To Costumers

Thank you very much for your favor of our products! This manual describes the usage of the FIP-2420 and amis to enable you quickly grasp the use of the product.

Version 2.0.1(4)
Date 6/24/2018
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If you have any suggestions or would like to receive more information, please visit our website at: http://www.iwavecomms.com, or email us support@iwavecomms.com.

Contents

1. Introduction

FIP-2420 is 2.4Ghz point-to-point drone digital Ethernet data downlink radio for 18km-22km range.
It supports two way TCPIP/UDP Ethernet data and duplex serial data transmission.

2.Package List

Tx & RX

TTL-USB Cable*4

Ethernet Cable*3

Antenna Cable*3

Power Cable*4

Rx Directional Antenna*1

Tx Antenna*1

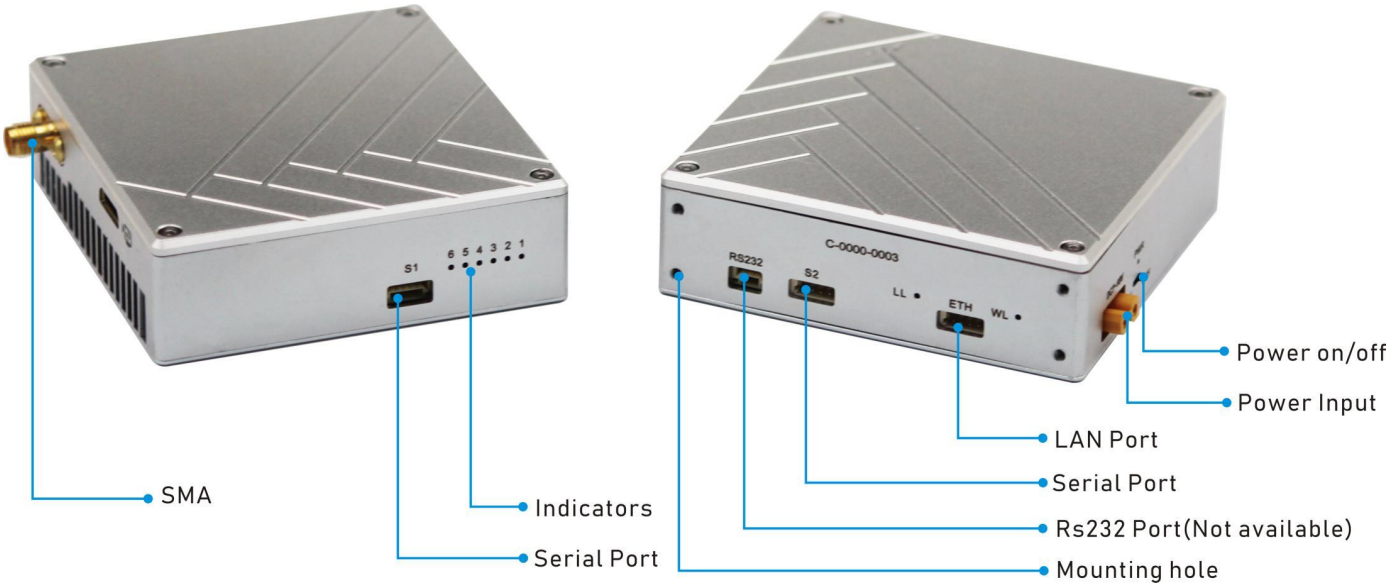
Rx Omni Antenna*1

3. Precautions

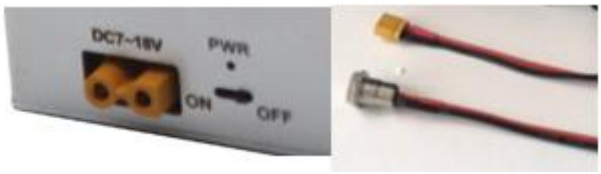
1. Please use the parts provided by IWAVE.
2. Before powering on please make sure the antennas are in good connection and not install or remove the antennas with power on.
3. Keep the antenna on board vertically downward.
4. Antennas on board should be kept away from other radio antennas to avoid electromagnetic noise and interference.
5. Do not disassemble or modify IWAVE FIP-2420. Any problem occur during installation, contact IWAVEor IWAVE local branch office.
6. Keep proper distances between different radio devices to minimize the electromagnetic interference.
7. Before use, please make sure all cables are in good connection and all components can work properly.
8. Check the surrounding environment to ensure there is no other 2.4GHz devices or they will cause interference with FIP-2420.
9. After powering on FIP-2420, 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.
10. Before use, please check the power of RX and TX. If the Rx power off, Tx on board will lose connection.
11. 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.
12. The camera onboard should be fully charged to ensure normal video output.
13. 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.

4. Interfaces and Indicators

4.1. Interfaces



Power Input Interface and Power Cable



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

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

RS232 Interface

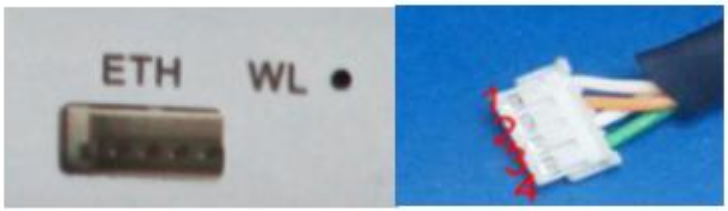
RS232: 3p GH with lock socket(GH 1.25mm)

GH 3P	Signal Definition
1	TXD
2	GND
3	RXD

RF Interface

RF: Standard SMA to connect with antenna or feeder cable

ETH: EZH 4P 1.5mm



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

5. Operating Instructions & Steps

5.1. Connection

Make the power cable, Ethernet cable, serial cable and antenna are in good connection.

The serial port(S1) and RS232 on Tx are used to connect with the fly control system such as Pixhawk or gimbal control

Note: RS232 and S1 can not be used simultaneously.

The serial port(S1) and RS232 on Rx are used to connect your PC with GCS via the TTL-USB cable

Ethernet Port: Ethernet port on Tx and Rx is for Ethernet data input and output and connecting with PC via LAN cable for parameters adjusting by IFLY software.

Power Input: DC7-18V(DC12V is advised)

5.2. Power On

After checking all the connections are in good condition, turn on the camera, display, Tx and Rx. Then PWR indicator will bright and the whole system starts work.

5.3. Indicators

When the device begin to normally work, all indicators status are 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 keep bright in green.
③ After the starting complete. Light 1(Green), 2(Green), 3(Green), 6(blue), 4(Red) keep bright. Light 5(Green) will fast blink.
④ When data transmission goes well, WL green light will flicker.

5.3. Boot up successfully

After successfully connection, the display will smoothly show camera's video.

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.

6. Antenna Installation

6.1. Multi-rotor UAV

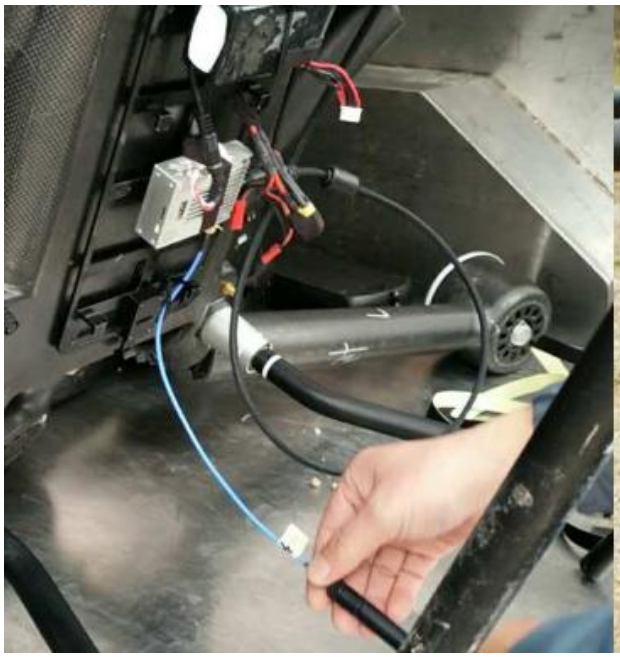
1)Using SMA cable provided by IFLY to connect the TX SMA port with antenna.

2)The antenna needs to be mounted vertically downwards.

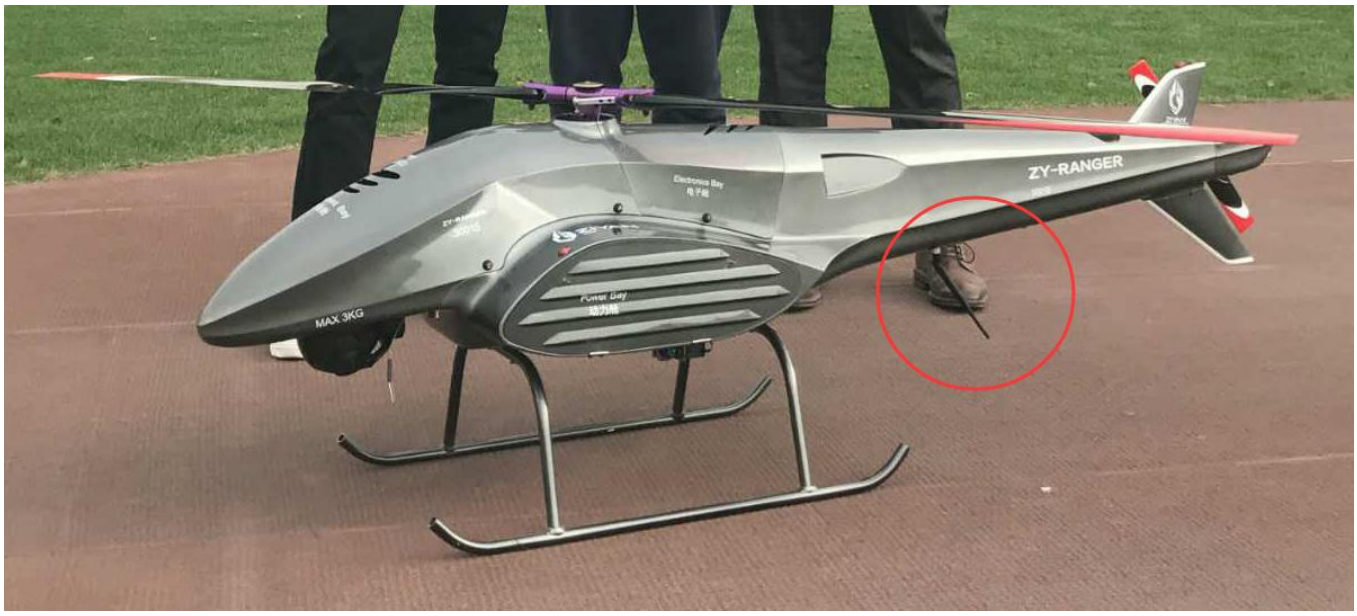
3)The best installation location is UAV ground bracket and the bracket need to be fiberglass material.

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.



6.1. Fixed Wing or VTOL Drone



1. The best installation position is center of UAV tail, prominent outside the body and vertical downward.

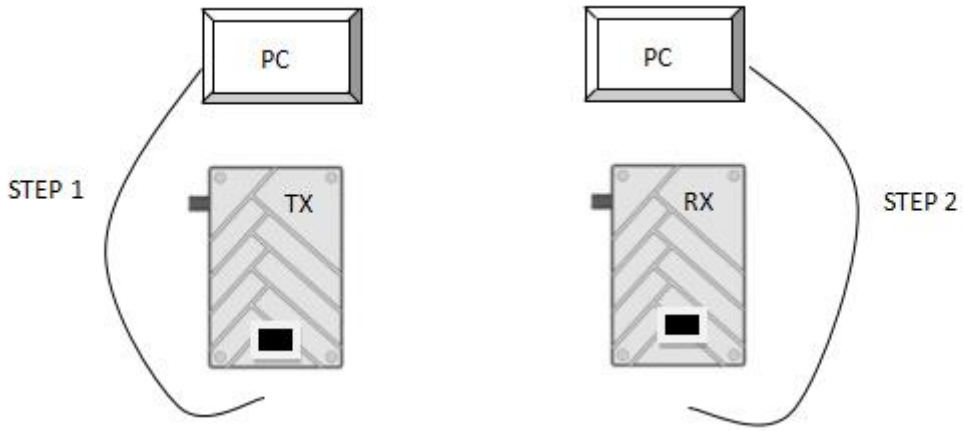
2. The second optional mounting position is located below the wing and body joints, vertical down, as far as possible away from the wing but near the machine abdomen, protruding below the abdomen level.

7. Software Operation

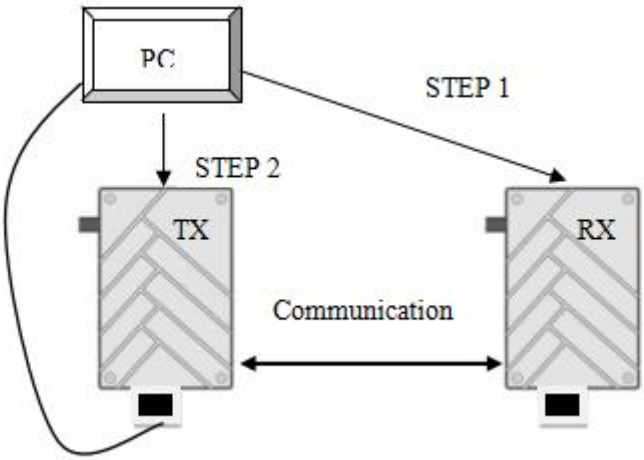
Note: Because Tx and Rx are working in pairs, so their parameters need be consistent, which means when one unit parameters are changed, the other unit parameters need to be change too. Or they will lose connection.

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.

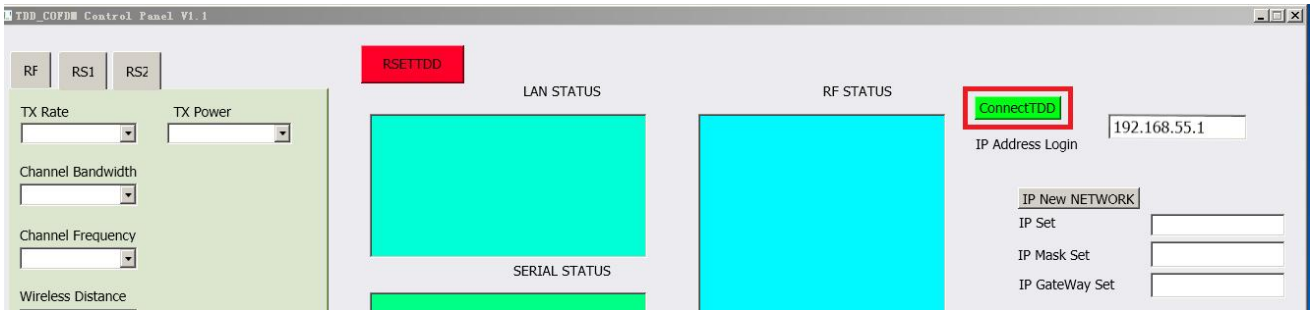
Secondly, check whether the distance between Tx and Rx is too close, increase their distance and try again.

If still failure, try another Ethernet cable.

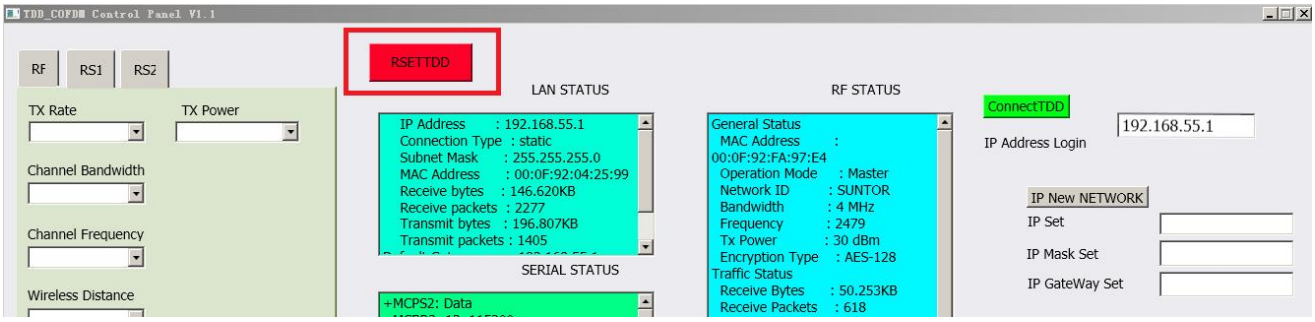
7.1. Start The Software

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

2)Enter the IP address**(Tx IP: 192.168.11.1 ; Rx IP: 192.168.11.2)**, Next click **ConnectTDD** button

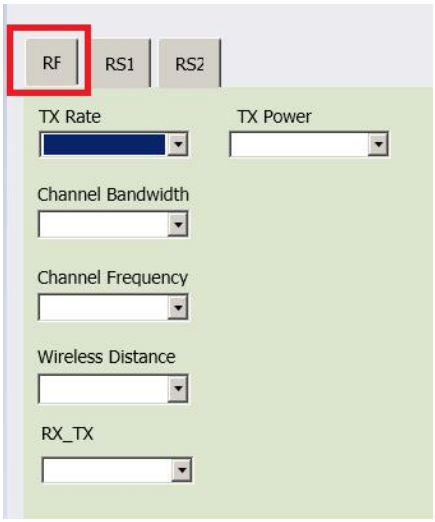


If you want to Restart OFDM software, click **RESETTDD** button.



Notice: You must restart the software after finishing modifying TX or RX parameters. Then type in another one’s IP address, connect and modify its parameters. Please not change IP address directly in IP ADDRESS LOGIN.

7.2. RF Configuration



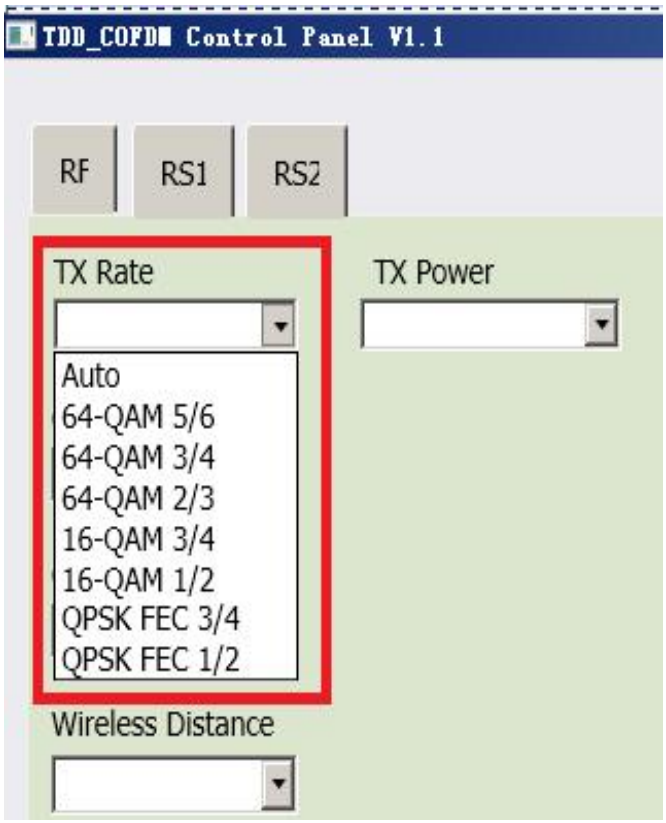
In this section, you can modify six parameters.

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.

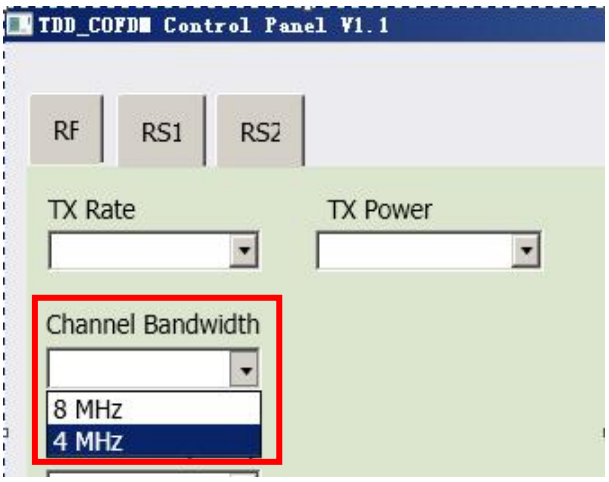


Channel Bandwidth(Default: 4Mhz)

The bandwidth channel can be selected from the list.

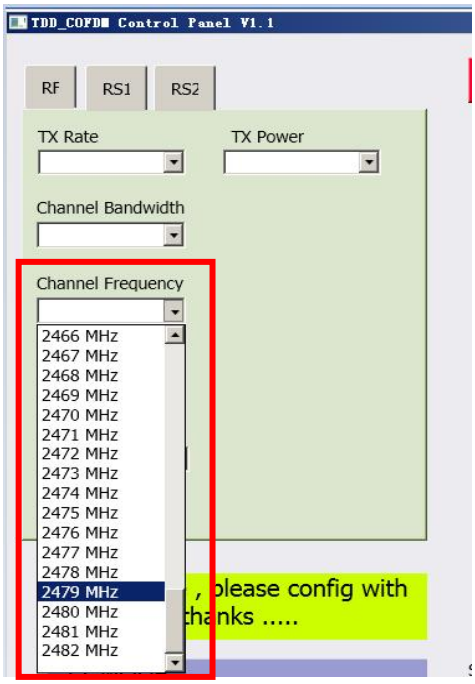
Note: Before choosing the bandwidth please refer to the specifications to see the relationship and performance between channel bandwidth , throughput and sensitivity.

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.



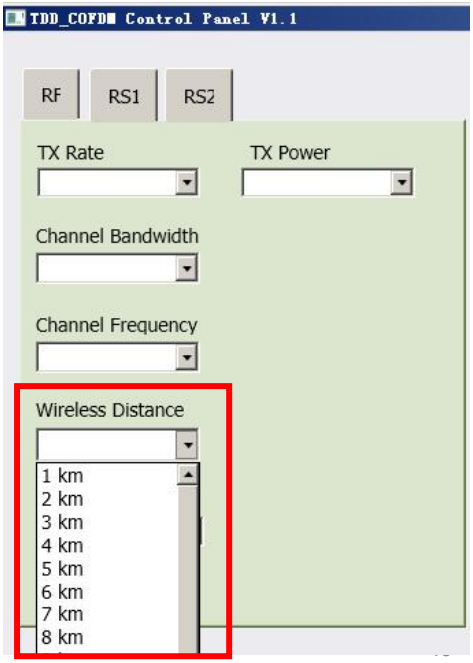
Channel-Frequency (Default: 2479Mhz)

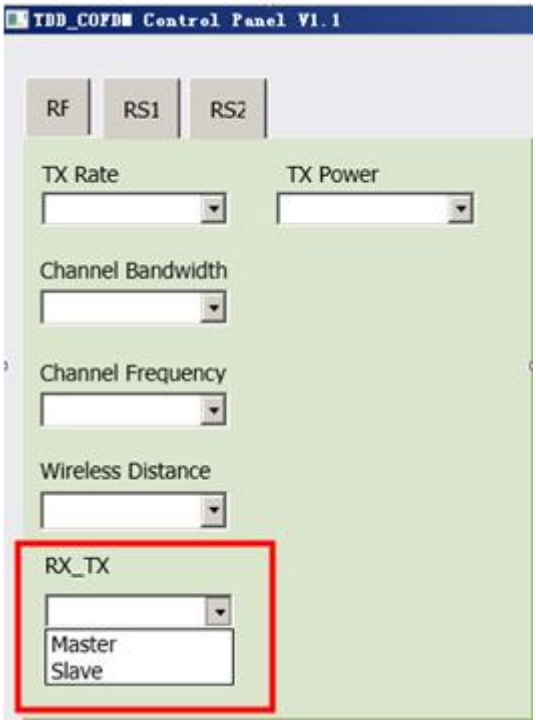
You can choose the frequency from 2402 to 2482Mhz



Wireless Distance(Default: 20km)

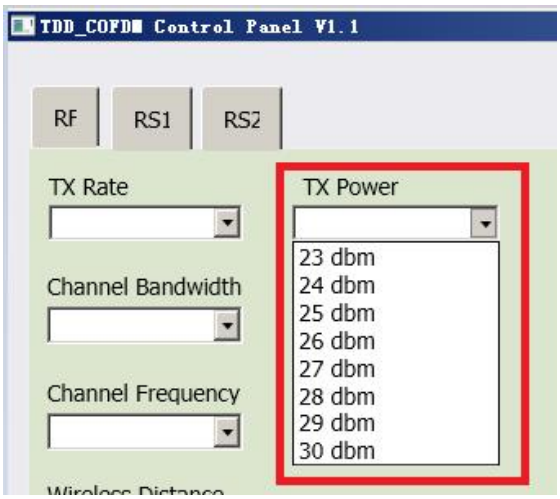
The Wireless Distance parameter allows a user to set the expected distance that the wireless signal needs to travel. The TDD-COFDM sets various internal timeouts to account for this travel time. Longer distances will require a higher setting, and shorter distances may perform better if the setting is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





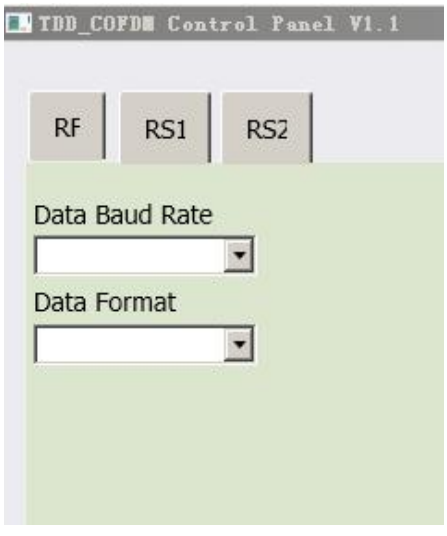
RX TX Mode

TX Master - A Master provide a wireless data connection to slave.
RX Slave- A Salve sustain one wireless connection to Master.



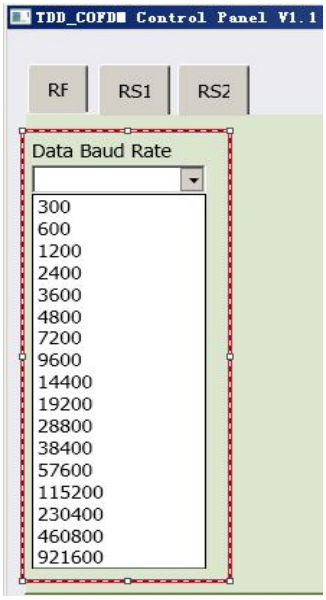
TX Power(Default: 33dBm)

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.



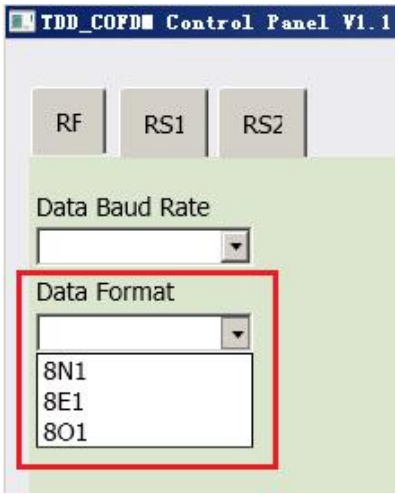
7.3. RS1 Configuration

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.

7.4. 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)

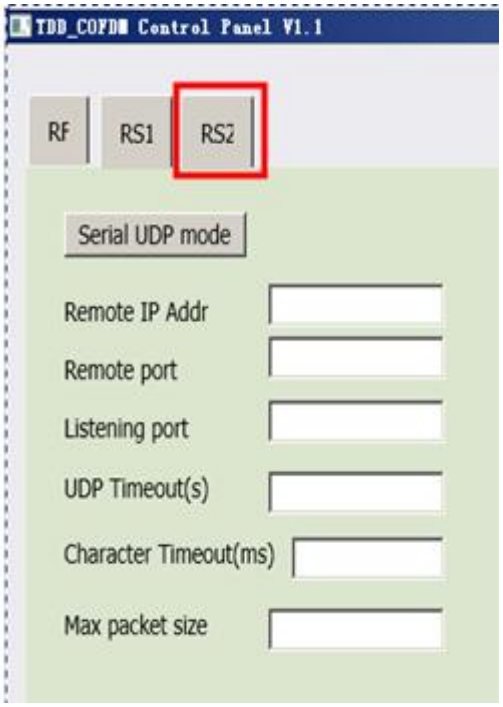
UDP Timeout in second.
Default: 10

- Character Timeout(ms)

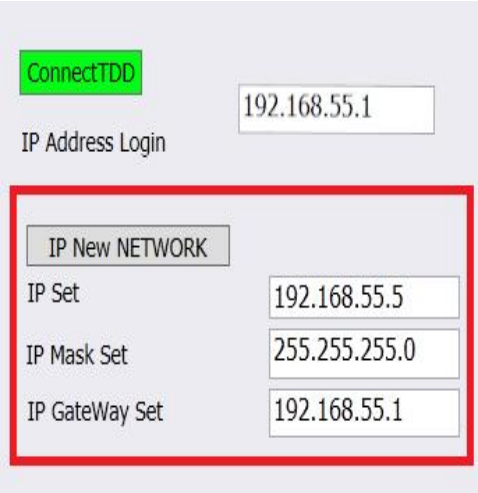
Character Timeout in millisecond.
Default: 1

- Max Packet size

Default: 1024



7.5. IP New Network Configuration



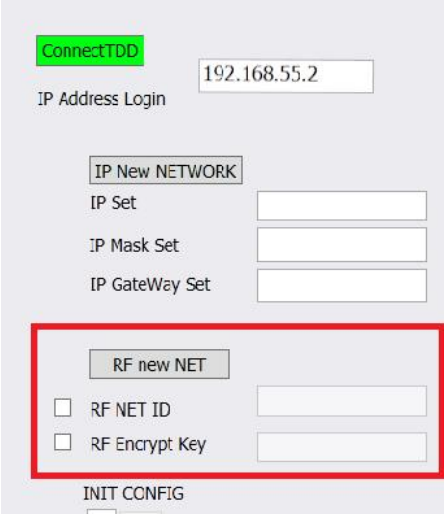
This setting helps you to change the IP address of devices.
The master default IP 192.168.55.1
the slave default IP 192.168.55.2

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”.

7.6. 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.

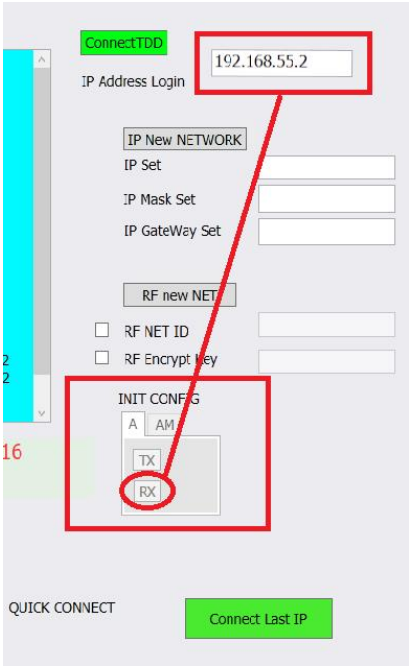
RF Encrypt KEY

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 have a password defined, and change it from the factory default

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.



Connect last IP

For quickly connect to last IP