

# E103-W14 Series User Manual

### WiFi+BLE5.2 low power WiFi serial port module



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#### **1** Overview

#### **1.1 Introduction**

The E103-W14 series is a low-power, cost-effective Wi-Fi & Bluetooth module developed by Chengdu Ebyte Electronics Co., Ltd., which complies with Bluetooth 5.2 and IEEE 802.11b/g/n standard protocol. The module integrates the hardware and software resources required for complete Wi-Fi and Bluetooth applications, supports AP, STA, AP+STA 3 Wi-Fi working modes and low-power Bluetooth, and is very suitable for low-rate applications and data acquisition applications such as smart home and industrial control.

In terms of functions, the module supports IEEE802.11 b/g/n standards and Bluetooth BLE5.2 protocol . The module can work in STA and BLE slave modes at the same time , and supports multiple network transmission protocols such as TCP/UDP/HTTP/MQTT .



#### **1.2 Features**

- Support IEEE802.11 /b/g/n standards and work in 2.4GHz frequency band;
- Support Bluetooth BLE5.2 protocol and operate in 2.4GHz frequency band;
- Support 3 working modes: AP, STA, and AP+STA;
- Support module STA and BLE slave to work simultaneously ;
- Support WPA2 WIFI security authentication method;
- Support multiple network communication protocols such as TCP/UDP/HTTP/MQTT;
- Support up to 6 socket connections;
- ◆ AP access point supports 3 -way STA device connection;
- Support SNTP network time acquisition (on the premise of Internet access);
- Support MQTT and MQTTS network protocols (Alibaba Cloud, Baidu Cloud, OneNet)
- Support HTTP Client;
- Support TCP SERVER/TCP CLIENT, UDP communication mode;

- Support AT command configuration;
- Support static IP address allocation and DHCP dynamic allocation;
- Support scanning nearby AP information;
- Support WIFI fast connection;
- Support automatic adjustment of Bluetooth packet length ;
- Support WiFi and Bluetooth slave mode switching;
- Maximum MTU is 244 bytes;

### **1.3 Application Scenario**

-Medical and healthcare

- Multi-parameter patient monitor
- Electrocardiogram (ECG)
- Hospital electronic bed and bed control system
- Telemedicine system
- Building and home automation:
- HVAC systems and thermostats
- Video surveillance, video doorbells, and low-power cameras
- Building security systems and low-power electronic locks
- Smart appliances
- Smart Wear
- Asset tracking
- Factory Automation
- Grid infrastructure

# 2 Specifications

### 2.1 RF parameters

DEmonstern		Mo	del	Demerk
KF parameters	unit	E103-W14X	E103-W14	Kemark
WiFi Protocols	-	IEEE 802	2.11b/g/n	
Bluetooth Protocol	-	BLI	E5.2	
Wi-Fi transfer rate	-	<ul> <li>802.11b: 1 Mb Mbps, 11 Mbp</li> <li>802.11g: 6 Mb Mbps, 18 Mbp Mbps, 48 Mbp</li> <li>802.11n: HT20</li> </ul>	ps, 2 Mbps, 5.5 s ps, 9 Mbps, 12 s, 24 Mbps, 36 s, 54 Mbps 0 (MCS0~MCS7)	
Antenna type	-	IPEX	PCB board antenna	Characteristic impedance is about 50 ohms
Reference distance	М	500	200	Antenna gain 5dBi, module

			communicates with device
Frequency band	GHz	2.4 (WiFi, Bluetooth)	Supports the global license-free ISM 2.4GHz frequency band

### 2.2 Electrical parameters

г	)F		*4	Mo	del	Dement				
ľ	cr paramete	rs	unit	E103-W14X	E103-W14	Кетагк				
Oj	perating Volt	age	V	2. 7 -	3.6V	Over 3.6 V will permanently burn out the module				
Communication le		level	V	3.3		Using 5V TTL may burn out				
	Transmi	it power	dBm	18		18		18		
	Emissio	n current	mA	20	00					
	Receivin	g current	mA	3	3					
Power consump tion	Sleep current	Sleep1	uA	3	3	In this mode, the clocks of the MCU and all digital peripherals are stopped, and the system has only a 32K clock. At this time, only some hardware modules are working, and only GPIO interrupts and AON counter interrupts can wake up the system to restore to normal voltage and continue running.				
		Sleep2	uA	0.	5	In this mode, the system has only 32K clock, and only some hardware modules are working. Except for the AON module, other hardware modules are powered off.				
Tempera	Operating t	emperature	°C	-40~	~+85	Industrial Grade				
ture	Storage te	mperature		-40~	+ 95					

# 2.3 Hardware Parameters

Hand-nana Danamatana	Model		Demark
Hardware Parameters	E103-W14X	E103-W14	кетагк
Flash	2 N	ИB	
RAM	256	KB	
Frequency	120MHz		
Packaging	Pate	ches	
Size	10*10mm	14.5*10mm	The error size is $\pm 0.2 \text{ mm}$
Weight	0.4±0.1g	1.2±0.1g	The error is ±0.1g

# **3** Mechanical dimensions and pin definition

### 3.1 E103-W14X Pin Diagram



### 3.2 E103-W14 Pin Diagram



Pin num ber	Pin Name	Pin Type	Pin Purpose
1	GND	-	Power Ground
2	NC	-	Empty feet
3	VBAT	-	VCC recommended 3.3v
4	GPIO24	I/O	GPIO
5	GND	-	Power Ground
6	GND	-	Power Ground
7	CEN	-	The chip enable pin is valid at a high level (the module has an internal pull-up, and the customer can use this pin to implement the hardware reset pin function).
8	ADC1	Ι	Analog input pin (no software function yet)
9	GPIO6	I/O	GPIO
10	GPIO8	I/O	GPIO
11	NC	-	Empty feet
12	GND	-	Power Ground
13	GPIO9	Ι	Default SLEEP wake-up pin (rising edge or falling edge is valid, depending on the actual configuration of the customer)
14	TXD	0	Module serial port sending
15	RxD	Ι	Module serial port receiving
16	GPIO1	I/O	GPIO
17	GPIO0	I/O	GPIO
18	GND	-	GPIO

#### E103-W14&E103-W14X pin definition:

# 4 Recommended connection diagram



#### Notice:

The power supply must be guaranteed to be between 2.7 V and 3.6 V. To ensure stable operation of the module, it is recommended to select an external LDO with a power supply capacity greater than 500 mA.

### **5** Function Description

This module can work in WiFi mode and ble mode through instructions. From the perspective of the WiFi layer, the module can work in AP, STA, STA+AP mode. From the perspective of the BLE layer, the module currently only supports the slave role. From the perspective of the network layer, the module supports TCP (server, client), TLS (server, client), UDP, HTTP, MQTT.

#### 5.1 Working Mode

This section describes supported working mode.

#### 5.2 Access Point (AP Mode)

Access Point is referred to as AP mode, which is similar to a router. It allows wireless devices to connect and establish server, client, and UDP communications based on TCP/IP. This mode supports connecting 3 stations and supports up to 6 TCP socket transmissions. Use the command AT+CWMSAP to configure the module to initialize AP.

#### 5.3 Station (STA mode)

Station mode is referred to as STA. In this role, the module does not provide connection and can only connect to Access Point or router. This module supports TCP server, TCP client, UDP, and supports up to 6 sockets in the Station role. It also supports MQTT and HTTP client. The command AT+C WJAP enables the module to connect to AP as STA role.

#### 5.4 SoftAP+STA mode

That is, it is in AP and STA mode at the same time. Use AT+CWSAP and AT+CWJAP commands to make the module work in SoftAP mode and STA mode at the same time. In this mode, it supports connecting to one AP at most and connecting to two STAs.

#### 5.5 Internet function

This module supports TLS server TLS client TCP server, TCP client, UDP, MQTT, HTTP client and other functions. All network functions can be used at the same time, for example, you can open a TCP server and act as a TCP client to connect to other ones at the same time. ( Note that in addition to the TLS function, since TLS will occupy a lot of resources, the TLS link can only be used alone ).

#### 5.5.1TCP server

The module can initialize a TCP Server. In this mode, it can only connect to 5 SOCKETs at most. After the module initializes a server, the entire module shares 5 sockets in total. For example, after the server module connects to 5 clients, the server module can no longer connect to other server modules as a client. On the contrary, if the server module only connects to 4 clients, the module can still connect to a server as a client.

#### 5.5.2TCP client

The module connects to other TCP servers. In single TCP client mode, up to 6 sockets can be connected .

#### 5.5.3TLS Server

The module is initialized as a TLS server. In this mode, only one TLS encrypted socket can be connected. Supports TLS 1.2

#### 5.5.4TLS Client

The module only supports tls single link. That is, if TLS Client mode is used, only one socket can be supported.

#### 5.5.5UDP

You can use the udp mode of AT+CIPSTART to communicate with the remote UDP service that is listening. The module supports a maximum of 6 sockets. (Note : This module does not support the UDP listening function.)

#### 5.5.6MQTT

In MQTT mode, the module supports IoT platforms such as Alibaba Cloud, Baidu Cloud, and OneNet. Simply enter the service parameters created on the platform into the module to start communication.

#### 5.5.6.1Ali Cloud

For network communication based on the Alibaba Cloud platform, you need to log in to Alibaba Cloud to obtain relevant parameters, mainly including product keys, device names, client IDs, and other information. For details, see Chapter 7 Alibaba Cloud Configuration Tutorial.

#### 5.5.7 HTTP Client

When using this function, you only need to configure the corresponding server resource symbol URL and start a trigger request to obtain the server response resources. You do not need to worry about the complex HTTP protocol layer. For details, see the AT command manual

#### 5.6 Low power consumption

This module has two low power modes

Low voltage sleep (AT+SLEEP=2) is a relatively power-saving sleep mode. In this mode, the clocks of the MCU and all digital peripherals are stopped, and the system has only 32K clocks; at this time, only some hardware modules are working, and only GPIO interrupts and AON counter interrupts can wake up the system to restore to normal voltage and continue to run.

Deep sleep (AT+SLEEP=1) is a relatively power-saving sleep mode. In this mode, the system has only 32K clocks, and only some hardware modules are working. Except for the AON module, other hardware modules have been powered off. When the GPIO interrupt or RTC timeout interrupt wake-up signal is triggered, the system exits the deep sleep state. (Note: Wake-up will reset the system.)

#### 6 Tutorial

This module has many functions, and relevant parameters need to be configured before use so that it can work normally. In the following tutorials, the operations marked with \* are required. Please set them according to your needs when using other modes.

#### 6.1 Basic module WiFi connection

#### 6.1.1WiFi connection between modules

This section mainly demonstrates the WiFi connection between modules

- 1) Module 1 uses AT+CWSAP=fortest, 12345678, 1,6 to enable the AP function of the module
- 2) After module 1 turns on AP, module 2 uses AT+CWJAP=fortest,12345678 to connect to module 1.
- 3) Module 2 returns OK, which means it has started to connect to AP, but the connection is not successful at this time. Wait for the module to return WIFI GOT IP, which means the connection is successful.

As shown in the figure below, the left side is module 1 and the right side is module 2.

XCOM V2.6	- 🗆 ×	XCOM V2.6	- 🗆 X
[2024-04-29 19:36:45.640]	串口选择	[2024-04-29 19:37:03.959]	串口选择
TX: AT+CWSAP=fortest, 12345678, 1, 6	COM13:USB-SERIAL CH34 $\vee$	TX: AT+CWJAP=fortest, 12345678	COM15:USB-SERIAL CH34 $\lor$
[2024-04-29 19:36:45.714]	波特率 115200 ~	[2024-04-29 19:37:04.029]	波特率 115200 ~
AA: AI "UNDAF-TOTTEST, 123400(0, 1, 0	停止位 1 🗸	KX: AI "U¥JAY"=fortest, 12345676	停止位 1 ~
[2024-04-29 19:36:47.233]	数据位 8 🗸	[2024-04-29 19:37:04.168]	数据位 8 ~
	校验位 None ~		校验位 None ~
	串口操作 🔶 关闭串口	EX: WIFI CONNECTED	串口操作 🔶 关闭串口
	保存窗口 清除接收	[2024-04-29 19:37:05.732]	保存窗口 清除接收
	□ 16进制显示□ DTR		□ 16进制显示□ DTR
	□ RTS □ 自动保存		□ RTS □ 自动保存
	☑ 时间戳 50 ms		☑ 时间戳 50 ms
《单条发送 多条发送 协议传输 帮助		单条发送 多条发送 协议传输 帮助	
AT+WSAP=fortest,12345678,1,6	~ 发送	AT+CWJAP=fortest,12345678	↑ 发送
	_ 清除发送		↓ 清除发送
□ 定时发送 周期: 300 ms 打开文件	发送文件  停止发送	□ 定时发送 周期: 300 ms 打开文件	发送文件 停止发送
□ 16进制发送 ☑ 发送新行 0% 【火爆全网	】正点原子DS100手持示波器上市	□ 16进制发送 ☑ 发送新行 0% 正点原子官方	论坛http://www.openedv.com/
🔅 🔹 www.openedv.com S:31 R:37 CTS=0 DSR=0 DCD=0	当前时间 19:37:06:	🔅 • www.openedv.com S:27 R:62 CTS=0 DSR=0 DCD=0 🗎	前时间 19:37:06:

#### 6.1.2The module works in both STA and AP modes

- 1) The module uses the command AT+CWSAP=fortest,12345678,1,6. Wait for the return OK.
- 2) The module uses the command AT+CWJAP=zhendu,123456789 ( **the AP information here should be replaced by the customer's own AP information** ). Connect to the AP generated by the router. Wait for the return of OK
- 3) Wait for the WIFI GOT IP to be returned, as shown in the figure



4) At the same time, you can use a computer or mobile phone to scan the AP generated by the module and connect to it.



#### 6.2 Basic TCP/UDP data transmission

This section mainly demonstrates the module's TCP and UDP communications.

#### 6.2.1TCP communication between modules

- 1) Module 1 AT+CWSAP=fortest,12345678,1,6 initialized as AP
- 2) Module 1 AT+CIPMUX=1 to open multiple links (if you want to open the server, you must first open multiple links)
- 3) Module 1 AT+CIPSERVER=1,4200 to start the server, listen to port 4200, and wait for the return of LISTENING to indicate successful start. At this point, the configuration of module 1 is complete
- 4) Module 2 AT+CWJAP=fortest,12345678. Connect module 1 WiFi
- 5) Wait for the return of WIFI GOIT IP
- 6) Module 2 AT+CIPSTART=TCP,192.168.100.1,4200 connects to the server of module 1
- 7) Wait for SOCKET CONNECTED:0 to return to indicate that the TCP connection is successful.
- 8) Both sides send data. Since module 1 is configured as multi-link, it needs to use AT+CIPSEND=<ID>,<LEN> to send data. Module 2 is not configured, so it uses AT+CIPSEND=<LEN> to send data, as shown below

₩ XCOM V2.6	- X XCOM V2.6	- 🗆 ×
	串口选择 [2024-04-29, 19:46:16, 775]	串口选择
[2024-04-29 19:45:20.204] TX: AT+CWSAP=fortest, 12345678, 1, 6	COM13:USB-SERIAL CH34 V TX: AT+CWJAP=fortest, 12345678	COM15:USB-SERIAL CH34 $\sim$
[2024-04-29 19:45:20.292]	波特率 115200 🗸 [2024-04-29 19:46:16.834]	波特率 115200 ~
RX: AT+CWSAP=fortest, 12345678, 1, 6	(査)上行 1 RX: AT+CWJAP=fortest, 12345678	停止位 1 ~
		教据位 8 ~
[2024-04-29 19:45:21.790] RX: OK	RX: OK	校验位 N
[2024-04-29 19:45:41 111]	校验位 None ~ [2024-04-29 19:46:18.455]	tocau DZ None V
TX: AT+CIPMUX=1	串口操作 🛞 关闭串口 RX: WIFI CONNECTED	串口操作 🔶 关闭串口
[2024-04-29 19:45:41.181]	(保存窗口 <del></del> 海於採版 [2024-04-29 19:46:18.564]	保存窗口 清除接收
RX: AT+CIPMUX=1	□ 16进制显示□ DTR	□ 16进制显示□ DTR
ок	[2024-04-29 19:46:37.771] □ RTS □ 自动保存 TY: AT+CTPSTART=TYP 192 168 100 1 4200	□ RTS □ 自动保存
[2024-04-29 19:45:50.202]	✓ 时间戳 50 ms 1	☑ 时间戳 50 ms
TX: AT+CIPSERVER=1, 4200	[2024-04-29 19:46:37.862] RX: AT+CIPSTART=TCP, 192.168.100.1, 4200	
[2024-04-29 19:45:50.273]	n od ov	
RX: AT+CIPSERVER=1, 4200	SOCKET CONNECTED: 0	
OK	[2024-04-29 19:46:45.926]	
LISTENING	TX: AT +CIPSEND=8	
[2024-04-29 19:46:37.892] RX: SOCKET CONVECTED:0	[2024-04-29 19:46:46.003]	
	1 RX: AT+CIPSEND=6	
[2024-04-29 19:46:49.748] RX: +IPD:0,8:12345678	10>	
	, [[2024-04-29 19:46:49.679]	
	1 TX: 12345678	
	[2024-04-29 19:46:49, 748]	
	EX: SEND OK	
Materia Na A A A A A A A A A A A A A A A A A A	单型发祥 多条发送 协议传输 帮助	
単余反法 ジボス広 初以传動 帮助 AT+CWSAP=fortext,12345678,1.6 400	AGE CA VENE DEGT	465 🔽 发送新行
400 AT+CIPHUX=1 461	466 16进制发送 AT+CIPSTART=TCP, 192. 168. 100. 1, 4200 461 □	466 16进制发送
AT+CIPSERVER=1, 4200 462	467 □ 关联数字键盘 □ AT+CIPSEND=6 462 □	467 二 关联数字键盘
463	468     □ 自动循环发送     □     12345678     463     □	468 🗌 自动循环发送
464	469 周期 10 ms 464 □	469 周期 10 ms
石码 47/47 移除此页 添加页码 首页 トー页 下一页 尾页 页码	1 跳转 导入导出条目 页码 47/47 移除此页 添加页码 首页 上一页 下一页 尾页	页码 1 跳转 导入导出条目

### 6.2.2 Module communicates with PC UDP (PC needs to enable monitoring)

- 1) The module and the computer are connected to the same WiFi, AT+CWJAP=zhendu,123456789 ( the parameters here need to be replaced with the actual ones of the customer )
- 2) Use the network debugging assistant tool on the PC and select UDP protocol to start monitoring
- 3) Module AT+CIPSTART=UDP,192.168.1.107,4200. Wait for the return of SOCKET CONNECT:0. At this time, the surface is created successfully
- 4) Use the command AT+CIPSEND=<LEN> to send data. If successful, it will return SEND OK
- 5) Since UDP is connectionless, the PC does not know the module's IP address, so the PC can only send data to the module after the module sends data to the PC. When the module receives the data, it will be displayed in the form of

+IPD:<LEN>,<DATA>. LEN indicates the data length, and DATA indicates the actual received data.

6) The whole process is shown in the figure below



#### 6.2.3 TLS communication between modules

- 1) Module 1 AT+CWSAP=fortest,12345678,1,6 turns on the AP function.
- 2) Module 1 AT+CIPMUX =1 to enable multi-link (this command must be used before enabling the server)
- 3) Module 1 AT+CIPSERVER=1,4200,TLS starts the tls server. Waiting for the return of LISTENING means that the TLS server is successfully started
- 4) Module 2 AT+CWJAP= fortest, 12345678 connects to the AP of module 1
- 5) Module 2 Waiting for WiFi GOT IP to be returned
- 6) Module 2 Use the command AT+CIPSTART=TLS,192.168.100.1,4200 and wait for the return SOCKET CONNECTED:0, which means the TLS connection is successful.
- 7) At this time, you can send data through the command AT+CIPSEND. For details, see the command manual.
- 8) The entire configuration process is shown in the figure below.

XCOM V2.6	-		创下单 0.2.1	Simplicity and	yx U-Flash	XW16Pro Beyond		由國國國	防汛会议 1	业微信 西华
[2024-04-29 19-51-51 103]			<u>*</u> ·			网络调试助手				×□- ∕₩
RX: WIFI CONNECTED	COM15:18	B-SERTAL CH34 V	网络设置	数据日志		NetAssist V5.0.3 🗇 🖨	JT808终制	#模拟   数据波形	浮点转换   校验计	算 ASCII码表
[2024-04-29 19:51:51 643]			(1) 例收类型			^	快播指令	批量发送   月	5史发送 自动应答	Modbus 描令
RX: WIFI GOT IP	波特革	115200 ~	(2) 太地主机地址	12024-04-29 19:52:00.	.792]# RECV ASCII FRO	M 192.168.1.105 :56108>	优先级	指令匹配很极 123456789012	指令应音模板 123456789012	前王
[2024-04-29 19:51:55.415]	停止位	1 ~	192.168.1.107 -	F0004-04-00 10-F0-00	ootla crem soort to	100 100 1 105 (50100)	1 vi			
TX: AT*CIPSTART=UDF, 192. 168. 1. 107, 4200	数据位	8 ~	(3) 本地主机端口	http://www.omsoft.on	.027]# SEND ASCII IU	192.100.1.105 .00100/				
[2024-04-29 19:51:55.493]	构验位	None	4200							
EX: AT+CIPSTART=UDP, 192. 168. 1. 107, 4200	Loc the Las		A Han							
OK	串口操作	🔶 关闭串口	<u> </u>							
SOCKET CONNECTED:0	保存窗	「 清砕接版	接收设置							
[2024-04-29 19:51:57.211]	1644									
TX: AT+CIPSEND=0	I RTS	自动保存	▼ 按日志模式显示	<						
[2024-04-29 19:51:57.275]	日時間間	50 av	✓ 接收区目初换行 □ 協助教婦不見子							
EX: AT+CIPSEND=8			F 接收保存到文件							
>			自动资展 清除接收							
			444.744.745.999							
12024-04-29 19:51:57.811] TX: 12345678			CASCIL CHEY							
			▼ 转义符指令解析 ①			~	00	2 O O O E	EiR(Ons)	自动自动应答
12024-04-29 19:51:57.891] EX: SEND OK			匚 自动发送附加位	**************************************	192 169 1 10E -E610	10			- 3899	T SEPO A SEPO
[2024-04-29 19:51:58.644]			□ 打开文件数据源	http://www.coroft.com	102.100.1.100 .0010	10 10		<u>.</u>	<u>- 利休</u>	<u> </u>
11: 12340070			□ 循环周期 1000 ms							发送
[2024-04-29 19:51:58.712]			受措指令 历史发法							
EX: 12346670			19 就绪!			[	3/1	RX:24	TX:20	夏位计数
[0004-04-00_10-00_000]			Trans.							
12024-04-25 15.52.00.252] TX: AT+CIPSEND=6			Alasker Barres							
[0004-04-00 10-00-020]				Te ancente	and any and any and					
EX: AT+CIPSEND=6						and the second				
			Ford of the logistic statement	The state of the state of the state				and the second sec		
1 <sup>′</sup>				- Alter				and the second	NTP -	
[2024-04-29 19:52:00.787]			and the second second	a second as	- The state	1				
LAY LEVENDIN						53152 2 18 48			and the	
[2024-04-29 19:52:00.858] 87- STAD 0K					-					
[2024-04-29 19:52:08.898]				the second		A CONTRACTOR			-	
RX: +IPD:20:http://www.cmsoft.cn	~		a second second			and the second				
● 単条发送 多余友法 协议传输 帮助 ▲ T+YFTAP==handra 123456789	105 1		margare to share of					The second		
460	465	✓ 友伝新行 □ 40世まり始送							E	
AT+CTPSENT=8 400	466	10进制反因 关联教会领教								
402	407	」大軟熨子碾盘 □ 白計通77世送	-							
464	469	日本の時代及法	Sector Sector							
	3846	豆入豆出茶日								
	Serentili to r	2.50								
* www.openeav.com 5:121 R:216 CTS=0 DSR=0 DCD=0	二前(中)1月 19:5	2:50 .::	No. of Contraction	and the second s				and the second	1000 C	Carl Carl

#### 6.2.4 Transparent transmission description

- 1) The transparent transmission mode only supports a single connection, that is, only connection 0 is supported for data transparent transmission.
- 2) The server does not support transparent transmission.
- 3) The client can enter transparent transmission mode by using the AT+SAVETRANSLINK command, or by using AT+CIPMODE=1 after connecting, or by simply sending "AT+CIPSEND". After entering transparent transmission mode, all serial port data will be sent on socket link 0.
- 4) After entering the transparent transmission mode, you can exit the transparent transmission mode by sending +++. Note that unlike the command, which needs to end with a carriage return and line feed, when sending +++, you only need to send three characters +++.

### 6.3 HTTP Request

This section introduces how to make a simple HTTP request

- 1) The module needs to connect to an AP that can access the Internet. AT+CWJAP=zhendu,123456789 (the WiFi information here needs to be replaced with the customer's actual information).
- 2) Waiting for the return of WIFI GOT IP
- 3) GET request (AT+HTTPCLIENT=2,http://httpbin.org/get,httpbin.org,/get,1) For command parameters, see the AT command manual. Note that the URL here must contain http:// or https://. Wait for OK to be returned. If there is data, the server's reply will be returned before OK is returned.
- 4) The process is shown in the figure below

TX: AT+CWJAP=zhendu, 123456789		中口採用	
[2024-04-29 20:00:02.618]		但方案	
RX: AT+CWJAP=zhendu, 123456789		171718	
		□ 16进	制显示[] DTR
[2024-04-29 20:00:02.744] RX: OK		□ RTS ☑ 时间	□ 自动保存 戳 50 ms
[2024-04-29 20:00:04.326] RX: WIFI CONNECTED			
[2024-04-29 20:00:04.698] RX: WIFI GOT IP			
[2024-04-29 20:00:16.889] TX: AT+HITPCLIENT=2.0, http://httpbin.org/get, httpb	oin. org. /get, 1		
[2024-04-29 20:00:16.975] RX: AT+HTTPCLIENT=2,0, http://httpbin.org/get, httpb	pin. org,/get, 1		
<pre>[2024-04-29 20:00:17.885] RX: HTTPCLIENT:250,, {     "args": {},     "headers": {         "Accept": "application/x=www=form=urlencoded",         "Most": "httpbin.org",         "X=Amzn=Trace=Id": "Root=1-662f8bce=2c527d2864 },     "origin": "112.54.89.224",     "url": "http://httpbin.org/get" } [2024-04-29 20:00:22.565] RX: OK</pre>	130b3e170924775″		
单条发送 多条发送 协议传输 帮助			
AT+CWJAP=zhendu, 123456789 470		475	☑ 发送新行
//httpbin. org/get, httpbin. org, /get, 1 471		476	16进制发送
//httpbin. org/get, httpbin. org, /get, 1 471		476	<ul> <li>□ 16进制发送</li> <li>□ 关联数字键母</li> </ul>
//ttpbin.org/get, httpbin.org/get, 1 471		476 477 478	<ul> <li>□ 16进制发送</li> <li>□ 关联数字键盘</li> <li>□ 白おぼびて送送</li> </ul>
//httpbin.org/get, httpbin.org./get, 1     471       472     472       473     473		476 477 478 479	<ul> <li>16进制发送</li> <li>关联数字键盘</li> <li>自动循环发送</li> <li>周期</li> <li>10</li> </ul>

### **6.4 MQTT**

MQTT supports versions v3.1 and v3.1.1. Any cloud platform that supports these two versions of MQTT can be connected. This summary will use Alibaba Cloud as an example for demonstration.

#### 6.4.1 Ali Cloud

- 1) The module acts as a STA and is connected to a router that can access the external network.
- 2) Visit Alibaba Cloud IoT Platform, IoT Platform (aliyun.com).
- 3) Click to enter the public example

公共实例	
♂ 已开通	
[D] -	
-	
查看公共实例和企业版实例的区别	IJ

4) Select "Product" on the left column and click Create Product

fortest			
Tortest			
所属品类 🕜			
▶ 标准品类 ○ 自定义品	送		
智能城市 / 公共服务 / 路外	丁照明	~	查看功能
节点类型			
夏 直连设备	网关子设备	😺 网关设备	
车网与数据			
连网方式			
Wi-Fi		~	
数据格式			
透传/自定义		~	
数据校验级别 🕢			
● 弱校验 ○ 免校验			
、收起			
~ 认证方式			
更多信息			
产品描述			
请输入产品描述			
		0/100	
		5/100	

5) Select Device in the left column, click Add Device, and select the product you just created.

<ol> <li>特别说明: 唯一标识?</li> </ol>	DeviceName 可以为空 夺作为 DeviceName。	, 当为空时, 阿里云会流	顽发产品下的
产品			
fortest			~
DeviceName 👩			
fortest			
备注名称 🕜			
请输入备注名和	尔		

6) Click to view the information and get the necessary parameters for the connection (note that if there is a special character ',' in the parameter, please use a backslash to escape it. For example, if the parameter you want to enter is ", asd", you need to send "\, asd" when using the command.

设备信息							
产品名称	fortest		ProductKey	a156h9NRUph 复制		地域	华东2 (上海)
节点类型	设备		DeviceName	fortest 复制		认证方式	设备密钥
备注名称 @	编辑		IP地址			固件版本	
创建时间	2024/04/30 09:47:15		激活时间			最后上线时间	
当前状态 🕜 📩	未激活 🔲		实时延迟 🕜	测试	_	设备本地日志上报	已关闭 🔵
MQTT 连接参数		MQTT 连接参	遨		×		
心条扩展信白		clientId	a156h9NRUph.fc 795	rtest[securemode=2,signmethod=hmacsha256,timestamp	=1714441639		
设备扩展信息		username	fortest&a156h9N	IRUph			
SDK 语言		passwd	8425bac17668ffc	42811dd8fc726c92120ed92e090b0ef66b9f2d19e16ff8697		模组商	
模组信息		mqttHostUrl	a156h9NRUph.ic	t-as-mqtt.cn-shanghai.aliyuncs.com			
		port	1883				
标签信息 ∠	編編 1			一键复制	关闭		

- 7) Module sets user login information AT+MQTTUSERCFG=0,0,a156h9NRUph.fortest|securemode=2 \, signmethod=hmacsha256 \, timestamp=1714441911497|,fortest&a156h9NRUph,cc2a9489408d1b6c6843552e6c60a2409af224c2c4761badb017
  - 4c9d623cf5d2,0,0 ( Note that the backslash marked in red is escaped )
- 8) Set the connection parameters AT+MQTTCONNCFG=0,120,0,lwt,LWT,BYE,1,0
- 9) Initiate a connection AT+MQTTCONN=0, a156h9NRUph.iot-as-mqtt.cn-shanghai.aliyuncs.com,1883,0. Note that it may take a long time to wait after using this command
- 10) The module setting process is shown in the figure below

XCOM V2.6						1		×
						串口选择	ł	
[2024-04-30 09:55:44.528] FX: AT+CWJAP=zhendu, 123456789	12					COM13:U	SB-SERIAL (	снза 🗸
						波性变	115200	
[2024-04-30 09155144.590] RX: AT+CWJAP=zhendu, 123456789	e.					现何举	115200	~
						停止位	1	~
[2024-04-30 09:55:44.791]						数据位	8	~
RX: OK						校验位	None	
[2024-04-30 09:55:46.326]								
RX: WIFI CONNECTED						串口操作	(● 天)	<b>北半</b> 口
[2024-04-30 09:55:46.855]						保存窗	口 清除	接收
RX: WIFI GOT IP						16)#\$		R
[2024-04-30 09:55:52.129]							「日白」	。 动保存
TX: AT +MQTTUSERCFG=0, 0, a156hs	NRUph. fortest securem	10de=2 s	ignmethod=	hmacsha256		回时间	截 50	
timestamp=1714441911497  , fortest&a156h9NRUph.cc2a948	9408d1b6c6843552e6c60	a2409 af2;	24c2c4761b	adb0174c9d6	23cf5d			
2, 0, 0								
[2024-04-30 09:55:52.220]								
RX: AT +MQTTUSERCFG=0, 0, a156hS	NRUph. fortest securem	ode=2 s:	ignmethod=	hmacsha256				
timestamp=1714441911497   fortest#e156b9NRUpb_cc2e948	9408.41%6.6843552.6666	a2409.f2	2402047611	adb0174c9d6	23af5d			
2, 0, 0	545541555564555226555	al foo all.	2402041010	44001140040	200104			
ж								
[2024-04-30 09·57·31 598]								
TX: AT +MQTTCONNCFG=0, 120, 0, 1v	t, LWT, BYE, 1, O							
2024-04-30 09:57:31 668]								
XX: AT+MQTTCONNCFG=0, 120, 0, 1v	t, LWT, BYE, 1, 0							
)K								
[2024-04-30 09:58:55.313] FX: AT+MQTTCONN=0, a156h9NRUph	. iot-as-mgtt. cn-shang	ghai. aliy	uncs. com, 1	883, 0				
[2024-04-30 09:58:55.391] RX: AT+MQTTCONN=0, a156h9NRUph	. iot-as-mqtt. cn-shang	ghai. aliy	uncs. com, 1	883, 0				
JK								
[2024-04-30 09:59:03.375]								
KA: TMQIICONN:OK								
单条发送 多条发送 协议传输	帮助							
AT+CWJAP=zhendu, 12345678	9 470					475	☑ 发送新行	ī
AT +MQTTUSERCFG=0, 0, a156h	9NRUph. forte 471					476	🗌 16进制发	送
AT +MQTTCONNCFG=0, 120, 0, 1	wt, LWT, BYE, 1 472					477	🗌 关联数字	≧键盘
🔲 🔤 nqtt. cn-shanghai. aliyunc	s. com, 1883, 0 473					478	🗌 自动循环	陇送
	474					479	周期 10	ms
页码 48/48 移除此页 🚿	动页码 首页	上一页	下一页	尾页	页码 1	跳转	导入导出	条目
							2	

11) The device can also be seen online on Alibaba Cloud.

← forte	← fortest ﷺ											
产品 ProductKey	fortest a156h9NRU	F Iph 复制							DeviceSecret	******** 查看		
设备信息	Topic 列表	物模型数据	设备影子	文件管理	日志服务	在线调试	分组	任务				
设备信息												
产品名称	forte	est				ProductKey		a156h	9NRUph 复制		地域	华东2 (上海)
节点类型	设备	F				DeviceName		fortes	复制		认证方式	设备密钥
备注名称 🕢	編組	t				IP地址		112.54	1.89.224		固件版本	
创建时间	2024	4/04/30 09:47:15				激活时间		2024/	04/30 09:58:55.070		最后上线时间	2024/04/30 09:58:55.070
当前状态 🔞	在线	5				实时延迟 🔞		测试			设备本地日志上报	已关闭
MQTT 连接参数	查看	t i				最后离线时间						

- 12) Note that Alibaba Cloud can only subscribe to physical models that it has designed.
- 13) MQTT can only send data through commands (AT+MQTTPUB /AT+MQTTPUBRAW).

# 7 Welding work instructions

# 7.1 Reflow Temperature

Reflow pro	file characteristics	Leaded process assembly	Lead-free assembly		
	Minimum temperature ( Tsmin )	100°C	150°C		
Preheating/keeping	Maximum temperature (T smax )	150°C	200°C		
	Time (T smin ~T smin )	60-120 seconds	60-120 seconds		
Heating s	slope (T L~T p)	3°C/sec, max.	3°C/sec, max.		
Liquidus t	emperature ( TL )	183°C	217°C		
T L above	the holding time	60~90 seconds	60~90 seconds		
Package pe	ak temperature Tp	Users must not exceed the temperature stated on the product's "Moisture Sensitivity" label.	Users must not exceed the temperature stated on the product's "Moisture Sensitivity" label.		
p) within 5°C of th temperature (Tc) is	ne specified classification shown in the figure below.	20 seconds	30 seconds		
Cooling	slope (Tp~T L)	6°C/sec, max.	6°C/sec, max.		
Time from roor ten	n temperature to peak	6 minutes, longest	8 minutes, longest		
*The peak temperat	ture (Tp) tolerance of the ten	nperature curve is defined as the up	oper limit of the user		

### 7.2 Reflow Oven Curve



### 8 FAQ

### 8.1 The transmission distance is not ideal

- When there is a straight-line communication obstacle, the communication distance will be attenuated accordingly ;
- Temperature, humidity, and co-channel interference can increase the communication packet loss rate ;
- The ground absorbs and reflects radio waves, so the test results are poor when close to the ground ;
- Seawater has a strong ability to absorb radio waves, so the test effect at the seaside is poor ;
- If there are metal objects near the antenna, or the antenna is placed in a metal shell, the signal attenuation will be very serious ;
- The power register is set incorrectly, or the air rate is set too high (the higher the air rate, the closer the distance);
- The power supply voltage at room temperature is lower than the recommended value. The lower the voltage, the lower the power output .
- The antenna used does not match the module well or the antenna itself has quality issues.

### 8.2 Module is easily damaged

- Please check the power supply to ensure that it is within the recommended power supply voltage. If it exceeds the maximum value, the module will be permanently damaged .
- Please check the stability of the power supply. The voltage should not fluctuate greatly or frequently .

- Please ensure anti-static operation during installation and use, as high-frequency components are sensitive to static electricity ;
- Please ensure that the humidity is not too high during installation and use, as some components are humidity sensitive devices ;
- If there is no special requirement, it is not recommended to use it at too high or too low temperature.

### 8.3The bit error rate is too high

- There is interference from the same frequency signal nearby. Stay away from the interference source or change the frequency or channel to avoid interference.
- An unsatisfactory power supply may also cause garbled characters, so the reliability of the power supply must be ensured;
- Extension cables or feeder cables that are of poor quality or are too long can also cause a high bit error rate.

### 9 Bulk packaging method

#### 9.1 E103-W14



#### 9.2 E103-W14X



### **10** Revise history

Version	Revision Date	Revision Notes	Maintenance man	
1.0	2023-10-31	initial version	Нао	

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