

FIM-2410 User Manual








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I. Precautions for integration

- ✓ Please use the parts provided by IWAVE.
- ✓ Before powering on please make sure the antennas are in good connection and not install or remove the antennas with power on.
- ✓ Keep the antenna on board vertically downward.
- ✓ Antennas on board should be kept away from other radio antennas to avoid electromagnetic noise and interference.
- ✓ Do not disassemble or modify IWAVE FIM-2410. Any problem occur during installation, contact IWAVE or IWAVE local branch office.
- ✓ Keep proper distances between different radio devices to minimize the electromagnetic interference.
- ✓ Before use, please make sure all cables are in good connection and all components can work properly.
- ✓ Check the surrounding environment to ensure there is no other 2.4GHz devices or they will cause interference with FIM-2410.
- ✓ After powering on FIM-2410, the self-test indicator will continuously blink for 30s and then keep bright. After the camera's video shown on the display, which means the Tx and Rx work properly now.
- ✓ Before use, please check the power of RX and TX. If the Rx power off, Tx on board will lose connection.
- ✓ Please pay attention to the angle and direction of Rx antenna during flight. When the signal is poor or the image quality is not good, adjusting Rx antenna's tilt will improve the signal strength and image quality.
- ✓ The camera onboard should be fully charged to ensure normal video output.
- ✓ If the video stuck or stopped for more than 10s which means the radio signal is too weak or radio channel is narrowing. In this case, the aircraft need to fly back to short the distance between TX and RX. Otherwise, the connection will be lost.

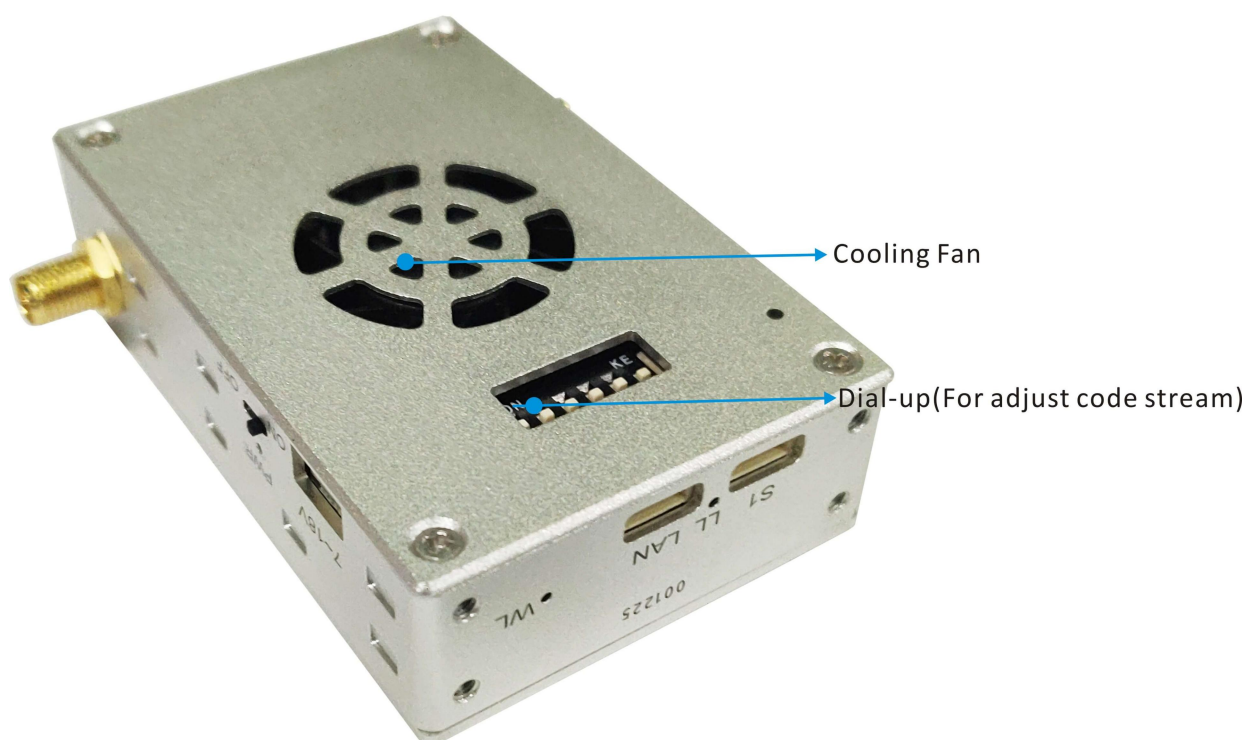
II. List of in-box items

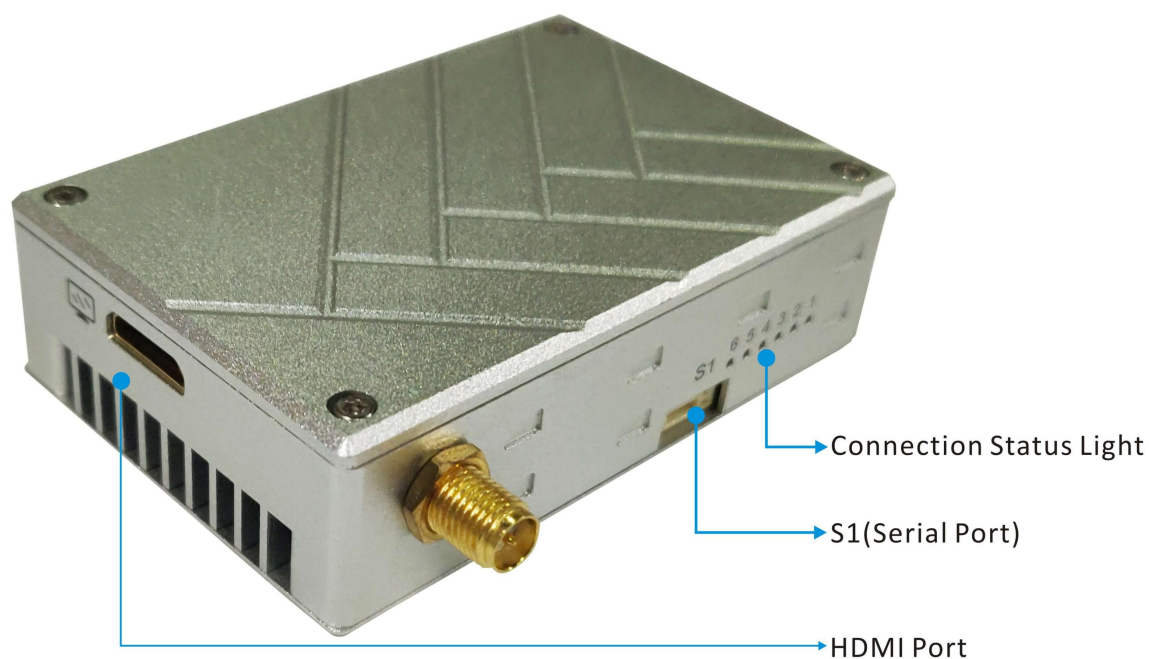
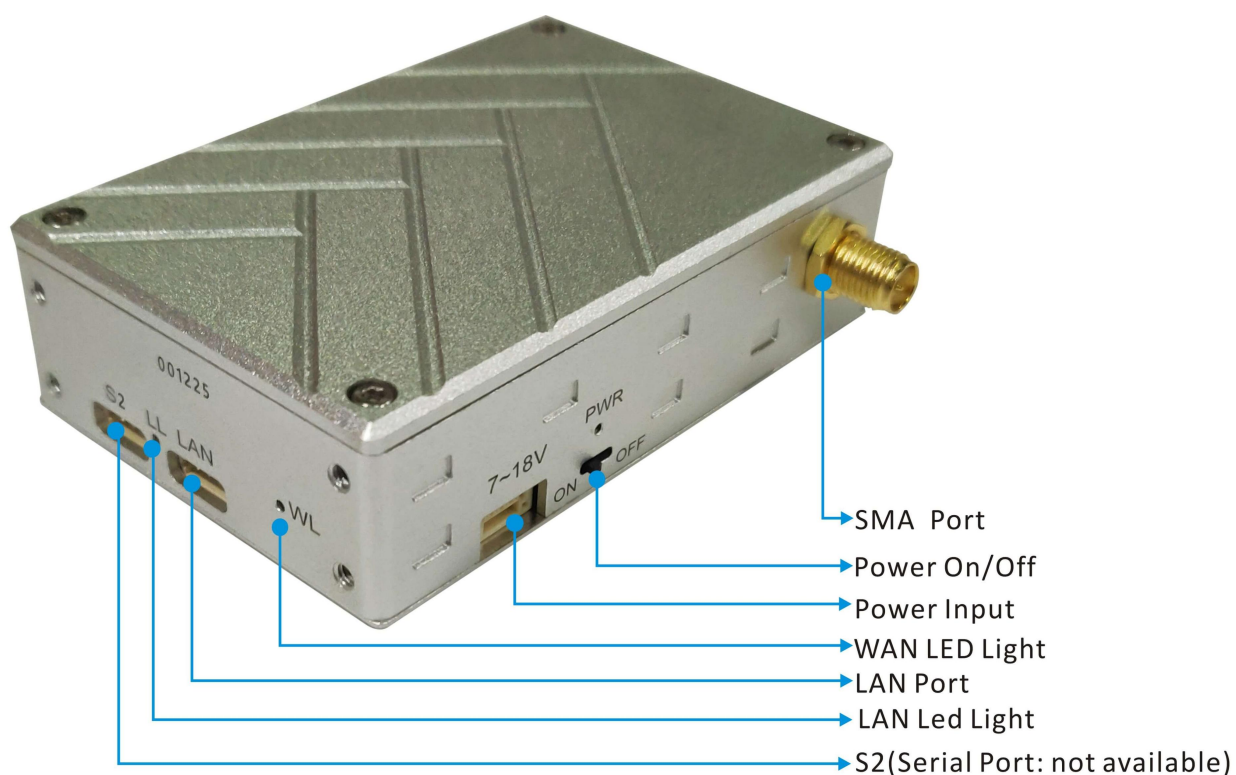
On board x1	Ground terminal x1
	
On board antenna x1	Ground antenna x1
	
DC power cable x4	
	
HDMI video cable x2	

Network cable x3
TTL cable *2
TTL to RS232 Cable x2(On request)
USB TTL serial port x2
SMA Cable(Copper wire tinned shield semi-soft line) x2

III. Interface

3.1 Interface





3.2 How to connect with Auto Pilot System

On board

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 such as pixhawk 2/cube/v2.4.8/4, Apm 2.8.

If your auto pilot system is RS232 interface for data, with the cable's definition, you can make a RS232 cable to do the connection with your auto pilot system.

On Ground

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



IV. Operating Instructions & Steps

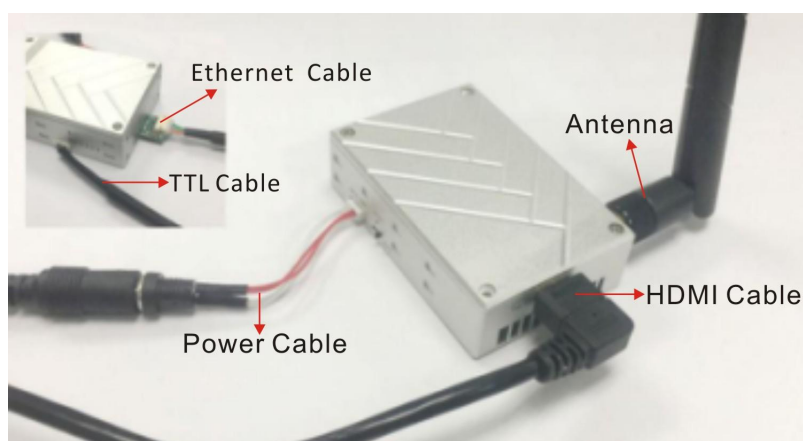
4.1 Make TX and RX and accessories ready

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



4.2 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, the serial port cable is for data links)



4.3 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.



4.4 The status of all indicators during starting

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

LL Light(LAN Led Light): LL light blinking means the network signal is being transmitted.

WL Light(WAN Led Light): WL light blinking means the video is being transmitted.

Light 1, 2, 3 are indicator for signal strength.

- Light 1 on: Signal Weak
- Light 1,2 on: Signal Normal
- Light 1,2,3 on: Signal Strong

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



4.5 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.

V. Antenna Installation

5.1 Multi-rotor UAV



SMA Feeder Cable

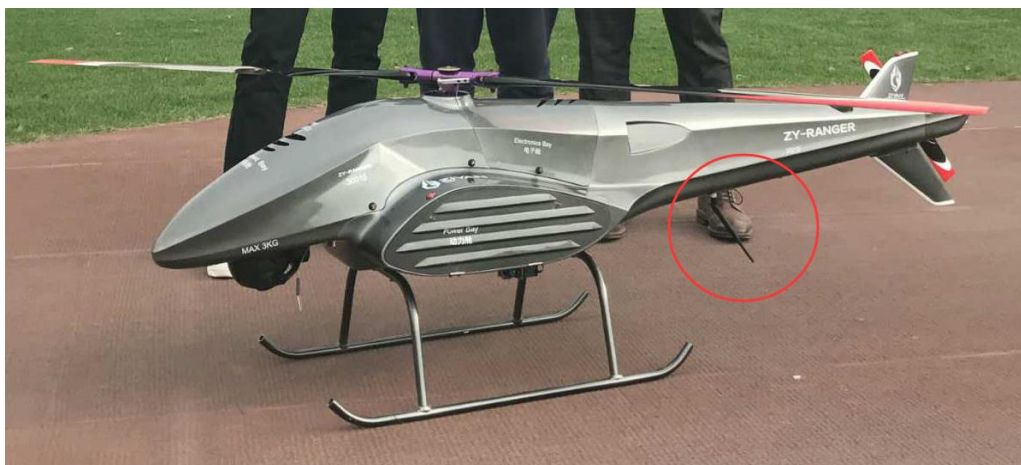


- 1) Using SMA metal shielded semi-flexible blue feeder cable provided by Hong Kong IWAVE to connect the TX SMA port with antenna.
- 2) The antenna needs to be mounted vertically downwards.
- 3) The best installation location is UAV ground bracket. With antenna inside, the bracket can only use fiberglass 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.



5.2 Fixed Wing UAV

- 1) Using SMA metal shielded semi-flexible blue feeder cable provided by Hong Kong 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.



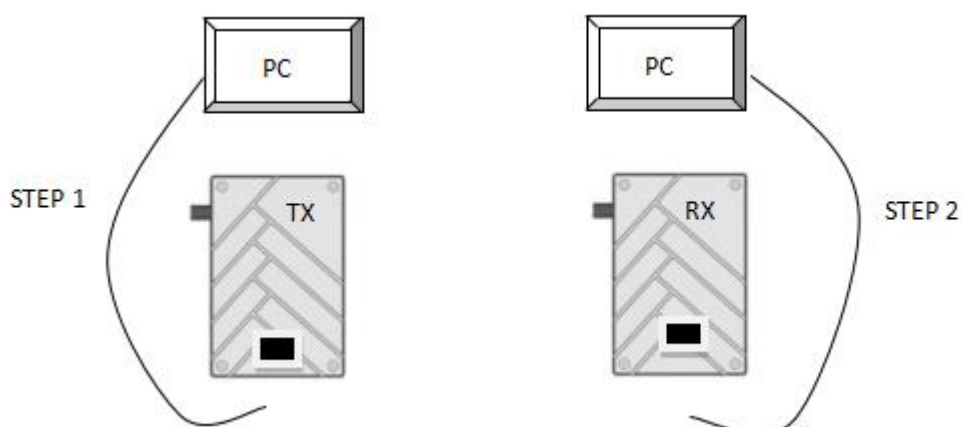
VI. Software Operation

User's Manual Book of TDD_COFDM V1.6

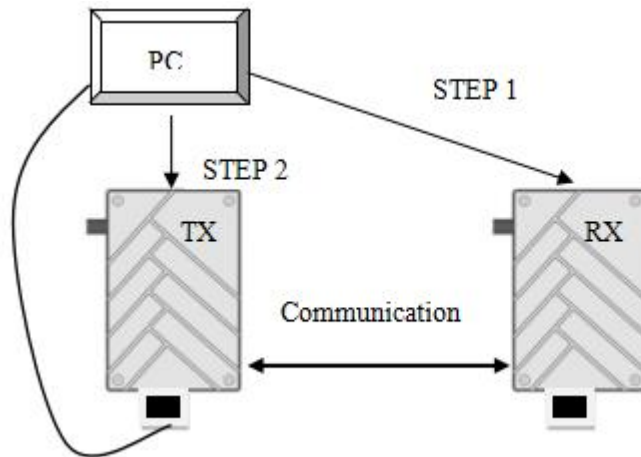
Note: Because Tx and Rx are working in pairs, so their parameters need be consistent, which means when one unit parameters are changed, the other unit parameters need to be change too. Or they will lose connection.

The following show you two ways to do the parameters settings:

(1)Connect Tx or Rx with PC separately then change their parameters one by one.



(2)When the communication between Tx and Rx are working normally, you can change the remote unit parameters through the local unit and then change the local unit parameters.



Note: If you find the devices cannot connect with PC, firstly wait for a moment for device finishing its running process, then try again.

Secondly, check whether the distance between Tx and Rx is too close, increase their distance and try again.

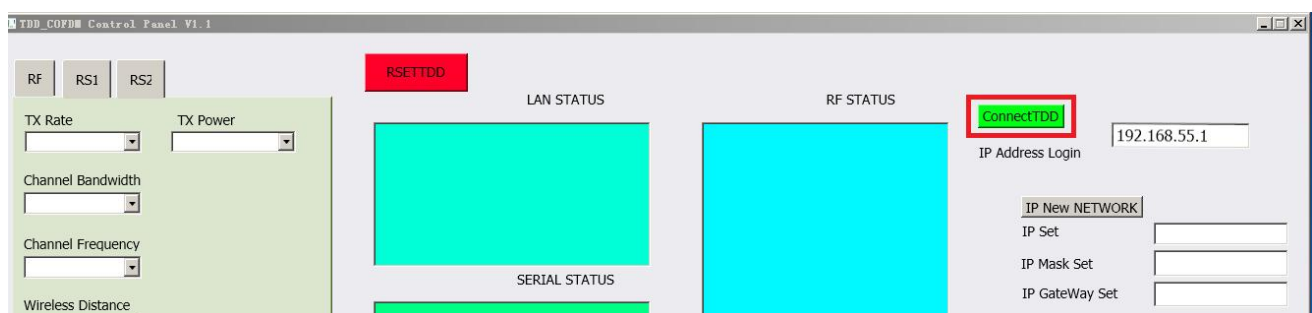
If still failure, try another Ethernet cable.

6.1 Start the Software

1) Right-click the icon to choose “Run as administrator”

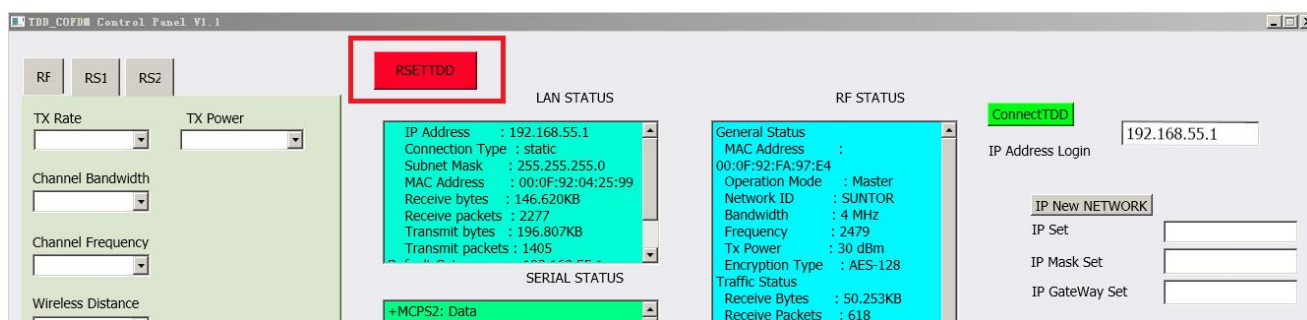


2) Enter the IP address (Tx IP: 192.168.55.1 ; Rx IP: 192.168.55.2), Next click ConnectTDD button



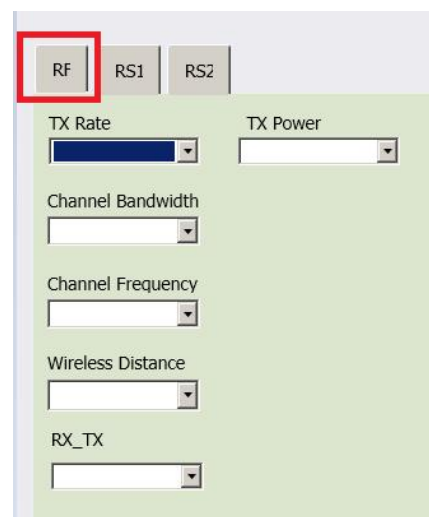
Note:

- ✓ If you want to Restart OFDM software, click RESETTDD button.
- ✓ You must restart the software after finishing TX or RX parameters changing. Then type in another one's IP address, connect and modify its parameters. Please not change IP address directly in IP ADDRESS LOGIN.



6.2 RF Configuration

In this section, you can modify six parameters.

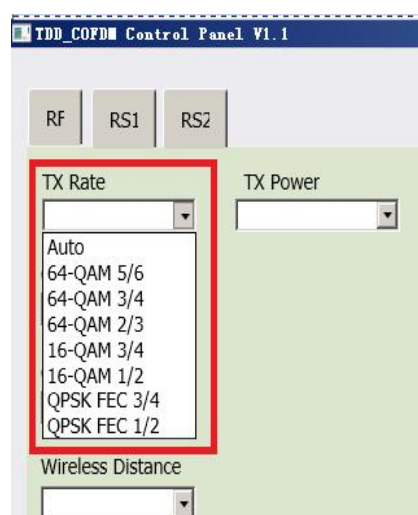


6.2.1 TX Rate(Default: QPSK FEC 1/2)

This setting determines the modulation type and the rate at which the data is wirelessly transferred. For example:

Auto: The data will be transmitted at the highest possible rate in consideration of the receive signal strength (RSSI)

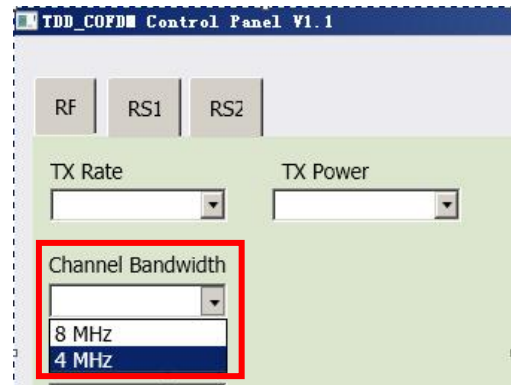
If setting a fixed TX Rate, it is recommended to retain a fade margin of at least 10dbm for optimum performance. For example, for a link (8MHz channel) with a signal strength of at least -75dBm, a TX rate of 16-QAM 3/4 FEC is recommended. Note: Setting the highest rate with a poor link will degrade the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



6.2.2.Channel Bandwidth(Default: 4Mhz)

The bandwidth channel can be selected from the list.

Note: Before choosing the bandwidth please 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.



6.2.3 Channel-Frequency (Default: 2479Mhz)

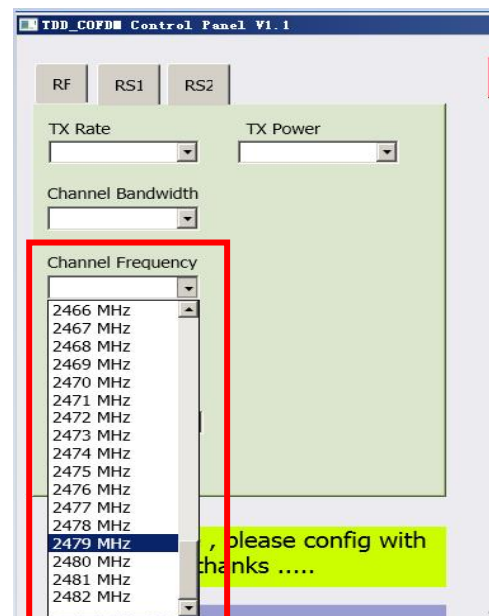
2402 - 2482 (1MHz BW, CH 1-81)

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

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

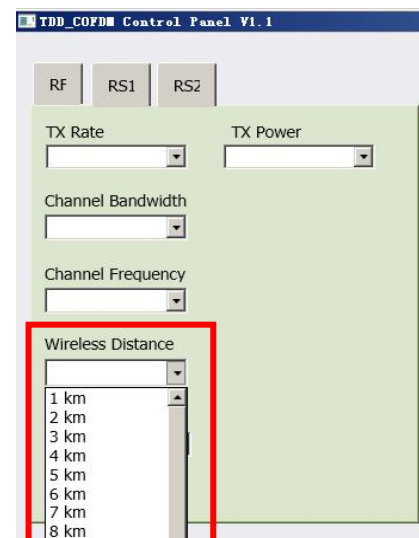
2407 - 2477 (8MHz BW, CH 6-76)

You can choose the frequency from 2402 to 2482Mhz



6.2.4 Wireless Distance(Default: 10km)

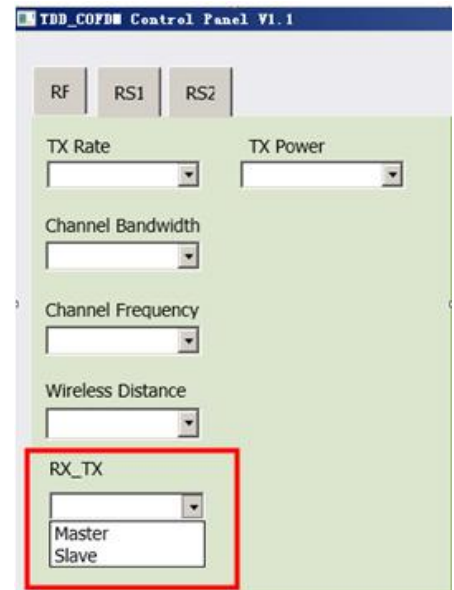
The Wireless Distance parameter allows a user to set the expected distance that the wireless signal needs to travel. The TDD-COOFDM sets various internal timeouts to account for this travel time. Longer distances will require a higher setting, and shorter distances may perform better if the setting is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



6.2.5.RX TX Mode

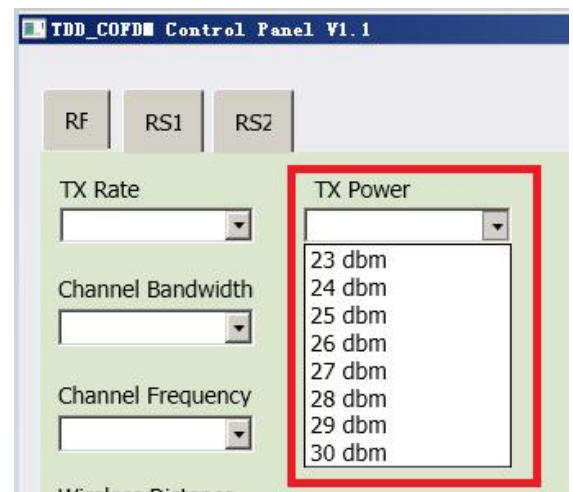
TX Master - A Master provide a wireless data connection to slave.

RX Slave- A Slave sustain one wireless connection to Master.



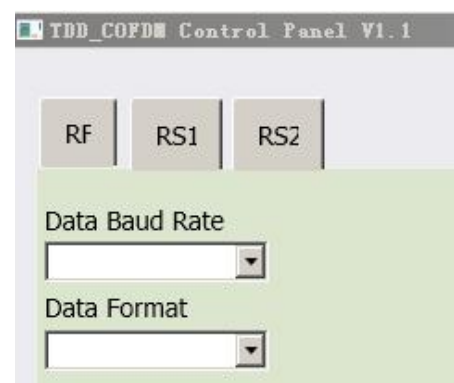
6.2.6 TX Power(Default: 30dBm)

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



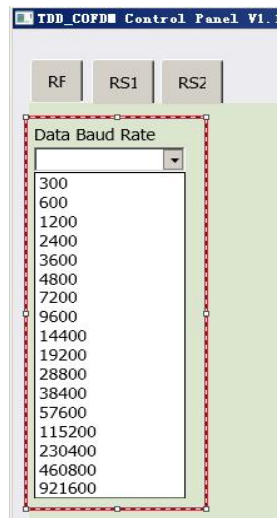
6.3 RS1 Configuration

In this section, you can modify two parameters listed in the right picture.



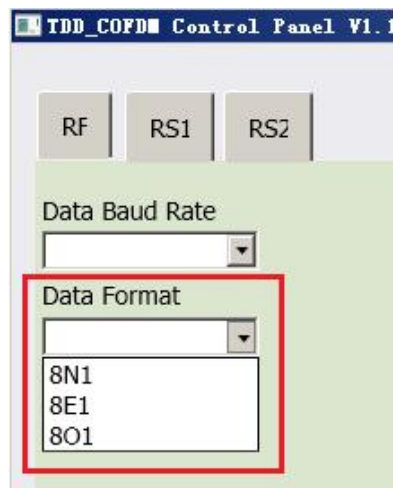
Data Baud Rate(Default: 115200)

The serial baud rate is the rate at which the 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.



6.4 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

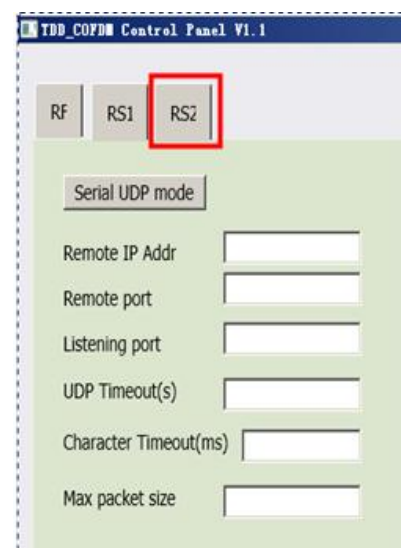
IP address of distant device to which UDP packets are sent when data received at serial port.

Default: 192.168.55.1(master)

192.168.55.2(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: 1

- Max Packet size

Default: 1024

6.5 IP New Network Configuration

This setting helps you to change the IP address of devices.

The master default IP 192.168.55.1

the slave default IP 192.168.55.2

For example, you want to change the master's IP address to "192.168.55.5". Then 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 **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 also correct the salver's "Remote IP Addr" to "192.168.55.5".

6.6 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 same in each unit on the network. You can change it according to your needs , but TX and RX must have the same RF NET ID.

Chose the box in front of RF NEW ID , and type in the RF NET ID you choose , then click RF new NET button.

Select the RF NEW ID, and type in the RF NET ID you choose, then click **RF new NET** button.

RF Encrypt KEY

This is the password or preshared key that is required by any device trying to connect with the wireless interface of the TDD-COFDM. We strongly recommend you to set a password defined, and change it from the factory default. Then your wireless transmission will be very safe.

Notice! TX and RX must have the same RF Encrypt Key.

Select the RF Encrypt Key then type in the password you set, and then click **RF new NET** button. The default encryption is AES128.

INIT CONFIG

TX means transmitter initialization and RX means receiver initialization.

We suggest that when you initialize one device, please initialize another one at the same time.

The screenshot shows the 'ConnectTDD' web interface. At the top, there's a green 'ConnectTDD' button and an 'IP Address Login' field containing '192.168.55.2'. Below this are fields for 'IP New NETWORK', 'IP Set', 'IP Mask Set', and 'IP GateWay Set'. A red box highlights the 'RF new NET' section, which includes a button labeled 'RF new NET' and two checkboxes: 'RF NET ID' and 'RF Encrypt Key', each followed by an input field. Below the red box is an 'INIT CONFIG' section.

The screenshot shows the system status and log. At the top, there's a green bar with 'Listening Port : 20002' and a cyan bar with 'MIMO OFF'. Below these are two green boxes: 'SNR (dB) : 84' and 'RSSI (dBm) : -'. A 'System Log' window shows the following text: 'IP address to connect : 192.168.55.2', 'Connection Succesful : 192.168.55.2', 'Login in success', and 'Initialization in RX mode....'.

This screenshot is similar to the one above but highlights the 'INIT CONFIG' section with a red box. A red arrow points from the 'RF new NET' button in the previous screenshot to the 'INIT CONFIG' section. The 'INIT CONFIG' section contains a grid of buttons: 'A', 'AM', 'TX', and 'RX'. The 'RX' button is circled in red. At the bottom, there's a 'QUICK CONNECT' section with a green 'Connect Last IP' button.

Connect last IP

For quickly connect to last IP

QUICK CONNECT

Connect Last IP

VII. How to get video on PC from the receiver?

7.1 Download the TPlayer Video player software and install it on your PC.



7.2 Connect the RX to PC by Ethernet Cable. Then click the TPlayer software for video monitoring.