Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual

E870-W1

Contents

1. Overview

1.1. Product introduction

E870-W1 is a WiFi cloud IO gateway developed based on the communication protocol "Ebyte Cloud Device Communication Protocol" developed by our company. It works in the 2.4G frequency band. It can send commands to the device through the server to achieve control or acquisition functions. Open on the device 4-way DI, 2-way AI (4-20mA) input, 2-way DO output, support TCP client protocol and MQTT access, support heartbeat package, registration package settings; at the same time, the product supports multiple configuration methods and supports web platform;

At the same time, the product supports multiple configuration methods and supports web platforms;

Support acquisition and control edge RTU nodes, and can also be used as RTU equipment to analyze Modbus command acquisition and control equipment IO ;

Industrial-grade design standards are adopted to ensure high reliability of the equipment .

1.2. Features

- Support the open protocol of "Ebyte Cloud Device Communication Protocol"
- Support Ebyte cloud platform remote management
- Support edge acquisition control 20 M odbus RTU data points
- Support change reporting, periodic reporting and other reporting methods
- Support adding edge computing formulas for uplink and downlink data
- Support Alibaba Cloud object model JSON protocol reporting
- Support device linkage
- Support 4-way Socket independent connection to user-defined server
- Support TCPC, UDPC, MQTT3.1.1 protocol
- Support registration package, heartbeat package
- Support Ebyte cloud platform, host computer, network and other configuration methods
- Support multi-link edge acquisition function, support Modbus to automatically add CRC check;
- 2-way analog input (4-20mA) ;
- 4 -way switch input DI (dry contact);
- 2 -way switch output DO (Form A relay);
- Switch output (DO) supports level mode and follower mode ;

2. Quick use

[Note] This experiment needs to be carried out with the default factory parameters.

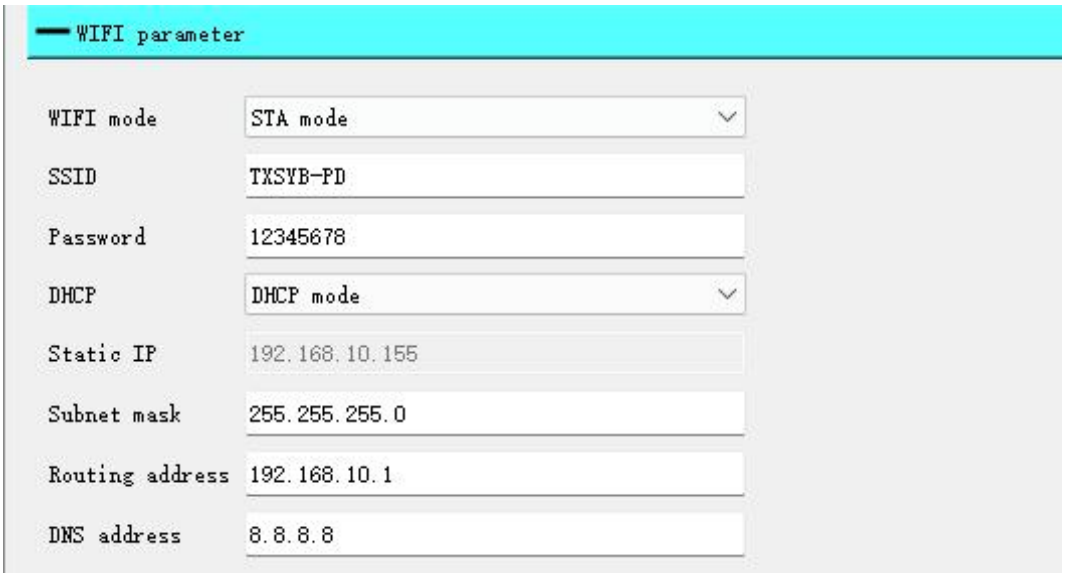
2.1. Equipment preparation

The following table lists the materials required for this test:
One computer, one E870-W1 device, one normal networked router, one 485 to USB data cable

2.2. Device connection

2.2.1. Connect platform

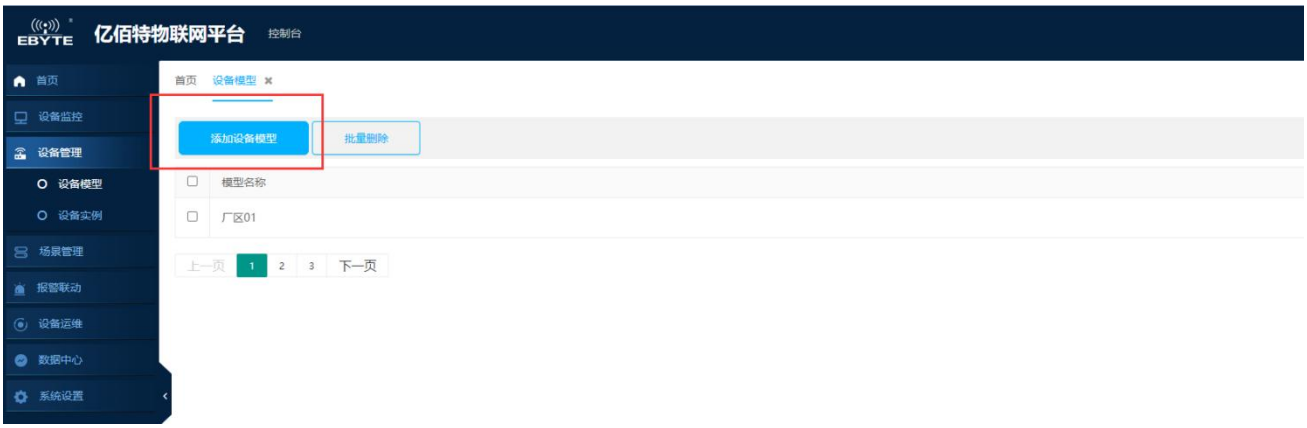
Step 1: Connect the power supply of the device (DC 8-28V), turn on the upper computer of the device, fill in the name and password to connect to the WiFi, and ensure that the device can access the Internet normally;



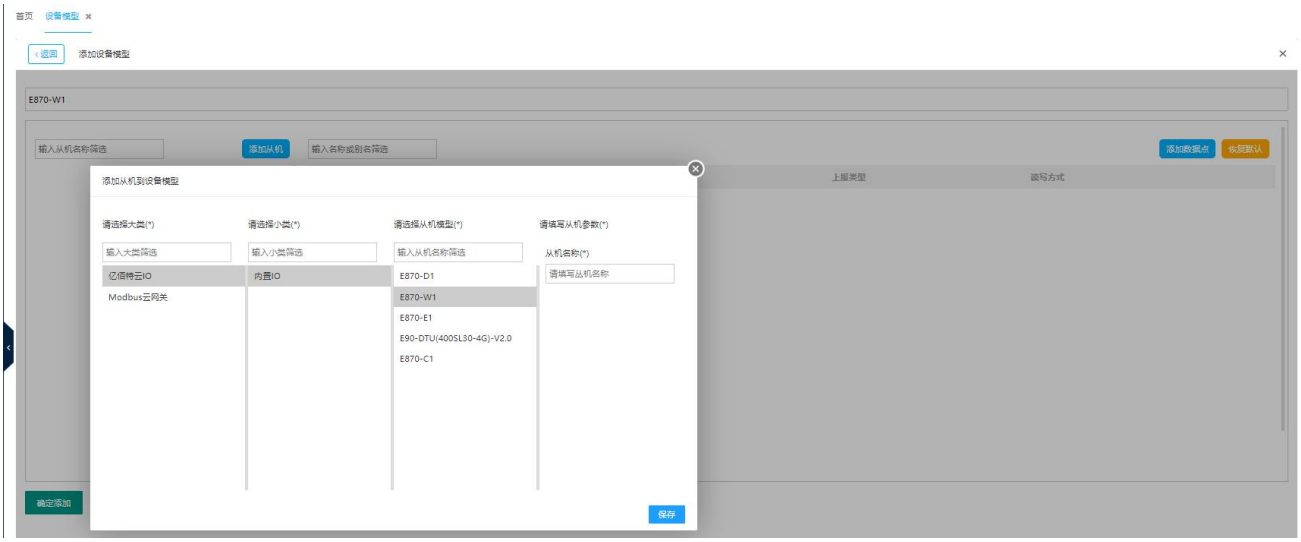
Step 2: Use a browser to log in to cloud.ebyte.com, register and log in to the ebyte cloud platform, after successfully entering the platform:

①Click on the left column box "Device Management"

②Click "Device Model" to enter to create a device model, select "Add Device Model"



③Input relevant parameters, click "Add Slave", select "Ebyte Cloud IO", "Built-in IO", "E870-W1", enter the name of the slave, click "Save", and click "Confirm to add", that is Device models can be created.

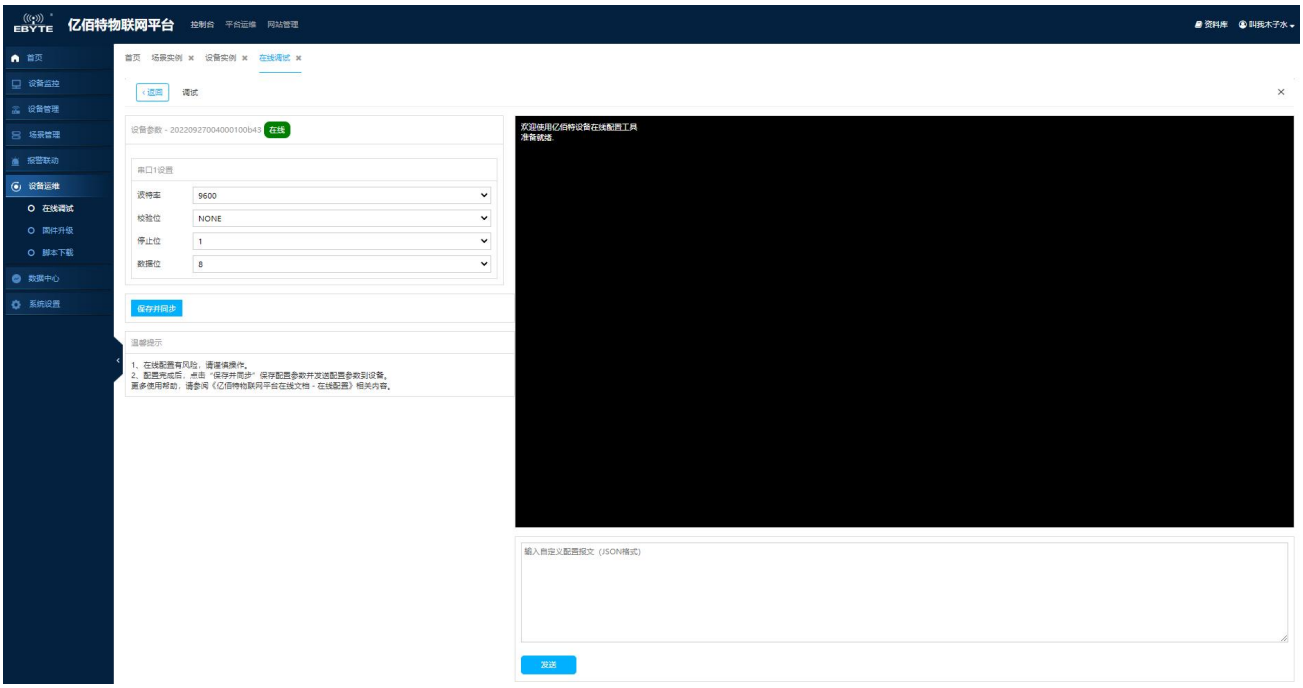


④Click "Device Instance", enter and click "Add Device"

⑤ "Equipment model" select the previously created E870-W1 model, then enter the SN code on the back of the device, fill in other parameters according to your needs, click "OK to add" to create the device.

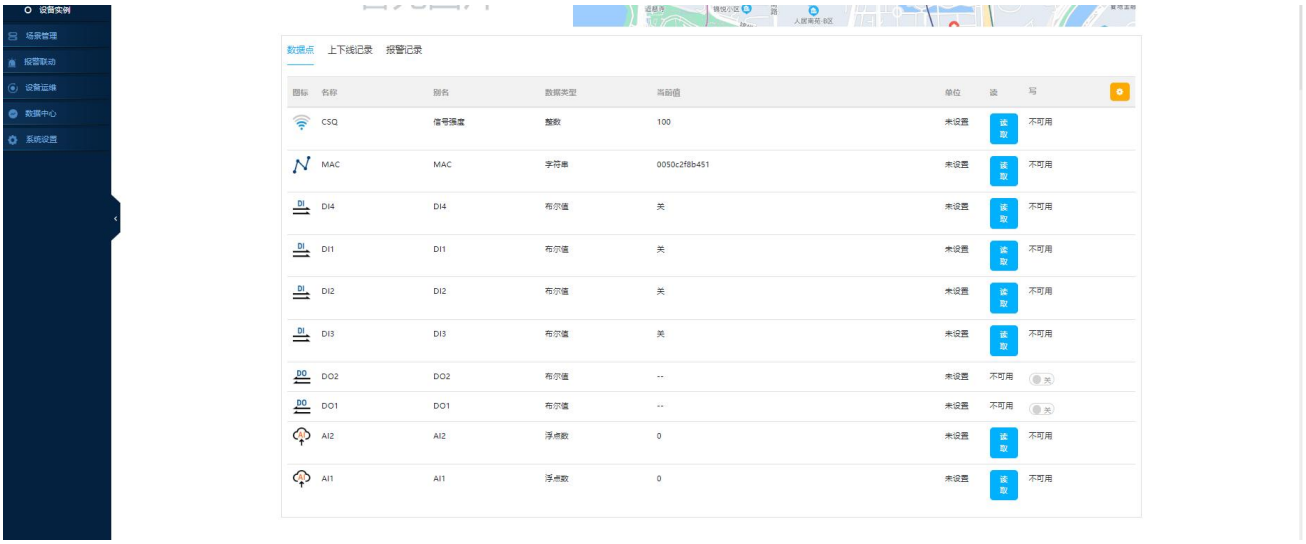
⑥Restart the device, and when the STATE light of the device is always on, the device can be seen online on the platform.

⑦Click "Device Operation and Maintenance" and "Online Debugging" on the platform, and click "Debug" behind the device to enter the device debugging interface. Enter the corresponding command to control the device.



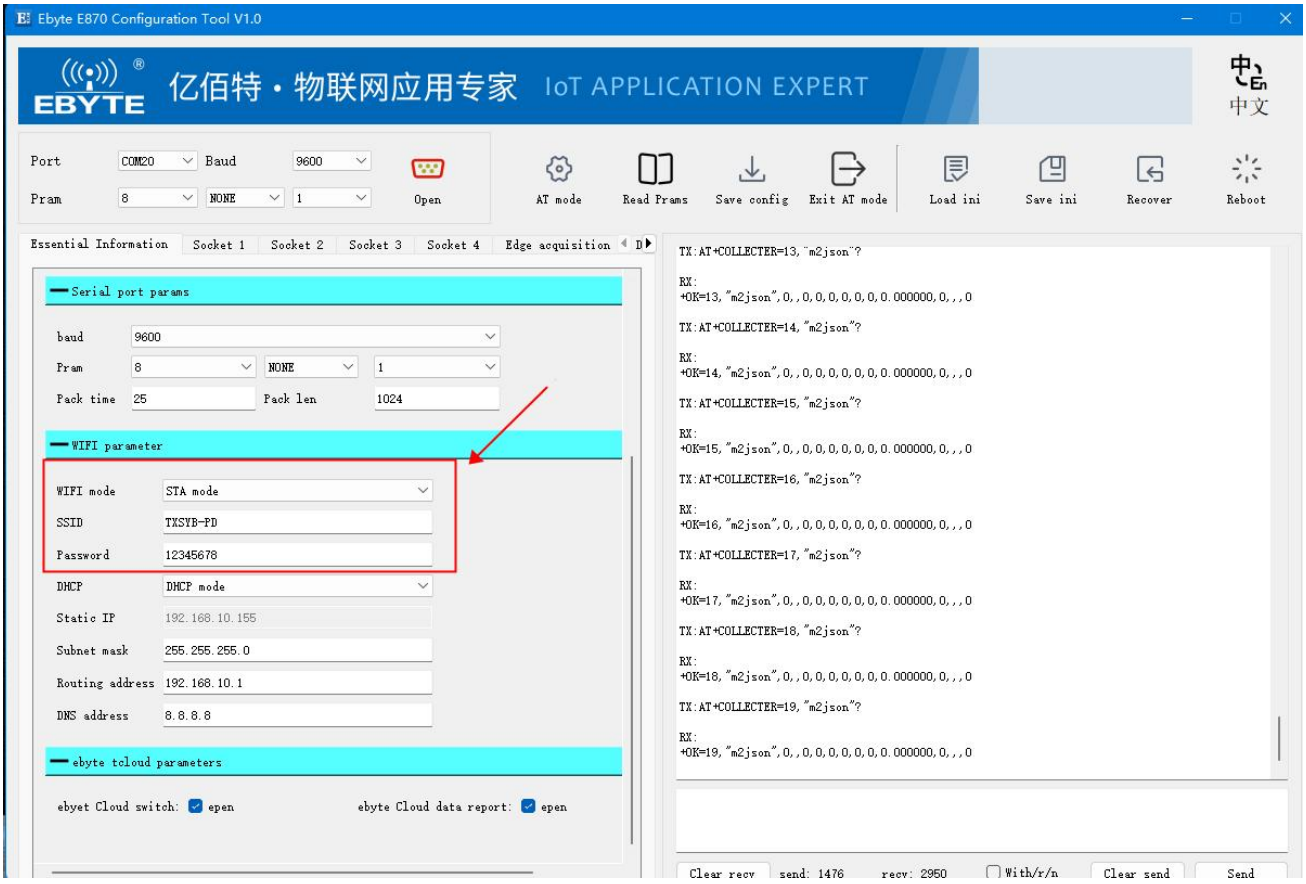
⑧Or click "Device Instance" and click "Device Details" of the online device, you can see the information of the device data points in the device details, and you can read the data or operate the device on the interface.

Finally, click the control button of DO to execute the output of DO to the device;



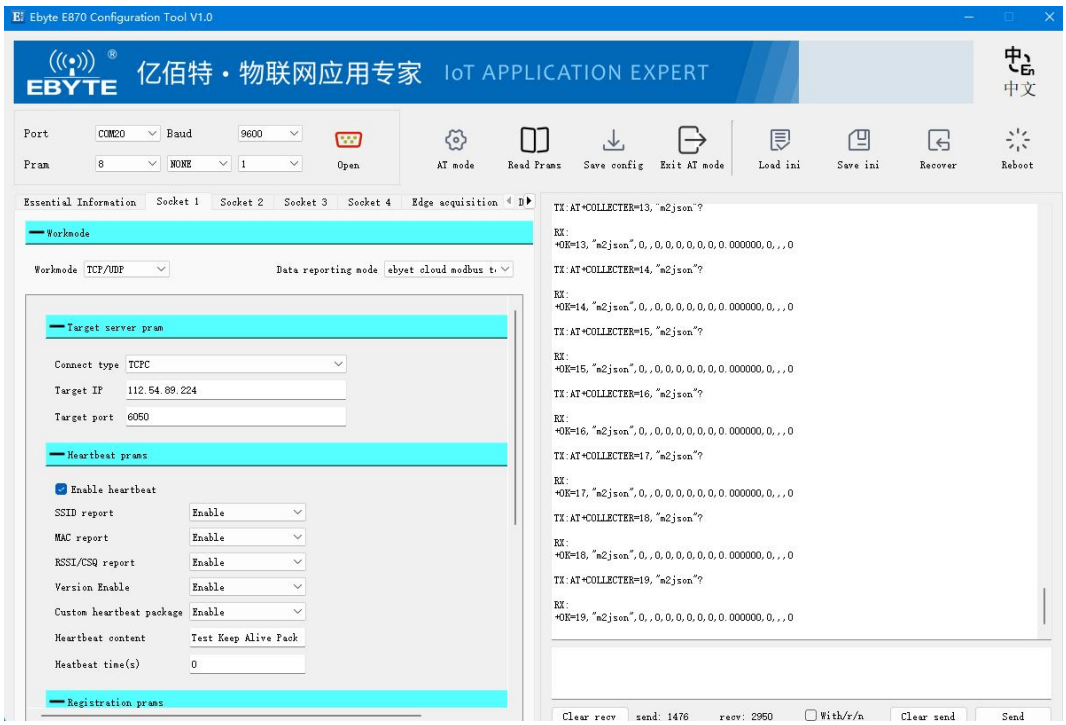
2.2.2. Connect to self-built server

Step 1: Connect the power supply of the device (DC 8-28V), turn on the upper computer of the device, fill in the name and password to connect to the WiFi, and ensure that the device can access the Internet normally;



Step 2: Use "Net Assist " to build a user server:

Step 3: Select TCP/UDP transparent transmission in channel 1 of the host computer, fill in the correct server parameters, and configure it as TCP client mode, destination address, destination port, etc., as shown in the figure below:



Step 5: After configuring the parameters, save and restart. When the STATE light is always on, the device has been connected to the server platform normally, and waits for the edge of the device to collect parameters and report.

2.2.3. AI analog input connection

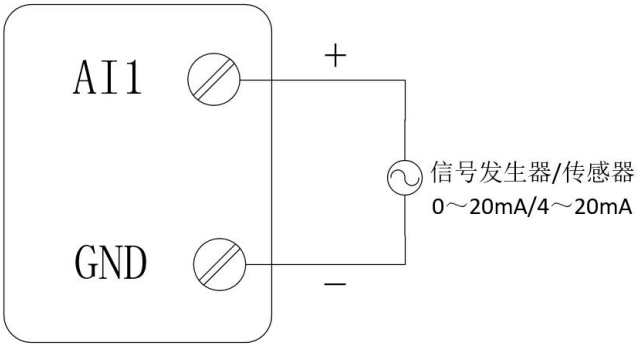
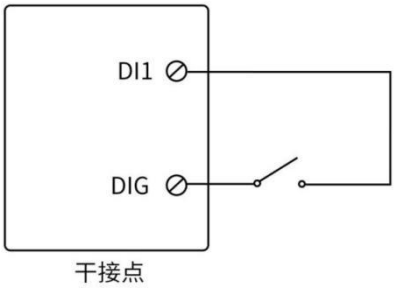


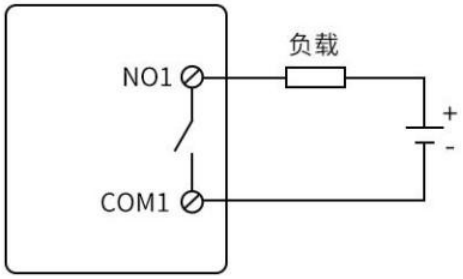
Figure 7 Schematic diagram of AI acquisition connection

2.2.4. D I digital input connection



DI acquisition connection

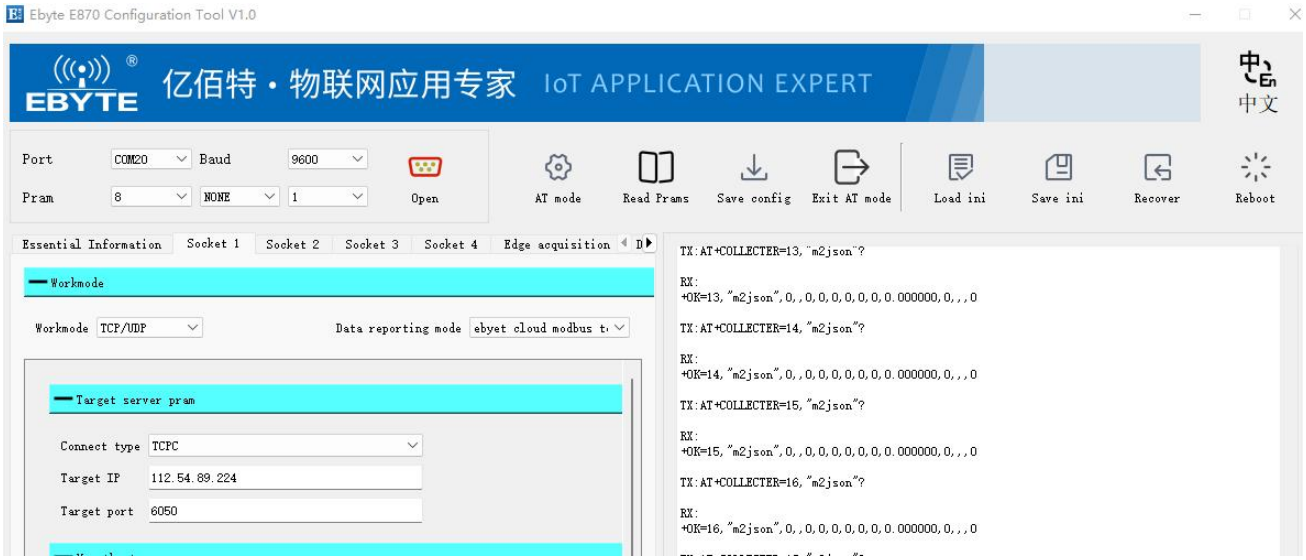
2.2.5. Relay output connection



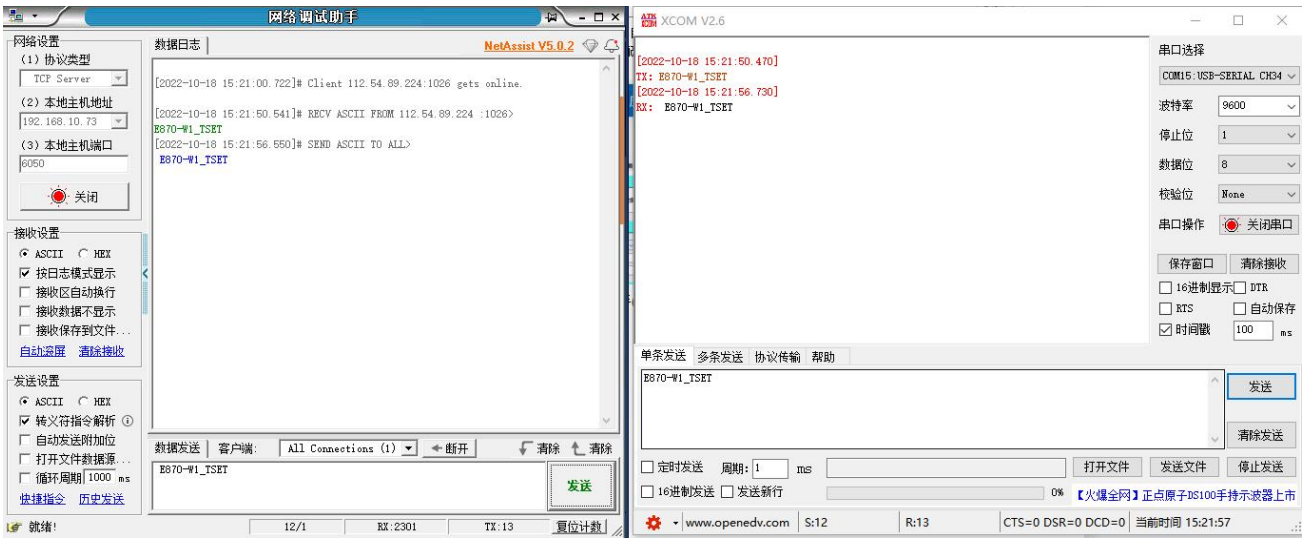
DO output connection

2.3. Transparent use

Select channel 1 to configure TCP / UDP transparent transmission, fill in the target server parameters, select TCPC mode, and target address 112.54.89.224 . (Users can configure it as their own public network IP server) , target port 6050 (if using their own IP , fill in the port of the corresponding server), 0 (long connection), other parameters remain default, click to exit configuration, enter transparent transmission mode .



Connect the RS485 interface, open the serial port assistant (XCOM) and the network debugging assistant (Net Assist), and directly send the transparent data "E 870- W 1_TSET ", which can be used as a serial port server:

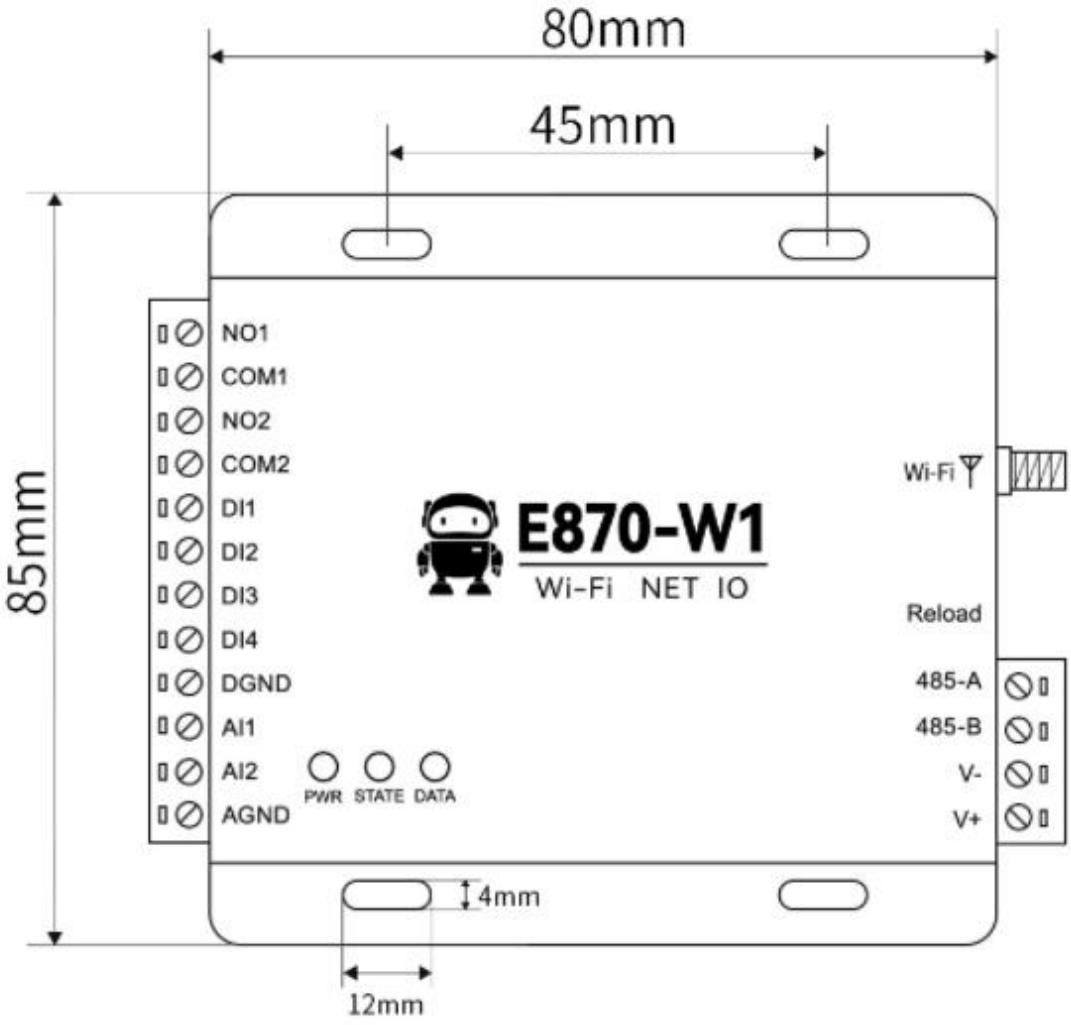


3. Technical Parameters

3.1. Specifications

category	name	parameter
power supply	Operating Voltage	D C8 ~ 2 8V
	Power indicator	Red LED indication
serial port	Communication Interface	RS485
	baud rate	9600bps (customizable)
	Protocol	"Ebyte Cloud Device Communication Protocol", which can be transparently transmitted
DI input	Number of DI channels	4 way
	input type	default stem node
	Acquisition frequency	1 kHz
AI input	Number of AI channels	2 way
	Acquisition Features	single-ended input
	input type	4-20mA _ _ _
	AI Resolution _	5%
	Acquisition frequency	1 0 Hz
DO output	Number of DO channels	2 way
	DO output type	Form A relay
	DO output mode	level output
	Relay contact capacity	DC : 30V /7A , AC : 2 50V / 7A
other	product weight	140±5g
	Working temperature and humidity	-40 ~ +85℃, 5% ~ 95%RH (no condensation)
	installation method	rail installation

3.2. Mechanical Dimensions



3.3. Interface description

Port Diagram

serial number	logo	illustrate
1	V-	Negative pole of power input terminal , DC 8 V~ 28 V, 3.81 mm Phoenix terminal
2	V+	pole of power input terminal, DC 8 V~ 28 V, 3.81 mm Phoenix terminal
3	485-B	RS485 interface B is connected to interface B of external equipment, 3.81 mm Phoenix terminal
4	485-A	RS485 interface A is connected to interface A of external equipment, 3.81 mm Phoenix terminal
5	Reload	Restore factory settings button
6	WiFi	WiFi antenna interface
7	NO1	Relay 1 normally open pin, used with relay 1 common terminal, 3 .81 mm Phoenix terminal
8	COM1	Relay 1 common terminal, used with relay 1 normally open pin, 3 .81 mm Phoenix terminal
9	N O2	Relay 2 normally open pin, used with relay 2 common terminal, 3.81 mm Phoenix terminal
10	COM2	Relay 2 common terminal, used with relay 2 normally

		open pin, 3 .81 mm Phoenix terminal
11	DI1	Digital input channel 1 , 3.81 mm Phoenix terminal
12	DI2	Digital input channel 2 , 3.81 mm Phoenix terminal
13	DI 3	Digital input channel 3, 3.81 mm Phoenix terminal
14	DI 4	Digital input channel 4, 3.81 mm Phoenix terminal
15	D GND	Digital input ground, 3.81 mm Phoenix terminal
16	AI1	Analog input channel 1 , 3.81 mm Phoenix terminal
17	AI2	Analog input channel 2 , 3.81 mm Phoenix terminal
18	A GND	Analog input ground, 3.81 mm Phoenix terminal

instruction sheet

3.4. Description of LED indicators

Label	color	illustrate
PWR	red	Power indicator light, always on after the device is powered on
STA	green	Off, searching for SIM card
		Slow flashing (1000ms off, 200ms on), the correct SIM card is found, and the network is being attached
		Fast flashing (200ms off, 200ms on), attached to the network, connecting to the server
		Steady on, connected to the server
DATA	yellow	Blinking: The server communicates with serial port data

3.5. Serial port description

The serial port supports the following parameter configurations:

project	parameter
baud rate	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800
data bit	7, 8bit
Check Digit	NONE, ODD, EVEN
stop bit	1, 2

4. Product function introduction

4.1. DO output

Two-way A-type relay output is adopted, and the normally open contact and the common point are respectively led out by 3.81 mm Phoenix terminals, which can shut off the maximum AC 250V / 7A and DC 30V / 7A .
The active reporting of DO acquisition signals can be turned on or off, and the active reporting function of DO supports the configuration change reporting, periodic update, change reporting + periodic realization of the active reporting function of the device;
Periodic reporting: report the current status according to the configured time period, the time interval can be 1-65535 , unit: minute;
Change report: that is, the DO status is reported once when the DO status changes, and the range needs to be configured as a non-zero value.

4.1.1. Level output

Two-way A-type relay output is adopted, and the normally open contact and the common point are respectively led out by 3.81 mm Phoenix terminals, which can shut off the maximum AC 250V / 7A and DC 30V / 7A .
The active reporting of DO acquisition signals can be turned on or off, and the active reporting function of DO supports the configuration change reporting, periodic update, change reporting + periodic realization of the active reporting function of the device;
Periodic reporting: report the current status according to the configured time period, the time interval can be 1-65535 , unit: minute;
Change report: that is, the DO status is reported once when the DO status changes, and the range needs to be configured as a non-zero value.

4.1.2. Following mode

according to the following source configured by the user (D I1 , DI2 , DI3 , D I4 , AI1, AI2, DO1, DO2), and multiple outputs can follow the same follow-up source output. Simply put, it is to detect the state change of the follow-up source , automatically output the relay with it as the following source. When the follow mode is turned on, the follow source should be configured at the same time to use this linkage function.
Note: This function only supports local IO linkage

4.1.3. Active reporting of status

The active reporting of DO acquisition signals can be turned on or off. The condition for realizing the active reporting function of DO is to configure change reporting, periodic reporting, or change reporting + periodic reporting to realize this active reporting function. Periodic reporting is reported according to the timing, and the time interval It can be 0-65535, unit: minute; the change is reported as the DO state changes, that is, the DO state is reported once.

4.2. DI input

Support 4 -way dry contact acquisition, can turn on or off the active reporting of switch input DI acquisition signals, the realization conditions of DI active reporting function support configuration change reporting, periodic update, change reporting + periodic realization of the device's active reporting function;

Periodic reporting: report the current status according to the configured time period, the time interval can be 1-65535 , unit: minute;

Change report: that is, when the DI status changes, the DI status is reported once, and the range needs to be configured as a non-zero value.

4.3. AI input mode

4.3.1. Analog range

Supports 2 channels of current signal acquisition , adopts high-resolution ADC , the acquisition accuracy can reach 3 ‰, the factory default configuration is 0-20 m A , supports the configuration of the acquisition range (register address is 0x 044c) and the acquisition of the current current through Modbus RTU commands Signal (floating point: register is 0x00c8 , integer: 0x0064), the maximum current cannot exceed 25mA (more than 25mA will cause the risk of equipment damage) ;

Support mode 0x 00 (0-20 mA) : directly output the collected current signal;

Mode 0x 01 (4-20 mA): The current input device below 3.5 mA is used for disconnection detection output 0mA, and the current greater than 3.5mA is directly output;

Take the device Modbus address configuration as 1 as an example (the edge acquisition function needs to be turned off to use this function, and the following instructions are all in hexadecimal) :

Read the collected current signal (integer):

Send: 0 1 04 00 64 00 02 30 14

Return: 0 1 04 04 0F A0 13 88 F5 E4 (first channel: 4 000 uA, second channel: 5 000 uA)

Read the collected current signal (floating point):

Send: 0 1 04 00 C8 00 04 30 14

Return: 0 1 04 08 40 80 00 00 40 A0 00 00 B4 17 (first circuit: 4 m A, second circuit: 5 m A)

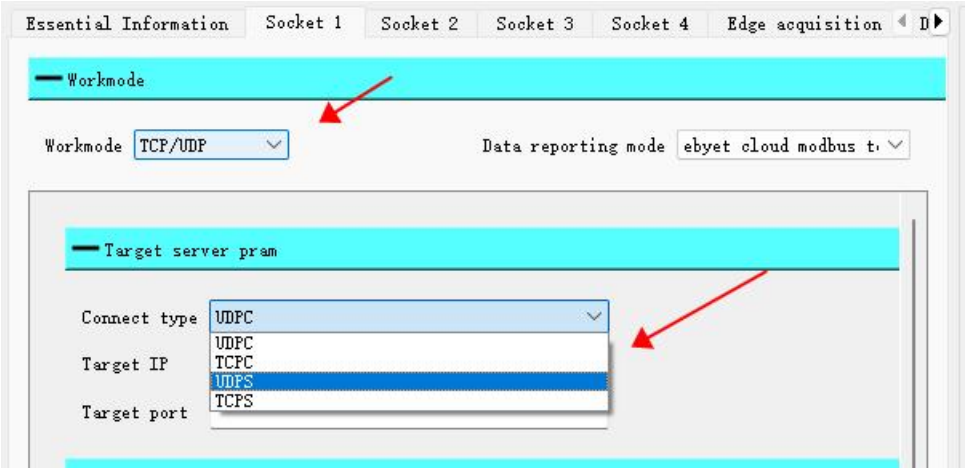
Configured as 0-20 mA acquisition mode (the first channel and the second channel are configured at the same time):
Send: 01 10 04 4C 00 02 04 00 00 00 00 C5 0A
Configured as 4-20 mA acquisition mode (the first channel and the second channel are configured at the same time):
Send: 01 10 04 4C 00 02 04 00 01 00 01 55 0A
[Note] Floating point numbers are stored in IEEE754 single-precision big-endian format (ABCD), for example, 12.5 mA uses a hexadecimal number 0x 41480000 ;

4.3.2. Active reporting of status

You can turn on or off the switch to input the active reporting of AI acquisition signals. The condition for realizing the active reporting function of AI is to configure change reporting, periodic reporting or change reporting + periodic reporting to realize this active reporting function. Periodic reporting is reported according to the timing, and the time interval It can be 0-65535, unit: minute; the change report means that the AI input value is reported once when the AI input range changes, and the range condition is 0~3.4e38 (a 4-byte float greater than 0) .

4.4. Network transparent transmission mode

This product supports TCP client (TCPC), UDP client (UDPC), TCP server (TCPS), UDP server (UDPS) transparent transmission communication.
In this mode, the user's serial device can send data to the designated server on the network through this device. The device can also accept data from the server and forward the information to the serial device, supporting four independent configurations.



Users do not need to pay attention to the data conversion process between serial port data and network data packets, and can realize data transparent communication between serial port devices and network servers only through simple parameter settings.

4.5. MQTT mode

Set the corresponding MQTT parameters, including ClientID, server address, port, user name, password, and topics for publishing and subscribing. The MQTT connection can be realized.

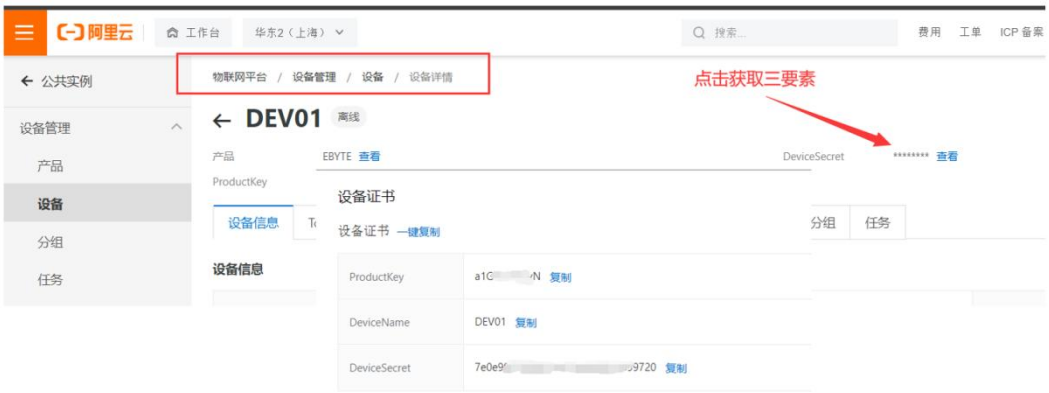
（1）、 Product key, device name, device key, device ID, product ID, authentication information, device name, client ID , user name , password , subscription, publishing can be configured with a maximum of 1 28B it data;

（2）、 The address can be configured with a maximum of 6 4B it domain names;

（3）、 Support 0, 1 message publishing level;

4.5.1. Ali Cloud

It supports the use of Alibaba Cloud's "three elements" to directly connect to the server to obtain the "three elements" required to connect to Alibaba Cloud, as shown in the figure:



Configure device connection parameters, as shown in the following figure:

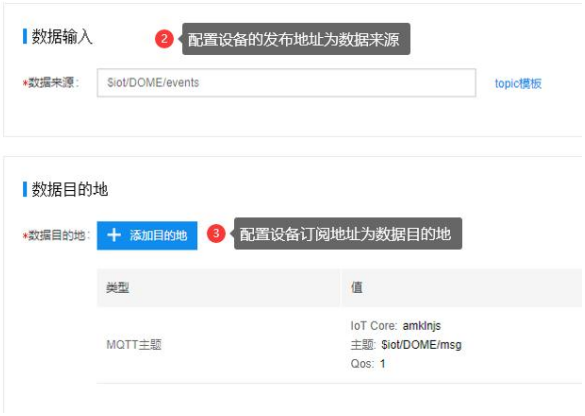
4.5.2. Baidu cloud

It supports the use of Baidu Cloud's "three elements" to directly connect to the server to obtain the "three elements" needed to connect to Baidu Cloud, as shown in the figure:

Configure device connection parameters, as shown in the following figure:

Subscription and publishing require the establishment of a rule engine to achieve data return. First, a message template needs to be established, as follows:

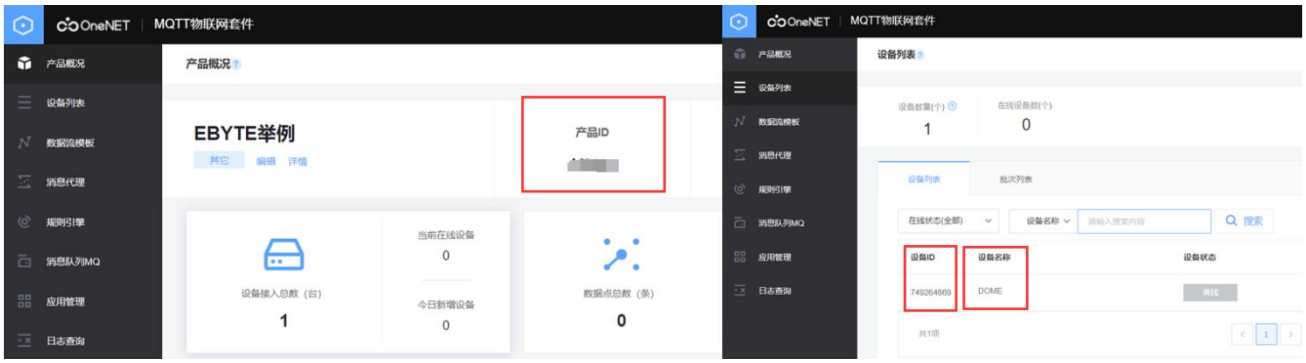
Create a rule engine for data return, as shown in the following figure:



Enable the rule engine, restart the device (re-subscribe, publish), and the communication test is as shown in the figure below:

4.5.3. One NET Cloud

supports the use of One NET "three elements" to directly connect to the server to obtain the "three elements" needed to connect to One NET , as shown in the figure:



Configure device connection parameters, as shown in the following figure:

OneNET supports automatic generation of To pic with subscription and publication attributes , and only needs to subscribe and publish the same address to realize data return. Communication test:

4.5.4. Standard MQTT3.1.1

standard M QTT3.1.1 connection here takes Tencent's standard M QTT 3.1.1 server as an example, and the "three elements" described in the standard can be obtained from the Tencent server, as shown in the figure below:

The parameter configuration description is shown in the figure below:

Configure the corresponding subscription publishing address, and use the platform to debug and send data online for communication testing:

5. Special feature

5.1. Ebyte Cloud Modbus to JSON

It supports the conversion of Modbus RTU data at the serial port into the JSON message format of the Ebyte cloud device communication protocol for data transmission and reception.

5.2. Alibaba Cloud Modbus to JSON

It supports the conversion of Modbus RTU data at the serial port into the JSON message format of the Alibaba Cloud device communication protocol for data transmission and reception.

5.3. Edge acquisition

Support 20 external data point collection, you can establish data points through the host computer or Ebyte cloud device communication protocol, the server can send JSON messages to read or set data points through the Ebyte cloud communication protocol or Alibaba cloud protocol, and then The device automatically converts JSON commands into Modbus commands to set or read, and then reports the return value in JSON format.
After setting the data points, the device will poll and read all the data points every one second (enable). If the external data points are set to report changes, once the data points are read, they will actively report the status of the data points. or value.

5.4. Registration package

In the network transparent transmission mode (T CPC/UDPC), the user can choose to let the device send a registration packet to the server. The registration package is to enable the server to identify the data source, or as a password to obtain server function authorization. The registration packet can be sent when the device establishes a connection with the server, or the registration packet data can be spliced at the front end of each data packet as the header of a data packet. The data of the registration package can be ICCID code, IMEI code, CSQ value, FW version information or custom registration data (support ASCII configuration custom registration package, ASCII can be configured up to 6 4B it).

5.5. Heartbeat packet

In the network transparent transmission mode (T CPC/UDPC), the user can select the module to send the heartbeat packet. The main purpose of sending to the network is to keep active with the server, so that devices that are idle (do not send data to the server for a long time) maintain a connection with the server. The data of the heartbeat packet can be ICCID code, IMEI code, CSQ value, FW version information or custom registration data (support

ASCII configuration custom registration packet, ASCII can be configured up to 6 4B it).

5.6. Firmware upgrade

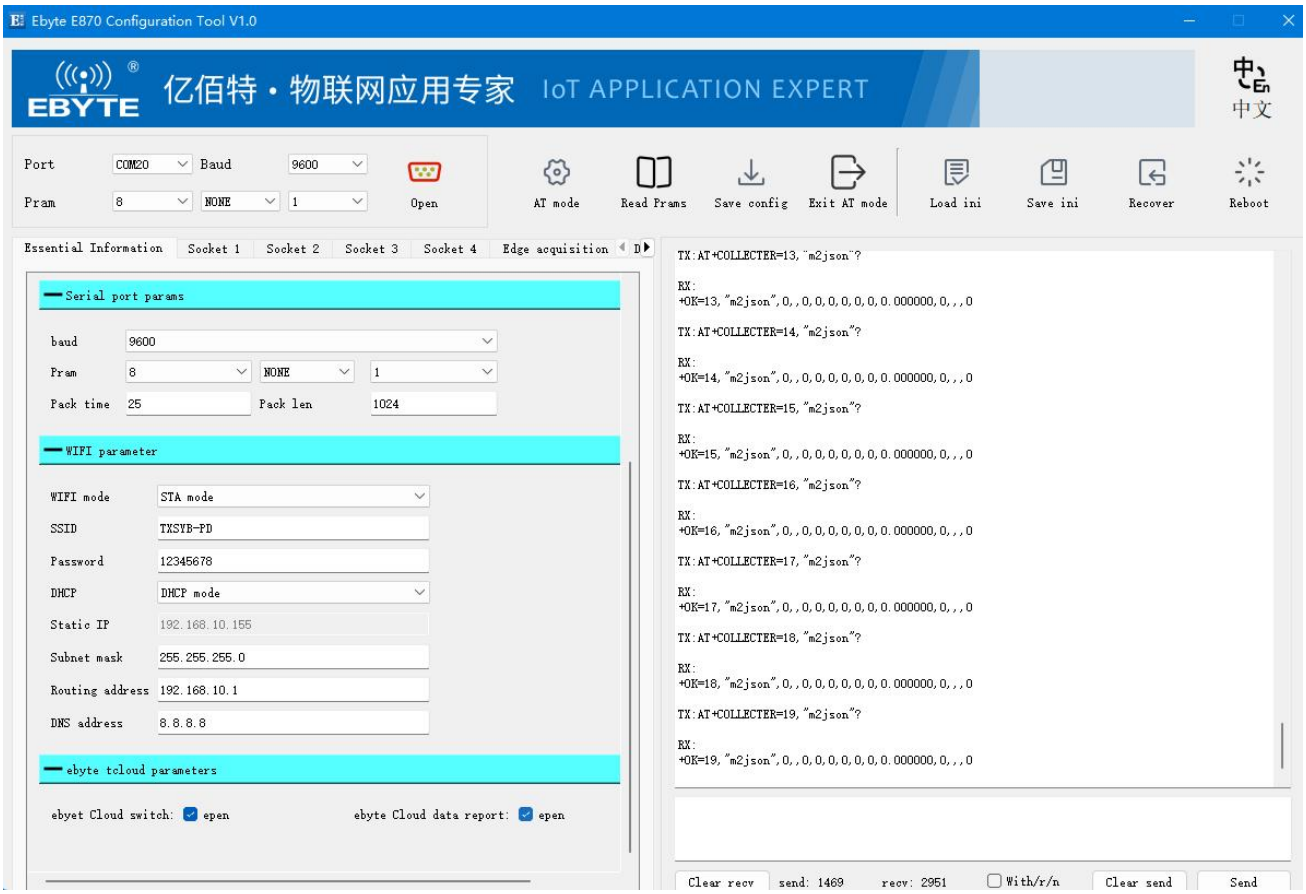
The firmware upgrade is realized through the serial port upgrade method, and the device can be upgraded through the Ebyte serial port upgrade tool

5.7. Hardware factory reset

Restore the factory default parameters. After power on, press the Re load button for 5~10 seconds until all the LEDs light up (LINKA&LNNKB only flashes, and the rest of the LEDs are always on until the button is released), and then release the device to restore the device parameters to Factory default parameters, the device will automatically restart, short press the device to perform the restart operation.

6. Configuration method

6.1. Host computer configuration



6.2. Management platform configuration

Refer to "Cloud Platform Management Functions".

6.3. AT configuration command and network command configuration

Support serial AT command;
Support "Ebyte Cloud Device Communication Protocol" command configuration
For details, see the relevant downloads on the official website

7. About customization

◆Support various public clouds and private cloud platforms to customize IoT gateway access;

◆Support the customization of various transmission protocols such as Json, Modbus, and private protocols;

◆Support MQTT, TCP, UDP, HTTP and various transmission protocol equipment customization;

◆Ethernet, WiFi, 4G , 433M and other gateways ;

◆Switch value, analog value and all kinds of sensors are connected to the cloud platform for customization;

◆LoRa, Zigbee, BLE Mesh, WiFi and other local area networks are connected to the cloud platform;

◆Support customized explosion-proof, high-temperature, high-power industrial-grade communication equipment;

◆The company has its own patch SMT production line, which supports batch customization of product appearance and model identification .

8. Revision History

Version	revision date	Revision Notes	v'vd
1.0	2022-10-18	initial version	LM

Contact us

Technical support: support@cdebyte.com
Documents and RF Setting download link: https://www.cdebyte.com
Thank you for using Ebyte products! Please contact us with any questions or suggestions: info@cdebyte.com
---
Fax: 028-64146160 Web:https://www.cdebyte.com
Address: B5 Mould Industrial Park, 199# Xiqu Ave, High tech Zone, Chengdu, Sichuan, China

Chengdu Ebyte Electronic Technology Co.,Ltd.