# ZLAN5843A Serial Server

# Modbus Gateway User Manual

## 8 ports RS232/485 To TCP/IP converter

ZL DUI 20161028.1.0

**Version Data**

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**Ownership information**

# Catalogue

## 1. Summary

Zlan5843A is a new generation 8 serial port server developed by Shanghai Zhuolan Information Technology Co., Ltd., which can realize 8-channel serial port data conversion to TCP/IP and supports two 10M/100M Ethernet ports. Compared with Zlan5800A, Zlan5843A supports Modbus gateway function from Modbus TCP to Modbus RTU. Modbus Gateway supports simultaneous reading of data on multiple Modbus client connections, known as the "multi-host" function.

Zlan5843A supports 8 RS232 serial ports and 8 RS485 serial ports. RS232 is DB9 interface. RS485 uses pins 1 and 9 of DB9, and can be equipped with DB9 terminal interface board to facilitate connection by terminal mode. The user connects Zlan5443A to the network through a network cable. The upper computer can access 8 serial ports simultaneously through the virtual serial port or TCP protocol.

Zlan5843A supports 16 serial ports, 24 serial ports, 32 serial ports and up to 64 serial ports through the level of networking port expansion.



Chart 1 ZLAN5843AConnected module

Applications：

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

- All kinds of configuration software and equipment communication interface；

- Internet connection of equipment in the field of access control and security；

- Networked information collection for medical devices；

## 2. Features

2.1. Hardware speciality

1. 8 ports all support RS232, RS485.

2. 8 ports can work independently in full duplex without interference, and can be configured for different baud rates.

3. Support 2 network switch functions, can be used as a switch at the same time.

4. Rich indicator lights, each serial port has an independent TCP connection indicator and data activity indicator.

5. Shanghai ZLAN patented products, leading 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. The baud rate supports 1200 ~ 460800bps, the data bit supports 5 ~ 9 bits, and the check bit can be no check, odd check, even check, mark, space five ways, and supports CTS/RTS hardware flow control and XON/XOFF asfluidic control.

3. It supports the function of sending MAC address on the device connection to facilitate the cloud management of the device.

4. Provide computer - side search, configure equipment secondary development package DLL development library.

5. Support DHCP dynamic access to IP, DNS protocol connection domain name server address.

6. Support cloud remote device search and device parameters configuration.

7. Support remote viewing of the TCP connection status of the device through software. The virtual serial port supports data monitoring.

8. Support Modbus gateway function, support Modbus RTU to Modbus TCP.

9. Support multi-host function: under the query mode of one question and one answer,

support network port terminal allows multiple computers to access the same serial port device at the same time.

## 3. Technology Data

| Outline | | | |
|---|---|---|---|
| Interface： | RS232：DB9；RS485：DB9 lines 1 and 9; Two RJ45 ports | | |
| Power supply： | 5.5mm，+(inside),-(outside), standard power socket | | |
| Size： | L x W x H =27cm×10.5cm×2.6cm | | |
| **Communication interface** | | | |
| Ethernet： | 2 10M/100M, one can be connected arbitrarily, 2 kV class surge protection | | |
| Serial port： | RS232/485×8：RXD，TXD，GND， CTS，RTS，DTR，DCR | | |
| **Serial port parameters** | | | |
| Baud rate： | 1200~460800bps | Check rate： | None, odd, even, Mark, Space |
| Data bits： | 5～9 | Flow control： | RTS/CTS，DTR/DCR, NONE |
| **Software** | | | |
| Protocol： | ETHERNET、IP、TCP、UDP、HTTP、ARP、ICMP、DHCP、DNS | | |
| Configuration： | 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 Supply： | 9～24V DC | | |
| Consuption: | 5.4W | | |
| **Environment request** | | | |
| Operation temperature： | Industrial | -45~85℃ | |
| Storage temperature： | -65~165℃ | | |
| Moisture range： | 5~95% Relative humidity | | |

# 4. Hardware Instructions

ZLAN5843A Front view as Chart 2.



Chart 2 ZLAN5843A Front View

1．Size：L x W x H =27cm×10.5cm×2.6cm

2．Power supply：A standard power adapter (5.5mm positive core) or a power terminal can be used, as shown in Figure 2. The supply voltage can be 9 ~ 24V. Power supply current is more than 600mA.

3．LAN：

a) Normal LAN：The user connects Zlan5843A to a switch, hub or directly to a computer network card through this network port.

b) Level networking mouth：For cascading for ZLAN5843A, refer to the instructions in the cascading section of this document.

c) POE power supply：Zlan5843A can be supplied with power through two wires of pin 5 (GND) and pin 8 (VCC) at the ordinary RJ45 network port, and the power supply voltage is any value between 9 and 24V. RJ45 network line sequence refer to Figure 3. The default POE function is not enabled and needs to be customized.
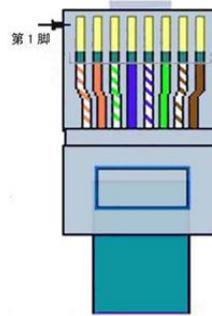
Chart 3 Cable line

4．Signal lights：

a) Data forwarding indicator ACT (white hair and blue) : When ACT light is on, it indicates that data is transmitted between Ethernet and corresponding serial port normally. When there is no data communication, ACT light is not on.

b) TCP connection establishment indicator LINK (green) : The LINK light indicates that the current TCP connection of the corresponding serial port has been established, and it can send and receive data normally.

c) Power indicator PWR (red) : Indicates that the serial server is powered on.

d) Network indicator light NET (orange) : indicates that the network cable of ordinary network port (non-level network port) has been connected.

5．Serial port：

a) DB9 interface.

| No. | Name | Function |
|---|---|---|
| 1 | 485+ | 485+ |
| 2 | RXD | The serial server receives pins |
| 3 | TXD | The serial server sends pins |
| 4 | DTR | After the flow control is enabled, the serial port server will accept data from the serial port device when the pin is 0 |
| 5 | GND | Ground wire |
| 6 | DCR | After the flow control is enabled, the serial port server will send data to the serial port device when the pin is 0 |
| 7 | RTS | After the flow control is enabled, the serial port server will accept data from the serial port device when the pin is 0 |

| 8 | CTS | After the flow control is enabled, the serial port server will send data to the serial port device when the pin is 0 |
| 9 | 485- | 485- |

b) Note that the sequence of serial port numbers is Port1～Port4 from right to left. Port4～Port8 It is arranged counterclockwise from left to right.

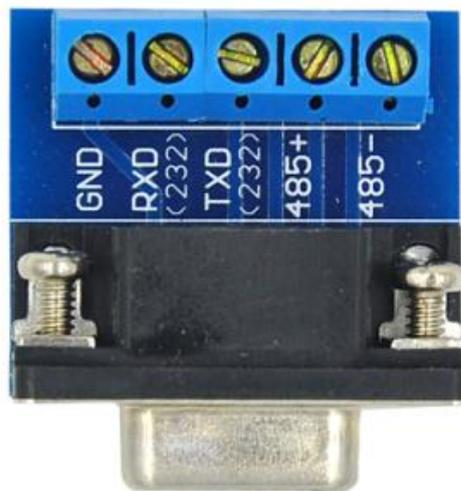c) For the convenience of RS485 connection, a DB9 to RS485 terminal adapter board is provided：



Chart 4 DB9To the terminal adapter plate

d) Zlan5843A complying with RS485 standard, each Zlan5843A can be equipped with 32 terminal 485 devices. The longest communication distance is 1200 meters. 485 terminal resistor is 120 ohm, generally in more than 300 meters of wiring when the use of terminal resistor. Note that when wiring, 485+ and 485- must be a pair of twisted pairs hinged together to reduce signal interference.

# 5. Usage

## 5.1. Usage Summary

After installation of Zhuolan ZLvircom, the equipment can be managed.

Power on ZLAN5843A and connect the network cable to the ordinary network port of ZLAN5843A. At this point, device management using ZLvircom software can see the interface as shown in Chart 5。

Chart 5 ZLVircom search for ZLAN5843A

The 8 lines here correspond to 8 serial ports inside Zlan5843A respectively. When delivered from the factory, serial ports 1 to 8 of Zlan5843A correspond to IP addresses of 192.168.1.201 ~ 192.168.1.208 respectively. Double-click on a row to configure and edit parameters for a particular serial port. Specific use details are described in the following sections.

## 5.2. Software installation

Zlvircom can be used to configure parameters such as device IP, as well as to create virtual serial ports. If you do not need the virtual serial port capability, you can download the installment-free version. Download address：http://www.zlmcu.com/download.htm

Chart 1 ZLVircom Version

| Software name | Instructions |
|---|---|
| ZLVircom device management tool （non-installed version） | non-installed version excludes virtual serial port function |
| ZLVircom device management tool （installed version） | installed version，includes ZLVircom_x64.msi and ZLVircom_x86.msi. 64bits operation system x 64，32 bits operation system install x 86 versions. |

Follow the default prompts when installing. After installation, ZLvircom will be started every time the computer is started to create a virtual serial port.

## 5.3. Parameter configuration

ZLVircom After the installation is completed and the hardware connection of the device is completed, run the ZLvircom software as shown in Chart 6, and then click "Device Management" as shown in Chart 7. Using Zlvircom, you can easily search and configure device parameters in different network segments, as long as the device is under the same switch as the computer running Zlvircom.
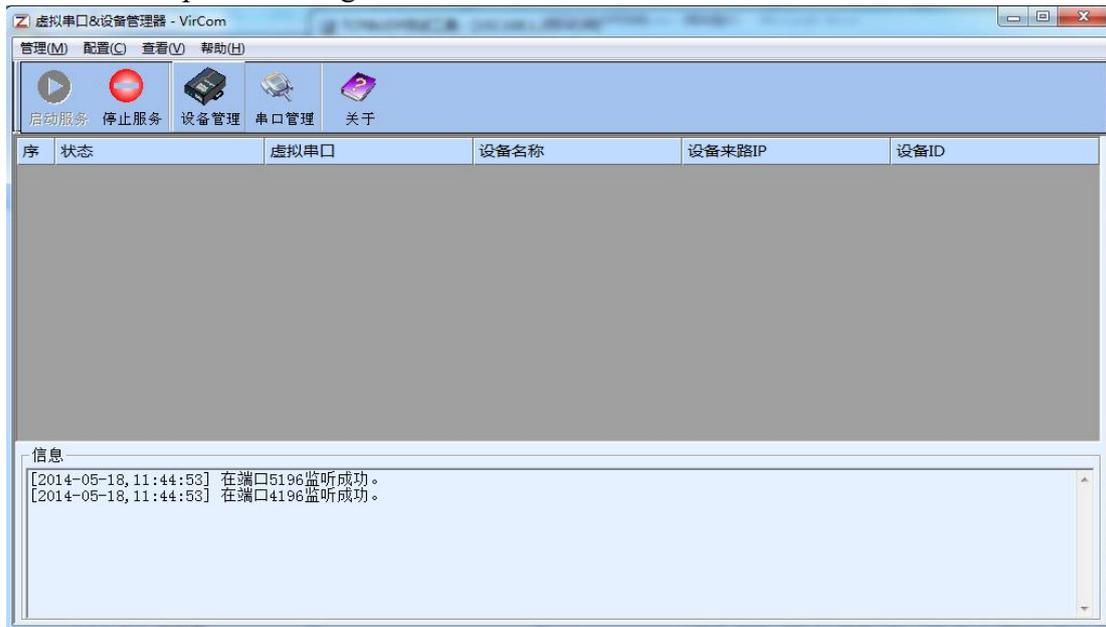


Chart 6 ZLVircom Main View
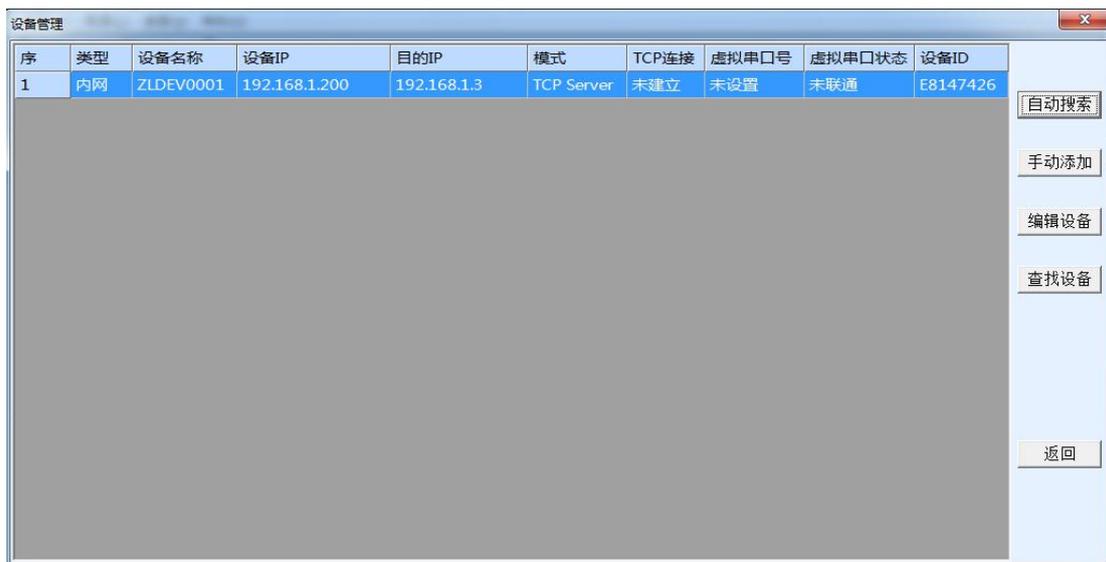


Chart 7 Device list

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



Chart 8 Device Data

In this interface, the user can set the parameters of the device, and then click "Modify Settings". The parameters will be set in the Flash of the device, and the power will not be lost. At the same time the device will automatically restart.

Here the main configuration parameters are: serial port setting in the baud rate, data bit, check bit; IP address, subnet mask and gateway in network Settings; Sometimes according to the computer software, also need to configure the serial port server working mode.

The meanings of other parameters are detailed as follows：

Chart 2 Parameter meaning

| Name | Range | Instructions |
|---|---|---|
| Virtual serial port | No、 create virtual serial port | You can bind the current device to a virtual serial port that has been created. Please first add COM port in "Serial Port Management" on the main interface. |
| Dev. Name | | Only show  number of the core module |
| Dev. Name | Random | You can give the device an easy-to-read name, up to 9 bytes, and support Chinese names. |

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| Dev ID | | Factory unique ID, not modifiable. |
|---|---|---|
| Firmware Version | | firmware version of the core module |
| functions supported by the device | | Refer to Table 3 for the functions supported by the device |
| IP mode | static、DHCP | Users can choose between static or DHCP (dynamic IP acquisition) |
| IP address | | IP address of the serial server |
| Interface | 0～65535 | The listening port for a serial Server when it is in TCP Server or UDP mode. As a client, it is better to specify port 0 to improve the connection speed. When using port 0, the system will randomly assign a local port. The difference between this and non-zero port is that :<br><br>(1) When the local port is 0, the module restarts with the PC and establishes a new TCP connection. The old TCP connection may not be closed, and there may be multiple false connections with the device. Generally, the upper computer wants to close the old connection when the module is restarted; Specifying a non-zero port closes the old connection.<br><br> (2) When the local port is 0, TCP takes faster time to re-establish the connection. When the serial port server is in TCP client mode, it also listens for connections as a TCP server on the port. Meanwhile, 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, | When set to TCP server, the serial server waits for the computer to connect; When set as a TCP client, |

| | UDP multicast | the serial server initiates a connection to the network server specified by the destination IP. |
|---|---|---|
| Subnet mask | eg：255.255.255.0 | Must be the same as the local LAN subnet mask. |
| Gateway | eg：192.168.1.1 | Must be the same as the local LAN gateway. |
| destination IP or domain name | | In TCP client or UDP mode, the data is sent to the computer indicated by the destination IP or domain name. |
| Destination port | | In TCP client or UDP mode, data is sent to the destination port of the destination IP. |
| Baud Rate | 1200、2400、4800、7200、9600、14400、19200、28800、38400、57600、76800、115200、230400、460800 | Serial baud rate |
| Digit bis | 5、6、7、8、9 | |
| Check bits | Non, even, odd, mark, space | |
| Stop bits | 1、2 | |
| Flow control | No 、 Hard flow control CTS/RTS, hard flow control DTR/DCR, soft flow control XON/XOFF | Only available for RS232 port |
| DNS server | | The DNS server IP is required when the destination IP is described by the domain name. When IP mode is DHCP, the DNS server is not specified, it will be automatically fetched from the DHCP server. |
| Objective mode | Static , dynamic | TCP client mode: in static destination mode, the device will automatically restart the device after 5 consecutive attempts to connect to the server. |

| | | |
|---|---|---|
| Conversion of agreement | NONE 、 Modbus TCP<->RTU、Real_COM | None means that data forwarding from the serial port to the network is transparent; Modbus TCP<->RTU will directly convert Modbus TCP protocol to RTU protocol, convenient for coordination with Modbus TCP protocol; Realcom is designed to be compatible with the old version of Real_COM protocol. It is a kind of protocol in the way of virtual serial port, but when using virtual serial port, it is not necessary to choose the Realcom protocol. |
| Keep running time | 0～255 | Interval of heart beats. (1) When 1 ~ 255 is selected, if the device is in TCP client operating mode, it will automatically send TCP heartbeat every "guaranteed time". This ensures the TCP validity of the link. Set to 0, there will be no TCP heartbeat. (2) Set to 0 ~ 254, when the conversion protocol is selected as the REAL_COM protocol, the device will send a length of 1 and content of 0 data every time to realize the heartbeat mechanism in the REALCOM protocol. When set to 255, there will be no RealCom heartbeat. (3) When set to 0 ~ 254, if the device is working on TCP client, the device will send device parameters to the destination computer every guaranteed time. When set to 255, there will be no parameter sending function, which can realize remote device management. |
| Disconnection and reconnection time | 0～255 | When in TCP client mode, a TCP connection is reinitiated to the computer at each "disconnect reconnect time" when the connection is not successful. Can be 0 to 254 seconds, if set to 255, |

| | | |
|---|---|---|
| | | means that reconnect is never done. Note first TCP connection (such as hardware on electricity, through zlvircom software restart equipment, countless according to lamp is) would immediately, only after the first connection failure will wait retry after "break time", so "break time" will not affect the normal situation of network and server connection is established. |
| Web Access Port | 1～65535 | The default is 80 |
| multicast address | | UDP multicast |
| Enable registration packs | | When the TCP connection is established, the registration packet is sent to the computer. You must select the Realcom protocol after enabling the registration package. Support TCP server and TCP client mode. |
| Packet length | 1～1400 | One of the serial port framing rules. Serial port server after receiving the length of data, the serial port has received the data as a frame sent to the network. |
| Packet spacing | 0～255 | Serial port framing rule two. When the data received by the serial port server has a pause, and the pause time is longer than this time, the received data will be sent to the network as a frame. |

The functions supported by the device are explained below：

Chart 3 Features supported by the device

| Name | Instructions |
|---|---|
| Web download | Support through the web page to control the serial output instructions, only the product with W tail has this function. |
| The domain name system | The destination IP can be the domain name (such as the WWW |

| | |
|---|---|
| | server address at the beginning). |
| REAL_COM protocol | A non-passthrough serial server protocol, suitable for multi-serial server to bind virtual serial port over the Internet. Because the protocol contains the device MAC address, it helps the upper computer to recognize the device. In general, it can not be used. |
| Modbus TCP To RTU | Only models with bit 3 for 4 support this feature. Can realize Modbus TCP to RTU. It also supports multi-host functionality. |
| The serial port modifies the parameters | Support serial port class AT instruction to configure and read device parameters. |
| Automatic IP acquisition | Support for DHCP client protocol |
| Storage extended EX functionality | Subsequent extension |
| Multi TCP connection | Supports more than 1 TCP connection when serving as a TCP server. |
| IO terminal control | Model 3 with digit 4 supports any custom instructions to control 8 IO outputs. |
| UDP broadcast | UDP broadcast |
| Multi-destinations IP | As a TCP client, it can connect to 7 destinations simultaneously. |
| Proxy server | Proxy server support (specific model required). |
| SNMP function | Support SNMP to Modbus RTU protocol, Only those with -snmp support this feature. |
| P2P function | Support through P2P crossing technology to achieve access to any network equipment function. Models with N tailings support this feature. |

## 5.4. TCP communication test

After the configuration of the device parameters, you can use the serial port tool, TCP debugging tool for TCP connection communication test.

Chart 9 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 10. 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 11. Enter "SocketSend" in SocketTest and click Send, then the data will be transferred to the RS232 interface through the network port of the serial port server, and then sent to ZLComdebug, and then displayed in ZLComdebug. Conversely, type "Comdebug Send" in ZLComdebug and click Send to send the socket test and it will be displayed.

This demonstration, serial port server to network port, network port to serial data transparent forwarding function.
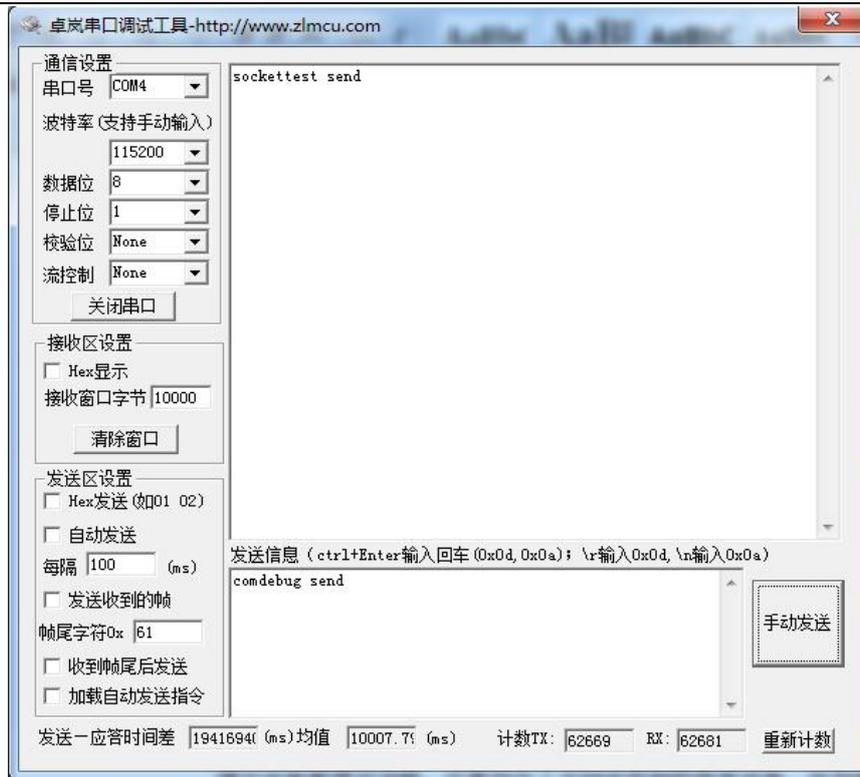
Chart 10 comdebug receive and send page



Chart 11 sockettest receive and send page

## 5.5. Virtual serial port test

The SocketTest in Chart 9 communicates directly with the serial port server through TCP. In order to allow the user to communicate with the serial port server, a virtual serial port should be added between the user program and the serial port server. As shown in Figure 12, ZLVircom and the user program run on a computer. Zlvircom virtualizes a COM port to correspond to the serial port server. When the user program opens COM communication, it can be sent to the user serial port device through the ZLvircom serial port server. Here's how to do this：
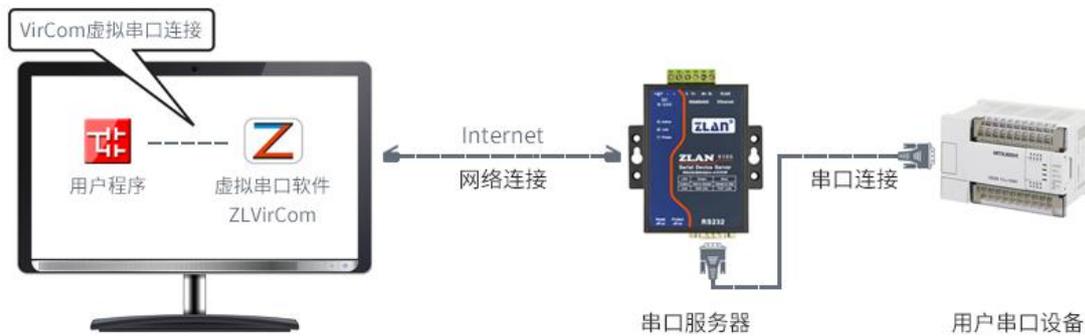


Chart 12    Virtual serial port function

Click "Serial Port Management" on the main interface of ZLvircom, then click "Add" and select "Add COM5", where COM5 is the original non-existent COM port of the computer.
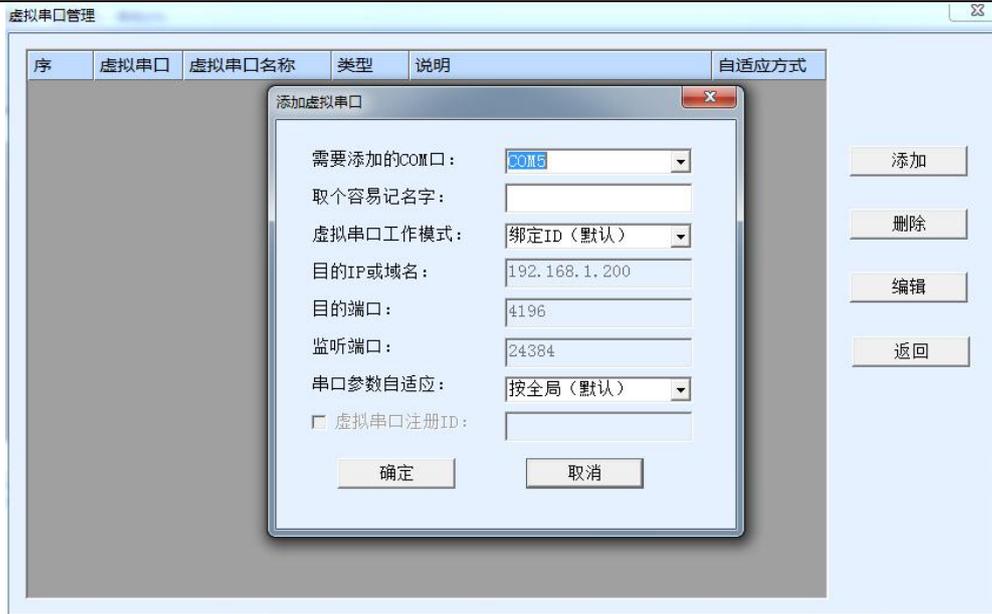
Chart 13 Virtual serial port

Then go to Device Management and double-click the device that needs to be bound to COM5. As shown in Figure 8, select COM5 from the list of Virtual Serial Ports in the upper left corner. Then click "Modify Settings." And returns to the main interface of ZLvircom. You can see that COM5 has been connected to the device with IP 192.168.1.200. You can use COM5 instead of SocketTest to communicate at this point.
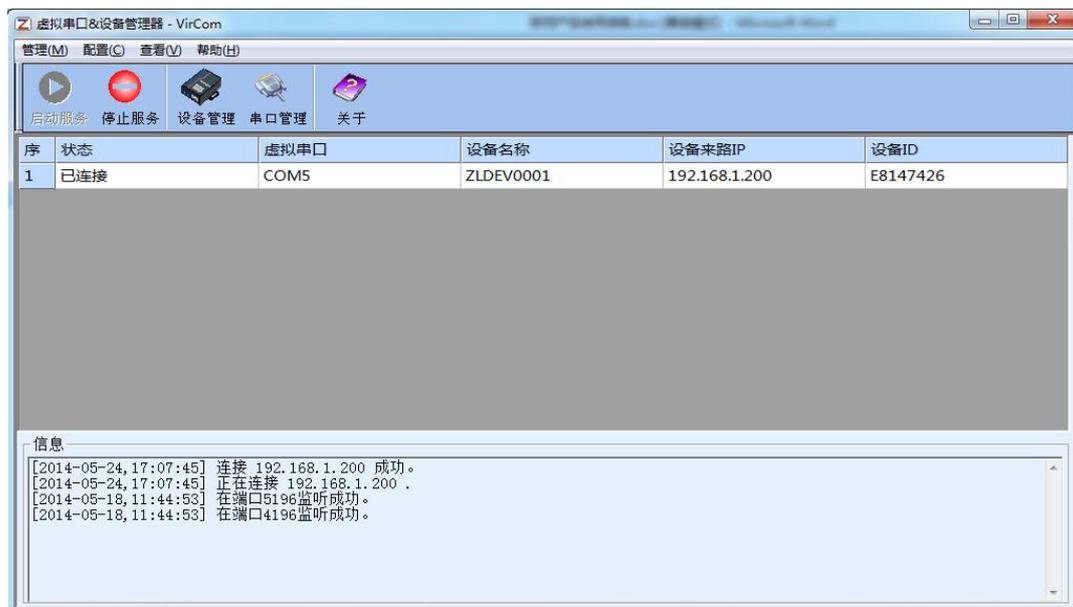


Chart 14 Virtual serial port connection

Open ZLCOMDEBUG to simulate the user's serial port program, open COM5(virtual serial port above), open another ZLCOMDEBUG to simulate a serial device, and open COM4(hardware serial port). At this time, COM5 sends the data link as follows: COM5ZLVIRCOM Serial Port Server Network Port Serial Port Server COM4. On the contrary, COM4 to COM5 can also transmit data: COM4 Serial Server Serial Server Network Port ZLVIRCOMCOM5. Chart 15 shows how the parties send and receive data.

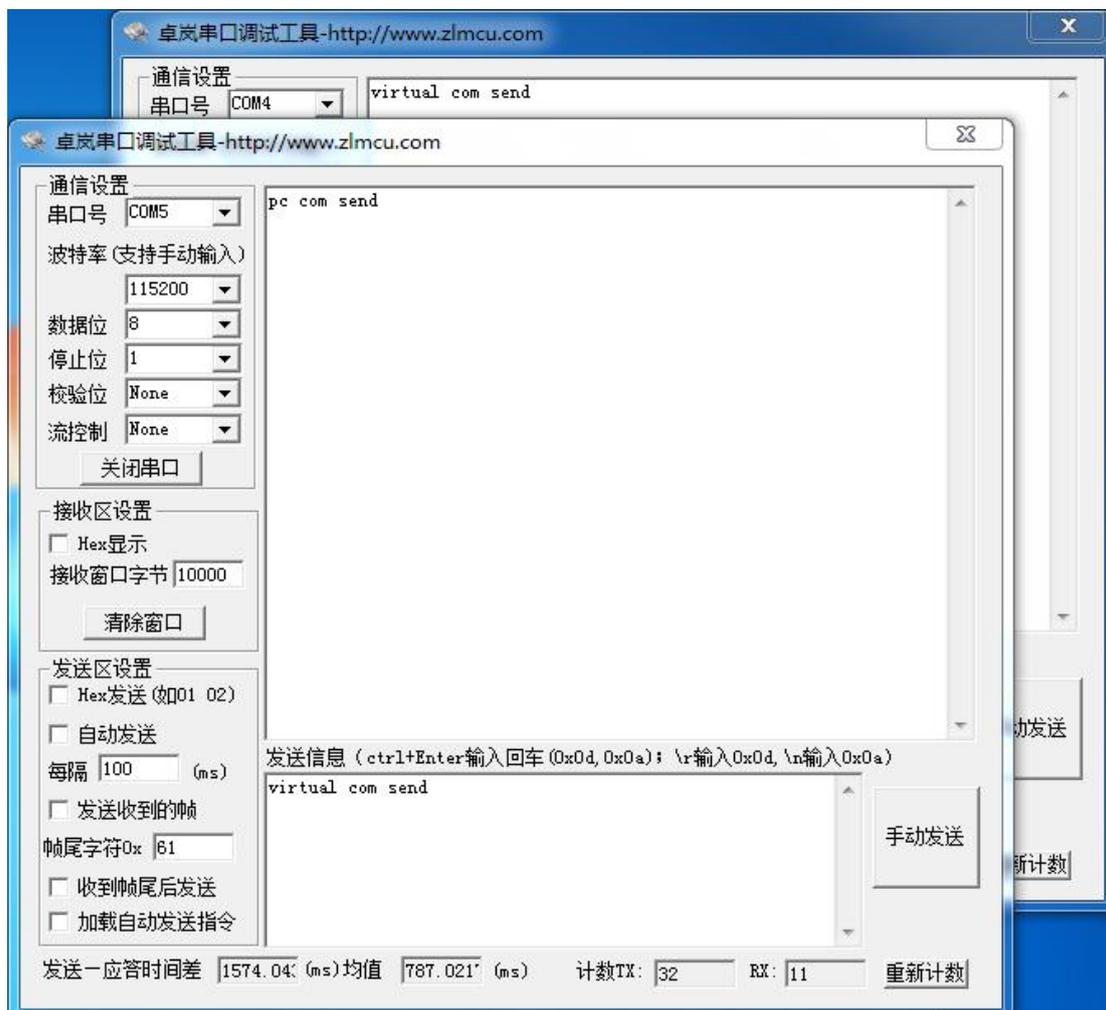If COM4 is changed into user serial port device, COM5 can realize the communication with user device.



Chart 15 communicate via virtual serial port

## 5.6. Modbus TCP Testing

By default, serial and network port data is transmitted transparently. If you want to

convert Modbus TCP to RTU, select the conversion protocol as "Modbus TCPRTU" in the Device Setup dialog box, as shown in Figure 16. At this time, the device port is automatically changed to 502. At this time, the user's Modbus TCP tool connects to port 502 of the IP of the serial port server, and the Modbus TCP instructions sent will be converted into RTU instructions and output from the serial port. For example, the serial port server receives the Modbus TCP instruction of 00 00 00 00 06 01 03 00 00 00 0A, and the serial port outputs the instruction of 01 03 00 00 0A C5 CD. Note: The serial port may send multiple 01 03 00 00 00 0A C5 CD instructions. This is because the default Modbus is stored and automatically rotates the query instructions. I'll show you how to switch to non-storage, right.



Chart 16    Start Modbus TCP function

If the user's Modbus TCP software is a Slave, it is required to change the working mode to the client on the basis of selecting the conversion protocol, change the destination IP to the IP of the computer where the Modbus TCP software is located, and the destination port is 502, as shown in Fig. 17。



Chart 17 Modbus TCP being client side

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# 6. Working mode and transformation protocol

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

Serial port server is basically divided into two types: virtual serial port and non-virtual serial port, as shown in Fig. 9 TCP communication schematic diagram and Fig. 12 function of virtual serial port respectively. The user software that needs to be connected with the virtual serial port is the serial port interface (COM port), that is, the user software and user equipment are serial ports; Non-virtual serial port user software is direct TCP/IP communication but user equipment is still serial.

In the non-virtual serial port mode, the "conversion protocol" is divided into three ways: transparent transmission, Modbus TCP to RTU and Realcom protocol. If the user's software is Modbus TCP protocol with fixed protocol and the lower computer is Modbus RTU, the mode of switching from Modbus TCP to RTU should be selected. The Realcom protocol is currently only used when multiple serial servers are connected to a server as TCP clients and virtual serial ports are used on the server.

The usage is summarized as follows：

<center>Chart 4Network configuration mode</center>

| No. | Virtual serial port mode | Operating mode of equipment | Conversion of agreement | Instructions |
|---|---|---|---|---|
| 1 | Yes | TCP server | none | Suitable for user software open COM port to actively collect data occasions. |
| 2 | Yes | TCP client | none | Suitable for the device on the initiative to send data, if the choice of TCP server may appear after the device disconnected can not be reconnected to the problem. |
| 3 | No | TCP server | Modbus TCP To RTU | The user software is Modbus TCP, and the user device is Modbus RTU. And Modbus TCP as the host. |

| 4 | No | TCP client | Modbus TCP To RTU | The user software is Modbus TCP, and the user device is Modbus RTU. And Modbus RTU as the master station. |
| 5 | Yes | TCP client | Realcom protocol | When using a virtual serial port as a TCP client, it is best to use the Realcom protocol. |
| 6 | No | TCP client | No | Applicable to a large number of devices, connected to a cloud way. In general, the cloud is a public network IP server on the Internet. |
| 7 | No | TCP server | No | Suitable for devices and computers are in the same local network, in the local monitoring, no need to cross the Internet communication. |

## 6.1. Virtual serial port mode

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

Also see if the monitoring computers and devices are on the local network：

a)  If the computer is rented on the Internet on a public network IP server, then the device is bound to use the TCP client way, let the device connect to the server. ② and ⑤ in Table 4 can be selected at this time, or ⑤ must be selected for multiple serial servers.

b)  All in the local network (can ping each other), it is the upper computer active query or the device initiative on the data. If the device is sent on the initiative must use the device to do TCP client ② mode, otherwise you can choose ① mode.

## 6.2. Direct TCP/IP communication mode

If neither Modbus TCP protocol conversion nor virtual serial port is required, then 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 convert TCP/IP data to serial port data and send it to the serial port device.

The general usage of this kind of user is their own development of the upper computer network communication software, integrated equipment serial communication protocol analysis. This method is more flexible and efficient than virtual serial port. This corresponds to ⑥ and ⑦ in Table 4.

In the section "5.4TCP communication test", we briefly describe how the serial server communicates when it acts as a TCP server. Here you'll see how the TCP client, UDP mode, and multiple TCP connections communicate with computer software. The example of computer software is SocketTest (software that mimics a user's TCP/IP communication).

The ZLAN serial port server abides by the standard TCP/IP protocol, so any network terminal that abides by this protocol can communicate with the serial port server. ZLAN Technology provides network debugging tools (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, their parameter configurations must be paired.

## 6.2.1. TCP client terminal mode

There are two working modes under TCP mode: TCP server and TCP client. No matter which mode is adopted, one side must be the server side, the other side is the client, and then the client can access the server side. Both are the client side or the server side cannot realize communication.

When the serial server is a client, there must be three corresponding relationships, as shown in Figure 18. (1) Correspondence of working mode: the working mode of the serial port server is the server mode of the network tool corresponding to the client; (2) Correspondence of IP address: the destination IP of the serial port server must be the IP address of the computer where the network tool is located; (3) Correspondence of port: the destination port of the serial port server must be the local port of the network tool. After this setting, the serial port server can automatically connect to the network tool, and the data can be sent and received after the connection is established.
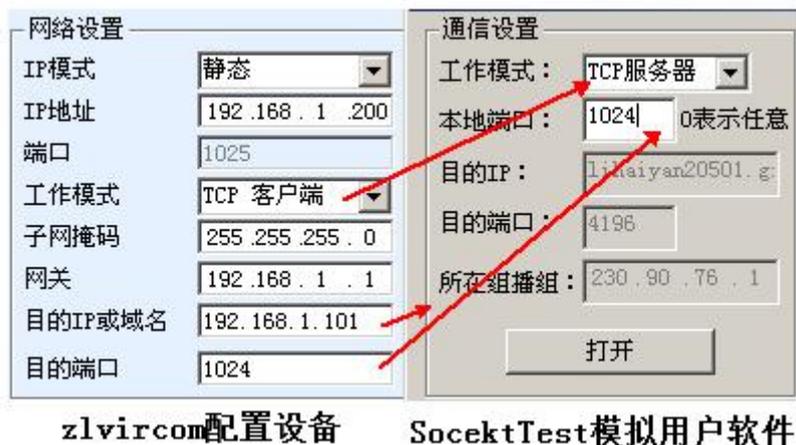
Chart 18 serial server being client terminal

## 6.2.2. TCP server mode

When the serial port server serves as the server, there are also three corresponding relationships, as shown in Figure 19, 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, data can be sent and received.
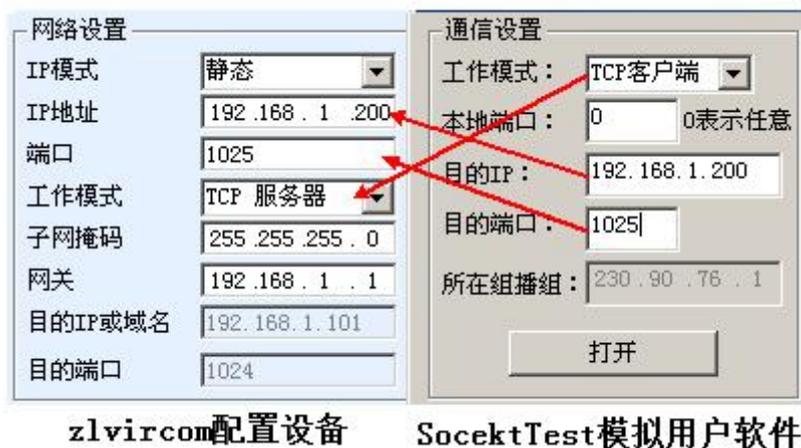


Chart 19　serial server being service terminal

Serial port server can accept 30 TCP connections at the same time. The data received by the serial port is forwarded to all established TCP connections. If you want data to be sent only to TCP that has recently received network packets, you need to enable multi-host functionality. Refer to 8.2 multi-host functionality.

### 6.2.3. UDP mode

In UDP mode, parameter configuration is shown in Figure 20. 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 working in UDP mode. 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 local port of the serial port server. As indicated by the blue arrow, the destination IP of the serial port server must be the IP address of the computer on which 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 can be configured to ensure two-way UDP data communication.
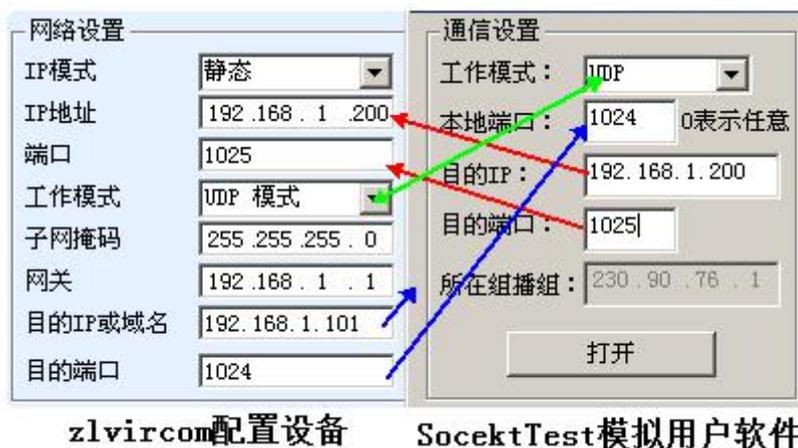


Chart 20 UDP mode data configurations

## 6.3. Equipment couplet mode

If the host machine is not a Socket program (SocketDlgTest) or a virtual serial port, but the two devices are connected through the network port, the configuration method is similar. First, users need to connect two devices and computers to the same LAN. This computer is running ZLVircom and is connected to the computer only for configuration purposes, so the computer does not need to be connected once the configuration is complete.

Click Device Management of ZLvircom to find the two devices, as shown in Figure 22. Then click "Device Edit" to configure the device. Device couplets can be divided into TCP couplets and UDP couplets. In the case of TCP connection, the parameters of both devices are shown in Figure 21. The parameters shown by the arrow must correspond as if they were connected to a PC. After successful TCP connection, you can check the connection status by

returning to the "Device Management" dialog box, as shown in Figure 22. If the status of both devices is "Connected", it means that the TCP link between the two devices has been established.



Chart 21 TCP Equipment couplet parameter configuration

| 序 | 网络 | 设备名称 | 设备IP | 目的IP | 模式 | TCP连接 | 虚拟串口号 |
|---|---|---|---|---|---|---|---|
| 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 |

Chart 22 TCP Equipment couplet successfully checked

In the case of UDP connection, the configuration parameters are shown in Figure 23. The parameters corresponding to the arrows must be one-to-one. As long as the parameters of UDP couplet are configured correctly without checking the connection status, the data sent will be automatically sent to the specified device.



Chart 23 UDP Equipment couplet parameter configuration

Finally, I need to remind you that if the device is connected to each other, in addition to the network port parameters as set above, you must also set the correct serial port parameters. The baud rate of the serial server is mainly consistent with the baud rate of the user's equipment. When this is set up, user devices can send data to each other through the serial port of the two serial servers.

# 7. Equipment debugging

## 7.1. Network physical connection

The serial server can be connected to a 10M/100M switch or directly to a computer network port using a cross or direct network cable.

After the connection is established, the first step is to check whether the LINK light is green. Otherwise, please check whether the network cable is well connected.

## 7.2. Ethernet TCP connection

When the device is used as a means of dynamic IP acquisition, it cannot be directly connected to the computer network port. Because there is no DHCP server available (usually a DHCP server is a router on the LAN). So please specify IP when connecting directly. The computer also needs to specify a fixed IP.
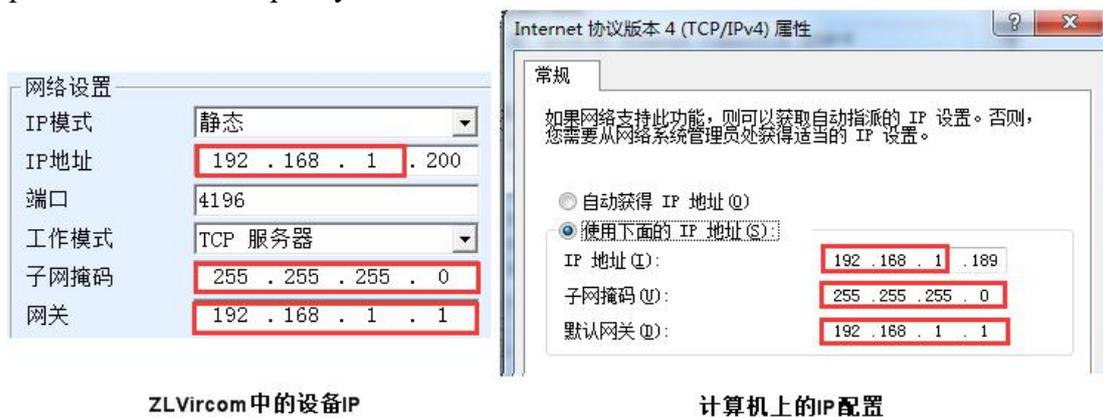


Chart 24 Configured on the same network segment

Whether connected directly or via a switch, when configured for static IP, the device and the computer need to be on the same network segment (unless communicating across gateways), as shown in Figure 24.

Since ZLvircom supports cross-network segment search and configuration, the IP address

that can be searched but cannot be communicated is generally not well configured. In this case, the device can be configured in the same network segment with ZLvircom.

You can see that the Link light turns blue when establishing a TCP connection. The blue of the Link light can also be seen by 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 25, which can facilitate remote diagnosis.



| 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 |

Chart 25 Connection state and data sending and receiving state

## 7.3.  data sending and receiving

When the Link light turns blue, data can be sent and received between the software and the serial server. At this point, if the software sends a data, the ACTIVE light will turn green, lasting at least 1 second. Data is also exported from the serial port of the serial port server, but the correct output depends on the configuration of the correct serial parameters (baud rate, data bits, stop bits, check bits).

For the correct command issuing, the serial port device will reply. Once there is a reply (the serial port sends data to the network port), then ACTIVE will turn blue. Otherwise, please check whether there is a problem with the serial port parameters or the serial port line.

In order to facilitate remote debugging, ZLvircom also supports remote viewing of sending and receiving data, as shown in Figure 25, where TXD is the amount of data sent by the serial port server. When refreshing the device list, the change of this value indicates that there is outgoing data, and the ACTIVE light will also be green. If you see a change in the RXD value, it indicates that the serial port device has returned data. Active is blue.

## 7.4.  ZLVircom Remote monitoring data

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

Suppose that the virtual serial port communication has been established according to the

method of 5.5 virtual serial port test. Now you need to monitor the data passing through the virtual serial port. Open the ZLvircom Menu/Configuration/Software Configuration/Vircom Configuration dialog.
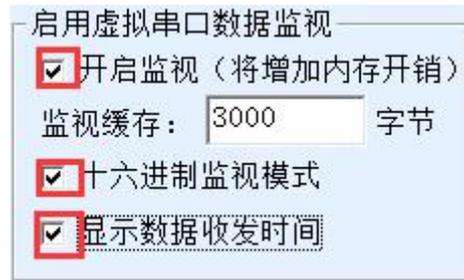


Chart 26 Start ZLVirocm monitoring

Check the three options to enable monitoring, hexadecimal monitoring mode, and display the data receiving and receiving time, as shown in Figure 26. Then click OK. Assuming that you have sent and received data before, now select a virtual serial port that you want to monitor on the main screen, and then select Menu/View/Monitor, as shown in Figure 27.
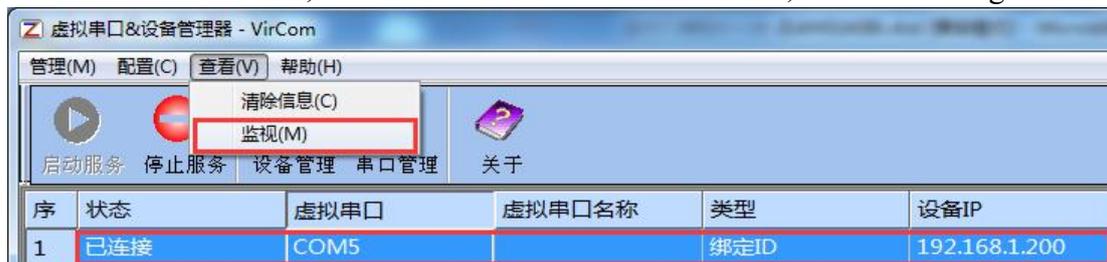


Chart 27 open ZLVirocm monitoring

From the open dialog box, you can see the instructions issued by the upper computer and the instructions returned by the device, as shown in Figure 28. This function can be convenient for field communication debugging.
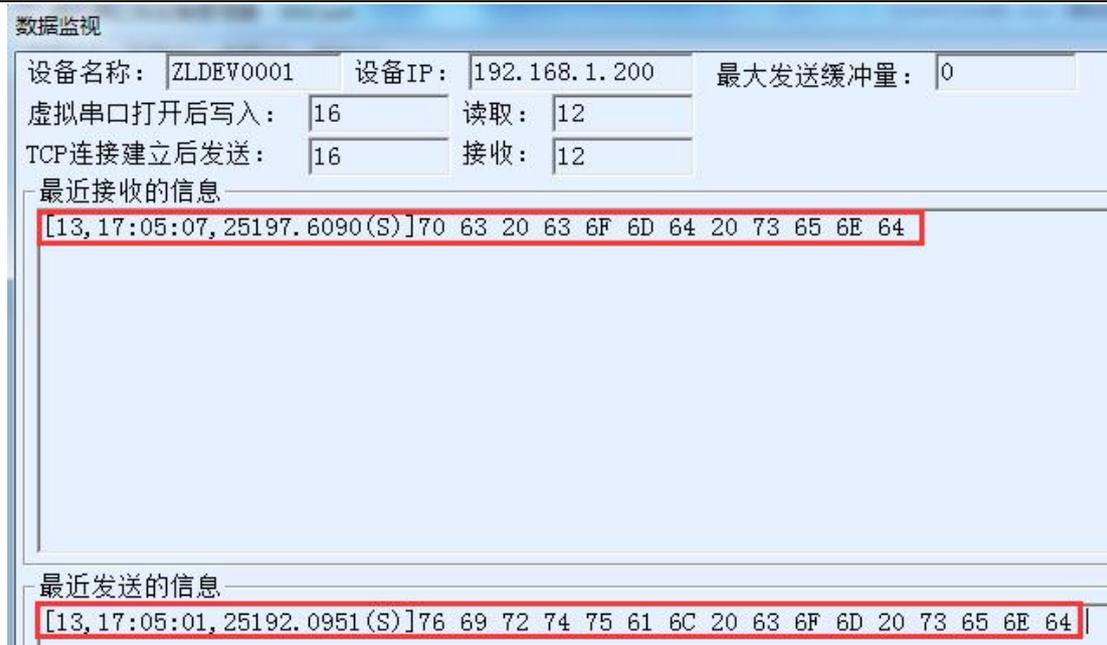
Chart 28 Monitoring and receiving data

## 8. Modbus Advanced function

Serial port server with Modbus gateway function does not have station address and register itself, it is a communication bridge, it will generate Modbus RTU specification according to the Salve ID, function code, register number and register number in the Modbus TCP instruction sent by user software to Modbus gateway, and output it from the serial port. Think of it as a protocol "translator".

### 8.1. Start Modbus gateway

First of all, the serial server should support Modbus Gateway, i.e. the "Modbus TCP to RTU" function in Table 3 of the Device Settings dialog box should be checked.

By default, the serial server is in normal pass-through mode. If you want to convert to Modbus gateway mode, please select the option Modbus TCPRTU in the "Conversion Protocol". The device then automatically changes the "port" parameter to 502 (the port of the Modbus server). The Modbus gateway is now enabled.

The serial port RTU device serves as the slave station, and the upper 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 master station, the Modbus gateway works on the TCP client, and the destination IP is the IP of the computer where the Modbus TCP software is located. The destination port is usually 502.

## 8.2. Multi-master function

As shown in Chart 30, "RS458 multi-host support" and "RS485 bus collision detection function" are the multi-host functions of Zhuolan. They are generally both enabled and disabled. When enabled, devices that convert the protocol to Modbus TCP have the function of storage Modbus Gateway, otherwise it is non-storage Modbus Gateway. If the conversion protocol is not, it can generally let the user-defined RS485 protocol also has the function of a serial port device that multiple hosts access at the same time, which is impossible to achieve in the pure RS485 network, because multiple master stations send at the same time will produce conflicts on the RS485 bus. Multiple hosts of Zhuolan serial port server can "coordinate" the RS485 bus to achieve the purpose of multi-host access.
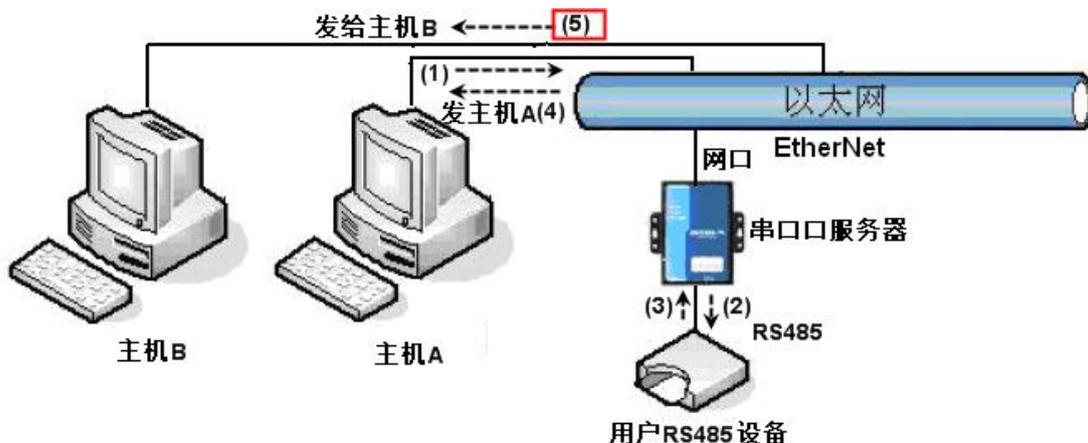


Chart 29 Multi-host function demonstration

As shown in Chart 29, in the ordinary mode, when two hosts, Host A and Host B, are connected to the serial port server at the same time, Host A sends instruction (1), RS485 receives instruction (2), and RS485 returns instruction (3). However, the network port of the serial port server sends instruction (4) to Host A and (5) to Host B at the same time. Because Host B did not send the query, but it also received the reply command (5), Host B may generate a communication exception error. In multi-host mode, there are only instructions (4)

and no instructions (5), because the serial server automatically remembers the host to be returned and only returns instructions to the nearest communication host. Host A queries only reply to A, and Host B queries reply to Host B.

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

If the conversion protocol is "none", multi-host function will not be enabled by default. When multi-host is required, please click "More Advanced Options" in the device configuration dialog box, and then tick "RS485 Multi-host Support".

## 8.3. Multiple host parameters

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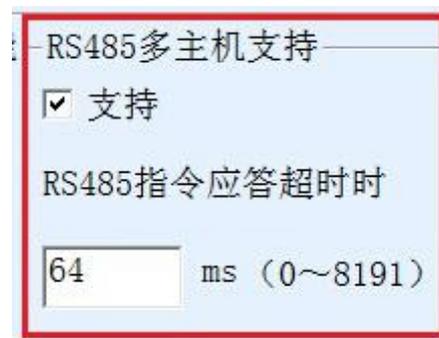


Chart 30 RS485 Multi-host support

Among them, RS485 instruction reply timeout is: the maximum time interval between the serial port server sending this instruction and receiving the reply from the serial port. The time entered should be greater than the actual maximum time interval. Because if the timeout is determined, the next instruction will be sent.
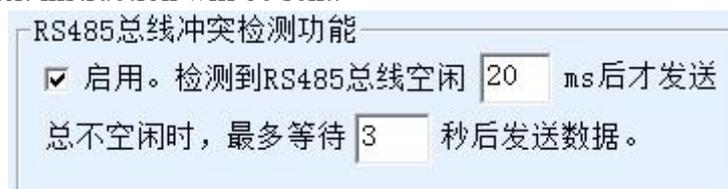


Chart 31 RS485 collision proof idle time

RS485 bus collision time: indicates how many milliseconds 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 the instruction rotation. This value is recommended above 20ms. The "maximum wait time of 3 seconds" parameter is generally not modified.

When the conversion protocol is selected as "Modbus TCP to RTU" by the user using ZLvircom, ZLVricom will automatically check the above two enabling boxes (unless the user manually enters the advanced option to remove them), and the above two times will be automatically configured according to the baud rate. However, if the user has a long MODUS command or if the conversion protocol is "none", you need to manually configure these two parameters.

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

1. Chart 31 shows "RS485 bus collision prevention time", which can be generally set as twice of the "packet interval" in the lower right corner of the parameter configuration interface, but the minimum can not be less than 20.

2. Chart 30 shows "RS485 instruction reply timeout", which is generally determined according to the length of the back and forth instructions. If the sent instruction is N bytes and the reply is M bytes, then the recommended setting value is: "packet interval" $\times$ (N+M+5) +100.

## 8.4. Storage and non-storage

Zlan5143I is a storage Modbus gateway. Its advantage is that 5143I can automatically query and save the value of registers, which can speed up the return time. But there are times when the value of the device is not what you want in the case of continuous training, and the Zlan5G40 is a non-memory type that comes in handy. The 5G40 will send the RTU query instruction when the Modbus TCP is sent, otherwise the RTU query will not be sent, i.e. the non-storage Modbus gateway.

For the introduction of storage type, please refer to "Introduction to Modbus" of Zlan5143I.

# 9. Modify parameters of network port

Parameter modification of network port is to realize the function of searching device and

modifying device parameters like ZLvircom software, that is, to manage device and modify parameters through the network port of serial port server. Suitable for users who integrate search and configuration functions into the user's software.

Network port modification parameters are implemented through the UDP management port protocol, such as：

1. The computer software sends UDP broadcast packets over the network at the destination port 1092. When the device receives the data packet, it will return its information to the computer software to search the device.

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

# 10. Device management library

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

The "UDP management port protocol" has been 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 call.

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

The development library is available on the ZLAN website ：http://zlmcu.com/download.htm page search for "Device management function library".

# 11. Serial port modification parameters

Users can read and set parameters by sending instructions to the serial port of the serial port server. Suitable for users who choose chip or module level products to be controlled and configured through serial ports. Parameters that can be set include: IP address, baud rate, device name, working mode, etc. After the new parameters are set, the serial server can be restarted through the serial command.

The ZLAN serial command has the following characteristics：

1.  Serial instructions use 10 bytes of data leading code, so there is no need to separate communication data or commands by pulling down and pulling up other configuration pins, 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 a variety of command formats such as save parameters, do not save parameters, restart device, etc.

3.  It can realize a variety of applications, such as reading the serial port server MAC address, such as changing the serial port server working mode 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.

## 12. Remote device management

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

For the ZLvircom software, as long as the device can be found in the device list, it can be managed remotely. Remote management of devices falls into the following categories：

1.  Auto Search：segment, ZLvircom on the computer to search the device is: ZLvircom sends a broadcast query → All devices receive the query and return their parameters to the ZLVircom tool. This method searches all devices at once.
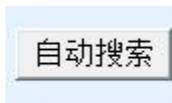
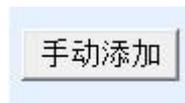

Chart 32   Auto search

2.  Manually add：includes 2 cases：



Chart   33 Manually add

a)  Large routers split the network：On some large networks, broadcast packets are split by routers so that they can't reach the device, but ping the device's IP is all right. This time generally need to manually add to solve. The method of manual addition is to

click "Manual Add" in the "Device Management" dialog box to add the beginning and end IP and then query the devices one by one.

b) The public server queries the Intranet device：Serial server on the internal network and as TCP server mode, ZLvircom on the public IP server. At this point, a port map of 1092 UDP should be made on the router of the network where the device is located to map it to the IP where the device is located. Then ZLvircom manually adds the device, which is the public network IP of the device.

3. TCP client terminal：When a device acts as a TCP client, it initiates a TCP connection to port 4196 of the destination IP (116.15.2.3). After the connection is established, it will automatically send its own parameter system to the UDP port (note not TCP port) of the destination port (here is 4196) at each guaranteed time, so that ZLvircom can search for the device on this computer (116.15.2.3). If the destination port is not 4196, you need to change the default port of ZLvircom by changing the menu/configuration/software configuration/default listening port, and then start ZLvircom. If a TCP port conflict pops up, you can continue.



Chart 34 Client terminal

4. Timed transmission parameter：Even if the serial port server is in TCP server mode, it can also tick the function of "Timed Send Parameter", which will send the parameter to the destination port of the destination IP (here, 116.15.2.3) every 5 minutes. Zlvircom, which receives parameters on this port on this server, can manage these devices.



Chart 35 Timed transmission parameter

In order to facilitate the identification of the device, if the need for remote management, please give the device an easy to remember name.

# 13. Cascading methods

The Zlan5843A supports cascading, which allows the Zlan5843A to easily expand to 16-port, 24-port, and 32-port converters. Engineering transformation and upgrading are more convenient.

When cascading, the level network port (Uplink RJ45) of the upper stage Zlan5843A is connected to the common network port (RJ45) of the lower stage Zlan5843A by the level network cable provided by the manufacturer (actually the short parallel network cable). This cascading step can be continuous, scaling up to 8 levels.

By default, each stage of the Zlan5843A needs power. If the power supply is needed through the level networking line, the manufacturer needs to customize.
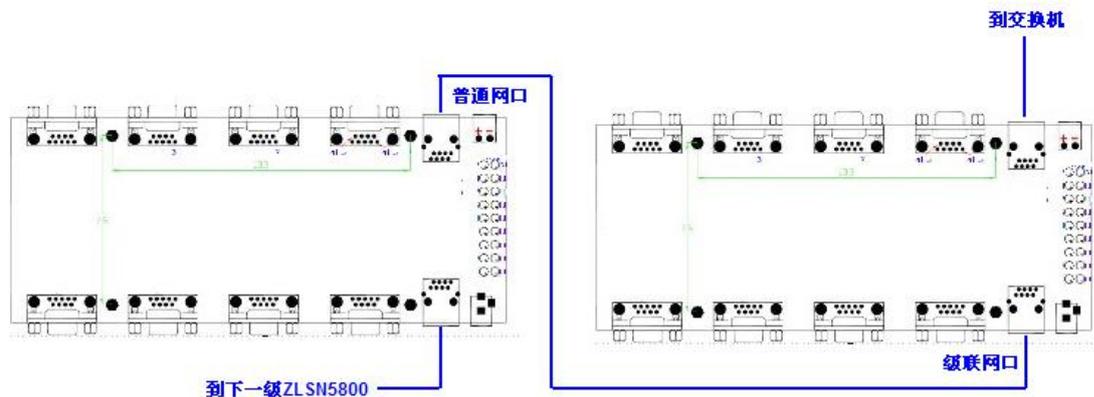


Chart 36 ZLAN5843A Cascade method
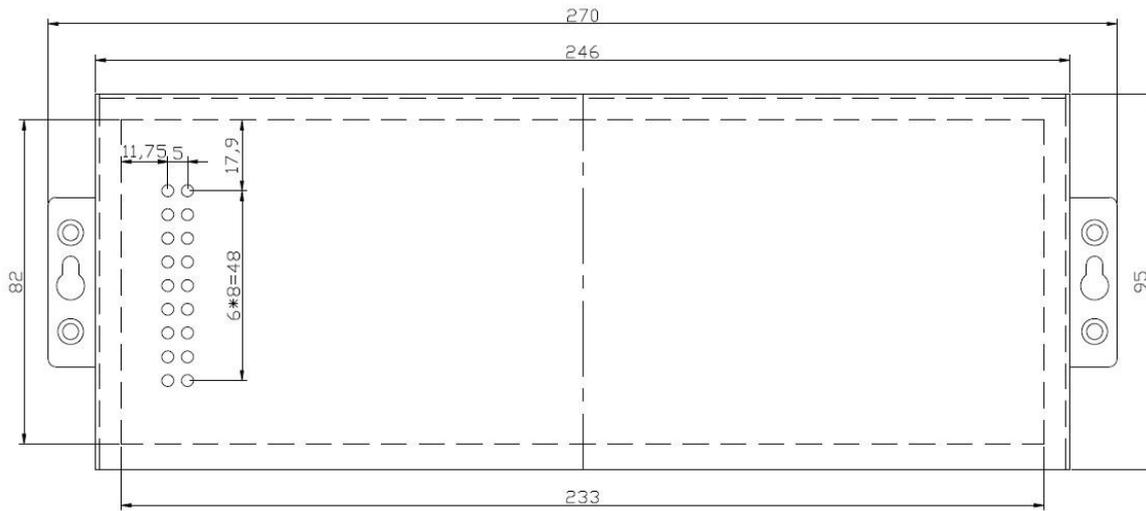
## 14. Mounting dimension



Chart    37 ZLAN5843A mounting dimension

## 15. After-sales service and support

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