EBYTE

Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual

NB114 User Manual

Serial ⇌ Ethernet

Serial Server

CONTENTS

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1 Product Overview

1.1 Brief Introduction

NB114 is a serial port server that realizes serial port data ⇌ Ethernet data conversion;

it has multiple Modbus gateway modes and MQTTC/HTTPC IoT gateway modes, which can meet the networking functions of various serial port devices/PLCs;

adopt industrial-grade design standards to ensure device reliability The product comes with RJ45 network port and 4*3.81mm phoenix terminal and DB9 data interface;

supports a variety of serial port protocols (RS422/RS485/RS232); uses positioning holes for installation.

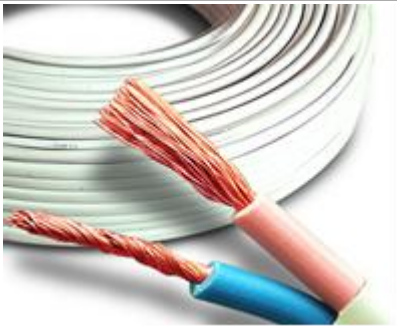
1.2 Feature

- RJ45 adaptive 10/100M Ethernet interface;
- Support multiple working modes (TCP Server, TCP Client, UDP Server, UDP Client, HTTPC, MQTTC);
- Support three configuration methods: configuration tool, web page and AT command;
- Server mode supports multiple socket connections;
- Support a variety of serial port protocols (RS485, RS422, RS485);
- Support multiple baud rates;
- Support DHCP function;
- Support DNS (domain name resolution), and custom domain name resolution server;
- Support multiple Modbus gateways (simple protocol conversion, multi-host mode, storage gateway, configurable gateway, etc.);
- Supports quick access to Alibaba Cloud, Baidu Cloud, OneNET, Huawei Cloud, and standard MQTT servers of version 3.1;
- Support HTTP protocol (GET/POST request)
- Support virtual serial port;
- Support timeout restart function, time can be customized;
- Support short connection function, short connection interval time customization;
- Support heartbeat package and registration package function;
- Support serial port cache cleaning function;
- Support access to external network and local area network;
- Support hardware reset to factory settings;
- Support online upgrade function.

2 Quick Start

2.1 Preparation for use

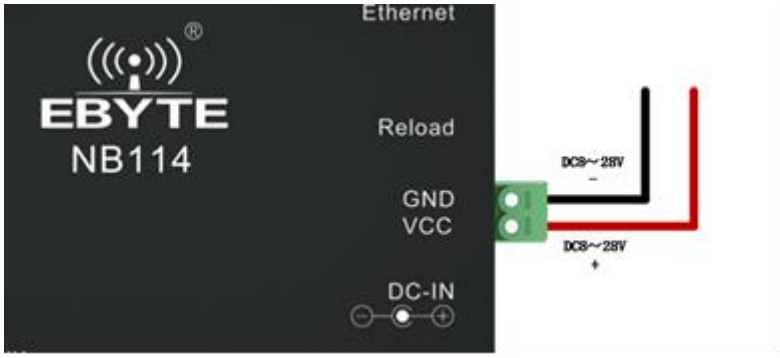
Before using the serial server (hereinafter referred to as "device"), you need to prepare network cables, computers, USB-to-serial converters and other related accessories. details as follows:

		
NB114	Cable	Computer
		
DC 12Vswitching power supply	USB to RS485	Several cables

[Note] This case uses the RS485 interface for demonstration;

2.2 Device wiring

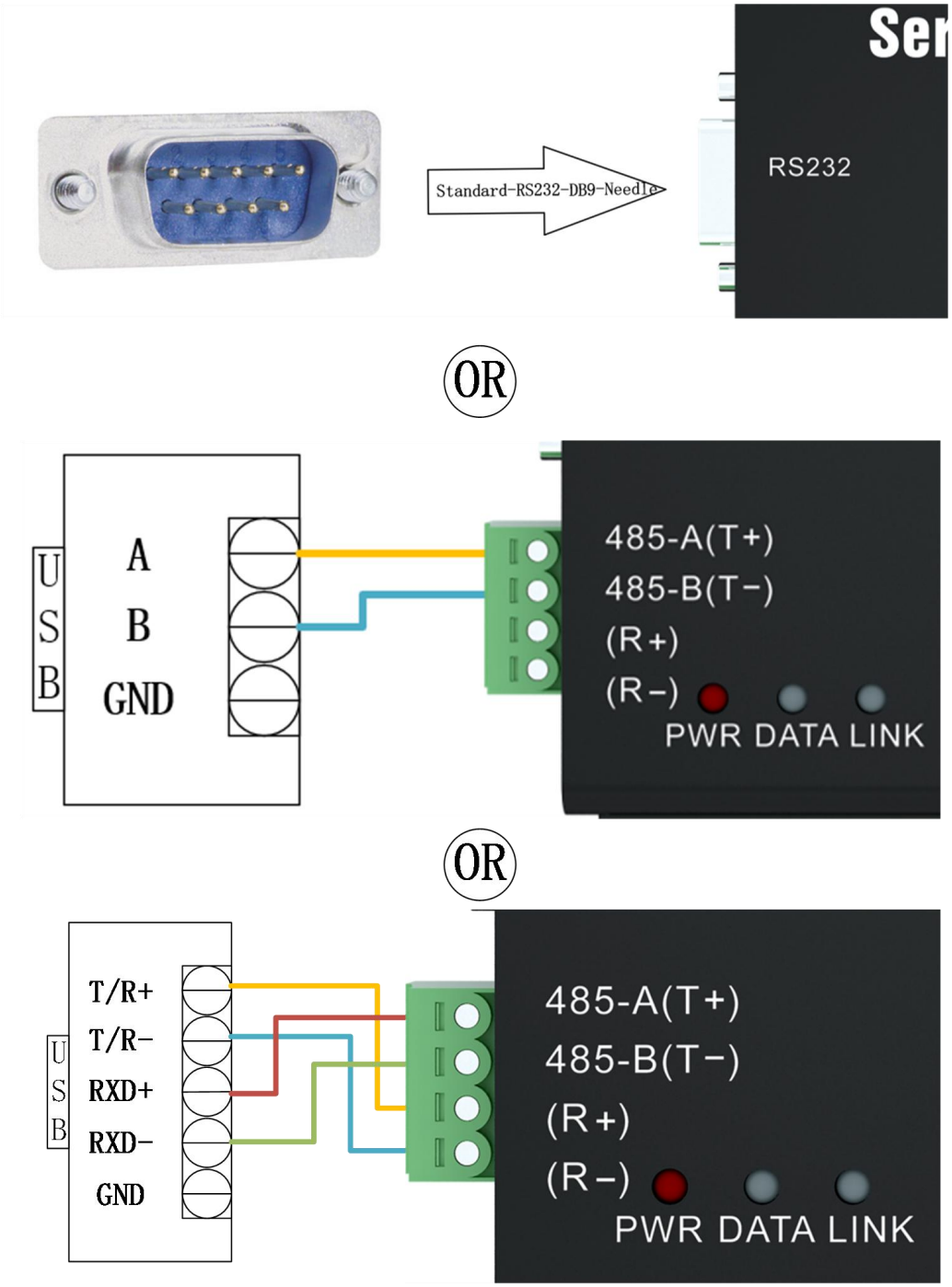
Power wiring (DC 8-28v):



Serial port and network port and wiring:

1. The standard 10M/100M self-adaptive RJ45 network port is adopted. After correct access, the orange indicator light of the device network port is always on, and the green indicator light is flashing;

2. The standard RS485 interface (4*3.81mm phoenix terminal) is used, the device 485-A is connected to the A of the USB to RS485 converter, and the device 485-B is connected to the B of the USB to RS485 converter (please use the standard RS485 twisted pair for long distances) cable, otherwise it may not be able to communicate normally due to excessive environmental interference);



【Note】Do not use RS485, RS422, RS232 interfaces at the same time, which may affect the data transmission and reception.

2.3 Software Settings

2.3.1 Network test environment

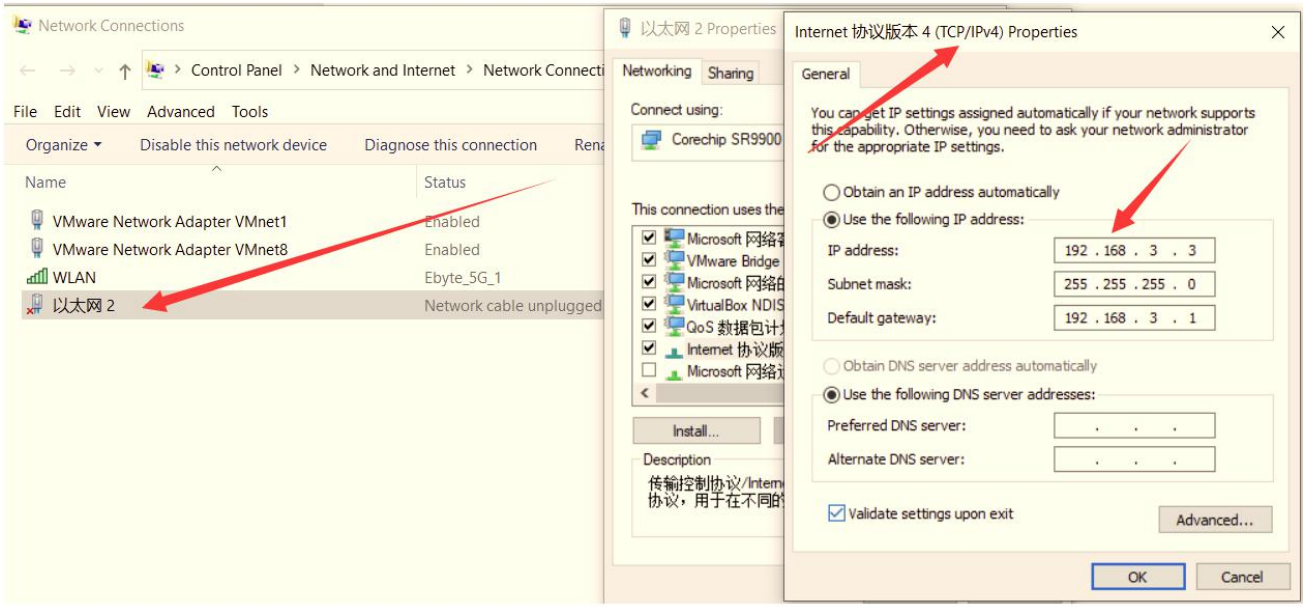
Avoid server search failures and inability to open web page configuration and other related problems in the actual application process. Check the computer settings first

(1) Turn off the firewall and anti-virus software of the computer;

(2) Configure the network card connected to the device;

(3) In this case, the PC is directly connected to the computer, and the static IP of the computer needs to be configured. The static IP of the computer, refer to the PC direct connection configuration) or the router needs to ensure that the device and the PC are on the same network end (for example: 192.168.3.xxx);

(4) Here, configure the static IP of the PC as 192.168.3.3 (the factory default destination IP of the serial port server), configure the subnet mask as 255.255.255.0, and configure the default gateway as 192.168.3.1;



2.3.2 Default parameters

Item	default parameters
IP Address	192.168.3.7
Default local port	8887
subnet mask	255.255.255.0
default gateway	192.168.3.1
Default working mode	TCP Server
Default destination IP	192.168.3.3
Default destination port	8888
Serial port baud rate	115200
Serial port parameters	None / 8 / 1

2.3.3 Data transmission test

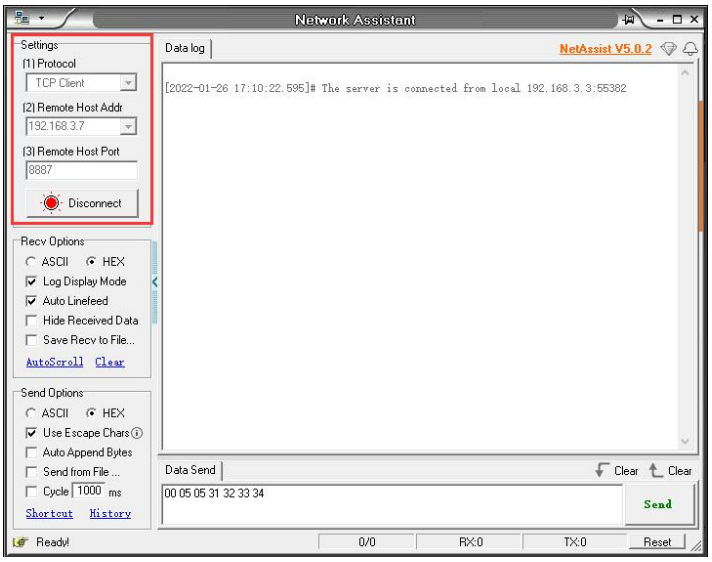
After the above operation steps, follow the factory default parameters of the device and perform the following operations to realize the transparent transmission test of data.

The operation steps are as follows:

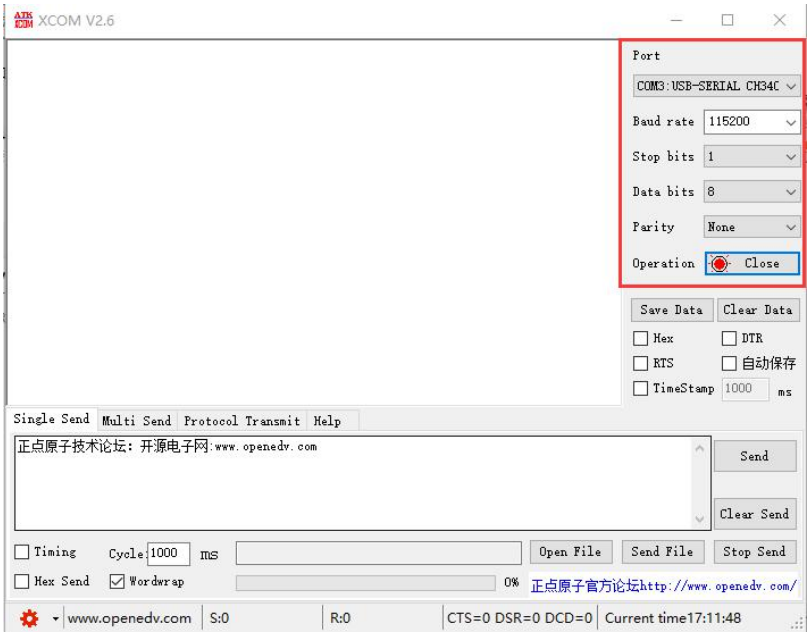
(1) Open the test TCP/IP debugging assistant software.

(2) Select the TCP client mode (TCP Client) in the "Network Setting Area", corresponding to the remote host address (the default local IP of the device: 192.168.3.7). The remote host port corresponds to the factory port 8887 of the device, click Connect.

(3) Wait for the computer to connect to the serial server. After the connection is completed, the LINK light of the serial server is always on.

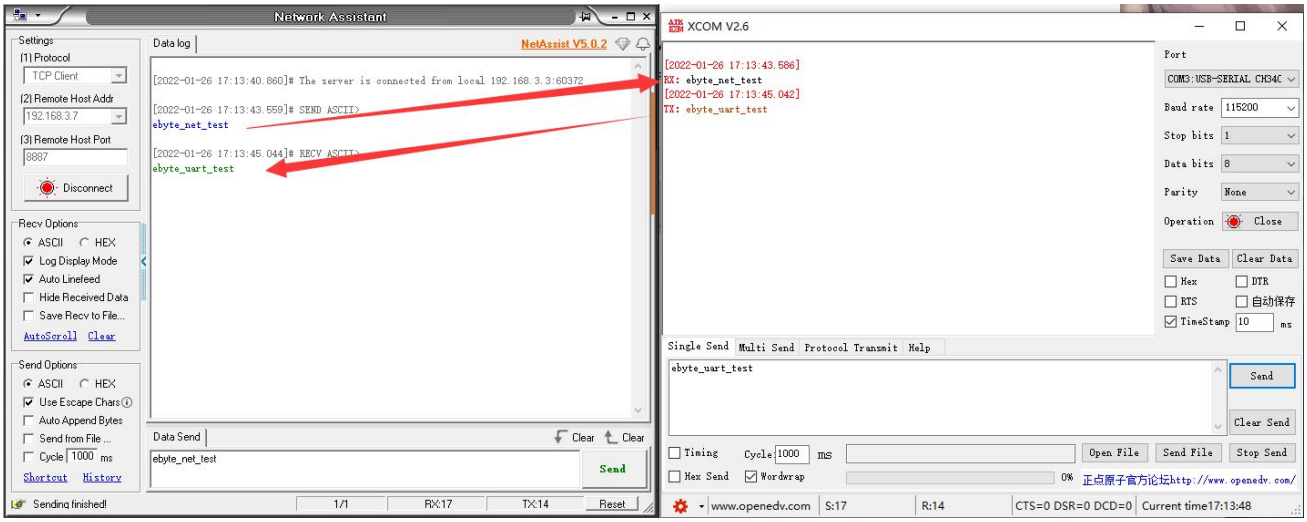


(4) Open the serial port assistant, select the corresponding serial port, set the baud rate to 115200, set other serial port parameters to None/8/1, and click "Open Serial Port".



Data transmission test, the serial port assistant (serial port side) sends the test data, and the network debugging

assistant (network side) receives the test data. The network debugging assistant (network side) sends test data, and the serial port assistant (serial port) receives test data. Realize duplex communication (that is, two-way data sending and receiving from local to network).

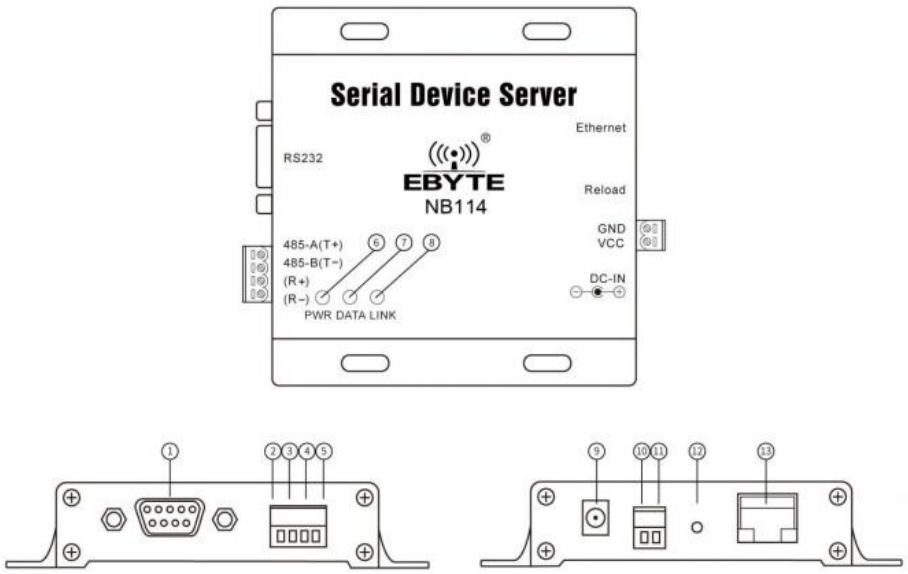


3 Product Overview

3.1 Technical parameters

Item	Instruction
Operating Voltage	DC 8 ~ 28V
Working current	7mA @ 12V
Interface	Serial port (RS422/RS485, 4*3.81mm phoenix terminal) Serial port (RS232, standard RS232 line sequence DB9 female) Ethernet port (RJ45)
Work Mode	TCP Server、TCP Client、UDP Server、UDP Client、HTTP Client、MQTT Client（default TCP Server）
Socket connection	Support 6-way client connection (TCP server mode)
Network protocol	IPv4、TCP/UDP、HTTP、MQTT
How to get IP	DHCP、Static IP (default static IP)
DNS	Support
DNS server	Customizable (default 114.114.114.114)
Configuration method	Web pages, configuration tools, AT commands
IP address	Customizable (default 192.168.3.7)
local port	Customizable (default 8887)
subnet mask	Customizable (default 255.255.255.0)
gateway	Customizable (default 192.168.3.1)
target IP	Customizable (default 192.168.3.3)
destination port	Customizable (default 8888)
Serial port cache	1024Byte
Packaging mechanism	512 Byte
Serial port baud rate	1200 ~ 230400 bps（default 115200）
data bits	5、6、7、8（default 8）
stop bit	1、2（default 1）
Check Digit	None、Odd、Even、Mark、Space（default None）
Product Size	102 mm * 84mm * 25mm （length*width*height）
product weight	126g ± 5g
Working temperature and humidity	-40 ~ +85℃、5% ~ 95%RH（no condensation）
Storage temperature and humidity	-40 ~ +105℃、5% ~ 95%RH（no condensation）

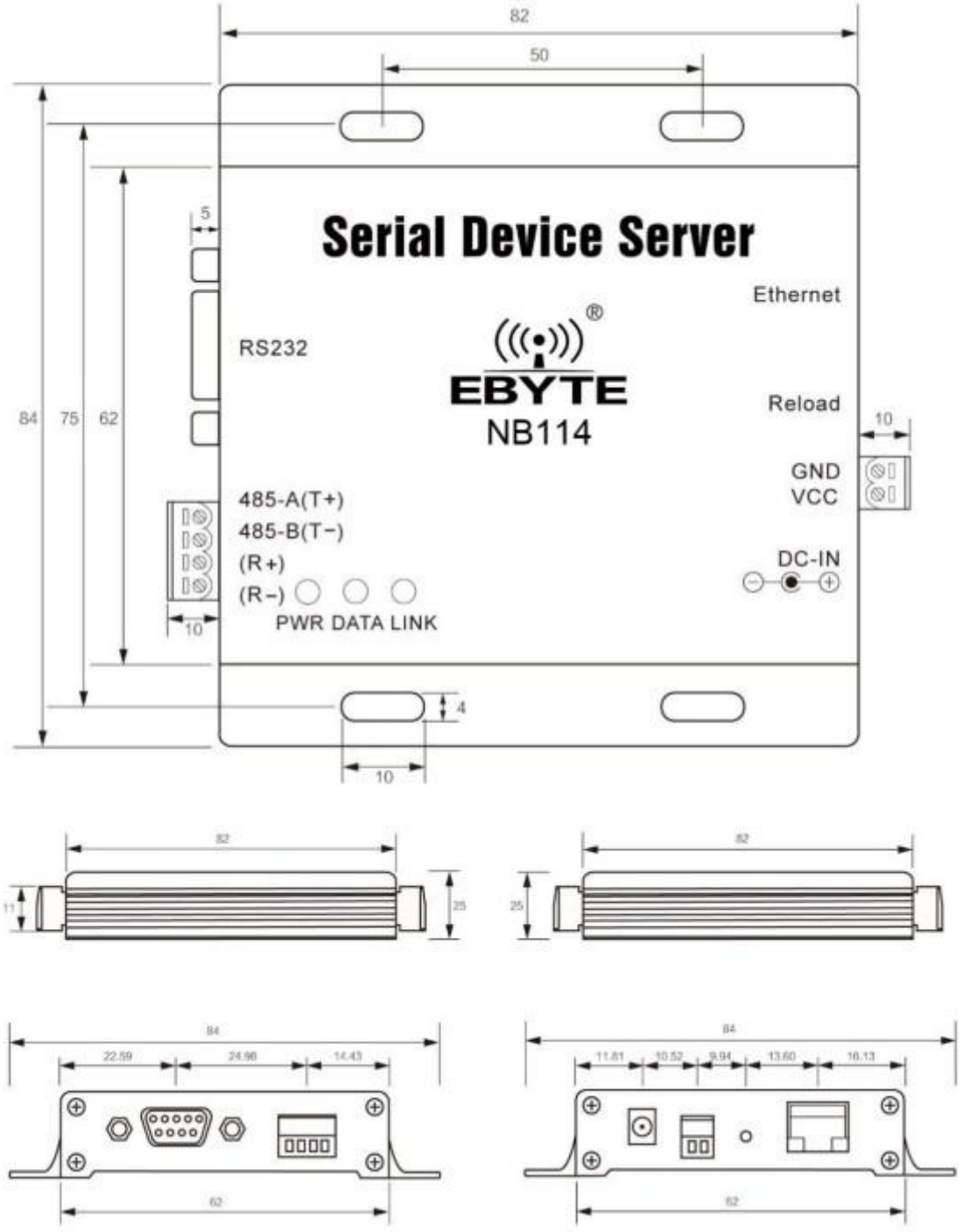
3.2 Interface and Indicator Description



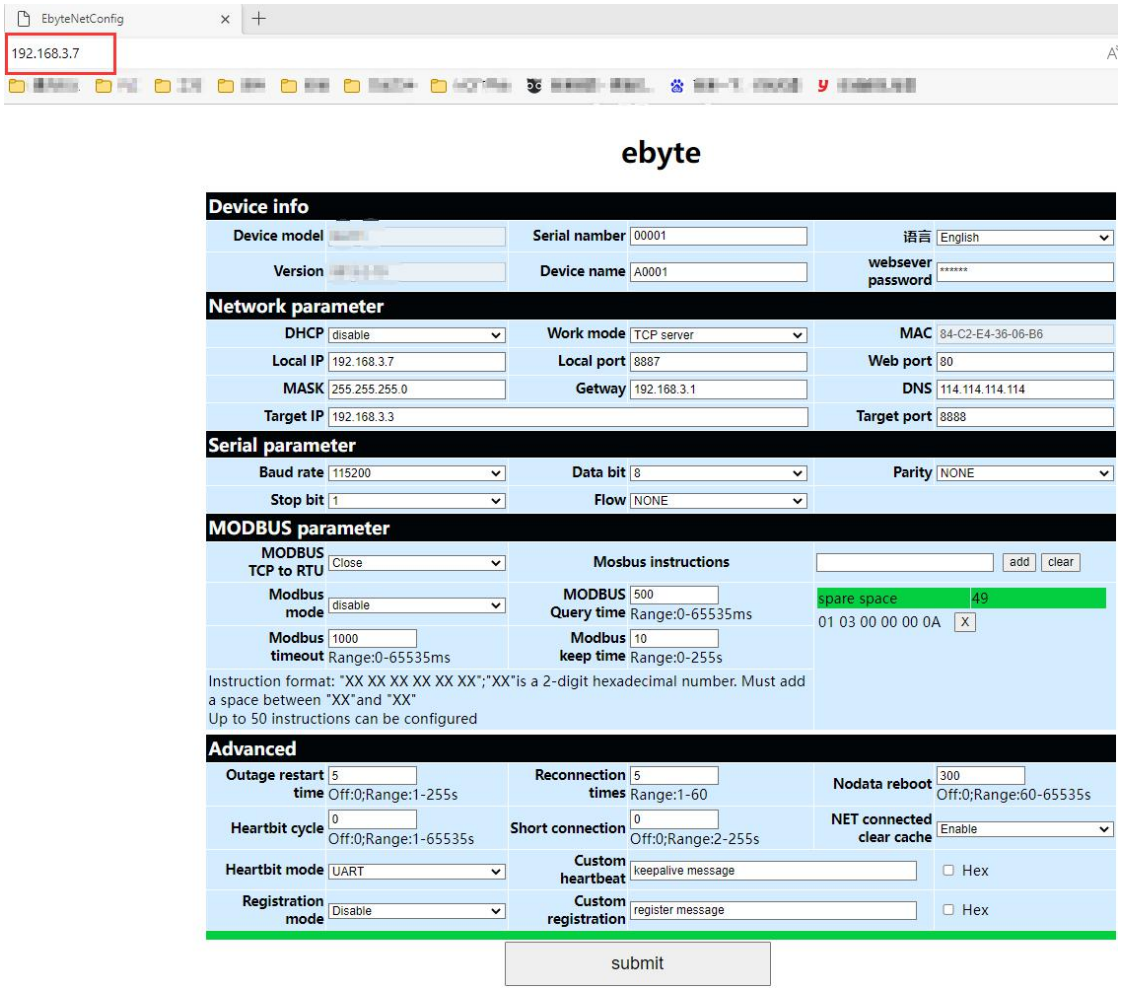
No.	Name	Function	Instruction
1	RS232	RS232 Interface	Standard DB9-RS-232 Female Wire Sequence;
2	485-A(T+)	RS485/RS422 Interface	A of RS-485 interface, T+ sent by RS-422;
3	485-A(T+)	RS485/RS422 Interface	B for RS-485 interface, T- for RS-422 transmission;
4	(R+)	RS422 Interface（R+）	R+ received by RS-422;
5	(R-)	RS422 Interface（R-）	R- received by RS-422;
6	PWR	Power Indicator	Power on: red light on; Power off: light off;
7	DATA	Data transceiver indicator	Network port data: blue light on; Serial data: green light on; No data: light off;
8	LINK	Link connection light	The connection is successful: the green light is on; No connection: light off; UDP mode is always on;
9	DC-IN	DC female power input	DC 8 ~ 28V input, please do not input at the same time with the phoenix terminal;
10	VCC	DC power input	3.81mm phoenix terminal, the positive pole of DC 8~28V, please do not input the DC head at the same time;
11	GND	DC power output	3.81mm phoenix terminal, the negative pole of DC 8~28V, please do not input the DC head at the same time;
12	Reload	Factory reset button	Press and hold the device for 5 seconds to perform a factory reset;
13	Ethernet	network interface	Standard RJ45 interface;

[Note] When the network cable is not connected, PWR, DATA, and LINK all light up, and the device is in standby state.

3.3 Dimensions



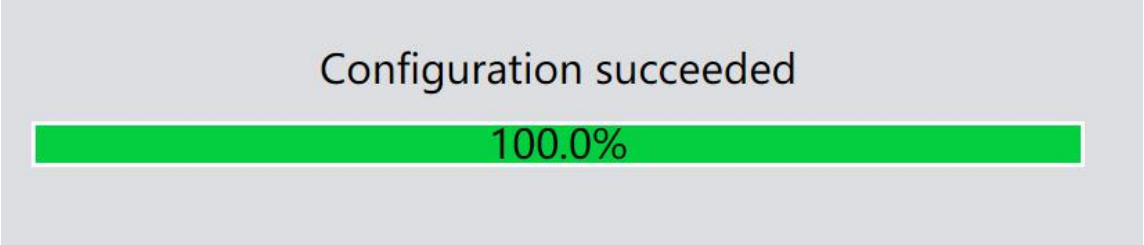
SIZE: mm



Step 2: The webpage pops up the main interface, and you can query and set relevant parameters;

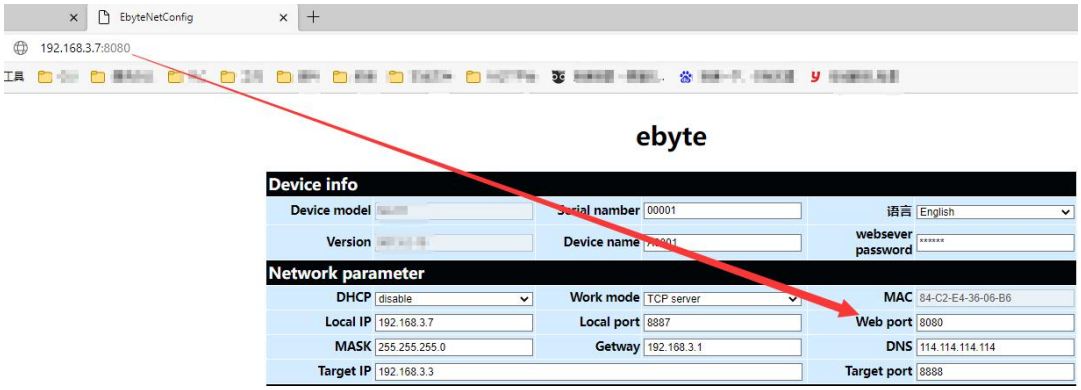
Step 3: Click Submit to save the configuration parameters after entering the correct key. The factory default key is: 123456;

Step 4: The progress bar indicates the configuration progress. Do not refresh the web page again after the configuration is completed (refresh the web page to enter the configuration mode again, you can restart the device or submit it again to enter the communication mode);



It can also be opened through the Open Web Configuration button of the configuration software.

[Note] If the port number is modified, the port number should be added to the address input field. For example, if you modify the web page access port to 8080, you need to enter 192.168.3.7:8080 in the address bar to connect to the web page configuration.



4.2.2 Subnet mask/IP address

The IP address is the identification of the module in the local area network and is unique in the local area network. Therefore, it cannot be duplicated with other devices on the same local area network. There are two ways to obtain the IP address of the module, static IP and DHCP.

(1) Static IP: Static IP needs to be set manually by the user. In the process of setting, pay attention to writing IP, subnet mask and gateway at the same time. Static IP is suitable for scenarios where IP and device statistics are required and one-to-one correspondence is required.

Advantages: Access to devices that cannot be assigned IP addresses can be searched through the broadcast mode of the entire network segment, which is convenient for unified management;

Disadvantages: Different network segments in different LANs, resulting in normal TCP/UDP communication.

(2) Dynamic DHCP: The main function of DHCP is to dynamically obtain the IP address, gateway address, DNS server address and other information from the gateway host, thereby eliminating the tedious steps of setting the IP address. It is suitable for scenarios where there is no requirement for IP, and there is no mandatory one-to-one correspondence between IP and modules.

Advantages: devices with DHCP Server such as access routers can communicate directly, reducing the trouble of setting IP address gateway and subnet mask.

Disadvantage: Connecting to a network without DHCP Server, such as direct connection with a computer, the module will not work properly. The subnet mask is mainly used to determine the network number and host number of the IP address, to indicate the number of subnets, and to determine whether the module is in the subnet. The subnet mask must be set. Our commonly used class C subnet mask: 255.255.255.0, the network number is the first 24 bits, the host number is the last 8 bits, the number of subnets is 255, and the module IP is in the range of 255 within this subnet, the module IP is considered to be in this subnet. Gateway refers to the network number of the network where the current IP address of the module is located. If a device such as a router is connected to the external network, the gateway is the router

4.2.3 Domain Name Resolution (DNS)

Domain name resolution translates domain names into network-recognized IP addresses through Domain Name Resolution (DNS) servers. The domain name resolution (DNS) server address of the serial port server supports user definition, and can realize domain name resolution through a custom domain name resolution server in the event of an abnormal domain name server. The device will report the resolution to the custom domain name resolution (DNS) server during domain name resolution. Request, return the device connection parameters (usually the IP address) after the parsing is completed.

In DHCP mode, the domain name resolution (DNS) server address is automatically obtained (synchronized with the router's domain name resolution address) and cannot be modified.

In static IP mode, the factory default address of the Domain Name Resolution (DNS) server is 114.114.114.114.

4.2.4 Restore factory settings

Press and hold the Reload pin of the device until the LED indicator lights up to release the key.

4.3 Socket function

4.3.1 TCP server mode

TCP Server is the TCP server. In TCP Server mode, the device listens to the local port, accepts the client's connection request and establishes a connection for data communication. When the Modbus gateway function is turned off, the device sends the data received by the serial port to all client devices that establish connections with the device, and supports connecting up to 6 clients. After the Modbus gateway function is enabled, the non-Modbus data will be cleared and not forwarded.

Typically used for communication with TCP clients within a local area network.

4.3.2 TCP Client Mode

TCP Client is the TCP client. When the device is working, it will actively initiate a connection request to the server and establish a connection to realize the interaction between serial port data and server data.

To use the client, you need to configure the target IP address/domain name and target port accurately.

4.3.3 UDP Server Mode

UDP Server means that the device does not verify the IP address of the data source when communicating with the UDP protocol. After receiving a UDP data packet, it saves the source IP address and source port of the data packet, and sets it as the destination IP and port, so The data sent by the device only sends data packets to the source IP address and port where the device received data last time .

This mode is usually used in scenarios where multiple network devices communicate with this device, and the frequency is high, and the TCP Server cannot meet the conditions.

Using UDP Server requires the remote UDP device to send data first, otherwise the data cannot be sent normally.

[Note] In UDP mode, the data sent by the network to the device should be less than 512Bit per packet, otherwise it will cause data loss

4.3.4 UDP Client Mode

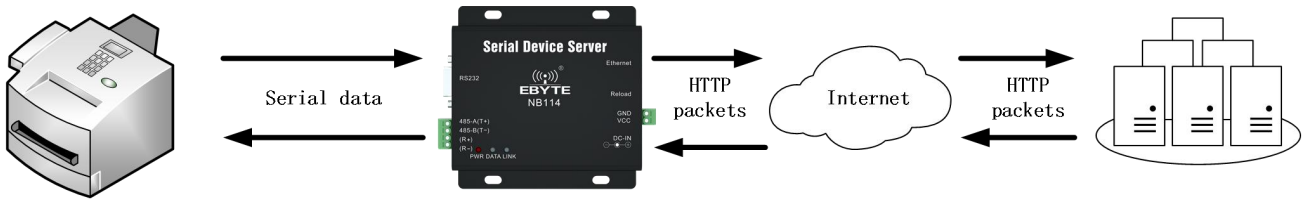
UDP Client is a connectionless transmission protocol that provides transaction-oriented simple and unreliable information transmission services. There is no connection establishment and disconnection, and data can be sent to the other party only by configuring the destination IP and destination port. It is usually used in data transmission scenarios where there is no requirement for the packet loss rate, the data packets are small and the transmission frequency is fast, and the data is to be transmitted to the specified IP.

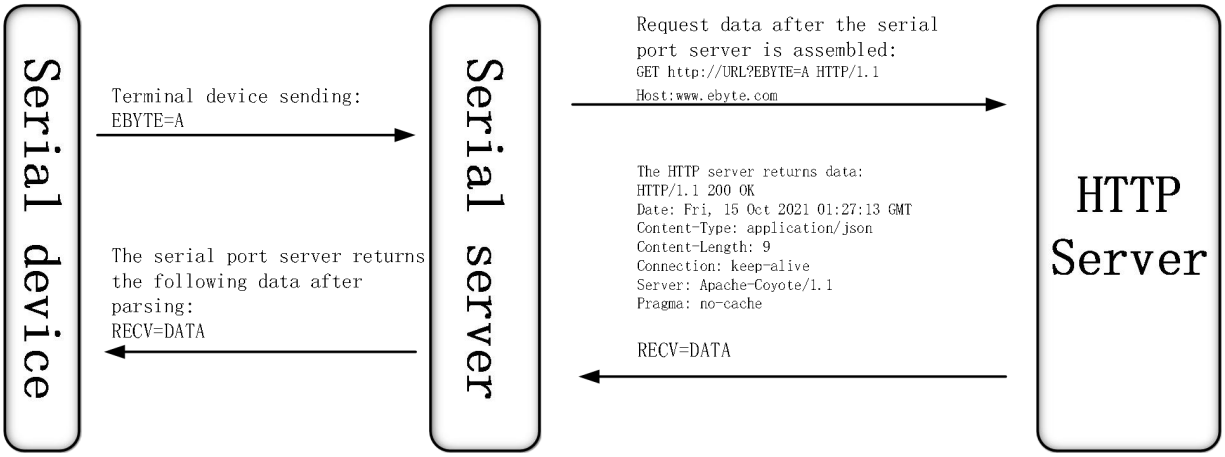
In UDP Client mode, the device will only communicate with the configured (target IP and target port) remote UDP devices.

In this mode, the target address is set to 255.255.255.255, and the sent data will be broadcast on the entire network segment, but the transceiver device needs to ensure that the ports are consistent, and the device can also receive broadcast data.

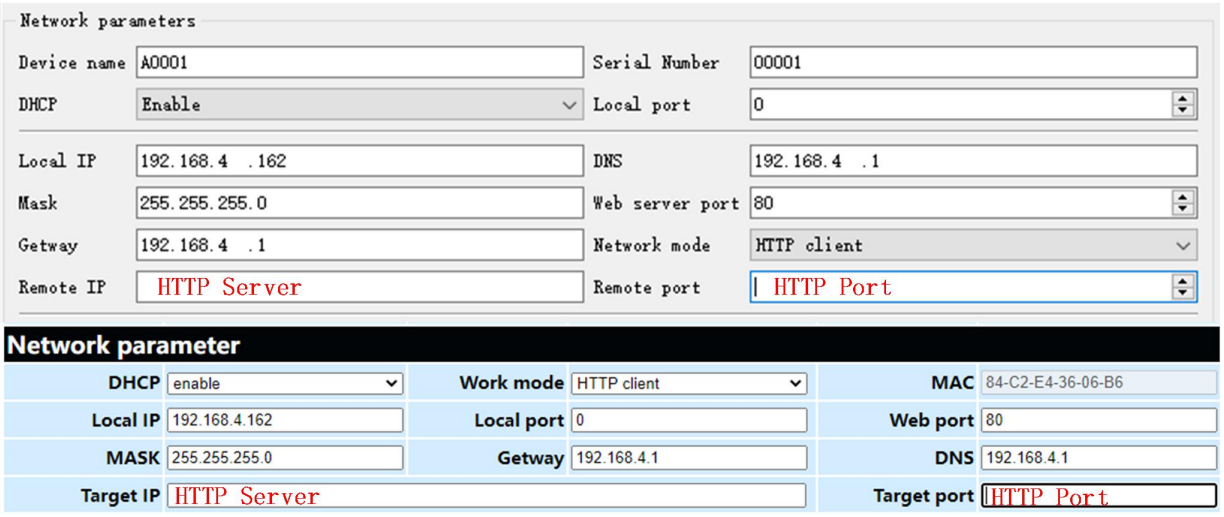
4.3.5 HTTP Client Mode

This mode can realize the function of HTTP grouping. It provides two modes: GET and POST. Customers can configure URL, Header and other parameters by themselves, and the device (serial port server) will send packets to realize fast communication between the serial port device and the HTTP server. In HTTP client mode, it is recommended to use random ports and enable short connections to save HTTP server resources.

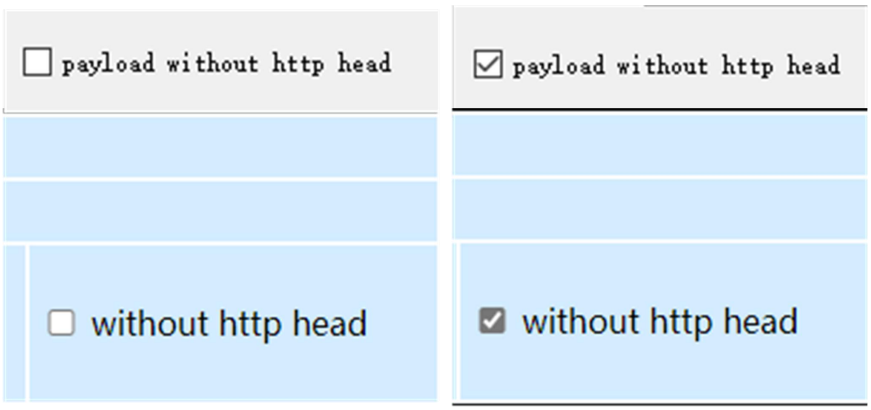




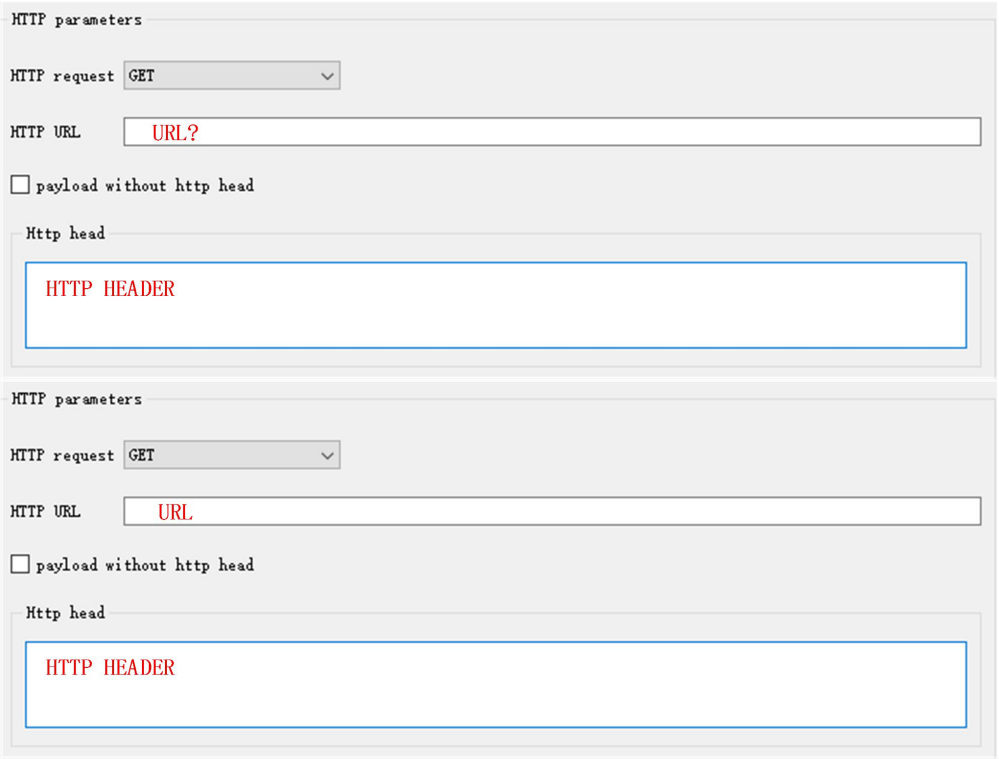
Configure the local network parameters and the HTTP server address and port(You are advised to enable DHCP and random ports), As shown in the figure below(Above is the upper computer, below is the web page):



Return standard HTTP frame data (left image) and only valid data (right image):



Parameter configuration description as shown in the figure (GET on, POST is under):



4.3.6 MQTT Client mode

The serial port server supports quick access to standard MQTT3.1.1 protocol servers (OneNET, Baidu Cloud, Huawei Cloud, user-built and other server types) and Alibaba Cloud servers, supports service quality level configuration (QoS 0, QoS 1), and supports super long text Configuration, convenient and better access to network service operators (server address, three elements, subscription and publishing addresses support up to 128 characters of configuration).

