Chengdu Ebyte Electronic Technology Co.,Ltd

Wireless Modem

User Manual



【RS485 ⇌ WiFi】

NA611-S / NA611-SA

All rights to interpret and modify this manual belong to
Chengdu Ebyte Electronic Technology Co., Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

目录

1. Introduction 4
1.1. Features 4
2. QuickStart 5
2.1. Ready to use 5
2.2. Wiring 5
2.2.1. Power 5
2.2.2. Communication RS485 6
2.3. Host computer configuration 6
Link configuration area 9
2.4. AP mode communication test 14
2.5. Host computer configuration (used in STA mode) 16
2.6. STA mode communication test 18
3. Introduction 20
3.1. Specification 20
3.2. Technical specification 20
3.3. Port Description 21
3.4. Size 22
3.5. Installation method 22
3.6. Default parameters 23
4. Function 25
4.1. Serial port configuration 25
4.1.1. Parameter setting 25
4.1.2. Cache function 25
4.2. Job role 25
4.2.1. AP mode（Access Point） 25
4.2.2. STA mode（Station） 25
4.3. Transfer mode 25
4.3.1. Transparent transmission 26
4.3.2. MQTT Mode 26
4.3.3. HTTP mode 29
4.3.4. Network receive cache 30
4.4. Support DHCP and domain name resolution 30
4.4.1. DHCP 30
4.4.2. DNS 30
4.5. Disconnection reconnection and no data reboot 31
4.6. Multilink distribution 31
1. Protocol Description 31
4.7. Heartbeat pack with registration pack 32
4.8. High-speed simulcasting（1M） 33
4.9. Modbus gateway 33
4.9.1. Simple protocol conversion 33
4.9.2. Multi-host gateway 33
4.9.3. Storage gateway 33

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

4.9.4. Configurable gateway 34
4.10. Serial port upgrade 34
5. Parameter configuration 36
5.1. Hardware factory restore 36
5.2. Directive configuration 36
5.2.1. Serial port AT configuration 36
5.2.2. Network AT configuration 36
6. Revision History 38
7. About us 39

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1. Introduction



NA611-S/NA611-SA is a high-performance and highly reliable WiFi serial server (RS485 ⇌ WiFi). Works in the 2.4G frequency band, realizes RS485 data to realize device networking data exchange through WiFi, supports IEEE802.11 b/g/n standard, supports 4-way Socket connection; supports Alibaba Cloud, Baidu Cloud, OneNet, standard MQTT protocol; supports TCP/ UDP/HTTP/MQTT multiple network communication protocols.

1.1. Features

- Support simultaneous TCP/UDP/HTTP/MQTT multiple network communication protocol communication;
- Support up to 4 channels of Socket communication at the same time;
- Support Alibaba Cloud, Baidu Cloud, OneNet, standard MQTT protocol;
- Support Modbus protocol conversion (RTU and TCP);
- Support modbus storage gateway / configuration gateway / multi-host gateway;
- Support transparent transmission multiplex protocol transmission and broadcast transmission;
- Support custom registration package, custom heartbeat package function;
- Support host computer configuration (download from official website), support direct A interactive configuration, support network interactive configuration;
- Support disconnection and automatic reconnection;
- High-speed continuous transmission
- Support WIFI idle restart;
- Support IEEE802.11 b/g/n standard;
- Support 2.4G frequency band;
- Support AP, STA working mode;
- Support WPA2 WIFI security authentication method;
- Support 3-way STA device connection (AP access point);
- Support dynamic DNS, DHCP network service package;
- Flexible power supply mode (DC/AC optional);
- Support static IP address allocation;

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2. QuickStart

2.1. Ready to use

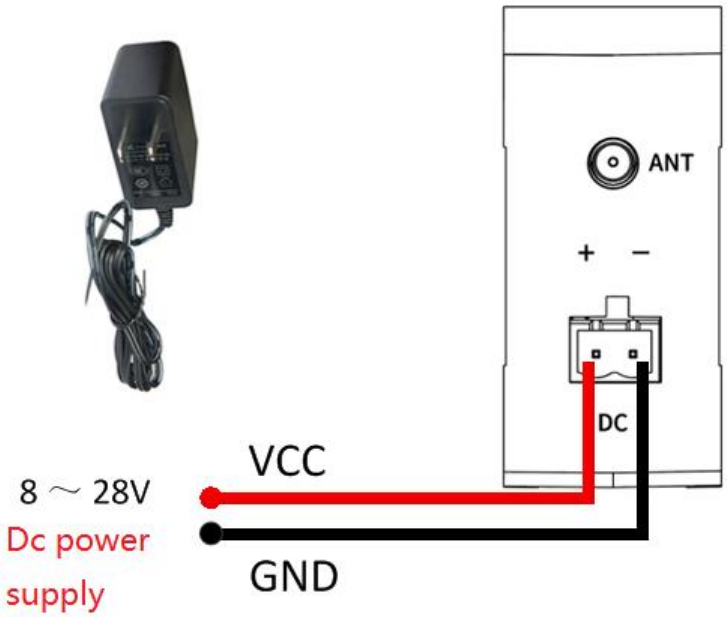
Before using the WiFi serial server (hereinafter referred to as "device"), you need to prepare the computer, converter, power supply, screwdriver and other related accessories details as follows:
List

NA611-S	USB to RS485	Computer
Power adapter (12V1A) (SA is the AC version, prepare an AC power cord)	WiFi antenna（2.4G）	Screwdriver (slotted SL2)

2.2. Wiring

2.2.1. Power

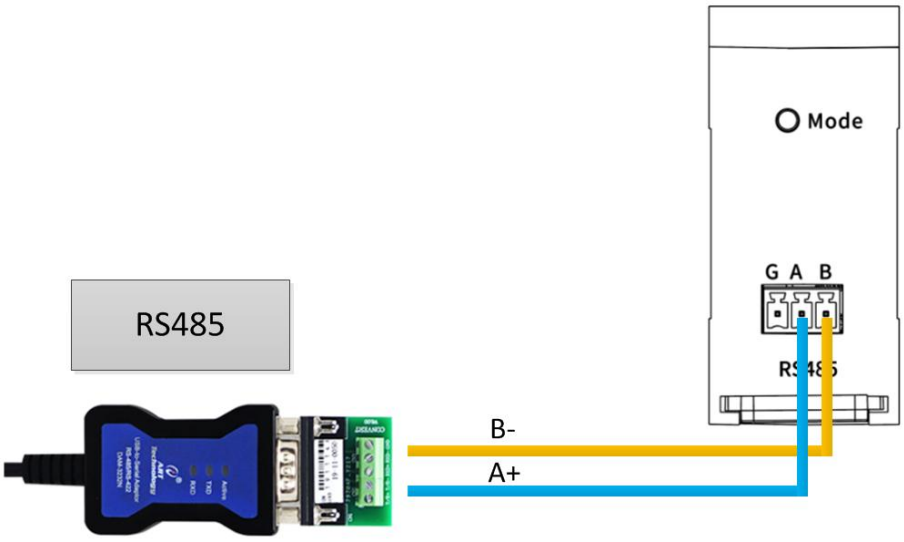
Power supply, use DC 8~28V power supply, or DC 12V or 24V power supply, pay attention to the positive and negative of the DC power supply (the device has anti-reverse connection). If it is SA AC version, connect to 220V AC power supply.



Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2.2.2. Communication RS485



2.2.3. Schematic diagram of the whole equipment



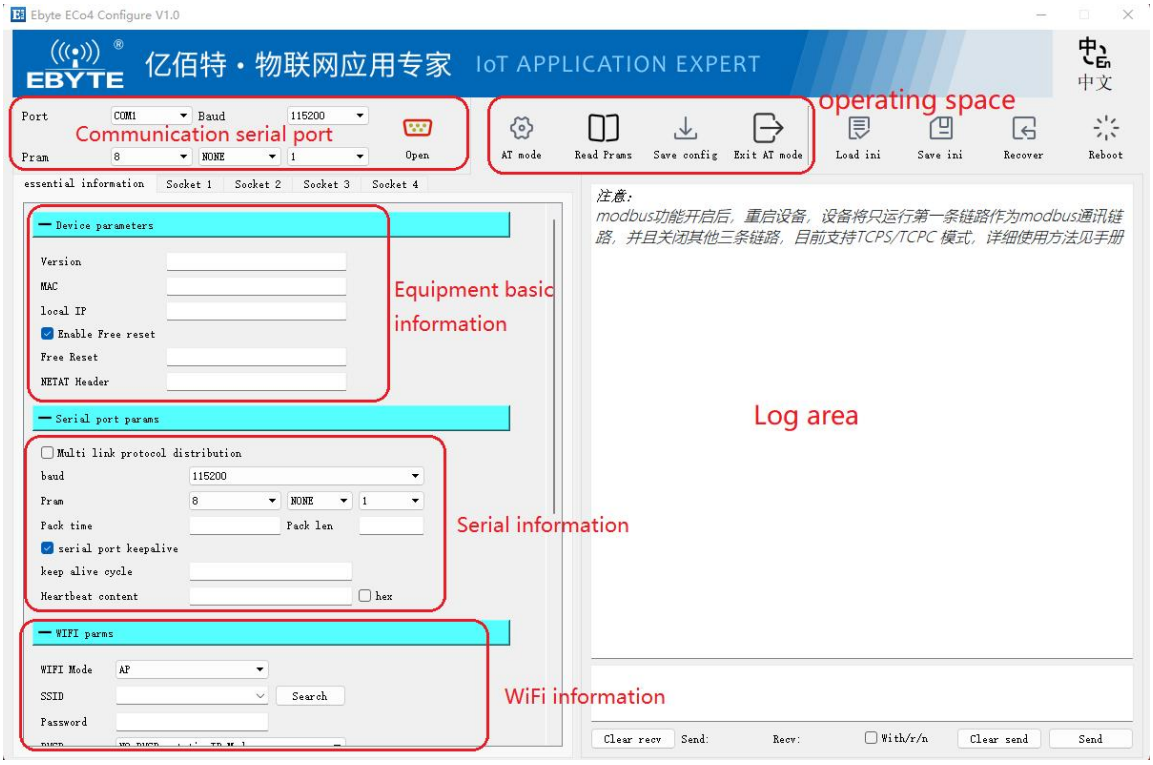
2.3. Host computer configuration

First, get to know the functions of each area of the host computer. All function settings are based on the

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

understanding of the host computer. The host computer uses AT to quickly interact with the device. Users can configure the device directly through AT, and the effect is the same as that of the host computer. machine is consistent.



Basic Information Area------Product Parameters

Version information/MAC address are inherent parameters of the device, users can only read

The local IP is a parameter that will be valid only for the query after the device is connected to wifi, reflecting the ip of the device itself.

Idle restart If it is checked, it means idle restart is enabled. If the device does not perform any network information interaction and 485 information interaction within the idle restart time, the software will restart the device. Idle restart time in minutes.

Network AT header configuration The default network AT header of the device is NETEbyte, that is to say, the data sent on the network, if it has this header, it will be regarded as an AT command and will not be regarded as information. This header can be configured by the user. Yes, not Chinese, and the length is between 3-23 English characters and numbers. For example, after setting up network communication, send NETEbyteAT+VER\r\n The device will reply to your relevant device information through the network (\r\n is carriage return, line feed, not string), for more AT commands, see the device's AT manual.

Basic information area------ serial port parameters (configured to take effect after restarting)

Multilink Protocol Distribution Mode If checked, for example, you have created two links to connect to two TCPS servers respectively, then the information sent by the TCPS server will be sent out through 485 with a specific header, the header length is 5 bits, and the distance For the content of the header, check the content of the following protocol transmission. At the same time, whether you check this option or not, send information to 485 and upload it to the network. The information can have a header, such as the header designation is to link 1. If it is

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

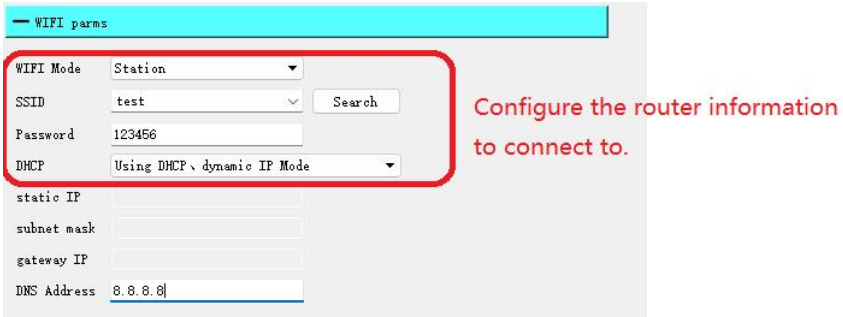
sent, then only link 1 will send this piece of information. For the specific rules of the header, see the protocol transmission part that follows.

Baud Rate/Data/Parity/Stop Bits It represents the properties of the 485 serial port of the device. If it is changed, after restarting the device, the host computer must change the topmost serial port property to the content you changed, and then open the serial port to conduct normal communication.

Packing time/packet length The default value is 50/1024, which means that 50ms is the minimum interval between two packets of data. For example, if the time interval between sending two packets of data to 485 is very small, only 30ms (less than 50ms), then the two packets of data will be combined into one packet of data. It will be distinguished. The packet length of 1024 means that if a packet of data is very long, up to 1300 bytes (greater than 1024), it will be divided into two packets of data to send.

Serial Heartbeat Packet/Serial Heartbeat Packet Time/Serial Heartbeat Packet Content This function is disabled by default. Users need to open it by themselves (check the serial port heartbeat package option), the serial port heartbeat package time unit is seconds, the heartbeat content is the content that will be sent through 485, and the hex check on the right means that The heartbeat content will be converted into hex format (hex format is rarely used, if checked, the content in hex format will be sent). After opening, the device will send serial heartbeat information through 485 every other serial heartbeat time.

Basic information area ------ WiFi parameter area (configured to take effect after restarting)



WIFI Mode/SSID/Password Parameters representing wifi, such as AP mode, ssid is test, password is 12345678(When entering a password, you can enter a lowercase "x" to set it as open WiFi), then the device is a hotspot, which can be connected through wifi, the hotspot name is test, and the password is 12345678. If the STA mode is set, the ssid is test, and the password is 9876543210, then the device will use the password of 9876543210 to connect to a router (hotspot) named test after restarting.

DHCP/Static IP/Subnet Mask/Routed Address The DHCP selection part can choose dynamic IP and static IP mode (it works in STA mode). If it is dynamic IP, it is easy to understand, that is, after the device is connected to the router (hotspot), the IP of the device is dynamically assigned to the device by the router (hotspot). Yes, so every time you restart the device or reconnect to wifi, the address of the device may change. If it is static IP mode, you can fill in the IP address you want to fix in the static IP below, but note that this cannot be filled in randomly, it must be kept on the same network segment and this address is not assigned to other devices, for example, your router is 192.168 .3.XXX network segment, your static IP can only be filled in such as 192.168.3.52. It cannot be filled in across network segments. Generally, the following subnet masks do not need to be changed. The routing address is the IP address of the router. In the correct case, every time the device is powered on and connected to the

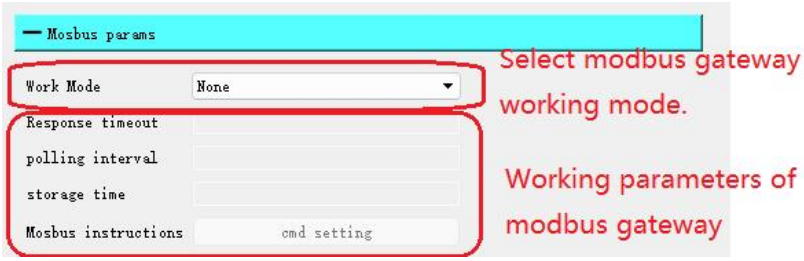
Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

router, it will be this static IP.

DNS address The resolution address generally does not need to be changed

Basic information area------modbus parameter area (the configuration will take effect after restarting)



Modbus working mode The five types of simple protocol conversion/multi-host/storage type/configuration type/active upload type can be set respectively. The default is disabled, that is, the modbus functional area is not enabled. Change the option to any type, which is enabled. Note: enable After that, the modbus gateway will work on link one, only support TCP interaction, and will actively close the other three links, please do not use the other three links. The following briefly introduces several gateway modes:

Simple protocol conversion: the most commonly used, simple TCP-RTU conversion

Multi-host mode: that is, for example, both hosts A/B will access device information through modbus. If A/B initiates an access request at the same time, for example, A has accessed, modbus will enter the busy state, and the access information of B will be stored. Down, wait for the end of the interaction of host A, and then execute the interaction of host B, thus avoiding the information conflict of multiple host modbus buses

Storage gateway: Since the interaction speed of the 485 interactive terminal is slower than that of the network terminal, many bus waits originate from the slow side, and a storage gateway, such as the host accesses an instruction, then the device as a modbus gateway will "remember" "This command, and keep polling, and save the polling result in the device, then next time the host accesses this data again, the device as a modbus gateway will not go to 485 to send the inquiry information, wait for the content to return, and then return the content. Instead, it directly returns the polling content stored in the device to the host, making the interaction speed smoother.

Configuration gateway: Similar to storage gateway, but you can configure common query commands into the device in advance, which means that the device does not need to be issued by the host, and directly remembers these commands. The subsequent workflow is the same as the storage gateway.

Active upload: You can configure the command in the modbus command configuration (this command configuration area is the configuration used by the configuration gateway and the active upload uniformly). After the configuration, just like the configuration gateway, the device as a modbus gateway will send a query through 485 information, but after the query result is obtained here, it will be directly returned to the host through the network.

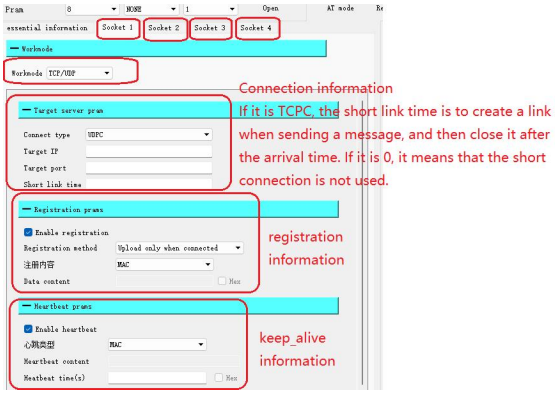
Server Hex：not support

TCP Modbus：It is supported to not check this item when selecting multiple hosts, and check it at other times. This is a common usage, which means that the default network terminal runs TCP type data, and then the device acts as a modbus gateway to the RTU data run by the slave terminal.

Link configuration area

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000



Working mode: When none is selected, it means the link is closed. When TCP/UDP transparent transmission is selected, the above interface is used. At the same time, HTTP mode or a different MQTT mode can also be selected.

When in TCP/UDP transparent transmission：

Connection type: TCPS/TCPC/UDPC/UDPS can be selected, representing the different roles of the device in network communication. When in TCPS/UDPS, when the client connects, the device will remember the client socket (records up to eight A), you can query the information of the currently connected client through the AT command, see the AT manual for specific commands, and the interactive communication with the client also supports protocol transmission. You can specify to send information to a certain client, or Can choose to broadcast

Server address/target address: When in TCPS/UDPS, fill in 192.168.1.1 uniformly (cannot fill in the blanks, in fact, this parameter does not work in server mode, the device uses its own IP to open the server by default), when in client mode (TCPC/ UDPC), this is the target IP address that the client wants to connect to

Server port/target port: When in server mode, this is the open port of the server, when in client mode, this is the port opened by the target server.

Short connection time: This parameter does not matter, it is only useful in TCPC mode. The default value is 0, which means the short connection is closed by default. For example, if you are in TCPS mode and set the short connection time to 5, then this TCPC link After the connection with the server is obtained, the data is exchanged, the link will be closed after 5S, and the connection with the server will be disconnected (if the interaction is performed again within 5S, the time will be re-timed in 5S)

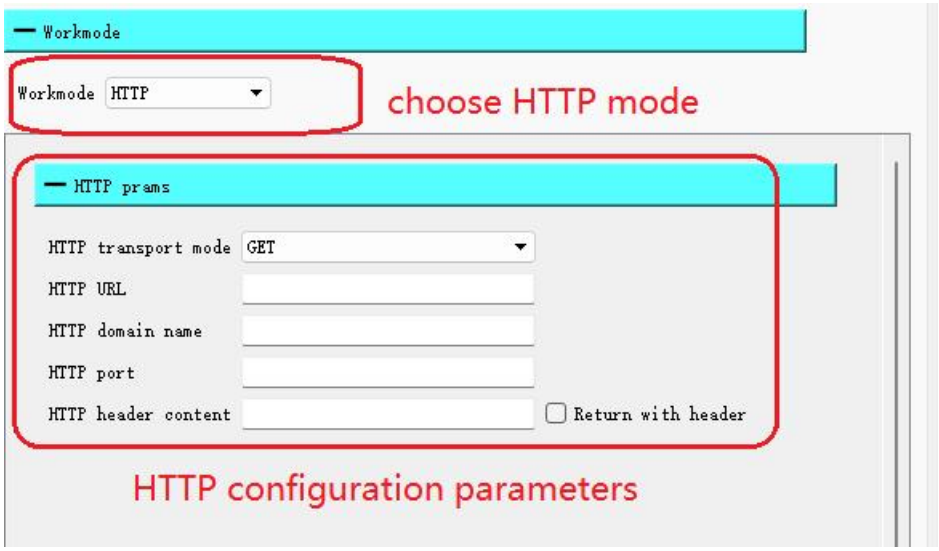
Registration package parameters (only useful for clients): Checking to enable the registration package means that the registration package function is enabled. There are two registration methods. There is another registration package to send. The other is that all the data sent later will have this registration package as the header. The following data content is the content of the registration package. The Hex mode on the right is generally unchecked, if checked That is, the data content is to be converted into hex mode.

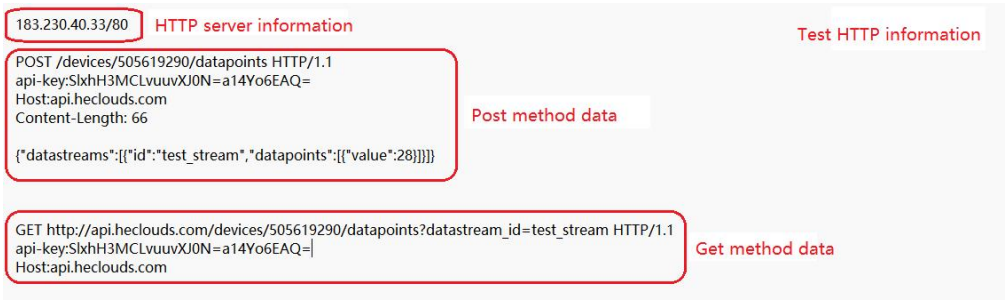
Heartbeat packet parameters (only useful for clients): Check the heartbeat switch to enable the heartbeat packet function, the heartbeat content is the content of the heartbeat packet sent, and the heartbeat time is the heartbeat sending interval, such as 60, then this link is every 60S A heartbeat packet will be sent to the server (if there is normal data interaction during this period, the heartbeat time will be reset).

When in HTTP mode

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000





HTTP transmission mode: It is divided into POST and GET methods. When the HTTP information is set, the information in the information area is directly written, and the device will automatically seal the data packet before uploading to the network.

HTTP URL content: represents the URL part of the HTTP message body, such as the HTTP content part of the test above.

（POST method URL）

/devices/505619290/datapoints

（GET method URL）

http://api.heclouds.com/devices/505619290/datapoints?datastream_id=test_stream

HTTP domain name: represents the IP address of the target HTTP server, such as 183.230.33.80 in the above test content

HTTP port: represents the port number of the target HTTP server, such as the appeal 80, the general HTTP port number is port 80

HTTP header content: represents the header part of HTTP, such as the appealed

api-key:SlxhH3MCLvuuvXJ0N=a14Yo6EAQ=\r\nHost:api.heclouds.com

After configuring the HTTP information, send {"datastreams":[{"id":"test_stream","datapoints":[{"value":28}]}]} （post message）You can POST information to the HTTP server, and send datastream _id=test stream to GET information from the HTTP server.

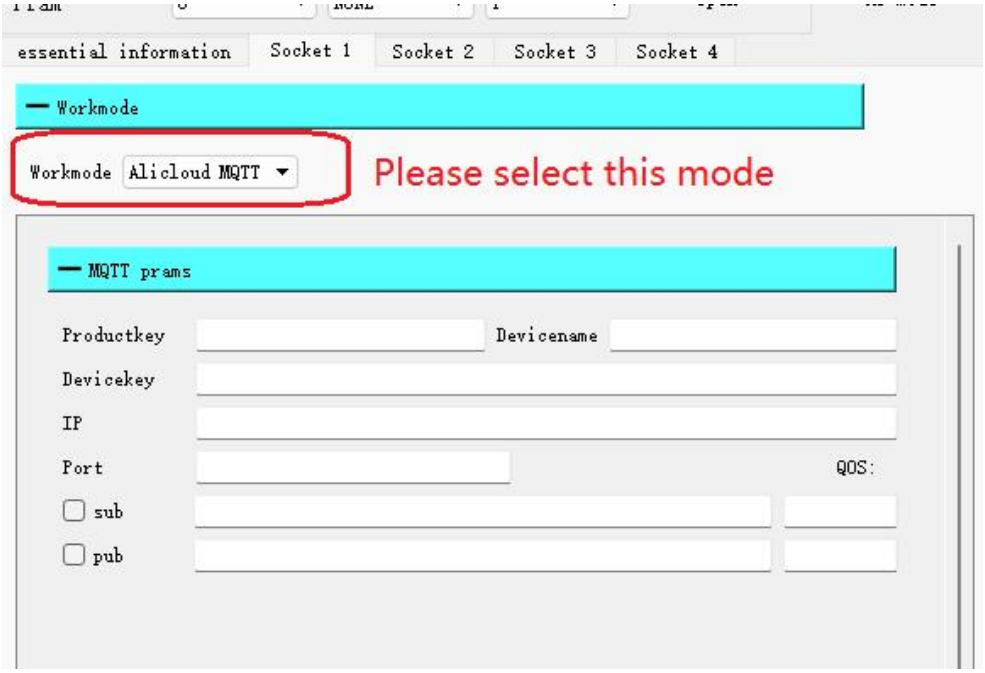
Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

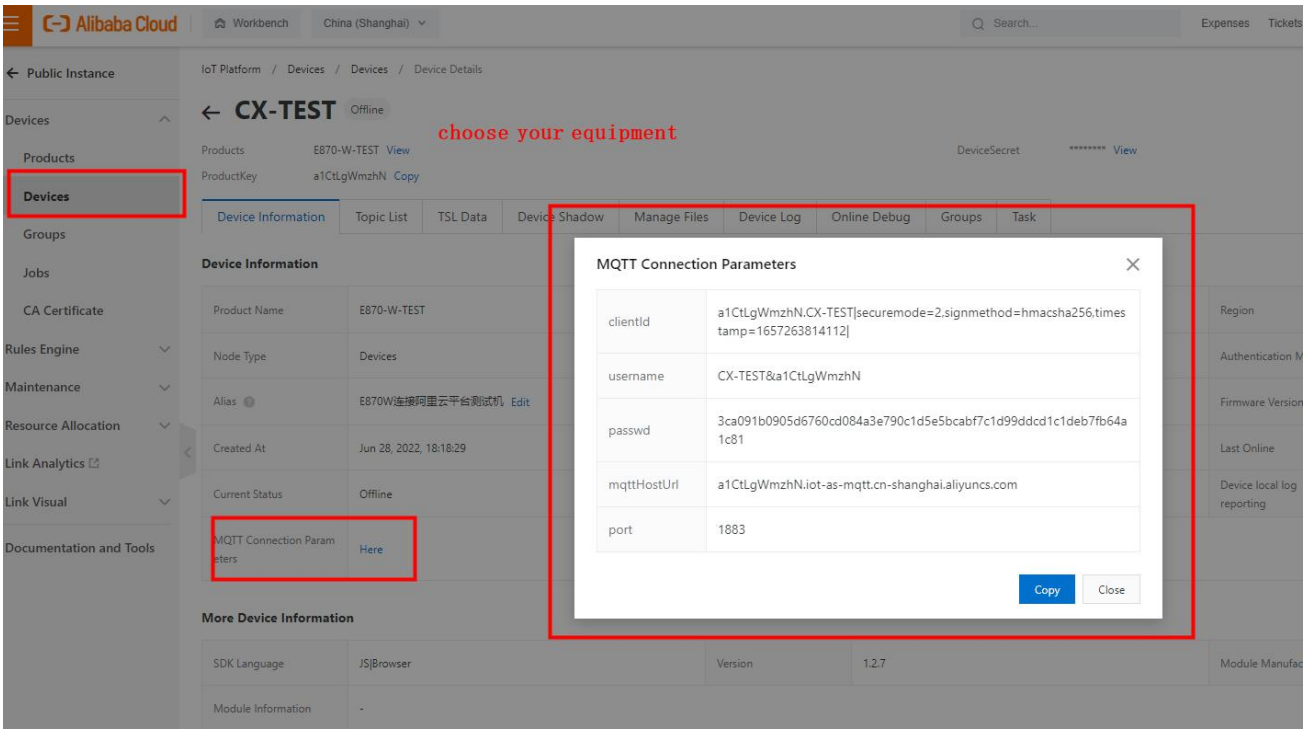
When in MQTT mode：

Support the connection of MQTT servers such as Alibaba Cloud, Baidu Cloud, ONENET and custom private clouds

The following is an example of how to use Alibaba Cloud



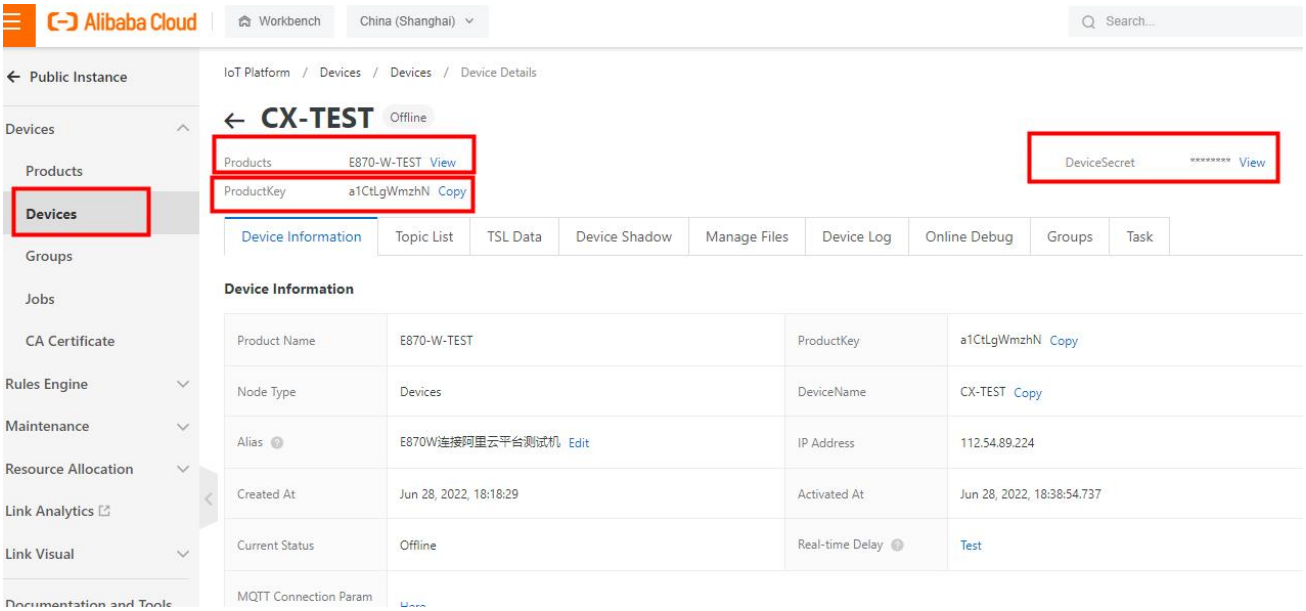
First, create products and devices on the Alibaba Cloud IoT platform. If not, you can view the operation method on the official website or Baidu, there are many tutorials on the Internet, the operation is simple, and then find the device you created on the device, click View on the right, and then click MQTT Link the parameter item to get the following interface.



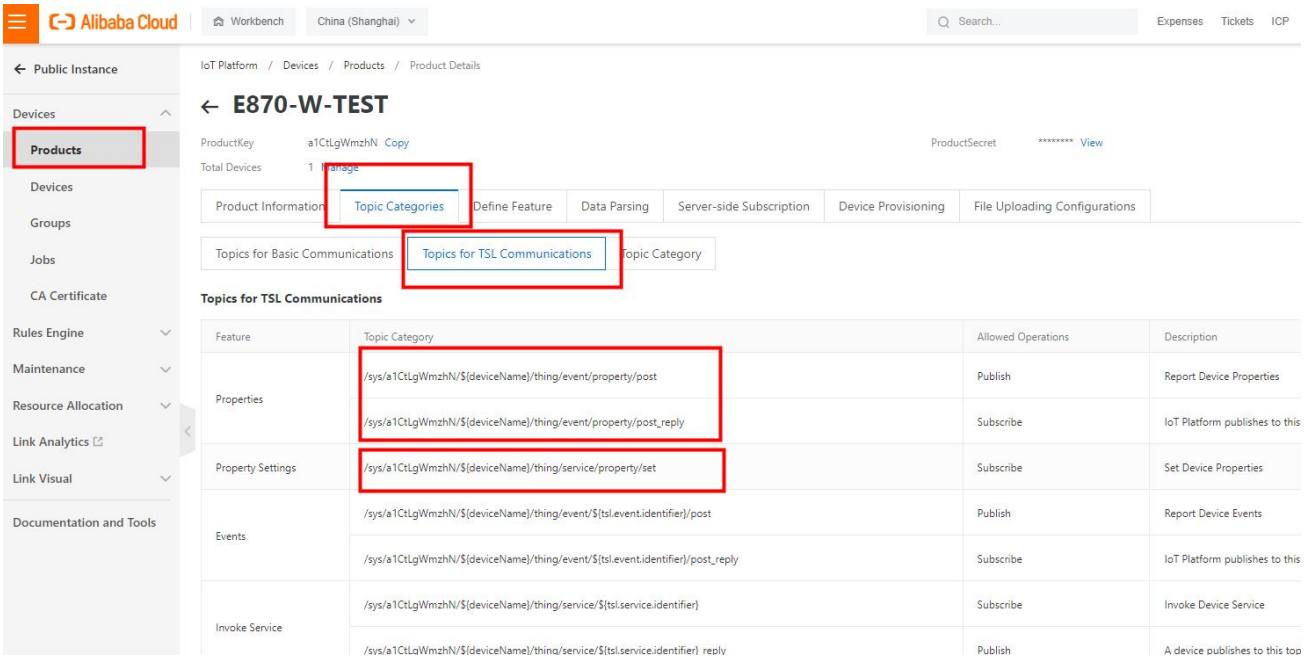
Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Fill the above mqttHostUrl into the above address bar and post in the above port bar. However, the above three columns such as clientID are ignored, because this is a packaged parameter, and our device will automatically package it for you, so fill in the following content in the three columns of product key, device name, and device key, and fill in the product to the device Name column, Productkey is filled in the product key column, DeviceSecret is filled in the device secret column.



Then check the subscribe/publish option below, fill in the topic of subscription and publishing, select your item in the product column, click View, and then find the content you want to subscribe and publish in the Topic category list and fill it in.



Simple configuration of the device

1. Select the corresponding serial port and configure the baud rate parameters correctly. The factory default baud rate is 115200, 8 data bits, 1 stop bit, and no parity bit (NONE);

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2. Select the working mode of the device, the factory default AP mode, the following tests are carried out with the factory parameters, if the factory parameters are not, it is recommended to restore the factory (after the device enters the configuration according to the previous three steps and connects with the host computer, click on the upper right to restore the factory settings) and then carry out;

3. Configure the SSID of the device (factory default: NA611-S) and Password (factory default: 88888888), here do not modify the parameters that only query WiFi;

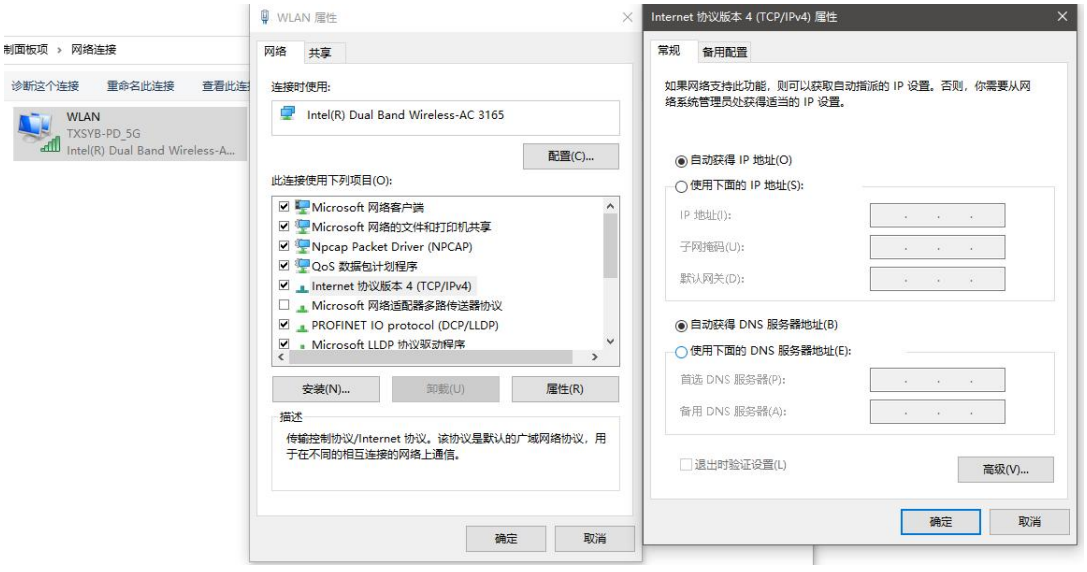


4. Configure the link parameters, the factory default is server mode (TCPS), the default IP (192.168.1.1), and the port is 8888;

5. Turn off other advanced modes, the factory default is turned off.

2.4. AP mode communication test

1. Configure the computer Ethernet in the following ways, modify IPv4 to obtain IP automatically and obtain DNS server address automatically;



Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

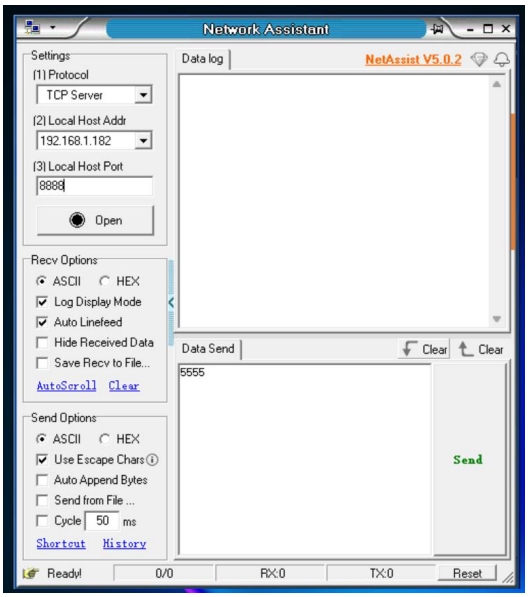
Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2. Use the SSID obtained from the computer connection query, here is NA611-S, enter the wifi password, and connect the device (the device LINKA is always on when the connection is successful);



3. Through the host computer configuration, open link 1, open the TCPS mode, the default (192.168.1.1, 8888 port), save the parameters and exit the configuration, LINKB is always on.

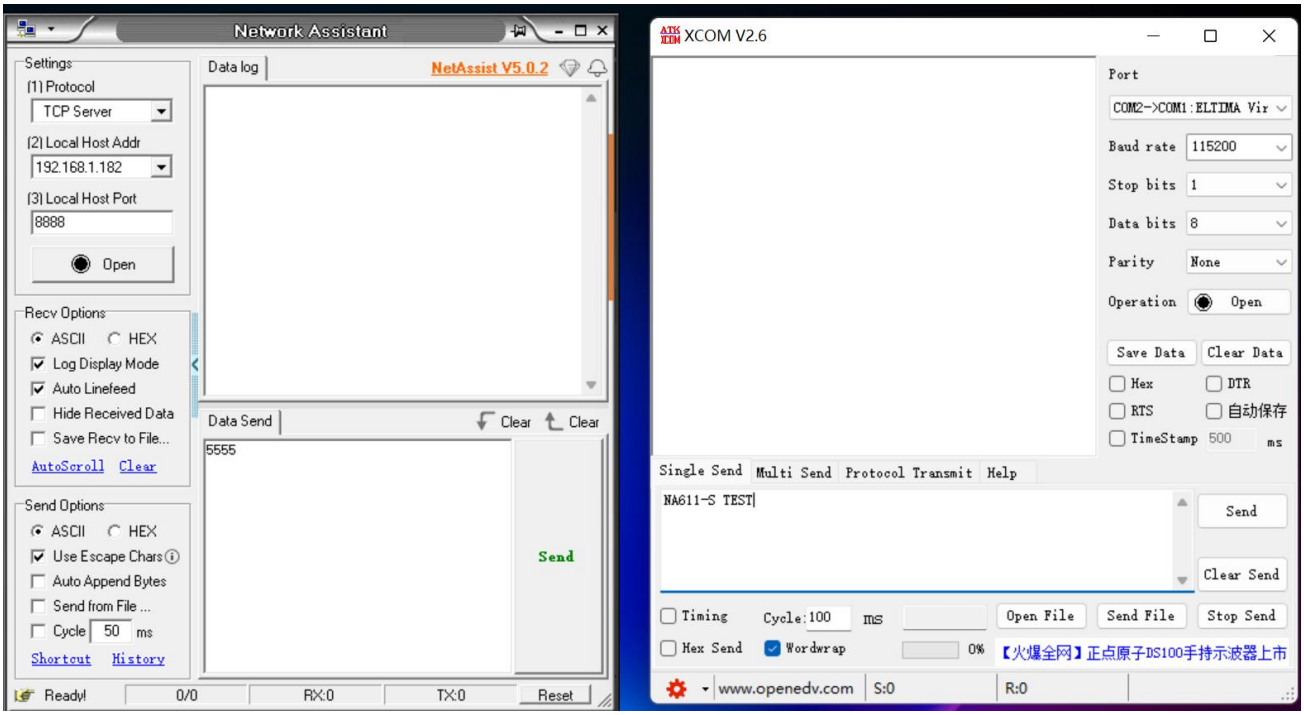
4. Open the network assistant and connect to the device server (192.168.1.1:8888). If you cannot connect according to the above configuration, it is recommended to turn off the computer firewall;



5. The communication test uses the serial assistant to send "EBYTE_NA6111_S_TEST_UART", the network assistant receives "EBYTE_NA6111_S_TEST_UART", the network assistant sends "EBYTE_NA6111_S_TEST_NET", and the serial assistant receives "EBYTE_NA6111_S_TEST_NET";

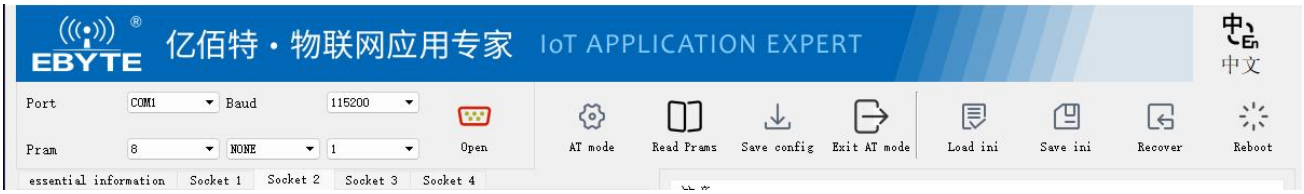
Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000



2.5. Host computer configuration (used in STA mode)

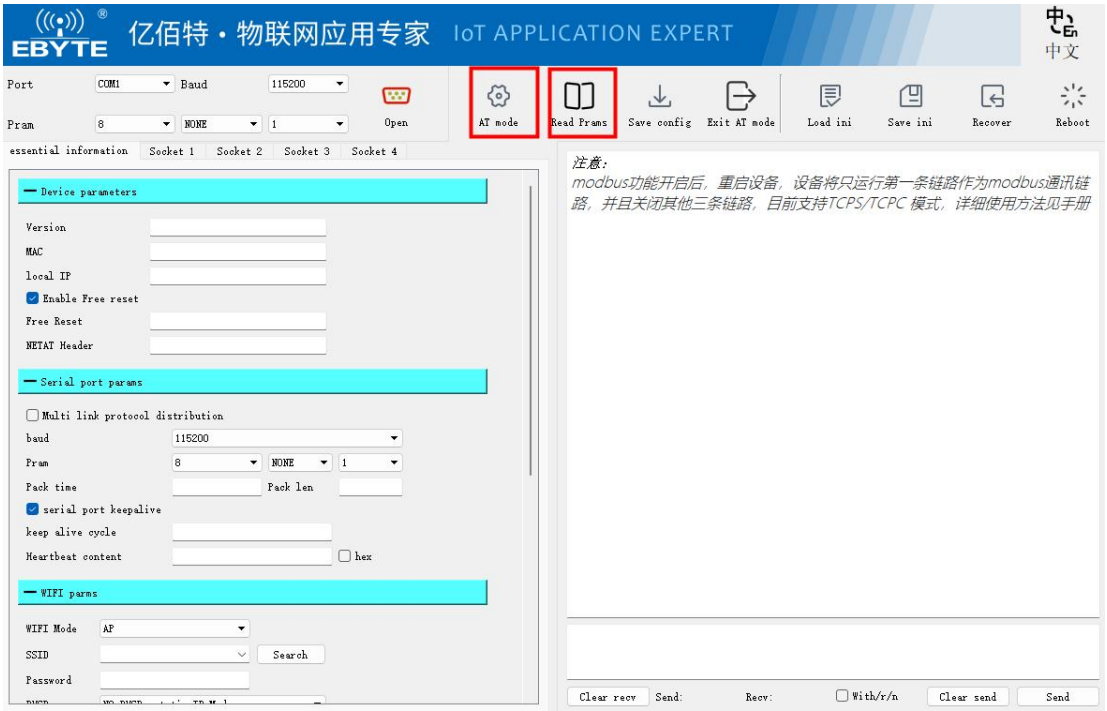
1. Select the corresponding serial port, and configure the baud rate parameters correctly, the factory default baud rate is 115200, 8 data bits, 1 stop bit, no parity bit (NONE);



2. Click to enter the configuration and read the parameters to obtain the current configuration parameters of the device;

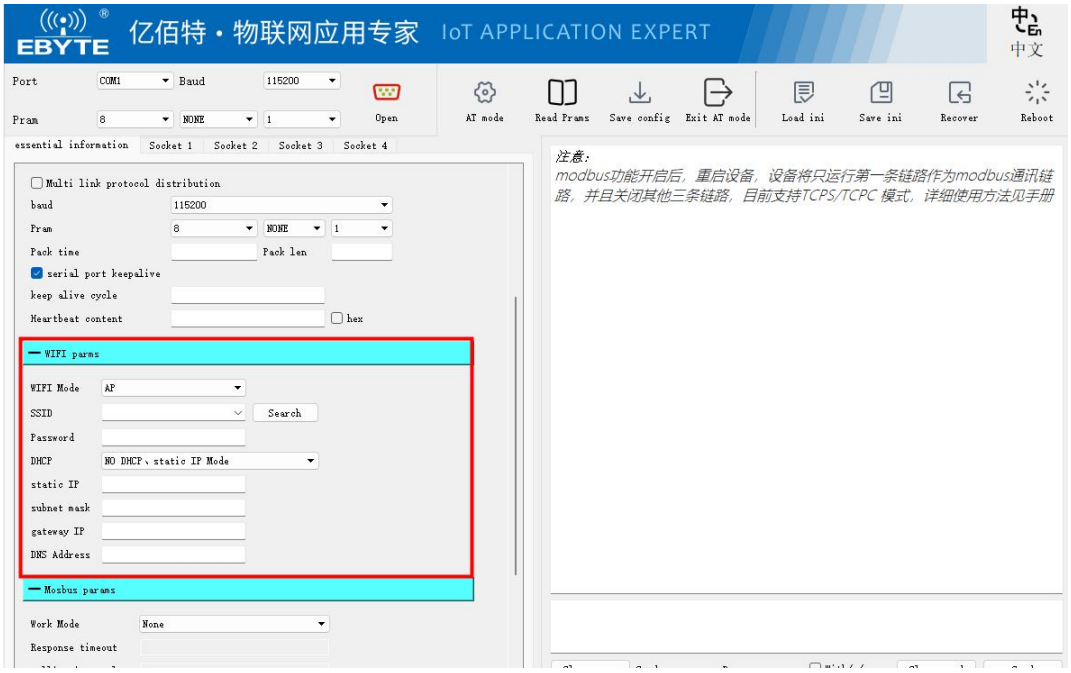
Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000



3. Select the WIFI working mode, turn on the STA mode, and the device automatically enables dynamic IP (DHCP) when the STA mode is turned on for the first time;

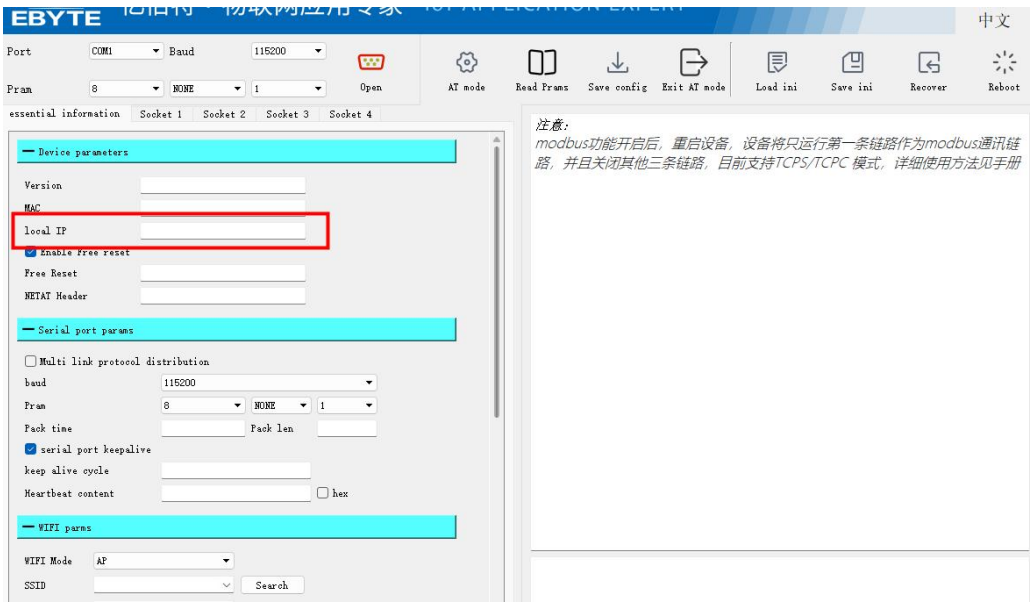
4. Configure the WiFi name and password for the device to connect to;



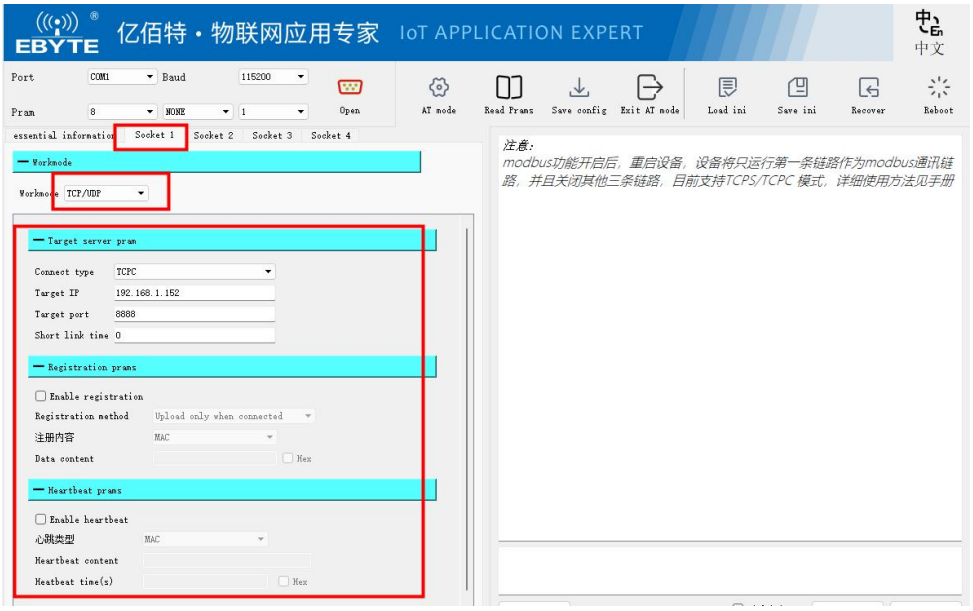
5. Save the parameters, restart the device, wait for the device to restart, read the parameters to obtain the IP address of the device;

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000



6. Configure the link parameters, the factory default is server mode (TCPS), the IP is dynamically obtained by the device, here is 192.168.10.152, and the local port is modified to 8888;



7. Click Save to restart the device;

2.6. STA mode communication test

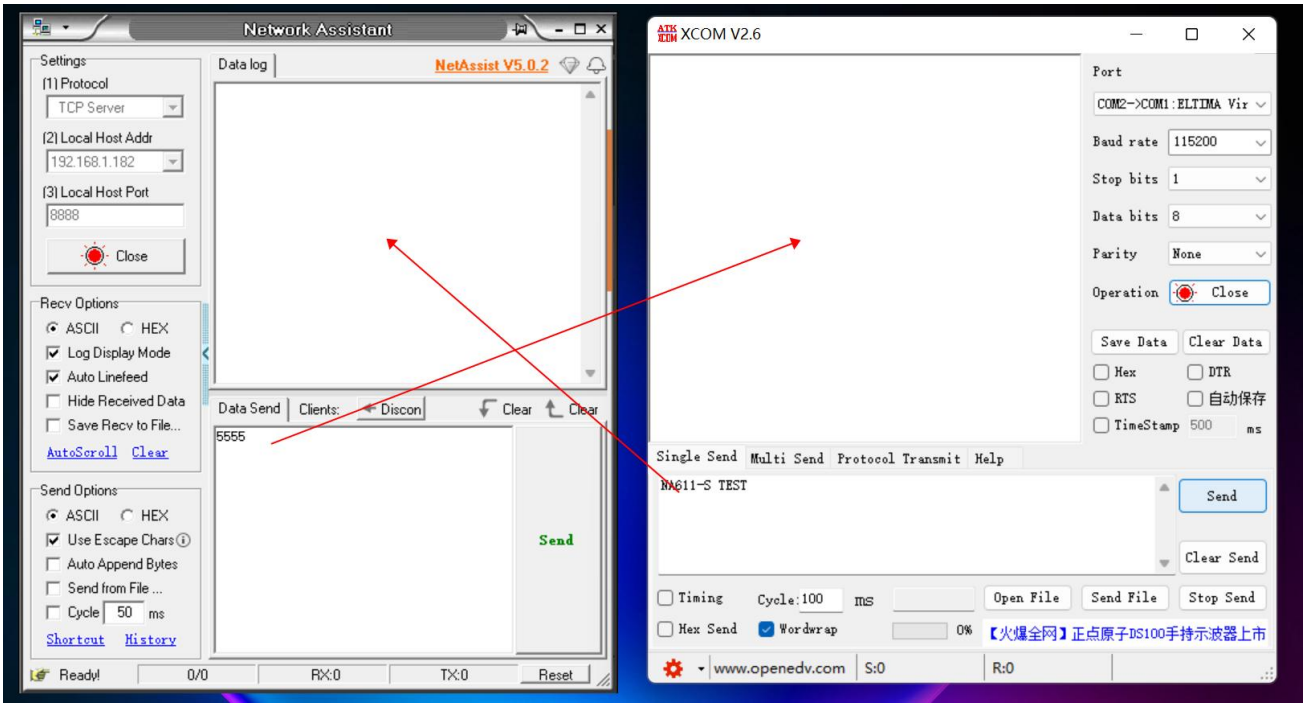
Keep the computer and the device connected to the same router (the connection is successful and LINKA is always on), the computer uses a dynamic IP (for the configuration method, refer to 2.4 AP mode communication test), open the network assistant, and connect to the device server (192.168.10.152:8888, obtain the IP according to the actual device) If the connection is successful, LINKB is always on), if you cannot connect according to the above configuration, it is recommended to turn off the computer firewall;

The communication test uses the serial assistant to send "EBYTE_NA6111_S_TEST_UART", the network assistant receives "EBYTE_NA6111_S_TEST_UART", the network assistant sends

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

"EBYTE_NA6111_S_TEST_NET", and the serial assistant receives "EBYTE_NA6111_S_TEST_NET";



Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3. Introduction

3.1. Specification

Model	WiFi version	Power	Frequency	Ports	Temperature
NA611-S	802.11 b/g/n	DC 8～28V	2.412GHz ～ 2.472GHz	RS485	-40℃ ～ +70℃
NA611-SA		AC 85～265V		RS485	

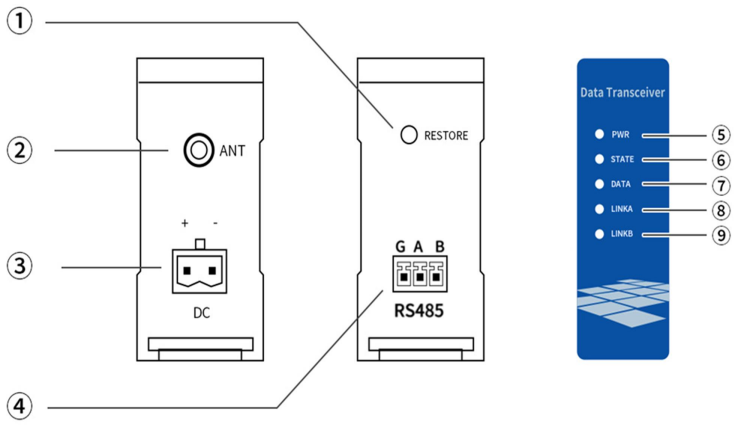
3.2. Technical specification

Item	Parameter
Operating Voltage	DC 8～28V / AC 85～265V
Communication Interface	RS485
Working frequency	2.412GHz ～ 2.472GHz
Maximum transmit power	16dBm ～ 18.5dBm @2.412GHz
Emission current	90mA @12V 瞬时功耗（2.412GHz）
receive current	30mA @12V 接收的平均功耗（2.412GHz）
WiFi version	802.11 b/g/n
Operating temperature	-40℃ ～ +70℃
Product Size	92 * 66 * 30 mm（长*宽*高）
Weight	95 g ± 5 g

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3.3. Port Description

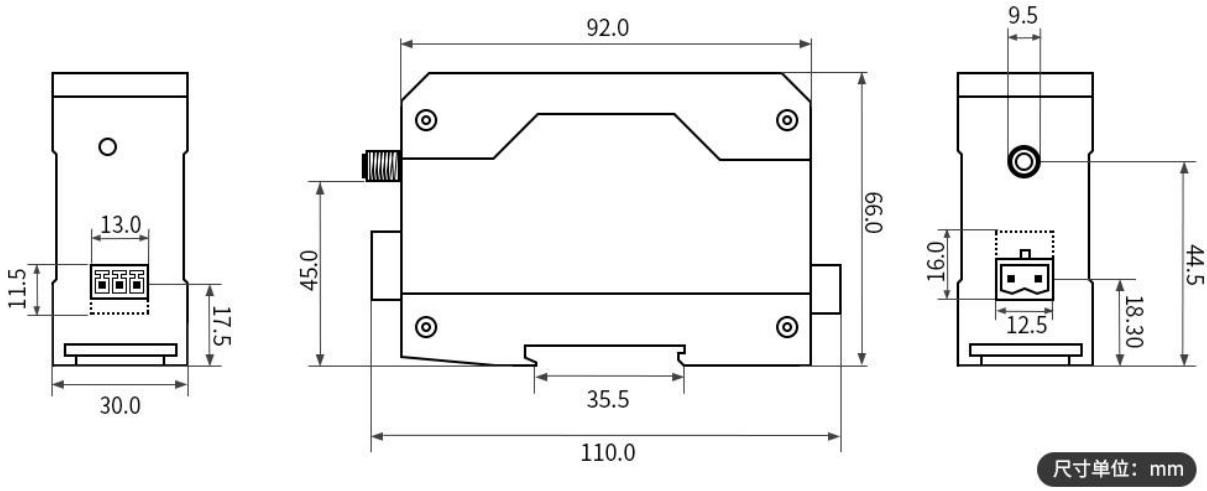


No.	Name	Function	Explain
1	Restore	Restart/factory reset button	Short press to restart, long press 5S device to restore factory
2	ANT	RF interface	SMA-K, male thread inner hole, characteristic impedance 50Ω
3	DC/AC	Power interface	DC/AC power input port, crimped port
4	RS485	RS485 communication port	Standard RS485 interface
5	PWR	Power Indicator	Lights up when the power is turned on
6	STATE	Fault indicator	Steady on: Device failure
7	DATA	Data transceiver indicator	Always off: no data is sent or received
8	LINKA	WIFI connection indicator	Flashing: WIFI or serial port receives data
9	LINKB	data link indicator	Steady on: WIFI connection is successful

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

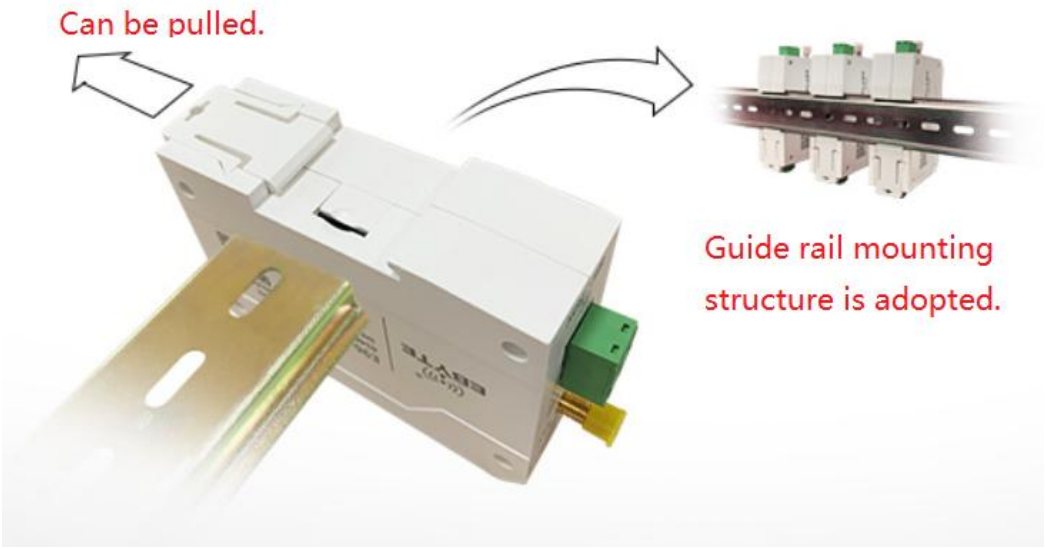
Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3.4. Size



3.5. Installation method

The equipment adopts the rail installation method.



Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3.6. Default parameters

Category	Name		Value
Serial port	baud rate		115200
	digit		8
	stop bit		1
	parity		无
	serial port timeout		50（ms）
	Serial frame length		1024
RF parameters	working frequency		2.4G
	channel		1
	transmit power level		0
	CountryCode		CN
AP role SSID parameter	SSID		NA611-S
	Whether to hide SSID		0（no）
	encryption type		2（WPA2）
	password		88888888
Operating mode	job role		AP
	transfer mode		透传
	service mode		TCP Server
STA connection parameters	target SSID		NA611-S
	encryption type		2（WPA2）
	password		88888888
	Connection Type		1
Heartbeat parameters	4 way socket is the same	Heartbeat type	0（turn off）
		Heartbeat timeout	5（Unit：S）
		Heartbeat data type	1（character string）
		Heartbeat data	343536
Registration package	4 way socket is the same	Registration package type	0（turn off）
		Registration package data type	1（character string）
		Registration package data	313233
Modbus	Modbus enabled		0（Turn off Modbus）
Static IP	IP address		192.168.8.46
	subnet mask		255.255.255.0
	routing address		192.168.202.197

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

	DNS address	114.114.114.14

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

4. Function

4.1. Serial port configuration

4.1.1. Parameter setting

Baud rate configuration：1200、2400、4800、9600、14400、19200、38400、57600、76800、115200、230400、460800bps；
Data bits：7, 8 bits (Modbus and multi-link distribution modes do not support 7 data bits);
Stop bit: 1, 2 bits;
Check digit: NONE (no check), ODD (odd check), EVEN (even check);

4.1.2. Cache function

The connection clears the serial port data, with a 15K (15*1024Bit) serial port cache. When the network is not connected, the data sent by the user will be recorded. After the network connection is successful, the data will be sent out normally.

4.2. Job role

4.2.1. AP mode（Access Point）

Access Point is referred to as AP mode, which is similar to a router, allowing wireless devices to connect and establish TCP/IP-based server, client, and UDP communications. In this mode, 3 stations are supported, and a maximum of 4 TCP sockets are supported.

4.2.2. STA mode（Station）

Station mode is abbreviated as STA. In this role, the device does not provide connection, but can only connect to an Access Point or a router. This device supports TCP server, TCP client, UDP in the Station role, and supports up to 4 sockets. The device works from other working roles. When switching to STA mode, the device will automatically enable DHCP to obtain IP, and automatically configure the subnet mask and DNS domain name server.

4.3. Transfer mode

Transmission mode refers to the number of sockets supported by the device under the TCP/IP protocol. When only

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

one socket is supported, we define it as single-mode transparent transmission, and when multiple channels are supported, we define it as protocol transmission.

4.3.1. Transparent transmission

Transparent transmission means that the device works in TCP Server, TCP Client, UDP Server, and UDP Client mode without enabling MQTT, HTTP, Modbus gateway and other protocol functions.

1. TCP Server

Let the device work as a TCP server, and the network device and the computer connect to the NA611-S through the TCP client.

2. TCP Client

Make the device work as a TCP client, connecting to the configured server.

3. UDP Server/UDP Client

Select the IP and port sent by the fixed network of the UDP Client device, and automatically forward the data to the target IP and port configured by the device after the serial port receives the data. Select the UDP Server device to record the IP and port of the last communication, and automatically forward the data after the serial port receives data to the recorded IP and port.

4.3.2. MQTT Mode

In the MQTT mode, the device supports IoT platforms such as Alibaba Cloud, Baidu Cloud, and OneNet. The service parameters created on the platform can be entered into the device to communicate, and the QoS0, QoS1, and QoS2 service quality levels are supported, and the address can be configured with a maximum of 72 characters. Festival;

productKey: Ali product key, Baidu device key, ONENET device ID, the maximum configurable length is 64 bytes

deviceName: Ali device name, Baidu user name, ONENET product ID, the maximum configurable length is 64 bytes

deviceSecret: Ali device key, Baidu password, ONENET authentication information, the maximum configurable length is 96 bytes;

Publish and subscribe topics up to 128 bytes.

1. Standard MQTT3.1.1 protocol

Based on the standard MQTT3.1.1 network communication, you need to fill in the relevant parameters (such as: Client ID, User Name, Password, etc.) to log in to the server, and support three service quality levels (QoS0, QoS1, QoS2).

2. Ali Cloud

For network communication based on Alibaba Cloud platform, you need to log in to Alibaba Cloud to obtain relevant parameters, including product secret key, device name, client ID and other information.

3. Baidu cloud

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

For network communication based on Baidu cloud platform, you need to log in to Baidu cloud to obtain relevant parameters, mainly including device name, user name, password and other information.

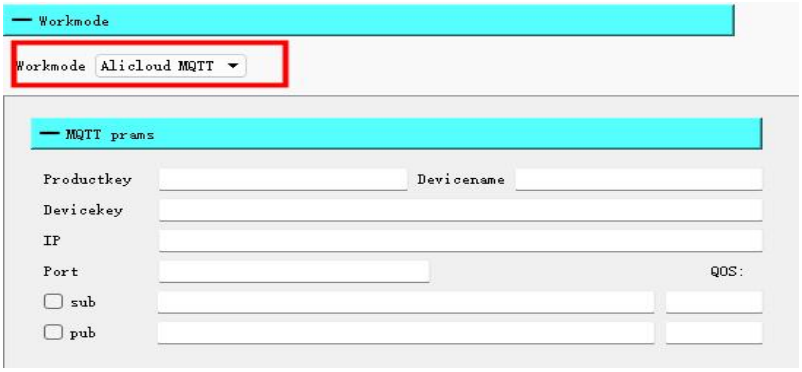
4. OneNET

For network communication based on the OneNet cloud platform, you need to log in to OneNet to obtain relevant parameters, including device ID, product ID, and authentication information.

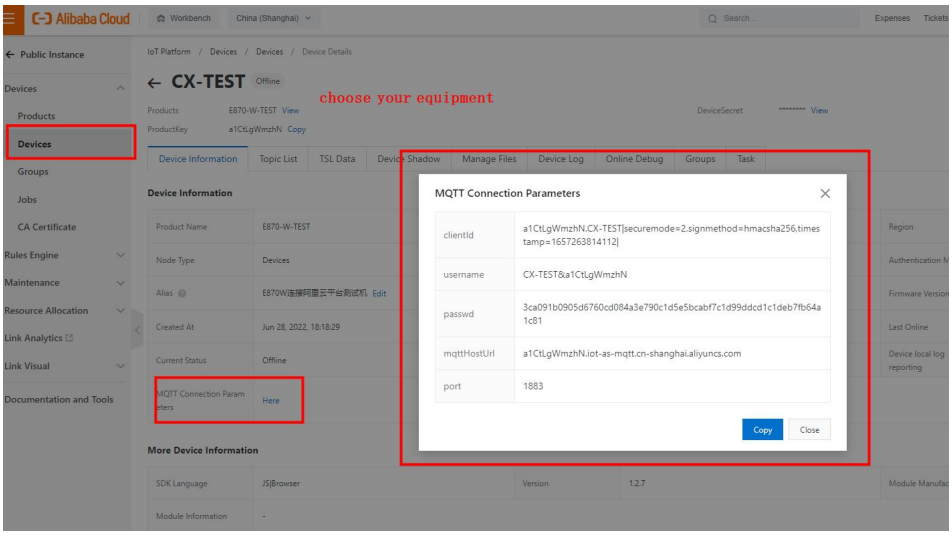
When in MQTT mode:

Support the connection of MQTT servers such as Alibaba Cloud, Baidu Cloud, ONENET and custom private clouds

The following is an example of how to use Alibaba Cloud



First, create products and devices on the Alibaba Cloud IoT platform. If not, you can view the operation method on the official website or Baidu, there are many tutorials on the Internet, the operation is simple, and then find the device you created on the device, click View on the right, and then click MQTT Link the parameter item to get the following interface.

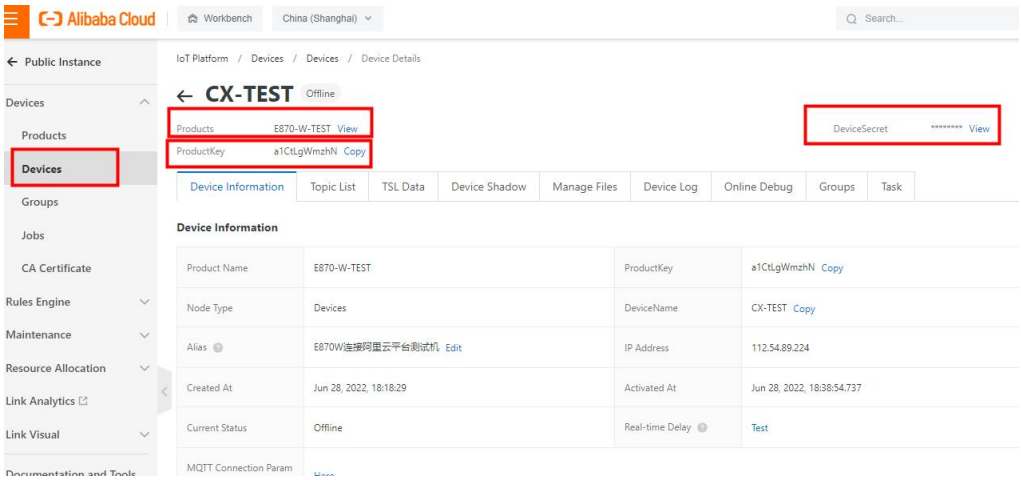


Fill the above mqttHostUrl into the above address bar and post in the above port bar. However, the above three columns such as clientID are ignored, because this is a packaged parameter, and our device will automatically package it for you, so fill in the following content in the three columns of product key, device name, and device key, and fill in the product to the device Name column, Productkey is filled in the product key column, DeviceSecret is

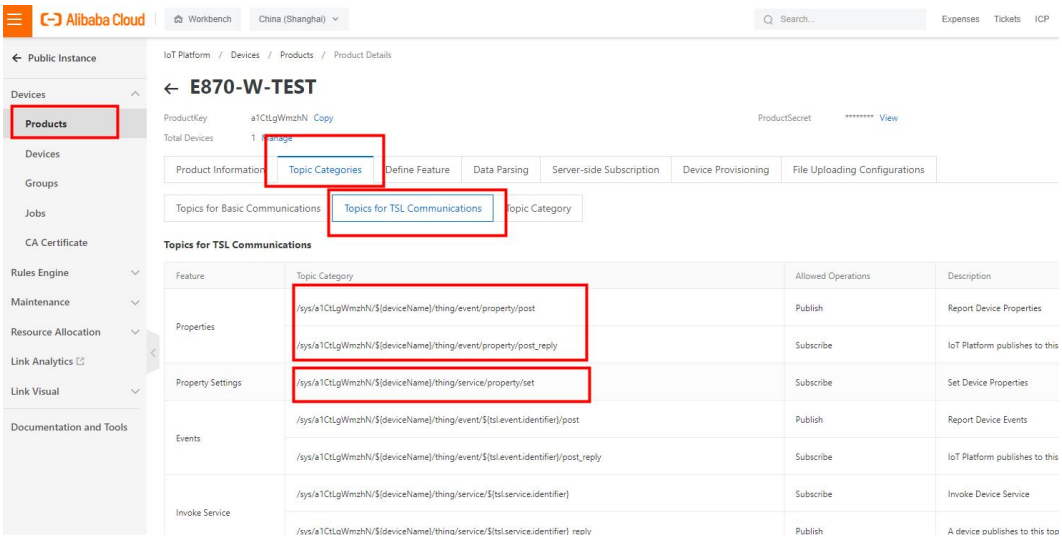
Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

filled in the device secret column.



Then check the subscribe/publish option below, fill in the topic of subscription and publishing, select your item in the product column, click View, and then find the content you want to subscribe and publish in the Topic category list and fill it in.



Simple configuration of the device

1. Select the corresponding serial port and configure the baud rate parameters correctly. The factory default baud rate is 115200, 8 data bits, 1 stop bit, and no parity bit (NONE);

2. Select the working mode of the device, the factory default AP mode, the following tests are carried out with the factory parameters, if the factory parameters are not, it is recommended to restore the factory (after the device enters the configuration according to the previous three steps and connects with the host computer, click on the upper right to restore the factory settings) and then carry out;

3. Configure the SSID of the device (factory default: NA611-S) and Password (factory default: 88888888), here do not modify the parameters that only query WiFi;

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000



4. Configure the link parameters, the factory default is server mode (TCPS), the default IP (192.168.1.1), and the port is 8888;

5. Turn off other advanced modes, the factory default is turned off;

4.3.3. HTTP mode

When using this function, you only need to select and start a trigger request to get the resources responded by the server. You don't need to care about the complex HTTP protocol layer. You can choose whether to output the HTTP header. HTTP supports two common request methods: POST and GET;
Request path (HTTP URL): configurable up to 128 bytes;
Request header (HEADER): The maximum configuration is 128 bytes, and the supported data can contain escape characters such as "\r\n";
When in HTTP mode





HTTP transmission mode: It is divided into POST and GET methods. When the HTTP information is set, the information in the information area is directly written, and the device will automatically seal the data packet before uploading to the network.

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

HTTP URL content: represents the URL part of the HTTP message body, such as the HTTP content part of the test above.

(POST method URL)

/devices/505619290/datapoints

(GET method URL)

http://api.heclouds.com/devices/505619290/datapoints?datastream_id=test_stream

HTTP domain name: represents the IP address of the target HTTP server, such as 183.230.33.80 in the above test content

HTTP port: Represents the port number of the target HTTP server, such as the appeal 80, the general HTTP port number is port 80

HTTP header content:Represents the HTTP header part, as appealed

api-key:SlxhH3MCLvuuvXJ0N=a14Yo6EAQ=\r\nHost:api.heclouds.com

After configuring the HTTP information , send {"datastreams":[{"id":"test_stream","datapoints":[{"value":28}]}]} （post message）You can POST information to the HTTP server, and send datastream _id=test stream to GET information from the HTTP server.

4.3.4. Network receive cache

All links have a total of 15K (15*1024Bit) network cache to alleviate the impact of the network speed being greater than the serial port speed during continuous transmission.

4.4. Support DHCP and domain name resolution

4.4.1. DHCP

AP mode supports dynamic allocation of I P of connected devices;

STA mode device can automatically obtain IP through the router, and automatically configure the subnet mask and DNS server, support modifying the subnet mask and DNS server, modification error may cause the device to work abnormally. It is recommended that the subnet mask be modified with the DNS server when dynamically acquiring IP (when statically switching to dynamic, the device automatically synchronizes the subnet mask with the DNS server).

4.4.2. DNS

When the other modes are switched to STA mode, the device automatically follows the router to configure the DNS server, and the user can enter the configuration of the custom DNS server again to meet the needs of custom domain name resolution.

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

4.5. Disconnection reconnection and no data reboot

Disconnected reconnection: The device periodically requests a connection after the disconnection to ensure that the connection can be restored in the event of an accidental disconnection (note that the device is not restarted);
No data restart: the user can customize the enable and disable the function (off by default), after opening the mode, if the device does not communicate data within the user configuration time (default: 120min, configurable 1-10080min), the device will automatically restart to prevent link blockage and cause non-functional operation.

4.6. Multilink distribution

When multiple sockets are supported, in order to distinguish the source and destination of the data, we define it as a protocol transmission, which contains a specified send and broadcast transmission, which requires the use of 1 hex (hex) transmission.

4.6.1. Protocol distribution specifies sending

1. Protocol Description
Send a description
[Protocol Distribution Header]+[Protocol Type]+[sockID]+[clientID]+ Data
Protocol distribution header: 0XAA + 0XFE
Protocol Type: 0X55 TCPS Communication 0X54 TCPC Communication 0X53UDPS Communication 0X52 UDPC Communication 0X51 HTTP Communication 0X50 MQTT Communication
SockID：00、01、02、03
ClientID：01、02、03、04、05、06、07、08
If working in client mode, the clientID is invalid.
{Note: There is a hidden function here, the host computer supports HTTP configuration, but the configuration method can only select radio POST or GET, you can (on the host computer or through AT) respectively set POST and Get the parameter, because in the device this parameter is originally separated, and then transmitted directly through the protocol using the POST and GET methods, when the protocol type is in HTTP communication mode, ClientID Flag bit 0 for using THE POST method, followed by POST data, and 1 for the GET method, followed by it GET data}

Specifies that the packet entered into the serial port contains a unique socked ID number, according to which the device transmits data to the corresponding socket connection. For example:

Fixed head	Socket ID		ClientID	data
3 Byte	1 Byte		1 Byte(Only server/HTTP mode takes effect)	N Byte
0xAA 0xFE 0xXX	Socket 0 Link	0x00	0x01	N Byte

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

（The last bit protocol type）	Socket 1 Link	0x01	...	N Byte
	Socket 2 Link	0x02	...	N Byte
	Socket 3 Link	0x03	...	N Byte

Note: If the send does not have a protocol distribution header, then the default is to broadcast to all connected links, and the ClientID in the protocol distribution header is sent 1-8 as A TCPS/UDPS to send information to a certain client (the device stores up to 8). Client Information), as for the client information that is currently connected, you can view the data through AT. If it is HTTP mode, a ClientID bit of 0 represents the use of the POST method and a 1 represents GET Method.
Protocol receipt instructions

Fixed head	Socket ID		ClientID	length	data
3 Byte	1Byte		1Byte	2Byte	N Byte
0xAA 0xFE 0xXX （The last bit protocol type）	Socket 0 Link	0x00	0x01	1-65535 Apply the data actual length value	N Byte
	Socket 1 Link	0x01	...		N Byte
	Socket 2 Link	0x02	...		N Byte
	Socket 3 Link	0x03	...		N Byte

4.6.2. Broadcast sending

Protocol Description
When the device link works in server mode, when the Socket ID is 0x00 or there is no protocol header before the data, it means broadcasting, if a 4-way connection is established, the data is sent to the 4-way socket at the same time. Otherwise, the data is sent to the established connection, and the data reception format refers to "Specify Send-Protocol Receive Instructions".

4.7. Heartbeat pack with registration pack

Heartbeat packages or enrollment packages are features that are only available in client mode, and this device supports customized heartbeat package data and registration package data content.

4.7.1. Heartbeat pack

The heartbeat packet can be configured as serial and network heartbeats, and the content can be selected from MAC and user-defined (support A SCII or HEX data, configurable up to 72Bit.) , HEX format halved).

4.7.2. Register the package

Registration package content selectable MAC and user definable (support A SCII or HEX data, configurable up to 72Bit, HEX format halved).

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

4.8. High-speed simulcasting（1M）

Support large file high-speed connection, the actual network reception of large files depends on the serial port baud rate, the larger the baud rate, the larger the support for large files, the network transmission is not affected.
Regarding high-speed simulcasting, the following issues need to be noted:

1. Serial port chip must be able to support to 1M baud rate model, the company test backplane using CP2102 series;
2. Serial port assistant software must be able to support to 1M baud rate, the company test use software is XCOM2.6;
3. The connection between the device and the PC should try not to go through the USB converter and connect directly to the USB3.0 port of the PC, otherwise it is easy to lose packets;

4.9. Modbus gateway

4.9.1. Simple protocol conversion

Simple protocol conversion: Convert Modbus RTU data to Modbus TCP data, or convert Modbus TCP data to Modbus RTU data to achieve Ethernet Modbus data and serial port Modbus data is transferred interchangeably.

4.9.2. Multi-host gateway

For simple protocol conversion, there can only be one Modbus master, and the function upgrade is carried out, and when multiple hosts access the Modbus gateway at the same time, the bus occupancy scheduling will be carried out, thus solving the bus conflict problem (currently only 8 host connections are supported), and only support working in TCP Server mode.

4.9.3. Storage gateway

Based on the multi-host development to optimize the network side read speed of the gateway, storage network side issued by the read instructions, when the network side reads the stored instructions, the gateway will replace the RTU device to quickly reply to modBUS TCP instructions, the serial port side automatically polls the RTU device register during the instruction storage time to update the data.
As an upgraded version of the multi-host mode, the storage gateway can only work in tcp server mode, which improves the response speed of the network side.
Peculiarity:

- The gateway allocates a total of 3K space for storing instructions and returning results;
- RTU responds to timeout automatic deletion of storage instructions to ensure the real-time nature of data;
- The gateway polls the RTU device according to the instruction storage time used for configuration, the MODBUS host does not query the instruction again at the storage time, and the gateway automatically deletes the storage instruction to free up memory;
- The first instruction is transmitted directly to the RTU device;

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

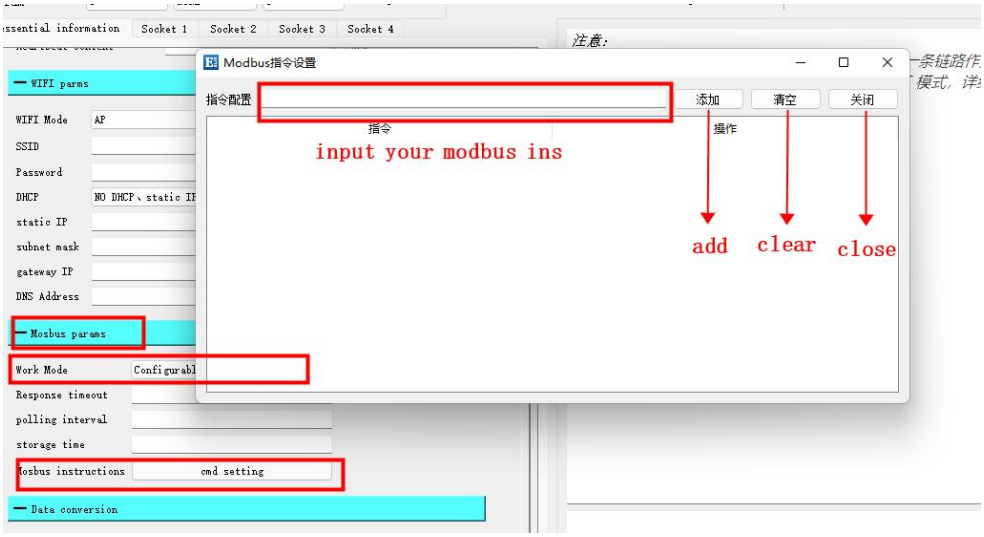
Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

- Only support 01, 02, 03, 04Modbus function code query result storage;

4.9.4. Configurable gateway

The serial port will automatically poll according to the configured Modbus instructions (only support 01, 02, 0 3, 04 instruction configuration). RTU device registers, unconfigured instructions and control instructions operate the RTU device directly. Frequently read instructions are stored in advance within the gateway, reducing response times throughout the process. Due to the above characteristics, the serial port side of the storage gateway can only be connected to the Modbus slave.

The device supports configuring 50 instructions via the host computer



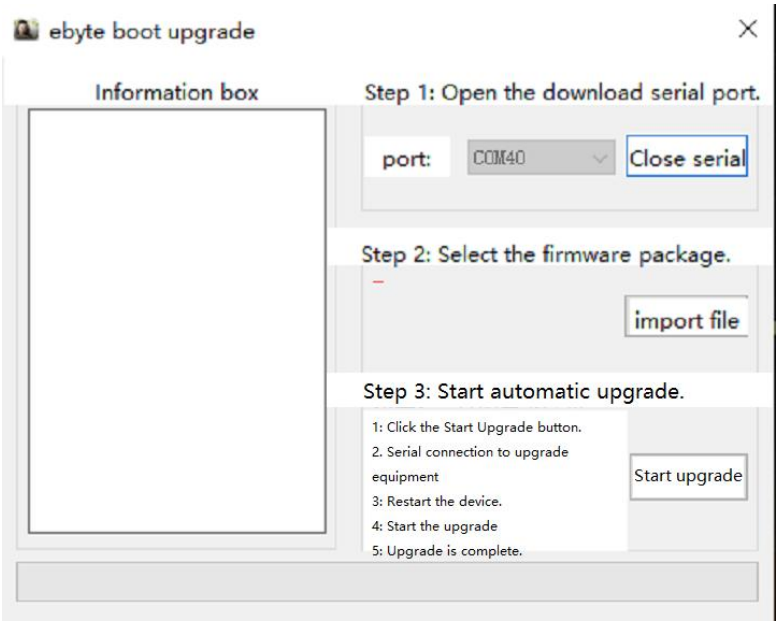
4.10. Serial port upgrade

The NA611-S can be upgraded and maintained via the serial port upgrade tool provided by us.

Step 1: Open the software, select the corresponding serial port, click to open the serial port;

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000



Step 2: Select the firmware that needs to be upgraded

Step 3: Click Upgrade, disconnect the device power and restart the device;

Step 4: Wait for the upgrade to complete, click Stop Upgrade;

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5. Parameter configuration

There are two ways to configure the parameters: serial port-based AT instruction configuration, UDP-based remote AT configuration, and serial port-based host computer. For detailed operation, see "NA611-S Instruction Manual Usage"。

5.1. Hardware factory restore

Hardware factory reset: long press the Restore button 5s (after the factory reset, all LED is on until the button is released), the device is restored to the factory; If you press 1.5S or above, below 5S, the device will restart but will not restore the factory settings.

5.2. Directive configuration

5.2.1. Serial port AT configuration

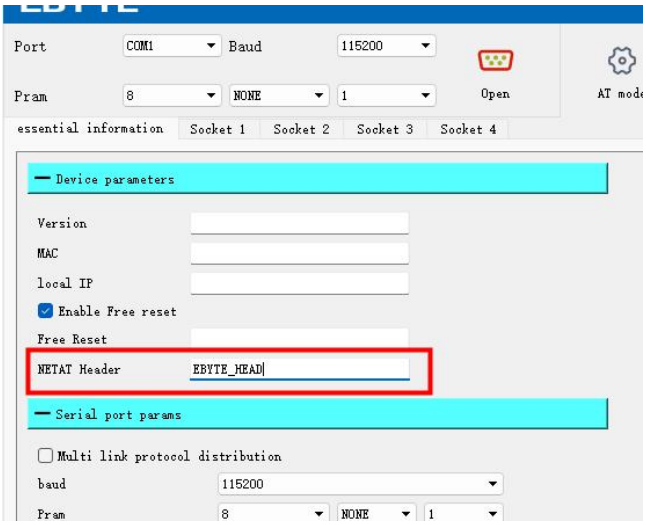
When you need to use the serial port AT command to configure the parameters, first send "+++", and send "AT" within 3s to enter the configuration mode, and the device will close the disconnection reconnection and restart without data in the configuration mode, and exit AT Restore the disconnected reconnection and dataless restart configuration after configuration. If the serial port does not receive "AT" or other non-"A T" data after 3s, the device resumes transmission.
For other directives, refer to "NA611-S Instruction Manual Use".

5.2.2. Network AT configuration

Same as serial port AT instruction, after connecting the link, refer to "NA611-S Instruction Manual Use".
The above bit computer is configured with a network AT header as shown below

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000



After the device is successfully connected, the network configuration can be performed by issuing a network AT command through the network assistant, as follows:

Note: The device must be in a communication state for this configuration method.

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

6. Revision History

version	Date of revision	Revision Notes	Maintainer
1.0	2022-04-19	Initial release	LM
1.1	2022-07-21	Content revision	LM
1.2	2022-09-13	Content revision	XXN
1.3	2023-01-31	Content revision	LT

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

7. About 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
---
Phone: +86 028-61399028
Web: https://www.cdebyte.com
Address: B5 Mould Park, 199# Xiqu Ave, High-tech District, Sichuan, China

Chengdu Ebyte Electronic Technology Co.,Ltd.

Copyright ©2012–2022，Chengdu Ebyte Electronic Technology Co.,Ltd.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000