

VT-WF110 User Manual



Figure 1 VT-WF110

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1. Overview

VT-WF110 is a high-performance WIFI serial server that allows simultaneous use of Ethernet and WIFI, with easy configuration. The WIFI serial server is positioned for high stability and rich functionality, suitable for industrial fields requiring high real-time and stability, equipped with one RS485 interface and one Ethernet interface. It adopts a rail-type installation method, with a compact size and convenient installation. It uses a terminal block power input with a wide voltage range of 9 to 24V.

It is not only features RS485 to WIFI TCP/IP conversion but also integrates Modbus TCP gateway functionality, facilitating the conversion of Modbus RTU protocol to Modbus TCP protocol.

This serial port server conveniently allows serial devices to connect to WIFI networks, enabling wireless network upgrades for serial devices. The WIFI supports STA mode for connection to wireless routers, or operates in AP mode to allow devices like smartphones to connect.

It is suitable for applications like data acquisition, IoT gateway, safety & security IoT, and intelligent instrument monitoring.

For users employing virtual serial ports, the Vircom software can be used to achieve virtual serial ports, and existing serial PC software does not need to be modified. Alternatively, Modbus TCP protocol in configuration software can be directly connected to RTU devices, achieving WIFI network communication.

VT-WF110 can be applied to:

- PLC remote wireless monitoring;
- Power electronics, intelligent instruments;
- Banking/medical automation systems;
- Securities trading systems;
- Industrial automation systems;

The typical application connection is shown in Figure 2. The existing serial port device is connected to the VT-WF110, and then the VT-WF110 is connected to the wireless network via WIFI. Any data sent by the serial port device will be transparently transmitted to the PC machine specified by the VT-WF110, and the data sent by the PC machine through the network to the VT-WF110 will also be transparently transmitted to the serial port device.

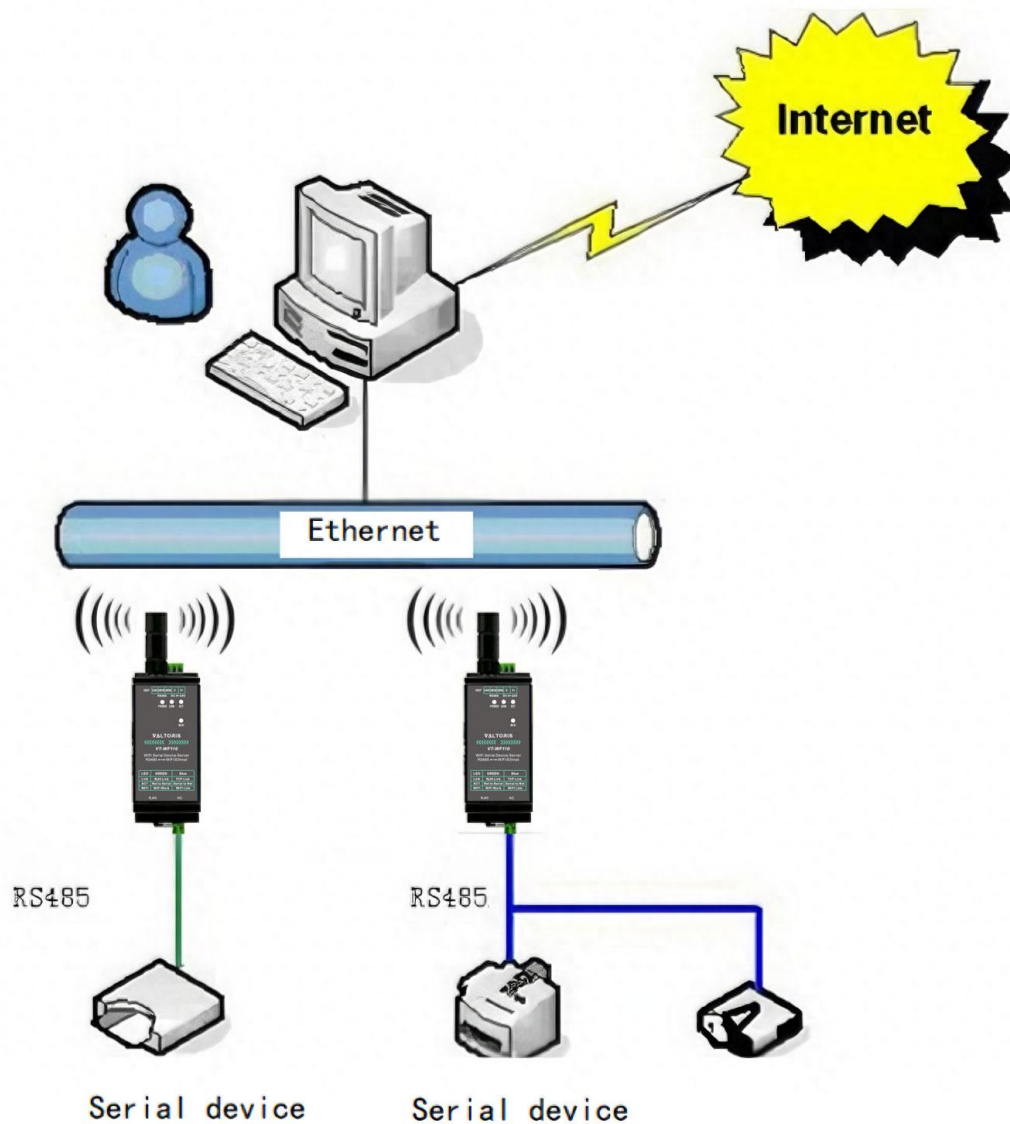


Figure 2 Network Structure

2. Feature

2.1 General software features

- 1 Supports both Ethernet and Wifi access.
- 2 Wide voltage power supply: 9~24V power supply range. Power input is via industrial terminal block power supply method.
- 3 Terminal RS485 interface, supports up to 32 slave devices, baud rate support from 1200 to 115200bps.
- 4 VT-WF110 is suitable for industrial applications with strong serial port real-time requirements, preventing the merging of two serial port data frames. The serial

packet segmentation interval for ordinary WIFI serial port servers is over 100ms, while VT-WF110 can be set to 1ms~100ms, greatly improving resolution accuracy.

- 5 Supports system firmware upgrades via network port.
- 6 Supports wifi peer-to-peer connection between modules.
- 7 Provides 4 types of LINK indicator interfaces: LINK blue indicates TCP connection established, LINK green indicates Ethernet cable connected, WIFI blue indicates wifi connection established as AP or STA, WIFI green indicates normal operation of wifi function. A rich set of indicator lights can intuitively display the device status.
- 8 One-click search configuration.
 - 8.1 WIFI Search: After establishing a link between the wifi and the PC or router, use the Vircom software to search and configure device parameters with one click. The device IP and PC do not need to be in the same network segment.
 - 8.2 Ethernet Port Search: When you forget the SSID or password and cannot find the module via wifi, simply plug in the Ethernet cable. Even if not in the same network segment, you can immediately find the module and configure wifi, network, and serial port parameters using the Vircom tool.
- 9 Supports DNS resolution, can act as a DHCP Client, and also as a DHCP Server when in AP mode.
- 10 Supports TCP Server, TCP Client, UDP, and UDP multicast. As a Server, it can handle up to 100 concurrent TCP connections communicating with the networking module; as a Client, it can connect to 7 destination IPs.
- 11 Supports the function of sending MAC address upon device connection, facilitating cloud management of devices.
- 12 Supports remote viewing of device TCP connection status, serial data transmission, and reception status through software. Virtual serial port supports data monitoring function.
- 13 Enclosure is flame retardant:High-temperature resistant shell, does not melt at 110 degrees Celsius.

2.2 Advanced software features

- 1 Supports Modbus gateway functionality, enabling Modbus RTU to Modbus TCP conversion. It can support storage-type Modbus, automatically collect device data and store it; it also supports Modbus gateways in non-storage mode.
- 2 Supports multi-host functionality: under a request-response query method, it allows multiple computers to access the same serial device via the network port

simultaneously.

- 3 Supports custom heartbeat and registration packet functionality: facilitating communication and device identification with the cloud.
- 4 Supports the feature of requiring password verification for TCP connection establishment, ensuring connection security.
- 5 Supports the "translation" function, which enables the translation work for specific device protocols, allowing different devices to interface with a unified software platform.
- 6 Supports data submission and distribution via HTTP, enabling the cloud to directly interact with the device's serial data using HTTP GET commands.

3. Technical Parameters

Table 1 Technical Parameters

Appearance			
Interface:	485: Terminal		
Power Supply:	Two lines terminal		
Size:	L x W x H =37.6mm×83.6mm×89.2mm		
Communicate Interface			
Wifi	802.11b/g		
Serial	RS485:485A,485B		
Serial Parameters			
Baud rate:	1200~115200bps	Parity:	None, Odd, Even, Mark, Space
Data size:	5~9	Flow control:	NONE
WLAN			
WLAN Standard:	802.11 b/g		
Frequency Range	2.412GHz-2.484GHz		
Transmit Power	802.11b: +20dBm(Max.); 802.11g: +18dBm(Max.);		
Receiving Sensitivity	802.11b: -89dBm; 802.11g: -81dBm;		
Antenna Choice	External antenna		
Hardware			
Ethernet	10M/100M		
Power	9~24V, <1W		

Software	
WLAN Work Mode	STA/AP
Security Mechanism	WEP/WPA-PSK/WPA2-PSK
Encryption Type	WEP64/WEP128/TKIP/AES
Protocol	TCP/UDP/ARP/ICMP/DHCP/DNS/HTTP
Net communication method:	TCP/IP direct communicate, Virtual serial
Configuration	VirCom, WEB browser
Environment	
Running temperature:	-40~85°C
Storage temp:	-45~100°C
Humidity:	5~95%RH

4. Instruction

4.1 Hardware instructions

The front view of the VT-WF110 WIFI serial server is shown in Figure 3. The VT-WF110 is made of high-temperature resistant and flame-retardant materials. It is compact in size and has a rail mounting clip on the back for easy installation.

Size:

Length × Width × Height=37.6mm×83.6mm×89.2mm



Figure 3 VT-WF110 front view

Panel light:

1. ACT: When the ACT light is yellow, it indicates that data is being normally transmitted between WIFI/Ethernet and RS485. A yellow flashing ACT light (with a hint of blue) means that data is being returned from RS485 to WIFI/Ethernet. If the data is short, the blue flashing duration is brief, so it's important to pay attention.
2. LINK: A green LINK light indicates that the RJ45 network cable is properly connected. A blue LINK light means that a TCP connection has been established or it is in UDP mode.
3. POWER: Indicates that the serial server has been powered on.
4. WIFI: A blue WIFI light means that WIFI has established a connection with the router as a STA or as an AP, or that a WIFI connection has been established with it. A green WIFI light: blinks once every 2 seconds, indicating that it is in AP mode and no WIFI connection has been established; blinks rapidly every 5 seconds, indicating that the device is in STA mode and is in the process of connecting to

the router.



Figure 4 Bottom interface of VT-WF110

The bottom interface of the serial server is as shown in Figure 4, from left to right, they are:

1. Network port: Standard RJ45 interface
2. NC terminal: Empty

The top panel of the serial server is as shown in Figure 5, from left to right, respectively:



Figure 5 Top interface of VT-WF110

1. WIFI antenna: Default Suction antenna.
2. DEF button: Pressing the button once will reset the wifi mode to AP mode, the SSID will change, the password will be empty, and the IP will be set to 192.168.1.254.
3. RS485: GND, 485B (connected to the 485B/T- of the meter), 485A (connected to

the 485A/T+ of the meter)

- DC9-24V: V- is the negative power supply, V+ is the positive power supply.

4.2 WIFI Function

Assuming the user has already installed the VT-WF110 device onto the rail and attached the WiFi antenna.

4.2.1 AP mode

First, do not plug in the network cable, and power on the VT-WF110 baseboard. After a while, when you see the WIFI light start to blink, it indicates that the WIFI function is working properly.

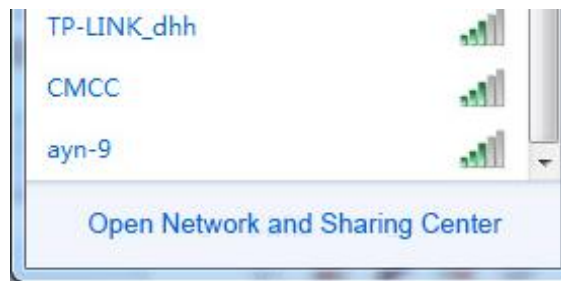


Figure 6 Search for Wifi

After connecting, the laptop can automatically obtain an IP address from VT-WF110. Click the "Device Management" button in the Vircom software, and you can see a line in the device list, detecting the VT-WF110 device.

I...	T...	Name	t...	P...	Dev IP	Loc...	Dest IP	Work M...	TCP...	Virtual...	Vircom ...	Dev ID	T...	R...	
1	S...	D6A37F-...		1	192.168.1.2...	50...	192.168.1.3	TCP Serv...	Not ...	Haven'...	Not Link...	29D6A37F	0	0	Auto Search

Figure 7 Search for VT-WF110 device

Double-click this line to open the device parameter editing dialog box.

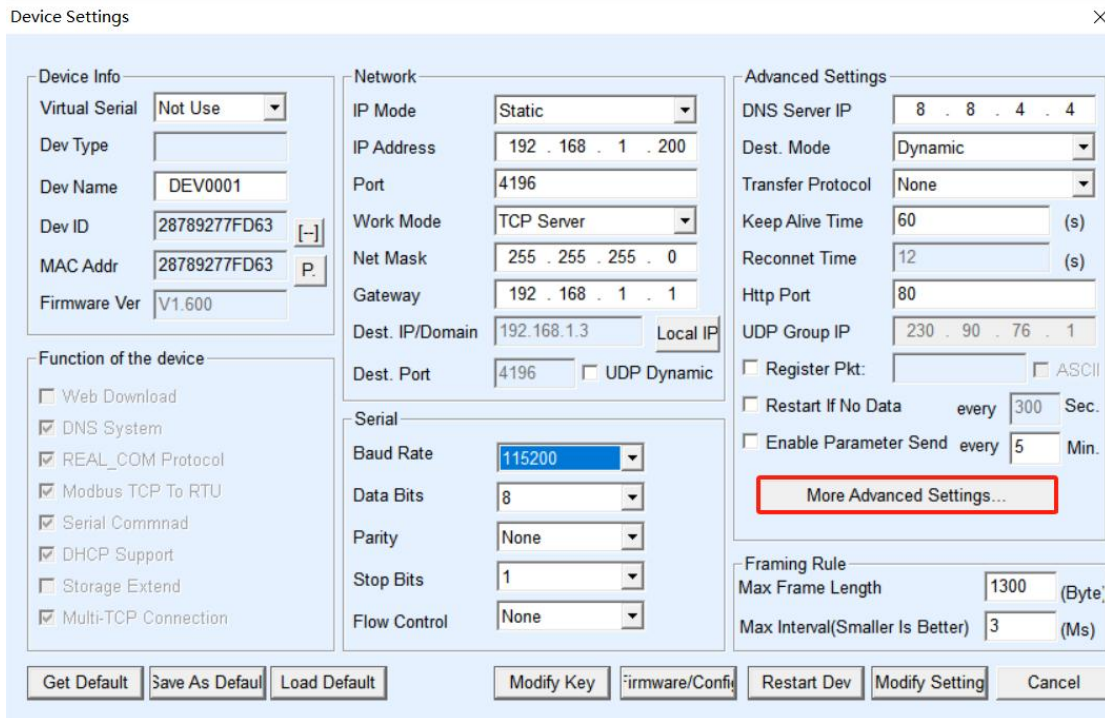


Figure 8 Device Parameter Settings Dialog Box

Here you can configure the IP address and baud rate, the meaning of these parameters will introduce after. Please click on "More Advanced Settings", you can configure the VT-WF110 wifi parameters in the open dialog box.

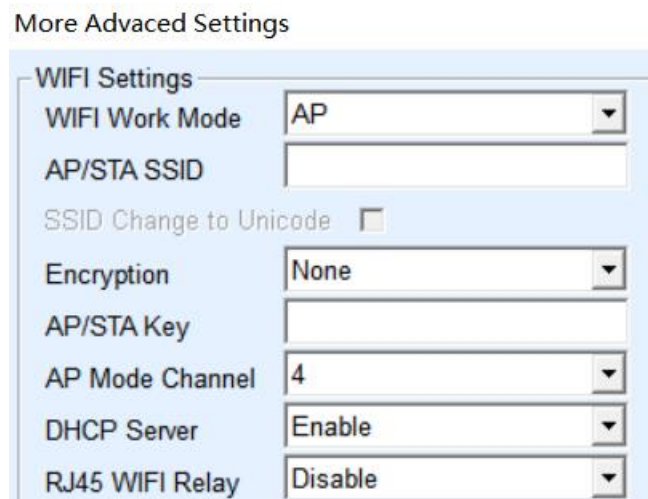


Figure 9: WiFi Parameter Configuration

The meanings of the WIFI parameter are as follows:

Table 2

Name	Optional values	Explanation
WIFI Work mode	<ul style="list-style-type: none"> ➤ Wireless AP: The VT-WF110 acts as a hotspot, allowing laptops, phones, and other devices to connect, mainly used for configuration during the first use. ➤ Wireless Station: In STA mode, the VT-WF110 will actively connect to a hotspot (such as a router). 	
AP or STA SSID	String less than or equal to 32 bytes	When operating as an AP, this SSID is the hotspot name. When in STA mode, it is the SSID of the hotspot you are pre-connected to. Please note to change the SSID when switching from STA to AP mode, or else it may conflict with existing SSIDs on the network.
Encryption types	<ul style="list-style-type: none"> ➤ Unencrypted: No password mode ➤ WEP64: Password length must be 5 characters. ➤ WEP128: Password length must be 13 characters. ➤ TKIP: TKIP encryption, password 1 to 32 bytes. ➤ AES: AES encryption, password 1 to 32 bytes. ➤ Automatic: Usually, routers use either TKIP or AES encryption. When the user is 	

	not sure which one is being used, the automatic mode can be selected.	
AP or STA password	The password length varies depending on the encryption type.	When it is in AP mode, this password is the one for computers and phones to connect to VT-WF110. When it is in STA mode, this password is for the pre-connected AP.
APP channel selection	1~11	This parameter is only valid when in AP mode; it is invalid in STA mode.
DHCP Server	Enable/Disable	When using as an AP mode, the phone can obtain an IP by connecting to this hotspot. If only using the Ethernet port, it is recommended to turn off the DHCP server to avoid DHCP server allocation conflicts with the router.
Network port and WiFi interoperability	Enable/Disable	Allow the data from the WiFi to reach the network port, and vice versa, meaning it can be used as a router, not just as a serial server.

If VT-WF110 is used in AP mode, it can be divided into password-protected and non-password-protected methods. The non-password-protected method simply involves selecting the "No Encryption" type; for the password-protected method, it is recommended to use WEP128 encryption, at which point the password length is 13 bytes.

4.2.2 STA mode

When operating in STA mode, please input the SSID, encryption mode, and password of the pre-connected router in Figure 9. If the encryption mode of the router is unknown, you can choose the "Auto" mode.

When in STA mode, the VT-WF110 will automatically connect to the AP hotspot after

being powered on. At this point, you will see the WIFI_WORK light flashing rapidly, indicating that it is in the process of connecting. Once the connection is established, the WIFI_LINK light will illuminate.

STA mode supports automatic reconnection. For example, after the AP hotspot restarts, the VT-WF110 can automatically reconnect. If it fails to connect to the AP hotspot, please verify that the encryption method, password, and SSID are correct, that the antenna is installed, and that you are within the signal range.

4.2.3 Ethernet Search

One advantage of the VT-WF110 is that it has both WiFi and Ethernet capabilities. Whenever you are uncertain about the WiFi parameters of the VT-WF110 and cannot connect to it, you can plug in an Ethernet cable and use the Vircom one-click search module to configure the desired WiFi parameters.

4.2.4 Wifi Connection in pairs

VT-WF100 support 2 modules via wifi interconnect. Interconnection configuration parameters are as follows:

Table 3

Parameters	Module as AP	Module as STA
WIFI Work Mode	Wireless AP	Wireless Station
AP or STA SSID	Same	Same
Encryption Type	Recommended as "no encryption" or WEP128	Recommended as "no encryption" or WEP128
AP or STA Password	Same	Same

When two VT-WF110 devices establish a connection via Wi-Fi, the WIFI_LINK light will be on.

4.2.5 Wifi Signal Test

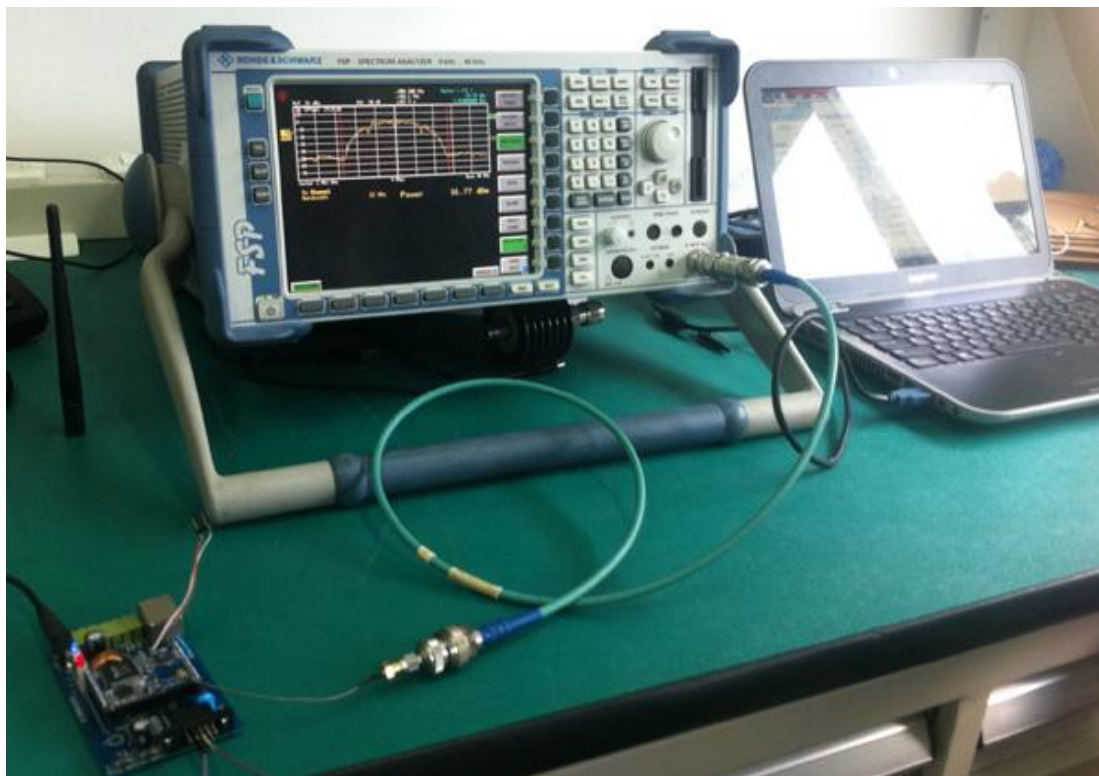


Figure 10 VT-WF110 Signal Test

The test instrument used by VT-WF110 is the 9kHz to 40GHz spectrum analyzer from ROHDE&SCHWARZ.

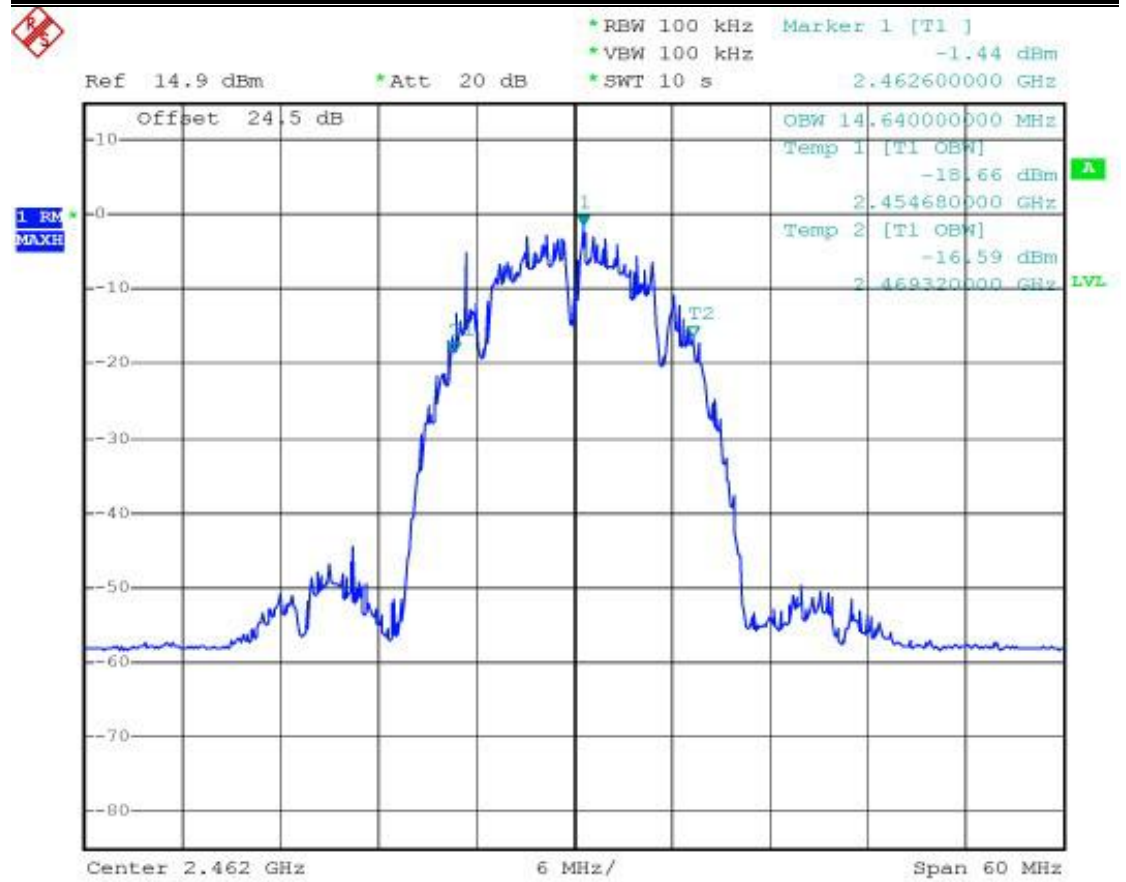


Figure 11 VT-WF110 bandwidth test curve

From the bandwidth test curve, it can be seen that the bandwidth of VT-WF110 within the 20M range will not interfere with the adjacent channel signals.



Figure 12 VT-WF110 Power Test Curve

The transmission power within the range of two test points is observed to be 17.34 dBm from the power test curve, which meets the requirements for transmission power of standard WiFi signals.

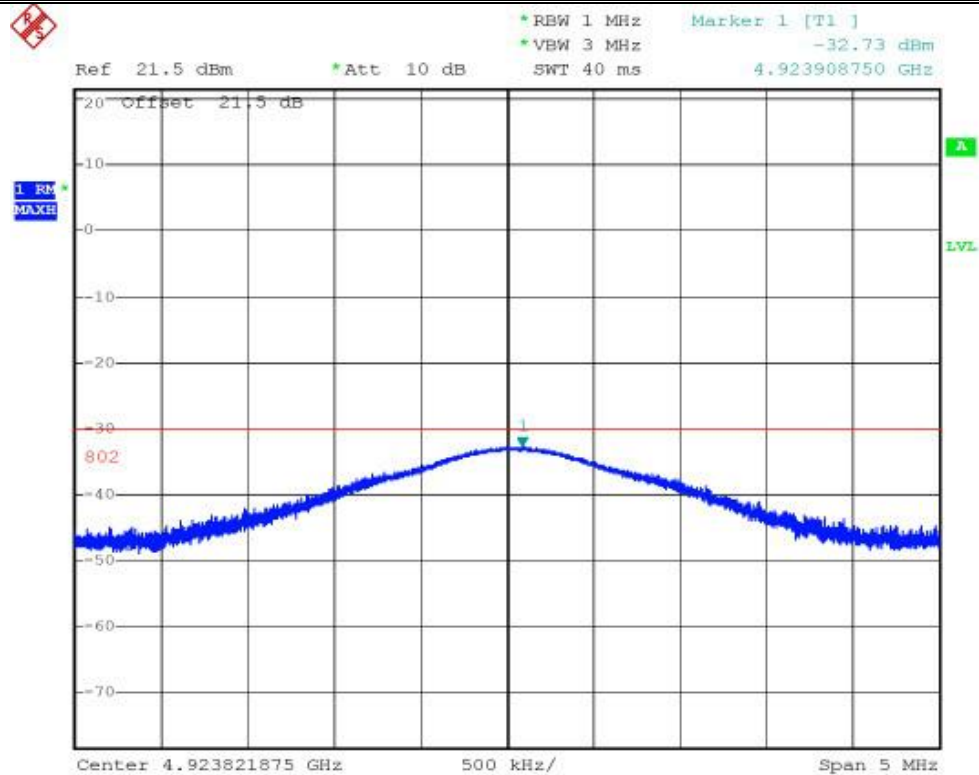


Figure 13 VT-WF110 Spurious Test Curve

From the spurious test of VT-WF110, the spurious emissions near the double frequency of 5GHz are less than -30dB, which meets the requirements for radio frequency spurious radiation.

4.2.6 Antenna Selection

If the module uses an internal antenna, no external antenna is required.

If an external antenna is needed, it must meet the following characteristics. We can provide an external antenna.

Impedance	50 Ohm
Return loss	-10dB(Max)
Connector types	I-PEX
Frequency range	2.4~2.5GHz
VSWR	2 (Max)

5. How to use

Please configure the VT-WF110 using Vircom. Once the VT-WF110 is connected to the network via Ethernet or Wi-Fi, computers within the same local area network can search for and configure the device using the installed Vircom tool.

5.1 Software installation

Vircom can be used for the configuration of device IP and other parameters, as well as for creating virtual serial ports.

Table 4 Software Version

Software	Description
VirCom_en	English version configuration software
Virtual-serial-port	Virtual serial port control software

Install by following the default prompts. After installation, Vircom will start with each computer boot to create virtual serial ports upon startup.

5.2 Parameter configuration

After the Vircom installation is complete and the hardware connection of the device is also completed, run the Vircom software as shown in Figure 14, then click on "Device Management" as shown in Figure 15. Using Vircom, you can search for and configure device parameters within different network segments, which is very convenient, as long as the device and the computer running Vircom are under the same switch.

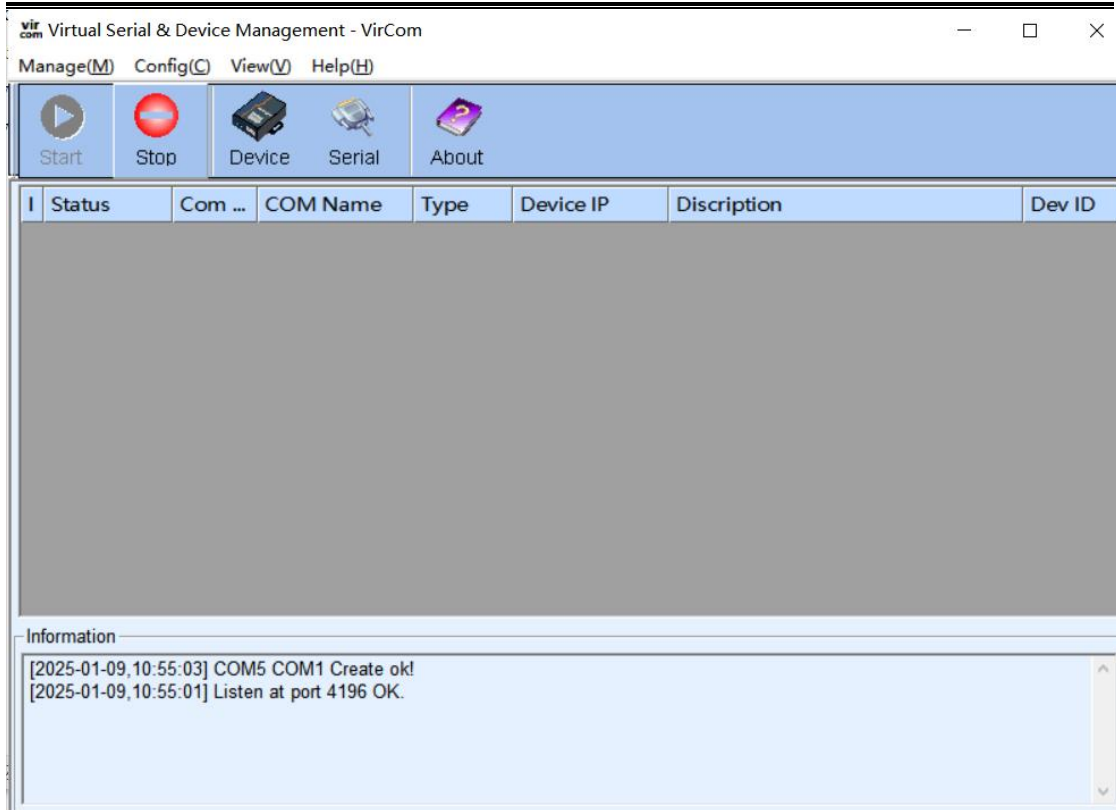


Figure 14 Vircom Main Interface

I...	T...	Name	t...	P...	Dev IP	Loc...	Dest IP	Work M...	TCP...	Virtual...	Vircom ...	Dev ID	T...	R...	
1	S...	D6A37F-...		1	192.168.1.2...	50...	192.168.1.3	TCP Serv...	Not ...	Haven'...	Not Link...	29D6A37F	0	0	Auto Search

Figure 15 Device List

View all currently online devices from the device list. Click "Edit Device" to configure the parameters.

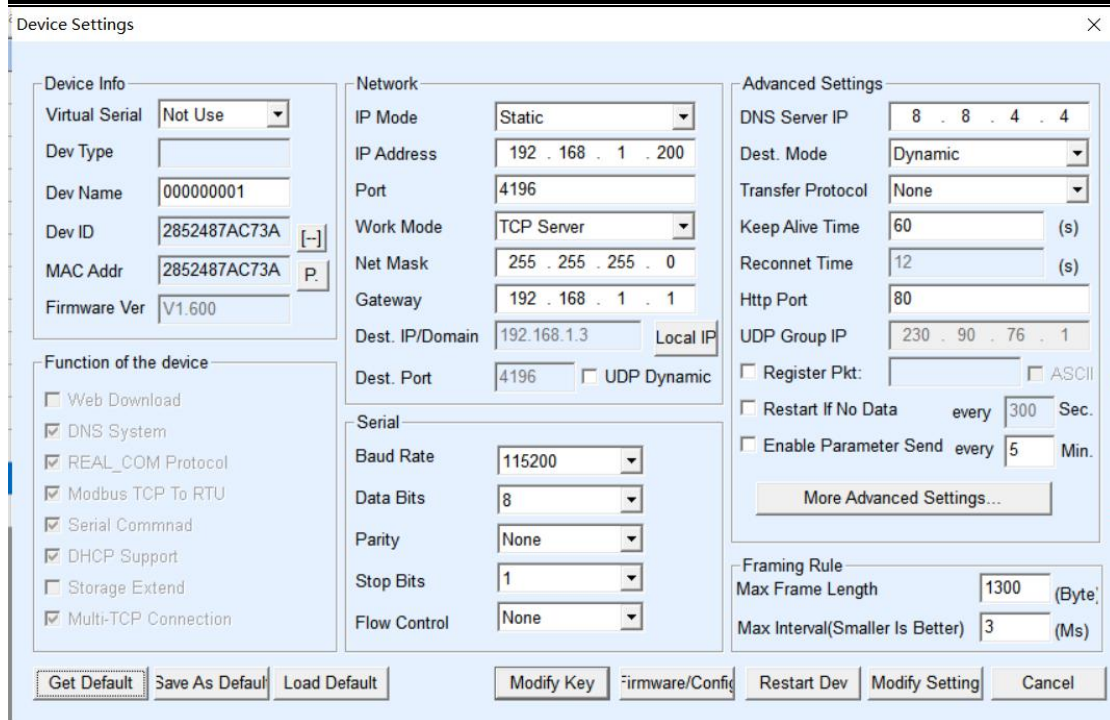


Figure 16 Equipment Parameters

In this interface, users can set the parameters of the device. After clicking "Modify Settings," the parameters are saved to the device's flash memory, ensuring they are not lost during a power outage. At the same time, the device will automatically restart.

The main parameters configured here include: baud rate, data bits, and parity bits in the serial port settings; IP address, subnet mask, and gateway in the network settings. Sometimes, depending on the computer software, the working mode of the serial port server also needs to be configured.

The detailed meanings of other parameters are as follows:

Table 5 Parameter Meanings

Parameter name	Range of values	Meaning
Virtual Serial Port	Do not use, create virtual serial port	You can bind the current device to a virtual serial port that has been created. Please add a COM port first in the "Serial Port Management" on the main interface.
Device model number		Display only the model number of the core module.

Device Name	Any	You can name the device with a readable name, up to 9 bytes long, supporting Chinese names.
Device ID		Unique factory ID, non-modifiable.
Firmware version		Firmware version of the core module
The functions supported by the device.		Refer to Table 6 for supported device features.
IP Pattern	Static、DHCP	The user can choose between static or DHCP (Dynamic Host Configuration Protocol).
IP Address		Serial port server's IP address
Port	0~65535	When the serial port server is in TCP Server or UDP mode, it listens on a specific port. As a client, it is best to specify the port as 0, which can improve connection speed. When using port 0, the system will randomly assign a local port. The difference between this and a non-zero port is: (1) When the local port is 0, upon module restart, a new TCP connection is established with the PC, and the old TCP connection may not be closed, potentially resulting in multiple false connections with the device. Generally, the upper computer wishes to close the old connection upon module restart; specifying a non-zero port will close the old connection. (2) When the local port is 0, the time to re-establish a TCP connection is faster. When the serial port server is in TCP client mode, it also listens for connections on a port as a TCP server. The local port number used by the TCP client to connect to the server is "port + 1".

Work mode	TCP server mode, TCP client mode, UDP mode, UDP multicast	When set as a TCP server, the serial port server waits for the computer to connect; when set as a TCP client, the serial port server initiates a connection to the network server specified by the destination IP.
Subnet mask	Eg: 255.255.255.0	Must be the same as the subnet mask of the local LAN.
Gateway	Eg: 192.168.1.1	Must be the same as the local LAN gateway.
Destination IP or domain name		In TCP client or UDP mode, data will be sent to the computer indicated by the destination IP or domain name.
Destination port		In TCP client or UDP mode, data will be sent to the destination IP's destination port.
Baud rate	1200、2400、4800、7200、9600、14400、19200、28800、38400、57600、76800、115200	Serial Port Baud Rate
Data bit	5、6、7、8、9	
Check digit	None, Even, Odd, Mark, Space	
Stop bit	1、2	
DNS Server		When the destination IP is described by a domain name, the IP of this DNS server needs to be filled in. When the IP mode is DHCP, there is no need to specify the DNS server, as it will automatically obtain it from the DHCP server.
Purpose mode	Static, dynamic	In TCP client mode: After using the static destination mode, the device will automatically restart if it fails to connect to the server 5 consecutive times.
Conversion protocol	NONE、Modbus TCP<->RTU、Real_COM	NONE indicates that data forwarding from serial port to network is transparent; Modbus TCP<->RTU will directly convert Modbus TCP

		<p>protocol into RTU protocol, facilitating compatibility with Modbus TCP protocol; RealCOM is designed to be compatible with the older version of the REAL_COM protocol and is a type of protocol for virtual serial port, but when using a virtual serial port, it is not necessarily required to choose the RealCom protocol.</p>
Keep-alive timeout duration	0~255	<p>Heartbeat interval. (1) When selected as 1 to 255, if the device is in TCP client mode, it will automatically send TCP heartbeats every "keep-alive time" to ensure the validity of the TCP link. Set to 0, there will be no TCP heartbeat. (2) When set to 0 to 254, if the conversion protocol is selected as REAL_COM protocol, the device will send a data packet with a length of 1 and content of 0 every keep-alive time, realizing the heartbeat mechanism in Realcom protocol. Set to 255, there will be no realcom heartbeat. (3) When set to 0 to 254, if the device is working in TCP client mode, it will send device parameters to the destination computer every keep-alive time. Set to 255, there will be no parameter sending function, which can realize remote device management.</p>
Reconnect time after disconnection	0~255	<p>When in TCP client mode, if the connection is not successful, it will attempt to reconnect to the computer every "reconnect time" interval. It can be set from 0 to 254 seconds; if set to 255, it means never to reconnect. Note that the first TCP connection (such as after hardware power-up, restarting the device via Vircom software, or when the data light is off) is usually attempted immediately, and only after the first</p>

		connection fails will it wait for the "reconnect time" before trying again. Therefore, the "reconnect time" does not affect the connection establishment time under normal network and server conditions.
Web access port	1~65535	The default is 80.
Multicast address of the group		Used in multicast. UDP
Enable the registration package.		When the TCP connection is established, send the registration packet to the computer. After enabling the registration packet, the realcom protocol must be selected. Supports TCP server and TCP client modes.
Packet length	1~1400	One of the serial port framing rules. After the serial port server receives data of this length, it sends the received data as one frame to the network.
Packet spacing	0~255	Serial port framing rule two. When the serial server receives data with pauses, and the pause time is greater than this time, the data received will be the collected data is sent as a frame onto the network.

The supported features of the device are explained as follows:

Table 6: Features Supported by the Device

Name		Explanation
Domain System	Name	The destination IP can be a domain name (such as a www server address).
REAL_COM Protocol		A non-inherited serial server protocol suitable for multi-serial servers to bind virtual serial ports over the Internet. Because the protocol contains the device's MAC address, it helps the

		host computer to identify the device. Generally, it can be left unused.
Modbus RTU	TCPTurn	It can achieve Modbus TCP to RTU conversion. It also supports multi-host functionality.
Serial port parameter modification		Supports serial AT commands for device parameter configuration and reading.
Automatically obtain IP		Supports DHCP client protocol
Storage Expansion EX Functionality		Subsequent expansion
Multiple connections	TCP	Supports more than one TCP connection when acting as a TCP server.
UDP Multicast		UDP Multicast
Multi-purpose IP		As a TCP client, it supports simultaneous connections to 7 destination IPs.
Proxy server		Supports proxy server functionality (requires specific model).

5.3 TCP Communication test

After configuring the device parameters, you can use serial port tools and TCP debugging tools to perform TCP connection communication tests.

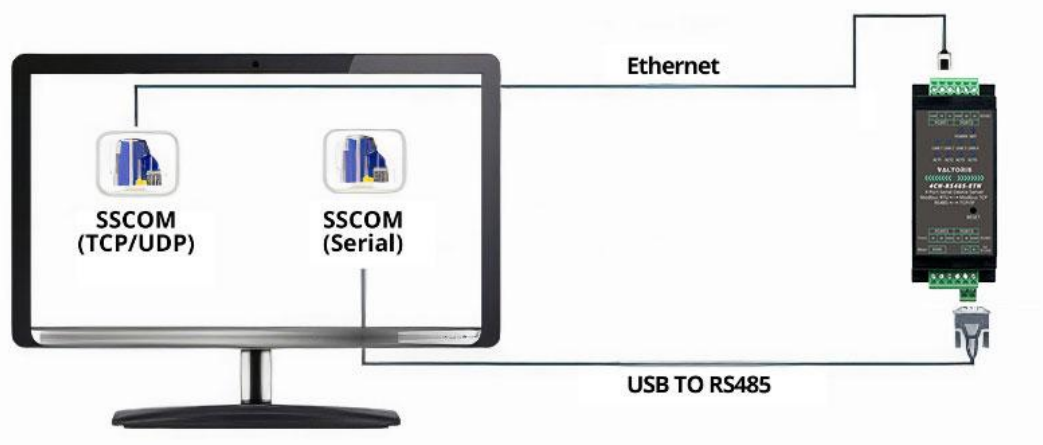


Figure 17 TCP Communication Diagram

The serial port server's serial port to network port, network port to serial port data transparent forwarding function.

Assuming that the COM port (USB TO RS485) of the PC is connected to the serial port of the serial server, then open the serial debugging assistant window and open the corresponding COM port, as shown in the figure below:

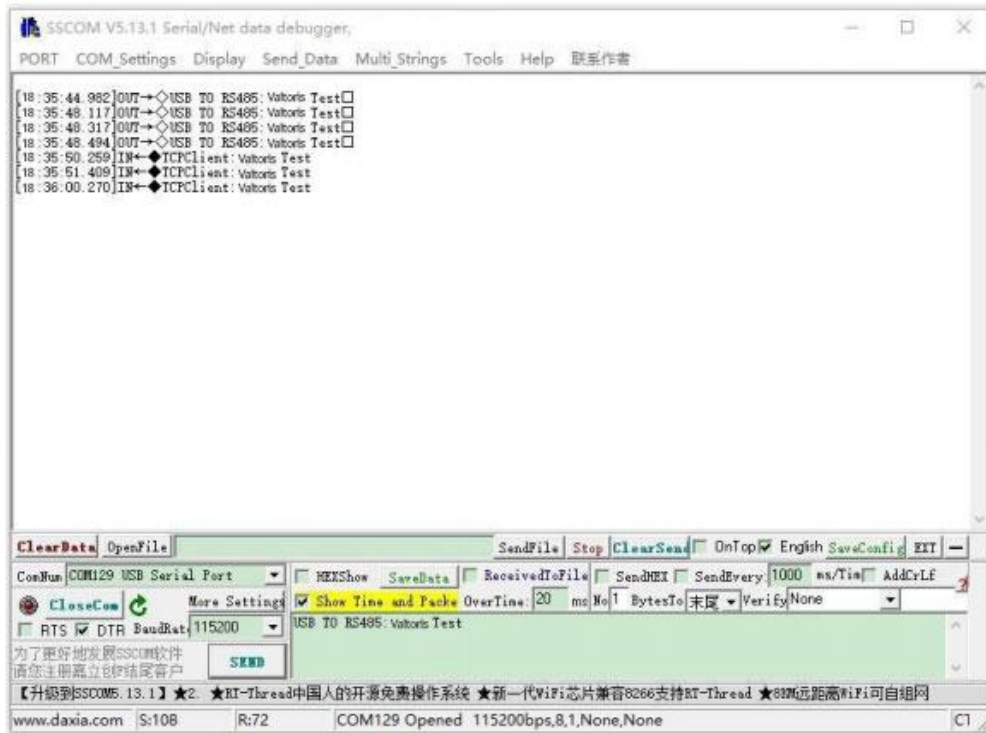


Figure 18 SSCOM1: USB to RS485 transceiver interface

In addition, open one more serial port debugging assistant window and use it as a TCP client mode. Fill in the destination IP as the IP of the serial server (currently 192.168.1.200) and the destination port as 4196, and then click the "Open" button, as shown in the figure below:

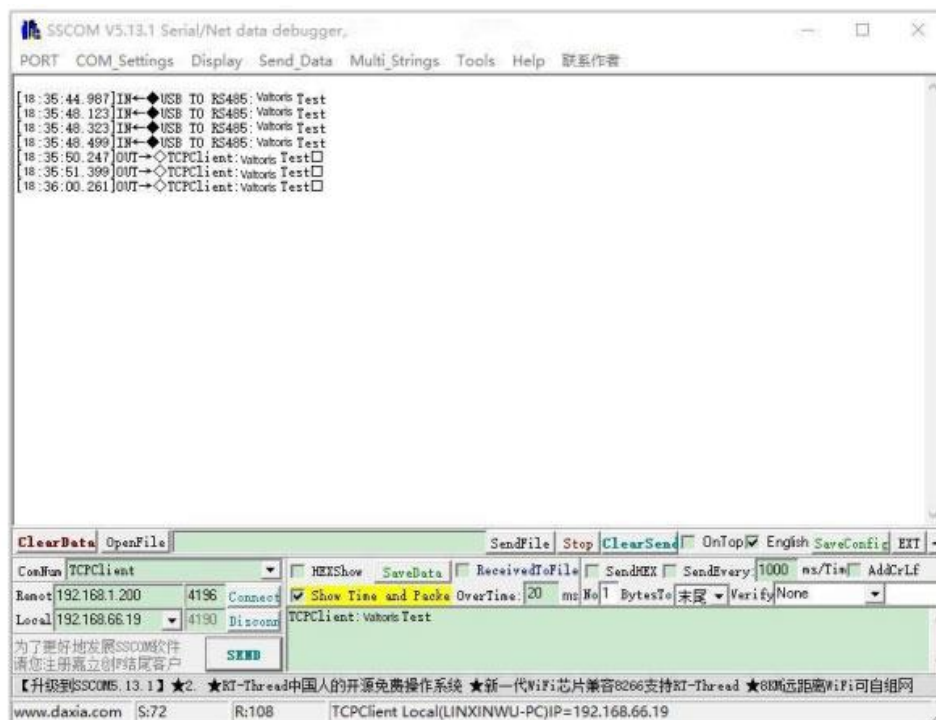


Figure 19 SSCOM2: TCP Client transceiver interface

Enter "TCP Client: "Valtoris Test" in the serial debugging assistant SSCOM2 set as

TCPClient and click to send, the data will be transferred to the RS485 interface through the serial server network port, next it will be sent to the USB TO RS485, and finally be displayed in the serial debugging assistant SSCOM. In turn, input "USB TO RS485: Valtoris Test" in SSCOM1, and click to send to SSCOM2 and display it.

5.4 Virtual Serial Port Test

The SSCOM2 in the figure communicates directly with the serial server via TCP. In order to allow the serial software that has been developed by the user to communicate with the serial server, a virtual serial port needs to be added between the user's program and the serial server. As shown in the figure, Vircom and the user's program run on the same computer, and Vircom virtualizes a COM port, so that this COM port corresponds to the serial server. When the user program opens the COM communication, it can be sent to the user serial device through the Vircom serial server. The following demonstrates this operation step:

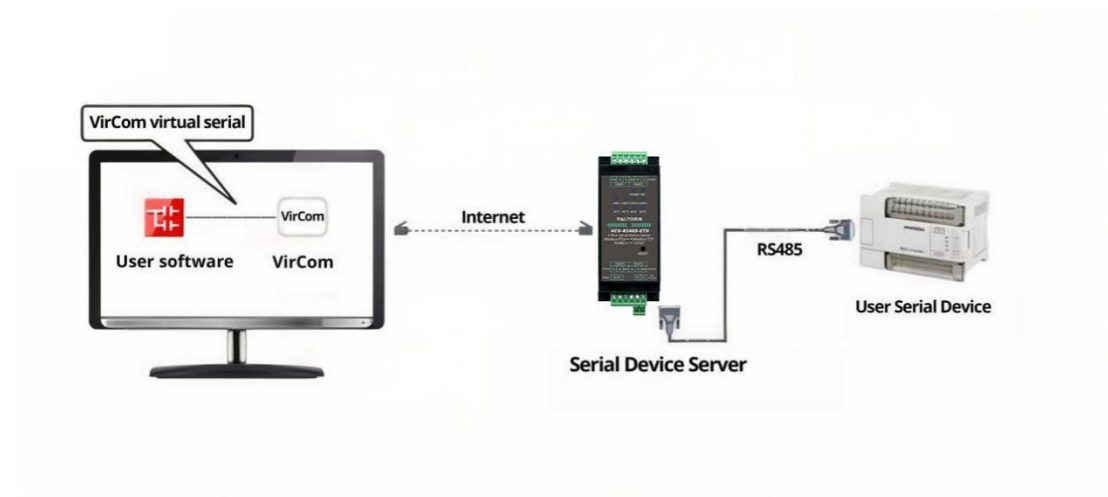


Figure 20 Function of virtual serial port

Click "Serial Port Management" on the Vircom main interface, then click "Add", and select to add COM2, where COM2 is the COM port that does not originally exist on the computer.

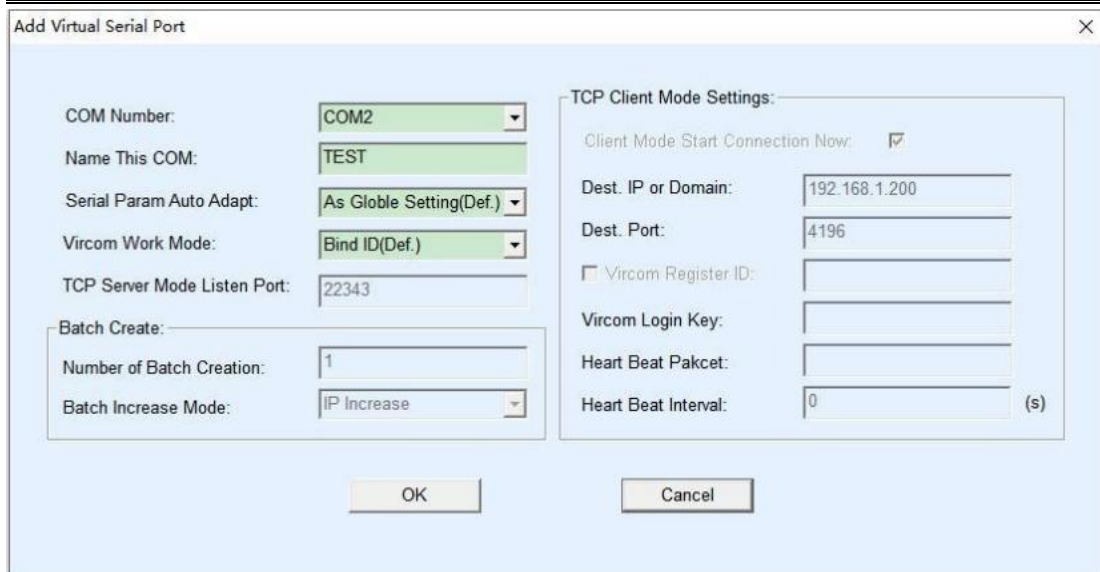
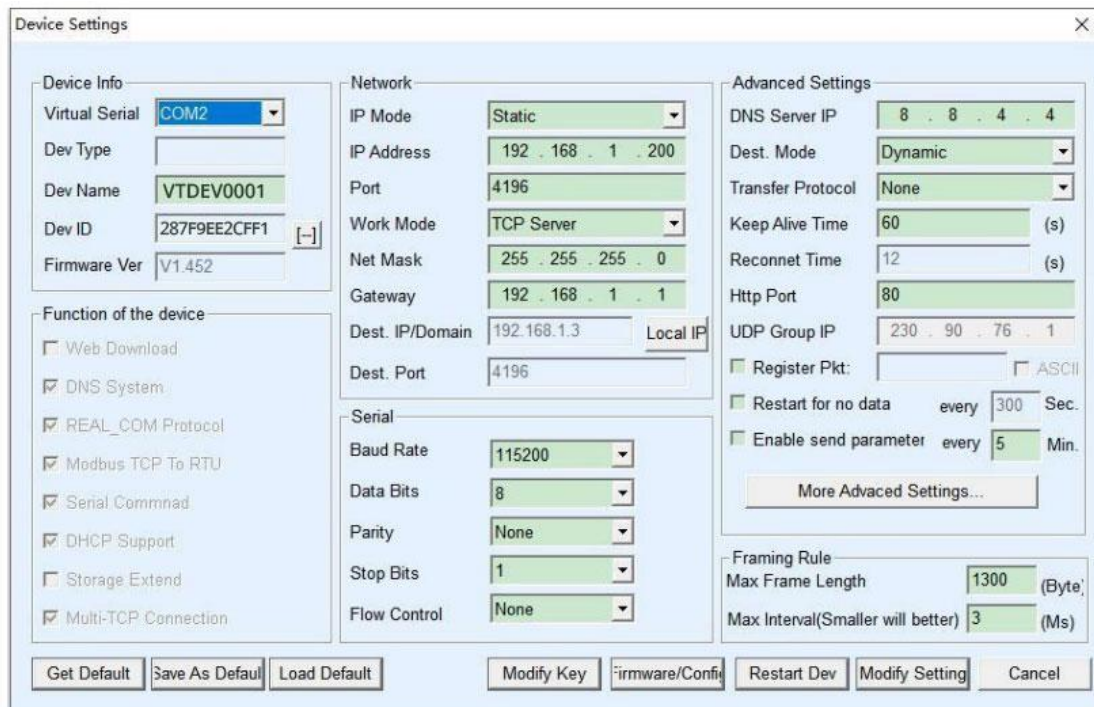


Figure 21 Add Virtual Serial Port

Then enter the “device manage”, and double-click the device that you need to bind to the COM2. As shown in Figure 21, select COM2 from the "virtual serial port" list in the upper left corner. Then click "modify Settings". And return to the main interface of Vircom. You can see that the COM2 has been connected to a device with IP 192.168.1.200. You can use COM2 instead of SSCOM2 to communicate.



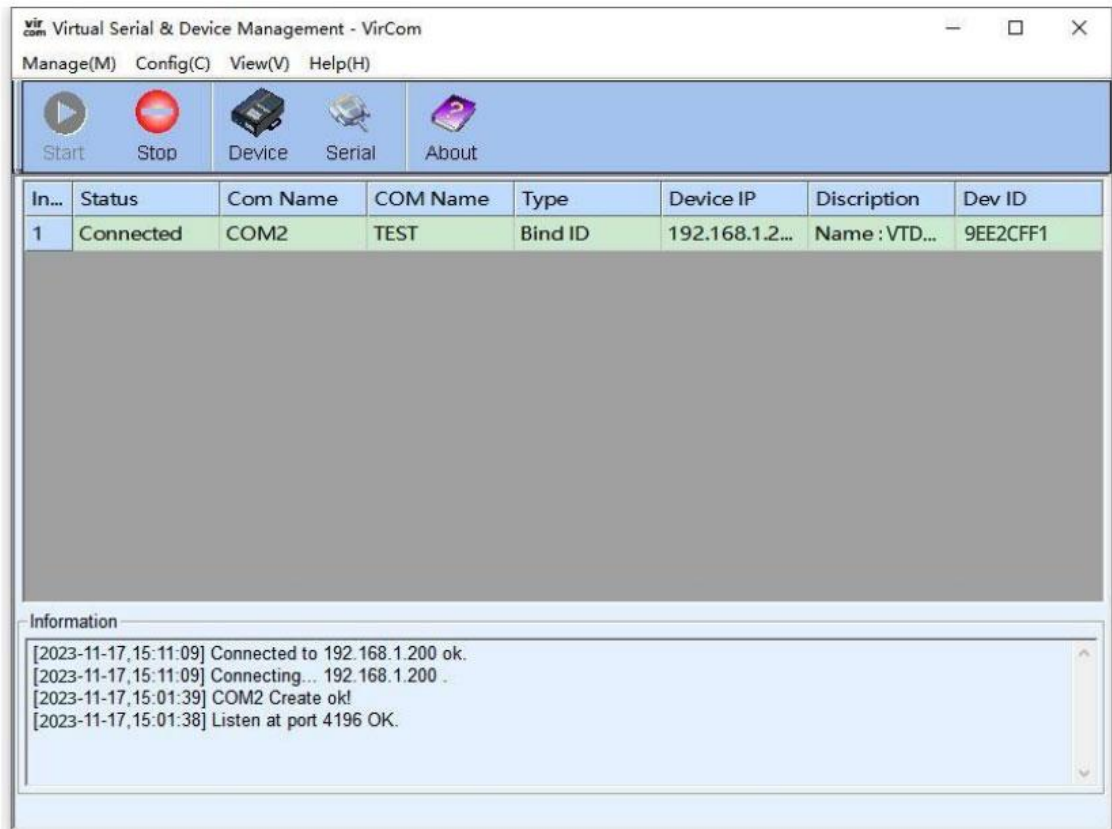


Figure 22 Virtual Serial Port has been connected

Open the SSCOM simulated user serial port program, open COM2 (the virtual serial port in the figure above), then open an SSCOM simulated serial port device, and open COM3 (hardware serial port). At this time, the COM2 data transmission link is as follows: COM2 - Vircom - serial port server network port - serial port server serial port - COM3. Conversely, data can also be transmitted from COM3 to COM2: COM3 - serial port server serial port - serial port server network port - Vircom - COM2. The figure below shows the data transmission and reception of both parties.

If COM3 is replaced with a user serial port device, COM2 can communicate with the user device.

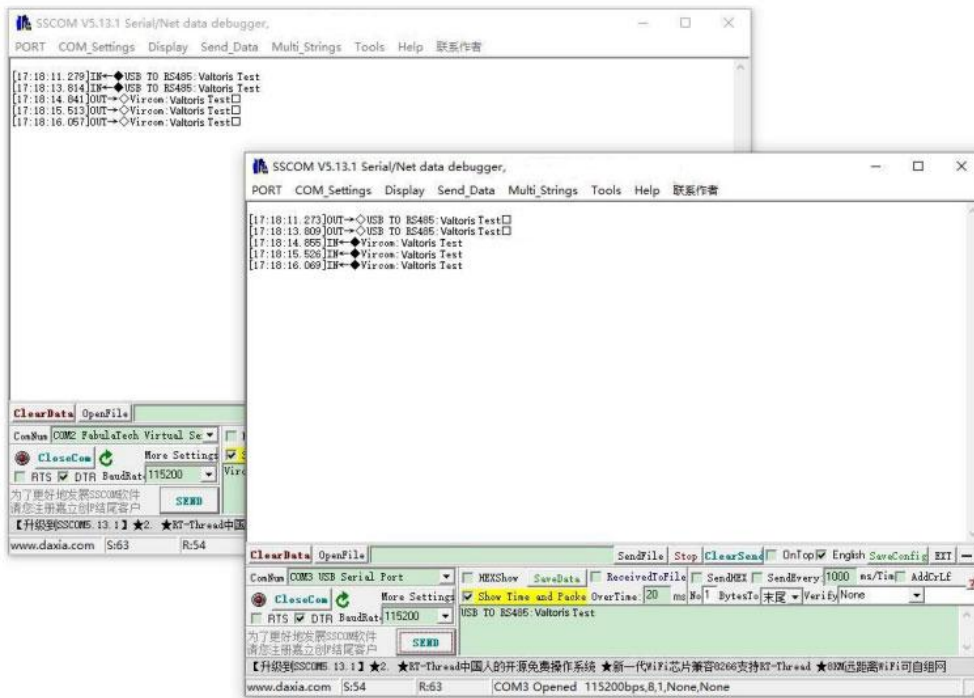


Figure 23 Communication via Virtual Serial Port

5.5 Modbus TCP test

By default, the data of the serial and network port is transparently transmitted. If you need to convert Modbus TCP to RTU, you need to select "Modbus_TCP Protocol" as the conversion protocol in the device setting, as shown in the figure 24 below.

At this time, the device port is automatically changed to 502, the user's Modbus TCP tool is connected to the 502 port of the serial server's IP, the Modbus TCP commands that have been sent will be converted into RTU commands and output via the serial port.

For example, if the serial port server receives the Modbus TCP command of 00 00 00 00 00 06 01 03 00 00 0a, the serial port outputs the command of 01 03 00 00 00 0a c5 cd.

Note: The serial port may send multiple commands of 01 03 00 00 00 0a c5 cd. This is because the default Modbus adopts the storage mode and will automatically train and query commands in turn. How to switch to non-storage mode will be explained later.

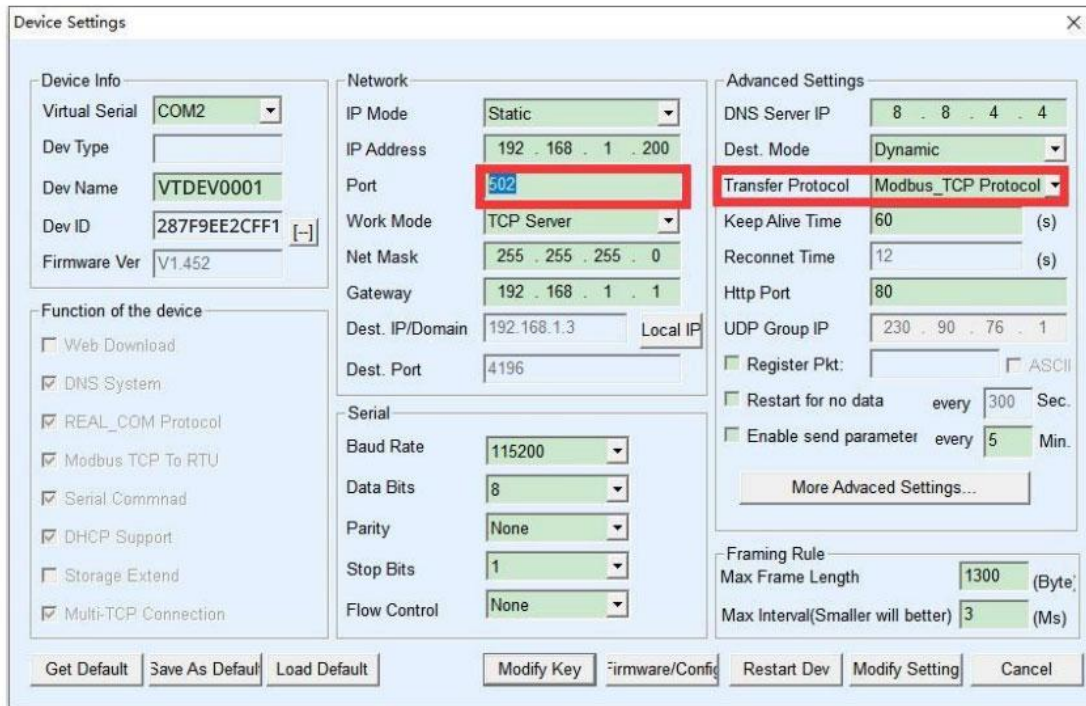


Figure 24 Enable Modbus TCP

If the user's Modbus TCP software is used as a slave, you need to change the working mode to client based on the conversion protocol, and change the destination IP to the IP of the computer where the Modbus TCP software is located, and the destination port is 502, as shown in the figure 25 blow.

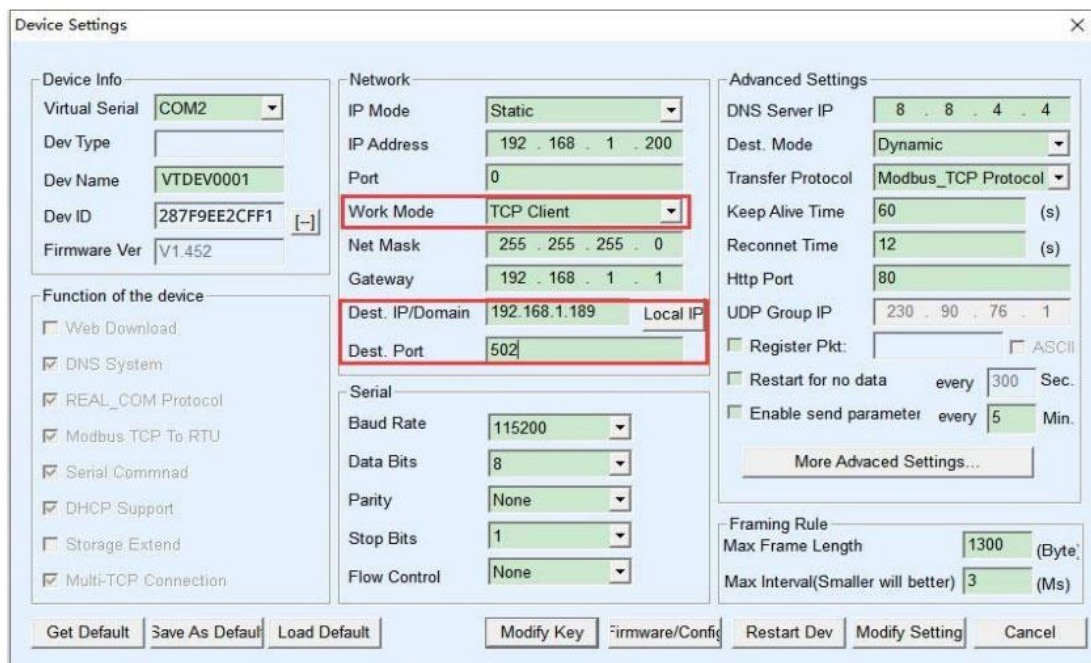


Figure 25 Modbus TCP as client

5.6 Web Configuration

Using Vircom, you can search and configure device parameters in different network segments. Web configuration requires that the computer and the serial server are in the same IP segment first, and the IP address of the serial server must be known in advance. However, Web configuration can be performed on any computer without Vircom.

1. Enter the IP address of the serial server in the browser, such as `http://192.168.1.200`, and open the following web page:

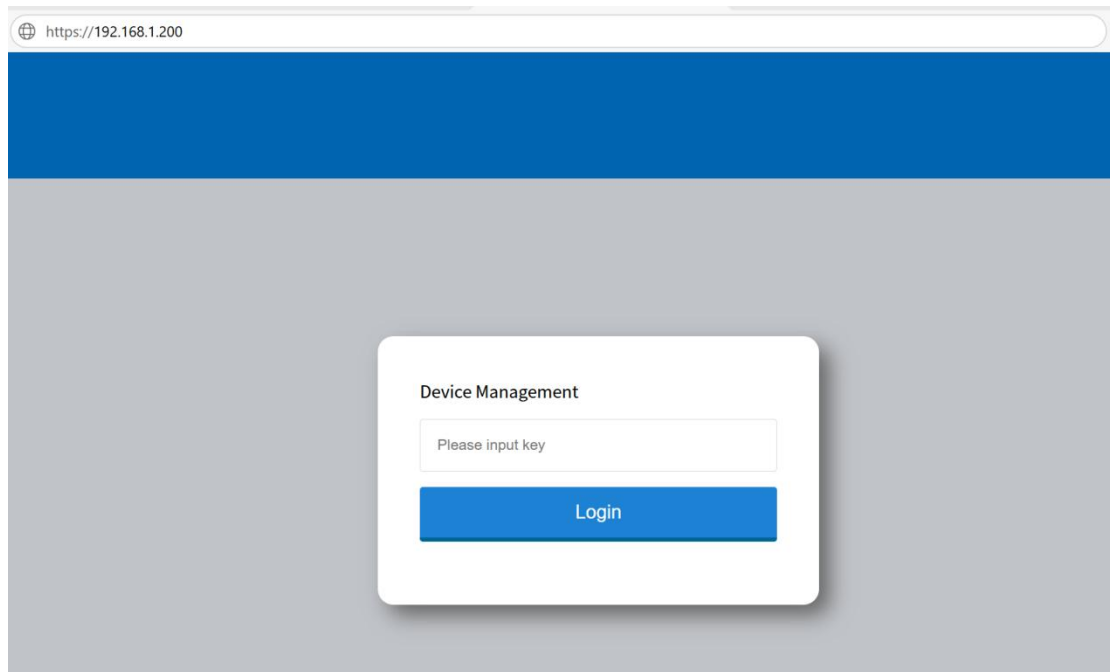


Figure 26 Web login interface

2. Enter Password in Password: default is 123456. Click the login button to login.

Figure 27 Web configuration interface

3. You can modify the serial port server parameters on the web page that appears. For related parameters, refer to Table 5 Parameter Meaning.
4. After modifying the parameters, click the "Submit Changes" button.

6. Work Mode and Transfer Protocol

Different serial server working modes and conversion protocols can be selected in different application occasions, so that it can be used more stably and reliably, which will be described in detail below.

The use of the serial port server is basically divided into two types: with virtual serial port and non-virtual serial port, as shown in Figure 17 TCP communication diagram and Figure 20 the function of virtual serial port. The virtual serial mode is for the serial interface (COM) on the user software, that is, the user software and devices are serial ports. The user software with the non-virtual serial port mode directly adopt TCP/IP communication, but the user devices still use the serial port.

In non-virtual serial port mode, the "conversion protocol part" is divided into three modes: transparent transmission, Modbus TCP to RTU and Realcom protocol. If the user software is a fixed protocol Modbus TCP protocol and the lower computer is Modbus RTU/ASCII, you need to select the Modbus TCP mode; Realcom protocol is currently only

used when the multi-serial port server is used as a TCP client to connect to a server and the server uses a virtual serial port.

Usage is summarized as follows:

Table 6 network configuration modes

No.	Virtual Serial Port	Device Working Mode	Conversion protocol	Description
1	Use	TCP Server	None	Suitable for situations where user software opens the COM port to actively collect data.
2	Use	TCP Client	None	Suitable for the occasion where the device actively sends data. If you choose TCP server, the device may not be able to reconnect after disconnection.
3	Do not use	TCP Server	Modbus TCP to RTU	Applicable to the case where the user software is Modbus TCP, the user device is Modbus RTU and Modbus TCP is the master station.
4	Do not use	TCP Client	Modbus TCP to RTU	Applicable to the user software is Modbus TCP, the user device is Modbus RTU, and the Modbus RTU is the master station.
5	Use	TCP Client	Realcom Protocol	When the multi-serial port server acts as a TCP client and uses a virtual serial port, it is best to use the Realcom protocol.
6	Do not use	TCP Client	None	Suitable for a large number of devices connected to a cloud. In general, the cloud is a server with a public IP on the Internet.
7	Do not use	TCP Server	None	Applicable when the device and computer are in the same local network, monitoring is done locally without the need to communicate across the Internet.

6.1 Virtual Serial Port Mode

If the user software uses the COM port for communication, it must use the virtual serial port mode including some PLC software, configuration software, instrument software, etc.

Check if the monitoring computer and the device are both in the local network:

- a) If the computer is a server with a public IP leased on the Internet, then the device must use the TCP client method to connect the device to the server. At this time, you can choose ② and ⑤ in Table 5. If it is a multi-serial port server, you must choose ⑤.
- b) If they are all in the local network (can ping each other), see whether the host computer actively queries or the device actively sends data. If the device actively sends, you must use the device as a TCP client method ②, otherwise you can choose method ①.

6.2 Direct TCP/IP Communication Mode

There are two working modes in TCP mode: TCP server and TCP client. Regardless of which mode is adopted, one must be the server and the other must be the client. After that, only the client can access the server. If they all are the servers or the clients, the communication is invalid.

6.2.1 TCP Client Mode

When the serial server is used as a client, there must be three corresponding relationships, as shown in Figure blow.

(1) Working mode correspondence: The working mode of the serial port server is the server mode of the client corresponding to the network tool.

(2) IP address correspondence: The destination IP of the serial port server must be the IP address of the computer where the network tool is located.

(3) Port correspondence: The destination port of the serial server must be the local port of the network tool. After this setting, the serial server can automatically connect to the network tool, and data can be sent and received after the connection is established.

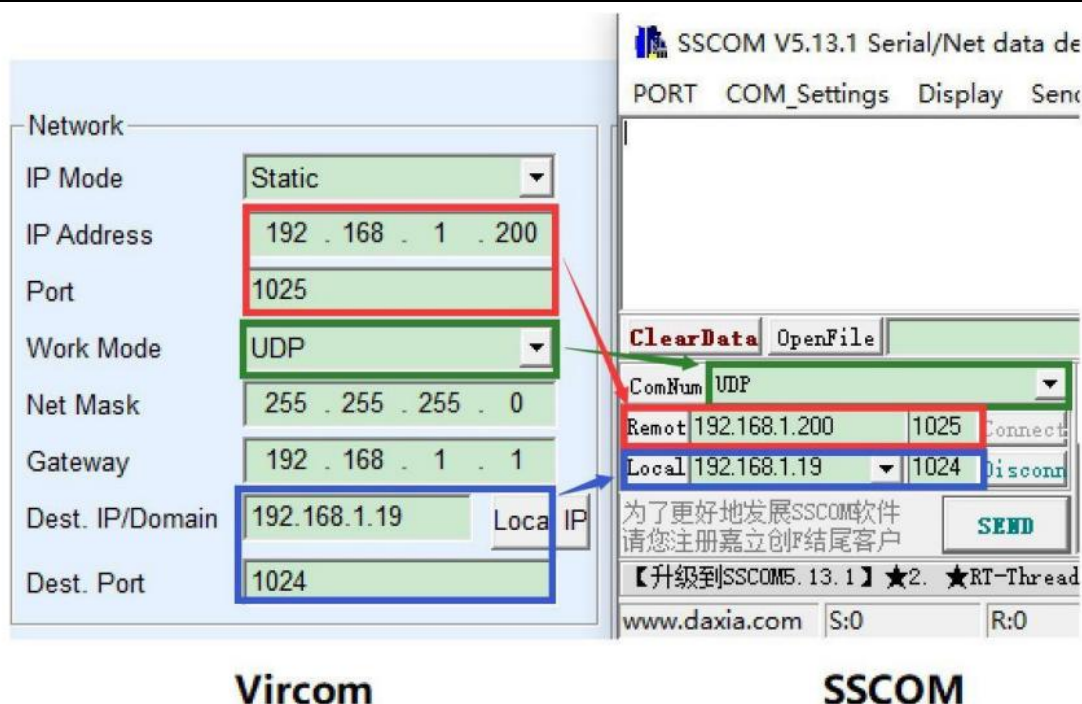


Figure 28 Serial server as a client

6.2.2 The Client connects to Multiple Servers

When the serial server is used as a TCP client, it can connect to 7 destination IP addresses at the same time, and the data sent by the serial port will be sent to 7 destination IPs too. If there are not so many servers, leave the rest of the destination IP vacant. The method is as follow:

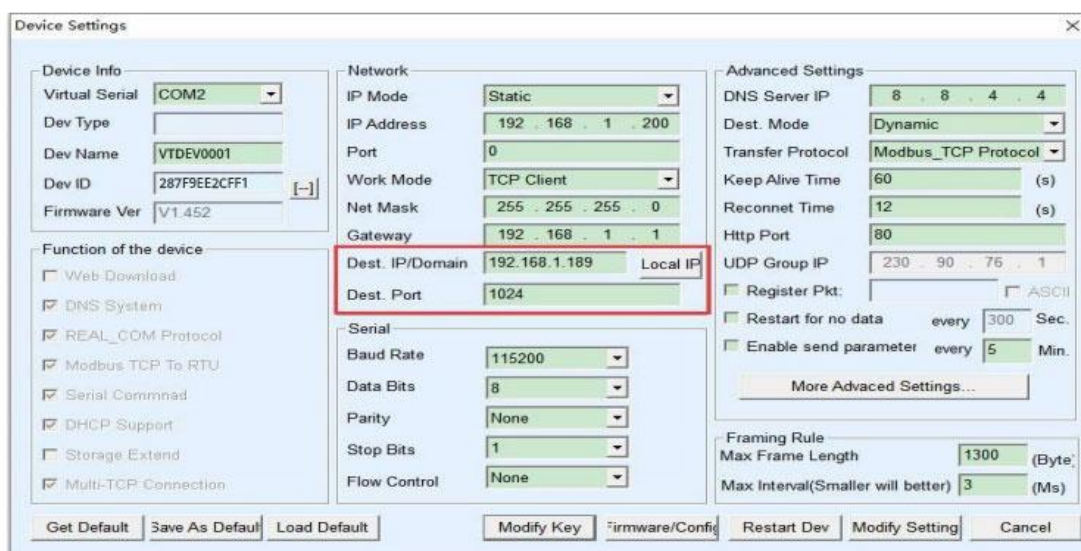


Figure 29 The first destination IP and port

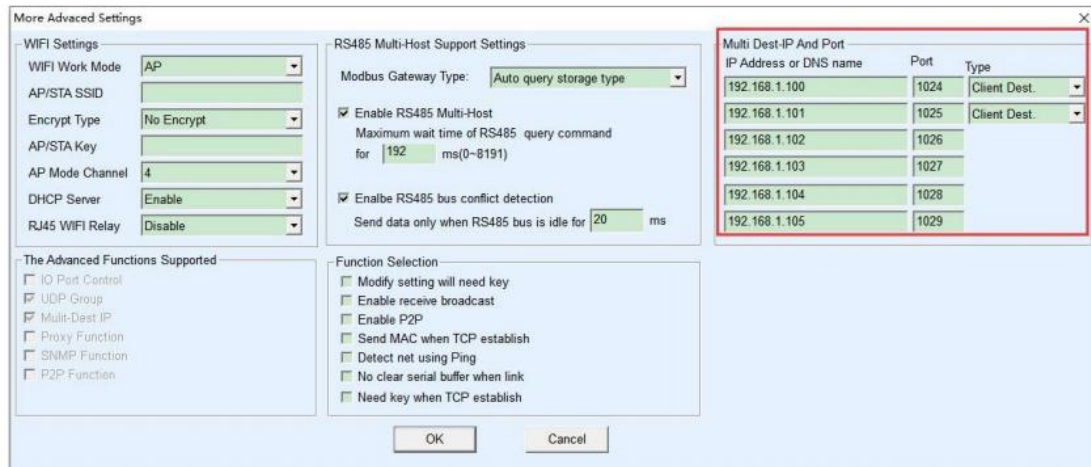


Figure 30 The remaining 2 to 7 IPs and ports

The first IP is set in the device setting interface as shown in Figure 29. The first IP can be a domain name. For the remaining 2~7 destination IPs, click the "More Advanced Setting..." button in the device setting interface to open More Advanced Settings for setting.

After all 7 destination IPs are set up, they can be connected automatically. If they are not connected, they will wait for the "Reconnect Time" time and then reconnect repeatedly.

6.2.3 TCP Server Mode

When the serial port server is used as the server, there are also three corresponding relationships, as shown in Figure 31, which will not be explained here. After setting, click the open button of the network tool to establish a TCP connection with the serial server, and then you can send and receive data after the connection is established.

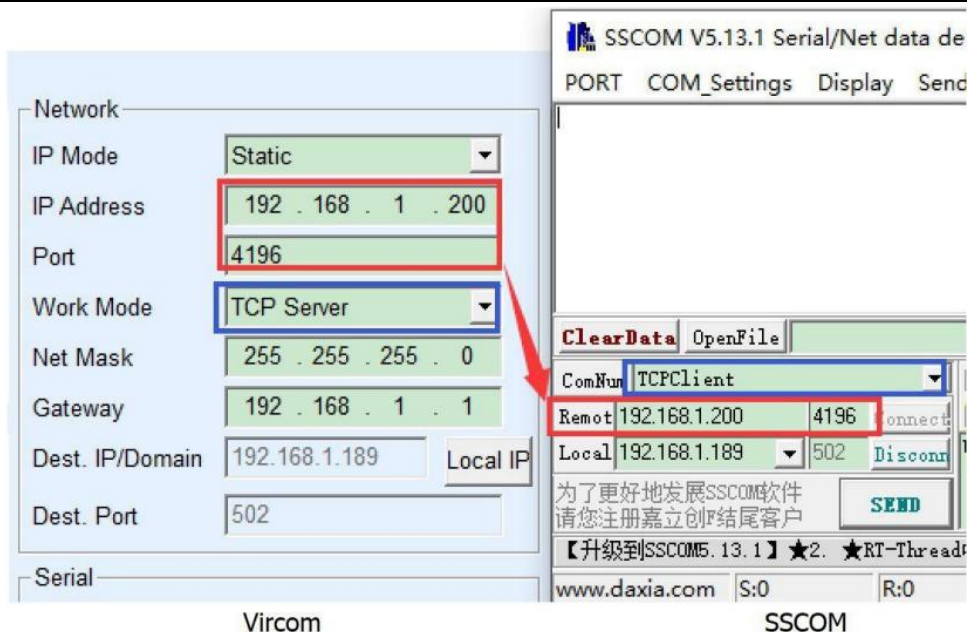


Figure 31 The serial port server as TCP Server

When the serial port server is used as a server, it can accept 32 TCP connections at the same time. The data received by the serial port will be forwarded to all established TCP connections.

6.2.4 Acting as both client and server

The serial server can accept TCP connections even when the device is in the TCP client mode, that is, it also has the TCP server function.

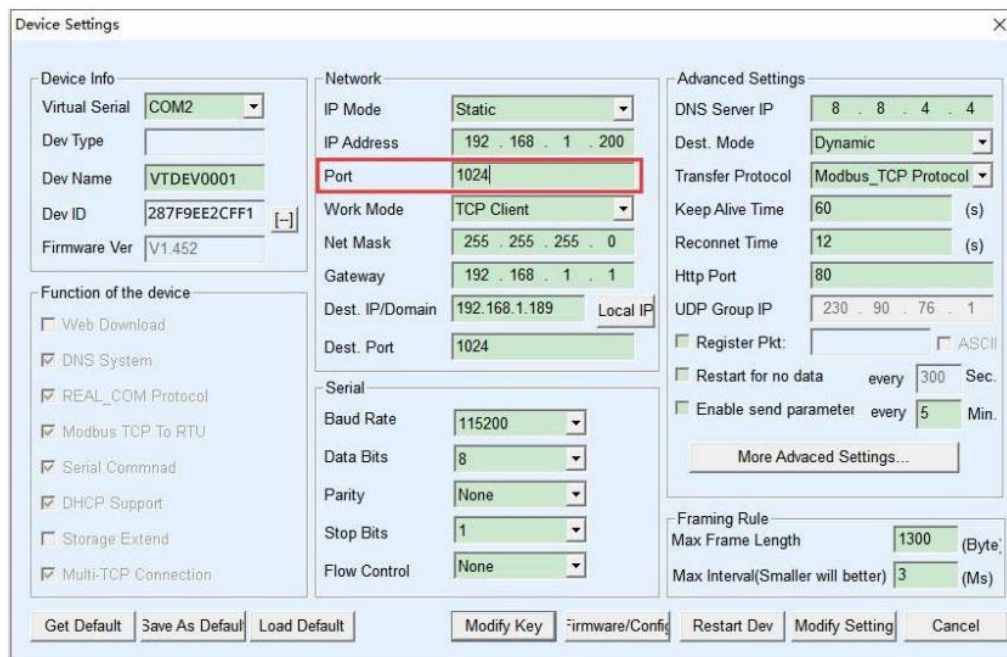


Figure 32 Acting as both Client and Server

By default, when using Vircom for configuration, if you change the working mode to "TCP client", the port (that is, the local port) will automatically become 0 (0 means a free port is randomly selected). In order to support the TCP server mode, the computer software must get the local port of the device, so a value needs to be specified here.

As shown in Figure 32, the computer software can now connect to the 1024 port of 192.168.1.200 for communication, and the device will also act as a client to connect the 1024 port of 192.168.1.189. It should be noted that since the local port 1024 is occupied by the server, the local port when used as a client is "port+1", that is, the software on 192.168.1.189 sees that the incoming port of the device is $1024+1=1025$

6.2.5 UDP Mode

In UDP mode, the parameter configuration is shown in Figure 33. The left side is the configuration for the serial server in Vircom, and the right side is the setting for the serial debugging tool SSCOM. First of all, both sides must be in UDP working modes. In addition, indicated by the red arrow, the destination IP and the destination port of the network tool must point to the local IP and local port of the serial server.

As indicated by the blue arrow, the destination IP of the serial server must be the computer IP where the network tool is located, and the destination port of the serial server must be the local port of the network debugging tool. Only after these network parameters are configured can two-way UDP data communication be ensured.

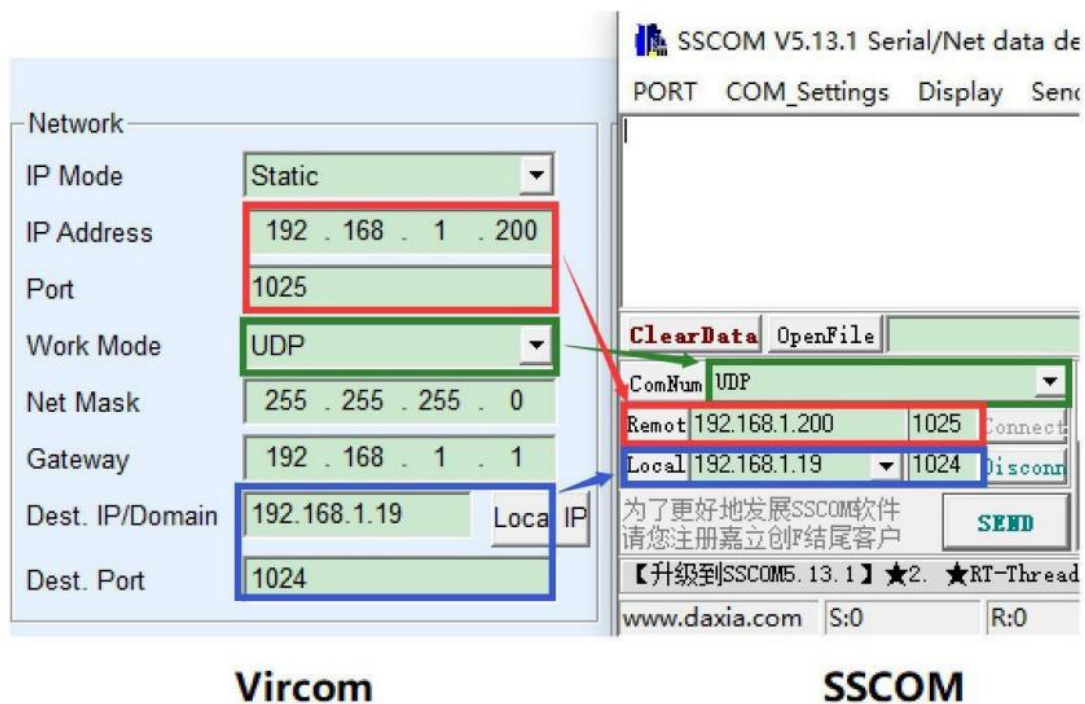


Figure 33 UDP mode parameter configuration

6.3 Pair-Connection Mode

If the host is not a Vircom, but the two devices are connected via the Ethernet port, the configuration method is similar. First, users need to connect two devices and the computer to the same LAN. This computer runs Vircom, it is just to configure, after configuration there no need to connect.

Click on Vircom's Device Manage to find these two devices, as shown in figure 34. Then click "device edit" to configure the device. Device pair-connection can be divided into TCP pair-connection and UDP pair-connection. If it is a TCP pair-connection, the parameters of the two devices are shown in figure 34. The parameters shown by the arrow must correspond as the corresponding mode of connection to the PC machine. After the success of the TCP connection, can return to the "Device Manage" dialog to see the connection status, as shown in figure 35, if the state of the two devices are "connected" say TCP link has been established between the two devices.

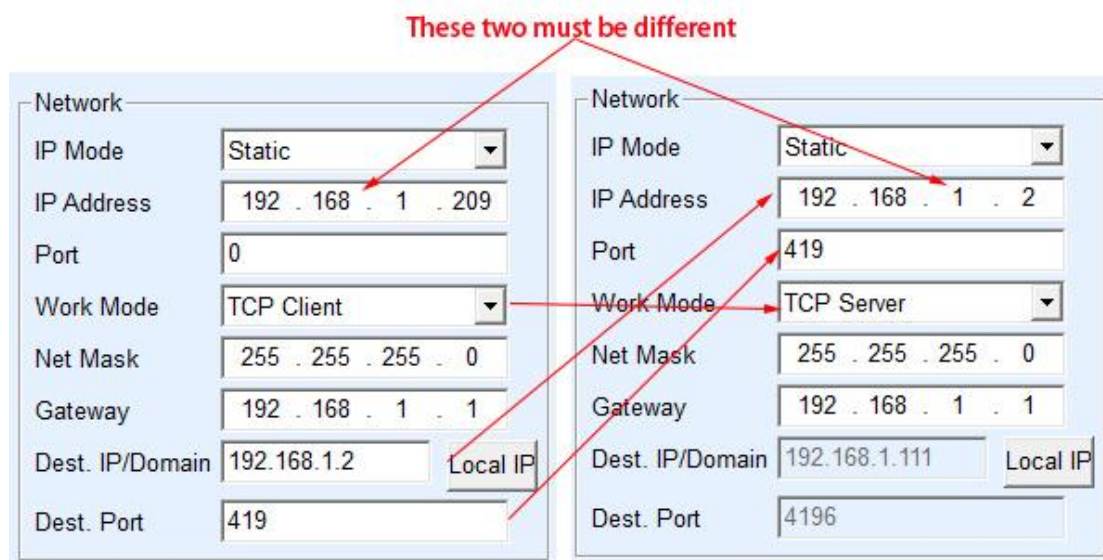


Figure 34 TCP Device Pair-connection Configuration

In...	Ty...	Name	I	Dev IP	Dest IP	Work M...	TCP ...	Virtual ...	Vircom St...	Dev ID	TXD	RXD	
1	Su...	LYH		192.168.1.2	192.168.1.3	TCP Ser...	Estab...	Haven't ...	Not Linked	B8AC6D4F	0	0	
2	Su...	LYH		192.168.1.209	192.168.1.2	TCP Clie...	Estab...	Haven't ...	Not Linked	B7F74C2A	0	0	Auto Search

Figure 35 TCP Devices Pair-connection Success Check

If the pair-connection in UDP mode, the configuration parameters are shown in figure 36, and the corresponding parameters of the arrows must be one-to-one. In UDP pair-connection the data will automatically be sent to the specified device as long as the parameters are configured correctly without checking the connection status.

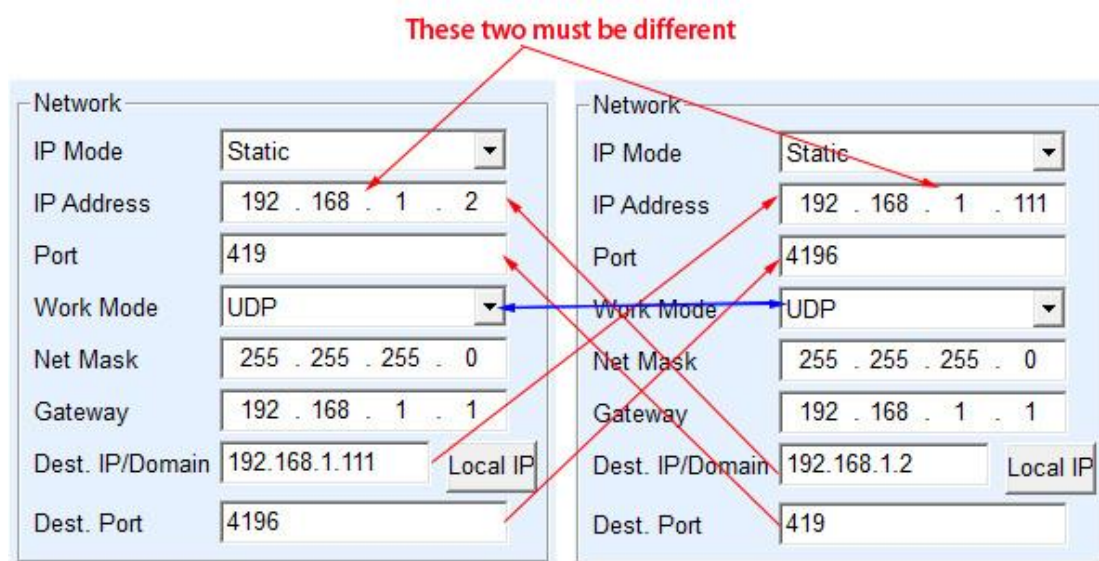


Figure 36 UDP Device Pair-connection Configuration

Finally, it is necessary to remind that if the device is pair-connected, except the Ethernet parameter configuration set as above, the serial port parameters also need to be correctly set. It is mainly because the baud rate of the networking products and the baud rate of the user's device should be accordance. After this setting, user devices can send data to each other through the serial port of two networking products.

7. Device Debugging

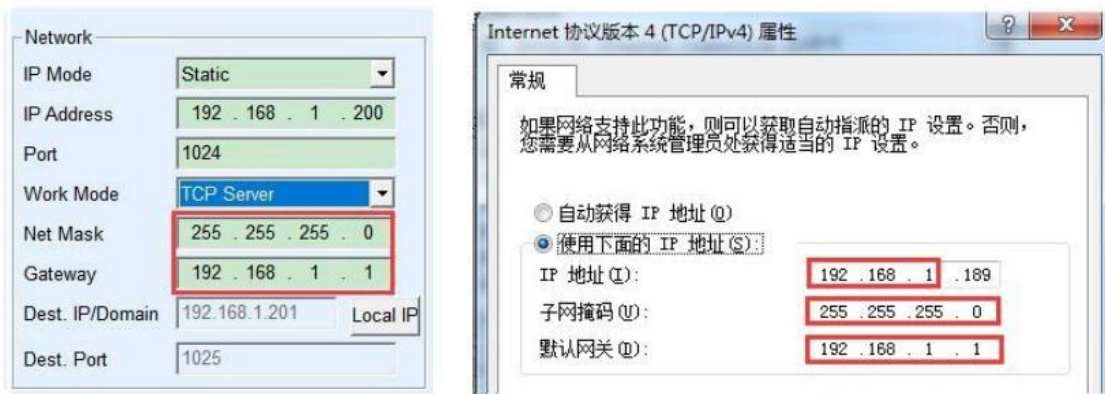
7.1 Network Physical Connection

The serial server can use a crossover cable or a network cable to connect to the switch or the computer network port directly.

After the connection is established, the first step is to check whether the Link light is green, otherwise, please check whether the network cable is connected.

7.2 Network TCP Connection

When the device is used as a dynamic IP, it cannot be directly connected to the computer network port. Because there is no DHCP server available (usually the DHCP server is the router in the LAN). Therefore, please specify the IP when connecting directly. At the same time, the computer also needs to specify a fixed IP.



Device IP in Vircom

IP configuration on computer

Figure 37 configured in the same network segment

Whether it is directly connected or through a switch, when configured as a static IP, the device and the computer need to be in the same network segment (unless it is cross-gateway communication), as shown in Figure 37 above.

Since Vircom supports searching and configuration across network segments, the IP address that can be searched but cannot be communicated is generally not configured correctly. In this case, you can use Vircom to configure the device in the same network segment.

After configuration, please use 5.3 TCP communication test or 5.4 virtual serial port test, you can see that the Link light turns blue when the TCP connection is established. The blue link light can also be seen through Vircom. For example, in the device management list, if the TCP connection column is "established", it means the link light is blue, as shown in Figure 38. This can facilitate remote diagnosis.

In...	Ty...	Name	Dev IP	Dest IP	Work M...	TCP Conn...	Virtual ...	Vircom St...	Dev ID	TXD	RXD
1	Su...	VTDEV00...	192.168.1.200	192.168.1.3	TCP Ser...	Established	Haven't ...	Not Linked	A10B...	45	1

Figure 38 Connection status and data send/receive status

7.3 Data Sending and Receiving

When the Link light turns blue, data can be sent and received between the software and the serial server. By now, if the software sends a data, the Active light will turn green, and the duration will generally be at least 1 second. The data will also be output from the serial port of the serial server, but whether the output data is correct depends on whether the serial port parameters (including the baud rate, data bit, stop bit and parity bit) are configured.

For the serial device that has send the correct demand. It will respond. Once there is a reply (the serial port sends data to the network port), the Active indicator will turn blue. Otherwise, please check the serial port parameters or whether the serial cable is connected.

In order to facilitate remote debugging, Vircom also supports remote viewing of data sent and received. As shown in Figure 38, TXD is the amount of data sent by the serial port server serial port. When the device list is refreshed, if this value changes, it indicates that there is data sent. The Active light will also be green; if you see the value of RXD changing, it indicates that the serial device has returned data, and Active is blue.

7.4 Vircom Remotely Monitor Data

When using the virtual serial port, Vircom supports real-time capture of the data of the virtual serial port. It is convenient for users to debug the system, and the method is as follows:

It is assumed that the communication of the virtual serial port has been established according to the method of 5.4 virtual serial port test. Now you need to monitor the data through the virtual serial port. Open Vircom's menu/Config/software setting/open the Vircom configuration dialog box.

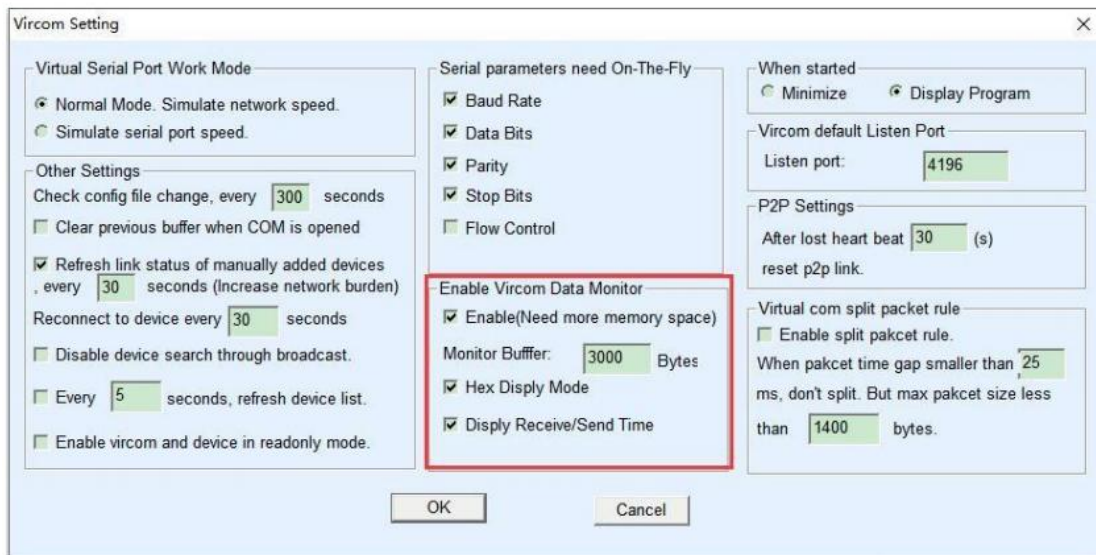


Figure 39 enabling Vircom monitoring

Check in front of the three options: open monitoring, hexadecimal monitoring mode, and display data sending and receiving time, as shown in Figure 39. Then click OK. Assuming that data has been sent and received before, now select a virtual serial port to be monitored in the main interface, and then select Menu/View/Monitor, as shown in Figure 36.



Figure 40 Open Vircom monitoring

From the opened dialog box, you can see the instructions sent by the host computer and the instructions returned by the device, as shown in Figure 41. This function can facilitate on-site communication debugging.

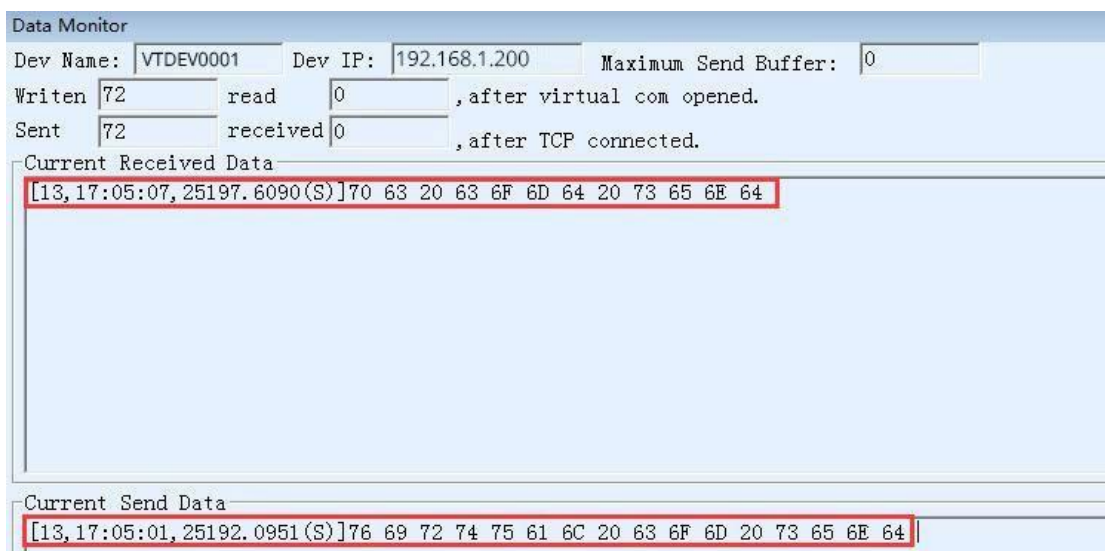


Figure 41 monitor sending & receiving data

8. Modbus Advanced Features

The serial port server with Modbus gateway function does not have station address and register itself. It is a communication bridge. It will generate Modbus RTU command according to the Slave ID, function code, register number and register quantity in the Modbus TCP command sent by the user software to the Modbus gateway, and output it from the serial port. It can be regarded as a protocol "translator".

8.1 Enable Modbus Gateway

First of all, the serial port server should support Modbus gateway, that is, the "Modbus TCP to RTU" function in Table 6 Device Supported Functions in the Device Settings dialog box should be checked.

By default, the serial port server is in normal transparent transmission mode. If you need to convert it to Modbus gateway mode, please select the "Modbus TCP protocol" option in "Conversion protocol". After that, the device automatically changes the "Port" parameter to 502 (the port of the Modbus server). In this way, the Modbus gateway is enabled.

If the serial port RTU device is used as a slave, the host computer Modbus TCP software connects to the Modbus gateway's port 502. At this time, the Modbus gateway needs to work in TCP server mode; if the serial port RTU is used as a master, the Modbus gateway works in TCP client mode, and the destination IP is filled with the IP of the computer where the Modbus TCP software is located, and the destination port is generally 502.

8.2 Storage Modbus Gateway

The contents of the read registers can be saved inside the gateway, so that the speed of Modbus TCP query can be greatly improved, and the performance is better when supporting multi-host access

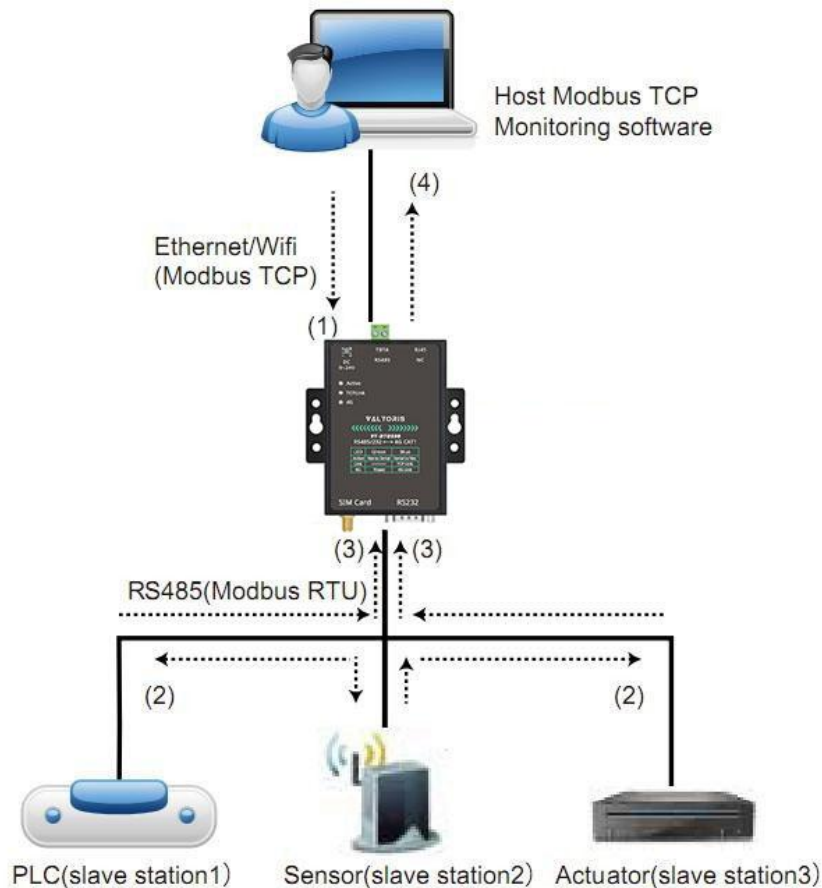


Figure 42 Storage Modbus Gateway

As shown in Figure 42: The direction of ordinary Modbus TCP data flow is (1) → (2) → (3) → (4). That is, the Modbus TCP command is first converted into the corresponding command of Modbus RTU, and then the device responds to the Modbus RTU command to the Modbus gateway, and then the Modbus gateway converts it into Modbus TCP again and sends it to the monitoring host computer.

Modbus TCP is a network communication with a very fast transmission speed, and it can generally respond within 3ms, while Modbus RTU is RS485, which generally has a speed of only 9600bps, and it generally takes at least 30ms to send and return a command. In this way, the query response time of ordinary non-storage Modbus gateways is relatively long. In addition, if there are many host computers querying data at the same time, the serial port will be congested. If the network is compared to a highway and the serial port is compared to a single-plank bridge, then the original method is to pass the traffic of the highway on the single-plank bridge.

The register-saving Modbus gateway solves the above problems. It can temporarily save the register data obtained in the Modbus gateway, so that when the Modbus TCP query, the Modbus gateway can immediately return the command, which demonstrates Modbus TCP can be operated quickly. On the other hand, the serial port server can take

the initiative to send instructions from the serial port to automatically update the contents of the currently saved register data, and save a copy of the latest register value.

In addition, this serial server is a fully automatic configuration-free Modbus gateway, users do not need to configure the required register address, function code, slave address, etc. The serial server will automatically recognize and dynamically add these registers according to the Modbus TCP commands sent from the network port.

VT-WF110 can response quickly when monitored by multiple computers. No matter what baud rate of the serial port is, it can generally response the data to the host within 3ms, which showed a good updating speed of serial port data.

The register-saving Modbus gateway is a real Modbus TCP to Modbus RTU. It really takes advantage of the fast speed of Modbus TCP and the ability to query by multiple hosts at the same time.

Note that when the serial port server is used as a TCP client, it does not have the storage function and will automatically switch to the non-storage type.

The characteristics of storage Modbus are listed below:

- 1) The first Modbus TCP query command is non-storage type. Because you must wait for the RTU device to return data slowly before returning the register content to the network port.
- 2) If a specific command is no longer inquired by the host computer on the network side within 5 seconds, this command will be automatically deleted and no longer sent to the RTU device from the serial port.
- 3) At present, it can store 10K Modbus cache. For ordinary single-register query, about 500 instructions can be stored at the same time.
- 4) When more commands are being queried at the same time, they are sent in order. The first command sends → the first command response → waits for 485 anti-collision time (refer to the multi-host section) → The second command sends... Return to the first command after the last command has been answered.

8.3 Disable Storage Functionality

Although the storage type Modbus has a faster response speed, some users do not want the serial port device to receive a large number of query commands, which affects the internal processing speed of the instrument. In this case, the storage type function can be turned off.

To disable the storage type, click the "More Advanced Options" button in the "Parameter Configuration" dialog box and select the non-storage type Modbus gateway. Then return to the device settings and click Modify Settings.

Note that when using the Web method to configure the conversion protocol, the default is a non-storage Modbus gateway.

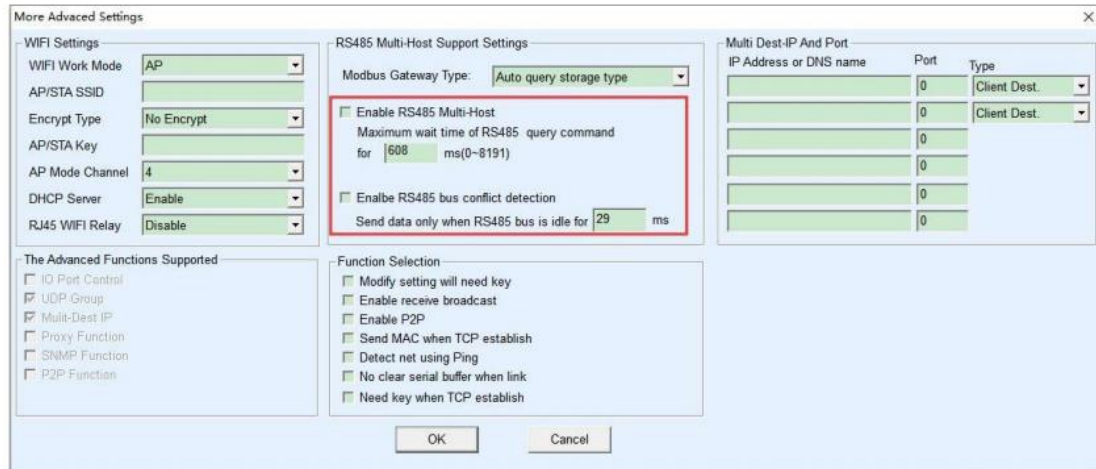


Figure 43 disable the storage function

8.4 Multi-host Function

As shown in Figure 44, "RS485 multi-host support" and "RS485 bus conflict detection function" are the multi-host functions. They are generally enabled and disabled at the same time. After enabling, the device with the conversion protocol of Modbus TCP has the function of storage-type Modbus gateway, otherwise it is a non-storage-type Modbus gateway; if the conversion protocol is None, the user-defined RS485 protocol can generally also have the function of serial port devices accessed by multiple hosts at the same time, which is impossible in a pure RS485 network, because multiple masters sending at the same time will cause conflicts on the RS485 bus. The multi-host of this serial port server can "coordinate" the RS485 bus to achieve the purpose of multi-host access.

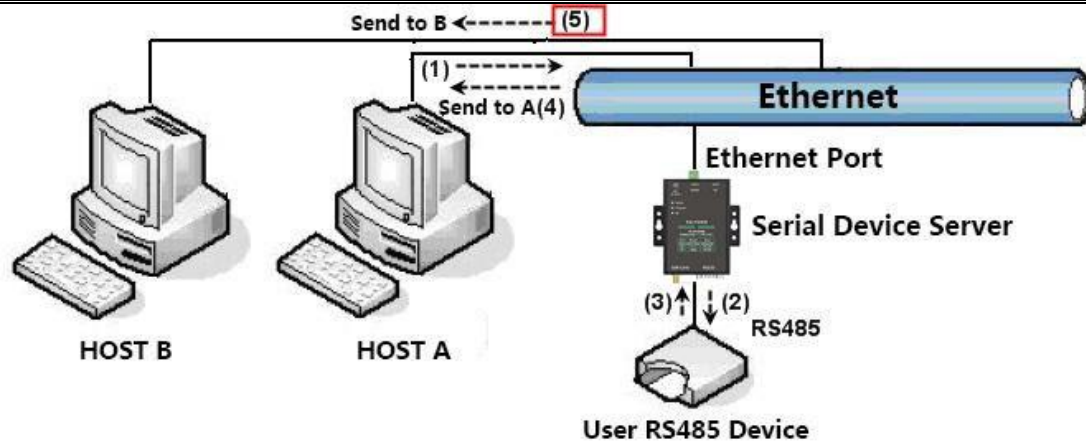


Figure 44 Multi-host function demonstration

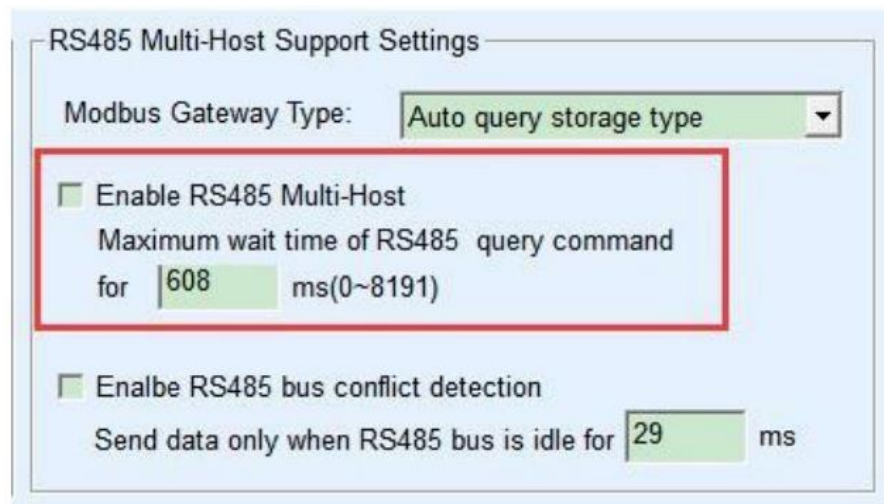
As shown in Figure 44, in the normal mode, when two hosts: host A and host B are connected to the serial server at the same time, host A sends (1) command, RS485 device receives (2) command, RS485 device returns (3) command, but the serial port server will send (4) to host A and (5) to host B at the same time. Since the host B did not send the query, but it also received the response command (5), the host B may generate a communication abnormal error. In the multi-host mode, there will only be command (4) but not command (5), because the serial server will automatically remember the host that needs to be returned, and only return the instructions to the most recent communication host, and the query of host A will only reply to A, host B queries and replies to host B.

Another function is that in the normal mode, when the host A and the host B send data at the same time, the combination of instructions will be generated on the RS485 bus, so that it cannot be recognized normally; in the multi-host mode, the serial server can schedule A and B to use the bus. Prioritize the conflict problem of simultaneous access by multiple machines in an effective way.

When the conversion protocol is "None", the multi-host function is not enabled by default. When you need to enable multiple hosts, please click "More Advanced Settings" in the device configuration dialog box, and then check "RS485 multi-host support".

8.5 Multi-host Parameter

The meanings of "RS485 multi-host support" and "RS485 bus collision detection function" are described as follows.



RS485 Multi-Host Support Settings

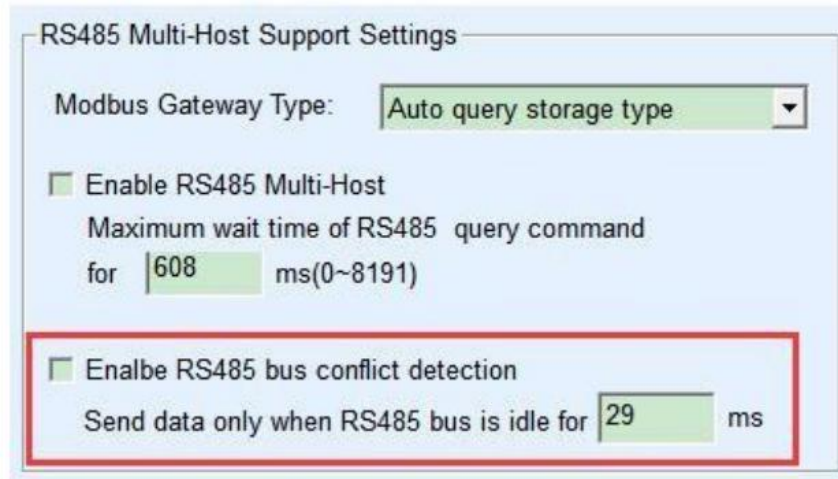
Modbus Gateway Type:

Enable RS485 Multi-Host
Maximum wait time of RS485 query command for ms(0~8191)

Enable RS485 bus conflict detection
Send data only when RS485 bus is idle for ms

Figure 45 RS485 multi-host support

The RS485 command response timeout is the maximum time interval from when the serial server starts sending this command to when it receives a response. The time filled in should be greater than the actual maximum time interval because if it is judged to be a timeout, the next command will be sent.



RS485 Multi-Host Support Settings

Modbus Gateway Type:

Enable RS485 Multi-Host
Maximum wait time of RS485 query command for ms(0~8191)

Enable RS485 bus conflict detection
Send data only when RS485 bus is idle for ms

Figure 46 RS485 anti-collision idle time

RS485 bus conflict time: indicates how many milliseconds the serial server waits after receiving the reply of the first command before sending the second command. This parameter actually defines the speed of the command rotation. The value is recommended to be more than 20ms. The parameter "maximum waiting time 3 seconds" generally does not need to be modified.

When the user uses Vircom to select the conversion protocol as "Modbus_TCP Protocol", Vricom will automatically check the above two enabling boxes (unless the user manually enters the advanced option to remove it), and the above two times will also be automatically configured according to the baud rate . However, if the user's Modbus command is relatively long or the conversion protocol is "None", these two parameters need to be configured manually.

The following describes the recommended settings of the above parameters:

1. Figure 46 shows the "RS485 bus anti-collision time". Generally, it can be set to twice the "Packet Interval" in the lower right corner of the parameter configuration interface, but the minimum should not be less than 20.
2. Figure 45 shows the "RS485 command response timeout", which is generally determined according to the length of the back and forth response command. If the sending command is N bytes and the response is M bytes, the recommended value is: "Packet interval" $\times(N+M+5)+100$.

8.6 Modbus Under Multi-destination IP

As shown in Figure 44, if the serial device (RTU device) is used as the master station and the network port device (Modbus TCP device) is used as the slave station, and there are multiple network port slave devices at the same time. At this time, you can use the method described in 6.2.2 Client Connecting Multiple Servers to let the serial port server as a client connect to these multiple network port devices at the same time.

The function that needs to be realized at this time is: when the serial port RTU sends a command, it can be sent to multiple network port devices, the network port device recognizes whether to send it to itself through the Slave ID field, and only the network port device corresponding to the Slave ID responds. After the network port response is sent to the serial server, it is converted into an RTU command and output from the serial port to the RTU device.

At this time, it should be noted that it is necessary to remove the two check marks shown in Figure 46 as "RS485 bus anti-collision time" and Figure 45 as "RS485 command response timeout time". Otherwise, the above forwarding function cannot be realized. Another application method is: Although the serial server is connected to multiple network port devices as a Client, the RTU device is not the master station, and the network port device still sends it first, and the RTU device responds (as a slave station). At this time, the "RS485 bus anti-collision time" and "RS485 command response timeout time" still need to be checked, so that multiple hosts can access one RTU device at the same time

9. Registration Packets and Heartbeat Packets

Registration packets and heartbeat packets are a function suitable for communication between devices and cloud software.

9.1 Registration Packets

The definition of a registration package is that when the computer software and the serial port server module (hereinafter referred to as the module) establish a TCP connection, the module will first send a string of codes to the software so that the software can know which module is communicating with itself. This string of codes is the registration package.

The registration package is very suitable for the monitoring of the Internet of Things, because the cloud software generally runs on the public network server of the Internet, and the modules are scattered in various collection and monitoring points. How to make the cloud software recognize the module is very important and is necessary to realize the communication of the Internet of Things.

Our serial port server provides the following multiple registration report methods.

9.1.1 Send MAC Address On Connection

Its method is to send its mac address to the cloud when the module is connected to the cloud. Since the MAC address is unique, it can identify the corresponding device. This method is simple and does not require writing a registration package for each device, so it is simple and effective. How to use it: Click "More Advanced Settings" in the device settings dialog box, find "Send MAC address when TCP is establish" in the upper middle, tick the front, and then return to the setting interface and click "Modify Settings".

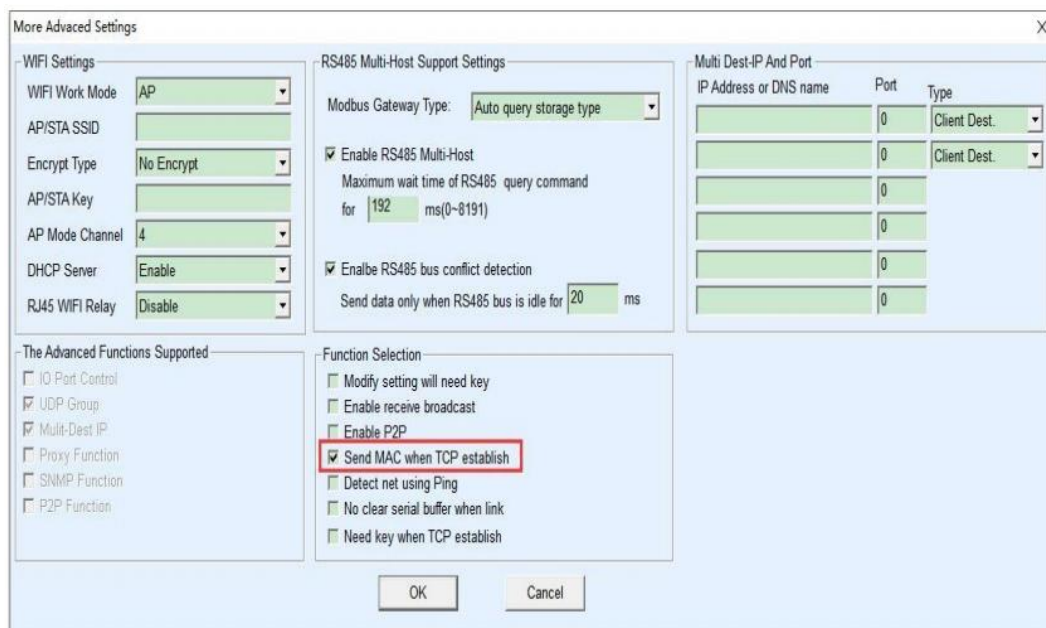


Figure 47 Sending MAC address on connection

9.1.2 Realcom Agreement

The Realcom protocol is a protocol containing a registration package and a heartbeat package. Users can use this protocol to realize the functions of the registration package and heartbeat package. The method to enable the Realcom protocol is: in the "Device Settings" dialog box, select "Conversion Protocol" to "REAL_COM Protocol", and note that the part of enabling the registration package needs to be blank and unchecked.

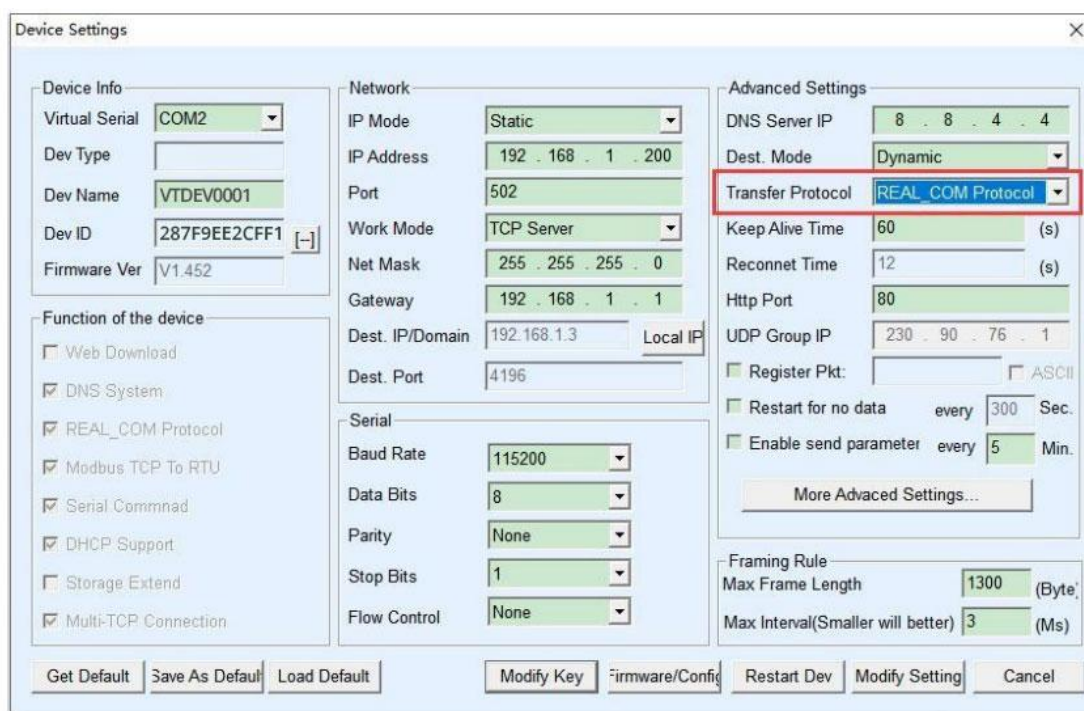


Figure 48 Enable the realcom protocol

After the Realcom protocol is enabled, it will not be transparent transmission communication. It has the following characteristics:

1. After the device establishes a TCP connection with the cloud, the device automatically sends a hexadecimal registration packet FA 07 13 02 FA 02 MAC[5] MAC[4] MAC[3] MAC[2] MAC[1] MAC[0] FA FF. Among them, MAC[5]~MAC[0] is the MAC address of the device.

2. When the device sends data to the network, it will automatically add the 3-byte header prefix of FA 01 01.

3. Every keep-alive timing interval, the device sends a 00 1-byte heartbeat packet to the software. The REAL_COM protocol can be used as a device registration package because it contains the MAC address in the registration package. However, due to its fixed format, only the cloud software can design the REALCOM protocol to be compatible with this method.

9.1.3 Custom registration package

The custom registration package method allows users to fill in any registration package format. The method is: in the device settings interface, configure as follows:

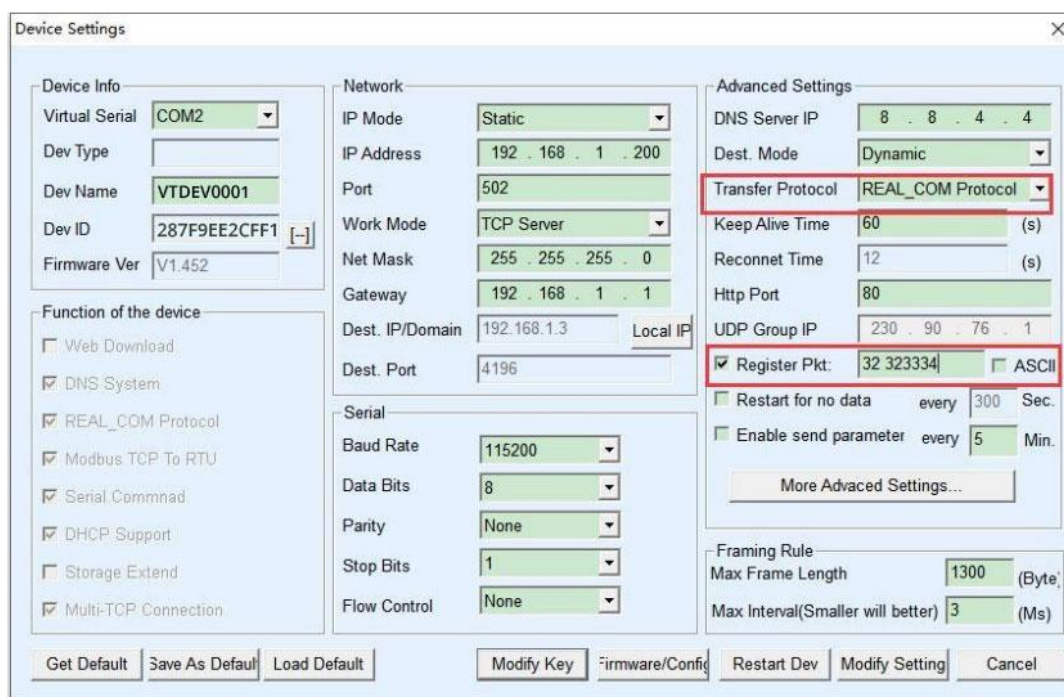


Figure 49 Set registration package

The difference from the REAL_COM protocol is that the registration package is enabled here, and the registration package information such as 31 32 33 34 is filled in. Note that this is hexadecimal, which means that the data actually sent is a string of characters 1234. If you need to display the string, click the "ASCII" option next to it.

When the device is connected to the cloud software, it can automatically send a hexadecimal registration package of 31 32 33 34. This registration package method is more flexible and allows the device to adapt to the existing cloud registration package format; however, there is no wildcard such as MAC in the registration package, and different registration packages need to be configured for each device separately, which is more cumbersome. The above two methods of sending MAC address and REALCOM have the same configuration for each device, but the registration package is naturally different due to different MAC.

The longest registration package length is 33 bytes. This method supports registration packages and heartbeat packets in UDP mode.

9.1.4 Configuration File

The serial port server is supported to write a configuration file, so as to realize a

completely customized registration package by the user, and the MAC address wildcard can be used, which can solve the trouble of writing a custom registration package for each device, and there is no limit on the length of the registration package.

9.2 Heartbeat Packets

Heartbeat packets are mainly used to detect whether the communication link is disconnected. The implementation method is that the device sends a heartbeat packet data to the server software at regular intervals. This data will be discarded after being received by the server and will not be regarded as valid communication data.

The heartbeat packet has two main functions: first, it can let the host computer software know that the device is active; second, if the device fails to send a heartbeat, the device on the TCP client will automatically re-establish the TCP connection, so it is a means to restore network communication.

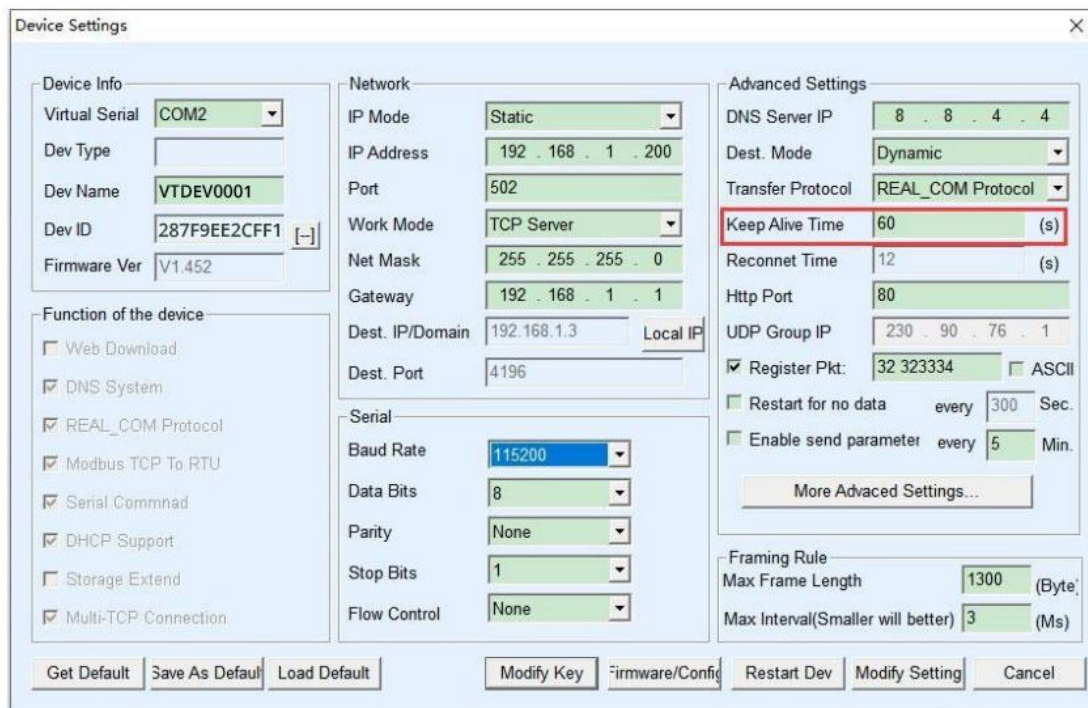


Figure 50 Keep Alive time

As shown in Figure 50, the sending time of the heartbeat packet is set by the "Keep Alive Time".

9.2.1 Implied Heartbeat

Even if you don't set any heartbeat packets, the implicit heartbeat function will be enabled when the Valtoris device is on the TCP client.

Therefore, the implicit heartbeat function means that the device sends data, but the server cannot actually receive the heartbeat data. Therefore, it cannot play the first

function of the heartbeat packet, that is, the server detects whether the device is active or not; but because the device actually sends data, it can play the second function of the heartbeat packet, that is, the device detects the TCP connection is normal, once the disconnection is detected, the TCP connection can still be automatically re-established.

9.2.2 REALCOM Protocol

As described in 9.1.2 Realcom protocol, REALCOM protocol can send a 1-byte data of 00 every keep-alive time. This data is the heartbeat packet of realcom protocol.

9.2.3 Customize Heartbeat Packets

First, fill in the registration package according to the method of 9.1.3 customizing the registration package. Then add the heartbeat packet as follows: Click the "More Advanced Settings" button in the device settings, write the hexadecimal heartbeat packet in the second line of the multi-destination IP and port, and change the option on the right to "Param. Dest".

IP Address or DNS name	Port	Type
313233	0	Param. Dest.
616263	0	Param. Dest.
	0	
	0	
	0	
	0	

Figure 51 Customized registration package

Note that the sum of the registration packet and the heartbeat packet should be less than 33 bytes. The first line is actually the registration package.

10. Remote Device Management

The so-called remote device management refers to the ability to maintain and manage the device through Vircom software, including restarting the device, modifying parameters, and upgrading firmware. This function is suitable for users who use Vircom for device management.

For Vircom software, as long as the device can be found in the device list, it can be managed remotely. The remote management of equipment is divided into the following situations:

1. Automatic search: The device and the computer are on the same switch. At this time, no matter whether they are in the same network segment or not, the Vircom search method on the computer is: Vircom sends a broadcast query. After receiving the query, all devices will reply with their own parameters. Vircom tools. This method searches all devices at once.

2. Manually add: There are two situations:

a) Large-scale routers divide the network: In some large-scale networks, broadcast packets are divided by routers, so that the broadcast packets cannot reach the device end, but the ping device IP is all connected. At this time, it generally needs to be added manually to solve the problem. The method of adding manually is to click "Add manually" in the "Device Management" dialog box to add the first and last IP to query the devices one by one.

b) The public network server queries the internal network equipment: the serial port server is in the internal network and acts as a TCP server mode, and Vircom is on the public network IP server. At this time, you need to do a 1092 UDP port mapping on the router of the network where the device is located, and map it to the IP where the device is located, and then Vircom manually adds the device. The IP is the public network IP of the device.

3. TCP client: When the device acts as a TCP client, it will initiate a TCP connection to port 4196 of the destination IP (116.15.2.3). After the connection is established, it will automatically send its own parameter system to the UDP port (note that it is not the TCP port) of the destination port (here 4196) at each keep alive timing, so that Vircom can be able to do so on this computer (116.15.2.3) The device is found. If the destination port is not 4196, you need to modify the Vircom's default parameter receiving port. The method is to modify the menu/configuration/software configuration/default listening port, and then start Vircom. If a TCP port conflict pops up, just ignore it and continue execution.

4. Sending parameters at regular intervals: Even in a serial server in TCP server mode, you can check the "Send parameters at regular intervals" function, and the parameters will be sent to the destination port of the destination IP (here 116.15.2.3) every 5 minutes. Vircom that receives parameters on this port of this server can manage these devices.

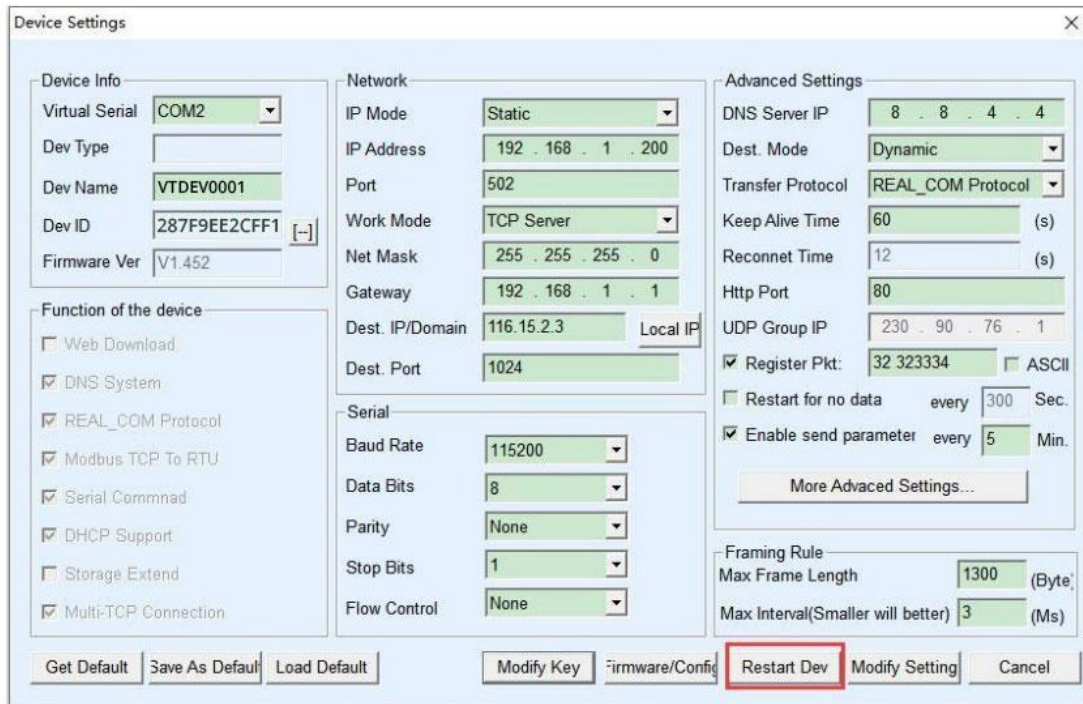


Figure 53 Restart the device

After the device restarts, use the same method to search for the device again, and enter this dialog box again. Click the "Firmware/Config" button in the lower right corner of the dialog box.

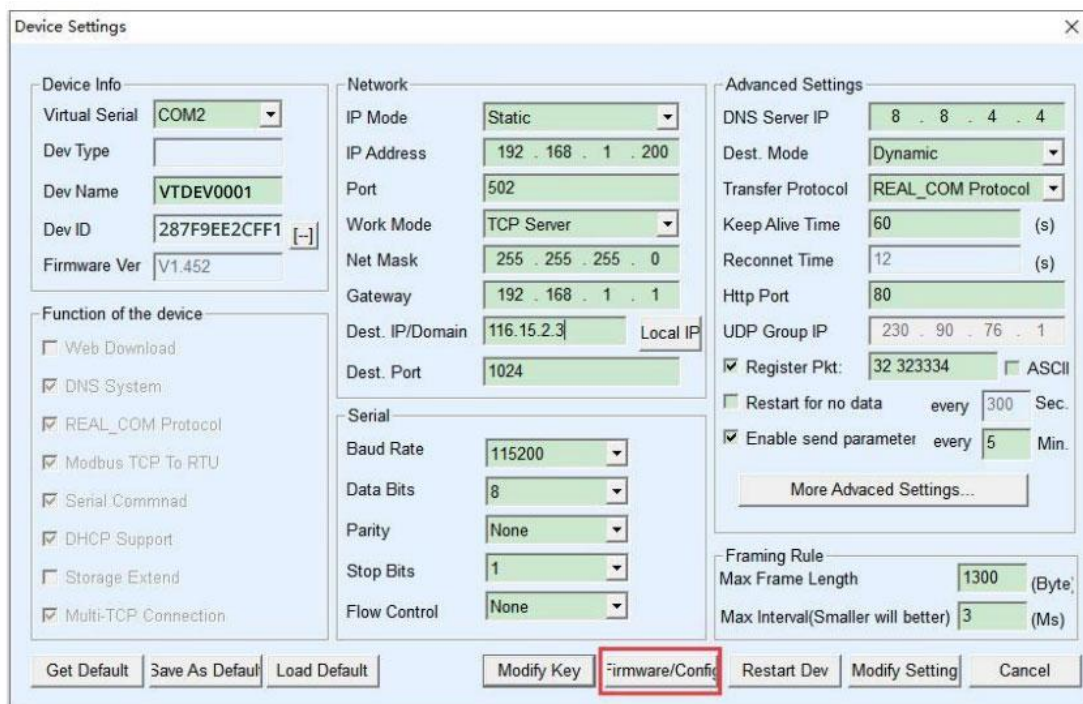


Figure 54 Upgrade firmware

3. As shown in Figure 55, select the "Program File Download" radio button. In the program file, choose the firmware file. The IP address part for the serial server has been automatically filled in and does not need to be written again, the module type/model has been automatically selected. Then click on Download.

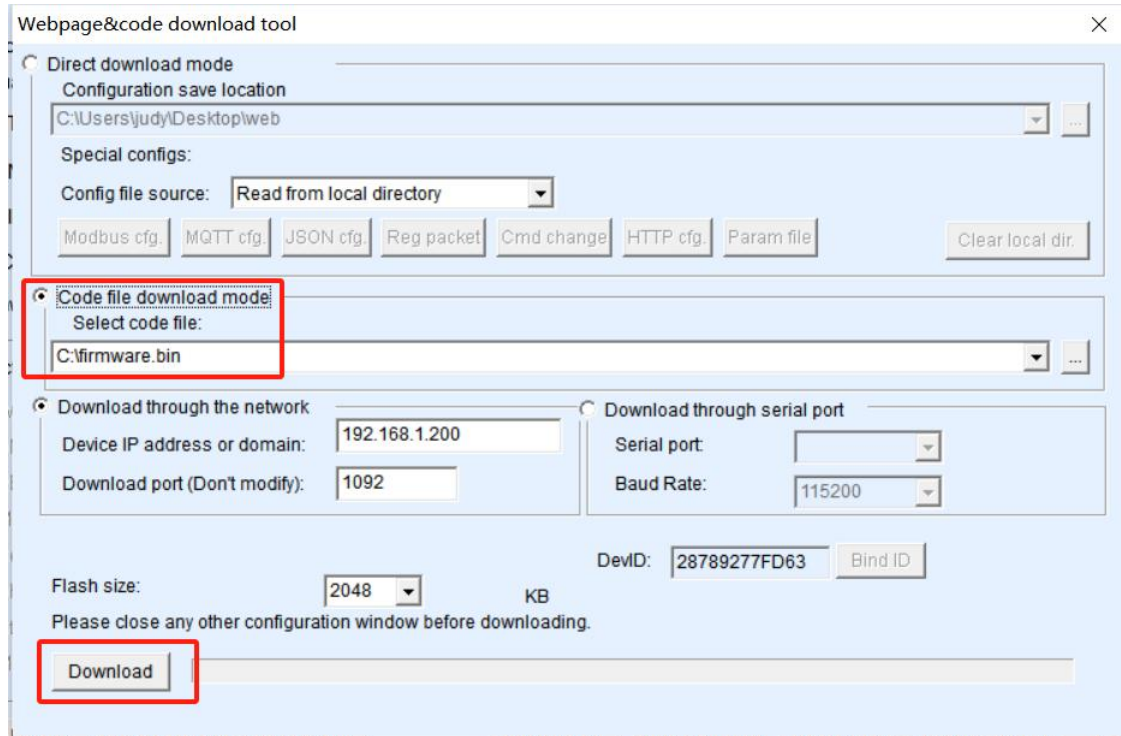


Figure 55 VT-WF110 Firmware Upgrade Method

4. By now, the download progress bar begins to move, and the download time is approximately 30 seconds. During the download process, you will see the ACT light on the device flashing. At the end of the download, you will see the LINK light flashing a few times. Then, a pop-up message will appear saying "Transfer complete, do not power off the device while the LINK light is flashing." Note: This only indicates that the transfer is complete, and the writing to flash process takes about 3 seconds. During this time, the LINK light will flash, and you should not power off the device.

5. After the download is complete, the program will usually restart automatically, and generally, there is no need to power off. If the running indicator light is flashing and the program does not automatically restart, wait for the LINK light to stop flashing for more than 30 seconds before powering on again.

6. Web Configuration Interface Update: After the firmware upgrade, the internal configuration webpage of the module also needs to be updated, otherwise, it will not be possible to configure through Web, but communication will not be affected. If web

configuration is not needed, the webpage does not need to be downloaded either. The method for downloading the Web is: as shown in Figure 56, change the "Program File" download mode to "Web Directory Download." And select the root directory of the local webpage as the directory where the webpage files to be downloaded are located (this directory can be obtained from Zhuolan), click download, and download all files from the local webpage directory to the device's internal file system.

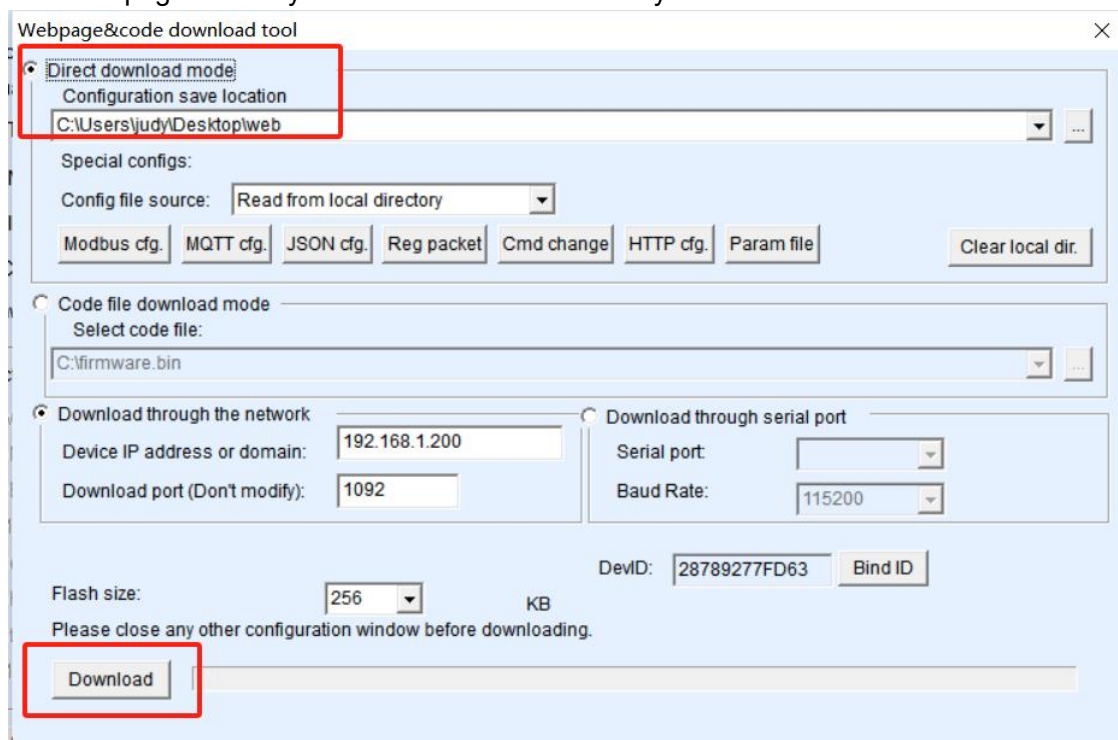


Figure 56 VT-WF110 web upgrade method

7. Note:

7.1 If the download fails, it will not damage the device, please restart the download. Also, when the LINK light is flashing at the end of the download, do not cut off the power, otherwise the device will be damaged.

7.2 You can check the firmware version number through Vircom to determine if the new firmware has been successfully downloaded.



Figure 57 Check the firmware version after the level is completed

13. After-sales service and Technical Support

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