RS2WLAN

High-Performance
WIFI Serial Device Server

3WIRE

User Manual

RS232/485/422 To WIFI/Ethernet

www.3wire.my

Content

1. Summary

RS2WLAN is a WIFI serial device server under 3Wire series. It is a high-performance WiFi serial device server. RS2WLAN is positioned on high stability, rich function, suitable for the high real-time and stability industrial applications, particularly for wireless remote monitoring such as PLC and so on.

Figure 1 RS2WLAN with Antenna

The high-quality power supply design in 9~48V wide voltage provides better industrial environment adaptability; can be equipped with installation guide accessories.

The RS2WLAN not only have the function of RS232/RS485/RS422 to WiFi TCP/IP, but it has the integrated function of Modbus TCP gateway which enable conversion of Modbus RTU protocol to Modbus TCP WiFi protocol.

The serial device server can easily connect the serial device to WiFi network,

implement the wireless network upgrade of the serial device. RS232 interface support full duplex, uninterrupted communication. RS485 is embedded 485 lightning protection. The WiFi supports STA mode to connect to the wireless router, or as AP mode which mobile phones and other WIFI devices can connect to.

You can also use the Modbus TCP protocol in the Configuration Software to directly connect with the RTU device to realize WiFi networking communication.

RS2WLAN can be applied to :

- PLC Remote Wireless Monitoring
- Power /Electronic /Intelligent Instrument
- Bank /Medical Automation System
- Industrial Automation System
- Information Household Appliances

The typical application is shown as FIG. 2. The original serial device connect with RS2WLAN, then connect RS2WLAN to wireless network through the WiFi. Then any data sent by serial device will be transparently transferred to the PC designated by RS2WLAN, and data sent to RS2WLAN from PC via network will also be transparently transmitted to the serial device.

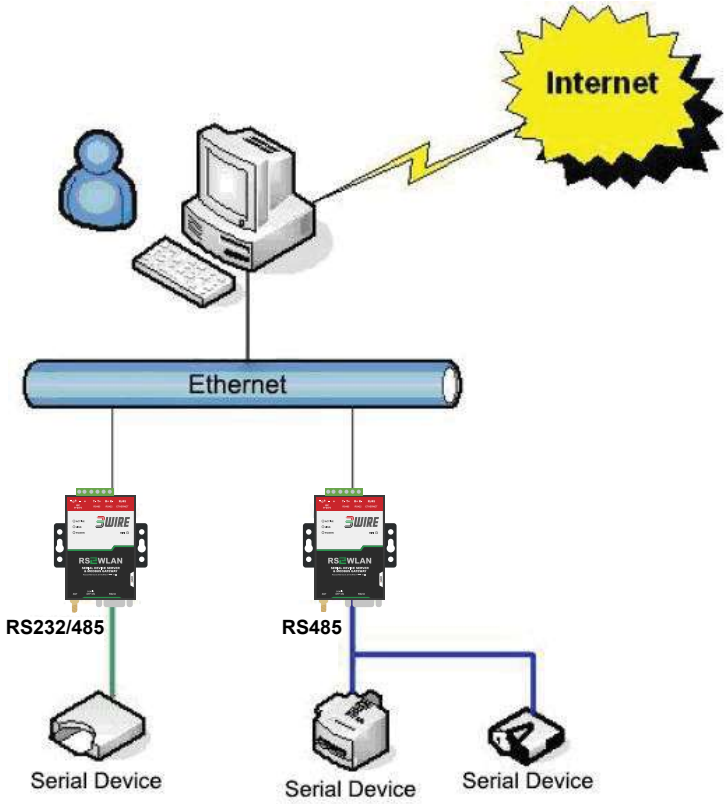


Figure 2 RS2WLAN Network Structure

2. Function Features

1) Support Ethernet and WIFI simultaneous access.

2) Wide voltage power supply: 9~48V supply scope

3) Support three forms of serial port: RS232/485/422

4) No packet loss.

5) Sticky package optimization, the real-time of serial framing is strong. The serial packet sub-package interval of ordinary WiFi serial port server is over 100ms, RS2WLAN is optional 1ms~100ms, resolution precision is greatly improved.

6) Support upgrading program through Ethernet port in the system. Support remote network upgrades.

7) Support configuring WEB custom download. Can be configured to the user's own web pages.

8) Support WiFi connection between modules.

9) Support hardware flow control CTS/RTS and Software flow control XON/XOFF.

10) Power input mode optional: can choose industrial terminal power supply or ordinary power adapter plugs.

11) Provide 4 types of LINK indicator interface.

12) Auto-adapt serial port parameters.

13) One-key search configuration. Using 3Wire DM software to one-key search and configure device parameters. User can also use WEB to configure parameters.

14) Provide serial port control command, can configure multiple parameters one time.

15) Support DNS, support as a DHCP client, as a AP mode can also be as a DHCP Server.

16) Support TCP sever, TCP client, UDP/UDP multicast.

17) Can equip long lead WiFi antenna, to conveniently install on metal chassis external surface.

18) Provide reset button. Can reset WiFi parameter and IP address of module.

19) The internal integrate real-time operating system, fast start.

20) Embedded 485 lightning protection function, suitable for outdoor 485 communication.

21) High strong anti-electromagnetic interference. The outer use anti-radiation SECC board.

3. Technical Parameters

Figure			
Interface:	485: Terminal; 232; DB9; 422: Terminal		
Power Supply:	Inside positive outside negative, standard outlet; Two lines terminal		
Size:	L x W x H =9.4cm×6.5cm×2.5cm		
Communicate Interface			
WiFi	802.11b/g		
Serial	RS232/485/422×1: RXD, TXD, GND, CTS, RTS		
Serial Parameters			
Baud rate:	1200~115200bps	Parity:	None, Odd, Even, Mark, Space
Data size:	5~9	Flow control:	RTS/CTS, XON/XOFF, 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: external antenna		
Hardware			
Ethernet	10M/100M		
Power	9~48V, <1W		
Work Temperature	-40~85℃		
Storage Temperature	-45~125℃		
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:	Socket, virtual serial port		
User Configuration	Web Server, Windows configuration tool using 3Wire DM Software		
Environment			
Running temperature:	-40~85℃		
Storage temp:	-45~165℃		
Humidity:	5~95%RH		

4. hardware Instruction

The front view of RS2WLAN WiFi serial server is shown in Figure 3. RS2WLAN uses black anti-radiation SECC board. It comes with bracket on both side (left & right) to facilitate the installation.

Size:

L × W × H = 9.4cm × 6.5cm × 2.5cm

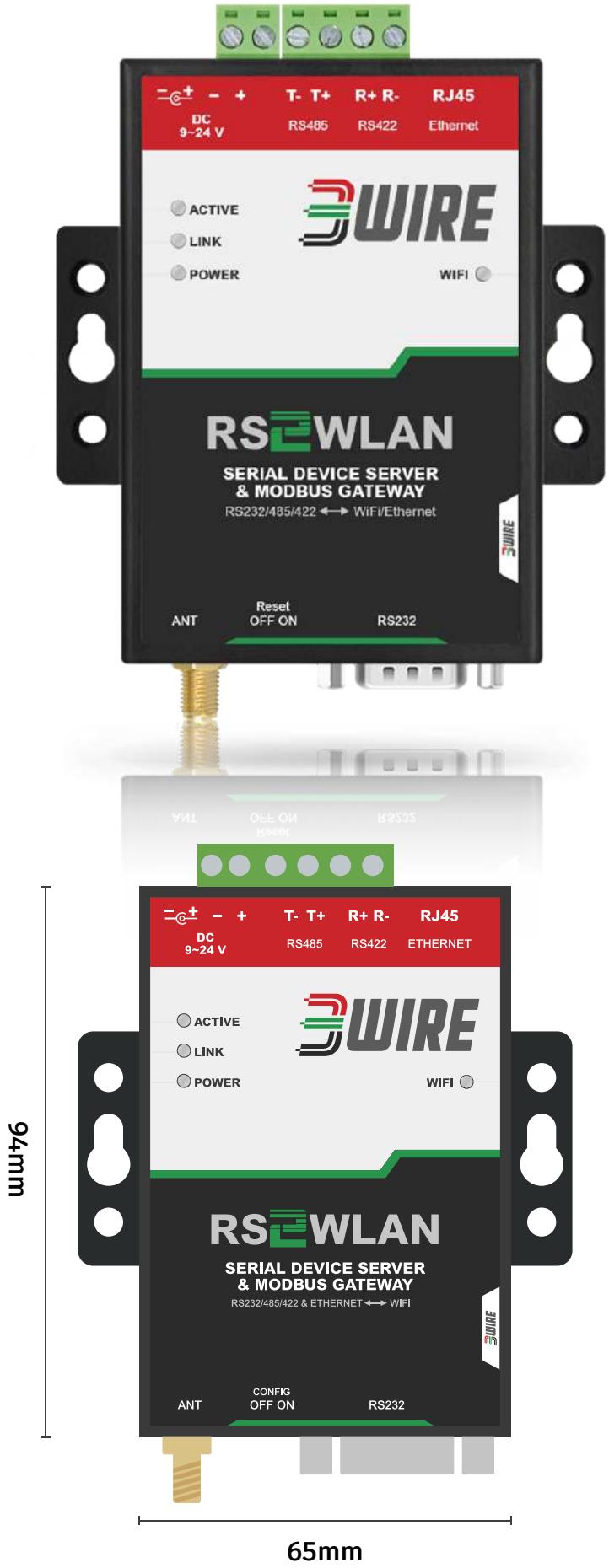
Panel Light:

ACT: ACT lights up when green indicates that data is normally transferred between WiFi/Ethernet and RS232/485/422. When the ACT light blinks blue, it indicates that data has been returned from RS232/485/422 to WiFi/Ethernet. If the data is short then blue flashing time is relatively short, need to pay attention to view.

LINK: LINK lights are green when the RJ45 cable is connected. When the LINK light is blue, it indicates that the TCP connection is established or is in UDP mode.

POWER: Indicates that the serial server is powered on.

WIFI: WiFi is blue when it indicates that WiFi has established a WiFi connection with router as an STA or as an AP there has WiFi establishing a connection with it. When the WiFi light is green: 2 seconds flashes, it indicates that it is in AP mode and no WiFi connection is established; It flashes every 5 seconds, indicating that the device is in STA mode and is connecting with the router.


DC
9~24 V
T- T+
RS485
R+ R-
RS422
RJ45
Ethernet
ACTIVE
LINK
POWER
WIFI
RS WLAN
SERIAL DEVICE SERVER
& MODBUS GATEWAY
RS232/485/422 WiFi/Ethernet
ANT
Reset
OFF ON
RS232
DC
9~24 V
T- T+
RS485
R+ R-
RS422
RJ45
ETHERNET
ACTIVE
LINK
POWER
WIFI
RS WLAN
SERIAL DEVICE SERVER
& MODBUS GATEWAY
RS232/485/422 & ETHERNET WIFI
ANT
CONFIG
OFF ON
RS232
94mm
65mm

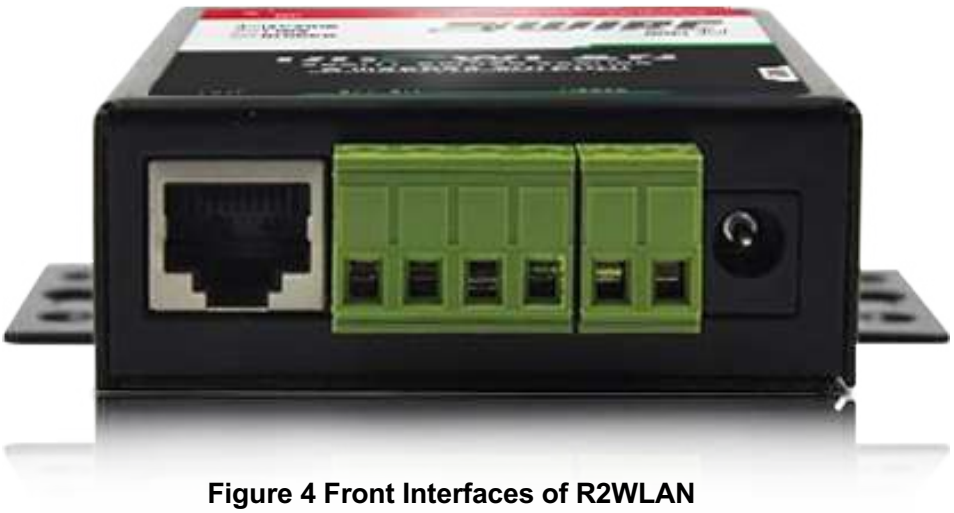


Figure 4 Front Interfaces of R2WLAN

The **serial interfaces in front** *of the server area shown in Figure 4, from left it have:*

1) Ethernet port: standard RJ45 interface

2) R-, R+, T+, T-: where T+ is RS485A, T- is RS485B; if you need RS422, you can connect these four lines.

3) Terminal power supply +, -: voltage is 9~48VDC.

4) Power outlet: you can use the standard 5.5mm plug (core for the positive), the voltage 9~48VDC.

The **back panel** *of serial server is as shown in Figure 5, from left it have:*

Figure 5 The back of RS2WLAN

1) WiFi antenna. You can choose to the extending line antenna, easy to install to the outside of the metal cabinet.

2) Reset switch: putting on the reset mode, will reset WiFi work mode to the AP mode, SSID into ZLAN, password is empty, IP into 192.168.1.254..

3) Serial port using standard DB9 male: line sequence as shown in Table 1:

Item	Name	Instruction
2	RXD	The receiving pins of serial device server
3	TXD	The sending pins of serial device server
5	GND	Grounding
7	RTS	After the flow control is enabled, when the pin is 0, the serial device server can accept the data of the serial device.
8	CTS	After the flow control is enabled, when the pin is 0, the serial device server can send the data of the serial device.

5. WiFi Function

5.1 AP Mode

Power up RS2WLAN. After a while you can see WIFI_WORK light began to flash, indicating the WiFi function has been normal. By default, RS2WLAN is in AP mode and SSID is "ZLAN". See "ZLAN" in the WiFi list of PC, connect the WiFi.

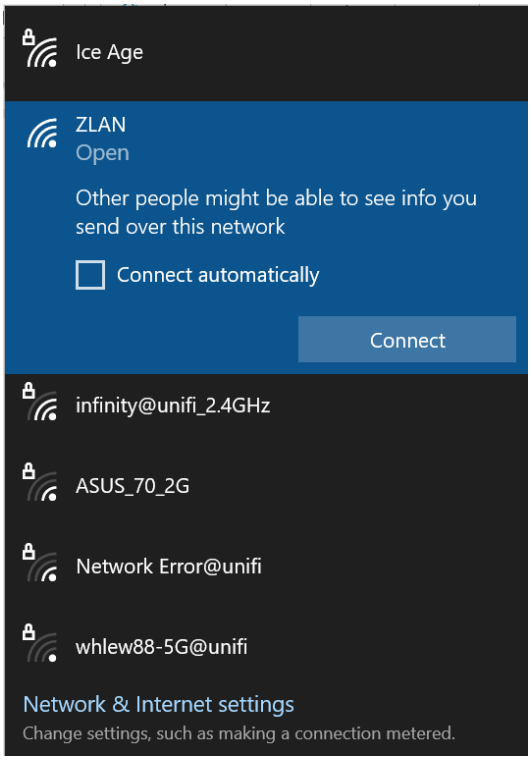


Figure 6 Search for RS2WLAN hotspots

After connecting the laptop, you can automatically get an IP address from RS2WLAN. In 3Wire DM software, click "Device Manage" button, and it will open the device list, showing RS2WLAN device.

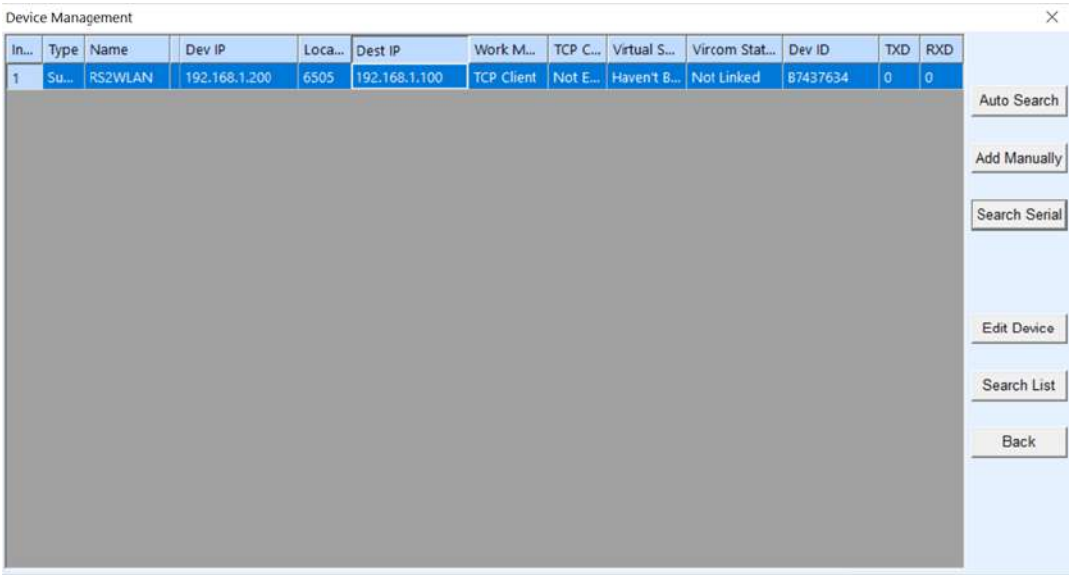


Figure 7 Search for RS2WLAN Device

Double-click the line to open the Device Parameter Edit dialog box.

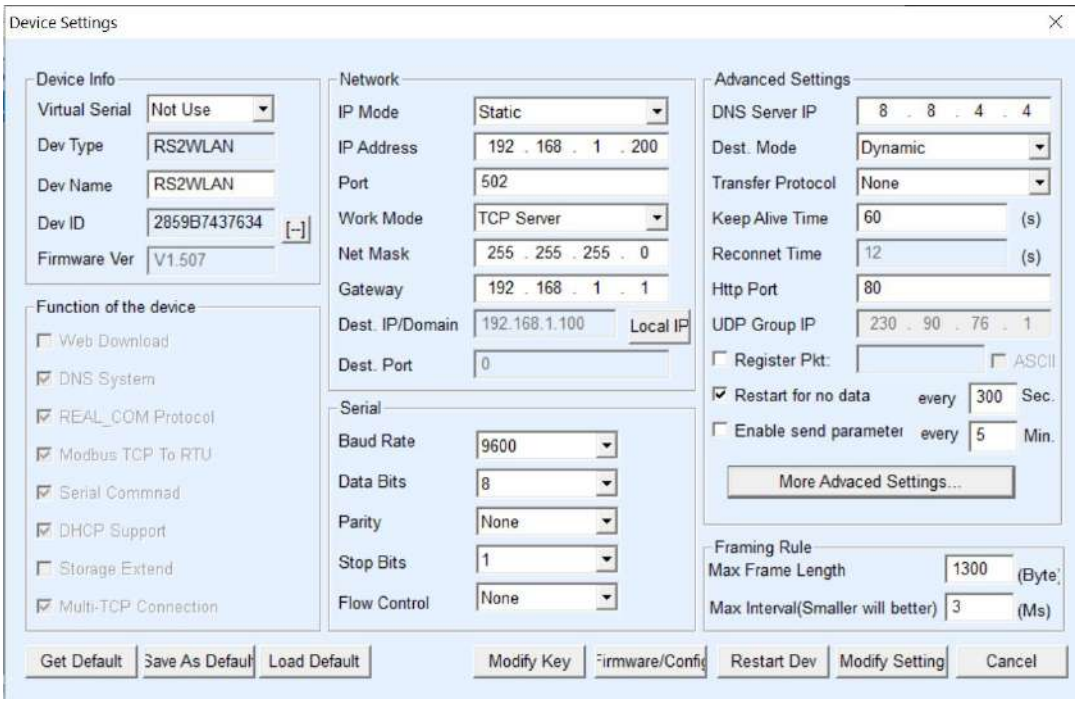


Figure 8 Device Parameter Settings dialog box

User can see the details of the device such as model, ID and firmware version. IP address and baud rate is configurable here. By clicking on "More Advanced Settings", user can configure the RS2WLAN WiFi parameters in the open dialog box.

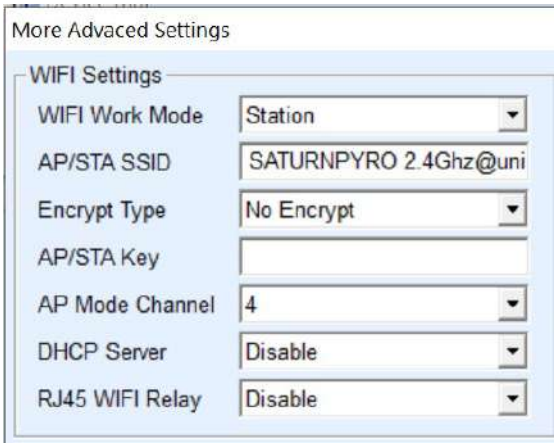


Figure 9 Wifi Parameter Configuration

The meanings of the WIFI parameter are as follows:

Name	Option Values	Instruction
WIFI Work Mode	➢ Wireless AP: RS2WLAN can be as a hotspot to be connected by notebooks, mobile phones, etc., mainly for using the configuration in the first time. ➢ Wireless Station: As STA mode, RS2WLAN will actively connect a hot spot (such as a router).	
AP or STA SSID	A string of 32 bytes or less	As an AP, this SSID is the hotspot name, when as STA mode, it is the SSID of the pre-connected hotspot. When changing from STA to AP mode, please pay attention to modify the SSID, otherwise it will conflict with the existing SSID on the network.
Encryption type	➢ No encryption: 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 one of TKIP and AES, when the user is not sure, you can choose automatic mode.	
AP or STA Password	Different password length according to the type of encryption	As AP mode, this password is the password of computer, mobile phone connecting to RS2WLAN. When used as STA mode, this password is the pre-connected AP password.

If the RS2WLAN used as AP mode, it has two types; with password and no password. For no password mode, user need to select "no encryption" type. For with password method, it is recommended to use WEP128 encryption and the password length is of 13 bytes.

5.2 STA Mode

When the STA mode is used, the user enters the SSID, encryption mode, and password of the pre-connected router in Figure. 9. When the router's encryption mode is unknown, user can choose "automatic" mode. When the STA mode is used, RS2WLAN will automatically connect to the AP hotspot after power-on. During this time, the WIFI_WORK light is flashing quickly, indicating that it is in the connecting state. WIFI_LINK lights will be permanently on when the connection is established. STA mode support automatic reconnection, such as AP hotspot restart, RS2WLAN can automatically connect. If unable to connect to the AP hotspot, please confirm that the encryption mode, password, SSID is correct, antenna is installed, and the unit is in the signal range.

5.3 Ethernet Search

One of the RS2WLAN advantages is having WiFi and Ethernet at the same time. At any time when user cannot determine the RS2WLAN WiFi parameters and cannot connect to the RS2WLAN, user can use one-key searching module in 3Wire DM software by plugging in network cable and configure the required WiFi parameters.

5.4 WiFi Connection in pairs

RS2WLAN support 2 modules via WiFi interconnect. Interconnection configuration parameters are as follows:

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 the 2 units of RS2WLAN establish connection via WiFi, WIFI_LINK light will be on.

5.5 Antenna Option

If user choose to use the built-in antenna module, no external antenna is needed. If user requires an external antenna, user need to meet the following characteristics.

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

6. Parameters Configuration

6.1 Parameter Meaning

The computers in same LAN can search the device using 3Wire DM Software. After searching there will pop-up dialog box as shown in Figure 8. The parameters are stored in the flash space of networking products, it will load with power-on and will not loss with power-off. The meaning of the parameters is described as follows:

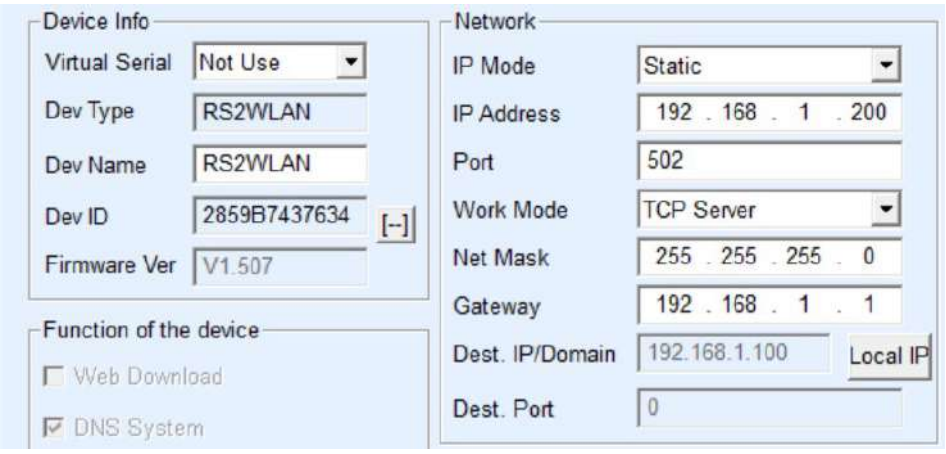


Figure 10 Basic Parameters

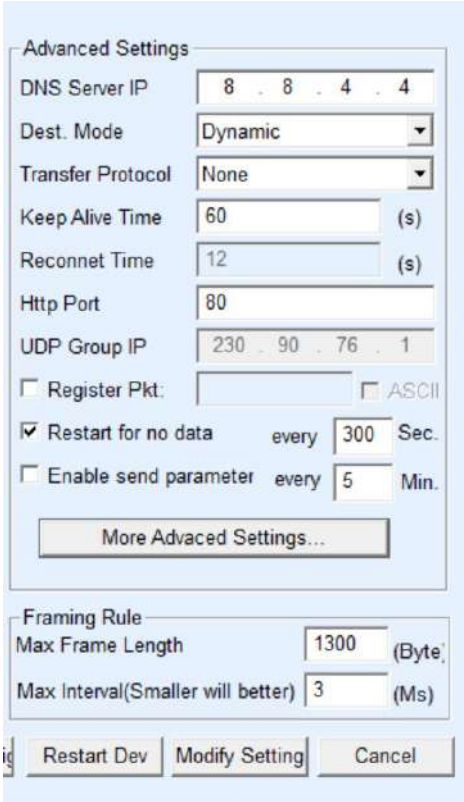


Figure 11 Advanced Parameters

The meaning of the parameters is as follows:

Table 2 Parameter Meaning

Parameter Name	Value Range	Instruction
Virtual Serial	Non-in use, created virtual serial port	You can bind the current device to a created virtual serial port.
Dev Type	RS2WLAN, RS2LAN, etc.	Show only the model of the core module
Dev Name	Any	You can give the device a readable name, with a maximum of 9 bytes, and support the Chinese name.
Dev ID		The factory's sole ID, cannot be modified.
Firmware		The firmware version of core module

Version		
IP Mode	Static, DHCP	The user can choose Static or DHCP (Dynamic acquisition of IP)
IP Address		The IP Address of networking products
Port	0～65535	The monitoring port of Networking products when in the TCP Server or UDP mode. As a client, it is best to specify that the port is port 0, which is good for increasing the connection speed, and the system will randomly assign a local port when using the 0 port. At this time the difference from specifying the non-zero port are: (1) local port is 0, module sets up a new TCP connection with PC when restarting, old TCP connection may not be closed, so that the old TCP connection of the host has been unable to close, specify the non-zero port does not have the problem. Generally, host wants to close the old connection when the module is restarted. (2) the local port is 0, the time of TCP rebuilding connection is faster.
Work Mode	TCP Server(TCP Server Mode),TCP Client(TCP Client Mode),UDP Mode, UDP Multicast	When set to TCP Server, the network Server need to be actively connected the networking products; When set to TCP Client, the networking product initiates the connection to the network server specified by the destination IP.
Net Mask	eg: 255.255.255.0	Must be same as net mask of local LAN.
Gateway	eg: 192.168.1.1	Must be same as the local LAN gateway. If it is not crossing outer network (such as the cable connecting computer), it is best to set the gateway as the IP address of the connected computer.
Dest. IP/Domain		In the TCP Client or UDP mode, the data will be sent to the destination IP or the computer of domain name instruction.
Dest. Port		In the TCP Client or UDP mode, the data is sent to the destination port of the destination IP.
Baud Rate	1200, 2400, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 57600, 76800, 115200, 230400, 460800	Serial baud rate

Data Bits	5, 6, 7, 8, 9	
Parity	None, Even, Odd, Mark, Space	
Stop Bits	1, 2	
Flow Control	None (no flow control), CTS/RTS, DTR/DCR, XON/XOFF	RS232 port valid
DNS Server IP		When the destination computer is described by a domain name, DNS server is required to resolve the domain name, which specifies the IP of this DNS server. When the IP mode is DHCP, the parameter is not specified and will be automatically acquired.
Dest. Mode	Static, Dynamic	UDP working mode: if the destination computer is described by a domain name, it's best to choose the static mode; If there are multiple computers in the LAN communicating with networking products through UDP, it is best to choose dynamic mode. TCP server mode: this parameter must be dynamic. TCP client mode: when IP mode is dynamic, the destination IP is reconnected after the device is restarted, so that the correct IP address can be obtained again. Otherwise, it will do direct connection without automatically restarting the device.
Transfer Protocol	NONE, Modbus TCP<->RTU, Real_COM	NONE indicates that the data forwarding from the serial port to the network is transparent; Modbus TCP<->RTU will convert Modbus TCP protocol directly into RTU protocol to facilitate coordination with Modbus TCP protocol; RealCOM is designed to be compatible with the old version of REAL_COM.
Keep Active Time	0～255	(1) Choose 1~255, if the device is in the TCP client working mode, the TCP heartbeat will be sent automatically for every "keep alive time". This can guarantee the TCP availability of links. When set to 0, there will be no TCP heartbeat. (2) Set to 0~254, when transformation protocol choose REAL_COM protocol, the device will send a length of 0 to 1 content data for every " keep alive time " to implement the heartbeat mechanism of Realcom. When

		set to 255, there will be no Realcom heartbeat. (3) Set to 0~254, if the device is working on the TCP client, the device will send the parameters to the destination computer every " keep alive time ". When set to 255, no have the parameter sending function. This mechanism is not normally used, users are not required to pay attention.
Reconnect Time	0～255	Once the networking products in a TCP client mode disconnect with the server (as long as in the non-connection status), it will initiates a TCP connection to the Server every while, can be 0~254 seconds, if set 255, never for reconnection. Note first TCP connection would immediately (such as hardware on electricity, through zlvircom software restart equipment, no data), only after the first connection failure will try again after waiting for the "break time", so "break time" will not affect the network and server connection setup time under normal circumstances.
Http Port	1～65535	
UDP Group IP		UDP multicast
Max Frame Length	1～1400	One of the rules of serial. The connected product serial port sends the received data to the network as a frame after receiving the length data.
Max Interval (Smaller will better)	0～255	One of the rules of serial. When there is a pause in the data received by the connected product, and the pause time is greater than that time, the received data is sent to the network as a frame.

6.2 Parameter Modification Method

6.2.1 Parameter Modification Method

3Wire DM Software can be used to find and edit the device's parameters through the Internet searching. Its advantages include:

1) No need PC and networking products in the same IP network segment.
2) Even the networking products having IP conflicts between can be modified the parameter.
3) User don't need to know the IP address of the networking product.
4) More parameters can be modified.

4.5 Web Configuration

If the 3Wire DM Software is not installed on the user PC, the parameters can be modified through the Web login.

1) Enter the IP address of the networking product in the browser, such as **http://192.168.1.200**, **and open the following page.**

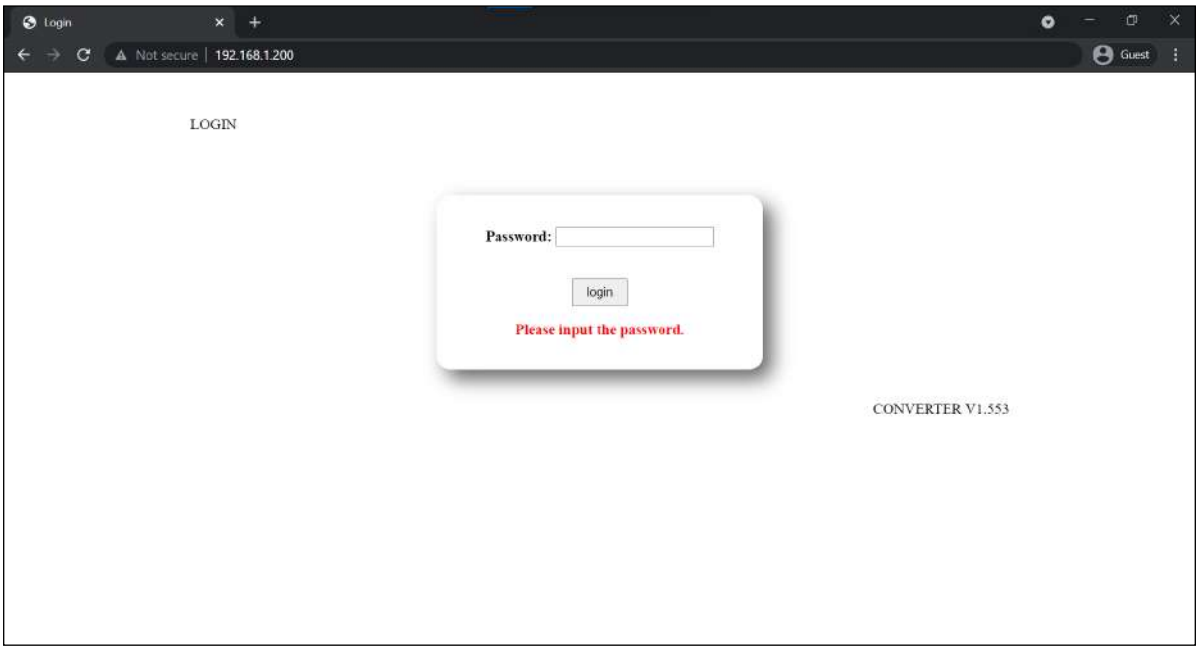


Figure 12

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

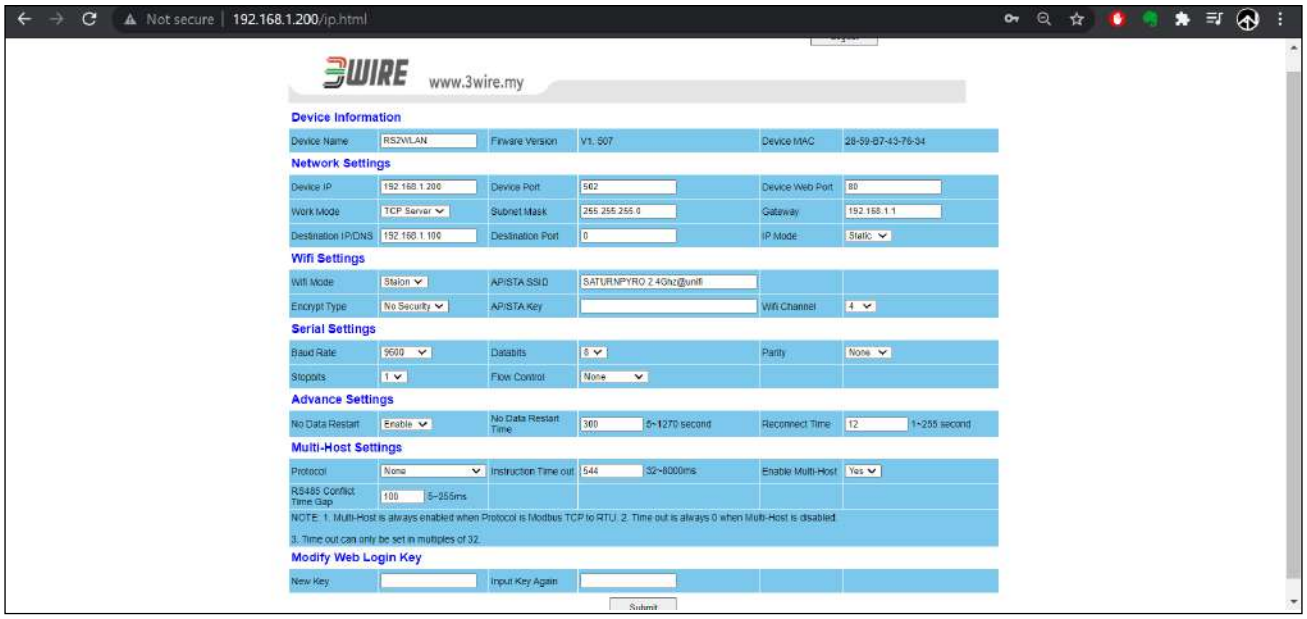


Figure 13

3) In the appearance of the Web page, you can modify the parameters of the networking product. In addition to the parameters of the Web login password, the parameters are already specified in the before parameter definition. The Web login password is the password for the login of the page.

4) Click **"submit"** button after modifying parameters.

4) Please click **"exit"** button after the modification. Anyone can enter this configuration interface if not quit.

7. Basic Usage

7.1 Device Search

Run 3Wire DM software and click "Device Manage" to see a list of devices.

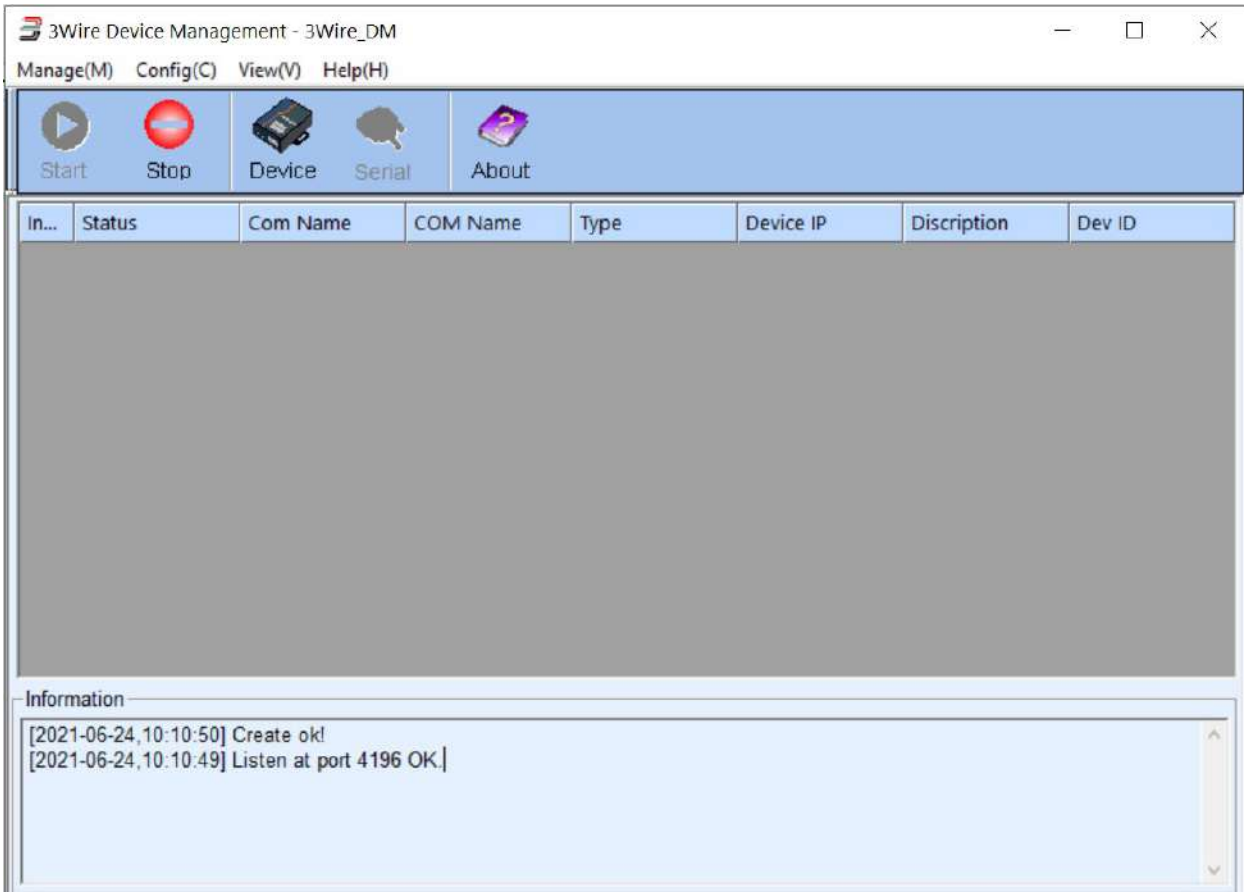


Figure 14 3Wire DM Main Interface

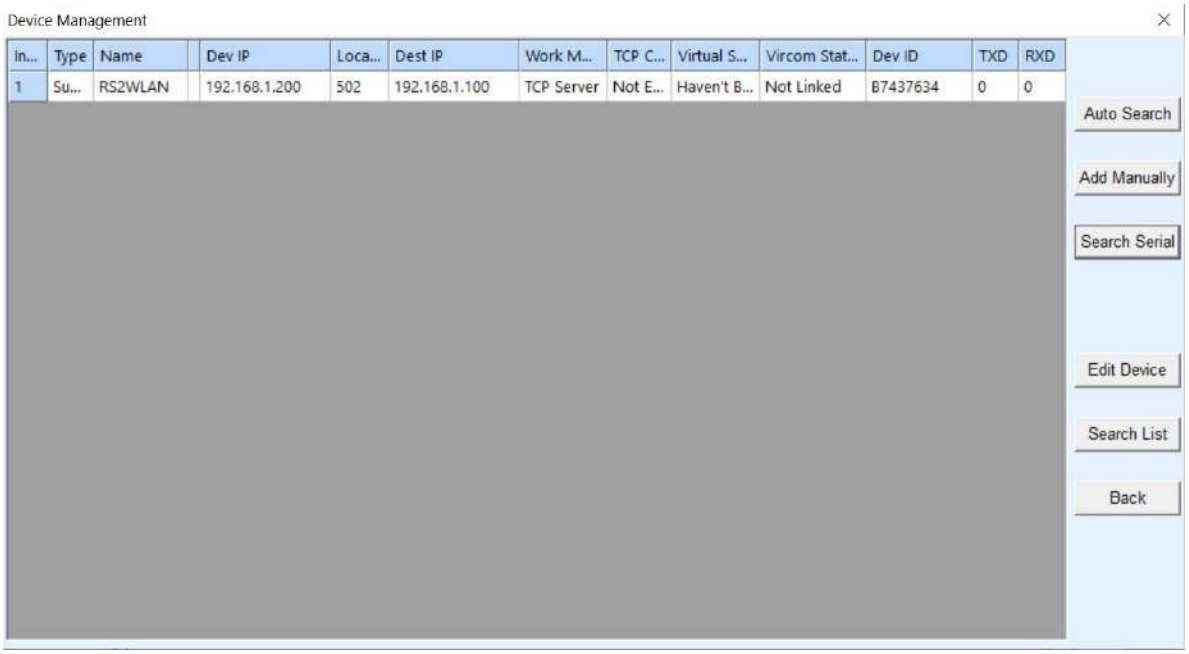


Figure 15 Device List

From the device list, you can see all of the current online devices, and you can search for devices that are not in one network segment. There is no need to use the **"Add Manually"** function.

7.2 Parameter Configuration

Double-click on a single line to edit the device parameters.

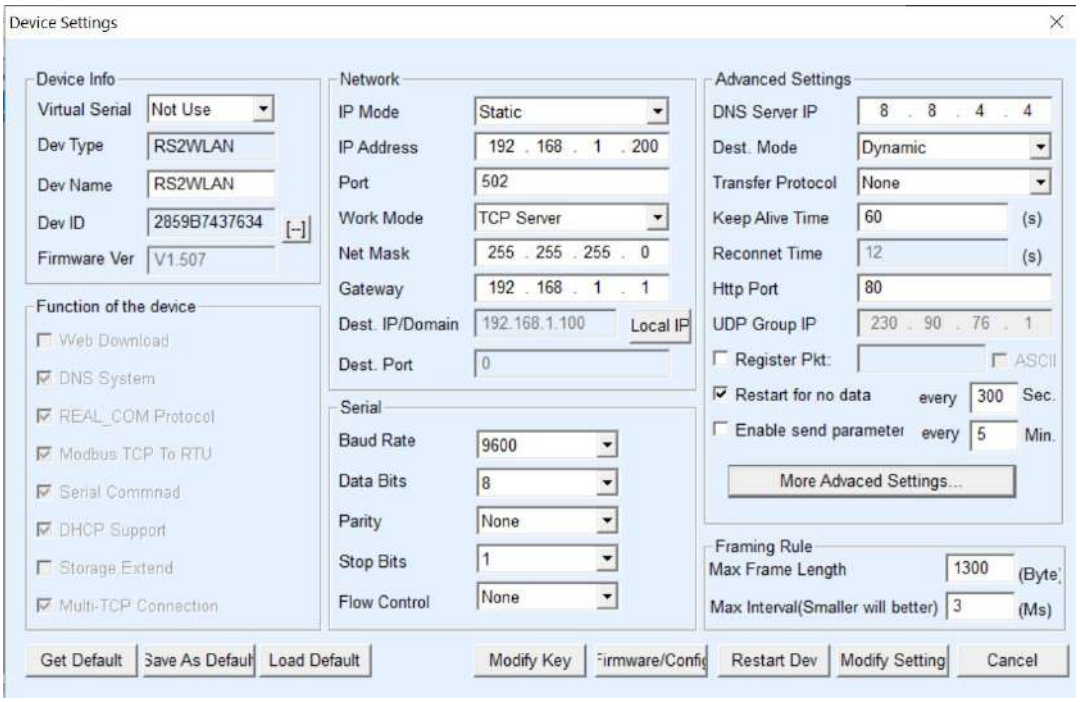


Figure 16 Device Edit Interface

In this interface, the user can set the parameters of the device, then click **"Modify Setting"**, and the parameters are set to the flash of the device, with power-off no lost. The device will restart automatically.

7.3 Different Work Mode and Parameters

This section describes how to configure the parameters when as the TCP client and UDP mode communicate with computer software and another networking module.
3Wire networking products comply with the standard TCP/IP protocol, so any network terminal complying with the agreement can communicate with the networking products.

If communication between two network terminals is required (network debugging tools and networking products), the parameter configuration must be matched.

7.3.1 UDP Mode

In UDP mode, the parameter configuration is shown in Figure 17, left is the configuration of networking products in 3Wire DM, and right is the setting of the pair device for network debugging tools. First, the two must be both UDP work modes. In addition, the red arrows indicate that the destination IP and port of network tool must point to those of networking products. The blue arrows indicate that the destination IP of networking products must be the IP address of computer which the network tool in, and the destination port of networking products must be the local port of network debugging tool. These network parameters are configured to ensure two-way UDP data communication.

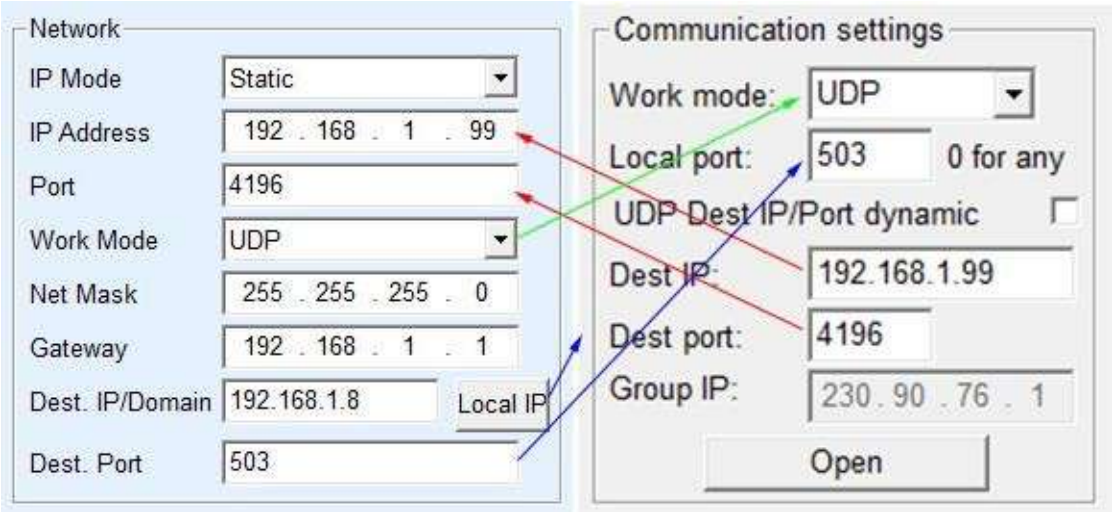


Figure 17 UDP mode Parameter Configuration

7.3.2 TCP Mode

Work mode in the TCP mode has two type: TCP server and TCP client. In any mode, one must be the Server, and the other one is the Client. Then Client can access the Server, both for the Client or the Server is unable to realize communication. When networking products are used as clients, there must be three. corresponding relationships, as shown in figure 18. The Work Mode of networking products as Client Mode corresponding to the Server Mode of network tools, the destination IP of networking products must be the IP address of the computer which network tools in, the destination port of networking products must be the local port of network tools. The networking product will automatically connect the network tools after setting, and the data can be sent and received after the connection is established.

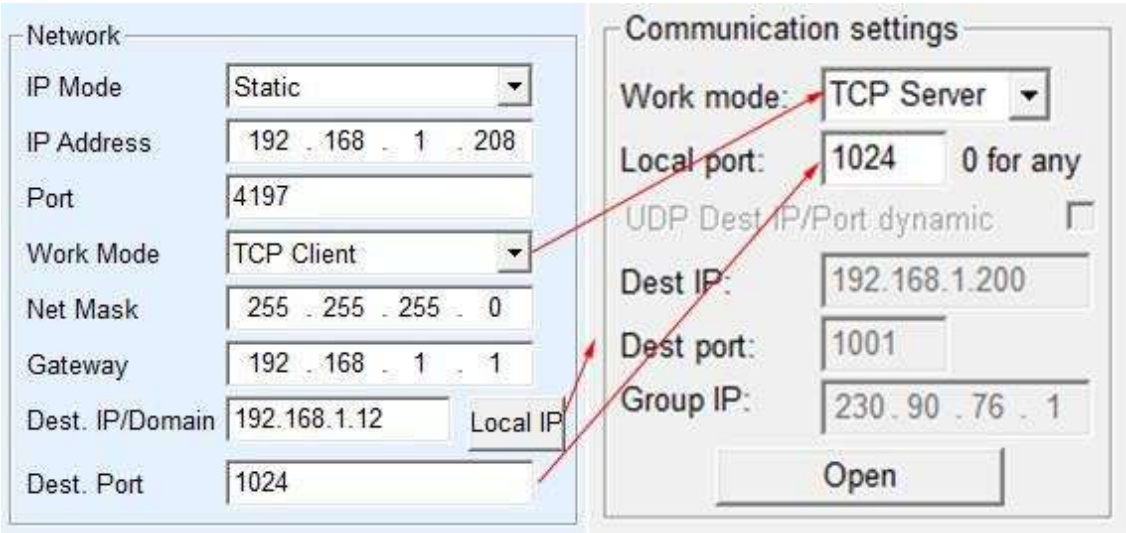


Figure 18 Networking Products as Client

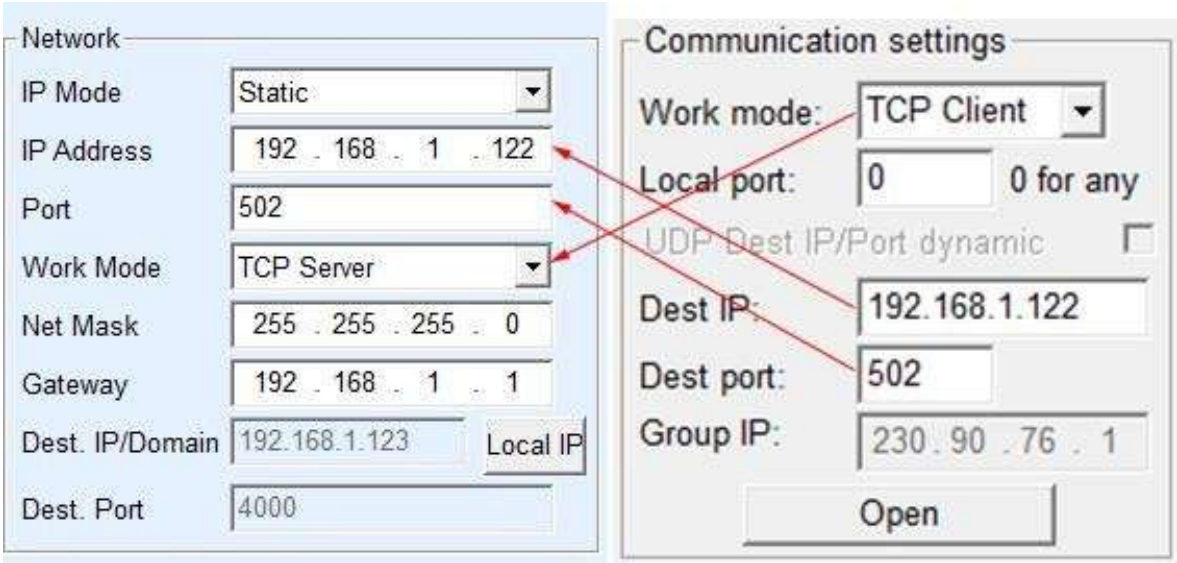


Figure 19 Networking Products as Server

7.3.3 Pair-Connection Mode

First, user need to connect two devices and the computer to the same LAN. To allow configuration, the computer need to run 3Wire DM Software.

In the 3Wire DM Software, click on 'Device Manage' to find these two devices, as shown in Figure 20. 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 21. 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 22, if the state of the two devices are "connected" say TCP link has been established between the two devices.

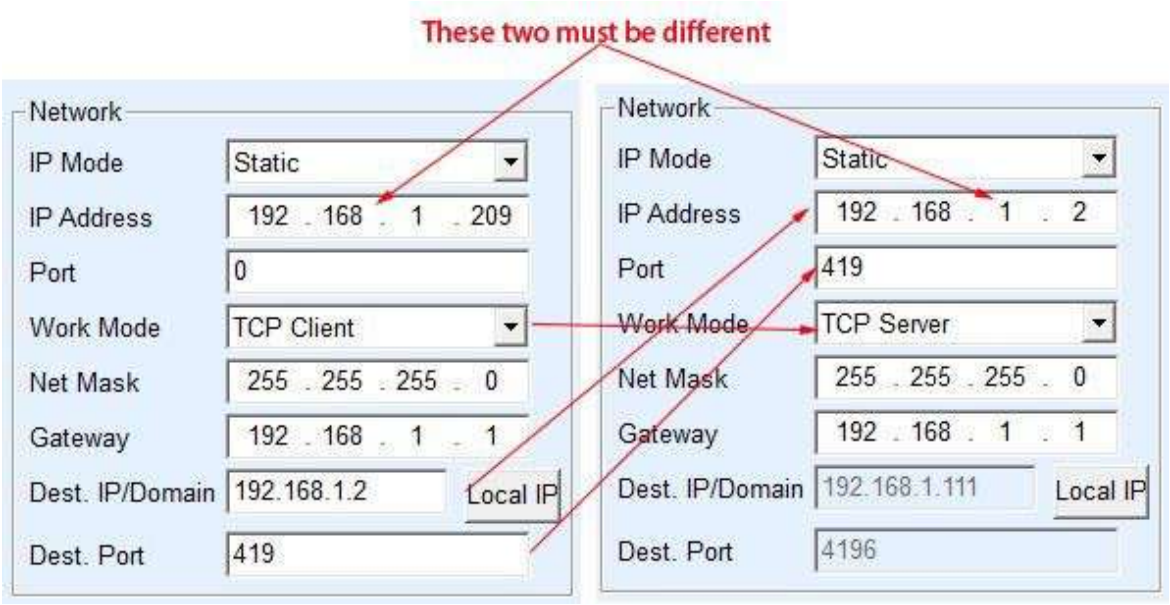
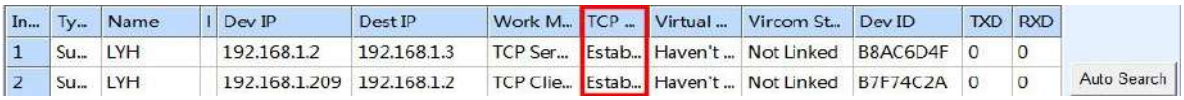


Figure 20 TCP Device Pair-connection Configuration



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 21 TCP Devices Pair-connection Success Check

If the pair-connection in UDP mode, the configuration parameters are shown in figure 22, 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.

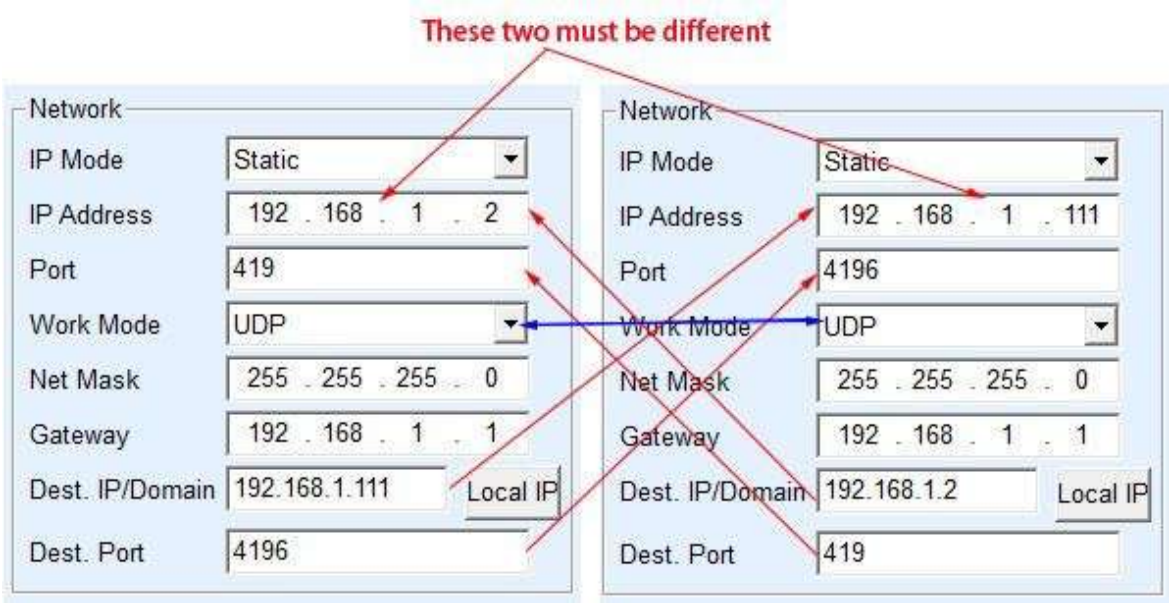


Figure 22 UDP Device Pair-connection Configuration

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.

8. After Service

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