data at the highest possible rate in consideration of the receive signal strength (RSSI). Refer to Performance for a table breakdown of performance at selected rates.

If setting a fixed TX Rate It is recommended to retain a fade margin of at least 10 dbm for optimum performance. For example, for a link (8MHz channel) with a signal strength at least -75dBm, a TX rate of 16-QAM 3/4 FEC is recommended. Setting to the highest rate with a poor link may result in reduced performance.

Channel Bandwidth (Default: 4Mhz)

You can select the channel bandwidth from the list. Refer to the specifications to see the relationship and performance between channel bandwidth, throughput and sensitivity. Generally a larger channel has greater throughput, at the cost of sensitivity, while a smaller channel tends to be more robust, but at the cost of throughput.



Channel-Frequency (Default: 2479Mhz)

2402 - 2482 (1MHz BW, CH 1-81)

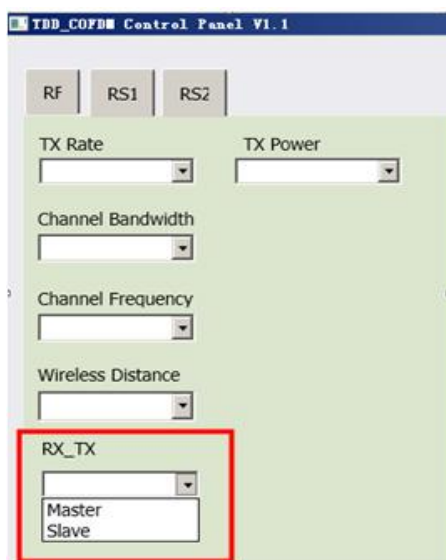
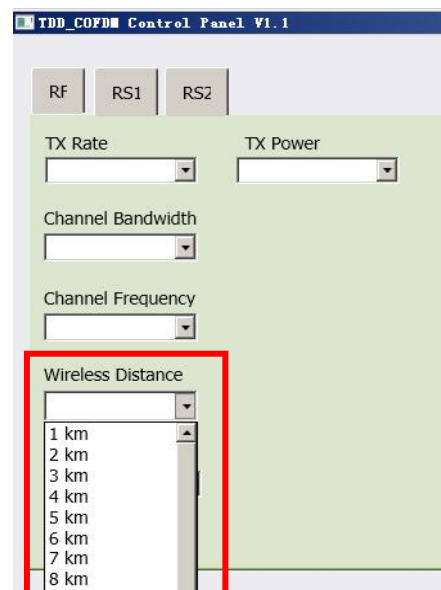
2402 - 2482 (2MHz BW, CH 1-81)

2405 - 2479 (4MHz BW, CH 4-78)

2407 - 2477 (8MHz BW, CH 6-76)

Wireless Distance (Default: e.g., FIM-2430 30km)

The Wireless Distance parameter allows a user to set the expected distance that the wireless signal needs to travel. The TDD-COFDM sets various internal timeouts to account for this travel time. Longer distances will require a higher setting, and shorter distances may perform better if the setting is reduced.



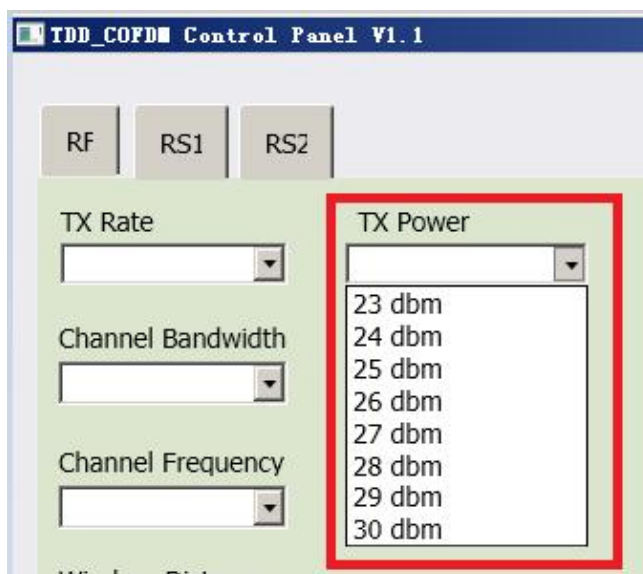
RX-TX Mode

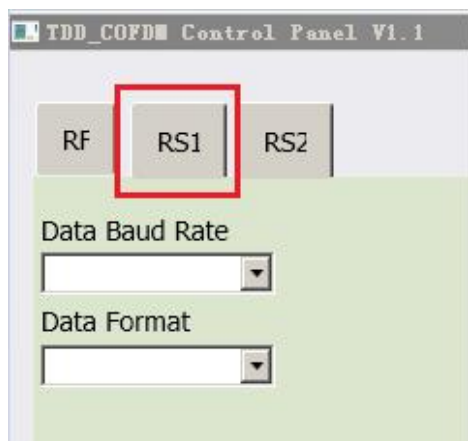
TX Master - A Master may provide a wireless data connection to many slaves

RX Slave: A Slave may sustain one wireless connection, i.e. to an Master.

TX Power(Default: 29dbm)

This setting establishes the transmit power level which will be presented to the antenna connector of the TDD_COFD. Unless required, the Tx Power should not be set into maximum, but rather for the minimum value required to maintain an adequate system fade margin.



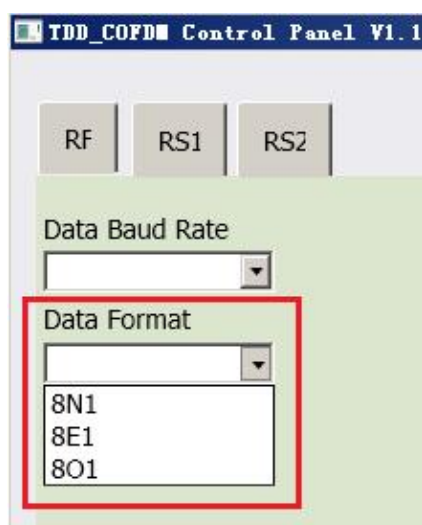
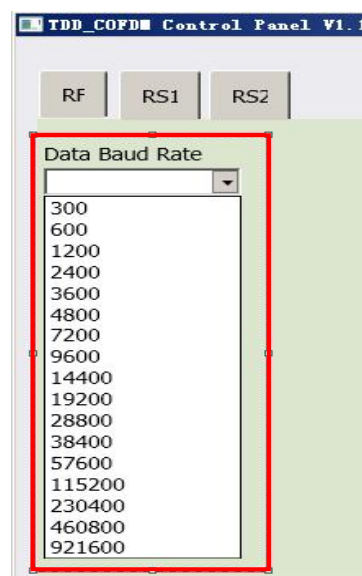


7.2.3. RS1 Configuration

In this section, you can modify two parameters listed in the following picture: Data Baud Rate and Data Format

Data Baud Rate(Default: 115200)

The serial baud rate is the rate at which modem is to communicate with the attached local asynchronous device.



Data Format (Default: 8N1)

This setting determines the format of the data on the serial port. The default is 8 data bits, No parity, and 1 Stop bit.

7.2.4. RS2 Configuration

This setting determines which protocol the serial server will use to transmit serial port data over the TDD-COFDM network.

- **Remote IP Address**

IP address of distant device to which UDP packets are sent when data received at serial port.

Default: **192.168.55.2(master)**

192.168.55.1(slave)

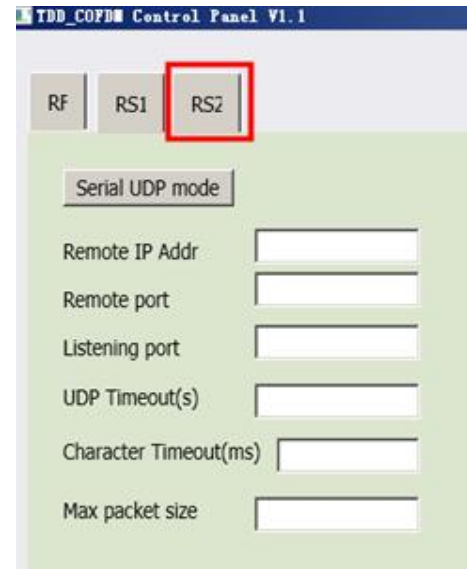
- **Remote Port**

UDP port of distant device mentioned above.

Default: **20002**

- **Listening Port**

UDP port which the IP Series listens to (monitors).



UDP packets received on this port are forwarded to the unit's serial port.

Default: **20002**

- **UDP Timeout(s)**

UDP Timeout in second.

Default: **10**

- **Character Timeout(ms)**

Character Timeout in millisecond.

Default:10

- **Max Packet size**

Default:1024

7.2.5. IP New Network Configuration

This setting helps you to change the IP address of devices. The default of master's IP address is **192.168.55.1**. The default of slave's IP address is **192.168.55.2**

For example, if you want to change the master's IP address to "192.168.55". Please do as the following steps.

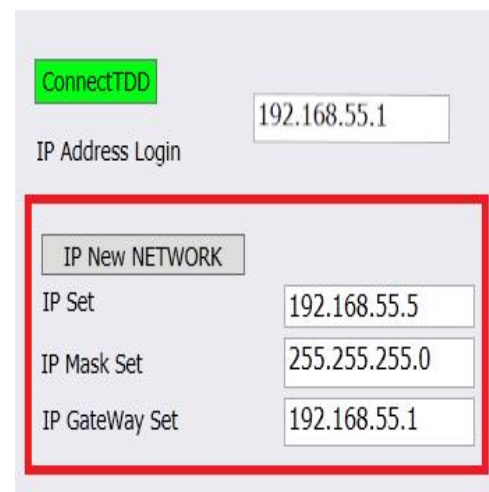
IP Set : 192.168.55.5

IP Mask Set: 255.255.255.0

IP Gateway Set: 192.168.55.1

Then click the **IP NEW NETWORK** button.

Attention! When you have changed the IP address ,you should correct another device 's "Remote IP Addr" into the same "IP SET", or the serial port will lose connection. For example , you have changed the master's IP address to "192.168.55.5", the you should correct the salver's "Remote IP Addr" to "192.168.55.5".



7.2.6. RF New NET Configuration

RF Net ID:

Each network of TDD-COFDM modules must have a unique Network ID. This Network ID must be set in each unit on the network.

RF Encrypt KEY

This is the password, or preshared key that is required by any device to connect to the wireless interface of the TDD-COFDM. It is to always have a password defined, and changed from the factory default.

After you change the ID or the RF Encrypt Key, you need click the **RF NEW NET** to save the changing.

Note: After many times changing parameters, the software will be unstable. Then you need to click the **RSETTDD** Button to restart the software. After restart, the software will be very stable.

VIII. How to get video on PC by using TPlayer

TPlayer can help you to watch the video on PC from RX.

TPlayer Software



8.1. Install the Tplayer Software on PC.



8.2. Connect the RX to PC by Ethernet Cable. If the connection is right, the Ethernet will be fast blink. If not the connection is failed.



8.3. Open the Tplayer software

After connection well, open the TPlayer



software

Then you can get the video on PC.

