



Chengdu Ebyte Electronic Technology Co.,Ltd

# Wireless Modem

## User Manual



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About us.....	错误！未定义书签。

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# 1. Overview

## 1.1 Introduction to the product

The E841-DTU (EC03-485) is a cost-effective 4G DTU developed using 4GCAT1 technology. The main function is to realize the two-way transparent transmission of serial device and network server. With the RS485 interface, support for 8 to 28VDC voltage inputs. No communication distance limit, and has a wide network coverage, strong anti-jamming ability advantages. Easy integration into IoT projects.

The equipment is mounted in a rail-type manner, which is small in size and easy to install. Set up with simple AT instructions, or you can use configuration software settings to easily use this product for two-way data transparent transmission from serial to network in just a few steps.

Devices support multiple links, MQTT protocols, APN/VPN, Access to OneNet, Baidu, Alibaba Cloud, and IoT applications. Supports automatic conversion of Modbus RTUs and Modbus TCP to each other.



## 1.2 Features

- Use a 4G CAT1 solution
- Ability to meet almost all M2M application needs;
- Supports transparent data transfer
- Supports TCP,UDP network protocols
- Support heartbeat package, registration package;
- Supports network configuration parameters;
- Supports simultaneous sending and receiving of 2 Socket links;
- Supports automatic conversion of Modbus RTUs and Modbus TCP to each other;
- Support MQTT protocol, support access to oneNet platform, Baidu cloud platform, Alibaba cloud platform MQTT services;
- SUPPORT for APN/VPN;
- Support for serial upgrade;
- Support network AT instructions, through the network, remote configuration of devices;
- The use of flame retardant plastic housing, rail-type installation structure, installation is convenient and efficient;
- Power reverse protection, over-connected protection, antenna surge protection and other multiple protection functions to enhance the reliability of the station;
- Communication ports, power interfaces using isolation high protection;
- Operating temperature range: -40degrees C to 85degrees C to adapt to a variety of harsh working environments

## 1.3 Scenario

- Smart home and industrial sensors, etc.
- Security system, positioning system;
- Agricultural collection;
- Healthcare products;
- Automotive applications.

## 2. Specifications

### 2.1 Limit parameters

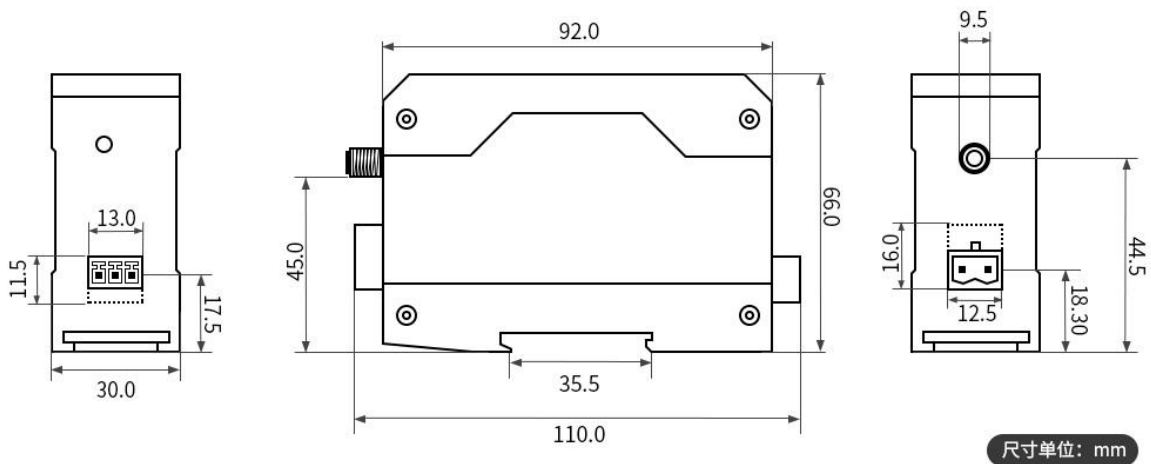
The main parameter	performance		remark
	minimum	maximum	
Supply voltage(V).	8	28	12V or 24V is recommended
Operating temperature (sc).	-40	+85	Industrial grade

### 2.2 Working parameters

The name of the argument	The value of the argument	description
The attribute parameters	Support for bands	LTE-TDD: B34/B38/B39/B40/B41 LTE-FDD: B1/B3/B5/B8
	Network protocol characteristics	Supports the TCP/UDP/MQTT protocol
Hardware features	Antenna interface	SMA-K
	The power interface	5.08 Terminals
	The communication interface	RS485

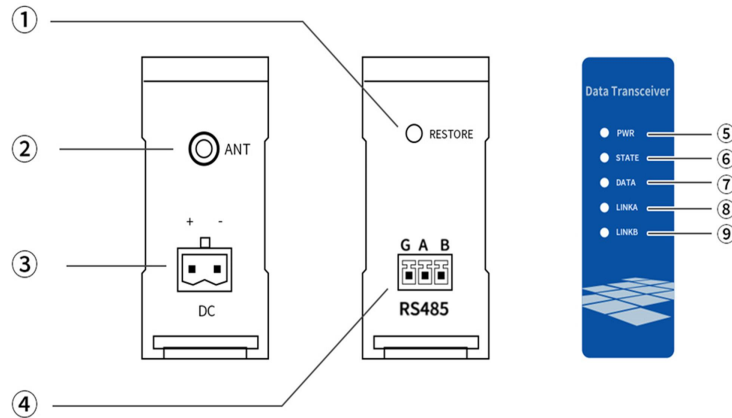
	baud rate	Supports a maximum of 921600bps and a default of 115200bps
	weight	95g tolerance $\pm 5$ g
	size	92×62×30mm
	power consumption (Related to the environment and other factors, for informational purposes only)	Standby: 35mA@12V In-network: 91mA@12V Transfer: 142mA@12V

### 3. Mechanical dimensions and pin definitions



Pin number	The pin name	Pin use
1	485_A	The A side of the other RS485 devices that are external
2	485_B	The B side of the other RS485 devices that are external
3	GND	earthing
4	PWR	Power LED

5	DC	Power adapter interface, power supply range 8to28VD C;
6	Restore	The station restores factory settings When the Restore dial continues down 3to10S, dial up to restore the radio parameters to the factory settings
7	YES	Sim card slot
8	ON	Antenna interface(SMA-K outer thread inner hole,50o characteristic impedance).



serial number	name	function	illustrate
1	Restore	The factory reset button	Press and hold 8S to restore the factory settings
2	ON	RF interface	SMA-K,outer thread inner hole, feature impedance of 50Ω
3	DC	The power interface	DC 8-28V power input port,5.08mm wired port
4	RS485	The communication port	A to the A side of the RS485 device, B to the B side of the RS485 device, andG ND to the external device
5	PWR	Power LED	Lit when the power is on
6	STATE	The in-network status indicator	Flashing: Power to the search network on the device Solid: The device is successfully attached to the network
7	DATA	Data transceiver indicator	Send/receive data flashing
8	LINE	The data link light	Solid:SocketA connects to the network server successfully Normally out:SocketA's connection to the network server was not successful
9	LINKB	The data link light	Solid:The SocketB connected to the network server successfully Normally out:The SocketB connection to the network server was not successful

## 4. Quick start and feature introduction

### Get started quickly

#### 4.1 Hardware preparation

This test requires the following devices to be prepared:



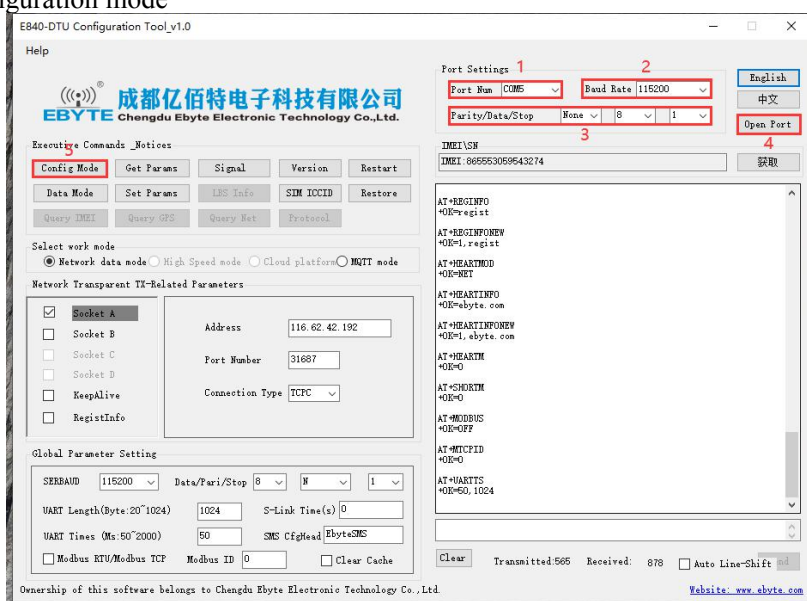
Before testing, plug in the SIM card, connect the USB to RS485 serial cord, connect the antenna, and finally power on. (At this point the PWR light goes on and the WORK light lights up after a few decades).

(The computer needs to install USB re-serial driver first, download the parameter configuration software in advance, you can go to our official website to download).

#### 4.2 Network transmission mode

Open the parameter configuration software

- 1、Select the appropriate port number
- 2、Select Baud Rate 115200(factory default).
- 3、Select Check, Data, Stop None,8,1(factory default).
- 4、Open the serial port
- 5、Click to enter configuration mode

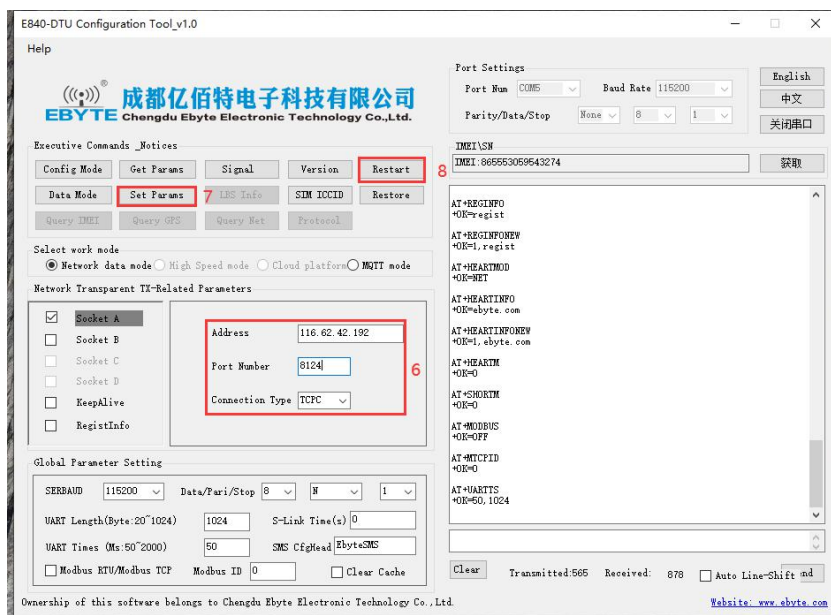


6、Modify the server address or IP, port, connection type (in this case, the E.U.S. test server, you can fill in the corresponding server information).

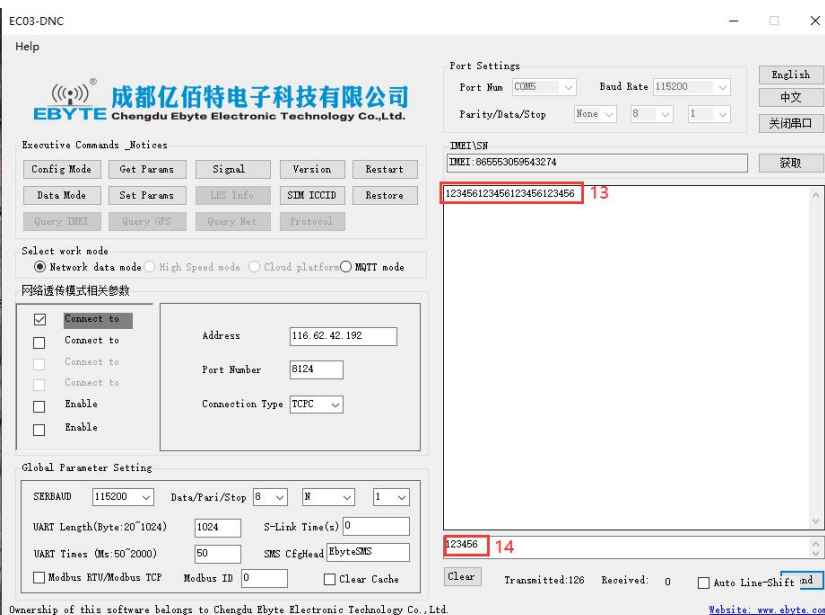
7、Click to save all parameters

8、Click on the module restart (at which point WORK, NET, etc. flashes and turns off to indicate a successful restart).





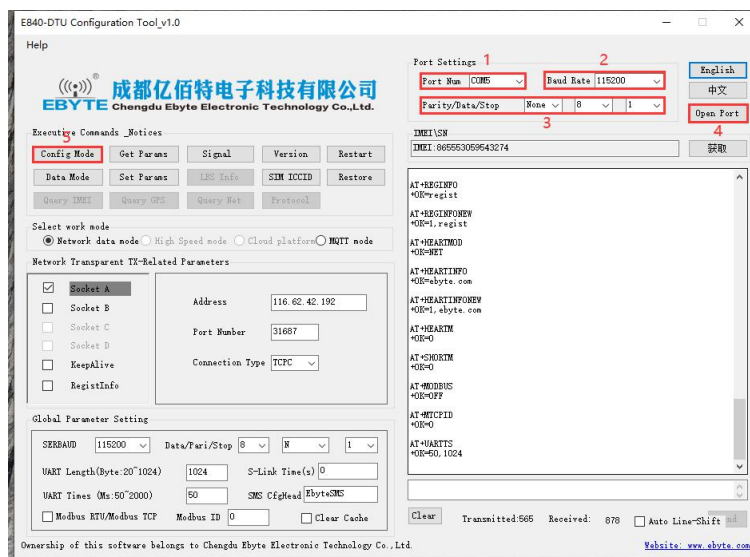
- 9、Mobile phone attention to "E-Yi Special Internet of Things application experts" WeChat public number
- 10、Click on Customer Support
- 11、Click on the device test
- 12、After popping up the interface, click Continue access (go to the Step 6 server test interface).
- 13、The phone sends data and the device receives it
- 14、Device send data, mobile phone reception, two-way testing normal



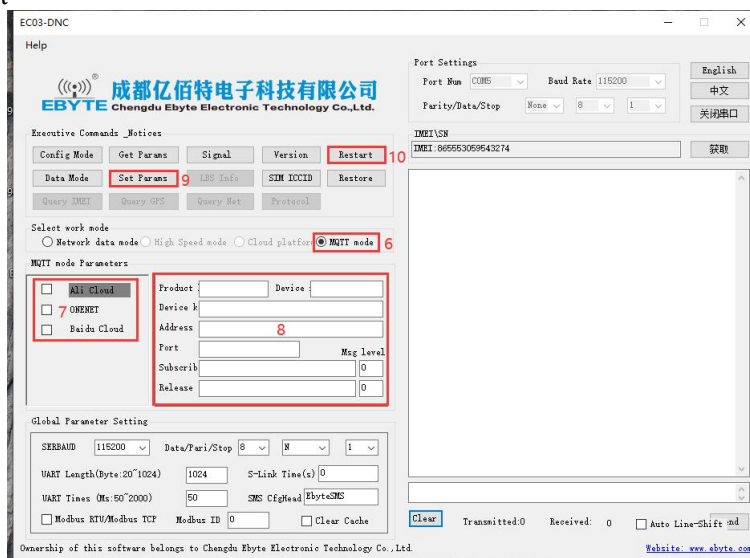
## 4.3 MQTT mode

Open the parameter configuration software

- 1、select the appropriate port number
- 2、elect Baud Rate 115200(factory default).
- 3、select check, data, stop bit None,8,1(factory default).
- 4、open the serial port
- 5、click to enter the configuration mode



- 6、Click on MQTT mode
- 7、Select the corresponding cloud platform (standard MQTT protocol platform select Baidu cloud).
- 8、Fill in the device name, username, password, address, port, subscription, publish, and subscription publishing message level
- 9、(Alibaba Cloud is the product key, device name, device key, address, port, subscription, publish, and subscription publishing level.)
- 10、ONENET is the device ID, product ID, authentication information, address, port, subscription, publication, and subscription publishing message level).
- 11、Click to save all parameters
- 12、Click the device to restart



## Introduction to the feature

### 4.4 ModBus TCP to RTU feature

When this option is turned on using parameter configuration software, the ModBus TCP and RTU are automatically converted.

When the device receives the data, it will detect whether the data meets the Modbus RTU or ModbusTCP protocol, and if it does, start the conversion function or output the original data.

The device serial receives ModbusT RTU instructions in the following format(16 feed):

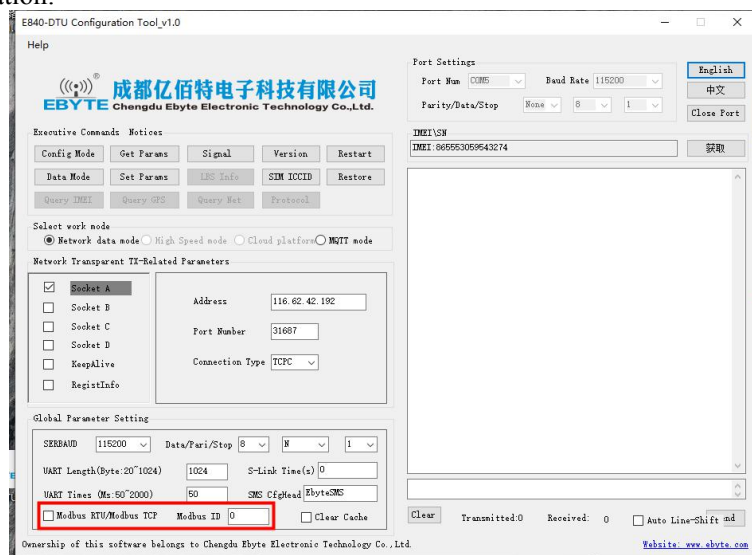
01 06 00 01 01 19 CA (ModbusT RTU), when the conversion is turned on, the server receives data for: 00 00 00 00 00 06 01 06 00 01 00 01 01 (ModbusT TCP).

The network side receives data as: 00 00 00 00 00 06 01 06 00 01 00 01 (ModbusT TCP) and the device serial end outputs the data as:

01 06 00 01 00 01 19 CA (ModbusT RTU);

Note: In the Modbus TCP standard protocol, the thing element identifier is specified, and in E841-DTU (EC03-485), the

user can configure the value through at -MTCPID, and when the value is configured to 0, the receiving end resolves and converts all Modbus TCP-compliant data, otherwise only the packet identifier applied will be converted with the same identifier as the device configuration.

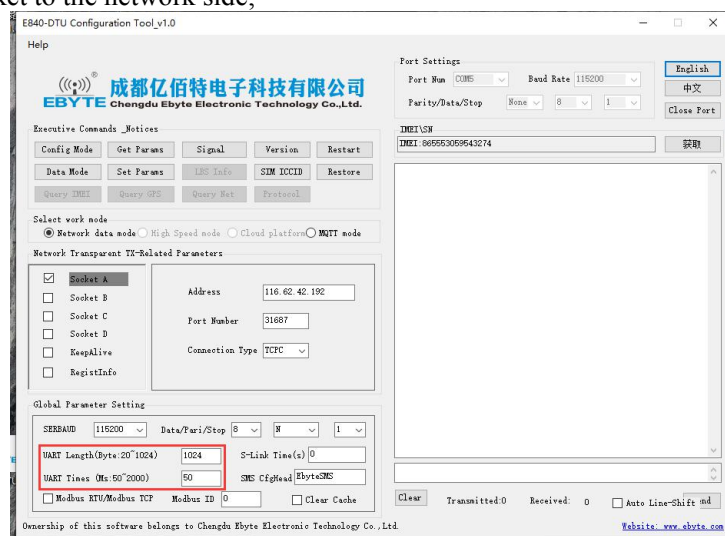


## 4.5 Serial packaging feature

E841-DTU (EC03-485) serial frame break time and packaging length can be configured, and the user can configure frame break time and package length through parameter configuration software.

**Frame break time:** When the frame break time receives data for a serial port, the interval between two bytes of phase collar is constantly detected, and if it is greater than the user's configured time (which can be set to 50-2000ms), the device automatically sends the previously received data as a packet to the network side;

**Package length:** When packaging the length of the serial to receive data, the currently received data length is constantly checked, if the length of the user configuration (can be set to 20 to 1024 bytes), the device will automatically receive the previously received data as a packet to the network side;



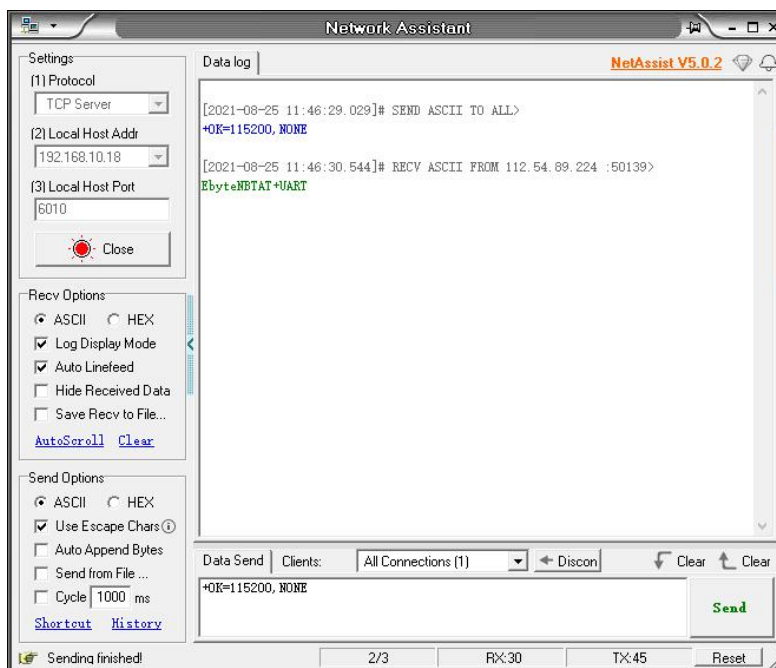
## 4.6 Network AT functionality

E841-DTU (EC03-485) supports networking on the connection, and the module works in transmission mode after sending commands in the following format via connected web pages, remote query/configuration parameters

< Head > AT-CMD, where the < Head > is the device network AT identifier, which is factory default:EbyteNET, and CMD is the corresponding command

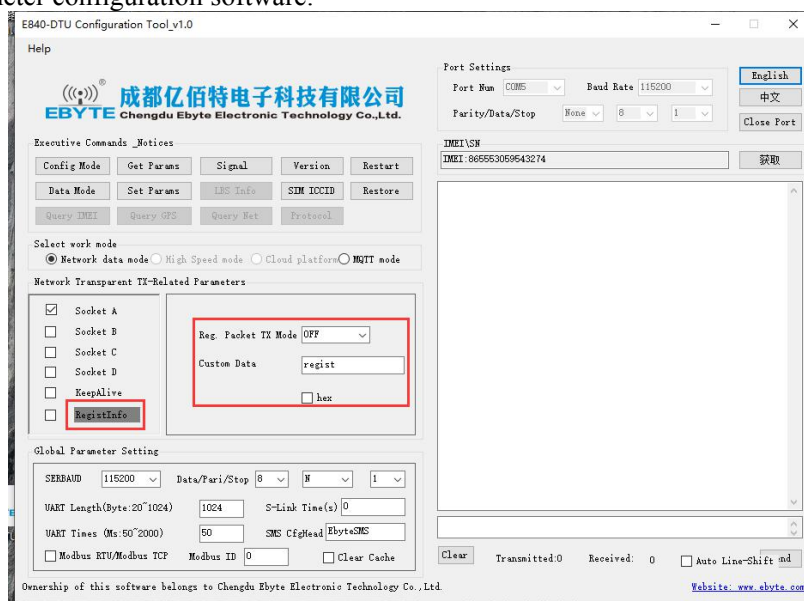
(Note: For the wrong network AT instruction, a unified reply is made to the .ERRER).

This demo takes the query Baud Rate as an example:



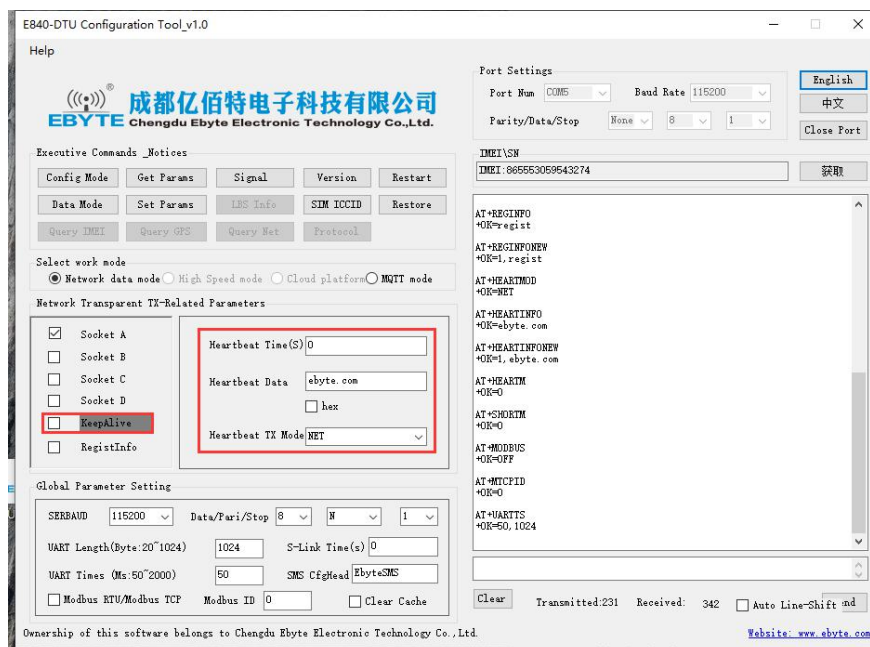
## 4.7 The registration package feature

Registration packages are turned off by default, and users can configure 4 types of registration packages, with the option of sending a physical address (IMEI code) at connection time, sending custom data at connection time, appending physical address at connection time, and before each packet of data, adding custom data at connection time and before each package of data, and customizing registration numbers. The maximum length of the package is 80 bytes (up to 40 bytes when set to HEX format), which can be set by the parameter configuration software.



## 4.8 Heartbeat pack function

In the idle state of network communication, the heartbeat package is used for network state maintenance. The heartbeat period can be set from 0 to 65535 seconds, with a maximum length of 80 bytes (up to 40 bytes when set to HEX format). Support network heartbeat, serial heartbeat two types of heartbeat, when selected as a network heartbeat, to communicate idle start timing, according to the configured heartbeat cycle to the server to send heartbeat packets. Select as a serial heartbeat to communicate idle start timing, according to the configured heartbeat cycle to the serial heartbeat packets, can be set by the parameter configuration software.

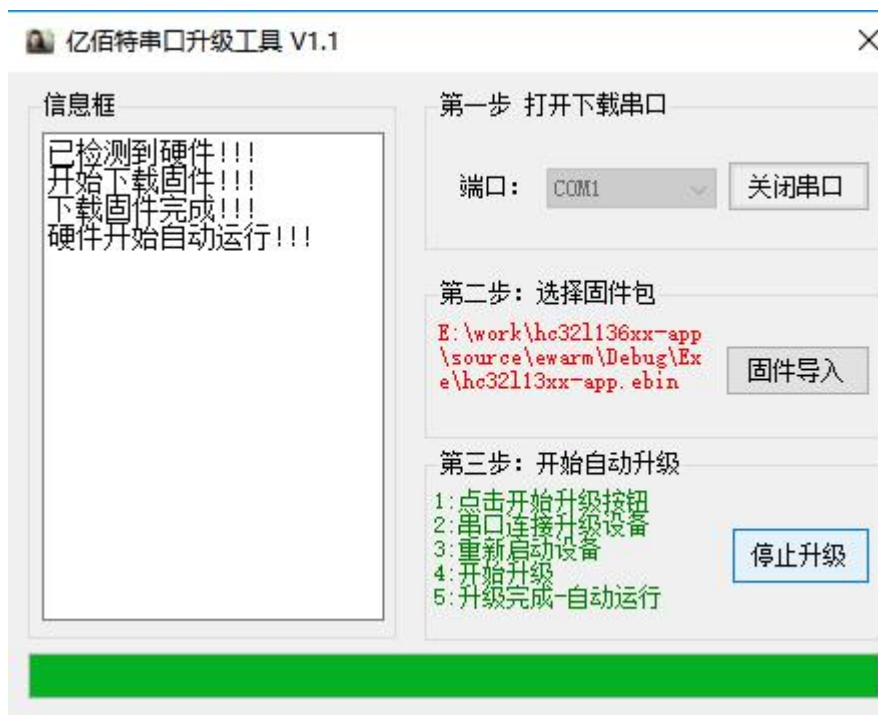


## 4.9 Serial upgrade

Open the E-Yi Special Serial Upgrade Tool, select the serial port and open it, import the version firmware that needs to be upgraded, click the Start Upgrade button



The device is powered off and restarted, automatically completing the upgrade.





## 5. Precautions

- The first Socket of this module is always open. After successful initialization, it will automatically establish a connection with the configured network server.
- After the module is powered on, it has not been able to initialize successfully, that is, there is no indication on the State indicator for more than 30 seconds. At this time, check whether the module is installed normally, whether the SIM card is inserted normally, and whether the SIM has failed.
- The short connection function can be used to reduce the connection pressure of multiple devices to the server. When the short connection function is enabled, when there is no data on the network or serial port for longer than the short connection setting period, the module will actively disconnect the connection. After disconnection, the network cannot send data. The local serial port sends valid data, and the module will immediately communicate with The server establishes a connection. If the local cache clear function is turned off at this time, the data packet will be cached (maximum 10K bytes). After the connection is successful, the data will be sent to the server. If the local cache clear function is enabled, The packet will be discarded.
- The heartbeat function is used to maintain the connection after the module has successfully established a connection with the server. In the network, if there is no data transmission for a long time after the client has successfully established a connection with the network server, the Socket link may appear "dead", that is, the chain The path exists, but data cannot be sent or received. Therefore, in actual use, it is recommended to enable the heartbeat packet function to ensure the reliability of the network link.
- In actual use, it is normal for the data delay difference between the two communications to be different.
- After the module closes the protocol transmission, the maximum single packet length supported by a single link is 10K bytes. The local serial port or network single transmission of data packets exceeding this length may cause packet abnormalities; open the distribution protocol, each Socket A single link packet can support up to 1024 bytes (the serial port packet length configured by the user),
- When the device serial port outputs the words "pdp error, device will be reset!", it means that the PDP context is disabled by the network side. It may be that the SIM card is loose or the current network channel is occupied abnormally.
- The SMS function requires the inserted SIM card to support the SMS service, and the IoT card cannot send and receive SMS; when the device sends a SMS, the device responds OK only to indicate that the module has sent the SMS, but it does not mean that the device has received the SMS.
- After modifying the serial port frame time, the AT command also needs to be configured to operate according to this frame time. For example: after setting this parameter to 2000ms, the next time you power on the device to configure the device parameters, you need to send'+++' After that, send a valid AT command within the period of more than 2000ms and less than 3000ms to enter the AT mode normally

## 6. Related products

Product model	products category	The communication interface	Operating voltage	Introduction to the product
E841-DTU(EC03-485)	4G Cat1	RS485	8~28V (DC)	4GDTU, MQTTsupport, APNsupport, rail housing, DC power supply
E841-DTU(EC03-232)	4G Cat1	RS232	8~28V (DC)	4GDTU, MQTTsupport, APNsupport, rail housing, DC power supply
E841-DTU(EC03P-485)	4G Cat1	RS485	8~28V (DC)	4GDTU, MQTTsupport, APNsupport, rail housing, high protection, DC power supply
E841-DTU(EC03P-232)	4G Cat1	RS232	8~28V (DC)	4G DTU, MQTTsupport, APNsupport, rail housing, high protection, DC power supply
E842-DTU(EC03-485)	4G Cat1	RS485	85~265V (AC)	4G DTU, MQTTsupport, APN,rail housing, AC power supply
E842-DTU(EC03-232)	4G Cat1	RS232	85~265V (AC)	4G DTU, MQTTsupport, APN,rail housing, AC power supply
E842-DTU(EC03P-485)	4G Cat1	RS485	85~265V (AC)	4G DTU, MQTTsupport, APNsupport, rail housing, high protection, AC power supply
E842-DTU(EC03P-232)	4G Cat1	RS232	85~265V (AC)	4G DTU, MQTTsupport, APNsupport, rail housing, high protection, AC power supply
E840-DTU(EC03)	4G Cat1	RS485+RS232	8~28V (DC)	4G DTU, MQTTsupport, aluminum profile housing, high protection, DC power supply



## Revised history

version	The revision date	Revised description	Maintainer
1.0	2017-10-16	The initial version	huaa
1.1	2021-07-15	Content reorganization	LYL

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