

# **ZLAN5443H Serial Device Server**

## **Modbus Gateway User Manual**

**4 serial ports RS232/485/422**

**To TCP/IP Converter**

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ZL DUI 20150413.1.0



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## Table of contents

1.Overview.....	5
2.Features.....	6
2.1.    Hardware Features.....	6
2.2.    Software Features.....	7
3.Technical Parameters.....	7
4.Hardware Description.....	8
5.Instructions.....	11
5.1.    Usage Overview.....	11
5.2.    Software Installation.....	12
5.3.    Parameter Configuration.....	12
TCPCommunication Test.....	17
5.5.    Virtual Serial Port Test.....	20
5.6. Modbus TCPtest.....	twenty two
6.Working Mode and Conversion Protocol.....	twenty three
6.1.    Virtual Serial Port Mode.....	25
6.2.    directTCP/IPCommunication Mode.....	25
6.3.    Equipment pairing method.....	27
7.Equipment Debugging.....	29
7.1.    Network Physical Connections.....	29
7.2.    networkTCPconnect.....	29
7.3.    Data transmission and reception.....	30
7.4. ZLVircomRemote Monitoring Data.....	30
8. MODBUSAdvanced Features.....	31
8.1.    EnableModbusGateway.....	32
8.2.    Multi-host capability.....	32
8.3.    Multi-Host Parameters.....	33
8.4.    Storage and non-storage.....	34
9.Network port parameter modification.....	34

10.Device Management Library.....	35
11.Modify parameters via serial port.....	35
12.Remote Device Management.....	36
13.Cascade Method.....	37
14.Installation dimensions.....	39
15.After-sales service and technical support.....	39

## 1.Overview

ZLAN5443H is a new generation developed by Shanghai Zhuolan Information Technology Co., Ltd. It is a 4-serial port server. It can realize 4-serial port data transfer TCP/IP, supports two 10M/100M Ethernet ports. ZLAN5443H supports Modbus TCP, change Modbus RTU to Modbus Gateway functionality. Modbus The gateway supports multiple Modbus. The client connects to read data simultaneously, which is the "multi-master" function.

ZLAN5443H Sub-model ZLAN5443H-H Support up to 921.6 kbps The baud rate of ZLAN5443H Supports connecting as a client Purpose IP.

ZLAN5443H supports 4 individual RS232 Serial ports, 4 individual RS422/485 Serial ports. Users connect ZLAN5443H When connected to the network, the host computer can simultaneously use the virtual serial port or TCP Protocol Access 4 serial ports.

ZLAN5443H Support expansion through tiered networking ports 8 Serial ports, 12 Serial ports, 16 Serial ports, can be expanded to 32 Serial ports.



picture1 ZLAN5443HSerial Server

### Applicable to:

- Power electronics, smart meters and energy consumption monitoring;
- As an IoT gateway, it serves as a communication bridge between devices and the cloud;
- Various types of automation PLC Remote monitoring and program download;
- Various configuration software and equipment communication interfaces;
- Networking of equipment in the field of access control and security;
- Network information collection of medical equipment;

## 2.Features

### 2.1.Hardware Features

1. 4All serial ports support RS232, RS485, RS422 Three serial ports.

twenty four Each serial port can work in full-duplex independently without interfering with each other and can be configured with different baud rates.

3.support2It has the network switch function of 4 network ports and can be used as a switch at the same time.

4.Rich indicator lights, each serial port has an independentTCPConnection indicator and data activity indicator.

5.Shanghai ZLAN patented product, leading technology. Patent No.ZL 2014 2 0108890.3.

## 2.2.Features

1.supportTCP Server,TCPClient,UDPmodel,UDPMulticast.TCP Server Support10 individualTCPconnect.

2.Baud rate support1200~460800bps, data bit support5~9The parity bit can be no parity, odd parity, even parity, mark, space, etc.CTS/RTSHardware flow control andXON/XOFF Soft fluid control.

3.Support sending on device connectionMACAddress function, convenient for cloud management of devices.

4.Provide secondary development package for computer-side search and device configurationDLLDevelopment libraries.

5.supportDHCPDynamic acquisitionIP,DNSProtocol connection domain name server address.

6.Supports remote search of devices and configuration of device parameters in the cloud.

7.Support remote viewing of the device through softwareTCPConnection status. The virtual serial port supports data monitoring function.

8.supportModbusGateway function, supportModbus RTUchangeModbus TCP.

9.Support multi-host function: In a question-and-answer query mode, the network port allows multiple computers to access the same serial port device at the same time.

## 3.Technical Parameters

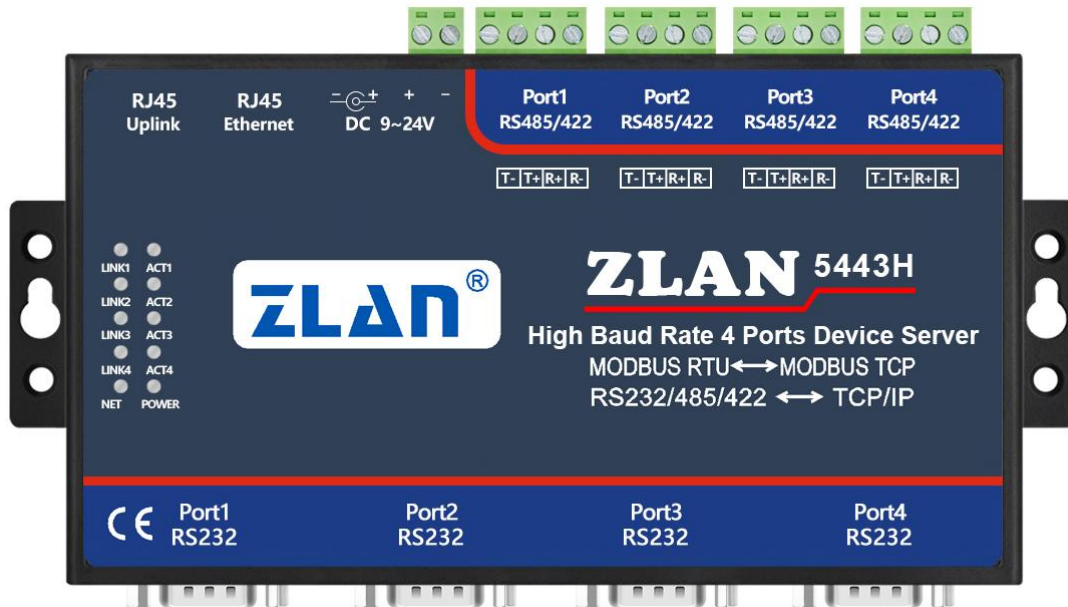
<b>shape</b>	
interface:	RS232:DB9,RS485: Terminal,RS422: Terminal
power supply:	5.5mm, positive inside and negative outside, standard power socket
size:	L x W x H =9.2cm×19.7cm×2.5cm
<b>Communication interface</b>	
Ethernet:	10M/100M,2 KVLevel surge protection
Serial Port:	RS232/485/422×4:RxD,TxD,GND,CTS,RTS,DTR,DCR
<b>Serial port parameters</b>	

Baud rate:	1200~460800bps	Verification:	None,Odd parity, Even parity, Mark, Space
Data bits:	5~9Bit	Flow Control:	RTS/CTS,DTR/DCR, NONE
<b>software</b>			
protocol:	ETHERNET,IP,TCP,UDP,HTTP,ARP,ICMP,DHCP,DNS, Modbus TCPprotocol		
Configuration method:	ZLVirCOMTools, device management function library		
way of communication:	Socket, virtual serial port, device management function library		
<b>Operating mode</b>			
TCP server, TCP client, UDP, UDPMulticast			
<b>Power Requirements</b>			
power supply:	9~24V DC		
Power consumption	5W		
<b>Environmental requirements</b>			
Operating Temperature:	Industrial Grade	- 40~85°C	
Storage temperature:	- 65~165°C		
Humidity range:	5~95%Relative humidity		

#### 4. Hardware Description

ZLAN5443H The front view of 2 shown.





picture2 ZLAN5443HFront view

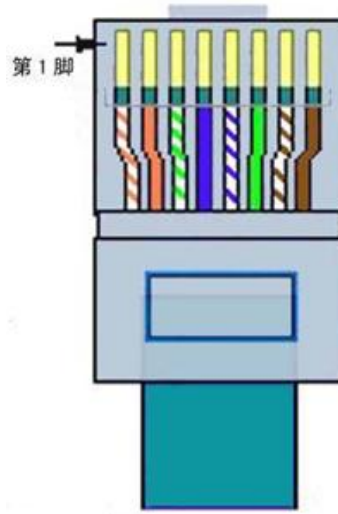
1.size:L x W x H =9.2cm×19.7cm×2.5cm

2. Power supply: You can use a standard power adapter (5.5mmThe inner core is positive) or power supply wiring

The supply voltage can be9~24V, the power requirement is greater than5W. 3.

Network port:

- a)Ordinary network port: Users can use this network port toZLAN5443HConnect to a switch, hub, or directly to a computer's network card.
- b)Level network port: used forZLAN5443HFor cascading, refer to the description of cascading in this document.
- c) POEPower supply: through ordinaryRJ45Network port pinout5 (GND) and pins8 (VCC) Two wires can giveZLAN5443HPower supply, the supply voltage is9~24VAny value in between. RJ45Network cable sequence reference diagram3.



picture3Network cable sequence

4. Indicator light:

- a) Data forwarding indicator ACT: ACT When the light is on, it indicates that data is being transmitted normally between the Ethernet and the corresponding serial port. ACT light is not on.
- b) TCP Connection established indicator LINK: LINK The light is on, indicating that the corresponding serial port is TCP The connection has been established, and data can be sent and received normally.
- c) Power Indicator PWR: Indicates that the serial device server has been powered on.
- d) Network indicator light NET: Indicates that the network cable is connected.

5. Serial port:

- a) 485/422 Serial port: as 485 When using, just connect 2 Root line, as 422 When using, connect 4 Root wire. The wire sequence is shown in the figure 2 shown.

ZLAN5443H conform to RS485/422 Standard, each ZLAN5443H Can bring 32 Terminal 485 Device. Maximum communication distance 1200m. 485 The terminal resistance is 120 Ohm, generally more than 300 Terminal resistors are only necessary when wiring 1 meter. 485+ and 485- It must be a pair of twisted wires twisted together to reduce signal interference.

surface1 RS422 Wiring method

Serial number	ZLAN5443H of 422 Wire	With users RS422 Corresponding connection line
1	485-, T-	R-
2	485+, T+	R+
3	R+	T+
4	R-	T-

b) 232Serial port: StandardDB9Pin connector.

surface2 RS233wiring

Serial number	name	Function
2	RxD	Serial port server receiving pin
3	TXD	Serial port server sending pin
4	DTR	When flow control is enabled, this pin is0The serial device server will receive data from the serial device.
5	GND	Ground
6	DCR	When flow control is enabled, this pin is0The serial port server sends data to the serial port device only when
7	RTS	When flow control is enabled, this pin is0The serial device server will receive data from the serial device.
8	CTS	When flow control is enabled, this pin is0The serial port server sends data to the serial port device only when

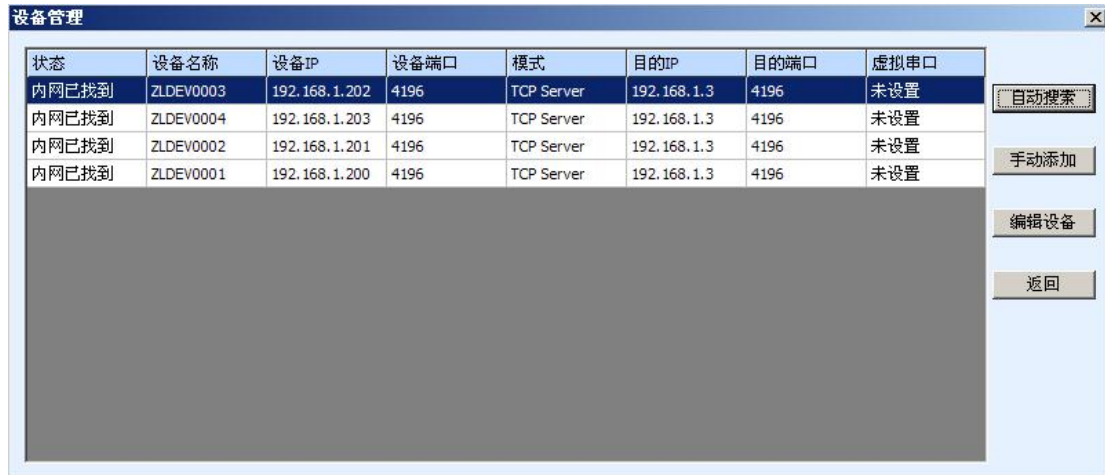
## 5.Instructions

### 5.1.Usage Overview

Install ZLANZLVircomThe device can be managed later.

GiveZLAN5443HPower on, connect the network cableZLAN5443HAt this time, useZLVircom The device management of the

software can be seen as shown in the figure4The interface shown.



picture4 ZLVircomSearchedZLAN5443H

here4The rows correspond toZLAN5443HInternal4Serial ports, when shipped from the factory, ZLAN5443HSerial port1~Serial Port4Corresponding toIPThe address is192.168.1.200~192.168.1.203.

Double-click a row to configure and edit the device.

5.2. Software Installation

ZLVircom Available for devices IP Configuration of parameters such as , and creation of virtual serial port. If the virtual serial port function is not needed, you can download the installation-free version. Download address: <http://www.zlmcu.com/download.htm>

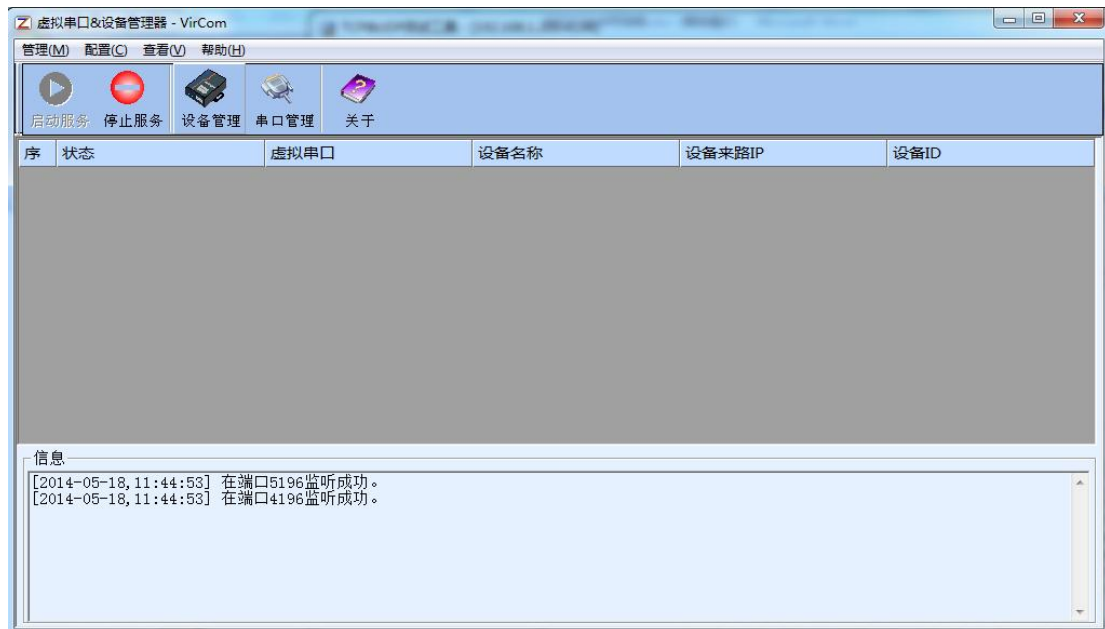
surface3 ZLVircomVersion

name of software	illustrate
ZLVircomDevice Management Tool (Non-installation version)	The non-installation version does not include the virtual serial port function.
ZLVircom-Device Management Tool (Installation Version)	Installation version, which contains ZLVircom_x64.msi and ZLVircom_x86.msi. 64-bit operating system installation x64, 32-bit operating system installation x86 Version.

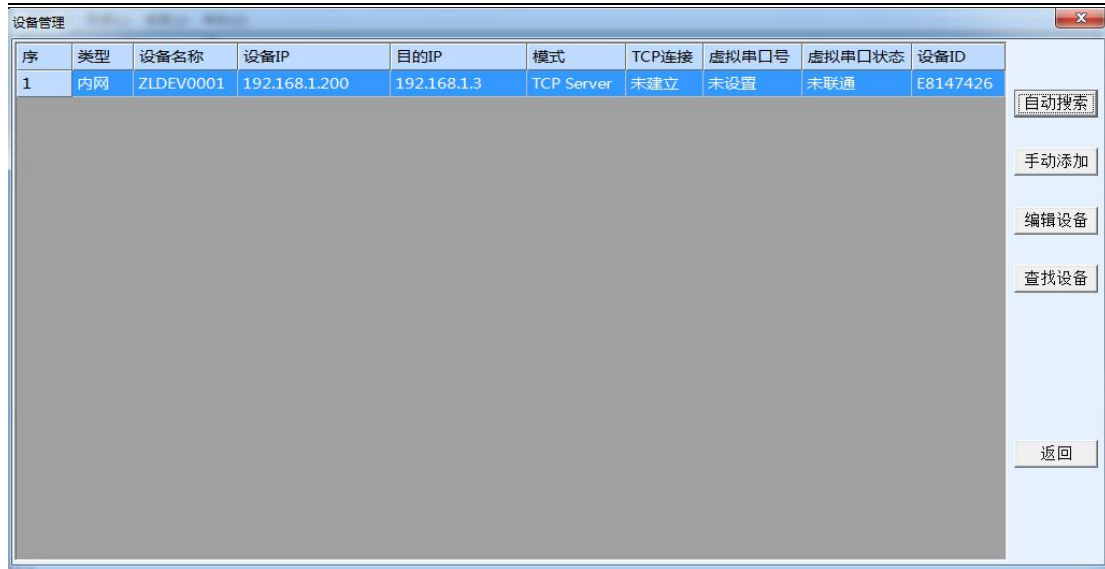
When installing, just follow the default prompts. After installation, it will start every time the computer starts zlvir.com, used to create a virtual serial port when booting.

5.3. Parameter configuration

ZLVircom After the installation is complete and the device hardware is connected, run ZLVircom Software as shown 5. Then click "Device Management" as shown in the figure 6. As shown. Use ZLVircom It is very convenient to search and configure device parameters in different network segments. ZLVircom All computers can be connected to the same switch.



picture5 ZLVircomMain interface



picture6Device List

You can see all the currently online devices in the device list. Click "Edit Device" to configure the parameters.



picture7Device parameters

In this interface, users can set the parameters of the device, and then click "Modify Settings" to set the parameters to the device. The data will not be lost when the power is off. The device will automatically restart.

The main configuration parameters here are: baud rate, data bit, check bit in the serial port settings; IP address, subnet mask, gateway; sometimes, depending on the computer software, it is also necessary to configure the working mode of the serial port server.

The detailed meanings of other parameters are as follows:

surface4Parameter meaning

parameter name	Ranges	meaning
Virtual Serial Port	Virtual string not used or created mouth	You can bind the current device to a created virtual serial port. Please add it in the "Serial Port Management" on the main interface firstCOMmouth.
Device Model		Only display the core module model
Device Name	Any	You can give the device a human-readable name, up to 9 Words Section, support Chinese names.
equipmentID		Factory only ID, Unchangeable.
Firmware version		Core module firmware version
The device supports Function		Reference Table 5 Device supported features
IPmodel	Static, DHCP	The user can select static or DHCP (Dynamic acquisition IP)
IPaddress		Serial port server IP address
port	0~65535	The serial port server is in TCP Server or UDP Mode monitoring Listen port. When acting as a client, it is best to specify the port as 0 port, It is helpful to improve the connection speed when using 0. The system will follow the port The machine is assigned a local port. The difference between this and the non-zero port <b>yes:</b> (1) The local port is 0. When the module is restarted and PC machine Re-create a new TCP connection, old TCP connection available The device may not be closed and multiple fake connections may exist. Generally, the host computer hopes to close the old connection when the module restarts; specify A non-zero port will close old connections. 2) The local port is 0 hour, TCP Re-establishing the connection takes less time. The serial port server is in TCP In client mode, it also acts as TCP The server listens for connections on port. TCP Client The local port number used to connect to the server is "port +1".
Operating mode	TCP Server mode, TCP Client mode, UDP model, UDPMulticast	Set as TCP When the server is on, the serial port server waits for the computer Connect; Set to TCP When the client is Towards the goal IP The specified network server initiates the connection.

Subnet Mask	For example:255.255.255.0	Must be the same as the subnet mask of the local area network.
Gateway	for example:192.168.1.1	Must be the same as the local LAN gateway.
PurposeIPor domain name		existTCPClient orUDPIn this mode, data will be sent to the destination IPOr the computer indicated by the domain name.
Destination Port		existTCPClient orUDPIn this mode, data will be sent to the destination IPThe destination port of the
Baud rate	1200,2400,4800,7200, 9600,14400,19200, 28800,38400,57600, 76800,115200,230400, 460800	Serial port baud rate
Data bits	5,6,7,8,9	
Check Digit	None, Even, Odd, Mark, Empty grid	
Stop bits	1,2	
Flow Control	No flow control, hard flow control CTS/RTS、 Hard flow control DTR/DCR、 Soft Fluidics XON/XOFF	Only forRS232Serial port valid
DNSserver		When the purposeIPWhen describing by domain name, you need to fill in thisDNSClothes ServerIP.existIPMode isDHCPNo need to specifyDNS server, it will automaticallyDHCPserver acquisition.
Purpose Mode	Static, dynamic	TCPIn client mode: After using static destination mode, the device Connect to server continuously5The device will automatically restart after the first failure.
Conversion Protocol	NONE , Modbus TCP<->RTU,Real_COM	NONEIndicates that data forwarding from the serial port to the network is transparent; Modbus TCP<->RTUwillModbus TCPAgreement Direct Convert toRTUAgreement, convenience andModbus TCPprotocol Cooperate;RealCOMFor compatibility with old versionsREAL_COM protocol is designed for virtual serial port mode, but When using a virtual serial port, you do not necessarily need to selectRealCom

		protocol.
Keep-alive time	0~255	<p>Heartbeat interval.1) Select 1~255 If the device is AtTCP In client working mode, it will automatically Scheduled time"TCP This ensures the link TCP Validity. Set to 0 When TCP Heartbeat. (2) Set as 0~254 When the conversion protocol is selected as REAL_COM Protocol, every keep-alive timer, the device A length of 1 Contents 0 data, to achieve</p> <p>Realcom The heartbeat mechanism in the protocol. Set to 255 There will be no realcom Heartbeat. (3) Set as 0~254 When the device Work on TCP Client, the device will keep alive every time Will send device parameters to the destination computer. Set to 255 Time will No parameter sending function, remote device management can be achieved.</p>
Disconnection reconnection time	0~255	<p>In TCP In client mode, if the connection is not successful, The "disconnection reconnection time" is sent to the computer to re-initiate TCP Even can be 0~254 seconds, if set 255, then it means Never reconnect. Note the first TCP Connection (such as Hardware power on, through zlvir.com Software restarts the device, no data The light is on) will usually be connected immediately, only after the first connection fails It will wait for the "disconnection reconnection time" before trying again, so The "reconnection time" will not affect the normal operation of the network and server. The connection establishment time.</p>
Web access port	1~65535	The default is 80
Multicast address		UDP Used for multicast
Enable Registration Package		<p>when TCP When the connection is established, the registration packet is sent to the computer. After enabling the registration package, you must select realcom Protocol. Support TCP Servers and TCP Client mode.</p>
Packet length	1~1400	<p>One of the serial port framing rules. The serial port server receives the long After receiving the data, the received data is sent to the network as a frame superior.</p>
Packet Interval	0~255	Serial port framing rule 2. When the serial port of the serial server receives data



		<p>If a pause occurs and the pause time is greater than this time, the received</p> <p>The received data is sent to the network as a frame.</p>
--	--	---

The functions supported by the device are explained as follows:

surface5Device supported features

name	illustrate
Web Download	Supports controlling serial port output commands through web pages, only the suffix isWThe products have Function.
Domain Name System	PurposeIPIt can be a domain name (for example,wwwserver address) .
REAL_COMprotocol	A non-transparent serial port server protocol suitable for multi-serial port serversInternet Bind the virtual serial port. Because the protocol contains the deviceMACSo the address is Helps the host computer to identify the device. Generally, it can be ignored.
Modbus TCPchangeRTU	Only model3Position4This function can be achievedModbus TCPchange RTU. It also supports multi-host functionality.
Modify the parameters of the serial port	Support serial portATInstructions to configure and read device parameters.
Automatic acquisitionIP	supportDHCPClient Protocol
Storage expansionEXFunction	Subsequent expansion
manyTCPconnect	AsTCPThe server supports more than1 indivualTCPconnect.
IOPort Control	Model No.3Position4Models support any custom instructions to control8 indivualIOOutput.
UDPMulticast	UDPMulticast
Multi-PurposeIP	AsTCPsupport simultaneous connections when client is connected7PurposeIP.
Proxy Server	Supports proxy server functionality (requires specific models).
SNMPFunction	supportSNMPchangeModbus RTUProtocol. Only the suffix -SNMPOnly support This function.
P2PFunction	Support byP2PThe traversal technology enables access to devices in any network. Suffix:NThe models support this function.

## TCPCommunication test

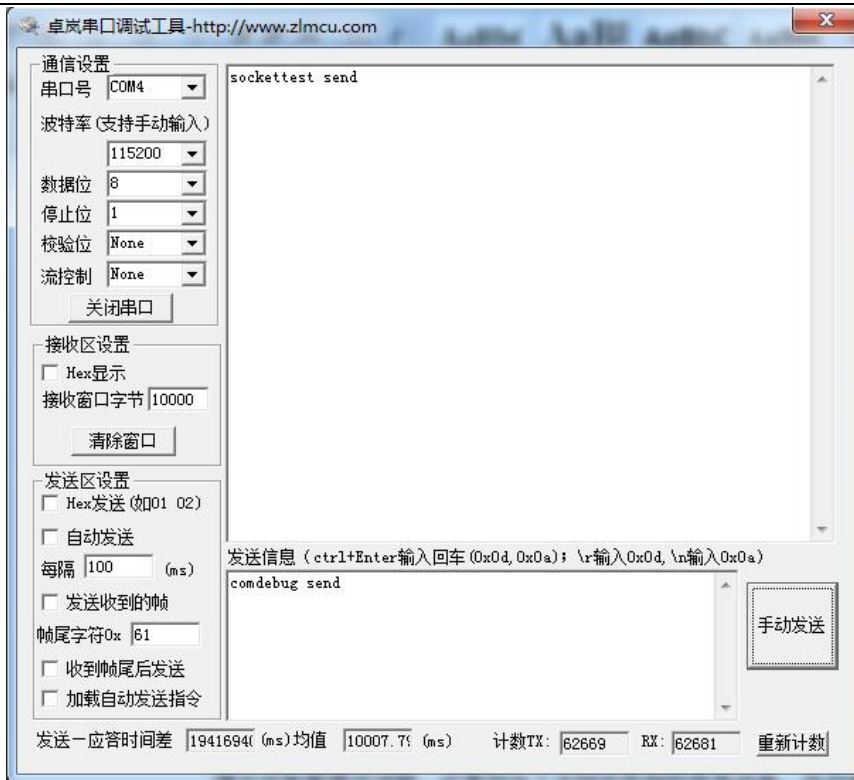
After configuring the device parameters, you can use the serial port tool,TCPDebugging toolsTCPConnect communication test.



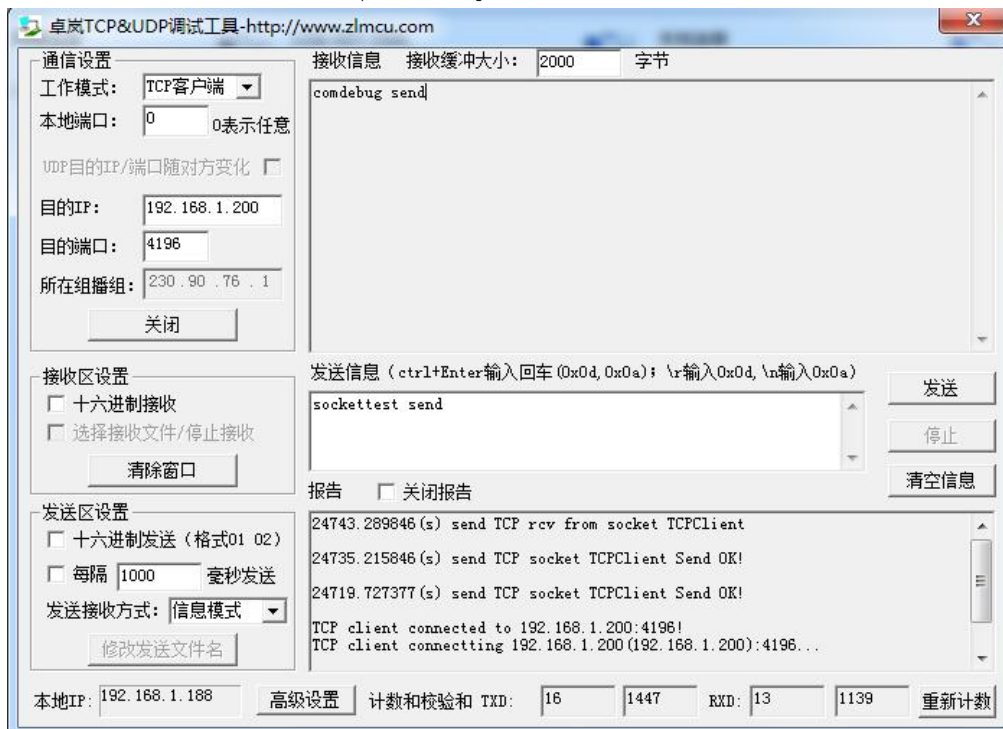
picture8 TCPCommunication diagram

Assume now PC Machine COM mouth (USB change RS232 cable) and the serial port of the serial server, then open ZLComDebug (<http://www.zlmcu.com/download/Comdebug.rar>) Serial port debugging assistant, and open the corresponding COM Mouth map 9; Open TCP & UDP Debug Assistant SocketTest (<http://www.zlmcu.com/download/SocketTest.rar>), and as TCP Client mode, fill in the purpose IP For serial port servers IP (Currently 192.168.1.200), the destination port is 4196, then click the "Open" button. exist SocketTest Enter "socket send" Click Send, and the data will be transferred to the serial server through the network port. RS232 interface, and then sent to ZLComDebug, then in ZLComDebug In turn, ZLComDebug Enter "Comdebug send", click Send to send to socket test, and display it.

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



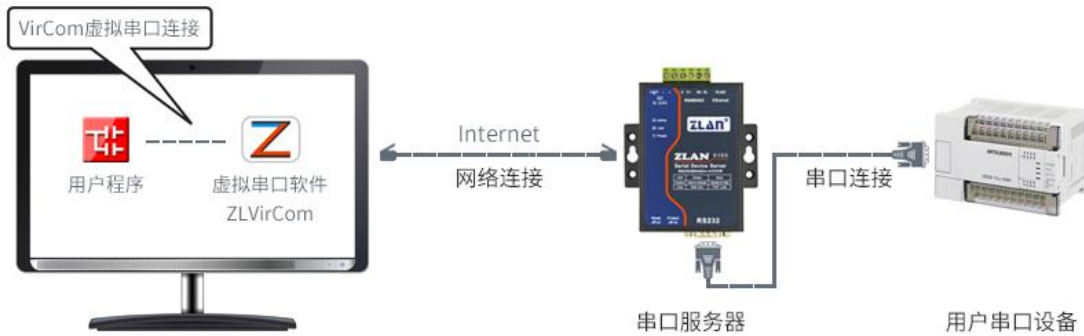
picture9 comdebugSend and receive interface



picture10 sockettestSend and receive interface

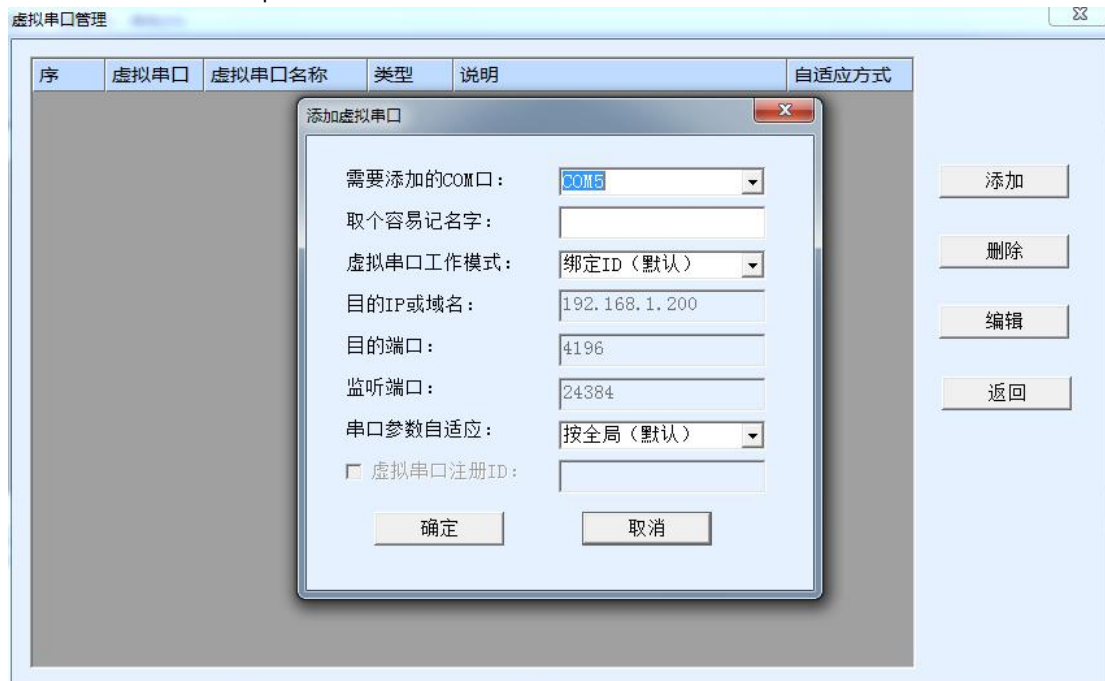
### 5.5.Virtual serial port test

picture8middleSocketTestis throughTCPTo communicate directly with the serial port server, in order to enable the user's already developed serial port software to communicate with the serial port server, it is necessary to add a virtual serial port between the user program and the serial port server.11As shown,ZLVircomand user programs run on one computer,ZLVircom Virtual OneCOMMouth, let thisCOMThe port corresponds to this serial port server. When the user program opensCOM Communication can be done throughZLVircom-Serial port server - send to the user's serial port device. The following demonstrates the operation steps:



picture11The role of virtual serial port

ClickZLVircomClick "Serial Port Management" on the main interface, then click "Add" and select Add COM5, inCOM5The computer didn't exist.COMmouth.



picture12Add a virtual serial port

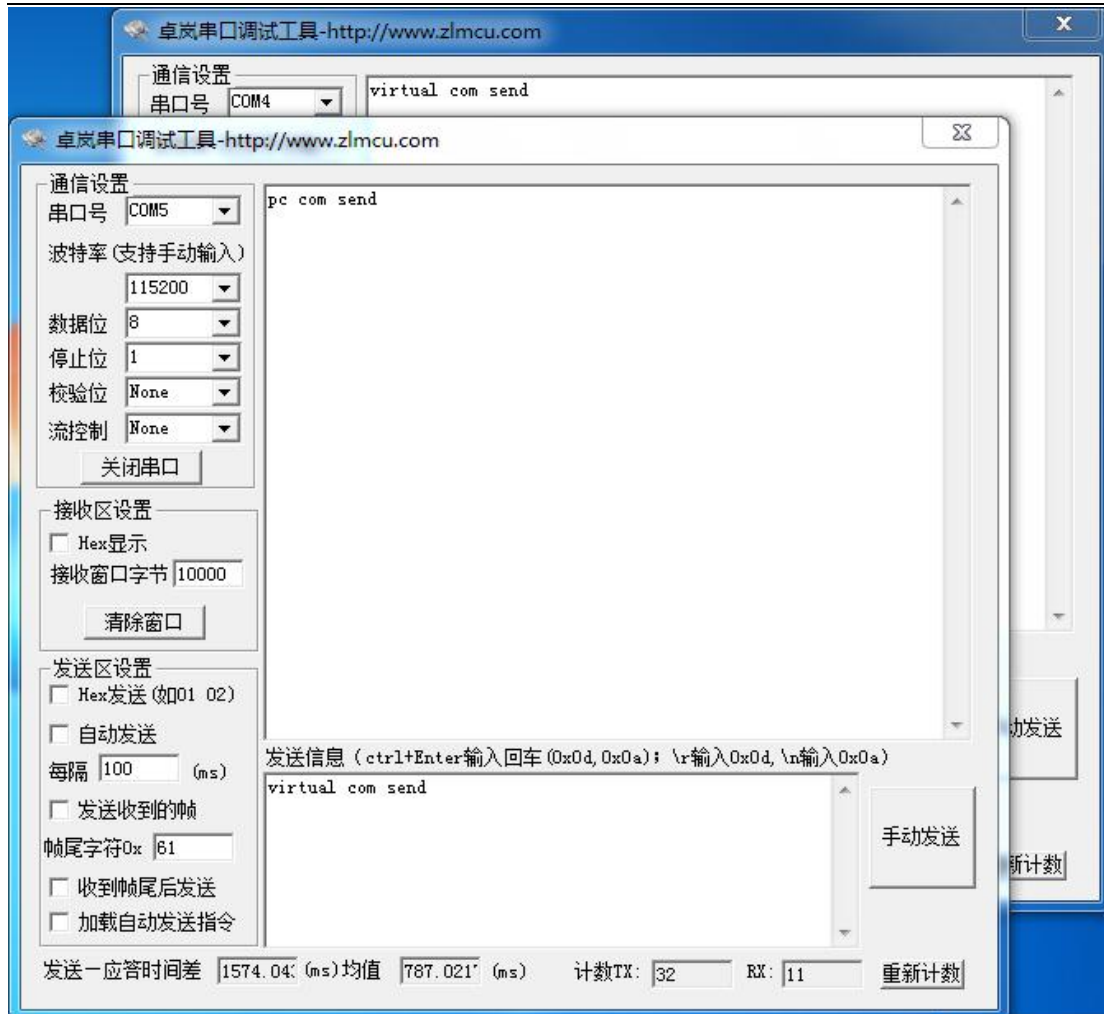
Then go to Device Manager and double-click the required COM5 Bound devices. As shown, select in the "Virtual Serial Port" list in the upper left corner COM5. Then click "Edit Settings". and return ZLVircom You can see the main interface of COM5 Already and IP for 192.168.1.200 The device is connected. You can now use COM5 replace SocketTest to communicate.



picture13The virtual serial port has been connected

Open ZLComdebug To simulate the user's serial port program, open COM5 (The virtual serial port above), open another ZLComdebug To simulate a serial port device, open COM4 (Hardware serial port). COM5 The link for sending data is as follows: COM5-ZLVircom-Serial server network port-Serial server serial port-COM4. on the contrary, COM4 arrive COM5 It can also transfer data: COM4-Serial port server serial port-Serial port server network port-ZLVircom-COM5 As shown in the figure 14 It shows the data sending and receiving of both parties.

If COM4 is changed to user serial port device, COM5 It can realize communication with user equipment.



picture14Communicate via virtual serial port

## 5.6. Modbus TCPtest

By default, serial port and network port data are transmitted transparently. Modbus TCP change RTU, you need to select the conversion protocol as "Modbus TCP--RTU, as shown in the figure 15A as shown. At this time, the device port automatically changes to 502, at this time the user's Modbus TCP The tool is connected to the serial server IP of 502 Port, sending Modbus TCP The command will be converted to RTU The command is output from the serial port. For example, the serial server receives 00 00 00 00 00 06 01 03 00 00 00 0a of Modbus TCP command, the serial port outputs 01 03 00 00 00 0a c5 cd Note: The serial port may send multiple 01 03 00 00 00 0a c5 cd instruction, this is because the default Modbus If the storage mode is used, query commands will be automatically polled. How to switch to the non-storage mode will be explained later.

高级选项	
DNS服务器IP	8 . 8 . 4 . 4
目的模式	动态
转化协议	Modbus_TCP 协议
保活定时时间	60 (秒)
断线重连时间	12 (秒)
网页访问端口	80

picture15EnableModbus TCPFunction

If the user Modbus TCP The software is used as a slave (Slave), you need to change the working mode to client based on the conversion protocol. IP Change to Modbus TCP Computer where the software is located IP, the destination port is 502, as shown in the figure 16 shown.

网络设置	
IP模式	静态
IP地址	192 . 168 . 1 . 223
端口	0
工作模式	TCP 客户端
子网掩码	255 . 255 . 255 . 0
网关	192 . 168 . 1 . 1
目的IP或域名	192.168.1.189 本地IP
目的端口	502

picture16 Modbus TCP Be a client.

## 6. Working mode and conversion protocol

Different serial port server working modes and conversion protocols can be selected in different application scenarios, so that they can be used more stably and reliably. The following is a detailed introduction.

There are basically two types of serial port servers: with virtual serial port and without virtual serial port, as shown in the figure. 8 TCP Communication diagrams and graphs 11 The function of the virtual serial port is shown in the figure. The user software that needs to be connected with the virtual serial port is the serial port interface (COMport), that is, both the user software and the user device are serial ports; in the case of non-virtual serial ports, the user software is directly TCP/IP Communication but the user device is still serial port.

In non-virtual serial port mode, the "conversion protocol part" is divided into transparent transmission, Modbus TCP change RTU and Realcom protocol 3. If the user software is a fixed protocol Modbus TCP Cooperation

The lower machine is Modbus RTU. When you need to select Modbus TCP, change RTU to Modbus TCP. The protocol is currently only used in multi-serial port servers as TCP. Used when the client connects to a server and the server uses a virtual serial port.

The usage is summarized as follows:

surface6 Network Configuration Mode

serial number	Virtual Serial Port use	Equipment working mode Mode	Conversion Protocol	illustrate
1	use	TCPserver	none	Suitable for user software to open COM mouth. Active data collection scenarios.
2	use	TCPClient	none	Suitable for scenarios where the device actively sends data. If you select TCP, the server can be disconnected and unable to reconnect. question.
3	Do not use	TCPserver	Modbus TCPchangeRTU	Applicable to user software is Modbus TCP, The user device is Modbus RTU. and Modbus TCP. The situation of being the main station.
4	Do not use	TCPClient	Modbus TCPchangeRTU	Applicable to user software is Modbus TCP, The user device is Modbus RTU. and Modbus RTU. The situation of being the main station.
5	use	TCPClient	Realcomprotocol	Multi-port serial server as TCPclient. When using a virtual serial port, it is best to use Realcomprotocol.
6	Do not use	TCPClient	none	Suitable for a large number of devices connected. A cloud-based approach. And generally, the cloud is Internet. A public network IP server.
7	Do not use	TCPserver	none	Applicable to both devices and computers on the same local network, monitoring locally. No need to cross Internet communication.



## 6.1.Virtual serial port mode

If the user software is using COM if you want to communicate with the port, you must use the virtual serial port mode.

PLC Software, configuration software, instrument software, etc.

Check whether the monitoring computer and device are in the local network:

a) If the computer is in Internet A public network IP If the device is using a server, then it must use TCP Client mode allows the device to connect to the server.

② and ⑤. If it is a multi-serial port server, you must select ⑤.

b) All in the local network (can ping) If the device sends data actively, you must use the device to do TCP The client can choose method ②, otherwise you can choose method ①.

## 6.2.direct TCP/IP Communication Mode

If not needed Modbus TCP Protocol conversion does not require a virtual serial port. In this case, the user software may communicate directly with the network port of the serial server. TCP/IP Communication, the serial port server will TCP/IP The data is converted into serial port data and sent to the serial port device.

Generally, users of this type of usage develop their own host computer network communication software, which integrates the analysis of the device's serial port communication protocol. This method is more flexible and efficient than the virtual serial port.

exist "5.4 TCP The section "Communication Test" briefly describes the serial port server as a TCP Here we will describe how to communicate with the server. TCP Client, UDP Mode, multiple TCP How to connect and communicate with computer software. Socket Test (Imitate user TCP/IP communication software) as an example.

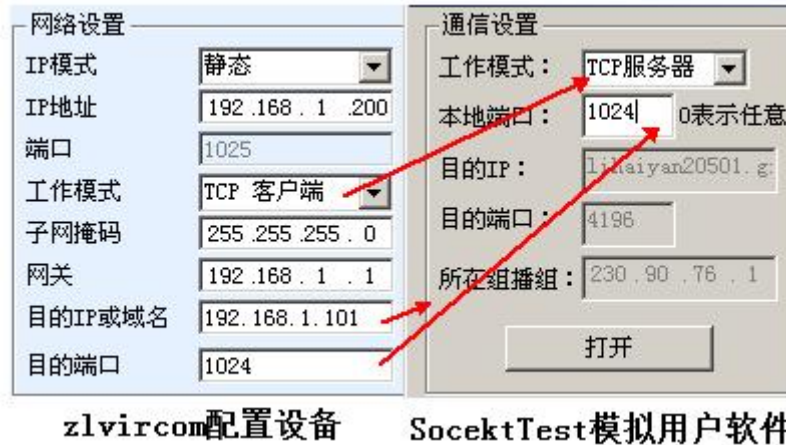
ZLAN serial port server complies with the standard TCP/IP Protocol, so any network terminal that complies with the protocol can communicate with the serial port server. ZLAN Technology provides a network debugging tool (SocketDlgTest Program) to simulate a network terminal to communicate with the serial port server.

In order for two network terminals (here the network debugging tool and the serial port server) to communicate, their parameter configurations must be paired.

## TCP Client Mode

TCP There are two working modes in this mode: TCP Server and TCP No matter which mode is adopted, one party must be the server and the other party must be the client. Only then can the client access the server. If both parties are the client or the server, communication cannot be achieved.

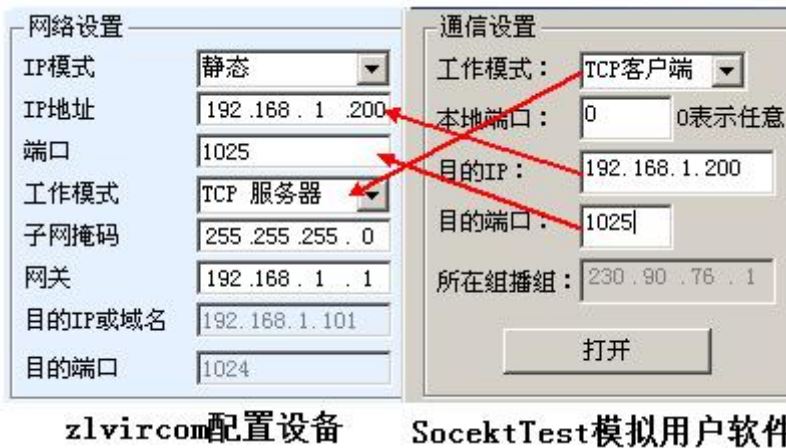
When the serial device server acts as a client, it must have the corresponding relationship, Figure 17As shown. (1)Working mode correspondence: The working mode of the serial port server is the server mode of the client corresponding to the network tool. (2) IP Address correspondence: the purpose of the serial port server IP Must be the computer where the network tool is located IP Address, (3) Port correspondence: The destination port of the serial port server must be the local port of the network tool. After this setting, the serial port server can automatically connect to the network tool and send and receive data after the connection is established.



picture17Serial Device Server as Client

### TCP Server Mode

When the serial device server is used as a server, there are also the corresponding relationship is shown in Figure 18 After setting up, click the open button of the network tool to establish a connection with the serial port server. TCP Connection. After the connection is established, data can be sent and received.



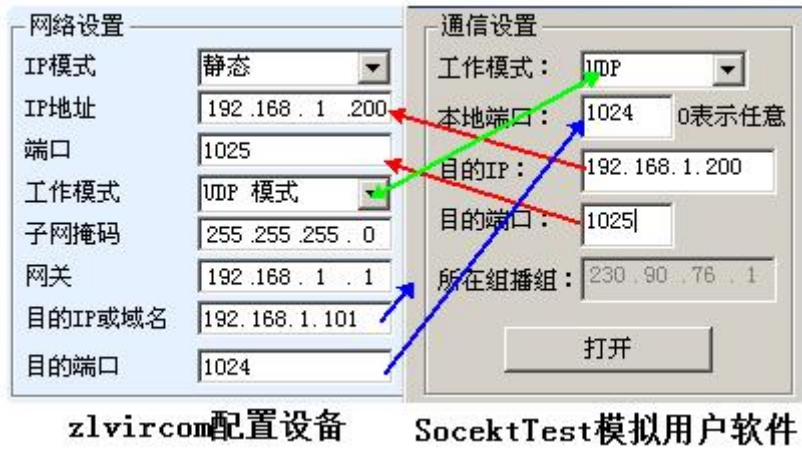
picture18Serial port server as server

When the serial port server is used as a server, it can accept individual TCP The data received by the serial port will be forwarded to all established TCP If you need to send data only to the most recently received

Network PacketTCP, you need to enable the multi-host function, please refer to8.2Multi-host capability.

### UDPmodel

existUDPIn this mode, the parameter configuration is shown in the figure19As shown, on the left isZLVircomThe configuration of the serial port server in the middle, and the network debugging tool on the rightSocketDlgTestFirst, both must beUDPWorking mode. Also indicated by the red arrow is the purpose of the network toolIPThe destination port must point to the local port of the serial server. IPand local port. The purpose of the serial port server is indicated by the blue arrowIPMust be the computer where the network tool is locatedIPThe destination port of the serial server must be the local port of the network debugging tool. Only after these network parameters are configured can bidirectional communication be guaranteed.UDPdata communication.



picture19 UDPMode parameter configuration

### 6.3.Equipment couplet method

If the host computer is notSocketprogram(SocketDlgTest) is not a virtual serial port, but two devices are connected through the network port. The configuration method is similar. First, the user needs to2The devices and computers are connected to the same LAN.ZLVircomThe purpose of connecting the computer is only for configuration. After the configuration is completed, the computer does not need to be connected.

ClickZLVircomDevice Management, find this2Equipment, as shown in Figuretwenty oneThen click "Device Edit" to configure the device. Device couplets can be divided intoTCPCouplets andUDPCouplet. If it is TCPCouplet mode, the parameters of the two devices are as shown in the figure20The parameters indicated by the arrows must correspond, as shown inPCThe corresponding method of connecting the two machines is the same.TCPAfter the connection is successful, you can check the connection status by returning to the "Device Management" dialog box, as shown in the figuretwenty oneIf the status of both devices is "connected", it means that the two devices areTCPThe link has been established.



picture20 TCPDevice 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
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

picture21 TCPDevice pairing success check

in the case of UDPThe configuration parameters are shown in the figure.twenty twoAs shown, the parameters corresponding to the arrows must be one-to-one.UDPAs long as the parameters are configured correctly, there is no need to check the connection status, and the data to be sent will be automatically sent to the specified device.



picture22 UDPDevice couplet parameter configuration

Finally, it is necessary to remind you that if the devices are connected, in addition to setting the network port parameters as above, you must also set the correct serial port parameters. Mainly, the baud rate of the serial port server needs to be consistent with the baud rate of the user's device. After this setting, the user's device can send data to each other through the serial ports of the two serial port servers.

## 7. Equipment debugging

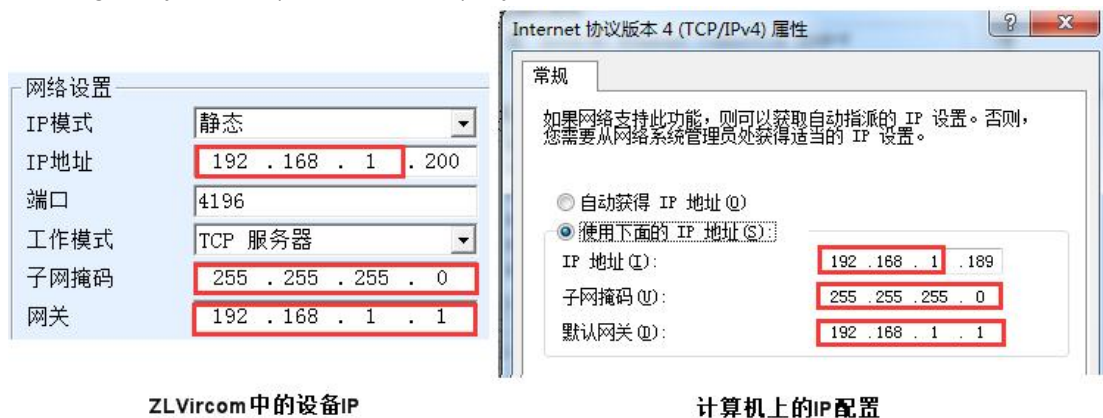
### 7.1. Network physical connection

The serial port server can be connected using a crossover cable or a straight cable to a 10M/100M Switch or directly connect to the computer network port.

After the connection is established, the first step is to check if the Link light is green? If not, check whether the network cable is connected properly.

### 7.2. Network TCP connect

When the device is dynamically acquired IP when using the network port, you cannot connect directly to the computer network port. DHCP server can be used (generally DHCP server is the router in the LAN). So please specify it when connecting directly to IP. The computer also needs to specify a fixed IP.



picture twenty three Configured in the same network segment

Whether connected directly or through a switch, when configured as static IP when the device and computer are in the same network segment (unless they are communicating across gateways), as shown in the figure twenty three shown.

because ZLVircom supports cross-segment search and configuration, so the ones that can be searched but cannot communicate are generally IP. The address is not configured, you can use ZLVircom to configure the devices in the same network segment.

Use after configuration 5.4 TCP Communication test or 5.5 The steps for virtual serial port testing can be seen in the establishment TCP. When connecting Link, the light turns blue. Link light blue can also be passed ZLVircom See, as in the device management list, if TCP if the connection column is "established", it means Link, the light is blue, as shown in the picture twenty four. This can facilitate remote diagnostics.

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

picturetwenty fourConnection status and data sending and receiving status

### 7.3.Data sending and receiving

whenLinkAfter the light turns blue, data can be sent and received between the software and the serial port server.ActiveThe light will turn green and will generally last for at least1The data will also be 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, check bit) are configured.

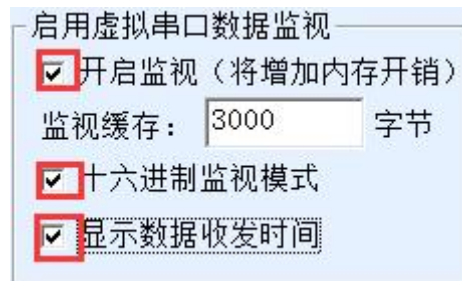
The serial port device will generally respond to the correct command. Once there is a response (the serial port sends data to the network port),ActiveIt will turn blue, otherwise please check the serial port parameters or whether there is a problem with the serial port cable connection.

To facilitate remote debuggingZLVircomIt also supports remote viewing of data transmission and reception, as shown in the figuretwenty fourAs shown,TXDIt is the amount of data sent by the serial port of the serial server. When refreshing the device list, if this value changes, it means that data has been sent.ActiveThe light will also be green; if you seeRxDIf this value changes, it means that the serial port device has returned data.Activeis blue.

### 7.4. ZLVircomRemote monitoring data

When using a virtual serial port,ZLVircomSupports real-time capture of data sent and received by the virtual serial port. It is convenient for users to debug the system. The usage is as follows:

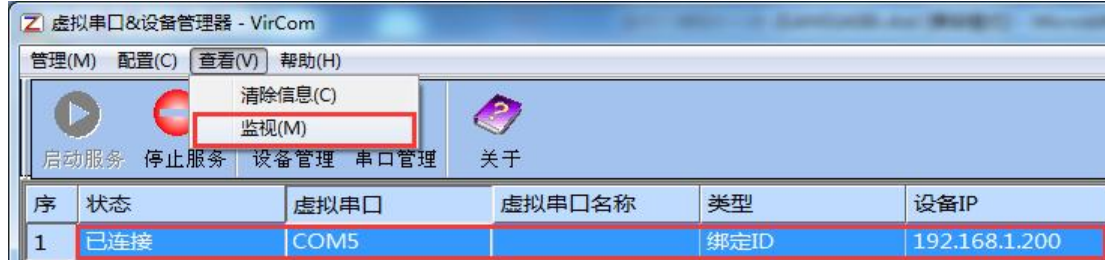
Assuming that now5.5The virtual serial port test method establishes the communication of the virtual serial port. Now you need to monitor the data passing through the virtual serial port. OpenZLVircomMenu / Configuration / Software Configuration / Open vircom Configuration dialog box.



picture25EnableZL VirocmMonitoring

In the monitoring mode, display the data transmission and reception time.3Tick the options, such as

Then click OK. Assuming that data has been sent and received before, now select a virtual serial port to be monitored in the main interface, and then select Menu/View/Monitor, as shown in the figure shown.



Open ZL Virocm Monitoring

From the opened dialog box, you can see the instructions sent by the host computer and the instructions returned by the device, as shown in the figure

This function can facilitate on-site communication debugging.



Monitor sent and received data

### 8. ModbusAdvanced Features

The serial port server with gateway function does not have station address and register. It is a communication bridge. Modbus Gateway Modbus TCP Instructions Salve ID, function code, register number, register quantity generation Modbus RTU Specify and output from the serial port. It can be regarded as a protocol "translator".

### 8.1.EnableModbusGateway

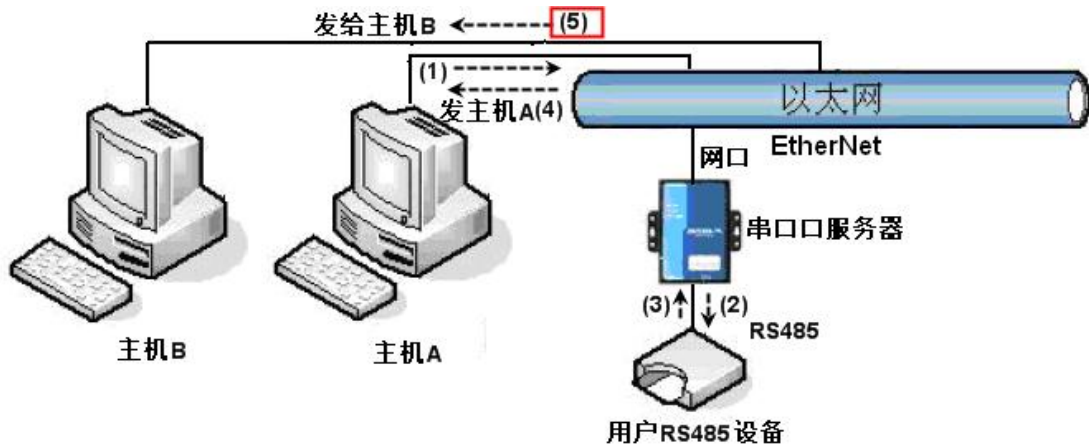
First of all, the serial port server should supportModbusThe gateway is the device settings dialog box.5 "Modbus TCPchangeRTU"The feature should be ticked.

By default, the serial port server is in normal transparent transmission mode. If you need to convert toModbusGateway mode, please select "Modbus TCP--RTUThis option. After that, the device automatically changes the "Port" parameter to502 (Modbusserver's port).ModbusThe gateway is enabled.

Serial PortRTUIf the device is a slave, the host computerModbus TCPSoftware ConnectionModbusGateway 502 Port, at this timeModbusThe gateway needs to work onTCPServer mode; if the serial portRTUAs the master station, ModbusThe gateway works onTCPClient, and purposeIPfillModbus TCPThe computer where the software is locatedIP, the destination port is usually502.

### 8.2.Multi-host capability

As shown29The "RS458Multi-host support" and "RS485The bus conflict detection function is the multi-host function of ZLAN. They are generally enabled and disabled at the same time. After enabling, the conversion protocol is Modbus TCPThe device has storage typeModbusGateway function, otherwise non-storage typeModbusGateway; if the conversion protocol is None, it can generally be customized by the userRS485The protocol also has the function of multiple hosts accessing serial devices at the same time, which is in the pureRS485This is not possible in a network, because multiple masters sending at the same time willRS485The multiple hosts of ZLAN serial port server can RS485 The bus is "coordinated" to achieve multi-host access.



picture28Multi-host function demonstration

As shown28As shown, in normal mode, when two hosts:Aand hostBConnect to the serial port at the same time



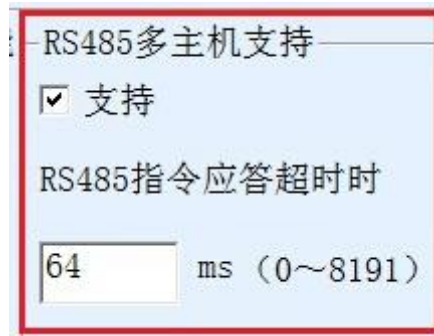
Server, at this time the hostA send (1) instruction, RS485 The device receives (2) instruction, RS485 Equipment Returns (3) command, but the serial port server will send the command at the same time (4) To the hostA and (5) Send to hostB. Because the hostB No query was sent, but it also received a reply command (5) So, the hostB Communication errors may occur. In multi-host mode, only commands (4) There will be no instructions (5) Because the serial port server will automatically remember the host to be returned, it will only return the command to the host with the most recent communication. A Inquiries are only replied to A, hostB Query reply to hostB.

Another function is that in normal mode, the hostA and hostB at the same time, sending data will RS485 The command merge on the bus cannot be recognized normally; the serial port server can schedule in multi-host mode A, B The order of using the bus can effectively solve the conflict problem of multiple machines accessing at the same time.

When the conversion protocol is "None", the multi-host function is not enabled by default. To enable multi-host, click "More Advanced Options" in the device configuration dialog box and check "RS485 Multi-host support".

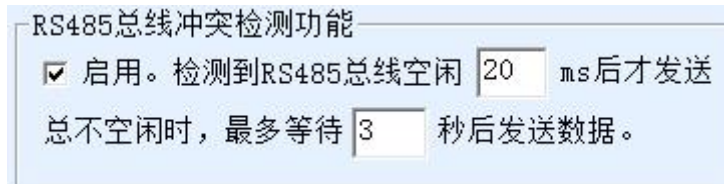
### 8.3. Multi-host parameters

RS485 Multi-host support" and "RS485 The meaning of "bus conflict detection function" is introduced as follows.



picture29 RS485 Multi-host support

in RS485 The command response timeout is the maximum time interval from the serial port server sending this command to receiving the response. The time filled in should be greater than the actual maximum time interval, because if it is judged as a timeout, the next command will be sent.



picture30 RS485 Anti-collision idle time

RS485 Bus conflict time: indicates how long the serial port server waits after receiving the reply of the first command.

milliseconds later, the second command is sent. This parameter actually defines the speed of command polling. This value is recommended to be 20ms "Maximum waiting time" The parameter "seconds" generally does not need to be modified.

When the user uses ZLVircomSelect the conversion protocol as "Modbus TCPchangeRTUafter" ZLVricomThe above two enable boxes will be automatically checked (unless the user manually enters the advanced options to remove them), and the above two times will be automatically configured according to the baud rate.ModusIf the command is long or the conversion protocol is "None", you need to manually configure this 2 parameters.

The following are recommended values for the above parameters:

1. picture 30 Shown as "RS485The bus anti-collision time can generally be set to twice the "packet interval" in the lower right corner of the parameter configuration interface, but the minimum cannot be less than 20.
2. picture 29 Shown as "RS485The command response timeout is generally determined by the length of the back-and-forth response command. NBytes, the response is Mbytes, the recommended setting value is:  $\text{"data Packet interval"} \times (N+M+5) + 100$ .

#### 8.4.Storage and non-storage

ZLAN5143It is storage type ModbusThe advantage of gateway is 5143The register value will be automatically queried and saved, which can speed up the return. However, sometimes the value of some devices will not be what you want when they are continuously polled.ZLAN5G40This non-storage type comes in handy. 5G40Will be at Modbus TCP Send when you send RTU Query command, otherwise it will not be sent RTU Query, i.e. non-storage Modbus Gateway.

For an introduction to storage types, please refer to ZLAN5143IoF"ModbusIntroduction section".

#### 9.Network port modification parameters

Modifying the network port parameters is achieved zlvir.comThe function of searching devices and modifying device parameters like software, that is, managing devices and modifying parameters through the network port of the serial device server. It is suitable for users who integrate the search and configuration functions into the user software.

The network port parameters are modified through "UDPThis is achieved through the "Management Port Protocol", for example:

- 1.The computer software sends the destination port in the network as 1092of UDP Broadcast data packet. When the device receives the data packet, it will return its information to the computer software to achieve the purpose of searching for the device.
- 2.Computer software to the device 1092Port forwarding UDP Modify the parameter command to achieve the purpose of modifying device parameters.

For a detailed introduction to network port modification parameters, please refer to "ZLAN Networking Products UDP Management Port Protocol" document. You can also use this, which is implemented by the device management function library of the device management function library.

## 10. Device management library

This function 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 ZLDevManageInside. This is a DLL of windows. The platform's development library can be used in VC, VB, Delphi and other development tools call.

Provide detailed API interface introduction document and VC transfer Demo Case. It can realize device search, parameter modification, P2P function calls, etc.

You can get the development library from the ZLAN official website: <http://zlmcu.com/download.htm> Search for "Device Management Function Library" on the page. For details, please refer to "ZOLAN WinP2P and Device Management Development Library»

## 11. Modify the parameters of the serial port

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

ZLAN serial port commands have the following characteristics:

1. Serial port command uses 10-bit preamble code, so there is no need to distinguish whether it is communication data or command by pulling down or raising another configuration pin, and there is no need to switch between command mode and communication mode, which makes it more flexible and convenient to use.
2. The command set includes multiple command formats such as saving parameters, not saving parameters, and restarting the device.
3. Can realize a variety of applications, such as reading the serial port server MAC. For example, to change the serial port server working mode, TCP. The server switches to TCP. In client mode, you can actively connect to the server; TCP. The client switches to TCP. You can disconnect from the server when you log in to the server.

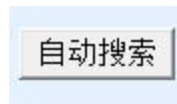
For detailed operation methods of serial port parameter modification, please refer to «Serial port modification parameters and hardware TCP/IP Protocol Stack

## 12.Remote device management

Remote device management refers to ZLVircom. The software can maintain and manage the device, including restarting the device, modifying parameters, and upgrading firmware. ZLVircom User who manages the device.

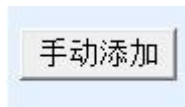
for ZLVircom Software, as long as the device can be found in the device list, remote management can be performed. Remote management of devices can be divided into the following situations:

1. Automatic search: The device and the computer are on the same switch. In this case, whether they are in the same network segment or not, the computer ZLVircom. The way to search for devices is: ZLVircom. Send a broadcast query - all devices will reply with their own parameters after receiving the query ZLVircom Tool. This method searches all devices at once.



picture31 Auto Search

2. Manual adding: There are two cases:



picture32 add manually

a) Large routers divide the network: In some large networks, broadcast packets are divided by routers, so that broadcast packets cannot reach the device end, but ping equipment IP All are connected. In this case, you usually need to add it manually to solve the problem. The manual adding method is to click "Manual Add" in the "Device Management" dialog box to add the head and tail IP. You can query the devices one by one.

b) Public network server queries internal network devices: The serial port server is in the internal network and acts as TCP Server mode, zlvir.com. On the public network IP. At this time, you need to make a 1092 of UDP. The port mapping is mapped to the device IP, Then zlvir.com. Manually add this device. IP. It is the public network on the device side IP.

3. TCP Client: Device as TCP. When the client is IP (116.15.2.3) of 4196 Port Initiation TCP. Once the connection is established, it will automatically send a message to the destination port (here 4196) of UDP Port (note not TCP port) to send its own parameter system, so that zlvir.com. On this computer (116.15.2.3) can search for the device. If the destination port is not 4196. You need to modify zlvir.com. The default parameter receiving port is to modify the menu/configuration/software configuration/default listening port, and then start zlvir.com. If pop-up TCP Port conflicts are not

Use the command to continue execution.

工作模式	TCP 客户端
子网掩码	255 . 255 . 255 . 0
网关	192 . 168 . 1 . 1
目的IP或域名	116.15.2.3 本地IP
目的端口	4196

picture33Client

4.Scheduled sending parameters: Even inTCPFor a serial port server in server mode, you can also check the "Send parameters regularly" function to set the5Minutes to send parameters to the destinationIP(here it is116.15.2.3) destination port. The port on this server receives the parameterszlvir.comThese devices can be managed.

工作模式	TCP 服务器	保活定时时间	60	(秒)
子网掩码	255 . 255 . 255 . 0	断线重连时间	12	(秒)
网关	192 . 168 . 1 . 1	网页访问端口	80	
目的IP或域名	116.15.2.3 本地IP	所在组播地址	230 . 90 . 76 . 1	
目的端口	1024	<input type="checkbox"/> 启用注册包:		<input type="checkbox"/> ASCII
串口设置		<input type="checkbox"/> 启用无数据重启 每隔	300	(秒)
波特率	115200	<input checked="" type="checkbox"/> 启用定时发送参数 每隔	5	(分钟)

picture34Scheduled sending parameters

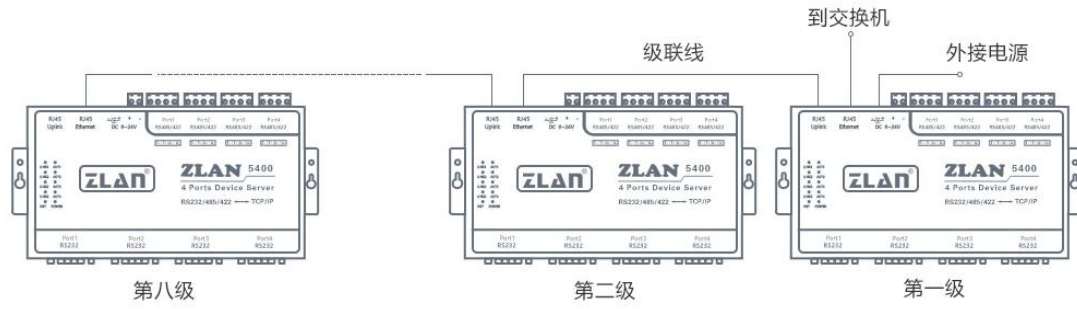
To facilitate device identification, if remote management is required, please give the device an easy-to-remember name.

### 13.Cascade Method

ZLAN5443HSupports cascading, which makesZLAN5443HCan be easily expanded to8mouth,12mouth, 16Port converter. Engineering transformation and upgrading are more convenient.

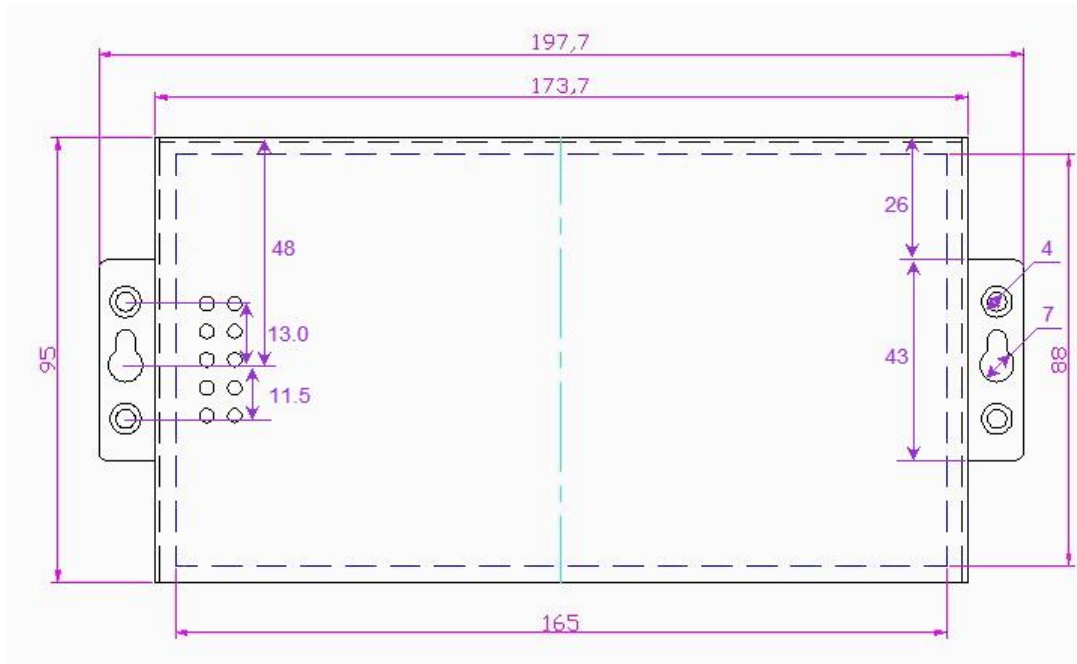
When cascading, from the previous levelZLAN5443HThe network port ofUplink RJ45) Use the factory-provided network cable (actually a shorter parallel network cable) to connect to the next levelZLAN5443HOrdinary network port (RJ45). This cascade step can be continued, expanding up to8class.

By default, each levelZLAN5443HAll of them need power supply. If they need to be powered by a tiered network cable, they need to be customized by the manufacturer.



picture35 ZLAN5443HCascade Method

**14.Installation Dimensions**



picture36 ZLAN5443HInstallation Dimensions

**15.After-sales service and technical support**

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