

# USR-DR504-E Software Manual

Version: V1.0.2



## Function

- Supports accessing to European bands.
- Supports 2 socket connections , support TCP Server , TCP Client and UDP Client.
- Support remote upgrade, hardware watchdog.
- Each connection supports buffering 5 packets of serial port data.
- Supports sending the register package and heartbeat package data
- Supports setting DTU parameters by serial port /SMS/network.
- Supports base station positioning function.
- Supports Modbus protocol conversion, modbus RTU to Modbus TCP.
- Supports base station positioning.
- Supports multiple work mode: transparent transmission mode and SMS mode.
- Supports basic commands.
- Supports remote upgrade, keep the firmware up to date.
- Supports sending English SMS.

# Contents

USR-DR504-E Software Manual.....	1
Function.....	2
1. Product overview.....	6
1.1. Product Overview.....	6
2. Product function.....	7
2.1. Work mode.....	8
2.1.1. Net transparent transmission mode.....	8
2.1.2. SMS mode.....	11
2.2. Serial port.....	12
2.2.1. Basic parameter.....	12
2.2.2. Frame forming mechanism.....	13
2. 2. 2. 1 Time trigger.....	13
2. 2. 2. 2 Length trigger.....	13
2.3. Characteristic function.....	14
2.3.1. Registration package function.....	14
2.3.2. Heartbeat packet.....	16
2.3.3. USR Cloud.....	19
2.3.4. Basic Station Position.....	21
2.3.5. Modbus protocol conversion.....	22
2.3.6. Indicator Status.....	24
Form 2.3.6-1 Indicators.....	24
2.3.7. Restore to the factory default settings.....	24
2.3.8. Firmware Upgrade.....	24
2.3.8.1. Upgrade by serial port.....	24
2.3.8.2. Remote update.....	26
3. Parameter setting.....	27
3.1. Setup by serial port.....	27
3.1.1. Setup software.....	27
3.1.2. AT command setting.....	28
3.1.3. Serial AT command.....	29
3.1.4. Network AT command.....	30
3.1.5. SMS AT command.....	30
3.1.6. Command format.....	31
3. 1. 6. 3 The Answer Format in Command.....	32
3. 1. 6. 4 Special symbols.....	33
3.1.7. AT commands.....	33
1. AT.....	35
2. AT+H.....	35
3. AT+Z.....	35
4. AT+E.....	35
5. AT+ENTM.....	36
6. AT+WKMOD.....	36

7. AT+CMDPW.....	36
8. AT+STMSG.....	37
9. AT+RSTIM.....	37
10. AT+CSQ.....	37
11. AT+SYSINFO.....	38
12. AT+UCPIN.....	39
13. AT+RELD.....	39
14. AT+CLEAR.....	40
15. AT+CFGTF.....	40
16. AT+VER.....	40
17. AT+SN.....	40
18. AT+ICCID.....	40
19. AT+IMEI.....	41
20. AT+CIP.....	41
21. AT+LBS.....	41
22. AT+PING.....	41
23. AT+UART.....	42
24. AT+UARTFT.....	42
25. AT+UARTFL.....	43
26. AT+APN.....	43
27. AT+SOCKA.....	43
28. AT+SOCKB.....	44
29. AT+SOCKAEN.....	44
30. AT+SOCKBEN.....	45
31. AT+SOCKALK.....	45
32. AT+SOCKBLK.....	45
33. AT+SOCKATO.....	46
34. AT+SOCKBTO.....	46
35. AT+SOCKRSTIM.....	46
36. AT+MODBUSEN.....	46
37. AT+REGEN.....	47
38. AT+REGTP.....	47
39. AT+REGDT.....	48
40. AT+REGSND.....	48
41. AT+CLOUD.....	48
42. AT+HEARTEN.....	49
43. AT+HEARTDT.....	49
44. AT+HEARTSND.....	50
45. AT+HEARTTM.....	50
46. AT+DSTNUM.....	50
47. AT+SMSFLT.....	51
48. AT+CISMSEND.....	51
4. Contact Us.....	52
5. Disclaimer.....	52

6. Update History..... 52

# 1. Product overview

## 1.1. Product Overview

USR-DR504-E is the M2M product launched in 2019 with the characteristics of high speed and low latency. European band. The software has perfect functions and covers most common application scenarios. It can realize two-way data transparent transmission from serial port to network by simple settings. And supports SMS mode, custom register packages, heartbeat packages , support 2 way socket connections, support TCP Server, support access USR cloud , support remote upgrade.

**Figure 1 DTU default parameters**

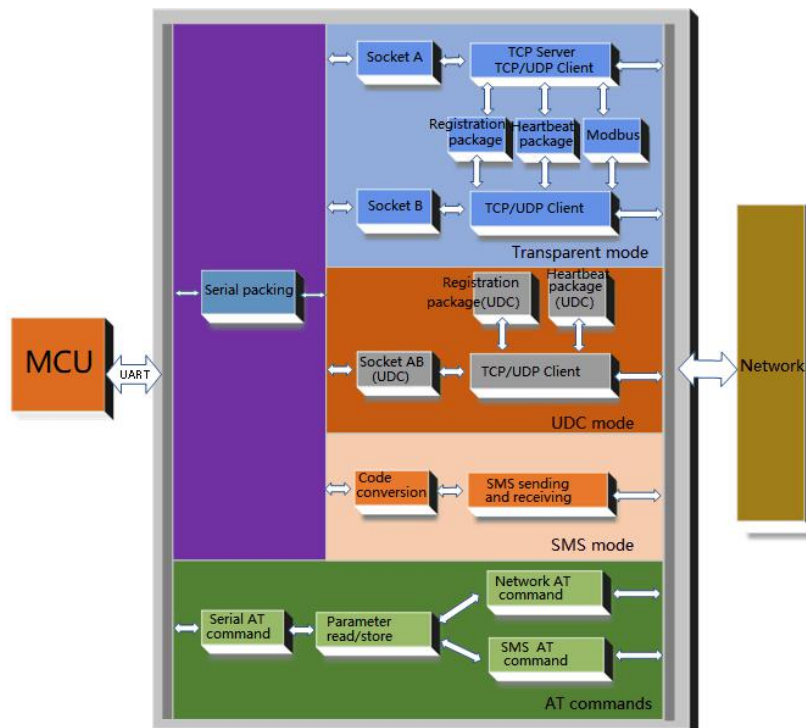
Parameter	Item	Index	
Wireless Parameters	Wireless standard	FDD-LTE, TDD-LTE, HSPA+/WCDMA, GSM/GPRS/EDGE	
	Standard frequency range	FDD-LTE	Band 1/2/3/5/7/8/20
		TDD-LTE	Band 38/40/41
		HSPA+/WCDMA	Band 1/2/5/8
		GSM/GPRS/EDGE	Band 2/3/5/8
	Transmitting power	TDD-LTE	+23dBm(Power class 3)
		FDD-LTE	+23dBm(Power class 3)
		WCDMA	+24dBm(Power class 3)
		EDGE Band8	+27dBm(Power class E2)
		EDGE Band3	+26dBm(Power class E2)
		GSM Band8	+33dBm(Power class 4)
		GSM Band3	+30dBm(Power class 1)
	Technical specifications	LTE	3GPP R10 CAT4 Downward 150 Mbps , Uplink 50 Mbps
		HSPA+	Downward 42 Mbps , Uplink 5. 76 Mbps
EDGE		Downward 236. 8 kbps , Uplink 236. 8 kbps	
GPRS		Downward rate 85. 6 kbps Uplink rate 85. 6 kbps	
Antenna options	SMA interface		
Hardware parameters	Data interface	RS485: 2400bps - 230400bps	
	Working voltage	DC 9V~36V	
	Working current	Average:83.69mA- 98.26mA@12V Max:232.91mA@12V	
	Working temperature	-30℃ - 75℃	
	Storage temperature	-40℃ - 95℃	
	Size (mm)	28*64.7*109.7(L*W*H)	
Software	Work mode	Transparent transmission mode, SMS mode	
	Setting command	AT+Command	
	Network protocol	TCP/UDP	
	Maximum TCP connection number	2	

<b>parameters</b>	User configuration	Serial AT command , Net AT command , Message AT command
	Customer application software	Support customized application software
<b>Software function</b>	Domain name solution DNS	Support
	Modbus protocol conversion	Support
	Simple transmission	Support TCP Client/TCP Server/UDP Client
	Message functions	Support
	Heartbeat package	Support
	Registration package mechanism	Custom registration package/ICCID /IMEI
	User-cloud service	Support
	Remote update	Support

**Form1. 1-1 Basic Parameters**

## 2. Product function

This chapter introduces the functions of DR504-E, the following diagram is a block diagram the function of the module. It can help you to have a general understanding of the product.


**Diagram 2-1 Product Function**

## 2.1. Work mode

USR-DR504-E module has three working modes: network transmission mode and SMS transmission mode.

Network transmission mode: the data is sent to the network server directly through the serial port of the module without any processing or modification.

SMS transmission mode: data enters the module through serial port and is processed by the module and sent to the target mobile phone number.

### 2.1.1. Net transparent transmission mode

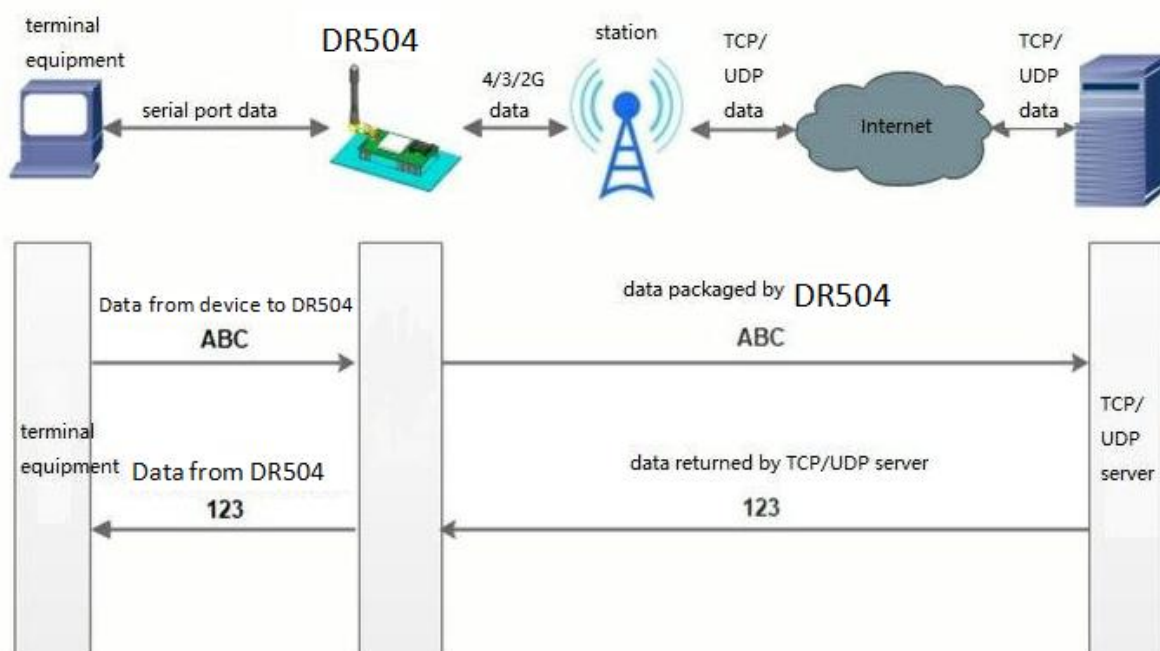


Diagram 2. 1. 1-1 Net transparent transmission mode

In this mode, the user's serial device can directly send data to the specified network server through the DR504-E module.

The module can also receive data from the server and directly forward the received information to the serial port device.

In this mode, users do not need to pay attention to the data conversion process between serial port data and network data packets. They only need to set simple parameters to realize the transparent transmission of data between serial port devices and network servers.

The module supports 2 socket connections, Socket A and Socket B, which are independent of each other. Only Socket A supports as TCP Client, TCP Server and UDP Client. Socket B only supports TCP Client and UDP Client.

Under the TCP server mode, It supports 3 clients connections at max. Because the conventional operator network can not be accessed through the external network, so for the Server function need to use a dedicated APN card.

Set DR504-E work at TCP client by AT commands:

1. Set the working mode to net transparent transmission:



**AT+WKMOD=NET**

2. Enable socket A:

**AT+SOCKAEN=ON**

3. Setup remote IP and port:

**AT+SOCKA=TCPC,test.usr.cn,2317**

4. Setup APN.

E. g: APN is CMNET, username is empty, password is empty, authentication method is NONE:

**AT+APN=CMNET,,,0**

5. Reboot:

**AT+Z**

Set DR504-E work at TCP Sever by AT commands:

1. Set the work mode to net transparent mode:

**AT+WKMOD=NET**

2. Enable socket A:

**AT+SOCKAEN=ON**

3. Set socket A as TCP Server, local port 2317, IP has no reference meaning in Server:

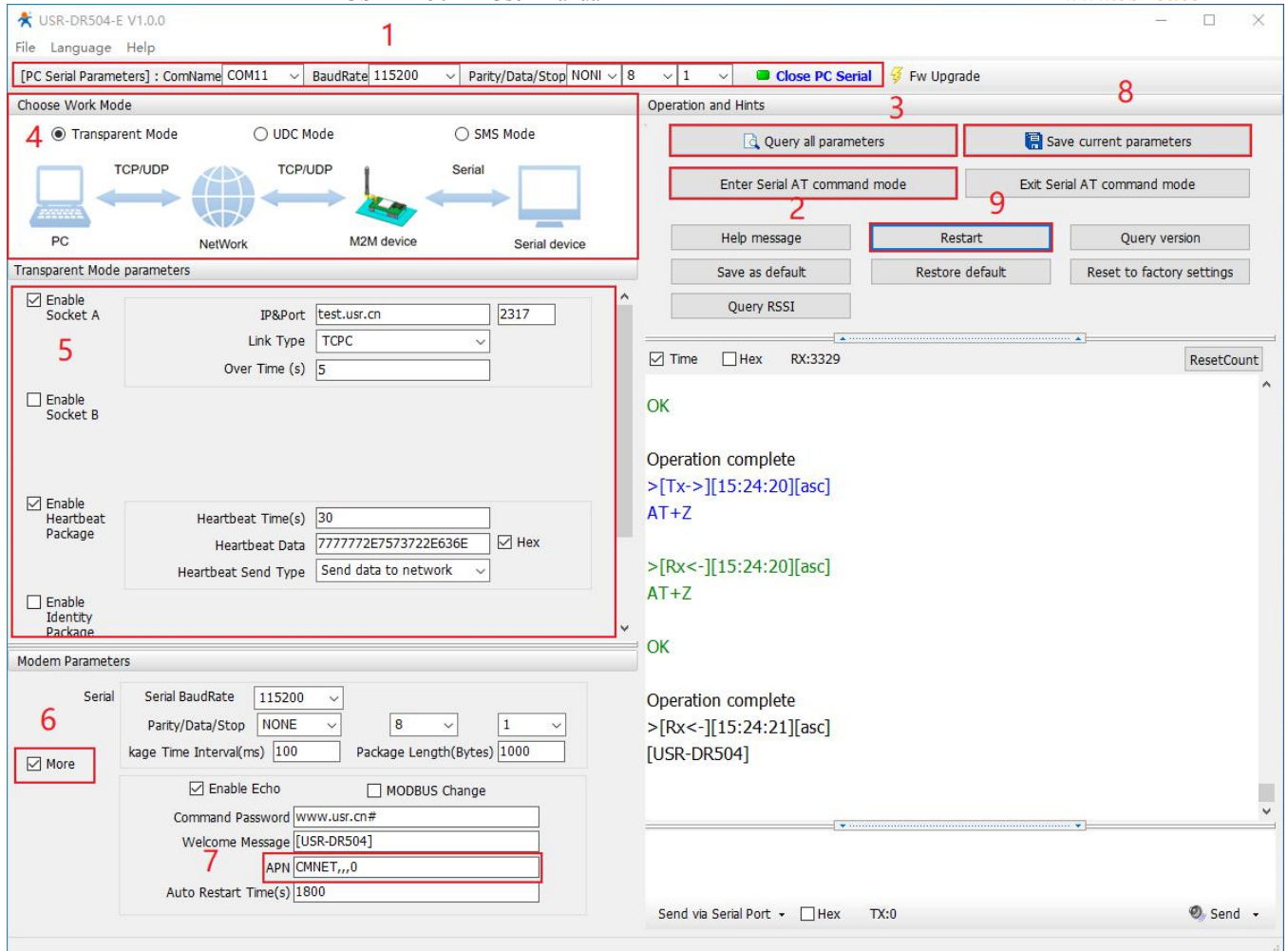
**AT+SOCKA=TCPS,test.usr.cn,2317**

4. Setup APN. E. g: APN:CMNET, username: empty, password: empty, authentication method: NONE:

**AT+APN=CMNET,,,0**

5. Reboot:

**AT+Z**



**Diagram 2.1.1-1 Software schematic diagram**

1. Open the setup software. Set the Serial port parameters according to the actual situation and click "Open PC Serial".
2. Click "Enter Serial AT command mode" and wait for the device to enter AT command configuration mode.
3. Click "Query all parameters" and wait for obtaining all current parameters.
4. In the "Choose Work Mode", select "Transparent Mode".
5. Set "IP&Port" to test. usr. cn and 2317.
6. Check "More".
7. Set the APN parameter: CMNET,,0. E. g: APN: CMNET, username: empty, password: empty, authentication method :NONE.
8. Click "Save current parameters".
9. Click the "Restart" button to restart the module.

## 2.1.1.2. SMS mode

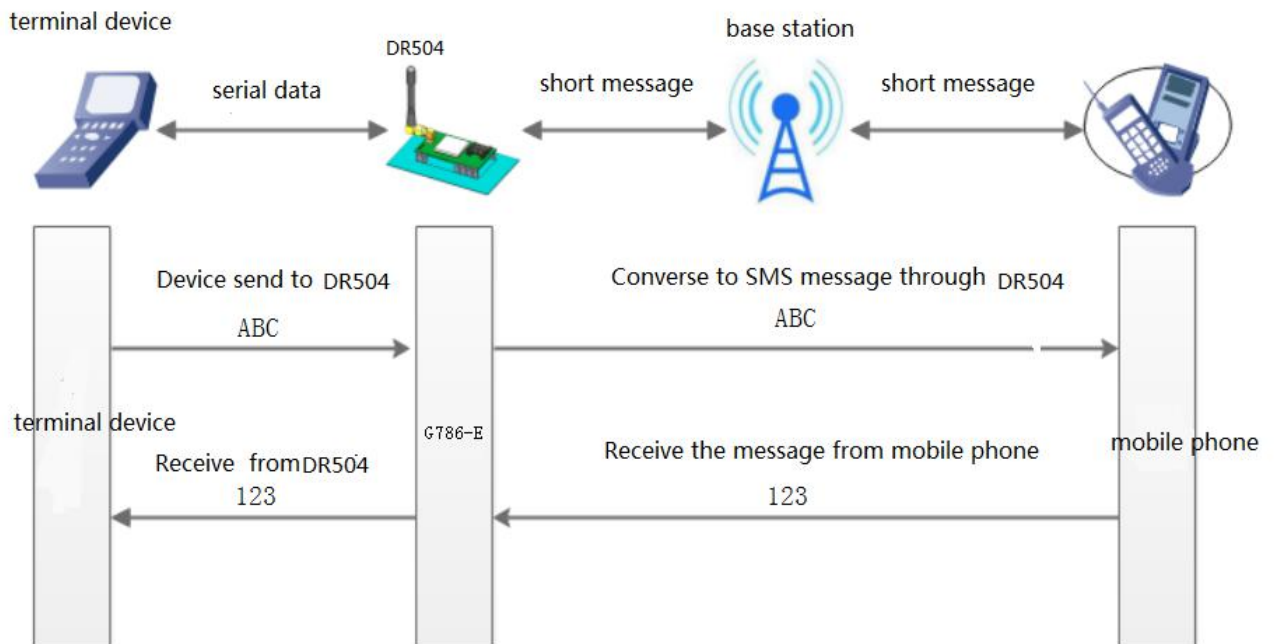


Diagram 2.1.3-1 SMS transmission mode diagram

In this mode, user's serial device can send SMS to the specified mobile phone and receive SMS from any mobile phone. User can decide whether to transmit the data of the specified mobile phone to the serial device through Settings.

Users do not need to pay attention to the data conversion process between serial port data and SMS. They only need to set simple parameters to realize transparent data communication between mobile phones and serial port devices.

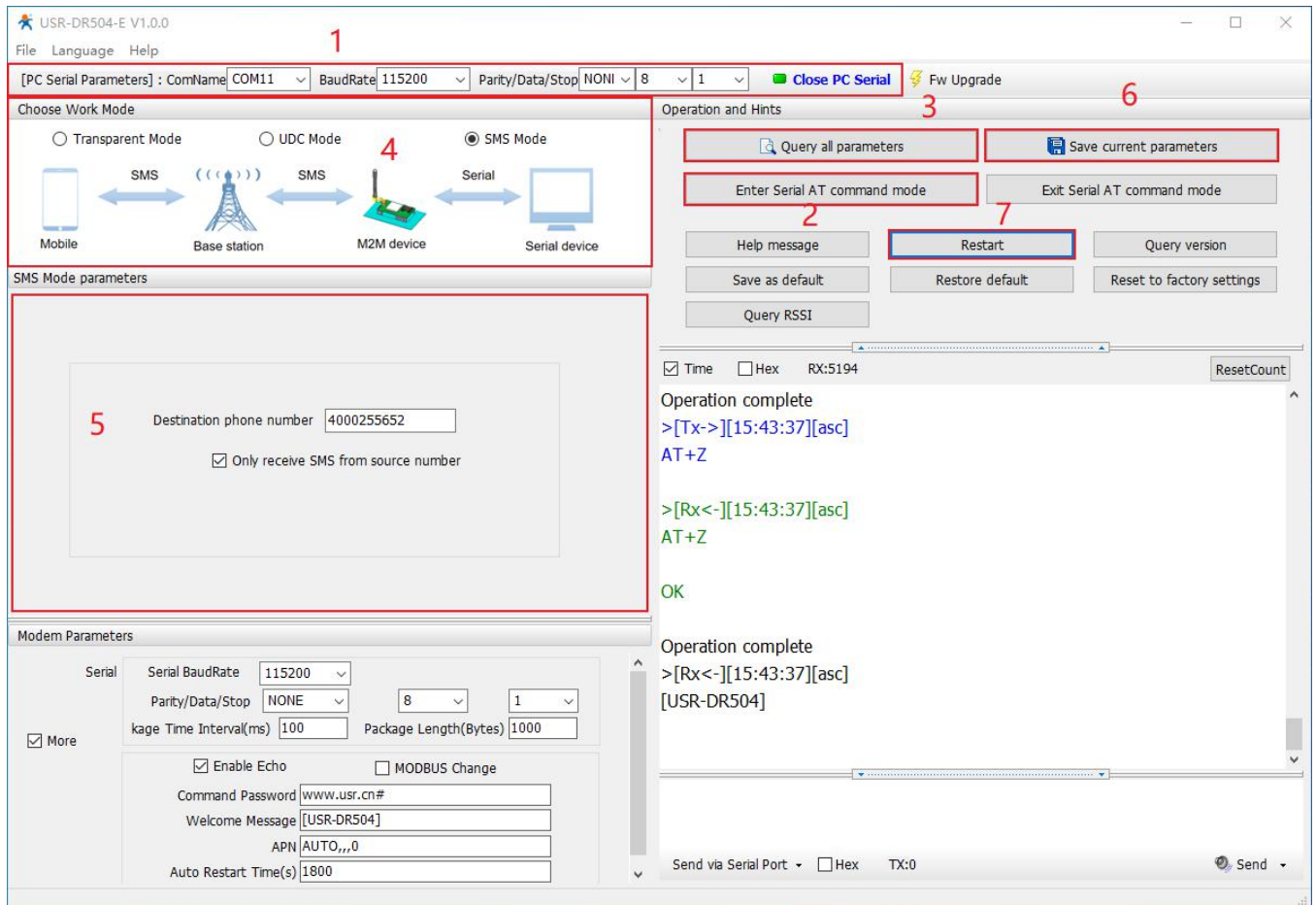
If the user's device is a serial port device and is placed in a remote place, this DTU can be used to realize this function when the user wants to check the running status of the device or control the running parameters of the device by sending and receiving SMS messages.

### Setup by AT commands:

1. Set work mode to SMS mode:  
**AT+WKMOD=SMS**
2. Set the target mobile phone number to 10086. E. g:10086:  
**AT+DSTNUM=10086**
3. Restart the module:  
**AT+Z**

- Note:**
1. The target phone number of SMS should be added with the international number;
  2. When non-target mobile phone number filtering is enabled, the non-target mobile phone number can still query or set parameters;
  3. When a SMS longer than 140 bytes is sent to the device, the received SMS will be incomplete.

### Setting by the software:


**Diagram 2.1.3-1 Software Schematic**

1. Open the setup software. Setting the serial port parameters according to the actual situation and click "Open PC Serial".
2. Click "Enter Serial AT command mode" and wait for the device to enter AT command configuration mode.
3. Click "Query all parameters" and waiting for obtaining all current parameters.
4. In the "choose work Mode" , select "SMS Mode".
5. Set the target mobile phone number as "10086". E. g: 10086.
6. If you need to filter SMS from other mobile numbers, open "Only receive SMS from source number".
7. Click "Save current parameters" to set and save all parameters.
8. Click "Restart" to restart the module.

## 2.2. Serial port

### 2.2.1. Basic parameter

**Figure 2 Serial port basic parameter**

Project	Parameter
---------	-----------

Baud rate	2400,4800,9600,14400,19200,28800,33600,38400,57600 ,115200,230400,460800
Data bit	8
Stop bit	1,2
Check bit	NONE EVEN ODD

Form 2.2.1-1 Serial Parameters

## 2.2.2. Frame forming mechanism

### 2. 2. 2. 1 Time trigger

When DR504-E receives data from the UART, it continuously checks the interval of two adjacent bytes. If the interval time is greater or equal to a certain "time threshold", then a frame is considered finished, otherwise the data is received until greater or equal to the packet length byte set. This frame is sent to the network as a TCP or UDP packet. The "time threshold" here is the time between packages. The range of settable is 100ms~60000ms. Factory default: 100ms.

This parameter can be set by AT command, AT+UARTFT=<time>.

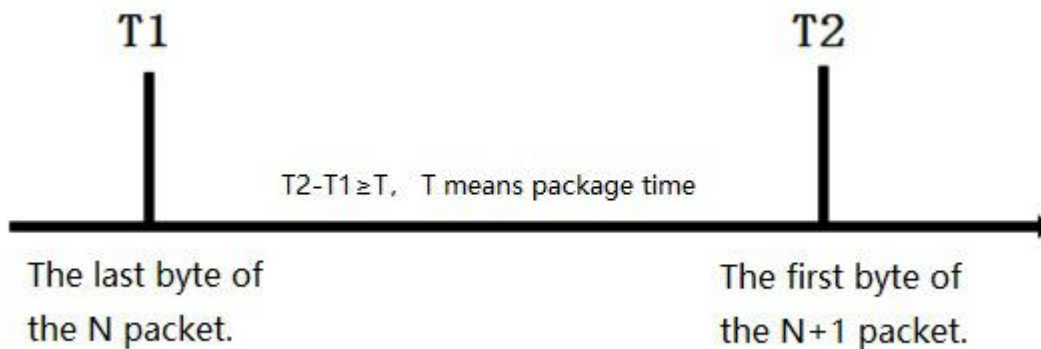


Diagram 2.2.2.1-1 Time trigger

### 2. 2. 2. 2 Length trigger

When DR504-E receives data from the UART, it constantly checks the number of bytes received. If the number of bytes received is equal to a certain "length threshold", a frame is considered to have ended, otherwise the packaging time is waiting for the end. This frame is sent to the network as a TCP or UDP packet. The "length threshold" here is the package length. The settable range is 100~1000. Factory default 1000.

**Note:** when using "command password +AT command" function, the package length must be larger than the "command password +AT command", otherwise AT command is invalid

This parameter can be set by AT command, AT+UARTFL=<length>.

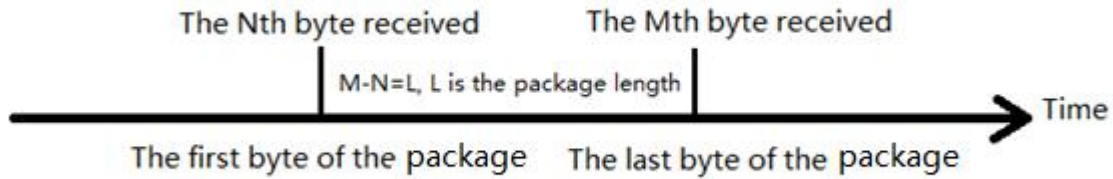


Diagram 2.2.2.2-1 Length Trigger

## 2.3. Characteristic function

### 2.3.1. Registration package function

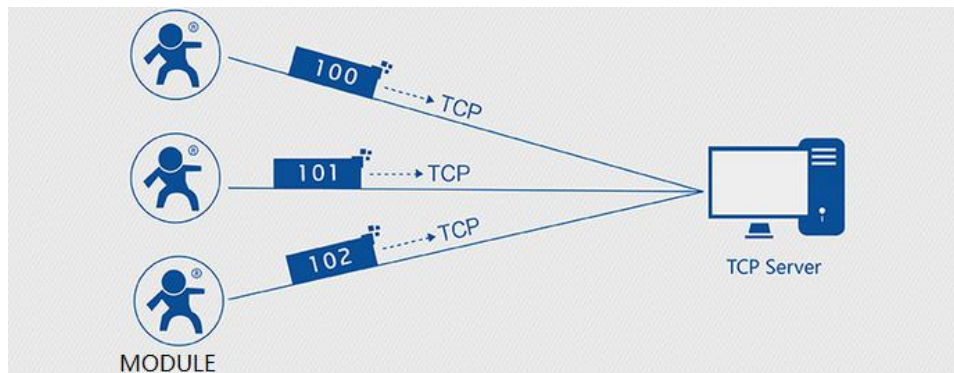


Diagram 2.3.1-1 Registration Schematic Diagram

In the network transparent mode, the user can choose to have the module send the registration package to the server. Registered package is intended to allow the server to identify the data from which device or to use it as a password to obtain authorization for the server's functions. The registration package can be sent when the module establishes a connection with the server, or be added at the forefront of each data packet to form a data packet to be sent to the network. The data of registration package can be ICCID code, IMEI code, USR-cloud registration package, or custom registration data.

**ICCID:** Unique SIM identification code, for applications based on SIM card identification.

**IMEI:** The unique identification code of the Internet module, which is mainly used in device identification, has nothing to do with SIM.

**CLOUD:** The identification code based on the USR-cloud, can easily use the USR-Cloud by setting the relevant parameters.

**USER:** User-defined data.

Figure 3 AT commands

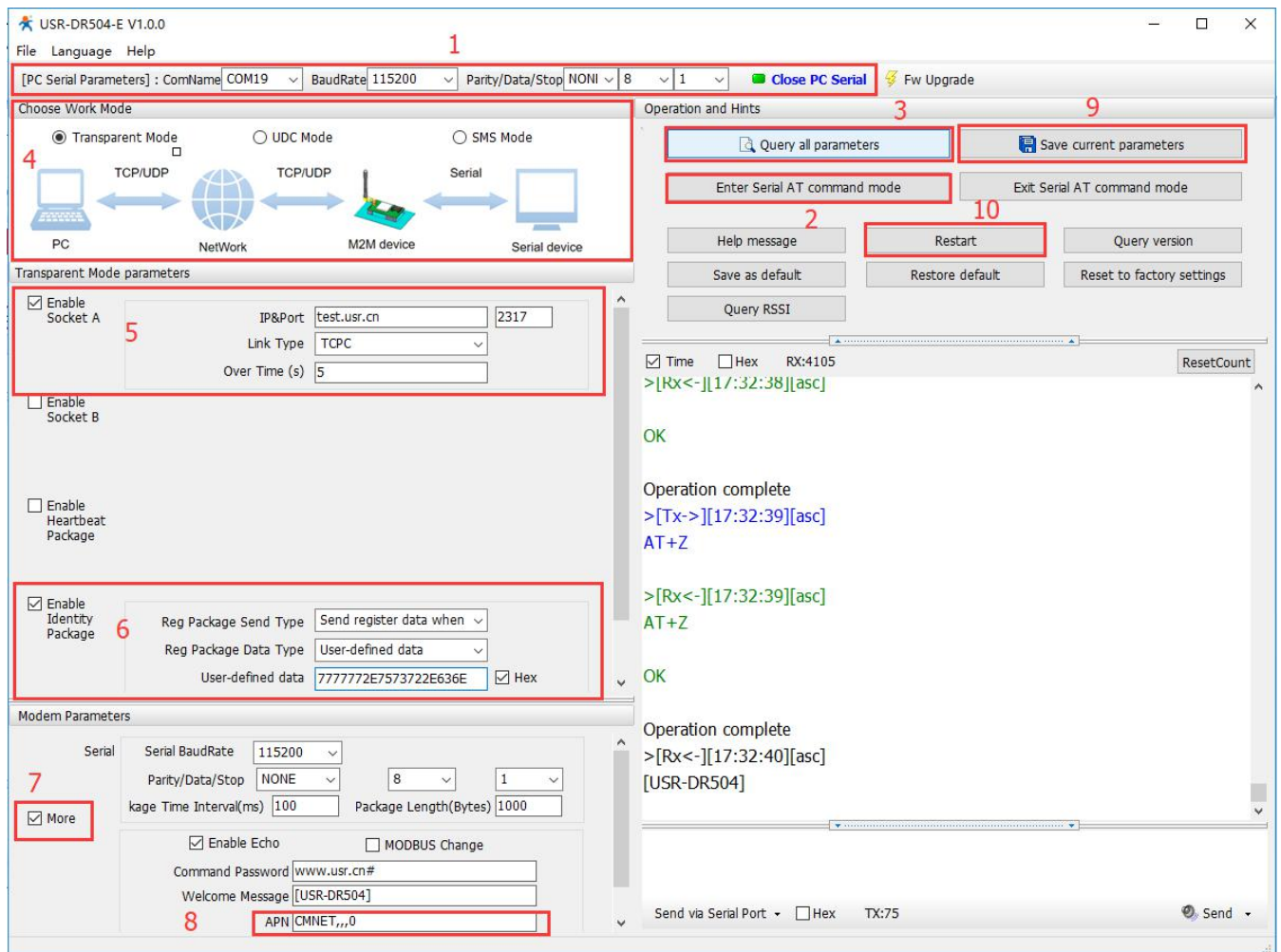
Command name	Command function	Default parameter
AT+REGEN	Query/setting enable registration package	OFF
AT+REGTP	Query/setting the type of registration package content	USER

<b>AT+REGDT</b>	Query/setting custom registration information	777772E7573722E636E
<b>AT+REGSND</b>	Query/setting the mode of registration package for sending	DATA

Form 2.3.1-1 Related AT Command

**AT commands setting:**

1. Enable register package function:  
**AT+REGEN=ON**
2. Setup custom the register package:  
**AT+REGTP=USER**
3. Setup the contents:  
**AT+REGDT=777772E7573722E636E**
4. Setup the type of register package:  
**AT+REGSND=DATA**
5. Reboot:  
**AT+Z**

**Setting software schematic diagram:**


The screenshot shows the USR-DR504-E V1.0.0 software interface. Key elements are highlighted with red boxes and numbers:

- 1:** The menu bar (File, Language, Help).
- 2:** The 'Enter Serial AT command mode' button.
- 3:** The 'Query all parameters' button.
- 4:** The 'Transparent Mode' radio button in the 'Choose Work Mode' section.
- 5:** The 'Enable Socket A' checkbox in the 'Transparent Mode parameters' section.
- 6:** The 'Enable Identity Package' checkbox and the 'Reg Package Send Type' dropdown in the 'Transparent Mode parameters' section.
- 7:** The 'More' checkbox in the 'Modem Parameters' section.
- 8:** The 'APN' field set to 'CMNET,,0' in the 'Modem Parameters' section.
- 9:** The 'Save current parameters' button.
- 10:** The 'Restart' button.

The terminal window shows the following sequence of commands and responses:

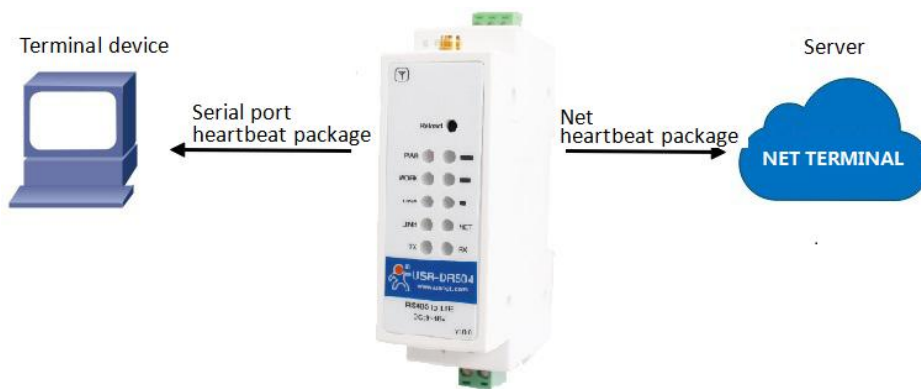
```

>[Rx<-][17:32:38][asc]
OK
Operation complete
>[Tx->][17:32:39][asc]
AT+Z
>[Rx<-][17:32:39][asc]
AT+Z
OK
Operation complete
>[Rx<-][17:32:40][asc]
[USR-DR504]
  
```

Diagram 2.3.1-2 Software Schematic Diagram

1. Open the dedicated setup software. Set the Serial port parameters according to the actual situation and click "Open PC Serial".
2. Click "Enter Serial AT command mode" and wait for the device to enter AT command configuration mode.
3. Click "Query all parameters" and wait for obtaining all current parameters.
4. In the "Choose Work Mode" column, select "Transparent Mode".
5. Set the parameter of SocketA.
6. Enable identity package and set various parameters.
7. Set APN parameters.
8. Click "Save current parameters" to save all parameters.
9. Restart the module.

### 2.3.2. Heartbeat packet



**Diagram 2.3.2-1 Heartbeat schematic diagram**

In the network transparent mode, user can send the heartbeat packet from the module to meet specific requirements.

Heartbeat packet can be sent to the network side, also can be sent to the serial port device. The main purpose of sending the heartbeat to the network is to keep the connection stable and reliable, to ensure the normal connection of the module, and at the same time, to let the server know the online situation of the module through the heartbeat packet.

In the application of fixed query commands sent by the server to the device, in order to reduce communication traffic, user can choose to send heartbeat packet (query commands) to the serial port device instead of sending query commands from the server, so as to save traffic and respond faster.

**Figure 4 AT commands**

Command name	Command function	Default parameter
AT+HEARTEN	Query/Setting enable heartbeat packet	ON
AT+HEARTDT	Query/Setting heartbeat data	7777772E7573722E636E
AT+HEARTSND	Query/Setting heartbeat packet send type	NET
AT+HEARTTM	Query/Setting heartbeat packet interval	30

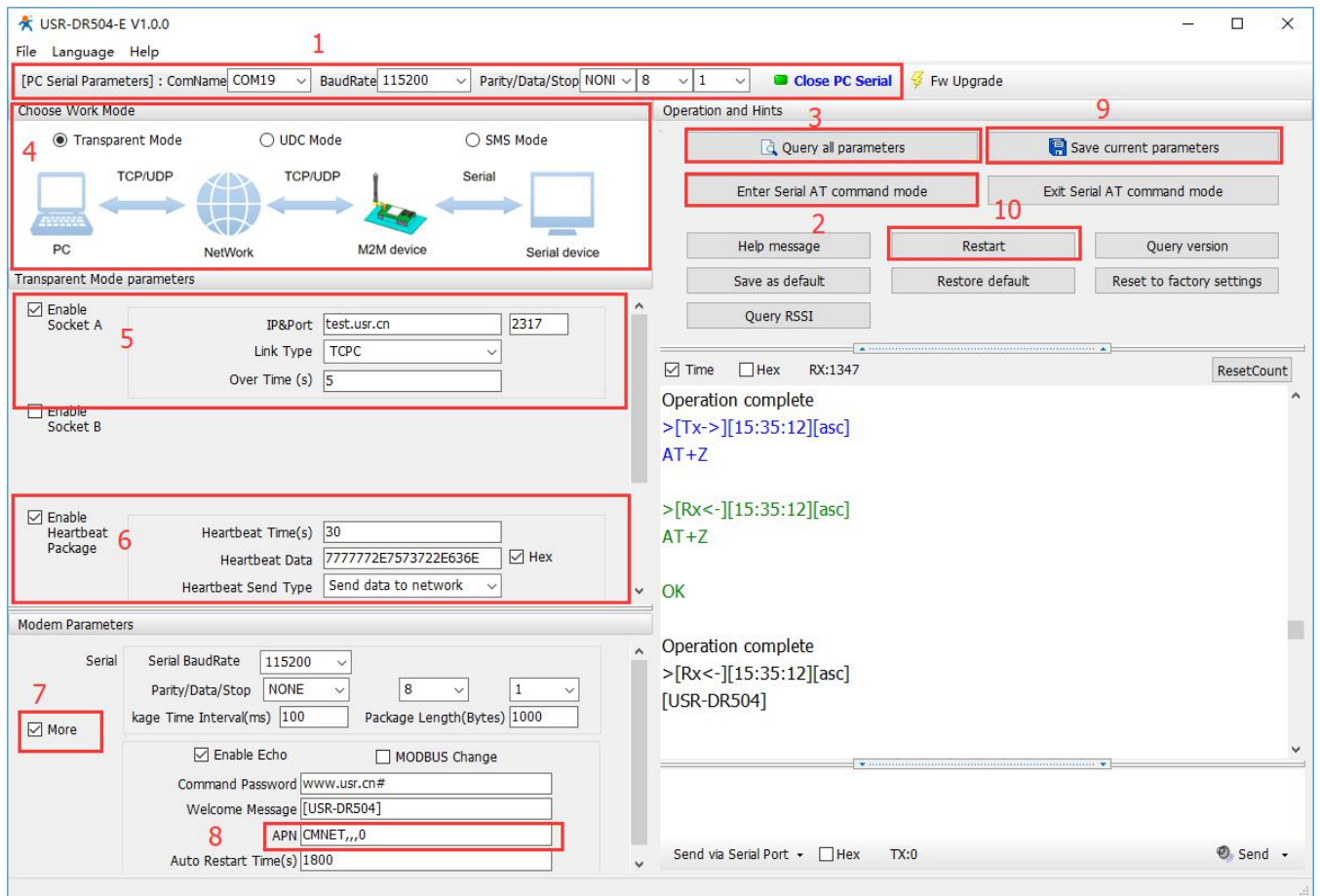
**Form 2.3.2-1 Related AT Command**

**AT commands setting :**



1. Enable heartbeat function:  
**AT+HEARTEN=ON**
2. Setup the contents of heartbeat packet:  
**AT+HEARTDT=777772E7573722E636E**
3. Setup the type of heartbeat packet:  
**AT+HEARTTP=NET**
4. Setup the sending time:  
**AT+HEARTTM=30**
4. Reboot:  
**AT+Z**

Schematic diagram of setup software:



The screenshot shows the 'USR-DR504-E V1.0.0' software interface. The interface is divided into several sections:

- 1**: The top menu bar (File, Language, Help).
- 2**: The 'Operation and Hints' panel on the right, containing buttons like 'Enter Serial AT command mode', 'Restart', and 'Reset to factory settings'.
- 3**: The 'Operation and Hints' panel, specifically the top section with 'Query all parameters' and 'Save current parameters' buttons.
- 4**: The 'Choose Work Mode' section, where 'Transparent Mode' is selected. A diagram shows the connection between a PC, Network, M2M device, and Serial device.
- 5**: The 'Transparent Mode parameters' section, where 'Enable Socket A' is checked and 'IP&Port' is set to 'test.usr.cn' and '2317'.
- 6**: The 'Enable Heartbeat Package' section, where 'Enable Heartbeat Package' is checked, 'Heartbeat Time(s)' is set to '30', and 'Heartbeat Data' is set to '777772E7573722E636E'.
- 7**: The 'Modem Parameters' section, where 'More' is checked under the 'Serial' settings.
- 8**: The 'APN' field in the 'Modem Parameters' section, set to 'CMNET,,0'.
- 9**: The 'Operation and Hints' panel, specifically the bottom section with 'Exit Serial AT command mode' and 'Query version' buttons.
- 10**: The 'Operation and Hints' panel, specifically the 'Restart' button.

The terminal window on the right shows the following output:

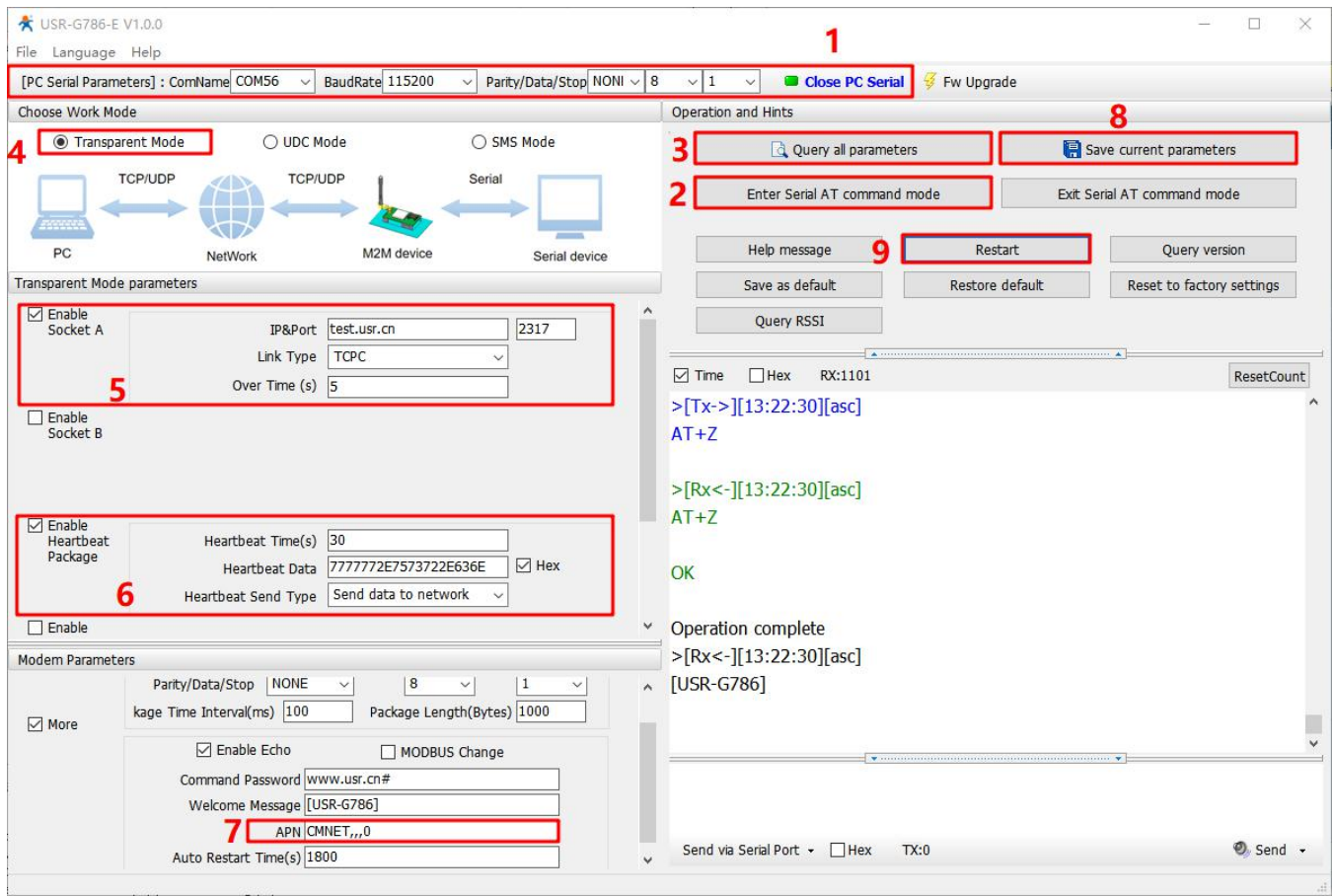
```

>[Tx->][15:35:12][asc]
AT+Z

>[Rx<-][15:35:12][asc]
AT+Z

OK

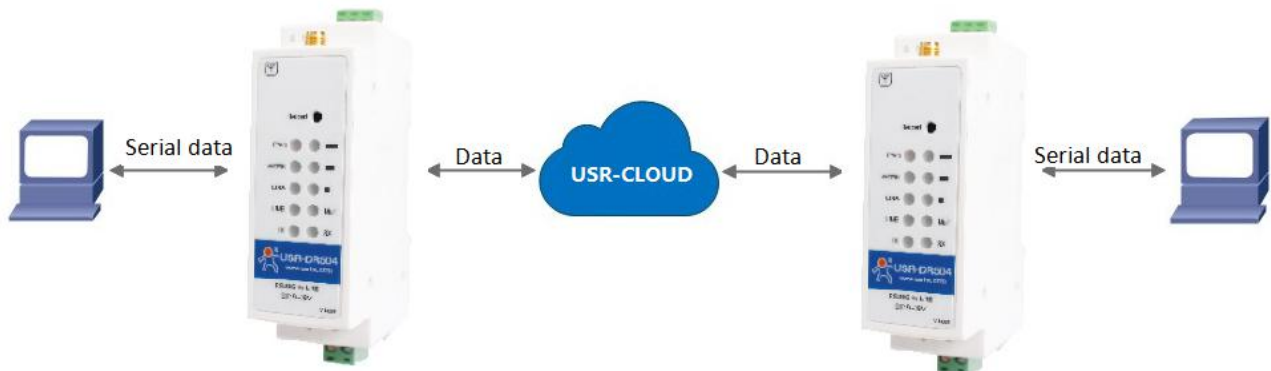
Operation complete
>[Rx<-][15:35:12][asc]
[USR-DR504]
  
```



**Diagram 2.3.2-2 Software Schematic Diagram**

1. Open the dedicated setup software. Set the Serial port parameters according to the actual situation and click "Open PC Serial".
2. Click "Enter Serial AT command mode" and wait for the device to enter AT command mode.
3. Click "Query all parameters" and wait for obtaining all current parameters.
4. In the "Choose Work Mode", select "Transparent Mode".
5. Set the parameters of SocketA.
6. Enable heartbeat package function and set various parameters.
7. Set APN parameters.
8. Click "Save current parameters" to set and save all parameters.
9. Restart the module.

### 2.3.3. USR Cloud



**Diagram 2.3.3-1 USR-Cloud**

USR-Cloud is mainly an open platform to solve the communication between devices and devices, devices and upper computer (Android, IOS, PC). USR-Cloud is mainly used for transmission of data, The device can be accessed without any modification to achieve remote transparent transmission of data. . USR-Cloud is suitable for remote monitoring, Internet of things, Internet of vehicles, smart home and other fields, so our USR-DR504-E also supports access to USR-Cloud. For more information about USR-Cloud, please visit <http://console.usriot.com/>.

**Figure 5 Reference AT command**

Command name	Command function	Default Parameter
AT+CLOUD	To configure device ID(20 bytes), password (8 bytes)	"" , ""

**Form 2.3.3-1 USR-Cloud**

AT commands setting:

1. Setup the work mode:

**AT+WKMOD=NET**

2. Enable socket A :

**AT+SOCKAEN=ON**

3. Setup SocketA parameters,

Address: clouddata.usriot.com, port: 15000

**AT+SOCKA=TCPC,clouddata.usriot.com,15000**

4. Set the ID of usr-cloud

(the ID and password can get from the usr-cloud website):

**AT+CLOUD=01234567890123456789,13245678**

5. Set the registration packet to usr-cloud:

**AT+REGTP=CLOUD**

6. Enable registration packet:

**AT+REGEN=ON**

7. Setup the registration sending mode :

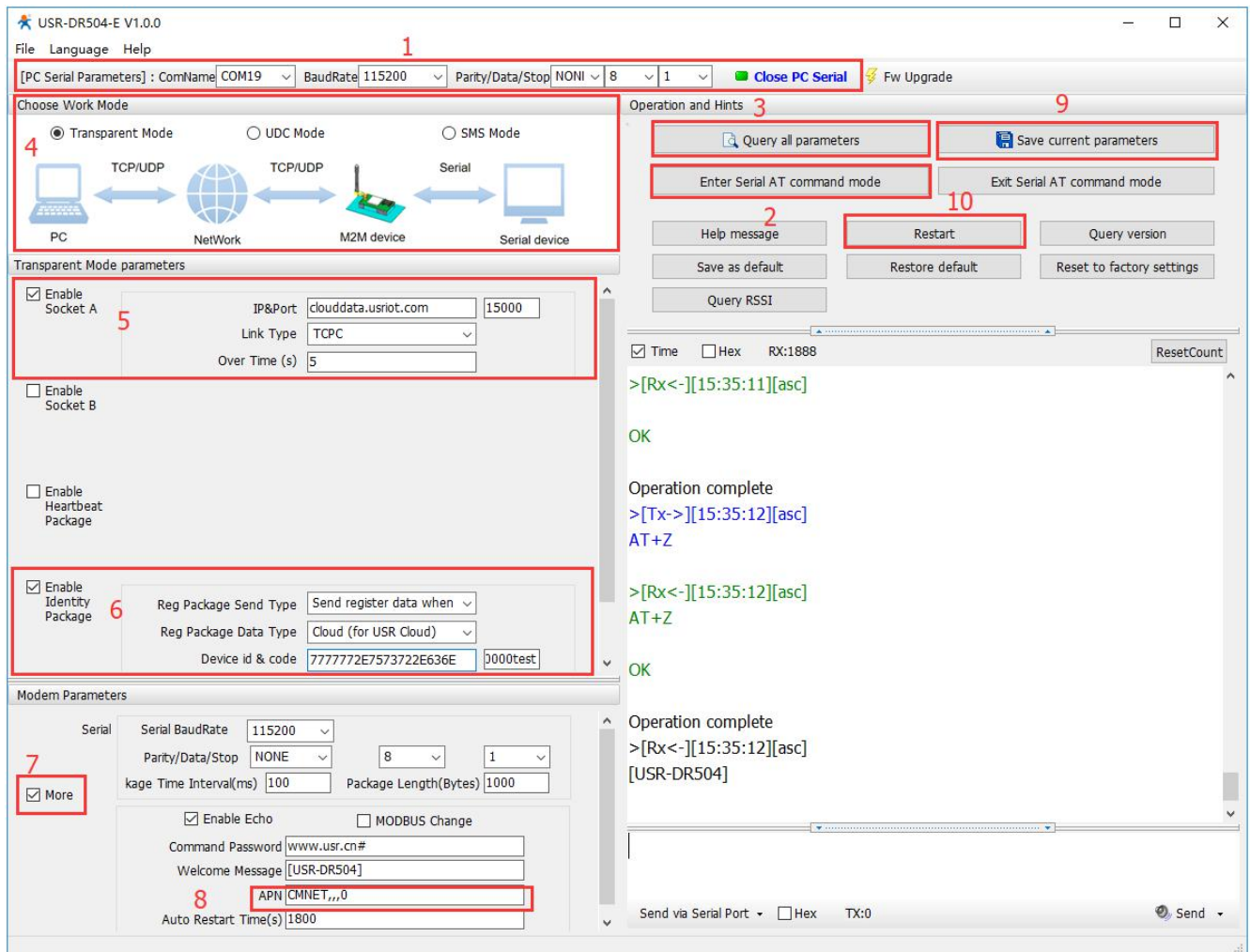
**AT+REGSND=LINK**

8. Reboot:

**AT+Z**

Note: USR-cloud website :<http://console.usriot.com/>

Software schematic diagram:



**Diagram 2.3.3-2 USR-Cloud**

1. Open the dedicated setup software. Set the Serial port parameters according to the actual situation and click "Open PC Serial".
2. Click "Enter Serial AT command mode" and wait for the device to enter AT command configuration mode.
3. Click "Query all parameters" and wait for obtaining all current parameters.
4. In the column "Choose Work Mode", select "Transparent Mode".
5. Set the parameters of SocketA, "IP&Port" is clouddata.usriot.com and 15000, and the connection type is "TCPC".
6. Open the "Enable Identity Package" function, the registry sending option is "Send registers data when socket connects", registered type is "Cloud (for USR Cloud)", open the function of Cloud, and set the parameters (device ID and the code need to log in to <http://console.usriot.com/>).
7. Set the parameters of APN.
8. Click "Save current parameters" to set and save all parameters.
9. Restart the module.

### 2.3.4. Basic Station Position

USR-DR504-E supports LBS base station positioning function, and can obtain the general location of the equipment through the operator's network, with a positioning accuracy of about 100 meters. Base station positioning information is obtained through AT command, which can be used flexibly with serial AT and SMS AT command.

Command name	Command function	Default parameter
AT+LBS	Query station positioning information	Empty

**Form 2.3.4-1 Related AT Command**

**Note:** This function does not obtain positioning information directly(for example, latitude and longitude information), but base station location information. Users need to give this information to a third party, and the third party will obtain a direct positioning information through calculation. Third-party location information services are generally paid services. When the user tests, you can go to the URL to convert the actual location:

<http://www.minigps.net/cellsearch.html>(This URL is for testing only and does not guarantee site stability)

The query interface is shown below:



**Diagram 2.3.4-1 Searching the Position**

Click the query to get the converted location information



**Diagram 2.3.4-2 Position**

### 2.3.5. Modbus protocol conversion

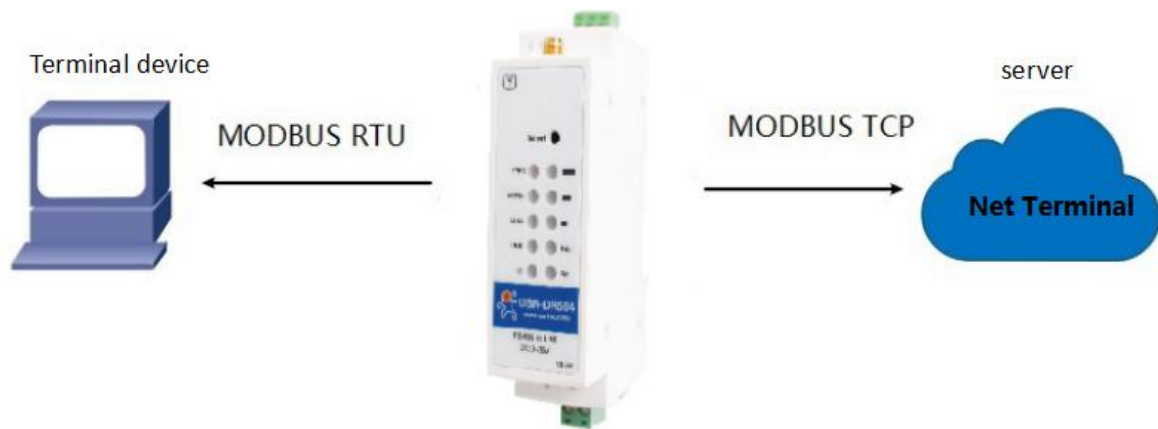


Diagram 2.3.5-1 Modbus Protocol Conversion Schematic Diagram

In the network transparent mode, if the terminal device transmits data through Modbus RTU protocol and the server communicates through Modbus TCP protocol, user can turn on the function of DTU Modbus TCP/RTU protocol internal conversion. After this function is enabled, DTU converts the Modbus TCP protocol data sent by the server into Modbus RTU protocol and sends it to the terminal device, and converts the Modbus RTU protocol data sent by the terminal device into Modbus TCP protocol and sends it to the server.

Command name	Command functions	Default parameter
AT+MODBUSEN	Query/Setting whether to enable Modbus protocol conversion	OFF

Form 2.3.5-1 Related AT Command

**AT commnd setting method:**

1. Set work mode to Transparent mode. :  
**AT+WKMOD=NET**
2. Enable Socket A:  
**AT+SOCKAEN=ON**
3. Set socket A to TCP Client:  
**AT+SOCKA=TCP,test. usr. cn,2317**
4. Enable Modbus protocol conversion:  
**AT+MODBUSEN=ON**
5. Restart the machine:  
**AT+Z**

**Setting software diagram:**

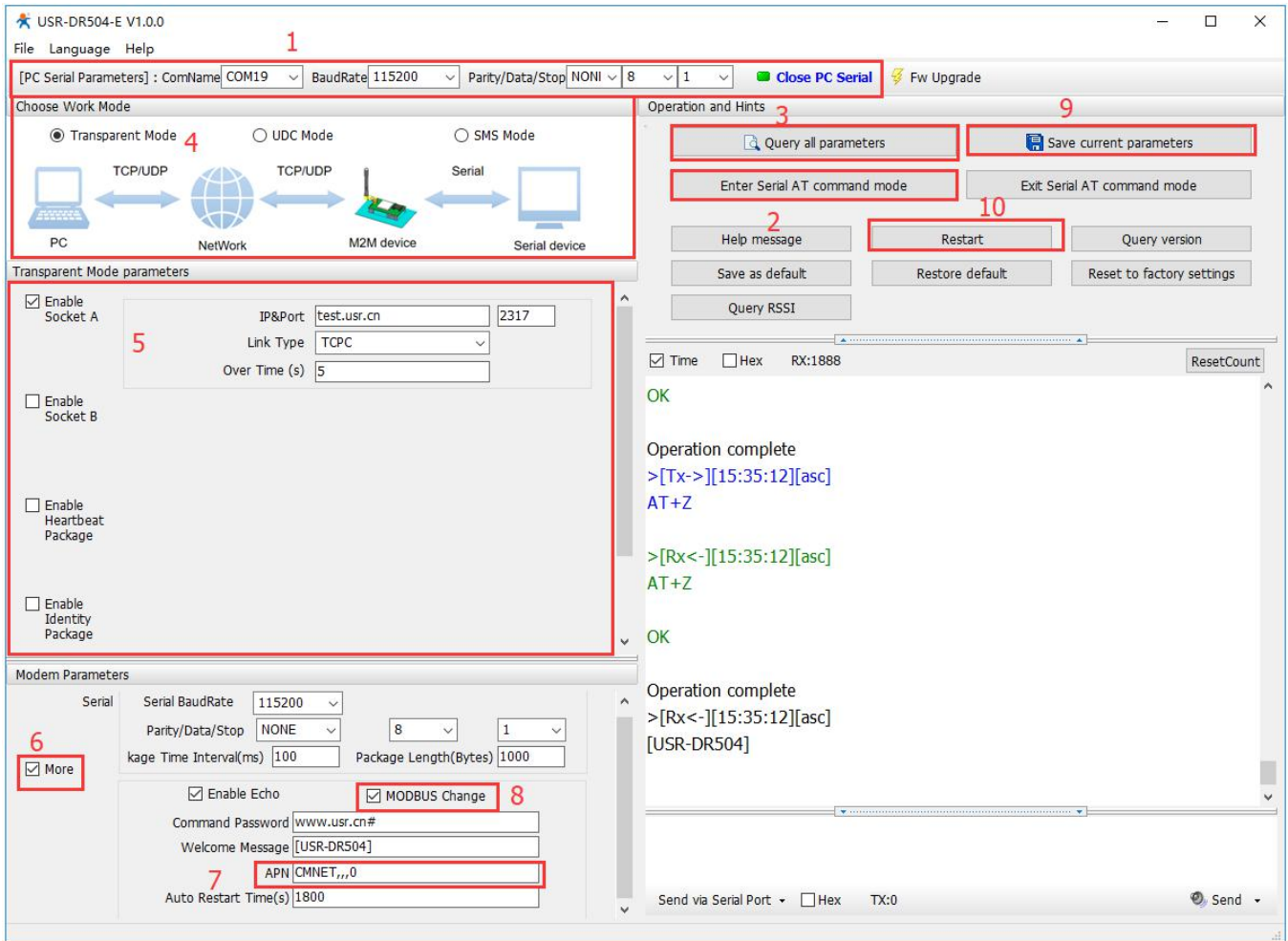


Diagram 2.3.5-2 Setting software diagram

1. Open the dedicated setup software. Set the serial port parameters according to the actual situation and click "Open PC Serial".
2. Click "Query all parameters", waiting to get all current parameters.
3. In the "Choose Work Mode", check "Transparent Mode"
4. Set the parameters of SocketA
5. Check "MODBUS Change".
6. Set the APN parameters.
7. Click "Save current parameters" to set and save all parameters.
8. Click "Restart" to restart the module.

### 2.3.6. Indicator Status

There are ten indicators light on the DR504, PWR, WORK, NET, LINKA, LINKB, TX, RX, First-level signal strength, second-level signal and third- level signal. The status represented by the indicator are as follows:

**Figure 8 Indicator status**

Indicator name	Indicator function	Status
<b>POWER</b>	Power indicator	Always on after power work normally
<b>WORK</b>	System operation indicator.	Flashing after system running
<b>NET</b>	Network status indicator	Always on after registering the network
<b>LINKA</b>	Socket A connection indicator	Always on after socket A is connected
<b>LINKB</b>	Socket B connection indicator	Always on after the socket B connected
<b>TX</b>	Serial port send the data	Light when there is data from serial port
<b>RX</b>	Serial port receive the data	Light when there is data received by the serial port
<b>First-level signal</b>	Indicate the first level signal strength	Always on when the signal strength reach the first level
<b>Second-level</b>	Indicate the second level signal strength	Always on when the signal strength reach the second level
<b>Third- level signal</b>	Indicate the third level signal strength	Always on when the signal strength reach the third level

**Form 2.3.6-1 Indicators**

### 2.3.7. Restore to the factory default settings

After power on, press the Reload button for 3~15S and release it to restore the device parameters to factory default parameters.

### 2.3.8. Firmware Upgrade

#### 2.3.8.1. Upgrade by serial port

In order to reduce the complexity of firmware upgrade for users, USR-DR504-E has specially set up the firmware upgrade with 232 ports. The steps are as follows:

(1) Set baud rate to 115200, no check bit, data bit 8, stop bit 1, open serial port, click firmware upgrade, and select the firmware to be upgraded.



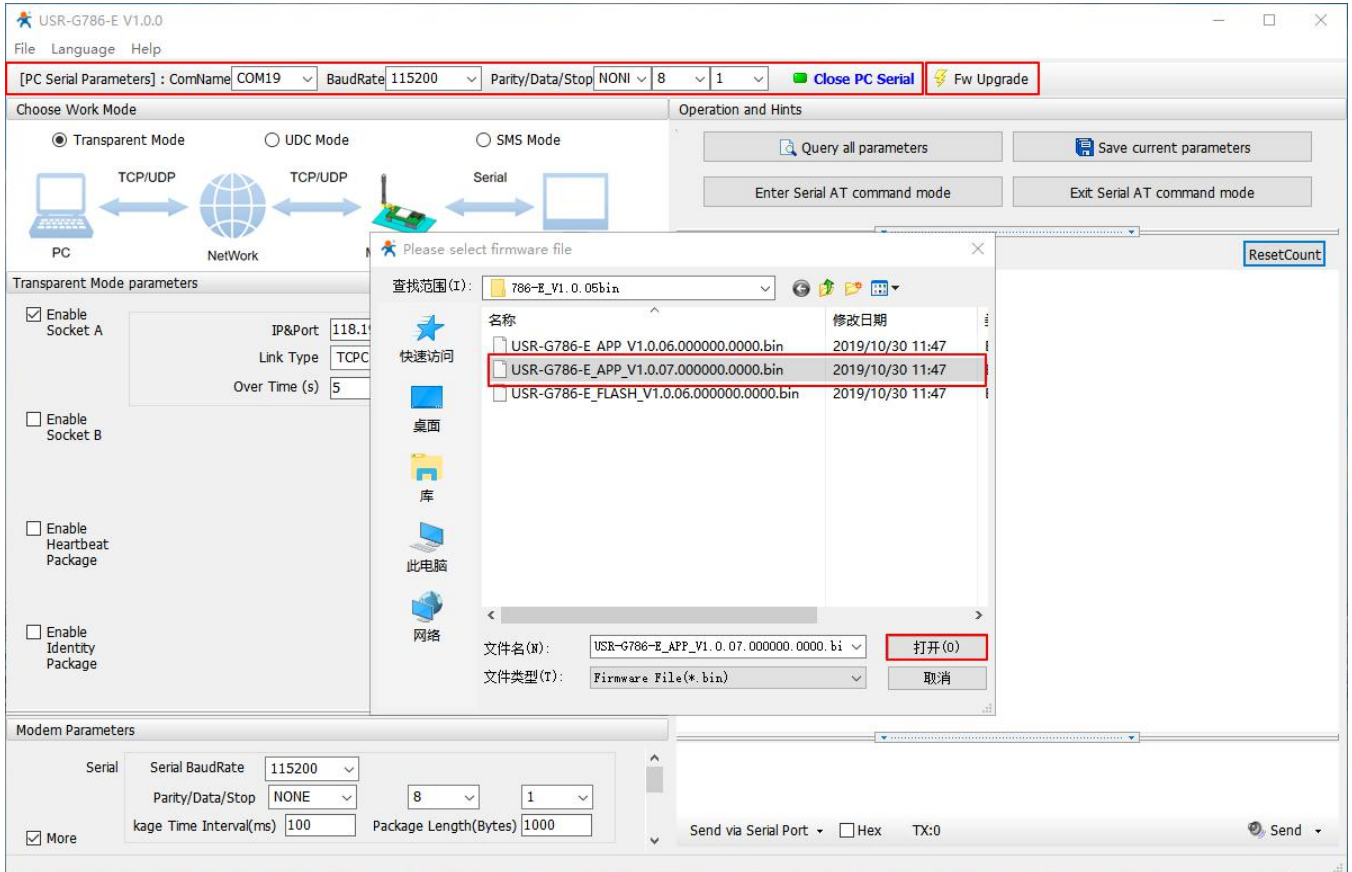


Diagram 2.3.8.1-1 Serial update Schematic Diagram

(2) As indicated, hold down the Reload pin and power USR-DR504-E at the same time.

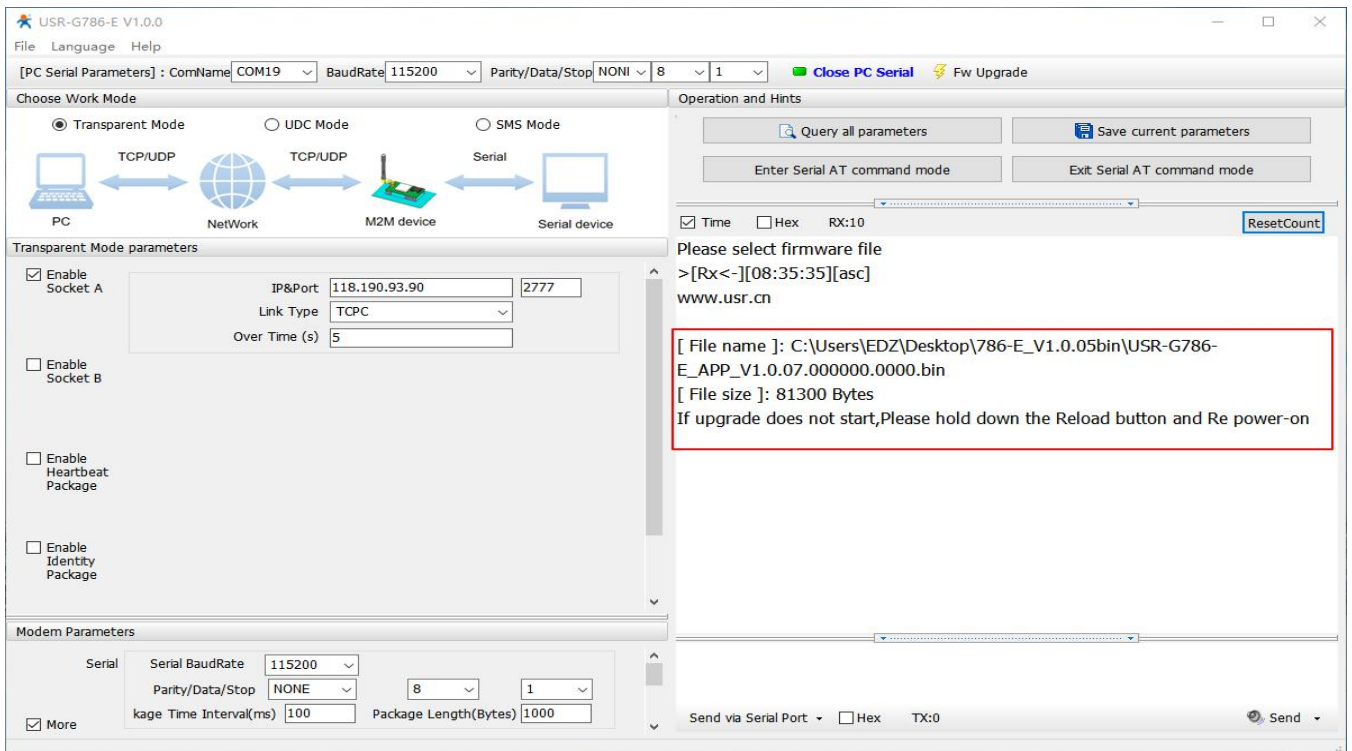


Diagram 2.3.8.1-2 Serial Update Schematic Diagram

(3) After that, you can see that the firmware is being downloaded, release the Reload pin and wait for the update.

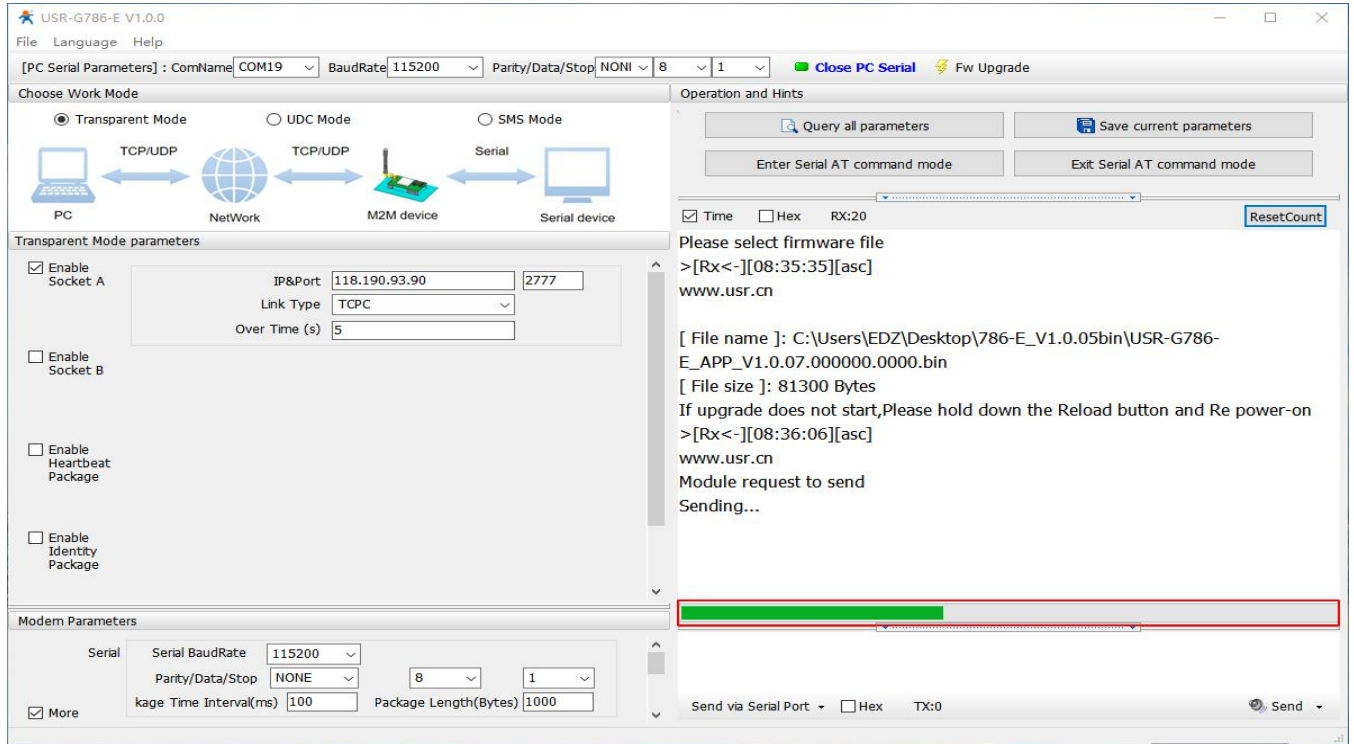


Diagram 2.3.8.1-3 Serial Update Schematic Diagram

(4) firmware update is completed and the device is restarted.

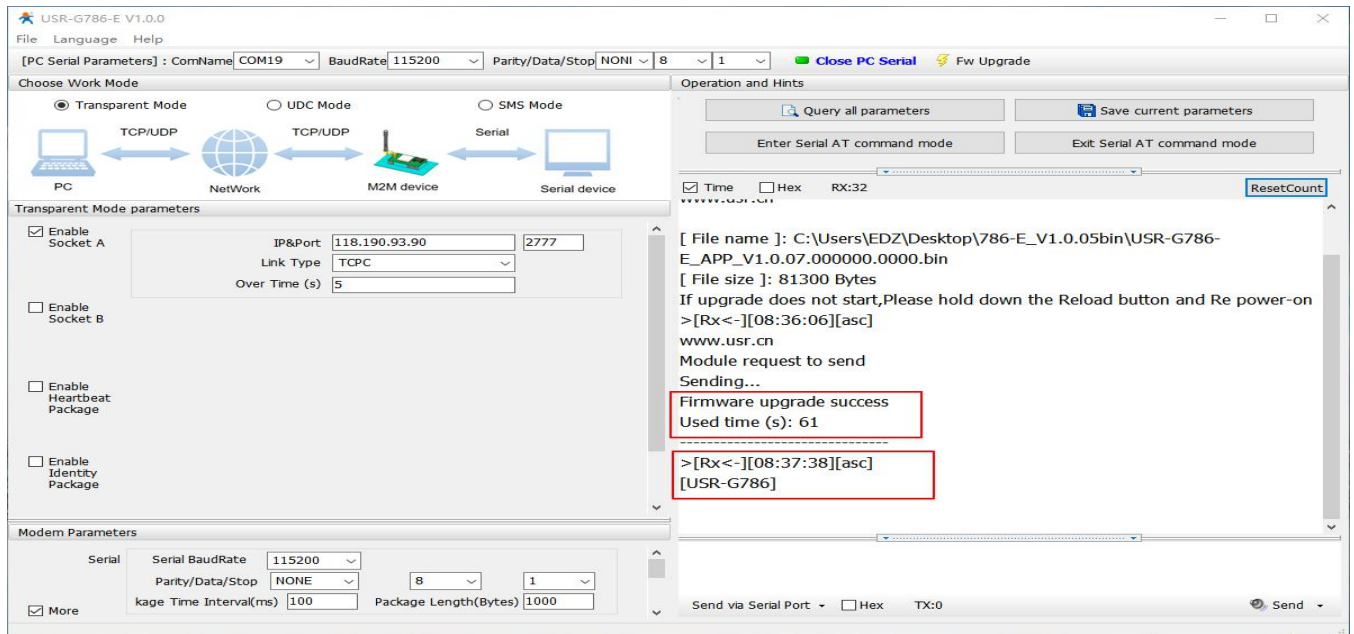


Diagram 2.3.8.1-1 Serial update Schematic Diagram

### 2.3.8.2. Remote update

Remote upgrade uses polling mode to query, and the server is requested once by default for 30 minutes to get whether there is an upgrade demand. If the upgrade is needed, the firmware data will be downloaded from the server for the upgrade; if not, the system will sleep and wait for the next round. The polling time of Fota upgrade can be set through AT+FOTATIME with a range of 10~65535s.

### 3. Parameter setting

#### 3.1. Setup by serial port

##### 3.1.1. Setup software

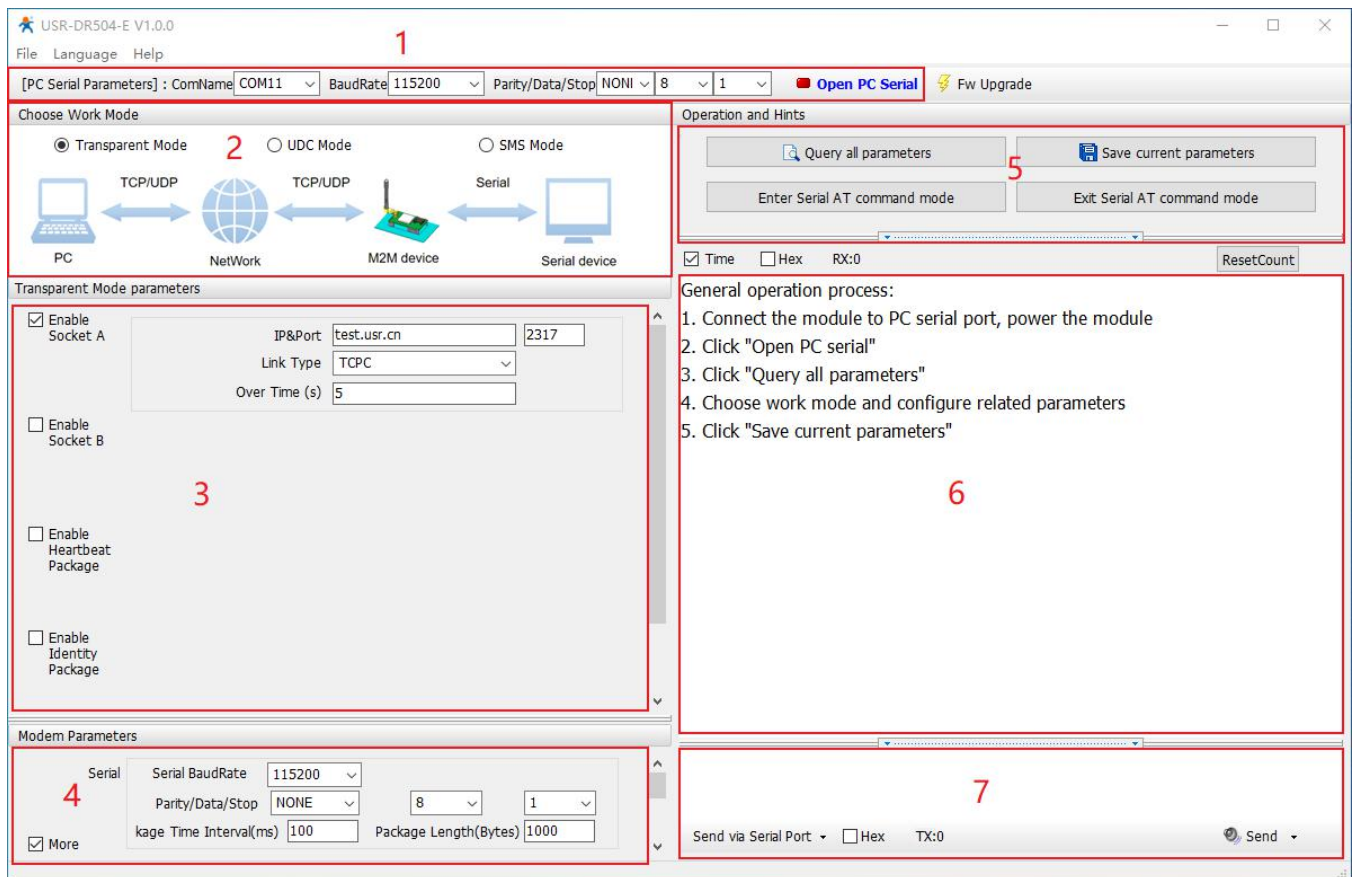


Diagram 3.1.1-1 Setting Software

Description:

1. In PC serial parameter setting area, it is necessary to set parameters consistent with the current serial port of DTU, otherwise it cannot communicate with DTU.
2. Working mode selection area, select the working mode of DTU.
3. In the parameter setting area of characteristic functions, set parameters related to DTU's featured functions
4. Global parameter area, setup DTU basic global parameters.
5. Common command button, click to send the self-input command.
6. Data receiving and display area, displaying the data sent and received.
7. Data sending area, input the data and click Send.

### 3.1.2. AT command setting

When the device works in either the network transparent mode, the device can switch to the "AT command mode" by sending time-specific data to the serial port of the device.

When the operation is completed in "AT command mode", the device is sent specific commands to return to the previous working mode.

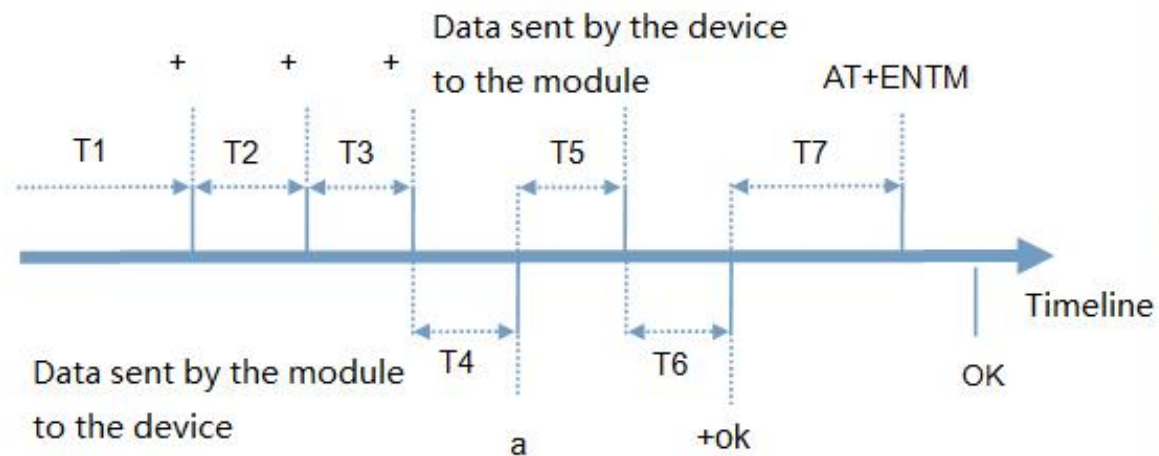


Diagram 3.1.2-1 Time Line

#### Changing the timing of command mode:

In the figure above, the horizontal axis is the time axis, the data above the time axis is sent by the serial port device to the device, and the data below the time axis is sent by the device to the serial port.

Time requirement:

T1 > current serial port packaging interval (refer to AT+UARTFT)

T2 < current serial port packaging interval time (refer to AT+UARTFT)

T3 < current serial port packaging interval time (refer to AT+UARTFT)

T4 = current serial port packaging interval time (refer to AT+UARTFT)

T5 < 3 s

T6 = current serial port packaging interval time (refer to AT+UARTFT)

#### The time sequence of switching from Transparent transmission mode to AT Command mode:

- Serial port device continuously sends "+++" to the device. After receiving "+++", the device will send an "a" to the serial device. No data can be sent during a packaging cycle before sending "+++".
- When the serial device receives 'a', a 'a' must be sent to the device within 3 seconds.
- After receiving 'a', the device returns "+ok" and enter "temporary command mode".
- After receiving "+ok", the device has enter "temporary command mode" and now can send AT command to it

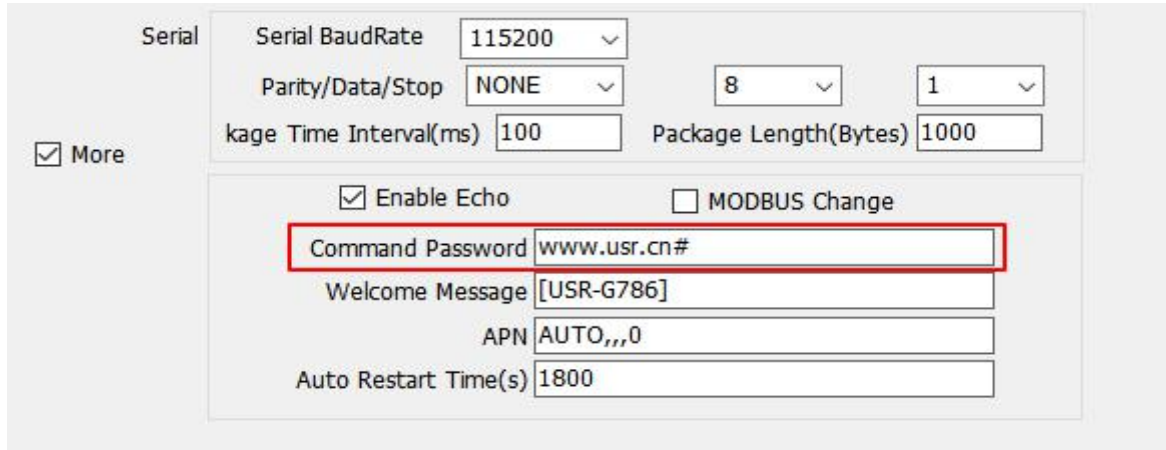
#### Time sequence of switching from AT command mode to network Transparent transmission mode"

- The serial device sends "AT+ENTM" to the device.
- After receiving the command, the device sends "OK" to the serial device and returns to the previous working mode.
- After the serial device receives "OK", it knows that the device has returned to its previous working mode.

### 3.1.3. Serial AT command

Serial AT command refers to the devices work in transparent mode and we do not need to switch to the command mode. We can use the method of password and AT command to query and set parameters.

Generally, it is used when client equipment needs to query or modify parameters when DTU is running. It does not need complicated +++ timing sequence to enter AT command mode, so as to quickly query or set parameters.



Serial

Serial BaudRate: 115200

Parity/Data/Stop: NONE, 8, 1

Package Time Interval(ms): 100, Package Length(Bytes): 1000

More

Enable Echo,  MODBUS Change

Command Password: www.usr.cn#

Welcome Message: [USR-G786]

APN: AUTO,,,0

Auto Restart Time(s): 1800

Diagram 3.1.3-1 Software Schematic

Query the current password , query/setting command: [AT+CMDPW](#)

Through the software can see the current command password is: [www.usr.cn#](#)

After the setting is completed, restart the module, and send [www.usr.cn#AT+VER](#) (note that there is an Enter at the end of the string) from the serial port to the module.

After receiving the string, the module will return the response information.

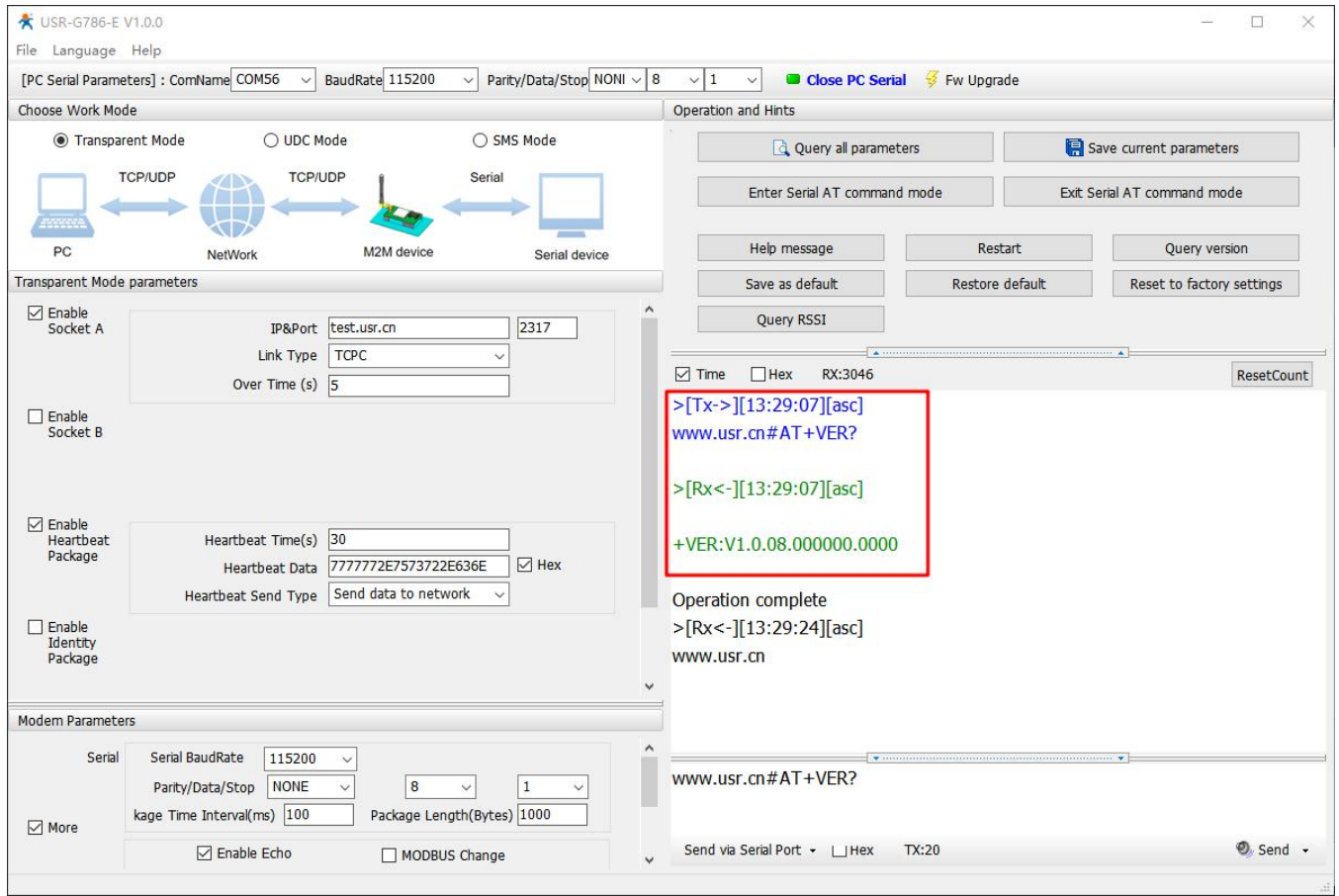


Diagram 3.1.3-2 Set-Up Software

### 3.1.4. Network AT command

Network AT command refers to the way to set and query parameters by sending passwords and AT commands through the network when working in transparent transmission mode.

Network AT command is similar to serial AT command. The difference is that network AT command is issued through the network, which is used for remote inquiry or parameter modification by Customer's server device. Customers can use the network AT command for batch parameter modification and query, which is convenient for managing owned equipment.

For example, query the firmware version number and send `www.usr.cn#AT+VER` (note that there is an Enter at the end of the string) from the server to the module. After receiving the command, the module will return a response message.

### 3.1.5. SMS AT command

SMS AT command means that we can use SMS to query and configure the parameters of DTU.

SMS AT command is generally used when customers need to query or modify parameters temporarily. As long as you know the phone number of the device, you can query and modify parameters, which is very convenient for equipment management in remote areas.

Take the query of firmware version number as an example, send AT command. Send `"www.usr.cn#AT+VER"` from

the mobile phone to the module. After receiving it, the module will return the response information as shown in the figure below:

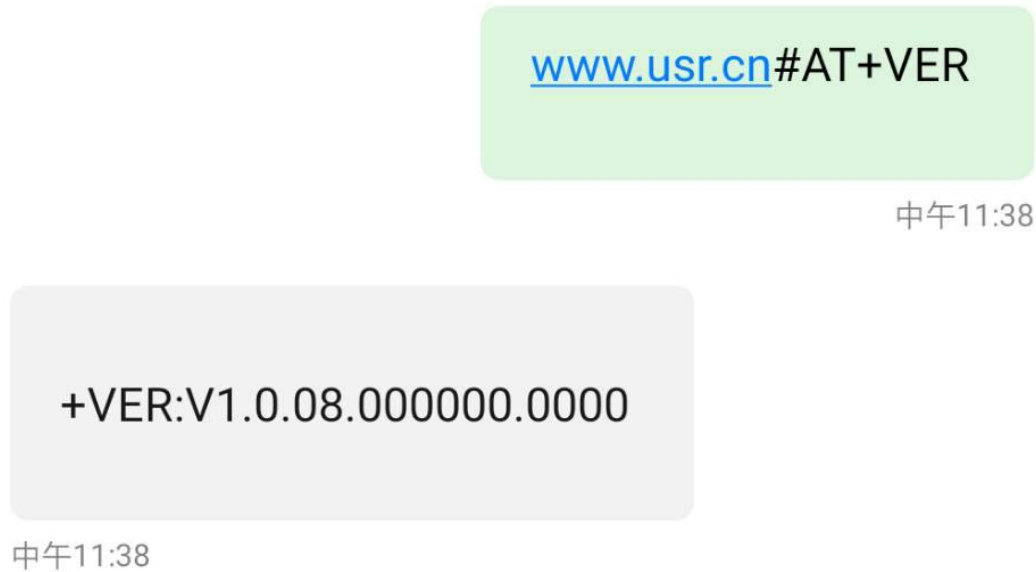


Diagram 3.1.5-1 SMS Command

### 3.1.6. Command format

AT command is "question and answer" command, divided into "question" and "answer" two parts. "Question" means that the device sends an AT command to DR504-E, and "answer" means that DR504-E sends a reply to the device.

Note: characters in instructions are case-insensitive.

#### 3.1.6.1 Symbol description

Figure 9 Symbol Description

Symbol name	Implication
<>	The content is necessary items
[]	The content is non-essential items
{}	The content is a string with special meaning
~	Parameter range , e. g. A~B. Parameter 's range is from A to B
CMD	Command code
OP	The operator
PARA	Parameters
CR	Enter key in ASCII, 0X0D in hex
LF	Line break in ASCII, 0X0A in hex

Form3.1.6.1-1 Symbol Description

#### 3.1.6.2 The question format in command

Command string: <AT+>[CMD][OP][PARA]<CR>

Figure 10 symbol description

Command code	Implication	Necessary or not
--------------	-------------	------------------

AT+	AT command header	YES
CMD	Command name	NO
OP	Operator, such as =,?	YES
PARA	Executed Parameter	NO
CR	Enter, command terminator	YES

**Form3.1.6.2-1 Command**

Command type description

**Figure 11 Command string format description**

Type	String format	Description
0	<AT+><CMD>?<CR>	Query current Parameter
1	<AT+><CMD><CR>	Execute the action of this instruction or query current Parameter
2	<AT+><CMD>=<PARA><CR>	Set this command's parameter

**Form3.1.6.2-2 Command**

### 3. 1. 6. 3 The Answer Format in Command

Note: the response information of the command can be divided into two types: return and no return. Return means to return the input content when the instruction is input, and then make a response to the command.

No return means no input is returned and only the command is responded to.

In the following instructions, no return mode is used as an example.

Command String: [CR][LF][+CMD][OP][PARA][CR][LF]<CR><LF>[OK]<CR><LF>

**Figure 11 Symbol Descriptions**

Command	Implication	Necessary or not
CR	Enter key	No
LF	Line break	No
+CMD	Response header	No
OP	Operator , for example “:.”	No
PARA	Returned parameter	No
CR	Enter key	No
LF	Line break	No
CR	Enter key	Yes
LF	Line break	Yes
OK	Operate successfully	No
CR	Enter key	Yes
LF	Line break	No

**Form3.1.6.3-1Symbol**

Response instruction type description:

**Figure 13 The description of string format**

Type	String Format	Description
0	<CR><LF><OK><CR><LF>	Means command send success
1	<CR><LF><+CMD:><PARA><CR><LF><CR><LF><OK><CR><LF>	Return current parameters

**Form3.1.6.3-2 String Format**



### 3.1.6.4 Special symbols

In AT commands, equals (=), comma (,), question mark (?), enter, line feed are special symbols, so the parameter can not directly contain the equals sign, comma, question mark. It needs to be escaped.

Escape rule: use [] to enclose the hexadecimal code of a special symbol, representing the ASCII code represented by an input hexadecimal code.

Example: question mark (?)The hexadecimal encoding of 0x3F is expressed as [3F] after escaping by this escape method.

**Figure 14 Commonly used escape characters**

Symbol	Implication	Escape characters
=	Equal sign	[3D]
,	Comma	[2C]
?	Question mark	[3F]
<CR>	Enter key	[0D]
<LF>	Line break	[0A]

**Form3.1.6.4-1 Characters**

### 3.1.7. AT commands

**Figure 15 AT command error code**

Code	Implication
Err1	Does not conform to the AT commands format, is not the beginning of AT
Err2	The AT command was not found and does not exist
Err3	Not meet the format of the query or Settings
Err4	Wrong parameters or number
Err5	Setting parameter failed

**Form3.1.7-1 Error**

Command	Command description
<b>Executive command</b>	
AT	Test Command
H	Help information
Z	Module reboot
E	Query/set whether to enable command return
ENTM	Exit AT command mode
WKMOD	Query/set work mode
CMDPW	Query/set command password
STMSG	Query/set module start information
RSTIM	Query/set the time of equipment automatically restart
CSQ	Query signal strength information of device currently
SYSINFO	Query network information of device
UCPIN	Query/set PIN code
<b>Query/set query instructions</b>	

RELD	Reload the default settings of user
CLEAR	Restore original factory Settings
CFGTF	Save current settings to default settings
<b>Query/set short message query instructions</b>	
VER	Query version information
SN	Query SN code
ICCID	Query ICCID code
IMEI	Query IMEI code
CIP	Query IP address
LBS	Query information of base station positioning
PING	Query the network on or off
<b>Serial parameter commands</b>	
UART	Query / set the parameters of serial ports
UARTFT	Query/set serial port package time
UARTFL	Query/set the serial port package length
<b>Network commands</b>	
APN	Query/set APN information
SOCKA	Query/set socket A parameter
SOCKB	Query/set socket B parameter
SOCKAEN	Query/setup whether to enable socket A
SOCKBEN	Query/setup whether to enable socket B
SOCKALK	Query socket A connection status
SOCKBLK	Query socket B connection status
SOCKATO	Query/set reconnect time after disconnection of socket A
SOCKBTO	Query/set reconnect time after disconnection of socket B
SOCKRSTM	Query/Set the max number of reconnect when socket connection failure
MODBUSEN	Query/set whether to enable Modbus protocol conversion
<b>Registration package commands</b>	
REGEN	Query/set whether to enable package registration
REGTP	Query/set the content type of registered package
REGDT	Query/set custom registration information
REGSND	Query/set registration package sending mode
CLOUD	Query/set ID/Password of enable USR-Cloud
<b>Heartbeat package commands</b>	
HEARTEN	Query/set whether to enable heartbeat
HEARTDT	Query/set heartbeat packet data
HEARTSND	Query/set heartbeat packets sending type
HEARTTM	Query/set heartbeat packet sending interval
<b>SMS commands</b>	
DSTNUM	Query/set the target mobile phone number of SMS mode
SMSFLT	Query/set whether to enable non-target mobile phone number filtering
CISMSEND	Send SMS

## 1. AT

- Function: Test commands to test whether the current device is active
- Format
  - ◆ Query:  
AT{CR}  
{CR}{LF}OK{CR}{LF}{CR}{LF}

## 2. AT+H

- Function: Helping command
- Format
  - ◆ Query:  
AT+H{CR}  
{CR}{LF} help message {CR}{LF}{CR}{LF}
- Parameter:
  - ◆ help message: command.

## 3. AT+Z

- Function: Reload the module.
- Format  
AT+Z{CR}  
{CR}{LF}OK{CR}{LF}

## 4. AT+E

Function: Query/set the echo status of the device 's AT commands.

Format:

- ◆ Query current parameter:  
AT+E{CR} or AT+E?{CR}  
{CR}{LF}+E:status{CR}{LF}{CR}{LF}
  - ◆ Setting:  
AT+E=status{CR}  
{CR}{LF}OK{CR}{LF}
  - Parameter:
    - ◆ status: echo status , including:  
ON: open  
OFF: close
- Command echo default is on.

- E. g: AT+E=ON

## 5. AT+ENTM

- Function: set the device to return to the previous working mode.
- Format:
  - ◆ Perform specified function:  
AT+ENTM{CR}  
{CR}{LF}OK{CR}{LF}

## 6. AT+WKMOD

- Function: Query/Setting module's work mode
- Format:
  - ◆ Query current Parameter:  
AT+WKMOD{CR} or AT+WKMOD?{CR}  
{CR}{LF}+WKMOD:mode{CR}{LF}{CR}{LF}
  - ◆ Setting:  
AT+WKMOD=mode{CR}  
{CR}{LF}OK{CR}{LF}
- Parameter:
  - ◆ mode: work mode , including:
    - NET: Network transparent transmission mode
    - SMS: SMS mode
  - Default is NET mode:
- E. g: AT+WKMOD=NET

## 7. AT+CMDPW

- Function: Query/Setting command password
- Format:
  - ◆ Query current Parameter:  
AT+CMDPW{CR} or AT+CMDPW?{CR}  
{CR}{LF}+CMDPW:password{CR}{LF}{CR}{LF}
  - ◆ Setting:  
AT+CMDPW=password{CR}  
{CR}{LF}OK{CR}{LF}
- Parameter:
  - ◆ password: Command password , 1~11 bytes ASCII code, the default is www. usr. cn#.
- E. g: AT+CMDPW=www. usr. cn#

## 8. AT+STMSG

Function: Query/Setting equipment's welcome message

- Function: Query/Setting module's welcome message.
- Format:
  - ◆ Query current Parameter:  
AT+STMSG{CR} or AT+STMSG?{CR}  
{CR}{LF}+STMSG:message{CR}{LF}{CR}{LF}
  - ◆ Setting:  
AT+STMSG=message{CR}  
{CR}{LF}OK{CR}{LF}
- Parameter:
  - ◆ message: Welcome message, after the device is powered on. ASCII code of 1~20 bytes, default is [USR-DR504].
- E. g: AT+STMSG=www.usr.cn

## 9. AT+RSTIM

- Function: Query/Setting module's automatic restart time.
- Format:
  - ◆ Query current Parameter:  
AT+RSTIM{CR} or AT+RSTIM?{CR}  
{CR}{LF}+RSTIM:time{CR}{LF}{CR}{LF}
  - ◆ Setting:  
AT+RSTIM=time{CR}  
{CR}{LF}OK{CR}{LF}
- Parameter:
  - ◆ time: The unit is second. The range can be set from 60s to 60000s. When the network does not respond to data longer than this time, the device will restart. The default time is 1800s. When the parameter is set to 0, it means that this function is disabled.
- E. g: AT+RSTIM=2400

## 10. AT+CSQ

- Function: Query module's current signal strength.
- Format:
  - ◆ Query current Parameter  
AT+CSQ{CR} or AT+CSQ?{CR}  
{CR}{LF}+CSQ: rssi {CR}{LF}{CR}{LF}
- Parameter:
  - ◆ rssi: Received signal strength information.

Figure 3 Mapping relation

Number	Implication
0	Less than -140 dBm
1 . . . 96	-140 . . . -45 dBm
97	Greater than or equal to -44 dBm
99	Unknown or unmeasured

## 11. AT+SYSINFO

- Function: Query module 's network information
- Format:
  - ◆ Query current parameter:  
 AT+SYSINFO{CR} or AT+SYSINFO?{CR}  
 {CR}{LF}+SYSINFO: state,srv\_domain ,roam\_status,sys\_mode,sim\_state{CR}{LF}{CR}{LF}
- Parameter
  - ◆ state: current network service status

**Figure 4** Sever status list

Number	Implication
0	No service
1	Restricted service
2	Have a service
3	Restricted regional services
4	Power saving state

- ◆ srv\_domain: business domain

**Figure 5** Business domain list

Number	Implication
0	No service
1	Only CS server
2	Only PS server
3	PS+CS server
4	CS,PS is not registered and is in the search state

- ◆ roam\_status: Roaming state  
 0: Non-roaming state  
 1: Roaming state
- ◆ sys\_mode: System mode

**Figure 6** System mode list

Number	Implication
0	No service
1	AMPS mode
2	CDMA mode
3	GSM mode
4	HDR mode
5	WCDMA mode

6	GPS mode
7	GSM/WCDMA mode
8	CDMA/HDR mixed mode
9	LTE mode
10	GSM/WCDMA/LTE mode
11	TDS mode

- ◆ sim\_state: UIM state.

**Figure 7 UIM status list**

Number	Implication
0	UIM card status is invalid
1	UIM card status is effective
2	UIM card status is not valid under CS
3	UIM is not valid under PS
4	UIM is not valid under PS+CS
240	ROMUIM edition
255	UIM card not exist

## 12. AT+UCPIN

Function: Query/Sett PIN code.

- Function: Query/Setting PIN code
- Format
  - ◆ Query current Parameter:  
AT+UCPIN{CR} or AT+UCPIN?{CR}  
{CR}{LF}+UCPIN:pin{CR}{LF}{CR}{LF}
  - ◆ Setting:  
AT+UCPIN=pin{CR}  
{CR}{LF}OK{CR}{LF}
- Parameter:
  - ◆ pin: PIN code ,Default is empty
- E. g: AT+PIN=1234

## 13. AT+RELD

- Function: Restore the default settings and the device will restart.
- Format:
  - ◆ Execute the specified function  
AT+RELD{CR}  
{CR}{LF}OK{CR}{LF}

#### 14. AT+CLEAR

- Function: Reload the default settings, device will restart.
- Format:
  - ◆ Execute specified function:  
AT+CLEAR{CR}  
{CR}{LF}OK{CR}{LF}

#### 15. AT+CFGTF

- Function: Save current parameter to default parameter.
- Format:
  - ◆ Execute specified function:  
AT+CFGTF{CR}  
{CR}{LF}OK{CR}{LF}

#### 16. AT+VER

- Function: Query module's firmware version.
- Format:
  - ◆ Query current parameter:  
AT+VER{CR} or AT+VER?{CR}  
{CR}{LF}+VER:version{CR}{LF}{CR}{LF}
- Parameters:
  - ◆ version: Firmware version number.

#### 17. AT+SN

- Function: Query module's SN code.
- Format:
  - ◆ Query current Parameter:  
AT+SN{CR} or AT+SN?{CR}  
{CR}{LF}+SN:code{CR}{LF}{CR}{LF}
- Parameters:
  - ◆ code:SN code

#### 18. AT+ICCID

- Function: Query module's ICCID code.
- Format:
  - ◆ Query current parameter:  
AT+ICCID{CR} or AT+ICCID?{CR}



{CR}{LF}+ICCID:code{CR}{LF}{CR}{LF}

- Parameters:
  - ◆ code: ICCID code.

## 19. AT+IMEI

- Function: Query module's IMEI code.
- Format:
  - ◆ Query current parameter:  
AT+IMEI{CR} or AT+IMEI?{CR}  
{CR}{LF}+IMEI:code{CR}{LF}{CR}{LF}
- Parameters:
  - ◆ code: IMEI code.

## 20. AT+CIP

- Function: Query local IP address.
- Format:
  - ◆ Query current parameter:  
AT+CIP{CR} or AT+CIP?{CR}  
{CR}{LF}+CIP: IP {CR}{LF}{CR}{LF}
- Parameters:
  - ◆ IP: local IP address.

## 21. AT+LBS

- Function: Query base station positioning.
- Format:
  - ◆ Query:  
AT+LBS{CR}  
{CR}{LF}+IMEI : <lac>,<cid>{CR}{LF}{CR}{LF}
- Parameters:
  - ◆ <lac>: LAC information , Range: 1~65535
  - ◆ <cid>: CID information , Range: 2G: (1-65535) 3G/4G (1~268435455)
- E. g: AT+LBS

## 22. AT+PING

- Function: Query network continuity.
- Format:
  - ◆ Query:  
AT+PING="ip\_address"{CR}

```
{CR}{LF}"ip_adress"{CR}{LF}{CR}{LF}
{CR}{LF}+MPING: <ip_address>,<serrier num>,<rtt>{CR}{LF}{CR}{LF}
```

- Parameters:
- ◆ < ip\_address >: ip address
- ◆ < serrier num >: send ping data packet 's order
- ◆ < rtt >: response time
- E. g: AT+PING="www. baidu. com"

### 23. AT+UART

- Function: Query/Setting the serial port parameters
- Format:

```
AT+UART{CR} or AT+UART?{CR}
{CR}{LF}+UART:baud,data bit,stop bit,parity {CR}{LF}{CR}{LF}
```

  - ◆ Setting:

```
AT+UART=baud,data bit,stop bit,parity {CR}
{CR}{LF}OK{CR}{LF}
```
- Parameters:
  - ◆ Baud:band rate:2400,4800,9600,14400,19200, 28800, 33600,38400,57600,115200,230400,460800  
Default rate 115200.
  - ◆ data bit: data bit , including:  
8: 8 data bits.  
Default data bit :8.
  - ◆ stop bit: stop bit , including:  
1: 1 stop bit.  
2: 2 stop bits.  
Default 1 stop bit.
  - ◆ parity: Checking methods, including:  
NONE: NO check.  
ODD: ODD check.  
EVEN: EVEN check.  
Default is NONE.
- E. g.: AT+UART=115200,8,1,NONE.

### 24. AT+UARTFT

- Function: Query/Setting interval packet time of serial port
- Format:

```
AT+UARTFT{CR} or AT+UARTFT?{CR}
{CR}{LF}+UARTFT:time{CR}{LF}{CR}{LF}
```

  - ◆ Setting:

```
AT+UARTFT=time{CR}
{CR}{LF}OK{CR}{LF}
```

- Parameters:
  - ◆ time: Packaging interval, the range is 100~60000ms, default is 100ms.
- E. g: AT+UARTFT=100.

## 25. AT+UARTFL

- Function: Query/Setting the length of serial port package.
- Format:
  - AT+UARTFL{CR} or AT+UARTFL?{CR}
  - {CR}{LF}+UARTFL:length{CR}{LF}{CR}{LF}
  - ◆ Setting:
    - AT+UARTFL=length{CR}
    - {CR}{LF}OK{CR}{LF}
- Parameters:
  - ◆ length: Package length, ranging from 100 to 1000 bytes, default to 1000 bytes.
- E. g: AT+UARTFL =1000

## 26. AT+APN

- Function: Query/Setting APN code
- Format
  - ◆ Query current parameter:
    - AT+APN{CR} or AT+APN?{CR}
    - {CR}{LF}+APN:code,user\_name,password,auth{CR}{LF}{CR}{LF}
  - ◆ Setting:
    - AT+APN=code,user\_name,password,auth{CR}
    - {CR}{LF}OK{CR}{LF}
- Parameters:
  - ◆ code: APN, default is AUTO, with a maximum length of 50.
  - ◆ user\_name: User name, default is empty, maximum length 64.
  - ◆ password: Password, default empty, maximum length 127.
  - ◆ auth: Authentication mode , 0: None , 1: PAP , 2: CHAP , 3: PAP+CHAP , default is 0.
- E. g: AT+APN=4gnet,admin,admin,1.

## 27. AT+SOCKA

- Function: Query/Setting the parameters of socket A.
- Format:
  - ◆ Query current parameter:
    - AT+SOCKA{CR} or AT+SOCKA?{CR}
    - {CR}{LF}+SOCKA:protocol,address,port{CR}{LF}{CR}{LF}
  - ◆ Setting:

AT+SOCKA=protocol,address,port{CR}  
{CR}{LF}OK{CR}{LF}

- Parameters:
  - ◆ protocol: Connection Type , including:
    - TCPS: TCP Server
    - TCPC: TCP Client
    - UDPC: UDP Client
    - Default is TCPC.
  - ◆ address: Server address. This address can be a domain name or IP. The default is test. usr. cn. It is invalid under TCPS. Can set any domain name or IP. It is not allowed to be empty.
  - ◆ port: Server port, range 1~65535, default 2317, local port in TCPS mode
- E. g: AT+SOCKA=TCPC,test. usr. cn,8899.

## 28. AT+SOCKB

Function: Query/Setting the parameters of socket B.

- Function: Query/Setting the parameters of socket B.
- Format:
  - ◆ Query current parameter:  
AT+SOCKB{CR} or AT+SOCKB?{CR}  
{CR}{LF}+SOCKB:protocol,address,port{CR}{LF}{CR}{LF}
  - ◆ Setting:  
AT+SOCKB=protocol,address,port{CR}  
{CR}{LF}OK{CR}{LF}
- Parameters:
  - ◆ protocol: protocol, including:
    - TCPC: TCP Client
    - UDPC: UDP Client
    - Default TCPC.
  - ◆ address: Server address, this address can be domain name or IP, maximum support 100 bytes, the default is test. usr. cn.
  - ◆ port: Server port, range 1~65535, default 2317
- E. g: AT+SOCKB=TCPC,test. usr. cn,2317

## 29. AT+SOCKAEN

- Function: Query/Setting whether to enable socket A
- Format:
  - ◆ Query current Parameter:  
AT+SOCKAEN{CR} or AT+SOCKAEN?{CR}  
{CR}{LF}+SOCKAEN:status{CR}{LF}{CR}{LF}
  - ◆ Setting:  
AT+SOCKAEN=status{CR}

{CR}{LF}OK{CR}{LF}

- Parameters:
  - ◆ status: whether to enable socket A , including:
    - ON: enable.
    - OFF: disable.

### 30. AT+SOCKBEN

- Function: Query/Setting whether to enable socket B.
- Format:
  - ◆ Query current Parameter:  
AT+SOCKBEN{CR} or AT+SOCKBEN?{CR}  
{CR}{LF}+SOCKBEN:status{CR}{LF}{CR}{LF}
  - ◆ Setting:  
AT+SOCKBEN=status{CR}  
{CR}{LF}OK{CR}{LF}
- Parameters:
  - ◆ status: whether to enable socket B, including:
    - ON: enable.
    - OFF: disable

### 31. AT+SOCKALK

- Function: Query whether socket A is connected.
- Format:
  - ◆ Query current parameter:  
AT+SOCKALK{CR} or AT+SOCKALK?{CR}  
{CR}{LF}+SOCKALK:status{CR}{LF}{CR}{LF}
- Parameters:
  - ◆ status: socket A connection status , including:
    - ON: connected.
    - OFF: unconnected.

### 32. AT+SOCKBLK

- Function: Query whether socket B is connected.
- Format:
  - ◆ Query current parameter:  
AT+SOCKBLK{CR} or AT+SOCKBLK?{CR}  
{CR}{LF}+SOCKBLK:status{CR}{LF}{CR}{LF}
- Parameters:
  - ◆ status: socket B connection status , including:
    - ON: connected.

OFF: unconnected.

### 33. AT+SOCKATO

- Function: Query/Setting reconnect time of Socket A once timeout.
- Format:
  - ◆ Query current Parameter:  
AT+SOCKATO{CR} or AT+SOCKATO?{CR}  
{CR}{LF}+SOCKATO:time{CR}{LF}{CR}{LF}
- Parameters:
  - ◆ time: reconnect time, time range is 1~100 s. Default time is 5s.
- E. g: AT+SOCKATO=10

### 34. AT+SOCKBTO

- Function: Query/Setting reconnect time of Socket B once timeout.
- Format:
  - ◆ Query current parameter:  
AT+SOCKBTO{CR} or AT+SOCKBTO?{CR}  
{CR}{LF}+SOCKBTO:time{CR}{LF}{CR}{LF}
- Parameters:
  - ◆ time: reconnect time, time range is 1~100 s. Default time is 5s.

### 35. AT+SOCKRSTIM

- Function: Query/Setting the maximum number of re-connections after connection failure, the device will restart after the maximum number of re-connections.
- Format:
  - ◆ Query current Parameter:  
AT+SOCKRSTIM{CR} or AT+SOCKRSTIM?{CR}  
{CR}{LF}+SOCKRSTIM:num{CR}{LF}{CR}{LF}
- Parameter:
  - ◆ num: Maximum re-connection times, Setting range is 10~600 times, the default is 60 times.

### 36. AT+MODBUSEN

- Function: Query/Setting Whether to enable Modbus protocol transformation Function.
- Format:
  - ◆ Query current Parameter:  
AT+MODBUSEN{CR} or AT+MODBUSEN?{CR}  
{CR}{LF}+MODBUSEN:status{CR}{LF}{CR}{LF}
  - ◆ Setting:

AT+MODBUSEN=status{CR}

{CR}{LF}OK{CR}{LF}

➤ Parameter:

◆ status: Modbus protocol transformation function status, including:

ON: enable

OFF: forbid

Default is OFF.

### 37. AT+REGEN

➤ Function: Query/Setting whether to enable the function of registration of package.

➤ Format:

◆ Query current Parameter:

AT+REGEN{CR} or AT+REGEN?{CR}

{CR}{LF}+REGEN:status{CR}{LF}{CR}{LF}

◆ Setting:

AT+REGEN=status{CR}

{CR}{LF}OK{CR}{LF}

➤ Parameter:

◆ status: The function register package enable status, including:

ON: open

OFF: close

Default :OFF。

### 38. AT+REGTP

➤ Function: Query/Setting the registration packet type.

➤ Format:

◆ Query current Parameter:

AT+REGTP{CR} or AT+REGTP?{CR}

{CR}{LF}+REGTP:type{CR}{LF}{CR}{LF}

◆ Setting:

AT+REGTP=type{CR}

{CR}{LF}OK{CR}{LF}

➤ Parameter:

◆ Type: The type of registration data , include:

ICCID: ICCID code

IMEI: IMEI code

CLOUD: Transparent transmissions function

USER: User default

Default is USER。

For example: AT+REGTP =ICCID

### 39. AT+REGDT

- Function: Query/Setting the data of default registration packet.
- Format:
  - ◆ Query current Parameter:  
AT+REGDT{CR} or AT+REGDT?{CR}  
{CR}{LF}+REGDT:data{CR}{LF}{CR}{LF}
  - ◆ Setting:  
AT+REGDT=data{CR}  
{CR}{LF}OK{CR}{LF}
- Parameter:
  - ◆ data: User-defined registry data, hexadecimal string Format, maximum length 160bytes,  $2 \leq 160$  even bytes, default to 777772E7573722E636E. For example such as: Parameter 777772E7573722E636E, if represented by ASCII code, www.usr.cn
  - ◆ Note:The maximum length of 160 bytes is the number of bytes after ASCIIcode is converted to a hexadecimal string.
  - ◆ For example: AT+REGDT =777772E7573722E636E

### 40. AT+REGSND

- Function: Query/Setting the transmission mode of registration packet.
- Format:
  - ◆ Query current Parameter:  
AT+REGSND{CR} or AT+REGSND?{CR}  
{CR}{LF}+REGSND:type{CR}{LF}{CR}{LF}
  - ◆ Setting:  
AT+REGSND=type{CR}  
{CR}{LF}OK{CR}{LF}
- Parameter:
  - ◆ type: transmissions type, include:  
LINK: Send when connection is established.  
DATA: Register package data as the beginning of each package of data
  - ◆ Default is DATA.
  - ◆ For example: AT+REGSND =DATA

### 41. AT+CLOUD

- Function: Query/Setting the registration parameter of USR-Cloud.
- Format:
  - ◆ Query current Parameter:  
AT+CLOUD{CR} or AT+CLOUD?{CR}  
{CR}{LF}+CLOUD:id,password{CR}{LF}{CR}{LF}
  - ◆ Setting:



```
AT+CLOUD=id,password{CR}
{CR}{LF}OK{CR}{LF}
```

➤ Parameter:

id: The registration ID of USR-Cloud ,length is 20 bits,Default is Empty.

password: The USR-Cloud 's transmission password,length is 8 bit,Default is empty.

◆ For example: AT+CLOUD =12345678901234567890,12345678

## 42. AT+HEARTEN

➤ Function: Query/Setting enable the heartbeat packet Function。

➤ Format:

◆ Query current Parameter:

```
AT+HEARTEN{CR} or AT+HEARTEN?{CR}
{CR}{LF}+HEARTEN:status{CR}{LF}{CR}{LF}
```

◆ Setting:

```
AT+HEARTEN=status{CR}
{CR}{LF}OK{CR}{LF}
```

➤ Parameter:

◆ status: the status of heartbeat packet , include:

ON: open

OFF: close

◆ Default is ON.

## 43. AT+HEARTDT

➤ Function: Query/Setting heartbeat package.

➤ Format:

◆ Query current Parameter:

```
AT+HEARTDT{CR} or AT+HEARTDT?{CR}
{CR}{LF}+HEARTDT:data{CR}{LF}{CR}{LF}
```

◆ Setting:

```
AT+HEARTDT=data{CR}
{CR}{LF}OK{CR}{LF}
```

➤ Parameter:

data: User-defined registry data, hexadecimal string Format, maximum length 160bytes,  $2 \leq 160$  even bytes, default to 7777772E7573722E636E.

For example such as: Parameter 7777772E7573722E636E, if represented by ASCII code, [www.usr.cn](http://www.usr.cn)

◆ Note:The maximum length of 160 bytes is the number of bytes after ASCII code is converted to a hexadecimal string.

◆ For example: AT+HEARTDT =7777772E7573722E636E

#### 44. AT+HEARTSND

- Function: Query/Setting the type of heartbeat's sending type.
- Format:
  - ◆ Query current Parameter:  
AT+HEARTSND{CR} or AT+HEARTSND?{CR}  
{CR}{LF}+HEARTSND:type{CR}{LF}{CR}{LF}
  - ◆ Setting:  
AT+HEARTSND=type{CR}  
{CR}{LF}OK{CR}{LF}
- Parameter:
  - ◆ type: sending type , include:  
COM: Send heartbeat package to serial port.  
NET: Send heartbeat packet to network side.
  - ◆ Default is NET.
  - ◆ For example: AT+HEARTSND =COM

#### 45. AT+HEARTTM

- Function: Query/Setting the interval time for heartbeat interval
  - Format:
    - ◆ Query current Parameter:  
AT+HEARTTM{CR} or AT+HEARTTM?{CR}  
{CR}{LF}+HEARTTM:time{CR}{LF}{CR}{LF}
    - ◆ Setting:  
AT+HEARTTM=time{CR}  
{CR}{LF}OK{CR}{LF}
  - Parameter:
    - ◆ time: interval time , It can setting the range about 1~6000s , default is 30s.
- For example: AT+HEARTTM=60

#### 46. AT+DSTNUM

- Function: Query/Setting the target cell phone number for short message transparent transmissions
- Format:
  - ◆ Query:  
AT+DSTNUM{CR} or AT+DSTNUM?{CR}  
{CR}{LF}+DSTNUM: number{CR}{LF}
  - ◆ Setting:  
AT+DSTNUM=number{CR}  
{CR}{LF}OK{CR}{LF}
- Parameter:
  - ◆ number: SMS target phone number, note add international number, the default number is 4000255652, up to

20 bytes.

- ◆ For example: AT+DSTNUM=8618888888888

#### 47. AT+SMSFLT

- Function: Query or Setting whether to enable non-target cellphone number filter
- Format:
  - ◆ Query:  
AT+SMSFLT{CR} or AT+SMSFLT?{CR}  
{CR}{LF}+SMSFLT: status{CR}{LF}
  - ◆ Setting:  
AT+SMSFLT=status{CR}  
{CR}{LF}OK{CR}{LF}
- Parameter:
  - ◆ Status:  
ON: enable  
OFF: forbid
  - ◆ Default mode: ON。
  - ◆ For example: AT+SMSFLT=ON

#### 48. AT+CISMSEND

- Function: Sending short message.
- Format:
  - ◆ Setting:  
AT+CISMSEND=number,data{CR}  
{CR}{LF}OK{CR}{LF}
- Parameter:
  - Number: The target cellphone number for short message need add international number. For example:8618888888888
  - ◆ data: Text messages can be sent up to 70 characters at a time。
  - ◆ For example: AT+CISMSEND=8618888888888,Hello!

## 4. Contact Us

Company: Jinan USR IOT Technology Limited

Address: Floor 11, Building 1, No. 1166 Xinluo Street, Gaoxin District, Jinan, Shandong, 250101, China

Web: [www.usriot.com](http://www.usriot.com)

Support: [h.usriot.com](mailto:h.usriot.com)

Email: [sales@usriot.com](mailto:sales@usriot.com)

Tel: 86-531-88826739

## 5. Disclaimer

This document provides the information of USR-DR504-E products, it hasn't been granted any intellectual property license by forbidding speak or other ways either explicitly or implicitly. Except the duty declared in sales terms and conditions, we don't take any other responsibilities. We don't warrant the products sales and use explicitly or implicitly, including particular purpose merchant ability and marketability, the tort liability of any other patent right, copyright, intellectual property right. We may modify specification and description at any time without prior notice.

## 6. Update History

2019-11-26 V1. 0. 1. Established.

2019-11-29 V1. 0. 1. Modifies Instruction