E840-TTL-4G02E User Manual

4G/LTE Module

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Content

1 Product Overview

1.1. Introduction

E840-TTL-4G02E is developed for serial port devices and network servers to transmit data to each other through a network.It is a LTE-FDD/LTE-TDD/WCDMA/TD-SCDMA/CDMA/GSM wireless communication data transmission modem with diversity receiving function, supporting LTE-FDD, LTE-TDD, DC-HSDPA, HSPA+, HSDPA, HSUPA, WCDMA, TD-SCDMA, CDMA, EDGE and GPRS network data connections, through simple AT commands Settings, you can easily use this product to achieve two-way data transparent transmission from serial to network.
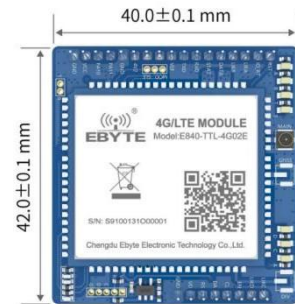
The module with 2.0 mm pin header is good for embedded development by a wide voltage of 5.0V to 20.0V. Support 4G card, RS485 and RS232. With circuits electrical isolation scheme for anti-interference ability, it can be used in environments with strong electromagnetic interference, such as power industry. This manual is a quick introduction to the modem E840-TTL-4G02E. It is the easiest hardware environment to test the E840-TTL-4G02E network transmission function, that is, to realize data being transmitted in both directions between the serial device (here, the computer) and the network server.
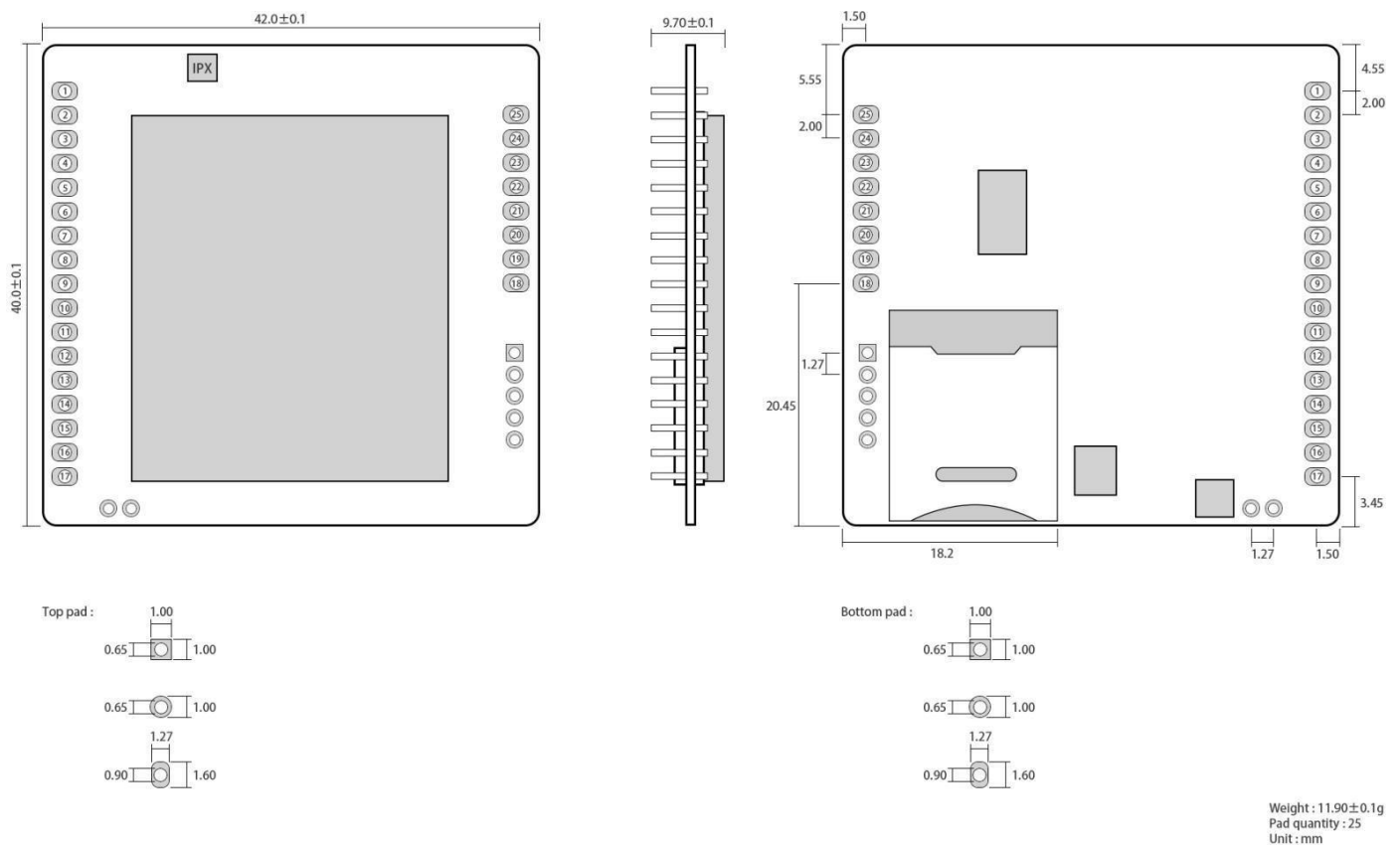
1.2. Features

- Almost meet all M2M application demands;

- Support data transparent transmission, support TCP, UDP network protocol, support heartbeat package, registration package function;

- Support two-way serial transmission from device to network server for 460800 serial port baud rate and below;

- Support serial port large cache function, the serial port data can be cached locally before the server is established;

- Support SMS sending and receiving, SMS remote query / configuration device parameters;

- Support multiple Socket links to send and receive at the same time;

- Support Modbus RTU and Modbus TCP to automatically convert each other;

- LTE-FDD: Max downstream rate of 150Mbps, Max upstream rate of 50Mbps;

- With software/hardware double watchdog design, the system is stable, will never crash.

1.3 Module parameter

Parameter	Value	Description
Characteristic	Frequency	LTE-FDD：B1/B3/B7/B8/B20/B28A WCDMA： B1/B8 GSM：B3/B8
	LTE characteristic	Support max. of 3GPP R8 non-CA Cat 4 FDD and TDD Support 1.4MHz~20MHz , Downstream support： MIMO LTE-FDD: Max downstream rate 150Mbps, Max upstream rate50Mbps
	WCDMA characteristic	WCDMA: Max downstream rate 384Kbps， Max upstream rate 384Kbps
	GSM characteristic	GPRS: Max downstream rate 107Kbps， Max upstream rate 85.6Kbps EDGE: Max downstream rate 296Kbps，Max upstream rate 236.8Kbps
	Network protocol characteristic	Support TCP/UDP/PPP/FTP/HTTP/NTP/PING/QMI/NITZ/CMUX/HTTPS/SMTP/MMS/FTP S/ SMTPS/SSL/FILE protocol Support PAP (Password Authentication Protocol)and CHAP (ChallengeHandshake Authentication Protocol)
Hardware Characteristic	Antenna	IPX
	Data interface	UART
	Baud rate	Support Max. 921600bps， default 115200bps
	Transmitting power	Class 4 (33dBm±2dB) for GSM900 Class 1 (30dBm±2dB) for DCS1800 Class E2 (27dBm±3dB) for GSM900 8-PSK Class E2 (26dBm±3dB) for DCS1800 8-PSK Class 3 (24dBm+2/-1dB) for CDMA BC0 Class 3 (24dBm+1/-3dB) for WCDMA bands Class 2 (24dBm+1/-3dB) for TD-SCDMA bands Class 3 (23dBm±2dB) for LTE-FDD bands Class 3 (23dBm±2dB) for LTE-TDD bands
	Sensitivity	FDD B1: -101.5dBm (10M) FDD B3: -101.5dBm (10M) FDD B7: -99.5dBm (10M) FDD B8: -101dBm (10M) TDD B20: -102.5dBm (10M) TDD B28A: -102dBm (10M) WCDMA B1: -110dBm WCDMA B8: -110.5dBm GSM 3: -109dBm GSM 8: -109dBm
	Consumption （Typical）：	11uA @ power off
		1.8mA @LTE sleep (PF=128)

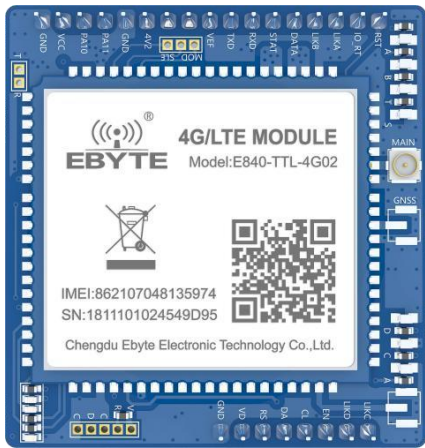|	1.5mA @LTE sleep (PF=256)
	20mA @ idle
Bandwidth	1.4/3/5/10/15/20MHz
Operating temperature	-30℃- +70℃, extending to -40℃~+85℃
Operating voltage	DC 5V ~ 18V
Size	42×40×9.7 mm

1.4 Interface description

Top pad : 1.00
0.65 1.00
0.65 1.00
1.27
0.90 1.60

Bottom pad : 1.00
0.65 1.00
0.65 1.00
1.27
0.90 1.60

Weight : 11.90±0.1g
Pad quantity : 25
Unit : mm

1.5 Pin definition

Pin No.	Name	Description
1	RST	Reset pin
2	IO_RT	The low level lasts for 3~10S, the module parameters will be restored to the factory settings, and will be restarted immediately.
3	LIKA	SocketA link connection status indicator pin, corresponding to the onboard left 1 LED. High: SocketA is successfully connected to the web server; Low: SocketA did not successfully connect to the network server;

4	LIKB	The SocketB link connection status indicator pin corresponds to the onboard left 2 LED. High: SocketB is successfully connected to the web server; Low: SocketB did not successfully connect to the network server;
5	DATA	The data TX and RX indication pin, when the network receives the data or the serial port receives the data (50ms high/10ms low), corresponding to the onboard left 3LED light.
6	STAT	The device status indication pin corresponds to the onboard left 4 LED. Low: The device is powered on to search for SIM card 1800ms low, 200ms high: the device checks the correct SIM card and is attaching to the network; High: The device is attached to the network successfully.
7	RXD	Data receiving pin, default 3.3V, compatible with 5V communication level.
8	TXD	Data transmitting pin, default 3.3V, compatible with 5V communication level.
9	VEF	Drive level power supply pin, if you need to achieve serial communication and LED indication is 5V drive level, you need to input 5V level on this pin.
10、11、14、15、23	MOD、SLE、PA11、PA10、EN	NC
12	4V2	Lithium battery power supply pin, power supply range: 3.8V~4.3V. This pin is prohibited from being reversed and is not allowed to be supplied with VCC.
16	VCC	DC power supply pin, power supply range: 5V~18V. This pin is prohibited from being reversed and is not allowed to be supplied with VCC.
19	VD	External SIM card power supply pin, if the onboard SIM card holder is used, the pin remains NC
20	RS	External SIM card reset pin, if the onboard SIM card holder is used, the pin remains NC
21	DA	External SIM card data pin, if the onboard SIM card holder is used, the pin remains NC
22	CL	External SIM card clock pin, if the onboard SIM card holder is used, the pin remains NC
24	LIKD	SocketD link connection status indicator pin, corresponding to the onboard right 3 LED. High: SocketD is successfully connected to the web server; Low: SocketD did not successfully connect to the network server;
25	LIKC	SocketC link connection status indicator pin, corresponding to the onboard right 2 LED. High: SocketC is successfully connected to the web server; Low: SocketC did not successfully connect to the network server;
13、17、18	GND	Ground

2. Quick start

2.1 Hardware

Hardware for test are as follows：

E840-TTL（4G-02）	5V—18V power adaptor or 4.2V battery
USB to TTL board	4G/LTE sucker antenna and IPEX to SMA cable

UART cable connected according to recommended circuit diagram, SIM card and antenna

Connect the power supply, antenna, SIM card, serial cable and other hardware before testing.

1. Access the official website of EBYTE: www.ebyte.com, to download the latest GPRS/E840-TTL-4G02E series product configuration tool, install USB to 232/485 driver, run the software!

2. Select the corresponding COM port number. The factory default serial port baud rate is 115200, 8N1, as shown below:

3. Click the tool "Enter Configuration Status" button and wait for the device parameters to be automatically obtained. After completion, the following figure is displayed:：

4. Query the signal strength, set the device connection server IP and port number to be: 116.62.42.192, 8124; (Ebyte test server), and finally click "Save all parameters", and finally as shown below:

5. Click the tool "Module Restart" button and wait for the device LINK light to be on.

6. Search "Ebyte IoT expert" WeChat public number, enter the page, click: Customer Support -> Device

Test, the mobile phone screenshot interface is as follows:

7. Use the PC-side tool to send data to, and use the mobile phone to send data to the device. The communication test

result is as shown below:

2.2 Data transmission test

Software tools used for the test are as follows：

Any serial port assistant, XCOM is used in this manual, which can be downloaded from our official website.

2.1.1 Operating mode is as follows：

1. Operating mode includes: transparent transmission mode、AT configuration mode

a) Transparent transmission mode: After power-on, the radio works in the transparent transmission mode by default, and automatically starts the network connection. When the connection is established with the server, any data received by the serial port will be transparently transmitted to the server. At the same time, it can also receive data from the server. After receiving the server data, the module will output directly through the serial port. The maximum length of data supported by this module is 10 bytes. When multiple links are connected to the server at the same time, the data packet will be sent to the four links at the same time. When there are data to be sent from any network link, the radio will transparently output the data.

b) Protocol transmission: This module supports 4-channel Socket connections. For each socket users can configured it as TCP Client or UDP Client. When sending data, users can use protocol transmission or transparent transmission.The maximum length of data supported by this module is 1024 bytes.

Protocol transmission format

Transmit：0x55 0xFE 0xAA ID data

For example :55 FE AA 00 AA BB CC   //00：SOCK0 link，AA BB CC :the data that the user actually needs to transmit

Receive：0xAA 0XFE 0x55 ID data length Data

For example：AA FE 55 00 00 03 11 22 33   //00: SOCK0 link，   00 03 :the valid data length received this time
11 22 33：real data

Demonstration：

Take SOCK0 as an example：,

Transmit：+++(do not add new line for transmitting)   //enter AT command

Transmit：AT+VER(add new line for transmitting)   //read version info. And enter AT command setting at the same time

+OK=E840-TTL(4G-02)_V1.0

Transmit：AT+SOCK=TCPC,116.62.42.192,31687   //open SOCK0 and configure the network server parameters that SOCK0 will connect to (the parameter used here is Ebyte test server, not recommended for users)

+OK

Transmit：AT+LINKSTA   //read if SOCK2 has started connection with server

+OK=Connect

Transmit：AT+POTOCOL=ON   // open protocol transmission mode

+OK

Transmit：AT+POTOCOL   //inquire if protocol transmission is on

+OK=ON

AT+REBT   //restart

+OK

Waiting for the radio to restart, SOCK will automatically establish a connection with the server. After the connection is started, data can be transmitted to each other via protocol.

a) AT mode：under this mode all UART data is considered as AT command.

b) Mode switch，In the transparent transmission mode, after the serial port receives the "+++" frame data, the RX pin receives any AT command within 3 seconds, and the mode switches to the AT mode. In AT mode, send AT+EXAT<CR><LF> to switch to transparent transmission mode.
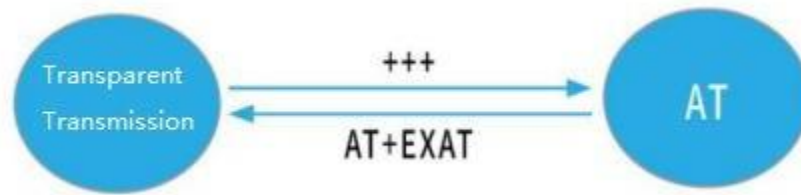
2. Network function

a) Short connection: In TCP Client mode, the short connection function is enabled. If there is no data reception in the serial port or network port within the set time, the network connection will be automatically disconnected. The short connection function is turned off by default. The connection time can be set from 2 to 255 seconds. When set to 0, the short connection function is disabled.

b) Registration package: The registration package is closed by default. The user can configure 4 types of registration packages. You can choose to send the physical address (IMEI code) when connecting, send custom data when connecting, add the physics before the connection and each packet of data. Custom data is added to the address, connection time, and data before each packet. The maximum length of the custom registration packet is 40 bytes (when set to HEX format, the maximum length is 20 bytes).

c) Heartbeat packet: In the idle state of network communication, the heartbeat packet is used for network state maintenance. The heartbeat period can be set from 0 to 65535 seconds, and the maximum length of the heartbeat packet is 40 bytes (when set to HEX format, the maximum length is 20 bytes). Supports two heartbeat types: network heartbeat and serial heartbeat. When the network heartbeat is selected, the communication idle time starts, and the heartbeat data packet is sent to the server according to the configured heartbeat period. Select the serial port heartbeat, start timing with communication idle, and send heartbeat packets to the serial port according to the configured heartbeat period.

d) Clear the cache: Before the connection to the server is established, the data received by the serial port will be cached. When the connection with the server is established, you can choose whether to clear the cached data. By default, the cache is cleared. The maximum size of each Socket in the local cache is 10 bytes, and each Socket buffer is independent of each other.

3. High speed mode

The E840-TTL-4G02E is designed with a separate high-speed mode. In this mode, both the network and the device can transmit any packet length data, such as file, picture, and video.

Configure/query the high-speed mode state through the AT+HSPEED command. After the high-speed mode is enabled, the device can transmit any packet length data at 460800 serial port baud rate and below.

The E840-TTL-4G02E file transfer process will be demonstrated below:

1. Turn on the device high-speed mode: After the device enters the AT mode, send AT+HSPEED=ON to enable the high-speed mode, configure the connected server address, and restart the device.

2. Ready to transfer the file. The file transferred in this demo is RF_Setting3.49.exe. The file is an executable file. After startup, the following interface is displayed:
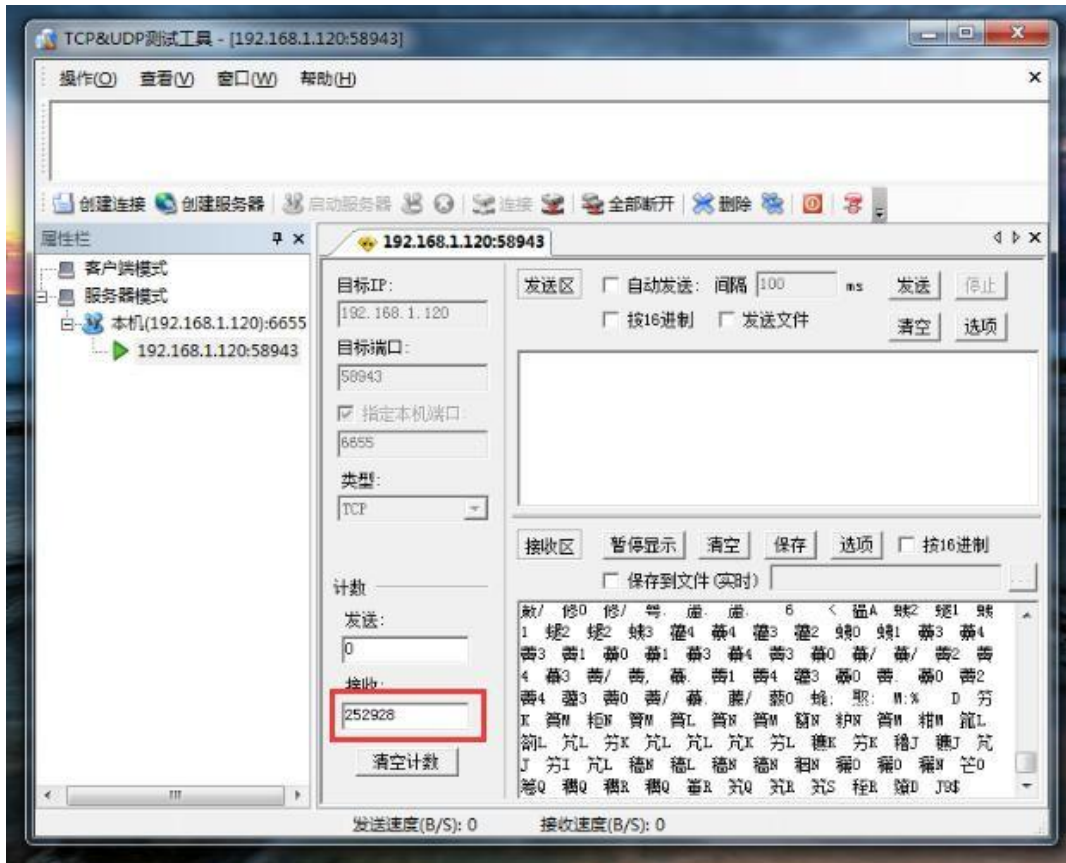
3. Open the serial port tool and use the file sending method to open RF_Setting3.49.exe. After the device is connected to the network server normally, click "send file" and the sending is completed as shown below. :
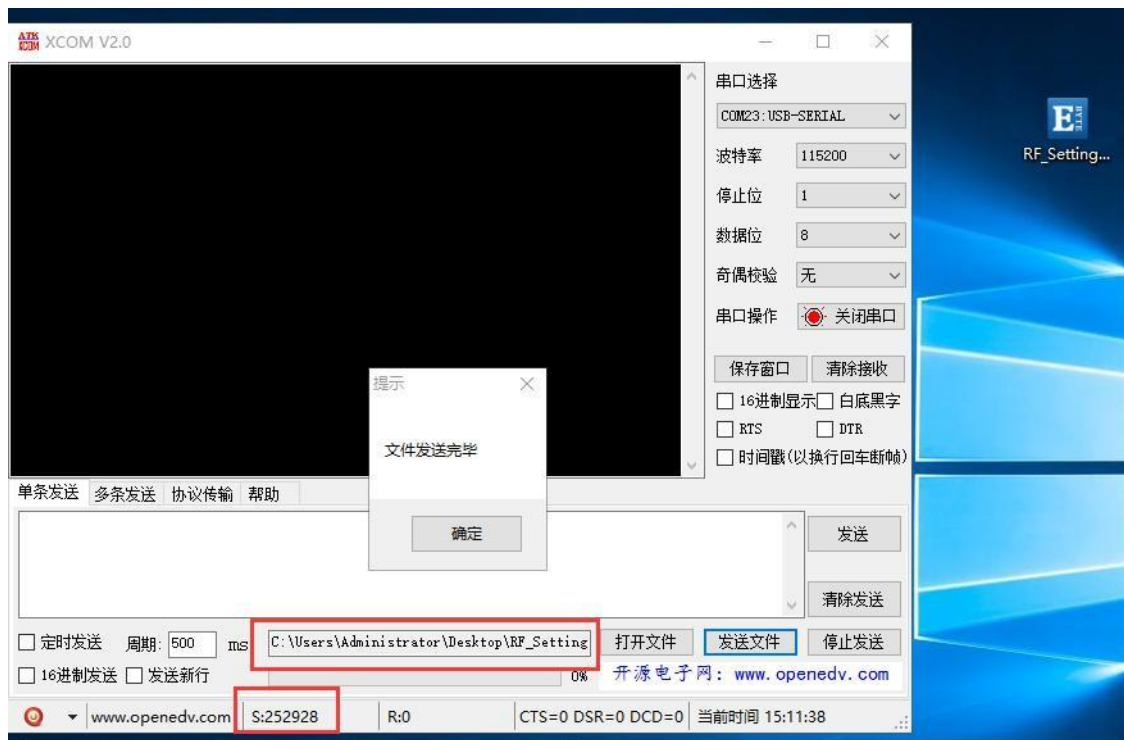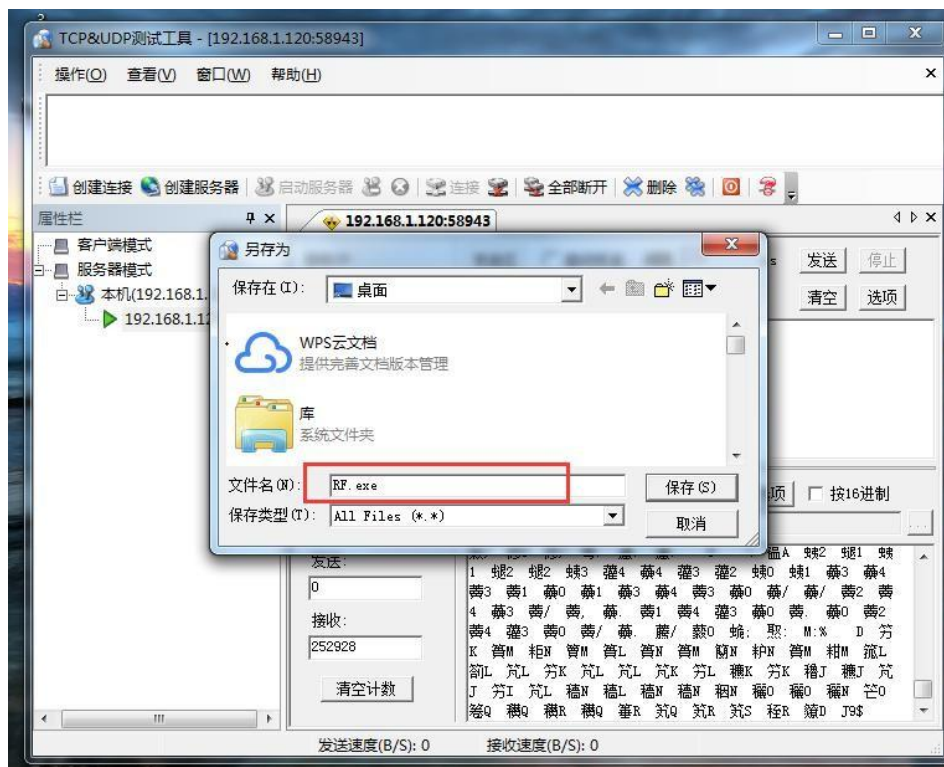

4. The server (the external network mapping used for this demo, the server is the TCP debugging tool), after receiving the data, it is as follows：

5. Save the data as an .exe trial file type. This time it is named RF.exe, as shown below::

6. Click on the server to run RF.exe to test the file, as shown below:

In summary, the E840-TTL-4G02E completes the remote transfer of files from the serial port to the network server.

4. SMS function

E840-TTL-4G02E can support SMS sending and receiving, SMS remote configuration function (inserted SIM card needs to support SMS service).

a) SMS sending: In AT mode, send AT+SMSSEND=number, data to complete the SMS sending, where number refers to the receiving number, and data refers to the data to be sent.

The demo is shown below:
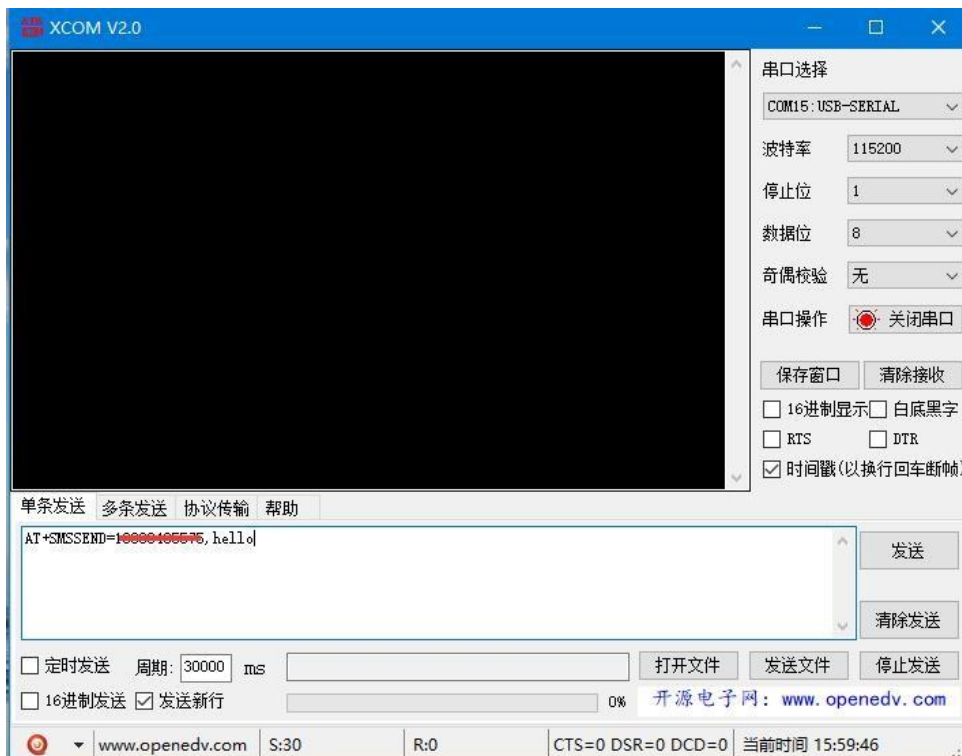
b) SMS receiving: The device can receive remote SMS content in transparent transmission mode. The format is as follows:

+SMS REC:number

Data, where number is the sender's mobile phone number and data is the received short message content;
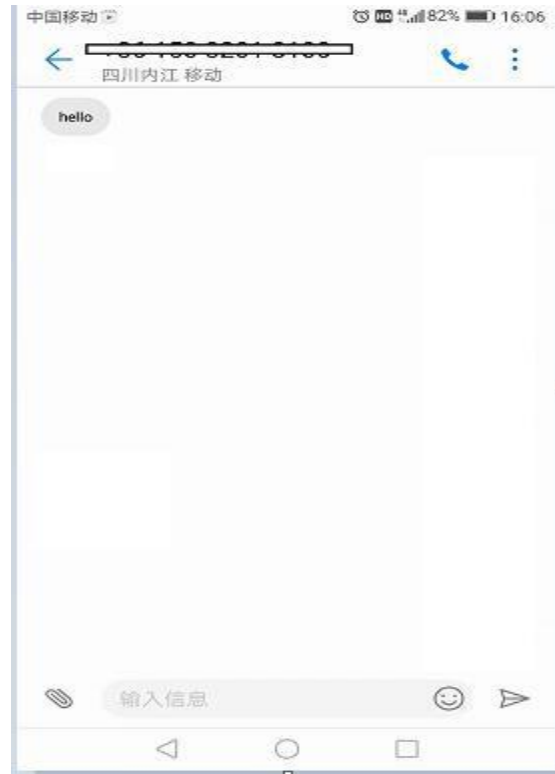
c) SMS configuration/query: The device can support SMS remote configuration/inquiry parameters in transparent transmission mode. The format of the transmission format command is:

<Head>AT+CMD, where <Head> is the device SMS identifier. The factory default is: EbyteSMS, CMD is the corresponding command. Specifically, you can view the introduction of AT commands.

In this demonstration, remotely use the mobile phone to query the SOCK1 link information of the device:
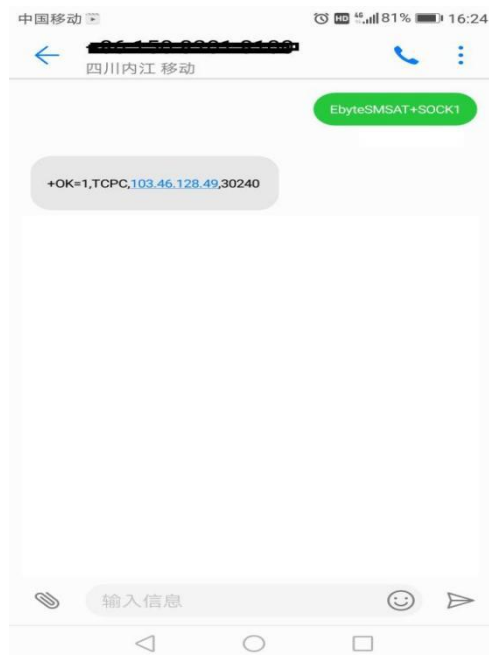
5. Modbus RTU and Modbus TCP are mutually converted

E840-TTL-4G02E supports the mutual conversion between Modbus RTU and ModbusTCP. After the function is enabled, after receiving the data, the device will detect whether the data meets the Modbus RTU or ModbusTCP protocol. If it meets the requirement, the conversion function is enabled. Otherwise, it will output/send original data.

a) For example, the serial port receives the ModbusT RTU write-out command in the following format (hexadecimal):

01 06 00 01 00 01 19 CA (ModbusT RTU), when the conversion function is enabled, the data received by the server is: 00 00 00 00 00 06 01 06 00 01 00 01 (ModbusT TCP)

b) When the data received by the network is: 00 00 00 00 00 06 01 06 00 01 00 01 (ModbusT TCP), the serial port of the device will output the data : 01 06 00 01 00 01 19 CA (ModbusT RTU);

Note: In the Modbus TCP standard protocol, the transaction element identifier needs to be specified. In E840-TTL-4G02E, the user can configure the value through AT+MTCPID, and when the value is configured to 0, the receiving end All data conforming to the Modbus TCP protocol will be parsed, otherwise only packets with the same application packet identifier and device configuration identifier will be converted.

6 Base station positioning function

The E840-TTL-4G02E supports the base station positioning function. The user can send the AT+LBS command in the AT mode to read the current LBS information of the device. The device returns the data format as follows:

+OK=LAC,xxxx;CID,xxxx, where LAC is the unique identification number of the global cell, CID is the base station number, (xxxx is the hexadecimal value);

The LAC and CID number can be used to query the current location information of the device. For the query method, refer to the link: http://www.gpsspg.com/bs.htm

7 Serial port packaging function

The E840-TTL-4G02E serial port break time and packing length can be configured. The user can configure the frame break time and the package length through the AT+UARTTS command. Please refers to the AT command for the specific configuration .

a) Frame break time: When the serial port receives data, it will continuously detect the interval between two bytes. If it is greater than the configuration time (50-2000ms), the device will automatically send the previously received data as a data packet to Network side;

b) Packing length: When the serial port receives data, it will continuously check the length of the currently received data. If the length of the configuration is exceeded (20~1024 bytes), the device will automatically send the previously received data as a data packet to Network side;

8 Enable Ebyte IoT platform function

The AT+EBTIOT command is used to set whether the module enables the transparent transmission function of the EBYTE cloud platform, after it is turned on, the information such as the heartbeat and registration packet configured by the user will be invalid. The user only needs to set the forwarding relationship of the corresponding device to the platform to implement the device. Data is transparent. For details of the related operations, please refer to the "Ebyte Cloud Platform Transparent Transmission Guide".

9 Network AT command function

E840-TTL-4G02E supports connection on web pages, and when the module works in transparent transmission mode. Through the connected web pages, it can inquiry or configure parameters remotely. The command format is:

<Head>AT+CMD, where <Head> is the device network AT identifier, the default value is: EbyteNET, CMD is the corresponding command, you can view the AT command for details.

(***Note**: For the incorrect network AT command, it will return + ERRER)

Here is an example of query baud rate:
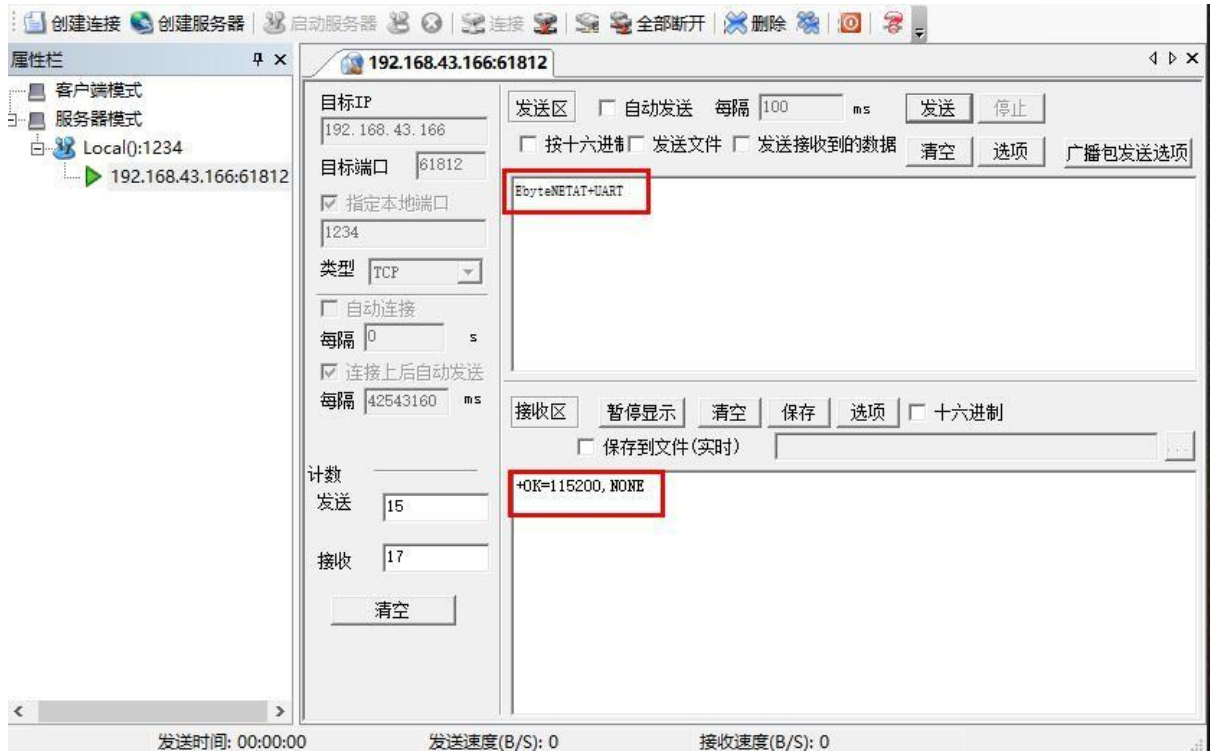
3. AT command

a) Command format：

<div align="center">AT+<CMD>[op][para1, para2, para3,…]<CR><LF></div>

AT+：command front end

CMD：control command

[op]："=" indicates parameter configuration

　　　"NULL"indicates parameters inquire

[para-n]：parameter list

<CR><LF>：CRLF，ASCII 0x0D 0x0A

b) Command error code：

Error code	Description
-1	Invalid command format
-2	Invalid command
-3	Invalid operator
-4	Invalid parameter
-5	Operation prevented

c) Command set：

REBT	restart module
VER	inquire version No.
INFO	inquire device info.
EXAT	exit AT command mode

RESTORE	restore to factory configuration
UART	set/inquire UART parameter
UARTCLR	set/inquire if UART buffer is cleared before module is connected
IMEI	inquire IMEI
LINKSTA	inquire SOCK connection status
LINKSTA1	inquire SOCK1 connection status
LINKSTA2	inquire SOCK2 connection status
LINKSTA3	inquire SOCK3 connection status
SOCK	set/inquire SOCK parameter
SOCK1	set/inquire SOCK1 parameter
SOCK2	set/inquire SOCK2 parameter
SOCK3	set/inquire SOCK3 parameter
REGMOD	set/inquire register packet mode
REGINFO	set/inquire self-defined registration info. （ASCII）
REGINFONEW	set/inquire self-defined registration info (ASCII ,HEX)
HEARTMOD	set/inquire heartbeat packet mode
HEARTINFO	set/inquire self-defined heartbeat packet info.(ASCII)
HEARTINFONEW	set/inquire heartbeat packet info. （ASCII, HEX）
HEARTM	set/inquire heartbeat packet time
SHORTM	set/inquire short connection time
EBTIOT	set/inquire to enable Ebyte IoT Cloud Platform
CREG	Inquire if it is registered to network
CSQ	Inquire signal strength
CPIN	Inquire SIM card status
POTOCOL	set/inquire if protocol transmission mode starts
UARTEX	set/inquire serial port parameter(9600,8，N，1)
ICCID	Inquire SIM card's ICCID
HSPEED	set/inquire if high speed continuous transmission is opened
LBS	set/inquire base station information （base station positioning）
UARTTS	set/inquire serial port packing length and gap
SMSSEND	Send message
SMSINFO	set/inquire message setting identifier
MODBUS	set/inquire ModbusTCP/RTU switch function
MTCPID	set/inquire ModbusTCP event identifier
RSTIME	set/inquire server response timeout

d)   Command Description：

AT+REBT

Function： Restart module

Format： configure

Transmit：AT+REBT<CR>

return：<CR><LF>+OK<CR><LF>

Parameter：None

Description：After the command is executed correctly, the module restarts immediately and enters the transparent transmission mode after restarting.

AT+VER

Function： inquire firmware version

Format： configure

transmit AT+VER<CR><LF>

return <CR><LF>+OK=<ver><CR><LF>

Parameter：ver firmware version

Description：None

AT+INFO

Function： Inquire module type and version info.

Format： configure

transmit AT+INFO<CR><LF>

return <CR><LF>+OK=<mod_name>,<hw_ver>,<sw_ver><CR><LF>

Parameter：   mod_name module name

hw_ver   hardware version

sw_ver   software version

Description：None

AT+EXAT

Function： exit command mode， enter transparent transmission mode

Format： configure

transmit AT+EXAT<CR><LF>

return <CR><LF>+OK<CR><LF>

Parameter：None

Description: After the command is executed correctly, the module is switched from command mode to the transparent transmission mode.

AT+RESTORE

Function： restore factory configuration

Format： configure

transmit AT+RESTORE<CR><LF>

return <CR><LF>+OK<CR><LF>

Parameter：None
Description：None

AT+UART

Function： set/inquire UART parameters

Format： inquire

transmit：AT+UART<CR> return：

<CR><LF>+OK=<baudrate>,< parity ><CR><LF>

configure

transmit：AT+UART=<baudrate>,< parity ><CR><LF> return：

<CR><LF>+OK<CR><LF>

Parameter：   baudrate   baud rate can be configured to:

9600,

19200,

38400,

57600,

115200,

230400,

460800,

921600,

Parity   NON   E   No check

EVEN   Even parity check

ODD   Odd parity check

description：none

AT+UARTCLR

Function： Set/inquire whether to clear the serial port cache before connecting the module.

Format：Inquire

transmit：AT+ UARTCLR <CR> return：

<CR><LF>+OK=< sta ><CR><LF>

configure

transmit：AT+ UARTCLR =< sta ><CR> return：

<CR><LF>+OK<CR><LF>

Parameter：   sta status

ON   Clear the serial port cache before connecting.

OFF Do not clear the serial port cache before connecting.

AT+IMEI

Function： inquire the IMEI of module

Format：inquire

transmit：AT+IMEI<CR> return：

<CR><LF>+OK=<imei><CR><LF>

parameter：   imei IMEI of module

AT+LINKSTA

Function： inquire whether TCP connection is established

Format：inquire

transmit：AT+LINKSTA<CR> return：

<CR><LF>+OK=<sta><CR><LF>

Parameter：   Sta whether establish TCP connection，Connect(TCP connection)/ Disconnect(TCP cut off)

AT+LINKSTA1

Function： inquire TCP whether TCP connection is established

Format：inquire

transmit：AT+LINKSTA1<CR> return：

<CR><LF>+OK=<sta><CR><LF>

Parameter： Sta whether establish TCP connection，Connect(TCP connection)/ Disconnect(TCP cut off)

AT+LINKSTA2

Function： inquire whether TCP connection is established

Format： inquire

transmit：AT+LINKSTA2<CR> return：

<CR><LF>+OK=<sta><CR><LF>

Parameter： Sta whether establish TCP connection，Connect(TCP connection)/ Disconnect(TCP cut off)

AT+LINKSTA3

Function： inquire whether TCP connection is established

Format： inquire

transmit：AT+LINKSTA3<CR> return：

<CR><LF>+OK=<sta><CR><LF>

Parameter： Sta whether establish TCP connection，Connect(TCP connection)/ Disconnect(TCP cut off)

AT+SOCK

Function： Set/query the network protocol parameter format.

Format： inquire

transmit：AT+SOCK<CR> return：

<CR><LF>+OK=<protocol>,<ip>,< port ><CR><LF>

configure

transmit：AT+SOCK=<protocol>,<ip>,< port ><CR> return：

<CR><LF>+OK<CR><LF>

Parameter： protocol   protocol type，TCPC / UDPC

TCPC   corresponding TCP client

UDPC   corresponding UDP client

Ip   The IP address or domain name of the target server when the module is set to "CLIENT"

Port   The port number of the server, in decimal, less than 65535.

AT+SOCK1

Function： Set/query the network protocol parameter format.

Format： inquire

transmit：AT+SOCK1<CR> return：

<CR><LF>+OK=<EN>,<protocol>,<ip>,< port ><CR><LF>

configure

transmit：AT+SOCK1=<EN>,<protocol>,<ip>,< port ><CR>

return：<CR><LF>+OK<CR><LF>

Parameter：   EN enable 0：turn off SOCK1

1：turn on SOCK1

protocol type，TCPC / UDPC

TCPC corresponding TCP client

UDPC   corresponding   UDP client

Ip   The IP address or domain name of the target server when the module is set to "CLIENT"

Port   The port number of the server, in decimal, less than 65535.

AT+SOCK2

Function： Set/query the network protocol parameter format.

Format： inquire

transmit：AT+SOCK2<CR> return：

<CR><LF>+OK=<EN>,<protocol>,<ip>,< port ><CR><LF>

configure

transmi：AT+SOCK2=<EN>,<protocol>,<ip>,< port ><CR>

return：<CR><LF>+OK<CR><LF>

Parameter：   EN enable 0：turn off SOCK2

               1：turn on SOCK2

           protocol   type，TCPC / UDPC

           TCPC corresponding TCP client

           UDPC   corresponding UDP client

Ip   The IP address or domain name of the target server when the module is set to "CLIENT"

Port   The port number of the server, in decimal, less than 65535.

AT+SOCK3

Function：   Set/query the network protocol parameter format.

Format：inquire

        transmit：AT+SOCK3<CR> return：

        <CR><LF>+OK=<EN>,<protocol>,<ip>,< port ><CR><LF>

        configure

        transmit：AT+SOCK3=<EN>,<protocol>,<ip>,< port ><CR>

        return：<CR><LF>+OK<CR><LF>

Parameter：   EN enable 0：turn off SOCK3

               1：turn on SOCK3

           protocol   type，TCPC / UDPC

           TCPC corresponding TCP client

           UDPC   corresponding UDP client

Ip   The IP address or domain name of the target server when the module is set to "CLIENT"

Port   The port number of the server, in decimal, less than 65535.

AT+REGMOD

Function：Set the query registration package mechanism.

Format：inquire

        transmit：AT+REGMOD<CR> return：

        <CR><LF>+OK=<status><CR><LF>

        configure

        transmit：AT+REGMOD =<status><CR> return：

        <CR><LF>+OK<CR><LF>

Parameter：status   registration package mechanism.

     EMBMAC   adds MAC/IMEI as registration packet data before each packet sent to the server.

     EMBCSTM   adds custom registration package data before each packet is sent to the server.

     OLMAC   sends a MAC/IMEI registration packet only when it is first linked to the server.

     OLCSTM   sends a user-defined registration package only the first time it is linked to the server.

     OFF   Disables the registration of the packet mechanism.

AT+REGINFO

Function   Set the contents of the inquiry custom registration package

Format: inquiry

transmit：AT+ REGINFO <CR> return：

<CR><LF>+OK=<data><CR><LF>

configure

transmit：AT+ REGINFO =<data><CR> return：

<CR><LF>+OK<CR><LF>

Parameter：data ASCII in 40 bytes

AT+REGINFONEW

Function： set inquire self-defined registration package content

Format： inquire

transmit：AT+ REGINFONEW<CR> return：

<CR><LF>+OK=<type>,<data><CR><LF>

configure

transmit：AT+ REGINFONEW =<type>,<data><CR> return：

<CR><LF>+OK<CR><LF>

Parameter：type

0 Registration package type is HEX

1 Registration package type is ASCII code

data

ASCII code within 40 bytes, when the registration packet type is HEX, the content must be in the legal HEX format and the length must be an even number.

AT+HEARTMOD

Function： set/inquire heartbeat mode

Format： inquire

transmit：AT+ HEARTMOD<CR> return：

<CR><LF>+OK=<mode><CR><LF>

configure

transmit：AT+ HEARTMOD=<mode><CR> return：

<CR><LF>+OK<CR><LF>

parameter：mode

NET Network heartbeat package

UART UART heartbeat package

AT+HEARTINFO

Function： Set/inquire heartbeat package data

Format： inquire

transmit：AT+ HEARTINFO<CR> return：

<CR><LF>+OK=<data><CR><LF>

configure

transmit：AT+ HEARTINFO=<data><CR> return：

<CR><LF>+OK<CR><LF>

Parameters: ASCII heartbeat packet data within 40 bytes of data.

AT+HEARTINFONEW

Function： configure/inquire heartbeat packet data

Format： inquire

transmit：AT+ HEARTINFONEW<CR>

return：<CR><LF>+OK=<type>,<data><CR><LF>

configure

transmit：AT+ HEARTINFO=<type>,<data><CR> return：

<CR><LF>+OK<CR><LF>

parameter：type

        0 Heartbeat package type is HEX

        1 Heartbeat type is ASCII code

        data

        ASCII code within 40 bytes, when the heartbeat packet type is HEX, the content must be a legal HEX format and the length must be an even number.

AT+HEARTM

Function：   configure/inquire heartbeat package time

Format： inquire

     transmit：AT+ HEARTM <CR> return：

     <CR><LF>+OK=<time><CR><LF>

     configure

     transmit：AT+ HEARTM =<time><CR> return：

     <CR><LF>+OK<CR><LF>

Parameters: time heartbeat time, 0 off, range 1 to 65535 seconds.

AT+SHORTM

Function：   set/inquire short connection time

Format： inquire

     transmit：AT+ SHORTM<CR> return：

     <CR><LF>+OK=<time><CR><LF>

     configure

     transmit：AT+ SHORTM=<time><CR> return：

     <CR><LF>+OK<CR><LF>

Parameter：time short connection time，0 off，from 2-255 second

AT+EBTIOT

Function：   set /inquire EBYTE IoT Cloud platform

Format： inquire

     transmit：AT+EBTIOT <CR> return：

     <CR><LF>+OK=<ctrl><CR><LF>

     configure

     transmit：AT+EBTIOT =<ctrl><CR> return：

     <CR><LF>+OK<CR><LF>

Parameter：   ctrl EBYTE IoT function switch，0 off/1 on

Note: After the IoT cloud function is enabled, the module is automatically connected to the Yiyi special IoT platform, ignoring the sock configuration, registration package, and heartbeat package function.

AT+CSQ

Function： inquire signal strength

Format： configure

     transmit AT+CSQ<CR><LF>

     return <CR><LF>+OK=<csq><CR><LF>

Parameter： csq signal strength

Description：none

AT+CREG

Function： inquire whether it is registered with the carrier.

Format： configure

transmit AT+CREG<CR><LF>

return <CR><LF>+OK=<creg><CR><LF>

Parameter： creg

1 Register to the network

0 Not registered to the network1

Description： None

AT+CPIN

Function： inquire SIM card status

Format： configure

transmit AT+CPIN<CR><LF>

return <CR><LF>+OK=<cpin><CR><LF>

Parameter： cpin

1 Able to detect SIM card

0 unable to detect SIM card

Description： None

AT+ POTOCOL

Function： Set/inquire Whether to enable protocol transmission (valid under 4G multi socket)

Format： inquire

transmit：AT+ POTOCOL <CR> return：

<CR><LF>+OK=<sta><CR><LF>

configure

transmit：AT+ POTOCOL =<data><CR> return：

<CR><LF>+OK<CR><LF>

Parameters: data status

ON Turns on the transmission of the EBYTE protocol

OFF Turns off the he transmission of the EBYTE protocol

AT+ UARTEX（extending command）

Function： Set/inquire serial port parameter（AT+UART is for configuring baud rate and parity only）

Format： inquire

transmit：AT+ UARTEX <CR> return：

<CR><LF>+OK=<sta><CR><LF>

configure

transmit：AT+ UARTEX =<baud>,<data bit>,< parity>,<stop><CR>

return：<CR><LF>+OK<CR><LF>

Parameter： baud: UART baud can be configured as levels below：

9600,

19200,

38400,

57600,

> 115200,
>
> 230400,
>
> 460800,
>
> 921600,

data bit：UART data bit

> 8，length is 8 bits
>
> 7，length is 7 bits

Parity：UART parity

> N, None
>
> O, Odd
>
> E,   Even

stop：UART stop bit

> 1，1 bit
>
> 2，2 bits

AT+ ICCID

Function：inquire SIM card ID

Format：inquire

> transmit：AT+ ICCID <CR> return：
>
> <CR><LF>+OK=<number><CR><LF>

Parameter：   number：

> The present ICCID of SIM card

AT+ LBS

Function：inquire the service info. based on location

Format：inquire

> transmit：AT+ LBS <CR> return：
>
> <CR><LF>+OK=LAC:<lac>,CID:<cid><CR><LF>

Parameter：   lac：

> Base station location code for present device

cid:

> Base station id

AT+ HSPEED

Function：   configure/inquire if high speed mode is enabled

Format：configure

> transmit：AT+ HSPEED=<state> <CR> return：
>
> <CR><LF>+OK<CR><LF>
>
> Inquire
>
> transmit：AT+ HSPEED <CR> return：
>
> <CR><LF>+OK=<state> <CR><LF>

Parameter：state

> ON high speed enabled
>
> OFF high speed disabled

AT+ UARTTS

Function： configure/inquire serial port packaging and break frame mechanism

Format： configure

transmit：AT+ UARTTS =<time>,<length> <CR> return：

<CR><LF>+OK<CR><LF>

inquire

transmit：AT+ UARTTS <CR> return：

<CR><LF>+OK=<time>,<length> <CR>

Parameter：

time

Serial port break frame packaging time： （50~2000）ms

Length

Serial port packaging length： （20~1024）bytes

AT+ SMSSEND

Function： transmit SMS command

Format： transmit

transmit：AT+ SMSSEND =<number>,<info> <CR> return：

<CR><LF>+OK<CR><LF>

Parameter：

Number :receiver's phone number

info: transmitted content （English or number）

AT+ SMSINFO

Function： configure/inquire SMS configuration identifier ID

Format： transmit

transmit：AT+ SMSINFO =<Info> <CR> return：

<CR><LF>+OK<CR><LF>

Inquire

transmit：AT+ SMSINFO <CR>

return：<CR><LF>+OK=<info> <CR>

Parameter：

Info :remote SMS configuration identifier ID

AT+MODBUS

Function： configure/ inquire if Modbus RTU/TCP switch function is enabled

Format： configure

transmit：AT+ MODBUS =<state> <CR> return：

<CR><LF>+OK<CR><LF>

inquire

transmit：AT+ MODBUS <CR> return：

<CR><LF>+OK=<state> <CR><LF>

Parameter： state

ON Modbus RTU/TCP switch is on

OFF Modbus RTU/TCP switch is off

AT+MTCPID

Function： configure/ inquire Modbus RTU/TCPevent identifier

Format： configure

transmit：AT+ MTCPID =<id> <CR> return：

<CR><LF>+OK<CR><LF>

inquire

transmit：AT+ MTCPID <CR> return：

<CR><LF>+OK=<id> <CR><LF>

Parameter：id （0~65535） 2 bytes

Remark：when ID is 0， any modbusTCP received will switch to corresponding RTU protocol， otherwise, only when id is matched can it switch

AT+RSTIME

Function： configure/ inquire server response overtime

Format： configure

transmit：AT+ RSTIME =<value> <CR> return：

<CR><LF>+OK<CR><LF>

inquire

transmit：AT+ RSTIME = <CR> return：

<CR><LF>+OK=<value><CR><LF>

Parameters: value, set/query the server timeout value to the device

Remark: The value is mainly used to set the server response timeout. When the device does not receive the data sent by the server, the device will restart automatically.

Range: 60~65535; in seconds, 0 means turning off the function

AT+NETHEAD

Function： configure/ inquire network AT command head

Format： configure

transmit：AT+ NETHEAD =<value> <CR> return：

<CR><LF>+OK<CR><LF>

inquire

transmi：AT+ NETHEAD <CR> return：

<CR><LF>+OK=<value><CR><LF>

Parameters：value, configure/ inquire network AT command head

Remark: The maximum length of network AT command head is 19 bytes

4 Notes

- The first Socket of this module will always be opened. After the initialization is successful, it will automatically establish a connection with the configured network server.

- After the module is powered on, it cannot be initialized successfully. That is, the State indicator has no indication for more than 30 seconds. In this case, check whether the module is installed properly, whether the SIM card is properly inserted, and whether the SIM has failed.

- Short connection function can be used to reduce the connection pressure of multiple devices to the server. When the short connection function is enabled (AT+SHORTM>2), the module will actively disconnect the connection when the network or serial port has no data for more than the short connection setting period. After the disconnection, the network cannot send data and the local serial port sends. For valid data, the module will immediately establish a connection with the server. If the local clear cache function is turned off, the packet will be cached (maximum 10K bytes). After the connection is successful, the data will be sent to the server. The local cache function is cleared and the packet will be discarded.

- The heartbeat function is used to maintain the connection after the module and the server are successfully connected. In the network, if the client and the network server successfully establish a connection and there is no data transmission for a long time, the Socket link may appear "dead", that is, the chain. The road exists but cannot send and receive data. Therefore, in actual use, it is recommended to enable the heartbeat packet function to ensure the reliability of the network link.

- In actual use, it is normal for the data delay of the two communications to be different.

- After the protocol is closed, the maximum single packet length supported by a single link is 10K bytes. A local serial port or a network sending a packet exceeding this length may cause packet abnormality. The distribution protocol is enabled. Each Socket is enabled. The link single packet can support up to 1024 bytes (user-configured serial port packing length).

- In the high-speed serial transmission mode, the EMBMAC and EMBCSTM registration package functions cannot be enabled, and in the high-speed mode, the short message transmission and reception function is not supported. Only the first Socket effective link is valid, and the protocol distribution data is not supported.

- After the EBYTE cloud transparent transmission function is enabled, the high-speed mode is invalid.

- When the device serial port outputs the words "pdp error, device will be reset!", it indicates that the PDP context is disabled by the network. The SIM card may be loose or the current network channel is occupied abnormally.

- The SMS function needs to insert the SIM card to support the SMS service. The IoT card cannot send and receive SMS messages. When the device sends a text message, the device responds with OK only to indicate that the module has sent the SMS, which does not mean that the device has received the SMS.

- After modifying the serial port break time, the AT command must be configured according to the frame break time. For example, after setting the parameter to 2000ms, you need to configure the device parameters after power-on. You need to send '+++'. , Send a valid AT command within the period of more than 2000ms and less than 3000ms to enter the AT mode normally.

- The network AT command will fail in high speed mode.

5 Important Statement

- All rights to interpret and modify this manual belong to Ebyte.
- This manual will be updated based on the upgrade of firmware and hardware, please refer to the latest version.
- Please refer to our website for new product information.

6 Reversion History

Version	Edit date	Description	Issued by
1.0	2018/4/12	Initial version	-
1.1	2019/8/8	Product upgrade	Lyl
1.2	2019/8/21	Parameters update	Lyl
1.3	2019/8/23	Content update	Lyl
1.4	2021/5/26	Content update	HLL

7 About Us

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