ZLAN9500/03 Series

ZigBee Wireless Data Transmission Device

User Manual

RS232/485/422/Ethernet to ZigBee

Document DI: ZL DUI 20141016.1.0

Version Information

The History of the revision to this document:

History

Date	Version	Document ID	Revising content
2014-10-16	Rev.1	ZL DUI 20141016.1.0	Release
2016-02-19	Rev.2	ZL DUI 20141016.2.0	Update

Copyright information

Content

1. **Summary** 4
2. **Features** 7
3. **Technical Parameters** 7
4. **Hardware Instruction** 8
5. **Zigbee Configuration** 12
6. **TCP/IP Configuration** 12
   - **6.1 Parameter Meaning** 13
   - **6.2 Parameter Modification Method** 17
     - **6.2.1 ZLVircom Type** 17
     - **6.2.2 Web Browser** 18
   - **6.3 Device Search** 19
   - **6.4 Parameter Configuration** 21
   - **6.5 Transparent Communication** 21
   - **6.6 Virtual Port** 23
7. **After-service** 26

1. Summary

Shanghai ZLAN Zigbee products currently have two categories, one is serial port converter to Zigbee for Model ZLAN9500, it includes 3 kinds of serial port: RS232/485/422. The other is Ethernet (TCP/IP) converting to Zigbee for Model ZLAN9503, can make Zigbee connected Internet.

Figure 1 ZLAN Zigbee Converter

9500 can be used in data collection of variety RS232/485/232 serial devices, can transfer the collecting data to Zigbee network, to realize a structure similar with wireless RS485. The Zigbee of 9503 usually as main station, it receives serial data from each 9500 devices, and converter serial data to TCP/IP packet then transfer to the network server. The function diagram of ZLAN9500 and ZLAN9503 is shown in figure 2.

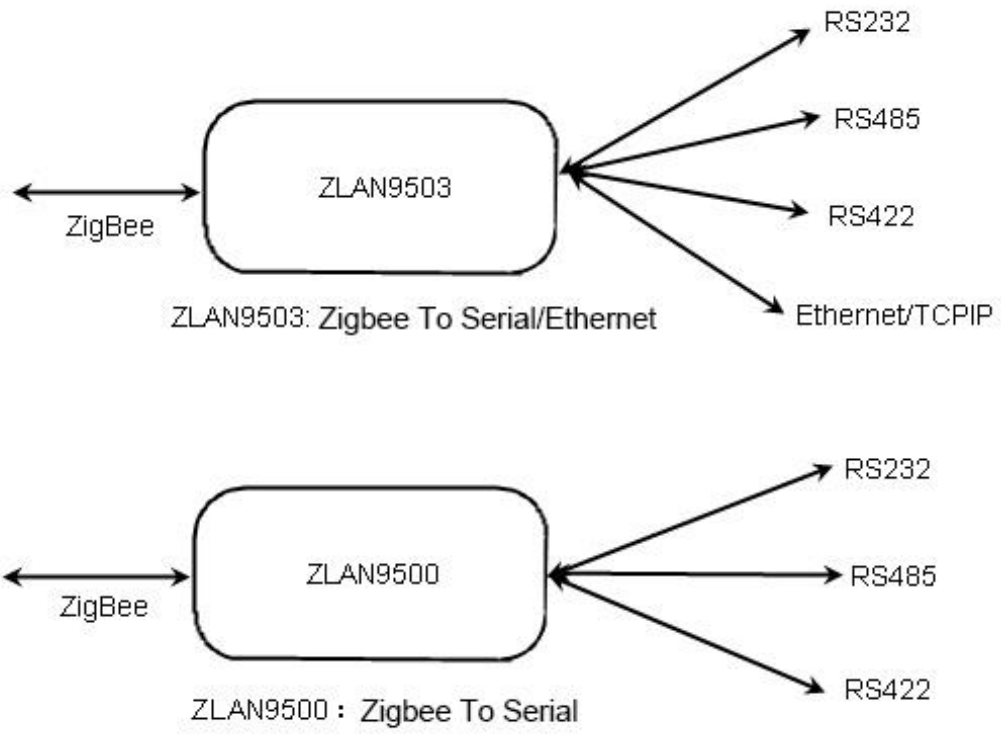

Figure 2 Function Diagram of ZLAN9503 and ZLAN9500

The combination of 9500 and 9503 not only has the advantages of Zigbee wireless transfer and convenient networking, but also can access to TCP/IP network, with all kinds of existing network forms such as wifi, Ethernet, optical fiber, etc., realize the network transmission and storage, provide a very good solution for modern IOT collecting transfer system building.

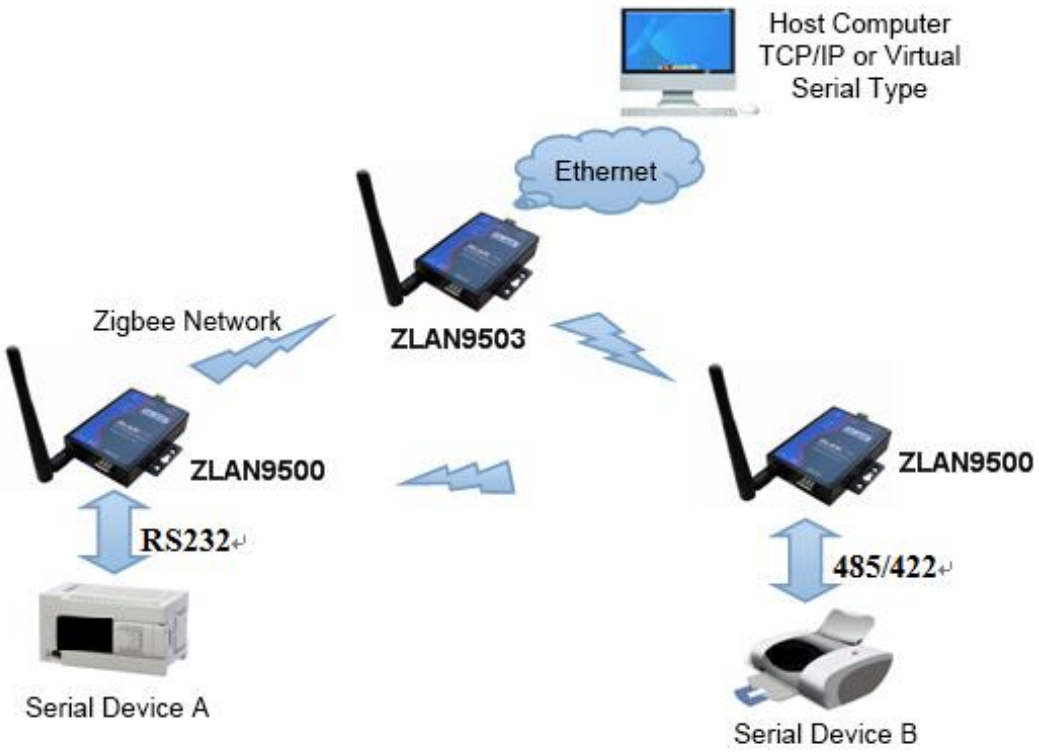

Figure 3 ZLAN Zigbee Usage

9500/9503 product realize the data transparent transferring between RS232/485/232 Ethernet and Zigbee. As shown in figure 3, when two 9500 access to one network, the data sending by A serial device immediately output in B serial device, and vice versa. When 9500 and 9503 connect, the data sending by 9500 serial port can immediately appear in 9503 serial port, as transparently converting to the TCP/IP data of 9503. 9503 can work in TCP server/TCP client/UDP mode, 9503 just like a serial device server in Zigbee form.

The Zigbee products of Shanghai ZLAN is high performance products designed for industrial application, the transmission distance can achieve 2 km in the open. As using 2.4G DSSS spread spectrum technology, the anti-jamming capability is strong. Compared to Wifi, its wireless connection is farther, connection speed is faster, anti-jamming capability is stronger, networking is more convenient.

The 9500/9503 products can be configured to relative link, as point-to-point communication or broadcast mode, also as point to multipoint mode. Can constitute star type and MESH network

structure. The configuration can be done through serial port.

The ZLAN Zigbee products can be applied to:

- Building /Entrance /Door /Security Control System
- Power /Electronic /Intelligent Instrument
- Bank /Medical Automation System
- Industrial Automation System
- Point-of-sale System (POS)
- Information Household Appliances

2. Features

1) Long distance Zigbee communication solution, high performance, high stability. The communication distance can be up to 2km.

2) Big data transmission no packet loss. Duplex transmission under 38400bps the data doesn't loss packet and no pause, data smoothness.

3) ZLAN9503 has multi-function of Zigbee to Ethernet, realize Zigbee to TCP/IP, can be configured as TCP server, TCP client, UDP mode and so on. Equipped with Windows virtual serial port and device managing tool ZLVircom, can support virtual serial port.

4) The networking mode of Zigbee is flexible, can have many types: realizing point-to-point, point-to-multipoint; having center node, no center node; star network, mesh network, peer-to-peer network.

5) Network capacity is larger, 16 channel optional, 65535 network ID can be freely set.

6) 6 kinds of LED lights separately indicate data flow direction, TCP/IP network status, Zigbee signal and connection state, intuitively response equipment status.

3. Technical Parameters

Specification	Working Voltage	DC9~24V

Parameters	Woking Current	9500：50mA@9V
		9503：start 250mA@9V, stable 220mA@9V；
	Environment Temp	-40℃~85℃
	Environment Humidity	<95%RH
Wireless Communication	Transmission Distance	2000m
	Frequency Range	2.405GHz~2.480GHz
	Wireless Channel	16
	Receiving Sensity	-105dbm
	Transmit Power	25dbm
	Network Topology	point-to-point, star, tree, mesh
	Communication Protocol	IEEE802.15.4/ZigBee standard protocol
	Network ID	0000~FFFF
	Modulation System	DSSS
	Antenna Connection	external SMA male head antenna; Work frequency: 2.4G, Frequency region between 2400M-2485M
	Anticollision Loop	CSMA-CA and GTS CSMA-CA
Wire Communication	Data Interface	RS232, RS485/422, Ethernet 10M/100M
	Max Packet Size	100 bytes
	Serial Port Setup	Baud Rate: 1200~115200bps；Check bit: None, Even, Odd；Data: 7, 8; Stop bit: 1
	Ethernet Protocol	ETHERNET、IP、TCP、UDP、HTTP、ARP、ICMP、DHCP、 DNS
Figure	Interface:	485/422: Terminal； 232： DB9; Ethernet: RJ45
	Power Supply:	Inside positive outside negative, standard outlet
	Size:	L x W x H =9.4cm×6.5cm×2.5cm

4. Hardware Instruction

The front view of ZLAN9500/03 ZigBee Ethernet/serial port is shown in figure 4. ZLAN9500/03

adopts black anti-radiation SECC board. It is equipped with two "ears" for easy installation.

Size:

L x W =9.4cm x 6.5cm x 2.5cm

Figure 4 9500/9503 Front View

Panel lights:

1) **ACT:** ACT light green indicates that data is being received from ZigBee and transmitted to serial/Ethernet. ACT light blue indicates data from serial/Ethernet sending to ZigBee. If the data is short, the scintillation time will be short, it should be noted.

2) **LINK:** when the LINK light is green, the RJ45 network line has been connected. When the LINK light is blue, it indicates that the TCP connection has been established or in UDP mode. This indicator is only valid for ZLAN9503.

3) **POWER:** when green, indicates that 9500/03 has already been charged; The blue flashes indicate that ZigBee is in configuration mode.

4) **ZigBee:** green flash indicates that ZigBee is working but not yet connected; The blue light staying indicates that ZigBee has been connected; The blue flash indicates the configuration mode. Note that for the center node, the ZigBee indicator is always bright blue.

Figure 5 The Front Interface of 9503

The front panel of 9500/03 is shown in FIG.5, from left to:

1) Ethernet port: standard RJ45 interface

2) R -, R +, T +, T- : T+ is RS485A, T- RS485B. If you need RS422, connect these 4 lines.

3) Terminal type power supply +, -: voltage is 9 ~ 24VDC.

4) Power outlet: can adopt standard plug 5.5mm (inner core is positive pole), voltage 9 ~ 24VDC.

The back panel of 9500/03 is shown in figure 6, from left to:

Figure 6 The Back of 9503

1) ZigBee antenna: also can choose extension antenna, easy to install to the metal cabinet outside.

2) CFG switch: when you dial “on”, enter ZigBee's configuration mode, and then Power light and ZigBee indicator lights are both blue flash. For ZLAN9503, the device's IP will also be restored as the default 192.168.1.254.

3) Serial port adopts standard DB9 male head: the sequence is as table 1:

Table 1

Item	Name	Function
2	RXD	The receiving pins of serial device server
3	TXD	The sending pins of serial device server
5	GND	Grounding
7	RTS	After the flow control is enabled, when the pin is 0, the serial device server can accept the data of the serial device.
8	CTS	After the flow control is enabled, when the pin is 0, the serial device server can send the data of the serial device.

The appearance size of ZLAN9500/03 is as below:

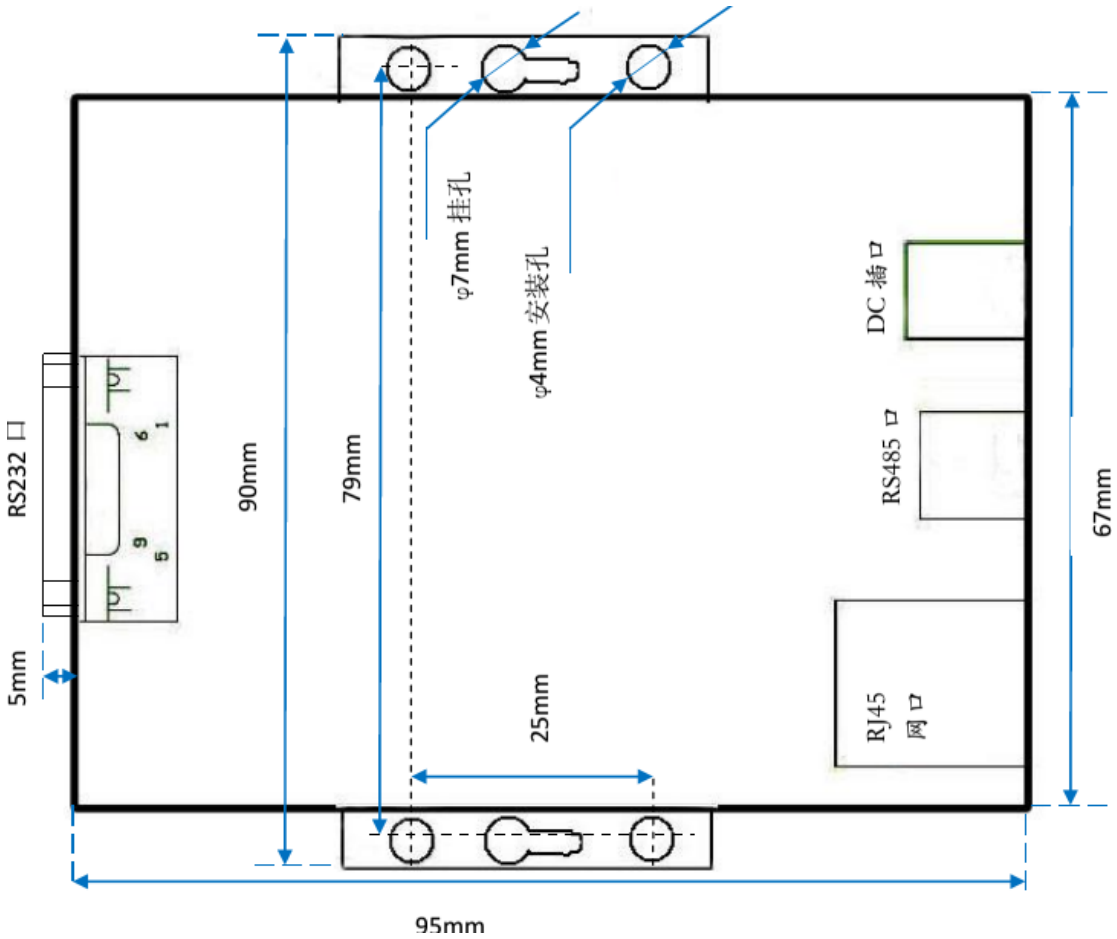

Figure 7 ZLAN9500/03 Appearance Size

5. Zigbee Configuration

It can be configured via serial port: ZigBee work mode, module address, network ID, network type, network node and other related parameters. If the user only use it as wireless RS485, the configuration can be done by Shanghai ZLAN, users can use it after power-on without any configuration. Please refer to the file <ZigBee Configuration Guide> for your own configuration.

6. TCP/IP Configuration

This configuration mode is only valid for ZLAN9503 and is invalid for ZLAN9500. The purpose of this configuration is to convert ZigBee data into TCP/IP data. Please note:

The serial parameter configuration of the network part should be configured to be the same as the

ZigBee serial port parameter, especially the baud rate. If the serial port parameters of the ZigBee part have not been modified, then just configure the serial parameters of figure 8 to 38400bps.

Other network related configurations are similar to ZLAN5103 products, which are introduced as follows:

6.1 Parameter Meaning

Use ZLVircom9503 for configuration. When 9503 is connected to the network via Ethernet, the computer in the same LAN can search the device through the installed ZLVircom tool.

The post-search pop-up dialog is shown in figure 8. The parameters are stored in the flash space of the networking product, which is loaded after power-on, will not lose when power-off. The definition of parameters is as follows:

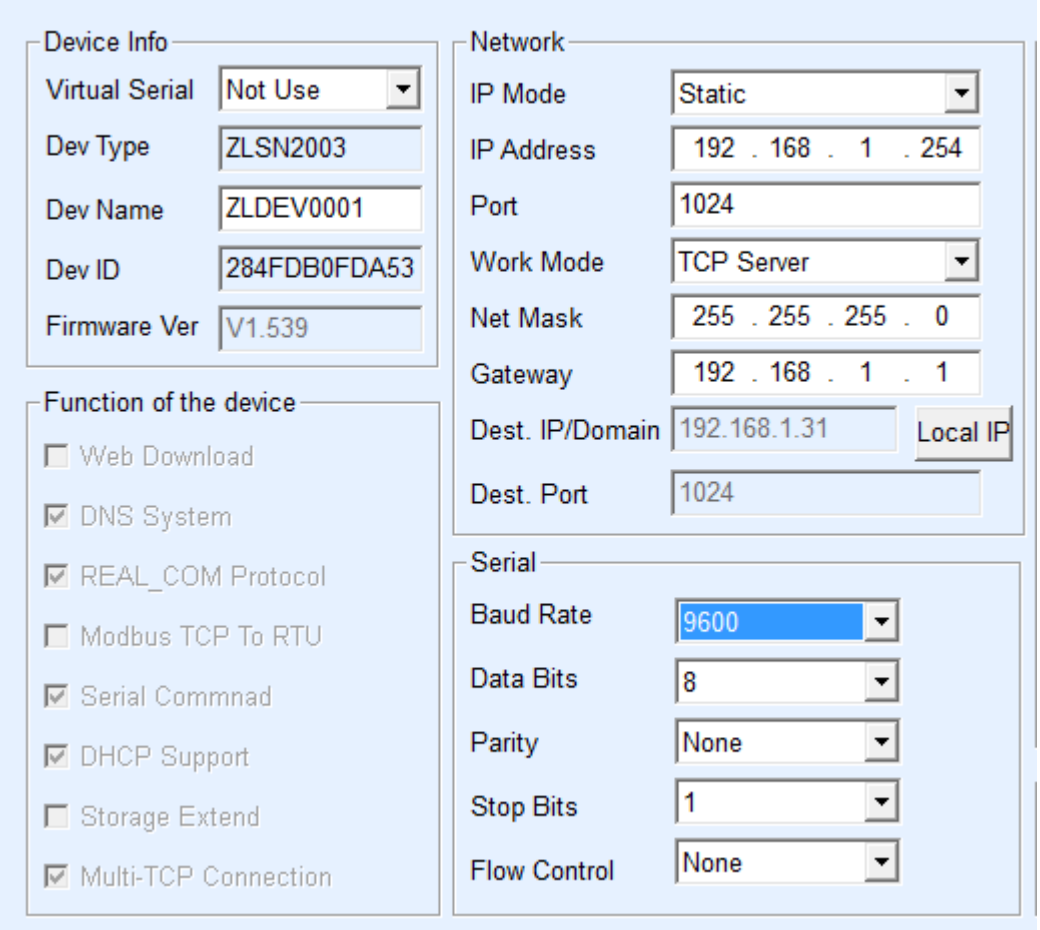

Figure 8 Basic Parameters

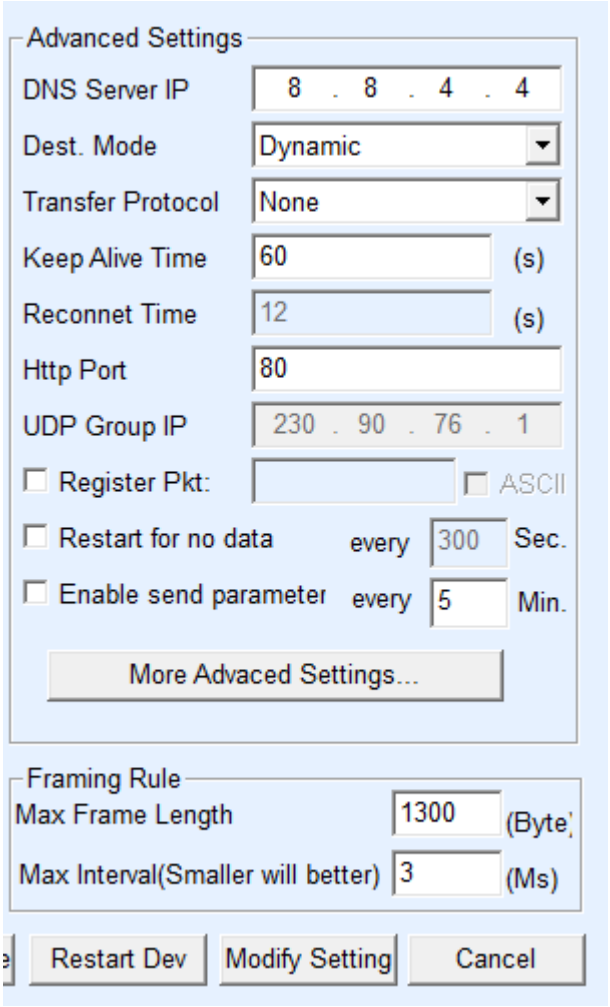

Figure 9 Advanced Parameters

The parameters are as follows:

Table 2 Parameter Meaning

Parameter Name	Value Range	Instruction
Virtual Serial	Non-in use, established virtual serial	You can bind the current device to a created virtual serial port.
Dev Type	ZLAN9503, ZLSN7044, ZLAN9503N, ZLSN7044N, etc.	Show only the model of the core module
Dev Name	Any	You can give the device a readable name, with a maximum of 9 bytes, and support the Chinese name.

Dev ID		The factory's sole ID, cannot be modified.
Firmware Ver		The firmware version of core module
Function of the Device		Please refer to the part of “5.2 Model and Function”
IP Mode	Static, DHCP	The user can choose Static or DHCP (Dynamic acquisition of IP)
IP Address		The IP Address of networking products
Port	0～65535	Networking products are in the monitoring port of the TCP Server or UDP mode. As a client, it is best to specify that the port is port 0, which is good for increasing the connection speed, and the system will randomly assign a local port when using the 0 port. At this time the difference from specifying the non-zero port are: (1) when local port to 0, module restarting set up a new TCP connection with PC, old TCP connection may not be closed, so that the old TCP connection of the host has been unable to close, specify the non-zero port does not have the problem. The general host wants to close the old connection when the module is restarted. (2) when the local port is 0, the time of TCP rebuilding connection is faster.
Work Mode	TCP Server （ TCP Server Mode）、TCP Client （ TCP Client Mode）、UDP Mode、UDP Multicast	When set to TCP Server, the network Server needs to actively connect the networking products; When set to TCP Client, the networking product initiates the connection to the network server specified by the destination IP.
Net Mask	eg：255.255.255.0	Must be same as net mask of local LAN.
Gateway	eg：192.168.1.1	Must be the same as the local LAN gateway. If it is not crossing outer network (such as the cable connecting computer), it is best to set the gateway as the IP address of the connected computer.
Dest. IP/Domain		In the TCP Client or UDP mode, the data will be sent to the destination IP or the computer of domain name instruction.
Dest. Port		In the TCP Client or UDP mode, the data is sent to the destination port of the destination IP.
Baud Rate	1200、2400、4800、7200、9600、14400、	Serial baud rate

	19200、28800、38400、57600、76800、115200、230400、460800	
Data Bits	5、6、7、8、9	
Parity	None 、 Even 、 Odd 、 Mark、Space	
Stop Bits	1、2	
Flow Control	None (no flow control), CTS/RTS, DTR/DCR, XON/XOFF	RS232 port valid
DNS Server IP		When the destination computer is described by a domain name, DNS server is required to resolve the domain name, which specifies the IP of this DNS server. When the IP mode is DHCP, the parameter is not specified and will be automatically acquired.
Dest. Mode	Static, Dynamic	UDP working mode: if the destination computer is the best choice for the domain name description, it is the static mode; If there are multiple computers in the LAN communicating with networked products through UDP, it is best to choose dynamic mode. TCP server mode: this parameter must be dynamic. TCP client mode: when IP mode is dynamic, the IP is reconnected after the device is restarted, so that the correct IP address can be obtained again. Otherwise, direct connection does not automatically restart the device.
Transfer Protocol	NONE 、 Modbus TCP<->RTU 、 Real_COM	NONE indicates that the data forwarding from the serial port to the network is transparent; Modbus TCP < - > RTU will convert Modbus TCP protocol directly into RTU protocol to facilitate coordination with Modbus TCP protocol; RealCOM is designed to be compatible with the old version of REAL_COM.
Keep Active Time	0～255	(1) if the device is in the TCP client working mode, the TCP heartbeat will be sent automatically for every "live time" if the device is in the TCP client working mode. This can guarantee the TCP availability of links. When set to 0, there will be no TCP heartbeat. (2) is set to 0 to 254, when transformation protocol selection for REAL_COM, every time keep alive time, equipment will be sent a length of 0 to 1 content data, implement Realcom the

		heartbeat of the agreement. When set to 255, the heartbeat will not be realcom. (3) if the device is set to 0 ~ 254, if the device is working on the TCP client, the device will send the device parameters to the destination computer every time when the device is protected. When set to 255, no parameters are sent. This mechanism is not normally used, and users are not required to pay attention.
Reconnect Time	0～255	Once in a TCP client mode of networking products and disconnect the server (that is, as long as in the connection status), then every once in a while a TCP connection to the server, the time interval for break time, can be 0 ~ 254 seconds, if set 255, never for reconnection. Note first TCP connection would immediately (such as hardware on electricity, through zlvircom software restart equipment, no data), only after the first connection failure will try again after waiting for the "break time", so "break time" will not affect the network and server connection setup time under normal circumstances.
Http Port	1～65535	
UDP Group IP		UDP multicast
Max Frame Length	1～1400	One of the rules of serial. The connected product serial port sends the received data to the network as a frame after receiving the length data.
Max Interval (Smaller will better)	0～255	One of the rules of serial. When there is a pause in the data received by the connected product, and the pause time is greater than that time, the received data is sent to the network as a frame.

6.2 Parameter Modification Method

6.2.1 ZLVircom Type

ZLVircom find the device and edit the device parameters through the Internet searching.

Its advantages include:

1) No need PC and networking products in the same IP network segment.

2) Even the networking products having IP conflicts between can be modified the parameters.

3) You don't need to know the IP address of the networking product.

4) More parameters can be modified.

6.2.2 Web Browser

If the ZLVirCom program is not installed on the user PC, the parameters can be modified through the Web login.

(1) Enter the IP address of the networking product in the browser, such as http://192.168.1.200, and open the following page.

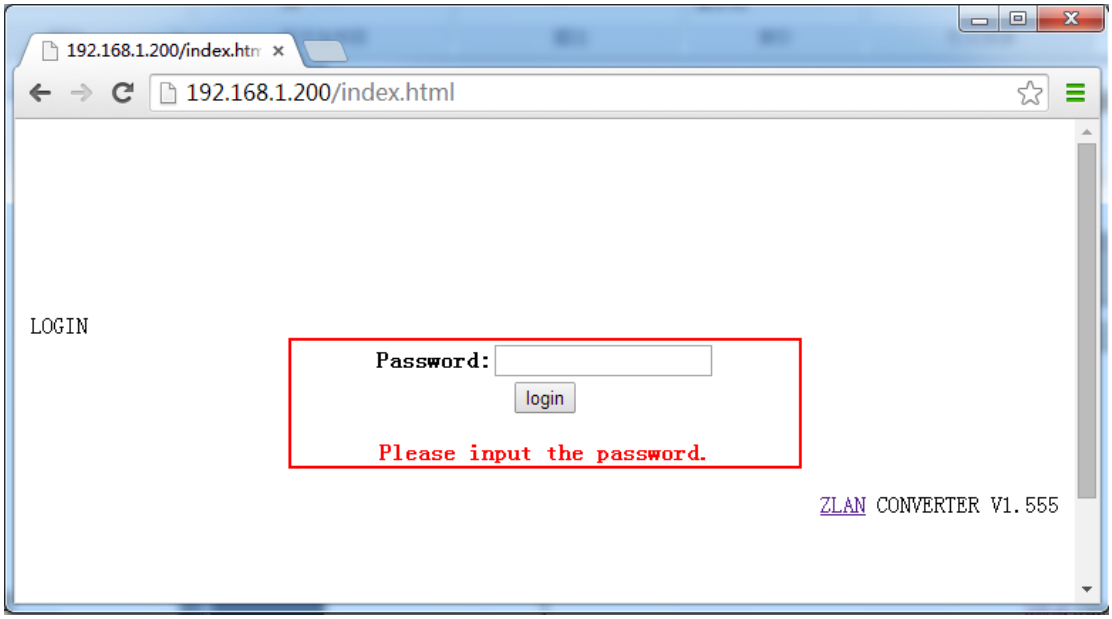

Figure 10

(2) Enter Password in “Password”: default is 123456. Click the “login” button to log in.

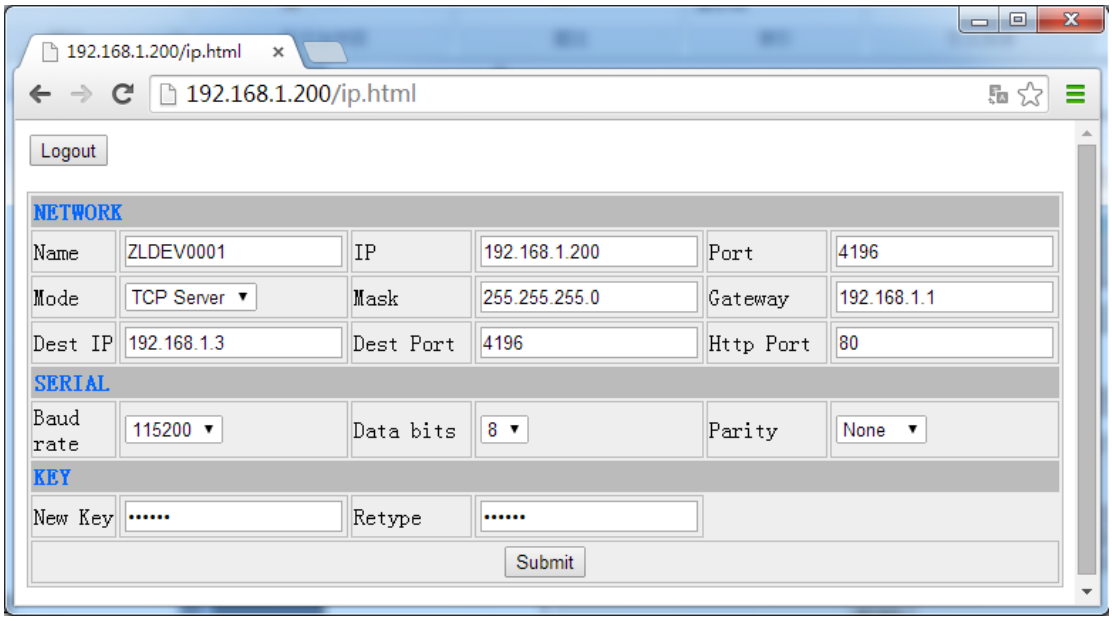

Figure 11

(3) In the appearance of the Web page, you can modify the parameters of the networking product. In addition to the parameters of the Web login password, the parameters are already specified in the 10.1 parameter definition. The Web login password is the password for the login of the page.

(4) Click "submit" button after modifying parameters.

(5) Please click "exit " button after the modification, anyone can enter this configuration interface if not quit.

6.3 Device Search

Run ZLVircom software and click "Device Manage" to see a list of devices.

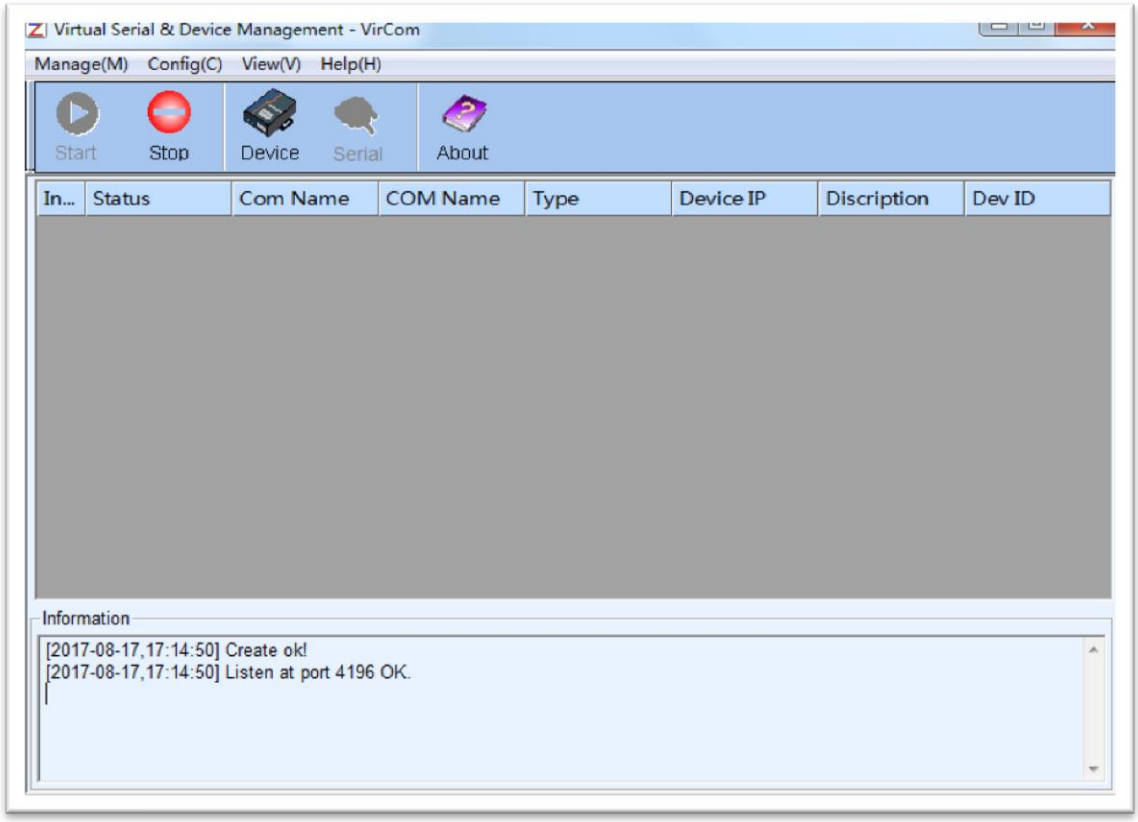

Figure 12 ZLVircom Main Interface

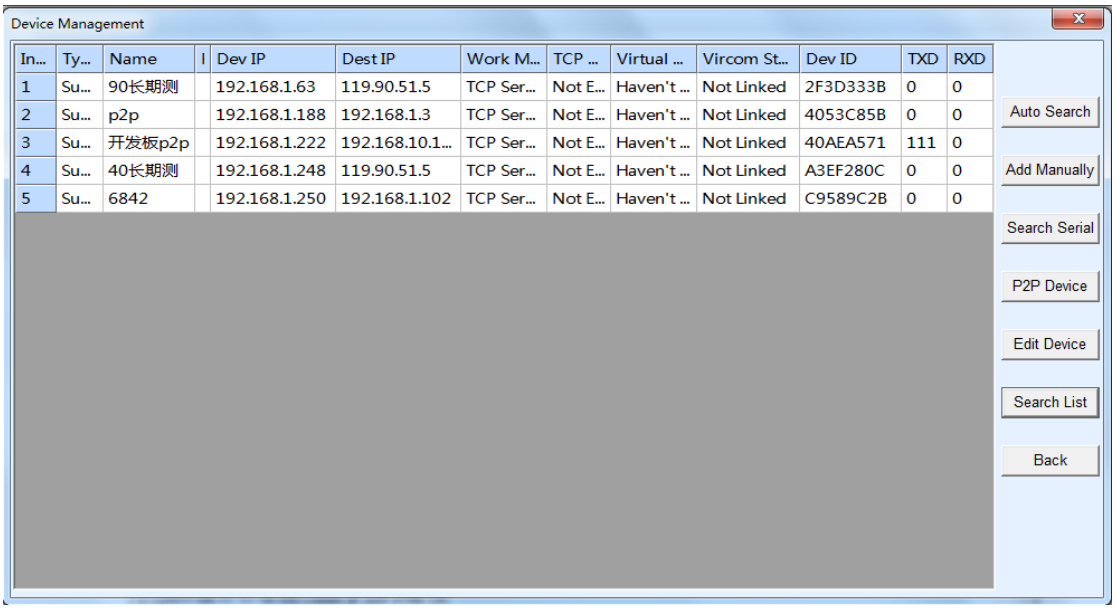

Figure 13 Device List

From the device list, you can see all of the current online devices, and you can search for devices that are not in one network segment. There is no need to use the "Add Manually"

function.

6.4 Parameter Configuration

Double-click on a single line to edit the device parameters.

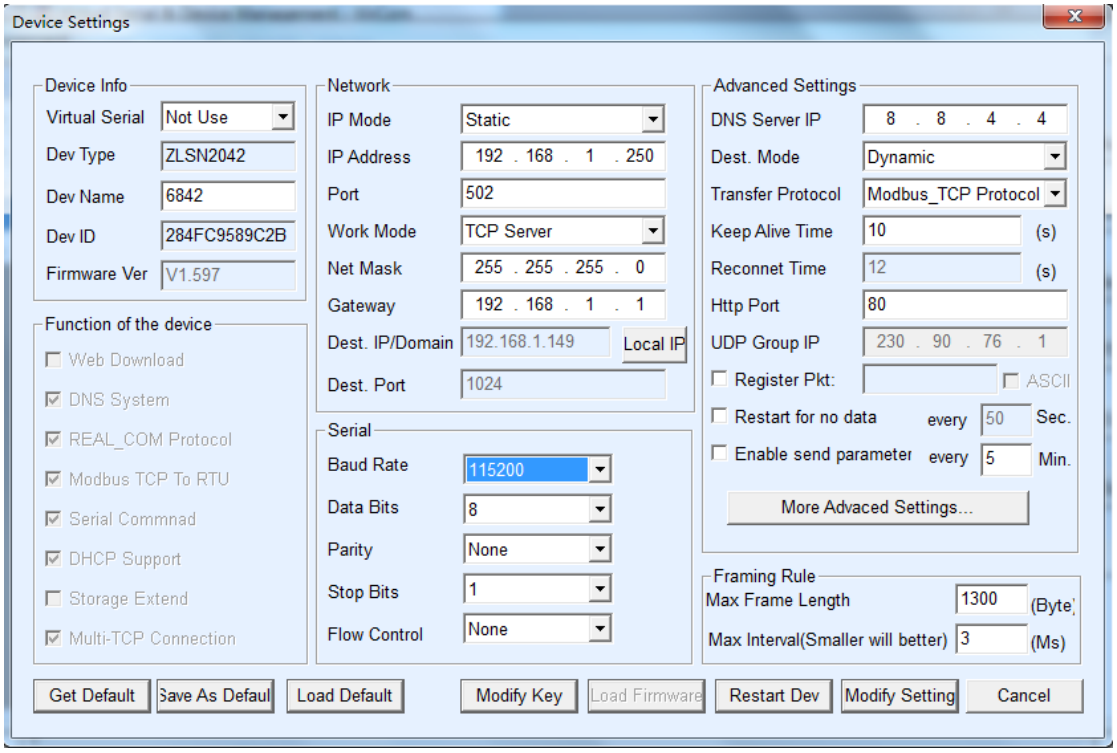

Figure 14 Device Edit Interface

In this interface, the user can set the parameters of the device, then click "Modify Setting", and the parameters are set to the flash of the device, with power-off no lost. The device will restart automatically.

6.5 Transparent Communication

Now we need to test the transparent communication function of the networking products. The transparent communication is: what data sent by computer to a networking product, the serial port of the networking product will output what data. Instead, what data the serial port received, it will send to the network computer.

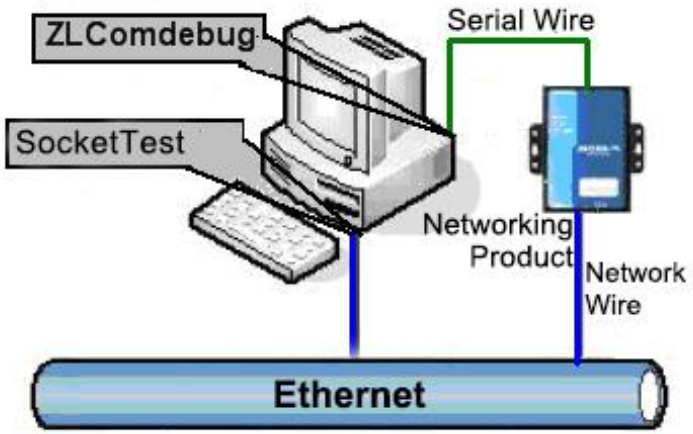

Figure 15 Transparent Transmission Diagram

If the COM port of PC is connected with the serial port of networking product, then open the ZLComDebug serial port debugging assistant, the ZLComDebug can communicate with the serial port of networking product. Open TCP&UDP debugging assistant SocketTest, and as TCP client, connect to the 4196 port under the IP (currently 192.168.1.200) of the networking product, and the TCP link can be established with networking products.

Since then, the data sent by SocketTest can be received by ZLComDebug, and the data sent by ZLComDebug can also be received by SocketTest.

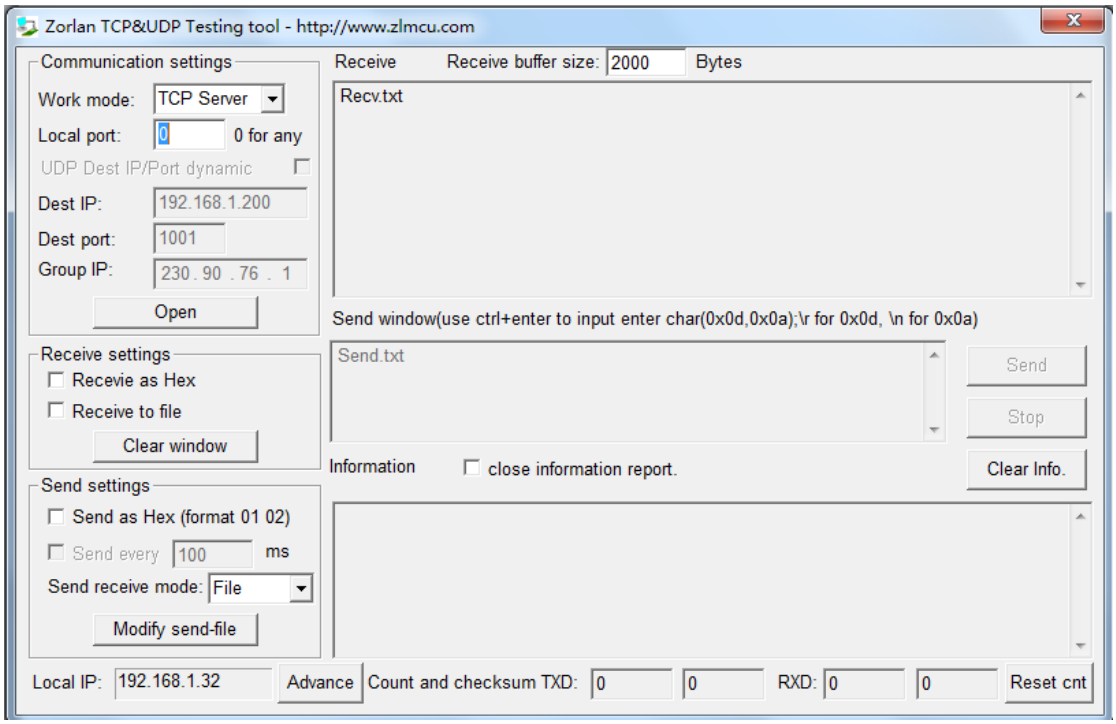

Figure 16 SocketTest Send-receive Interface

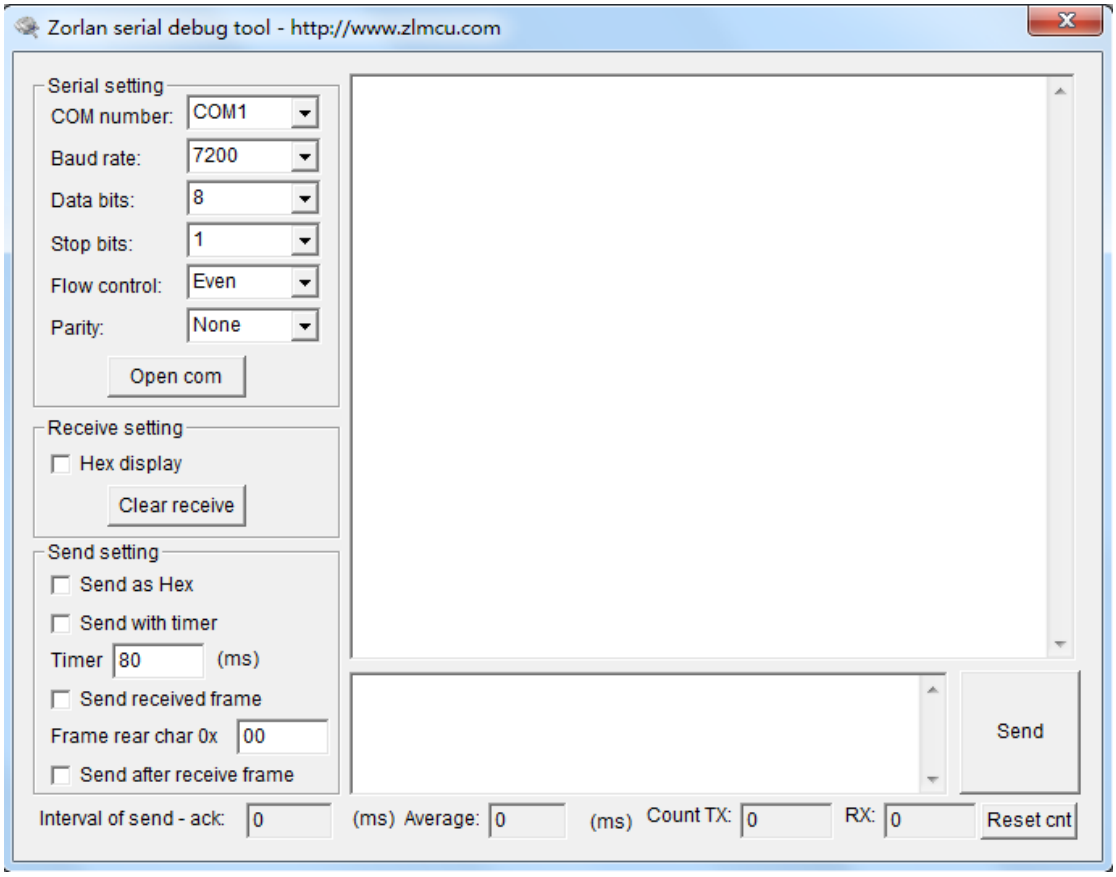

Figure 17 ComDebug Send-receive Interface

From FIG. 16 and FIG. 17, transparent communication between serial port and network port is carried out. If the serial port is connected to a user's serial port device, it can communicate with device serial port through the network TCP connection for data collection and control.

6.6 Virtual Port

In FIG. 15 SocketTest is through TCP&UDP to communicate with device, in order to let the user’s developed serial port software can be used but no need to be modified for TCP communications, need to add a converting step of COM port to TCP between the user program and TCP. ZLVircom can do this.

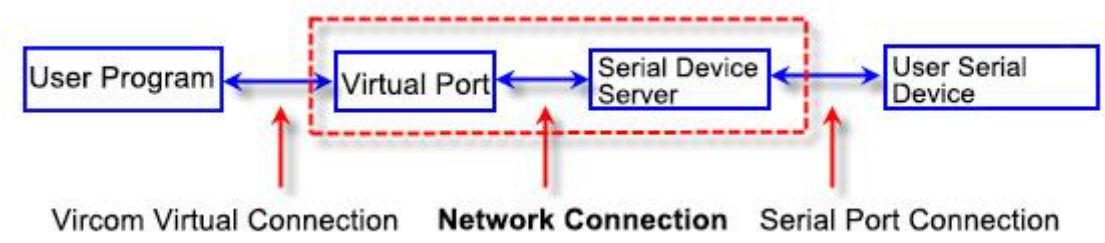

Figure 18 Virtual Port Usage

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

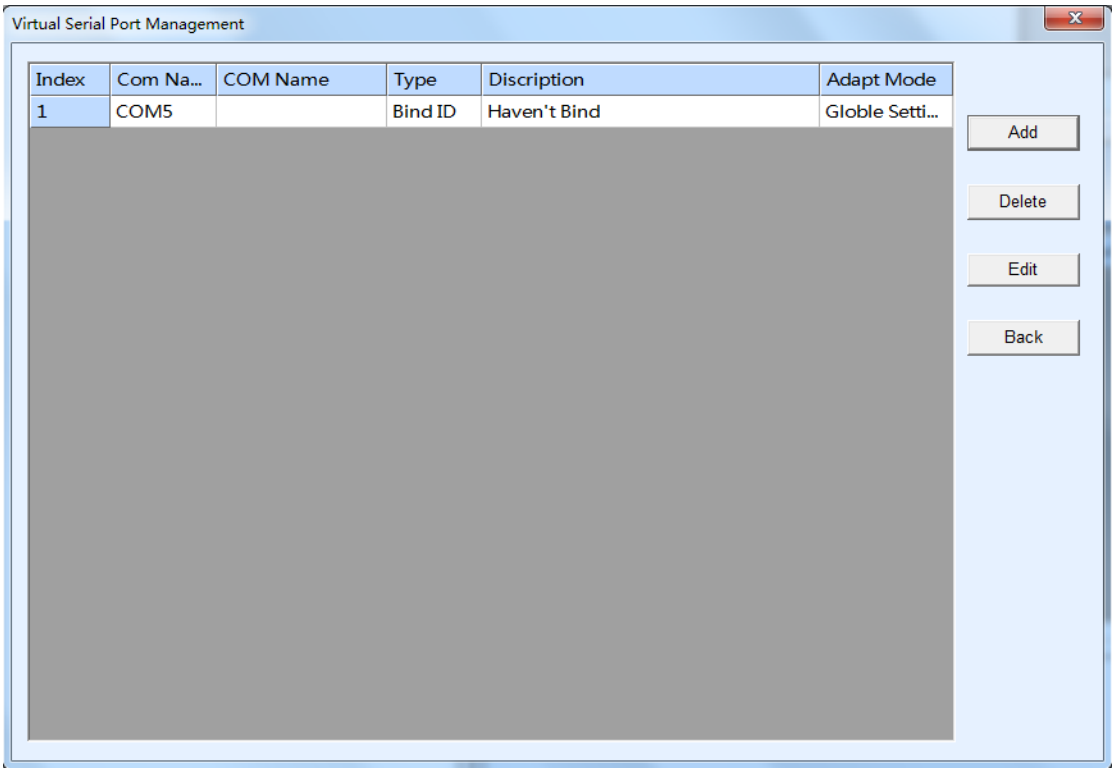

Figure 19 Add Virtual Serial Port

Then enter the "device manage", and double-click the device that you need to bind to the COM5. As shown in FIG. 14, select COM5 from the "virtual serial port" list in the upper left corner. Then click "modify Settings". And return to the main interface of ZLVircom. You can see that the COM5 has been connected to a device with IP 192.168.1.200. You can use COM5 instead of SocketTest to communicate.

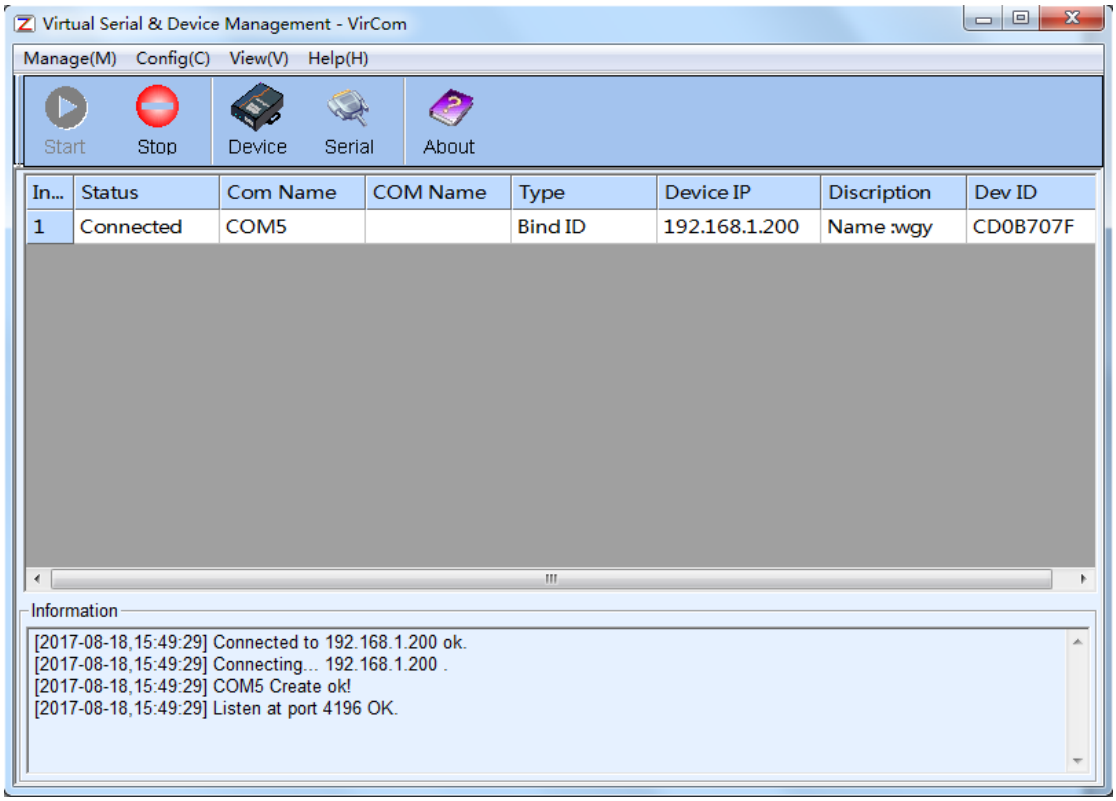

Figure 20 Virtual Serial Port has been connected

Now close the before SocketTest and open a new ZLComdebug as the user's serial port program, now open COM5. At this point, COM5 (virtual serial port) and COM4 (hardware serial port) can send-receive data through networking products. If the serial port of the connected product is not connected to the COM port of PC, but a serial port device, then the COM5 can be opened to communicate with the device. And it's just use the network way now.

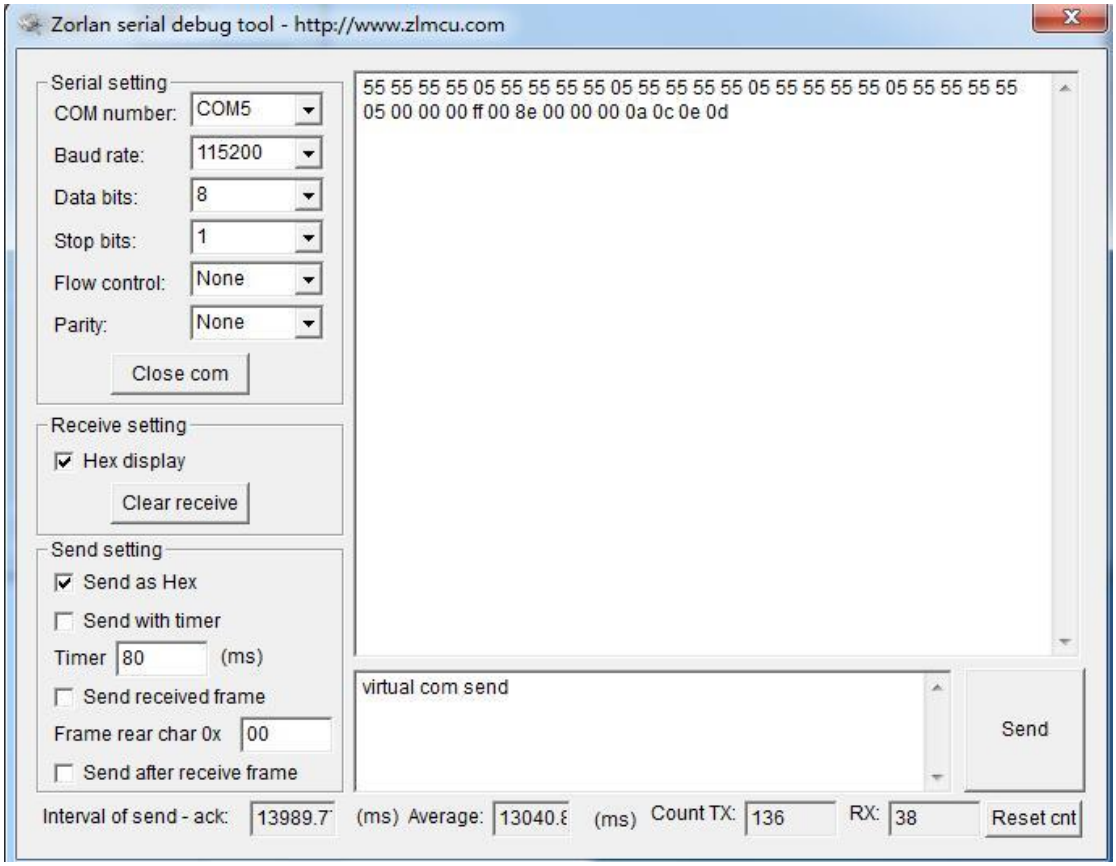

Figure 21 Communication via Virtual Serial Port

7. After-service

Shanghai ZLAN Information Technology Co., Ltd.

Address: 12 floor, D building, No. 80 CaoBao road, Xuhui District, Shanghai, China

Phone: 021-64325189

Fax: 021-64325200

Web: http://www.zlmcu.com

Email: support@zlmcu.com