

# DTU-G101

## GPRS To RS232 User Manual

### V1.0



### Overview of Characteristic

- ◇ Support Four Frequency Bands, Global Standard(850/900/1800/1900MHz)
- ◇ Support GSM/GPRS/EDGE(No 3G Network) and 2G/3G/4G CMCC or CUCC, CTCC SIM Card
- ◇ Support Max TCP/UDP Links: 3
- ◇ Support Multiple Work Mode(Transparent Transmission/AT Commands)
- ◇ Embedded RS232 to GPRS interface
- ◇ Size: 84 x 84 x 25mm
- ◇ Single 5~18V DC Power Supply

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High-Flying

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## HISTORY

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# 1. PRODUCT OVERVIEW

## 1.1 Basic Parameters

Table1. DTU-G101 Basic Parameters

	Item	Parameter
<b>Wireless Parameter</b>	Internet Type	GSM/GPRS
	Data Rate	85.6Kbps(DL,UL)
	Frequency	850/ 900/1800/1900MHz
	Multi-Slot Class	GPRS Class 12
	Terminal Device Class	Class B
	Coding Schemes	CS1 ~ CS4
	Max Transmit Power	GSM850/GSM900: Class 4(2W) DCS1800/PCS1900: Class 1(1W)
	Application	AT Command
	Network Protocol	TCP/UDP
	Max Link	3
	SIM Card	1.8V/3V
	Antenna Interface	SMA(female, 50Ω)
<b>Hardware Parameter</b>	Port Interface	1(RS232) DB9 male
	Data Bit	5,6,7,8
	Stop Bit	1,2
	Charity Bit	None,Even,Odd
	Baud Rate	1200bps ~ 115.2Kbps
	Flow Control	RTS/CTS
	Buffer	1K
	Size	84 x 84 x 25mm
	Work Temp.	-40 ~ 85°C
	Storage Temp	-45 ~ 105°C 5 ~ 95% RH
	Input Voltage	DC 5~18V
	Work Current	~400mA
	Power Consumption	<2W
<b>Others</b>	Guarantee	2 years
	Accessories	5V/1A Adapter, Male to Female Serial Cable GPRS Antenna

## 1.2 Hardware Introduction

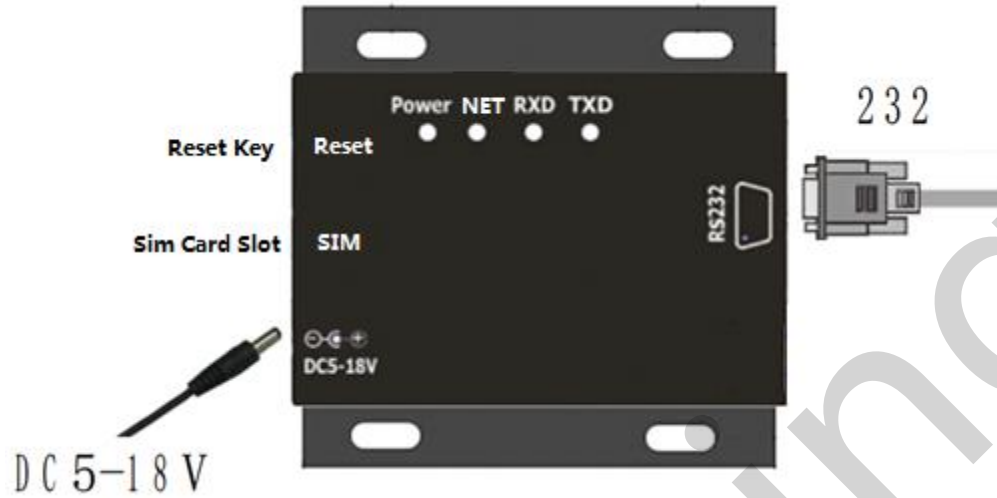


Figure 1. DTU-G101 Appearance

### 1.2.1. Interface Description

Table2. DTU-G101 External Interface

Function	Name	Description	
External Interface	RS232	RS232 Communication	
	DC5-18V	DC Power 5~18V Input	
LED Indicator	Power	3.3V Internal Power Supply Indicator	
	NET(Reserved)	64ms on / 800ms Off	Network not found
		64ms on / 3000ms Off	Registered on the network
		64ms on / 300ms Off	GPRS Communication
		light off	Power off
	RXD	RS232 Data Receive	
	TXD	RS232 Data Transfer	
Button	Reset	Reset the device.	

### 1.2.2. RS232 Interface

Device serial port is male(needle), RS232 voltage level(can connect to PC directly), Pin Order is consistent with PC COM port. Use cross Cable connected with PC(2-3 cross, 7-8 cross, 5-5 direct), see the following table for pin definition.



Figure 2. RS232 Pin Definition(Male/Needle Type)

### 1.2.3. Button Interface

This Button is used for reset device.

### 1.2.4. Mechanical Size

DTU-G101 device physical size as follows:

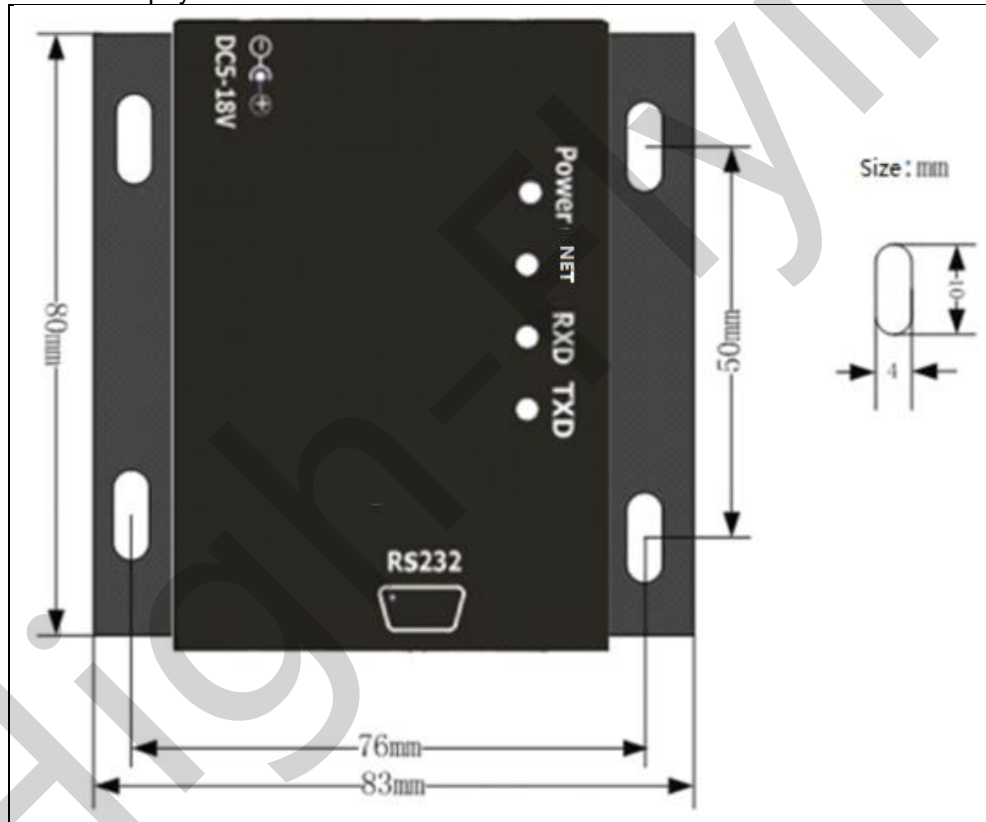


Figure 3. DTU-G101 Mechanical Dimension

### 1.2.5. Order Information

According to customer's demands, DTU-G101 product can provide different configured products, and the particular production code is shown as follow:

## HF-G101-eSIM

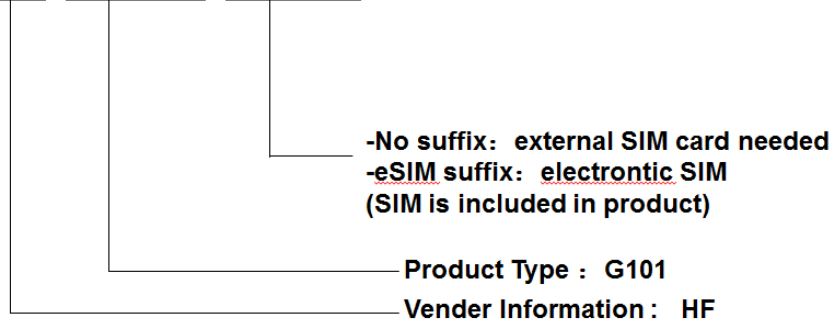


Figure 4. DTU-G101 Production Code Definition

### 1.2.6. Package Information

- 1 \* DTU-G101
- 1 \* 5V/1A Power Adapter
- 1 \* Serial Cable
- 1 \* GPRS Antenna



## 2. FUNCTION DESCRIPTION

### 2.1. Network indicator(Reserved)

DTU-G101 supports network lights and different frequencies of flashing lights represent different states. You can set the time interval flashes in all modes via AT commands and the following figure shows the default interval

State	LED Flashing Frequency
Network not found	64ms on / 800ms Off
Registered on the network	64ms on /3000ms Off
GPRS Communication	64ms on / 300ms Off
Power off	light off

### 2.2. Wireless Networking

Product is connected with serial devices and GPRS network and communicate with remote server through public network. It is suggested to use build-in TCP/IP protocol stack to achieve remote control and monitor through UDP/TCP connection with server.

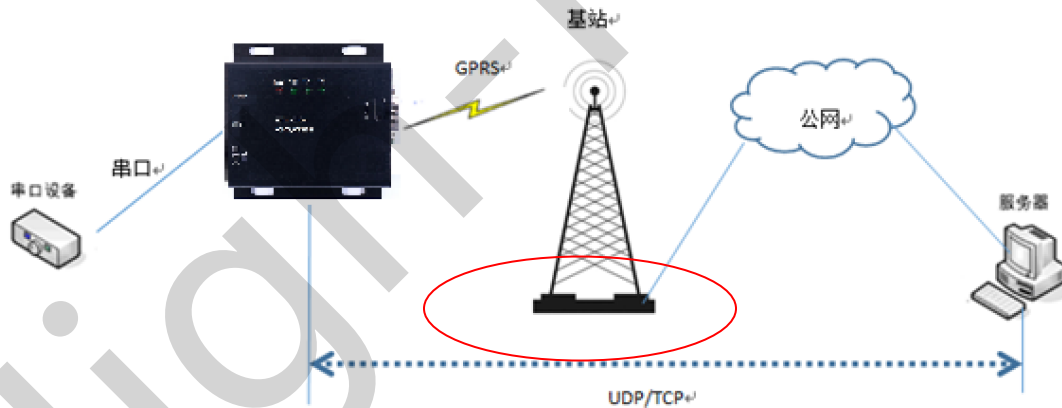


Figure 5. GPRS wireless network

### 2.3. Work Mode

#### 2.3.1. Support single and multiple connecton

Single connection: build only one connection (UDP/TCP)

Multiple connection: maximum eight connections (UDP/TCP, AT+SOCKA, AT+SOCKB, AT+SOCKC)

Note:

Recommend to send UART data every 500ms to device, otherwise may lost some packet.

## 3. AT+INSTRUCTION INTRODUCTION

### 3.1. Configuration Mode

When DTU-G101 power up, it will default works as transparent transmission mode, then user can switch to configuration mode by serial port command. DTU-G101 UART default parameters setting as below figure,

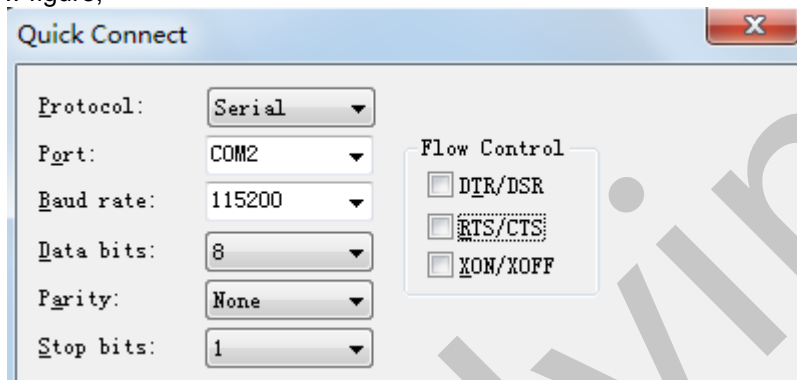


Figure 6. DTU-G101 Default UART Port Parameters

In configuration mode, user can setting the product through AT+instruction set, which cover all web page setting function.

#### 3.1.1. Switch to Configuration Mode

Two steps to finish switching from transparent transmission mode to configuration mode.

- UART input “+++”, after product receive “+++”, and feedback “a” as confirmation.
- UART input “a”, after product receive “a” and feedback “+ok” to go into AT+instruction set configuration mode.

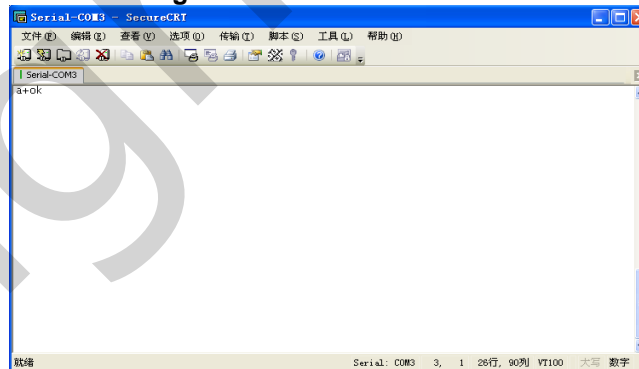
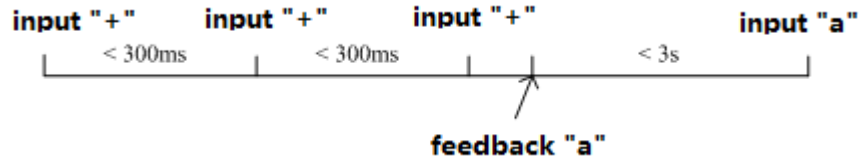


Figure 7. Switch to Configuration Mode

#### Notes:

1. When user input “+++” (No “Enter” key required), the UART port will display feedback information “a”, and not display input information “+++” as above UART display.
2. Any other input or wrong step to UART port will cause the product still works as original mode (transparent transmission).
3. “+++” and “a” should be input in a certain period of time to make the product switch to configuration mode. Like the following sequence.



### 3.2. AT+Instruction Set Overview

User can input AT+Instruction through hyper terminal or other serial debug terminal, also can program the AT+Instruction to script. User can also input "AT+H" to list all AT+Instruction and description to start.

```

AT+H
AT+: NONE command, reply "+ok".
AT+E: Echo ON/off, to turn on/off command line echo function.
AT+Z: Reset the Module.
AT+VER: Get application version.
AT+APPVER: Show application version.
AT+SOCKA: Set/Get SOCKA parameter.
AT+SOCKB: Set/Get SOCKB parameter.
AT+SOCKC: Set/Get SOCKC parameter.
AT+GSLQ: Get Link Quality of the Module.
AT+RELD: Reload the default setting and reboot.
AT+UPGRADE:Use uart0 upgrade firmware.
AT+GWMID:write module MID.
AT+GRMID:Read module MID.
AT+TCPALK: Show Under the long connection of network status.
AT+TCPBLK: Show Under the long connection of network status.
AT+TCPCLK: Show Under the long connection of network status.
AT+SOCKANUM: Show SOCKA total number of sending and receiving data.
AT+SOCKBNUM: Show SOCKB total number of sending and receiving data.
AT+SOCKCNUM: Show SOCKC total number of sending and receiving data.
AT+TIME: Set/Get time.
AT+GVER: Show GPRS module software version number.
AT+GCID: Show SIM card unique identification number.
AT+CNUM: Show query the machine number.
AT+WANN: Show the IP address of the connection after the GPRS module.
AT+GETIP: A domain name IP query.
AT+UART: Set/Get the UART0/UART1 Parameters.
AT+NDBGL:set/get debug level
AT+SMD5=len: Software md5.
AT+H:show help
+ok

```

Figure 8. "AT+H" Instruction for Help

#### 3.2.1. Instruction Syntax Format

AT+Instruction protocol is based on the instruction of ASCII command style, the description of syntax format as follow.

- **Format Description**
  - <>: Means the parts must be included
  - []: Means the optional part

- **Command Message**

**AT+<CMD>[op][para-1,para-2,para-3,para-4...]<CR>**

- AT+: Prefix of command message;
- CMD: Command string;
- [op]: Symbol of command operator,
  - ◆ "=" : The command requires parameters input;
  - ◆ "NULL": Query the current command parameters setting;

- [para-n]: Parameters input for setting if required;
- <CR>:"Enter" Key, it's 0x0a or 0x0d in ASCII;

**Notes:** When input AT+Instruction, "AT+<CMD>" character will display capital letter automatic and other parts will not change as you input.

#### ➤ Response Message

**+<RSP>[op] [para-1,para-2,para-3,para-4...]<CR><LF><CR><LF>**

- +: Prefix of response message;
- RSP: Response string;
  - ◆ "ok" : Success
  - ◆ "ERR": Failure
- [op] : =
- [para-n]: Parameters if query command or Error code when error happened;
- <CR>: ASCII 0x0d;
- <LF>: ASCII 0x0a;

#### ➤ Error Code

Table3. Error Code Description

Error Code	Description
-1	Invalid Command Format
-2	Invalid Command
-3	Invalid Operation Symbol
-4	Invalid Parameter
-5	Operation Not Permitted

### 3.2.2. AT+Instruction Set

Table4. AT+Instruction Set List

Instruction	Description
<null>	NULL
<b>Management Instruction Set</b>	
E	Open/Close show back function
ENTM	Set product into transparent transmission mode
VER	Query product software version information
APPVER	Query customized software version information
RELD	Restore to factory default setting
Z	Re-start product
H	Help
<b>UART Instruction Set</b>	
UART	Set/Query serial port parameters
<b>Network Instruction Set</b>	
SOCKA	Set/Query SOCK A network protocol parameters
TCPALK	Query if SOCK A TCP link already build-up;
SOCKANUM	Set/Query SOCK A send/receive data bytes.
SOCKB	Set/Query SOCK B network protocol parameters

Instruction	Description
TCPBLK	Query if SOCK B TCP link already build-up;
SOCKBNUM	Set/Query SOCK B send/receive data bytes.
SOCKC	Set/Query SOCK C network protocol parameters
TCPCLK	Query if SOCK C TCP link already build-up;
SOCKCNUM	Set/Query SOCK C send/receive data bytes.
WANN	Set/Query GPRS network status.
GETIP	Set/Query domain name IP address
<b>Upgrade Instruction Set</b>	
UPGRADE	Upgrade Firmware
<b>GPRS Instruction Set</b>	
GSLQ	Query GPRS signal strength
GVER	Query GPRS chip software version
GCID	Query SIM card CID number
CIMI	Query SIM card IMSI

### 3.2.2.1. AT+E

- Function: Open/Close show back function;
- Format:
  - ◆ Set Operation

```
AT+E=<status><CR>
+ok<CR><LF><CR><LF>
```

- Parameters:
  - ◆ status: Echo status
    - ◇ on: Open echo
    - ◇ off: Close echo

When DTU-G101 product firstly switch from transparent transmission to configuration mode, show back status is open, input "AT+E" to close show back function, input "AT+E" again to open show back function, use AT+E=on/off command to direct set the echo status..

### 3.2.2.2. AT+ENTM

- Function: Set product into transparent transmission mode;
- Format:

```
AT+ENTM<CR>
+ok<CR><LF><CR><LF>
```

When operate this command, product switch from configuration mode to transparent transmission mode.

### 3.2.2.3. AT+VER

- Function: Query module software version information;
- Format:

```
AT+VER<CR>
+ok=<ver><CR><LF><CR><LF>
```

- Parameters:
  - ◆ ver: Module software version information;

### 3.2.2.4. AT+APPVER

- Function: Query customized software version information
- Format:

- ◆ Query Operation

```
AT+APPVER<CR>
+ok=<ver><CR><LF><CR><LF>
```

- Parameters:
  - ◆ ver: Module customized software version information;

### 3.2.2.5. AT+RELD

- Function: module restore to factory default setting;
- Format:
  - ◆ Set Operation

```
AT+RELD<CR>
+ok<CR><LF><CR><LF>
```

When operate this command, module will restore to factory default setting.

### 3.2.2.6. AT+Z

- Function: Restart module;
- Format:

```
AT+Z<CR>
```

### 3.2.2.7. AT+H

- Function: Help;
- Format:
  - ◆ Query Operation

```
AT+H<CR>
+ok=<command help><CR><LF><CR><LF>
```

- Parameters:
  - ◆ command help: command introduction;

### 3.2.2.8. AT+UART

- Function: Set/Query serial port parameters. Setting is valid after reset.
- Format:

- ◆ Query Operation

```
AT+UART<CR>
+ok=<baudrate,data_bits,stop_bit,parity,flowctrl><CR><LF><CR><LF>
```

- ◆ Set Operation

```
AT+UART=<baudrate,data_bits,stop_bit,parity,flowctrl>[,uart_num]<CR>
+ok<CR><LF><CR><LF>
```

- Parameters:
  - ◆ baudrate:
    - ◇ 1200,1800,2400,4800,9600,19200,38400,57600,115200
  - ◆ data\_bits:
    - ◇ 8
  - ◆ stop\_bits:
    - ◇ 1,2
  - ◆ parity:
    - ◇ NONE
    - ◇ EVEN
    - ◇ ODD
  - ◆ Flowctrl: (CTSRTS),
    - ◇ NFC: No hardware flow control
    - ◇ FC: hardware flow control

### 3.2.2.9. AT+SOCKA

- Function: Set/Query SOCK A network protocol parameters, Setting is valid after reset.
- Format:
  - ◆ Query Operation  
**AT+SOCKA<CR>**  
**+ok=<protocol,port,IP,mode><CR><LF><CR><LF>**
  - ◆ Set Operation  
**AT+SOCKA=<protocol,port,IP,mode><CR>**  
**+ok<CR><LF><CR><LF>**
- Parameters:
  - ◆ protocol:
    - ◇ NONE: none setting, clear current setting.
    - ◇ TCP
    - ◇ UDP
  - ◆ port: protocol port ID: Decimal digit and less than 65535
  - ◆ IP: Server's IP address or domain name
  - ◆ mode: Connectiontype
    - ◇ LONG: long link connection
    - ◇ SHORT: short link connection.

### 3.2.2.10. AT+SOCKB

- Function: Set/Query SOCK B network protocol parameters, Setting is valid after reset.
- Format:
  - ◆ Query Operation  
**AT+SOCKB<CR>**  
**+ok=<protocol,port,IP,mode><CR><LF><CR><LF>**
  - ◆ Set Operation  
**AT+SOCKB=<protocol,port,IP,mode><CR>**  
**+ok<CR><LF><CR><LF>**
- Parameters:
  - ◆ protocol:
    - ◇ NONE: none setting, clear current setting.
    - ◇ TCP
    - ◇ UDP
  - ◆ port: protocol port ID: Decimal digit and less than 65535
  - ◆ IP: Server's IP address or domain name
  - ◆ mode: Connectiontype
    - ◇ LONG: long link connection
    - ◇ SHORT: short link connection.

### 3.2.2.11. AT+SOCKC

- Function: Set/Query SOCK C network protocol parameters, Setting is valid after reset.
- Format:
  - ◆ Query Operation  
**AT+SOCKC<CR>**  
**+ok=<protocol,port,IP,mode><CR><LF><CR><LF>**
  - ◆ Set Operation  
**AT+SOCKC=<protocol,port,IP,mode><CR>**  
**+ok<CR><LF><CR><LF>**
- Parameters:
  - ◆ protocol:

- ◇ NONE: none setting, clear current setting.
- ◇ TCP
- ◇ UDP
- ◆ port: protocol port ID: Decimal digit and less than 65535
- ◆ IP: Server's IP address or domain name
- ◆ mode: Connectiontype
  - ◇ LONG: long link connection
  - ◇ SHORT: short link connection.

### 3.2.2.12. AT+TCPALK

- Function: Query if SOCK A TCP link already build-up;
- Format:
  - AT+TCPALK<CR>**
  - +ok=<sta><CR><LF><CR><LF>**
- Parameters:
  - ◆ sta.: if module already setup TCP link;
    - ◇ on: TCP link setup;
    - ◇ off: TCP link not setup;

### 3.2.2.13. AT+TCPBLK

- Function: Query if SOCK A TCP link already build-up;
- Format:
  - AT+TCPBLK<CR>**
  - +ok=<sta><CR><LF><CR><LF>**
- Parameters:
  - ◆ sta.: if module already setup TCP link;
    - ◇ on: TCP link setup;
    - ◇ off: TCP link not setup;

### 3.2.2.14. AT+TCPCLK

- Function: Query if SOCK A TCP link already build-up;
- Format:
  - AT+TCPCLK<CR>**
  - +ok=<sta><CR><LF><CR><LF>**
- Parameters:
  - ◆ sta.: if module already setup TCP link;
    - ◇ on: TCP link setup;
    - ◇ off: TCP link not setup;

### 3.2.2.15. AT+SOCKANUM

- Function: Set/Query SOCK A send/receive data bytes.
- Format:
  - ◆ Query Operation
  - AT+SOCKANUM<CR>**
  - +ok=<send\_num rcv\_num ><CR><LF><CR><LF>**
- Parameters:
  - ◆ send\_num: socket a send data bytes.
  - ◆ rcv\_num: socket a receive data bytes.

### 3.2.2.16. AT+SOCKBNUM

- Function: Set/Query SOCK B send/receive data bytes.
- Format:



- ◆ Query Operation

```
AT+SOCKBNUM<CR>
+ok=<send_num rcv_num ><CR><LF><CR><LF>
```

- Parameters:
  - ◆ send\_num: socket b send data bytes.
  - ◆ rcv\_num: socket b receive data bytes.

### 3.2.2.17. AT+SOCKCNUM

- Function: Set/Query SOCK C send/receive data bytes.
- Format:

- ◆ Query Operation

```
AT+SOCKCNUM<CR>
+ok=<send_num rcv_num ><CR><LF><CR><LF>
```

- Parameters:
  - ◆ send\_num: socket c send data bytes.
  - ◆ rcv\_num: socket c receive data bytes.

### 3.2.2.18. AT+WANN

- Function: Set/Query GPRS network status.

- Format:

- ◆ Query Operation

```
AT+WANN<CR>
+ok=<IP><CR><LF><CR><LF>
```

- Parameters:
  - ◆ IP: device IP address.
    - ◇ XXX.XXX.XXX.XXX: IP address
    - ◇ Waiting GPRS initialization: waiting for initialization

### 3.2.2.19. AT+GETIP

- Function: Set/Query domain name IP address.

- Format:

- ◆ Set Operation

```
AT+GETIP=<domain_name><CR>
+ok<CR><LF><CR><LF>
```

- Parameters:
  - ◆ domain\_name: domain name.

### 3.2.2.20. AT+UPGRADE

- Function: Set device in UART upgrade mode

- Format:

- ◆ Set Operation

```
AT+UPGRADE<CR>
+ok=<CR><LF><CR><LF>
```

After input this command, the product fix baud rate at 115200 and output "Ready CCCCC...." waiting for upgrade file. Recommend to use secureCRT and transfer file in Xmodem to finish the upgrade operation.

### 3.2.2.21. AT+GVER

- Function: Query GPRS chip software version

- Format:

- ◆ Query Operation

```
AT+GVER<CR>
```

**+ok=<ver><CR><LF><CR><LF>**

- Parameters:
  - ◆ ver: GPRS chip software version;

### 3.2.2.22. AT+GCID

- Function: Query SIM card CID number
- Format:
  - ◆ Query Operation

**AT+GCID<CR>**

**+ok=<sim\_number><CR><LF><CR><LF>**

- Parameters:
  - ◆ Sim\_number: SIM card CID number.

### 3.2.2.23. AT+CIMI

- Function: Query SIM card IMSI
- Format:
  - ◆ Query Operation

**AT+CIMI<CR>**

**+ok=<imsi\_string><CR><LF><CR><LF>**

- Parameters:
  - ◆ imsi\_string: SIM card IMSI

### 3.2.2.24. AT+GSLQ

- Function: Query GPRS signal strength
- Format:
  - ◆ Query Operation

**AT+GSLQ<CR>**

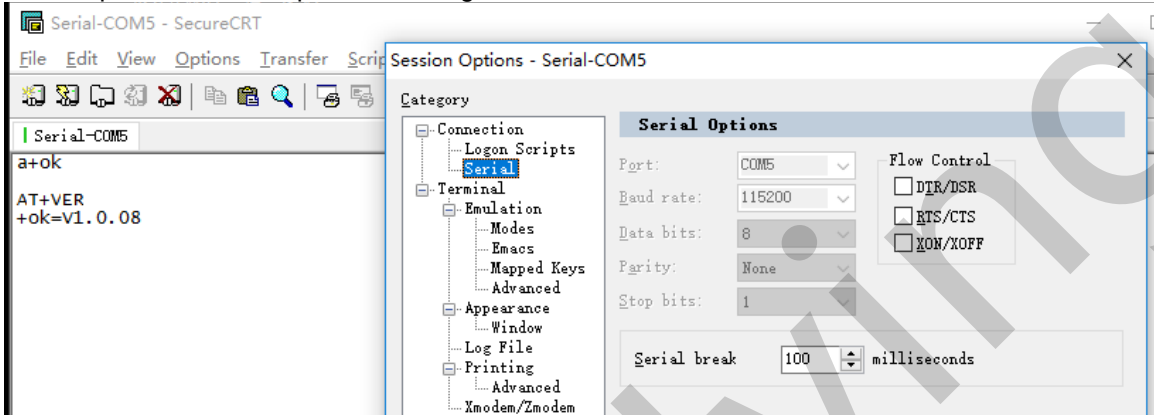
**+ok=<state,ret><CR><LF><CR><LF>**

- Parameters:
  - ◆ state: signal strength.
    - ◇ Disconnected: No connection with GPRS station
    - ◇ Good: signal is good
    - ◇ Normal: signal is normal
  - ◆ ret: signal strength value, range from 0~31.

## 4. TEST CASE

### 4.1. Use SOCK A to connect to server

Step 1: Refer to chapter 3 to change to AT command mode

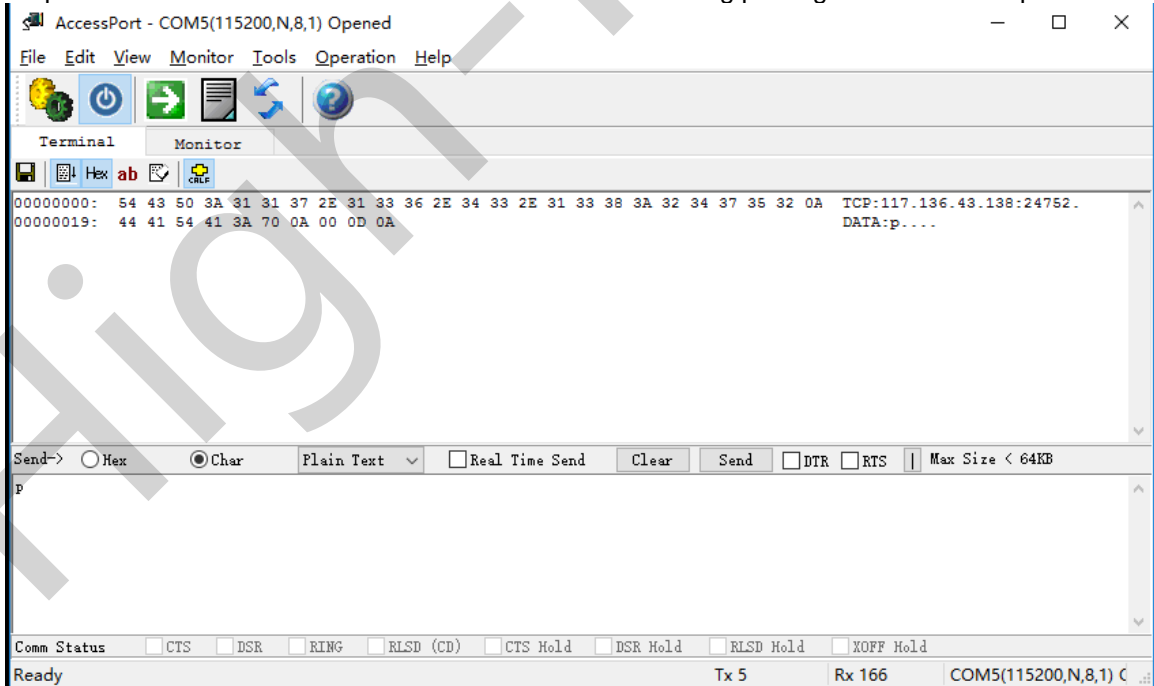


Step 2: Set the server information and reboot. The following is our test server address, it will feedback with the protocol, ip address, port and the received data.

```
AT+SOCKA=TCP,3006,112.124.43.15, LONG
+ok

AT+Z
```

Step 3: Send the data in HEX or ASCII format as the following pic to get the server response.



Note:

If encounter any problem, input AT+WANN and AT+TCPALK to check the network status.

```
AT+WANN  
+ok=10.58.94.37
```

```
AT+TCPALK  
+ok=on
```

High-Flying

## APPENDIX A: CONTACT US

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**Address: Room 1002, Building 1, No.3000, Longdong Avenue, Pudong New Area, Shanghai, China, 201203**

**Postcode : 201203**

**Website: [www.hi-flying.com](http://www.hi-flying.com)**

**Service Online : 400-189-3108**

**E-mail : [sales@hi-flying.com](mailto:sales@hi-flying.com)**

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**More about Hi-Flying products, please visit: <http://www.hi-flying.com/>**

**<END>**

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