

# 4G DTU User Manual

- MGT541
- MGT551
- MGT571

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## Description

This user manual is applicable to the MGT571/MGT551/MGT541 4G DTU. For illustrative purposes, the term "4G DTU" refers specifically to all of these products.  
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## Declaration

Due to the continuous update and improvement of products and technology, the content of this material may not be completely consistent with the actual product. Please understand. If you need to inquire about product updates, please consult our website or contact our sales representative directly.

## Reversion history:

Reversion No.	Date	Reason
V1.0	2020.01	Create file
V2.0	2020.06	Modify product name
V2.1	2020.08	Revised to standardize China Mobile OneNET format
V2.2	2020.10	1. Add SSL 2. Add modbus correlation

# Safe Use Instructions

This product performance is excellent and reliable in the designed range of use, but it's necessary to avoid man-made damage or destroy for the equipment.

- Read the manual carefully and keep this manual for reference if need afterwards.
- Do not put the device close to the water sources or damp places.
- Do not put anything on the power cable, it should be placed out of reach.
- To avoid causing fire, do not knot or wrap the cable.
- Power connector and other device connectors should be firmly connected with each other, frequently inspection is needed.
- Please keep the fiber socket and plug clean. Do not look directly at the fiber section when the equipment is working.
- Please keep the equipment clean and wipe it with a soft cotton cloth if necessary.
- Please do not repair the equipment by yourself, unless there is clear instructions in the manual.

Under the following circumstances, please cut off power immediately and contact us.

- Equipment water damage.
- The equipment is broken or the casing is broken.
- The equipment works abnormally or the performance has completely changed.
- The equipment produces odor, smoke or noise.



## Statement

Information requiring explanation in use of the managed software.



## Attention

Matters requiring specific attention in the use of the managed software.



## 1 Product Introduction

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## 3 Introduction of DTU Configuration Tool

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# 1 Product introduction

## 1.1 Product description

4G DTU produced by MAIWE is a 4G wireless data transmission terminal equipment based on China Mobile, Unicom and Telecom networks. It provides wireless data transmission channel of TCP/IP network protocol for industrial users, and can provide fully transparent data channel to realize two-way transparent data transmission from serial port to network and realize wireless data communication between RS485/RS232/RS422 bus equipment and central control system.

4G DTU has many advantages, such as wide network coverage, fast and flexible networking, and low running cost. The product can be used in power system, industrial monitoring, traffic management, meteorology, water treatment, environmental monitoring, financial securities, coal mining, oil and other industries, for remote field data acquisition, remote monitoring, field control, which is an essential industrial communication product for the development of IIoT.

## 1.2 Features

### ➤ 1.2.1 Powerful functions

- Embedded in the field of high performance industrial communication 4 g DTU, compatible with industrial field RS485 / RS232 / RS422 bus, satisfy diversified customers' needs.
- Support PC via a serial port configuration of the AT command/query equipment parameters.
- Support through the mai wei cloud platform remote configuration/query device parameters.
- Support various work modes: simple passthrough, ali MQTT, China mobile OneNET MQTT protocol, Modbus.
- Simple passthrough mode supports TCP Client, UDP Client, SSL.
- Support SSL encryption transmission.
- Support 2-way Socket connection.
- Support the heart function and registration package, type of ICCID, IMEI, user-defined data, etc.
- User-defined types support hexadecimal and string.
- Support network break line automatic reconnection functions.
- Support network receives data timeout disconnect reconnection functions.
- Support RS485, RS232 and RS422 bus standard.
- Aserial port receives the data length of the subcontract optional 1 byte to 1000 bytes, the subcontract time 200 milliseconds to 60000 ms optional.
- Support the AT command query and modify the equipment parameters.
- Support service in both English and Chinese,(Some models will not support the SMS function of some operators).
- Support the standard modbus protocol.
- Support FTP remote upgrade.

### ➤ 1.2.2 High Reliability

- External independent hardware watchdog design to prevent crashes.

### ➤ 1.2.3 Industrial grade surge protection

- RS232/RS485/RS422 interface up to 2KV surge protection.

### ➤ 1.2.4 Industrial-grade wide-voltage power supply design

- Provide industrial-grade DC power supply DC9~36V input.
- With anti-reverse protection.
- Up to 2KV surge protection.

### ➤ 1.2.5 Industrial grade temperature design

- RS232/RS485/RS422 interface up to 2KV surge protection.



MGT541



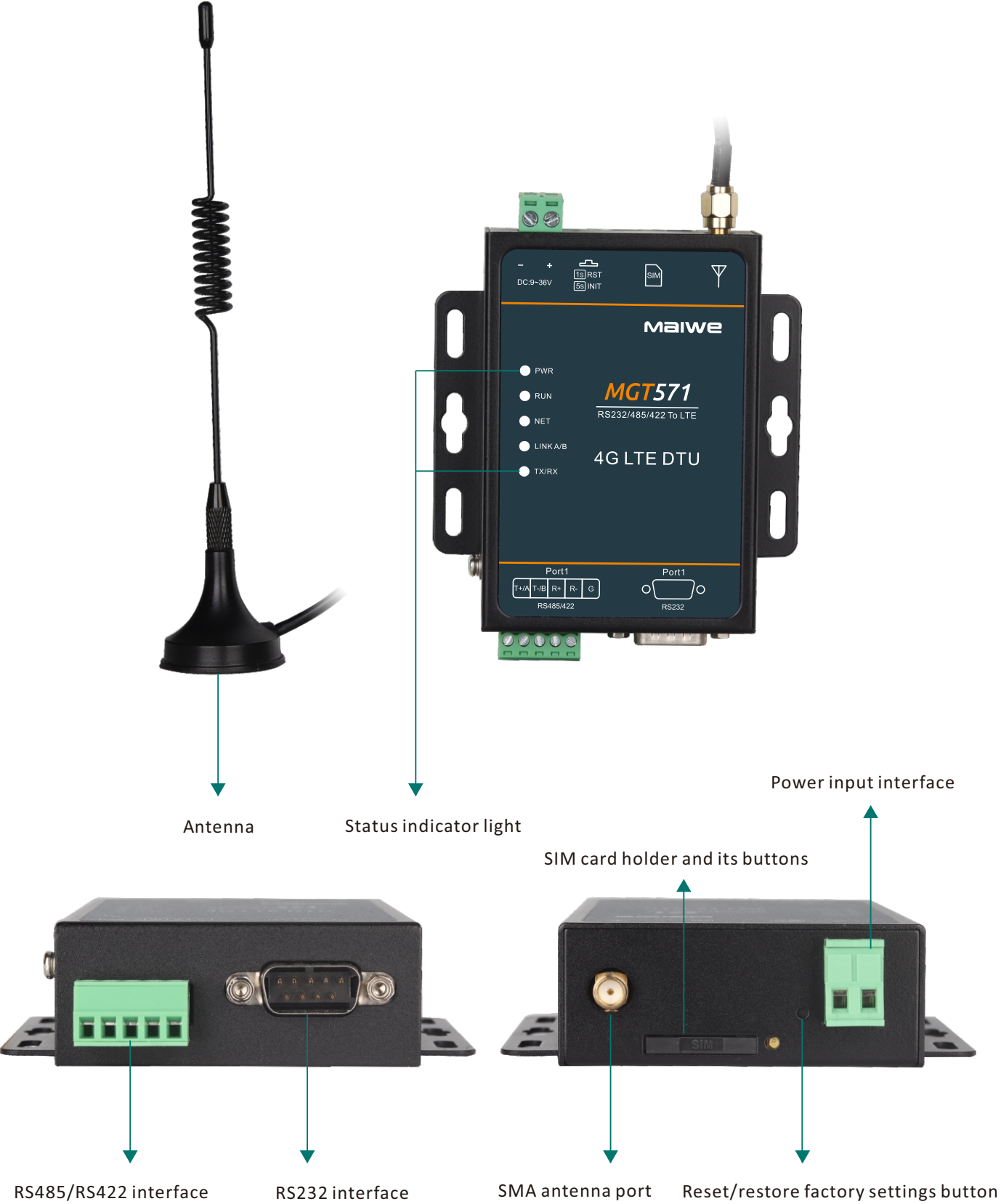
MGT551



MGT571

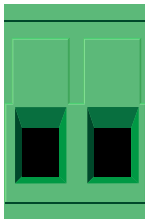
1.3 Interface description

Take MGT571 as a example



➤ 1.3.1 Power input interface

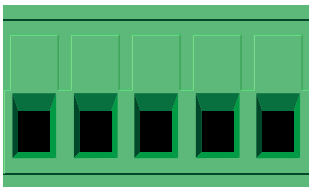
The power interface adopts the access method of terminal blocks (5.08mm pitch), and the input range is: DC 9 ~ 36V.



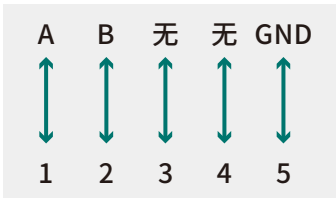
terminal blocks (5.08mm pitch)

➤ 1.3.2 RS485/RS422 interface

Use 3.81mm pitch terminals. The definition is shown in the figure below:



1 2 3 4 5



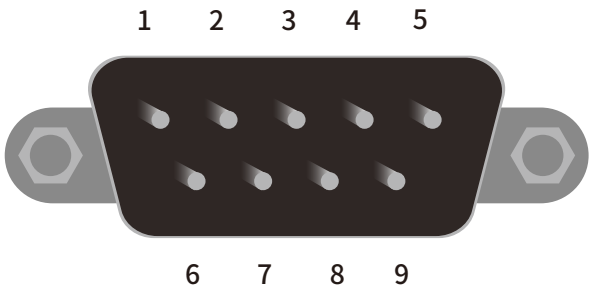
RS485 interface



RS422 interface

➤ 1.3.3 RS232 interface

It adopts DB9 male head. The definition is shown in the figure below:



Pin number	Pin name	Description	Signal	Direction
1	NO			
2	RXD	Receive Data	RS232	Input
3	TXD	Transmit Data	RS232	Output
4	NO			
5	GND	Ground	Ground	Ground
6	NO			
7	NO			
8	NO			

### ➤ 1.3.4 Status Indicators

LED		color	status description
PWR		Red	Always on means the power supply is normal, off means no power supply or abnormal power supply.
Run		Green	During the normal operation of the device, it will flash once every 0.5s, and it will always be on or off to indicate that the device is operating abnormally.
NET		Green	It is off first after power-on, and starts to search for the network after 10 seconds. It is on for 200ms and off for 1800ms during the search for mobile network. After finding the network, the NET light will be on for 1800ms and off for 200ms. If there is data transmission, the NET light flashes quickly, on for 125ms, and off for 125ms.
LINKA/B	LINKA	Green	It is always on when SocketA is successfully connected. Blinks if data is being transmitted. It is off when not connected.
	LINKB	Blue	It is always on when SocketB is successfully connected. Blinks if data is being transmitted. It is off when not connected.
TX/RX	TX	Green	Blinking means the RS232/RS485/RS422 interface is sending data, off means there is no data.
	RX	Blue	Blinking means the RS232/RS485/RS422 interface is receiving data, off means there is no data.

### ➤ 1.3.5 Reset/restore factory settings button

In the case of power-on, if you press it for 1~5s, then release it, the device will restart; if you press it for more than 5s, then release it, the device parameters will be restored to factory settings.

### ➤ 1.3.6 SMA antenna port

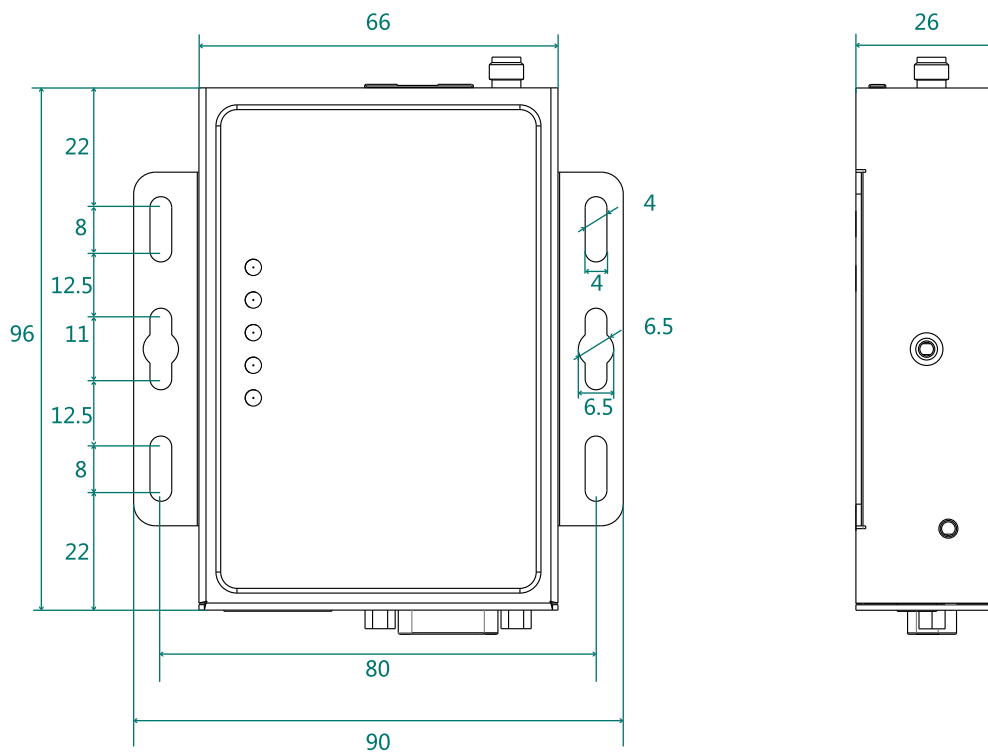
External screw and internal hole SMA female head, can be connected to an external antenna.

### ➤ 1.3.7 SIM card holder and its buttons

Standard SIM card is supported by default. If you use Micro SIM or Nano SIM card, etc., you need to use a card tray.

## 1.4 Installation dimensions

There are two ears on the left and right of the device for installation and fixing. The specific dimensions are shown in the figure below.



MGT541/551/571 size(Unit:mm)

## 1.5 Technical indicators

		MGT541	MGT551	MGT571
Hardware parameter	Operating Voltage	DC9~36V		
	Working current	56mA@12V		
	power protection	Anti-reverse protection		
	Network	LTE-FDD: B1/B3/B5/B8 LTE-TDD:B34/B38/B39/ B40/B41 GSM: 900/1800 MHz	LTE- FDD: B1/B3/B5/B8 LTE-TDD:B34/B38/B39/ B40/B41 WCDMA: B1/B5/B8 GSM: 900/1800MHz	LTE-FDD: B1/B3/B5/B8LTE TDD:B38/B39/B40/B41 WCDMA:B1/B8 TD-SCDMA: B34/B39 CDMA: BC0 GSM: 900/1800MHz
	EMI	FCC Part 15, CISPR (EN55022) class A		
	EMS	EN61000-4-2 (ESD) ±8kV(contact),±15kV(air)		
		EN61000-4-3 (RS) 10V/m (80~1000MHz)		
		EN61000-4-4 (EFT) Power Port: ±2kV, Data Port: ±2kV		
		EN61000-4-5 (Surge) Power Port: ±2kV/DM,±2kV/CM, Data Port: ±2kV		
		EN61000-4-6 ((RF conduction) 10V(150kHz~80MHz)		
		EN61000-4-8(Power frequency magnetic field) 100A/m; 1000A/m ,1s to 3s		
	Shock	IEC 60068-2-27		
	Free fall	IEC 60068-2-32		
	Shock	IEC 60068-2-6		
	Operating temperature	-40°C~+85°C		
	Storage temperature	-40°C~+85°C		
	Humidity	5%~95% RH(no condensation)		
	Size	96*90*26mm(L*W*H)		
	Weight	267g		



Software parameter	Certified	CE、FCC、RoHS
	Warranty	5 years
	Network protocol	IPV4
	User configuration	AT command
	Operating mode	Simple transparent transmission, Ali MQTT, China Mobile OneNET MQTT protocol, Modbus
	Simple transparent transmission method	TCPClient/UDP Client/SSL
	Modbus	Modbus RTU/TCP
	MQTT	Ali MQTT/China Mobile OneNET MQTT
	Registration package/heartbeat package	The types are ICCID, IMEI, user-defined data, etc.; user-defined data types support hexadecimal and character strings;
	Serial port support	RS232/RS485/RS422
	Serial baud rate	600~460800 (bps)
	Serial packaging mechanism	Time and length can be set; The default packaging time is 500ms, and the packaging length is 1000bytes
	web cache	Send: 1Kbyte; Receive: 1Kbyte;
	Serial cache	Send: 1Kbyte; Receive: 1Kbyte;
	Flow Control	none
	Remote configuration	support
	Supporting software	DTU configuration tool

## 2 Quick Start



### Statement

The interface and configuration of all the following functions are subject to the actual product.

MAIWE 4G DTU implements AT command interface externally, and users can configure parameters according to AT commands; they can also use the PC platform DTU configuration tool provided by Maiwei to quickly configure DTU parameters.

After the 4G DTU is powered on, the AT command mode is turned off by default, and various data of the user are directly transparently transmitted to the network. If you need to configure parameters, you need to set the 4G DTU into the AT command mode first.

### 2.1 Hardware preparation

The test in this chapter is based on 4G DTU and its accessories. The product packing list is shown in the table below. If any of the listed items are lost or damaged, please contact the agent or the customer service center of MAIWE to assist you with replacement or top-up.

Item	Qty
4G DTU	1
4G antenna	1
Product certificate and warranty card	1
Power Adapter	1
Serial cable	1

Users need to check the device manager of their PC to ensure that the PC has a usable serial port. The serial port here can be provided by the PC, or it can be virtualized by the USB-to-serial device. As shown in Figure 2-1:

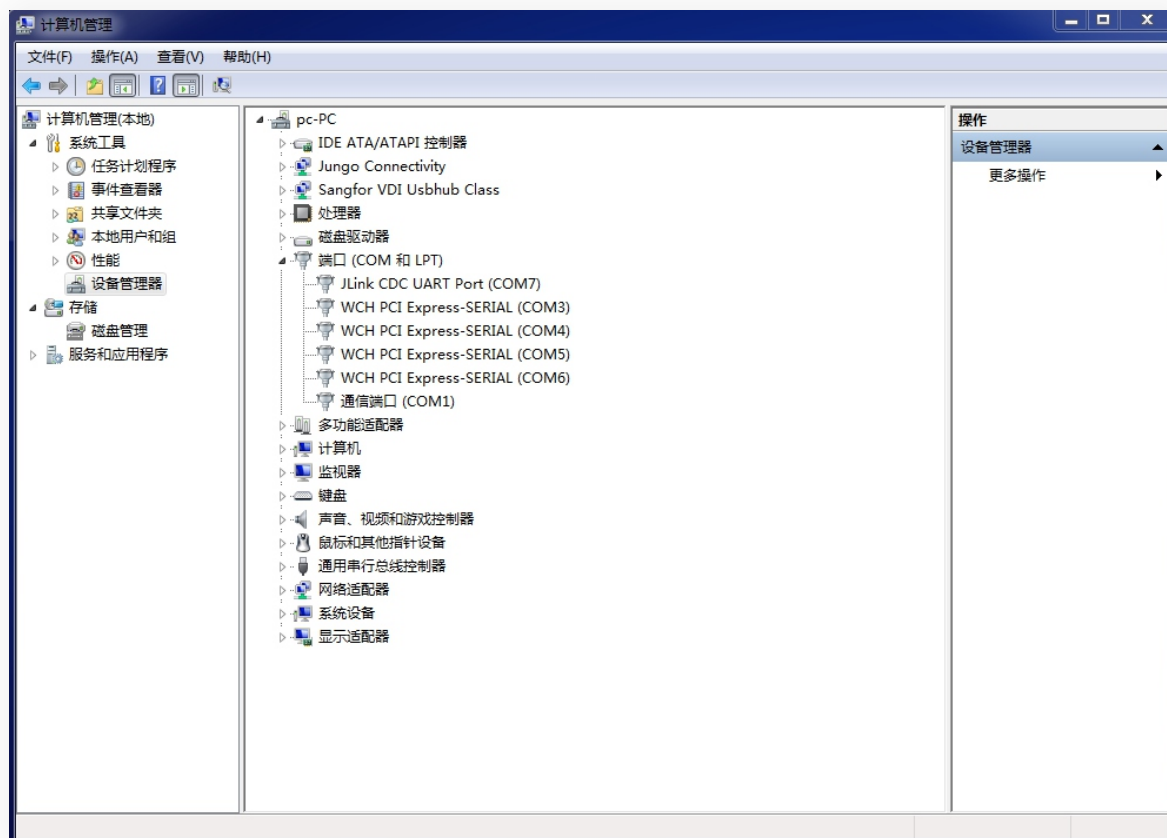


Figure 2-1 device manager

The initial state of 4G DTU is RS232 mode, the baud rate is 115200, the data bit is 8bits, the stop bit is 1bit, no parity, no flow control.

The user opens the serial port tool on the PC, configures the serial port parameters, and connects the DB9 interface of the 4G DTU to the serial port cable of the PC. After the 4G DTU is powered on, it will automatically output the device model, such as "MGT571" string, and the user can use this to check whether the hardware connection is intact. As shown in Figure 2-2:

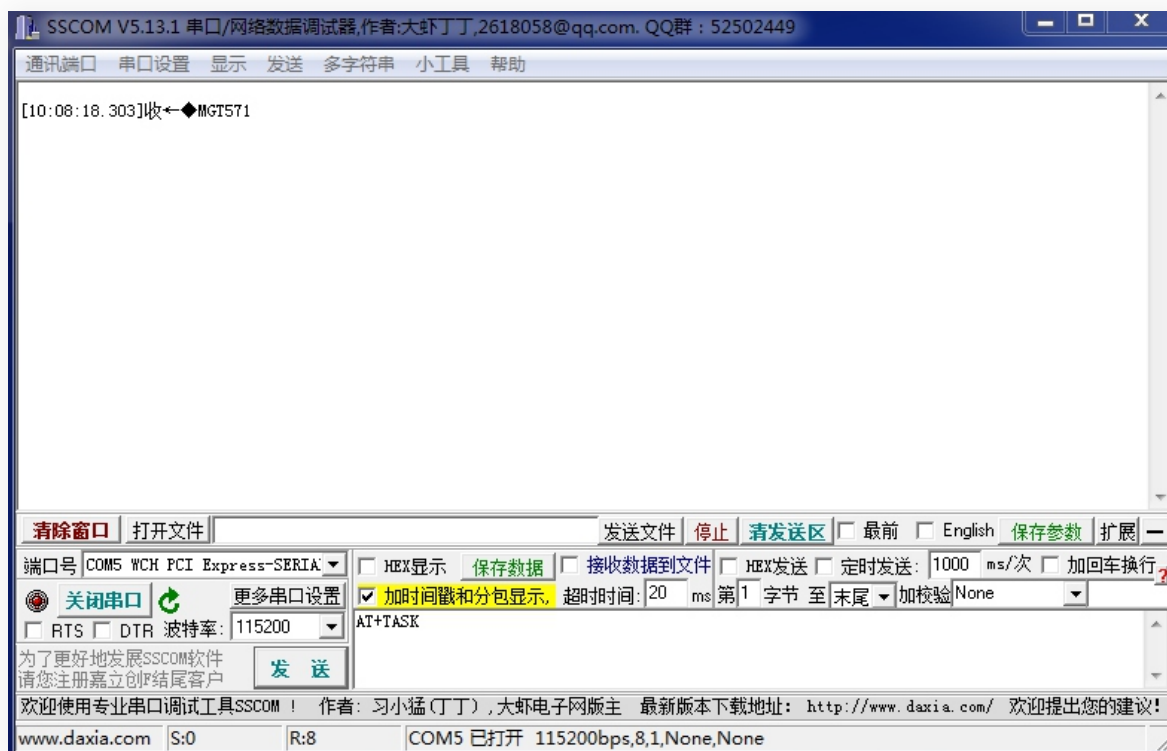


Figure 2-2 serial port tool

## 2.2 Introduction of DTU Configuration Tool

Our company provides a dedicated parameter configuration tool for 4G DTU to help users configure DTU quickly and accurately.

### Hardware requirements:

- The hardware platform is PC computer;
- The system memory requirement is more than 512M, and more than 2G memory is recommended;
- Hard disk capacity above 80G;
- The CPU uses an X86-compatible chip with a main frequency above 1.2G;
- A monitor above 17 inches is required, with a recommended resolution of 1440×900;

### Software Requirements:

- The operating system requires Windows XP, Windows2003 or above
- The software requires: Net Framework 4.0.

#### ➤ 2.2.1 Main page

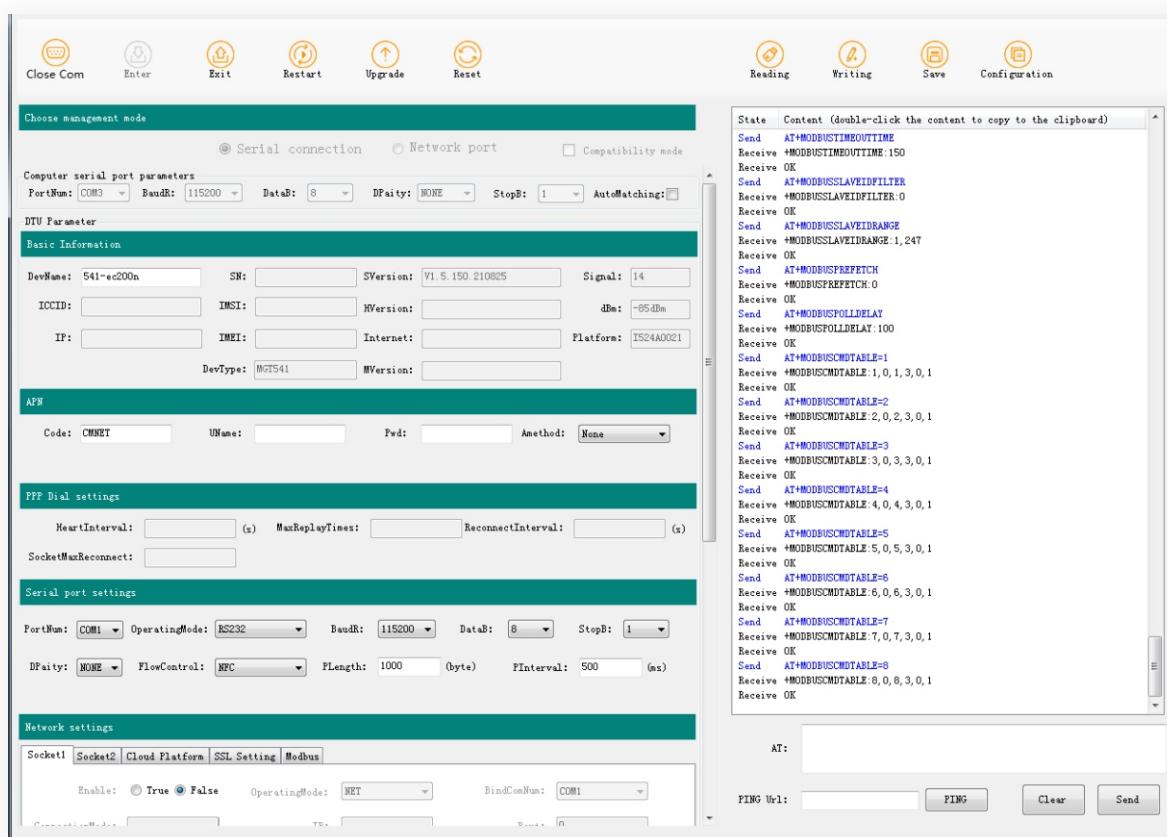


Figure 2-3 Main page

Above the interface is the functional area, mainly for opening/closing the local serial port, entering the command mode, exiting the command mode, restarting the device, upgrading the image, saving the configuration, restoring the factory configuration, reading the current parameter, writing the configuration parameter and batch configuration and other functions.



Figure 2-4 functional area

## 3 Introduction of DTU Configuration Tool

### 3.1 Introduction of DTU Configuration Tool

#### ➤ 3.1.1 PC local serial port configuration

It is necessary to correctly select the serial port number of the local PC and configure it according to the parameters consistent with the serial port of the DTU, in order to communicate with the DTU normally.

Figure 3-1 local serial port configuration

After the serial port of 4G DTU is powered on, it defaults to the transparent transmission mode, and it needs to enter the AT command mode before it can be configured.

After configuring the local serial port parameters correctly, click [Open Serial Port], and click [Enter Command Mode] to operate the 4G DTU.

After entering the command mode, click [Read Parameters] to get the current configuration parameters of 4G DTU.



This function can only identify the baud rate, and the data bit, parity bit, and stop bit may not be accurate. After entering the command, read the parameters and then manually correct it.

#### ➤ 3.1.2 Basic equipment information

The basic device information section displays basic information about the current device, including the device name, device serial number, software version, hardware version, ICCID of the SIM card, IMSI, current networking information, signal strength, Intranet IP address obtained from the mobile carrier, and device IMEI. Figure 2-6 shows the page.

Figure 3-2 Basic equipment information

The device name is output through the serial port when the 4G DTU is started, and the user can configure the tool to modify the device name.

Device serial number, software version and IMEI cannot be modified. SIM card-related information cannot be modified and will vary depending on the SIM card operator.

➤ 3.1.3 APN info

Code: CMNET

UName:

Pwd:

Amethod: None

Figure 3-3 APN info

Regarding the APN, if the user uses an ordinary mobile phone card, it can be used without any settings.

➤ 3.1.4 PPP dial-up setting

PortNum: COM1

OperatingMode: RS232

BaudR: 115200

DataB: 8

StopB: 1

DPAity: NONE

FlowControl: NFC

PLength: 1000 (byte)

PInterval: 500 (ms)

Figure 3-4 PPP dial-up setting

In the 4G DTU PPP setting area, you can set the PPP layer heartbeat interval, maximum redial times, and redial interval parameters. The maximum reconnection times of the socket is the limit for the connection times of the two sockets, if the connection times of the two sockets, if the connection fails, the device will restart.

➤ 3.1.5 Serial port configuration

DTU serial port configuration is shown in Figure 3-5.

HeartInterval: (s)

MaxReplayTimes:

ReconnectInterval: (s)

SocketMaxReconnect:

Figure 3-5 Serial port configuration

The detailed configuration parameters of this interface are shown in Table 3-1.

Table 3-1 Description of DTU serial port configuration parameters

Item	Description
Serial number	Select the serial port to be configured currently, currently 4G DTU only supports one serial port.
Operating mode	Select the working mode of the current serial port RS485, RS232 or RS422. The factory default is RS232 mode.
Baud rate	The baud rate of the serial communication, the unit is bps, the options are: 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400 and 460800. The factory default value is 115200.
Check Digit	Select the check method, there are three options: none, odd check, even check. The factory default is None.

data bit	Set the number of effective data bits in serial communication, this machine supports 7 or 8 data bits. The factory default is 8 data bits.
stop bit	Set the length of the stop bit in serial communication, you can choose: 1, 2. The factory default setting is 1 data bit.
packet length	When the length of data received continuously by the serial port exceeds the value set by the sub-packet length, a transmission operation will be triggered, and the data will be forwarded to the network, with a value range of 1~1000 bytes.
packet interval	When the intermittent time of serial port receiving data exceeds this value, no matter how much data has been received, a transmission operation will be triggered, and the data will be forwarded to the network, ranging from 200ms to 60000ms.

### ➤ 3.1.6 Socket configuration

4G DTU supports two sockets to work at the same time, and the configuration information of the two sockets is independent of each other and does not affect each other. At the same time, it can also connect to the cloud platform.

The Socket configuration page is shown in Figure 3-6:

The screenshot shows the 'Network settings' window with the 'Socket1' tab selected. The interface includes the following configuration options:

- Enable:** Radio buttons for 'True' and 'False' (False is selected).
- OperatingMode:** Dropdown menu set to 'NET'.
- BindComNum:** Dropdown menu set to 'COM1'.
- ConnectionMode:** Text input field.
- IP:** Text input field.
- Port:** Text input field set to '0'.
- IsItConnected:** Status indicator set to 'No'.
- DisReconnectTime:** Text input field set to '10' (s).
- NoDataTimeout:** Text input field set to '300' (s).
- ICMP Detect:**
  - Enable:** Radio buttons for 'True' and 'False' (False is selected).
  - TimeOut:** Text input field (s).
  - MaxPacketLoss:** Text input field.
- TCP layer heartbeat:**
  - Heartbeat:** Text input field (s).
  - Timeout:** Text input field (s).
- Whether to enable heartbeat packet data:**
  - ☐ checkbox.
  - Type:** Dropdown menu set to 'ICCID'.
  - SendMode:** Dropdown menu set to 'NETWORK'.
  - HeartbeatCycle:** Text input field set to '120'.
- Whether to enable the registration package:**
  - ☐ checkbox.
  - Type:** Dropdown menu set to 'ICCID'.
  - SendMode:** Dropdown menu set to 'LINK'.
- MQTT:**
  - UserName:** Text input field.
  - Pwd:** Text input field.
  - MQTTCLIENTID:** Text input field.
  - Subscribe:** Text input field.
  - Publish:** Text input field.

Figure 3-6 Socket configuration

The detailed configuration parameters of this interface are shown in Table 3-2.



Table 3-2 Socket configuration parameters

Item	Description
Operating mode	Select the working mode of the current Socket: transparent transmission, Ali MQTT, China Mobile OnetNET MQTT, Modbus.
connection mode	Select the connection mode of the current Socket in the "transparent transmission" working mode: TCP client, UDP client and SSL.
Bind serial number	Select which serial port to establish a binding relationship between the current Socket and
IP address	When Socket works on TCP/UDP client, here is the IP address or domain name of the server.
The port number	When the Socket works on the TCP/UDP client, here is the port number of the server.
Is it connected	Set whether the Socket is enabled. Default is not enabled.
disconnection reconnection time	When the Socket is disconnected, wait for a period of time and try to connect again. The unit is second, and the range is 10s~3600s.
no data timeout	Set how long the Socket does not receive data, then the Socket is considered disconnected. The unit is seconds, and the range is 60s~3600s. It can also be set to 0, which means that no matter how long no data is received, the socket will not be disconnected.
heartbeat type	Select the type of heartbeat packet: ICCID, IMEI or user-defined. User-defined types support both hexadecimal and string formats.
sending method	Select the heartbeat sending method: to UART or to the network.
heartbeat cycle	Define the heartbeat packet sending cycle, the unit is second. The range is 60s~1800s.
Registry package type	Select the type of registration package: ICCID, IMEI or user-defined. User-defined types support both hexadecimal and string formats.
sending method	Select the way to send the registration package: only send once when the connection is successful or add this registration package before sending data each time.
MQTT username	MQTT username.
MQTT password	User password for MQTT.
MQTT ID	The ID number generated by the MQTT platform.
subscribe topic	Socket The MQTT topic to subscribe to.
post topic	The MQTT topic selected when Socket sends data.

### ➤ 3.1.7 AT command debugging observation window

On the right side of the DTU configuration tool is a debugging observation window, which can display every AT command when the user reads or writes parameters.

There is an AT command input box at the bottom of this page, users can input specific AT commands to view and configure DTU parameters.

State	Content (double-click the content to copy to the clipboard)
Send	AT+MODBUSTIMEOUTTIME
Receive	+MODBUSTIMEOUTTIME:150
Receive	OK
Send	AT+MODBUSSLAVEIDFILTER
Receive	+MODBUSSLAVEIDFILTER:0
Receive	OK
Send	AT+MODBUSSLAVEIDRANGE
Receive	+MODBUSSLAVEIDRANGE:1,247
Receive	OK
Send	AT+MODBUSPREFETCH
Receive	+MODBUSPREFETCH:0
Receive	OK
Send	AT+MODBUSPOLLDelay
Receive	+MODBUSPOLLDelay:100
Receive	OK
Send	AT+MODBUSCMDTABLE=1
Receive	+MODBUSCMDTABLE:1,0,1,3,0,1
Receive	OK
Send	AT+MODBUSCMDTABLE=2
Receive	+MODBUSCMDTABLE:2,0,2,3,0,1
Receive	OK
Send	AT+MODBUSCMDTABLE=3
Receive	+MODBUSCMDTABLE:3,0,3,3,0,1
Receive	OK
Send	AT+MODBUSCMDTABLE=4
Receive	+MODBUSCMDTABLE:4,0,4,3,0,1
Receive	OK
Send	AT+MODBUSCMDTABLE=5
Receive	+MODBUSCMDTABLE:5,0,5,3,0,1
Receive	OK
Send	AT+MODBUSCMDTABLE=6
Receive	+MODBUSCMDTABLE:6,0,6,3,0,1
Receive	OK
Send	AT+MODBUSCMDTABLE=7
Receive	+MODBUSCMDTABLE:7,0,7,3,0,1
Receive	OK
Send	AT+MODBUSCMDTABLE=8
Receive	+MODBUSCMDTABLE:8,0,8,3,0,1
Receive	OK

Figure 3-7 AT command debugging observation window

### ➤ 3.1.8 Batch configuration

After configuring the device, you can choose to save the configuration information locally for future use. When writing the configuration operation, the configuration information will also be saved locally by default, and the configuration file of the device will be saved in the Config folder under the same directory as the configuration tool.

名称	修改日期	类型	大小
 DtuConfig.txt	2021/8/26 10:29	TXT 文件	1 KB

Figure 3-8 Location where the configuration file is stored

When configuring a new device, you only need to connect the device, enter the command mode, click the batch configuration button, select the configuration file, and the saved configuration information will be batch configured to the current device.

### ➤ 3.1.9 Upgrade image

When the user needs to upgrade the DTU firmware, follow the steps below to start upgrading the image. It should be noted that when upgrading the image, the working mode of the serial port must be RS232, the baud rate is 115200, 8 data bits, 1 stop bit, no parity, no flow control.

- Configure the local serial port parameters
- Click **【Open Serial Port】**
- Click **【Enter command mode】**
- Click **【Upgrade Image】**
- Select the file to be upgraded

Device Upgrade

UpgradeMode: ☒ Serial Port Upgrade ☐ FTP Upgrade

Serial port upgrade

FilePath:

FTP Upgrade

Address:  Port:

UserName:  Pwd:

FileName:

Figure 3-9 Procedure for upgrading an image

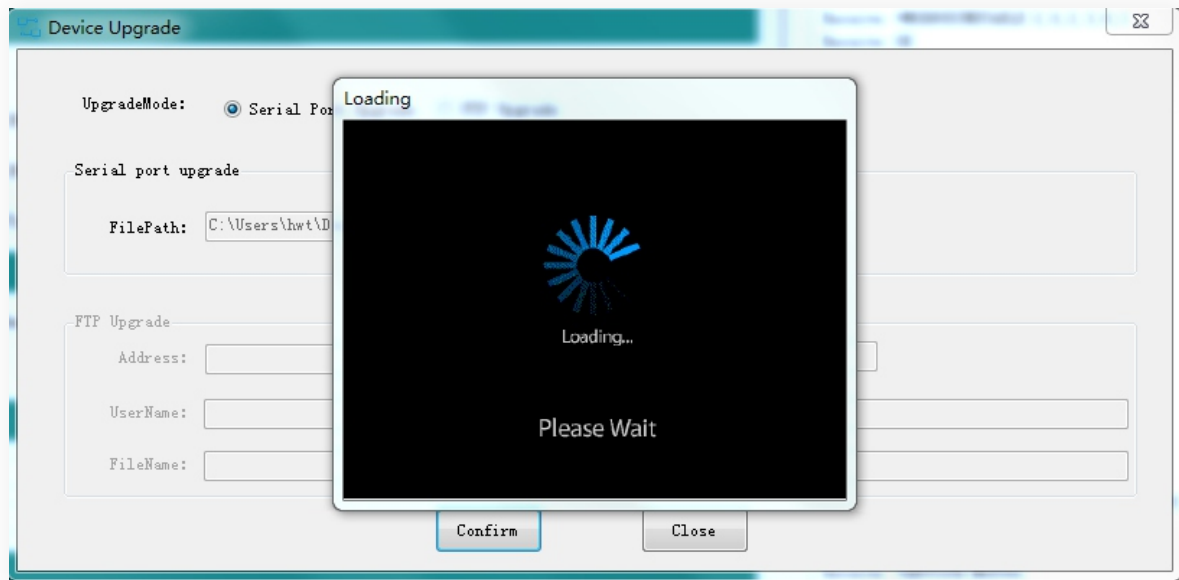


Figure 3-10 Upgrade image procedure

The upgrade process takes about 1 minute. During this period, do not power off or perform other operations. After the DTU upgrade is completed, it will automatically restart. If an error occurs during the upgrade process, the configuration tool will end the current operation. If the communication between DTU and the configuration tool is abnormal, DTU will automatically restart after 5 minutes to end the upgrade process.

## 3.2 SMS AT command test

On the mobile phone, the user enters the AT command preamble + AT command, sends a short message to the DTU's SIM card phone number, and the DTU will correctly respond to the AT command ACK. It is convenient for users to remotely view or modify the configuration parameters of DTU.

If the user does not add the AT command preamble when editing the message, the content of the message will be transparently transmitted to the serial port.

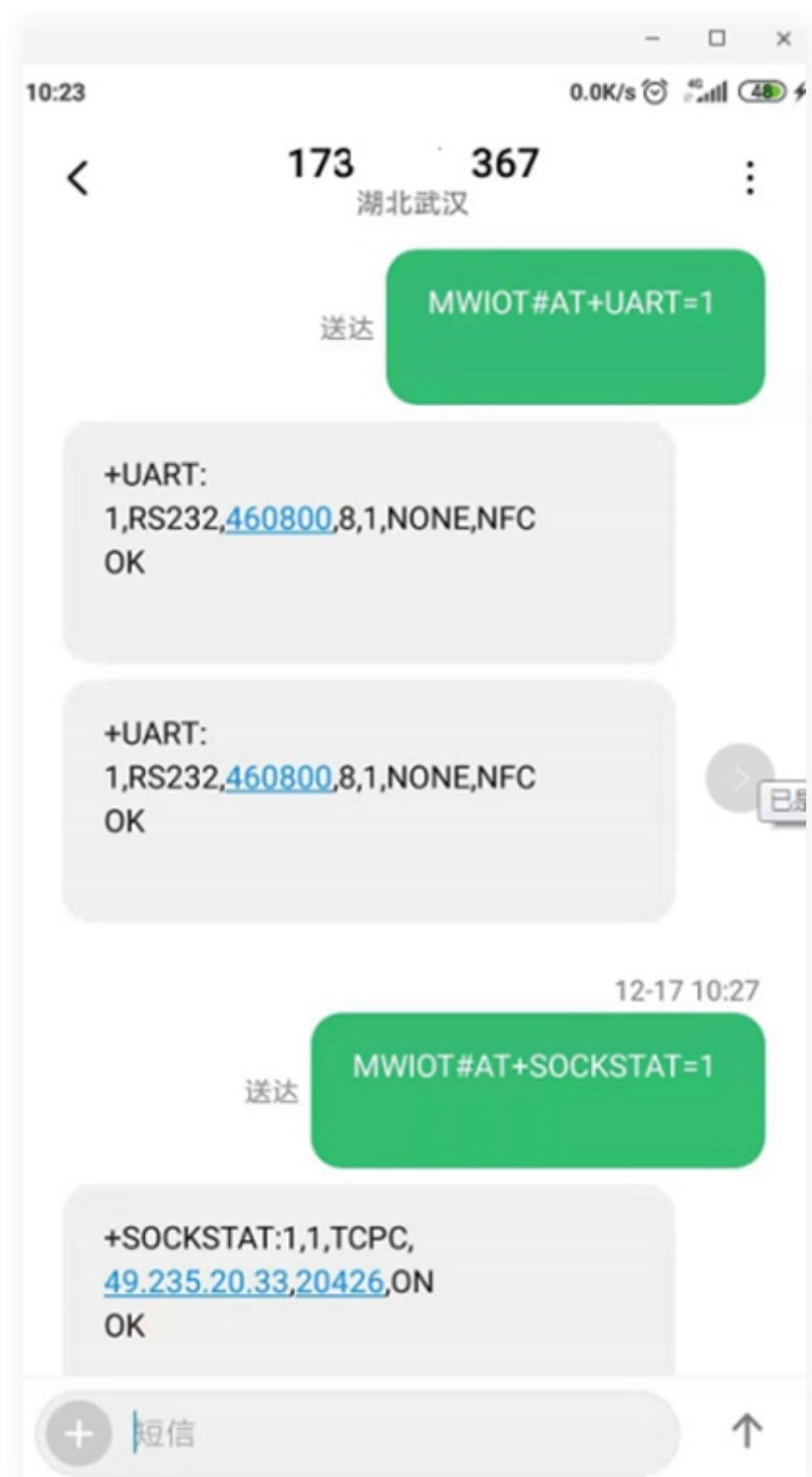


Figure 3-11 SMS AT command test



### 3.4 Network AT command test

It is necessary to correctly select the serial port number of the local PC and configure it according to the parameters consistent with the serial port of the DTU, in order to communicate with the DTU normally.

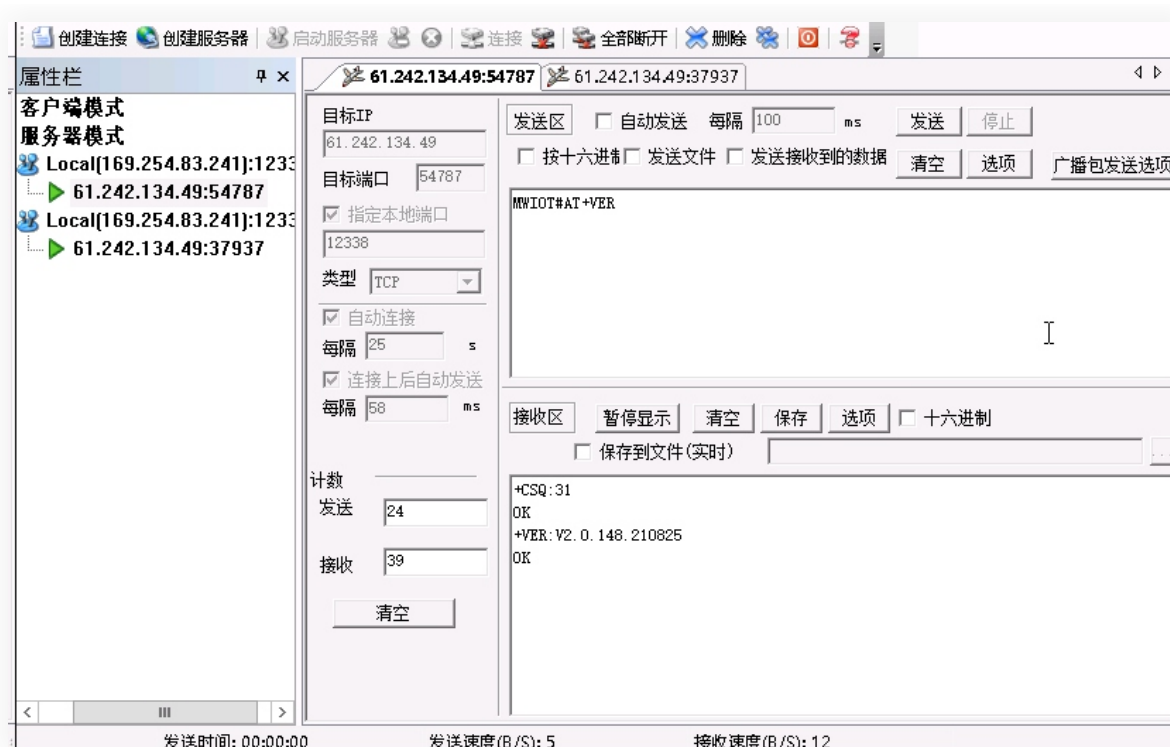


Figure 3-14 Network AT command test

### 3.5 Ali MQTT configuration

Users first need to register on Ali's MQTT platform, create devices and other operations. The following uses Socket1 as an example to introduce how to configure Ali's MQTT parameters.

- Working mode: select MQTTALI;
- IP address: fill in the domain name of the Alibaba Cloud server;
- Port number: Fill in the port number of Alibaba Cloud server, usually 1883;
- Product Ke: fill in the ProductKey generated by Ali platform;
- Device name: fill in the device name generated by Ali platform;
- Device secret key: fill in the device secret key generated by the Alibaba platform;
- Subscribe topic: fill in the topic that this DTU will receive data;
- Publish subject: fill in the subject to which the DTU sends data after receiving the serial port data.

It is necessary to correctly select the serial port number of the local PC and configure it according to the parameters consistent with the serial port of the DTU, in order to communicate with the DTU normally.

The screenshot displays the 'Socket2' configuration tab. At the top, there are three tabs: 'Socket1', 'Socket2', and 'Cloud Platform'. Below the tabs, the configuration is organized into several sections. The first section includes 'Enable' (radio buttons for True and False, with True selected), 'OperatingMode' (a dropdown menu showing 'MQTTALI'), and 'BindComNum' (a dropdown menu showing 'COM1'). The second section includes 'ConnectionMode' (a dropdown menu showing 'TCP client'), 'IP' (a text input field), and 'Port' (a text input field showing '0'). The third section includes 'IsItConnected' (radio buttons for Yes and No, with No selected), 'DisReconnectTime' (a text input field showing '10' with '(s)' next to it), and 'NoDataTimeout' (a text input field showing '300' with '(s)' next to it). The fourth section, titled 'ICMP Detect', includes 'Enable' (radio buttons for True and False, with False selected), 'TimeOut' (a text input field), and 'MaxPacketLoss' (a text input field). The fifth section, titled 'TCP layer heartbeat', includes 'Heartbeat' (a text input field) and 'Timeout' (a text input field), both with '(s)' next to them. The sixth section, titled 'MQTT', includes 'UserName' (a text input field), 'Pwd' (a text input field), 'MQTTCLIENTID' (a text input field), 'Subscribe' (a text input field), and 'Publish' (a text input field).

Figure 3-15 Ali MQTT configuration

### 3.6 China Mobile OneNET MQTT configuration

Users first register on the China Mobile OneNET platform, create devices and other operations. The following takes Socket 1 as an example to introduce how to configure the MQTT parameters of China Mobile OneNET.

- Working mode: select MQTTONENET;
- IP address: fill in the domain name or IP address of OneNET;
- Port number: fill in 6002.
- MQTT user name: fill in the device ID registered by the user on the OneNET platform here;
- MQTT password: fill in the product ID;
- MQTTCLIENTID: fill in the APIKey;
- Subscribe topic: fill in the topic that DTU wants to subscribe to;
- Publish subject: fill in the subject when DTU sends data.

Currently DTU, the QoS level supported by default is 0. After the user configures the above parameters, execute [Write Parameters], and the DTU will automatically restart and connect to the OneNET MQTT server. The user can send data transparently from the serial port to the corresponding topic. Send data to the topic subscribed by DTU on the server side, and DTU will transparently transmit it to the serial port after receiving it.



Socket1 Socket2 Cloud Platform

Enable: ☒ True ☐ False OperatingMode: MQTTONENET BindComNum: COM1

ConnectionMode: TCP client IP: Port: 0

IsItConnected: No DisReconnectTime: 10 (s) NoDataTimeout: 300 (s)

ICMP Detect

Enable: ☐ True ☒ False TimeOut: (s) MaxPacketLoss: (s)

TCP layer heartbeat

Heartbeat: (s) Timeout: (s)

MQTT

UserName: Pwd: MQTTCLIENTID:

Subscribe: Publish:

Figure 3-16 OneNET MQTT configuration

### 3.7 SSL parameter configuration

After the user selects the SSL connection mode, the DTU configuration tool will display the SSL setting option box, and the user needs to select the authentication mode and the path to import the CA certificate. (Processing expired certificates, certificate types, uploading CLIENTCERT certificates, and uploading CLIENTKEY certificates do not currently support configuration, and the verification server and client certificate options of the authentication mode do not currently support configuration)

Socket1 Socket2 Cloud Platform SSL Setting

ExpiredCertificates: ☒ True ☐ False CertificateType: ☐ SelfSignedCer ☒ PublicBusinessCer

AuthenticationMode: ☒ none ☐ Verify server certificate ☐ Verify server and client certificates

Certificate upload

CA Certificate: ChooseAttachment

CLIENTCERT Certificate: ChooseAttachment

CLIENTKEY Certificate: ChooseAttachment

Figure 3-17 SSL parameter configuration

### 3.8 MODBUS parameter configuration

After the user selects the MODBUSLAVERTU working mode, the DTU configuration tool will display a modbus setting option box, and the user can configure parameters according to their own needs.

Enable	Serial	Device address	Instruction	Register	Number of
<input type="checkbox"/>	1	1 (1-247)	3 (1-255)	0 (0-65535)	1 (1-125)
<input type="checkbox"/>	2	2 (1-247)	3 (1-255)	0 (0-65535)	1 (1-125)
<input type="checkbox"/>	3	3 (1-247)	3 (1-255)	0 (0-65535)	1 (1-125)
<input type="checkbox"/>	4	4 (1-247)	3 (1-255)	0 (0-65535)	1 (1-125)
<input type="checkbox"/>	5	5 (1-247)	3 (1-255)	0 (0-65535)	1 (1-125)
<input type="checkbox"/>	6	6 (1-247)	3 (1-255)	0 (0-65535)	1 (1-125)
<input type="checkbox"/>	7	7 (1-247)	3 (1-255)	0 (0-65535)	1 (1-125)
<input type="checkbox"/>	8	8 (1-247)	3 (1-255)	0 (0-65535)	1 (1-125)

Figure 3-18 MODBUS parameter configuration

### 3.9 DDP/DC function configuration

Customers can choose DDP/DC working mode according to their needs. The DDP/DC protocol is based on TCP client or UDP client, providing mechanisms such as login, heartbeat, data transmission, and exit.

Enable: ☒ True ☐ False    OperatingMode: **DDP**    BindComNum: COM1

ConnectionMode: **TCP client**    LocalPort:    DestinationIP:    DestinationPort: 0

IsItConnected: No    DisReconnectTime: 10 (s)    NoDataTimeout: 300 (s)

ICMP Detect  
Enable: ☐ True ☒ False    Timeout:    (s)    MaxPacketLoss:   

TCP layer heartbeat  
Heartbeat:    (s)    Timeout:    (s)

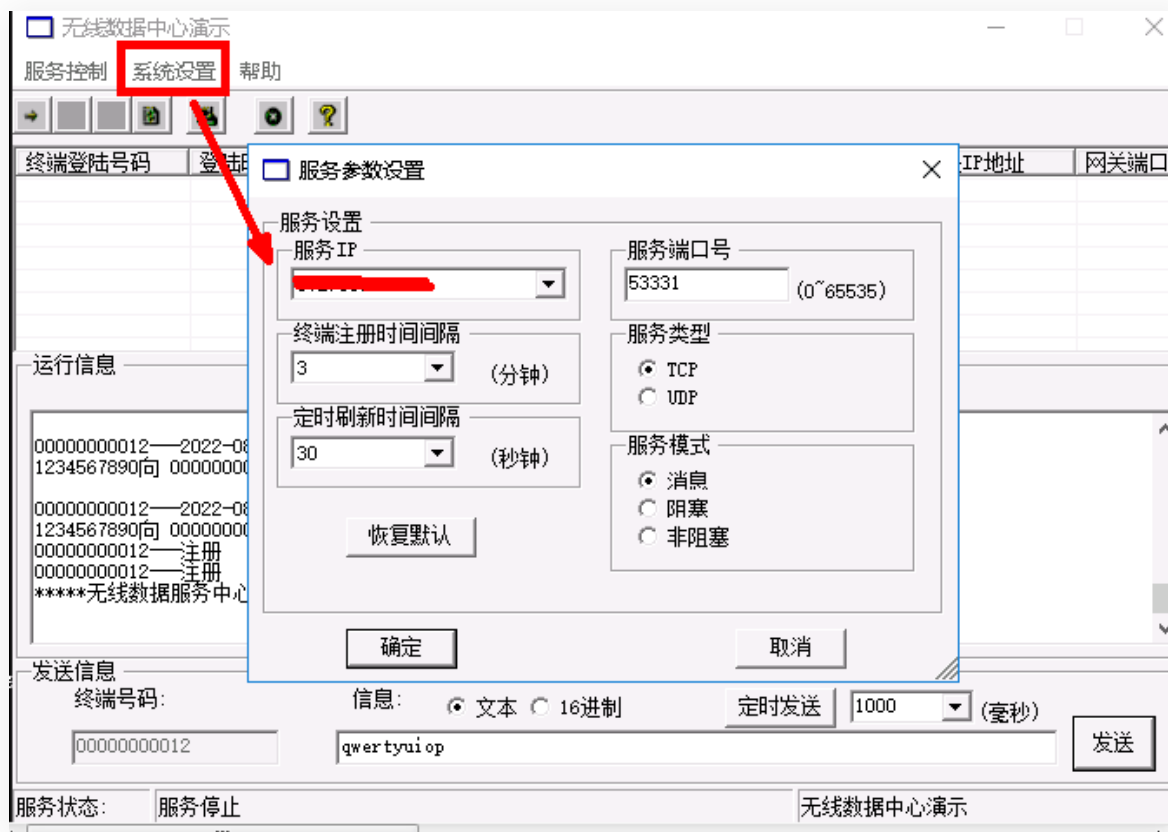
**DDP/DC Protocol**  
DeviceID:    HeartbeatCycle:    (s)

Figure 3-19 DDP/DC function configuration

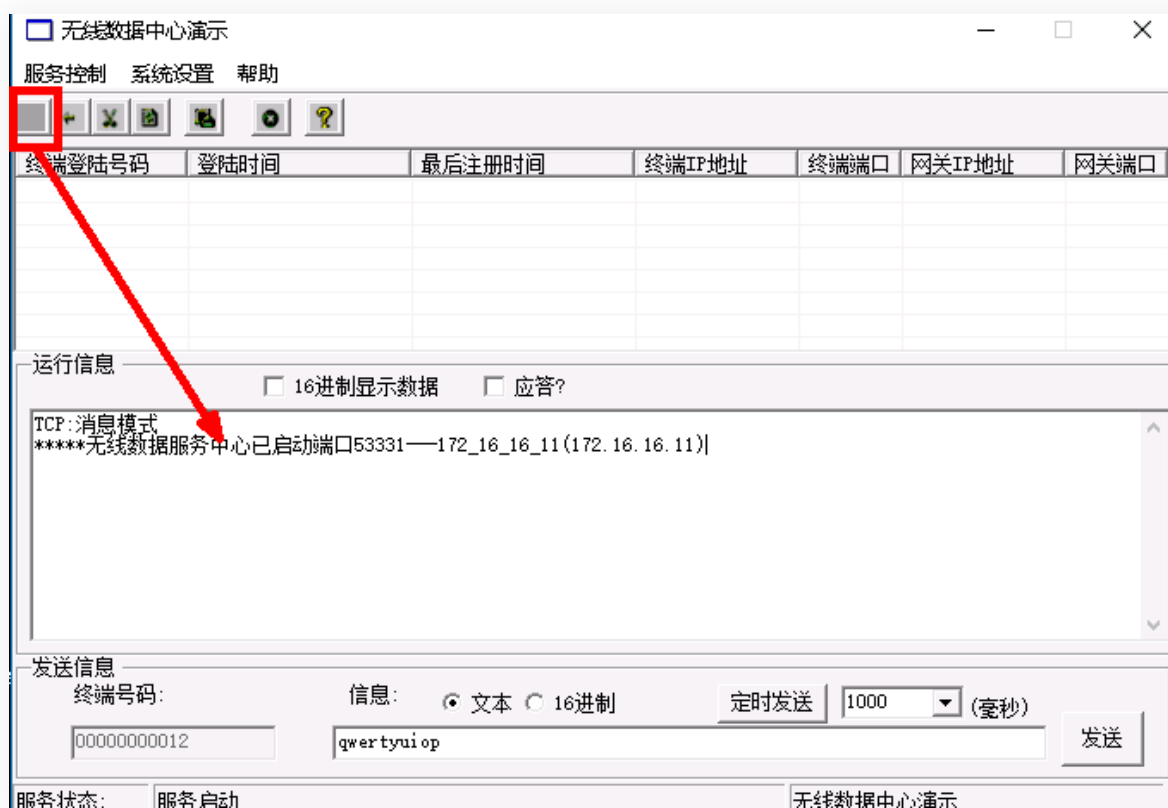
- Equipment number: the identification to distinguish different DTU equipment, it cannot be repeated, and the maximum length is 11 characters.
- Heartbeat cycle: The cycle of DTU actively uploading heartbeat packets, the unit is second, and the range is 0~9999.

This working mode needs to be used in conjunction with the host computer software that conforms to the DDP/DC communication protocol.

Configure the server parameters of the wireless data center:



Start the service:



### Data sending and receiving test:

