ZLAN5243A

Serial port server product manual
2 ports RS232/485/422 to TCP/IP converter Modbus Gateway

ZL DUI 20111205.1.0

Revised record as below：

Record

Date	Version	File No.	Contents
2011-12-5	Rev.1	ZL DUI 20111205.1.0	Public
2018-5-12	Rev.2	ZL DUI 20111205.1.0	Revised

CATALOGUE

1. Summary

ZLAN5243A Serial server is a 2 serial port developed by Shanghai ZLAN Information Technology Co., LTD

Protocol converter between RS232/485/422 and TCP/IP. ZLAN5240 supports Modbus TCP to Modbus RTU. The ZLAN5243A supports two RS232 serial ports and two RS422/485 serial ports, which are connected to the ZLAN5243A through one network cable to enable the two serial ports to work in full duplex at the same time. The RS485 port is a green wiring terminal port, and the RS232/RS485 port is an RJ45 port. Another 5243A is provided with an additional Ethernet interface, which can be used as a switch or cascade. The ZLAN5243A supports four serial ports, six serial ports, and eight serial ports. 5243A provides two kinds of power source access mode: power socket and wiring terminal, wide voltage range, and provides housing wiring protection.

Figure 1 ZLAN5243A serial port server

The serial port server can easily connect serial port devices to Ethernet and Internet, and realize the network upgrade of serial port devices.

In order to facilitate the connection of DB9 RS232, ZLAN can be equipped with RJ45 to DB9 cables, two such cables connected to two RJ45 RS232 interfaces can lead to two DB9 male RS232 connectors.

Figure 2 RS232 connection accessaries

ZLAN5243A RS232 interface supports full-duplex, uninterrupted communication; RS485 embedded with 485 lightning protection. Supports DHCP and DNS to easily monitor remote devices. Supports virtual serial ports, and the original serial port SOFTWARE on the PC does not need to be modified.

Applications：

- Power electronics, smart meters and energy consumption monitoring；
- As the gateway of the Internet of Things as the communication bridge between the device and the cloud；
- All kinds of automatic PLC remote monitoring and program download；

- All kinds of configuration software and equipment communication interface;
- Equipment networking in access control and security field;
- Network information collection of medical equipment;

Typical application connections are shown in Figure 3. Connect the original serial port device to the ZLAN5243A, and then connect the ZLAN5243A to the network through the network cable. After that, any data sent by the serial port device will be transparently transmitted to the PC specified by ZLAN5243A, and the data sent by the PC to ZLAN5243A over the network will be transparently transmitted to the serial port device.

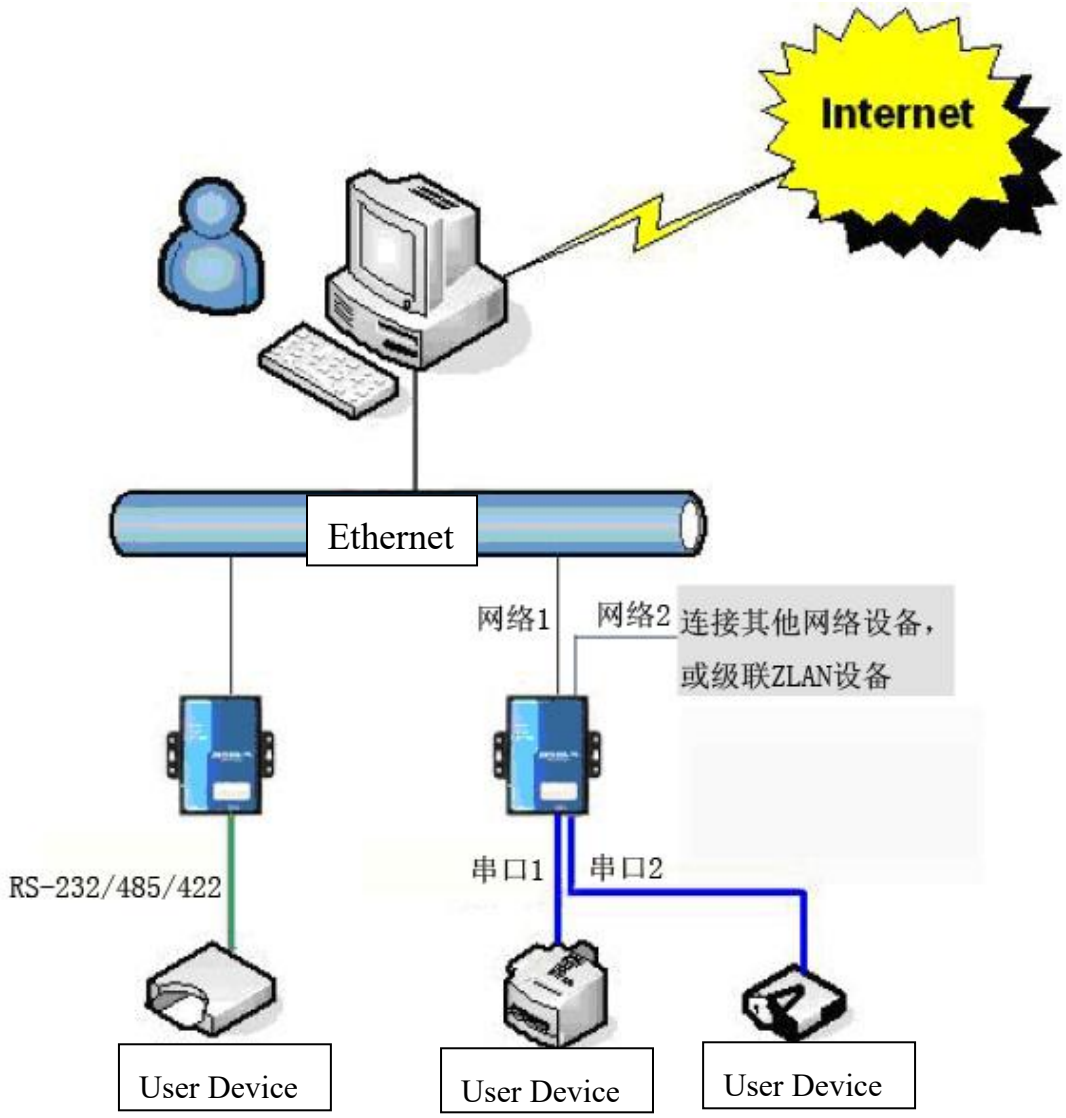


Figure 3 Connection Map

2. Function Speciality

2.1. Hardware speciality

1. 2 ports all support RS232、RS485、RS422 serial ports（RS422 need to ordered 5243A-422 model）。
2. The two serial ports can work independently in full-duplex mode without interfering with each other and can be configured with different baud rates.
3. Supports the function of a network switch with two network ports and functions as a switch at the same time.
4. Abundant indicators, each serial port has its own TCP connection indicator and data activity indicator.
5. Shanghai ZLAN patent product, high technology, Patent No. ZL 2014 2 0108890.3。

2.2. Software speciality

1. Support TCP server, TCP client, UDP mode, UDP multicast. Supports 10 TCP connections as a TCP server.
2. Baud rate support 1200～460800bps，Digit bits support 5～9 bits，The check bit can be none check, odd check, even check, mark, and space. It supports CTS/RTS hardware flow control and XON/XOFF software flow control.
3. Supports the MAC address sending function on connected devices, facilitating cloud management of devices.
4. Provides the computer side search, configuration device secondary development package DLL development library.
5. DHCP dynamically obtains IP addresses and DNS protocol for connecting to DNS servers.
6. Supports remote device search and device parameter setting on the cloud.
7. You can remotely view the TCP connection status of the device using software. The virtual serial port supports data monitoring.
8. ZLAN5243A support Modbus gateway function， support Modbus RTU to Modbus TCP。
9. ZLAN5243A Multi-host: In q&A mode, multiple computers on the network port

can access the same serial port device at the same time.

6. Technology data

Appearance			
Interface：	485：terminal；232：RJ45（optional RJ45 to DB9 cable）；422：RJ45		
Power supply：	5.5mm，+(inside)-(outside)，power supply socket；terminal		
Size：	L x W x H =9.4cm×6.5cm×2.5cm		
Communication view			
Ethernet：	2 10M/100M interface， each one is available， 2 KV wave protection		
Serial port：	RS232/485/422×2：RXD，TXD，GND， CTS，RTS		
Serial port data			
Baud rate：	1200~460800bps	Check bits：	None, Odd, even, Mark, Space
Digit bits：	5～9 bits	Flow control：	RTS/CTS，NONE
Software			
Protocol：	ETHERNET、IP、TCP、UDP、HTTP、ARP、ICMP、DHCP、DNS		
Configuration：	ZLVirCOM tool、device management library		
Communication：	Socket、Virtual port、device management library		
Working mode			
TCP server, TCP client, UDP			
Power supply			
Power supply：	9～24V DC，2~4W		
Environment			
Operation temperature：	-40~85℃		
Storage temperature：	-45~165℃		

Moisture Range：	5~95% humidity

7. Hardware

The front view of ZLAN5243A serial server is shown in Figure 4: ZLAN5243A uses black radiation resistant SECC board. There are two "ears" on the left and right for easy installation.

Size：

Length×Width×Height =9.4cm×6.5cm×2.5cm

Panel lights：

1. ACT： When the ACT indicator is on, data is being transmitted between the Ethernet and RS232/485/422. When there is no data communication, the ACT indicator is off.
2. LINK：LINK indicator Indicates that the network cable is connected properly and the TCP connection is established or in UDP mode.
3. POWER： The serial port server is powered on.
4. NET：Indicates that the network cable of Ethernet1 is connected properly.

Figure 4 ZLAN5243A Front view

Figure 5 RS485 interface and power supply terminal

Figure 5 shows the front panel of the serial port server：

1. Power socket can use standard plug 5.5mm (inner core is positive), voltage 9 ~ 24VDC.
2. The 485 wiring terminal can connect the positive and negative lines of user 485. Each ZLAN5243A can carry 32 terminal 485 devices. The longest communication distance is 1200 meters. 485 terminal resistance is 120 ohm, generally in more than 300 meters of wiring must be used terminal resistance. Note that 485+ and 485- must be twisted twisted-pair cables to reduce signal interference.

Figure 6 shows the back panel of the serial port server：

Figure 6 ZLAN5243A 2 ports LAN and 2 ports RS232

From left to right: RJ1 is Ethernet1; RJ2 is Ethernet2; RJ3 is serial port 2; RJ4 is serial port 1.

3. RS232 includes RJ45 port，ZLAN supply customized RJ45 to DB9 terminal，transfer to DB9 male terminal（pin）interface.

RJ45 to DB9 cables：

Figure 1

LAN No.	Serial port No.
1	6、8
2	2
3	3
4	4、7
5	5

ZLAN5200 RJ45LAN ports as below：

Figure 2

No.	Item	Function
2	RXD	serial server receive pin
3	TXD	serial server send pin
5	GND	Ground wire
1	RTS	Flow control is enabled，When the pin is 0, the serial port server receives data from the serial port device.
4	CTS	After flow control is enabled, the serial port server sends data to the serial port device only when the pin is 0.

2.RS422 is connected in RJ45 (note that the 422 interface is not enabled by default, please indicate that the 422 function is required before purchase). Table 3 shows the RJ45 network port wiring sequence：

Figure 3

No.	ZLAN5243A RS422 wire	Connect with User RS422
6	T/R+	R+
7	T/R-	R-
8	R+	T+
4	R-	T-

1．Power supply： A standard power adapter (5.5mm positive core) or power terminal can be used. The supply voltage can be 9 ~ 24V. The power supply current must be greater than 500mA.

2．LAN：

a) Ethernet1 normal LAN： Users can connect ZLAN5243A to switches, hubs, or directly to computer network cards through this network port.

b) Ethernet2 Level networking mouth：With Ethernet in the same Ethernet，suitable for ZLAN5243A cascade or connect other Ethernet devices，Refer to the cascading section of this document.

c) POE power supply：ZLAN5243A can be powered by pins 5 (GND) and 8 (VCC) of the ordinary RJ45 network port. The power supply voltage is any value between 9 and 24V. Figure 7 shows the sequence of the RJ45 network cable. By default, the POE power supply function is disabled. If you need this function, contact ZLAN.

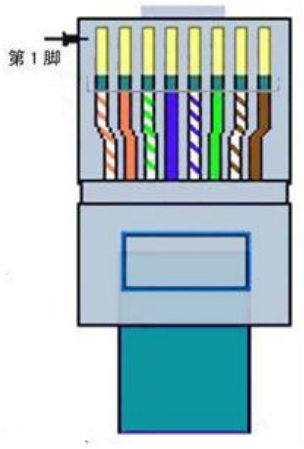


Figure 7 Cable line sequence

8. Cascade method

1. ZLAN5243A support cascade， This allows the ZLAN5243A to be easily expanded to 4-port, 6-port and 8-port converters. Engineering transformation, upgrade more convenient.
2. For cascading, connect the upper-level ZLSN5243A network port (Uplink RJ45) to the lower-level ZLSN5243A common network port (RJ45) using the manufacturer's network cable (actually shorter parallel network cable). This cascade step can be continuously expanded to a maximum of 8 steps.
3. By default, each grade of ZLSN5243A requires power supply. If the power supply needs to be through the cascade network line, the manufacturer needs to customize.

Figure 8 ZLAN5243A cascade method

9. Usage

1.1 Software installment

ZLVircomYou can configure parameters such as the DEVICE IP address and create a virtual serial port. If the virtual serial port function is not required, you can download the installation-free version. Download address : http://www.zlmcu.com/download.htm

Figure 1 ZLVircom Version

Software Name	Instructions
ZLVircom device management tool （non-installment）	The non-installed version does not include the virtual serial port function
ZLVircom device management tool （installment）	The installed version contains ZLVircom_x64. Msi and ZLVIRcom_x86. msi. Install x64 for 64-bit operating systems and x86 for 32-bit operating systems.

Follow the default instructions during installation. After installation, ZLVIRcom will be started every time the computer is started to create a virtual serial port.

1.2 Data Configuration

After ZLVircom is installed and the hardware connection of the device is completed, run ZLVircom software as shown in Figure 9, and then click "Device Management" as shown in Figure 10. Using ZLVircom, you can search and configure device parameters in different network segments, which is very convenient, as long as the device and the computer running ZLVircom are under the same switch.

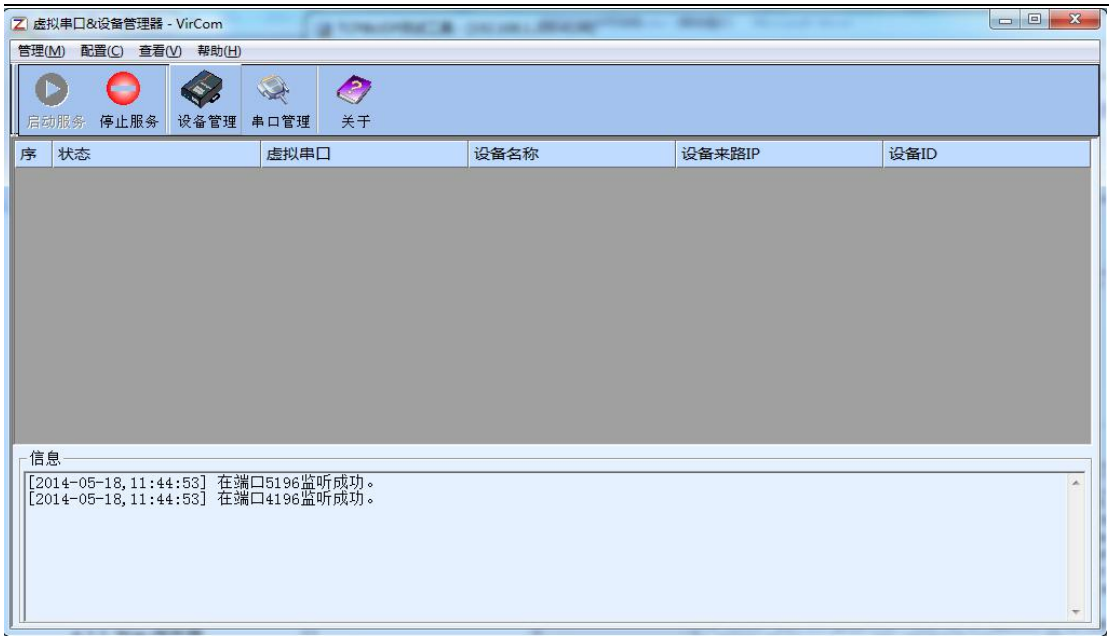


Figure 9 ZLVircom Front page

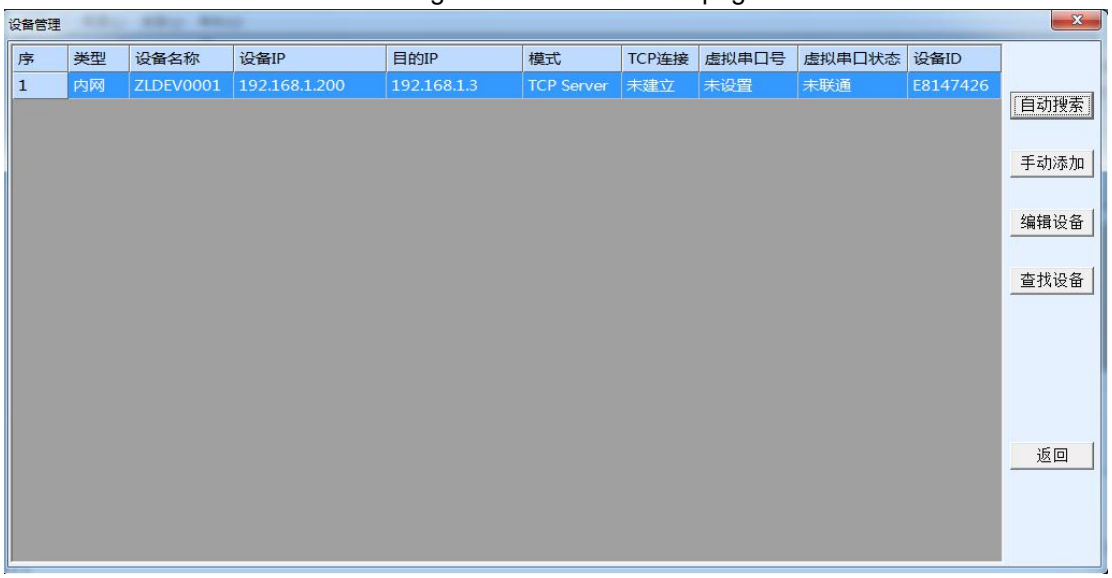


Figure 10 Device list

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

Figure 11 device data

On this interface, users can set device parameters and click "Modify Settings" to set the parameters in the flash of the device. The parameters will not be lost during power failure. At the same time, the device automatically restarts.

The main parameters are as follows: Baud rate, data bit, parity bit in serial port Settings; IP address, subnet mask, gateway in network Settings; Sometimes, the working mode of the serial port server needs to be configured according to the computer software.

The meanings of other parameters are described as follows：

Figure 2 Parameter meaning

Parameter names	Value range	Meaning
Virtual serial port	A virtual serial port that is not used or created	You can bind the current device to an existing virtual serial port. Add a COM port in Serial Port Management on the main window.
Device model		Only the core module model is displayed
Device name	Random	You can give the device an easy-to-read name that is up to 9 bytes long and supports Chinese names.
Device ID		factory only ID，can’t revised

Firmware version		Core module firmware version
Support function		See Figure 3 for the functions supported by the device
IP mode	static、DHCP	Users can choose static or DHCP (dynamically obtain IP)
IP address		Serial server IP address
Terminal	0～65535	Serial port Server Listening port when the serial port Server is 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 port and non-zero port is as follows :(1) when the local port is 0, a new TCP connection will be established with the PC when the module restarts. The old TCP connection may not be closed, and the device may have multiple false connections. Generally, the upper computer wants to close the old connection when the module restarts. Specifying a non-zero port closes an old connection. (2) When the local port is 0, the TCP connection takes longer to establish. When the serial port server is in TCP client mode, it also acts as the TCP server and listens for the connection on the port. The local port number used by the TCP client to connect to the server is "port +1".
Working mode	TCP server mode、 TCP client mode、UDP mode、UDP broadcast	When the TCP server is configured, the serial port server waits for the computer to connect. When the serial port server is set as a TCP client, the serial

		port server proactively initiates a connection to the network server whose destination IP address is specified.
Subnet mask	eg：255.255.255.0	The subnet mask must be the same as that of the local LAN.
Gateway	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 address 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	1200、2400、4800、7200、9600、14400、19200、28800、38400、57600、76800、115243A、230400、460800	Serial port baud rate
Digit bits	5、6、7、8、9	
Check bits	None, even, odd, mark, space	
Stop bits	1、2	
Flow control	none、hard CTS/RTS、hard DTR/DCR、soft XON/XOFF	only available for RS232 serial port
DNS server		If the destination IP address is described by a domain name, enter the DNS server IP address. If THE IP address mode is DHCP, the DNS server is automatically obtained from the DHCP server
Objective mode	Static, dynamic	In TCP client mode: In static destination mode, the device automatically restarts after five consecutive attempts to connect to the server fail.

Transmission protocol l	NONE 、 Modbus TCP<->RTU、Real_COM	NONE indicates that data is transparently forwarded from the serial port to the network. Modbus TCP<->RTU converts Modbus TCP to RTU. RealCOM is designed to be compatible with the old REAL_COM protocol. It is a virtual serial port protocol. However, you do not need to select RealCOM when using the virtual serial port
Keepalive time	0～255	Heartbeat interval. (1) If the value is set to 1 to 255 and the device works in TCP client mode, the device automatically sends the TCP heartbeat at keepalive Time. This ensures the TCP validity of the link. If the value is set to 0, the TCP heartbeat is unavailable. (2) When the value is set to 0-254 and the REAL_COM protocol is selected as the conversion protocol, the device will send a data with 1 length and 0 content at the interval of keepalive time to realize the heartbeat mechanism in Realcom protocol. When set to 255, there will be no RealCom heartbeat. (3) When the value is set to 0 to 254, if the device works on the TCP client, the device sends device parameters to the destination computer at intervals. If 255 is set to 255, no parameter is sent and remote device management can be implemented.
Reconnection time of disconnection	0～255	In TCP client mode, if the connection fails, the TCP connection is re-initiated to the computer at each Disconnection Reconnect time. The value ranges from 0 to 254 seconds. If 255 is set, the reconnection is never performed. Notice The first TCP connection (for example, hardware power-on, device restart through zlvircom, and no data

		indicator) is usually made immediately. After the first connection fails, the system waits for reconnect time and tries again. Therefore, reconnect time does not affect the normal connection establishment time between the network and the server.
Web access port	1～65535	Normal is 80
Multicast address		UDP broadcast
Enabling the Registration Package		This registration packet is sent to the computer when a TCP connection is established. You must select the RealCOM protocol after enabling the registration package. Supports TCP server and TCP client.
Packet length	1～1400	One of the rules for serial framing. Serial port server After receiving data of this length, the serial port sends the received data as a frame to the network.
Packet interval	0～255	Serial port framing rule two. When the data received by the serial port of the serial server stops and the stop time is longer than this period, the serial port sends the received data as a frame to the network.

The following describes the functions supported by the device：

Figure 3 Functions supported by the device

Name	Specifications
Web page download	Support through web pages to control serial output instructions, only the suffix W products have this function.
Domain system	The destination IP can be a domain name (such as the WWW server address at the beginning).

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 upper computer to identify the device. In general, you can not use it. The 5G40 model is not supported.
Modbus TCP to RTU	Only model 4 with the third digit supports this function. Modbus TCP can be converted to RTU. It also supports multiple hosts.
Serial Port Modification Parameters	Supports serial port AT commands to configure and read device parameters.
Automatic access to IP	Support DHCP Client protocol
Storage extended EX function	Subsequent extension
Multiple TCP connection	The TCP server supports more than one TCP connection.
IO terminal control	Model 4 supports any custom instruction to control up to eight IO outputs.
UDP broadcast	UDP broadcast
Multi destination IP	A TCP client can connect to seven destination IP addresses at the same time.
Proxy server	Supports the proxy server function (specific model required)
SNMP function	Supports SNMP to Modbus RTU. Only the suffix ending with -SNMP supports this function.
P2P function	Supports access to devices in any network through P2P traversal technology. Models with suffix N support this function.

1.3 TCP communication testing

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

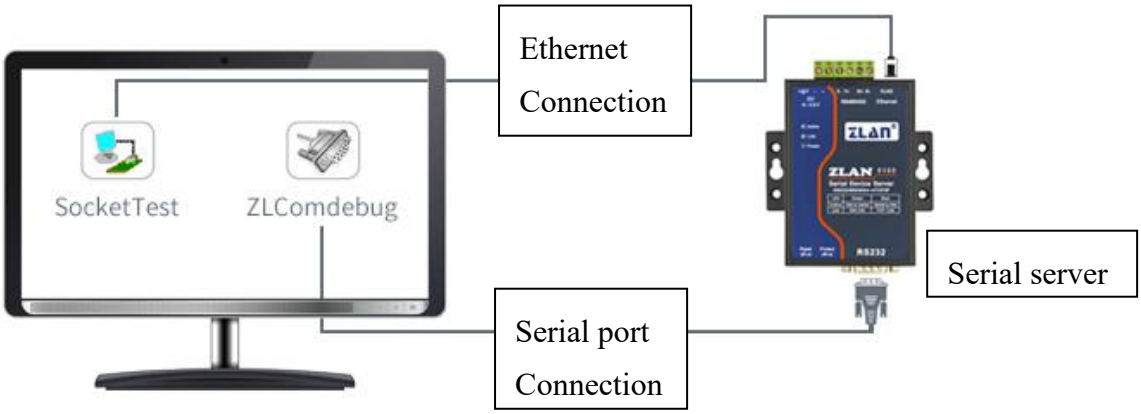


Figure 12 TCP communication map

Now suppose the PC COM port (USB to RS232 line) and serial port serial port server connection, then open the ZLComDebug (http://www.zlmcu.com/download/Comdebug.rar) serial debugging assistant, and open the corresponding COM figure 13. 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 192.168.1.200), The destination port is 4196, then click the "Open" button in Figure 14. Enter "Socket Send" in SocketTest and click "Send". The data will be transferred to RS232 through the network port of the serial port server and then sent to ZLComDebug, which will be displayed in ZLComDebug. Conversely, enter "Comdebug send" in ZLComDebug and click "Send" to send the socket test and display it.

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

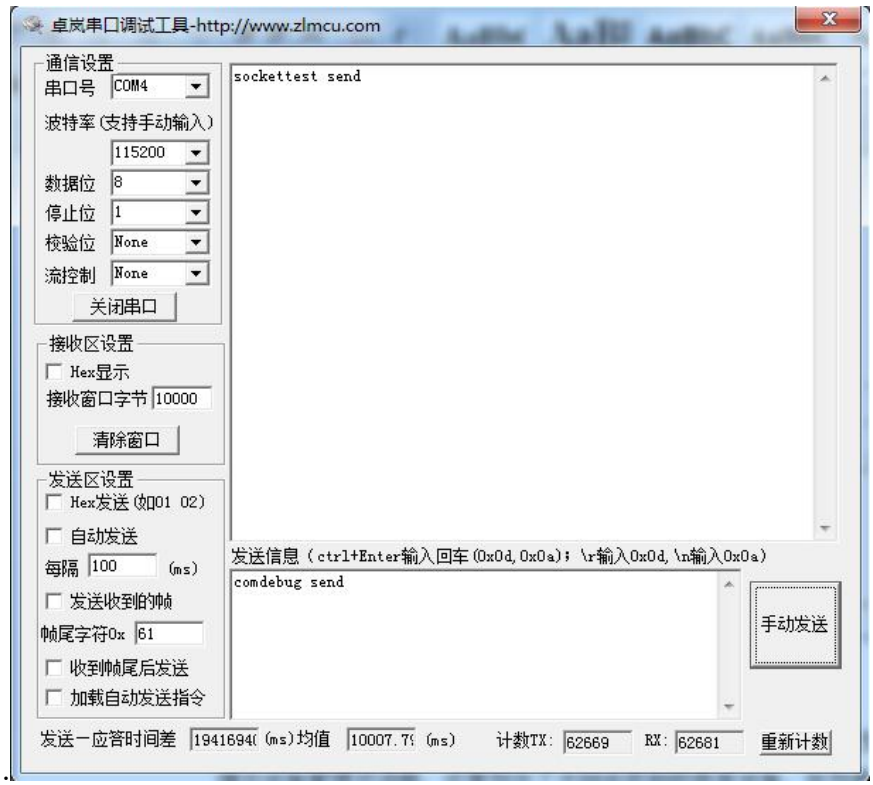


Figure 13 comdebug receive and send page

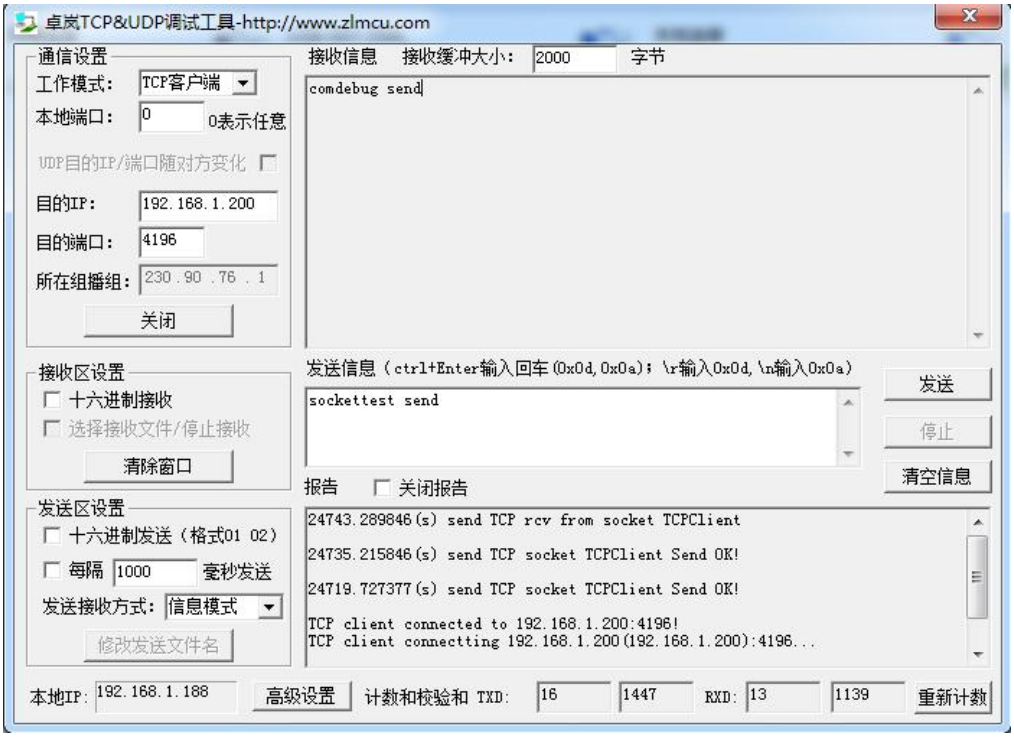


Figure 14 sockettest receive and send page

1.4 Virtual serial port testing

The SocketTest in Figure 12 communicates directly with the serial port server through TCP. In order to make the serial port software developed by the user also communicate with the serial port server, a virtual serial port needs to be added between the user program and the serial port server. As shown in Figure 15, ZLVircom and the user program run on the same computer. ZLVircom virtualizes a COM port and makes this COM port correspond to the serial server. When the user program opens COM communication, it can be sent to the user serial port device through ZLVircom serial server. This is illustrated below：

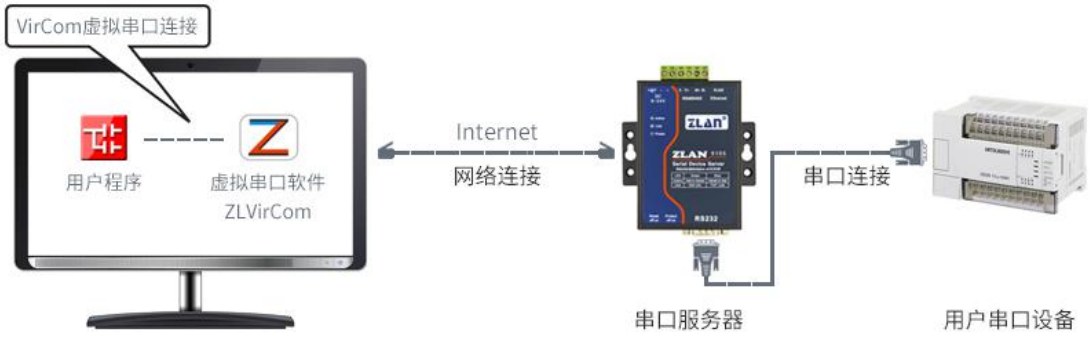


Figure 15 Virtual serial port function

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

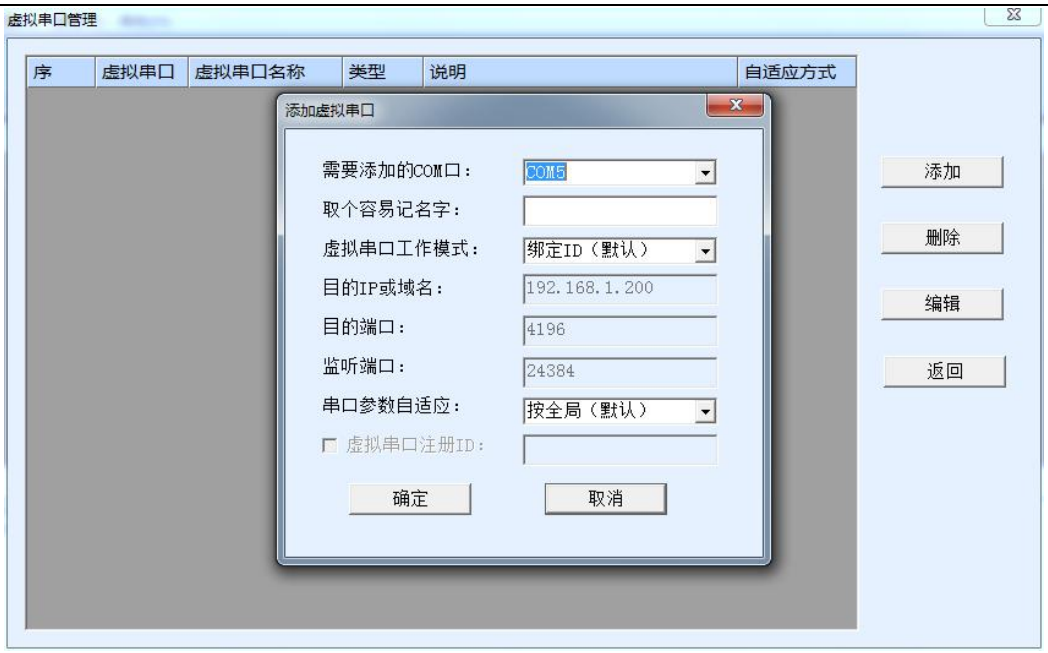


Figure 16 add virtual serial port

Then go to Device Management and double-click the device that you want to bind to COM5. As shown in Figure 11, select COM5 from the "Virtual Serial Ports" list in the upper left corner. Then click "Modify Settings". Return to the main interface of ZLVircom. You can see that COM5 is connected to the device whose IP address is 192.168.1.200. COM5 can be used instead of SocketTest for communication at this time.

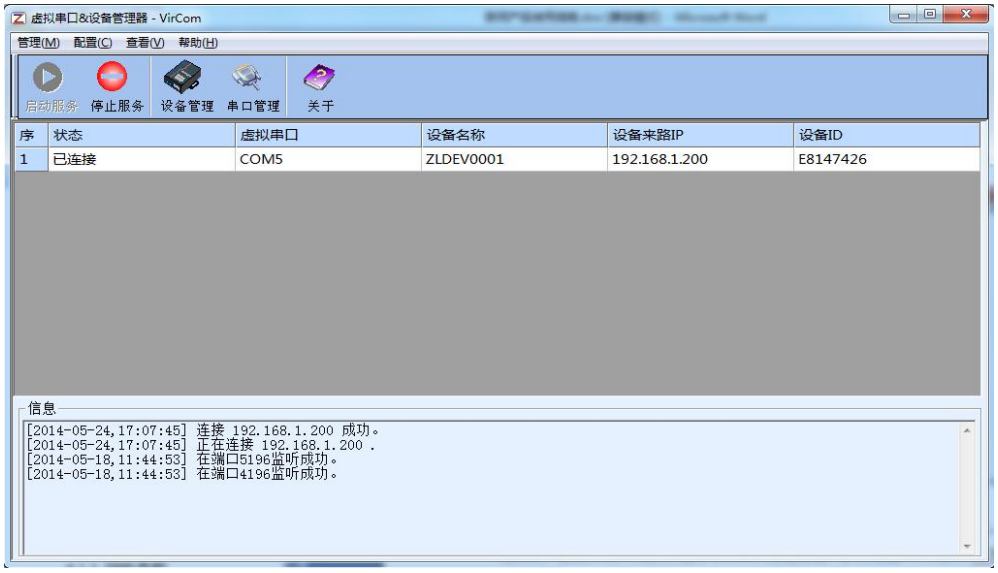


Figure 17 Virtual serial port connection

Open ZLComdebug to simulate the user's serial port program, open COM5(virtual serial port above), and open another ZLComdebug to simulate a serial port device, open COM4(hardware serial port). In this case, COM5 sends data through the following links: COM5ZLVircom Serial server network port Serial server serial port COM4. Conversely, COM4 to COM5 can also transmit data: COM4 serial server serial port Serial server network port ZLVircomCOM5. Figure 18 shows how both parties send and receive data.

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

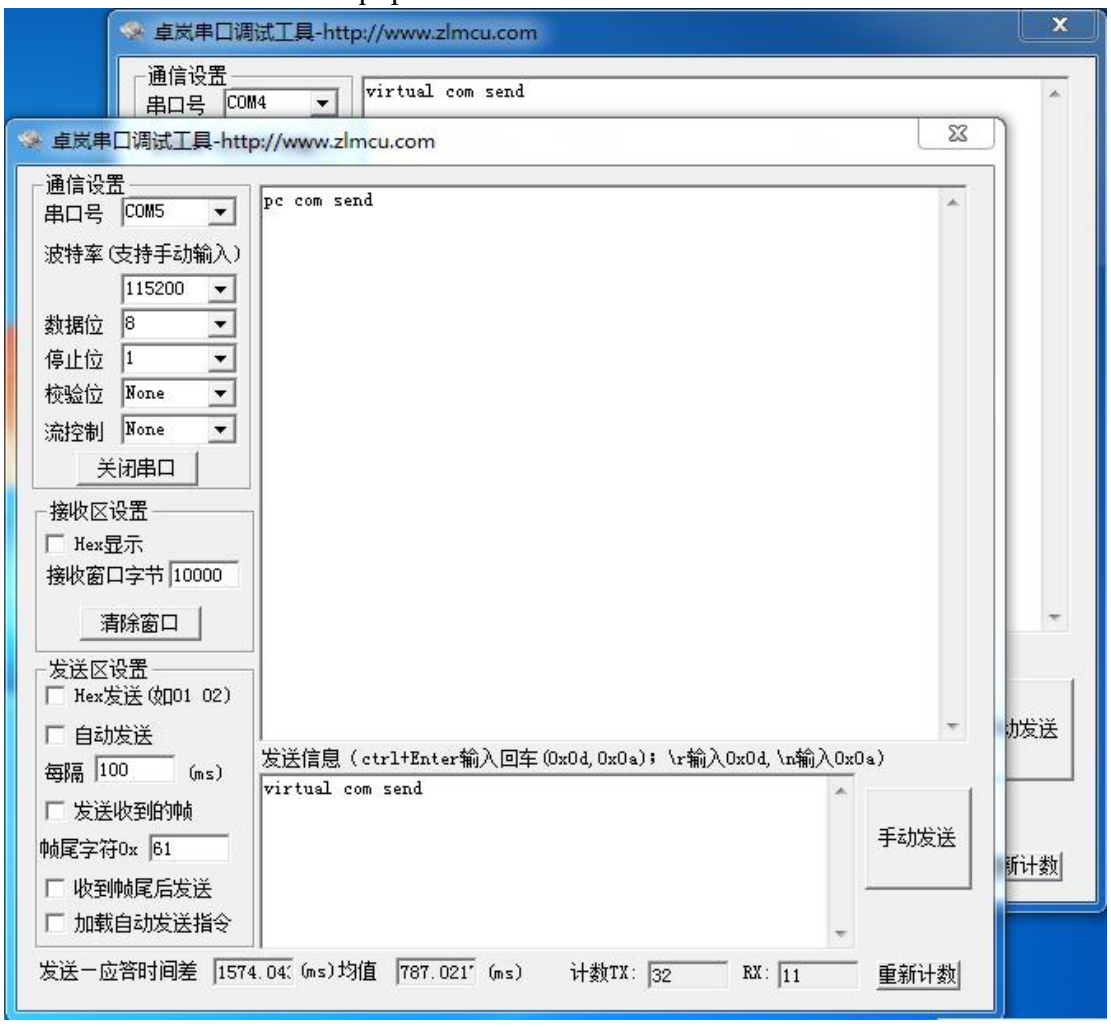


Figure 18 communication via virtual serial port

1.5 Modbus TCP Testing

By default, data is transparently transmitted through serial ports and network ports. To convert Modbus TCP to RTU, select Modbus TCPRTU as the conversion protocol in the device Settings dialog box, as shown in Figure 19. In this case, the device port automatically changes to 502. When the Modbus TCP tool is connected to port 502 of the IP address of the serial port server, the Modbus TCP command sent by the user is converted to RTU command and output from the serial port. For example, after the serial port server receives the Modbus TCP command 00 00 00 00 06 01 03 00 00 0A, the serial port outputs 01 03 00 00 00 00 0A C5 CD command. Note: The serial port may send multiple 01 03 00 00 00 00 A C5 CD commands. This is because the default Modbus uses storage mode and will automatically train query commands. How do I switch to non-storage.

Figure 19 start Modbus TCP function

If the Modbus TCP software is used as a Slave, you need to change the working mode to client, the destination IP address to the IP address of the computer where Modbus TCP software is installed, and the destination port to 502 after selecting the conversion protocol, as shown in Figure 20.

Figure 20 Modbus TCP being client side

3. Working mode and transformation protocol

In different application scenarios, you can choose different working modes and conversion protocols of serial port servers to ensure more stable and reliable use, as described in the following sections.

There are two types of serial port servers: virtual serial port and non-virtual serial port, as shown in Figure 12 TCP communication diagram and Figure 15 function of virtual serial port respectively. In virtual serial port mode, the user software to be connected is the COM port, that is, the user software and the user device are both serial ports. Non-virtual serial mode User software is direct TCP/IP communication but user devices are still serial port.

In non-virtual serial port mode, the conversion protocol can be divided into transparent transmission, Modbus TCP to RTU, and Realcom. If the user software uses Modbus TCP of a fixed protocol and the lower computer uses Modbus RTU, select Modbus TCP to RTU. The Realcom protocol is only used when multiple serial servers serve as TCP clients to connect to a server and virtual serial ports are used on the server.

The usage is summarized as follows：

Figure 4Network configuration mode

No.	Virtual	Device	Transmission protocol	Specifications

	serial port use	working mode		
1	use	TCP server	no	It is suitable for user software to open COM port to collect data actively
2	Use	TCP client side	no	This method is recommended when the device actively sends data. If you select the TCP server, the device may be disconnected and cannot be reconnected.
3	no	TCP server	Modbus TCP to RTU	The software is Modbus TCP and the device is Modbus RTU. And Modbus TCP master station.
4	no	TCP client side	Modbus TCP to RTU	The software is Modbus TCP and the device is Modbus RTU. And Modbus RTU master station.
5	Use	TCP client side	Realcom protocol	When a multi-serial server functions as a TCP client and uses virtual serial ports, the Realcom protocol is recommended.
6	no	TCP client side	No	Suitable for a large number of devices, connected to a cloud mode. Generally, the cloud is a server with a public IP address on the Internet.
7	no	TCP server	No	This mode is used when devices and computers are on the same local network and are monitored locally without inter-Internet

				communication

3.1. Virtual serial port mode

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

Then see if the monitoring computer and equipment are all on the local network：

a) If a computer rents a server with a public IP address on the Internet, the device must use the TCP client mode to connect the device to the server. In this case, you can select ② and ⑤ in Table 4. For a multi-serial server, you must select ⑤.

b) Are in the local network (can ping each other), then see is the upper computer active query or the device active send data. If the device proactively sends TCP packets, the device must be used as the TCP client (2). Otherwise, you can select (1).

3.2. Direct TCP/IP communication

If Modbus TCP conversion 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 through TCP/IP, and the serial port server converts TCP/IP data to serial port data and sends it to the serial port device.

Generally, such users develop their own PC network communication software, which integrates the analysis of the serial communication protocol of the equipment. This method is more flexible and efficient than virtual serial port. Corresponding to ⑥ and ⑦ in Table 4.

In the section of "1.3TCP communication Test", the serial port server is briefly described how to communicate when it serves as a TCP server. This section describes how TCP clients, UDP modes, and multiple TCP connections communicate with computer software. For example, the computer software SocketTest (software that imitates the user's TCP/IP communication) is used as an example.

ZLAN serial server complies with the standard TCP/IP protocol, so any network terminal that complies with this protocol can communicate with the serial server. ZLAN Technology provides a network debugging tool (Socket Dlg Test program) to simulate the network terminal to communicate with the serial server。

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

3.2.1. TCP Client side mode

In TCP mode, there are two working modes: TCP server and TCP client. In either mode, one party must be the server and the other party must be the client. Then the client can access the server.

When the serial server is the client, there must be three mappings, as shown in Figure 21. (2)IP address mapping: The destination IP address of the serial port server must be the IP address of the computer where the network tool resides. (3) Port mapping: 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 tool and send and receive data after the connection is established.

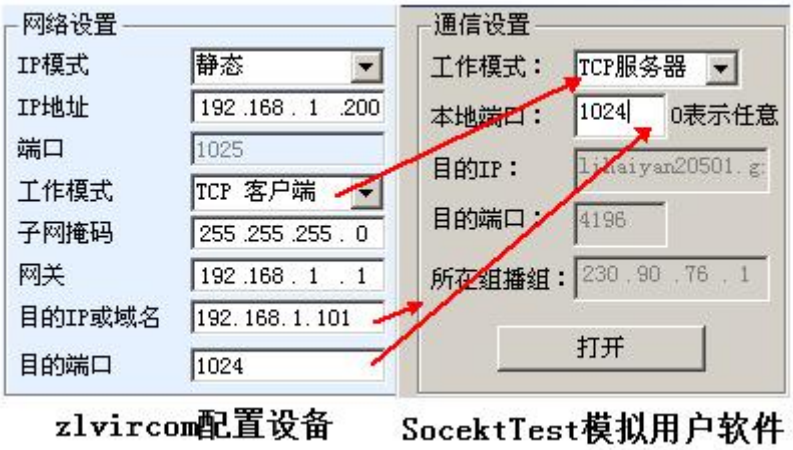


Figure 21 serial server being client side

3.2.2. TCP server mode

When the serial server is used as the server, there are also three corresponding relationships, as shown in Figure 22, which are not explained here. Click the open button of the network tool to establish a TCP connection with the serial port server.

After the connection is established, data can be sent and received.

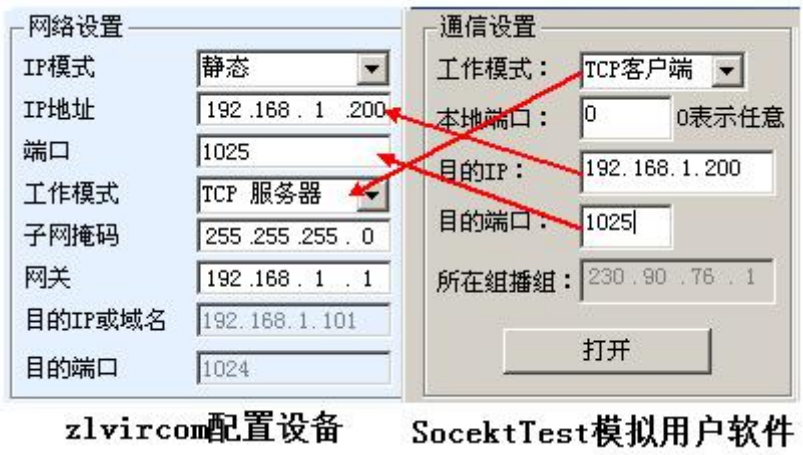


Figure 22 serial server being service side

When the serial port server functions as a server, it can accept up to 30 TCP connections simultaneously. The data received by the serial port is forwarded to all established TCP connections. To enable TCP to send data only to the recently received network packets, enable the multi-host function. For details, see 5.2 Multi-Host Function.

3.2.3. UDP mode

In UDP mode, the parameter configuration is shown in Figure 23. The left is the configuration of the serial port server in ZLVircom, and the right is the configuration of the network debugging tool SocketDlgTest. First, both must work in UDP mode. In addition, as indicated by the red arrow, the destination IP address and destination port of the network tool must point to the local IP address and port of the serial server. As indicated by the blue arrow, the destination IP address of the serial port server must be the IP address of the computer where the network tool resides, 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 bidirectional UDP data communication.

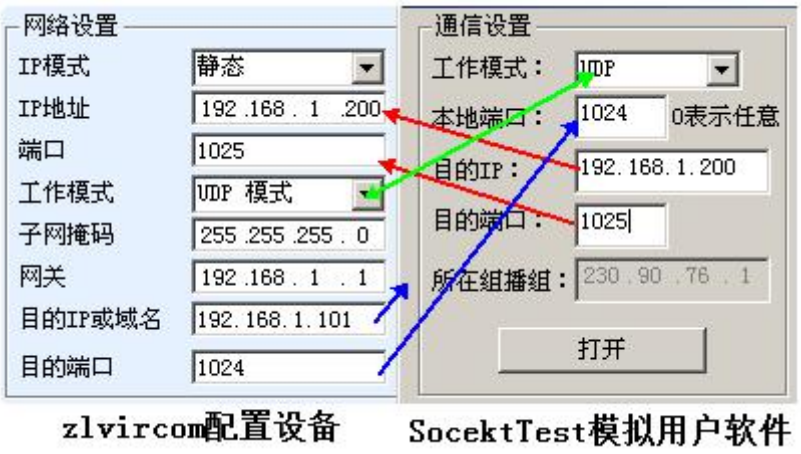


Figure 23 UDP mode data configuration

3.3. Device couplet mode

If the host is neither a Socket program (SocketDlgTest) nor a virtual serial port, but two devices are connected through a network port, the configuration method is similar. You need to connect two devices and computers to the same LAN. ZLVircom runs on this computer. The purpose of connecting the computer is only for configuration. After configuration, the computer can not be connected.

Click on ZLVircom's Device Management to find these two devices, as shown in Figure 25. Then click Device Edit to configure the device. Device couplet can be divided into TCP couplet and UDP couplet. If TCP is connected, the parameters of the two devices are shown in Figure 24. The parameters shown in the arrow must correspond to each other in the same way as the connection to the PC. After the TCP connection is successful, you can check the connection status by returning to the Device Management dialog box, as shown in Figure 25. If the status of the two devices is Connected, the TCP link between the two devices is established.

Figure 24 TCP Configure device couplet parameters

序	网络	设备名称	设备IP	目的IP	模式	TCP连接	虚拟串口
1	内网	ZLDEV0001	192.168.1.201	192.168.1.200	TCP Client	已建立	未设置
2	内网	ZLDEV0001	192.168.1.200	192.168.1.1	TCP Server	已建立	未设置

Figure 25 TCP The device couplet is successfully checked

For UDP couplet, the configuration parameters are shown in Figure 26. The parameters corresponding to the arrow must be one-to-one. UDP couplet As long as the parameters are correctly configured, you do not need to check the connection status. The sent data is automatically sent to the specified device.

Figure 26 UDP Configure device couplet parameters

Finally, it is necessary to remind you that if the device is couplet, in addition to the above Settings, you must also set the correct serial port parameters. The baud rate of the serial port server must be consistent with that of the user's device. After this

setting, user devices can send data to each other through the serial ports of the two serial servers.

4. Equipment debugging

4.1. Physical network connection

The serial port server can connect to the 10M/100M switch or computer network port using crossover cable or direct cable.

After the connection is established, check whether the Link indicator is green. Otherwise, check whether the network cable is properly connected.

4.2. Network TCP Connection

When the device is used to dynamically obtain IP addresses, it cannot be directly connected to the network port of the computer. There is no DHCP server available (usually a DHCP server is a router on a LAN). Therefore, specify an IP address for direct connection. The computer also needs a fixed IP address.

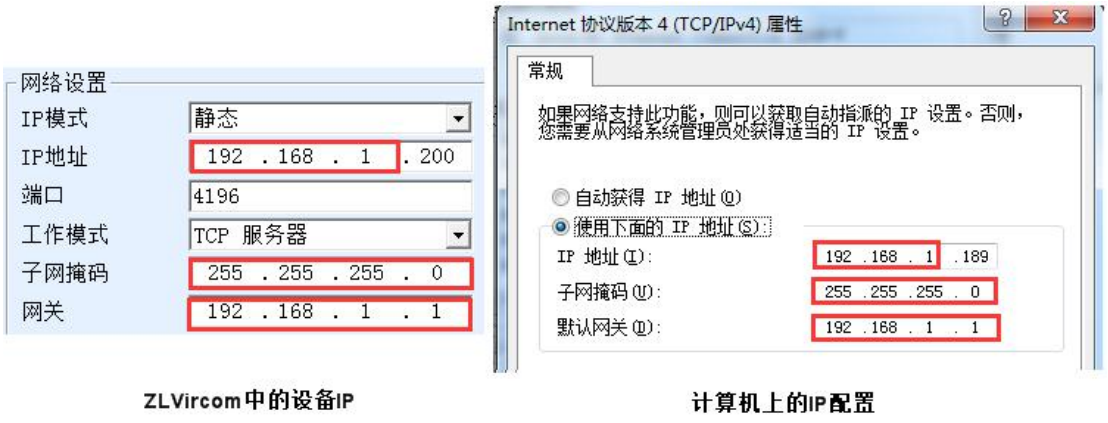


Figure 27 The configurations are on the same network segment

When configured as a static IP address, the device and the computer need to be on the same network segment (unless they communicate across gateways), whether directly or through a switch, as shown in Figure 27.

ZLVircom supports cross-network segment search and configuration, so the IP address that can be searched but cannot be communicated is not configured properly. In this case, ZLVircom can be used to configure the device in the same network segment.

After the configuration is complete, you can see that the Link indicator turns blue when establishing the TCP connection by using 1.3 TCP Communication Test or 1.4 Virtual Serial Port Test. Link indicator blue can also be seen through ZLVircom. For example, in the device management list, if the TCP connection column is "established", the Link indicator is blue, as shown in Figure 28, which is convenient for remote diagnosis.

设备管理

序	类型	设备名称	P.	设备IP	本地...	目的IP	模式	TCP连...	虚拟串口...	虚拟串口状...	设备ID	TXD	RXD
1	内网	ZLDEV0001		192.168.1.200	1024	192.168.1.189	TCP Client	已建立	未设置	未联通	B25ED458	88	44

Figure 28 Connection status and data sending status

4.3. Data sending and receiving

When the Link indicator turns blue, data can be sent and received between the software and the serial port server. At this point, if the software sends a data, the Active light turns green for at least a second. Data is also output from the serial port of the serial server, but whether the output data is correct depends on whether the correct serial port parameters (baud rate, data bit, stop bit, parity bit) are configured..

If the serial port sends a command correctly, the serial port device responds. If the serial port sends data to the network port, the Active turns blue. Otherwise, check whether serial port parameters or serial cables are properly connected.

In order to facilitate remote debugging, ZLVircom also supports remote viewing of data sent and received, as shown in Figure 28, where TXD is the amount of data sent by the serial port of the serial server. When refreshing the device list, if this value changes, it indicates that data has been sent, and the Active light will also be green. If you see RXD changing, the serial port device has returned data. Active is blue.

4.4. ZLVircom remote monitoring data

When the virtual serial port is used, ZLVircom supports real-time capture of data sent and received by the virtual serial port. It is convenient for users to debug the system：

Assume that the virtual serial port communication has been established as

described in 1.4 Virtual Serial Port Testing. Now you need to monitor the data going through the virtual serial port. Open the menu/configuration/software configuration/virCOM configuration dialog box of ZLVircom.

Figure 29 Start ZLVirocm monitoring

Check the options of enable monitoring, hexadecimal monitoring mode, and display data sending and receiving time, as shown in Figure 29. Then click OK. Assuming that data has been sent and received 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 30.

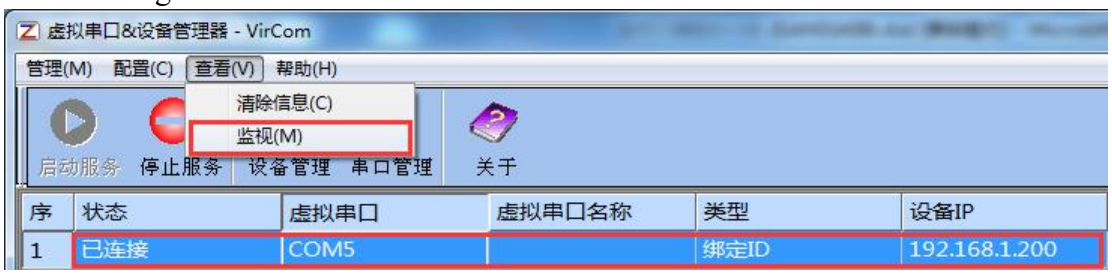


Figure 30 Open ZLVirocm monitoring

From the open dialog box, you can see the instructions sent by the upper computer and the instructions returned by the device, as shown in Figure 31. This function can facilitate the field communication debugging.

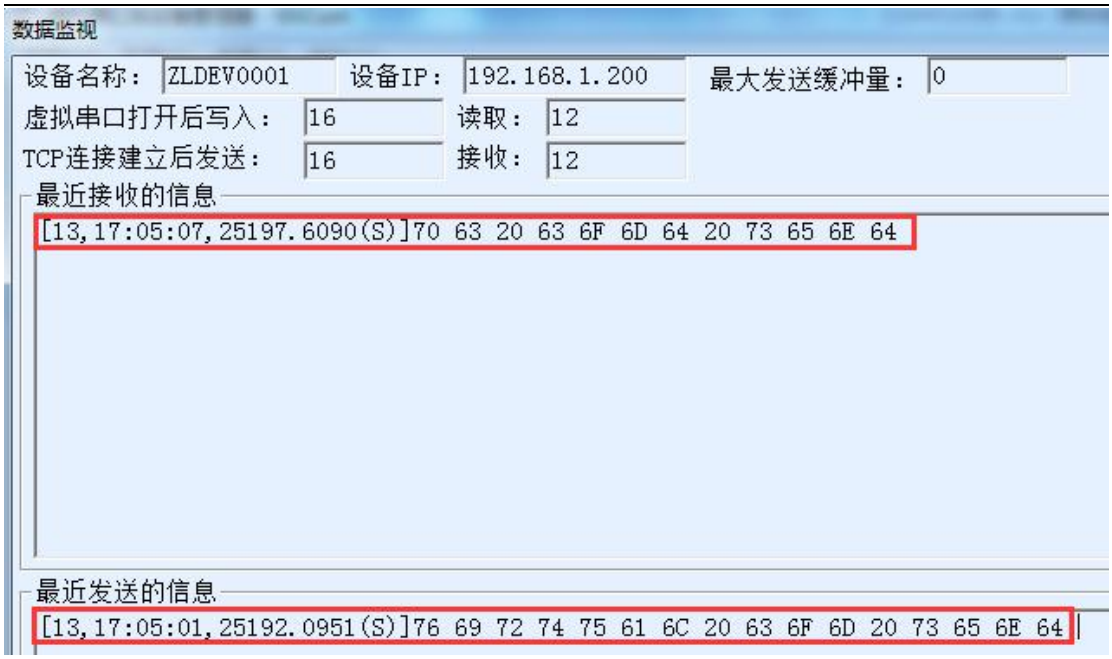


Figure 31 monitor receive and send data

5. Modbus Advanced function

The serial port server with Modbus gateway function has no station address and register itself. It is a communication bridge. It will generate Modbus RTU according to the Salve ID, function code, register number and register quantity in the Modbus TCP instruction sent by the user software to Modbus gateway, and output it from the serial port. Think of it as a protocol "translator".

5.1. Start Modbus gateway

First of all, the serial port server should support Modbus gateway, that is, the "Modbus TCP to RTU" function should be checked in the device Settings dialog box listed in Table 3.

By default, the serial port server works in transparent transmission mode. If you want to convert the serial port server to Modbus gateway mode, select Modbus TCPRTU in Conversion Protocol. After that, the device automatically changes port to 502 (the port of the Modbus server). This enables Modbus gateway.

The serial RTU device serves as the slave, so the Modbus TCP software of the

upper computer connects to port 502 of Modbus gateway. In this case, Modbus gateway needs to work in TCP server mode. If the serial port RTU serves as the master station, the Modbus gateway works on the TCP client, and the destination IP address is the IP address of the computer where the Modbus TCP software is installed. The destination port is usually 502.

5.2. Multi-master function

As shown in Figure 33, "RS458 multi-host support" and "RS485 bus conflict detection function" are the multi-host functions of Zhuolan. They are generally both enabled and disabled. After Modbus TCP is enabled, the device has the storage Modbus gateway function. Otherwise, the device has the non-storage Modbus gateway function. If the conversion protocol is none, it is generally possible to make the user-defined RS485 protocol also have the function of serial port equipment accessed by multiple hosts at the same time, which cannot be realized in the pure RS485 network, because multiple master stations will be sent at the same time in the RS485 bus conflict. The multi-host of zolan serial server can "coordinate" the RS485 bus so as to achieve the purpose of multi-host access.

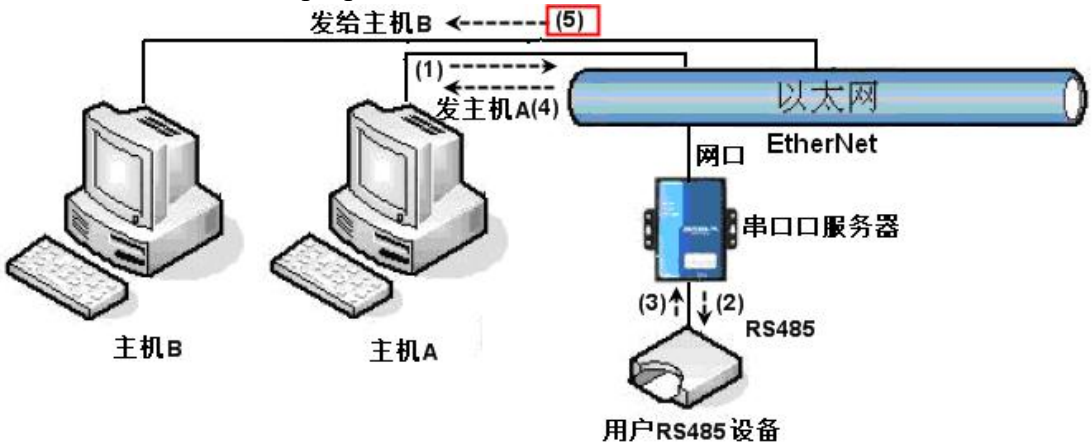


Figure 32 multi master function demo

As shown in Figure 32, when two hosts, host A and host B, are connected to the serial server at the same time, host A sends the command (1), the RS485 device receives the command (2), and the RS485 device returns the command (3). However, the port of the serial server sends the command (4) to host A and the command (5) to

host B. Because host B did not send a query, but it also received a reply command (5), host B may generate a communication exception error. In multi-host mode, there is only instruction (4) but no instruction (5), because the serial server automatically remembers the host to be returned and only returns the instruction to the nearest communicating host. The query from host A is returned to host A, and the query from host B is returned to host B.

Another function is that, in common mode, host A and host B simultaneously send data will produce instructions on the RS485 bus merge, so as to not be identified normally; In multi-host mode, the serial port server can schedule the sequence of A and B using the bus to effectively solve the problem of simultaneous access conflict.

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

5.3. Multi-master data

“RS458 Multi-host support” and “RS485 Bus conflict detection” are described as follows

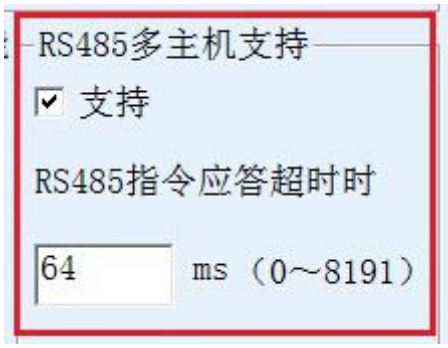


Figure 33 RS485 Multi-host support

The timeout time of RS485 command reply is the maximum interval between the serial port of the serial server sending the command and receiving the reply. The specified time must be greater than the actual maximum interval. Because if a timeout is determined, the next instruction will be sent.

Figure 34 RS485 Bus conflict detection time

RS485 bus conflict time: indicates the number of milliseconds that the serial port server waits to send the second instruction after receiving the reply of the first instruction. This parameter actually defines the speed of instruction rotation. It is recommended that the value be greater than 20ms. You do not need to change the maximum waiting time 3 seconds parameter.

When the user uses ZLVircom to set the conversion protocol to "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 automatically set according to the baud rate. However, if the user's Modus command is long or the conversion protocol is "None", you need to manually configure the two parameters.

The following describes recommended values for the preceding parameters：

1. Figure 34 shows RS485 Bus Collision Prevention Time. Generally, you can set it to twice of Packet Interval at the lower right corner of the parameter configuration page, but the minimum value cannot be less than 20.
2. Figure 33 shows "RS485 instruction reply timeout", which is generally determined by the length of the back and forth reply instruction. If the sending instruction is N bytes and the reply is M bytes, it is recommended to set the value as follows: Packet interval x (N+M+5) +100.

5.4. Storage and non-storage

ZLAN5143I is a storage Modbus gateway. Its advantage is that 5143I will automatically query and save the register value, which can speed up the return. However, in some cases, the value of the device will not be the desired value in the case of continuous rotation. In this case, the ZLAN5G40, a non-storage model, will come in handy. That is, 5G40 will send RTU query commands when Modbus TCP sends. Otherwise, 5G40 will not send RTU query commands. That is, it is a

non-storage Modbus gateway.

Please refer to "Introduction to Modbus" of ZLAN5143I for the introduction of storage models”.

6. LAN data modification

Network port parameter modification implements the function of searching for devices and modifying device parameters like zlVircom software, that is, managing devices and modifying parameters through the network port of the serial port server. Suitable for users who integrate search and configuration functions into their software.

Port modification parameters are implemented through UDP Management port Protocol, for example：

1. Computer software sends UDP broadcast packets with port 1092 on the network. When the device receives the packet, it returns its information to the computer software to search the device.
2. The computer software sends UDP parameter modification commands to port 1092 of the device to modify the device parameters.

For details about network port modification parameters, see the Zolan Networking Product UDP Management Port Protocol document. You can also use the device Management functions library in 7 device Management functions library.

7. Device management function library

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

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

Provides a detailed API interface documentation and VC call Demo case. It can realize device search, parameter modification, P2P function invocation, etc.

Can be gained from ZhuoLan website development libraries: search for

"equipment management function library" in http://zlmcu.com/download.htm pages. For details, please refer to "Zhuo LAN WinP2p and Device Management Development Library".

8. Serial port data modification

Users can read and set parameters by sending commands to the serial port of the serial server. Suitable for selecting chip or module level products through serial port control and configuration users. The parameters include THE IP address, baud rate, device name, and working mode. After setting the new parameters, restart the serial port server by running the serial port command.

ZLAN serial command has the following characteristics：

1. Serial port command uses 10 bytes of data lead code, so it is not necessary to distinguish communication data or command through another configuration pin pull low pull high, and there is no need to switch between command mode and communication mode, so the use is more flexible and convenient.
2. The command set contains various formats such as save parameter, do not save parameter, and restart device.
3. For example, you can read the MAC address of the serial server and change the working mode of the serial server. When you switch from the TCP server to the TCP client mode, you can actively connect to the server. You can disconnect the connection to the TCP server when switching from the TCP client to the TCP server.

For details about how to modify parameters over a serial port, see "Modifying Parameters over a Serial Port and Hardware TCPIP Stack".

9. Remote Device Management

Remote device management means that the ZLVircom software can be used to maintain and manage the device, including restarting the device, modifying parameters, and upgrading 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 carried out. Remote device management is classified into the following scenarios：

1. Automatic search: Under the same switch, no matter whether the device and computer are on the same network segment, ZLVircom on the computer searches for devices in the following way: ZLVircom sends broadcast query. After receiving the query, all devices reply their parameters to ZLVircom tool. This method searches all devices at once.

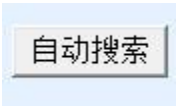


Figure 35 Auto search

2. Manual addition: There are two scenarios：

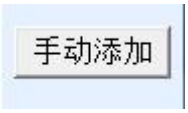


Figure 36 Manual add

   a) Large routers split the network: On some large networks, the broadcast packets are split by the router. As a result, the broadcast packets cannot reach the device, but the IP address of the ping device can be pinged. In this case, you need to add them manually. To manually add IP addresses, click Manually add in the Device Management dialog box to add the first and last IP addresses for each device.
   b) The public network server queries Intranet devices: The serial port server is on the internal network in TCP server mode, and zlvircom is on the server with a public IP address. In this case, you need to create a 1092 UDP port mapping on the router of the network where the device resides to map it to the IP address of the device. Then zlVircom manually adds the device. The IP address is the public IP address of the device.

3. TCP client: When the device functions as the TCP client, it initiates a TCP connection to port 4196 of the destination IP address (116.15.2.3). After the connection is established, zlVircom will automatically send its parameter system to UDP port of destination port (4196 in this case) at each live time, thus enabling

zlVirCOM to search for devices on this computer (116.15.2.3). If the destination port is not 4196, you need to modify the default parameter receiving port of ZLVIRcom by modifying the menu/configuration/software configuration/default listening port. After that, start ZLVIRcom. If TCP port conflict pops up, you do not need to continue the execution.

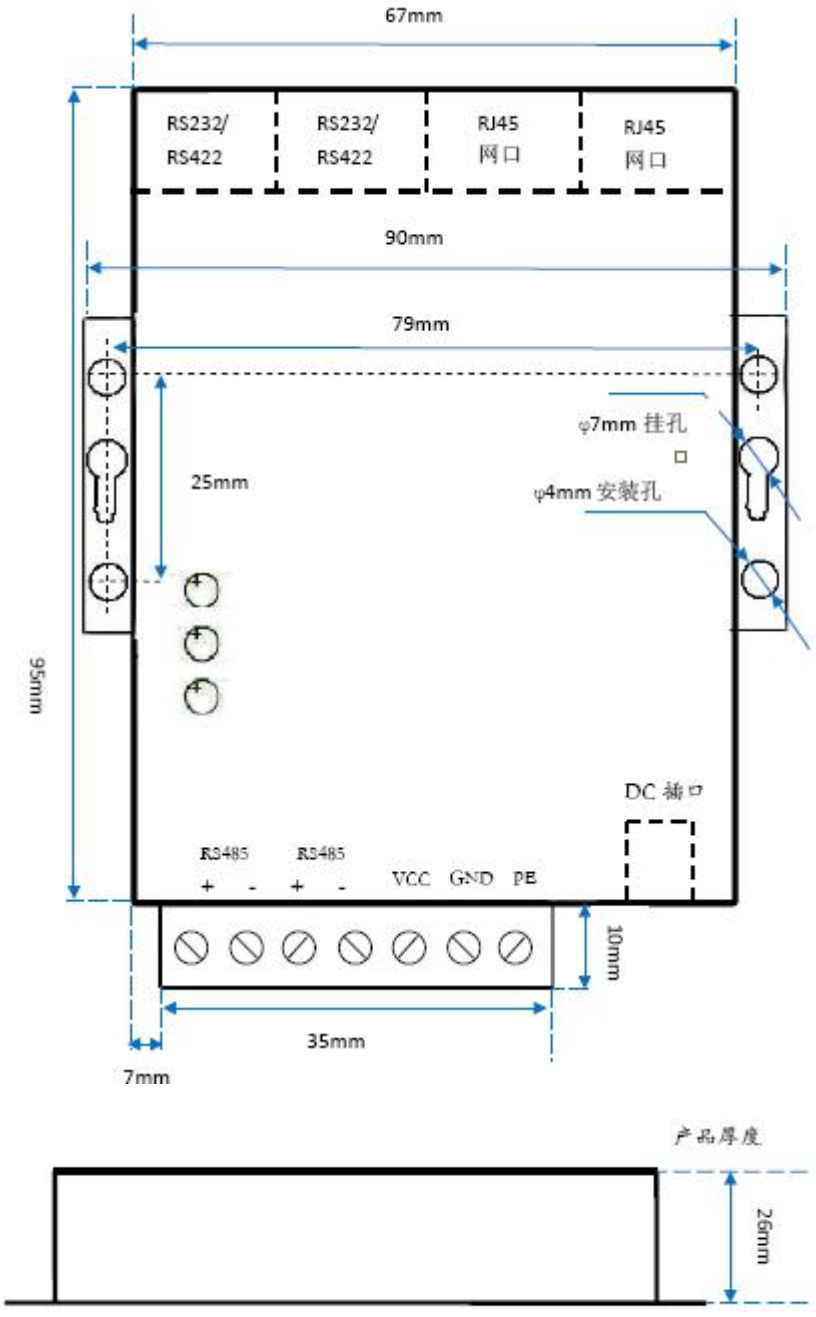
Figure 37 Client side

4. Scheduled parameters: Even if the serial port server uses the TCP server, you can select Scheduled Parameters to send parameters to the destination port of the DESTINATION IP address (116.15.2.3 in this example) every five minutes. Zlvircom, which receives parameters on this port of the server, can manage these devices.

Figure 38 Timing send parameter

To facilitate device identification, name the device easily to be remembered when you need to remotely manage the device.

10. Size



11. After sales service

Shanghai ZLAN Information Technology Co., Ltd.

Address: Room 2001, Shi Hong Jin Yuan Center, No. 28 Yuanwen Rd., Minhang

District, Shanghai, China（201199）

Tel：021-64325189

Fax：021-64325243A

Website：http://www.zlmcu.com

Email：support@zlmcu.com