

USR-G785-E Software Manual

File Version: V1.0.3



Contents

USR-G785-E Software Manual.....	1
Features.....	4
1. Product Overview.....	5
1.1. Product Introduction.....	5
1.2. Module Default Parameters.....	5
2. Product Function.....	6
2.1. Work Mode.....	8
2.1.1. Net Transparent Transmission Mode.....	8
2.1.1.1. Mode Declaration.....	8
2.1.2. UDC Mode.....	10
2.1.2.1. Mode Description.....	10
2.2. Serial Port.....	12
2.2.1. Basic Parameters.....	12
2.2.2. Frame Forming Mechanism.....	13
2.2.2.1. Time Trigger.....	13
2.2.2.2. Length Trigger.....	13
2.2.3. RFC2217 Similar Function.....	14
2.3. Characteristic Function.....	15
2.3.1. Registration Package Function.....	15
2.3.2. Heartbeat Packet.....	17
2.3.3. USR-Cloud.....	18
2.3.4. Indicator Status.....	20
2.3.5. Firmware Upgrade.....	21
2.3.5.1. Upgrade by Serial Port.....	21
2.3.6. Restore to The Factory Settings.....	24
3. Parameter Setting.....	25
3.1. Setup by serial port.....	25
3.1.1. Setup Software.....	25
3.1.2. AT Commands Setting.....	25
3.1.3. Serial AT command.....	26
3.1.4. Network AT command.....	27
3.1.5. SMS AT Command.....	28
3.1.6. Command Format.....	29
3.1.6.1. Symbol.....	30
3.1.6.2. The Answer Format in Command.....	30
3.1.6.3. Special Symbols.....	30
3.1.7. AT Commands.....	31
3.1.7.1. AT.....	32
3.1.7.2. AT+H.....	33
3.1.7.3. AT+Z.....	33
3.1.7.4. AT+E.....	33
3.1.7.5. AT+WKMOD.....	33

3.1.7.6. AT+CMDPW.....	34
3.1.7.7. AT+STMSG.....	34
3.1.7.8. AT+NWINFO.....	34
3.1.7.9. AT+CSQ.....	35
3.1.7.10. AT+CIP.....	35
3.1.7.11. AT+RELD.....	35
3.1.7.12. AT+CLEAR.....	36
3.1.7.13. AT+CFGTF.....	36
3.1.7.14. AT+VER.....	36
3.1.7.15. AT+HDVER.....	36
3.1.7.16. AT+SN.....	36
3.1.7.17. AT+ICCID.....	37
3.1.7.18. AT+IMEI.....	37
3.1.7.19. AT+UART.....	37
3.1.7.20. AT+UARTFT.....	38
3.1.7.21. AT+UARTFL.....	38
3.1.7.22. AT+CMDPT.....	38
3.1.7.23. AT+RFCEN.....	39
3.1.7.24. AT+APN.....	39
3.1.7.25. AT+SOCKA.....	40
3.1.7.26. AT+SOCKB.....	40
3.1.7.27. AT+SOCKAEN.....	40
3.1.7.28. AT+SOCKBEN.....	41
3.1.7.29. AT+SOCKALK.....	41
3.1.7.30. AT+SOCKBLK.....	42
3.1.7.31. AT+RSTIM.....	42
3.1.7.32. AT+REGEN.....	42
3.1.7.33. AT+SOCKATO.....	43
3.1.7.34. AT+SOCKBTO.....	43
3.1.7.35. AT+SOCKRSTIM.....	43
3.1.7.36. AT+REGTP.....	44
3.1.7.37. AT+REGDT.....	44
3.1.7.38. AT+REGSND.....	45
3.1.7.39. AT+CLOUD.....	45
3.1.7.40. AT+UDCID.....	45
3.1.7.41. AT+HEARTEN.....	46
3.1.7.42. AT+HEARTDT.....	46
3.1.7.43. AT+HEARTSND.....	47
3.1.7.44. AT+HEARTTM.....	47
3.1.7.45. AT+CISMSSEND.....	47
9. Contact Us.....	48
10. Disclaimer.....	48
11. Update History.....	49

Features

- Supports TCP Client and UDP Client
- Supports register package and heartbeat package
- Setting parameters by SMS
- Supports transparent transmission mode and UDC mode
- Supports AT commands
- Supports RFC2217 similar function
- SMS AT command to send SMS in English
- Hardware watchdog to keep the connection stable
- Support remote management

1. Product Overview

1.1. Product Introduction

USR-G785-E is the M2M product launched in 2018. **European band** . It can realize two-way data transparent transmission from serial port to network by simple settings. It also supports custom register packages, heartbeat packages, two-way Socket connections.

1.2. Module Default Parameters

Table 1 default parameters

	Item	Index		
Wireless parameters	Wireless standard	TDD-LTE, FDD-LTE, WCDMA, GSM		
	Standard frequency range	TDD-LTE	B38/B40/B41	
		FDD-LTE	B1/B3/B5/B7/B8/B20	
		WCDMA	B1/B5/B8	
		GSM	B3/B8	
	Transmitting power	TDD-LTE	Class 3 (23dBm±2Db)	
		FDD-LTE	Class 3 (23dBm±2Db)	
		WCDMA	Class 3 (24dBm+1/-3Db)	
		GSM Band8	Class 4 (33dBm±2Db)	
		GSM Band3	Class 1 (30dBm±2Db)	
	Technical specifications	LTE	Maximum support for non-CA CAT 4 Supporting 1.4~20MHz RF bandwidth Downlink support for multi-user MIMO TDD: maximum up 35 Mbps, maximum down 130 Mbps FDD: Maximum upstream 50 Mbps, maximum downstream 150 Mbps	
		WCDMA	Supports 3GPP R8 dc-hspa + Supports 16-qam, 64_QAM and QPSK modulation 3GPP R6 CAT6 HSUPA: maximum uplink rate 5.76Mbps 3GPP R8 CAT24 dc-hspa + : the maximum downlink rate is 42Mbps	
		GSM	R99: CSD transmission rate: 9.6 KBPS,14.4 KBPS GPRS: supports GPRS multi-slot class 12(default 12) Coding formats: cs-1 / cs-1 / cs-3 and cs-4	

			Maximum 4 RX slots per frame EDGE: Support EDGE multi-slot class 12(default 12)
	Antenna options	SMA interface	
Hardware parameters	Data interface	RS232: 2400bps – 460800bps	
		RS485: 2400bps – 460800bps	
	Working voltage	DC 9V~36V	
	Working current	Average 60ma-86ma Max: 175Ma 12V	
	Working temperature	-40°C - 70°C	
	Storage temperature	-45°C - 90°C	
	Size	96.5×70×25mm	
Software parameters	Work mode	Transparent transmission mode, UDC mode.	
	Set command	AT+ command	
	Network protocol	TCP/UDP/DNS	
	Maximum TCP connection number	2	
	User configuration	Serial AT command , net AT command , message AT command	
	Customer application software	Support customized application software	
Software function	Domain name resolution DNS	Support	
	Simple transmission mode	Support TCP Client /UDP Client	
	Heartbeat	Support	
	RFC2217 similar	Support	
	Registration mechanism	package	Support custom /ICCID/IMEI register package

2. Product Function

This chapter introduces the functions of USR-G785-E. The following diagram is a block diagram of the function of the module. It can help you to have a general understanding of the product.

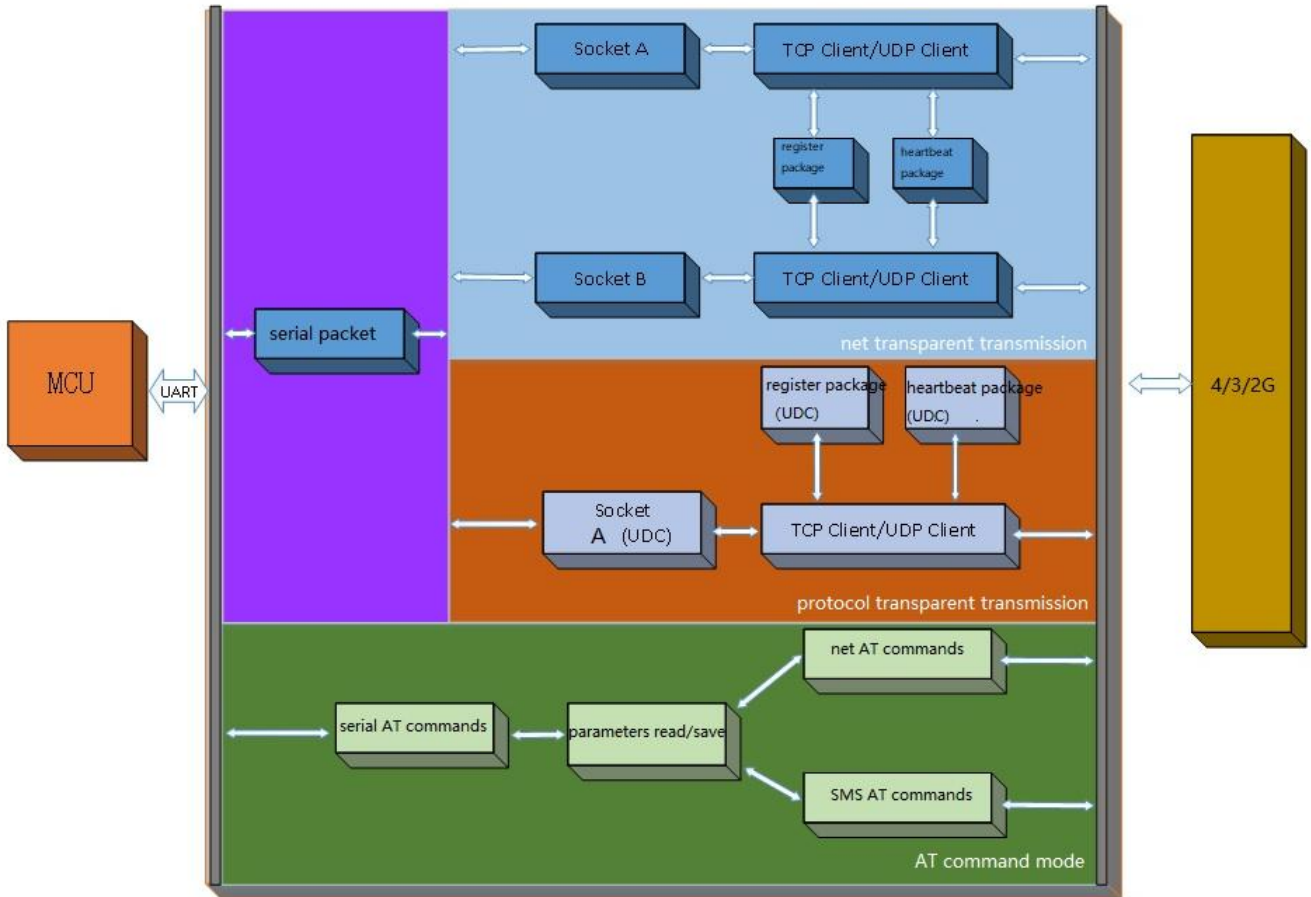


Figure 1 product function

2.1. Work Mode

2.1.1. Net Transparent Transmission Mode

2.1.1.1. Mode Declaration

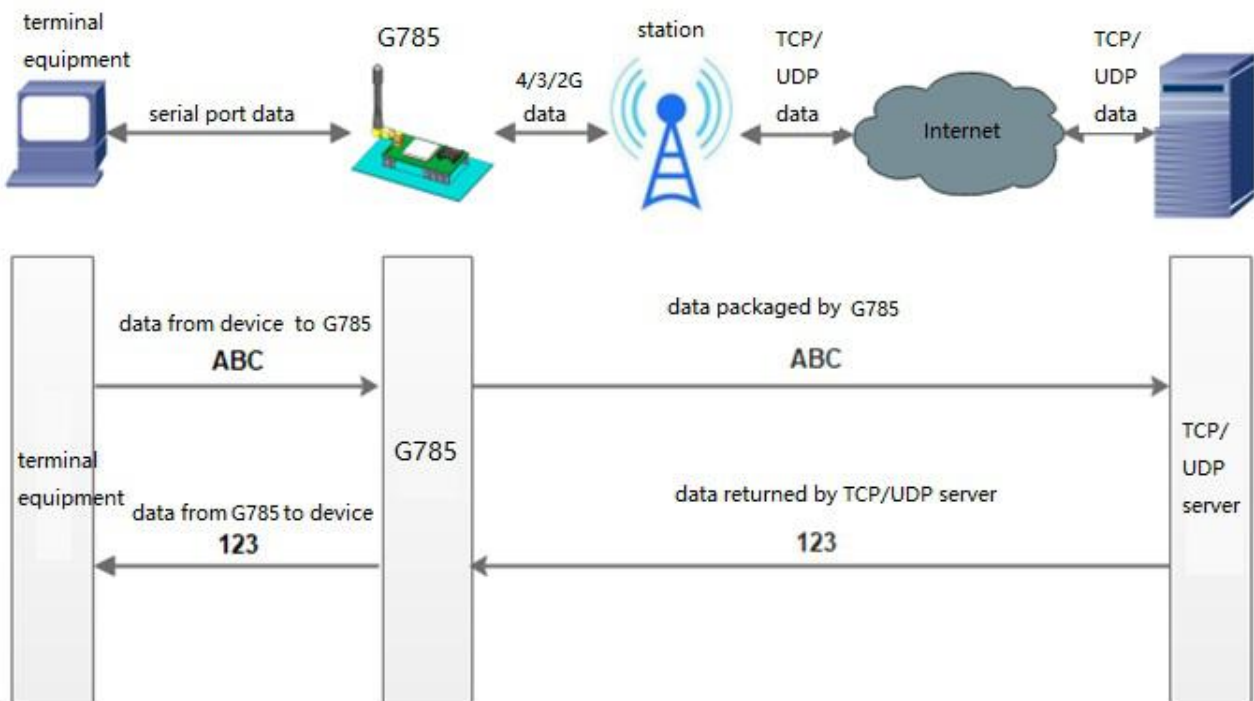


Figure 2 net transparent transmission mode

In this mode, the serial port device can send data to the specified server on the network through this module. The module can also accept data from the server and forward the information to the serial port device.

Users do not need to pay attention to the data conversion process between serial port data and network packets, only through simple parameter settings, data transparent communication between serial port devices and network servers can be achieved.

This module supports two Socket connections, Socket A and Socket B, which are independent of each other. Socket A supports TCP Client and UDP Client. Socket B support TCP Client and UDP Client.

Set G785 work at TCP Client by AT commands:

1. Setup work mode:
AT+WKMOD=NET
2. Enable socket A:
AT+SOCKAEN=ON
3. Setup remote IP and port:
AT+SOCKA=TCPC,test.usr.cn,2317

4. Reboot

AT+Z

Set G785 work at TCP Server by AT commands:

5. Setup work mode:

AT+WKMOD=NET

6. Enable socket A:

AT+SOCKAEN=ON

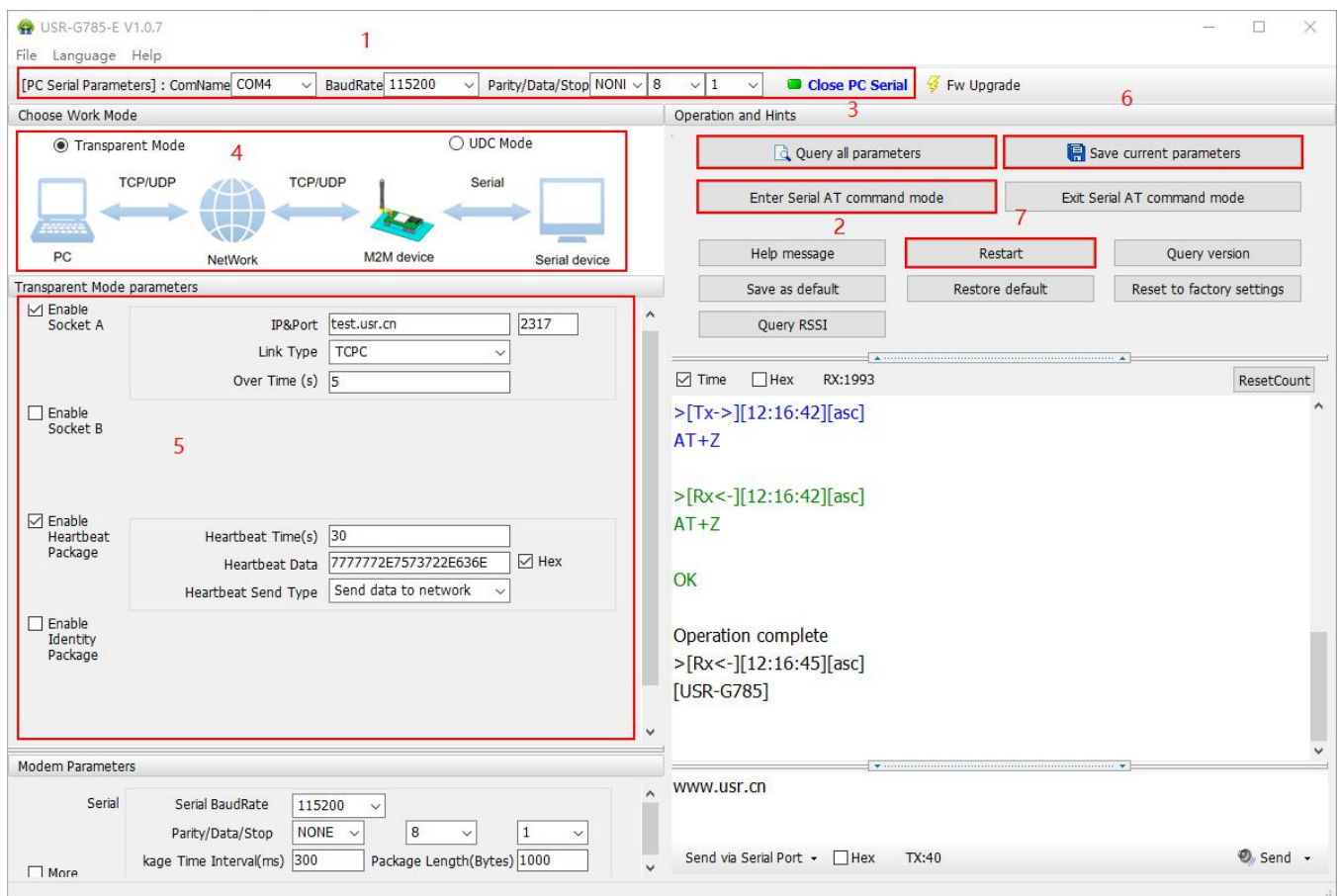
7. Setup remote port,(the IP is meaningless in this mode):

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

8. Reboot

AT+Z

Setting up software schematic diagram:


Figure 3 setting up software schematic diagram

Step 1. Open Serial Port

Step 2. Enter configuration state, Enter serial AT command mode

Step 3. Query all parameters - to get the parameters of the current device

Step 4. Choose work mode - transparent mode

Step 5. Configure the parameters of devices, such as socket A, socket B etc

Step 6. Save current parameters

Step 7. Restart device

2.1.2. UDC Mode

2.1.2.1. Mode Description

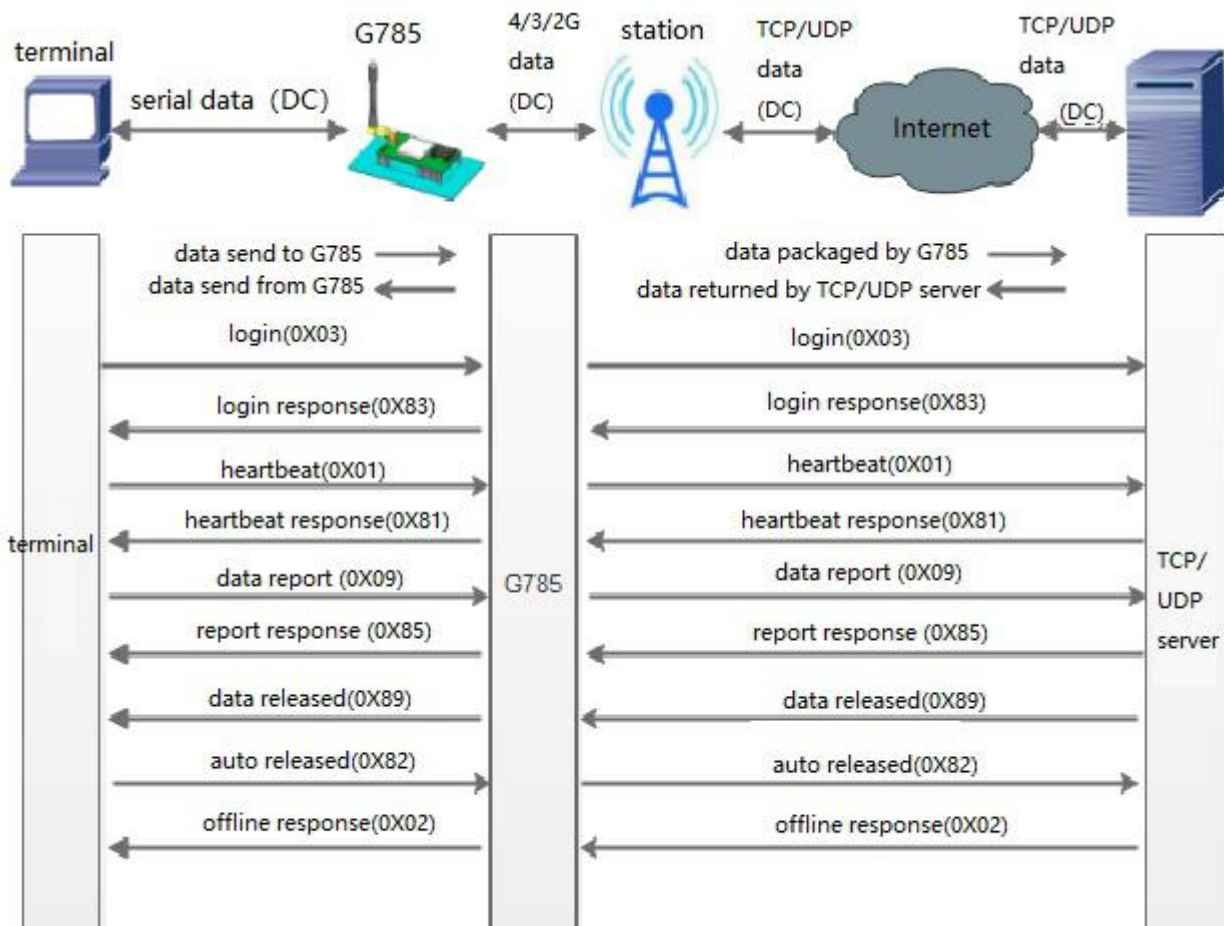


Figure4 UDC mode

In this mode, the user's terminal device can send the request data to the specified HTTP server through this module, then the module receives the data from the HTTP server, parses the data and sends the results to the serial port device. Users do not need to pay attention to the data conversion process between serial port data and network packets, only through simple parameter settings, can realize the serial port device to HTTP server data request.

The difference between protocol transparent transmission and net transparent transmission:

1. Protocol transparent transmission only need setup work mode,server address,port,TCP/UDP and device ID based on request;
2. The server-side is simple;



3. Can setup device by this server.



Note: more information about development:

Set G785 work at UDC by AT commands:

1. Setup work mode:
AT+WKMOD=UDC
2. Enable socket A:
AT+SOCKAEN=ON
3. Setup remote IP and port:
AT+SOCKA=TCPC,test.usr.cn,2317
4. Setup the ID:12345678901, max 11 bit:
AT+UDCID=12345678901
5. Reboot
AT+Z

Setting up software schematic diagram:

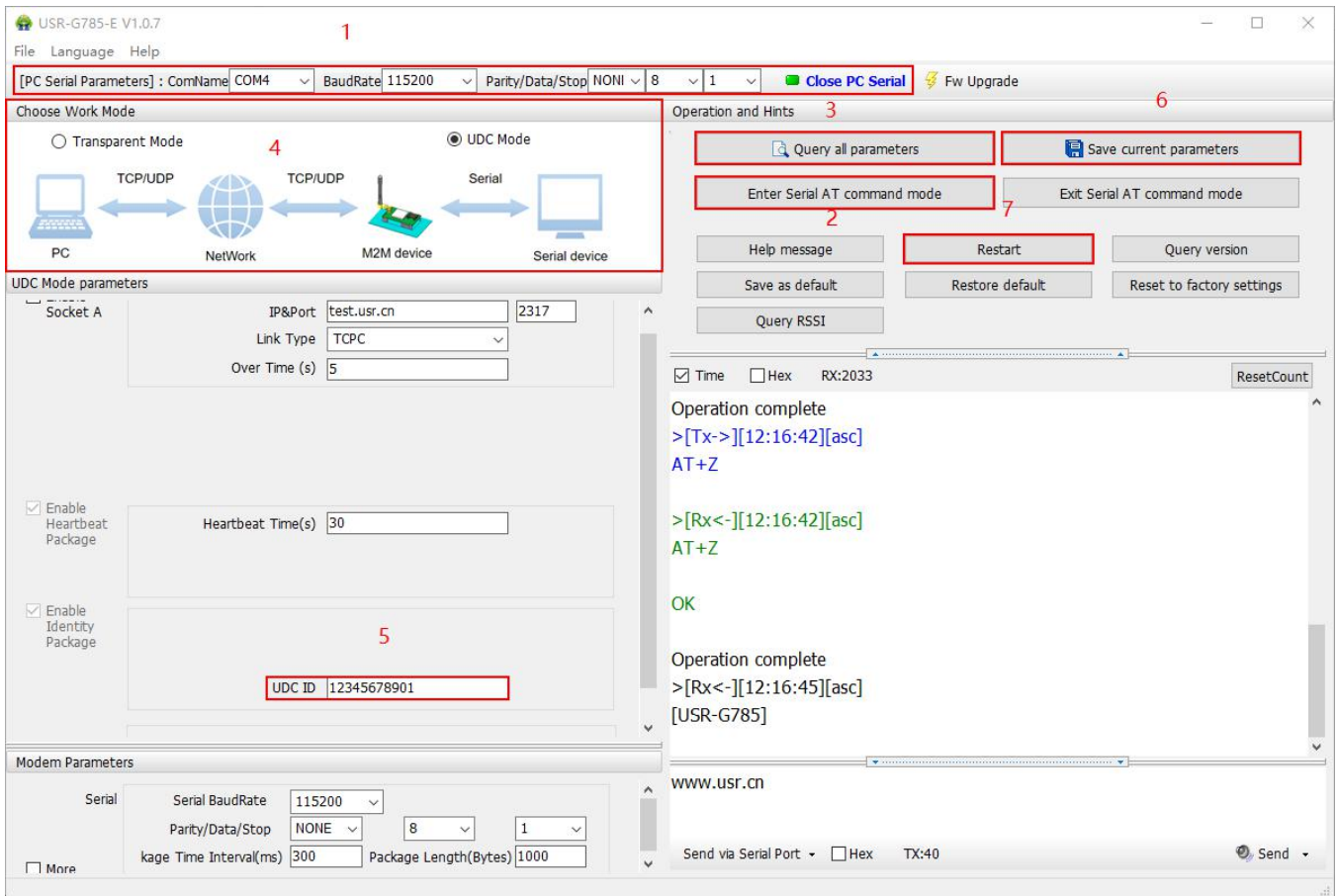


Figure5 UDC mode

Note: only socket A support UDC

- Step 1. Open serial port
- Step 2. Enter serial AT command mode - to enter configuration
- Step 3. Work mode to select UDC
- Step 4. UDC mode parameters
 - Enable Socket A 'ON'
 - Link type of Socket A: TCPC
 - IP & Port: Configure the IP address and port of server
- Step 5: UDC ID: User can customize ID
- Step 6: Save current parameters
- Step 7: Restart device, configuration takes effect

2.2. Serial Port

2.2.1. Basic Parameters

Table 2 serial port basic parameters

Item	Parameter
Baud rate	2400,4800,9600,19200,38400,57600,115200,230600,460800

Data bit	8
Stop bit	1,2
Check bit	NONE
	EVEN ODD
Flow control	None

2.2.2. Frame Forming Mechanism

2.2.2.1. Time Trigger

The packing time can be set from 300ms~60000ms. Default is 300ms. Users can send AT+UARTFT=<time> to set. The schematic diagram is as follows:

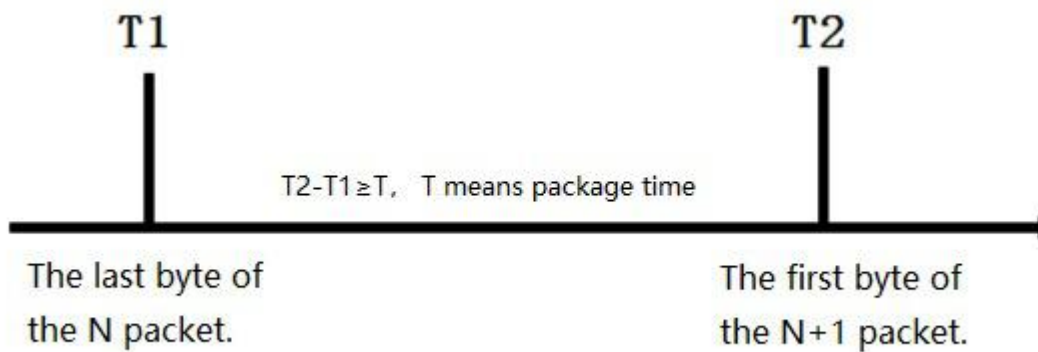


Figure6 frame forming mechanism

2.2.2.2. Length Trigger

The packing length can be set from 1~1000, default is 1000.

Users can send AT+UARTFL=<length>.

The schematic diagram is as follows:

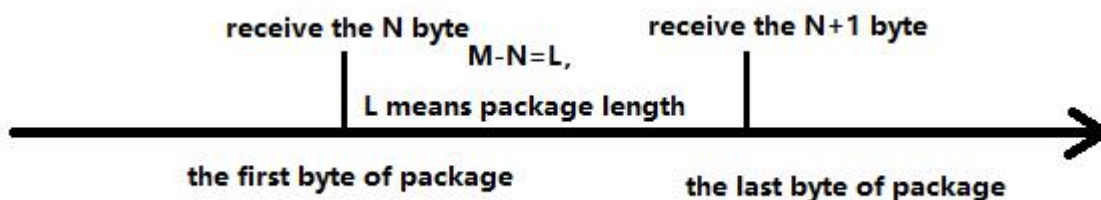


Figure7 frame forming mechanism

Note: The serial port receives 1000 bytes of cache, and the packet will be lost if the single packet exceeds 1000 bytes.

2.2.3. RFC2217 Similar Function

This function is similar to RFC2217 function, dynamically modifying serial port parameters from the network side. Sending data conforming to a specific protocol from the network side can modify the parameters of the serial port in real time. This modification is only temporary. After the module restarts, the original parameters can be restored.

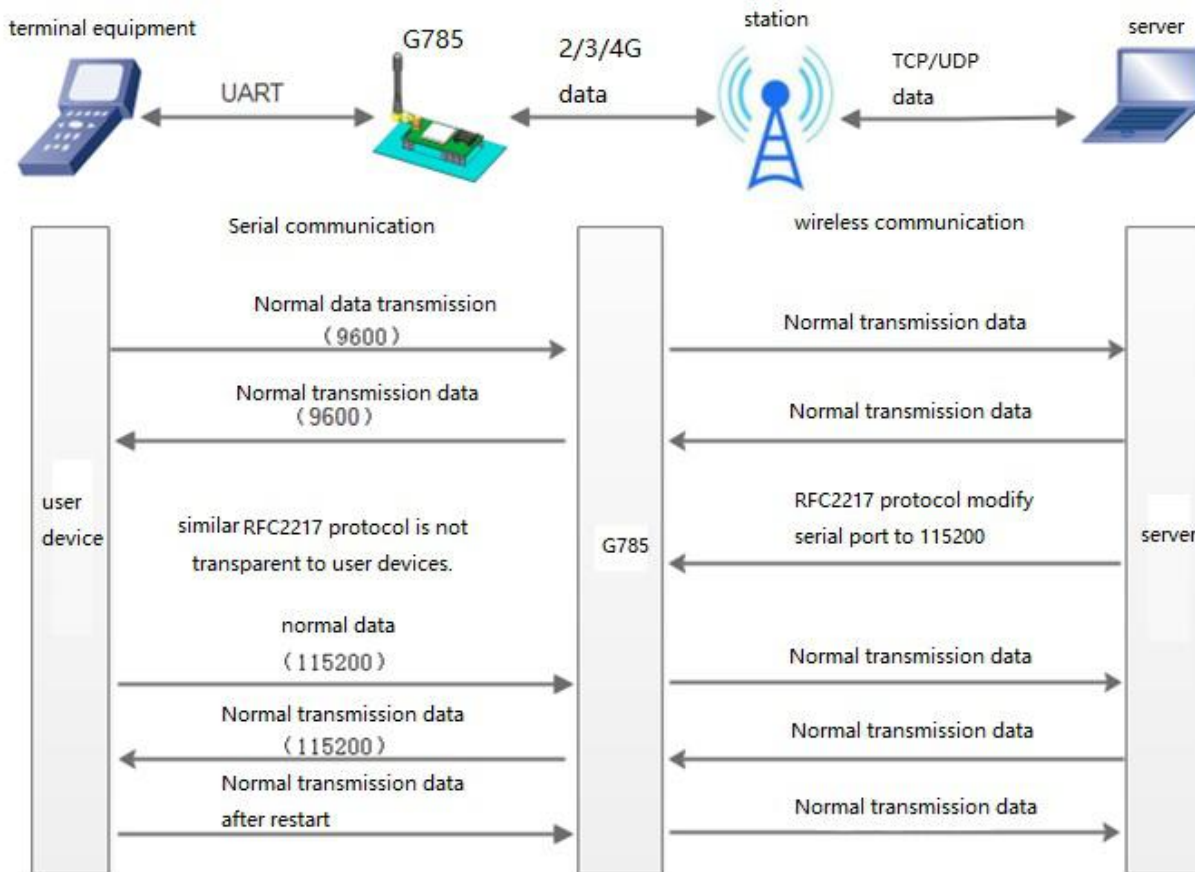


Figure 8 schematic diagram of RFC2217 similar function logic

Table 3 RFC2217 similar

Name	Head	Baudrate	Bit parameter	Sum check
Bytes	3	3	1	1
Intro		MSB first		Ignore carry
Example (115200,N,8,1)	55 AA 55	01 C2 00	83	46
Example (9600,N,8,1)	55 AA 55	00 25 80	83	28

Table 4 bit parameters introduce

Bit	Intro	Number	Describe
1 0	Data bits	00	5 bit data bit
		01	6 bit data bit
		10	7 bit data bit

		11	8 bit data bit
2	Stop bits	0	1 bit stop bit
		1	2 bit stop bit
3	Check bit enable/disable	0	disable
		1	enable
5 4	Check bit type	00	ODD
		01	EVEN
		10	Mark to 1
7 6	None	00	00

2.3. Characteristic Function

2.3.1. Registration Package Function

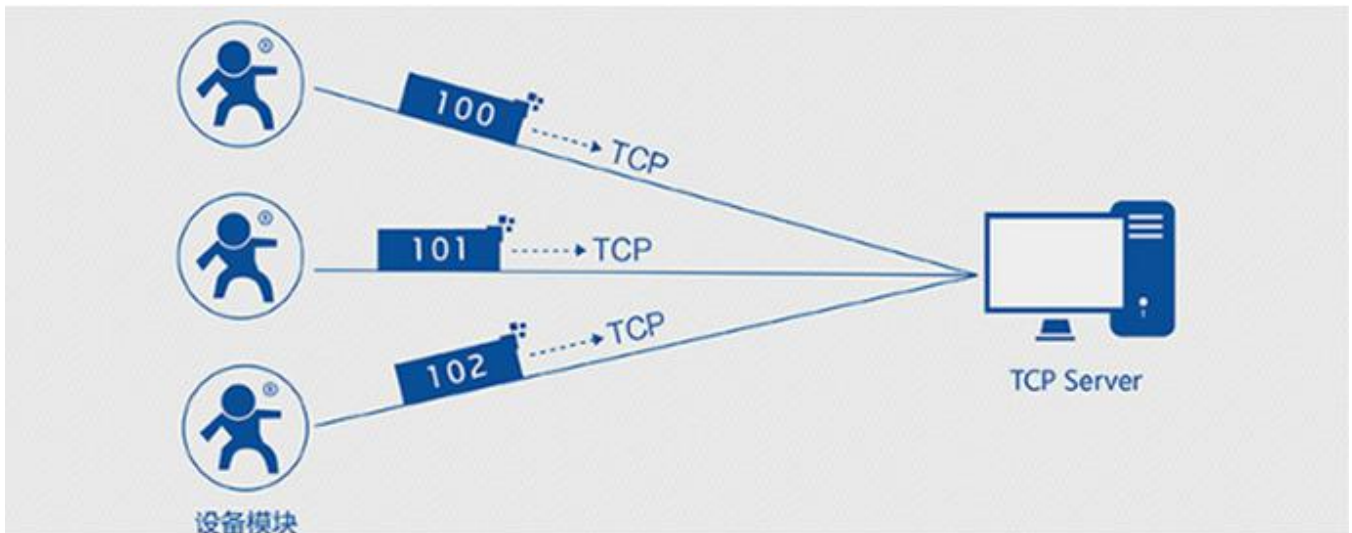


Figure9 schematic diagram of registration function

Under the network pass through mode, users can send register packets from modules to the server. Registered packages are designed to enable the server to identify the data source device, or as a password to obtain authorization for server functionality. Registered packets can be sent when the module establishes a connection with the server, and can also be spliced into the registration package data at the front end of each packet as a packet. The data of the registration package can be ICCID code, IMEI code, or custom registration data.

Table5 AT commands

Command name	Command function	Default parameter
AT+ REGEN	Query / settings enable registration package	“off”
AT+ REGTP	Query / settings register package content type	“USER”
AT+ REGDT	Query / settings custom registration information	“7777772E7573722E636E”
AT+ REGSND	Query / settings register packet sending mode	“DATA”

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 up software schematic diagram:

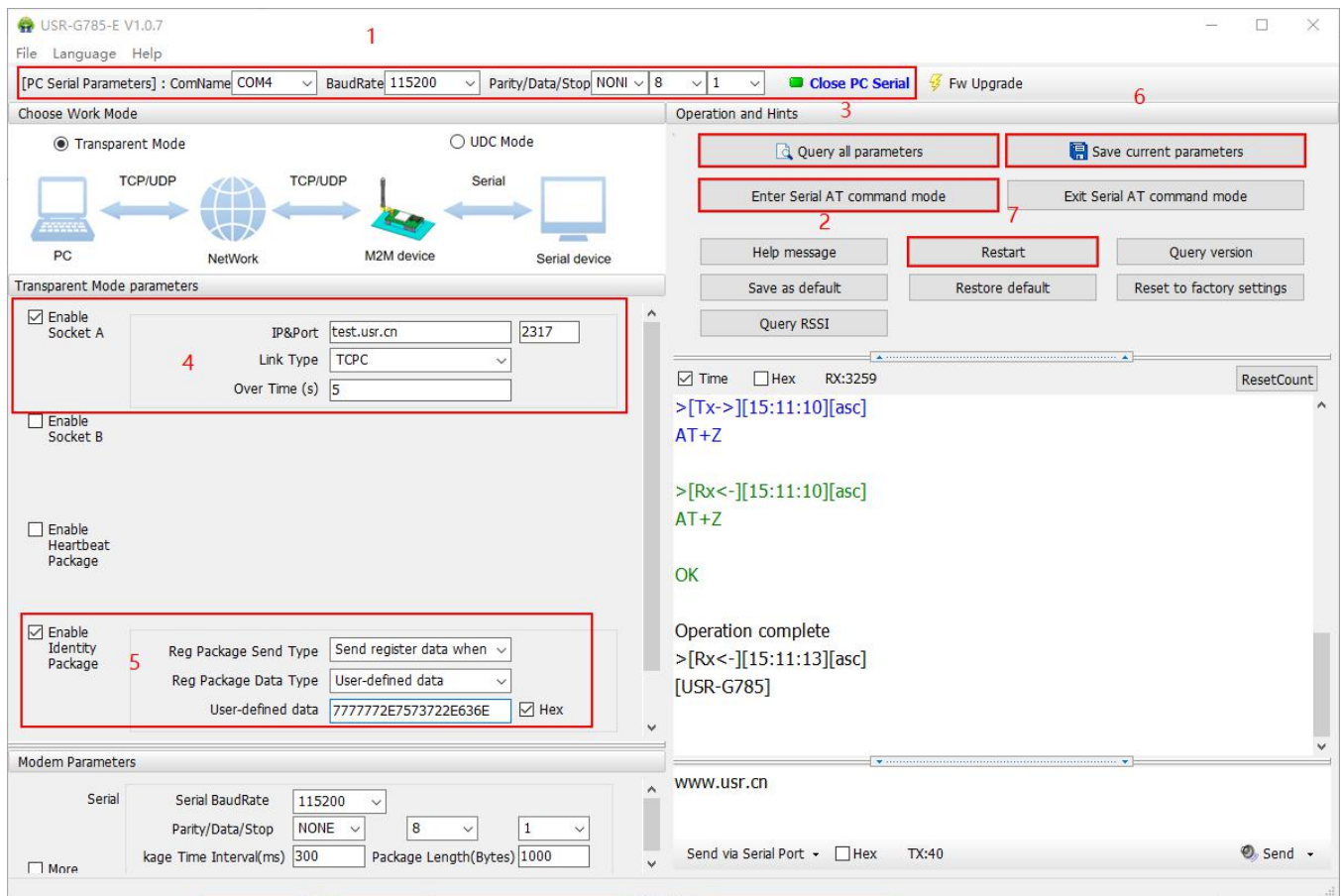


Figure10 setting up software schematic diagram

- Step 1. Open Serial Port
- Step 2. Enter configuration state, Enter serial AT command mode
- Step 3. Query all parameters - to get the parameters of the current device
- Step 4. Choose work mode - transparent mode
- Step 5. Enable Identity package
- Step 6. Save current parameters
- Step 7. Restart device

Notes: Identity package takes effect under transparent mode

2.3.2. Heartbeat Packet



Figure11 heartbeat packet

In the network transmission mode, user can send the heartbeat package from the module. Heartbeat packets can be sent to the server side of the network, or to the device port of the serial port.

Because KEEP-ALIVE function is only used to keep online, but it can't detect machine power outages, network wire pull-out, firewalls, or other disconnection, and the logic layer processing disconnection will be very complex. So we choose the mechanism of sending heartbeat to the network to detect whether the connection between the module and the server is normal.

In applications where the server sends fixed query instructions to the device, in order to reduce traffic, users can choose to send heartbeat packets (query instructions) to the serial port device instead of sending query instructions from the server.

Table 6 AT commands

Command name	Command function	Default parameter
AT+ HEARTEN	Query / settings enable heartbeat package	"on"
AT+ HEARTDT	Query / settings heartbeat data	"7777772E7573722E636E"
AT+ HEARSND	Query / settings heartbeat packet send type	"NET"
AT+ HEARTTM	Query / settings heartbeat packet interval	30

1. Enable heartbeat package function:

AT+HEARTEN=ON

2. Setup the contents of heartbeat package:

AT+HEARTDT=7777772E7573722E636E

3. Setup the type of heartbeat package:

AT+HEARTTP=NET

4. Setup the sending time

AT+HEARTTM=30

5. Reboot

AT+Z

Setting up software schematic diagram:

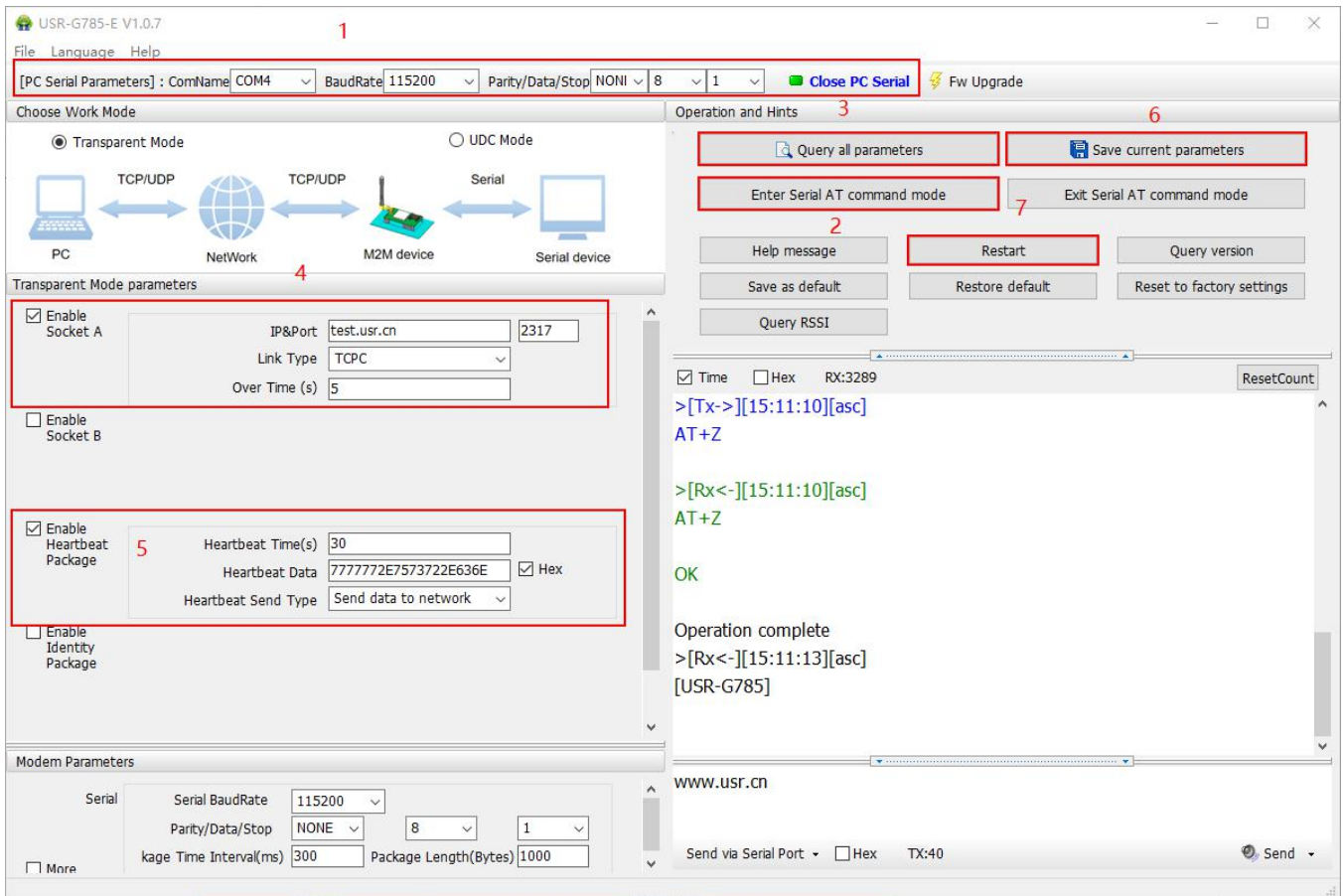


Figure12 setting up software schematic diagram

- Step 1. Open Serial Port
- Step 2. Enter configuration state, Enter serial AT command mode
- Step 3. Query all parameters - to get the parameters of the current device
- Step 4. Choose work mode - transparent mode
- Step 5. Enable Heartbeat package
- Step 6. Save current parameters
- Step 7. Restart device

2.3.3. USR-Cloud



USR-Cloud software is a platform for communication between devices and PC software. The cloud software is mainly used for data transmission or monitoring remotely. This function only works in TCP client mode.

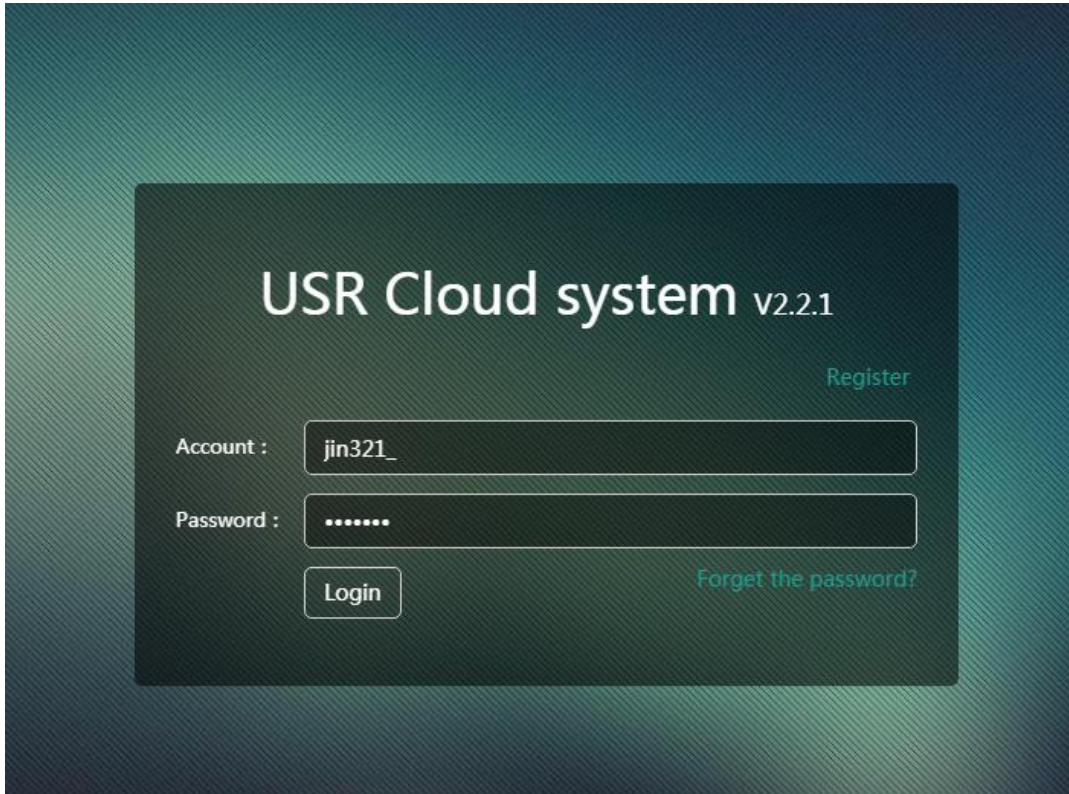
- ✓ Login link of USRIOT Cloud: <http://console.usriot.com>
- ✓ Remote server address: console.usriot.com
- ✓ Local port: The port of device, Remote port: Cloud software's port

- ✓ Device ID: It is assigned to device by cloud software
- ✓ Communications Code: Pass word generated after adding the device to cloud software

The following is test account of USR-Cloud:

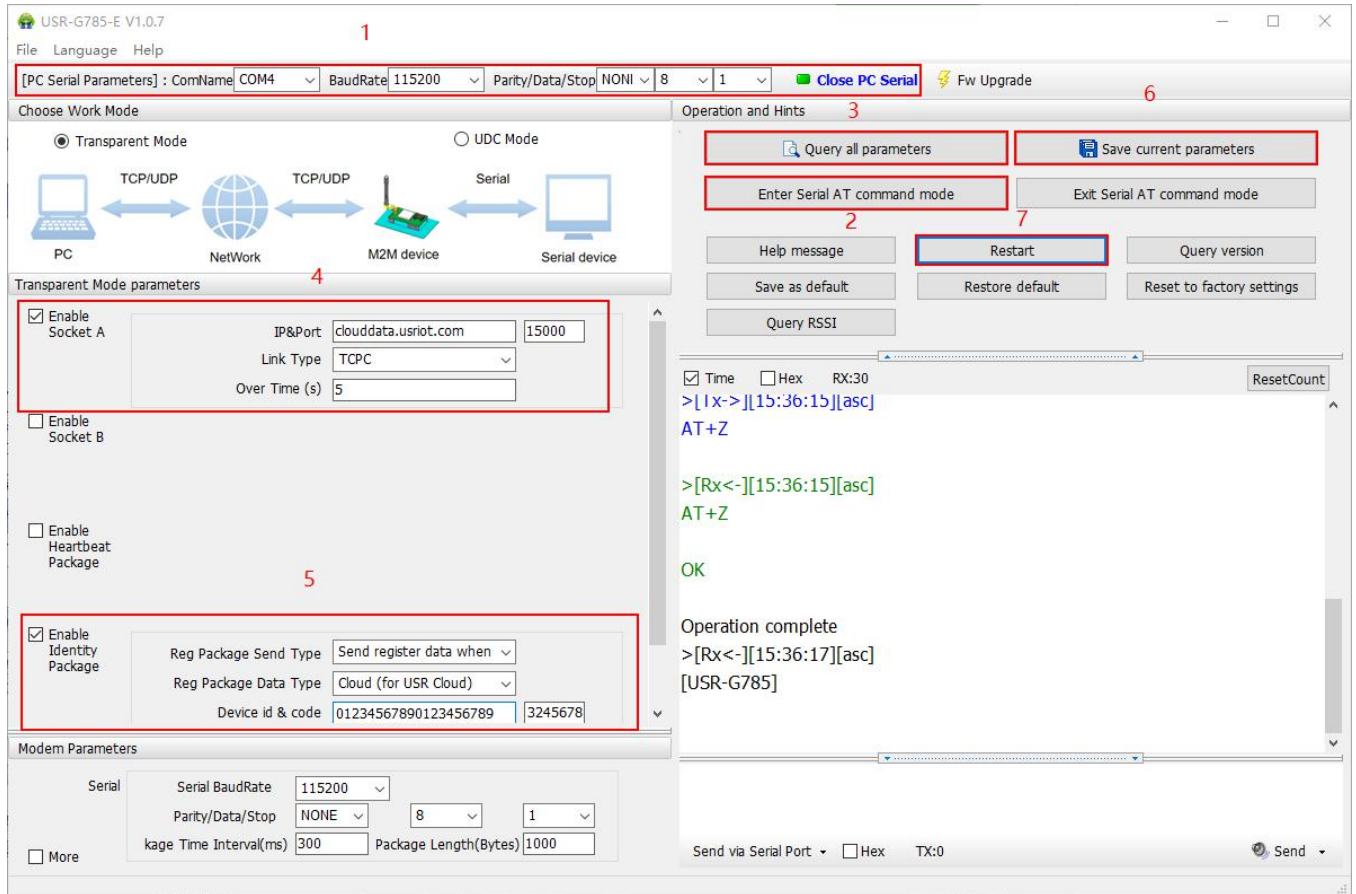
Account: jin321_

Password: 1987322



AT Command	Function	Default parameters
AT+CLOUD	To configure device ID (20 bytes), password (8 bytes)	"" , ""

1. Configure device ID and password
AT+CLOUD=01234567890123456789,13245678
2. Set the type of Identity package as Cloud
AT+REGTP=CLOUD
3. Enable the function of Identity package
AT+REGEN=ON
4. Restart device
AT+Z



- Step 1. Open Serial Port
- Step 2. Enter serial AT command mode
- Step 3. Query all parameters - to get the parameters of the current device
- Step 4. Choose work mode - transparent mode
- Step 5. Enable Identity package, select data type as Cloud. (code means password)
- Step 6. Save current parameters
- Step 7. Restart device

2.3.4. Indicator Status

There are four indicator lights on the G785, namely POWER, WORK, NET and LINKA. The status of the indicator is as follows:

Table 7 indicator status

Indicator name	Function	Status
POWER	Power on or not	on
WORK	Work normal or not	flicker
NET	Net status indicator	on
LINKA	Socket A connection instruction	on

2.3.5. Firmware Upgrade

USR-G785-E supports upgrading through serial ports.

2.3.5.1. Upgrade by Serial Port

- ◆ Open serial port, click upgrade, and choose the file;

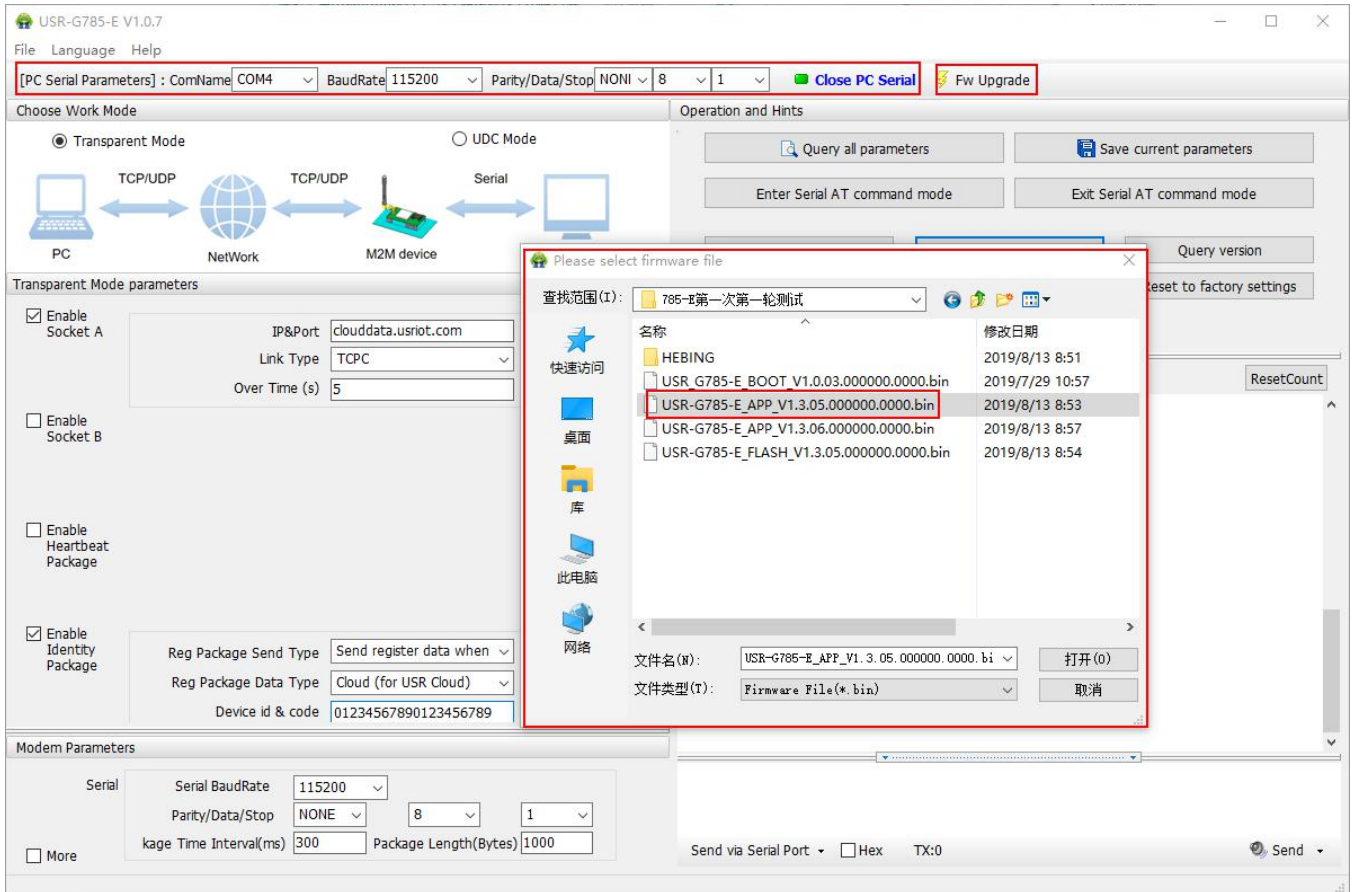


Figure13 upgrade1

- ◆ Hold down the reload button of USR-G785-E and then power on the 785-E device

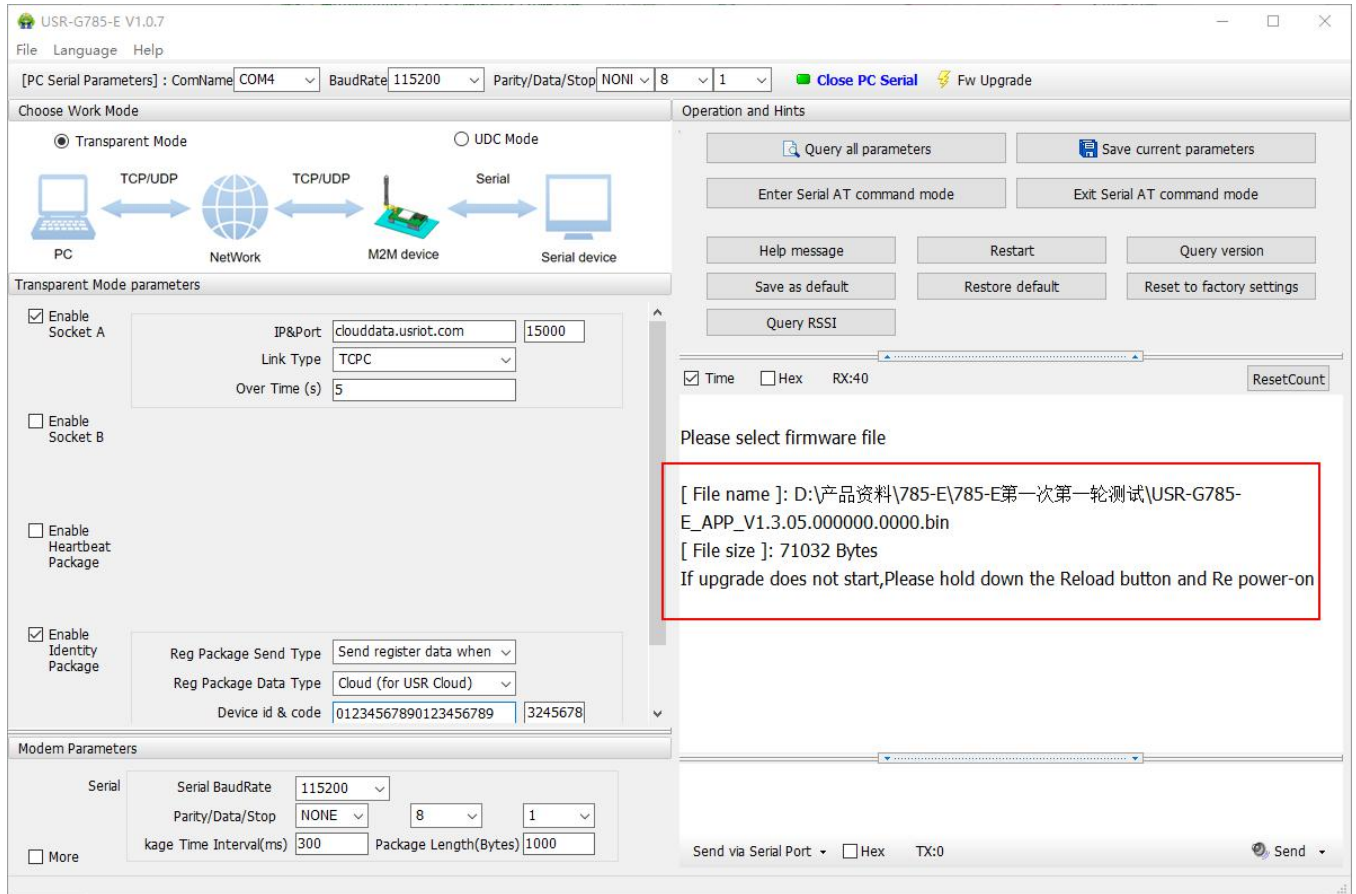


Figure14 upgrade2

- ◆ Wait for upgrade

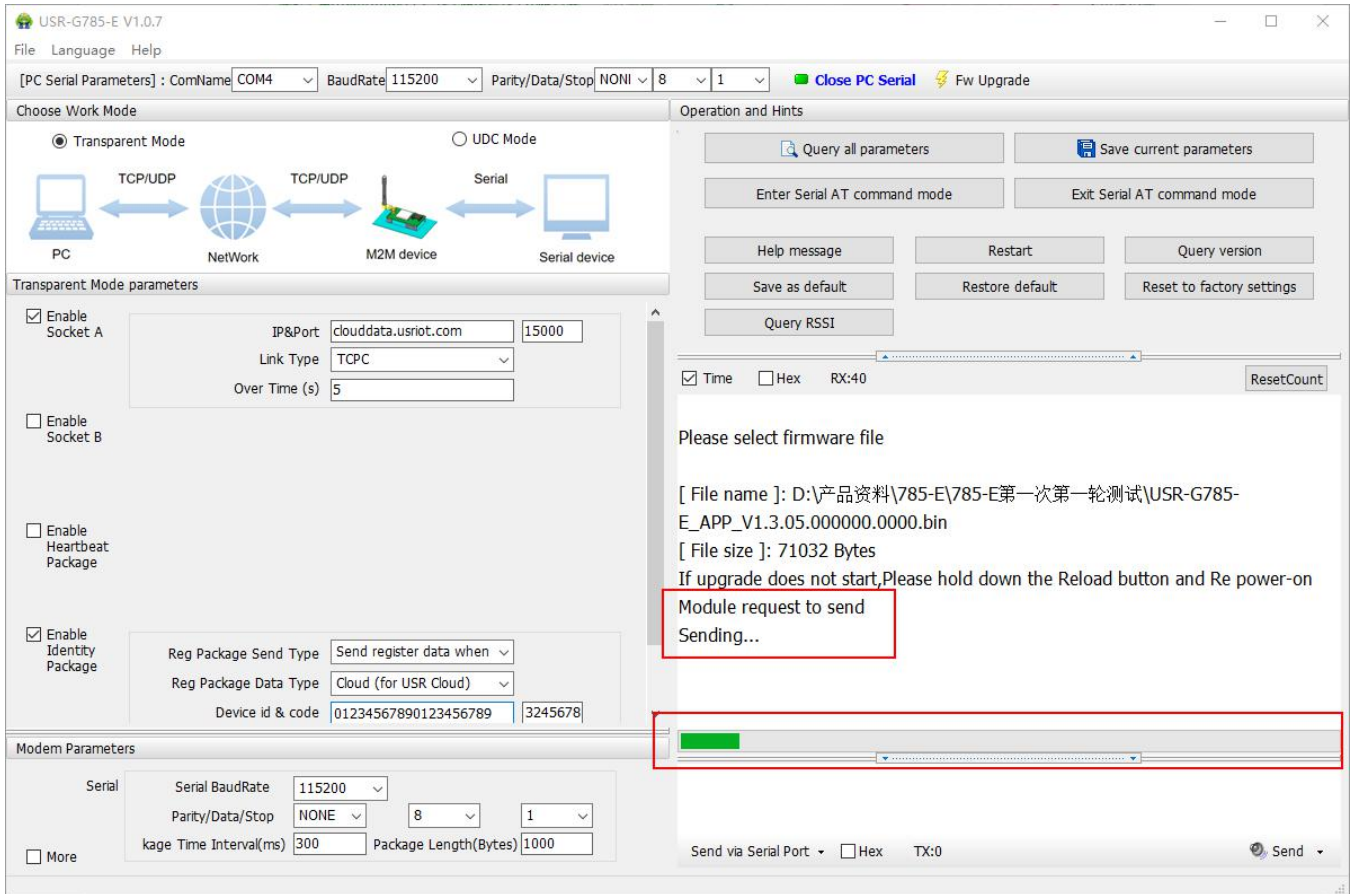


Figure15 upgrade3

◆ Finish upgrade

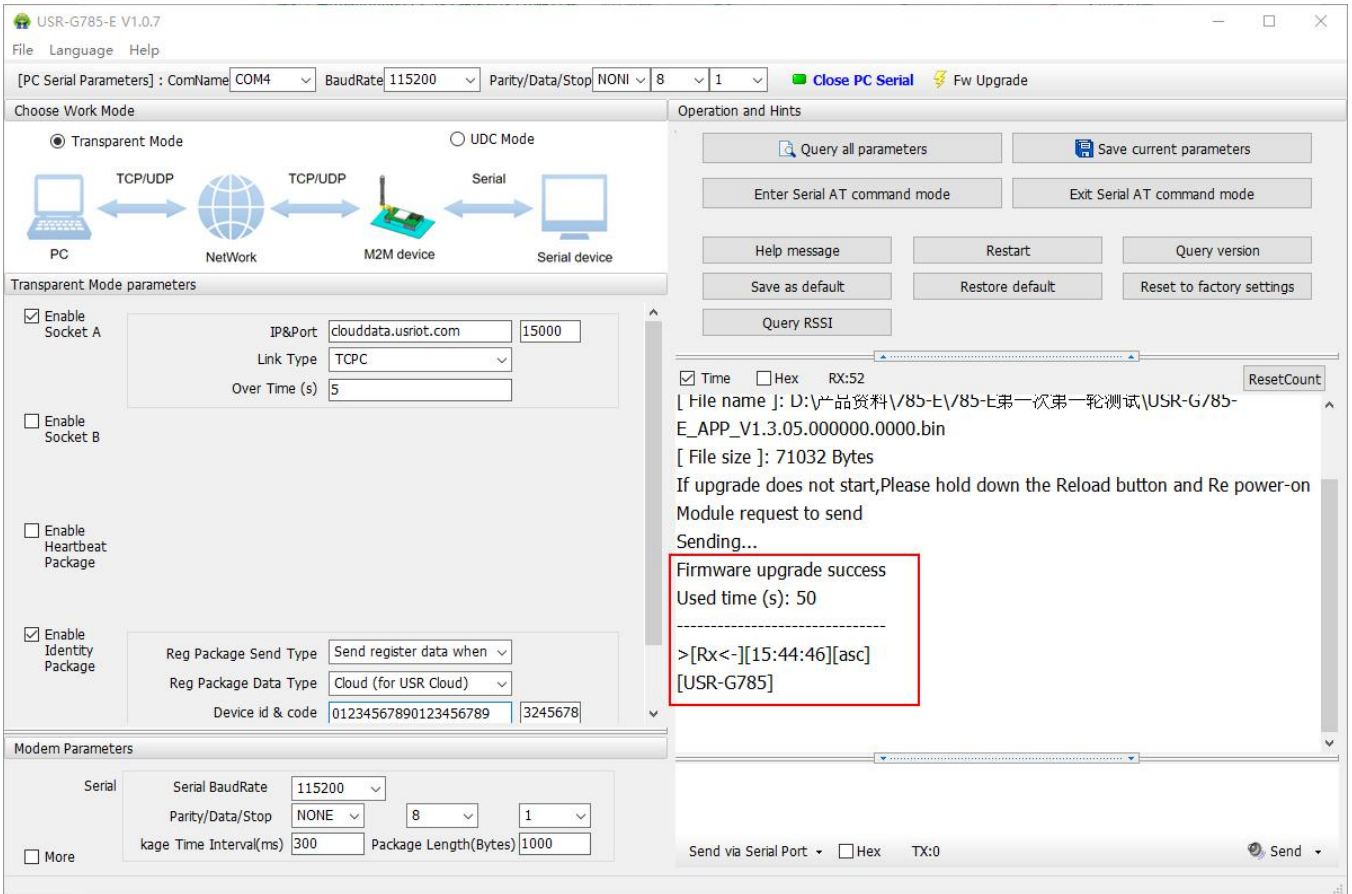


Figure16 upgrade4

2.3.6. Restore to The Factory Settings

Restore the factory default parameters. After power on, press the Reload key for 3~15S, and then release, the device parameters can be restored to the factory default parameters.

3. Parameter Setting

3.1. Setup by serial port

3.1.1. Setup Software

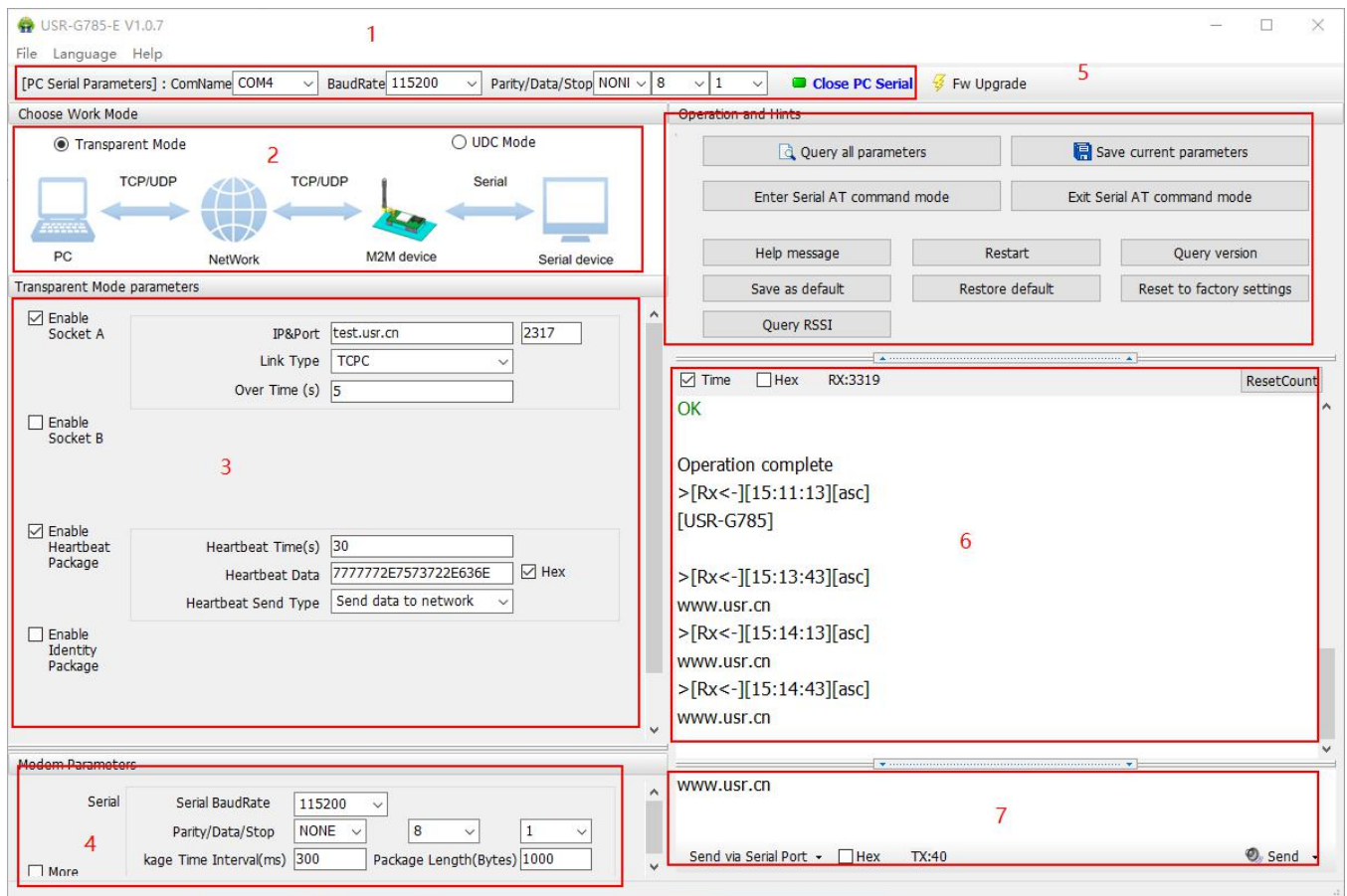


Figure17 setting up software schematic diagram

Explain:

1. Software serial port parameter setting area.
2. Work mode selection area, select module work and which mode.
3. Special feature parameter setting area, set up the special function related parameters of the module.
4. Set the basic global parameters of the module.
5. The command sending button can be sent from the input instruction.
6. Input box, from the input instruction text box.
7. The receiving box receives the return information from the module.
8. Commonly used instruction buttons, click to enter the commonly used AT commands.

3.1.2. AT Commands Setting

Note: Enter End Character after command

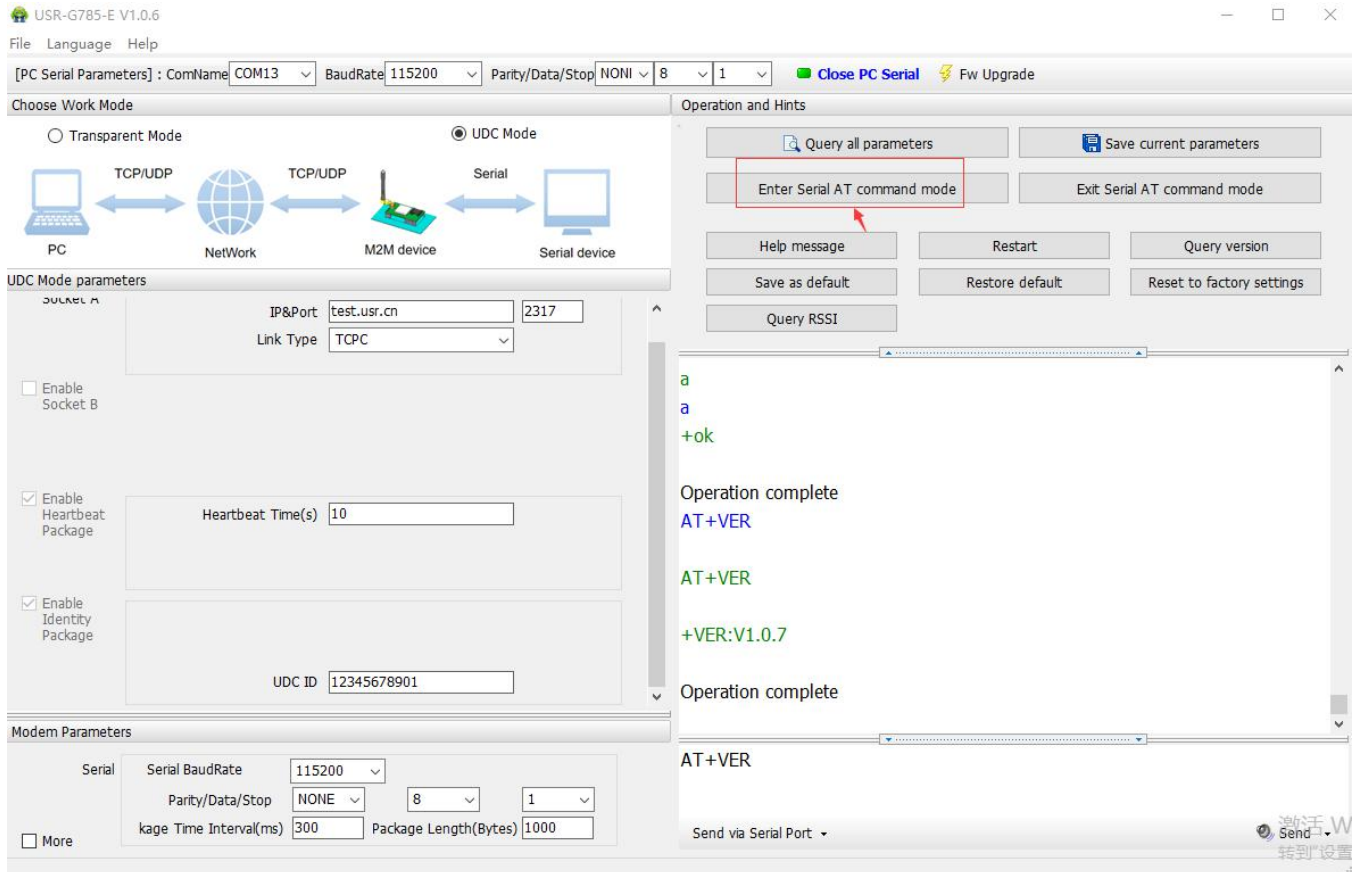


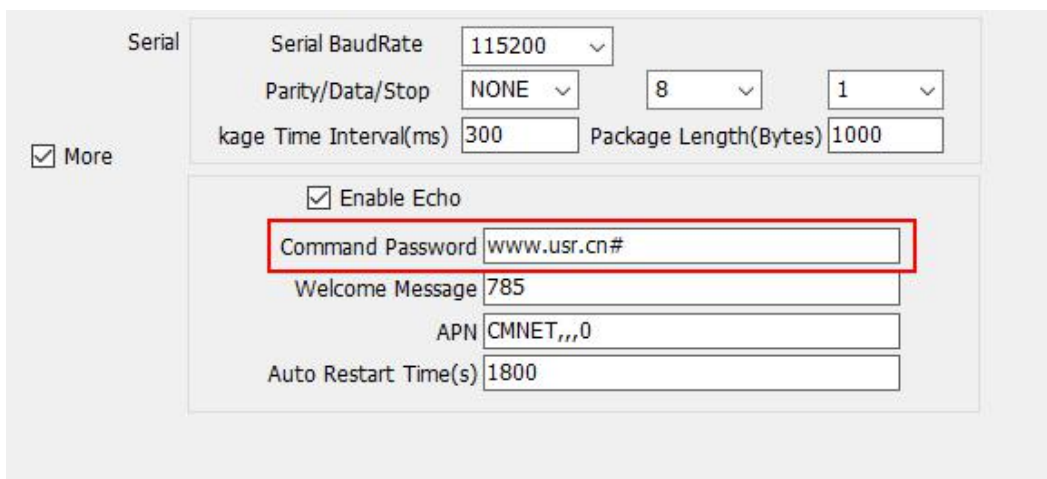
Figure18 send AT command

3.1.3. Serial AT command

Serial AT command refers to the devices work in transparent mode. User can use password and AT command to query and set parameters, do not need to switch to command mode. Generally, it is applied to query or modify parameters when the device is working. It can quickly query or set parameters without complex step such as ++ sequence entering the command.

For example, query the version by serial AT command

Step 1. Check or configure the password by setup software, likes:

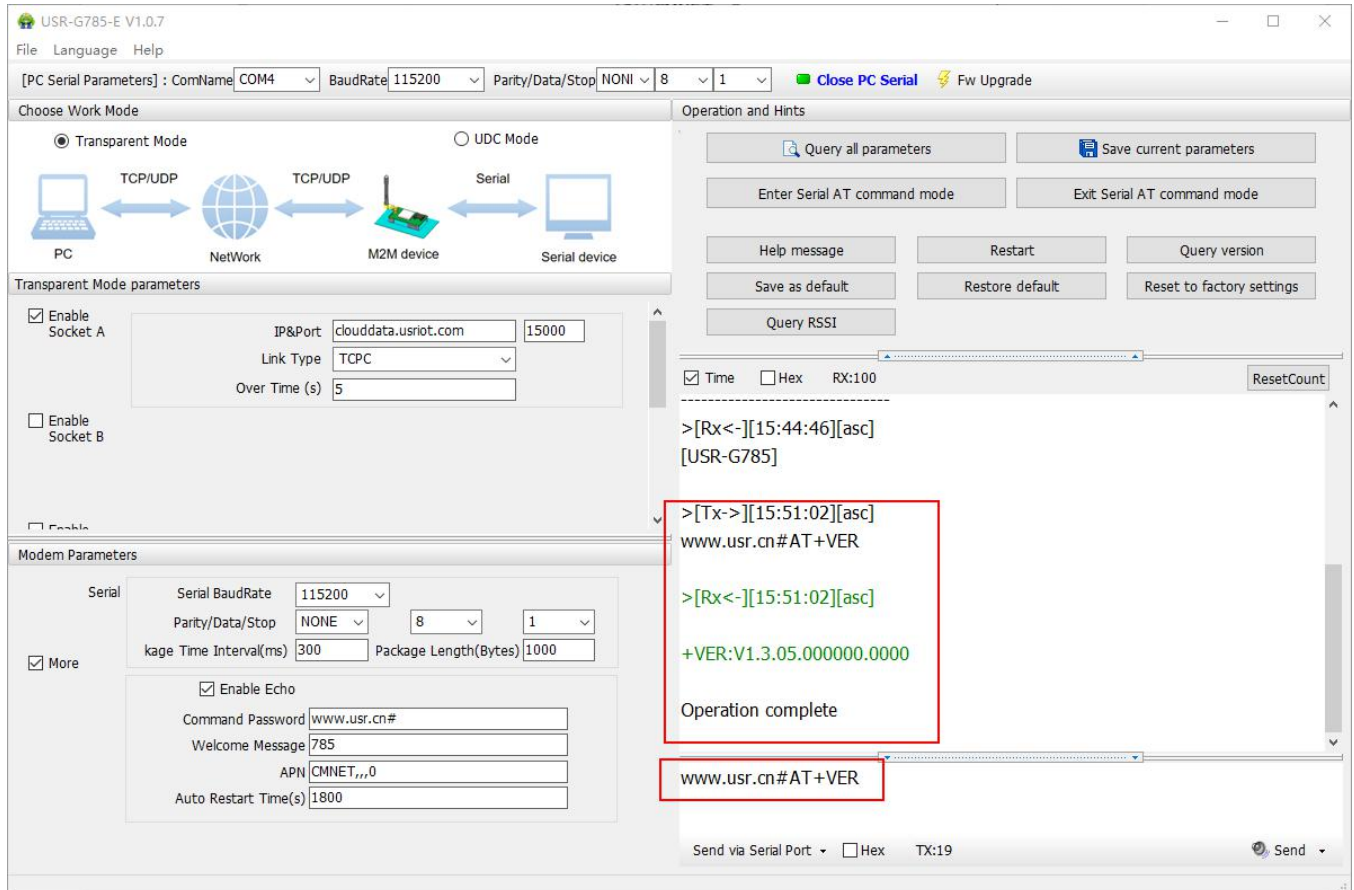


Restart device once the parameters are configured.

Send **www.usr.cn#AT+VER** from serial port via setup software. When device got this command it will return the correct information.

Notes: Need to add a carriage return after the AT command.

Command format: PasswordAT+command[carriage return]



3.1.4. Network AT command

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

For example, send **www.usr.cn#AT+VER**(**Note:** Enter carriage return after command)

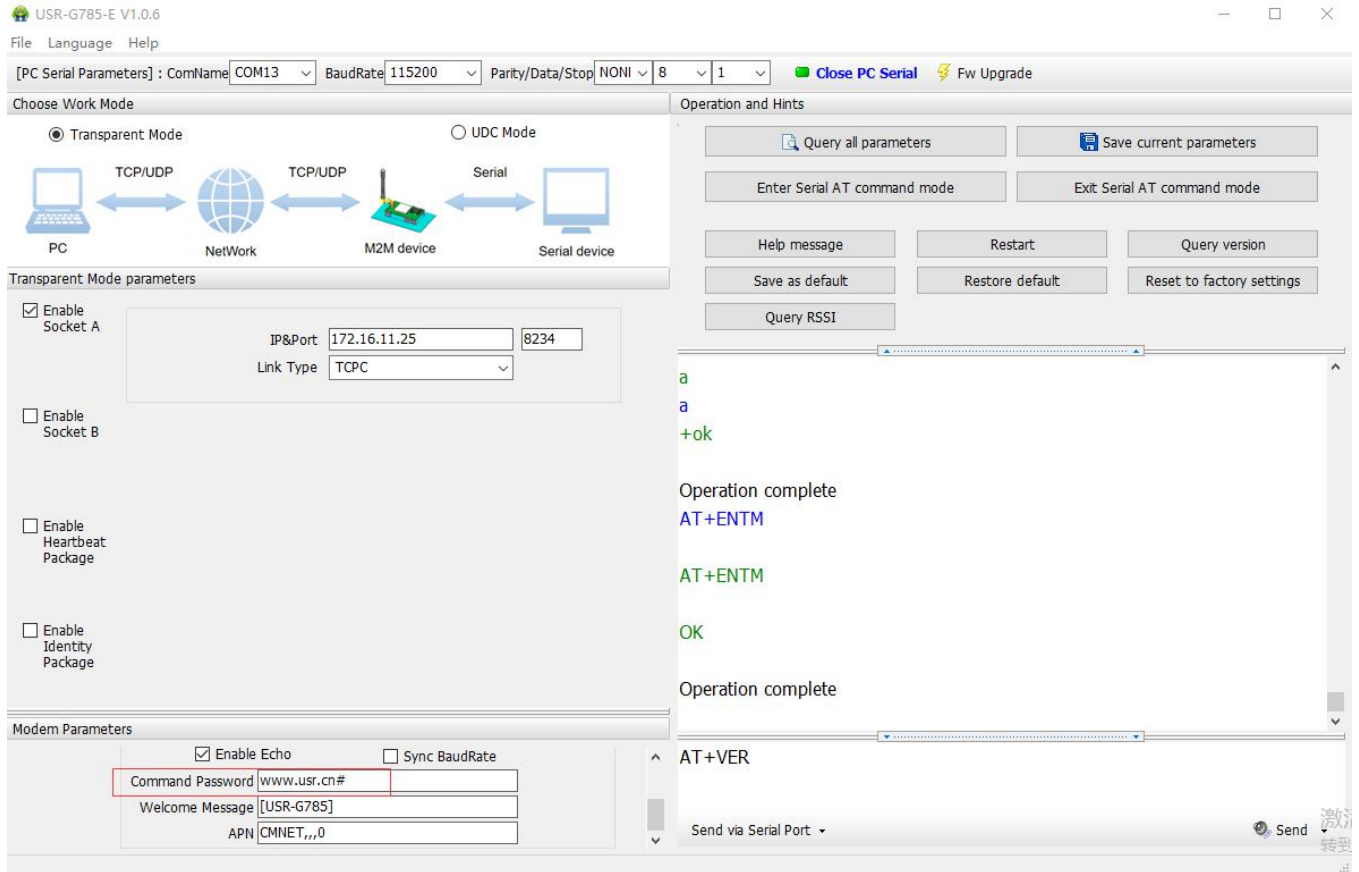


Figure19 command password

3.1.5. SMS AT Command

SMS AT instruction is that we can use SMS to query and configure the parameters of the module.

Send **www.usr.cn#AT+VER**



Figure19 SMS command

3.1.6. Command Format

Note: The characters in the instruction are case insensitive

3.1.6.1. Symbol

Table 8 symbol intro

Symbol Name	Intro
<>	The content is necessary items
[]	The content is non-essential items
{}	The content is a string with special meaning
~	Means parameter range, e.g. A~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

3.1.6.2. The Answer Format in Command

Note: the response information of the command is divided into return and no return. Return means to return the input content when the command is input, and then respond to the command. No return is returned to the input content, only to respond to the command. In the following instructions, the no return mode is used as an example.

Table 9 symbol intro

Command Code	Intro	Necessary or not
CR	Enter key	N
LF	Line break	N
+CMD	Response head	N
OP	Operator	N
PARA	The returned parameter	N
CR	Enter key	N
LF	Line break	N
CR	Enter key	Y
LF	Line break	Y
OK	Means operate successfully	N
CR	Enter key	Y
LF	Line break	Y

Table 10 symbol intro

Type	Command string format	Intro
0	<CR><LF><OK><CR><LF>	Means command send success
1	<CR><LF><+CMD:><PARA><CR><LF><CR><LF><OK><CR><LF>	Return parameters

3.1.6.3. Special Symbols

Escape rule: enclose the hexadecimal code of a special symbol in [] to represent the ASCII code represented by entering a hexadecimal code.

Example: question mark (?) The hexadecimal code of 0x3F is escaped by this escape method and denoted as [3F].

Symbol	Intro	Hexadecimal code
=	equal sign	[3D]
,	comma	[2C]
?	question mark	[3F]
<CR>	Enter key	[0D]
<LF>	Line break	[0A]

3.1.7. AT Commands

Table 11 error code

Error	Implication
Err1	Wrong format, need AT+
Err2	Wrong command
Err3	Not meet the format of the query or Settings
Err4	Wrong parameters or number

NO.	Command	Function	Effective immediately
Management command			
1	AT	Test command	Y
2	H	Help information	Y
3	Z	Module reboot	Y
4	E	Does query / settings open instruction recall	Y
5	ENTM	Exit command mode	Y
6	WKMOD	Query / setup work mode	N
7	CMDPW	Query / set command password	Y
8	STMSG	Query / set module startup information	N
9	NWINFO	Query network format	Y
10	CSQ	Query the current signal strength information of the device	Y
11	CIP	Query the IP of G785	Y
Configuration parameter command			
12	RELD	Restore user default settings	Y
13	CLEAR	Restore original factory settings	Y
14	CFGTF	Save the current settings as default settings.	Y
Information query command			
15	VER	Query version information	Y
16	HDVER	Query hardware version	Y
17	SN	Query SN code	Y
18	ICCID	Query ICCID code	Y
19	IMEI	Query IMEI code	Y

Serial port parameter command			
20	UART	Query / set the parameters of serial ports	N
21	UARTFT	Query/set serial port package time	N
22	UARTFL	Query/set serial port package length	N
23	CMDPT	Query/set RS232 or RS485 work as command port	N
24	RFCEN	Query/set enable/disable RFC2217 similar function	Y
Net command			
25	APN	Query / set APN information	N
26	SOCKA	Query / setup socket A parameter	N
27	SOCKB	Query / setup socket B parameter	N
28	SOCKAEN	Query / setup whether to enable socket A	N
29	SOCKBEN	Query / setup whether to enable socket B	N
30	SOCKALK	Query socket A connection state	N
31	SOCKBLK	Query socket B connection state	N
32	SOCKATO	Query/Set the reconnect time of socket A when connection time out	N
33	SOCKBTO	Query/Set the reconnect time of socket B when connection time out	N
34	SOCKRSTIM	Query/Set the max number of reconnect when socket connection failure	N
35	RSTIM	Query/set the reboot time without data transmission	N
Register command			
34	REGEN	Query / set enable registration package	N
35	REGTP	Query / set register package content type	N
36	REGDT	Query / set custom registration information	N
37	REGSND	Query / set register packet sending mode	N
38	CLOUD	Query/set ID/Password of enable USR-Cloud	N
39	UDCID	Query/set the device ID when work at UDC mode	N
Heartbeat command			
40	HEARTEN	Query / set enable heartbeat package	N
41	HEARTDT	Query / set heartbeat data	N
42	HEARTSND	Query / set heartbeat packet sending type	N
43	HEARTTM	Query / set heartbeat packet interval	N
SMS command			
44	CISMSEND	Send SMS	Y

Note: the details of AT commands, please view the software design manual of the module.

3.1.7.1. AT

Function: test

Format:

Query: AT{CR}

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

3.1.7.2. AT+H

Function: command for help

Format: AT+H{CR}{CR}{LF}help message{CR}{LF}{CR}{LF}OK{CR}{LF}

3.1.7.3. AT+Z

- Function: command for reboot
- Format: AT+Z{CR}{CR}{LF}OK{CR}{LF}

3.1.7.4. AT+E

- Function: Query / set AT command's display state
- Format:
- Query parameter description:
AT+E=? {CR}{CR}{LF}+E:< "on", "off" >{CR}{LF}{CR}{LF}OK{CR}{LF}
- Query the current parameter value:
AT+E{CR} or AT+E? {CR}
{CR}{LF}+E:status{CR}{LF}{CR}{LF}OK{CR}{LF}
- Set up:
AT+E=status{CR}{CR}{LF}OK{CR}{LF}
- Parameters:
Status: status of display, including:
"On": open
"Off": close
The default is "on".

3.1.7.5. AT+WKMOD

- Function: query / set module working mode.
- Format:
- Query parameter description:
AT+WKMOD=? {CR}
{CR}{LF}+WKMOD:< "NET", "UDC" >{CR}{LF}{CR}{LF}OK{CR}{LF}
- Query the current parameter value:
AT+WKMOD{CR} or AT+WKMOD? {CR}
{CR}{LF}+WKMOD: mode{CR}{LF}{CR}{LF}OK{CR}{LF}
- Set up:
AT+WKMOD=mode{CR}{CR}{LF}OK{CR}{LF}
- Parameters:
Mode: working mode
"NET": network transmission mode
"UDC": UDC protocol transparent transmission

The default is "NET".

Example: AT+WKMOD= "NET"

3.1.7.6. AT+CMDPW

➤ Function: query / set command password.

➤ Format:

Query parameter description:

AT+CMDPW=? {CR}

{CR}{LF}+CMDPW:< "password" >{CR}{LF}{CR}{LF}OK{CR}{LF}

Query the current parameter value:

AT+CMDPW{CR} or AT+CMDPW? {CR}

{CR}{LF}+CMDPW: "password" {CR}{LF}{CR}{LF}OK{CR}{LF}

Set up:

AT+CMDPW= "password" {CR}

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

➤ Parameters:

Password: Command password, www.usr.cn# by default, 1~11 bytes ASCII code.

Example: AT+CMDPW= www.usr.cn#

3.1.7.7. AT+STMSG

➤ Function: query / setting welcome information

➤ Format:

Query the current parameter value:

AT+STMSG{CR} or AT+STMSG? {CR}

{CR}{LF}+STMSG: "welcome message" {CR}{LF}{CR}{LF}OK{CR}{LF}

Set up:

AT+STMSG= "welcome message" {CR}

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

➤ Parameters:

"Welcome message": welcome information, module power-on boot, the active output of information, can be used to detect whether the module is properly driven, default to [USR-G785], 0~20 bytes.

Example: AT+ STMSG =[USR-G785]

3.1.7.8. AT+NWINFO

➤ Function: Query network format.

➤ Format:

Query network format:

AT+NWINFO{CR} or AT+NWINFO? {CR}

{CR} {LF} + NWINFO: Act {CR} {LF} {CR} {LF}

➤ Parameters:

Act: Network formats, including: NONE, CDMA1X, CDMA1X and HDR, CDMA1X and EHRPD, HDR, HDR-EHRPD, GSM, GPRS, EDGE, WCDMA, HSDPA, HSUPA, HSPA+, TDSCDMA, TDD LTE, FDD LTE

3.1.7.9. AT+CSQ

- Function: Query the current signal strength information of the device.
- Format:
Query the current parameter values:
AT+CSQ{CR} or AT+CSQ? {CR}
{CR} {LF} + CSQ: RSSI {CR} {LF} {CR} {LF}
- Parameters:
rssi: received signal strength indication.

Num	Intro
0	≤-113dBm
1	-111dBm
2...30	-109~-53dBm
31	≥-53dBm
99	Unknown or unpredictable
100	<-116dBm
101	-115dBm
102...190	-114~-26dBm
191	≥-25dBm
199	Unknown or unpredictable

3.1.7.10. AT+CIP

- Function: query local IP address
- Format:
Query the current parameter values:
AT+CIP{CR} or AT+CIP? {CR}
{CR} {LF} + CIP: IP {CR} {LF} {CR} {LF}
- Parameters:
IP: Local IP Address

3.1.7.11. AT+RELD

- Function: restore user default settings, and module will restart.
- Format:
Query the current parameter value:
AT+RELD{CR}
{CR}{LF}OK{CR}{LF}

3.1.7.12. AT+CLEAR

- Function: restore the factory settings, and the module will be restarted.

- Format:

Query the current parameter value:

```
AT+CLEAR{CR}
{CR}{LF}OK{CR}{LF}
```

3.1.7.13. AT+CFGTF

- Function: save the current operation parameters of the module as default parameters.

- Format:

Query the current parameter value:

```
AT+CFGTF{CR}
{CR}{LF}OK{CR}{LF}
```

3.1.7.14. AT+VER

- Function: the firmware version of the query module.

- Format:

Query the current parameter value:

```
AT+VER{CR} or AT+VER? {CR}
{CR}{LF}+VER: version{CR}{LF}{CR}{LF}OK{CR}{LF}
```

- Parameters:

Version: firmware version number

3.1.7.15. AT+HDVER

- Function: Query the hardware version of the device.

- Format:

Query the current parameter values:

```
AT+HDVER{CR} or AT+HDVER? {CR}
{CR} {LF} + HDVER: version {CR} {LF} {CR} {LF}
```

- Parameters:

Version: Hardware version number

3.1.7.16. AT+SN

- Function: query the SN code of the module.

- Format:

Query the current parameter value:

```
AT+SN{CR} or AT+SN? {CR}
```

```
{CR}{LF}+SN: code{CR}{LF}{CR}{LF}OK{CR}{LF}
```

- Parameters:
code: SN code

3.1.7.17. AT+ICCID

Function: query the ICCID code of the module.

Format:

Query the current parameter value:

```
AT+ICCID{CR} or AT+ICCID? {CR}  
{CR}{LF}+ICCID: code{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Parameters:

code: ICCID code

3.1.7.18. AT+IMEI

Function: query the IMEI code of the module.

Format:

Query the current parameter value:

```
AT+IMEI{CR} or AT+IMEI? {CR}  
{CR}{LF}+IMEI: code{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Parameters:

Code: IMEI code

3.1.7.19. AT+UART

Function: Query / Set serial port parameters.

Format:

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

Settings:

```
AT + UART= baud, data bit, stop bit, parity{CR}  
{CR} {LF} OK {CR} {LF}
```

Parameters:

- ◆ Baud: baud rate: 2400,4800,9600,19200,38400,57600,115200,230400,460800

Data bit: Data bit, including:

8: 8 bit data bits

Stop bit: Stop bit, including:

1: 1 stop bit

2: 2 bit stop bit

Default 1-bit stop bit

Parity: checking methods, including:

NONE: No Check

ODD: Odd Check
EVEN: Dual Check
Default No Check
Example: AT + UART= 115200, 8, 1, NONE

3.1.7.20. AT+UARTFT

Function: Query/Set the packing interval of serial port.
Format:
AT+UARTFT{CR} or AT+UARTFT? {CR}
{CR} {LF} + UARTFT: time {CR} {LF} {CR} {LF}
Settings:
AT+UARTFT=time{CR}
{CR} {LF} OK {CR} {LF}
Parameters:
Time: Packing interval time, default 300 ms, range from 300 to 60 000 Ms.
Example: AT+UARTFT=300

3.1.7.21. AT+UARTFL

Function: Query / Set the length of serial port packaging.
Format:
AT+UARTFL{CR} or AT+UARTFL? {CR}
{CR} {LF} + UARTFL: length {CR} {LF} {CR} {LF}
Settings:
AT + UARTFL = length {CR}
{CR} {LF} OK {CR} {LF}
Parameters:
Length: Packing length, default 1000 bytes, range from 1 to 1000 bytes.
Example: AT + UARTFL = 1000

3.1.7.22. AT+CMDPT

Function: Query/Set Command Port.
Format:
AT+CMDPT{CR} or AT+CMDPT? {CR}
{CR} {LF} + CMDPT: port {CR} {LF} {CR} {LF}
Settings:
AT + CMDPT = port {CR}
{CR} {LF} OK {CR} {LF}
Parameters:
Port: Serial port name, RS232 or RS485 or RSALL, default value is RSALL
Example: AT + CMDPT = RSALL

Notes: If set port as RS232, data will only be output at RS232.
Set it as RS485, data will only be output at RS485
RSALL means data will be output at both port RS232 and RS485

3.1.7.23. AT+RFCEN

Function: query / set whether enabling RFC2217 function.

Format:

Query parameter description:

```
AT+RFCEN=? {CR}
{CR}{LF}+RFCEN:< "on", "off" >{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Query the current parameter value:

```
AT+RFCEN{CR} or AT+RFCEN? {CR}
{CR}{LF}+RFCEN: status{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set up:

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

Parameters:

Status: RFC2217 enabled state, including:

“On”: enabling

“Off”: prohibition

The default is “off”.

Example: AT+ RFCEN = “on”

3.1.7.24. AT+APN

Function: query / set APN code.

Format:

Query the current parameter value:

```
AT+APN{CR} or AT+APN? {CR}
{CR}{LF}+APN: code, user_name, password, auth{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set up:

```
AT+APN= code, user_name,password,auth {CR}
{CR}{LF}OK{CR}{LF}
```

Parameters:

code: APN, default CMNET, up to 50 bytes.

The name: user name is not blank, up to 50 bytes, and the default is empty.

The pass: password is not blank, up to 50 bytes, and the default is empty.

Auth: Authentication type, 0: None, 1:PAP, 2:CHAP

Example: AT+APN= usr, admin,admin,0

3.1.7.25. AT+SOCKA

Function: query / set the parameters of socket A.

Format:

Query parameter description:

```
AT+SOCKA=? {CR}
{CR}{LF}+SOCKA:<protocol>, < "address >, <port>{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Query the current parameter value:

```
AT+SOCKA{CR} or AT+SOCKA? {CR}
{CR}{LF}+SOCKA: protocol, "address", port{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set up:

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

Parameters:

Protocol: communication protocol, default TCP, including:

"TCPC": TCP Client

"UDPC": UDP Client

Example: AT+SOCKA= "TCPC", "test.usr.cn", 2317

3.1.7.26. AT+SOCKB

Function: query / set the parameters of socket B.

Format:

Query parameter description:

```
AT+SOCKB=? {CR}
{CR}{LF}+SOCKB:<protocol>, < "address >, <port>{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Query the current parameter value:

```
AT+SOCKB{CR} or AT+SOCKB? {CR}
{CR}{LF}+SOCKB: protocol, "address", port{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set up:

```
AT+SOCKB=protocol, "address", port{CR}
{CR}{LF}OK{CR}{LF}
```

Parameters:

Protocol: communication protocol, default TCP, including:

"TCPC": TCP Client

"UDPC": UDP Client

Address: server address, this address can be domain name or IP, default test.usr.cn

Port: server port, default 2317, range 1~65535

Example: AT+SOCKB= "TCPC", "test.usr.cn", 2317

3.1.7.27. AT+SOCKAEN

Function: query / set whether to enable socket A.

Format:

Query parameter description:

```
AT+SOCKAEN=? {CR}
{CR}{LF}+SOCKAEN:< "on", "off" >{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Query the current parameter value:

```
AT+SOCKAEN{CR} or AT+SOCKAEN? {CR}
{CR}{LF}+SOCKAEN: status{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set up:

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

Parameters:

Status: socket A function enabling state, including:

“On”: enabling

“Off”: prohibition

The default is “on”.

Example: AT+SOCKAEN= “on”

3.1.7.28. AT+SOCKBEN

Function: query / set whether to enable socket B.

Format:

Query parameter description:

```
AT+SOCKBEN=? {CR}
{CR}{LF}+SOCKBEN:< "on", "off" >{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Query the current parameter value:

```
AT+SOCKBEN{CR} or AT+SOCKBEN? {CR}
{CR}{LF}+SOCKBEN: status{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set up:

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

Parameters:

Status: socket B function enabling state, including:

“On”: enabling

“Off”: prohibition

The default is “off”.

Example: AT+SOCKBEN= “on”

3.1.7.29. AT+SOCKALK

Function: query whether socket A has established a connection.

Format:

Query the current parameter value:

```
AT+SOCKALK{CR} or AT+SOCKALK? {CR}
{CR}{LF}+SOCKALK: status{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Parameters:

Status: socket A connection status, including:

“Connected”: connected

“Disconnected”: unconnected

3.1.7.30. AT+SOCKBLK

Function: query whether socket B has established a connection.

Format:

Query the current parameter value:

AT+SOCKBLK{CR} or AT+SOCKBLK? {CR}

{CR}{LF}+SOCKBLK: status{CR}{LF}{CR}{LF}OK{CR}{LF}

Parameters:

Status: socket B connection status, including:

“Connected”: connected

“Disconnected”: unconnected

3.1.7.31. AT+RSTIM

Function: Query/set the time of no data reboot at the device network end.

Format:

Query the current parameter values:

AT+RSTIM{CR} or AT+RSTIM? {CR}

{CR} {LF} + RSTIM: time {CR} {LF} {CR} {LF}

Settings:

AT+RSTIM=time{CR}

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

Parameters:

Time: In unit seconds, the settable range is 60-99999S. When the network does not reply to data beyond this time, the module will restart.

The default restart time for no data is 3600 seconds

Example: AT+RSTIM=3600

3.1.7.32. AT+REGEN

Function: query / set whether to enable the registration of package functions.

Format:

Query parameter description:

AT+REGEN=? {CR}

{CR}{LF}+REGEN:< “on”, “off” >{CR}{LF}{CR}{LF}OK{CR}{LF}

Query the current parameter value:

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

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

Set up:

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

Parameters:

Status: Registration package function enabling state, including:

“On”: open

“Off”: close

The default is “off”.

Example: AT+REGEN= “on”

3.1.7.33. AT+SOCKATO

- Function: Query/Set reconnect time of Socket A once timeout
- Format:
Query the current parameter value:
AT+SOCKATO{CR} or AT+SOCKATO? {CR}
{CR}{LF}+SOCKATO: time{CR}{LF}{CR}{LF}
- Parameters:
Time: reconnect time, time arrange 1~100 seconds. Default time is 5s
- Example: AT+SOCKATO=5

3.1.7.34. AT+SOCKBTO

- Function: Query/Set reconnect time of Socket B once timeout
- Format:
Query the current parameter value:
AT+SOCKBTO{CR} or AT+SOCKBTO? {CR}
{CR}{LF}+SOCKBTO: time{CR}{LF}{CR}{LF}
- Parameters:
Time: reconnect time, time arrange 1~100 seconds. Default time is 5s
- Example: AT+SOCKBTO=5

3.1.7.35. AT+SOCKRSTIM

- Function: Query/Set the maximum number of reconnect after socket connection failure. The device will restart once the number of reconnect after exceeding the maximum number
- Format:
Query the current parameter value:
AT+SOCKRSTIM{CR} or AT+SOCKRSTIM? {CR}
{CR}{LF}+SOCKRSTIM: number{CR}{LF}{CR}{LF}
- Parameters:

Number: The maximum number of reconnect, number arrange 10~600. Default time is 60

- Example: AT+SOCKBTO=60

3.1.7.36. AT+REGTP

- Function: query / set the content type of the registration package.

- Format:

Query parameter description:

```
AT+REGTP=? {CR}
```

```
{CR}{LF}+REGTP:< "ICCID", "IMEI", "REGID", "REGDT" >{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Query the current parameter value:

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

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

Set up:

```
AT+REGTP=type{CR}
```

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

- Parameters:

Type: registration data types, including:

"ICCID": ICCID code

"IMEI": IMEI code

"REGID": registered ID

"REGDT": custom data

The default is "REGDT".

Example: AT+REGEN= "ICCID"

3.1.7.37. AT+REGDT

Function: query / set custom registration package data.

Format:

Query parameter description:

```
AT+REGDT=? {CR}
```

```
{CR}{LF}+REGDT:< "data" >{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Query the current parameter value:

```
AT+REGDT{CR} or AT+REGDT? {CR}
```

```
{CR}{LF}+REGDT: "data" {CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set up:

```
AT+REGDT= "data" {CR}
```

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

Parameters:

Data: Custom registration package data, hexadecimal string format, maximum 80 bytes, default 7777772E7573722E636E, with ASCII code for the expression of www.usr.cn.

Note: Maximum length of 80 bytes refers to the number of bytes after ASCII codes are converted into hexadecimal strings.

Example: AT+REGDT= "7777772E7573722E636E"

3.1.7.38. AT+REGSND

Function: query / set the sending mode of the registration package.

Format:

Query parameter description:

```
AT+REGSND=? {CR}
{CR}{LF}+REGSND:< "link", "data" >{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Query the current parameter value:

```
AT+REGSND{CR} or AT+REGSND? {CR}
{CR}{LF}+REGSND: type{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Set up:

```
AT+REGSND=type{CR}
{CR}{LF}OK{CR}{LF}
```

Parameters:

Type: sending mode, including:

"Link": send when connection is established.

"Data": register packet data as the beginning of each packet data.

The default is "link".

Example: AT+REGSND= "link"

3.1.7.39. AT+CLOUD

➤ Function: Query/Set the registration parameters of USR-Cloud

➤ Format:

Query the current parameter value:

```
AT+CLOUD{CR} or AT+CLOUD? {CR}
{CR}{LF}+CLOUD: id, password{CR}{LF}{CR}{LF}
```

Set the parameter:

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

➤ Parameters:

ID: Register ID of enable USR-Cloud. The length is 20bytes. The default is empty

Password: communication password of USR-Cloud. The length is 8 bytes. The default is empty.

➤ Example: AT+CLOUD=12345678901234567890, 12345678

3.1.7.40. AT+UDCID

Function: query / set UDC mode device ID.

Format:

Query the current parameter values:

```
AT+UDCID{CR} or AT+UDCID? {CR}
{CR} {LF} + UDCID: ID {CR} {LF} {CR} {LF}
```

Settings:

```
AT + UDCID = ID {CR}
{CR} {LF} OK {CR} {LF}
```

Parameters:

ID: IDs of devices in UDC mode, default is 12345678901, the maximum length is 11 bits.

Example: AT+UDCID=12345678901

3.1.7.41. AT+HEARTEN

Function: query / set whether to enable heartbeat package function.

Format:

Query parameter description:

```
AT+HEARTEN=? {CR}
{CR}{LF}+HEARTEN:< "on", "off" >{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Query the current parameter value:

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

Set up:

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

Parameters:

Status: heartbeat package function enabling state, including:

“On”: open

“Off”: close

The default is “on”.

Example: AT+HEARTEN= “on”

3.1.7.42. AT+HEARTDT

Function: query / set heartbeat data.

Format:

Query parameter description:

```
AT+HEARTDT=? {CR}
{CR}{LF}+HEARTDT:< "data" >{CR}{LF}{CR}{LF}OK{CR}{LF}
```

Query the current parameter value:

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

Set up:

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

Parameters:

Data: Custom registration package data, hexadecimal string format, maximum length of 40 bytes, default 7777772E7573722E636E, with ASCII code is expressed as www.usr.cn.

Note: Maximum length of 80 bytes refers to the number of bytes after ASCII codes are converted into hexadecimal strings.

Example: AT+HEARTDT= "7777772E7573722E636E"

3.1.7.43. AT+HEARTSND

Function: Query/set the sending mode of heartbeat packet.

Format:

Query the current parameter values:

AT+HEARTSND{CR} or AT+HEARTSND? {CR}

{CR} {LF} + HEARTSND: type {CR} {LF} {CR} {LF}

Settings:

AT+HEARTSND=type{CR}

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

Parameters:

Type: The mode of transmission, including:

COM: Send Heart Packet to Serial Port

NET: Send Heart Packet to Network End

Default send to network.

Example: AT + HEARTSND = COM

3.1.7.44. AT+HEARTTM

Function: query / set the sending time of heartbeat packets.

Format:

Query parameter description:

AT+HEARTTM=? {CR}

{CR}{LF}+HEARTTM:<time>{CR}{LF}{CR}{LF}OK{CR}{LF}

Query the current parameter value:

AT+HEARTTM{CR} or AT+HEARTTM? {CR}

{CR}{LF}+HEARTTM: time{CR}{LF}{CR}{LF}OK{CR}{LF}

Set up:

AT+HEARTTM=time{CR}

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

Parameters:

Time: sending interval time, the default is 10s, the maximum 6000s.

Example: AT+HEARTTM=30

3.1.7.45. AT+CISMSND

Function: Send short message.

Format:

Settings:

AT + CISMSEND = number, type, data {CR}

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

Parameters:

Number: The target phone number of a short message

Type: 0-7Bits encoding format, 1-UCS2 encoding format.

Data: Short message content, up to 140 bytes.

Example: AT+CISMSEND=8613854123456,1. Hello.

9. 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

Support: h.usriot.com

Email: sales@usr.cn

Tel: 86-531-88826739/86-531-55507297

10. Disclaimer

This document provide the information of USR-G785-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 merchantability 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.

11. Update History

Edition	Describe
V1.0.2	2019-02-13 establish
V1.0.3	2019-02-21 modify the error description