

**BUELEC GINGKO**

**GT1001 Instruction Manual**

# **GT1001**

**Ethernet to TTL module**

**Version No.: V1.1**

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**Catalog**

## 1. Function characteristics

- 10Mbps Ethernet interface, supporting automatic switching of AUTO-MDIX network cable cross direct connection
- Operating mode supports TCP Server, TCP Client, UDP, Modbus \_ TCP Slave, Modbus \_ TCP Master
- Serial port baud rate can be set from 600bps to 230.4kbps, supporting None, Odd, Even, Mark and Space Five check modes
- User-defined heartbeat packet mechanism to ensure effective connection and prevent dead connection
- Support setting parameters of webpage, AT command, serial port protocol and network protocol, and provide setting protocol for customer integration into your own software
- Support the TCP Client short connection function and customize the disconnection time of short connection.
- Support the function of timeout restart (restart without data), and the restart time is customized.
- DHCP function, able to obtain IP automatically.
- User-defined MAC addresses.
- It is convenient to upgrade the firmware through the network upgrade function.
- Supports software factory settings.
- It can work in the local area network and can also access the external network.
- Support account and password settings for web login and network settings.
- Support data transfer between Modbus TCP and Modbus RTU

## 2. Product Overview

### 2.1. Product Introduction

The GT1001 module is used to realize the bidirectional and transparent transmission of data from the serial port to the Ethernet port, and has its own protocol conversion program. The user only needs to operate the serial port. The serial port end is TTL level data, and the Ethernet end is network data packet, which can be used by users. The data transmission function can be realized by simple parameter setting through web pages or serial port software.

GT1001 module is a brand new, small serial port to Ethernet module, and the whole module is only the size of a postage stamp. Through Level shifting of TTL signals makes it easy to convert between RS485/422/232 and Ethernet interfaces, enabling industry The network transmission of field data is more convenient.

The GT1001 module is a low-power design that consumes less current when running at full speed. It is equipped with M0 series. Processor, running speed block, high efficiency, while a variety of functions to meet the needs of our customers.

## 2.2. Basic parameter

**Table 2-1 Electrical Parameters**

Category	Parameter Name	Parameter Value
Hardware Parameter	Operating voltage	3.3 V/5.0 V (one of two)
	Operating current	50mA@3.3V/5.0 V
	Network port specification	RJ45, 10Mbps, cross direct connection adaptive
	Serial port baud rate	600bps ~ 230.4kbps
	Serial port standard	TTL-3.3 V/TTL-5.0 V
Software Parameter	Network protocols	IP, TCP/UDP, ARP, ICMP, IPV4
	IP acquisition method	static IP, DHCP
	Domain name resolution	support
	User configuration mode	Web page configuration and AT command configuration
	Transparent transmission mode	TCP Server/TCP Client/UDP/Modbus
	Http Client	support
	Network Cache	Network Cache Send: 536Byte; Receive: 536Byte
	Serial port cache	4K bytes
	Average transmission delay	< 10ms
	Packaging mechanism	5-byte packaging time
Other	Size	32 * 21 * 24.4mm (L * W * H)
	Operating temperature	-40 ~ 85 °C
	Storage temperature	-40 ~ 105 °C

### **2.3.Device default parameter**

**Table 2-2 Device default parameter**

Parameter Type	Parameter Value
Username	admin
Password	admin
IP Address	192.168.0.10
Subnet mask	255.255.255.0
Default gateway	192.168.0.1
Default operating mode	TCP Client
Default destination port	60000
Default local port	5000
Default destination IP	192.168.0.1
Serial port baud rate	115200
Serial port parameter	None/8/1/NFC

### 3. Introduction to hardware parameters

#### 3.1. Pin Definition

- (1) The physical object of GT1001 is shown in Figure 3-1, and the pin distribution is shown in Figure 3-2.

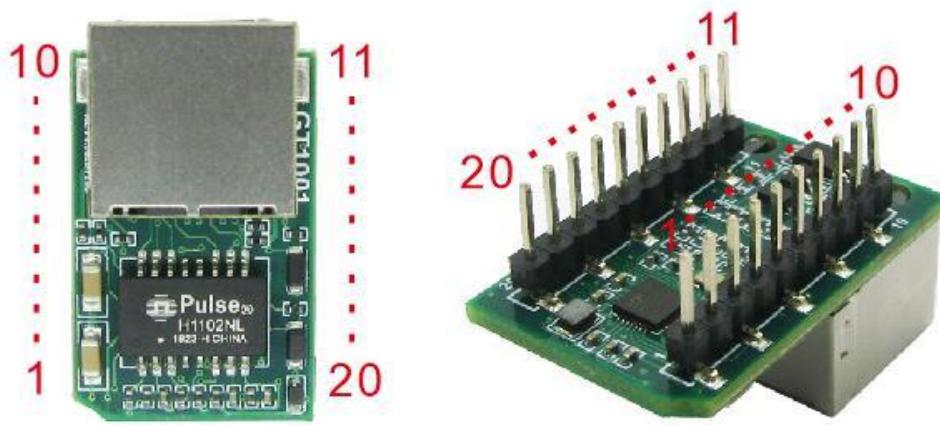


Figure 3-1GT1001 Physical Drawing

VCC	10	11	3V3
GND	9	12	GND
NC	8	13	RXD
NC	7	14	NC
NC	6	15	CFG
NC	5	16	TXD
NC	4	17	485_TEN
NC	3	18	RX_LED
RST	2	19	TX_LED
GND	1	20	GND

Figure 3-2 Pin Distribution of GT1001

(2) The pin functions of GT1001 are described in Table 3-1.

Table 3-1 GT1001 Pin Function Table		
Pin number	Pin name	Function Description
1,9,12, 20	GND	Connect to the GND plane of the system
2	RST	Reset entire module, active low
3,4,5,6,7,8,14,17	NC	Not connected, left hanging
10	VCC	5V supply input (3.3 V pin is floating or output when 5V supply is selected)
11	3.3V	3.3 V supply input (5V pin left floating when 3.3 V supply is selected)
13	RXD	UART data receive pin, TTL level supports 3.3 V/5V
15	CFG	Power-up sets this pin low to enter boot model
16	TXD	UART data transmit pin, TTL level supports 3.3 V/5V
17	485_TEN	GT1001 Transmit indication pin, low by default, high when transmitting
18	RX_LED	UART Receive Indicator (Refer to Figure 4-5 for circuit)
19	TX_LED	UART transmit indicator (Refer to Figure 4-5 for the circuit diagram)

### 3.2. Mechanical Dimension

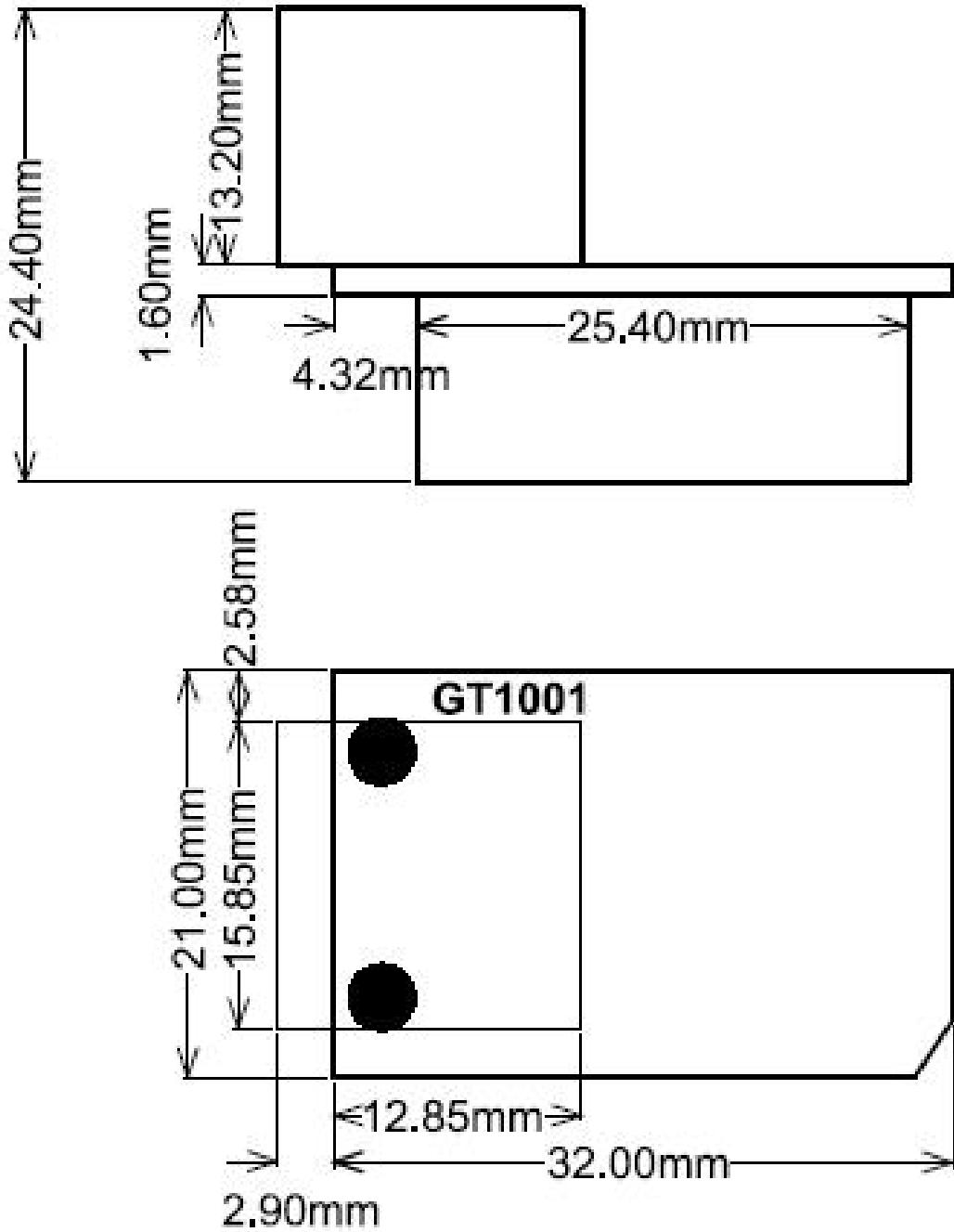


Figure 3-3 GT1001 Mechanical Dimensions

## 4. Hardware Reference Design

The main function of this design is to realize the data conversion between UART/RS232/RS485 and Ethernet, which is divided into TTL to UART design, TTL to RS232 design, TTL to RS485 design, key control, LED control and other parts.

### (1) TTL to UART design

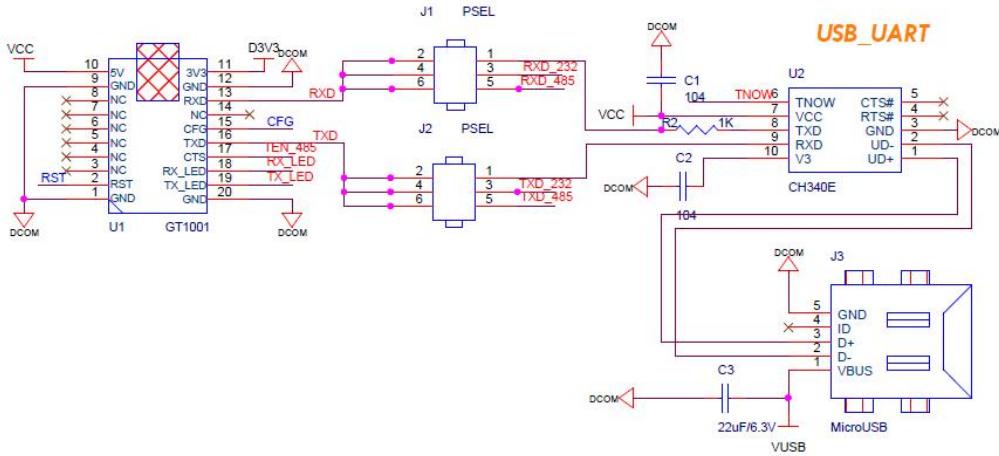


Figure 4-1 TTL to UART Reference Design

< Description >:

- 1) CH340 mainly realizes the conversion between TTL and USB interfaces. It can directly create a virtual serial port on the computer through the USB cable to communicate with the TTL of GT1001;
  - 2) The network port on the other end GT1001 is directly connected with the network port of the computer, thereby realizing the bidirectional data transmission between the serial port and the Ethernet;
  - 3) Select J1 and J2 at the < 1,2 > jumpers, respectively.
- (2) TTL to RS232 design

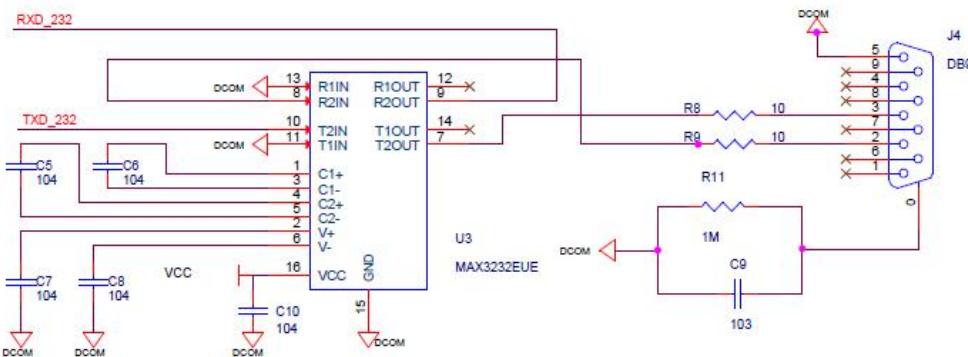


Figure 4-2 TTL to RS232 Reference Design

< Description >:

- 1) Select J1 and J2 in Figure 4-1 at < 3,4 > jumpers respectively;
- 2) MAX3232 mainly realizes the conversion between TTL and RS232, and can communicate with RS232 devices through standard DB9 GT1001;
- 3) The RS232 interface adopts the standard DB9 interface.

### (3) TTL to RS485 design

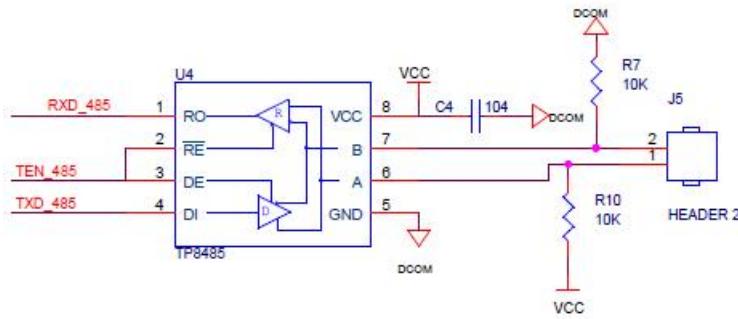


Figure 4-3 TTL to RS485 Reference Design

< Description >:

- 1) Select J1 and J2 in Figure 4-1 at < 5, 6 > jumpers respectively;
- 2) The TP8485 mainly realizes the conversion between TTL and RS485, and can flexibly realize the communication with RS485 serial port equipment through the connecting terminals with the spacing of 5.08 mm;
- 3) The RS485 interface uses 5.08 mm pitch terminals.

### (4) Key Control Reference Circuit

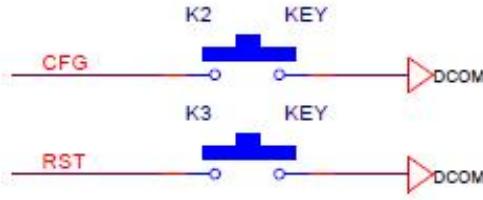


Figure 4-4 key control circuit Reference design

< Description >:

- 1) CFG: Configuration signal, input. When the signal is set to a low level during power-up, the GT1001 enters the BOOT mode; when the signal is set to a low level during normal operation, the GT1001 enters the configuration mode.
- 2) RST: GT1001 reset signal, input, active low.

### (5) LED status indication circuit

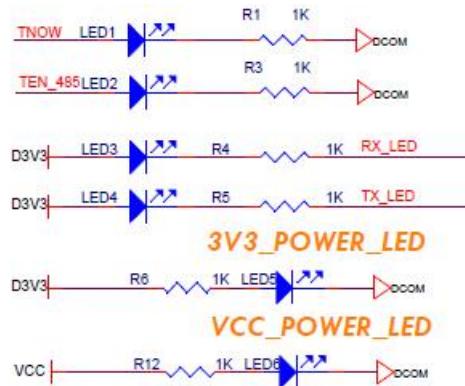


Figure 4-5 LED status indication circuit Reference Design

< Description >:

- 1) TNOW: USB data receiving indicator, which flashes when there is data transmission; RX \_ LED: GT1001 receiving indicator, LED flashes when data is received;
- 2) RX \_ LED: GT1001 receiving indicator, LED flashes when data is received;
- 3) TX \_ LED: GT1001 transmission indicator, LED flashes when data is transmitted;
- 4) 3 V3 \_ POWER \_ LED: 3.3V power indicator, LED is always on when GT1001 normally outputs 3.3V voltage.
- 5) TEN \_ 485: GT1001 transmit indication pin, which is low by default and high when data is transmitted. A typical application is as a direction control pin for 485 communication.
- 6) VCC \_ POWER \_ LED: 5V power indicator. When the GT1001 test backplane normally inputs 5V voltage, the LED is always on.

## 5. Hardware Test

**There are two purposes of hardware testing: to ensure that the product has no quality problems and to quickly understand the working process of GT1001.**

### 5.1. Hardware preparation

List of test platforms:

1. One GT1001 module;
2. One GT1001 test baseboard;
3. One DC5V power supply;
4. One MicroUSB cable;
5. One computer;
6. One network cable.



Figure 5-1 Hardware platform material

## 5.2.Hardware Connection

Hardware is mainly to ensure the connection of data transmission hardware data link.

1. Connect the GT1001 module to its test backplane correctly (as shown in Figure 8);
2. Connect the network port of GT1001 to the computer AA through the standard network cable;
3. Connect the Uart end (USB port) of the GT1001 backplane to the computer BB through the USB cable. At this time, the GT1001 hardware test platform is completed, as shown in Figure 8.



Figure 5-2 GT1001Hardware test platform

## 5.3.Hardware Test Flow

### 1. Preparation before test

(1) To prevent network problems such as communication errors, after the hardware is connected, please perform the following operations on the computer AA at the network port. As:

- 1) Close the computer firewall;
  - 2) Turn off the network card irrelevant to this test, and only keep the local connection corresponding to GT1001;
  - 3) Set a static IP in the same network segment as GT1001 on the computer side.
- (2) Install "TCP & UDP Test Tool" on computer AA (obtained from folder TOOL);  
(3) Install the "Commix" serial port test tool on the computer BB (obtained from the folder TOOL).

### 2. Test Flow

(1) Set the local IP of the computer AA as the static IP. The setting parameters are as shown in Figure 5-3, and the setting parameters are as shown in Box 4. Shown

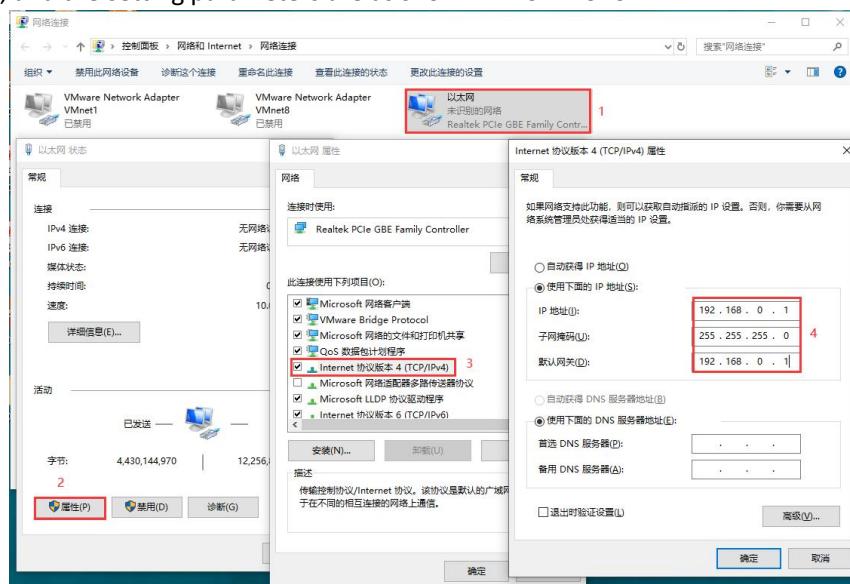


Figure 5-3 IP Parameter setting interface

- (2) Open "TCP & UDP Test Tool" on the computer AA, select Create Server, and set the local port number to 60000. As shown in Figure 5-4, then click Create.

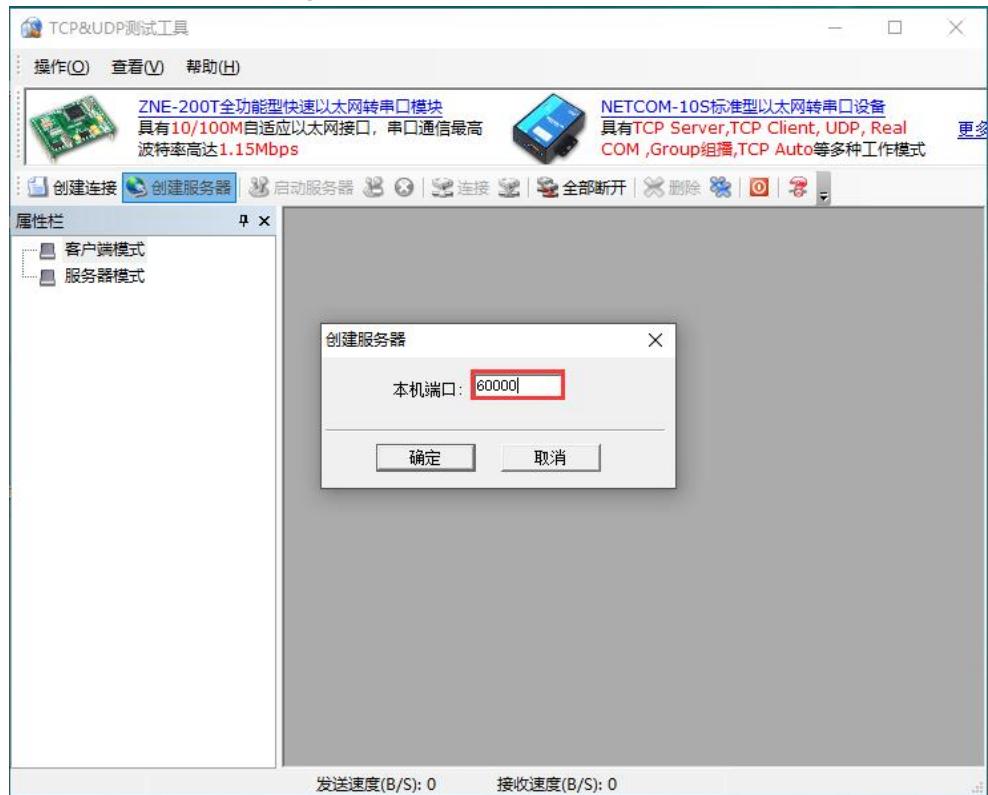


Figure 5-4 Network parameter setting interface

- (3) Click Start Server to enter the transmission interface, as shown in Figure 5-5.

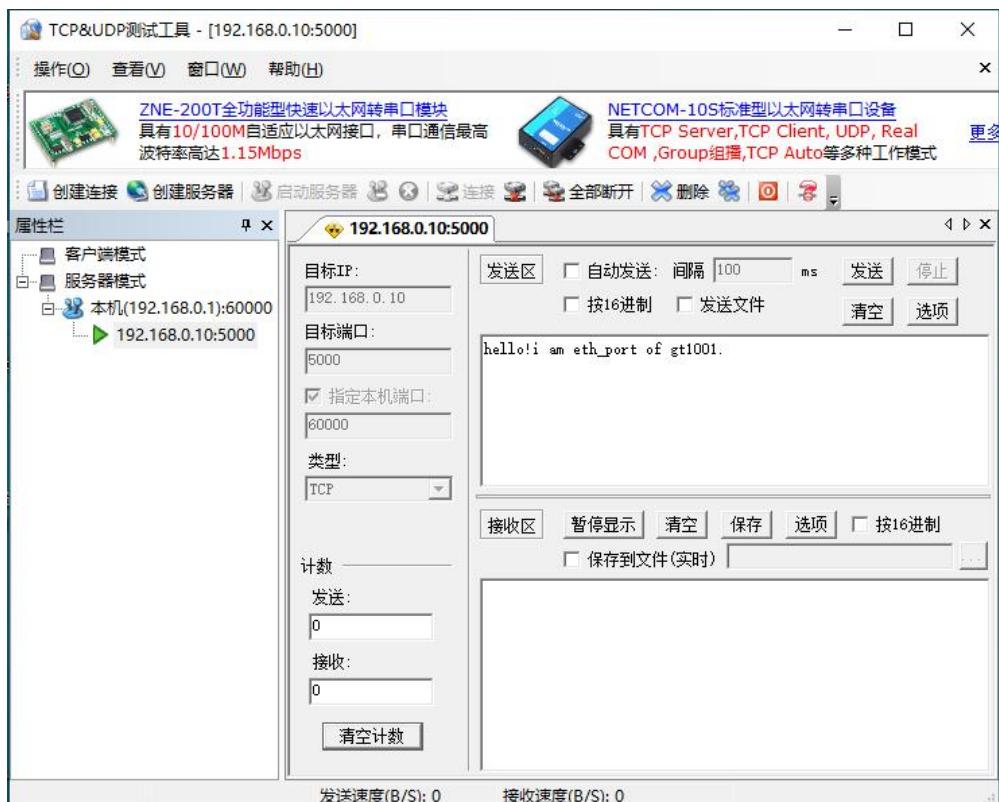


Figure 5-5 Network transmission interface.

(4) View the port number corresponding to the UART in the device manager of the computer BB, as shown in Figure 5-6.

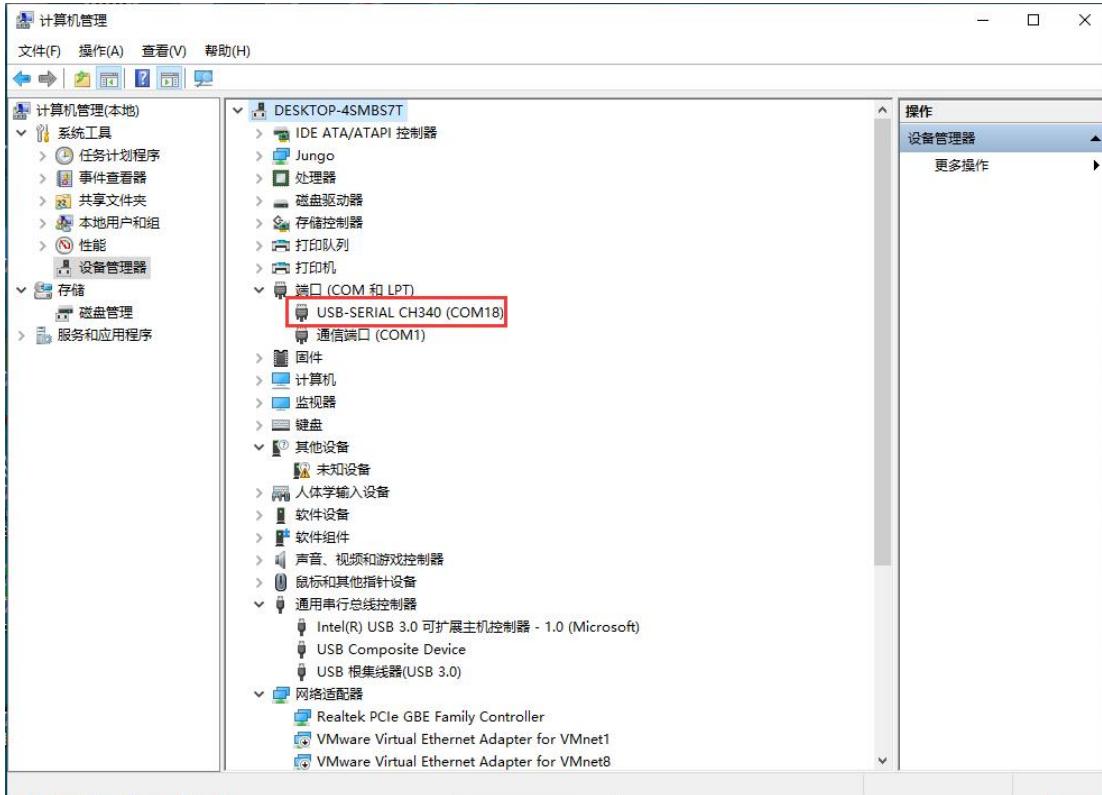


Figure 5-6 Uart port number query interface

(5) Open the "Commix" serial port test tool, set the serial port parameters as shown in Figure 5-7, and then click "open port". Open the serial port.



Figure 5-7 Serial port parameter setting interface

(6) Serial port to network data flow transmission test: PC BB serial port-> GT1001 serial port-> GT1001 Ethernet port-> Computer AA network. Input the data in the sending area of the computer BB, and then click Send to receive the corresponding data on the computer BB As shown in Figure 5-8.

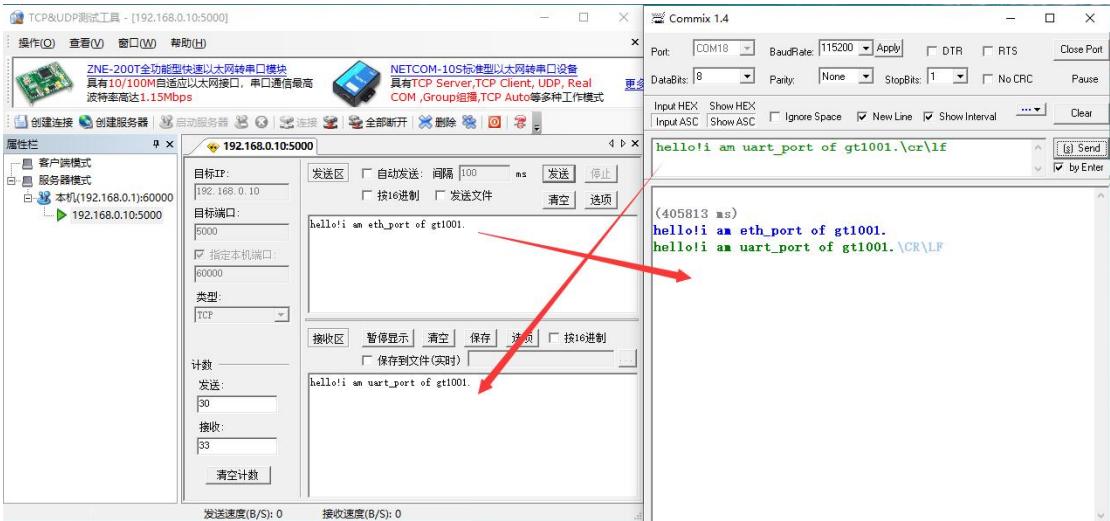


Figure 5-8 Serial port to network data transmission interface

(7) Network to serial port data flow transmission test: Computer AA network-> GT1001 network port-> GT1001 serial port-> Computer BB serial port. Input the data to be sent in the sending area of the network debugging tool on the computer AA, and then click Send. The corresponding data is received on AA, as shown in Figure 5-9.

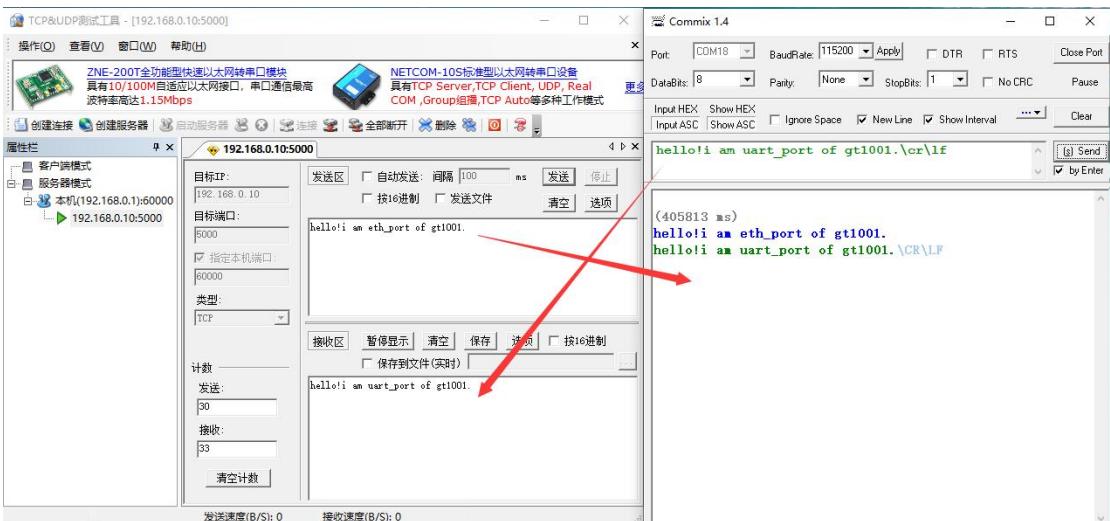


Figure 5-9 Network to serial port data transmission interface

(8) When the data transmission test is over and there is no data error, the GT1001 hardware has no quality problem.

## 6. Product function

### 6.1.Default parameter settings

The default parameters of the equipment are shown in Table 6-1.

Table 6-1 Default Parameters of GT 1001

Parameter Type	Parameter Value
Username	admin
Password	admin
IP Address	192.168.0.10
Subnet mask	255.255.255.0
Default gateway	192.168.0.1
Default operating mode	TCP Client
Default destination port	60000
Default local port	5000
Default destination IP	192.168.0.1
Serial port baud rate	115200
Serial port parameter	None/8/1/NFC

### 6.2.Network basic function

The basic functions of the network are mainly to meet the needs of basic network connection and network data interaction.

#### 6.2.1. IP Address/Subnet Mask/Gateway

1. The IP address is the unique identification of GT1001 in the local area network, which is not repeatable. Generally, the IP address of GT1001 can be obtained by static IP and DHCP.

(1) The static IP needs to be set manually by the user, and the IP, subnet mask and gateway need to be set at the same time to facilitate the implementation of IP. And correspond to that ports one by one.

(2) DHCP mainly obtains IP address, gateway address, DNS server address and other information dynamically from the gateway. Without the tedious steps of setting an IP address. It is applicable to devices that have no special requirements for IP and do not require one-to-one correspondence between devices and IP. The scene of.

2. The subnet mask is mainly used to determine the network number and host number of the IP address, indicate the number of subnets, and determine whether the module Flag within the subnet. The subnet mask must be set when IP is set. The commonly used class C subnet mask is 255.255.255.0. If the network number is the first 24 digits, the host number is the last 8 digits, the number of subnets is 255, and the module IP is within the range of 255, then Is the module IP in this subnet.

3. Gateway is the network number where the module's current IP address is located. If a device such as a router is connected to an external network, then The gateway is the IP address of the router. If it is set incorrectly, it cannot be connected to the external network. If it is not connected to a device such as a router, There is no need to set it, and the default is OK.

#### 4. Refer to the AT instruction set:

Table 6-2 Static IP/DHCP AT Commands

Instruction Name	Description
AT+WANN	sets and queries the IP acquisition method of GT1001, IP/subnet mask/gateway parameter

##### 6.2.2. WebServer

GT1001 has a built-in web server, which is mainly used for parameter setting and status query of GT1001. The end of the web server The port number can be set, and the default is 80.

Operation process:

1. Open the browser and enter the IP address of GT1001 in the address bar, such as 192.168.0.10 (IP address and computer On the same segment and not the same).
2. Enter the user name and password in the login interface. The default user name and password are admin. Click Login to enter Enter the main interface of the built-in webpage. As shown in Figure 6-1.

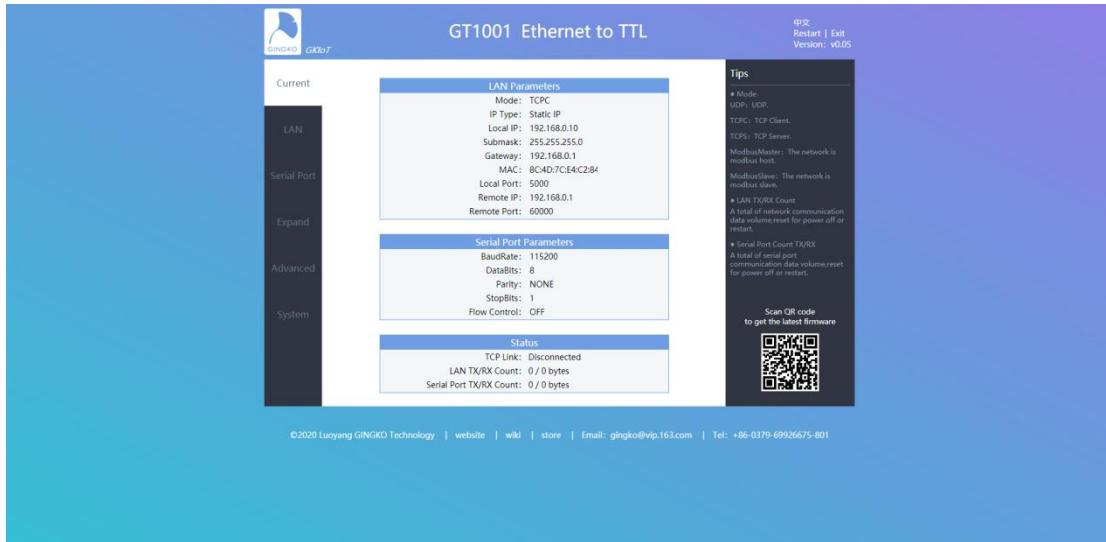


Figure 6-1 Built-in main interface

### 6.2.3. Network Upgrade Firmware

(1) Set the CFG pin to a low level at power-up to enter the firmware upgrade mode. At this time, the RX \_ LED and TX \_ LED are interleaved. Substitute scintillation;

(2) Set the computer IP to 192.168.0.1 (or any IP address in the same network segment except 192.168.0.10). As shown in Figure 6-2.

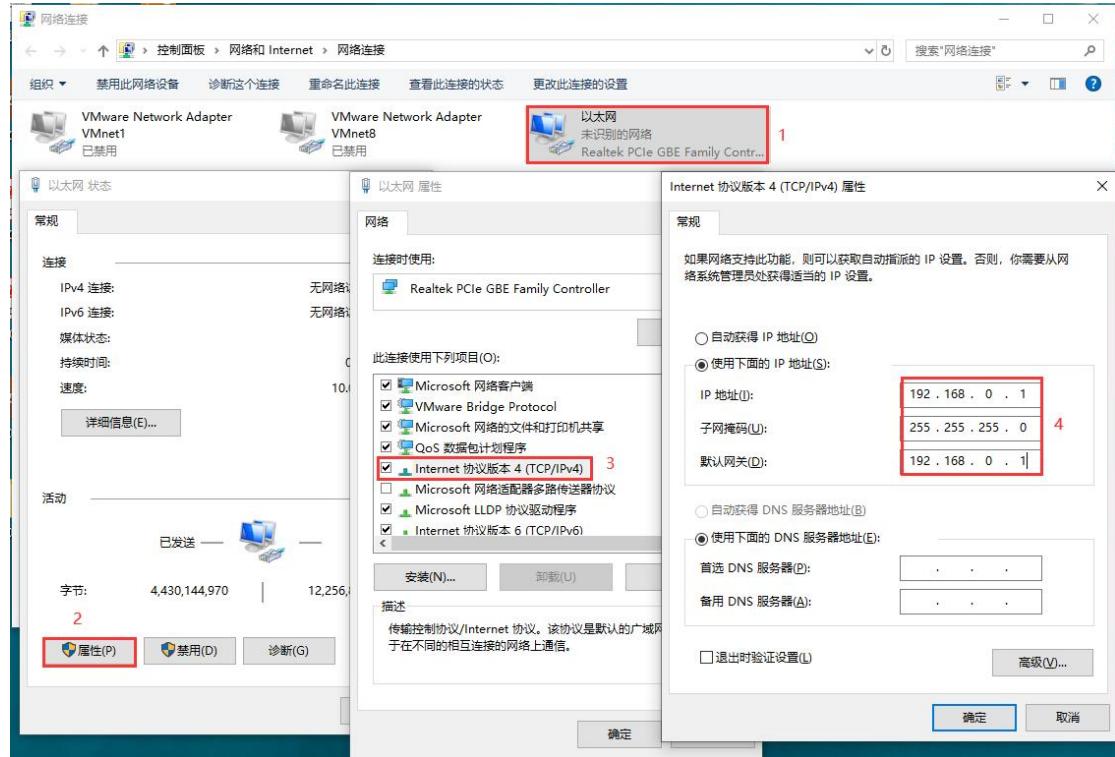


Figure 6-2 Computer IP Setting Interface in Firmware Upgrade Mode

- (3) Open the computer browser and enter the website "192.168.0.10" to enter the firmware upgrade setting interface, as shown in Figure 6-3



Figure 6-3 Main interface of firmware upgrade

- (4) Click the "Select File" button to point the path to the firmware to be upgraded (scan if the latest firmware is not available QR Code Acquisition).  
(5) Click the "Upgrade" button to start the firmware upgrade. During the upgrade process, RX \_ LED flashes and the upgrade is completed. Then enter the application mode, and the webpage prompts that the upgrade is successful, as shown in Figure 6-4.

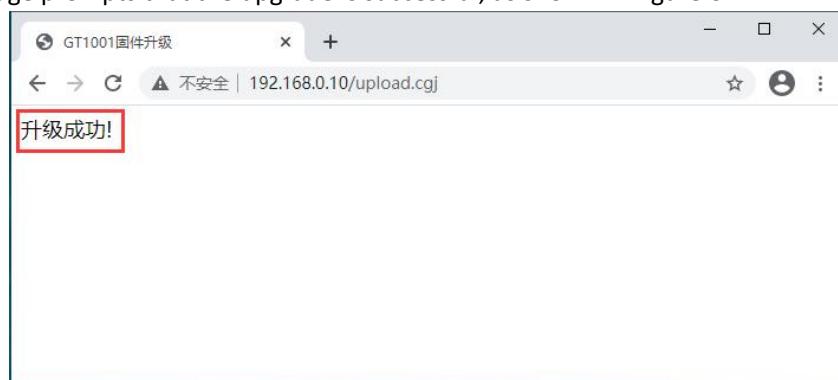


Figure 6-4 Prompt interface for successful upgrade

(6) Power on again. If the RX \_ LED and TX \_ LED flash alternately, the upgrade fails.

### 6.3. Operating Mode

The operating modes of GT1001 are UDP, TCP Client, TCP Server, Modbus Slave and Modbus Master, which can be set through the webpage and AT instruction set.

Refer to the AT instruction set:

Table 6-3 Setting/query working mode table

Instruction Name	Description
AT + MODE	set/query GT1001 operating mode

#### 6.3.1. UDP mode



Figure 6-5 Working diagram of UDP mode

- (1) UDP mode is a fast and connectionless data transmission mode, which does not have the process of establishing and disconnecting connections. It is enough to send data to the specified IP and port. This requires the module to set the destination IP and port before establishing communication Mouth.
- (2) Because this mode is fast and has no reliable connection, it is suitable for data packets with no requirement for data packet loss rate. Small and fast sending frequency working scenario.
- (3) In this mode, the remote IP is set to a fixed IP other than a XXX. XXX. XXX. 255, which can realize multiple Communication between a module and a computer.
- (4) Communication example:
  - 1) Set the module to UDP mode with the destination port set to 60000. Both AT commands and web pages are available Take AT command setting as an example, as shown in Figure 6-6. For specific AT command mode entry operation, please refer to AT. Instruction set portion

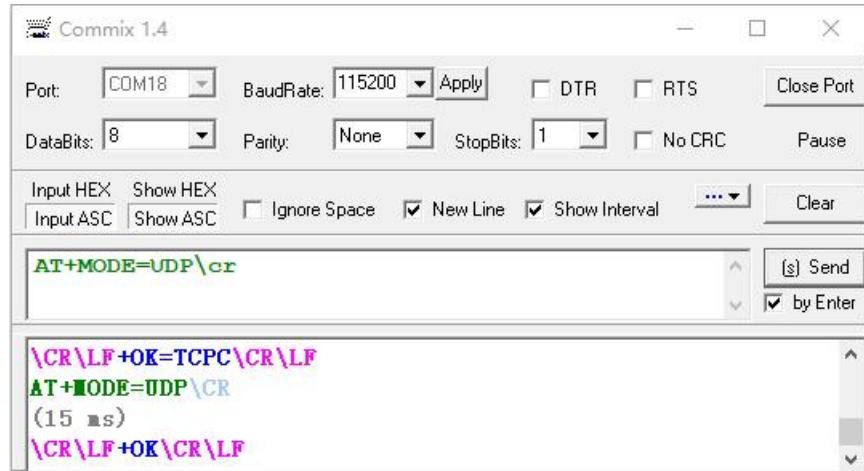


Figure 6-6 AT Command Setting UDP Mode

- 2) As shown in Figure 6-6, the receipt of "+ OK" indicates that the module has completed setting the UDP mode. Then exit the at command module. The program automatically returns to passthrough mode.
- 3) Set the computer IP to 192.168.0.1, open "TCP & UDP Test Tool", create a connection, and select the mode. Select UDP, and other parameter settings are as shown in Figure 6-7.

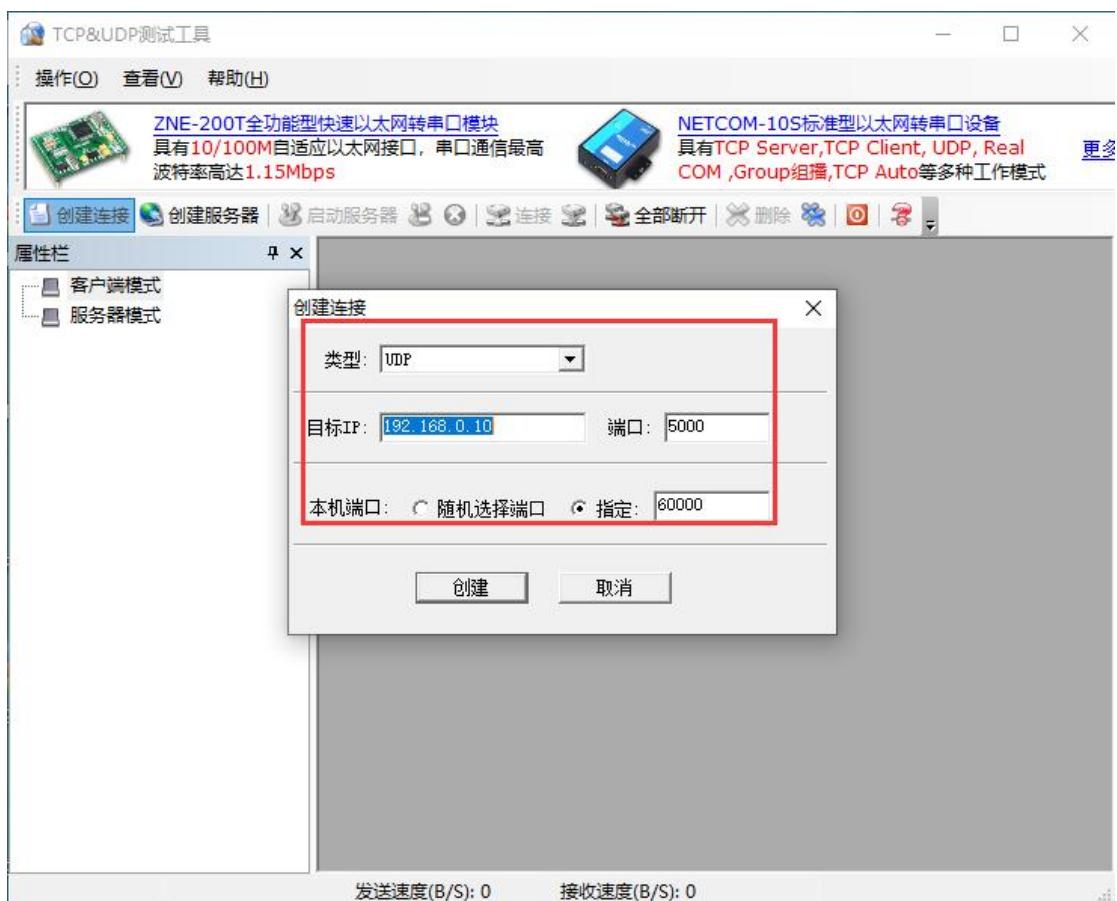


Figure 6-7 UDP Mode Settings

- 4) Click Create to enter the data transmission interface, and the data communication is as shown in Figure 6-8.

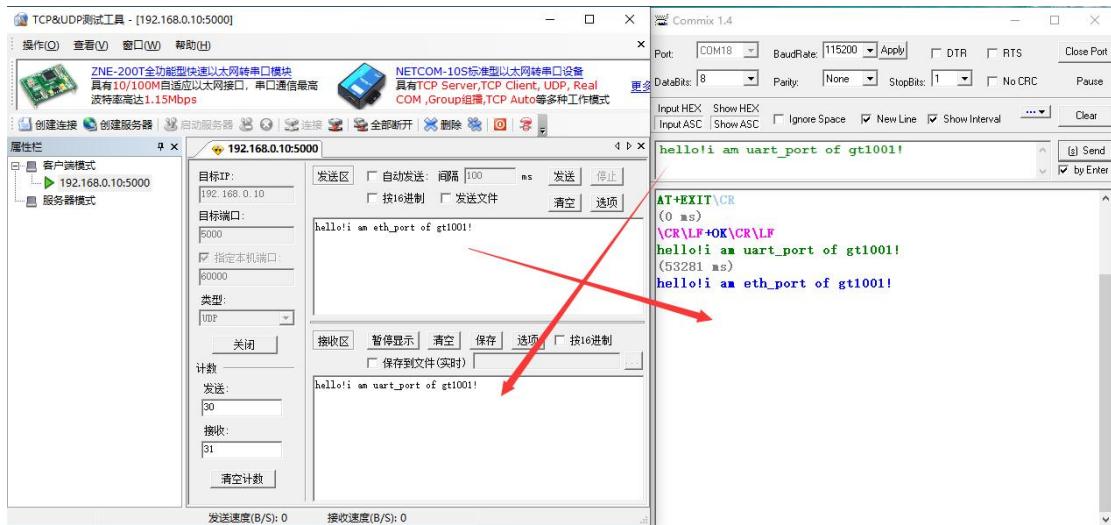


Figure 6-8 UDP Data Transmission

(5) In this mode, multiple modules can be connected to the same computer to communicate with multiple serial devices, as shown in Figure 6-9. At this time, the corresponding client can be added by using the setting method shown in Figure 6-7, as shown in Figure 6-10.

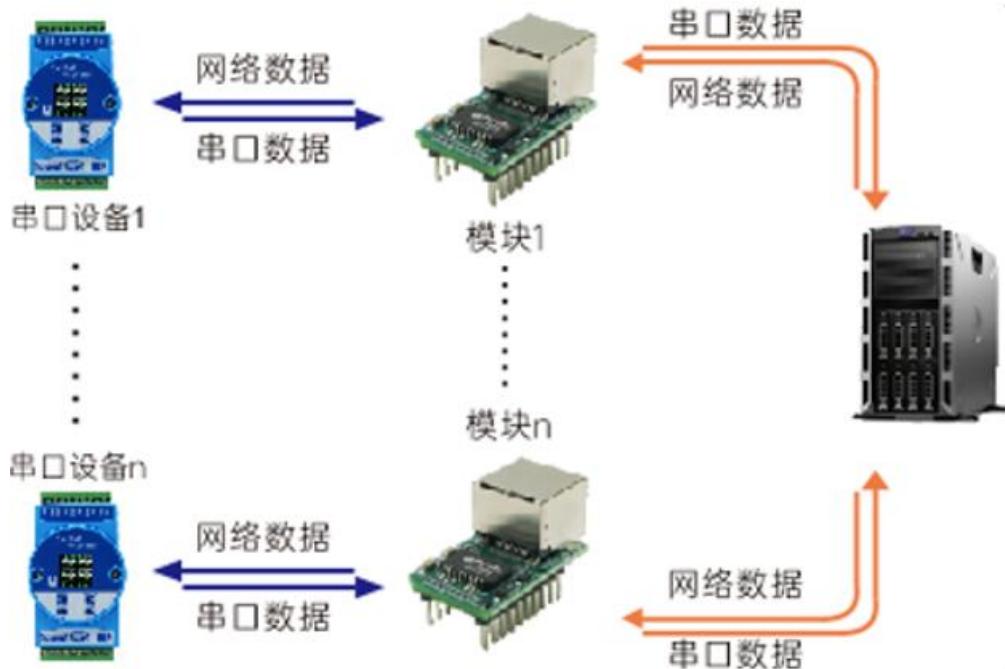


Figure 6-9 Schematic diagram of communication between multiple devices and one computer

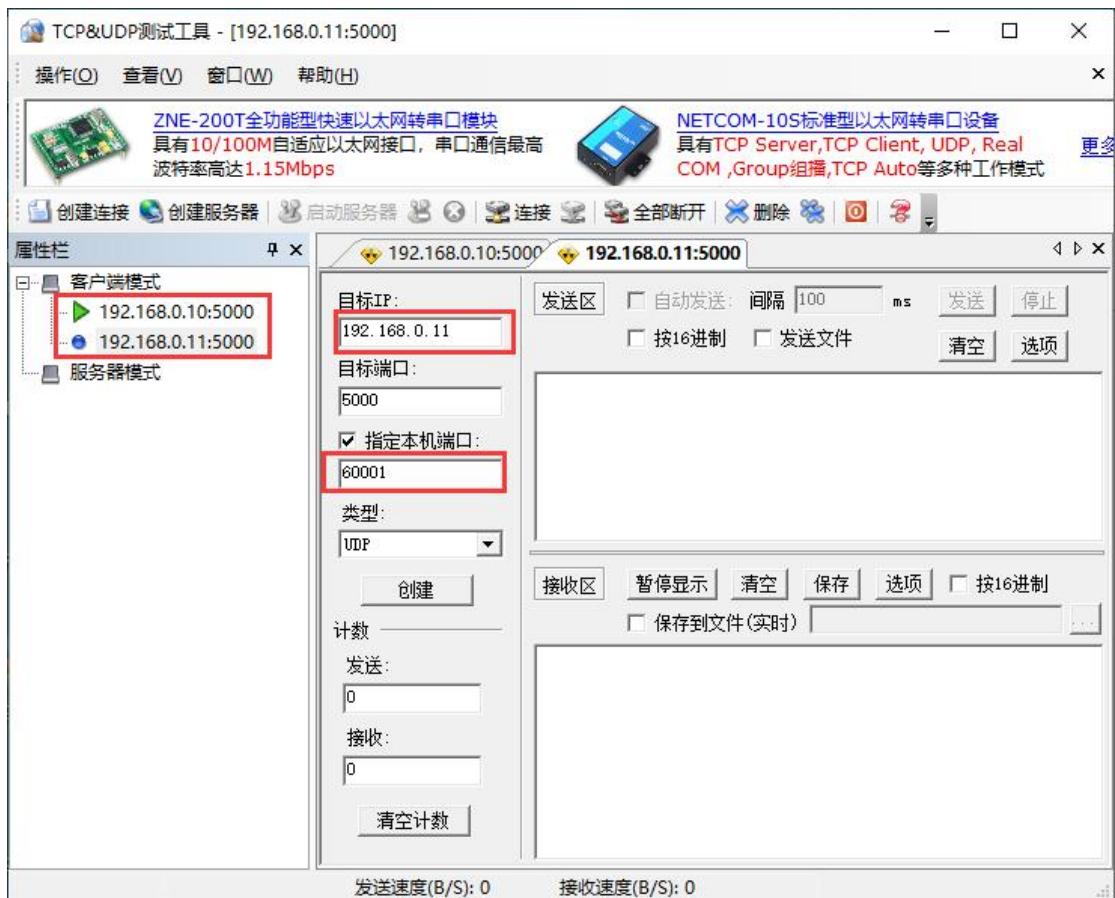


Figure 6-10 Communication setting interface between computer and multiple serial devices  
It should be noted that when establishing the client, the specified destination IP and native port must be unique and consistent with the settings in the module, otherwise data communication will be affected.

### 6.3.2. TCP Client Mode



Figure 6-11 Operation diagram of TCP Client mode

(1) TCP Client mode provides client connections for TCP networks. The module actively sends a request to a remote server in the same network segment, The connection request is sent and the connection is established, and the connection is reinitiated immediately after the module is disconnected. Number commonly used between the device and the server Data interaction is the most commonly used mode of communication. When connecting, the module needs to specify the remote server address.

(2) In the same LAN, when multiple modules are connected to a computer, it is necessary to ensure that the IP of the module has the same network segment. Inner uniqueness.

(3) In the same LAN, if the module static IP is set, the module IP and the gateway must be in the same network segment, and the gateway IP must be set correctly, otherwise the communication cannot be normal.

(4) The default IP address of the module is 192.168.0.10, and the remote IP address is 192.168.0.1. Default gateway is 192.168.0.1. Network parameters such as IP can be set through web pages and AT commands.

(5) Communication example:

1) Set the module to TCP Client mode with the target port set to 60000. Both AT commands and web pages are available Take AT command setting as an example, as shown in Figure 6-12. For specific AT command mode entry operation, please refer to. AT Instruction Set Section.

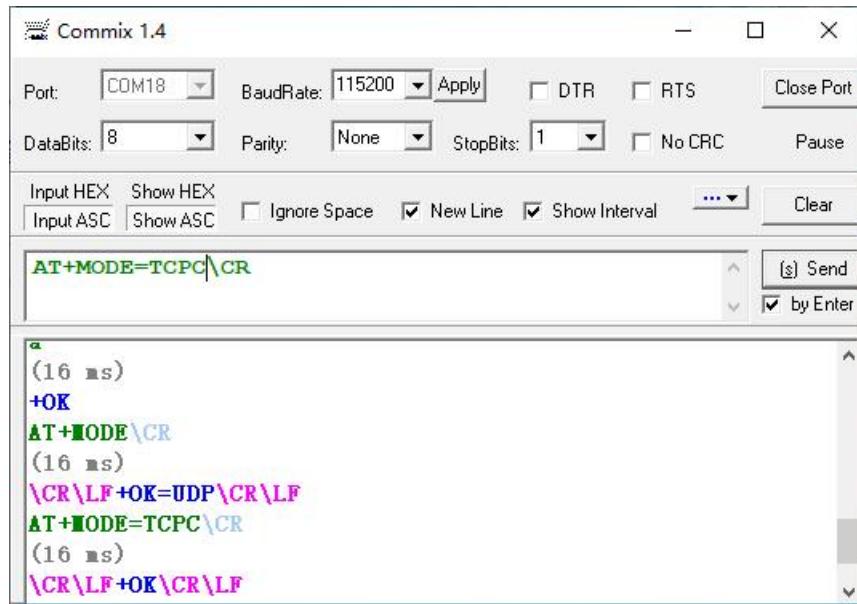


Figure 6-12 AT Command Setting TCP Client Mode

2) As shown in Figure 6-12, the receipt of "+ OK" indicates that the module has completed setting the TCP Client mode. Then exit the at instruction Mode, the program automatically returns to passthrough mode.

3) Set the computer IP to 192.168.0.1 (consistent with the remote IP set in the module), and open "TCP & UDP Test". Test Tool, set the server port to 60000, and set other parameters as shown in Figure 6-13.

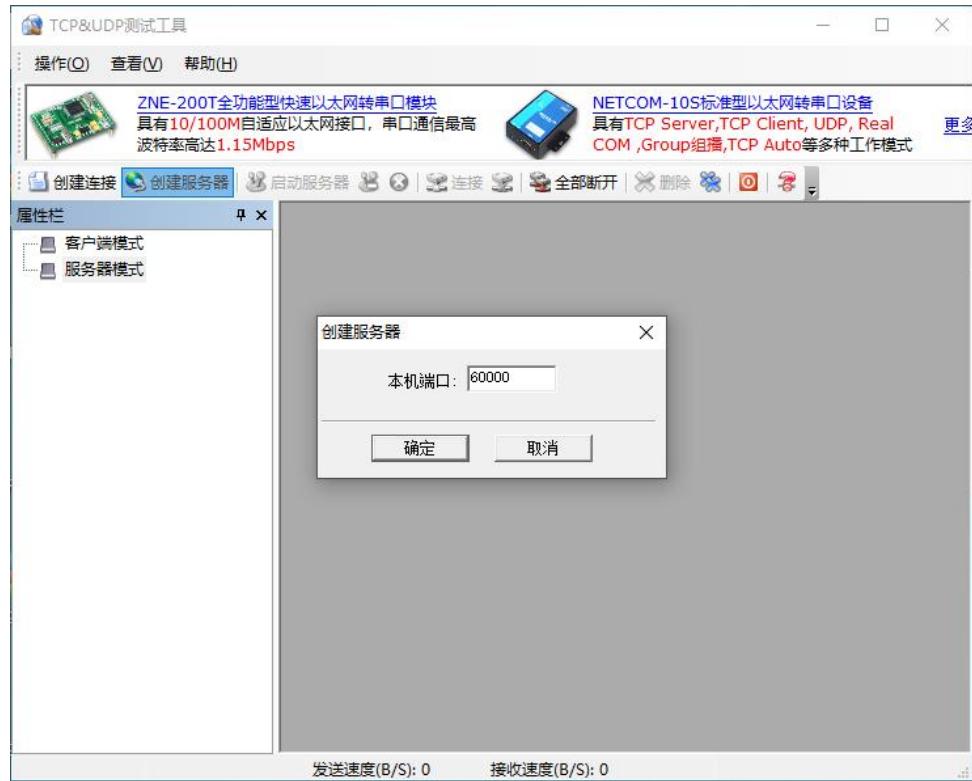


Figure 6-13 TCP Server Creation

4) that module, as a client, actively send a connection application to the computer to establish a connection, and after the connection is opened, communication can be directly carried out, The interface is shown in Figure 6-14.

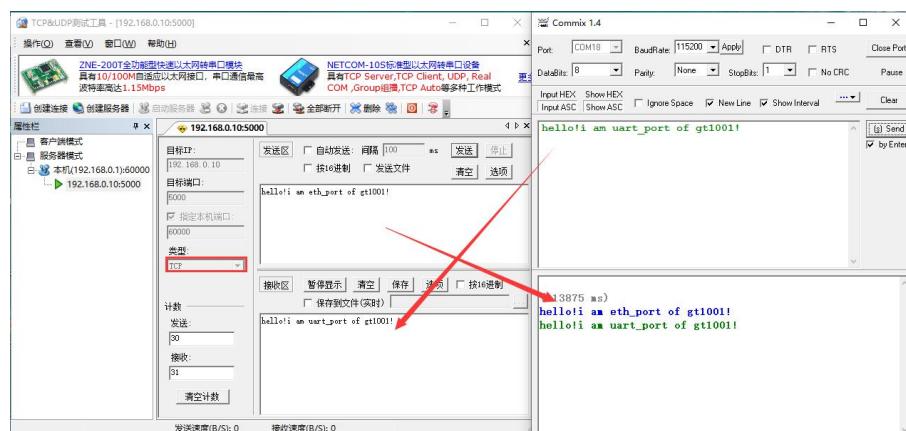


Figure 6-14 TCP Client Mode Communication Interface

(6) In this mode, multiple modules can be connected to the same computer server, and multiple serial devices can be connected at the same time. As shown in Figure 6-9. At this time, the corresponding server can be added by using the setting method shown in Figure 6-13, as shown in Figure 6-15.

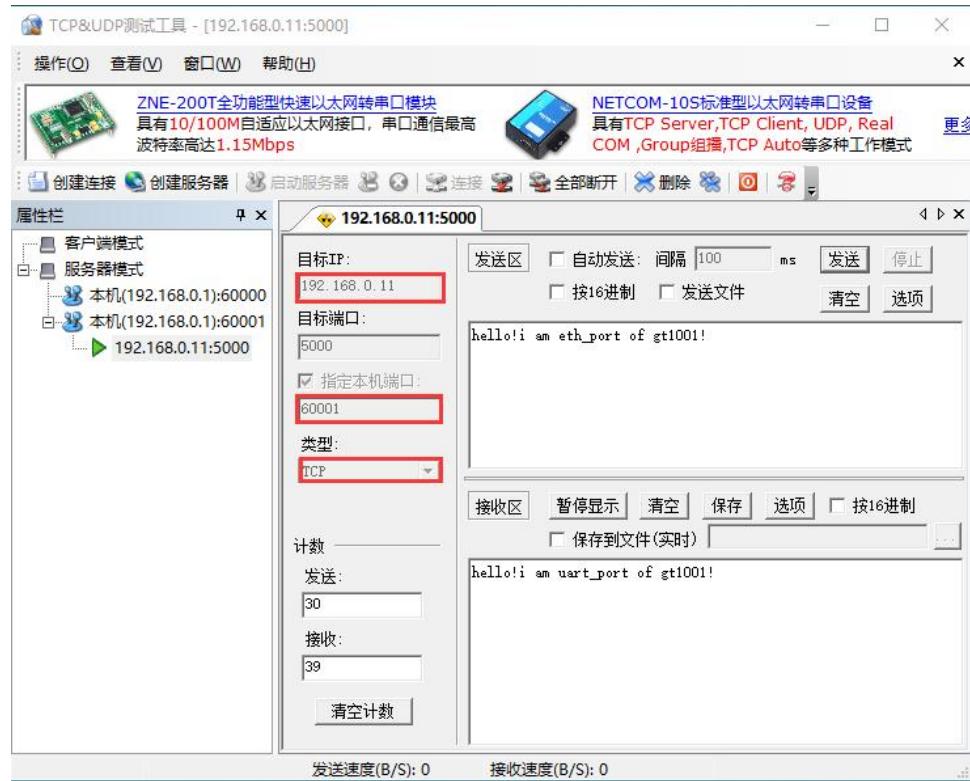


Figure 6-15 Setting Interface of Multiple Computer Servers

**Note that when establishing a client, the destination IP and native port specified must be unique, and must match the modulo The settings in the block remain the same, otherwise the data communication is affected.**

### 6.3.3. TCP Server Mode



Figure 6-16 Working diagram of TCP Server mode

- (1) In this mode, the module only supports one TCP Client connection, and multiple servers (modules) can be connected to one Client (computer).
- (2) In the TCP Server mode, the module actively monitors the set local port. When there is a connection request from the client, The corresponding connection is established, and the module communicates with the corresponding client.
- (3) In this mode, multiple services can be realized by setting the local IP and gateway correctly and selecting the correct working mode. Communicate with the same client.
- (4) Communication example:
  - 1) Set the module to TCP Server mode with the target port set to 60000. Both AT commands and web pages are available Take AT command setting as an example, as shown in Figure 6-17. For specific AT command mode entry operation, please refer to. AT Instruction Set Section.

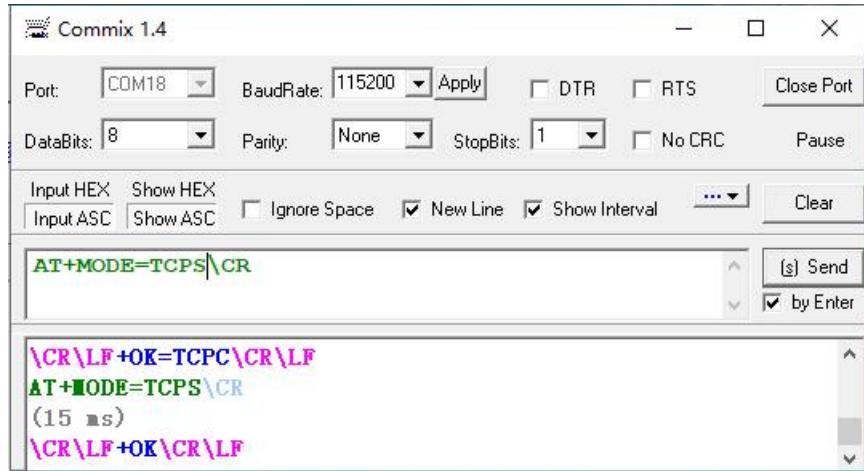


Figure 6-17 AT Command for Setting TCP Server Mode

- 2) As shown in Figure 6-17, the receipt of "+ OK" indicates that the module has finished setting the TCP Server mode. Then exit the at finger Command mode, the program automatically returns to passthrough mode.
- 3) Set the computer IP to 192.168.0.1 (consistent with the remote IP set in the module), and open "TCP & UDP Test". "Test Tool", set the connection port to 60000, and set other parameters as shown in Figure 6-18.

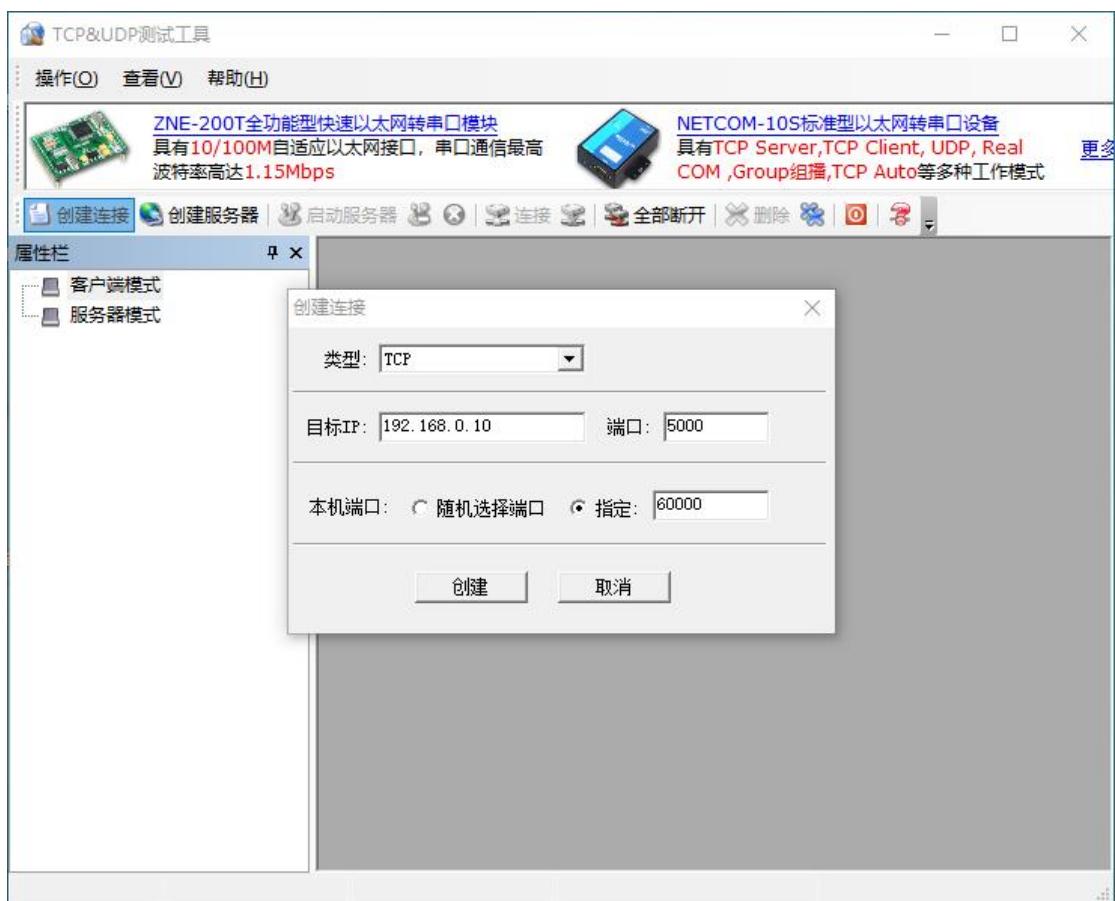


Figure 6-18 TCP Client Creation

- 4) The module, as a server, actively establishes a connection with the computer (the computer sends a connection request and clicks the connection button). After the connection

is opened, Direct communication is available, and the communication interface is shown in Fig. 6-19.

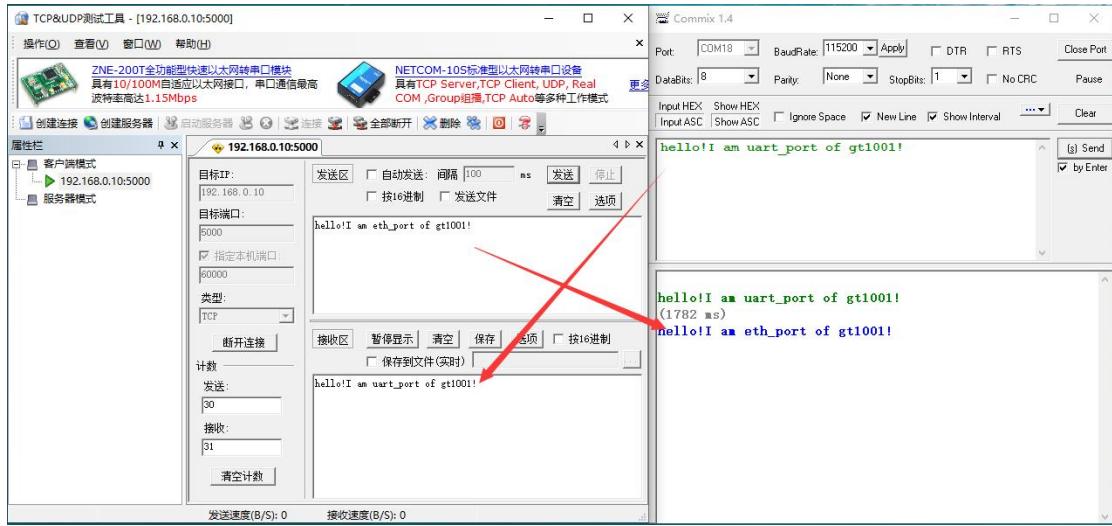


Figure 6-19 TCP Server Mode Communication Test

(5) As a client, the computer can establish connections with multiple TCP server modules, and the software settings are shown in Figure 6-20.

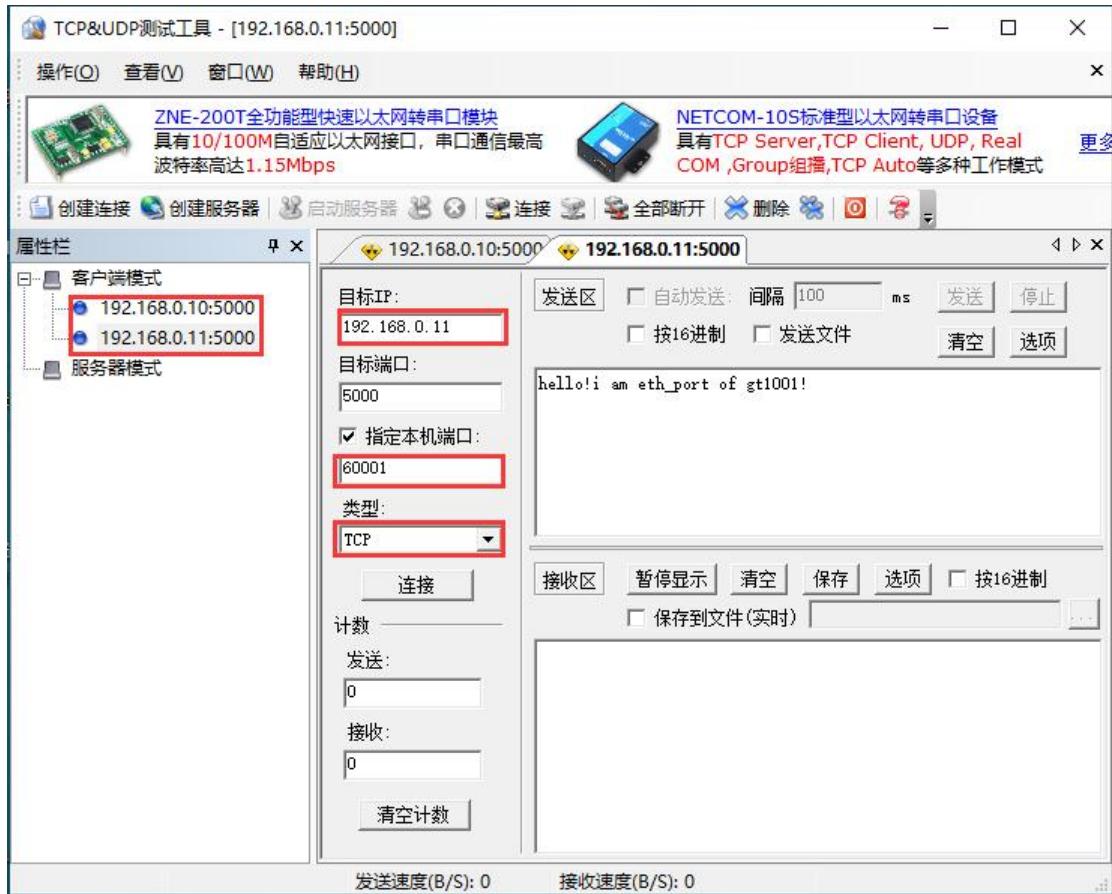


Figure 6-20 Multi-server and single serial port setting interface

### 6.3.4. Modbus TCP Slave Mode



Figure 6-21 Schematic Diagram of Modbus TCP Slave Mode

- (1) In this mode, the module can realize data exchange between MODBUS \_ TCP and MODBUS \_ RTU.
- (2) In the Modbus TCP Slave mode, the Ethernet end of the module actively obtains the data of the serial port end.
- (3) Communication example:
  - 1) Set the module to MODBUS \_ TCPS mode with port set to 5000. Both AT commands and web pages are available Take AT command setting as an example, as shown in Figure 6-22. For specific AT command mode entry operation, please refer to. AT Instruction Set Section.

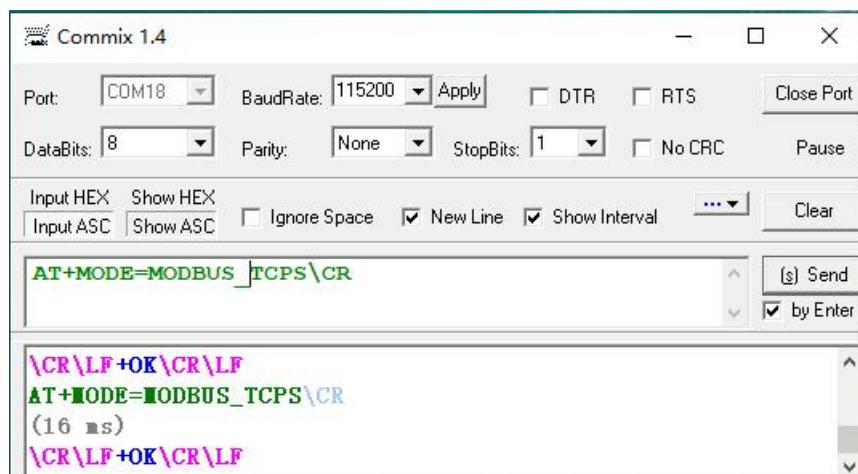


Figure 6-22 AT instruction for setting MODBUS \_ TCPS mode

- 2) As shown in Figure 6-22, the receipt of "+ OK" indicates that the module has finished setting the MODBUS \_ TCPS mode. Then exit the at finger Command mode, the program automatically returns to passthrough mode.

- 3) Set the computer IP to 192.168.0.1 (consistent with the remote IP set in the module), and open "Modbus Poll". Tool, other parameter settings are as shown in Figure 6-23, ID is set as 1, and function code is selected as 3.

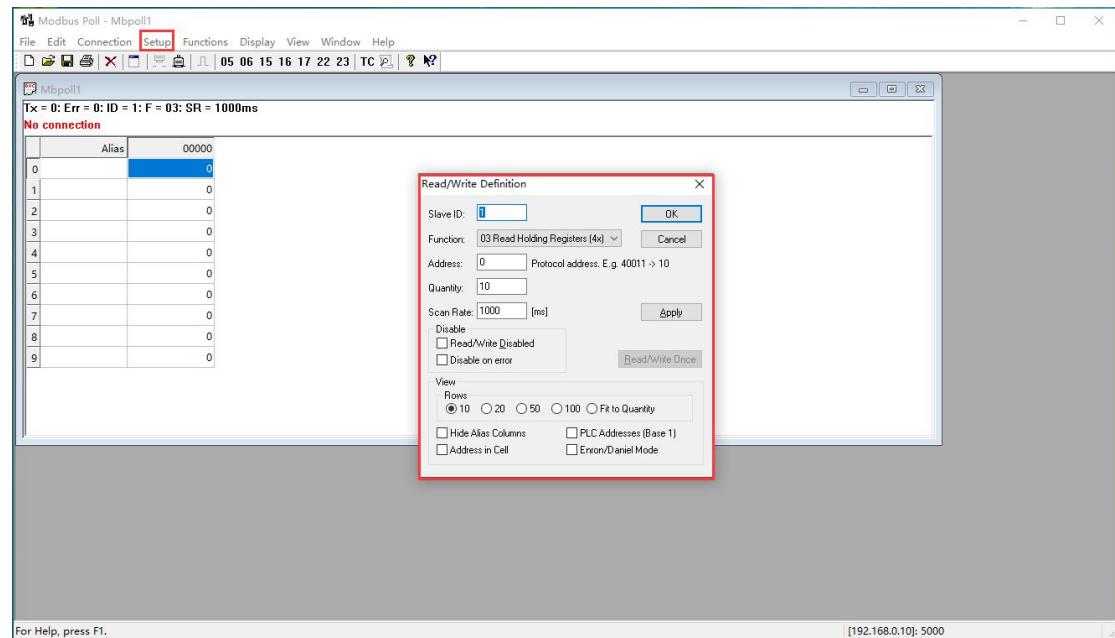


Figure 6-23 Modbus Master Creation

- 4) Click "Connection" to create a connection, and the MODBUD \_ TCP end setting parameters are shown in Figure 6-24.

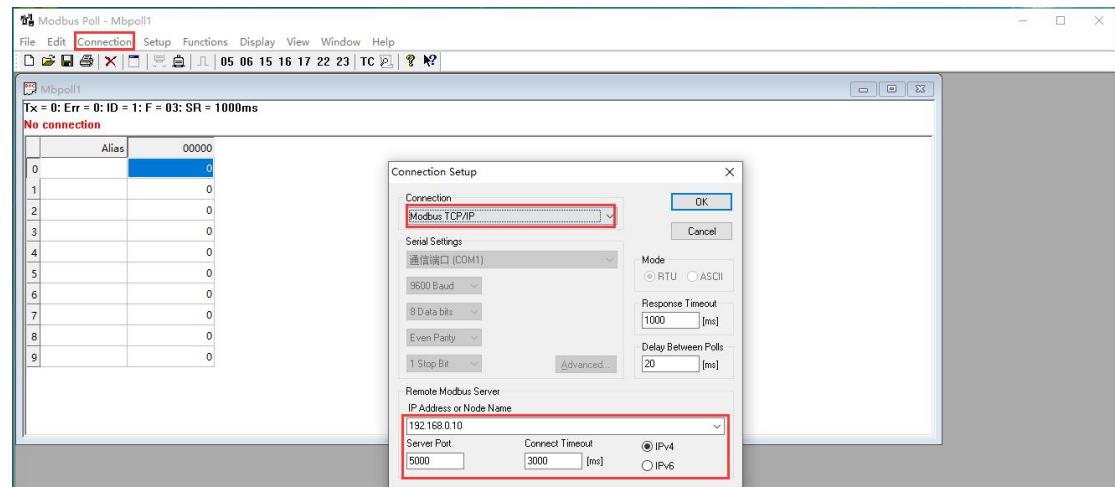


Figure 6-24 MODBUD \_ TCP Host Parameter Settings

- 5) Open "Modbus Slave" tool, MODBUS protocol setting is the same as "Modbus Poll", select function Code 3, as shown in Figure 6-25.

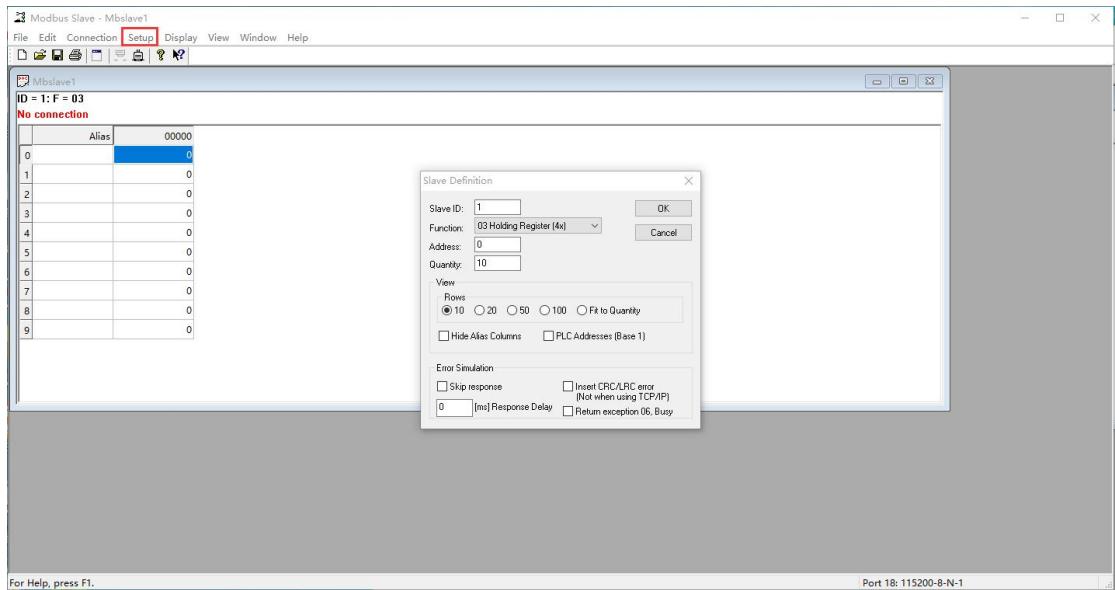


Figure 6-25 Slave software MODBUS protocol settings

- 6) Select RTU mode, and the serial port parameter setting is consistent with that of the equipment, as shown in Figure 6-26.

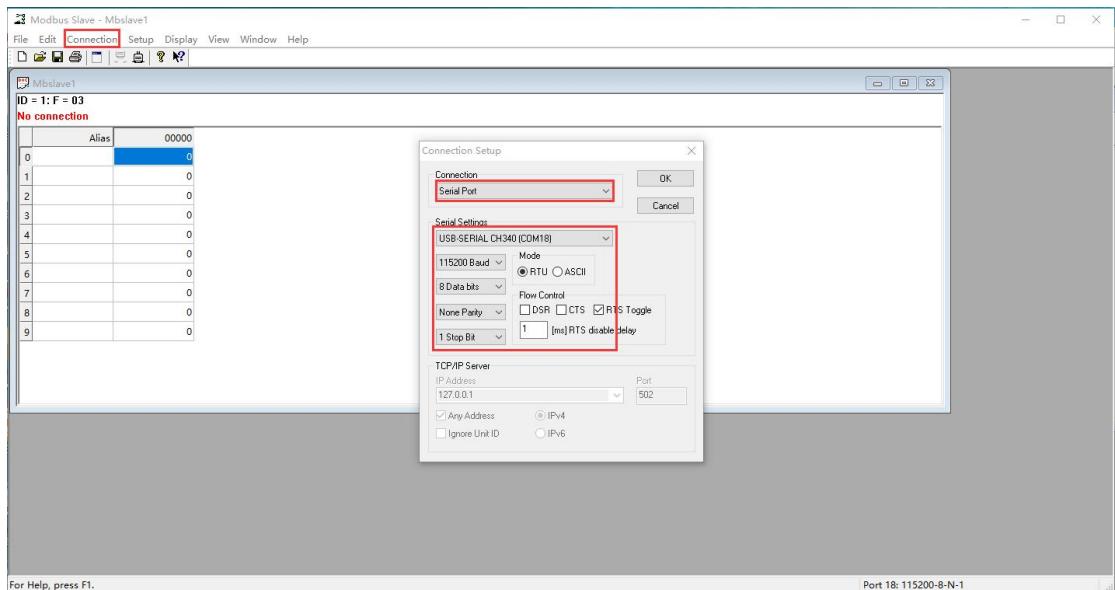


Figure 6-26 MODBUS \_ RTU parameter setting of slave software

7) Click "Connection" to realize the connection, as shown in Figure 6-27.

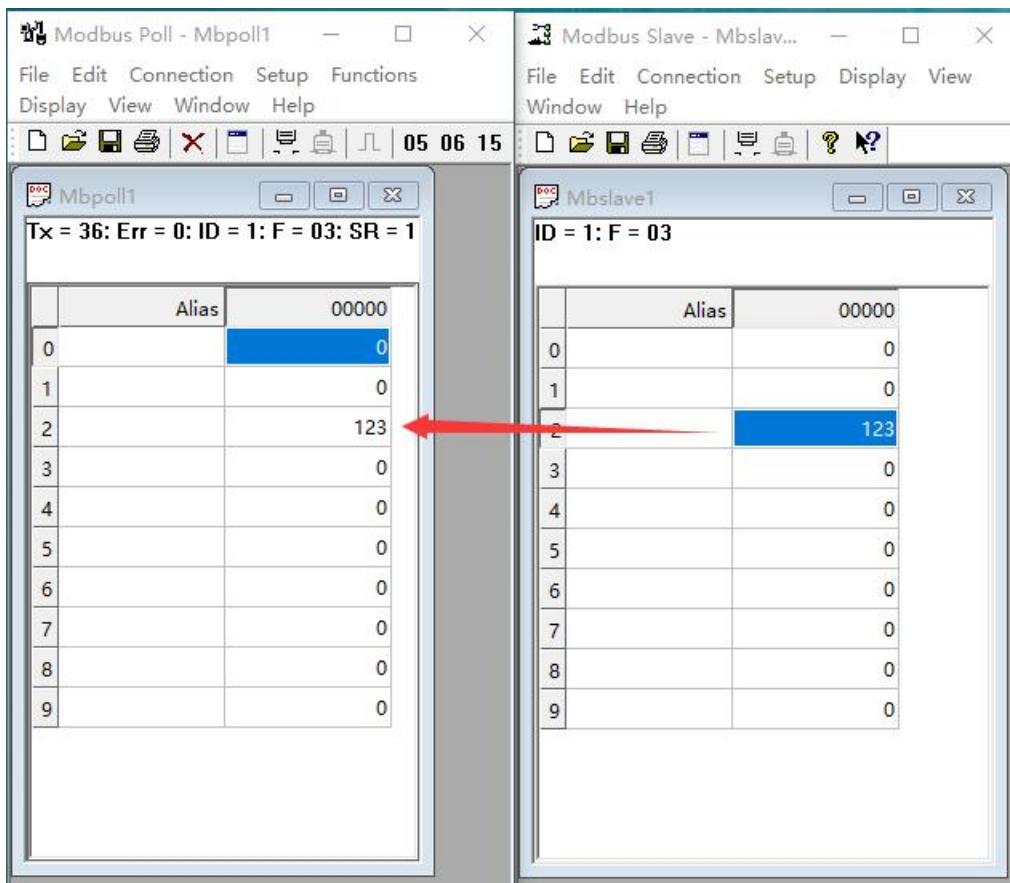


Figure 6-27 MODBUS communication test

#### 6.3.5. Modbus TCP Master Mode

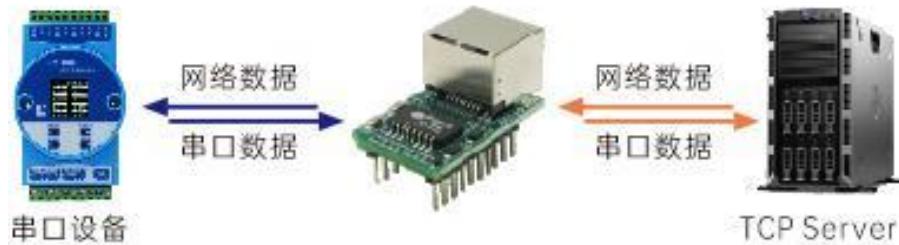


Figure 6-28 Schematic Diagram of Modbus TCP Master Mode Operation

- (1) In this mode, the module can realize data exchange between MODBUS \_ TCP and MODBUS \_ RTU.
- (2) In the Modbus TCP Master mode, the serial port of the module actively acquires the data from the Ethernet port.
- (3) Communication example:
  - 1) Set the module to MODBUS \_ TCPM mode with port set to 5000. Both AT commands and web pages are available Take AT command setting as an example, as shown in Figure 6-29. For specific AT command mode entry operation, please refer to. AT Instruction Set Section.

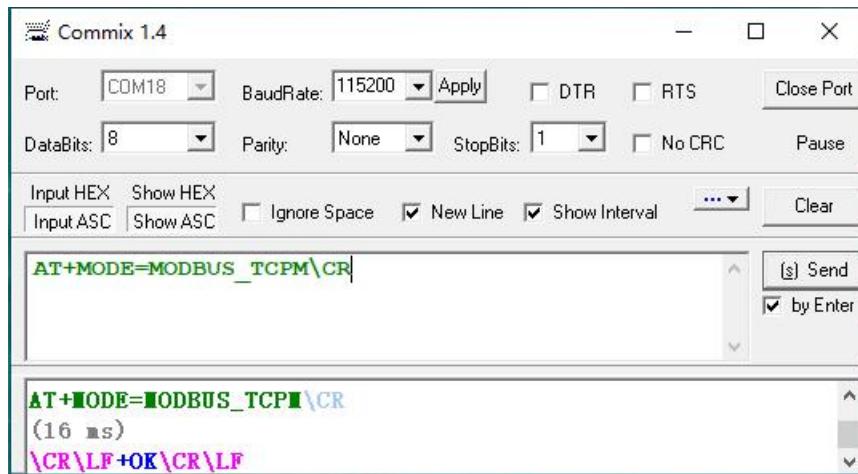


Figure 6-29 AT instruction for setting MODBUS \_ TCPS mode

- 2) As shown in Figure 6-29, the receipt of "+ OK" indicates that the module has finished setting the MODBUS \_ TCPS mode. Then exit AT Command mode, the program automatically returns to passthrough mode.
- 3) Open the "Modbus Poll" tool and configure the serial port information. The parameter settings are as shown in Figure 6-30, and the ID is set as 1. Function code selection 3.

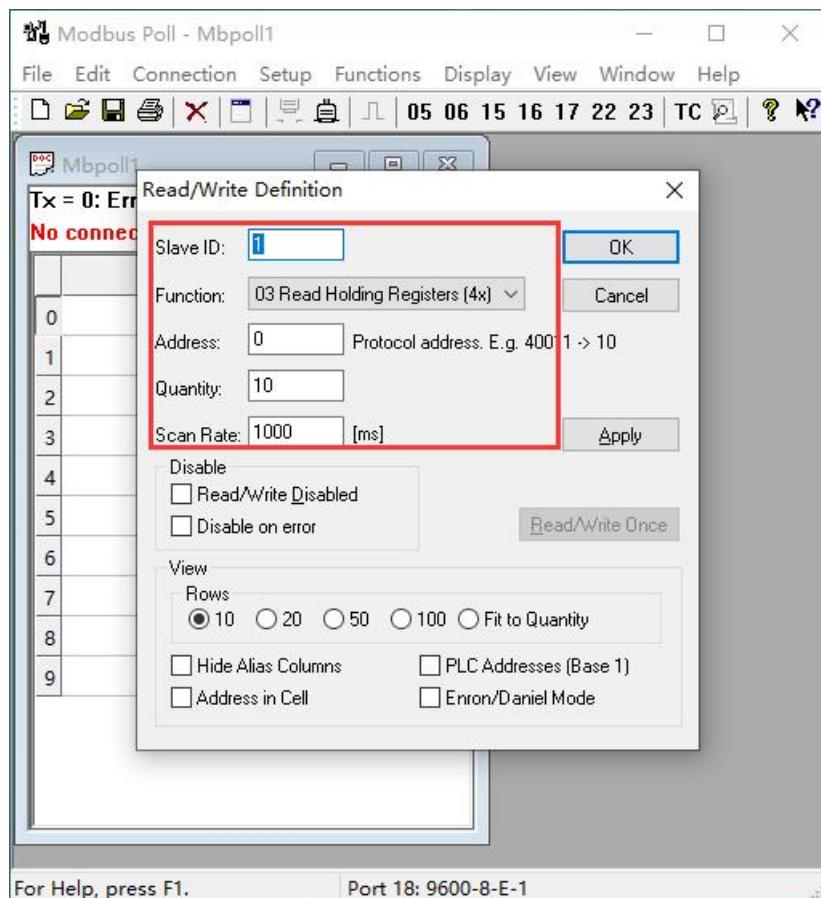


Figure 6-30 Modbus Master Creation

- 4) Click "Connection" to create a connection, and the setting parameters of MODBUD \_ RTU are shown in Figure 6-31.

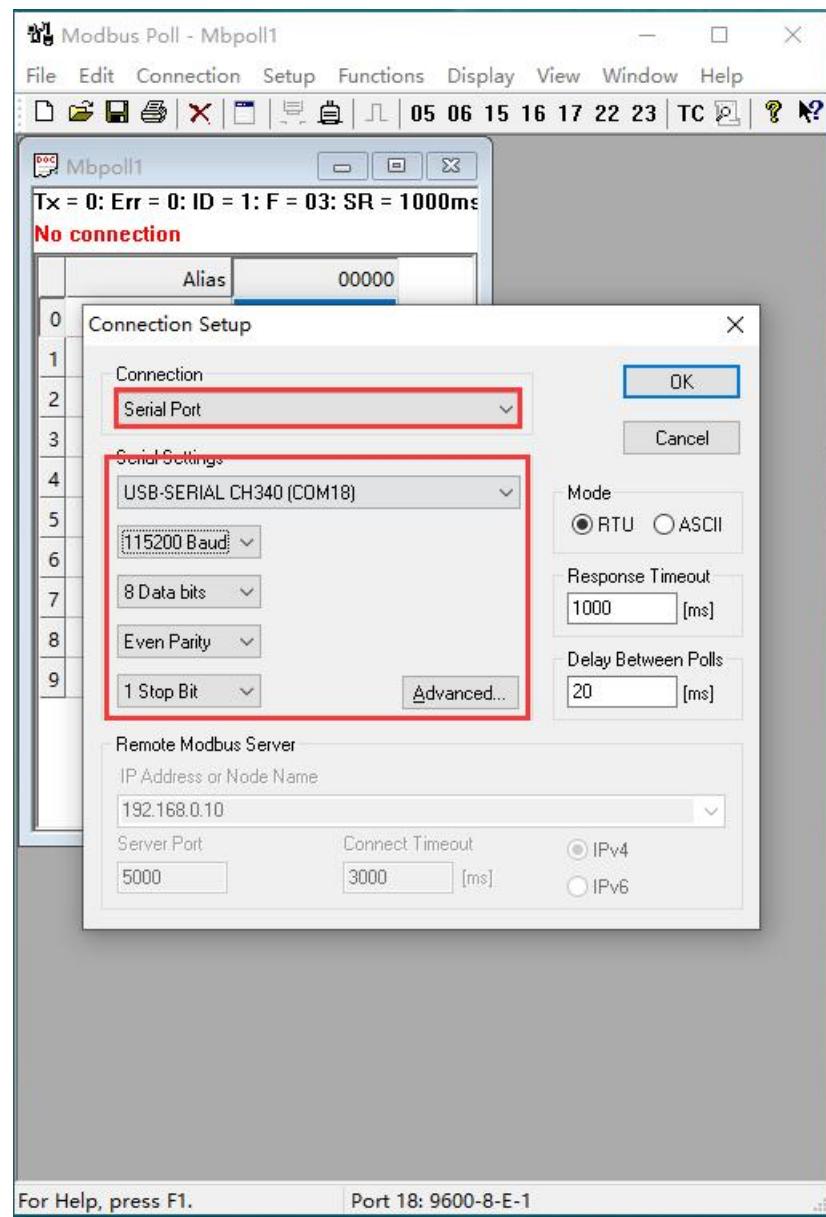


Figure 6-31 MODBUD \_ RTU Host Parameter Settings

- 5) Open the "Modbus Slave" tool, the MODBUS protocol setting is the same as "Modbus Poll", and select the function. Code 3, as shown in Figure 6-32.

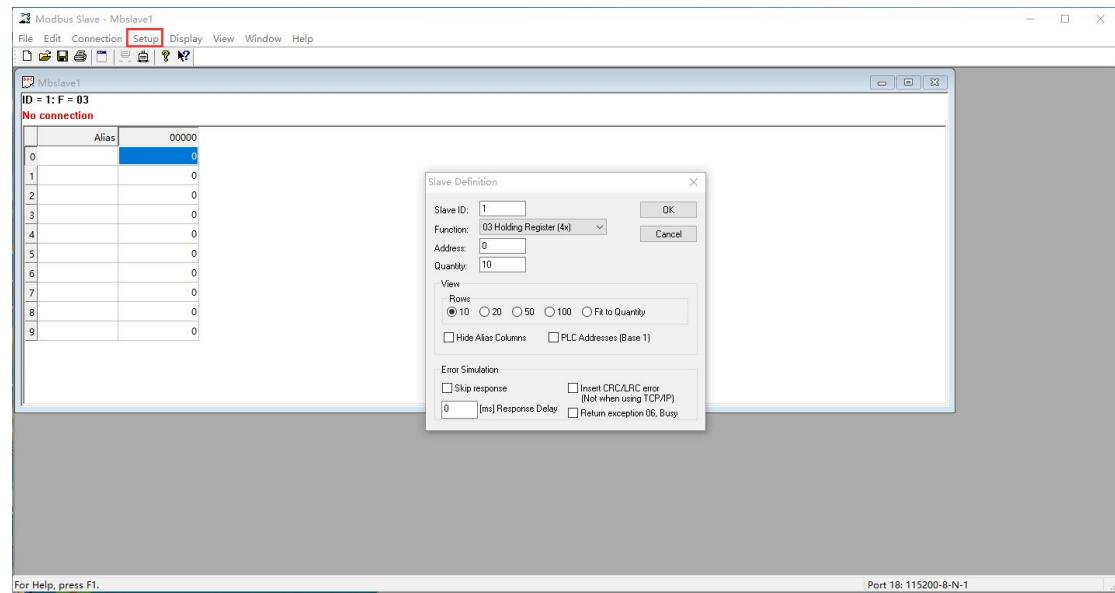


Figure 6-32 Slave software MODBUS protocol settings

- 6) Select the TCP/IP mode, and the IP address and port are consistent with the settings of the computer, as shown in Figure 6-33.

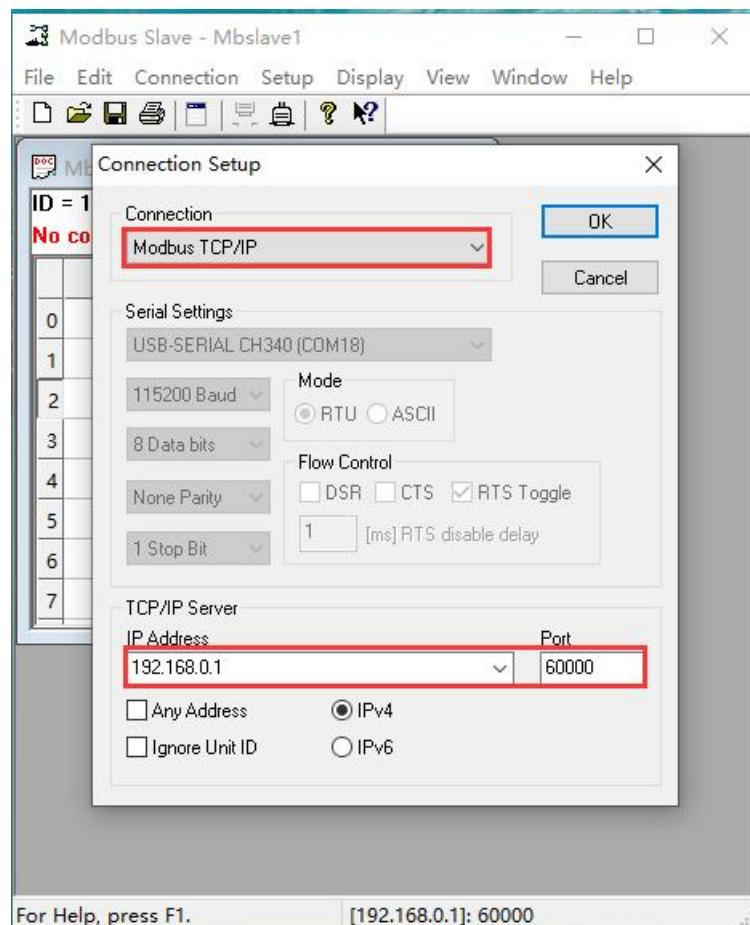


Figure 6-33 MODBUS \_ TCP parameter setting of slave software

7) Click "Connection" to realize the connection, as shown in Figure 6-34.

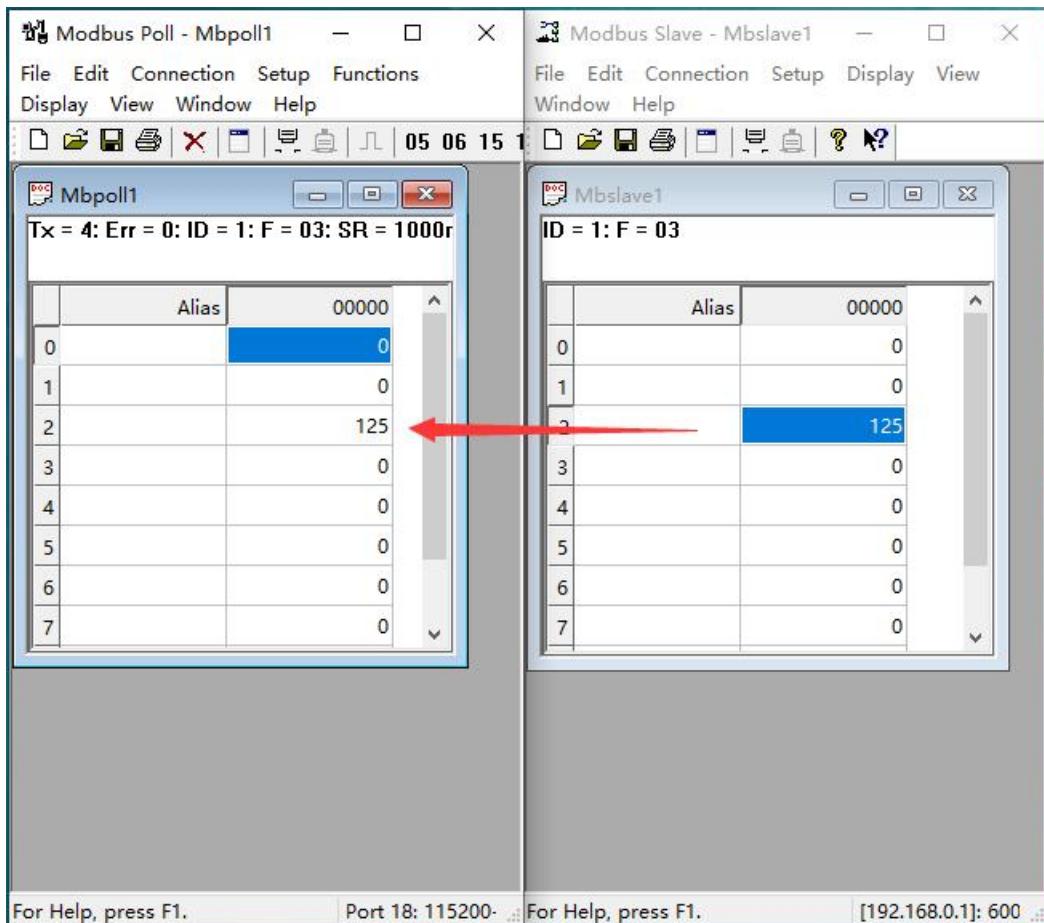


Figure 6-34 MODBUS communication test

## 6.4. Serial port function

### 6.4.1. Basic parameters of serial port



Figure 6-35 Interface of serial port tool

Basic parameters of serial port: baud rate, data bit, stop bit and check bit.

- (1) Baud rate: the baud rate is adjustable, and the setting range is 600 ~ 230.400 bps.
- (2) Data bit: The data bit width can be set from 5 to 8.

- (3) Stop bit: The stop bit width is optional, which is 1 and 2 respectively.
  - (4) Check digit: check digit is optional, including None, Odd, Even, Mark and Space. Set the serial port parameters through the serial port tool, and keep the setting parameters and the module serial port parameters all the time, otherwise the communication cannot be normal.
- Letter.

#### 6.4.2. Serial port framing mechanism

The module uses dynamic packing time, which is related to the baud rate, and the packing time is the data transmission time of 5 bytes. When the time interval between data is longer than the time required for normal transmission of 5 bytes, the module receives data by default as Two packets, otherwise it is treated as one packet.

The higher the baud rate, the smaller the packing interval, and vice versa. The schematic diagram is shown in Figure 6-36.

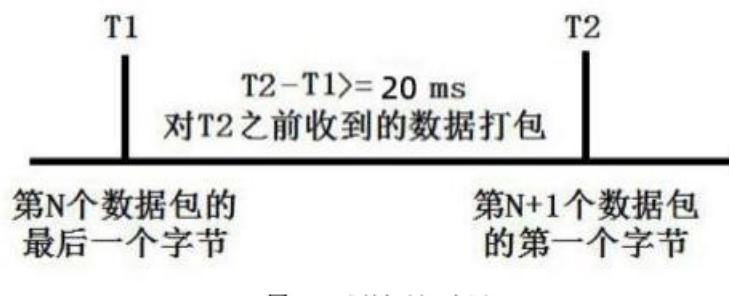


Figure 6-36 Schematic diagram of serial port framing mechanism

### 6.5. Featured function

#### 6.5.1. Heartbeat package function

In the network transparent transmission mode, the user can choose to let the GT1001 module send the heartbeat packet. Heartbeat packets can be sent to network services, It can also be sent to the serial device.

The main purpose of sending to the network is to maintain the connection, ensure the reliability of the connection, and eliminate dead links. Only on TCP Client And UDP Client mode. When the network port has data to send, the network heartbeat packet stops.

In the application that the server sends a fixed query instruction to the device, in order to reduce the communication flow, the user can select to send the query instruction to the device. The serial device sends a heartbeat packet. When data is sent from the serial port, the serial port heartbeat packet does not stop.

The heartbeat packet function is turned off by default, and supports two configurations of webpage and AT command (refer to AT command introduction for specific operation). The webpage setting interface is as shown in Figure 6-37:

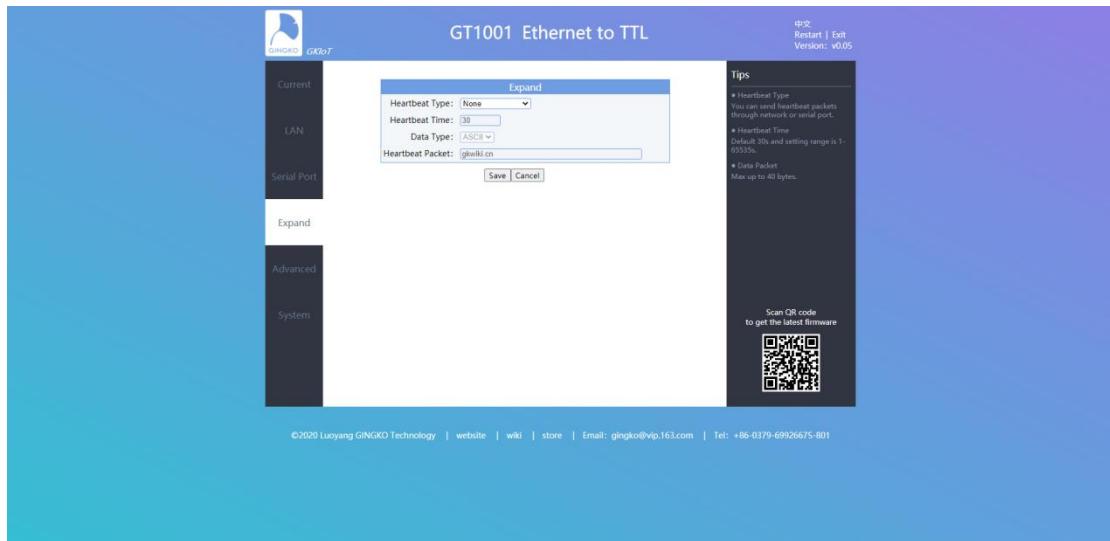


Figure 6-37 Web page configuration heartbeat package parameter interface

### 6.5.2. Disconnection reconnection time setting function

The disconnection reconnection function is mainly used in the network communication mode. When the device is in the TCP client mode, the disconnection time exceeds Set the time, and the device will reconnect, which can be set through the web page and AT command. The webpage settings are as shown in the figure below 6-38, please refer to the introduction of AT instruction for AT instruction.



Figure 6-38 Setting interface of disconnection reconnection time

## 7. Parameter settings

### 7.1.1. Web page setting parameter

(1) In the user program mode, set the computer IP to 192.168.0.1, open the web page, and enter the web address "192.168.0.10". As shown in Figure 7-1, enter the password "admin" and click "Login".

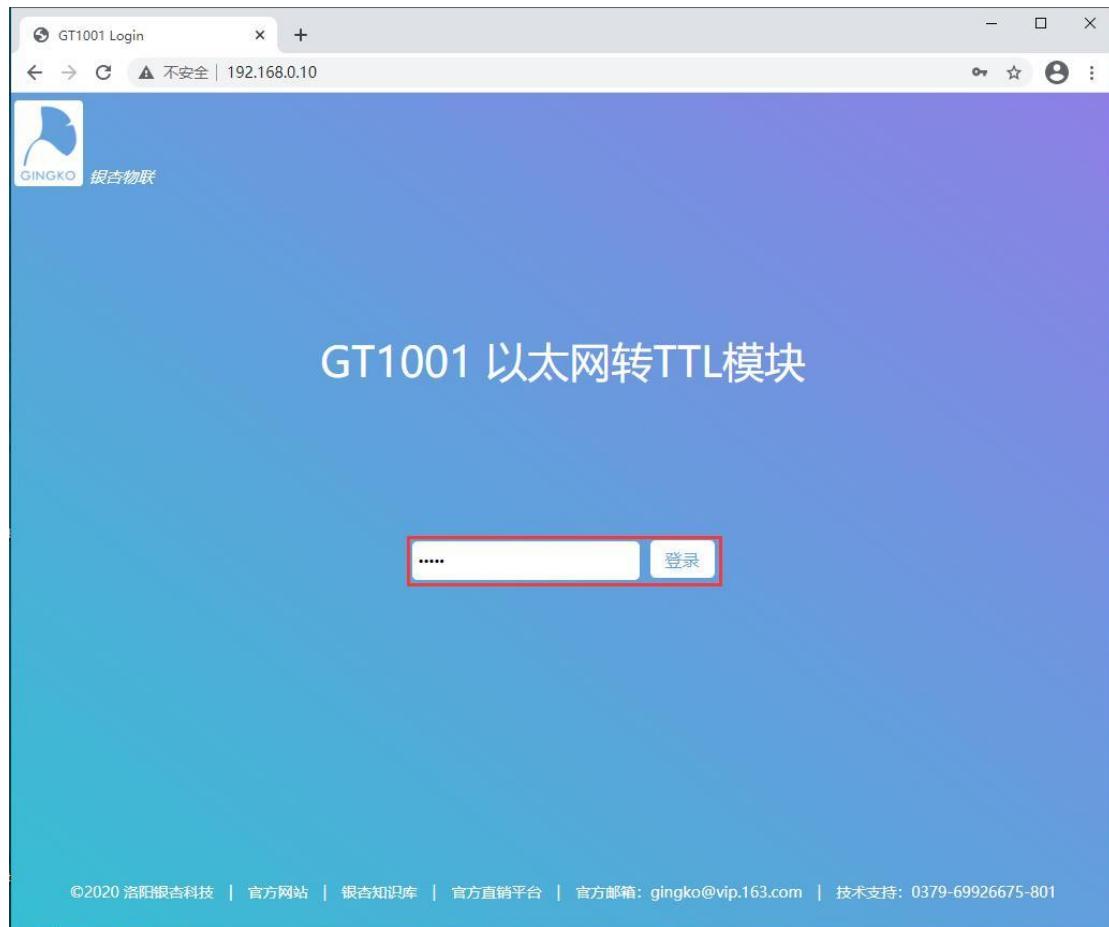


Figure 7-1 Login interface

(2) After entering, you can query the parameters and transmission status set by the current equipment, as shown in Figure 7-2.

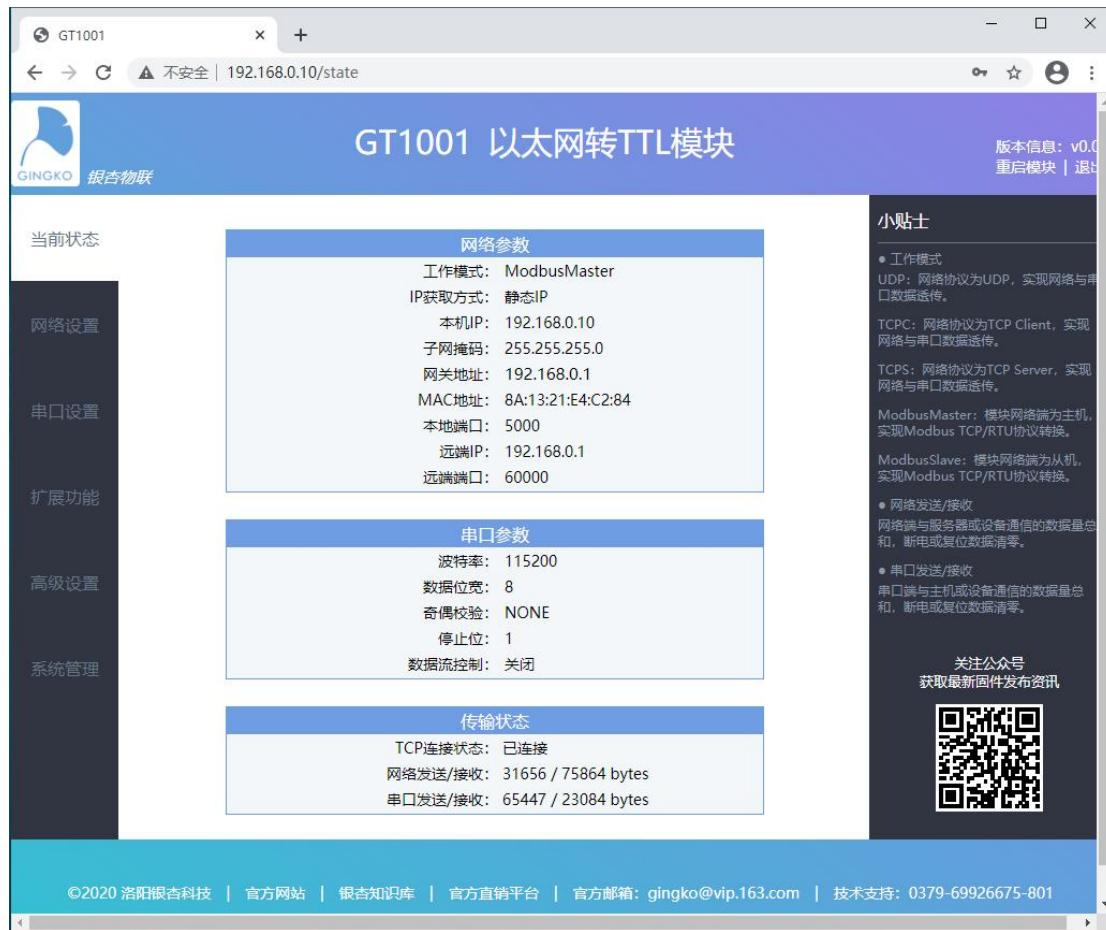


Figure 7-2 Current Device Status

(3) In the "Network Settings" item, you can set the relevant parameters of the network, as shown in Figure 7-3. After setting, click Save Settings. That's enough.

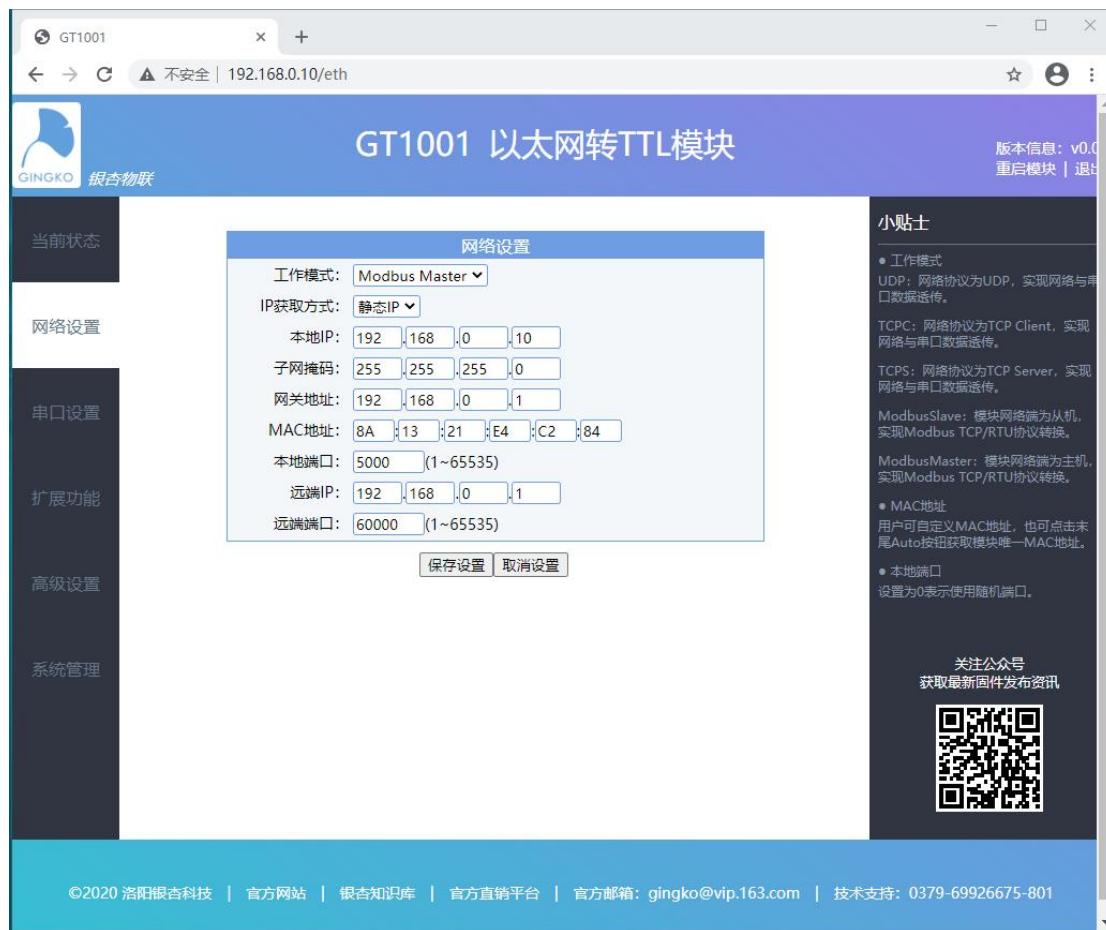


Figure 7-3 Network Parameter Settings

(4) In the "Serial port setting" item, you can set the relevant parameters of the serial port, as shown in Figure 7-4. After setting, click to save the settings.

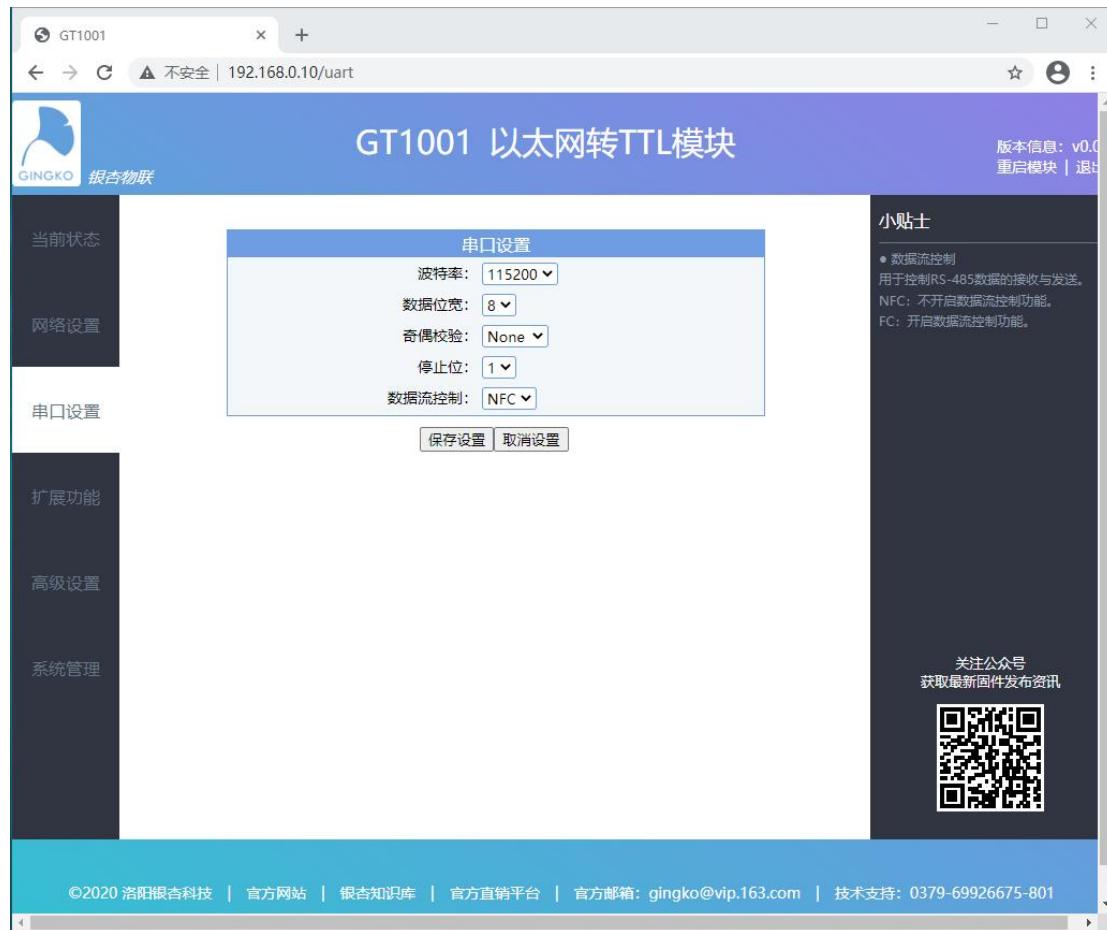


Figure 7-4 Serial port parameter setting.

(5) The voltage monitoring information can be queried in the "System Management" item, and the restart and factory settings can be restored, as shown in the figure. 7-5.

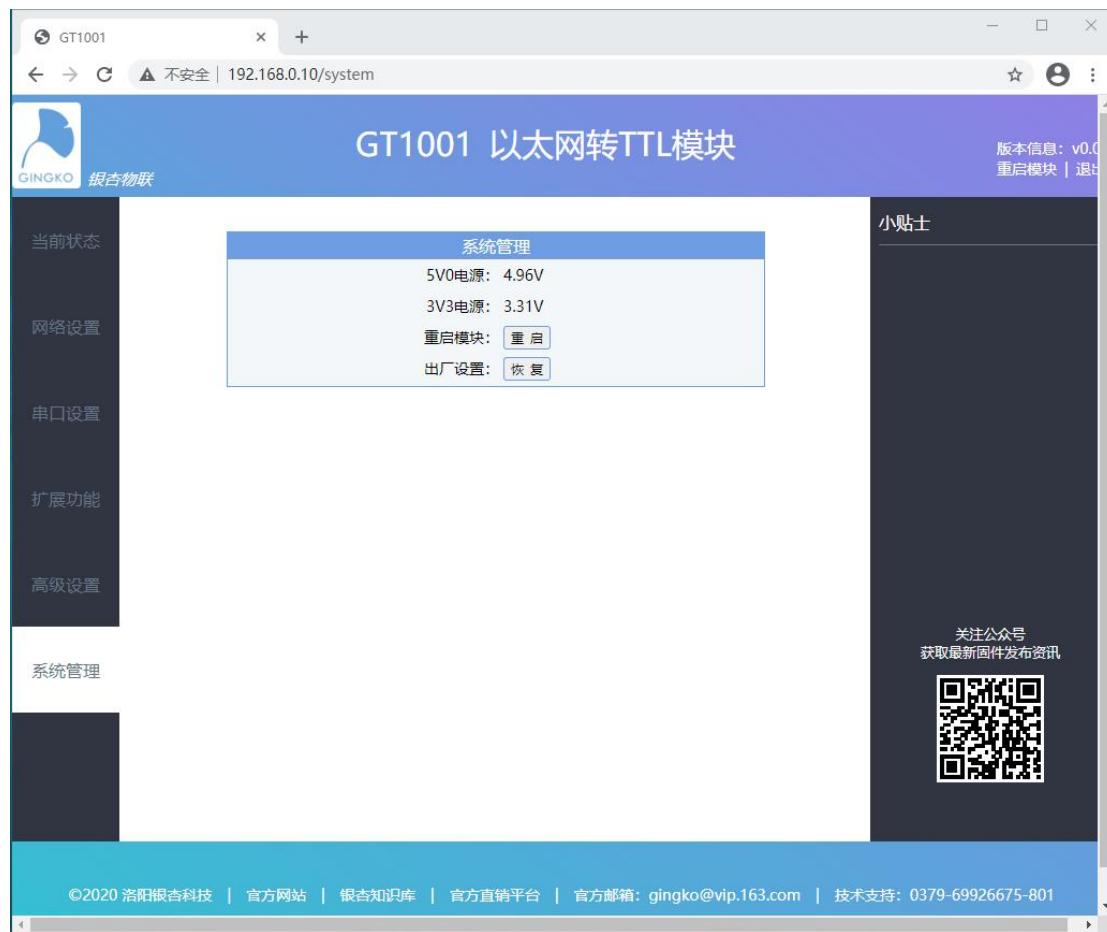


Figure 7-5 System parameter setting and query

### 7.1.2. Language settings

The built-in webpage supports Chinese and English switching mode, and there is a Chinese and English switching button in the upper right corner of the webpage, as shown in Figure 7-5-1.



Figure 7-5-1 Chinese-English switching function

## 7.2. AT command configuration

### 7.2.1. AT Instruction Overview

AT + command: the command set for the user to perform command interaction with the module through UART in the command mode, which is mainly used for Query and set the status and parameters of the module.

After the module is successfully started, the module can be set via UART.

The default UART parameters for the module are: baud rate 115 200, no checksum, 8 data bits, 1stop bit, no hardware Flow control.

AT command debugging tool and Commix serial port debugging tool for UART.

#### (1) Switch from transparent transmission mode to AT command mode

- 1) Input "+ +" on Commix, and the module returns a confirmation code "A" after receiving "+ +", as shown in the figure. As shown in 7-6

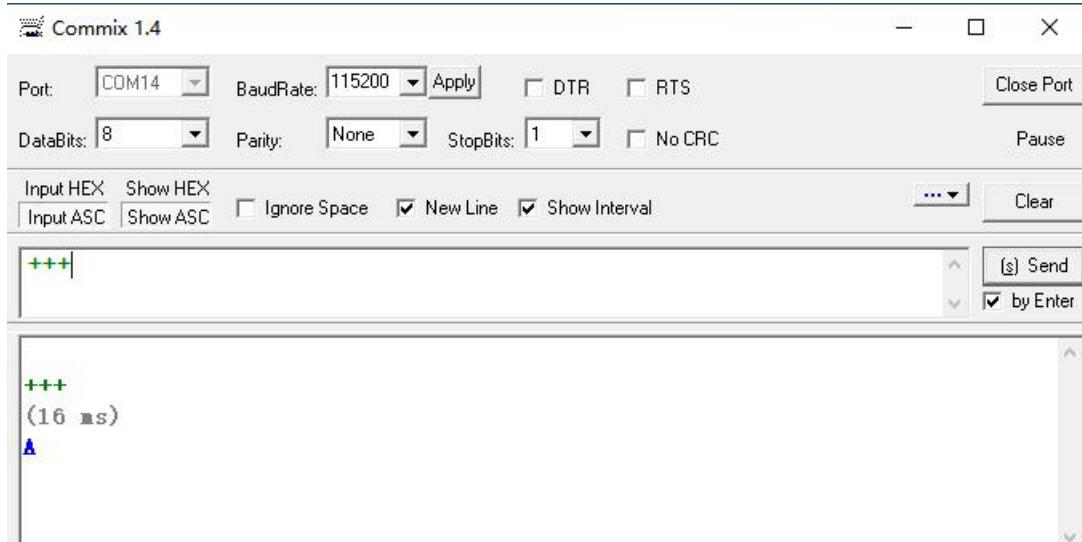


Figure 7-6 "+++" Command Sending Interface

- 2) After receiving the confirmation code "A" returned by the module, Commix must send an "A" to the module within 3 seconds.
- 3) After receiving "A", the module sends "+OK" to Commix and enters "AT command mode". As shown in the figure 7-7.

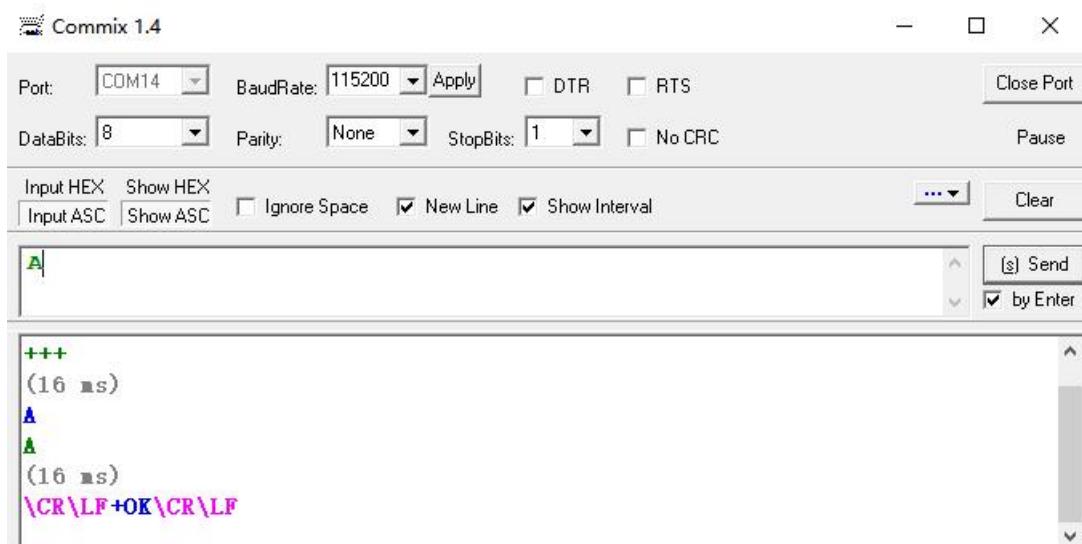


Figure 7-7 Confirmation Code Sending Interface

- 4) Commix receives "+OK", indicating that the module normally enters "AT command mode". At this time, it can send to the module. Send AT command.
- (2) Switch from AT command mode to transparent transmission mode
  - 1) Commix sends the command "AT + EXIT" to the module.
  - 2) After receiving the command, the module replies "+ OK" and exits the AT command mode.
- (3) The AT + command adopts the command line based on ASCII code, and the command format is as follows:
  - 1) Format description

<>: indicates that the part must be included; []: indicates that the part is optional.

2) Command message

AT+[op][para-1,para-2,para-3.....]<CR><LF>

Or AT + < CMD > [op] [para-1, para-2, para-3..]<CR>

**Note: This module is compatible with both < CR > < LF > and < CR > command terminators**

AT +: command message prefix;

[op]: instruction operand, and the instruction is parameter setting or query;

"=": indicates parameter setting; "NULL": indicates query.

< para-n >: input during parameter setting, not required during query;

< CR >: end character, carriage return, ASCII code 0X0D;

< LF >: line feed character, ASCII code 0X0A;

(4) AT command response message format

< CR > < LF > + < RSP > [op] [para-1, para-2, para-3..]<CR><LF>

+: response message prefix;

RSP: response string;

"OK": success; "ERROR": failure.

[Para-n]: return parameter or error code when querying

< CR >: ASCII code 0X0D;

< LF >: ASCII code 0X0A;

### 7.2.2. Error Code Comparison Table

**Table 7-1 Error Code Comparison Table**

Error Code	Description
-1	Invalid command format
-2	Invalid command
-3	Invaliid operand
-4	Invaliid parameter
-5	operand not allowed

### 7.2.3. AT instruction set

**Table 7-2 AT Instruction List**

Number	Instruction	Description
1	RST	Restart Module
2	VER	Query version number
3	SERIAL	Query module serial number
4	EXIT	EXIT AT Command Mode
5	UART	Query/Set UART Interface Parameters
6	WANN	Query/setting Wan port parameters
7	PORT	Query/Set Local Port
8	DEST	Query/Set Remote IP Port
9	MODE	Query/Set Operating Mode
10	TCPLINK	Querying TCP Connection Status
11	DEFAULT	Factory reset parameter
12	MAC	Query/Set MAC Parameter
13	HEARTMODE	Query/Set Heartbeat Packet Mode
14	HEARTTYPE	Query/set heartbeat packet information type
15	INTERVAL	Query Set Heartbeat Packet Interval
16	MESSAGE	Query/Set Heartbeat Packet Information
17	CONNTIME	Query/Set Disconnect Reconnection Time

### 7.2.4. AT Instruction Detail

**Note:** The AT command of this module supports two command end flags, < CR > < LF > and < CR >. < CR > as an example. "\ CR \ LF" and "\ CR" for positive input.

(1) AT+RST

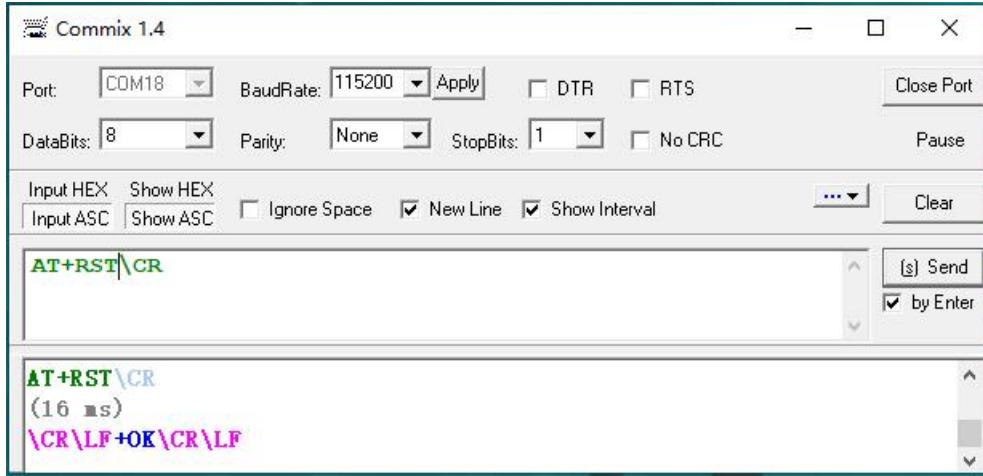
Function: Restart module

Formats: setting:

```
AT+RST<CR>
<CR><LF>+OK<CR><LF>
```

Parameters: none

Illustration:



< Note >: After this command is executed correctly, the module restarts and will exit the AT mode.

### (2) AT+VER

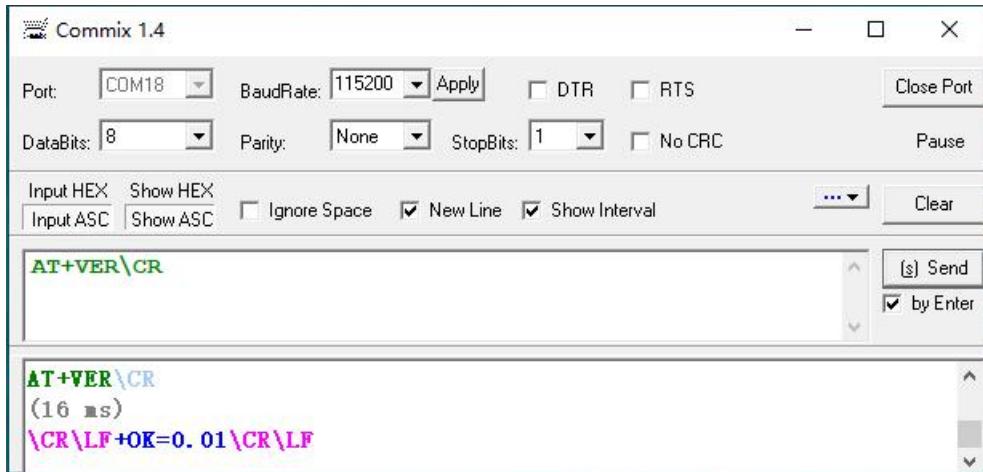
Function: Query module firmware version

Format: Query:

```
AT+VER<CR>
<CR><LF>+OK=<ver><CR><LF>
```

Parameters: ver: Module Firmware Version

An example:



### (3) AT+SERIAL

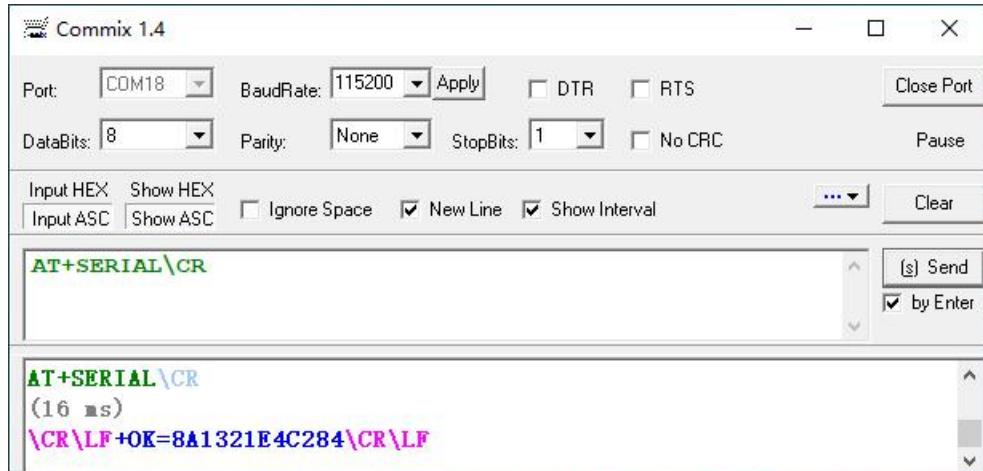
Function: Query module serial number

Format: Query:

```
AT+ SERIAL<CR>
<CR><LF>+OK=<serial><CR><LF>
```

Parameter: serial: module serial number

An example:



(4) AT\_EXIT

Function: Exit AT Command Mode

Format: Setting:

```
AT+EXIT<CR>
<CR><LF>+OK<CR><LF>
```

Parameter: none:

< Note >: After the command is executed correctly, the module exits the AT command mode.

An example:

(5) AT+UART

Function: Query/set UART interface parameters

Format: Query:

```
AT+UART<CR>
```

```
<CR><LF>+OK=<baudrate,data_bits,stop_bit,parity,flowctrl><CR><LF>
```

Setting:

```
AT+UART=<baudrate,data_bits,stop_bit,parity,flowctrl><CR><LF><CR><LF>+OK<CR><LF>
```

Parameter: baudrate: baud rate 9600, 19200, 38400, 57600, 115200, 128000, 153600, 230400

Data \_ bits: data bits 5, 6, 7, 8

Stop \_ bits: stop bits 1, 2

Parity: parity bit

- NONE (no parity bit)

- EVEN (even parity)

- ODD (odd parity)

- MASK (1 parity)

- SPACE (0 parity)

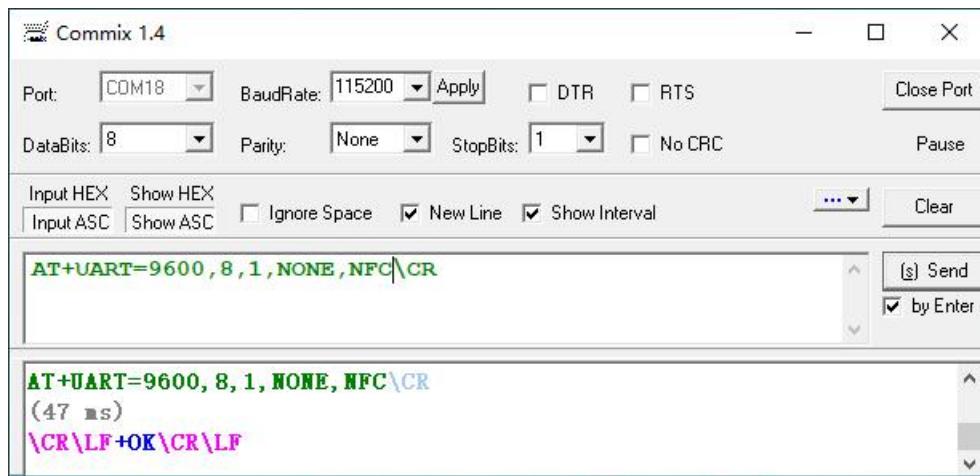
flowctrl: hardware flow control

- NFC: No hardware flow control

- FC: with hardware flow control

485:485 is supported, and the RSEN pin is the same as the RTS pin when it is turned on

For example: AT + UART = 115200, 8, 1, NONE, NFC



#### (6) AT+WANN

Function:Query/Set the Wan port IP obtained by the module (DHCP/STATIC)

Format:Query:

AT=WANN<CR>  
<CR><LF>+OK=<mode,address,mask,gateway><CR>

Setting:

AT+WANN=<mode,address,mask,gateway><CR>  
<CR><LF>+OK<CR><LF>

Parameter: mode: Network IP model

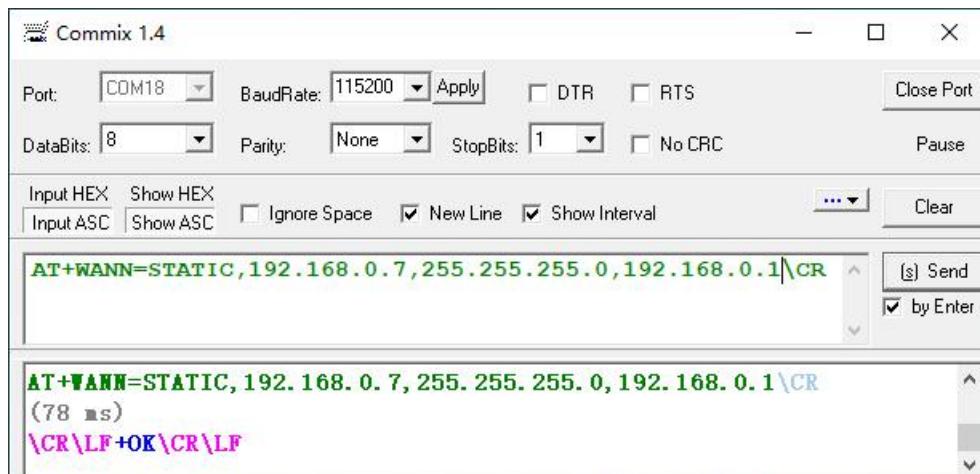
Static:Static IP/DHCP; DHCP: dynamic IP (address, mask, gateway parameters omitted)

Address: IP address

Mask: Subnet mask

Gateway: gateway address

For example: AT + WANN = static, 192.168.0.7, 255.255.255.0, 192.168.0.1



## (7) AT+PORT

Function: Query/Setting the local port number

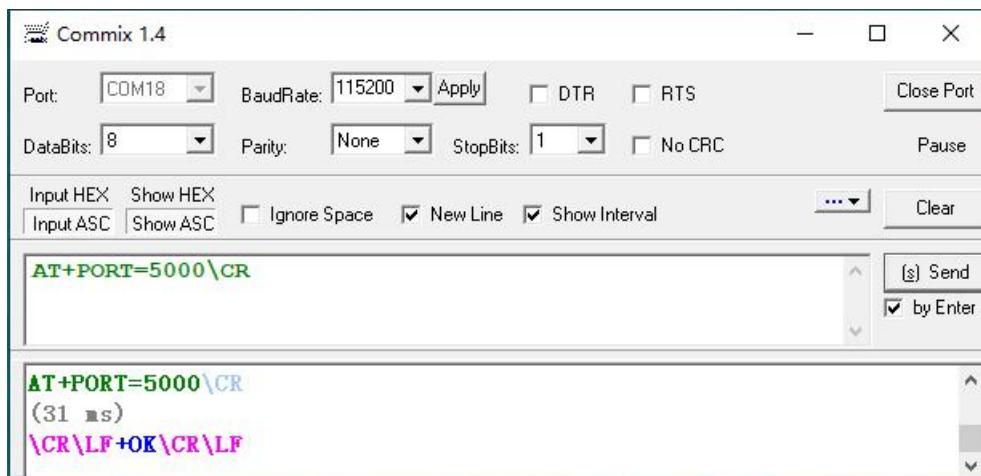
Format: Query:

**AT+PORT<CR>**  
<CR><LF>+OK=<sta><CR><LF>

Setting:

**AT+PORT<CR>**  
<CR><LF>+OK<CR><LF>

Parameter: sta: 0 indicates the use of a random port. 1-65535 indicates the set local port. The default value is 5000. For example: AT + PORT = 5000.



## (8) AT+DEST

Function: Query/Setting the Remote IP Port

Format: Query:

**AT+DEST<CR>**  
<CR><LF>+OK=<ip,port><CR><LF>

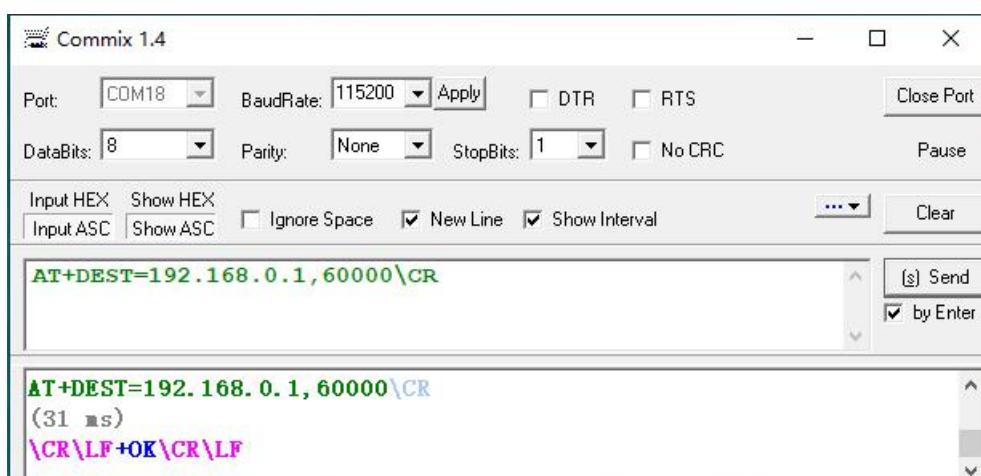
Setting:

**AT+DEST=<ip,port><CR>**  
<CR><LF>+OK<CR><LF>

Parameter: ip: Remote server IP address

Port: The range is 1-65535. The default value is 60000.

For example: AT + DEST = 192.168.0.1, 60000.



## (9) AT+MODE

Function: Query/Setting operating mode.

## Format: Query:

**AT+MODE<CR>**

<CR><LF>+OK<CR><LF>

## Parameter: protocol: Operating mode

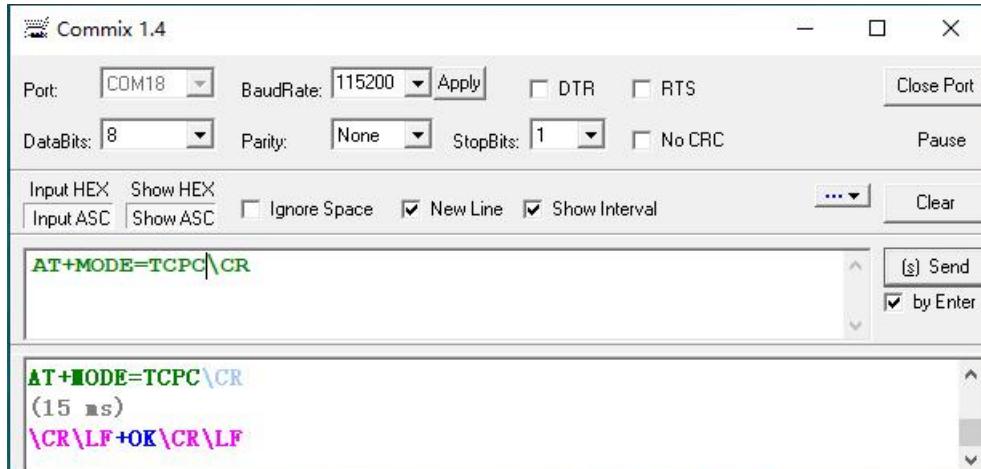
## UDP: Corresponding to UDP

## TCPS: Corresponding to TCPS

MODBUS\_TCPS: Corresponding to Modbus\_TCP Slave

MODBUS\_TCPM: Corresponding to Modbus\_TCP Master

For example: At+MODE=UPD



## (10) AT+TCPLINK

## Function: Query TCP connection status

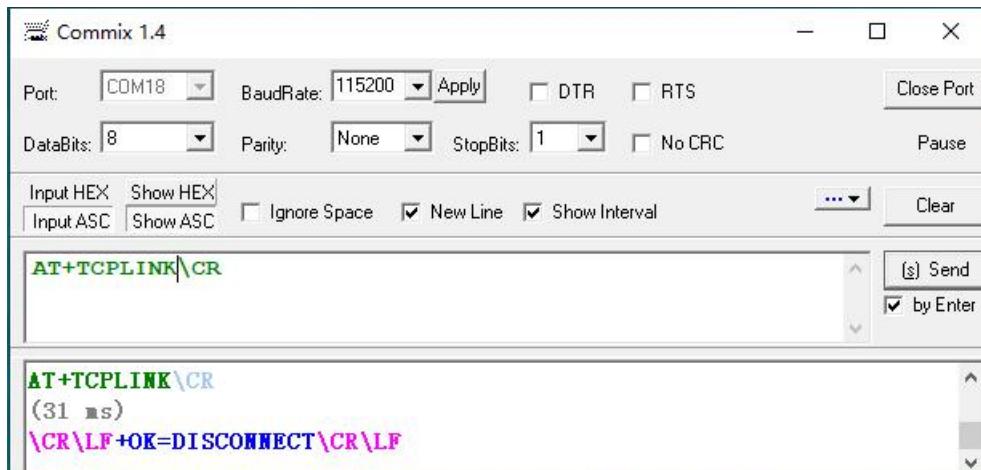
## Format: Query:

## AT+TCPLINK<CR>

<CR><LF>+OK=<sta><CR><LF>

Parameter: sta: DISCONNECT means disconnected; CONNECT means connected.

For example:



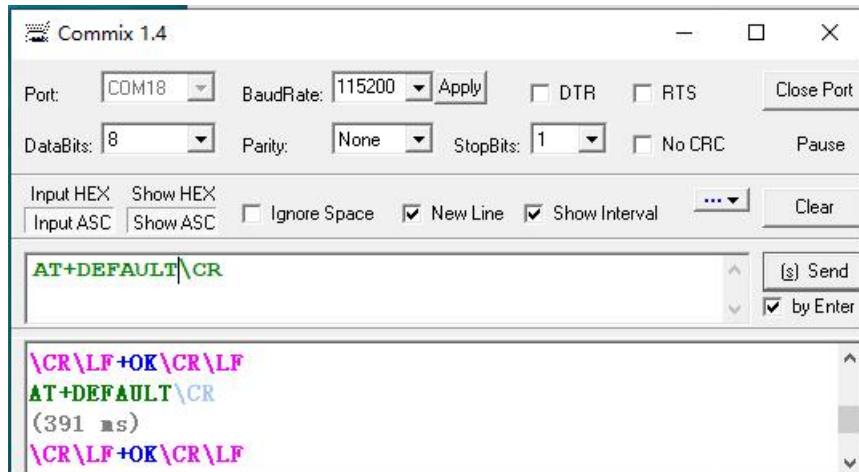
(11) AT+DEFAULT

Function: Factory reset command. The module automatically restarts after the command is sent.

Format: Setting:

**AT+DEFAULT<CR>**  
**<CR><LF>+OK<CR><LF>**

For example:



(12) AT+MAC

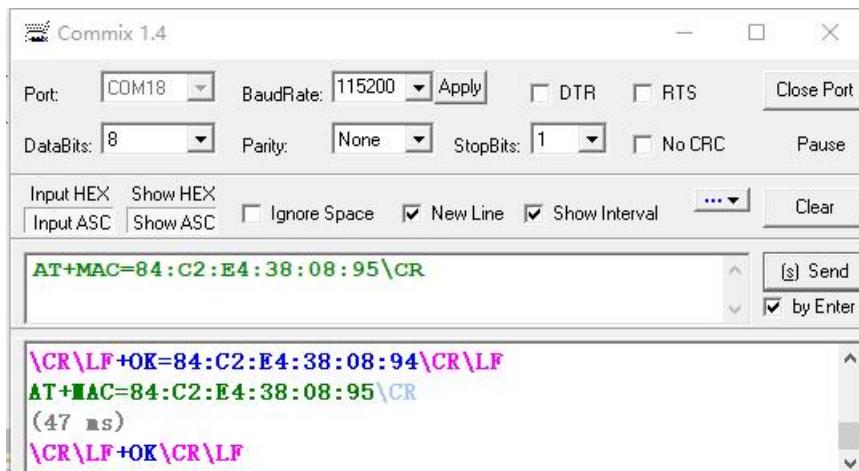
Function: Query/Setting MAC parameter

Format: Query:

**AT+MAC<CR>**  
**<CR><LF>+OK<CR><LF>**

Parameter: mac\_address: mac address.

For example: AT+MAC=84:C2:E4:38:08:95



(13) AT+HEARTMODE

Function: Query/Setting the operating mode of the heartbeat packet

Format: Query:

**AT+HEARTMODE<CR>**  
**<CR><LF>+OK<CR><LF>**

Setting:

**AT+HEARTMODE=<sta><CR>**

**<CR><LF>+OK<CR><LF>**

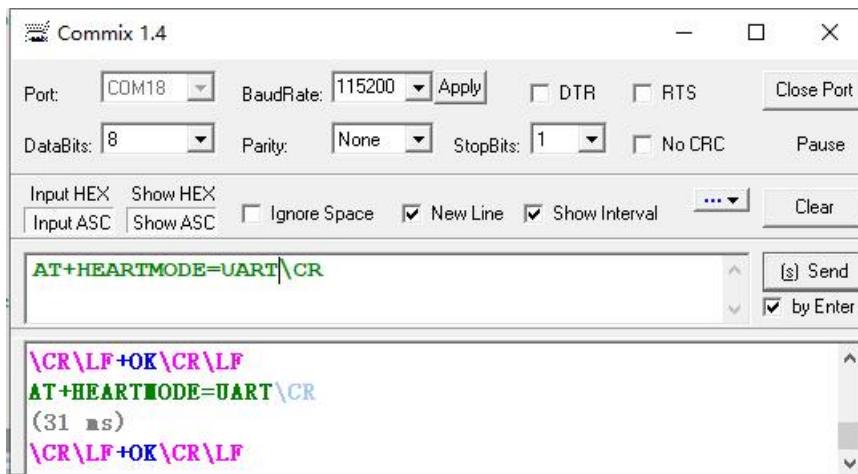
Parameter: **sta**:

DISABLE: The heartbeat packet is closed.

UART: Send heartbeat to serial port;

ETH: Send heartbeat to the network port;

For example: AT + HEARTMODE = UART



#### (14) AT+HEARTTYPE

Function: Query/Set the heartbeat packet information type

Format: Query:

**AT+HEARTTYPE<CR>**

**<CR><LF>+Ok=<type><CR><LF>**

Setting:

**AT+HEARTMODE=<type><CR><LF>**

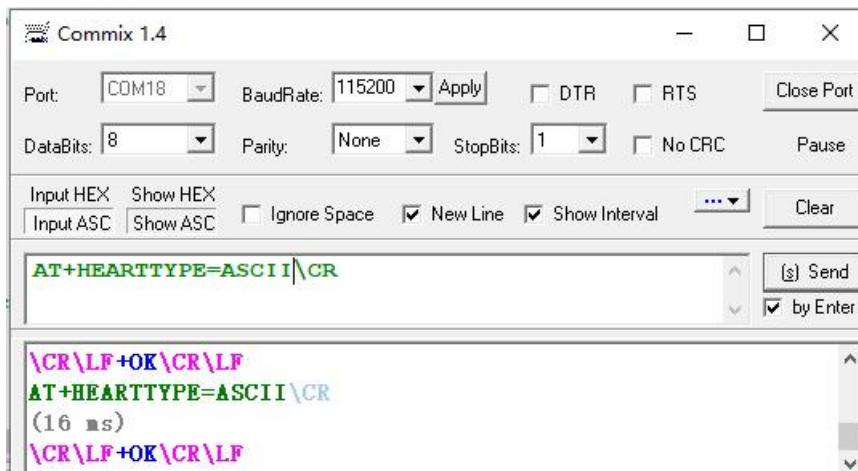
**<CR><LF>+OK<CR><LF>**

Parameter: **type**:

ASCII: ASCII data type

HEX: HEX data type

For example: AT + HEARTTYPE = ASCII



(15) AT+HEARTINTERVAL

Function: query/set heartbeat packet time interval

Format: Query:

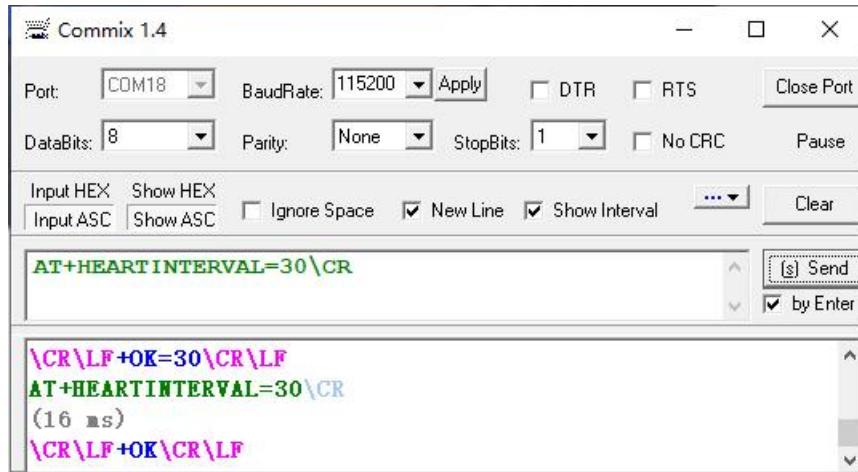
AT+HEARTINTERVAL<CR>  
<CR><LF>+OK=< interval ><CR><LF>

Setting:

AT+ HEARTINTERVAL =<interval><CR>  
<CR><LF>+OK<CR><LF>

Parameter: **interval**:

For example: AT+ HEARTINTERVAL = 30



(16) AT+HEARTMESSAGE

Function: Query/set heartbeat packet information

Format: Query:

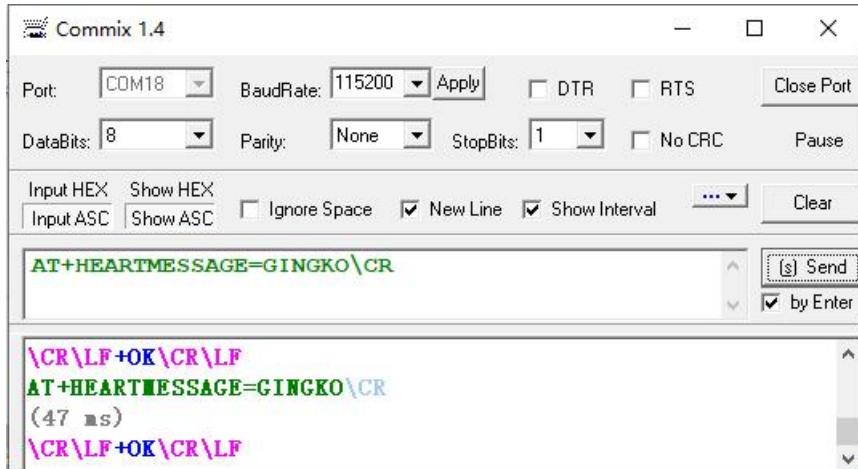
AT+HEARTMESSAGE<CR>  
<CR><LF>+OK=< data ><CR><LF>

Setting:

AT+ HEARTMESSAGE =<data><CR>  
<CR><LF>+OK<CR><LF>

Parameter: **interval**:

For example: AT+HEARTMESSAGE=GINGKO



(17) AT+CONNTIME

Function: Query/set heartbeat packet information

Format: Query:

AT+CONNTIME<CR>  
<CR><LF>+OK=<time>

Settings:

AT+ CONNTIME=<time><CR>  
<CR><LF>+OK<CR><LF>

Parameters: **interval**:

For example: AT + CONNTIME = 20

