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Chengdu Ebyte Electronic Technology Co.,Ltd.

MQTT Access to Alibaba Cloud

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I. Overview

The E103-W10 module is developed by Chengdu Ebyte Electronic Technology Co., Ltd. based on the ESP8285N08 chip of Espressif. The module integrates the AT command set of basic AT commands, WiFi function commands, TCP/IP commands, MQTT commands, and HTTP commands. This document describes how to use the MQTT AT command to connect the E103-W10 to the Alibaba Cloud enterprise IoT platform and implement subscription and publishing functions.

MQTT is a client-server based message publish/subscribe transport protocol. The MQTT protocol is lightweight, simple, open and easy to implement, which makes it applicable to a wide range of applications. In many cases, including constrained environments, such as: Machine-to-Machine (M2M) communication and the Internet of Things (IoT). Among them, communication sensors through satellite links, occasional dial-up medical equipment, smart homes, and some miniaturized devices have been widely used.

The enterprise IoT platform provides fully managed instance services, which can easily access and manage devices without self-built IoT infrastructure. It has the advantages of low cost, high reliability, high performance, and easy operation and maintenance. The powerful data processing capability can better analyze and visualize device data, and real-time security threat detection can ensure that each instance is safe and reliable, and it is the first choice for every enterprise device on the cloud.

II. Tools to be prepared

1. One Piece E103-W10 module (with backplane)
2. IPEX adapter cable and 1 piece 2.4G antenna
3.USB to Micro USB cable 1 piece
4. PC serial tool, used to send AT commands to E103-W10
5. 1 router with Internet access
6. A mobile phone (used to register an Alibaba Cloud account)

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III. Preliminary Preparation

3.1. Use E103-W10 base plate

Short-circuit 3.3V, RXD0, TXD0 on the bottom plate with a jumper cap, use an IPEX adapter cable to connect the 2.4G antenna, and then connect the E103-W10 to the PC through a USB to Micro USB cable. As shown in Figure 3-1.



Figure 3-1 Connection Diagram

Figure 3-2 and Figure 3-3 show the schematic diagram of jumper cap short circuit.

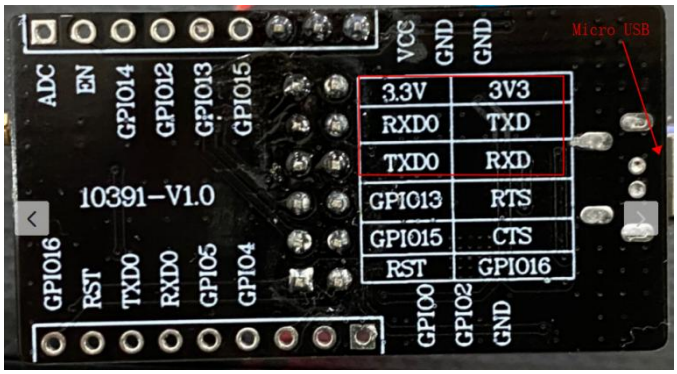


Figure 3-2 Back of the module

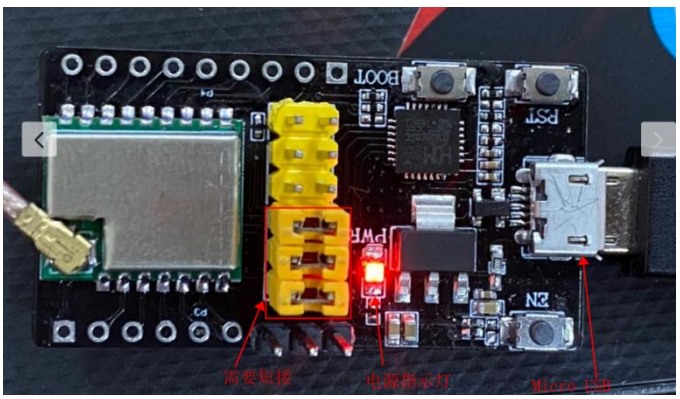


Figure 3-3 Module Front

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Open the serial port tool and take XCOM V2.6 as an example to verify the AT command. As shown in Exhibit 3-4.

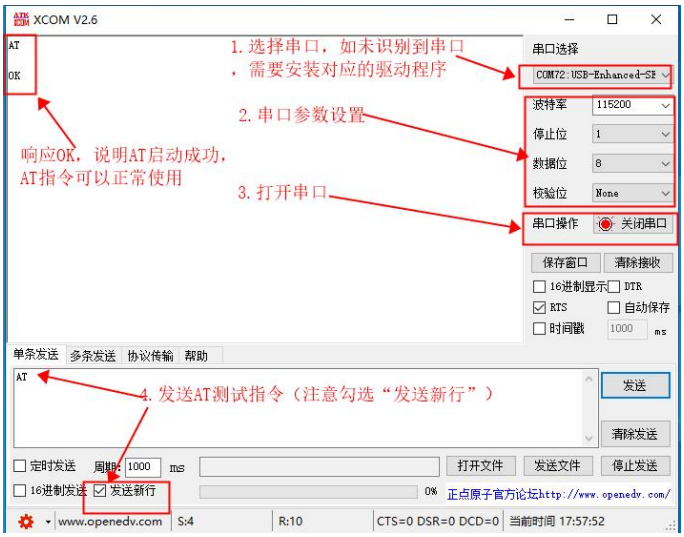


Figure 3-4 Verify AT command

If the serial port is not recognized, please follow the steps below to install the corresponding driver.

1) Check and install the serial port driver

Open the "Control Panel" on the PC, enter "Hardware and Sound", and select "Device Manager", as shown in Figure 3-5.



Figure 3-5 Enter Device Manager

2) Enter the "Device Manager", you can see the port number corresponding to the device, if there are multiple ports, please pay attention to distinguish it, as shown in Figure 3-6.

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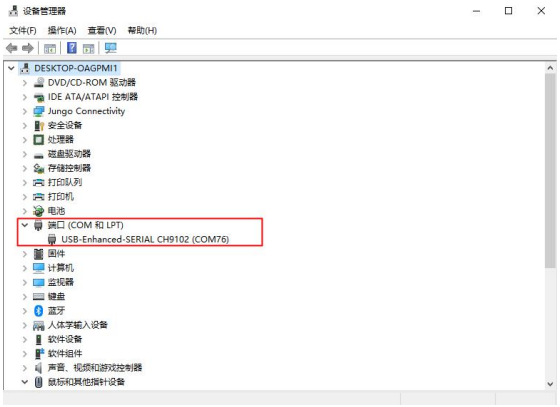


Figure 3-6 Check if the serial port is recognized

3). Download the driver

If the relevant port number is not found, you need to install the relevant driver. The driver download link is as follows, after opening, click to download directly. http://www.wch.cn/downloads/CH343SER_EXE.html.

4). Install the driver

Right-click the downloaded driver -> run as administrator -> install and wait for the installation to complete.

3.2. Directly use module to connect MCU

Except for connecting VCC and GND, the EN module has been pulled up by default and is a high level. Ensure that the E103-W10 enters the "normal operating mode" when powered on, see Table 3-1.

GPIO15	GPIO0	GPIO2	Boot 模式
0:low level	1:high level	1:high level	normal working mode
0:low level	0:low level	1:high level	Burn mode

Table 3-1 Boot Modes

IV. Configure Alibaba Cloud IoT platform

1. Search "Alibaba Cloud" on Baidu, as shown in Figure 4-1.

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Figure 4-1 Searching for Alibaba Cloud on Baidu

2. Select Product->Internet of Things IOT->Enterprise IoT Platform on the homepage of the official website, as shown in Figure 4-2.



Figure 4-2 Entering the enterprise IoT platform

3. Register an account, as shown in Figure 4-3.



Figure 4-3 Enter the registration interface

4. Select the registration method, you can use Alipay scan code registration or account password registration, both registration methods require mobile phone SMS verification code. As shown in Figure 4-4.

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Figure 4-4 Select the registration method

5. After successful login, on the "Enterprise IoT Platform" page, find the "Public Instance" window, as shown in Figure 4-5.



Figure 4-5 Enter the console

6. Enter "Public Instance", as shown in Figure 4-6.



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Figure 4-6 Public instance

7. Create the product as shown in Exhibit 4-7 and Exhibit 4-8.



Figure 4-7 Create a product



Figure 4-8 Fill in product parameters

8. Create the device as shown in Figure 4-9 and Figure 4-10.

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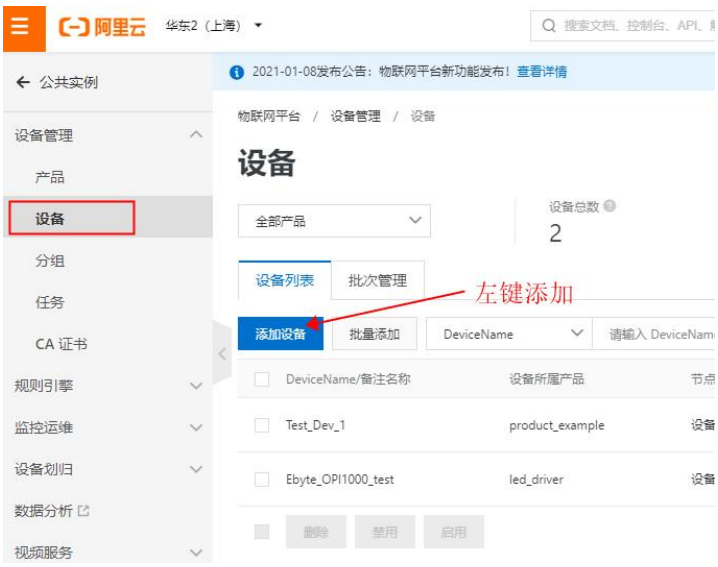


Figure 4-9 Adding a device to the product

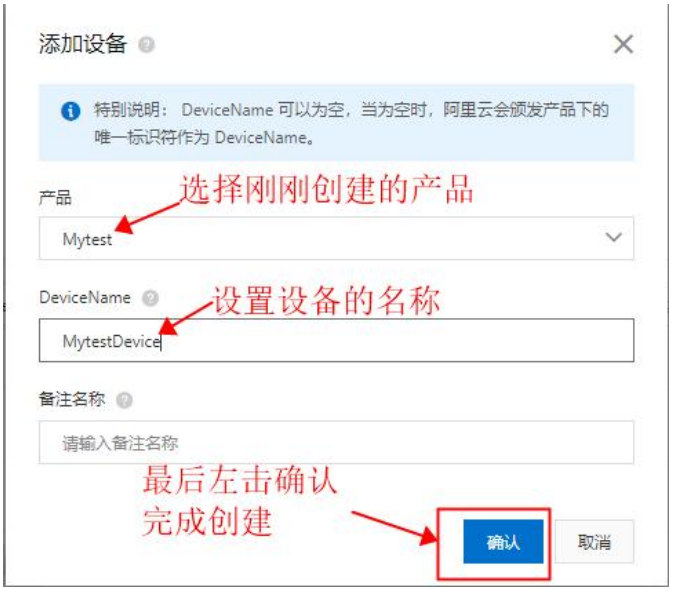


Figure 4-10 Setting Device Parameters

9. Set the functional definition of the product

Select "Product", left-click "View", select "Function Definition", and select "Edit Draft", as shown in Figure 4-11 and Figure 4-12.

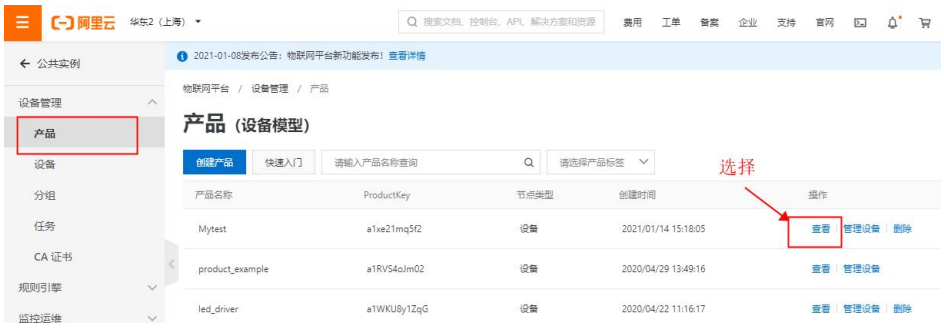


Figure 4-11 Enter the product interface

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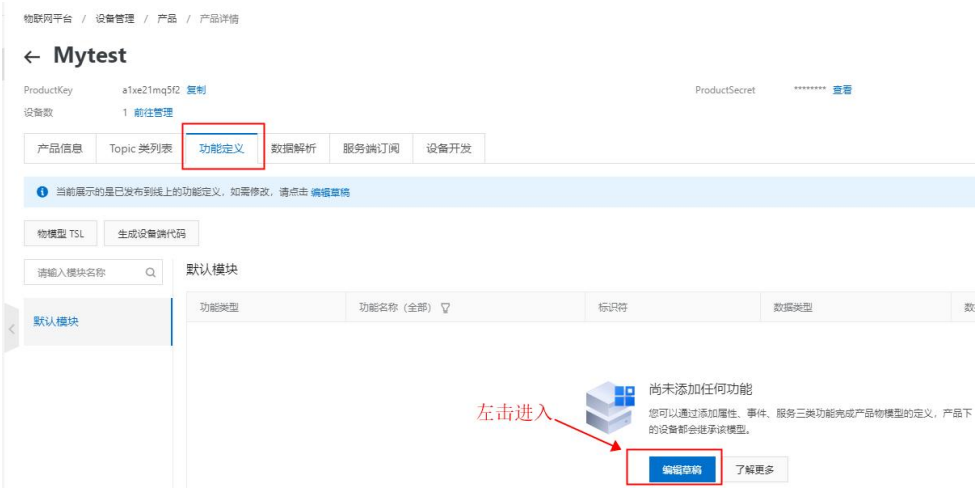


Figure 4-12 Product function definition interface

10. Add custom functions, as shown in Figure 4-13 and Figure 4-14.



Figure 4-13 Product Add Custom Function Interface

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Figure 4-14 Setting custom function interface

11. Release online, as shown in Figure 4-15.

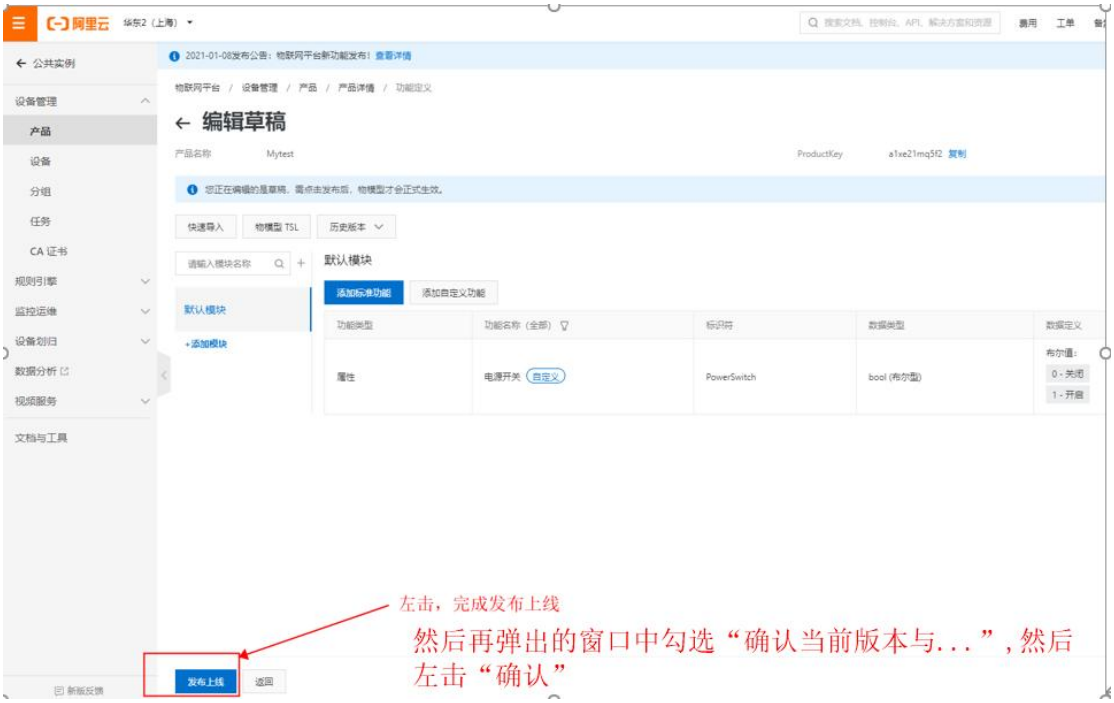


Figure 4-15 Release on-line

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V. Connect Alibaba Cloud Enterprise IoT Platform

Use the MQTT AT command to connect to the cloud, and complete the publication and subscription of related messages.

5.1. Calculation of MQTT AT command connection parameters

The relevant instructions are as follows:
//Set the time zone and SNTP server
AT+CIPSNTPCFG=1,8,"ntp1.aliyun.com"//1: SNTP server has been configured 8: Time zone "ntp1.aliyun.com": The domain name of the SNTP server is set to the China time zone here, select the STNP server of Aliyun .

//Connect WiFi command, take WiFi name "E880-IR01", password "JSZXE880" as an example.
AT+CWJAP="WiFi Name","WiFi Password"

AT+MQTTUSERCFG=0,1,"NULL","Username","Password",0,0,""// Username and Password are parameters of Alibaba Cloud MQTT

AT+MQTTCLIENTID=0,"ClienId" //The second parameter of clientId, note the separator "\" after each comma, for example: 12345|securemode=3\,signmethod=hmacsha1\,timestamp=777|

AT+MQTTCONN=0,"connection domain name",1883,1 //The connection domain name is the parameter of Alibaba Cloud MQTT, and the port number is used as a separate parameter.

The reference example is as follows:
E103-W10 is connected to router "E880-IR01", as shown in Figure 5-1.

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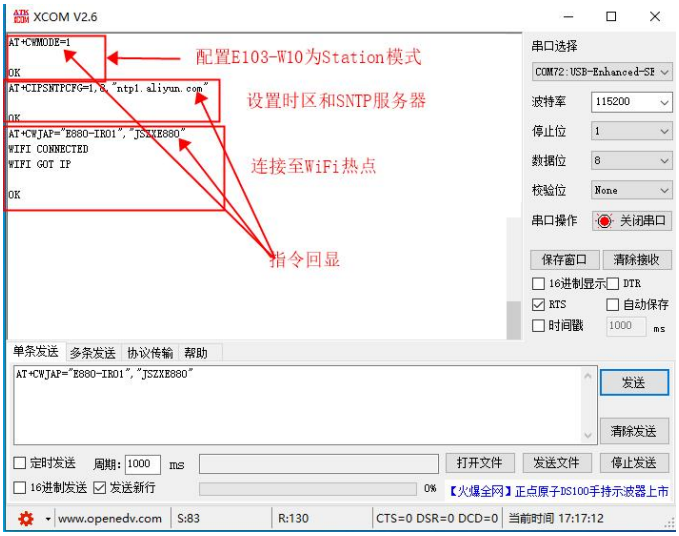


Figure 5-1 Connecting to the router

Configure MQTT and connect to the Alibaba Cloud IoT platform, as shown in Figure 5-2, Figure 5-3, and Figure 5-4.

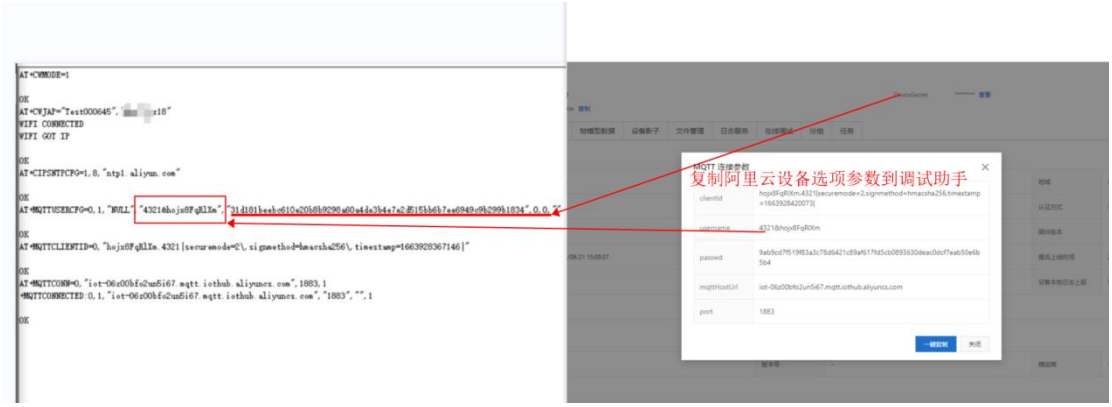


Figure 5-2 MQTT configuration

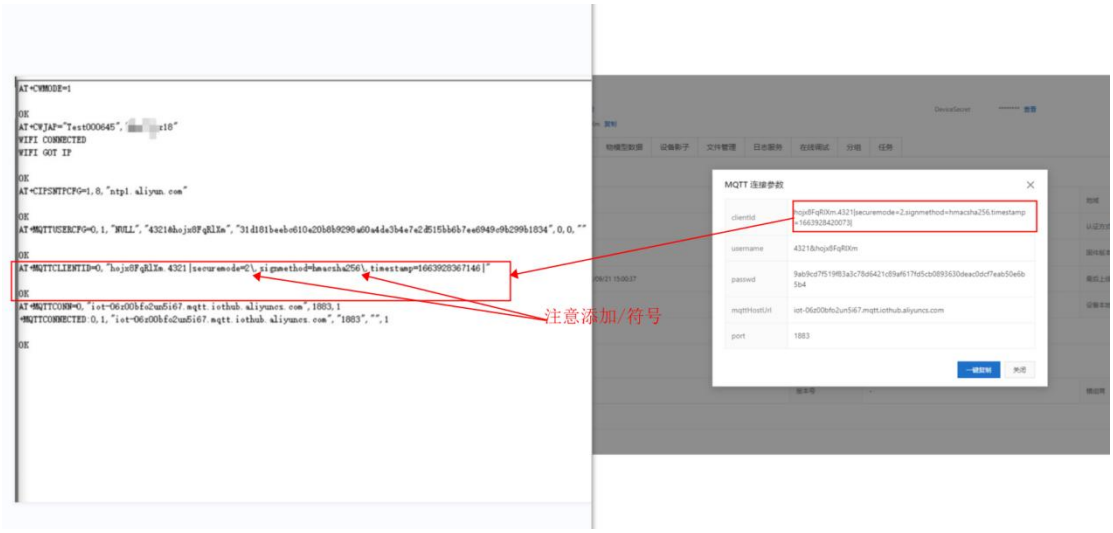


Figure 5-3 Setting ClientID

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Figure 5-4 Connecting to Alibaba Cloud

Now, we have successfully connected to the Alibaba Cloud enterprise IoT platform, and we can see that the device is online on the webpage, as shown in Figure 5-13.

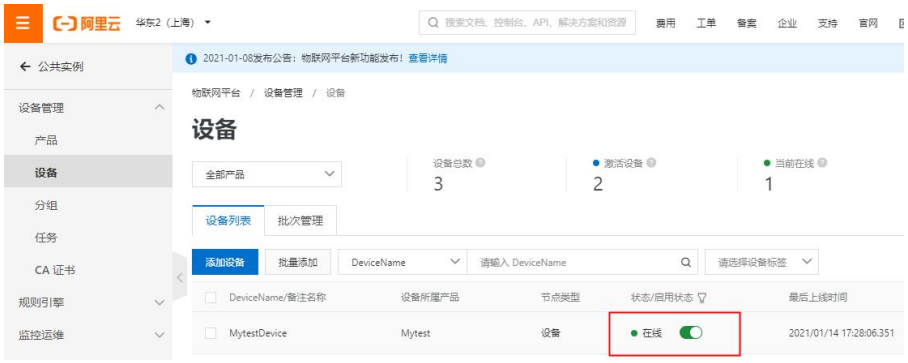


Figure 5-5 Device Status

VI. Alibaba Cloud Internet of Things Platform Communication

1. View the topic list of the product

On the web page, select Product->View, select Topic Class List->Physical Communication Topic, as shown in Figure 6-1.

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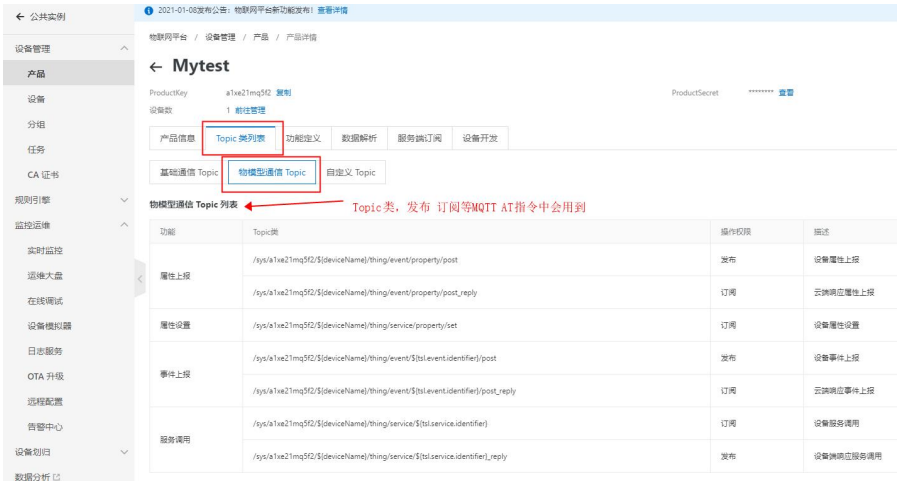


Figure 6-1 Topic list of products

2. Enter online debugging, and choose to debug the real device, as shown in Figure 6-2.



Figure 6-2 Online debugging

3. Check the running status of the device

On the web page, select Device->View, select the object model data, and select the running state, as shown in Figure 6-3.

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Figure 6-3 Equipment running status

4. Conduct a communication test

The relevant instructions are as follows:

Subscribe to topic AT+MQTTSUB=<LinkID>,<"topic">,<qos>

Release topic AT+MQTTPUB=<LinkID>,<"topic">,<"data">,<qos>,<retain>

To subscribe the settings of device property, <"topic">refer to the "topic class" of property settings in the topic list in step 1 of this chapter. The AT command reference format is as follows:

AT+MQTTSUB=0,"/sys/a1xe21mq5f2/MytestDevice/thing/service/property/set",1 //The blue font part has been replaced with the device name of the device.

Examples of Topic classes and operations are shown in Figure 6-4 and Figure 6-5.

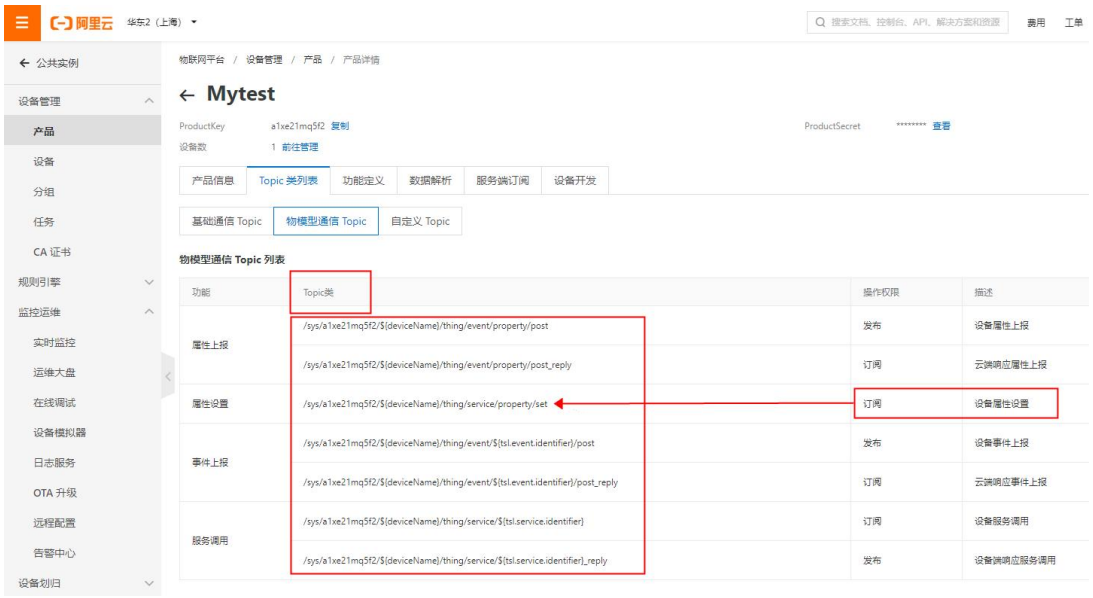


Figure 6-4 Device property setting Topic class

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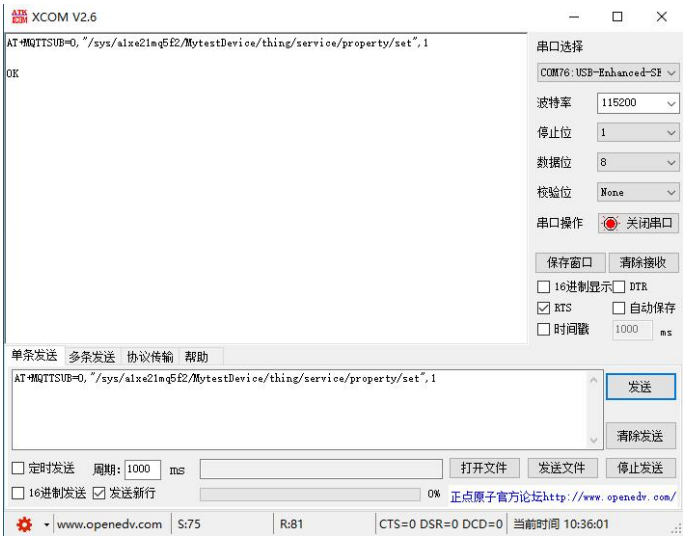


Figure 6-5 Subscription device property setting command

To issue device property setting instructions on the webpage, please refer to step 2 of this chapter. As shown in Figure 6-6 and Figure 6-7.



Figure 6-6 Web page delivery property settings



Figure 6-7 E103-W10 receives device property setting command

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To subscribe to the cloud response attribute report, refer to the "topic class" of the attribute setting in the topic list in step 1 of this chapter, as shown in 6-8.

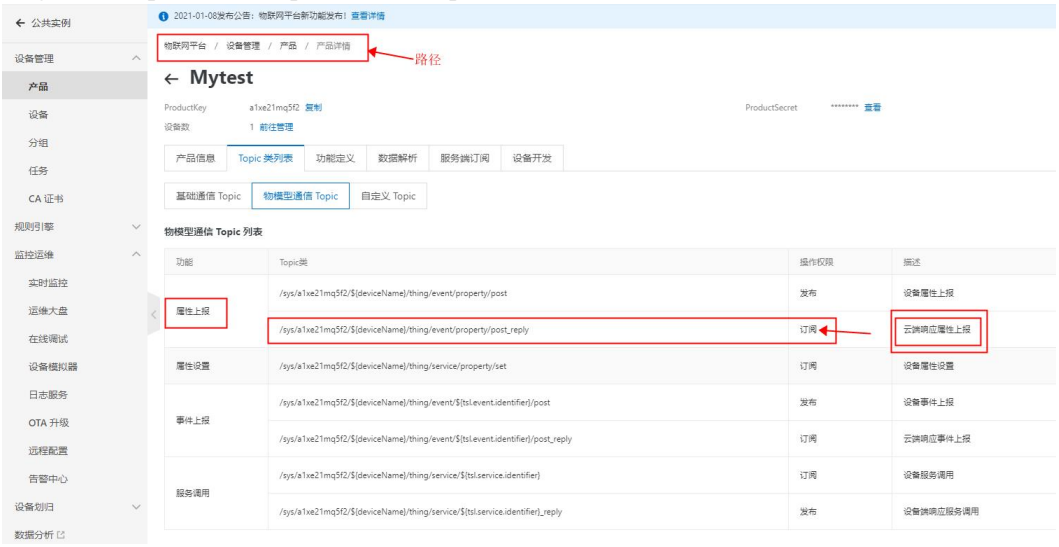


Figure 6-8 Cloud response attribute reporting Tooptic class

The reference AT command is as follows, where the device name is MytestDevice:
AT+MQTTSUB=0,"/sys/a1xe21mq5f2/MytestDevice/thing/event/property/post_reply",1
An example of operation is shown in Figure 6-9.

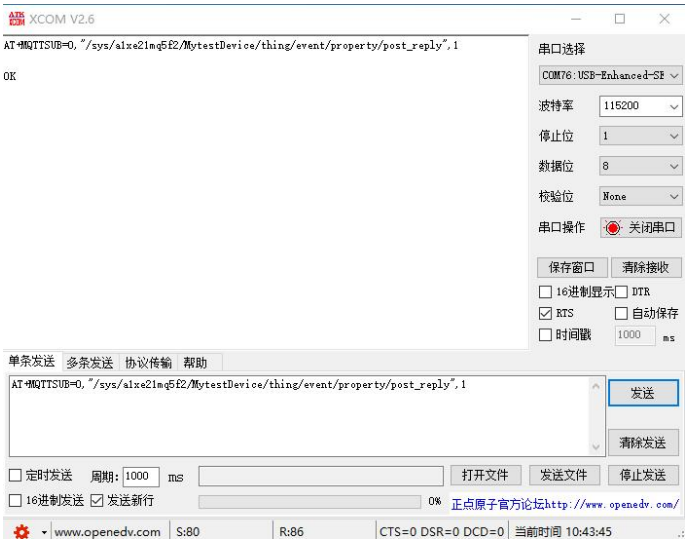


Figure 6-9 Cloud response attribute and report command

Report device attribute information. Topic class is shown in Figure 6-10.

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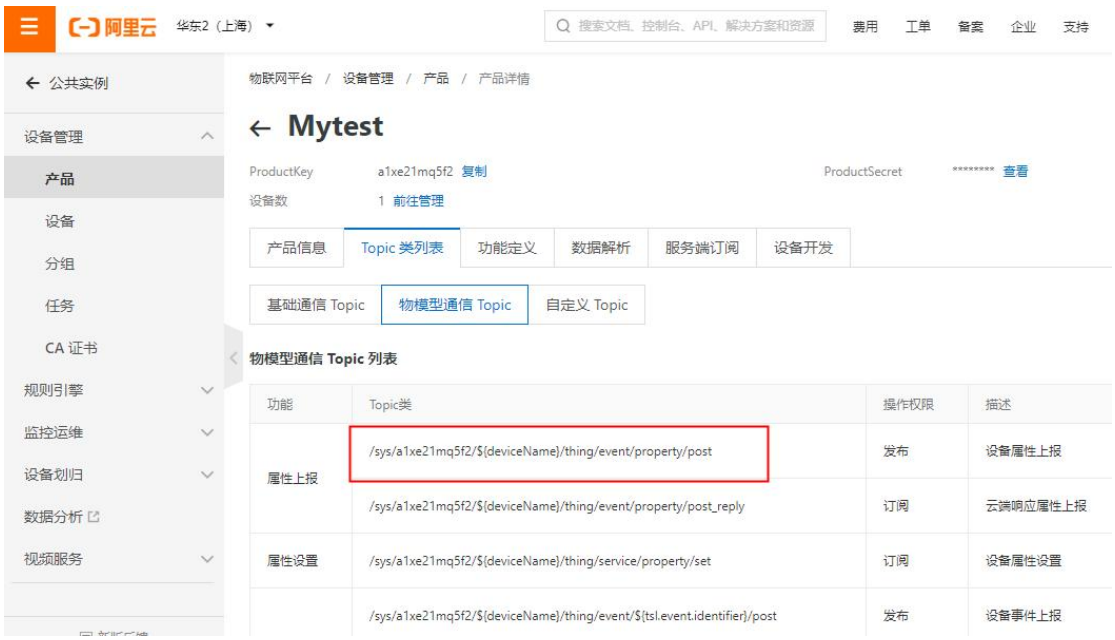


Figure 6-10 Device attribute reporting Topic class

AT command reference format

AT+MQTTPUB=0,"/sys/a1xe21mq5f2/MytestDevice/thing/event/property/post","{\"method\":\"thing.service.property.set\"\,\"id\":\"715904551\"\,\"params\":{\"PowerSwitch\":1}\,\"version\":\"1.0.0\"}",1,0

//In the third parameter, double quotes and commas need to be escaped. {\"PowerSwitch\":1} means reporting the power switch: ON.

An example of instruction operation is shown in Figure 6-11.

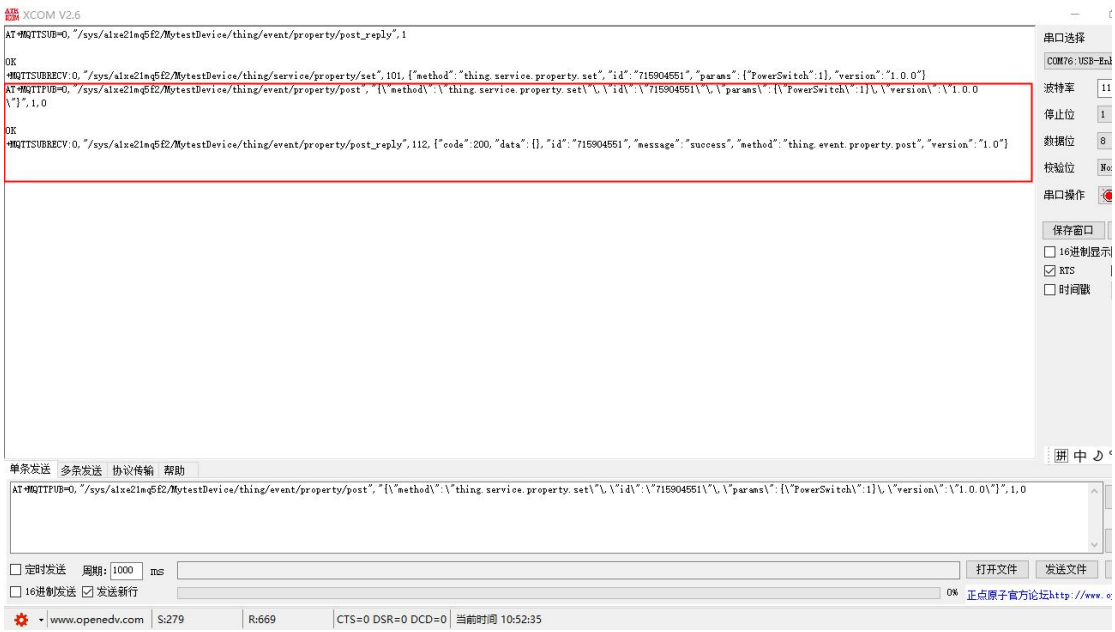


Figure 6-11 Device attribute reporting command - power on

View the running status of the device in the cloud, as shown in Figure 6-12.

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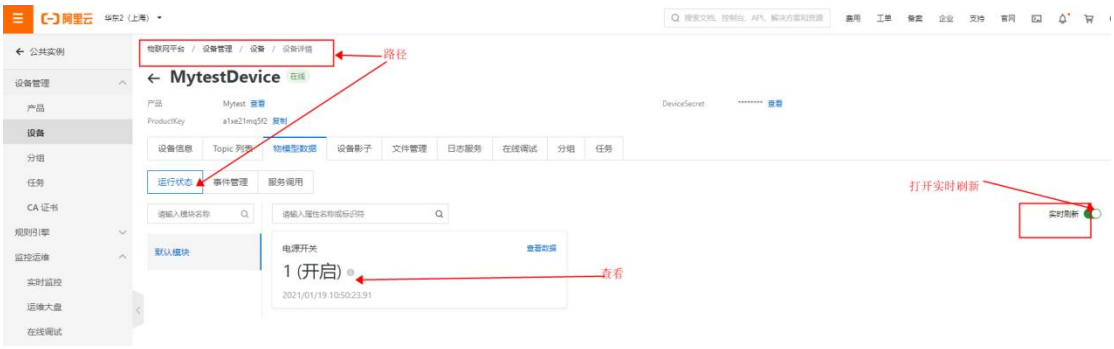


Figure 6-12 View the device running status in the cloud

Change {\"PowerSwitch\":1} in the above AT command to {\"PowerSwitch\":0}, that is, report the power switch: off. As shown in figure 6-13 and figure 6-14.



Figure 6-13 Device attribute reporting command - power off



Figure 6-14 Check the power switch status in the cloud

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VII. About Us

Chengdu Ebyte Electronic Technology Co., Ltd. is a high-tech company focusing on Internet of Things applications and a national high-tech enterprise. The company can provide customers with complete solutions and technical services in wireless communication, sensing, acquisition, control, cloud platform and other fields, shorten the research and development cycle and reduce research and development costs.

Our products have been widely used in consumer electronics, industrial control, medical, security alarm, field collection, smart home, highway, property management, water and electricity meter reading, power monitoring and other application scenarios.

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