EBYTE

E870-E0
Edge Collection Cloud Gateway

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Contents

I. Overview

1.1 Product Introduction

E870-E0 is an Ethernet device developed based on the communication protocol "Ebyte Cloud Device Communication Protocol" developed by our company. It can send instructions to the device through the server to realize the communication between the device and the server. Heartbeat package and registration package settings; at the same time, the product supports multiple configuration methods and supports web platform; it also supports edge collection function, a total of 50 edge collection data points; adopts industrial-grade design standards to ensure high reliability of the equipment.

1.2 Functional Characteristics

- Support the open protocol of "Ebyte Cloud Device Communication Protocol"
- Support remote management of Ebyte cloud platform
- Support edge acquisition and control of 50 Modbus RTU data points
- Support multiple reporting methods such as change reporting and periodic reporting
- Support adding edge computing formulas for uplink and downlink data
- Support Alibaba Cloud object model JSON protocol reporting
- Adaptive 10/100M Ethernet interface
- Support 4-way Socket independent connection to user-defined server
- Support TCPC, UDPC, MQTT3.1.1 protocols
- Support registration package, heartbeat package
- Support Ebyte cloud platform, host computer, network and other configuration methods
- Support the upper computer to upgrade the device through the network and serial port
- Industrial design supports -40~85℃ working environment

II.Quick use

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

The following provides two methods for quick access to the server, one is to access the Ebyte cloud platform through factory settings, and the other is to access the self-built server through the configuration of the host computer.

2.1 Equipment preparation

The following table lists the materials required for this test:
One computer, one E870-E0 (hereinafter referred to as "Device"), network cable, USB to RS485 converter, and several cables;
The most important thing is to need a routing environment that can access the Internet, otherwise the Ebyte cloud control device cannot be used;

	
PC	E870-E0
	
Network cable	USB to RS485 converter

2.2 Device connection

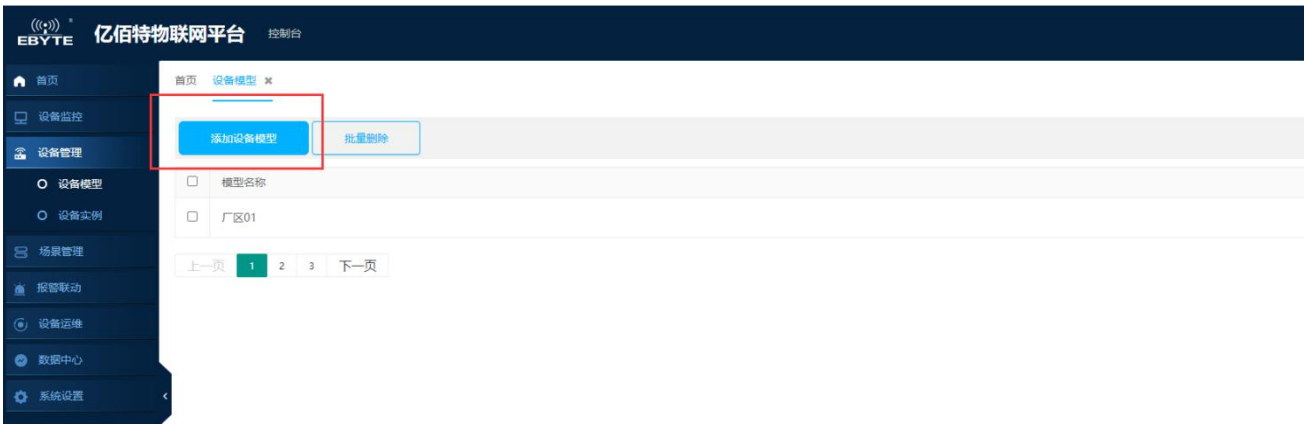
2.2.1 Connect Platform

Step 1: Connect the network cable to the device power supply (DC 8-28V) to ensure that the device can access the Internet normally;

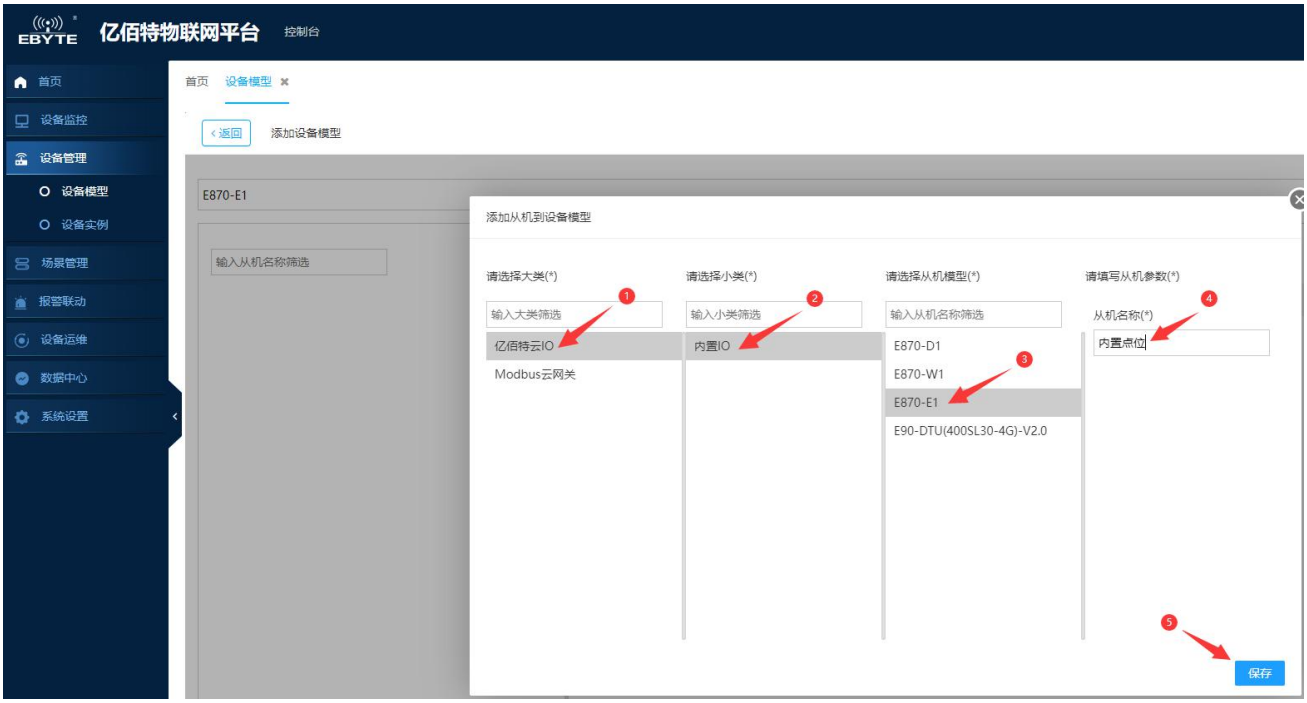
Step 2: Use a browser to log in to cloud.ebyte.com, register and log in to the ebyte cloud platform, after successfully entering the platform:

① Click on the left column box "Device Management"

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

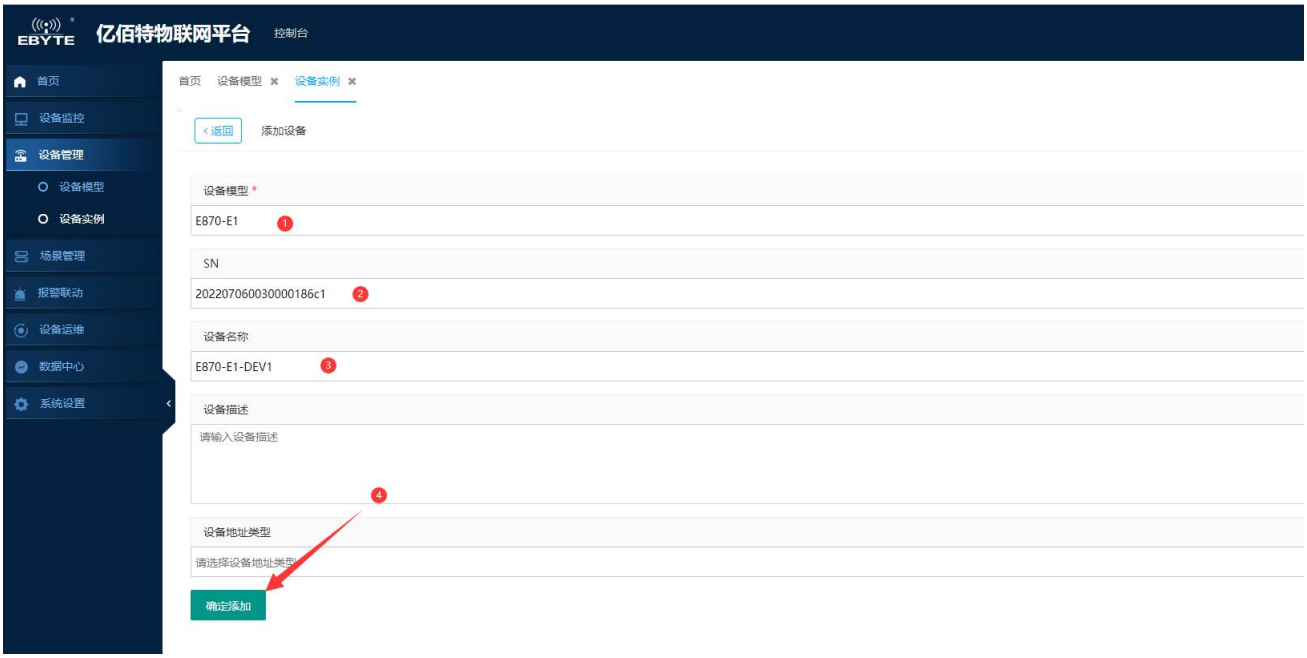


③ Enter relevant parameters, click "Add Slave", select "Ebyte Cloud IO", "Built-in IO", "E870-E0", enter the name of the slave and click "Save". Then click "Confirm to add" to create the device model.



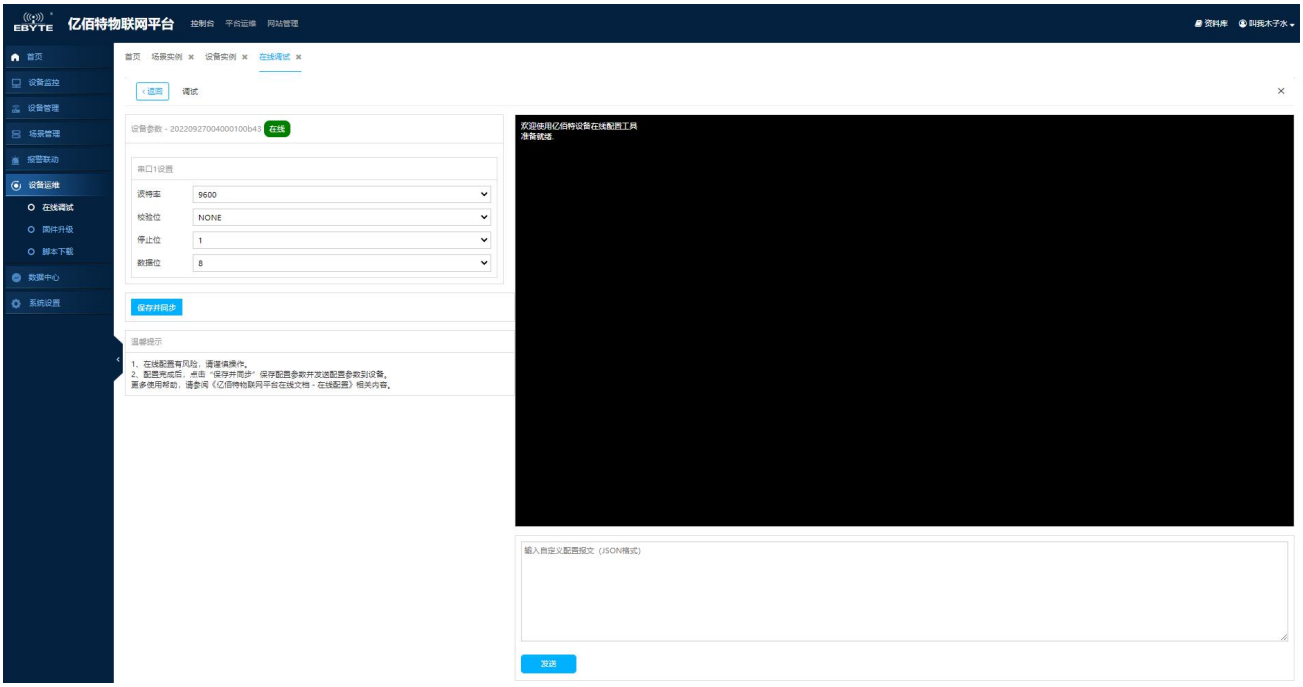
④ Click "Device Instance", enter and click "Add Device".

⑤ "Equipment model" select the previously created E870-E0 model, then enter the SN code on the back of the device, fill in other parameters according to your needs, and then click "OK to add" to create the device.



⑥ Restart the device, and when the STATE light of the device is always on, you can see that the device is online on the platform.

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

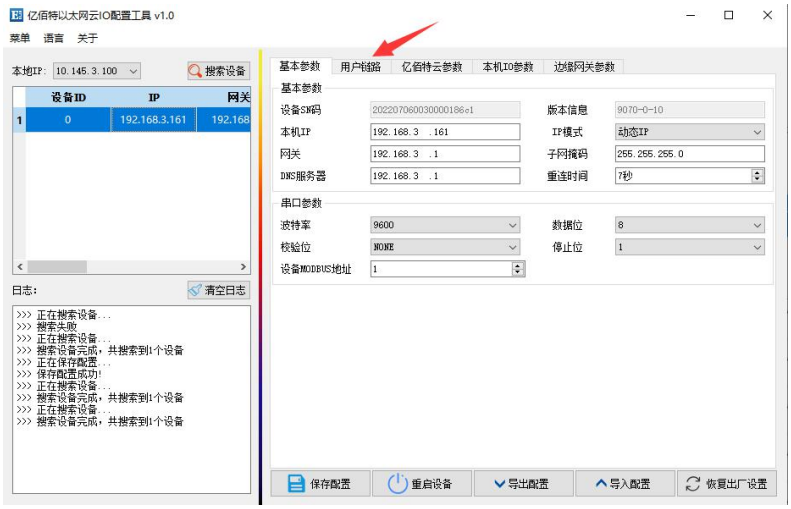


⑧ Or click "Device Instance" and click "Device Details" of the online device, you can see the information of the device data points in the device details, and you can read the data or operate the device on the interface.

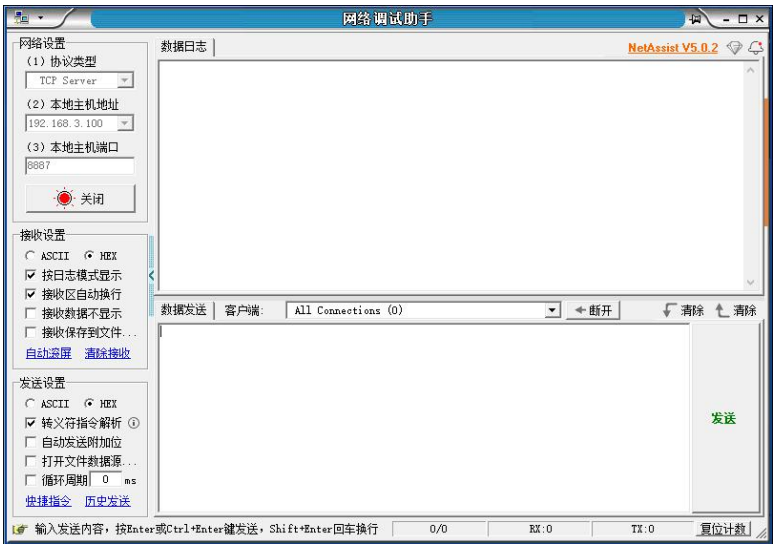
2.2.2 Connect to self-built server

Step 1: Connect the network cable and power supply (DC 8-28V), and ensure that the device and PC are in the same LAN environment;

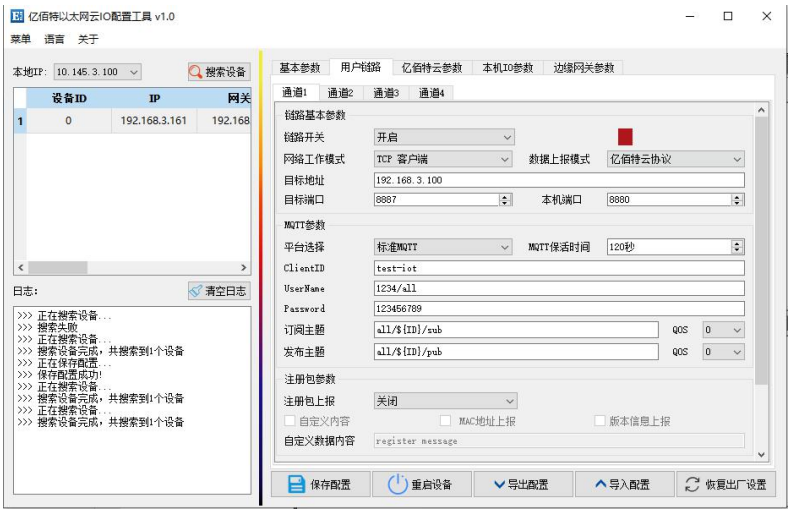
Step 2: Turn on the host computer, click "Search Device", and configure the network and serial port parameters in "Basic Parameters". The device uses dynamic IP by default. It is recommended to connect directly to the PC under the same router:



Step 3: Use "NetAssist" to build a user server:

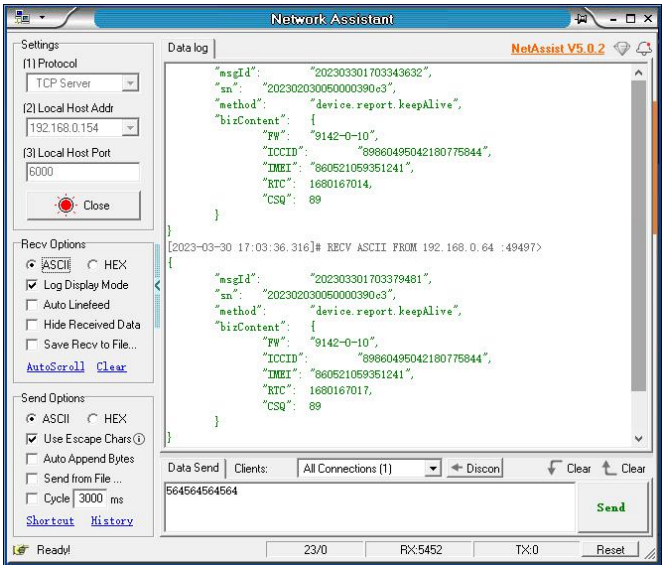


Step 4: Fill in the correct server parameters, configure as TCP client mode, target address, target port, etc., as shown in the figure below:

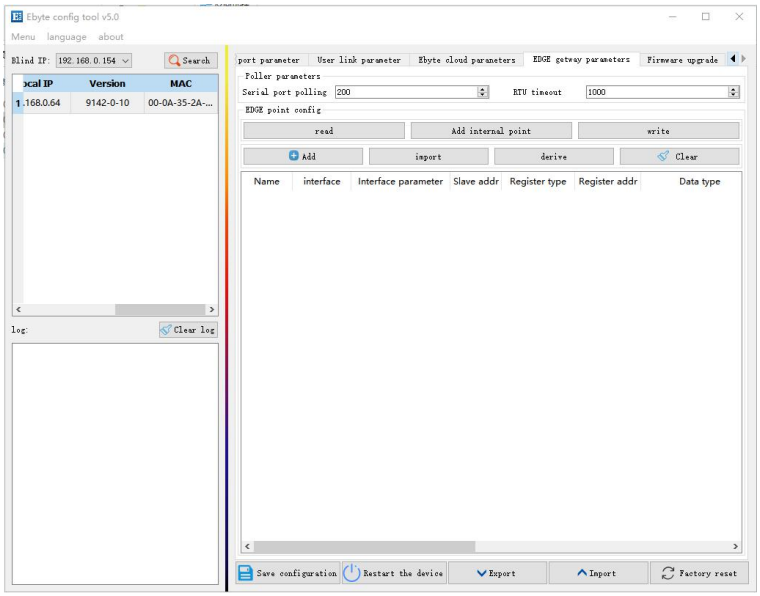


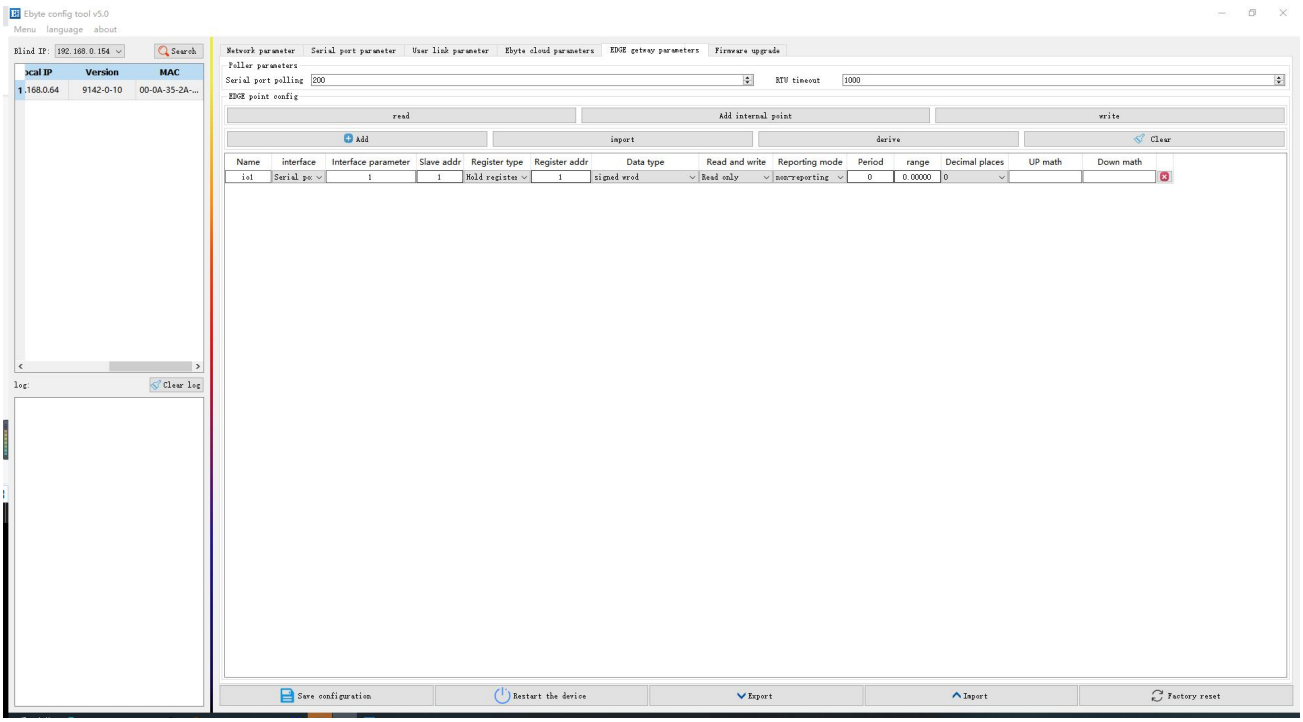
Step 5: After configuring the parameters, save and restart. When the STATE light is always on, the device has been connected to the server platform normally, and wait for the device to report the parameters of the device registration

package and heartbeat package.



Step 6: Connect the USB to RS485 to the RS485 port of the device, A1 to A, B1 to B; enter the edge collection gateway configuration interface through the configuration software, click "Add" by default, add the data points that need to be collected by the edge, refer to the following:

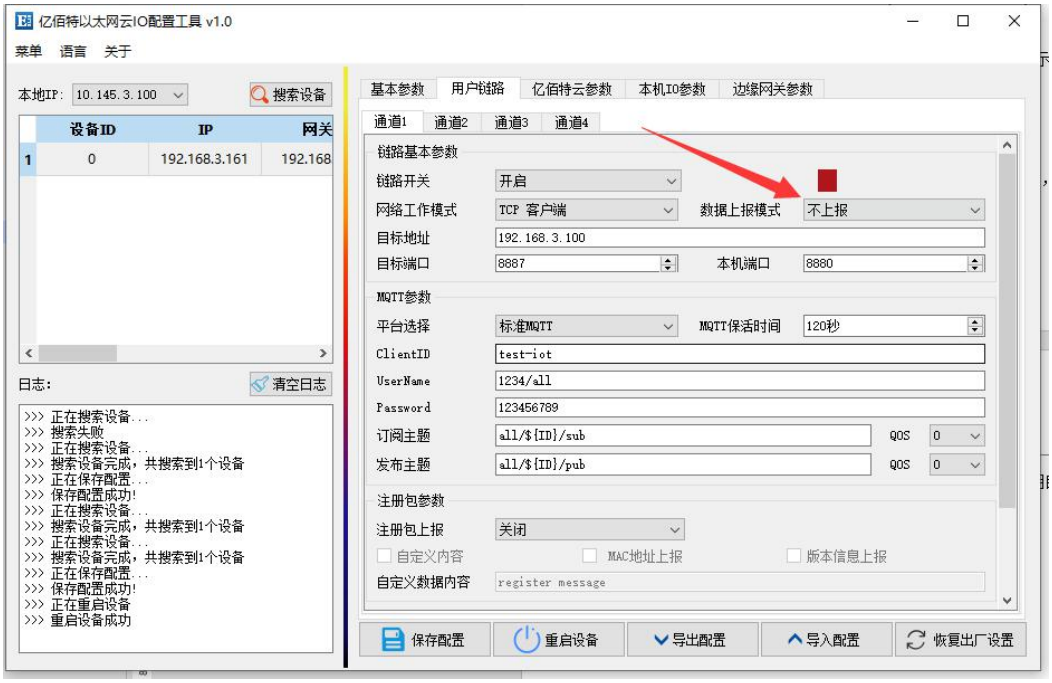




Then restart the device to poll the edge data points.

2.3 Use of transparent transmission

Select channel 1 to configure TCP/UDP transparent transmission, fill in the target server parameters, select TCPC mode, target address 192.168.3.100:8887 (users can configure their own IP server), target port 8887 (if using their own IP, fill in the Server port), other parameters keep the default, click to exit the configuration and enter the transparent transmission mode.



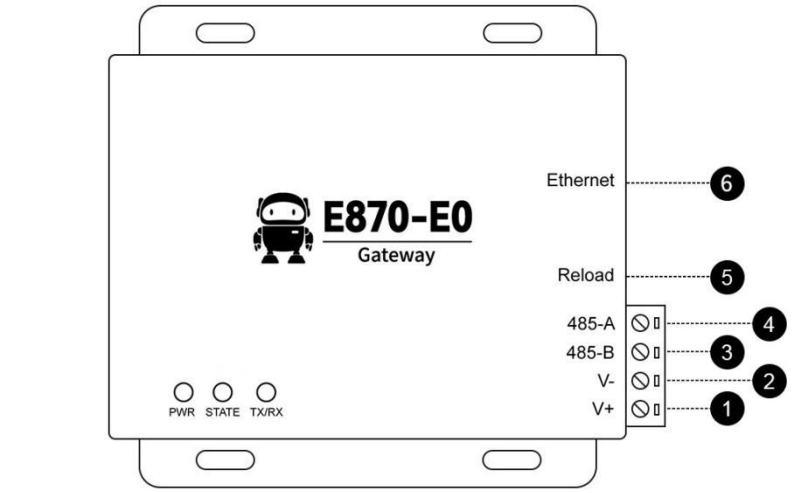
Connect the RS485 interface, open the serial port assistant (XCOM) and the network debugging assistant (NetAssist), and directly send the transparent data "E870-E0_TSET", which can be used as a serial port server:

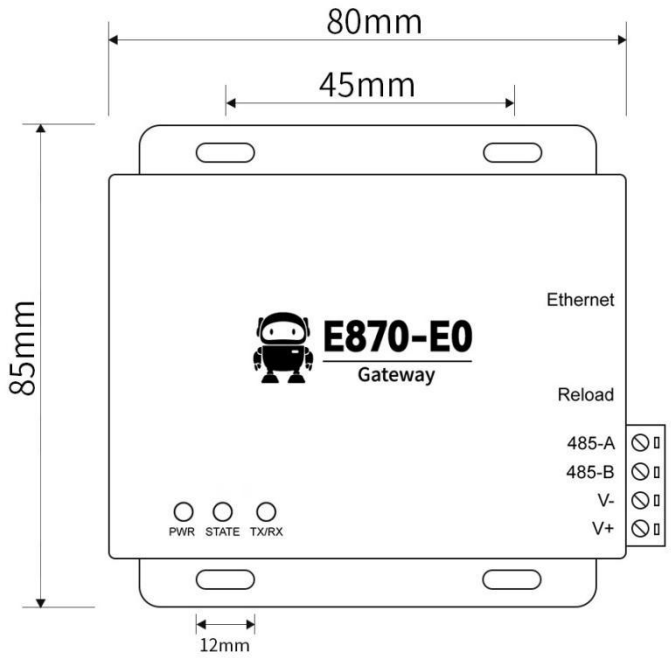
III. Technical Specification

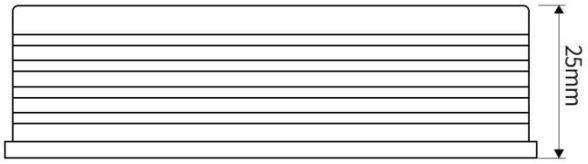
3.1 Specifications

Category	Name	Parameter
Power supply	Operating Voltage	DC 8～28V
	Power indicator	Red LED indication
Network port	RJ45	10/100 adaptive RJ45 Ethernet interface
Serial port	Communication Interface	RS-485
	Baud rate	9600bps (default)
	Protocol	"Ebyte Cloud Device Communication Protocol", which can be transparently transmitted
Other	Product weight	135±5g
	Working temperature and humidity	-40 ～ +85℃、5% ～ 95%RH（no condensation）
	Installation method	Positioning hole installation

3.2 Mechanical dimension drawing







3.3 Port description

See the dimension drawing mark in the above section

Serial number	Label	Illustrate
1	V+	Positive pole of power input terminal，DC 8V~28V
2	V-	Negative pole of power input terminal，DC 8V~28V
3	485-B	RS485 interface B is connected to interface B of external equipment
4	485-A	RS485 interface A is connected to interface A of external equipment
5	Reload	Restore factory settings button
6	Ethernet	RJ45 Ethernet interface

3.4 LED Indicator Description

Label	Color	Description
PWR	Red	Power indicator
STATE	Green	Flashing slowly, connecting to the server...
		Fast flashing, waiting for network cable or waiting for dynamic IP acquisition
		Always on, connected to the server
DATA	Yellow	Blinking: The server communicates with serial port data

【Note】

LED status during firmware upgrade:

Waiting for the upgrade (host computer, serial port), STATE and TX/RX flash alternately, if the upgrade package is not sent within 3s, exit the upgrade waiting;

Updating, STATE and TX/RX flash alternately and slowly;

3.5 Serial Port Description

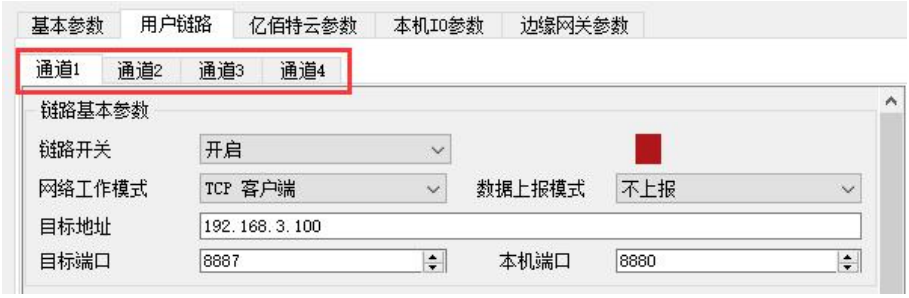
The serial port supports the following parameter configurations:

Project	Parameter
Baud rate	1200，2400，4800，9600，19200，38400，57600，115200，230400
Data bit	8
Check Digit	NONE、ODD、EVEN
Stop bit	1、2

IV. Product Function Introduction

4.1 Network transparent transmission mode

This product supports TCP client (TCPC), UDP client (UDPC) 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.



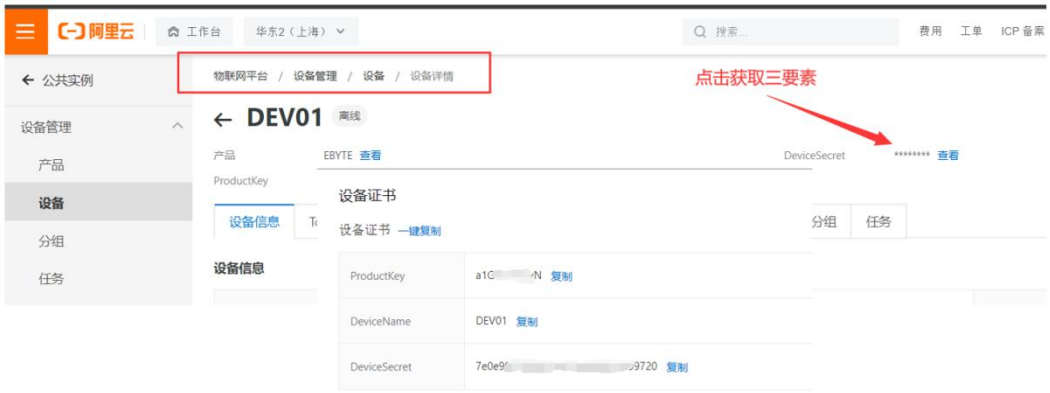
Users do not need to pay attention to the data conversion process between serial port data and network data packets. The device only needs to set simple parameters to realize data transparent communication between the serial port device and the network server.

4.2 MQTT mode

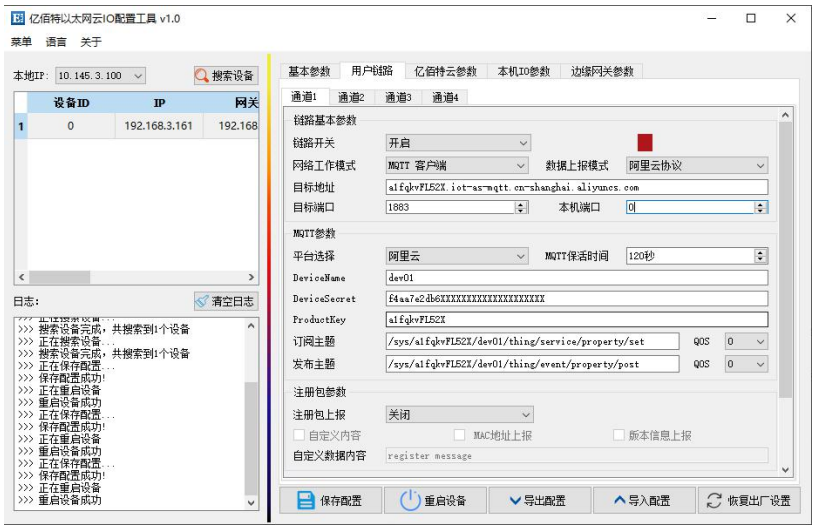
Set the corresponding MQTT parameters, including ClientID, server address, port, user name, password, and published and subscribed topics, etc. The MQTT connection can be realized.
(1), product key, device name, device key, device ID, product ID, authentication information, device name, Client ID, user name, password, subscription, release can be configured up to 128Bit, Alibaba Cloud product key is 64Bit;
(2) The maximum address can be configured with a 128Bit domain name;
(3), support 0, 1 message publishing level;

4.2.1. Alibaba Cloud

Supports direct connection to the server using the "three elements" of Alibaba Cloud. Obtain the "three elements" required to connect to Alibaba Cloud, as shown in the figure:



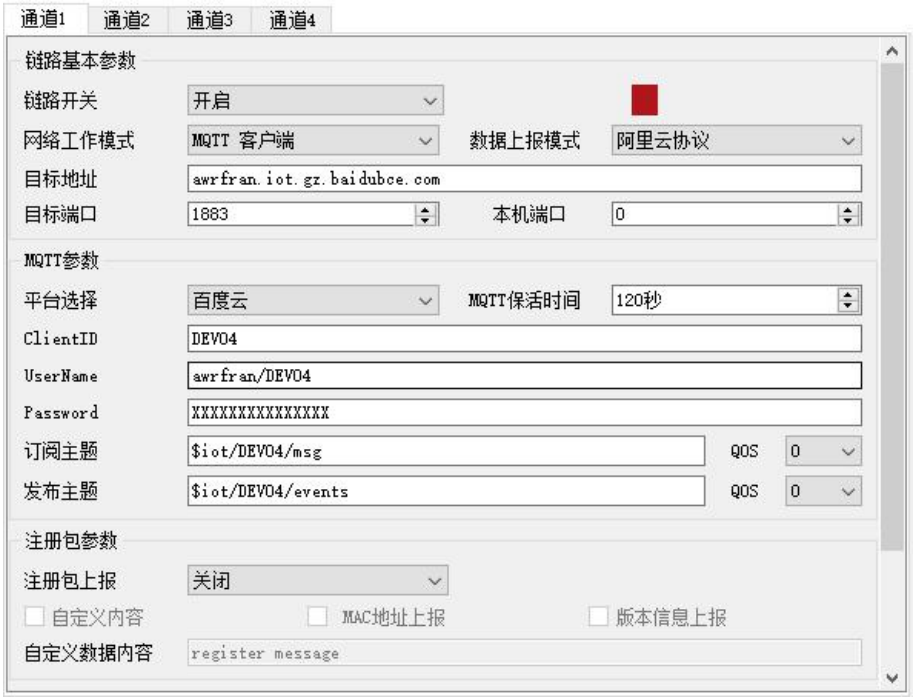
Configure device connection parameters, as shown in the following figure:



4.2.2. Baidu Cloud

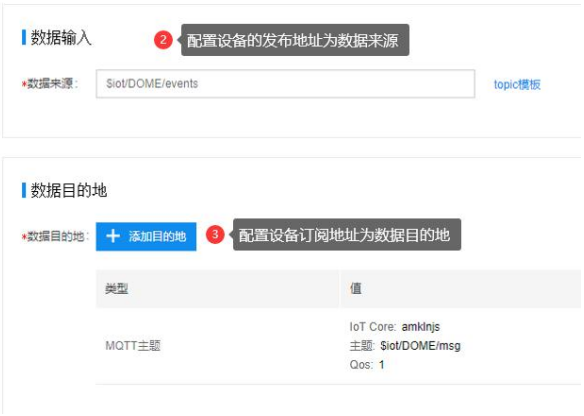
Supports direct connection to the server using the "three elements" of Baidu Cloud. Obtain the "three elements" required to connect to Baidu Cloud, as shown in the figure:

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:

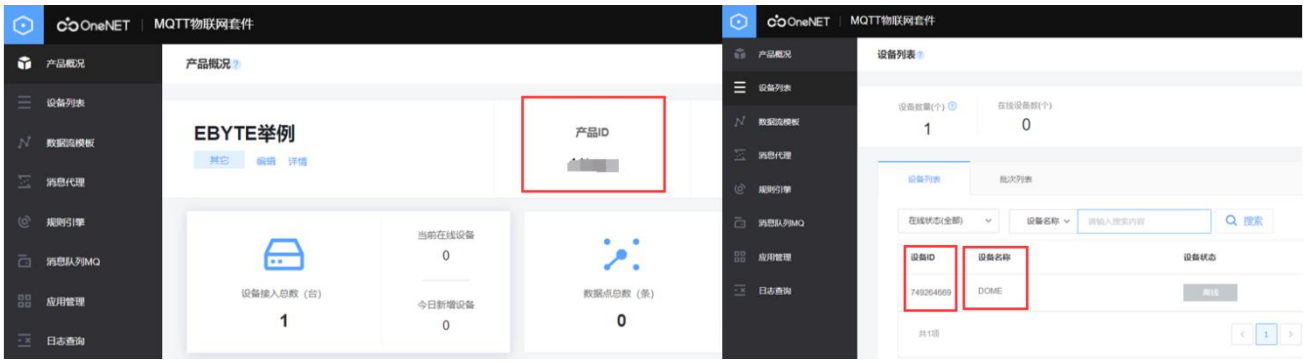
Create a rule engine for data return, as shown in the following figure:



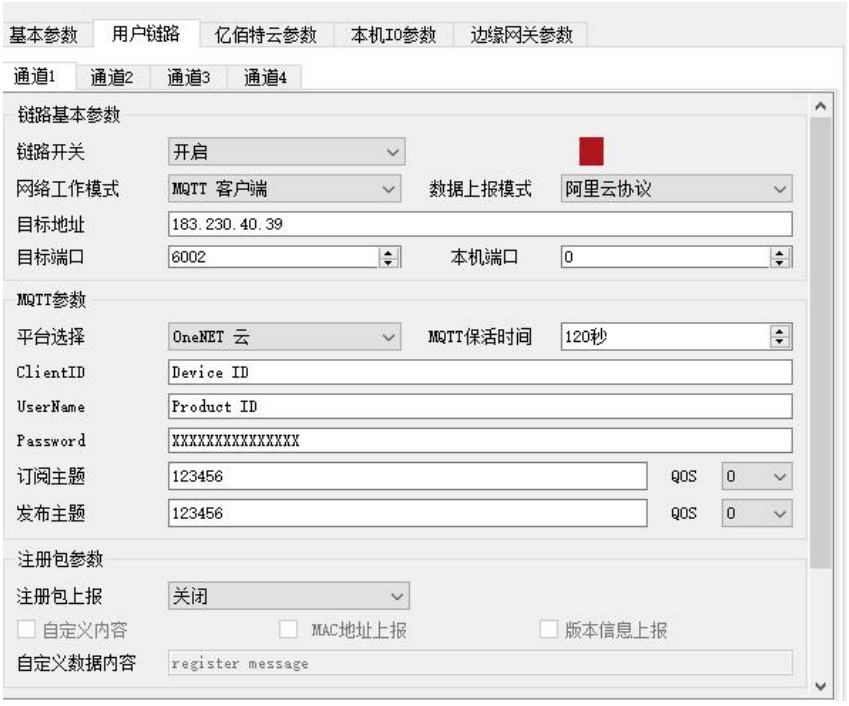
Enable the rule engine, restart the device (re-subscribe, publish), and the communication test is as shown in the figure below:

4.2.3. OneNET

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



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

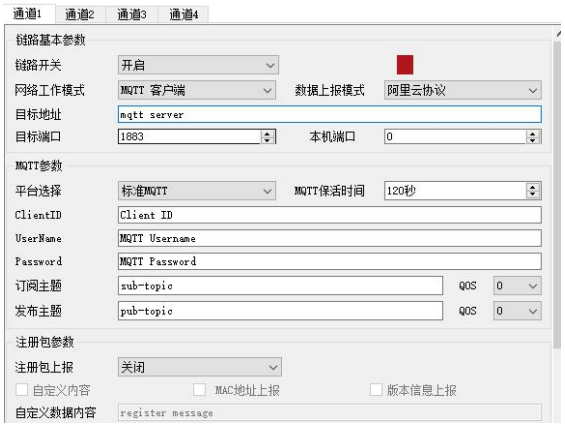


OneNET supports automatic generation of Topics with subscription and publication attributes. You only need to subscribe and publish the same address to realize data return. Communication test:

4.2.4. Standard MQTT3.1.1

The standard MQTT3.1.1 connection here takes Tencent's standard MQTT3.1.1 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:


设备信息
权限列表
在线调试
设备影子
设备模拟器
建议仅在开发调试阶段使用此功能，若设备已正式投入使用，下发消息时请评估是否会影响您的正常业务
下发消息
在线状态 在线
Topic * ELD0ERCUKD/DEV01/SUB
topic不能为空
QoS * 0 1
消息内容 * EBYTE-USERMQTT-TEST
消息内容不能为空，长度不大于16KB
实时日志
类型 时间 内容
云端下发消息 2021-09-13 13:56:52 EBYTE-USERMQTT-TEST
XCOM V2.6
[2021-09-13 13:56:52.206]
RX: EBYTE-USERMQTT-TEST
收到服务器下发数据

V.Features

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 50 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 Registry package

In the network transparent transmission mode (TCPC/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 MAC, FW version information or custom registration data (supports ASCII configuration of custom registration package, ASCII can be configured up to 128Bit).

5.5 Heartbeat package

In the network transparent transmission mode (TCPC/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

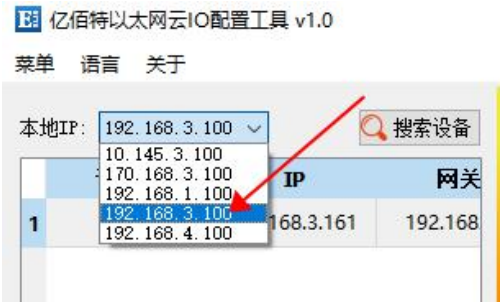
packet can be MAC, FW version information or custom registration data (supports ASCII to configure custom registration packets, ASCII can be configured up to 128Bit).

5.6 Firmware Upgrade

The firmware upgrade is to write the firmware through the host computer, and support the upgrade through the use of serial port and network;

5.6.1. Network upgrade:

Step 1: Select the network card connected to the device;



Step 2: Open the configuration software and select "Device Upgrade Assistant" under "Menu";

Step 3: Select the product firmware provided under the corresponding product details on the official website;

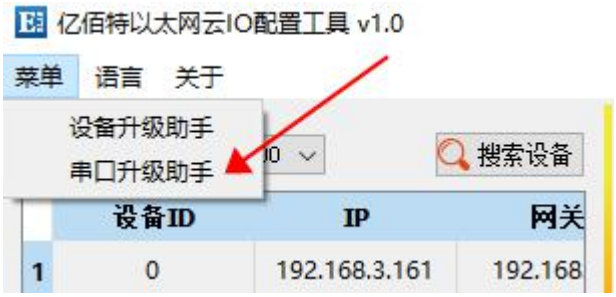
Step 4: Click Search Device, find the device and click "Stop Search";

Step 5: Select the device to be upgraded and click Upgrade;

Wait for the upgrade to complete;

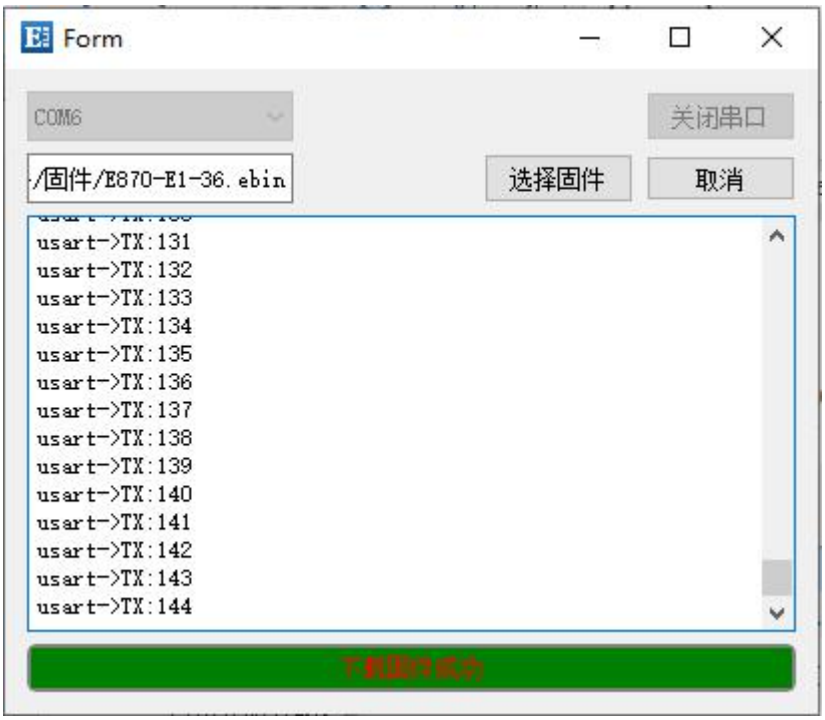
5.6.2. Serial port upgrade

Step 1: Use USB to RS-485 to connect to the serial port of the device, open the configuration software, and select "Serial Port Upgrade Assistant" under "Menu";



Step 2: Select the serial port number connected to the device, open the serial port, import the upgrade file (the product firmware provided under the corresponding product details on the official website), and click to start the upgrade;

Step 3: Disconnect the power of the device, turn on the power while pressing the "Reload" button of the device, and wait for the upgrade of the device to complete;



5.7 Hardware restore factory settings

Restore the factory default parameters. After power on, press the Reload button for 5~10 seconds until all STATEs flash quickly, and then release the device to restore the device parameters to the factory default parameters. The device will restart automatically.

5.8 RTU slave

When the edge acquisition function is turned off, the device can be used as an RTU slave device to receive Modbus RTU commands sent by the host device (HMI\SCADA, etc.);
The Modbus address of the device in factory mode is: 1.

The function register table is as follows:

Device property related						
Register function	Register address	Register address	Number	Operate	Data Range/Remarks	Related function code
Modbus address	0X07E8	Keeping register	1	RW	Modbus address, 1~247 configurable address	R：0x03 W：0x06
Module restart	0x07EA	Keeping register	1	W	Write 0xFE55 to restart	W：0x06

Baud rate	0x0834	Keeping register	1	RW	See the baud rate code table, the default is 9600 (0x0003)	R：0x03 W：0x06、0x10
Check Digit	0x0836	Keeping register	1	RW	0x0000 No verification（default） 0x0001 odd parity 0x0002 even parity	R：0x03 W：0x06、0x10
Stop bit	0x0837	Keeping register	1	RW	0x0000 1bit（default） 0x0001 2bit	R：0x03 W：0x06、0x10

VI.Configuration Method

Support configuration software and "Ebyte Cloud Device Communication Protocol" to configure devices.

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.

Revise history

Version	Revision date	Revision Notes	Maintenance man
1.0	2022-09-27	Initial version	LC

About us

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