

ZLAN5812D
Rail type
8 Serial port
server /Modbus
Gateway

RS485 To TCP/IP
Modbus RTU To Modbus TCP



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1. Overview

ZLAN5812D is an industrial-grade rail mounted 8-port serial port server, with data collector/iot gateway, Modbus gateway, MQTT gateway, RS485 to JSON and other functions in one.

The device has two Ethernet ports (single-port 5812D, dual-port 5812LD) and eight 485 serial ports. The two Ethernet ports of the ZLAN5812LD function as switches. The 8-way serial PORT of the ZLAN5812D can use the same IP address. Different serial ports are distinguished by their ports. You can also use a different IP address for each serial port. The parameters corresponding to each serial port can be set independently. It has the characteristics of rich functions, fast running speed and stable performance.

The device supports a wide voltage ranging from 9 V to 24V. The terminal type power supply is connected with a ground cable.

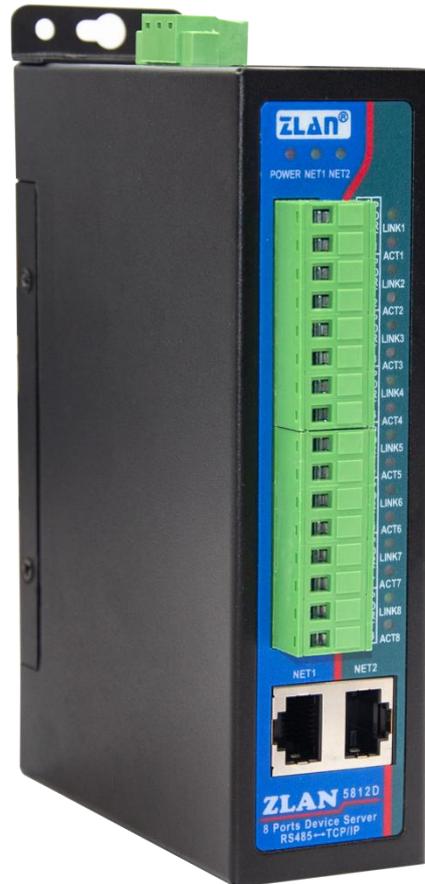


Figure 1 ZLAN5812D (5812LD) serial port server

ZLAN5812D adopts guide rail design, with guide buckle on the back; At the same time, it is also equipped with the above two mounting ears, which can be mounted horizontally or vertically, respectively suitable for installation to the backplane or the desktop.

The ZLAN5812D supports 2-bit stop bits, data bits smaller than 8 (e.g., 7-bit data with 1 stop bit), and baud rates up to 921.6Kbps.

ZLAN5812D can realize the conversion of 8 TCP/IP protocols to RS485, and 8 channels can work at the same time and can be configured at different baud rates. It can realize the data acquisition of 485 devices through the network, and the network side can use the virtual serial port to connect the serial port software or the direct TCP/IP communication software. The ZLAN5812LD comes with two 10M/100M network ports, which can be connected to any network port. The other network port

can be cascaded to multiple ZLAN5812Ds through network cables, which can be cascaded to 16 serial ports and 32 serial ports.

ZLAN5812D supports Modbus RTU to Modbus TCP and has the feature of storage Modbus gateway. It can also be used as a non-storage Modbus gateway.

ZLAN5812D can be used in:

- Power electronics, smart meters and energy monitoring;
- as the Internet of Things gateway as the communication bridge between devices and the cloud;
- all kinds of automation PLC remote monitoring and program download;
- all kinds of configuration software and equipment communication interfaces;
- Access control security field equipment networking;
- Network information collection of medical equipment;

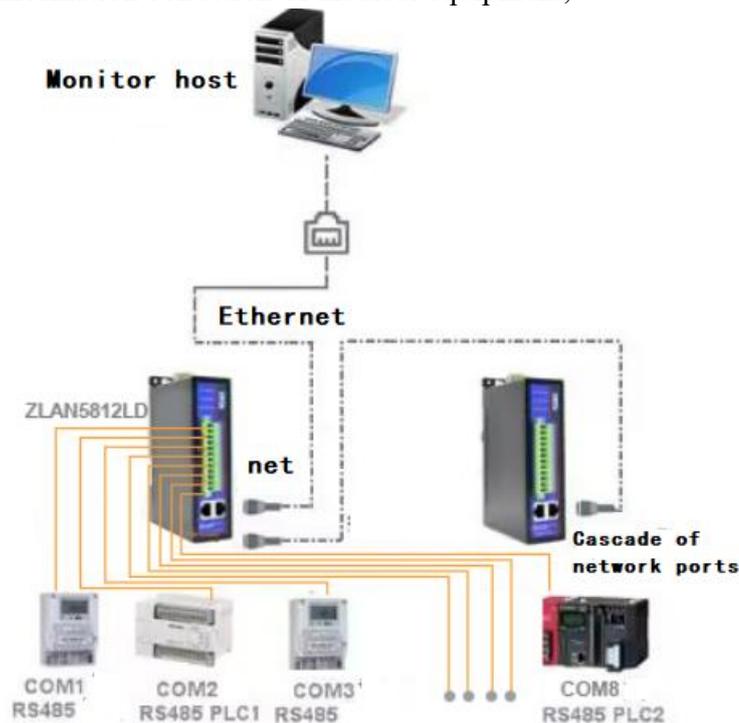


Figure 2 Connection diagram

A typical application connection is shown in Figure 2. The original serial device is connected to the serial port of the ZLAN5812D, and the ZLAN5812D is connected to the computer through the network cable. The software on the computer connects to the ZLAN5812D through TCP/IP or virtual serial port. Thereafter, any data sent by

the serial device is transparently transmitted to the computer's software, and the data sent by the software to the ZLAN5812D over the network is transparently transmitted to the serial device.

2. Functional features

2.1 Hardware Features

ZLAN5812D has the following features:

1. There are three ways to install guide rail, backplane mounting ear, and desktop mounting ear. Especially suitable for industrial rail installation, due to the narrow transverse width can save installation space, installation, disassembly more convenient.
2. Industrial power supply mode: terminal wiring mode, easy to use in industrial occasions. Can be 9 ~ 24V wide voltage supply. With housing ground wire, effective diversion interference and surge.
3. ZLAN5812LD Dual network port design, support serial port server cascading, expansion to 16 serial port, 24 serial port, 32 serial port and so on.
4. Abundant panel indicators for easy debugging: In connection, there are not only 100M_LINK lights indicating whether the network cable is properly connected, but also LINK lights indicating the establishment of TCP connections; For data indicators, there are independent indicators for serial port to network port and network port to serial port. Easy to debug on site.

2.2 Software Functions

- 1 The 8 serial ports can be configured with different baud rates and work independently without interference.
- 2 Support IP "split" technology: Different serial ports can be distinguished by port or IP address. Port differentiation: 8 IP addresses can be combined into one IP, and the ports are different, which is suitable for networks lacking IP. IP address differentiation: One IP address is changed to 2 to 8 IP addresses, and the ports are the same. This is suitable for applications with fixed port numbers (for example, Modbus TCP requires fixed port 502).

- 3 Support TCP server, TCP client, UDP mode, UDP multicast. The TCP client also supports the TCP server function. It supports up to 30 TCP connections as a TCP server and 7 destination IP addresses as a TCP client.
- 4 Support virtual serial port, equipped with Windows virtual serial port & device management tool ZLVircom.
- 5 Supports the MAC address sending function when the device is connected, facilitating device management by the cloud.
- 6 Provide computer side search, configure the device secondary development kit DLL development library.
- 7 Supports Web browser configuration, dynamic IP address acquisition by DHCP, and DNS.
- 8 Support cloud remote device search, device parameter configuration, and device program upgrade.

2.3 Advanced Software Functions

The 5812D supports advanced software features, including:

- 1 Supports the Modbus gateway function and transfers from Modbus RTU to Modbus TCP. It can support storage Modbus, which can automatically collect device data and store it. Non-storage Modbus gateways are also supported.
- 2 Multiple hosts: In the question-and-answer query mode, multiple computers can access the same serial port at the same time.
- 3 Support custom heartbeat packet and registration packet functions: can facilitate communication and device identification with the cloud.
- 4 Support Modbus RTU/DLT645/DLT698 to JSON, 8 serial ports support different collection modes.
- 5 Support MQTT connection, support all kinds of public cloud data transmission and other features, while supporting 8 serial ports of different MQTT connections.

3. Technical parameters

Table 1 Technical parameters

Outline			
Interface:	485: terminal		
Power supply:	Terminal mode		
Size:	L x W x H =150mm × 105mm × 41mm(Housing size, excluding interface)		
Communication page			
Ethernet:	10M/100M, 2 KV surge protection (5812D single port, 5812LD dual port)		
Serial port:	RS485×8: 485A、485B		
Serial port parameter			
Baud rate:	300~921600bps	Check bit:	None, Odd , even Mark, Space
Digit bits:	5~9 bits	Flow control:	RTS/CTS, DTR/DCR, NONE
Software			
Protocol:	ETHERNET、IP、TCP、UDP、HTTP、ARP、ICMP、DHCP、DNS		
Configuration:	ZLVirCOM tool, WEB browser (can customize the web page), device management function library, serial port AT command configuration, device cloud management (ZLan server)		
Conversion protocol:	Modbus TCP、MQTT、JSON、RealCom、HTTP		
Modbus Gateway:	Support multi-host mode, storage mode, Pre-configuration table (ZLMB) mode		
Communication method:	TCP/IP direct communication, virtual serial port mode		
Working mode			
TCP server, TCP client, UDP, Real Com Driver, Modbus TCP, Telnet			
Power			
Power source:	9~24V DC, 60mA@12V (ZLAN5812D)		
Environment requests			

Operation temperature:	-40~85℃
Storage temperature:	-40~120℃
Humidity range:	5~95% Relative humidity

4. Instructions for use

4.1 Hardware Description

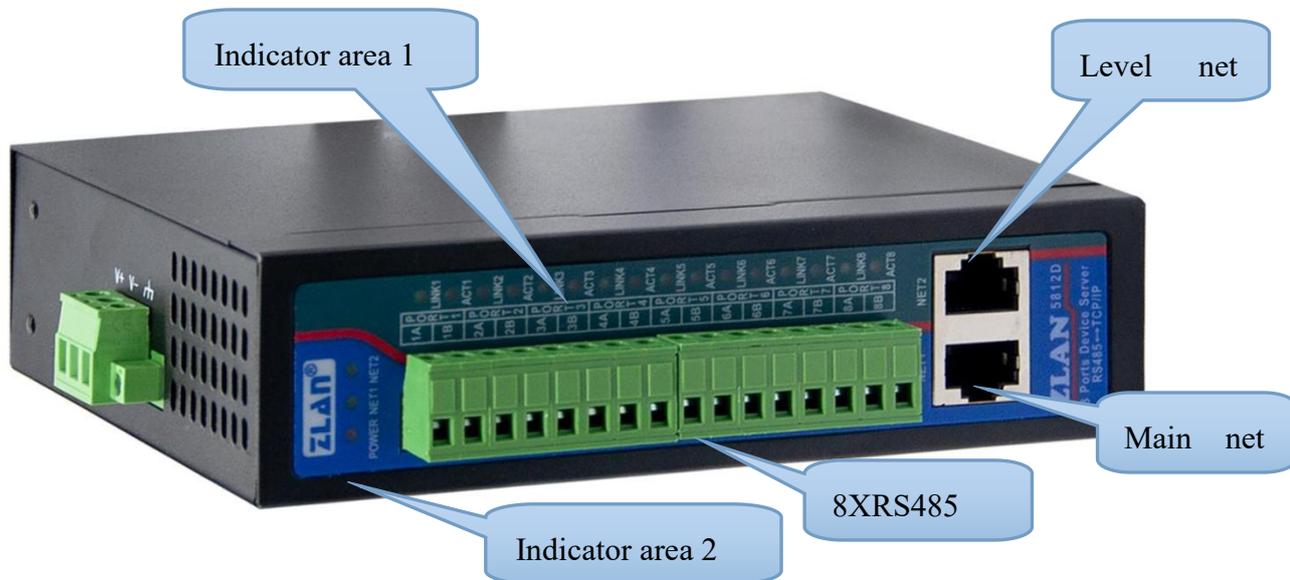


Figure 3 Front view

The front view of the ZLAN5812D (ZLAN5812LD) serial port server is shown in the figure above. The shell uses a black anti-radiation SECC metal shell.

- 1 **Power input:** The wiring terminals are 5.08mm terminals, and the V+ connects to 9 to 24V, and the V- connects to the GND and shell ground. Requires 1W power supply.
- 2 **RS485:** There are eight RS485 ports in total. Group 1A and 1B have 16 terminals.

1 A indicates the 485 positive line, 1B indicates the 485 negative line. The maximum communication distance is 1200 meters. Generally, when the RS485 line exceeds 300 meters, it is necessary to use the terminal resistance, and the 485 terminal resistance is 120 ohms.

- 3 **NET** : Connect 10M/100M network cables and support automatic crossover. 5812D is a single network port connected to NET1. A 5812LD is a dual-network port. The indicators corresponding to the main network port and the tier network port are NET1 and NET2 respectively. Otherwise, the two network ports are the same.

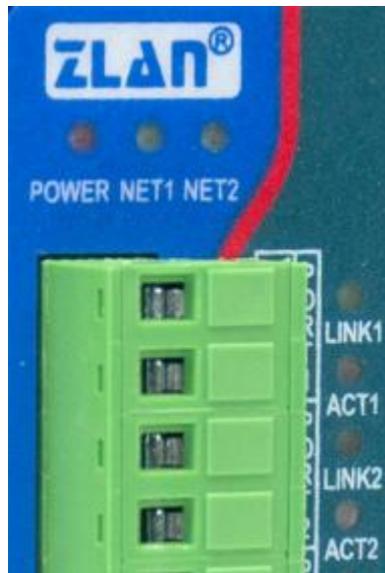


Figure 4 Indicator

- 4 **Pilot lamp**: POWER, NET, LINK, and ACT indicators indicate power supply, network port indicator, connection indicator, and data indicator respectively.

Table 2 Indicator meanings

POWER	Power indicator: Red indicates that the device is powered on.
NET1~2	(1) Off: Network port 1 or network port 2 is not connected. (2) Steady green: The network connection is normal
LINK1~8	(1) Off: TCP is not established. (2) Green: After the TCP connection is established (or in UDP mode), the Link color is green. It can be used to determine whether the serial port server establishes a communication link with the host software.

ACTIVE1~8	<p>(1) Green: When the network port is sending data to the serial port, the indicator is green. The flashing time is one second longer than the actual communication time, making it easier to detect short data communications.</p> <p>(2) Blue: When the serial port is sending data to the network port, the indicator is on both blue and green. If the blue color is displayed, the serial port returns data to the network port. This can determine whether the device has a response to the command of the upper computer, if there is no corresponding indicates that the serial port baud rate is not correct or the serial port is not connected.</p>
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Use the indicator to debug communication methods:

- 1) 1) If the NET indicator is not green, the network cable is not properly connected. Check the network cable.
- 2) 2) If the Link indicator is not green (only considering the TCP working mode), the host software is not connected to the serial port server. Please consider whether the IP address is configured on the same network segment.
- 3) 3) If the Active indicator is green, data is sent from the network port, but no data is returned from the serial port device. Check whether the baud rate is correctly configured and whether positive or negative values of the RS485 port are reversed.



Figure 5 Rear view

The rear view of the ZLAN5812D serial port server is shown in the figure above. You can install guide rails and mounting ear accessories.

4.2 Hardware Connections

Generally, the serial port server only needs to be connected to the power supply, serial port, and network cable.

The power supply can be configured with a 12V power adapter or on-site 2-wire power supply, which can be directly connected to the positive and negative terminals of the power supply.

The 485 of the RS485 device is connected to the TA, and the 485 is connected to the TB.

Network port connection A network cable can be directly connected to a computer or connected to the network through a switch.

4.3 Software Installation

ZLVircom can be used to configure parameters such as device IP and create virtual serial ports. If the virtual serial port function is not required, you can download the no-installation version. Download address: <http://www.zlmcu.com/download.htm>

Figure 1 ZLVircom version

Software name	Specifications
ZLVircom Device Management Tool (non-installed version)	The non-installed version does not include the virtual serial port function.
ZLVircom-Device Management Tool (Installation version)	The installed version contains ZLVircom_x64.msi and ZLVircom_x86.msi. 64-bit operating systems install x64, 16-bit operating systems install x86 versions.

Follow the default prompts during installation. After installation, zlvircom will be started every time the computer starts, which is used to create a virtual serial port.

4.4 Parameter Configuration

The following notes describe how to quickly batch edit multiple serial port devices. Configure the ZLVircom version of the ZLAN5812D to be 6.41 or greater.

Please note the version:

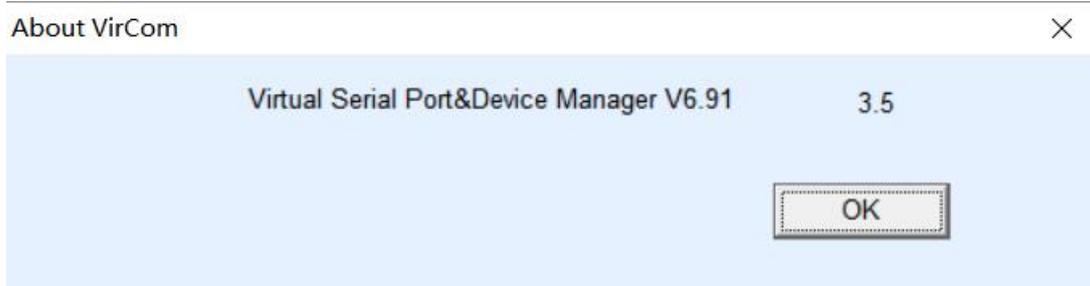


Figure 6 ZLVircom version confirmation

After ZLVircom is installed and equipment hardware connection is completed, ZLVircom software is run as shown in Figure 7, and then click "Equipment management" as shown in Figure 8. ZLVircom can be used to search and configure equipment parameters in different network segments, which is very convenient, as long as the equipment and the computer running ZLVircom are in the same switch.

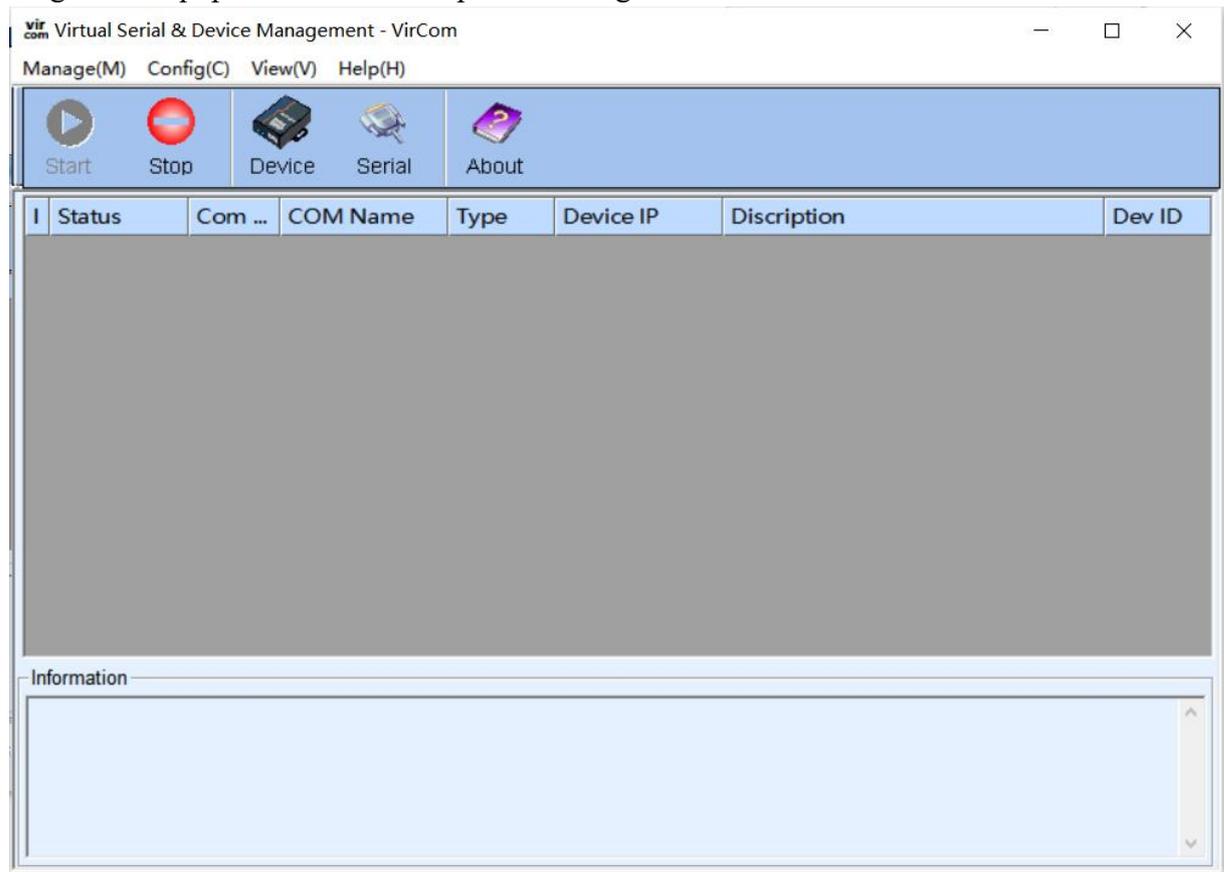
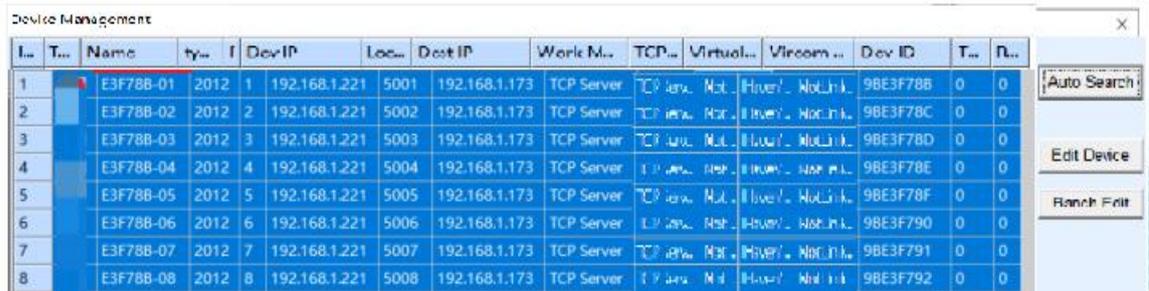


Figure 7 ZLVircom main interface

The list of devices with eight ports is displayed. So you need to sort by name so

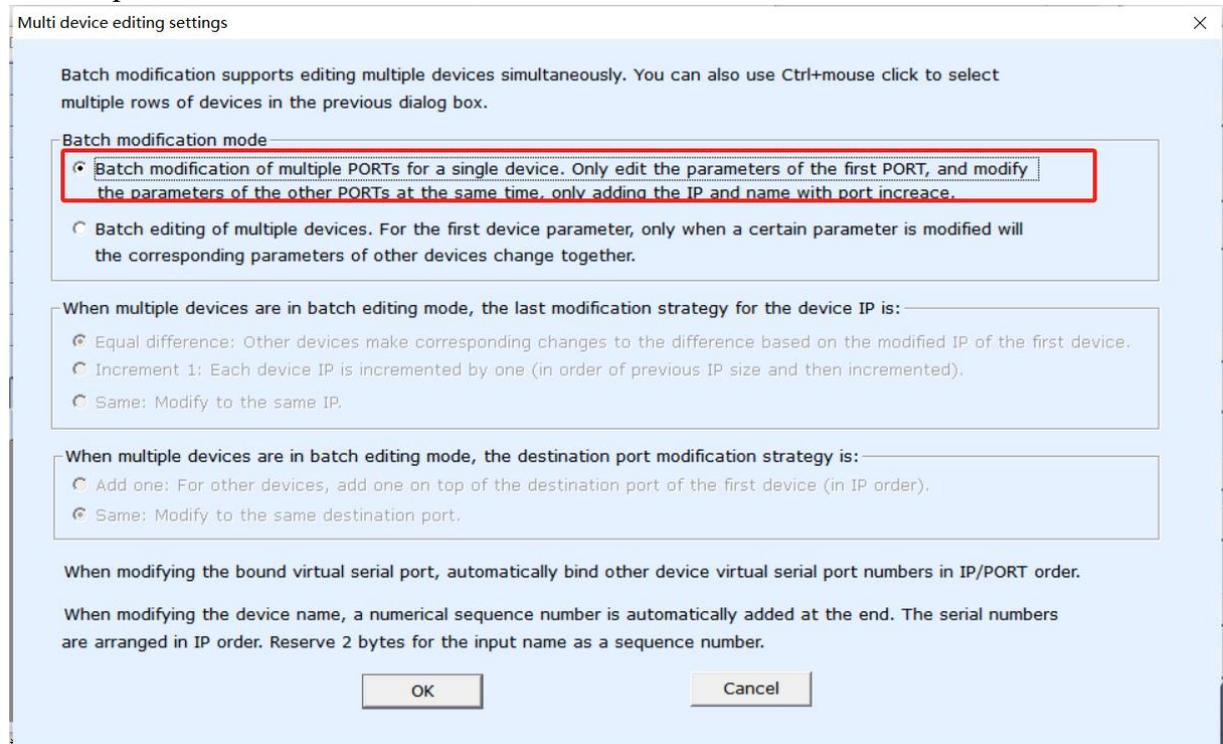
that the different ports of the same module are in a contiguous area. The method of sorting is to click on the title bar "Device name". Before delivery, the ports of each device are named ECF78C-01 to ECF78C-08. The ECF78C on the left is the device ID, that is, the last six digits of the first PORT ID. -01 to -08 indicates the PORT. The device name can be changed. If the device name has been changed, you can view the PORT ID of the device from 1 to 8 in the PORT list.



I...	T...	Name	ty...	Port	Dev IP	Loc...	Dest IP	Work M...	TCP...	Virtual...	Wincom ...	Dev ID	T...	P...
1		E3F78B-01	2012	1	192.168.1.221	5001	192.168.1.173	TCP Server	TCP	Virtual	Wincom	9BE3F78B	0	0
2		E3F78B-02	2012	2	192.168.1.221	5002	192.168.1.173	TCP Server	TCP	Virtual	Wincom	9BE3F78C	0	0
3		E3F78B-03	2012	3	192.168.1.221	5003	192.168.1.173	TCP Server	TCP	Virtual	Wincom	9BE3F78D	0	0
4		E3F78B-04	2012	4	192.168.1.221	5004	192.168.1.173	TCP Server	TCP	Virtual	Wincom	9BE3F78E	0	0
5		E3F78B-05	2012	5	192.168.1.221	5005	192.168.1.173	TCP Server	TCP	Virtual	Wincom	9BE3F78F	0	0
6		E3F78B-06	2012	6	192.168.1.221	5006	192.168.1.173	TCP Server	TCP	Virtual	Wincom	9BE3F790	0	0
7		E3F78B-07	2012	7	192.168.1.221	5007	192.168.1.173	TCP Server	TCP	Virtual	Wincom	9BE3F791	0	0
8		E3F78B-08	2012	8	192.168.1.221	5008	192.168.1.173	TCP Server	TCP	Virtual	Wincom	9BE3F792	0	0

Figure 8 List of devices

After sorting, the eight ports of the module are arranged consecutively. At this time, start the selection of the first device ECF78C-01 and drag the mouse down until the devices with all eight ports are selected. Then click "Batch Edit". Batch Edit will allow 8 ports to be modified at once, with the correct IP and PORT.



Multi device editing settings

Batch modification supports editing multiple devices simultaneously. You can also use Ctrl+mouse click to select multiple rows of devices in the previous dialog box.

Batch modification mode

- Batch modification of multiple PORTs for a single device. Only edit the parameters of the first PORT, and modify the parameters of the other PORTs at the same time, only adding the IP and name with port increase.
- Batch editing of multiple devices. For the first device parameter, only when a certain parameter is modified will the corresponding parameters of other devices change together.

When multiple devices are in batch editing mode, the last modification strategy for the device IP is:

- Equal difference: Other devices make corresponding changes to the difference based on the modified IP of the first device.
- Increment 1: Each device IP is incremented by one (in order of previous IP size and then incremented).
- Same: Modify to the same IP.

When multiple devices are in batch editing mode, the destination port modification strategy is:

- Add one: For other devices, add one on top of the destination port of the first device (in IP order).
- Same: Modify to the same destination port.

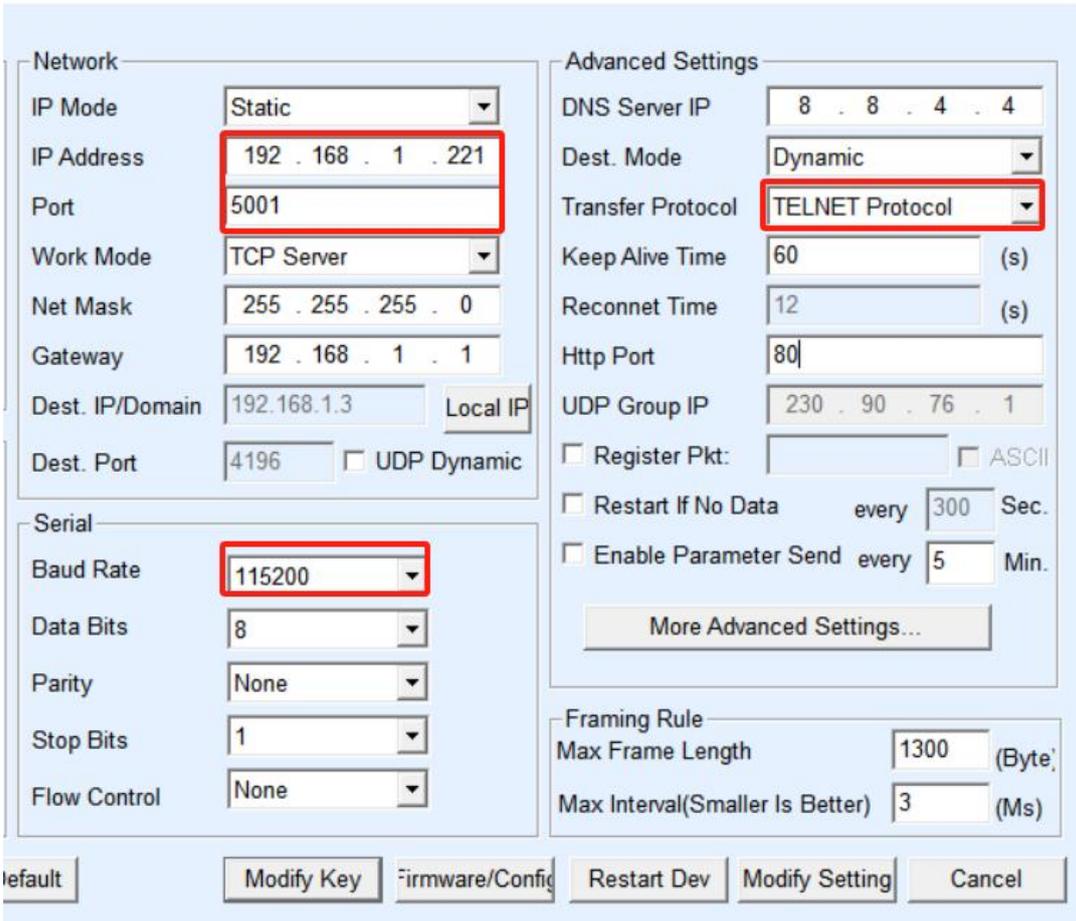
When modifying the bound virtual serial port, automatically bind other device virtual serial port numbers in IP/PORT order.

When modifying the device name, a numerical sequence number is automatically added at the end. The serial numbers are arranged in IP order. Reserve 2 bytes for the input name as a sequence number.

OK Cancel

Figure 9 Batch setup options

Since all ports of 1 to 8 channels are selected, the software recognizes all PORT modifications to this module at one time, as shown in the figure above. When selecting the batch modification method of 8 ports of a single module, you do not need to modify the content of the parameter dialog box, and you can directly click "Modify Settings" to modify it. In this case, although the PORT1 device parameters are not modified, the other 2 to 8 ports selected will be modified into the device parameters of PORT1.



The screenshot shows a 'Parameter dialog box' with three main sections: Network, Serial, and Advanced Settings. The Network section includes fields for IP Mode (Static), IP Address (192.168.1.221), Port (5001), Work Mode (TCP Server), Net Mask (255.255.255.0), Gateway (192.168.1.1), Dest. IP/Domain (192.168.1.3), and Dest. Port (4196). The Serial section includes Baud Rate (115200), Data Bits (8), Parity (None), Stop Bits (1), and Flow Control (None). The Advanced Settings section includes DNS Server IP (8.8.4.4), Dest. Mode (Dynamic), Transfer Protocol (TELNET Protocol), Keep Alive Time (60), Reconnect Time (12), Http Port (80), UDP Group IP (230.90.76.1), and checkboxes for Register Pkt, Restart If No Data, and Enable Parameter Send. A 'More Advanced Settings...' button is also present. At the bottom, there are buttons for 'default', 'Modify Key', 'Firmware/Config', 'Restart Dev', 'Modify Setting', and 'Cancel'.

Figure 10 Parameter dialog box

In the parameter dialog box, you can modify the baud rate and other parameters. If you want to switch from TELNET to serial port, select TELNET. ECF78C-01 is automatically filled in by the software according to the PORT ID. IP address 192.168.1.221 is the first IP address, and PORT 5001 is the number of the first port.

Then click the "Modify Settings" button. Modify eight ports in batches.

Different ports of the same module can also be set to different IP addresses. However, if you do not need to change the IP addresses of fixed ports, you are advised not to use multiple IP addresses. Here's how to change to one PORT, multiple ips.

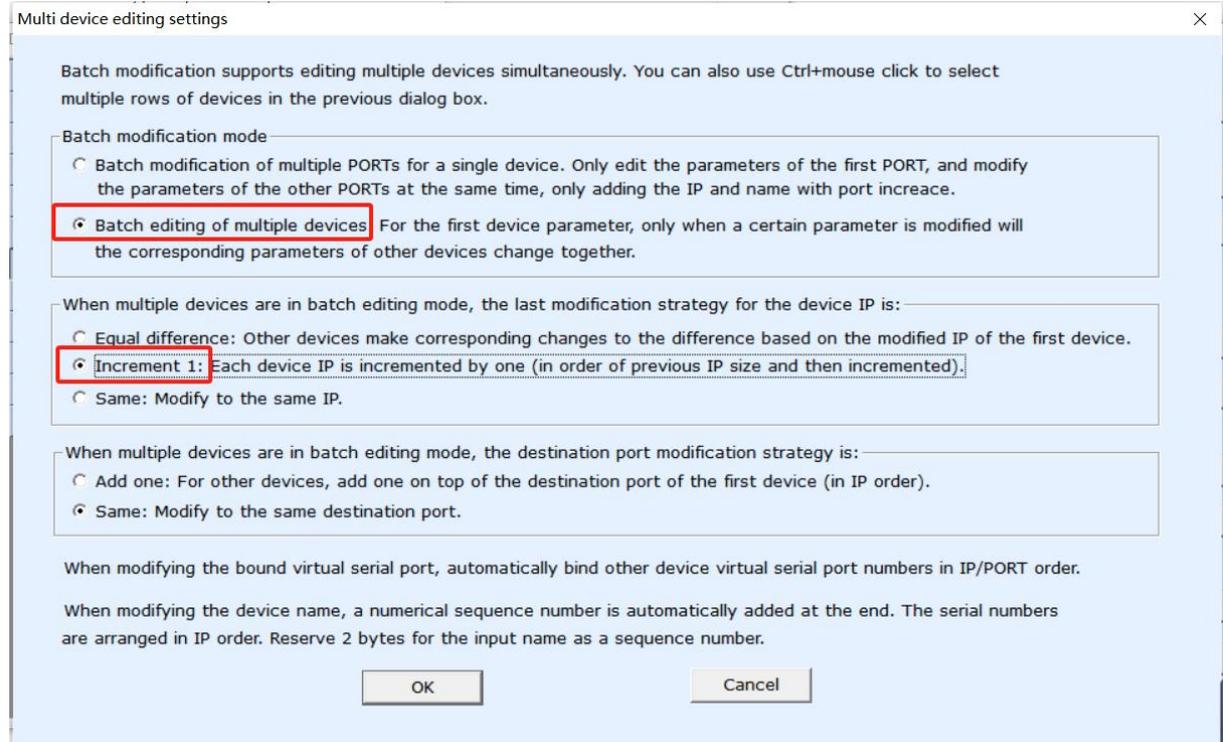
First, select the PORT number you want to modify, and then click "Batch Edit".



I...	T...	Name	ty...	I	Dev IP	Loc...	Dest IP	Work M...	TCP...	Virtual...	Wincom ...	Dev ID	T...	P...
1		E3F78B-01	2012	1	192.168.1.221	5001	192.168.1.173	TCP Server	TCP	Server	Mod	98E3F78B	0	0
2		E3F78B-02	2012	2	192.168.1.221	5002	192.168.1.173	TCP Server	TCP	Server	Mod	98E3F78C	0	0
3		E3F78B-03	2012	3	192.168.1.221	5003	192.168.1.173	TCP Server	TCP	Server	Mod	98E3F78D	0	0
4		E3F78B-04	2012	4	192.168.1.221	5004	192.168.1.173	TCP Server	TCP	Server	Mod	98E3F78E	0	0
5		E3F78B-05	2012	5	192.168.1.221	5005	192.168.1.173	TCP Server	TCP	Server	Mod	98E3F78F	0	0
6		E3F78B-06	2012	6	192.168.1.221	5006	192.168.1.173	TCP Server	TCP	Server	Mod	98E3F790	0	0
7		E3F78B-07	2012	7	192.168.1.221	5007	192.168.1.173	TCP Server	TCP	Server	Mod	98E3F791	0	0
8		E3F78B-08	2012	8	192.168.1.221	5008	192.168.1.173	TCP Server	TCP	Server	Mod	98E3F792	0	0

Figure 11 Modifying multiple IP addresses Step 1

In batch configuration modification, you can change the Multiple Ports for a single device mode to Batch Edit for multiple devices mode, which does not intelligently identify IP addresses and ports.



Multi device editing settings

Batch modification supports editing multiple devices simultaneously. You can also use Ctrl+mouse click to select multiple rows of devices in the previous dialog box.

Batch modification mode

- Batch modification of multiple PORTs for a single device. Only edit the parameters of the first PORT, and modify the parameters of the other PORTs at the same time, only adding the IP and name with port increase.
- Batch editing of multiple devices** For the first device parameter, only when a certain parameter is modified will the corresponding parameters of other devices change together.

When multiple devices are in batch editing mode, the last modification strategy for the device IP is:

- Equal difference: Other devices make corresponding changes to the difference based on the modified IP of the first device.
- Increment 1: Each device IP is incremented by one (in order of previous IP size and then incremented).**
- Same: Modify to the same IP.

When multiple devices are in batch editing mode, the destination port modification strategy is:

- Add one: For other devices, add one on top of the destination port of the first device (in IP order).
- Same: Modify to the same destination port.

When modifying the bound virtual serial port, automatically bind other device virtual serial port numbers in IP/PORT order.

When modifying the device name, a numerical sequence number is automatically added at the end. The serial numbers are arranged in IP order. Reserve 2 bytes for the input name as a sequence number.

OK Cancel

Figure 12 Modifying multiple IP addresses Step 2

In IP mode, select Add One. That is, the IP addresses that follow the first IP

address are automatically added by one.

The screenshot shows a 'Modify Parameters' dialog box with the following settings:

- Network:**
 - IP Mode: Static
 - IP Address: 192 . 168 . 1 . 221 (highlighted with a red box)
 - Port: 1001
 - Work Mode: TCP Server
 - Net Mask: 255 . 255 . 255 . 0
 - Gateway: 192 . 168 . 1 . 1
 - Dest. IP/Domain: 192.168.1.3 (Local IP)
 - Dest. Port: 4196 (UDP Dynamic)
- Serial:**
 - Baud Rate: 115200
 - Data Bits: 8
 - Parity: None
 - Stop Bits: 1
 - Flow Control: None
- Advanced Settings:**
 - DNS Server IP: 8 . 8 . 4 . 4
 - Dest. Mode: Static
 - Transfer Protocol: None
 - Keep Alive Time: 60 (s)
 - Reconnet Time: 12 (s)
 - Http Port: 80
 - UDP Group IP: 230 . 90 . 76 . 1
 - Register Pkt: (empty) (ASCII)
 - Restart If No Data: every 300 Sec.
 - Enable Parameter Send: every 5 Min.
 - More Advanced Settings... (button)
 - Framing Rule:
 - Max Frame Length: 1300 (Byte)
 - Max Interval(Smaller Is Better): 3 (Ms)

Buttons at the bottom: default, Modify Key, Firmware/Config, Restart Dev, Modify Setting, Cancel.

Figure 13 Modifying multiple IP addresses Step 3

In the Modify Parameters dialog box, be sure to change the IP address. If you do not change the IP address, no operation will be performed. Because this mode will only change the change of the parameter down, no change of the parameter will not affect.

1	EAF786-01	2012	1	192.168.1.221	1001	192.168.1.3	TCP Server
2	EAF786-02	2012	2	192.168.1.222	1002	192.168.1.3	TCP Server
3	EAF786-03	2012	3	192.168.1.223	1003	192.168.1.3	TCP Server
4	EAF786-04	2012	4	192.168.1.224	1004	192.168.1.3	TCP Server
5	EAF786-05	2012	5	192.168.1.225	1005	192.168.1.3	TCP Server
6	EAF786-06	2012	6	192.168.1.226	1006	192.168.1.3	TCP Server
7	EAF786-07	2012	7	192.168.1.227	1007	192.168.1.3	TCP Server
8	EAF786-08	2012	8	192.168.1.228	1008	192.168.1.3	TCP Server

Figure 14 Result of modifying multiple IP addresses

According to the modification result, there are now 8 IP addresses, ranging from 192.168.1.221 to 192.168.1.228.

4.5 Parameter Meaning

Because the functions and parameters of each of the 16 serial ports are independent and similar, the following parameters describe the parameters of only one serial port:

table 2 parameter contents

Parameter name	value range	Contents
virtual serial port	none, created virtual serial port	You can bind the current device to an existing virtual serial port. Add a COM port in Serial Port Management on the home screen.
Device model		Only the model of the core module is displayed
Device name	random	You can give the device an easy-to-read name, up to 9 bytes, support Chinese names.
Device ID		factory unique ID, cannot be modified.
Firmware version		Firmware version of the core module
Functions supported by the device		See Table 3 for features supported by the device
IP mode	static、DHCP	Users can choose between static or DHCP (dynamic IP acquisition)
IP address		IP address of the serial port server
Interface	0~65535	Listening port of the serial port Server in TCP Server or UDP mode. If you use port 0 as the client, you are advised to set port 0 to improve the connection speed. If port 0 is used, the system randomly assigns a local port. The difference between this and non-zero port is: (1) When the local port is 0, a new TCP connection is established with the PC when the module restarts, and the old

		<p>TCP connection may not be closed, and the device may have multiple fake connections. Generally, the host computer wants to close the old connection when the module restarts; Specifying a non-zero port closes the old connection. (2) If the local port is 0, the TCP connection takes a shorter time to re-establish.</p> <p>When the serial port server is in TCP client mode, it also acts as the TCP server to listen for incoming connections on the port. In this case, the local port number used by the TCP client to connect to the server is Port +1000.</p>
Working mode	TCP server mode, TCP client mode, UDP mode, UDP multicast mode	When set to TCP server, the serial server waits for the computer to connect. If TCP client is configured, the serial port server initiates a connection to the network server specified by the destination IP address.
Subnet mask	For eg.: 255.255.255.0	The subnet mask must be the same as that of the local LAN.
Gateway	For eg.: 192.168.1.1	It must be the same as the local LAN gateway
Destination IP address or domain name		In TCP client or UDP mode, data is sent to the computer indicated by the destination IP or domain name.
Destination port		In TCP client or UDP mode, data is sent to the destination port of the destination IP address.
Baud rate	300、600、1200、2400、4800、7200、9600、14400、19200、28800、38400、57600、76800、115200、230400、	Serial port baud rate

	460800、921.6K	
Digit bits	5、6、7、8、9	
Check bits	None, Even, Odd, tag, space	
Stop bits	1、2	
Flow control	No flow control, hard flow control CTS/RTS, hard flow control DTR/DCR, soft flow control XON/XOFF	Only available for RS232 serial port
DNS server		If the destination IP address is described by a domain name, enter the IP address of the DNS server. If the IP address mode is DHCP, you do not need to specify the DNS server. The DNS server automatically obtains the IP address from the DHCP server.
Destination mode	Static , dynamic	TCP client mode: In static destination mode, the device automatically restarts after five consecutive failed attempts to connect to the server.
Transfer protocol	NONE 、 Modbus TCP<->RTU 、 Real_COM、 TELNET	NONE indicates that data is transmitted transparently from the serial port to the network. Modbus TCP<->RTU will convert Modbus TCP protocol directly into RTU protocol, which is convenient to cooperate with Modbus TCP protocol; RealCOM is designed to be compatible with the older version of the REAL_COM protocol. It is a virtual serial port protocol. However, it is not necessary to select the RealCom protocol when using the virtual serial port. The TELNET protocol allows the network to log in to our device through TELNET to communicate with

		the serial port
Keepalive timing time	0~255	Heartbeat interval. (1) If the value ranges from 1 to 255 and the device is in TCP client working mode, the device automatically sends TCP heartbeat packets at Keepalive intervals. This ensures the TCP validity of the link. If the value is set to 0, there is no TCP heartbeat. (2) If the value is set to 0 to 254, and the conversion protocol is REAL_COM, the device will send data with length 1 and content 0 at keepalive intervals to implement the heartbeat mechanism in the Realcom protocol. If the value is set to 255, there is no realcom heartbeat. (3) When the value is set to 0 to 254, if the device works on the TCP client, the device will send device parameters to the destination computer at keepalive intervals. If the value is set to 255, no parameter is sent, enabling remote device management.
Disconnected reconnection time	0~255	In TCP client mode, when the connection fails, the TCP connection is re-initiated to the computer at disconnection Reconnection time intervals. The value ranges from 0 to 254 seconds. If the value is set to 255, the reconnection is never performed. Note that the first TCP connection (such as hardware power-on, device restart through zlvircom software, and no data light) is generally carried out immediately, and only after the first connection fails will it wait for the "disconnection reconnection time" to try again, so the "disconnection reconnection time" will not affect the normal connection establishment time between

		the network and the server.
Web access port	1~65535	Default is 80
Multicast address		Under UDP multicast
Enable registration package		When a TCP connection is established, the registration packet is sent to the computer. The realcom protocol must be selected after the registration package is enabled. TCP server and TCP client modes are supported.
Digit packet length	1~1400	One of the serial port framing rules. Serial port server After receiving data of this length, the serial port sends the received data to the network as one frame.
Packet interval	0~255	Serial frame rule 2. When the data received by the serial port server stops for a period longer than the specified period, the received data is sent to the network as a frame.

The functions supported by the device are described as followings:

table 3 Device supported functions

Name	Specifications
Domain name system	The destination IP address can be a domain name (such as the first www server address).
REAL_COM protocol	A non-transparent serial port server protocol, suitable for multiple serial port servers to bind virtual serial ports over the Internet. Because the protocol contains the MAC address of the device, it helps the host computer to identify the device. Generally, it can not be used.
Modbus TCP to RTU	Can realize Modbus TCP to RTU. It also supports the multi-host function.

Serial port modification parameter	Support serial port class AT instruction to configure and read device parameters.
Automatic acquisition IP	Support DHCP client terminal protocol
Multi TCP connection	The TCP server supports more than one TCP connection.
UDP broadcast	UDP broadcast
Multi purpose IP	As a TCP client, seven destination IP addresses can be connected at the same time.
P2P function	Supports the function of accessing devices in any network through P2P traversing technology. Models ending in N support this function.
TELNET function	Connect to the Zlan serial port server through Telnet to monitor the serial port of the device.

4.6 Modifying Parameters Without Restarting the system

PORT1 and PORT8 belong to the same module. If you modify the parameters of one PORT, the whole module restarts. However, in the following cases, only the local PORT will be restarted, and other ports of the module will not be affected.

- a) 1. Just click the "Restart Device" button without modifying any parameters.
- b) 2. Switch between None and TELNET Protocol.
- c) 3. Modify only one or more of the following parameters:

Local port and destination port

Baud rate, data as, check bit, flow control, stop bit

Device name, packet interval, packet length

4.7 TCP Communication Test

Because the functions and parameters of each of the eight serial ports are independent and similar, the following describes the configuration of only one serial port.

After device parameters are configured, you can use the serial port tool or TCP debugging tool to test the TCP connection.

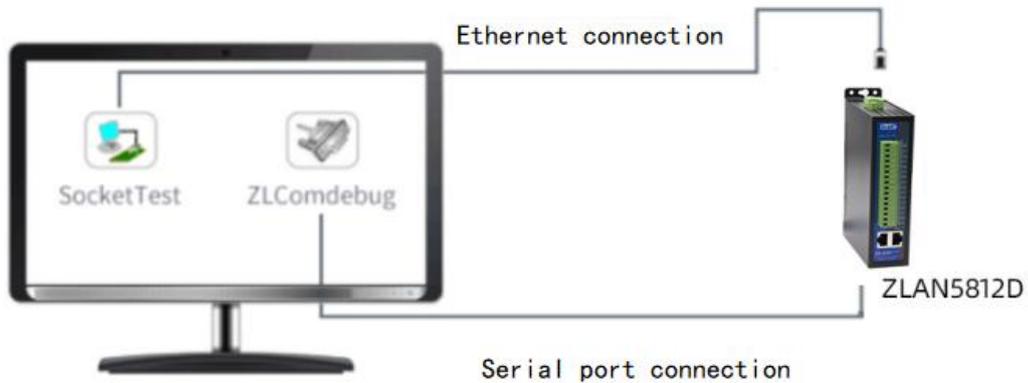


Figure 15 TCP communication diagram

Assuming the PC COM port (USB turn RS485 lines) and serial port serial port server connection, then open the ZLComDebug (<http://www.zlmcu.com/download/Comdebug.rar>) serial debugging assistant, figure 16, and open the corresponding to the COM Open TCP&UDP debugging assistant SocketTest (<http://www.zlmcu.com/download/SocketTest.rar>), and as a way of TCP client, fill in the destination IP for a serial port server IP (currently 192.168.1.221), The destination port is 5001, then click the "Open" button as shown in Figure 17. On the Ttest of SocketTest, input "socket send" and click send, the data is transferred to the RS485 interface through the network port of the serial server, and then sent to ZLComDebug, which is then displayed in ZLComDebug. On the other hand, input "Comdebug send" in ZLComDebug and click "send" to send to socket test.

This demonstration demonstrates the transparent data forwarding function of serial port to network port and network port to serial port of serial port server.

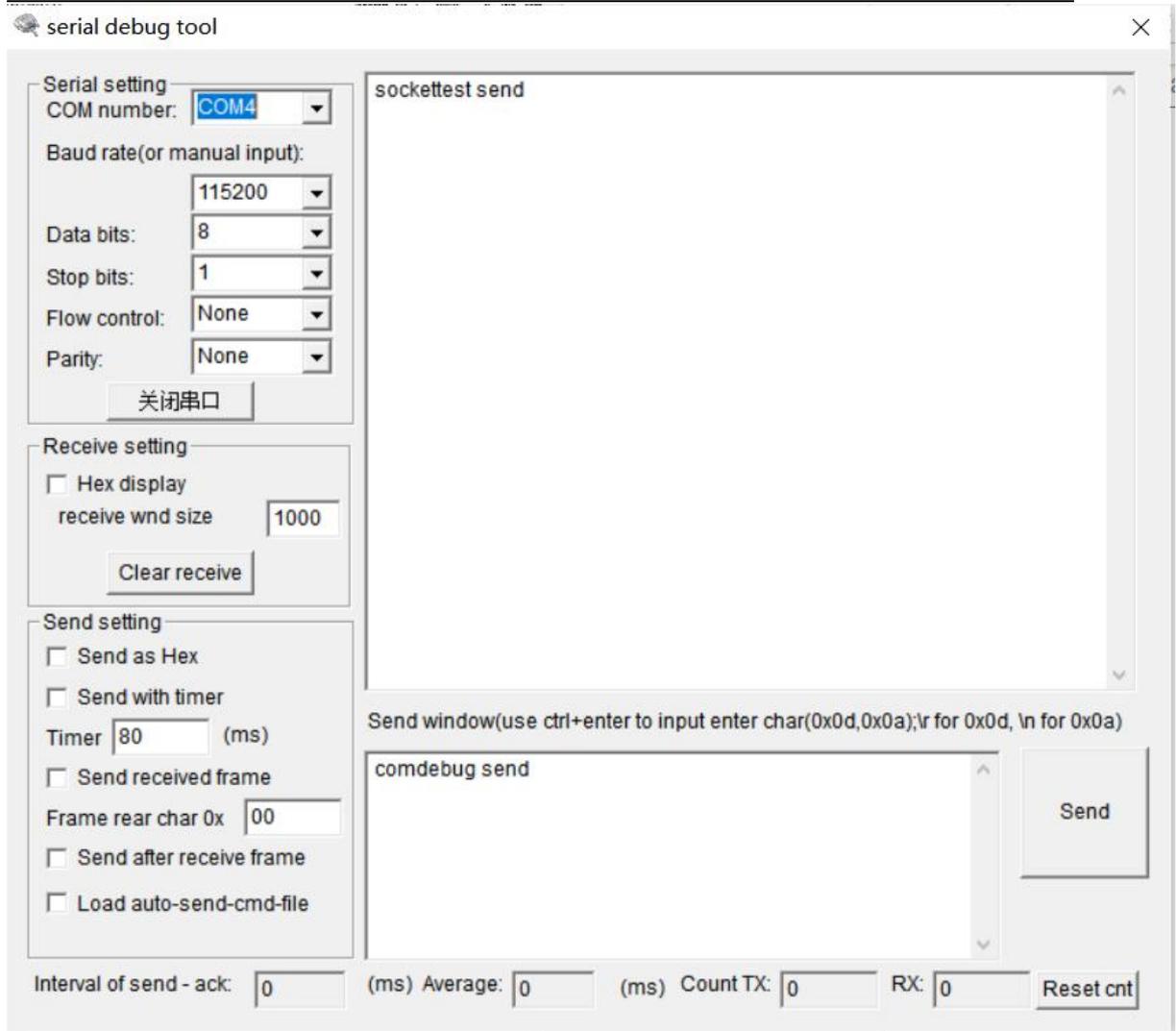


Figure 16 comdebug sending and receiving interface

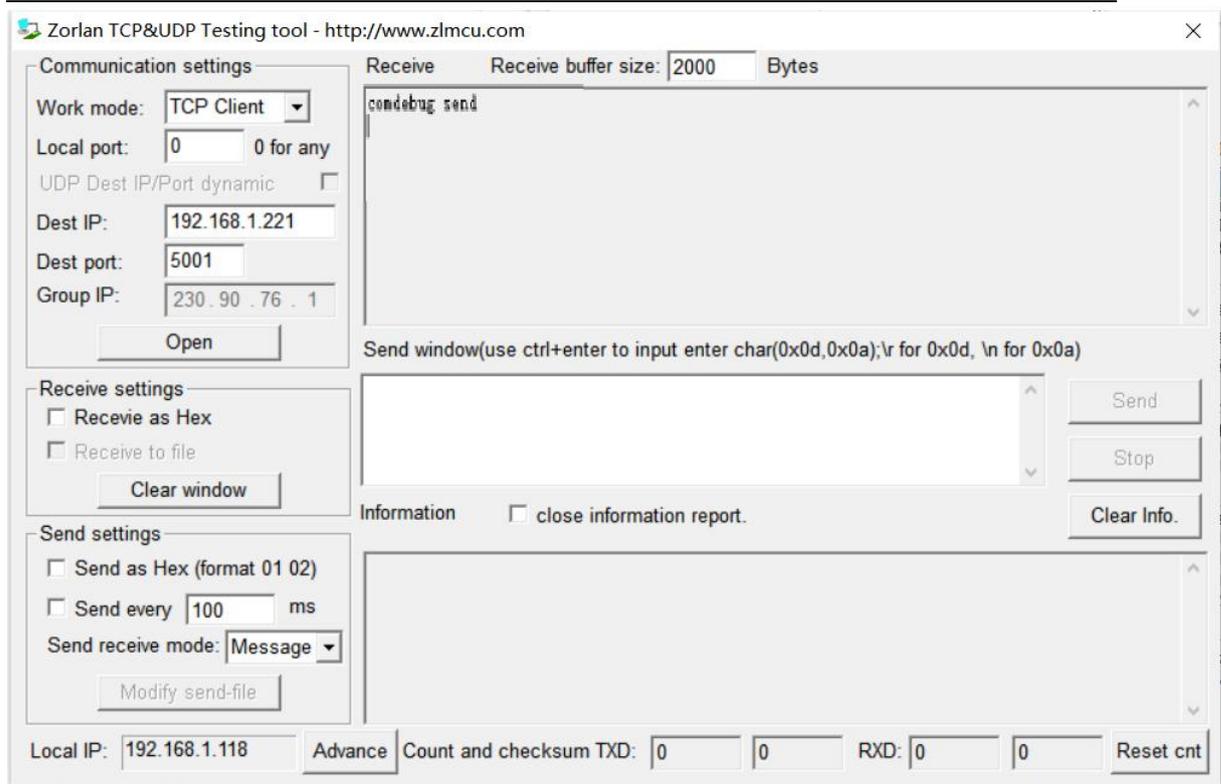


Figure 17 Receiving and receiving interface of sockettest

4.8 Virtual serial port test

The SocketTest shown in Figure 15 communicates directly with the serial server through TCP. In order to enable users to communicate with the serial server even with the developed serial software, a virtual serial port needs to be added between the user program and the serial server. As shown in Figure 18, ZLVircom and the user program run on a computer. ZLVircom virtualizes a COM port and makes this COM port correspond to this serial port server. When the user program opens COM communication, it can be sent to the user serial port device through the ZLVircom serial port server. Here's how to do it:



Figure 18 Functions for virtual serial port

Click "Serial port management" in the main interface of ZLVircom, then click "Add", select to add COM5, where COM5 is the COM port that does not exist in the computer.

The screenshot shows the 'Add Virtual Serial Port' dialog box. The 'COM Number' is set to 'COM5'. The 'TCP Client Mode Settings' section includes 'Dest. IP or Domain' (192.168.1.200), 'Dest. Port' (4196), and 'Heart Beat Interval' (0 s). The 'Add' button is highlighted on the right side of the dialog.

Figure 19 Add virtual serial port

Then go to Device Management and double-click the device that you want to bind to COM5. Select COM5 from the Virtual Serial Port list in the upper left corner. Then click "Modify Settings". And return to ZLVircom's main interface. You can see that COM5 has connected to the device whose IP address is 192.168.1.211. COM5 can be used instead of SocketTest to communicate at this time.

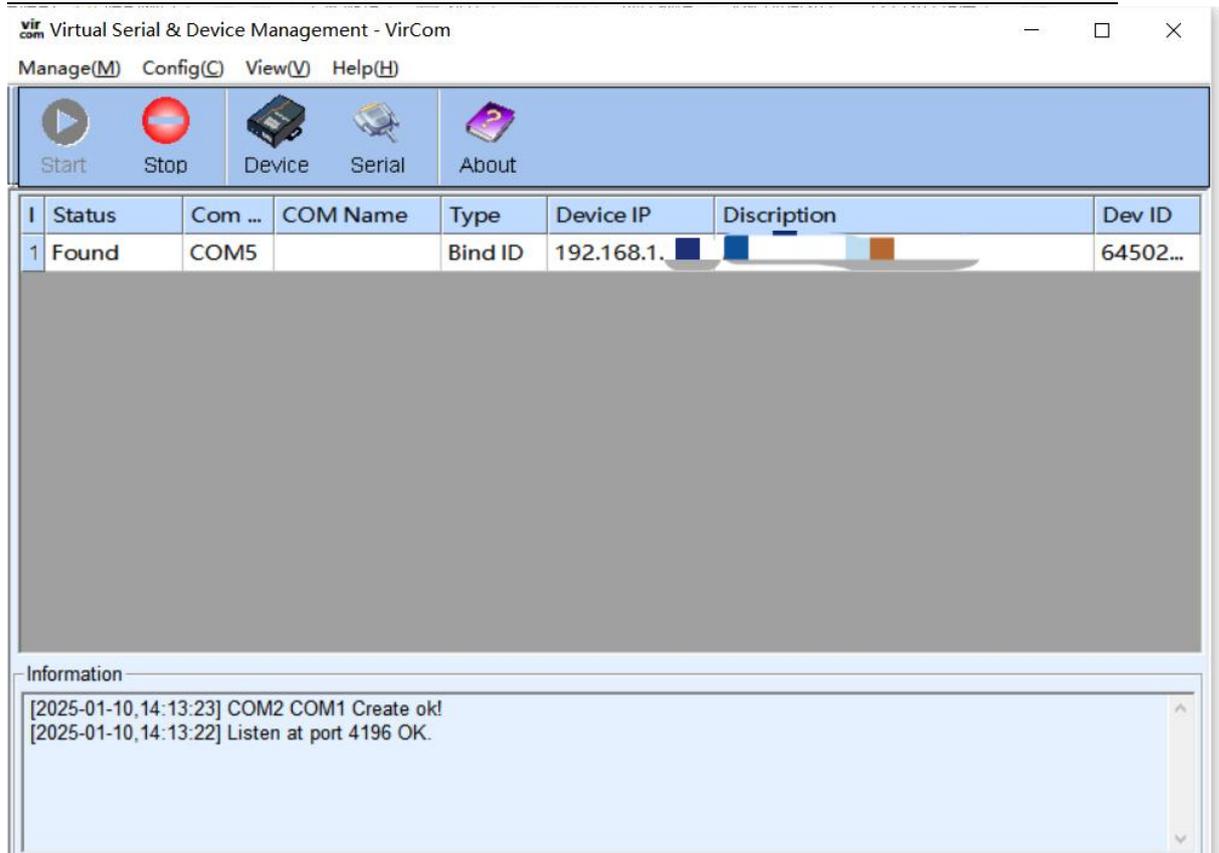


Figure 20 virtual serial port is connected

Open ZLComdebug to simulate the user's serial port program, open COM5(the above virtual serial port), and open a ZLComdebug to simulate a serial device, open COM4(hardware serial port). The data link sent by COM5 is as follows: COM5ZLVircom serial port Server network port Serial port Server serial port COM4. Conversely, COM4 to COM5 can also transmit data: COM4 serial port server serial port Serial port server network port ZLVircomCOM5. Figure 21 shows the two parties sending and receiving data.

If the COM4 is replaced by the user serial port device, the COM5 can realize the communication with the user device.

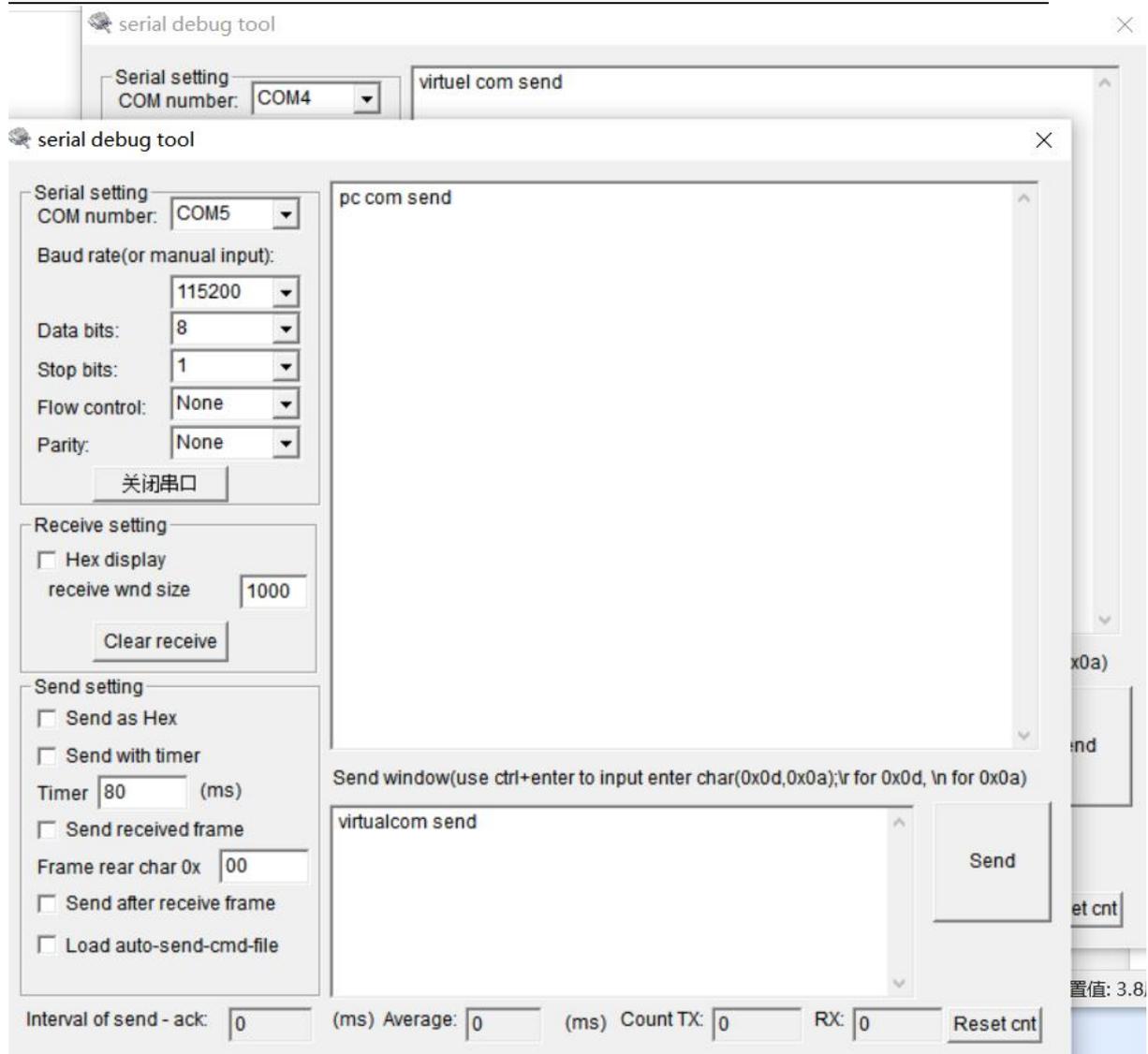


Figure 21 Communication through the virtual serial port

4.9 Modbus TCP Test

By default, serial port and network port data are transmitted transparently. If you need to convert Modbus TCP to RTU, you need to select "Modbus TCPRTU" as the conversion protocol in the device setup dialog box, as shown in Figure 22. In this case, the device port automatically changes to 502, and the Modbus TCP tool connects to port 502 of the serial port server IP address. The Modbus TCP command is converted to RTU command and output from the serial port. For example, if the port of the serial port server receives the Modbus TCP command 00 00 00 00 00 06

01 03 00 00 00 00 00 0a, the serial port outputs the command 01 03 00 00 00 00 00 a c5 cd. Note: The serial port may send more than one 01 03 00 00 00 00 00 0a c5 cd command, this is because the default Modbus is stored mode, will automatically rotate the query command. I'll explain how to switch to non-storage mode later.

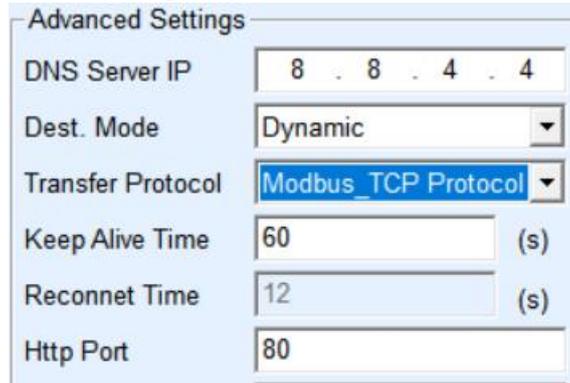


Figure 22 Enabling Modbus TCP

If the Modbus TCP software of the user is used as the Slave station, it is necessary to change the working mode to the client on the basis of selecting the conversion protocol, change the destination IP address to the IP address of the computer where the Modbus TCP software is located, and the destination port is 502, as shown in Figure 23.

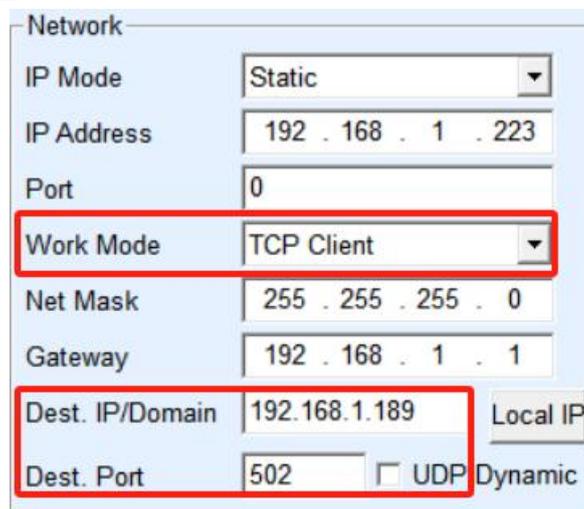


Figure 23 Modbus TCP as the client

4.10 Configuration in Web mode

ZLVircom can search and configure device parameters in different network segments.

Web configuration requires first to ensure that the computer and the serial server are in the same IP segment, and the IP address of the serial server needs to be known in advance. But Web configuration can be done on any computer without ZLVircom.

1. In the address box of your browser, enter the IP address of PORT1 of the serial port server, for example, http://192.168.1.221.

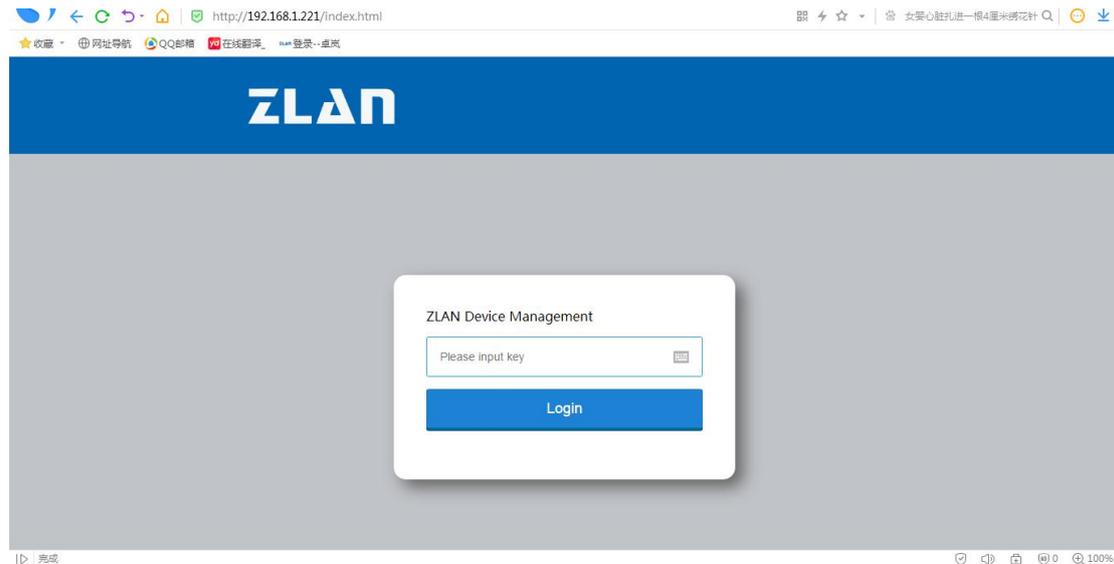


Figure 24 web login in page

2. Enter a Password in Password: there is no password by default. Click the login button to sign in.



Figure 25 Web configuration page

3. In the displayed page, select PORT1-8 that you want to modify. Modify the

corresponding PORT parameters and click Submit. For details about related parameters, see Table 4.

4. Precautions: 1. The IP address of the web page is the IP of the first serial PORT (PORT1), and the IP of other ports 2-8 cannot enter the web page. Submitting changes Only the parameters of the current PORT are submitted. For example, after parameters are modified on the PORT2 page, click Submit to modify only the parameters of PORT2.

5. Working mode and conversion protocol

In different applications can choose different serial server working mode, conversion protocol, so as to be more stable and reliable use, the following details.

The use of serial port server is basically divided into two types: with virtual serial port and non-virtual serial port, as shown in Figure 16 TCP communication diagram and Figure 19 function of virtual serial port. The user software that needs to be connected with the virtual serial port is a serial port (COM port), that is, the user software and the user device are serial ports. Non-virtual serial port mode The user software is directly TCP/IP communication but the user device is still serial port.

In the non-virtual serial port mode, the conversion protocol section is divided into transparent transmission, Modbus TCP to RTU, Realcom, and TELNET. If the user software uses the Modbus TCP protocol and the lower computer uses Modbus RTU, select Modbus TCP to RTU. Realcom is used only when a multi-serial port server serves as the TCP client to connect to a server and the virtual serial port is used on the server. TELNET is used to monitor the serial port of the device when the server is connected to the Zlan module through Telnet.

Usage is summarized as followings:

Table 6 Network configuration modes

No.	Virtual serial port usage	device working mode	Transfer protocol	Specifications

1	Use	TCP server	none	It is suitable for the occasion when the user software opens COM port to collect data actively.
2	Use	TCP client	none	If the TCP server is selected, the device may fail to reconnect after disconnection.
3	None	TCP server	Modbus TCP to RTU	The user software is Modbus TCP and the user device is Modbus RTU. And the Modbus TCP master station.
4	None	TCP client side	Modbus TCP to RTU	The user software is Modbus TCP and the user device is Modbus RTU. And Modbus RTU is the master station.
5	Use	TCP client side	Realcom protocol	When the multi-serial port server serves as the TCP client and the virtual serial port is used, the Realcom protocol is recommended.
6	None	TCP server	Telnet protocol	This mode applies to monitoring device serial ports when connecting to the Zlan serial port server over Telnet.
7	None	TCP client side	None	It is suitable for connecting a cloud with a large number of devices. In general, the cloud is a server with a public IP address on the Internet.

8	None	TCP server	None	Applicable to devices and computers on the same local network, local monitoring, no need to cross the Internet communication.
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5.1. Virtual Serial Port Mode

If the user software uses the COM port to communicate, it must use the virtual serial port mode. Including some PLC software, configuration software, instrument software and so on.

See if monitoring computers and devices are on the local network:

- a) a) If the computer is a server with a public IP address leased on the Internet, the device must use TCP client mode to connect the device to the server. In this case, you can select 2 and 5 in Table 6. If multiple serial servers are used, you must select 5.
- b) b) All in the local network (can ping each other), it depends on whether the host computer actively queries or the device actively sends data. If the device acts as the TCP client to send packets, mode 2 must be used. Otherwise, mode 1 can be used.

5.2. Direct TCP/IP communication mode

If the Modbus TCP protocol is not required and the virtual serial port is not required, the user software may directly communicate with the network port of the serial port server for TCP/IP communication, and the serial port server converts TCP/IP data to serial port data and sends it to the serial port device.

Generally, the user of this kind of usage develops the host computer network communication software by himself, which integrates the analysis of the serial communication protocol of the device. This method is more flexible and efficient than virtual serial port. Correspond to 7 and 8 in Table 4.

The section "3.4.6 TCP Communication Test" mainly describes how to

communicate when the serial server acts as a TCP server. Here we will talk about how TCP clients, UDP mode, and multi-TCP connections communicate with computer software. The Ttest computer software is based on SocketTest (software that mimics user TCP/IP communication) as an example.

Zlan serial port to network port module complies with the standard TCP/IP protocol, so any network terminal that complies with the protocol can communicate with the serial port server, Zlan technology provides a network debugging tool (SocketDlgTest program) to simulate the network terminal to communicate with the serial port server.

For two network terminals (in this case, the network debugging tool and the serial server) to communicate, their parameter configurations must be paired.

5.2.1. TCP client mode

There are two working modes in TCP mode: TCP server and TCP client. No matter which mode is used, one side must be the server and the other side is the client, and then the client can access the server.

When the serial server is the client, there must be three mappings, as shown in Figure 26. (1) Working mode: The working mode of the serial port server is the server mode of the network tool corresponding to the client. (2) IP address: The destination IP address of the serial port server must be the IP address of the computer where the network tool is located. (3) Port: The destination port of the serial port server must be the local port of the network tool. After this setting, the serial port server can automatically connect to the network tool and send and receive data after the connection is established.

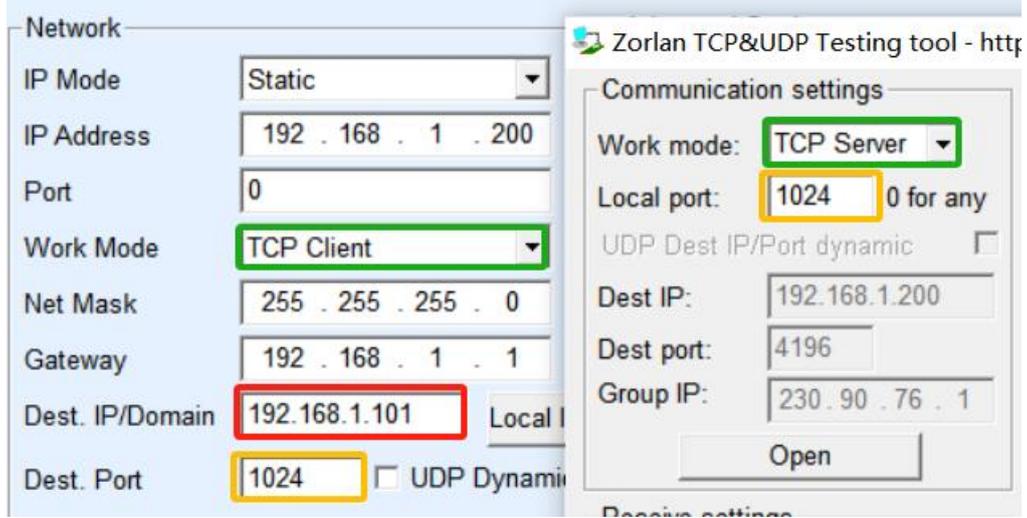


Figure 26 Serial server as client

5.2.2. The client connects to multiple servers

When the ZLAN serial port server serves as the TCP client, seven destination IP addresses can be connected at the same time. Data sent from the serial port is sent to all seven destination IP addresses at the same time. If there are not that many servers, the rest of the destination IP is vacant. Its use is as follows:

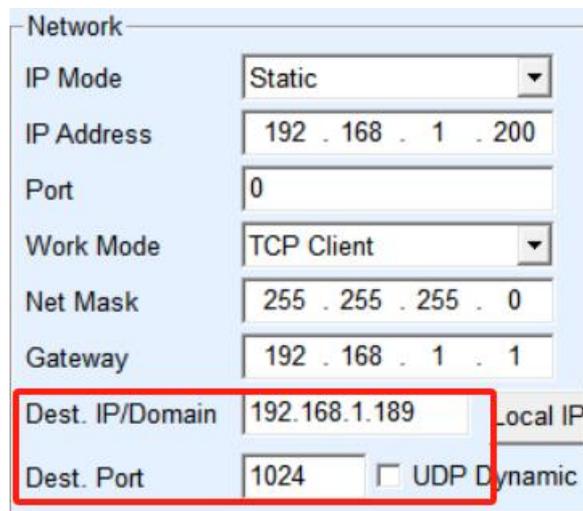
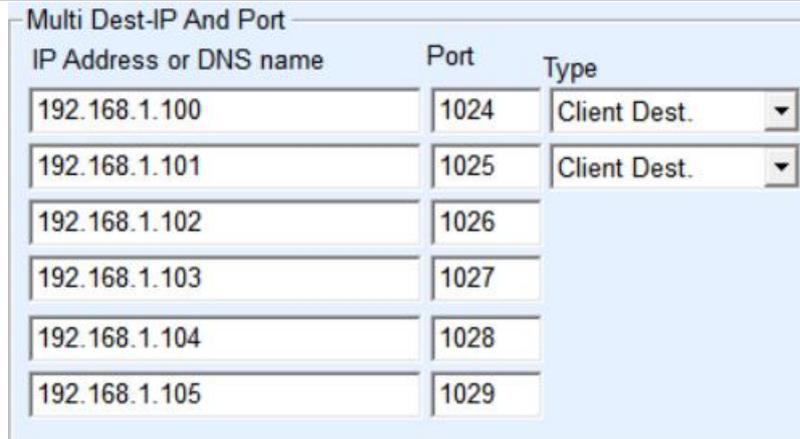


Figure 27 First destination IP address and port



IP Address or DNS name	Port	Type
192.168.1.100	1024	Client Dest. ▼
192.168.1.101	1025	Client Dest. ▼
192.168.1.102	1026	
192.168.1.103	1027	
192.168.1.104	1028	
192.168.1.105	1029	

Figure 28 left 2~7 IP and terminals

The first IP address is set in the device setup screen shown in Figure 27, where the first IP address can be a domain name. Remaining 2 to 7 destination IP addresses On the device Settings screen, click More Advanced Options to open more advanced options.

All seven destination IP addresses can be automatically connected after being set. If the destination IP addresses fail to be connected, they are reconnected repeatedly after the Disconnection time.

5.2.3. TCP server mode

When the serial server acts as the server, there are also three mappings, as shown in Figure 29, which are not explained here. After this setting, click the open button of the network tool to establish a TCP connection with the serial port server. After the connection is established, you can send and receive data.

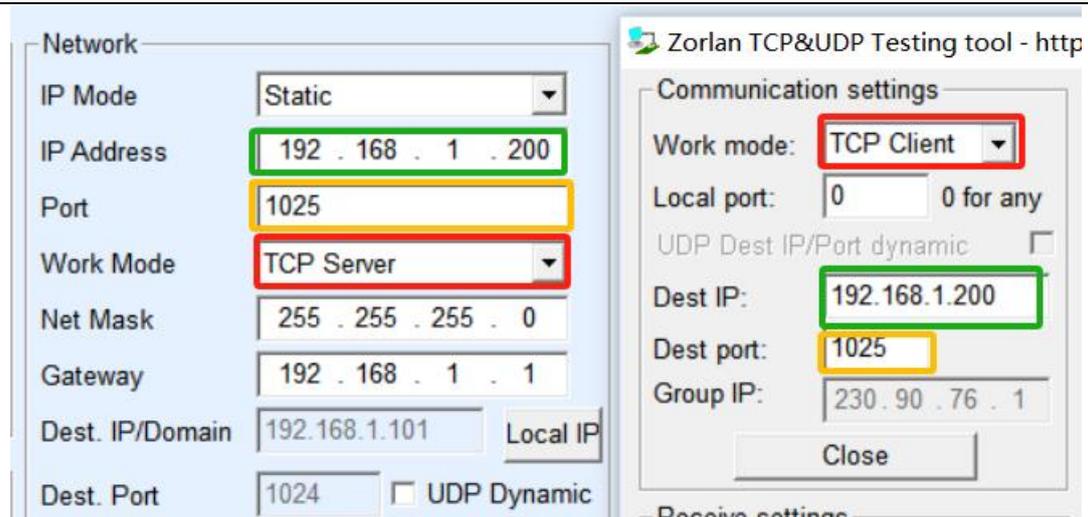


Figure 29 The serial server serves as the server

When the serial port server serves as the server, it can accept 30 TCP connections at the same time. The data received by the serial port is forwarded to all established TCP connections. If you want to send data only to the TCP that has recently received network packets, you need to enable the multi-host function. For details, see 7.4 Multi-Host Function.

5.2.4. Act as both client and server

Zlan serial port server supports the device in the TCP client mode can also accept TCP connections, that is, also has the TCP server function.

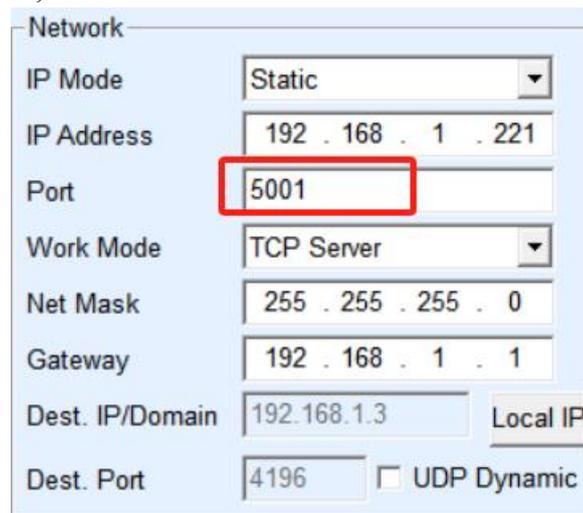


Figure 30 acts as both client and server

By default, when ZLVircom is configured, if the working mode is changed to

"TCP client" mode, the port (that is, the local port) will automatically become 0 (0 means that an idle port is randomly selected). In order to support the TCP server mode, the computer software must know the local port of the device, so a value needs to be specified here. As shown in Figure 30, the computer software can now connect to port 5001 of 192.168.1.221 for communication. In addition, the device acts as a client and connects to port 1024 of 192.168.1.189. Note that because the local port 5001 is occupied by the server, the local port used by the client is port +1000, that is, the software on 192.168.1.189 sees that the incoming port of the device is $5001+1000=6001$.

5.2.5. UDP Mode

In UDP mode, parameter configuration is shown in Figure 31. The left side is the configuration of serial server in ZLVircom, and the right side is the setting of network debugging tool SocketDlgTest. First, both must be in UDP working mode. In addition, the destination IP address and port of the network tool must point to the local IP address and port of the serial port server. The blue arrow indicates that the destination IP address of the serial port server must be the IP address of the computer where the network tool is installed, and the destination port of the serial port server must be the local port of the network debugging tool. These network parameters must be configured to ensure two-way UDP data communication.

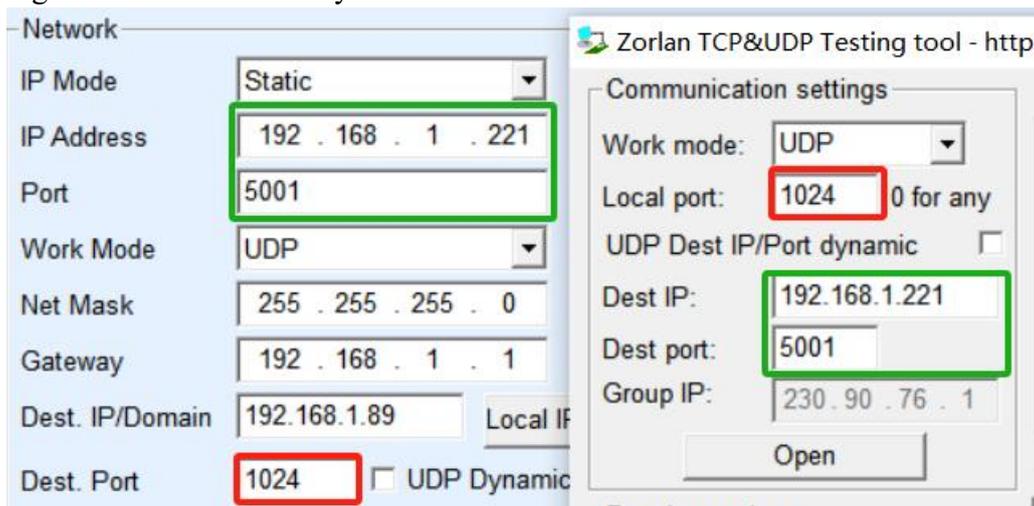


Figure 31 UDP mode parameter configuration

5.3. TELNET PROTOCOL

When you log in to the serial port server using some Telnet tools, double-characters are displayed. For example, when you log in to the system using Telnet in windows. In this case, the conversion protocol needs to be selected as the TELNET protocol. After you log in through Telnet, there are no more double characters.

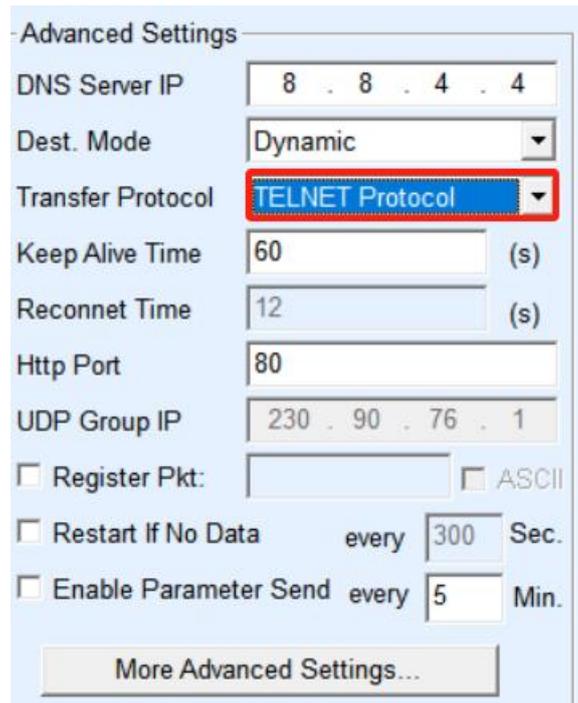


Figure 32 TELNET protocol

If the TAB key fails to be associated and two characters are displayed when secureCRT is used, it indicates that secureCRT is not in one character at a time mode. In this case, you only need to change the device port to 23, because the Send SGA (Only 23 ports) function is automatically selected in secureCRT. Therefore, when our device is on port 23, it will automatically enter the mode of "one character at a time".

Network	
IP Mode	Static
IP Address	192 . 168 . 1 . 221
Port	23
Work Mode	TCP Server
Net Mask	255 . 255 . 255 . 0
Gateway	192 . 168 . 1 . 1
Dest. IP/Domain	192.168.1.89 <input type="button" value="Local IP"/>
Dest. Port	1024 <input type="checkbox"/> UDP Dynamic

Figure 33 Terminal is 23

For details about how to modify secureCRT, kindly review file Precautions for Monitoring the Serial Port in Telnet Mode.

6. Equipment debugging

6.1. Physical network connection

The module can be connected to the 10M/100M switch or directly connected to the computer network port using the crossover network cable or the direct network cable.

The first step after the connection is established is to check whether the 100_Link1 indicator is steady on. Otherwise, check whether the network cable is properly connected.

6.2. Network TCP connection

If the device dynamically obtains IP addresses, do not directly connect to the network port of the computer. Because there is no DHCP server to use (generally DHCP servers are routers in the LAN). Therefore, specify the IP address for direct connection. The computer also needs to specify a fixed IP address.

Network configuration window showing the following settings:

- IP Mode: Static
- IP Address: 192 . 168 . 1 . 201
- Port: 1025
- Work Mode: TCP Server
- Net Mask: 255 . 255 . 255 . 0
- Gateway: 192 . 168 . 1 . 1

Figure 34 Configuration in the same network segment

Whether connected directly or through a switch, when configured with static IP, the device and the computer need to be on the same network segment (unless communicating across gateways), as shown in Figure 34.

Since ZLVircom supports cross-network segment search and configuration, the IP addresses that can be searched but cannot be communicated are generally not well configured. In this case, ZLVircom can be used to configure devices on the same network segment.

After the configuration is complete, you can see that the Link indicator turns green when the TCP connection is established. The green Link light can also be seen through ZLVircom. For example, in the device management list, if the TCP connection is listed as "established", the Link light is blue, as shown in Figure 35, which can facilitate remote diagnosis.

1		ECF78C-01	2012	1	192.168.1.221	5001	192.168.1.111	TCP Serv...	Estab...	Haven'...	Not Link...	9277FD53	49	7...
2		ECF78C-02	2012	2	192.168.1.222	5002	192.168.1.111	TCP Client	Not ...	Haven'...	Not Link...	29D6A3...	0	0
3		ECF78C-03	2012	3	192.168.1.223	5003	192.168.1.111	TCP Client	Not ...	Haven'...	Not Link...	29D6A3...	0	0
4		ECF78C-04	2012	4	192.168.1.224	5004	192.168.1.111	TCP Client	Not ...	Haven'...	Not Link...	29D6A3...	0	0
5		ECF78C-05	2012	5	192.168.1.225	5005	192.168.1.111	TCP Client	Not ...	Haven'...	Not Link...	29D6A3...	0	0
6		ECF78C-06	2012	6	192.168.1.226	5006	192.168.1.111	TCP Client	Not ...	Haven'...	Not Link...	29D6A3...	0	0
7		ECF78C-07	2012	7	192.168.1.227	5007	192.168.1.111	TCP Client	Not ...	Haven'...	Not Link...	29D6A3...	0	0
8		ECF78C-08	2012	8	192.168.1.228	5008	192.168.1.111	TCP Client	未建立	未设置	未联通	9BECF793	0	0

Figure 35 Connection status and data sending and receiving status

6.3. Data sending and receiving

When the Link indicator turns green, data can be sent and received between the software and the serial port server. If the software sends data, the Active light turns green for at least one second. Data is also output from the serial port of the serial port

server, but whether the output data is correct depends on whether the correct serial port parameters (baud rate, data bit, stop bit, check bit) are configured.

The serial port device responds to correct command delivery. Once a response is received (the serial port sends data to the network port), the Active color turns blue. Otherwise, check whether the serial port parameters or the serial cable are connected properly.

In order to facilitate remote debugging, ZLVircom also supports remote viewing of data sent and received. As shown in Figure 35, TXD is the amount of data sent by serial port server. When refreshing the device list, if the value changes, it indicates that data has been sent, and the Active light will turn green. If you see the value of RXD changing, it indicates that the serial device has returned data, and Active is blue.

6.4. ZLVircom Remote monitoring data

In the case of using virtual serial port, ZLVircom supports real-time capture of data sent and received by virtual serial port. Convenient for users to debug the system, the use method is as follows:

Assume that the communication of the virtual serial port has been established according to the method of 4.8 Virtual Serial Port test. Now you need to monitor the data through the virtual serial port. Open ZLVircom's menu/Configuration/Software configuration/Open vircom configuration dialog box.

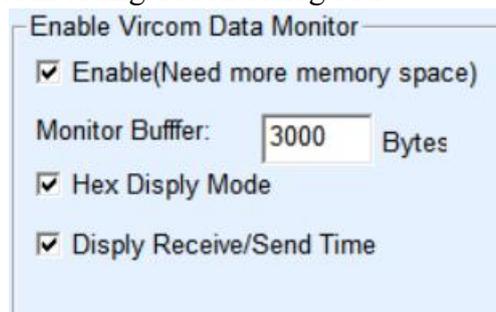


Figure 36 Enable ZLVirocm monitoring

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

as shown in Figure 37.

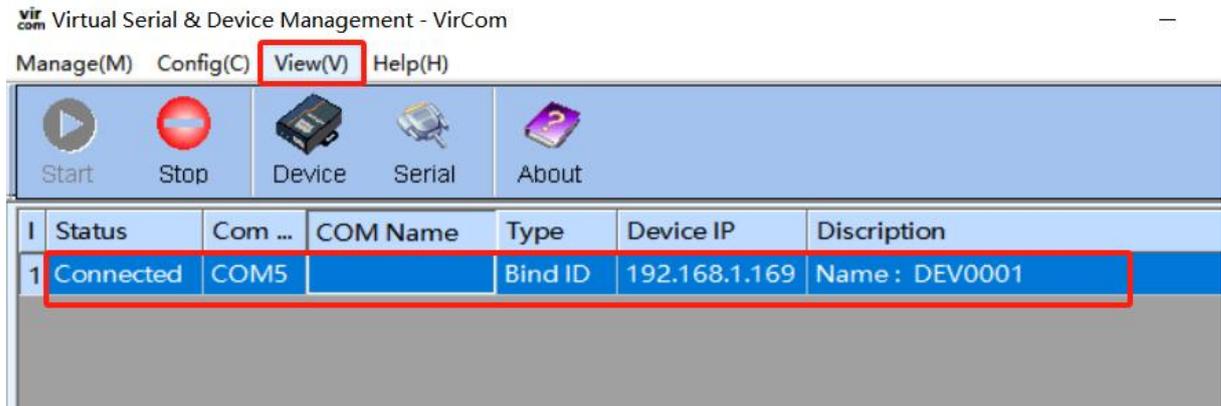


Figure 37 Open ZLVirocm monitoring

From the open dialog box, you can see the instructions sent by the host computer and the instructions returned by the device, as shown in Figure 38. This function can facilitate the field communication debugging.

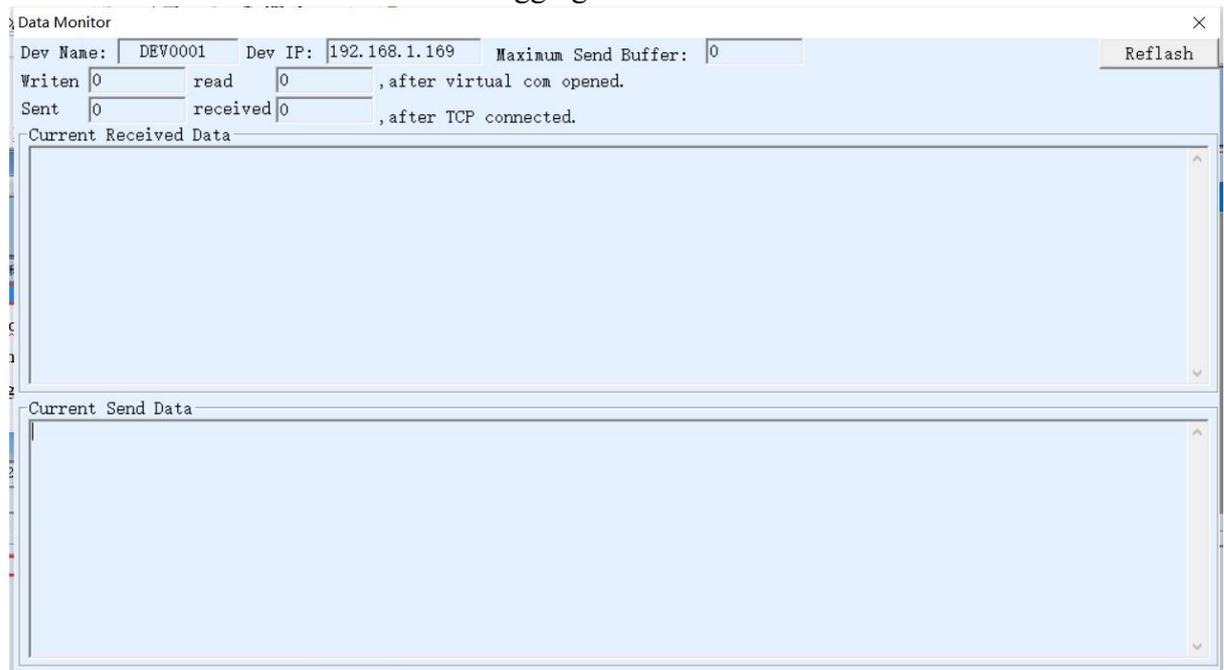


Figure 38 Monitor send and receive data

7. Modbus Advanced functions

Serial port server with Modbus gateway function itself does not have station address and register, it is a communication bridge, it will generate Modbus RTU

specification according to the user software to Modbus gateway in the Modbus TCP instruction, function code, register number, register number, and output from the serial port. Think of it as a protocol "translator."

7.1. Enable the Modbus gateway

First of all, the serial port server should support Modbus gateway, that is, the function of "Modbus TCP to RTU" in the function supported by the device in Table 5 of the device setup dialog box should be checked.

By default, the serial port server is in common transparent mode. If you want to switch to Modbus gateway mode, select Modbus TCPRTU in Conversion Protocol. The device automatically changes Port to 502 (port of the Modbus server). The Modbus gateway is enabled.

When the serial port RTU device serves as the slave station, the Modbus TCP software on the upper computer connects to port 502 of the Modbus gateway, and the Modbus gateway needs to work in TCP server mode. If serial port RTU is used as the primary station, the Modbus gateway works on the TCP client, and the destination IP address is the IP address of the computer on which the Modbus TCP software is installed. The destination port is usually 502.

7.2. Storage Modbus Gateway

ZLAN5812D can save the contents of the read registers inside the gateway, so the speed of Modbus TCP query can be greatly improved, and the performance is better when supporting multi-host access.

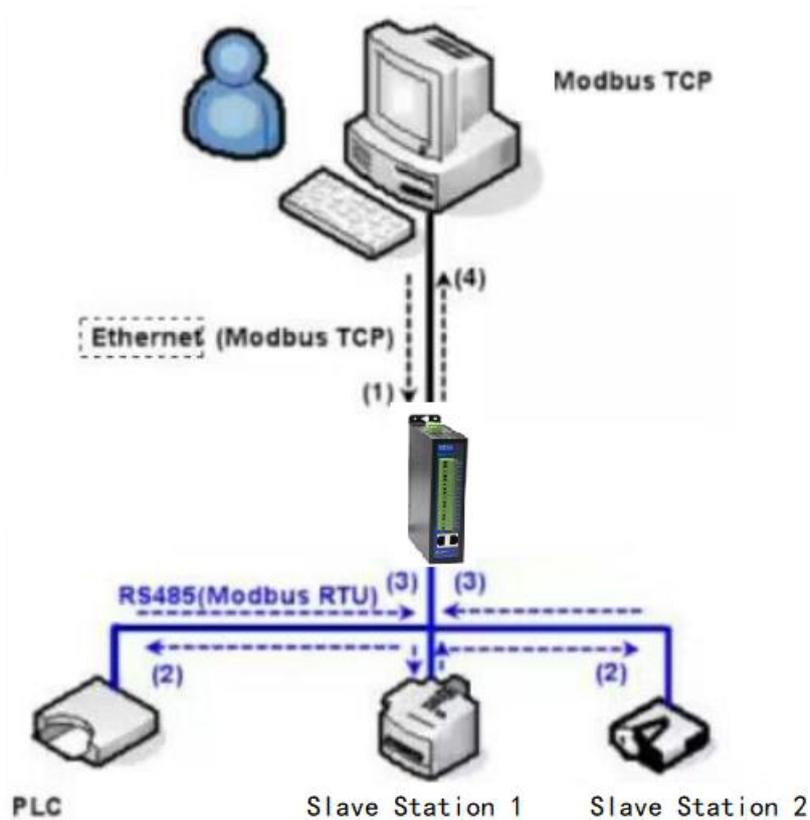


Figure 39 Working mode of storage Modbus gateway

As shown in Figure 39, the normal Modbus TCP data flow direction 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 is converted into Modbus TCP and sent to the monitoring host computer.

We know that Modbus TCP is a network communication, the transmission speed is very fast, generally within 3ms can answer, while Modbus RTU is RS485, generally only 9600bps speed, generally send and return an instruction at least 30ms. In this way, the query response time of the common non-storage Modbus gateway is relatively long. In addition, if there are a lot of upper computers to query data at the same time, then the serial port will be congested. If the network is like a highway and the serial port is like a single-log bridge, then the original way is to pass the traffic of the highway on the single-log bridge.

Register-saving Modbus gateway solves the above problems. It can temporarily

save the register data obtained by the query in the Modbus gateway, so that when the Modbus TCP query comes, the Modbus gateway can immediately return the command, and really bring the fast characteristics of Modbus TCP into play. On the other hand, ZLAN5812D can actively send instructions from the serial port to automatically update the data content of the currently saved register and save a copy of the latest register value.

In addition, the module is also a fully automatic configuration free Modbus gateway, the user does not need to configure the required register address, function code, slave station address, etc. The ZLAN5812D will automatically recognize and dynamically add these registers according to the Modbus TCP command sent by the network port.

When monitored by multiple computers, ZLAN5812D can show good response speed, no matter what baud rate the serial port is, it can generally give the host the response data within 3ms. And it shows a good speed of real-time update of serial data.

The register-saving Modbus gateway is the real Modbus TCP to Modbus RTU, which really plays the advantages of fast Modbus TCP and multi-host query at the same time.

Notice When the serial port server serves as the TCP client, it does not have the storage function and automatically switches to the non-storage mode.

The features of storage Modbus are listed below:

1. The first Modbus TCP query instruction is non-stored. Because you must wait for the RTU device to return the data slowly before you can return the register contents to the network port.
2. If a specific command is no longer queried by the host computer on the network within 5 seconds, the command is automatically deleted and no longer sent from the serial port to the RTU device.
3. Currently, 10K Modbus cache can be stored, and about 500 instructions can be stored at the same time for ordinary single-register queries.
4. When multiple instructions are queried at the same time, they are sent in order of priority. The first instruction is sent and the first instruction is answered. 485

anti-conflict time (refer to the multi-host part) The second instruction is sent. .
Do not return to the first command until the last command has been answered.

7.3. Disable the storage-type function

Although the memory Modbus has a fast response speed, some users do not want the RTU device to not want to receive a large number of query instructions, which affects the internal processing speed of the instrument. At this point, you can disable the storage function.

To disable storage type, click the "More Advanced Options" button in the "Parameter Configuration" dialog box and select Simple Modbus TCP to RTU. Then go back to device Settings and click Modify Settings.

Notice When you configure the conversion protocol in Web mode, it is a non-storage Modbus gateway by default.

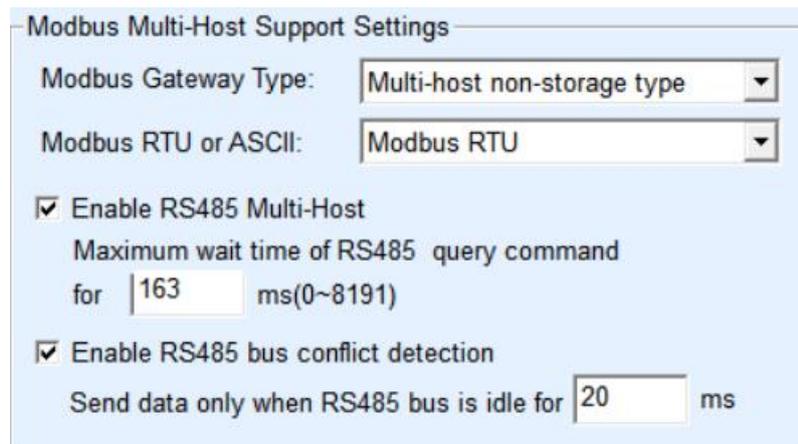
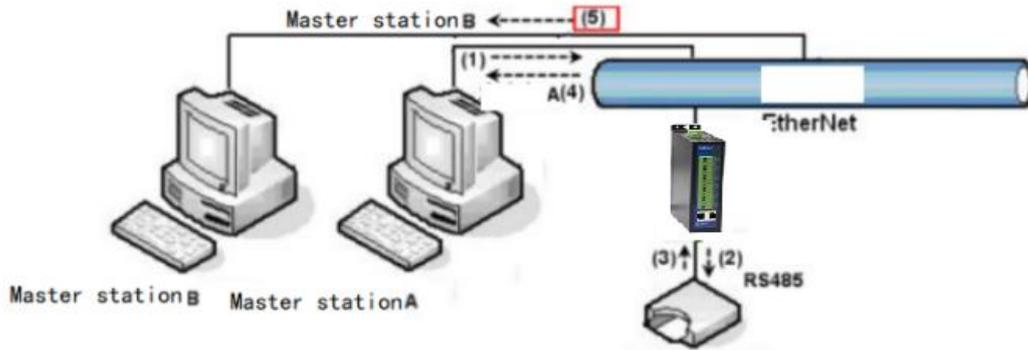


Figure 40 new version zlvircom setting

7.4. Multi-host function

As shown in Figure 40, "RS458 multi-host support" and "RS485 bus collision detection function" are the multi-host functions of ZLAN. They are generally enabled and disabled simultaneously. After this function is enabled, the device whose protocol is converted to Modbus TCP has the function of a storage Modbus gateway; otherwise, it is a non-storage Modbus gateway. If the conversion protocol is none, the user-defined RS485 protocol can generally also have the function of a serial port

device accessed by multiple hosts at the same time, which can not be achieved in a pure RS485 network, because multiple master stations send conflicts on the RS485 bus at the same time. The multi-host of ZLAN serial port server can "coordinate" the RS485 bus to achieve the purpose of multi-host access.



Multi-host function demonstration

As shown in Figure 41, in ordinary mode, when two hosts: host A and host B are connected to the serial port server at the same time, host A sends (1) instruction, the RS485 device receives (2) instruction, and the RS485 device returns (3) instruction, but the port end of the serial port server sends (4) to host A and (5) to host B at the same time. Because host B did not send the query, but it also received the reply instruction (5), host B may generate a communication exception error. In multi-host mode, there will be only instructions (4) and no instructions (5), because the serial server will automatically remember the host that needs to be returned, and only the command will be returned to the most recent communication host, host A queries will only reply to A, host B queries will reply to host B.

Another effect is that in the ordinary mode, host A and host B send data at the same time will produce a combination of instructions on the RS485 bus, so that it can not be recognized normally; In the multi-host mode, the serial port server can schedule the sequence of A and B in using the bus, so as to effectively solve the conflict problem of multi-machine simultaneous access.

If the conversion protocol is set to None, the multi-host function is disabled by default. To enable multiple hosts, click More Advanced Options in the Device configuration dialog box and select RS485 Multi-Host Support.

7.5. Multiple host parameters

The meanings of RS485 Multi-host support and RS485 bus conflict detection are described as

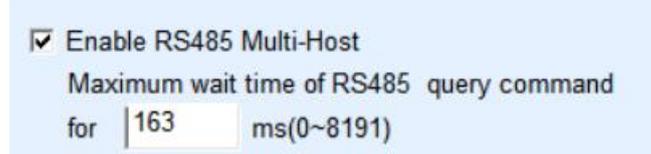


Figure 42 RS485 multi host support

The response timeout period of an RS485 command is as follows: Indicates the maximum interval between sending the command and receiving the response from the serial port on the server. The value must be greater than the actual maximum interval. Because if it is determined to be a timeout, the next instruction will be sent.

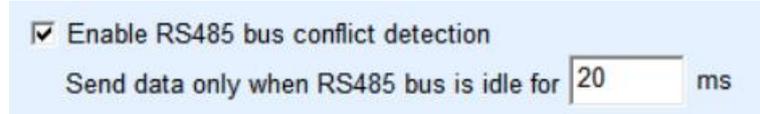


Figure 43 RS485 Conflict prevention idle time

RS485 bus collision time: indicates how many milliseconds the serial port server waits to send the second command after receiving the reply of the first command. This parameter actually defines the speed of instruction rotations. The recommended value is above 20ms. Generally, you do not need to change the value of Maximum Wait time 3 seconds.

When the user uses ZLVircom to select the conversion protocol as "after Modbus TCP to RTU", ZLVricom will automatically check the above two enable boxes (unless the user manually enters the advanced option to remove), and the above two times will be automatically configured according to the baud rate. However, if the Modus command is long or the protocol is converted to None, you need to manually set the two parameters.

The following describes the recommended values for setting the above parameters:

1. Figure 43 shows the RS485 bus collision prevention time. Generally, you can set it to twice the value of Packet Interval in the lower right corner of the parameter configuration page, but the value cannot be less than 20.
2. Figure 42 shows the "RS485 command response timeout time", which is generally determined by the length of the command to and from the reply. If the send

command is N bytes and the reply is M bytes, the recommended value is "packet interval" x (N+M+5) +100.

7.6. Non-storage multi-host

Some places must use non-storage Modbus, this is because when a certain event occurs to read the register data, but the read data is the data before the storage collection, which is logically incorrect, so it must also support non-storage Modbus collection. But on the other hand, it is also necessary to support multiple hosts at the same time, and you only need to select a non-storage modbus gateway type.

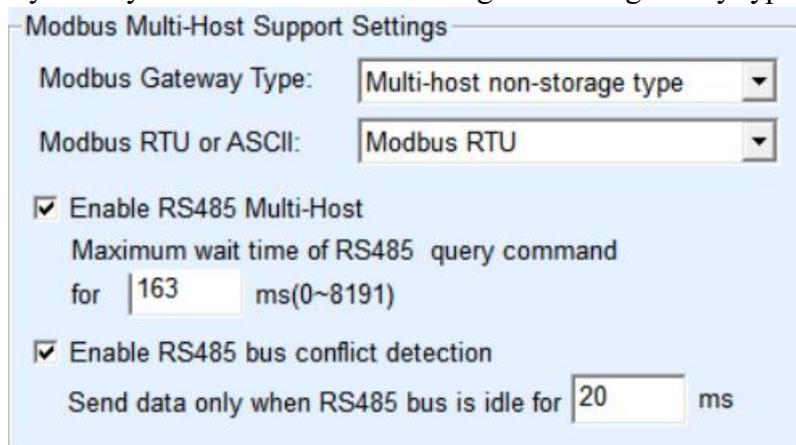


Figure 44 Multi-host non-storage setup

7.7. Modbus for Multi-destination IP Addresses

As shown in Figure 41, if the serial port device (RTU device) acts as the primary station and the network port device (Modbus TCP device) acts as the secondary station, there are multiple network port secondary devices at the same time. In this case, you can use the method described in the section about Connecting a Client to multiple servers to enable the serial port server to connect to multiple network ports simultaneously as a client.

In this case, the following functions need to be implemented: When the serial port RTU sends commands to multiple network port devices, the network port device identifies whether to send commands 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 port server, it is converted into an RTU command and

sent to the RTU device through the serial port.

At this time, it should be noted that the two check marks "RS485 bus collision prevention time" as shown in Figure 43 and "RS485 command response timeout time" as shown in Figure 42 need to be removed. Otherwise, the preceding forwarding function cannot be implemented.

Another application method is: Although the serial port server is connected to multiple network port devices as a Client, the RTU device is not the master station, but the network port device sends first, and the RTU device replies (as the slave station). In this case, the two checkboxes of RS485 bus Conflict Prevention time and RS485 command response timeout time need to be selected, so that multiple hosts can access an RTU device at the same time.

For the new version of ZLVircom, the above Settings can be completed by directly selecting "the device does the slave station for the client" in the Modbus gateway type.

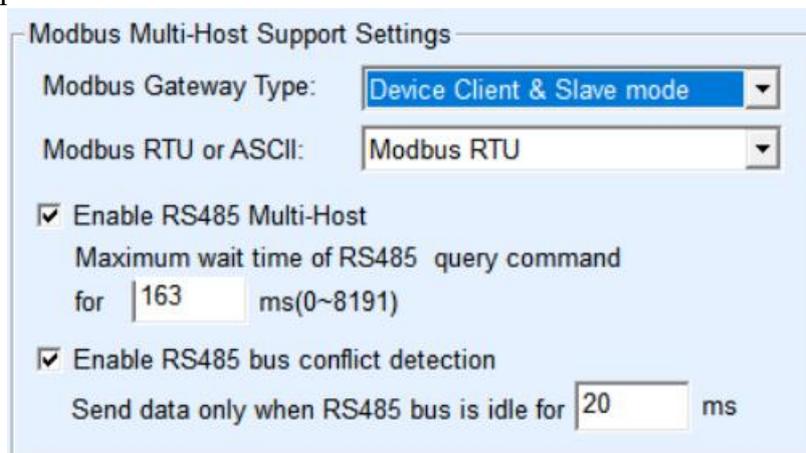


Figure 45 new version of zlvircom setting

8. Register the packet and heartbeat packet

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

8.1. Register package

The definition of the 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 on the Internet, and the modules are scattered in various collection and monitoring points. How to make the cloud software identify the module is very important, and it is necessary to achieve Internet of Things communication.

Shanghai Zlan serial server provides the following registration methods.

8.1.1. Send MAC addresses on the connection

Send MAC address on connection: When the module is connected to the cloud, it sends its mac address to the cloud. Since the MAC address is unique, the device can be uniquely identified. This method is simple and effective because it does not require registration package writing for each device. How to use: click "More Advanced Options" in the device Settings dialog box, find "Send MAC address when TCP is established" in the upper middle, tick in the front, and then return to the Settings interface, click "Modify Settings".

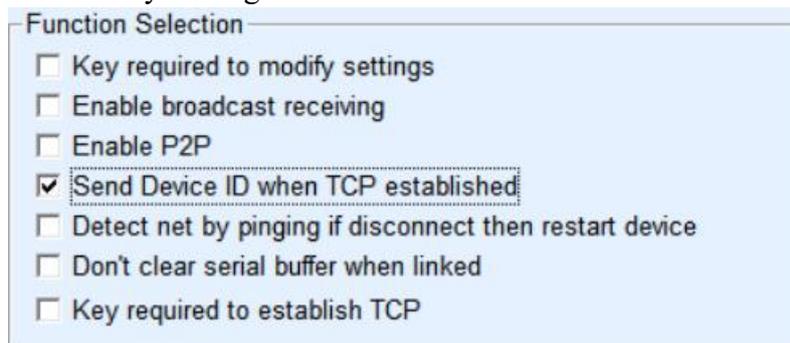


Figure 46 Send MAC address via connection

8.1.2. Realcom Protocol

Realcom protocol is a mature protocol containing registration packets and heartbeat packets. Users can use this protocol to realize registration packets and heartbeat packets. To enable the Realcom protocol, perform the following operations: In the Device Settings dialog box, set Conversion Protocol to REAL_COM protocol. Note that the part of enabling the registration package must be left blank.

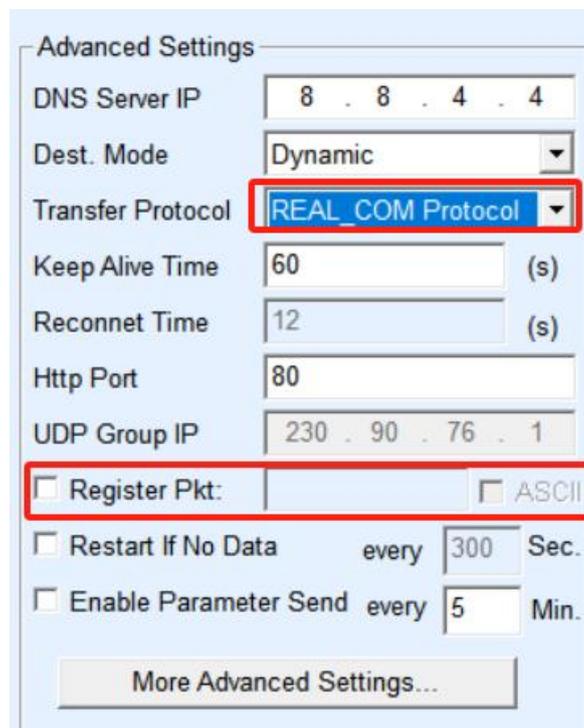


Figure 47 Enable realcom protocol

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

1. After a TCP connection is established between the device and 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. MAC[5] to MAC[0] indicates the MAC address of the device.

2. When the device sends data to the network, it automatically adds the three-byte prefix FA 01 01.

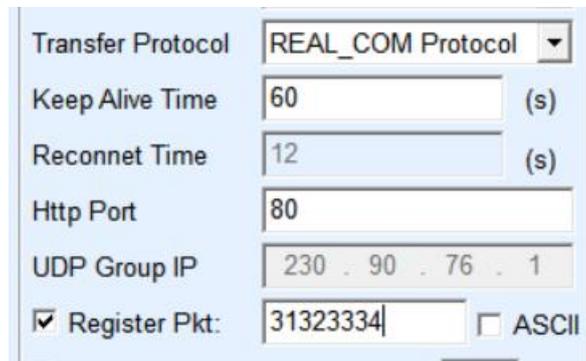
3. At a keepalive interval, the device sends a 1-byte heartbeat packet of 00 to the

software.

The REAL_COM protocol can be used as the registration package of the device because the registration package contains the MAC address. However, due to its fixed format, only cloud software can design the REALCOM protocol to be compatible with this approach.

8.1.3. Customize the registration package

The custom registration package mode allows the user to fill in any registration package format. The method is as follows: On the device Settings page, perform the following configurations:



Transfer Protocol	REAL_COM Protocol
Keep Alive Time	60 (s)
Reconnect Time	12 (s)
Http Port	80
UDP Group IP	230 . 90 . 76 . 1
<input checked="" type="checkbox"/> Register Pkt:	31323334 <input type="checkbox"/> ASCII

Figure 48 Setting up the registration package

The difference with the REAL_COM protocol is that the registration package is enabled and the registration package information such as 31, 16, 33, 34 is filled in. Note that this is in hexadecimal, which means that the actual data sent is the string 1234. If you want a string display, click the "ASCII" option next to it.

When the device is connected to the cloud software, it can automatically send the hexadecimal registration package of 31, 16, 33, and 34. This registration package method is more flexible, allowing the device to adapt to the existing cloud registration package format; However, there is no wildcard such as MAC in the registration package, so you need to configure a different registration package for each device, which is complicated. The above two methods of sending MAC addresses and REALCOM are the same for each device, but the registration package is naturally different due to different MACs.

The maximum registered package length is 33 bytes. This mode supports registered packets and heartbeat packets in UDP mode.

8.1.4. Configuration files

Configuration files can be used for longer registration packages.

The screenshot shows a dialog box titled "Webpage&code download tool". It has three main sections:

- Direct download mode:** This section is selected with a radio button. It includes a "Configuration save location" field with the path "C:\Users\judy\Desktop\web". Below it, "Special configs:" includes a "Config file source" dropdown set to "Read from local directory". A row of buttons includes "Modbus cfg.", "MQTT cfg.", "JSON cfg.", "Reg packet" (highlighted with a red box), "Cmd change", "HTTP cfg.", "Param file", and "Clear local dir."
- Code file download mode:** This section is unselected. It has a "Select code file:" field with the path "C:\firmware.bin".
- Download through the network:** This section is selected with a radio button. It includes "Device IP address or domain:" (192.168.1.222) and "Download port (Don't modify):" (1092).
- Download through serial port:** This section is unselected. It includes "Serial port:" and "Baud Rate:" (115200).

At the bottom, there is a "Flash size:" dropdown set to "256" KB, a "DevID:" field with "287529D6A385", and a "Bind ID" button. A "Download" button (highlighted with a red box) is at the bottom left, next to a progress bar. A warning message reads: "Please close any other configuration window before downloading."

Figure 49 download register packet

Click the "Firmware and Configuration" button in the parameter setting dialog box to open the "Configure Web page/program download tool". In the dialog box that appears, select "Configure Web Page directory download" and select an empty directory as the directory for storing the configuration file. Then click the "Register Package" button.

Register packet and heart beat packet settings

Select port (only supported by XX12 series):

The function of this interface is used to realize long registration package and heartbeat, which is realized by configuration file.

The steps are as follows:

1. In the device parameter dialog box, confirm that the firmware version of this device is greater than or equal to 1.589 (2003 model), otherwise, upgrade the firmware first.
2. Select a directory to store configuration files in the previous interface. When configuring for the first time, you can create a
3. Fill in the registration package and heartbeat package. The default format is hexadecimal. Hexadecimal with space in the middle, such as 01 02.
4. Click OK to return to the previous interface and click "download".

Register packet: ASCII

Heart beat packet: ASCII

Heart beat interval: (s)

Figure 50 set up register packet

Here, set the registration packet, heartbeat packet, heartbeat packet interval and click OK. After returning to the previous screen, click the "Download" button to download the configuration file to the device.

8.2. Heartbeat packets

The heartbeat packet is used to detect whether the communication link is down. The method of implementation is that every once in a while the device sends a heartbeat packet data to the server software, and the data will be discarded after the server receives it, and will not be regarded as valid communication data.

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

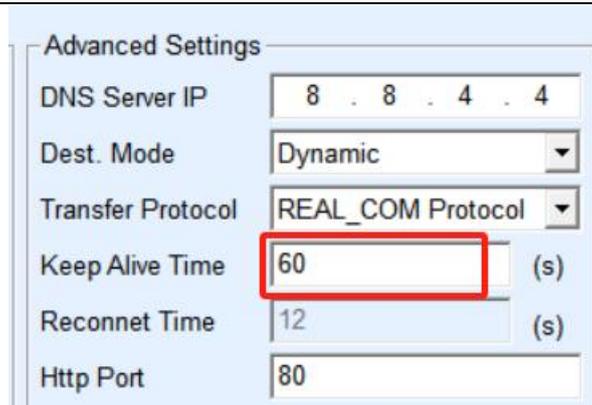


Figure 51 Keepalive timing time

As shown in Figure 51, the sending time of the heartbeat packet is set by the Keepalive Timing time.

8.2.1. Hidden heartbeat

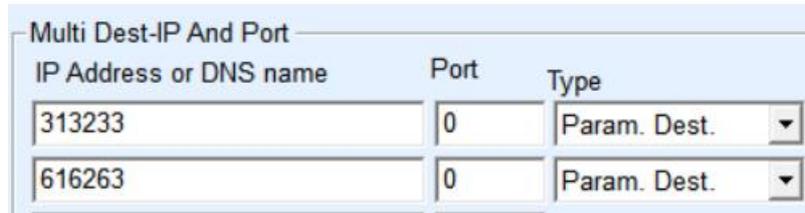
Even if no heartbeat packets are set, the implicit heartbeat function is enabled on the Zlan device when the TCP client is deployed. Therefore, the implied heartbeat function means that the device sends data but the server does not receive the heartbeat data. Therefore, it can not play the first function of the heartbeat packet, that is, the function of the server to detect the activity of the device; However, because the device actually sends data, it can play the second function of the heartbeat packet, that is, the function of the device to detect whether the TCP connection is normal. Once the connection is detected, the TCP connection can be automatically re-established.

8.2.2. REALCOM protocol

As described in 8.8.1.8.1.2Realcom protocol, the REALCOM protocol can send a 1-byte data of 00 at every keepalive interval. This data is the heartbeat packet of the realcom protocol.

8.2.3. Customize the heartbeat packet

Fill in the registration package by following instructions in 8.1.3 Customizing the Registration Package. Then add heartbeat packets as follows: Click the "More Advanced Options" 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 "Parameter packet Destination".



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

Figure 52Customize the registration package

The sum of the registered packet and heartbeat packet must be less than 33 bytes. The first line is actually the registration package.

8.2.4. Configuration files

For details, see how to use the configuration file of the registration package.

9. Modify network port parameters

Modifying parameters through the network port is to achieve the function of searching for devices and modifying device parameters, just like the zlvircom software does. This is done by managing devices and changing parameters through the network port of the serial server. It is suitable for users who want to integrate the search and configuration functions into their own software.

Modifying parameters through the network port is implemented via the "UDP Management Port Protocol", for example::

1. The computer software sends a UDP broadcast packet with the destination port set to 1092 over the network. When a device receives this packet, it sends back its information to the computer software, achieving the purpose of searching for devices.
2. The computer software sends a UDP command to modify parameters to the device's port 1092, achieving the purpose of modifying the device's parameters.

10. Device management library

This feature is intended for users who need to integrate device management functions into their own software.

The "UDP management port protocol" has been integrated in the device

management function library ZLDevManage. This is a DLL windows platform development library, can be called by VC, VB, Delphi and other development tools.

Provide detailed API interface documentation and VC call Demo cases. It can realize device search, parameter modification, P2P function call and so on.

Development libraries can be obtained from the ZhuoLan's official website: <http://zlmcu.com/download.htm> looking for "equipment management function library" page. For details, please refer to "Zlan WinP2p and Device Management Development Library"

11. Modify serial port parameters

Users can read and set parameters by sending commands to the serial port server's serial port. This is suitable for users who need to control and configure products at the chip or module level through serial port. The parameters that can be set include: IP address, baud rate, device name, working mode, etc. After the new parameters are set, the serial port server can be restarted through serial port commands.

The serial commands of Zlan have the following features:

1. Serial port commands use a 10-byte data preamble, so there is no need to distinguish between communication data and commands by pulling down or pulling up additional configuration pins, nor is there a need to switch between command mode and communication mode, making usage more flexible and convenient.
2. The command set includes various command formats such as saving parameters, not saving parameters, and restarting the device.
3. It can implement a variety of applications, such as reading the MAC address of the serial port server, or modifying the operating mode of the serial port server. For example, when switching from TCP server to TCP client mode, it can actively connect to the server; when switching from TCP client to TCP server mode, it can disconnect from the server connection.

Please refer to "Serial Port Parameter Modification and Hardware TCP/IP Stack

Protocol" for detailed operation methods on modifying serial port parameters.

12. Remote device management

Remote device management refers to the ability to maintain and manage devices through ZLVircom software, including restarting devices, modifying parameters, and updating firmware. This feature is suitable for users who manage devices through ZLVircom.

For ZLVircom software, as long as the device can be found in the device list, remote management can be performed. Remote management of devices can be divided into the following situations:

1. Automatic search: Under the same switch, regardless of whether they are on the same network segment, the way ZLVircom searches for devices on a computer is: ZLVircom sends a broadcast query (all devices receive the query and reply with their parameters to the ZLVircom tool. This method searches for all devices at once.)

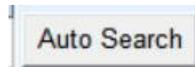


Figure 53 automatic search

2. Manually add: There are two situations:

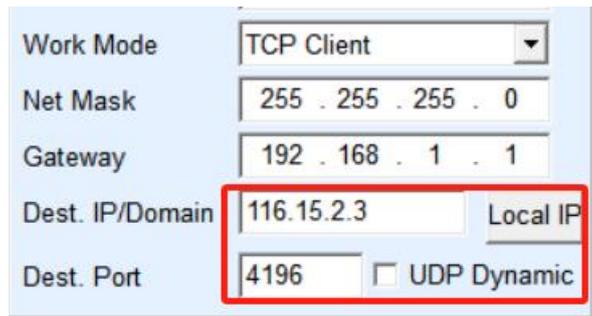


Figure 54 manually added

- a) Large routers divide the network: In some large networks, broadcast packets are divided by routers, so broadcast packets cannot reach the device end, but pinging the device IP is always through. At this point, manual addition is generally needed to solve the problem. The method of manual addition is to click "Manual Addition" in the "Device Management" dialog box to add the first and last IP for individual queries of the device.
- b) Public network server queries internal network devices: Serial servers are in the internal network and operate in TCP server mode, while zlvircom is on a server with a public IP. At this point, a UDP port mapping of 1092 needs to

be set up on the router of the network where the device is located, mapping to the IP of the device, and then zlvircom manually adds this device, with the IP being the public IP of the device end.

3. TCP Client: When the device acts as a TCP client, it will initiate a TCP connection to the destination IP (116.15.2.3) on port 4196. Once the connection is established, it will automatically send its parameter system to the destination's UDP port (not the TCP port) every keep-alive time interval, allowing zlvircom to detect the device on this computer (116.15.2.3). If the destination port is not 4196, you will need to modify zlvircom's default parameter receiving port by changing the menu/config/software configuration/default listening port. After starting zlvircom, if a TCP port conflict message appears, ignore it and continue with the execution.



Work Mode	TCP Client
Net Mask	255 . 255 . 255 . 0
Gateway	192 . 168 . 1 . 1
Dest. IP/Domain	116.15.2.3 Local IP
Dest. Port	4196 <input type="checkbox"/> UDP Dynamic

Figure 55 client

4. Scheduled transmission parameters: Even when in TCP server mode, the serial server can select the "Scheduled Transmission Parameters" feature to send parameters every 5 minutes to the destination IP (here, 116.15.2.3) on the destination port. The zlvircom on this server's port can receive parameters and manage these devices.

Work Mode	TCP Server	Keep Alive Time	60	(s)
Net Mask	255 . 255 . 255 . 0	Reconnet Time	12	(s)
Gateway	192 . 168 . 1 . 1	Http Port	80	
Dest. IP/Domain	116.15.2.3	UDP Group IP	230 . 90 . 76 . 1	
Dest. Port	1024 <input type="checkbox"/> UDP <input type="checkbox"/> Dynamic	<input type="checkbox"/> Register Pkt:		<input type="checkbox"/> ASCII
Serial		<input type="checkbox"/> Restart If No Data	every 300	Sec.
Baud Rate	115200	<input checked="" type="checkbox"/> Enable Parameter Send	every 5	Min.

Figure 56 Timing transmission parameters

To facilitate the identification of devices, if remote management is required, please name the device something easy to remember.

5. Device Operation Management: After enabling the cloud management feature on the device side, you can see the device on the designated platform equipped with Zlan Device Cloud Management. You can perform device configuration, firmware upgrade, configuration download, and more.

13. Firmware upgrade method

Different models can upgrade their own programs, but not each other's. You can use this method to upgrade the firmware of devices found in the device list by automatic search, manual add, or P2P search.

- 1 Get the firmware file for ZLAN5812D from Zlan, such as 1.445(2012).bin.
- 2 In the ZLVircom tool, first search the device that needs to be upgraded, and then enter the device parameter editing dialog box. First click "Restart Device" once.

<input type="text"/> <input type="text"/>	Framing Rule Max Frame Length <input type="text" value="1300"/> (Byte) Max Interval(Smaller Is Better) <input type="text" value="3"/> (Ms)
<input type="button" value="Modify Key"/> <input checked="" type="button" value="Firmware/Config"/> <input type="button" value="Restart Dev"/> <input type="button" value="Modify Setting"/> <input type="button" value="Cancel"/>	

Figure 59 Step 1 of Upgrade

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

corner of the dialog box.



Figure 58 Step 1 of Upgrade

- 3 Select the "Program File Download" option, as shown in Figure 59. In the program file, select the firmware file. The IP address of the serial port server is automatically filled in, and the module type/model is automatically selected. Then click Download.

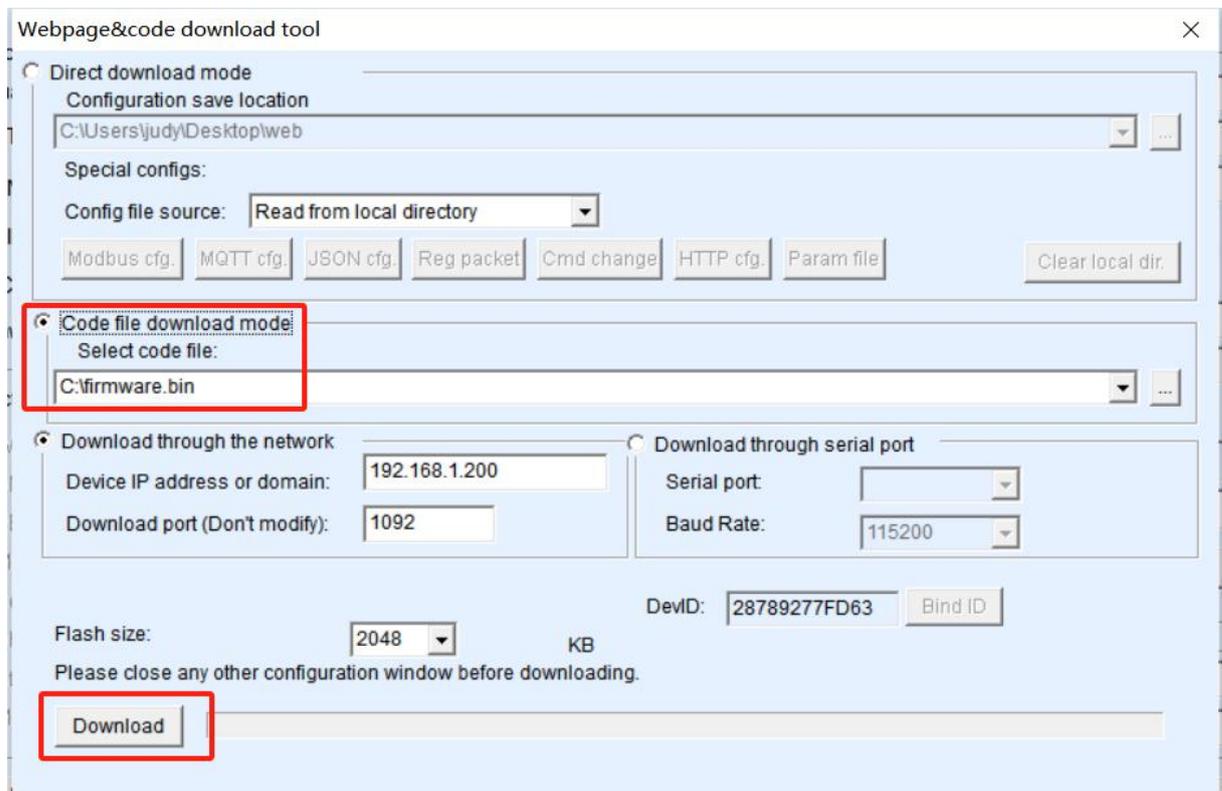


Figure 59 Firmware upgrade method of ZLAN5812D

- 4 At this time, the download progress bar starts to move, and the download time is about 30 seconds. During the download process, you will see the ACT light of the device blink, and at the end of the download, you will see the LINK light blink several times. Then the program pops up "transmission completed LINK

light flashing device do not power off" prompt box. Note: This is only the completion of transmission, write to the flash process takes about 3 seconds, at this time the LINK light will blink, during this period please do not power off.

- 5 After downloading the general program will automatically restart, generally do not need to power off. If the running indicator is blinking, stop the LINK indicator blinking for more than 30 seconds and power it on again.
- 6 Web Configuration interface update: After the firmware upgrade, the configuration page inside the module also needs to be updated. Otherwise, the configuration cannot be configured through the Web, but the communication will not be affected. It is also possible not to download web pages without web configuration. The method of downloading Web is: as shown in Figure 60, change the download mode of "program file" to "Web directory download". In addition, select the root directory of the local web page as the directory of the web file to be downloaded (this directory can be obtained from ZLAN), and click Download to download all files in the local web page directory to the internal file system of the device.

Figure 60 ZLAN5812D web upgrade method

7 Note:

- 7.1 If the message "Download failure" is displayed, the device will not be damaged. You can download the device again. In addition, when the LINK light blinks at the end of the download, do not power off, otherwise the device will be damaged.
- 7.2 Check the firmware version through ZLVircom to know whether the new firmware has been downloaded successfully.

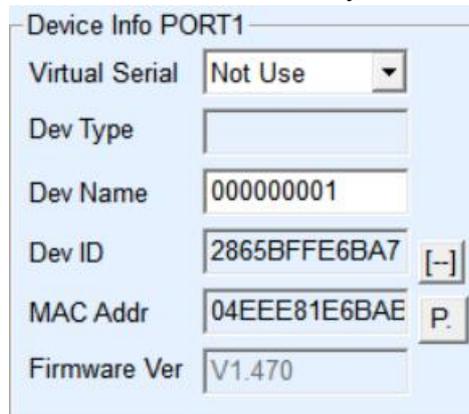


Figure 61 Checking the firmware version after the upgrade

14. Ordering information

Table 8 Ordering information

Model number	introduce
ZLAN5812D	Single-port guide eight-port server
ZLAN5812LD	Eight-serial port server with dual-port guide rails

15. Installation and packaging

ZLAN5812D mounting mounting ears have two mounting directions, as shown in the following figure, suitable for desktop installation or upright installation.



Figure 62 Desktop installation



Figure 63 Upright installation

ZLAN5812D is packed in a box with foam bedding. Includes a mainframe and other accessories. Accessories include: 12V power supply, 8PIN terminal *2, power terminal *1, mounting ear *2, several screws. As shown in the figure



Figure 64 Packaging

16. After-sales service and technical support

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