ZLAN5443H Serial port server

Modbus gateway user manual

4 serial port RS232/485/422
To TCP/IP converter

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Version Information

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CATALOGUE

1. Summary

ZLAN5443H is a new generation 4 serial port server developed by Shanghai Zhuolan Information Technology Co., LTD. It can transfer four serial ports to TCP/IP and support two 10M/100M Ethernet ports. ZLAN5443H supports the Modbus gateway function from Modbus TCP to Modbus RTU. The Modbus gateway supports simultaneous data reading over multiple Modbus clients, that is, the multi-host function.

ZLAN5443H submodel ZLAN5443H, H supports baud rates up to 921.6bps. ZLAN5443H supports connection to six destination IP addresses as a client

ZLAN5443H supports four RS232 serial ports and four RS422/485 serial ports. Users connect the ZLAN5443H to the network through one network cable. The host computer can access four serial ports through the virtual serial port or TCP protocol.

The ZLAN5443H can be expanded to 8 serial ports, 12 serial ports, 16 serial ports, or a maximum of 32 serial ports.

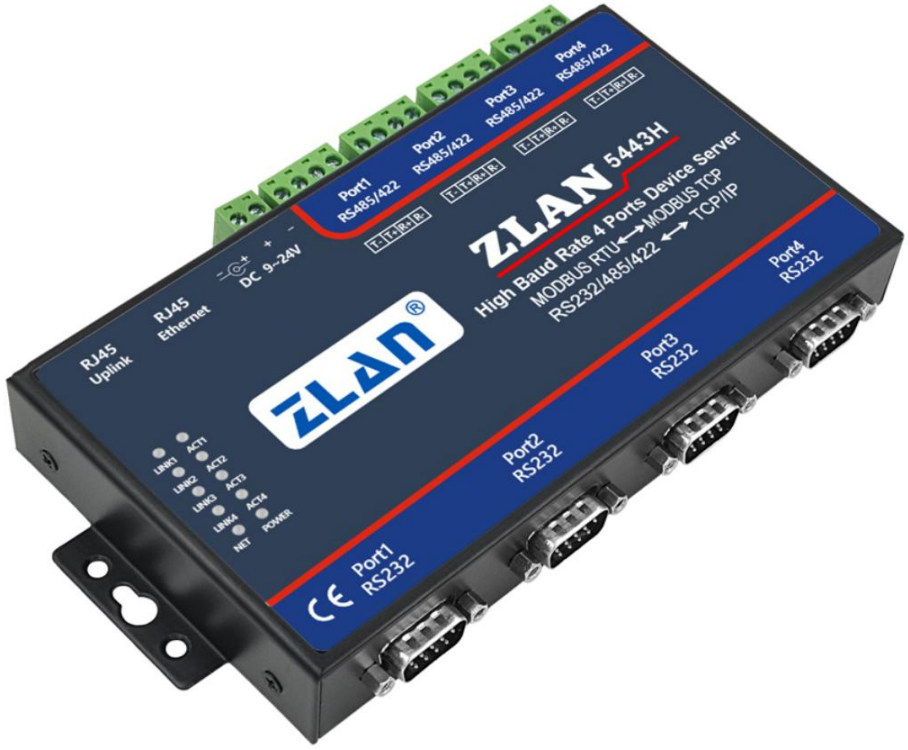


Chart 1 ZLAN5443H serial port server

Application:

- Power Electronics, Intelligent Meters and Energy Consumption Monitoring;
- As the gateway of the IoT as the communication bridge between devices and the cloud;
- Remote monitoring and program downloading of all kinds of automatic PLC;
- Various configuration software and equipment communication interfaces;
- Network of devices in the field of access control and security;
- Network information collection of medical equipment;

2. Hardware Features

2.1. Hardware Features

1. The 4 serial ports all support 3 serial forms: RS232, RS485, RS422.
2. The 4 serial ports can independently full-duplex working, no interference between each other.
3. Supports the function of a network switch with two network ports and can be used as a switch
4. Rich signal lights, each port has self TCP connecting indicator and data activity indicator.
5. ZLAN patent, No:ZL 2014 2 0108890.3。

2.2. Software Features

1. Support TCP server, TCP client, UDP mode, UDP multicast. Supports 10 TCP connections as a TCP server
2. The baud rate ranges from 1200 to 460800bps, data bits range from 5 to 9, and the parity bits can be none, odd, even, marked, or space. The CTS/RTS hardware flow control and XON/XOFF soft flow control are supported.
3. The device can send MAC addresses when connected, facilitating device

management on the cloud platform.

4. Provide the secondary development kit DLL development library for searching and configuring devices on the computer.
5. Support Web browser configuration, support DHCP dynamic access IP, DNS protocol connection domain name server address.
6. Support cloud remote search device, configuration device parameters, device program upgrade.
7. Support remote viewing of TCP connection status, serial data sending and receiving status of the device through software. The virtual serial port supports data monitoring.
8. Supports the Modbus gateway function and transfers from Modbus RTU to Modbus TCP.
9. Support for multiple hosts: In the one-question-one-answer query mode, the supported network port allows multiple computers to access the same serial port.

3. Technical specifications

Shape			
Interface:	RS232：DB9、RS485：terminal、RS422：terminal		
Power supply：	5.5mm，+ inside and - outside, standard power outlet		
Size：	L x W x H =9.2cm×19.7cm×2.5cm		
Communication interface			
Ethernet port：	10M/100M，2 KV level Surge protection		
Serial port：	RS232/485/422×4：RXD，TXD，GND， CTS，RTS，DTR，DCR		
Serial port parameter			
Baud rate：	1200~460800bps	Parity：	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、Modbus TCP protocol	
Configuration mode：	ZLVirCOM tool、Device management function library	
Communication：	Socket、Virtual serial port、Device management function library	
Working mode		
TCP server, TCP client, UDP, UDP broadcast		
Power supply		
Power：	9～24V DC	
Consumption:	5W	
Environment		
operating temperature：	Industrial	-40~85℃
storage temperature：	-65~165℃	
Humidity range：	5~95% Humidity	

4. Hardware

ZLAN5443H Front side View is same as Chart 2

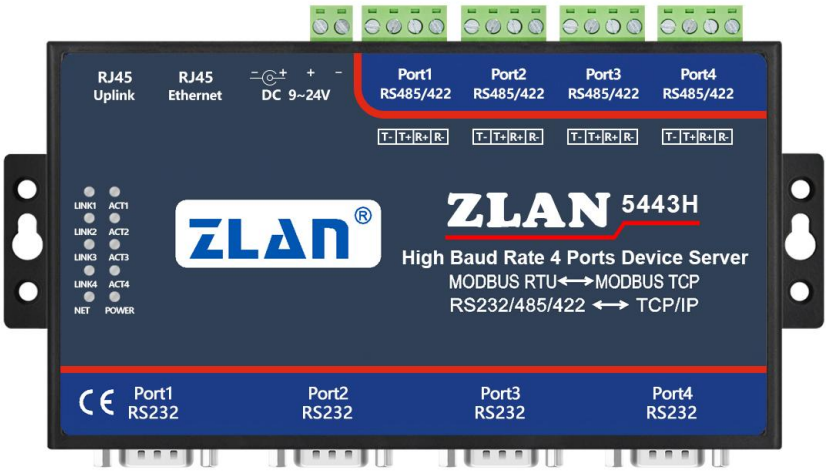


Chart 2 ZLAN5443H Front view

1. Size: L x W x H =9.2cm×19.7cm×2.5cm

2. Power supply: the standard power adaptor (5.5mm inner core is positive) or power binding post can be used. The power supply voltage can be 9 ~ 24V and the power requirement is greater than 5W.

3. Ethernet Port:

A. Normal Ethernet Port: the user connects ZLAN5443A to the switch, hub, or directly to the computer network card.

B. Cascade Ethernet Port: for cascade of ZLAN5443A, refer to the description of the cascade part in this document.

C. POE power supply: pin 5 (GND) and pin 8 (VCC) of the normal RJ45 Ethernet port can be used to supply power to ZLAN5443A, and the power supply voltage is between 9 ~ 24V. RJ45 network line sequence refers to figure 4.

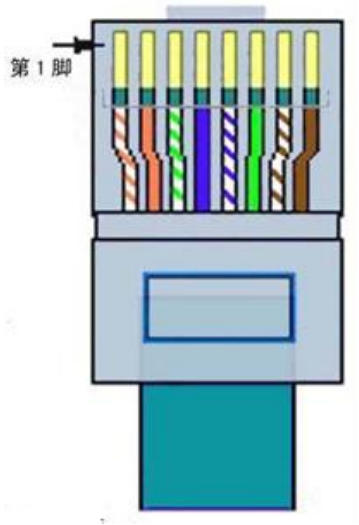


图 3 网线线序

4. Indicator:

a) Data forwarding indicator ACT: ACT light indicates that data is normally transmitted between Ethernet and corresponding serial port, without data communication, ACT light is not bright.

b) TCP connection establishing indicator LINK: LINK light indicates that the current TCP connection of serial port is established, and the data can be sent and received normally.

c) Power indicator PWR: indicates that the serial port server has already been

charged.

d) Network indicator NET: indicates that the network line has been connected.

5. Serial port:

a) 485/422 serial port: when used as 485, only 2 lines are connected to it, and 4 wires should be connected when used as 422. The line sequence is shown in Chart 2. ZLAN5443H meets the RS485/422 standard and each ZLAN5443H can carry 32 terminal 485 devices. The longest communication distance is 1200 meters. 485 terminal resistance for 120 ohms, generally in more than 300 meters of wiring must use the terminal resistance. Note that when wiring, 485+ and 485- must be a twisted pair twisted together to reduce signal interference

Chart 1 RS422 Wiring Method

Item	422 line of ZLAN5443H	Connection line corresponding to user RS422
1	485-,T-	R-
2	485+,T+	R+
3	R+	T+
4	R-	T-

b) 232 serial port: standard DB9 PIN-type interface.

Chart 2 RS232 Wiring

Item	Name	Instruction
2	**RXD**	receiving pin of the serial device server
3	**TXD**	sending pin of the serial device server
4	**DTR**	After the flow control in using, the serial device server will accept the data of the serial device when the pin is 0.
5	**GND**	Ground wire
6	**DCR**	After the flow control in using, the serial device server will send the data to the serial device when the pin is 0.
7	**RTS**	After the flow control in using, the serial device server will accept the data of the serial device when the pin is 0.

8	**CTS**	After the flow control in using, the serial device server will send the data to the serial device when the pin is 0.

5. Usage

5.1. Usage

ZLVircom can be installed to manage the equipment.
Power on the ZLAN5443H and connect a network cable to the common network port of the ZLAN5443H. At this point, the device management using ZLVircom software can see the interface as shown in Chart 4.

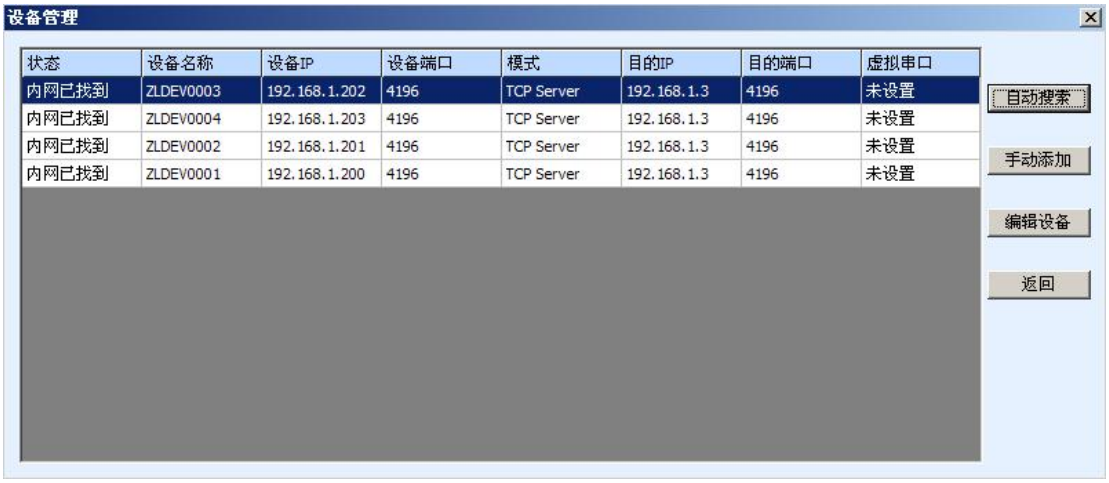


Chart 4 ZLVircom search for ZLAN5443H

The four lines correspond to the four internal serial ports of the ZLAN5443H. The IP addresses of serial ports 1 to 4 of the ZLAN5443H are 192.168.1.200 to 192.168.1.203.

You can double-click a line to configure and edit the device

5.2. Software installment

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 installation-free version. Download address：http://www.zlmcu.com/download.htm

Chart 3 ZLVircom Version

Software name	Specifications
ZLVircomDevice Management Tool (non-installed version)	The non-installed version does not include the virtual serial port function
ZLVircom-Equipment Management Tool	Mounting versio , that contains

(Installation version)	ZLVircom_x64.msi and ZLVircom_x86.msi。For 64-bit operating systems, install x64, and for 32-bit operating systems, install x86 versions.

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

5.3. Parameter configuration

ZLVircom After installation and hardware connection, ZLvircom software was run as shown in Figure 5, and then click "Device management" as shown in Figure 6. With ZLVircom, device parameters can be searched and configured in different network segments, which is very convenient, as long as the device and the computer running ZLVircom are in the same switch.

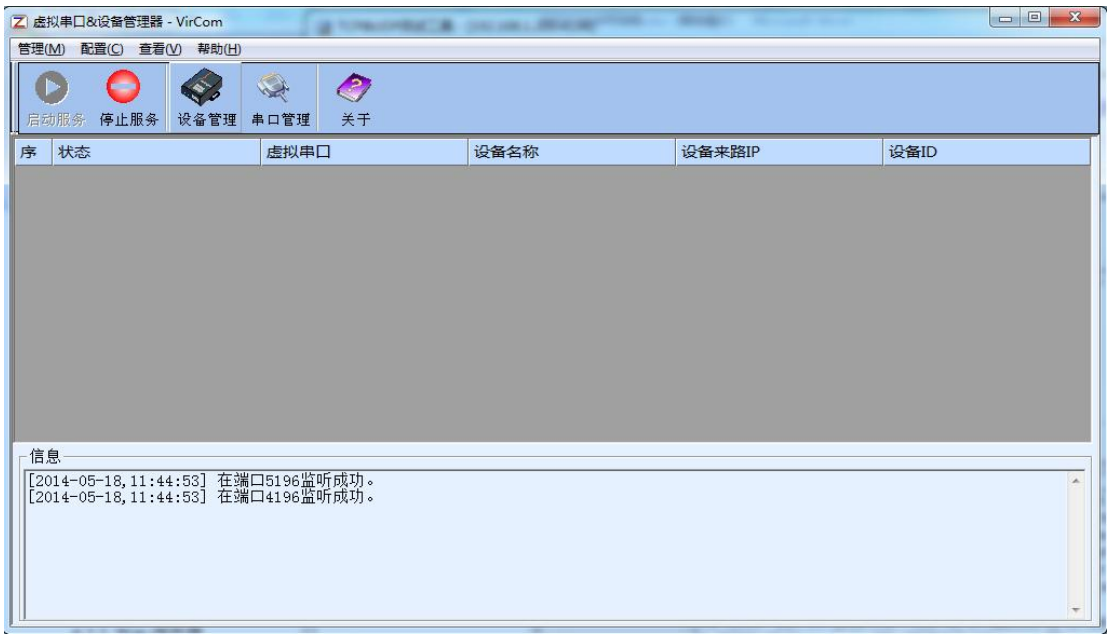


Chart 5 ZLVircom Front view

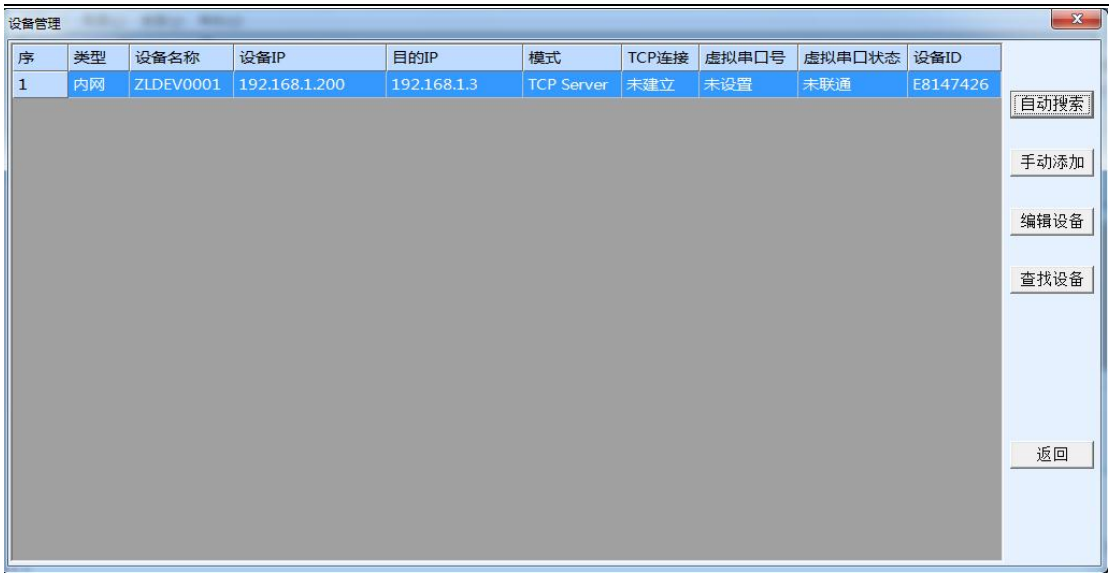


Chart 6 device list

View all online devices in the device list. Click "Edit Device" to set parameters.

Chart 7 device parameter

In this interface, the user can set the parameters of the device, and then click "Modify Settings", the parameters will be set to the flash of the device, power failure will not be lost. At the same time, the device automatically restarts.

Here the main configuration parameters are: serial port Settings in the baud rate,

data bit, check bit; IP address, subnet mask, gateway in network Settings; Sometimes according to the computer software, also need to configure the serial port server mode.

The meaning of the parameters is described as follows:

Table 4 Parameter Meaning

Parameter Name	**Value Range**	**Instruction**
Virtual Serial	Non-in use, created virtual serial port	You can bind the current device to a created virtual serial port.
Dev Type		Show only the model of the core module
Dev Name	Any	You can give the device a readable name, with a maximum of 9 bytes, and support the Chinese name.
Dev ID		The factory's sole ID, cannot be modified.
Firmware Version		The firmware version of core module
Supporting Function		Please refer to the Table 4 “support functions”
IP Mode	Static, DHCP	The user can choose Static or DHCP (Dynamic acquisition of IP)
IP Address		The IP Address of networking products
Port	0～65535	The monitoring port of Networking products when in the TCP Server or UDP mode. As a client, it is best to specify that the port is port 0, which is good for increasing the connection speed, and the system will randomly assign a local port when using the 0 port. At this time the difference from specifying the non-zero port are: (1) local port is 0, module sets up a new TCP connection with PC when restarting, old TCP connection may not be closed, so that the old TCP

		connection of the host has been unable to close, specify the non-zero port does not have the problem. Generally host wants to close the old connection when the module is restarted. (2) the local port is 0, the time of TCP rebuilding connection is faster.
Work Mode	TCP Server(TCP Server Mode),TCP Client(TCP Client Mode),UDP Mode, UDP Multicast	When set to TCP Server, the network Server needs to actively connect the networking products; When set to TCP Client, the networking product initiates the connection to the network server specified by the destination IP.
Net Mask	Eg: 255.255.255.0	Must be same as net mask of local LAN.
Gateway	Eg: 192.168.1.1	Must be the same as the local LAN gateway. If it is not crossing outer network (such as the cable connecting computer), it is best to set the gateway as the IP address of the connected computer.
Dest. IP/Domain		In the TCP Client or UDP mode, the data will be sent to the destination IP or the computer of domain name instruction.
Dest. Port		In the TCP Client or UDP mode, the data is sent to the destination port of the destination IP.
Baud Rate	1200, 2400, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 57600, 76800, 115200, 230400, 460800	Serial baud rate
Data Bits	5, 6, 7, 8, 9	
Parity	None, Even, Odd, Mark, Space	
Stop Bits	1, 2	
Flow Control	None (no flow control),	RS232 port valid

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

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

better)		greater than that time, the received data is sent to the network as a frame.

The functions supported by the device are explained as follows:

Table 5 Device Supported Function

Name	**Instruction**
Webpage download	Support to control the serial output command through the web page, only the product with the trailing W has this function.
Domain name system	The destination IP can be the domain name (such as the beginning of the WWW server address).
REAL_COM protocol	It is a non-transparent transmission serial device server protocol, which is suitable for the binding of virtual serial port through Internet. Because the protocol contains the device MAC address, it is helpful for the upper computer to identify the device. In general, it can be without use.
Modbus TCP to RTU	Only the models that the third bit is 4 support this function. Modbus TCP to RTU can be implemented. It also supports multi-host capabilities.
Serial port modify parameters	The serial port modification parameter supports the serial port AT instruction to configure and read the device parameters.
Automatic acquisition of IP	Support for DHCP client protocol
Storage extension EX function	Extended later
Multiple TCP connections	Support more than one TCP connections as a TCP server.

IO port control	Model No. 3 of 4 supports arbitrary custom instructions to control 8 IO outputs.
UDP multicast	UDP multicast
Multi-destination IP	As a TCP client supports simultaneous connection of 7 destination IP.
Proxy server	Support the proxy server functionality (a specific model is required).
SNMP function	Support SNMP to Modbus RTU protocol. Only those with -snmp tails support this feature.
P2 function	Support the ability to access devices in any network through P2P across technology. This feature is supported in model N with trailing patches.

5.4 TCP communication test

After the device parameters are configured, TCP connection communication can be tested with serial port tools and TCP debugging tools.

Chart 8 TCP communication diagram

Now suppose the PC COM port (USB to RS232 line) connect with serial port of serial device server, then open the serial debugging assistant ZLComDebug, and open the corresponding COM as figure 9; Open TCP&UDP debugging assistant SocketTest, and

as TCP client, fill in the destination IP for the serial port server IP (currently 192.168.1.200), destination port is 4196, and then click "open" button in figure 10. Enter "socket send" in SocketTest and click send, then the data is transferred to RS232 interface through the network port of the serial port server, and then sent to ZLComDebug, which is then displayed in ZLComDebug. Conversely, type "Comdebug send" in ZLComDebug, and clicking send can also be sent to socket test and displayed.

The demonstration demonstrates the data transparent forwarding function from serial port to network port, network port to serial port.

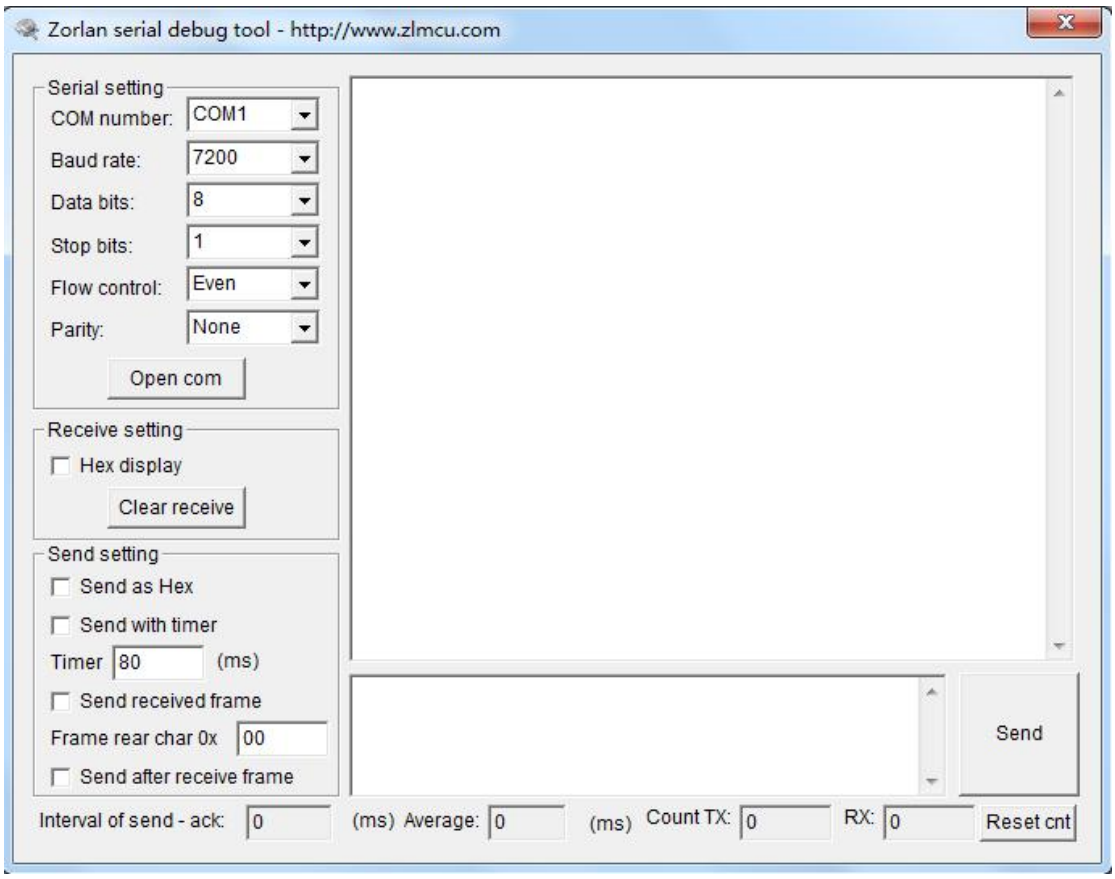


Figure 9 ComDebug Send-receive Interface

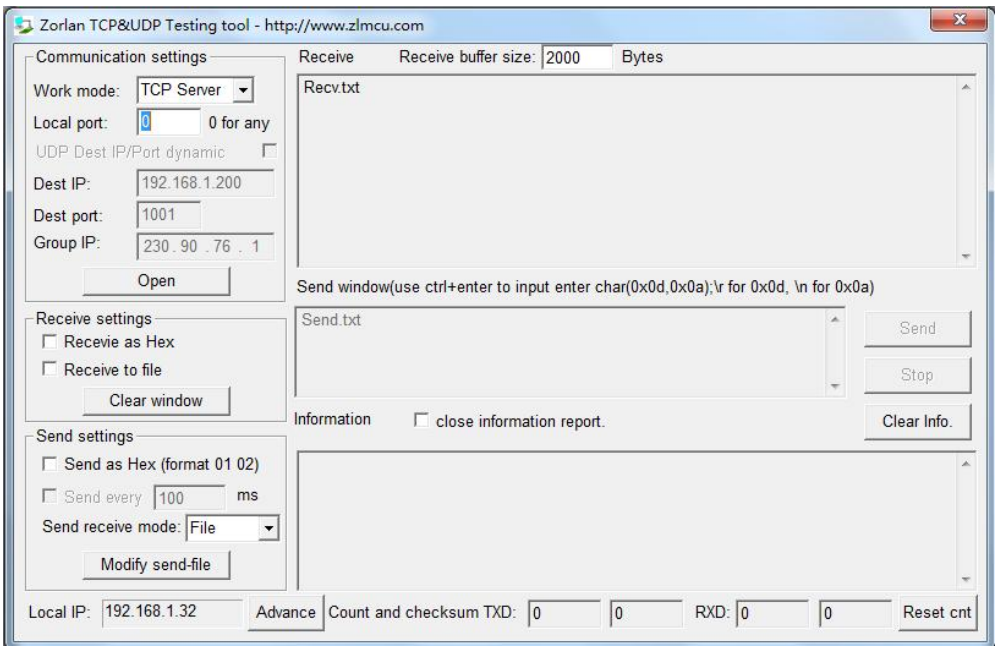


Figure 10 SocketTest Send-receive Interface

5.5 Virtual serial port test

SocketTest in figure 8 communicates directly with the serial port server through TCP. In order to enable users to communicate with the serial port server with the developed serial port software, it is necessary to add a virtual serial port between the user program and the serial port server. As shown in figure 11, ZLVircom and the user program run on a computer, and ZLVircom virtual a COM port, so that the COM port corresponds to the serial port server. When the user program opens the COM to communicate through ZLVircom → serial device server → to users. Here's how to do this:

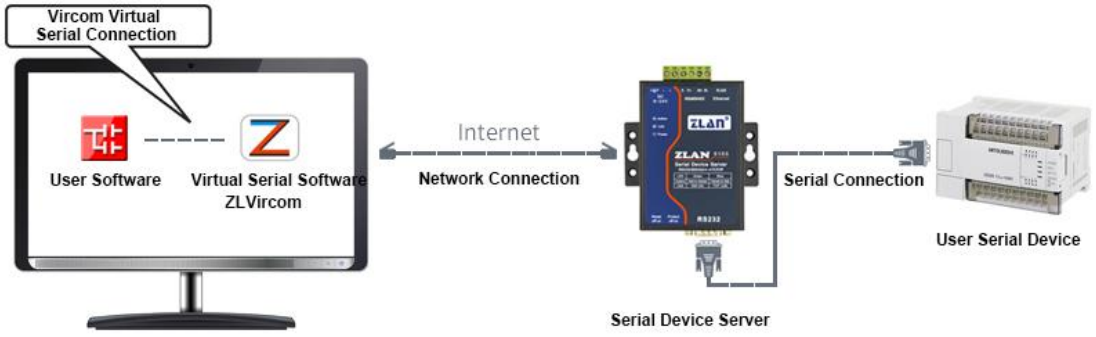


Figure 11 Virtual serial port

Click on the "Serial Manage" of the main interface of ZLVircom, then click "Add", and select COM5, where COM5 is the COM port that didn’t exist on the computer.

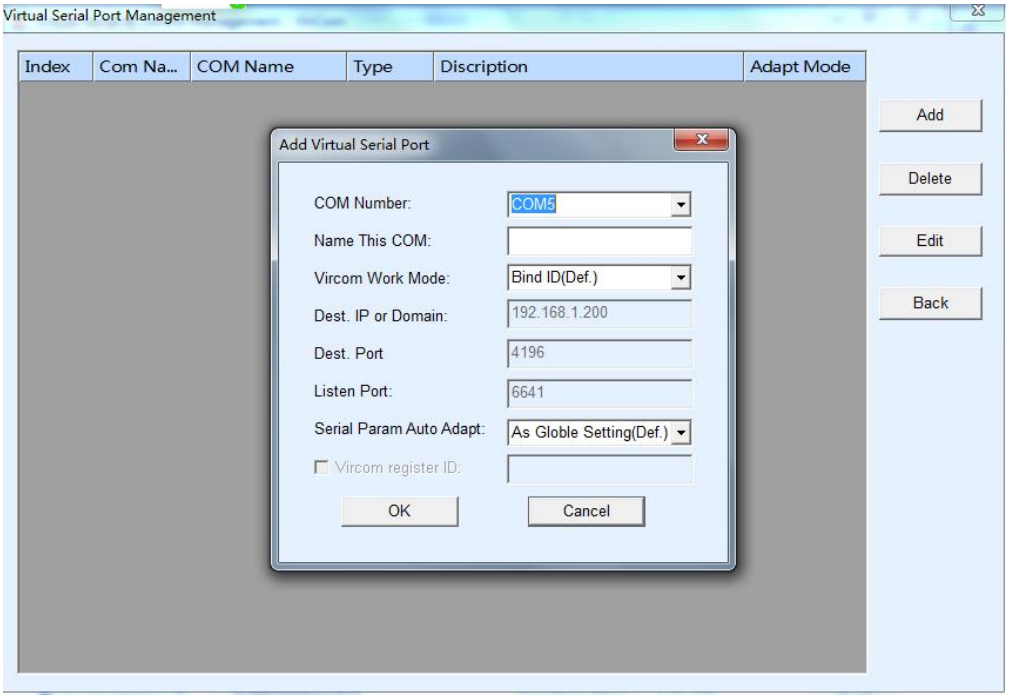


Figure 12 Add Virtual Serial Port

Then enter the “device manage”, and double-click the device that you need to bind to the COM5. As shown in FIG. 9, select COM5 from the "virtual serial port" list in the upper left corner. Then click "modify Settings". And return to the main interface of ZLVircom. You can see that the COM5 has been connected to a device with IP 192.168.1.200. You can use COM5 instead of SocketTest to communicate.

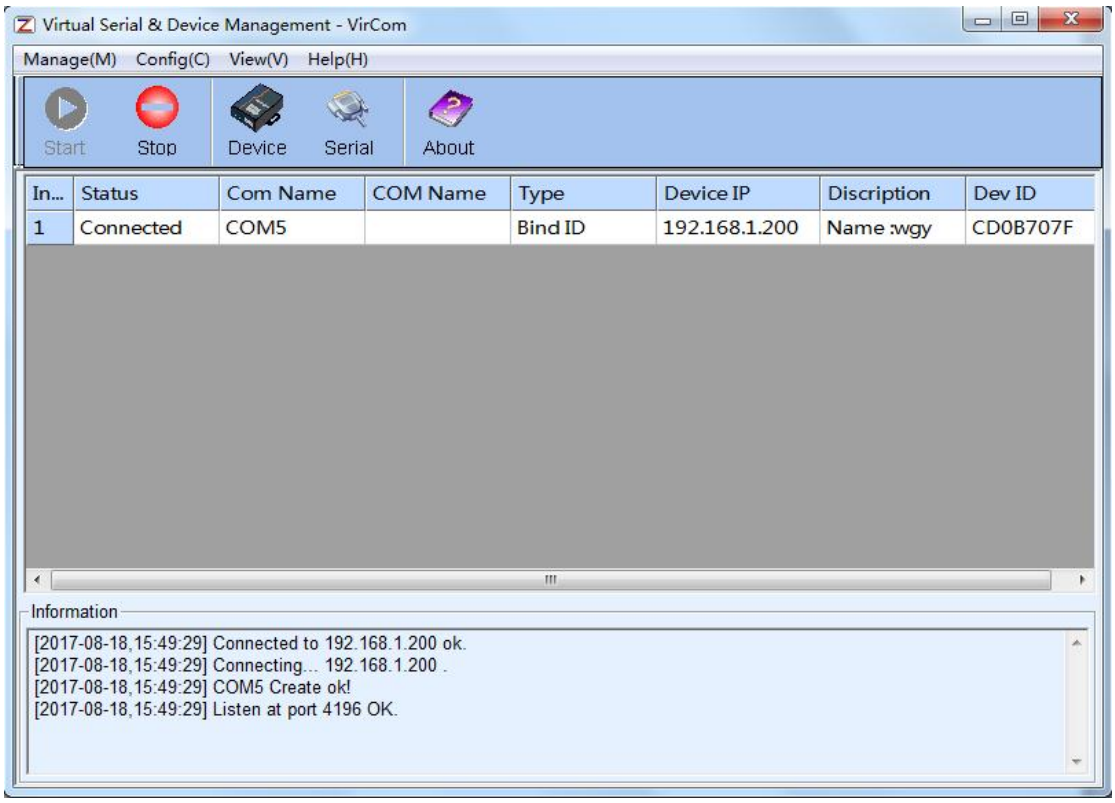


Figure 13 Virtual Serial Port has been connected

Now close the before SocketTest and open a new ZLComdebug as the user's serial port program, now open COM5. At this point, COM5 (virtual serial port) and COM4 (hardware serial port) can send-receive data through networking products.

If the serial port of the connected product is not connected to the COM port of PC, but a serial port device, then the COM5 can be opened to communicate with the device. And it's just use the network way now.

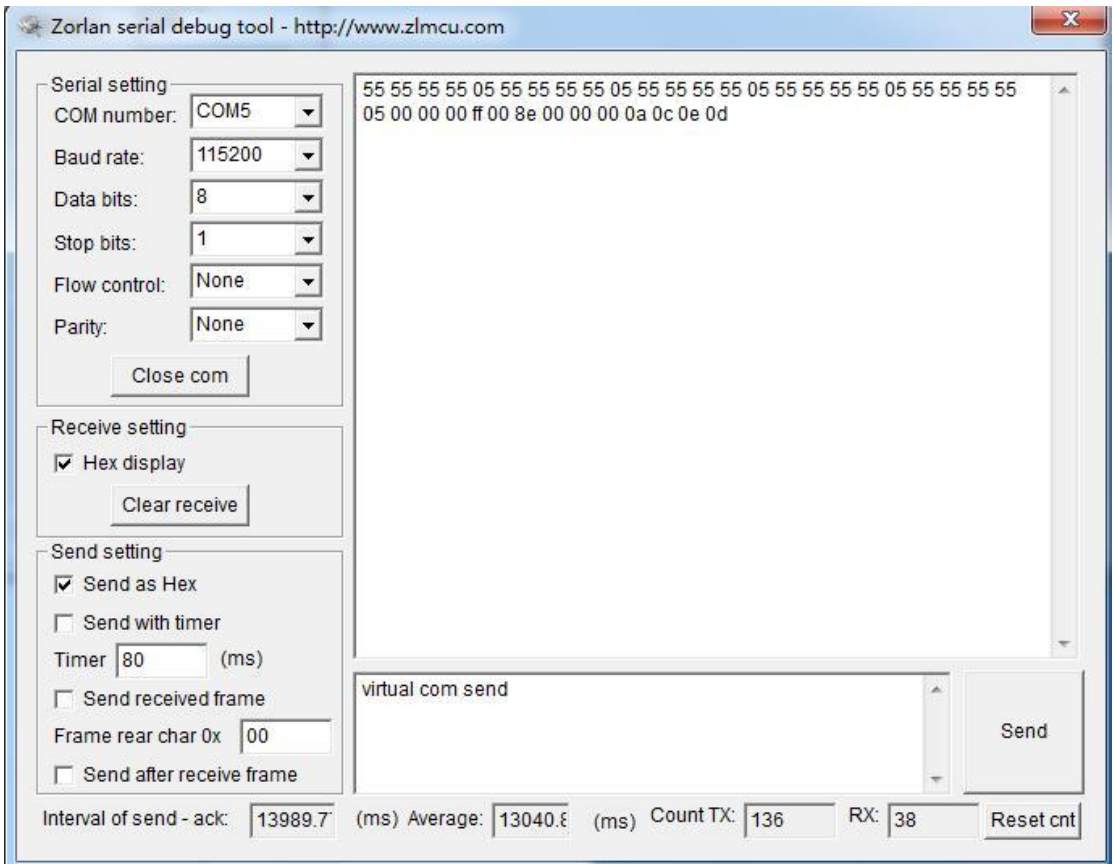


Figure 14 Communication via Virtual Serial Port

5.6 Modbus TCP test

By default, serial and network data is transmitted transparently. If you need to implement the Modbus TCP to RTU, requires selecting “transfer protocol” for "Modbus TCP ←→ RTU" in the Settings dialog, as shown in figure 20. At this point, the device port is automatically changed to 502. At this point, the user's Modbus TCP tool is connected to port 502 of IP of serial port server, and the Modbus TCP instruction sent will be converted into RTU instruction output from the serial port. For example, the serial port server network port receives the Modbus TCP instruction of 00 00 00 00 00 06 01 03 00 00 0a, then the serial port outputs the instruction of 01 03 00 00 00 0a c5 cd. Note: the serial port may send several 01 03 00 00 00 0a c5 cd instructions, because the default Modbus adopts the storage mode, which will automatically poll to query. It'll show you how to switch to non-storage.

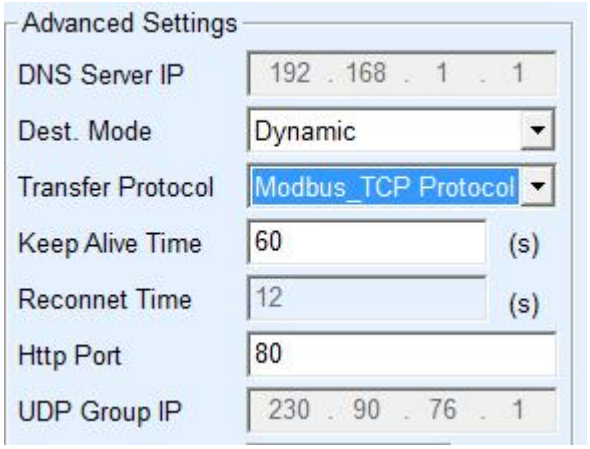


Figure 15 Enable Modbus TCP

If the user's Modbus TCP software is used as Slave, it is necessary to change the working mode to client based on the transfer protocol selection, and the destination IP change to the computer IP of Modbus TCP software, and the destination port is 502, as shown in figure 18.

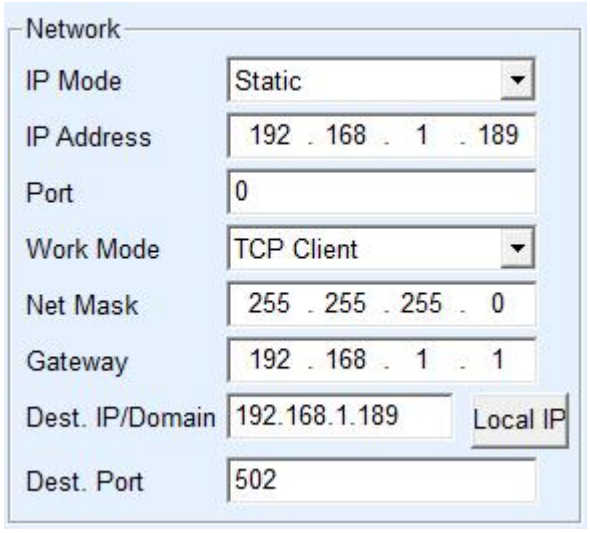


Figure 16 Modbus TCP as Client

6. Work Mode and Transfer Protocol

In different applications can choose different work mode, transfer protocol of the serial server, so as to be more stable and reliable use, the details are as following.

The use of serial device server is basically divided into two types: with virtual serial port and non-virtual serial port, as shown in fig.11 TCP communication diagram and fig.16

function of virtual serial port. The user software with virtual serial port needs to be connected is the COM port, that is, both the user software and the user device are serial ports. Non-virtual serial mode user software communicates directly over TCP/IP but user devices are still serial.

In the non-virtual serial port mode, the "Transfer Protocol" is divided into transparent transmission, Modbus TCP to RTU and Realcom protocol. If the user software is a fixed Modbus TCP protocol and the host computer is Modbus RTU, Modbus TCP to RTU mode should be selected. The Realcom protocol is currently only used when a multi-port server is connected to a server as a TCP client and a virtual serial port is used on the server.

Usage is summarized as follows:

Table 6 network configuration modes

No.	Virtual Serial Port Usage	Device Work Mode	Transfer Protocol	Instructions
1	Use	TCP Server	None	Suitable for the user to open the COM port to collect data actively.
2	Use	TCP Client	None	Suitable for the occasion when the device sends data actively. If the TCP server is selected, the problem that the device cannot be reconnected after being disconnected may occur.
3	No Use	TCP Server	Modbus TCP to RTU	The user software is Modbus TCP, and the user device is Modbus RTU. Modbus TCP is the main station.
4	No Use	TCP Client	Modbus TCP to RTU	The user software is Modbus TCP, and the user device is Modbus RTU. And Modbus RTU is the main station.
5	Use	TCP Client	Realcom Protocol	When using a multi-port server as a TCP client and the virtual serial port is used, it

				is best to use the Realcom protocol.
6	No Use	TCP Client	None	Suitable for a large number of devices, connected to a cloud way. And under normal circumstances the cloud is a server of public network IP on the Internet.
7	No Use	TCP Server	None	Suitable for devices and computers in the same local network, do local monitoring, no need to communicate across the Internet.

6.1 Virtual Serial Mode

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

Then check whether the monitoring computer and equipment are in the local network:

1) If the computer is a public network IP server rented over the Internet, then the device must use TCP client mode to connect the device to the server. At this point, you can select the (2) and (5) in Table 6, and must select (5) if it is a multi-port server.

2) All in the local network (can ping each other), then see is the upper computer active query or device active send data. If the device is sent initiatively it must use the device to be TCP client as (2) in Table 5, or you can choose the (1) way.

6.2 Direct TCP/IP Communication Mode

If Modbus TCP conversion is not required and 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 will transfer the TCP/IP data to the serial port data and send it to the serial port device.

Generally, users of this kind of usage develop the network communication software

of upper computer by themselves and integrate the analysis of the serial communication protocol of the equipment. This method is more flexible and efficient than virtual serial port. Correspond to (6) and (7) in table 6.

In the section of "6.4 TCP Communication Test", it mainly introduces how to communicate when the serial port server is a TCP server. Here you will learn about TCP clients, UDP mode, and how multi-TCP connections communicate with computer software. The computer software takes SocketTest (the software that imitates the user's TCP/IP to communicate) as an example.

ZLAN serial port server is in compliance with the standard TCP/IP protocol, so any network terminal that conforms to the protocol can communicate with the serial port server. ZLAN technology provides the 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 port server) to be able to communicate, the configuration of the parameters must be matched.

6.2 .1 TCP Client Mode

There are two operating modes under TCP mode: TCP Server and TCP Client. No matter which mode is adopted, one side must be the Server side and the other side the Client side. Then the Client side can access the Server side.

When the serial port server is the Client, there must be three corresponding relationships, as shown in figure 24. 1) working mode correspondence: the working mode of the serial port server is the Server mode corresponding to the Client mode of the network tool; 2) IP address correspondence: the destination IP of the serial port server must be the IP address of the computer on which the network tool is located; (3) port correspondence: the destination port of the serial port server must be the local port of the network tool. In this way, the serial port server can automatically connect to the network tools, send and receive data after the connection is established.

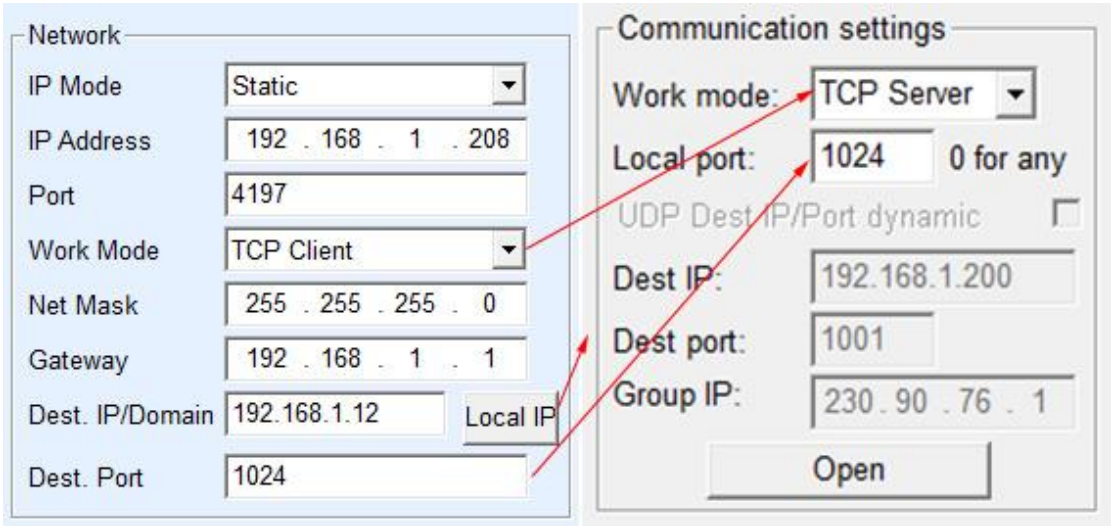


Chart 17 The serial port server as the Client

6.2 .2 TCP Server Mode

When the serial server acts as the server, there are also three relationships, as shown in Figure 18, 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.

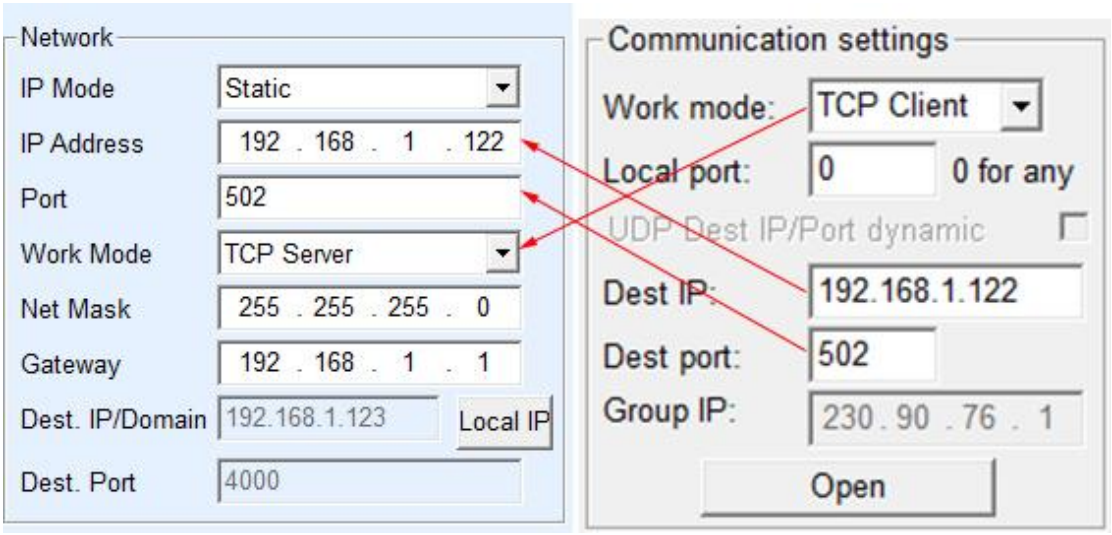


Chart 18 The serial port server as the Server

When the serial port server serves as the server, it can accept 30 TCP connections simultaneously. The data received by the serial port is forwarded to all established TCP

connections. If data needs to be sent only to TCP packets that have recently received network packets, you must enable the multi-host function. For details, see 8.2 Multi-Host Function.

6.2 .3 UDP mode

In UDP mode, the parameter configuration is shown in figure 19. The left side is the configuration of the serial port server in ZLVircom, and the right side is the setting of the network debugging tool SocketDlgTest. First, both must be UDP working modes. In addition, as indicated by the red arrow, the destination IP and destination port of the network tool must point to the local IP and port of the serial server. As indicated by the blue arrow, the destination IP of the serial port server must be the IP address of the computer where the network tool is located, while the destination port of the serial port server must be the local port of the network debugging tool. Only when these network parameters are configured the two-way UDP data communication can be guaranteed.

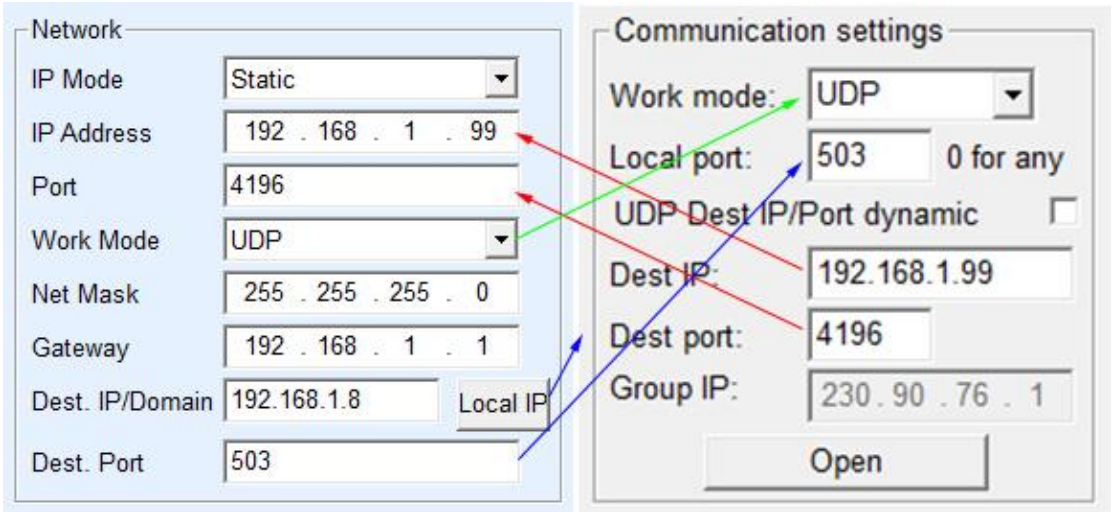


Chart 19 UDP mode parameter configuration

6.3 Device Pairs-connect Mode

If the upper machine is not a Socket program (SocketDlgTest) or a virtual serial port, but two devices are connected through a network port, the configuration method is similar. First, the user needs to connect two devices and computers to the same LAN. ZLVircom runs on this computer and is only connected to the computer for configuration purposes, after which the computer does not need to be connected.

Click ZLVircom's device management to find the two devices, as shown in figure 21.

Then click "Device Edit" to configure the device. Device pair-connection can be divided into TCP pair and UDP pair. In the case of TCP pairing, the parameters of the two devices are shown in figure 20. The parameters shown by the arrows must correspond as if they were connected to a PC. After a successful TCP connection, you can view the connection status by going back to the device management dialog box, as shown in figure 21. If both devices are "connected", the TCP link for both devices has been established.

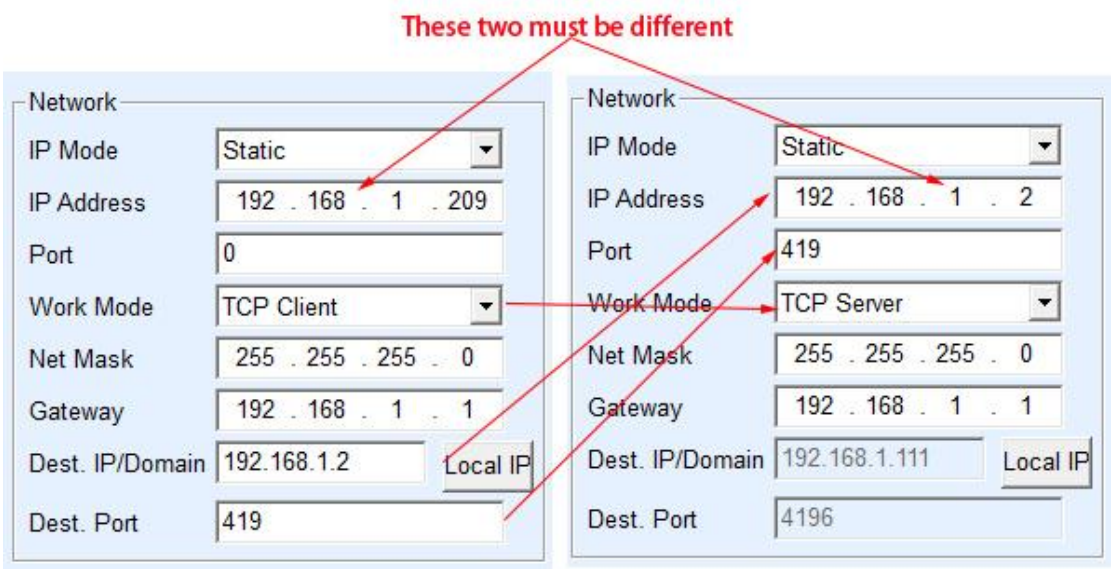


Chart 20 TCP device pairing parameter configuration

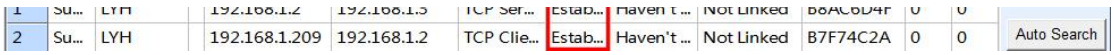


Chart 21 TCP successful TCP device pairing check

In the case of UDP pair-connection, the configuration parameters are shown in figure 22, and the parameters corresponding to the arrows must be one-to-one. As long as the parameters of UDP pair are configured correctly and the connection status is not checked, the data sent will be automatically sent to the specified device.

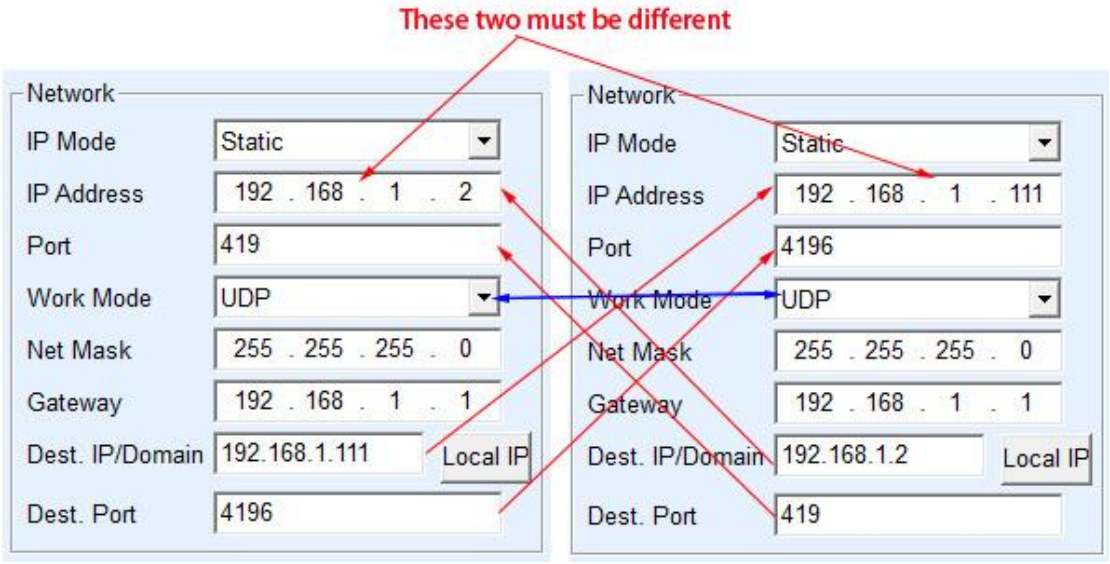


Chart 22 configuration of UDP device pairing parameters

Finally, we need to remind that if the device is connected to each other, in addition to the above settings of the Ethernet port parameters, the serial port parameters must also be correctly set. Mainly is the serial port server baud rate and so on needs to be consistent with user's equipment baud rate and so on. With this setup, the user device can send data to each other through the serial ports of the two serial servers.

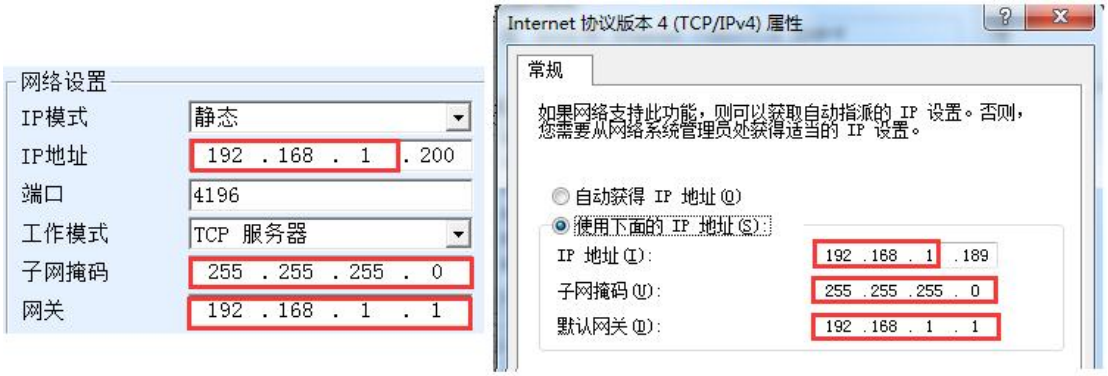
7. Device Debugging

7.1 Network Physical Connection

Confirm the wifi connection is normal through wifi_work and wifi_link indicator lights.

7.2 Network TCP Connection

When the device is in dynamic accessing IP mode, cannot directly connect to the computer network interface. Because no have DHCP server to be able to use (general DHCP server is the router in LAN). So please specify IP when connecting directly. The computer also needs to specify a fixed IP address.



ZLVircom中的设备IP　　计算机上的IP配置

Chart 23 configure on the same network segment

Whether directly connected or through a switch, devices and computers need to be on the same network segment (unless they communicate across gateways) when configured with static IP addresses, as shown in Figure 23.

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

After the configuration is complete, perform 5.4 TCP Communication Test or 5.5 Virtual Serial Port Test. You can see that the Link indicator turns blue when a TCP connection is established. The blue 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 24, which facilitates remote diagnosis.

Chart 24 Connection status and data send/receive status

7.3 Data Sending and Receiving

When the Link light turns blue, data can be sent and received between the software and the serial port server. If the software sends a message, the Active light turns green for at least a second. The data is also output from 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 device will reply to the right instruction. If there is a reply (the serial port sends data to the network port), “Active” will turn blue. Otherwise, please check the serial port parameters or the connection of the serial port line.

In order to facilitate remote debugging, ZLVircom also supports remote viewing of data sent and received, as shown in figure 29, where TXD is the amount of data sent by the serial port server. When refreshing the list of devices, a change in this value indicates that data has been sent, and the Active light is also green. If you see a change in the RXD value it indicates that the serial device has returned data. Active is blue.

7.4 ZLVircom Remotely Monitor Data

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

Assume that virtual serial port communication has been established according to 5.5 Virtual Serial Port Test method. Now you need to monitor the data through the virtual serial port. Open ZLVircom's menu/Configuration/Software Configuration/Open the vircom Configuration dialog.

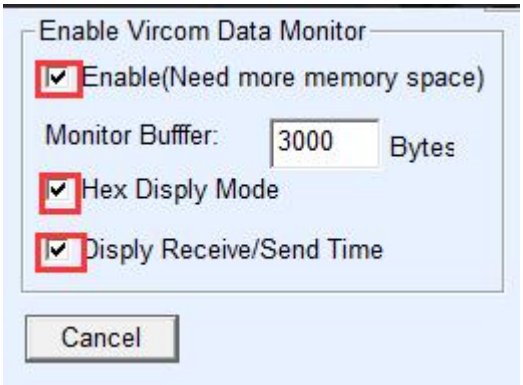


Chart 25 enabling ZLVirocm monitoring

Check the three options of enable monitoring, hexadecimal monitoring mode, and display data sending and receiving time, as shown in Figure 25. Then click OK. Assuming you have sent and received data before, select a virtual serial port that you want to monitor from the main screen, and then select Menu/View/Monitor, as shown in Figure 26.

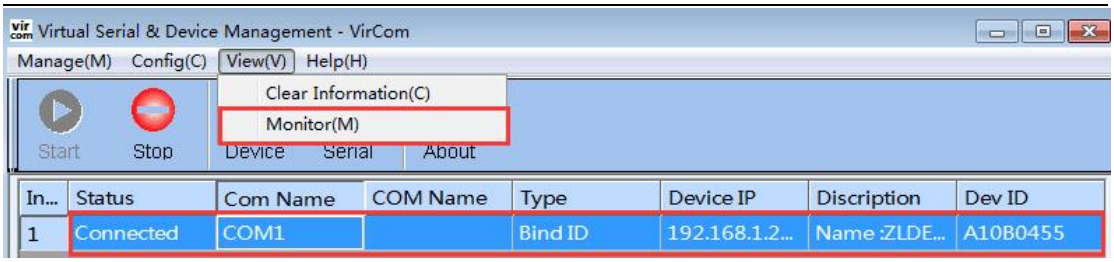


Chart 26 Open ZLVirocm monitoring

From the dialog box that opens, you can see the command sent by the upper computer and the command returned by the device, as shown in Figure 27. This function can facilitate the field communication debugging.

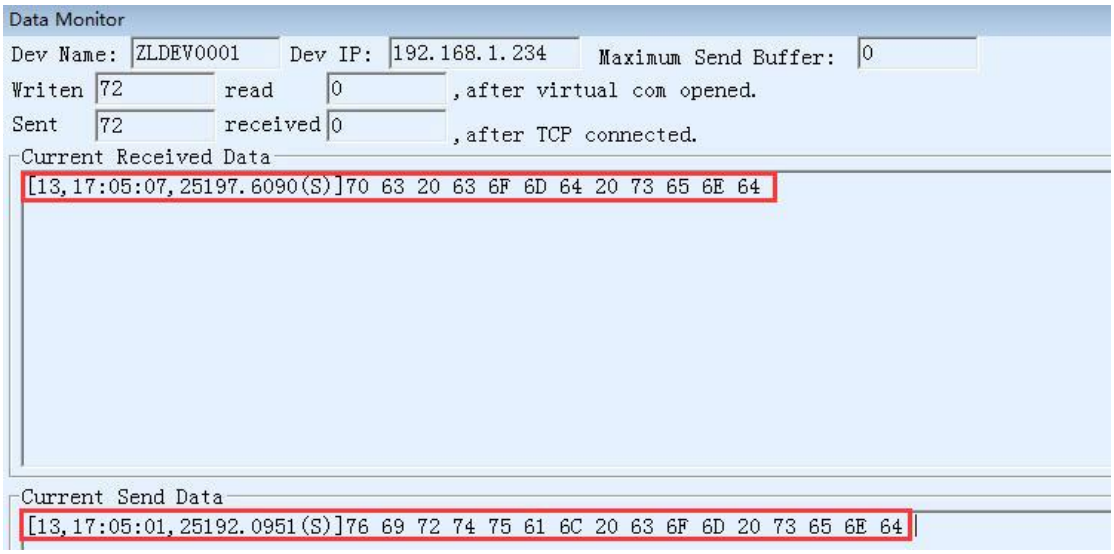


Chart 27 monitor send-receive data

8. Modbus Advanced Features

The serial port server with Modbus gateway function does not have station address and register. It is a communication bridge. It will generate Modbus RTU designation according to Salve ID, function code, register No. and register number in Modbus TCP instructions sent to Modbus gateway by user software and output them from the serial port. Think of it as a protocol "translator."

8.1 Enable Modbus Gateway

First of all, the serial port server should support Modbus gateway, that is, the function

of "Modbus TCP to RTU" supported by devices in table 5 in the device Settings dialog box should be checked.

By default, a serial port server is in ordinary transparent transmission mode, if you need to Modbus gateway pattern, please choose the option "Modbus TCP←→RTU" in the "transfer protocol". The device then automatically changes the "port" parameter to 502 (the Modbus server's port). The Modbus gateway is thus enabled.

If the serial port RTU device is the slave station, then the host computer Modbus TCP software connects to port 502 of Modbus gateway. At this time, Modbus gateway needs to work in TCP server mode. If the serial port RTU is the main station, the Modbus gateway works on the TCP client side, and the destination IP fills in the IP of the computer on which the Modbus TCP software resides, and the destination port is generally 502.

8.2 Multi-host Function

As shown in figure 28, "RS458 multi-host support" and "RS485 bus collision detection function" are ZLAN's multi-host functions. They are generally both enabled and disabled at the same time. After enabling, the device that converts the protocol into Modbus TCP has the function of storage Modbus gateway; otherwise, it is a non-storage Modbus gateway. If the conversion protocol is none, generally, the user-defined RS485 protocol can also have the function of serial devices accessed by multiple hosts at the same time, which cannot be achieved in the pure RS485 network, because the sending of multiple master stations at the same time will cause conflicts on the RS485 bus. The multi-host of ZLAN serial port server can "coordinate" the RS485 bus so as to achieve the purpose of multi-host access.

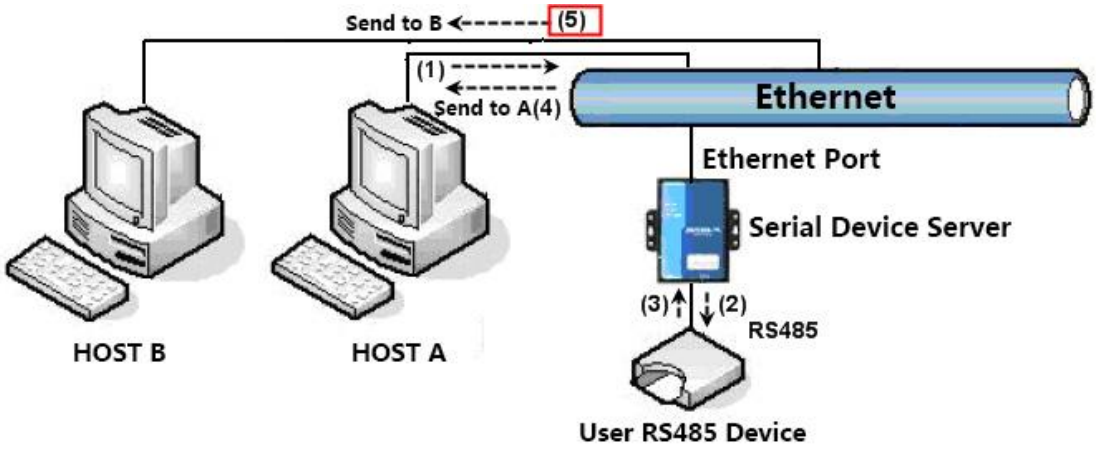


Chart 28 multi-host function demo

As shown in figure 28, in normal 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, RS485 device receives (2) instruction, and RS485 device returns (3) instruction, but the serial port server sends (4) to host A and (5) to host B at the same time. Since host B did not send a query, but it also received a reply instruction (5), host B may generate a communication exception error. In the multi-host mode, only instructions (4) will be given and no instructions (5) will be given, because the serial port server will automatically remember the host that needs to be returned and only return the instructions to the nearest communication host. The query of host A will only reply to A, and the query of host B will reply to host B.

Another effect is that in normal mode, when host A and host B send data at the same time, the instruction combination will be generated on the RS485 bus, so that it cannot be recognized normally. In the multi-host mode, the serial port server can schedule the priority of A and B on the use bus, so as to solve the conflict problem of simultaneous access of multiple machines in an effective manner.

If the conversion protocol is "none", the default is not to enable multi-host function. If you need to enable multi-host, please click "more advanced options" in the device configuration dialog box, and then check "RS485 multi-host support".

8.3 Multi-host Parameter

The meanings of "RS458 multi-host support" and "RS485 bus collision detection function" are described as follows.

Chart 29 RS485 multi-host support

RS485 instruction reply timeout is: the maximum time interval between the start of sending this instruction and the receipt of the reply by the serial port server. The filling time should be greater than the actual maximum time interval. If the timeout is determined, the next instruction is sent.

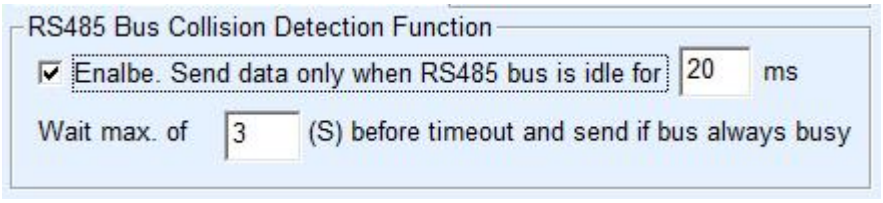


Chart 30 RS485 conflict free time

RS485 bus collision time: indicates how many milliseconds the serial server waits to send the second instruction after receiving the reply of the first instruction. This parameter actually defines the speed of instruction rotation. This value is recommended above 20ms. The "maximum wait time is 3 seconds" parameter does not need to be modified.

When the user use ZLVircom to select "Modbus TCP to RTU" as the transfer protocol, ZLVricom will automatically select the above two enabled boxes (unless the user manually enters the advanced option to remove), and the above two times will be automatically configured according to baud rate. However, if the user's Modus instruction is relatively long or the conversion protocol is "none", these two parameters need to be manually configured.

The following is the recommended setting values of the above parameters:

Figure 37 shows the "RS485 bus anti-collision time", which can be set as twice of the "packet interval" in the lower right corner of the parameter configuration interface,

but the minimum value should not be less than 20.

Figure 36 shows "RS485 instruction reply timeout time", which is generally determined according to the length of the reply instruction. If the sending instruction is N bytes and the reply is M bytes, the recommended value is: "packet interval" * (N+M+5) +100.

8.4 Stored and non-stored type

ZLAN5143I is a storage Modbus gateway, its advantage is that 5143I will automatically query and save the value of the register, which can speed up the return speed. However, there are times when the value of a device is not as desired under constant rotation, and this is where a non-storage model like the ZLAN5G40 comes in handy. That is, 5G40 will send RTU query instructions when Modbus TCP is sent, otherwise it will not send RTU query, that is, non-stored Modbus gateway.

Refer to the "Introduction to Modbus" section of the ZLAN5143I for an introduction to the storage model.

9. Network Interface to Modify Parameters

Network interface modification parameter is a function to search and modify device parameters like zlvircom software, that is, to manage the device and modify parameters through the network interface of the serial port server. Suitable for users who integrate search and configuration functions into the user's software.

Network interface modification parameters are realized through "UDP management port protocol", such as:

1) Computer software sends UDP broadcast packets with destination port of 1092 in the network. When the device receives the data packet, it will return its information to the computer software to achieve the purpose of searching the device.

2) The computer software sends the UDP modification parameter command to the 1092 port of the device to achieve the purpose of modifying the device parameter.

The detailed introduction of network interface modification parameters can be referred to the document of "UDP Management Port Protocol of ZLAN Networking Product". It can also be implemented directly using the device management function library of the “14 Device Management Function Library”.

10. Device Management Function Library

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

The described "UDP management port protocol" is integrated into the device management function library ZLDevManage. This is a Windows platform development library of DLL, can be called by VC, VB, Delphi and other development tools.

Provide detailed API interface introduction documents and VC call Demo case. Can realize the device search, parameter modification, P2P function call and so on.

Can be gained from ZLAN website development libraries: search for "equipment management function library" in http://zlmcu.com/download.htm pages. Please refer to "ZLAN WinP2p and equipment management development library" for details.

11. Serial Port Modify Parameters

Users can read and set parameters by sending instructions to the serial port of the serial port server. Suitable for users choose chip or module level products to control and configure through the serial port. Parameters that can be set include: IP address, baud rate, device name, working mode, etc. After setting the new parameters, you can restart the serial port server through the serial port instruction.

ZLAN serial instruction has the following characteristics:

The serial instruction uses 10 bytes of data leading code, so there is no need to distinguish the communication data or command through the pull down and pull up of another configuration pin, and there is no need to switch the command mode and communication mode, which is more flexible and convenient to use.

The command set contains a variety of command formats such as save parameters, do not save parameters, restart devices, and so on.

Can achieve a variety of applications, such as reading the MAC address of the serial

port server, such as changing the working mode of the serial port server when switching from TCP Server to TCP Client mode, can actively connect to the server; You can disconnect from the TCP server when switching from the TCP Client to the TCP Server.

Please refer to “Serial port modification parameters and hardware TCPIP protocol stack” for detailed operation methods.

12. Remote device management

The so-called remote device management refers to the maintenance and management of the device through ZLVircom software, including restarting the device, modifying parameters and upgrading firmware. This feature is suitable for users who manage devices through ZLVircom.

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

1. Automatic search: under the same switch of the device and computer, whether in the same network segment or not, the method of ZLVircom on the computer search for devices are: ZLVircomsend broadcast query→All devices will reply their parameters to the ZLVircom tool after receiving the query. This method searches all devices at once.

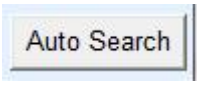


Chart 31 automatic search

2. Manual add: divided into two cases：

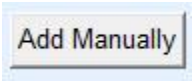


Chart 32 add manually

a) Large routers split the network: in some large networks, the broadcast packets are split by the router so that the broadcast packets cannot reach the device, but pinging device IP is enabled. At this point, you generally need to manually add to solve. The method of manual addition is to click "manual addition" in the "device management" dialog box to add the first and last IP to query the devices one by one.

b) Public network server query internal network equipment: the serial server in the internal network and as a TCP Server mode, zlvircom in the public network IP server. At this time, a port mapping of 1092 UDP should be made on the router of the network where the device is located, which is mapped to the IP of the device. Then, zlvircom will manually add the device, and the IP is the public network IP of the device.

3. TCP Client: when the device is a TCP Client, it initiates a TCP connection to port 4196 of the destination IP (116.15.2.3). When the connection is established, each hold time automatically sends its own parameter system to the UDP port (not TCP) on the destination port (4196 in this case,), enabling zlvircom to search for devices on this computer (116.15.2.3). If the destination port is not 4196, the default parameter receiving port of zlvircom needs to be modified by changing the menu/configuration/software configuration/default listening port, and then starting zlvircom will ignore the execution if TCP port conflict pops up.

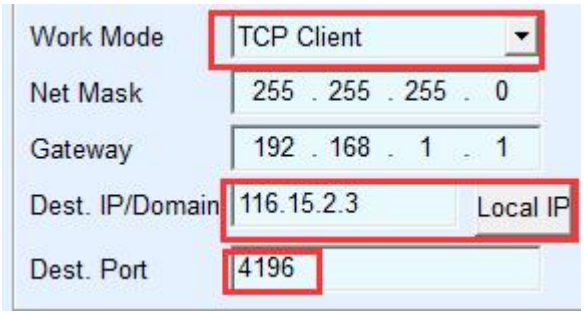


Chart 33 client

4. Timing sending parameters: even if the serial server is in the mode of TCP server, you can check the "timing sending parameters" function and send parameters to the destination port of the destination IP (in this case, 116.15.2.3) every 5 minutes. Zlvircom, which receives parameters on this port of the server, can manage these devices.

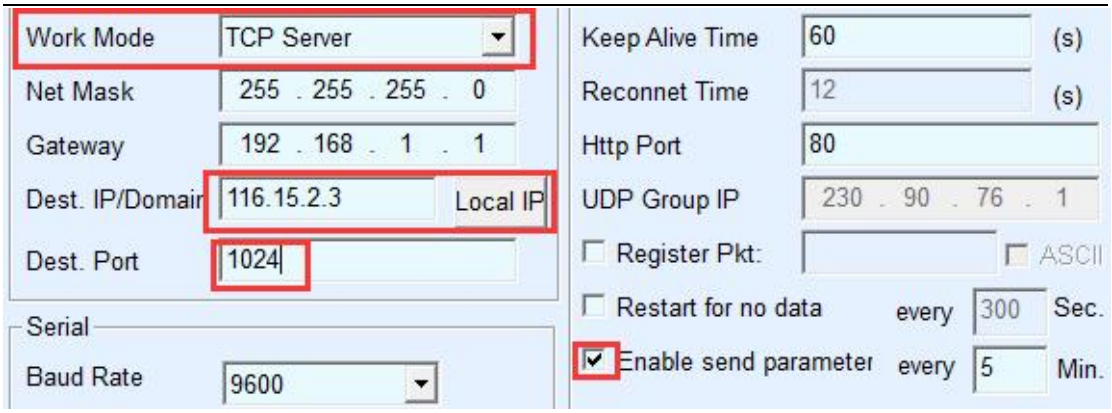


Chart 34 timing sending parameters

To facilitate device identification, give the device an easy-to-remember name if remote administration is required.

13. Cascading approach

The ZLAN5443H supports cascading, which allows the ZLAN5443H to be easily expanded to 8-port, 12-port, and 16-port converters. Engineering transformation and upgrading will be more convenient

Connect the Uplink RJ45 cable (a shorter parallel network cable) from the uplink RJ45 of the upper ZLAN5443H to the common network port (RJ45) of the lower ZLAN5443H. This cascading step can be continued for up to eight levels.

By default, each ZLAN5443H stage requires power. If power supply is required through the cascade network cable, it needs to be customized by the manufacturer.

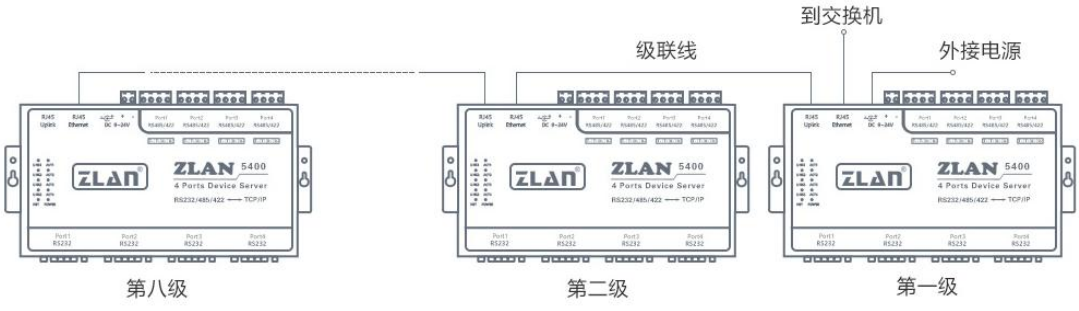


Chart 35 ZLAN5443H Cascading approach

14. Size

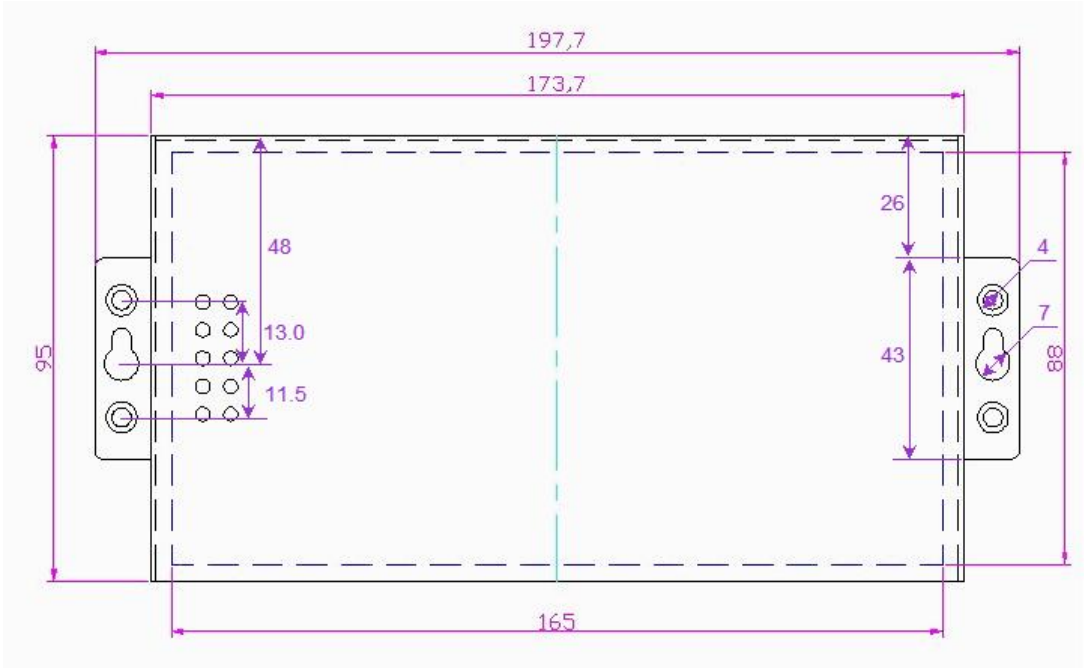


Chart 36 ZLAN5443H mounting size

15. After-service and technical support

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