



# GPRS Serial Server E840-DTU (GPRS-03)

User Manual



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E840-DTU (GPRS-03) is a product developed for serial port devices and network servers to transmit data through each other through the network. This product uses the standard AT command, which enables transparent transmission between devices and servers. The cloud platform built by Ebyte can realize the free networking mode. The E840-DTU (GPRS-03) is an industrial grade quad-band GSM/GPRS digital radio.

This chapter is a quick introduction to the E840-DTU (GPRS-03) product. It is the easiest hardware environment to test the E840-DTU (GPRS-03) network transmission function, that is, to realize the serial device (here, the computer) to the network server (TCP test tool instead of) network transparent transmission.

## Feature

- Able to meet almost all M2M application needs;
- Support data transparent transmission, support TCP, UDP network protocol, support heartbeat package, registration package;
- Support serial port caching function, the serial port data can be cached locally before the connection is established with the server;
- Maximum GPRS data downstream rate is 85.6kbps, maximum upstream rate is 85.6kbps;
- Support TCP/UDP/FTP/PPP/HTTP/NTP/MMS/SMTP/PING, code format include CS-1、CS-2、CS-3 and CS-4;
- Support 8~28V wide voltage power supply, adopt DC power supply and terminal terminal power supply mode;
- The RS485 circuit uses electrical isolation, lightning protection, and surge protection to provide immunity to interference.

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# 1. Introduction

## 1.1 Brief Introduction

E840-DTU (GPRS-01) is a new generation wireless data transceiver developed by Ebyte. The software of this product is fully functional and covers most of the conventional application scenarios. Users can realize the transparent transmission of bidirectional data from serial port to network server through simple setting.

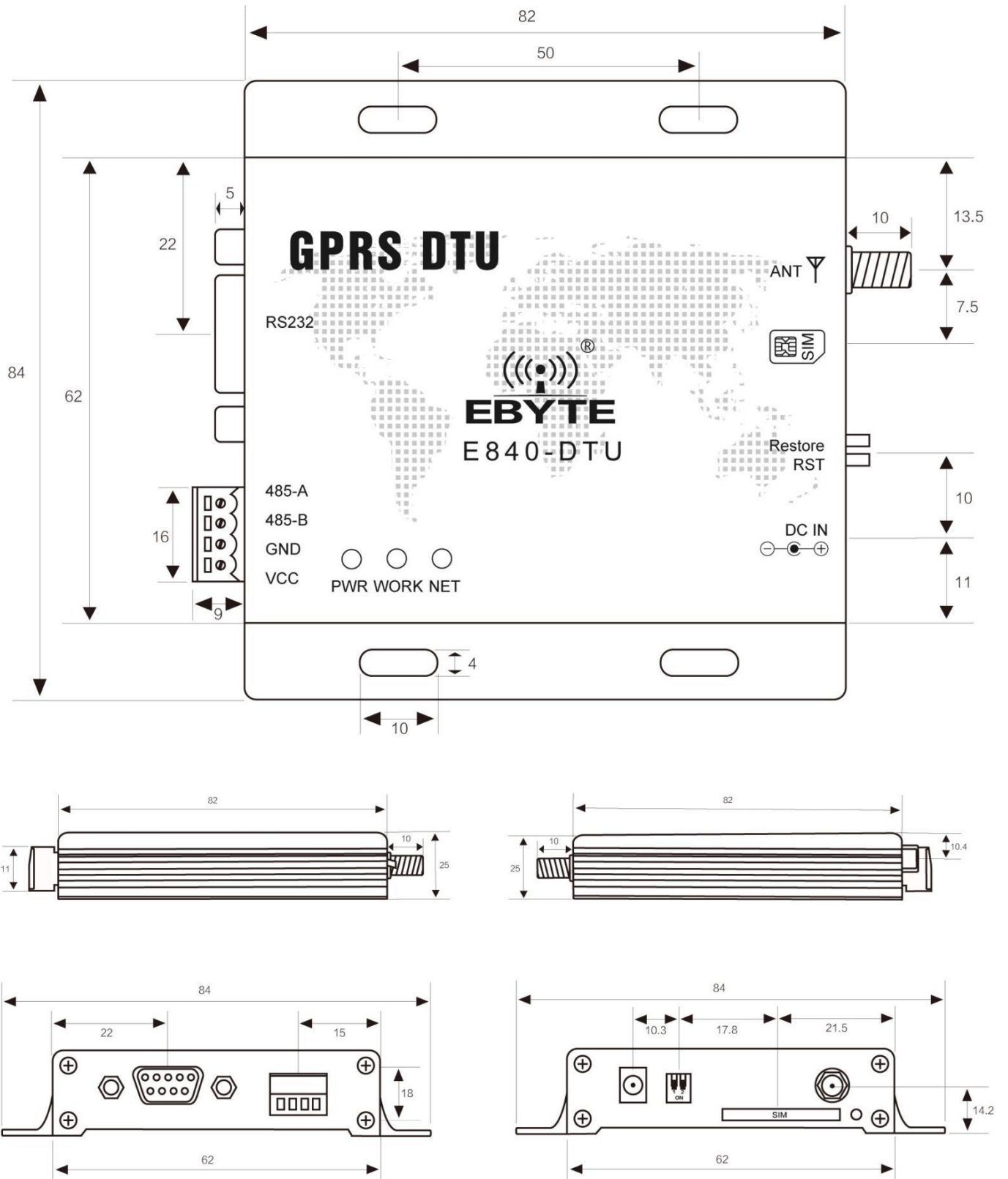
The radio is powered by the DC power supply or RS485 terminal in the power supply section. It is powered by a wide voltage of 8.0V to 28.0V and supports 5.0V power supply. It only supports mobile and Unicom 2G cards. RS485 and RS232 circuits use electrical isolation schemes, which have anti-interference ability and can be used in some environments with strong electromagnetic interference, such as some power industries.

## 1.2 Parameters

Item	Value	Description
Characteristic Features	Support Band	Quad Band: GSM850, EGSM900, DCS1800, PCS1900 Module automatically searches for frequencies Band selection can be set by AT command Compliant with GSM Phase 2/2+
	GPRS connection characteristic	GPRS multi-slot class 12 (default) GPRS multi-slot class 1~12 (configurable) GPRS mobile station class B
	GPRS data feature	GPRS data downstream transmission: up to 85.6kbps GPRS data upstream transmission: up to 85.6kbps Encoding format: CS-1, CS-2, CS-3 and CS-4 Support for PAP (Password Authentication Protocol) protocols commonly used for PPP connections Support is usually used for CHAP (Interrogation Handshake Authentication Protocol) protocol Embedded protocol: TCP/UDP/FTP/PPP/HTTP/NTP/MMS/SMTP/PING, etc. Support for unstructured supplementary data services (USSD)
Hardware Features	Antenna	SMA
	Data interface	RS485 / RS232
	Baud rate	1200bps ~115200bps, default: 115200bps
	TX power	Class 4 (2W): GSM850 and EGSM900 Class 1 (1W): DCS1800 and PCS1900
	AT command format	Ebyte general AT command

3GPP frequency	1 Timeslot	2 Timeslot	4 Timeslot
CS-1	9.05kbps	18.1kbps	36.2kbps
CS-2	13.4kbps	26.8kbps	53.6kbps
CS-3	15.6kbps	31.2kbps	62.4kbps
CS-4	21.4kbps	42.8kbps	85.6kbps

### 1.3 Interface Description





### 1.3 Pin Definition

Pin NO.	Name	Description
1	RS232	RS232 interface
2	485_A	Side A of external interface for other RS485 devices
3	485_B	Side B of external interface for other RS485 devices
4	GND	Ground
5	VCC	Power supply 8V-28V DC
6	PWR	Power indicator
7	WORK	UART communication indicator
8	NEL	Radio network working indicator, no light: Initializing, slow flashing: access to the base station, fast flashing: initialization is not successful, always on: access server
9	DC8~28V	Power adaptor interface, range: 8~28V
10	RST	Reset (downward, reset)
11	Restore	The radio operating DIP switch (downward, factory reset) needs to be operated in 3s-10s.
12	SIM	For SIM card
13	ANT	Antenna (SMA-K , 50Ω impedance match)

## 2. Quick start

### 2.1 Devices preparation

Please get UART, SIM card, sucker antenna and etc. ready according to the recommended circuit before test.

	
<p>One piece of E840-DTU(GPRS-03)</p>	<p>One piece of 12V power adaptor</p>

	
USB to RS485 adaptor or USB to RS232 adaptor(optional)	GPRS sucker antenna

- 1、 Enter the AT command mode and send +++ in the serial port assistant (+++ does not need to check to send a new line, other AT commands need to tick to send a new line to be valid), one must send any other AT command within 3 seconds after sending +++ (except for AT command for restarting) to enter the AT command mode completely.

- 2、 After entering the AT command mode, use AT+CPIN to check the SIM card access:

For example: AT+CPIN

+OK=1

For example : AT+CPIN

+OK=1

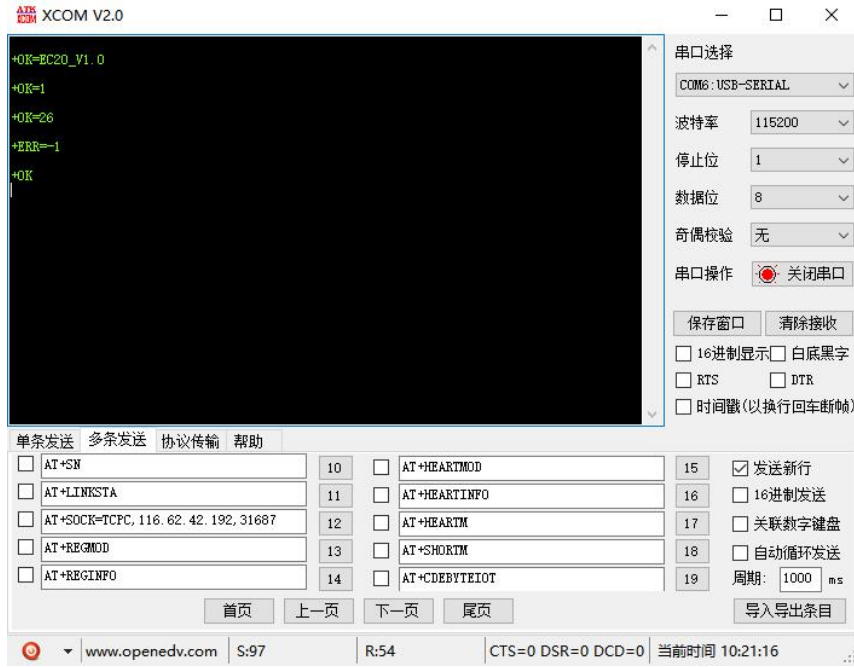
Indicates that the SIM card is connected, and use AT+CSQ to view the current signal strength :

For example: AT+CSQ

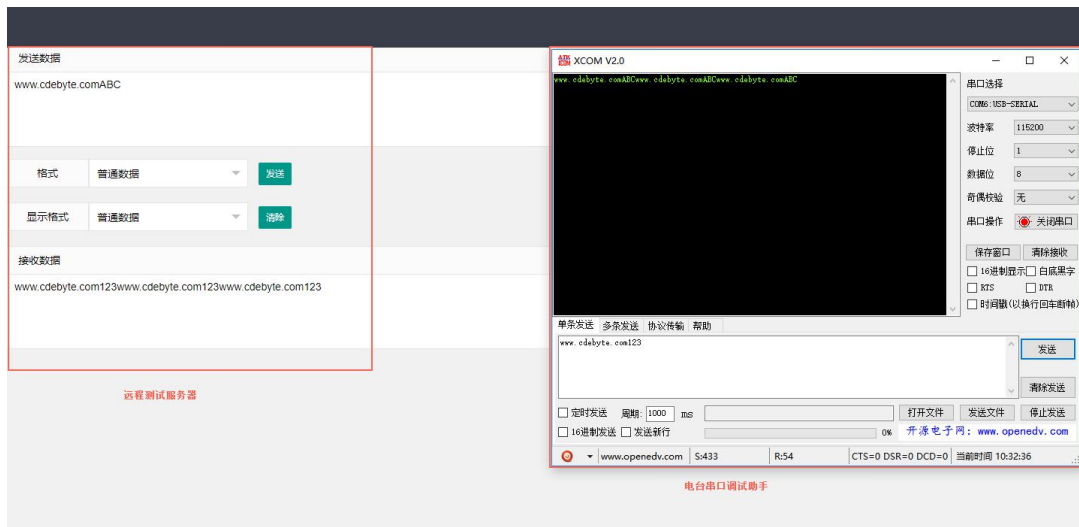
+OK=26

Execute the parameter modification command. If the baud rate is modified, it needs to be restarted to be valid.

- 3、 Access server, AT + SOCK = TCPC, 116.62.42.192, 31687 parameters separated by English characters comma, IP instructions are separated by English characters, after return + OK, one need to restart command AT + REBT to make it valid Here, the IP is only a demonstration, and the actual connection is based on the IP of the server to be connected.



- After the base station is connected, the NET light is always on to indicate that the server is connected, and transparent transmission is possible at this time.



- User can also use the Ebyte cloud platform for any networking operation. For details, please refer to the operation manual of Ebyte Cloud Platform.

### 3. Operating mode

#### 3.1 Transparent transmission

After power-on, the radio works in transparent 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 the 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 512 bytes.

This module supports one-channel Socket connection. The user can configure it as TCP Client or UDP Client. In transparent transmission mode, the received serial port data will be directly transmitted to the network server, and the received network server data will be directly output through the serial port.

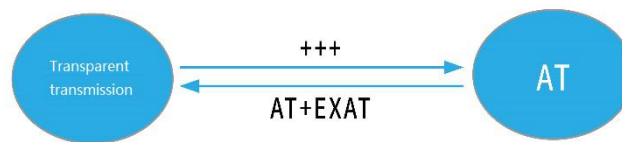


## 3.2 AT mode

In this mode, the serial port data is regarded as an AT command. The user can configure the module through a valid AT command. If the format is wrong, the relevant error code will be prompted.

## 3.3 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, one can send AT+EXAT<CR><LF> to switch to transparent transmission mode.



## 4. Network function

- 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.
- Registration package: The registration package is closed by default. 4 options include: physical address when connecting, send custom data when connecting, add physical address before each packet of data, add custom data before each packet of data. The maximum data length for customize registration package is 40 bytes (when set to HEX format, the maximum length is 20 bytes)
- 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 types of heartbeats, network heartbeat, serial heartbeat. User selects network heartbeat, starts timing when in communication idle, and sends heartbeat packets to the server according to the configured heartbeat period. User selects the serial port heartbeat, start timing when in communication idle, and send heartbeat packets to the serial port according to the configured heartbeat period.

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 packet length of the local cache is 256 bytes.

## 5. Ebyte IoT platform function

AT+EBTIOT command is used to set whether the module enables the transparent transmission function of the Ebyte cloud platform, after the device is turned on, the information such as the heartbeat and registration package 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 transparent transmission. For details of the related operations, please refer to the "Transparent Transmission Guide for Ebyte Cloud Platform".

## 6. AT command

- Command format:

AT+<CMD>[op][ para1, para2, para3,...]<CR><LF>

AT+: Command prefix

CMD: Control command

[op]: "=" indicate parameter configuration

"NULL" indicate parameter query

[para-n]: parameter list

<CR><LF>: Enter, start new line, ASCII 0x0D 0x0A

b) Error code:

Error code	Description
-1	Invalid command format
-2	Invalid command
-3	Invalid Operator
-4	Invalid parameter
-5	Operation not allowed

c) Command set:

Command	Description
REBT	Restart Module
VER	Query version number
INFO	Query device info.
EXAT	Exit AT command mode
RESTORE	Restore factory setting
UART	Set/Query UART parameter
UARTCLR	Set/query whether UART cache is cleared before module connection
MAC	Set/query MAC address
IMEI	Set/query IMEI
LINKSTA	Set/query SOCK connection
LINKSTA1	Set/query SOCK1 connection
LINKSTA2	Set/query SOCK2 connection
LINKSTA3	Set/query SOCK3 connection
SOCK	Set/query SOCK parameter
SOCK1	Set/query SOCK1 parameter
SOCK2	Set/query SOCK2 parameter
SOCK3	Set/query SOCK3 parameter
REGMOD	Set/query registration package mode
REGINFO	Set/query customized registration package information (ASCII)
REGINFO1	Set/query customized registration package information (HEX)
HEARTMOD	Set/query Heartbeat Packet mode
HEARTINFO	Set/Query Customized Heartbeat Packet Information (ASCII)
HEARTINFO1	Set/query custom heartbeat packet information (hexadecimal)
HEARTM	Set/query heartbeat time
SHORTM	Set/query short connection time
EBTIOT	Set/Query EBYTE IoT Cloud Platform Enable
CREG	Query whether registered to network
CSQ	Query signal strength
CPIN	Query SIM status

d) Command details:

#### AT+REBT

Function: Restart module

Format: Set

TX: 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: Query firmware version

Format: Set

TX AT+VER<CR><LF>

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

Parameter: Ver firmware version

description: None

#### AT+INFO

Function: Query module type and version

Format: Set

TX 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: Set

TX 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 transparent mode.

#### AT+RESTORE

Function: Restore factory setting

Format: Set

TX AT+RESTORE<CR><LF>

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

Parameter: None

description: None

#### AT+UART

Function: Set/Query UART parameter

Format: Query

TX: AT+UART<CR>

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

Set

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

Return: <CR><LF>+OK<CR><LF>

Parameter: baudrate Baud rate 1200~921600bps, can be self defined

Parity Parity NON no parity  
 EVEN even parity  
 ODD odd parity

Description: None

#### AT+UARTCLR

Function: Query/set whether the serial port cache is cleared before module is connected

Format: Query

TX: AT+ UARTCLR <CR>

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

Set

TX: AT+ UARTCLR =< sta ><CR>

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

Parameters: sta state

ON Clear the serial port cache before connecting.

OFF The serial port cache is not cleared before the connection.

#### AT+MAC

Function: Query MAC

Format: Query

TX: AT+MAC<CR>

Return: <CR><LF>+OK=<mac><CR><LF>

Parameter: mac MAC address

#### AT+IMEI

Function: Query IMEI

Format: Query

TX: AT+IMEI<CR>

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

Parameter: imei IMEI code

#### AT+LINKSTA

Function: Query whether TCP link is connected

Format: Query

TX: AT+LINKSTA<CR>

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

Parameter: Sta whether TCP link connection is established, Connect(TCP connection)/ Disconnect(TCP cut off)

#### AT+LINKSTA1

Function: Query whether TCP link is connected

Format: Query

TX: AT+LINKSTA1<CR>

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

Parameter: Sta whether TCP link connection is established, Connect(TCP connection)/ Disconnect(TCP cut off)

#### AT+LINKSTA2

Function: Query whether TCP link is connected

Format: Query

TX: AT+LINKSTA2<CR>

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

Parameter: Sta whether TCP link connection is established, Connect(TCP connection)/ Disconnect(TCP cut off)

### AT+LINKSTA3

Function: Query whether TCP link is connected

Format: Query

TX: AT+LINKSTA3<CR>

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

Parameter: Sta whether TCP link connection is established, Connect(TCP connection)/ Disconnect(TCP cut off)

### AT+SOCK

Function: Set/query the network protocol parameter format.

Format: Query

TX: AT+SOCK<CR>

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

Set

TX: 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 Server port number, in decimal, less than 65535.

### AT+REGMOD

Function: Set the query registration package mechanism.

Format: Query

TX: AT+REGMOD<CR>

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

Set

TX: 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 query custom registration package content

Format: Query

TX: AT+ REGINFO <CR>

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

Set

TX: AT+ REGINFO =<data><CR>

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

parameter: data ASCII code within 40 bytes

#### AT+HEARTMOD

Function: Set/query heartbeat packet mode.

Format: Query

TX: AT+ HEARTMOD<CR>

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

Set

TX: AT+ HEARTMOD=<mode><CR>

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

Parameter: mode

NET network heartbeat packet

UART UART heartbeat packet

#### AT+HEARTINFO

Function: Set/query heartbeat packet data

Format: Query

TX: AT+ HEARTINFO<CR>

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

Set

TX: AT+ HEARTINFO=<data><CR>

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

parameter: data ASCII code heartbeat packet data within 40 bytes

#### AT+HEARTM

Function: Set/Query short heartbeat time

Format: Query

TX: AT+ HEARTM <CR>

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

Set

TX: AT+ HEARTM =<time><CR>

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

parameter: time heartbeat time, 0 off, 1 ~ 65535 seconds

#### AT+SHORTM

Function: Set/Query short connection time

Format: Query

TX: AT+ SHORTM<CR>

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

Set

TX: AT+ SHORTM=<time><CR>

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

parameter: time short connection time, 0 off, 2-255 seconds

**AT+EBTIOT**

Function: Set/query the ebyte IoT platform.

Format: Query

TX: AT+EBTIOT <CR>

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

Set

TX: AT+EBTIOT =<ctrl><CR>

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

Parameter: ctrl IoT Function Switch, 0 off / 1 on.

Note: After the Internet of Things cloud function is turned on, the module is automatically connected to the Ebyte IoT platform, ignoring the sock configuration, registration package, and heartbeat package Function.

**AT+CSQ**

Function: Query signal strength

Format: Query

TX AT+CSQ<CR><LF>

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

parameter: csq signal strength

Description: None

**AT+CREG**

Function: Check if it is registered to the carrier.

Format: Set

TX AT+CREG<CR><LF>

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

Parameter: creg

1 Network registered

2 Network not registered

Description: None

**AT+CPIN**

Function: Query SIM status

Format: Set

TX AT+CPIN<CR><LF>

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

Parameter: cpin

1 SIM card detected

0 SIM card not detected

Description: None

## 7. Notes

- After the module is powered on, it will be automatically initialized. After the initialization is successful, it will automatically establish a connection with the configured network server. After the connection is successful, the NET light will be on. If the NET light has been flashing slowly, the module is initialized successfully, but it has been unable to communicate with the server. In this case, check whether the module network server parameter configuration is correct.
- After the module is powered on, it cannot be initialized successfully. After a short time, the NET light flashes quickly. At this time, check whether the module is installed properly, whether the SIM card is properly inserted, whether the SIM has failed, and whether the module radio antenna is properly connected.

## 8. Important Statement

1. CDEBYTE reserves the right of final interpretation and modification of all the contents of this manual.
2. As the hardware and software products continuously improving, this manual may subject to change without notice, please refer to the latest version.
3. Everyone is responsible for protecting the environment: to reduce the use of paper, we only provide electronic documents of the English manual, if necessary, please go to our official website to download.

## 9. About Us

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For file download and more product information, please visit: [www.cdebyte.com/en/](http://www.cdebyte.com/en/)

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