

# AT Command User Manual

V1.0.0

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## 1 Introduction

### 1.1 Overview

This manual describes the AT+ command communication protocol of Winner Micro's Embedded Wi-Fi chip. AT + command protocol is a command format based on ASCII command style, communication via the UART interface with Wi-Fi chip.

### 1.2 Control command protocol

#### 1.2.1 Command code

The content of this part is the user command, which shall be open to end users of the products for achieving product parameter configuration, networking transmission and other functions, the command list is as follows:

	Command Name	Use
1.	<a href="#"><u>(null)</u></a>	Null
2.	<a href="#"><u>ATLT</u></a>	Set/query the automatic framing data length
3.	<a href="#"><u>ATM</u></a>	Set/query operating mode of the module
4.	<a href="#"><u>ATPT</u></a>	Set/query the automatic framing period
5.	<a href="#"><u>ATRM</u></a>	Set/query socket connection message automatically created by the module in automatic operating mode
6.	<a href="#"><u>BSSID</u></a>	Set/query BSSID address of target AP
7.	<a href="#"><u>BRDSSID</u></a>	Enable and disable AP SSID broadcast
8.	<a href="#"><u>CHL</u></a>	Set/query target wireless channel number
9.	<a href="#"><u>CHLL</u></a>	Set/query wireless channel list
10.	<a href="#"><u>CMDM</u></a>	Set/query the system's default command mode
11.	<a href="#"><u>DNS</u></a>	Set NIC domain
12.	<a href="#"><u>E</u></a>	Switch serial characters echo
13.	<a href="#"><u>ENCRY</u></a>	Set/query encryption mode of wireless network
14.	<a href="#"><u>ENTM</u></a>	Set the module into the serial transparent transmission mode

15.	<a href="#"><u>ENTS</u></a>	Enter the sleeping mode
16.	<a href="#"><u>ESPC</u></a>	Set/query escape character used to exit the transparent transmission mode
17.	<a href="#"><u>ESPT</u></a>	Set/query escape time used to exit the transparent transmission mode
18.	<a href="#"><u>IOM</u></a>	Set/query GPIO mode
19.	<a href="#"><u>KEY</u></a>	Set/query key of the wireless network
20.	<a href="#"><u>LKSTT</u></a>	Query the network connection status
21.	<a href="#"><u>LKSTT2</u></a>	Query the network connection status2, apsta mode is valid
22.	<a href="#"><u>NIP</u></a>	Set/query local IP address
23.	<a href="#"><u>PASS</u></a>	Set/query system password
24.	<a href="#"><u>PMTF</u></a>	Update all the parameters in memory to Flash
25.	<a href="#"><u>QMAC</u></a>	Query the physical address
26.	<a href="#"><u>QMAC2</u></a>	Query the physical address2, apsta mode is valid
27.	<a href="#"><u>QVER</u></a>	Query version information
28.	<a href="#"><u>RSTF</u></a>	Factory Default Setting
29.	<a href="#"><u>SKCLS</u></a>	Close socket connection
30.	<a href="#"><u>SKCT</u></a>	Create socket connection
31.	<a href="#"><u>SKRCV</u></a>	Receive data through socket connection
32.	<a href="#"><u>SKSDF</u></a>	Set default sending socket connection
33.	<a href="#"><u>SKSND</u></a>	Send data through socket connection
34.	<a href="#"><u>SKSTT</u></a>	Query socket connection status
35.	<a href="#"><u>SSID</u></a>	Set/query SSID
36.	<a href="#"><u>SSID2</u></a>	Set/query SSID2, apsta mode is valid
37.	<a href="#"><u>UART</u></a>	Set/query serial data format
38.	<a href="#"><u>WARC</u></a>	Set/query automatic retry times in the automatic operating mode
39.	<a href="#"><u>WARM</u></a>	Set/query wireless roaming
40.	<a href="#"><u>WATC</u></a>	Set/query automatically create Ad hoc network
41.	<a href="#"><u>WBGR</u></a>	Set/query wireless BG mode and the maximum transmission rate
42.	<a href="#"><u>WEBS</u></a>	Set/query Web server

43.	<a href="#"><u>WJOIN</u></a>	Join/create a wireless network
44.	<a href="#"><u>WLEAV</u></a>	Disconnect the wireless network
45.	<a href="#"><u>WPRT</u></a>	Set/query wireless network mode
46.	<a href="#"><u>WPSM</u></a>	Turn on/off power saving mode
47.	<a href="#"><u>WSCAN</u></a>	Scan the network
48.	<a href="#"><u>Z</u></a>	Reset
49.	<a href="#"><u>SKSRCIP</u></a>	Query socket data source IP address
50.	<a href="#"><u>SKRPTM</u></a>	Turn on/off socket initiative sending and receiving data function
51.	<a href="#"><u>ONESHOT</u></a>	Turn on/off one-shot configuration function
52.	<a href="#"><u>HTTTPC</u></a>	http post get data function
53.	<a href="#"><u>SKGHBN</u></a>	Get the server IP.
54.	<a href="#"><u>WREG</u></a>	Set/query wireless channel national region
55.	<a href="#"><u>AOLM</u></a>	Set/query the always-online mode of the module (Note, this mode is only valid when the module is in automatic operation mode and the network type is STA).
56.	<a href="#"><u>PORTM</u></a>	Set the module interface Function:0 serial; 1 high-speed serial; 2 SPI interface
57.	<a href="#"><u>UPNP</u></a>	Set upnp (close/enable);
58.	<a href="#"><u>WWPS</u></a>	Set/query WPS function
59.	<a href="#"><u>CUSTDATA</u></a>	Receiving user data via one-shot configuration tool
60.	<a href="#"><u>CNTPARAM</u></a>	Query network configuration parameters
61.	<a href="#"><u>SLIST</u></a>	Query the sta information already connected. Valid only in ap, apsta mode

The content of this section is reserved as a system command only for manufacturers to implement products maintenance and test function, the command list is as follows:

AT+ commnad	Function
&DBG	Set the system debugging mode
&REGR	Read register or internal RAM space

&REGW	Modify register or internal RAM space
&RFR	Read RF register space
&RFW	Modify RF register space
&FLSR	Read SPI Flash address space
&FLSW	Modify SPI Flash address space
&UPDM	Set the user interface (UART/SPI) firmware upgrade mode
&UPDD	Send firmware upgrade data
&UPDP	Setting factory parameters

### 1.2.2 Error code

The error code supported by this system is defined as follows, which applies to response message in AT + command protocol:

ASCII	Meaning
-	Success
-1	Invalid command format
-2	Command is not supported
-3	Invalid operation symbol
-4	Invalid parameter
-5	Operation not permitted
-6	Lack of Memory
-7	FLASH Error
-10	Failed to Join the Network
-11	No Available Socket
-12	Invalid Socket
-13	Socket Connection Failed
-100	Undefined Error

## 2 AT Command Protocol

### 2.1 Syntax introduction

This module uses AT + command protocol as the user control protocol. AT + command protocol is a command format based on ASCII command style. Its syntax format and management process is described as follows.

### 2.1.1 Syntax format

#### ■ Format description

<>: Indicates the part must be included

[]: Indicates the optional part

#### ■ Command message

AT+<CMD>[op][para1],[para2],[para3],[para4]...<CR>

AT+: Command message prefix

CMD: Command string

[op] : Command operator, when the command requires parameter, it can specify the operation type of parameters, including,

=, Parameter/returned value prefix characters

=!, Synchronize the modified parameter to flash in the command of parameter setting type

=?, Query the current setting in the command of parameter setting type

<CR> : Enter. It is 0x0d in ASCII

#### ■ Response message

+<RSP>[op][para1],[para2],[para3],[para4]...<CR><LF><CR><LF>

+: Response message prefix

RSP: Response string

OK Success

ERR Failure

<CR>: Enter. It is 0x0d in ascii

<LF>: Newline. It is 0x0a in ascii

#### ■ Data type

String: String, enclosed by double quotation marks, but the content does not include the quotation marks, such as *"this is a string"*.

Dec: Number in decimalist, such as 10

Hex: Number in hexadecimal, such as a

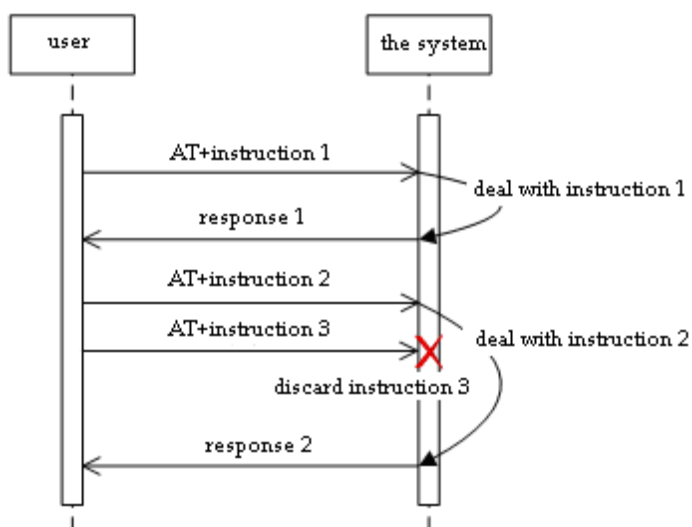
Ip: IP address string, such as 192.168.0.1

MAC: Formed with 12 hexadecimal numbers, such as 001EE3A80102

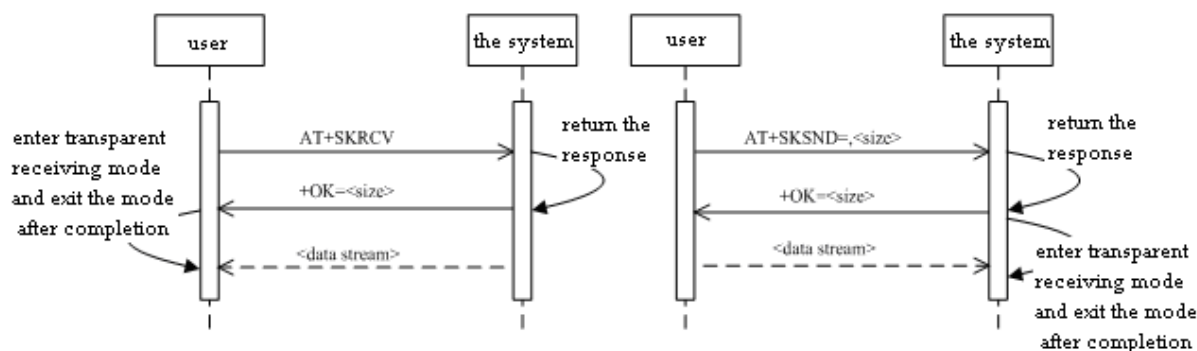


## 2.1.1.1 Process flow

AT+ command protocol uses the form of command+ response. The vast majority of commands need the response messages returned by the receiver after the completion of process. If the previous command is processing and a new command is received again, it will be silently discarded without returning any news, as shown below.



For certain special commands, such as AT + SKSND, AT + SKRCV, binary data shall be transmitted after the command or response, at this time, the data receiver temporarily turns into the transparent transmission mode and starts to receive the binary data flow until it receives the data length specified by the <size> field of command or message or waits for timeout, and then it automatically exits transparent transmission status, the process is shown as follows.



#### 2.1.1.2 Format examples

##### Example 1: Responding successful message

```
AT+  
+OK
```

##### Example 2: Responding failure message

```
AT+WJOIN  
+ERR=-10
```

##### Example 3: Using input parameter

```
AT+UART=9600, 1, 1, 0  
+OK
```

##### Example 4: Using parameter sync to Flash operator <!>

```
AT+ATPT=!500  
+OK
```

##### Example 5: Using query operator <?>

```
AT+ATPT=?  
+OK=500
```

#### 2.1.1.3 Error code

Value	Meaning
-1	Invalid command format
-2	Command is not supported
-3	Invalid operation symbol

	-4	Invalid parameter
	-5	Operation not permitted
	-6	Lack of Memory
	-7	FLASH Error
	-10	Failed to Join the Network
	-11	No Available Socket
	-12	Invalid Socket
	-13	Socket Connection Failed
	-100	Undefined Error

## 2.2 Command set

### 2.2.1 System control type

#### 2.2.1.1 AT+

##### **Function:**

Null command, to detect whether there is a normal response of the program.

##### **Format (ASCII):**

```
AT+<CR>
+OK<CR><LF><CR><LF>
```

##### **Parameter:**

None

#### 2.2.1.2 AT+Z

##### **Function:**

Reset system.

##### **Format (ASCII):**

```
AT+Z<CR>
+OK<CR><LF><CR><LF>
```

##### **Parameter:**

None

### 2.2.1.3 AT+E

**Function:**

Switch serial command echo.

**Format (ASCII):**

```
AT+E<CR>
+OK<CR><LF><CR><LF>
```

**Parameter:**

None

### 2.2.1.4 AT+ENTS

**Function:**

The system enters in sleeping mode. The system will be automatically awaked after receiving any at+ in sleeping state.

**Format (ASCII):**

```
AT+ENTS=[ps_type],[wake_type],[delay_time],[wake_time]<CR>
+OK<CR><LF><CR><LF>
```

**Parameter:**

ps\_type: power saving type

Value	Meaning
0	Sleep
1	Standby

wake\_type: awake type

Value	Meaning
0	gpio
1	Timer0

delay\_time: delay time, only valid when timer0 wake, unit ms, 100 ~ 10000ms

wake\_time: wake time, only valid when timer0 wake, unit ms, 1000 ~ 65535ms

#### 2.2.1.5 AT+ENTM

**Function:**

Serial enters in the transparent transmission mode. In the transparent transmission mode, the system will exit this mode while receiving escape character in line with the trigger conditions.

Note: before entering the transparent transmission mode, 1、ensure networking, 2、create a socket, 3、 set the default connection of the transparent transmission is the current created socket.

**Format (ASCII):**

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

**Parameter:**

None

#### 2.2.1.6 AT+RSTF

**Function:**

Return to the factory setting in FLASH. The system needs to restart and then the setting will become effective.

**Format (ASCII):**

```
AT+RSTF<CR>
+OK<CR><LF><CR><LF>
```

**Parameter:**

None

#### 2.2.1.7 AT+PMTF

**Function:**

All the parameters stored in memory shall be updated to FLASH to ensure that USER defined parameter won't disappear after power down.

**Format (ASCII):**

```
AT+PMTF<CR>
+OK<CR><LF><CR><LF>
```

**Parameter:**

None

#### 2.2.1.8 AT+QMAC

**Function:**

Acquire the physical address of the module.

**Format (ASCII):**

```
AT+QMAC<CR>
+OK=<mac address><CR><LF><CR><LF>
```

**Parameter:**

mac address: The length is 12 hexadecimal numbers, the format is 001EE3A34455

#### 2.2.1.9 AT+QMAC2

**Function:**

Acquire the soft ap physical address of the module created in apsta mode.

**Format (ASCII):**

```
AT+QMAC2<CR>
+OK=<mac address><CR><LF><CR><LF>
```

**Parameter:**

mac address: The length is 12 hexadecimal numbers, the format is 001EE3A34455

#### 2.2.1.10 AT+QVER

**Function:**

Acquire the system version information, including hardware version and firmware version.

**Format (ASCII):**

```
AT+QVER<CR>
+OK=<hard,firm,time,date><CR><LF><CR><LF>
```

**Parameter:**

hard: hardware version information, string format, such as “H1.00.00.1029”

firm: firmware version information, string format, such as “ F0.02.02@ 18:25:25 Jul 28 2010”

time: time of firmware creation

date: date of firmware creation

2.2.2 Parameter setting type

2.2.2.1 AT+NIP

**Function:**

When the module is STA, this command is used to set/query the local ip address. It should be noted that when the address type is set to DHCP, the actual dynamic IP address information of the module can't be queried by using this command. AT+LKSTT command can be used to query.

When the module as AP, this command is used to set/query the local ip address, enable and disable DHCP Server. It means that the meaning of the command “type” field in AP mode is different from that in STA mode. IP address of the module may be queried by using this command in enable DHCP Server.

**Format (ASCII):**

```
AT+NIP=[!?][type],[ip],[netmask],[gateway],[dns]<CR>
+OK[=type,ip,netmask,gateway,dns]<CR><LF><CR><LF>
```

**Parameter:**

type: address type

Value	Meaning
0	Use DHCP to dynamically allocate/enable DHCP Server
1	Use a static IP address/disable DHCP Server

ip: ip address, data format is “192.168.1.22”, without the quotation marks

netmask: subnet mask, data format is in line with ip address

gateway: gateway address, data format is in line with ip address

dns: DNS address, data format is in line with ip address

#### 2.2.2.2 AT+DNS

**Function:**

Set/query NIC module domain name, the setting is effective only when the module is AP.

**Format (ASCII):**

```
AT+DNS=[!?][dnsname]<CR>
+OK[=dnsname]<CR><LF><CR><LF>
```

**Parameter:**

dns name: NIC module domain name, 1~31 characters and surrounded by double quotation marks.

#### 2.2.2.3 AT+ATM

**Function:**

Set/query the operating mode of the module.

**Format (ASCII):**

```
AT+ATM=[!?][mode]<CR>
+OK[=mode]<CR><LF><CR><LF>
```

**Parameter:**

mode: operating mode

Value	Meaning
0	Automatic mode
1	Command mode

#### 2.2.2.4 AT+ATRM

**Function:**

Set/query the socket connection information automatically created by the module in automatic operating mode.

**Format (ASCII):**

```
AT+ATRM=[!?][protocol],[cs],[host/timeout],[port]<CR>
+OK[=protocol,cs, host/timeout,port]<CR><LF><CR><LF>
```



**Parameter:**

protocol: protocol type,

Value	Meaning
0	TCP
1	UDP

cs: C/S mode,

Value	Meaning
0	Client
1	Server

host\_timeout: According to the protocol and cs, the meanings are respectively as follows.

cs	protocol	Meaning
0	X	The target server name, input domain name or ip address, such as “192.168.1.100” or “www.sina.com.cn”
1	0	TCP connection timeout period, the client connecting to this server will be automatically kicked off if it does not send any data in this period. The effective value range is 1~10000000, unit: second, 0 means never, the default setting is 120 seconds
1	1	No meanings

port: port number

#### 2.2.2.5 AT+SSID

**Function:**

Set/query the wireless network name, that's ssid.

**Format (ASCII):**

```
AT+SSID=[!?][ssid]<CR>
+OK[=ssid]<CR><LF><CR><LF>
```

**Parameter:**

ssid: the wireless network name, 1~32 characters and surrounded by double quotation marks.

2.2.2.6 AT+SSID2

**Function:**

Set/query the soft ap name of the module created in apsta mode, that's ssid.

**Format (ASCII):**

```
AT+SSID2=[!?][ssid]<CR>
+OK[=ssid]<CR><LF><CR><LF>
```

**Parameter:**

ssid: the wireless network name, 1~32 characters and surrounded by double quotation marks.

2.2.2.7 AT+ENCRY

**Function:**

Set/query wireless network encryption mode. It should be specially noted that other encryption modes except OPEN mode need to set correct network key cooperating with AT+KEY command. In addition, the module only supports setting OPEN, WEP64 and WEP128 in AP or AD-HOC mode.

**Format (ASCII):**

```
AT+ENCRY=[!?][encry mode]<CR>
+OK[=encry mode]<CR><LF><CR><LF>
```

**Parameter:**

encry mode: encryption mode

Value	Meaning
0	OPEN
1	WEP64
2	WEP128

	3	WPA-PSK(TKIP)
	4	WPA-PSK(CCMP/AES)
	5	WPA2-PSK(TKIP)
	6	WPA2-PSK(CCMP/AES)

#### 2.2.2.8 AT+KEY

##### Function:

Set/query the network key. It should be noted that before using this command to set network key, the encryption mode must be firstly set by the command AT+ENCRY.

##### Format (ASCII):

```
AT+KEY=[!?][format],[index],[key]<CR>
+OK[=format,index,key]<CR><LF><CR><LF>
```

##### Parameter:

format: key format

Value	Meaning
0	HEX
1	ASCII

index: The key index number, 1~4 is used in WEP encryption key, and it's set 0 in other encryption mode.

key: Key string, it's embedded in double quotation marks. According to the different encryption modes, key size and key format are defined as follows,

Encryption mode	Key format	
	HEX	ASCII
WEP64	10 hexadecimal characters <sup>(Note 1)</sup>	5 ASCII characters <sup>(Note 2)</sup>
WEP128	26 hexadecimal characters	13 ASCII characters
WPA-PSK(TKIP)	64 hexadecimal characters	8 ~ 63 ASCII characters
WPA-PSK(CCMP/AES)	64 hexadecimal characters	8 ~ 63 ASCII characters
WPA2-PSK(TKIP)	64 hexadecimal characters	8 ~ 63 ASCII characters
WPA2-PSK(CCMP/AES)	64 hexadecimal characters	8 ~ 63 ASCII characters

Note 1: 16 hexadecimal characters represents 0 ~ 9, a ~ f (case insensitive), such as “11223344dd”

Note 2: ASCII character refers to numbers 0~9 and characters a ~ z (case-sensitive) in the standard ASCII character set specified by the International Organization for Standardization (ISO), such as “14u6E”

## 2.2.2.9 AT+BSSID

### Function:

Set/query specified bssid address of the target AP. This setting is effective only in the infra network when the module is STA.

### Format (ASCII):

```
AT+BSSID=[!?][mode],[bssid]<CR>
+OK[=mode,bssid]<CR><LF><CR><LF>
```

### Parameter:

mode: BSSID mode

Value	Meaning
0	Automatic
1	Specified

bssid: network BSSID, the length is 12 hexadecimal numbers, the format is 001EE3A34455

## 2.2.2.10 AT+CHL

### Function:

Set/query the specified wireless channel mode.

### Format (ASCII):

```
AT+CHL=[!?][mode],[channel]<CR>
+OK[=mode,channel]<CR><LF><CR><LF>
```

### Parameter:

mode: channel mode

Value	Meaning
0	Automatic
1	Specified

channel: wireless channel number, the effective range is 1 ~ 14.

#### 2.2.2.11 AT+CHLL

##### Function:

Set/query wireless channel list. The parameter in wireless channel list is used to specify working channel range of the module, channels not included in the list will not be scanned. Reasonably using this parameter may speed up the module scanning and networking speed.

##### Format (ASCII):

```
AT+CHLL=[!?][channel list]<CR>
+OK[=channel list]<CR><LF><CR><LF>
```

##### Parameter:

channel list: wireless channel list, in hexadecimal format, beginning from the lowest bit, each bit represents a channel, the default setting is 3fff, that represents all the 1~14 channels

#### 2.2.2.12 AT+WPRT

##### Function:

Set/query wireless network mode.

##### Format (ASCII):

```
AT+WPRT=[!?][type]<CR>
+OK[=type]<CR><LF><CR><LF>
```

##### Parameter:

type: network mode

Value	Meaning
0	infra network (the module as STA)
1	adhoc network
2	infra network (the module as AP)
3	infra network (the module as APSTA)

#### 2.2.2.13 AT+WATC

##### Function:

Set/query whether to automatically create the enabled adhoc network. This setting is effective only when the wireless network type is set to adhoc, which means whether to create an adhoc network with the same SSID when networking is failed.

**Format (ASCII):**

```
AT+WATC=[!?][enable]<CR>
+OK[=enable]<CR><LF><CR><LF>
```

**Parameter:**

enable: The symbol of enabling

Value	Meaning
0	Disabled
1	Enabled

2.2.2.14 AT+WPSM

**Function:**

Turn on/off automatic power saving mode.

**Format (ASCII):**

```
AT+WPSM=[!?][enable]<CR>
+OK[=enable]<CR><LF><CR><LF>
```

**Parameter:**

enable: The symbol of enabling

Value	Meaning
0	Disabled
1	Enabled

2.2.2.15 AT+WARM

**Function:**

Set/query whether to enable wireless roaming function, the setting is effective only in the infra network when the module as STA.

**Format (ASCII):**

```
AT+WARM=[!?][enable]<CR>
+OK[=enable]<CR><LF><CR><LF>
```

**Parameter:**

enable: The symbol of enabling

Value	Meaning
0	Disabled
1	Enabled

2.2.2.16 AT+WARC

**Function:**

Set/query the function of automatic retry after the wireless network is disconnected or networking is failed. This parameter is only effective in the infra network that the module as STA and the module is in the automatic operating mode.

**Format (ASCII):**

```
AT+WARC=[!?][count]<CR>
+OK[=count]<CR><LF><CR><LF>
```

**Parameter:**

count: Times of Retry

Value	Meaning
0	No retry
1~254	Times of retry
255	Retry forever

2.2.2.17 AT+WBGR

**Function:**

Set/query BG mode of the wireless network and the maximum sending rate.

**Format (ASCII):**

```
AT+WBGR= [!?][bg_mode],[max_rate]<CR>
+OK[=bg_mode,max_rate]<CR><LF><CR><LF>
```

**Parameter:**

bg mode: BG mode

Value	Meaning
0	B/G mixed

1	B
---	---

max rate: The maximum sending rate, in B mode, only 0-3 is effective.

Value	Meaning
0	1 Mbps
1	2 Mbps
2	5.5 Mbps
3	11 Mbps
4	6 Mbps
5	9 Mbps
6	12 Mbps
7	18 Mbps
8	24 Mbps
9	36 Mbps
10	48 Mbps
11	54 Mbps

#### 2.2.2.18 AT+BRDSSID

##### Function:

Enable/disable AP SSID broadcast, and this setting is only valid when the module is as AP.

##### Format (ASCII):

```
AT+BRDSSID=[!?][enable]<CR>
+OK[=enable]<CR><LF><CR><LF>
```

##### Parameter:

enable: Whether to enable SSID broadcast

Value	Meaning
0	Disable AP SSID broadcast
1	Enable AP SSID broadcast

#### 2.2.2.19 AT+UART

##### Function:



Set/query data format of uart interface.

## Format (ASCII):

AT+UART=[!?][baudrate],[databit],[stopbit],[parity],[flowcontrol]<CR>  
+OK[=baudrate,databit,stopbit,parity]<CR><LF><CR><LF>

## Parameter:

baud rate: baud rate, the valid range is from 1200~115200,

Value	Meaning
115200	115200 bps
57600	57600 bps
38400	38400 bps
19200	19200 bps
9600	9600 bps
4800	4800 bps
2400	2400 bps
1200	1200 bps

data bit: data bits

Value	Meaning
0	8 bits
1	7 bits

stop bit: stop bits

Value	Meaning
0	1 bit
1	Not support
2	2 bits

parity: parity

Value	Meaning
0	No parity
1	Odd parity

	2	Even parity	
--	---	-------------	--

#### 2.2.2.20 AT+ATPT

##### Function:

Set/query the automatic framing period of the data. This parameter is only effective in serial transparent transmission mode.

##### Format (ASCII):

```
AT+ATPT=[!?][period]<CR>
+OK[=period]<CR><LF><CR><LF>
```

##### Parameter:

period: automatic framing period, 50~10000ms, the unit is millisecond, the minimum step size is 50ms

#### 2.2.2.21 AT+ATLT

##### Function:

Set/query the automatic framing length of the data. This parameter is only effective in serial transparent transmission mode.

##### Format (ASCII):

```
AT+ATLT=[!?][length]<CR>
+OK[=length]<CR><LF><CR><LF>
```

##### Parameter:

length: automatic framing length, 32~1024 bytes

#### 2.2.2.22 AT+ESPC

##### Function:

Set/query the escape characters. This parameter is used for serial to exit the transparent transmission mode.

##### Format (ASCII):

```
AT+ESPC=[!?][escape]<CR>
+OK[=escape]<CR><LF><CR><LF>
```

**Parameter:**

escape: escape characters, the format is 2 hexadecimal numbers representing ASCII characters, for example, ASCII characters “+ ”should be expressed as “2B”.

### 2.2.2.23 AT+ESPT

**Function:**

Set/query the escape time. This parameter is used for serial to exit the transparent transmission mode.

**Format (ASCII):**

```
AT+ESPT=[!?][time]<CR>
+OK[=time]<CR><LF><CR><LF>
```

**Parameter:**

time: escape time, 100~10000ms, the unit is millisecond, the minimum step size is 100ms

### 2.2.2.24 AT+WEBS

**Function:**

Set/query whether to enable WEB management server.

**Format (ASCII):**

```
AT+WEBS=[!?][enable],[port]<CR>
+OK[=enable,port]<CR><LF><CR><LF>
```

**Parameter:**

enable: The symbol of enabling

Value	Meaning
0	Disabled
1	Enabled

port: server port number, the default setting is 80.

#### 2.2.2.25 AT+PASS

**Function:**

Set/query system login password.

**Format (ASCII):**

```
AT+PASS=[!?][password]<CR>
+OK[=password]<CR><LF><CR><LF>
```

**Parameter:**

pass: 6 ASCII characters

#### 2.2.2.26 AT+IOM

**Function:**

Set/query GPIO1 operating mode.

**Format (ASCII):**

```
AT+IOM=[!?][mode]<CR>
+OK[=mode]<CR><LF><CR><LF>
```

**Parameter:**

mode: Operating mode

Value	Meaning
0	System Function
1	Input
2	Output

#### 2.2.2.27 AT+CMDM

**Function:**

Set/query the default command mode of the system.

**Format (ASCII):**

```
AT+CMDM=[!?][mode]<CR>
+OK[=mode]<CR><LF><CR><LF>
```

**Parameter:**

mode: Command mode

Value	Meaning
0	AT + command
1	Compatible protocol

#### 2.2.2.28 AT+CUSTDATA

##### Function:

Receiving user data via one-shot configuration tool. The first to send AT + ONE SHOT = 1 command before using, the module is configured to one-shot mode.

##### Format (ASCII):

```
AT+CUSTDATA[=?]<CR>
+OK=data<CR><LF><CR><LF>
```

##### Parameter:

None

#### 2.2.2.29 AT+CNTPARAM

##### Function:

Query network configuration parameters.

##### Format (ASCII):

```
AT+CNTPARAM[=?]<CR>
+OK=<bssid_en>,[bssid],[ssid],<key><CR><LF><CR><LF>
```

##### Parameter:

return: bssid\_en

Value	Meaning
0	Disable BSSID connecting
1	Enable BSSID connecting

Enable BSSID,return 1 , bssid, key

Disable BSSID, return 0, ssid, key

## 2.2.3 Network control class

### 2.2.3.1 AT+UPNP

#### Function:

Set/query upnp function.

#### Format (ASCII):

```
AT+UPNP=[!?][enable] <CR>
+OK[=enable]<CR><LF><CR><LF>
```

#### Parameter:

enable: whether to enable upnp function

Value	Meaning
0	Disabled
1	Enabled

Description: UPnP is a P2P connection structure around the world achieved by various smart devices, wireless devices and personal computers.

### 2.2.3.2 AT+PORTM

#### Function:

Set/query the module interface mode.

#### Format (ASCII):

```
AT+PORTM=[!?][mode]<CR>
+OK[=mode]<CR><LF><CR><LF>
```

#### Parameter:

mode: interface mode

Value	Meaning
0	Low-speed UART
1	High-speed UART

2	H-SPI
---	-------

### 2.2.3.3 AT+ AOLM

#### Function:

Set/query the always-online mode of the module (Note, this mode is only valid when the module is in automatic operation mode and the network type is STA).

#### Format (ASCII):

```
AT+AOLM=[!?][enable],[ssid],[encry],[key]<CR>
+OK[=enable],[ssid],[encry],[key]<CR><LF><CR><LF>
```

#### Parameter:

enable: whether to enable always-online mode

ssid: wireless network name, 1~32 characters

encry: encryption mode

Value	Meaning
0	Open
1	Encryption (WPA2-PSK, CCMP/AES)

key: key, the length is fixed at 8 ASCII characters

### 2.2.3.4 AT+ SKGHBN

#### Function:

Get IP of the extranet domain name.

#### Format (ASCII):

```
AT+ SKGHBN =[!?][ URL] <CR>
+OK[=IP]<CR><LF><CR><LF>
```

#### Parameter:

URL: extranet domain name

IP: ip address.

### 2.2.3.5 AT+ WWPS

#### Function:

Set/query WPS function

**Format (ASCII):**

```
AT+WWPS=[!?][mode],[pin]<CR>
+OK[=mode],[pin]<CR><LF><CR><LF>
```

**Parameter:**

mode: WPS function selection

Value	Meaning
0	Button method
1	PIN method

pin\_len: the length of PIN code (only for HEX format command)

pin: wireless router PIN code, hexadecimal format

### 2.2.3.6 AT+WREG

**Function:**

Set/query wireless channel national region.

**Format (ASCII):**

```
AT+WREG=[!?][region] <CR>
+OK[=region]<CR><LF><CR><LF>
```

**Parameter:**

region: national region code

### 2.2.3.7 AT+WJOIN

**Function:**

This command is only valid when the module as STA is used to join/create a wireless network. If the current network mode is adhoc, and no specified SSID network can be detected, the module will automatically create a new network. If it is already networking, then the network connection information will be directly returned.

**Format (ASCII):**

```
AT+WJOIN<CR>
```



+OK=<bssid>,<type>,<channel>,<encry>,<ssid>,<rsi><CR><LF><CR><LF>

**Parameter:**

bssid: Network BSSID with the length of 12 hexadecimal numbers in the format of 001EE3A34455

type: network mode

Value	Meaning
0	Infra network(STA)
1	Adhoc network
2	infra network (AP)

channel: channel number

encry: encryption mode

Value	Meaning
0	Open
1	Encryption

ssid: wireless network name, 1~32 characters, surrounded by double quotation marks

rsi: network signal strength, none minus, its unit is Db, i.e., 50 indicates that the strength is -50Db.

### 2.2.3.8 AT+WLEAV

**Function:**

This command is only valid when the module is STA, and it can be used to disconnect the current wireless network.

**Format (ASCII):**

AT+WLEAV<CR>  
+OK<CR><LF><CR><LF>

**Parameter:**

None

### 2.2.3.9 AT+WSCAN

#### Function:

This command is only valid when the module is STA, and it can be used to scan wireless network and return after the completion.

#### Format (ASCII):

```
AT+WSCAN<CR>
+OK=<bssid>,<type>,<channel>,<encry>,<ssid>,<rssi><CR><LF>
    <bssid>,<type>,<channel>,<encry>,<ssid>,<rssi><CR><LF>
    .....
    <CR><LF>
```

#### Parameter:

The same with AT+WJOIN

### 2.2.3.10 AT+LKSTT

#### Function:

Query the network connection status.

#### Format (ASCII):

```
AT+LKSTT<CR>
+OK[=status,ip,netmask,gateway,dns1,dns2]<CR><LF><CR><LF>
```

#### Parameter:

status: connection status

Value	Meaning
0	Disconnect
1	Connect

ip: ip address, data format is "192.168.1.22", without the quotation marks

netmask: subnet mask, data format is in line with ip address

gateway: gateway address, data format is in line with ip address

dns1: DNS address, data format is in line with ip address

dns2: DNS address, data format is in line with ip address

### 2.2.3.11 AT+LKSTT2

#### Function:

Query the soft ap network connection status of the module created in apsta mode.

#### Format (ASCII):

AT+LKSTT2<CR>  
+OK[=status,ip,netmask,gateway,dns1,dns2]<CR><LF><CR><LF>

#### Parameter:

status: connection status

Value	Meaning
0	Disconnect
1	Connect

ip: ip address, data format is “192.168.1.22”, without the quotation marks

netmask: subnet mask, data format is in line with ip address

gateway: gateway address, data format is in line with ip address

dns1: DNS address, data format is in line with ip address

dns2: DNS address, data format is in line with ip address

### 2.2.3.12 AT+SLIST

#### Function:

Query the sta information already connected. Valid only in ap, apsta mode.

#### Format (ASCII):

AT+SLIST<CR>  
+OK[=sta\_number,sta\_mac1,sta\_ip1,sta\_mac2,sta\_ip2...]<CR><LF><CR><LF>

#### Parameter:

sta\_number: the number of station already connected.

sta\_mac: station mac address already connected

sta\_ip: station ip address already connected

### 2.2.3.13 AT+SKCT

#### Function:

Create the socket. In client mode, waiting for connection completion (success or failure) and then return; in server mode, directly return after the completion of creation.

#### Format (ASCII):

AT+SKCT=[protocol],[cs],[host\_timeout],<remote\_port>,<local\_port><CR>  
+OK=<socket><CR><LF><CR><LF>

#### Parameter:

protocol: protocol type,

Value	Meaning
0	TCP
1	UDP

cs: C/S mode,

Value	Meaning
0	Client
1	Server

host\_timeout: According to the protocol and cs, the meanings are respectively as follows.

cs	protocol	Meaning
0	X	The target server name, input domain name or ip address, such as “192.168.1.100” or “www.sina.com.cn”
1	0	TCP connection timeout period, the client connecting to this server will be automatically kicked off if it does not send any data in this period. The effective value range is 1~10000000, unit: second, 0 means never, the default setting is 120 seconds
1	1	No meanings

remote\_port: remote port number

local\_port: local port number

socket: socket number

#### 2.2.3.14 AT+SKSND

##### Function:

Send data by the specified socket and return after the completion. This command sends binary data. Users should begin to send original data after receiving the response (+OK) of module. The module will automatically exit transmission process after receiving the specified data length and send data to the network, the redundant data will be rejected. Otherwise, the module will be forced to constrainedly exit transmission mode and send the received data to the network when the module has been waiting for timeout period (1 second).

##### Format (ASCII):

```
AT+SKSND=<socket>,<size><CR>
+OK=<actualsize><CR><LF><CR><LF>
[data steam]
```

##### Parameter:

socket: socket number

size: the prepared sending data length, the number of bytes

actualsize: the allowed sending data length, the number of bytes

data steam: original data

#### 2.2.3.15 AT+SKRCV

##### Function:

Read data form receive buffer of the target socket, and return after the completion. After receiving this command, the module will transmit the specified size binary data after finishing sending the correspondent message (+OK).

##### Format (ASCII):

```
AT+SKRCV=<socket>,<maxsize><CR>
+OK=<size><CR><LF><CR><LF>
```

[data steam]

**Parameter:**

socket: socket number

maxsize: the maximum length of the receivable data

size: the length of the actual received data

data steam: original data

### 2.2.3.16 AT+SKSTT

**Function:**

Get the specified socket status, the first line of the return value means user-specified socket status information. If the socket type is TCP server, then from the next line, each line represents a socket status of a connected client.

**Format (ASCII):**

```
AT+SKSTT=<socket><CR>
+OK=<socket>,<status>,[host],[HostPort],[LocalPort],[rx_data]<CR><LF>
    [socket],[status],[host],[HostPort],[ LocalPort],[rx_data]<CR><LF>
    ...
    <CR><LF>
```

**Parameter:**

socket: socket number

status: socket status

Value	Meaning
0	Disconnection
1	Detecting
2	Connection

host: ip address of the opposite terminal

HostPort: port number of the opposite terminal

LocalPort: the local port number

rx\_data: data size in the receiving buffer

#### 2.2.3.17 AT+SKCLS

**Function:**

Close the specified socket.

**Format (ASCII):**

```
AT+SKCLS=<socket><CR>
+OK<CR><LF><CR><LF>
```

**Parameter:**

socket: socket number

#### 2.2.3.18 AT+SKSDF

**Function:**

Set the default sending socket of the system. If users need to enter the transparent transmission mode in command mode, using this command can specify the transparent serial data transmission destination.

**Format (ASCII):**

```
AT+SKSDF=<socket><CR>
+OK<CR><LF><CR><LF>
```

**Parameter:**

socket: socket number

#### 2.2.3.19 AT+SKSRCIP

**Function:**

Get current socket receiving data source IP address.

**Format (ASCII):**

```
AT+SKSRCIP=?<CR>
+OK=[host]<CR><LF><CR><LF>
```

**Parameter:**

Host: IP address of data source

#### 2.2.3.20 AT+SKRPTM

**Function:**

Turn on/off socket initiative reporting and receiving data function.

**Format (ASCII):**

```
AT+SKRPTM=<mode><CR>
+OK<CR><LF><CR><LF>
```

**Parameter:**

Mode:

Value	Meaning
0	Close
1	Open

#### 2.2.3.21 AT+ONESHOT

**Function:**

Turn on/off one-shot configuration function.

**Format (ASCII):**

```
AT+ONESHOT=<status><CR>
+OK<CR><LF><CR><LF>
```

**Parameter:**

status:

Value	Meaning
0	Close
1	Open

#### 2.2.3.22 AT+HTTTPC

**Function:**

Http post get function.

**Format (ASCII):**



```
AT+HTTTPC=<url>,<verb>,<postdata><CR>
+OK<CR><LF><CR><LF>
```

**Parameter:**

url: remote http server-side address;

verb:

Value	Meaning
0	http get
1	-
2	http post
3	http put

post data:

Upload data to http when verb is 2, 3.

## 2.2.4 System debug type

### 2.2.4.1 AT+&DBG

**Function:**

Set the system debugging mode.

**Format (ASCII):**

```
AT+&DBG=<bit_enable><CR>
+OK[=bit_enable]<CR><LF><CR><LF>
```

**Parameter:**

bit\_enable: hexadecimal notation, each bit refers to a debugging function, 0 - disable, 1 -enable

### 2.2.4.2 AT+&REGR

**Function:**

Read register or memory space, the unit is 32bit word, the maximum is 8 words.

**Format (ASCII):**

```
AT+&REGR=<address>,[num]<CR>
```

+OK=<value1>,[value2]...<CR><LF><CR><LF>
--

**Parameter:**

address: register base address

num: register number, the default setting is 1

value: register value

#### 2.2.4.3 AT+&REGW

**Function:**

Modify register or memory space, the unit is 32bit word, the maximum is 8 words.

**Format (ASCII):**

AT+&REGW=<address><value1>,[value2]...<CR> +OK=<CR><LF><CR><LF>
--

**Parameter:**

address: register address

num: register number

value: register value

#### 2.2.4.4 AT+&RFR

**Function:**

Read RF register space, the unit is 16bit word, the maximum is 8 words.

**Format (ASCII):**

AT+&RFR=<address>,[num]<CR> +OK=<value1>,[value2]...<CR><LF><CR><LF>
---

**Parameter:**

address: register base address

num: register number, the default setting is 1

value: register value

#### 2.2.4.5 AT+&RFW

**Function:**

Modify RF register space, the unit is 16bit word, the maximum is 8 words.

**Format (ASCII):**

```
AT+&RFW=<address><value1>,[value2]...<CR>
+OK=<CR><LF><CR><LF>
```

**Parameter:**

address: register address

num: register number ( only for HEX format command)

value: register value

#### 2.2.4.6 AT+&FLSR

**Function:**

Read SPI Flash space, the unit is 32bit word, the maximum is 8 words.

**Format (ASCII):**

```
AT+&FLSR=<address>,[num]<CR>
+OK=<value1>,[value2]...<CR><LF><CR><LF>
```

**Parameter:**

address: register base address

num: register number, the default setting is 1

value: register value

#### 2.2.4.7 AT+&FLSW

**Function:**

Modify SPI Flash space, the unit is 32bit word, the maximum is 8 words.

**Format (ASCII):**

```
AT+&FLSW=<address><value1>,[value2]...<CR>
+OK=<CR><LF><CR><LF>
```

**Parameter:**

address: register base address

num: register number, the default setting is 1

value: register value

#### 2.2.4.8 AT+&UPDM

**Function:**

Firmware upgrade mode set by the user interface (UART/SPI).

**Format (ASCII):**

```
AT+&UPDM=?![mode]<CR>
+OK[=mode]<CR><LF><CR><LF>
```

**Parameter:**

mode: system operation mode

0 - normal

1 –upgrade mode

#### 2.2.4.9 AT+&UPDD

**Function:**

Send online upgrade data.

**Format (ASCII):**

```
AT+&UPDD=<size><CR>[data stream]
+OK<CR><LF><CR><LF>
```

**Parameter:**

size: data length

data stream: upgrade date

#### 2.2.4.10 AT+&UPDP

**Function:**

Used to change the factory settings.

**Format (ASCII):**

```
AT+&UPDP=<mode><CR>
+OK<CR><LF><CR><LF>
```

## Parameter:

mode:

Value	Meaning
1	Enable modify factory parameter area, save the modified parameters to the user factory parameters area after setting.
0	Disable modify factory parameter area, save the modified parameters to the user parameters area after setting

If you need to change the parameters of the user parameter area of the factory, the first UPDP mode is set to 1, and then modify the parameters you need, UPDP mode is set to 0 after modify completed, so that the modified parameters are saved to the user area of the factory parameters.

## 3 Common operation

### 3.1 Create AP process

(1) WPRT Set wireless NIC operating mode as AP

AT+WPRT=2

(2) SSID Set wireless NIC network name of STA as MyAp

AT+SSID=MyAp

(3) ENCRY Set wireless NIC encryption mode as WEP64

AT+ENCRY=1

Parameter:open: 0, WEP64: 1, WEP128: 2

(4) KEY Set wireless NIC key as 12345

AT+KEY=1,1,12345

Parameter 1: key format, 0 represents HEX, 1 represents ASCII

Parameter 2: index: key index number, 1~4 for WEP encryption key, other encryption

method is fixed at 0

Parameter 3: wireless key. For example: 12345

- (5) NIP                      Set ip address and subnet mask

AT+NIP=1,192.168.1.1,255.255.255.0,192.168.1.1,192.168.1.1

Parameter 1: address type, 0 refers to using DHCP dynamic allocation, 1 refers to the static address

Parameter 2: ip: 192.168.1.1

Parameter 3: netmask: 255.255.255.0

Parameter 4: gateway: 192.168.1.1

Parameter 5: dns: 192.168.1.1

- (6) PMTF                  Save parameters to spi flash

AT+PMTF

- (7) Z                      Reset wireless NIC

AT+Z

- (8) Delay 1 second

- (9) WJOIN                Create wireless network MyAp

AT+WJOIN

### 3.2 Scan AP process

AT cmd for wireless NIC scanning AP: AT+WSCAN

### 3.3 STA joins AP process

- (1) WPRT                Set operating mode as STA

AT+WPRT=0

- (2) SSID                Set the added AP name , such as WinnerMicro

AT+SSID=WinnerMicro

- (3) KEY                Set the added AP wireless key 12345

AT+KEY=1,0,12345678

Parameter 1: key format, 0 represents HEX, 1 represents ASCII

Parameter 2: index: key index number, 1~4 for WEP encryption key, other encryption method is fixed at 0

Parameter 3: wireless key. For example: 12345678

(5) NIP                      Start DHCP

AT+NIP=0

(6) PMTF                  Save parameters to spi flash

AT+PMTF

(7) Z                        Reset wireless NIC

AT+Z

(8) Delay 1 second

(8) WJOIN                Join wireless network WinnerMicro

AT+WJOIN

### 3.4    How to disconnect AP by STA

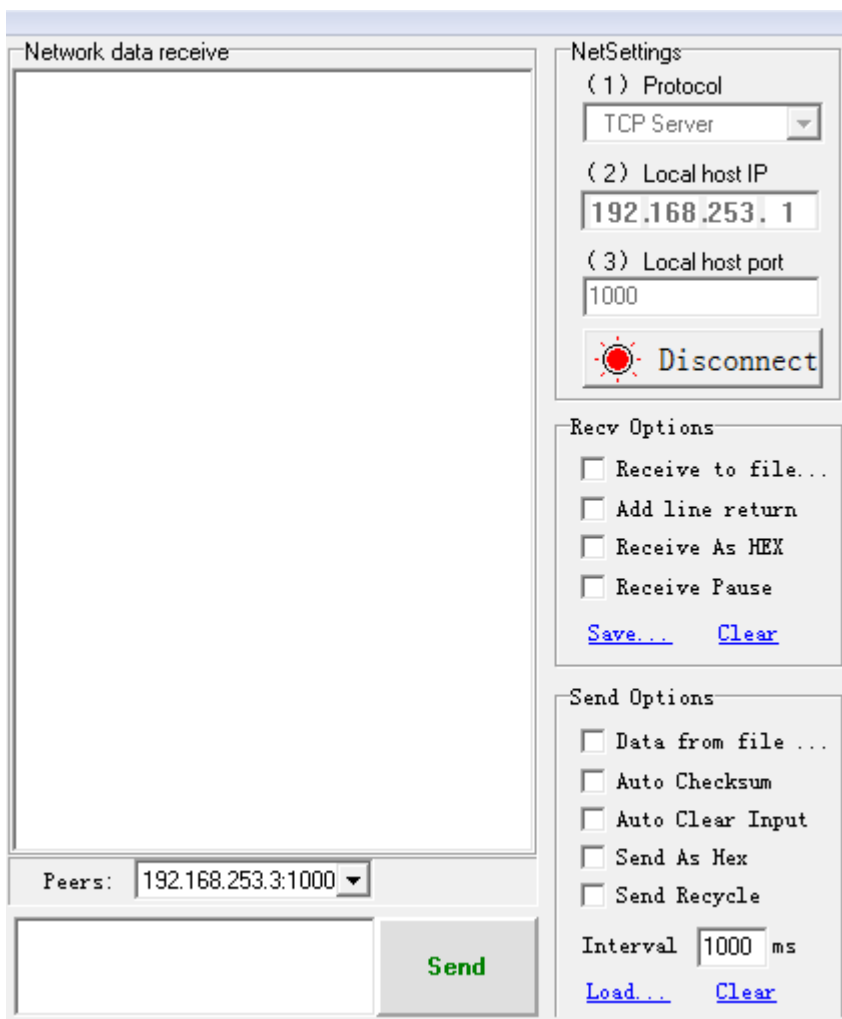
AT cmd for wireless NIC disconnecting AP: AT+WLEAV

### 3.5    How to view the current status by STA

AT cmd for wireless NIC querying current NIC status: AT+LKSTT

### 3.6    How to use socket function

(1) Build a PC-side TCP server. If using TCP debugging assistant, TCP server address is 192.168.253.1, listening port 1000.




Network data receive

NetSettings

(1) Protocol  
TCP Server

(2) Local host IP  
192.168.253.1

(3) Local host port  
1000

 Disconnect

Recv Options

☐ Receive to file...

☐ Add line return

☐ Receive As HEX

☐ Receive Pause

[Save...](#) [Clear](#)

Send Options

☐ Data from file ...

☐ Auto Checksum

☐ Auto Clear Input

☐ Send As Hex

☐ Send Recycle

Interval 1000 ms

[Load...](#) [Clear](#)

Peers: 192.168.253.3:1000

[Send](#)

(2) Set up Socket:

TX: AT+SKCT=0,0,192.168.253.1,1000,1000

RX: +OK=1 ---> 1 is socket number



File(F) Options(O) Help(H)

COMSettings


PortNum COM4

BaudR 115200

DPaity NONE

DataB 8 bit

StopB 1 bit

 Close

Recv Options

☐ Receive to file...

☐ Add line return

☐ Receive As HEX

☐ Receive Pause

[Save...](#) [Clear](#)

Send Options

☐ Data from file ...

☒ Auto Checksum

☐ Auto Clear Input

☐ Send As Hex

☐ Send Recycle

Interval 1000 ms

[Load...](#) [Clear](#)

COM port data receive

+OK=1

AT+SKCT=  
0, 0, 192. 168. 253. 1, 1000, 1000

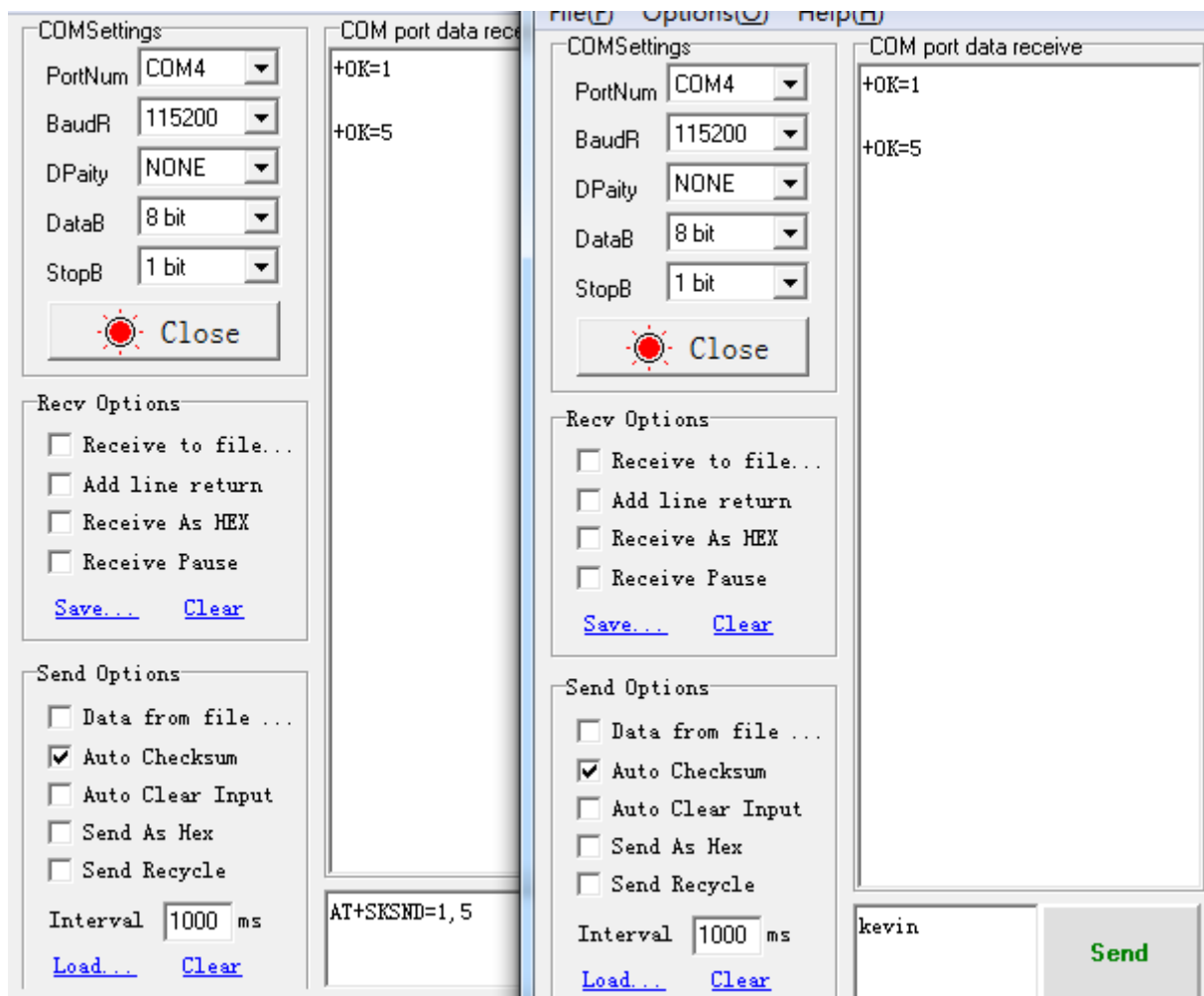
**Send**

(3) Sending data:

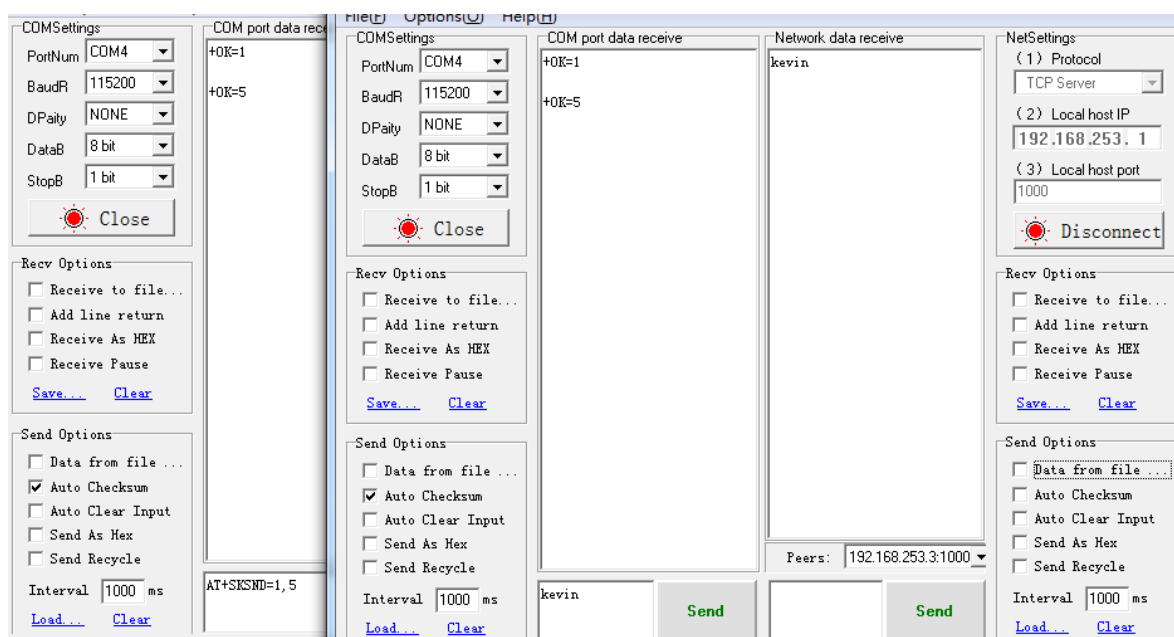
TX: AT+SKSND=1,5

kevin

RX: +OK=5

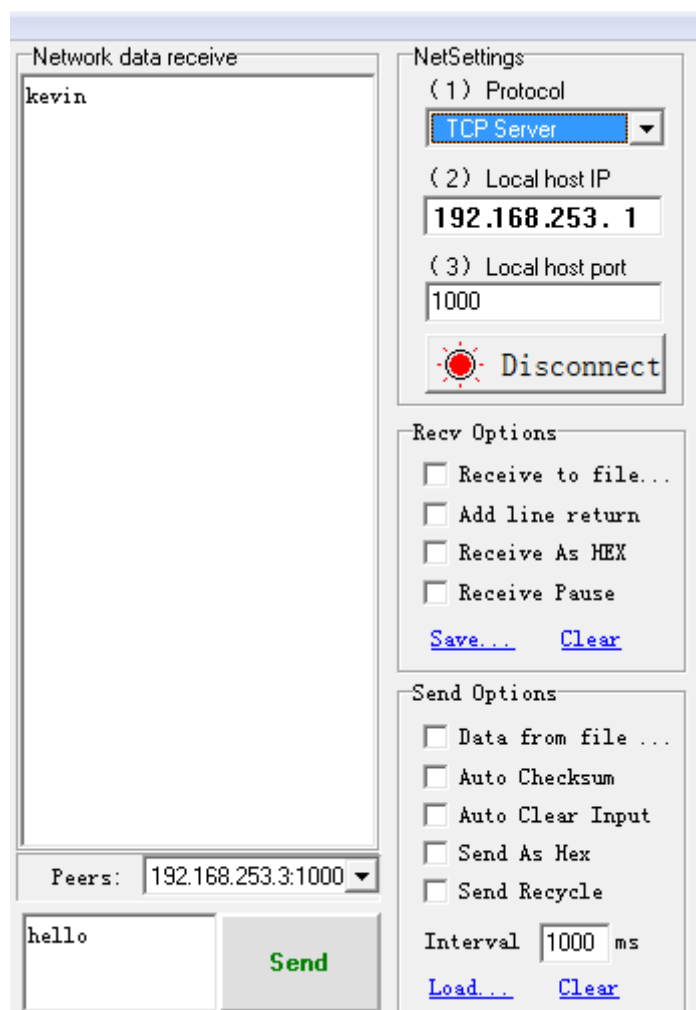


The data interface received by TCP server is as follows:



(4) Receiving data:

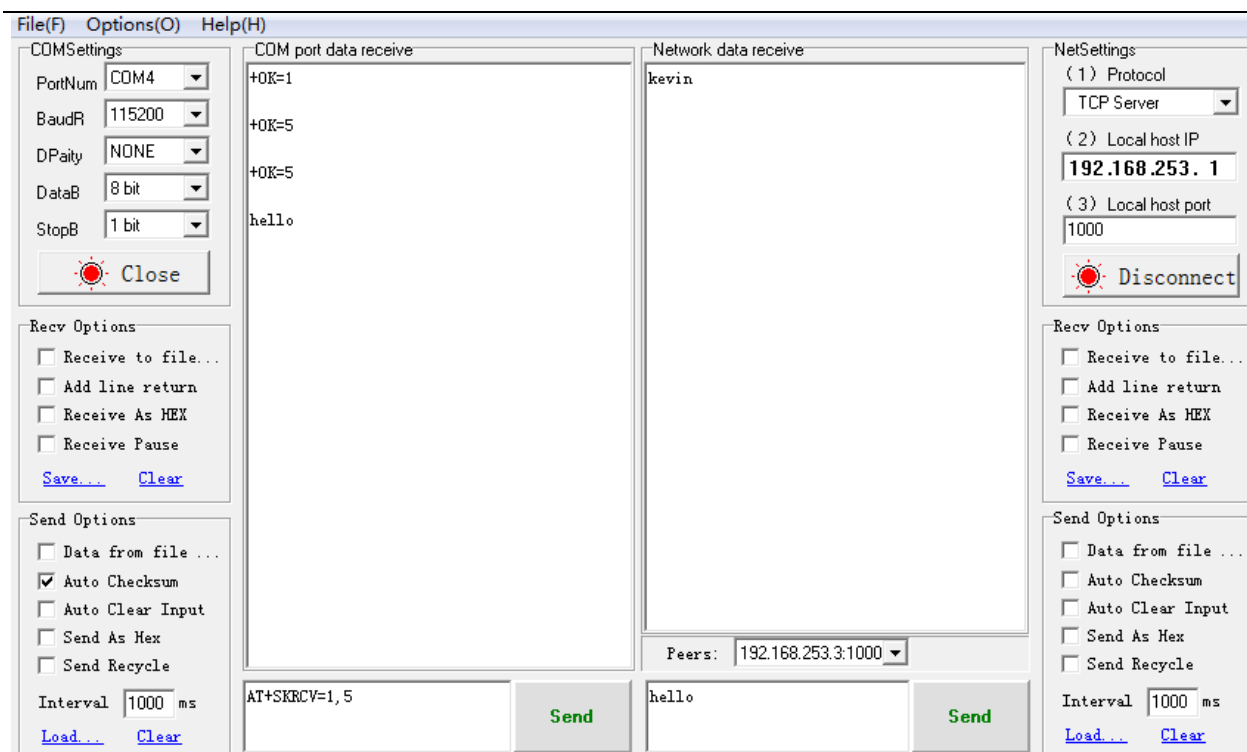
Input sending data *hello* in the TCP debugging assistant interface, and click *Sending*.



TX: AT+SKRCV=1,5

RX: +OK=5

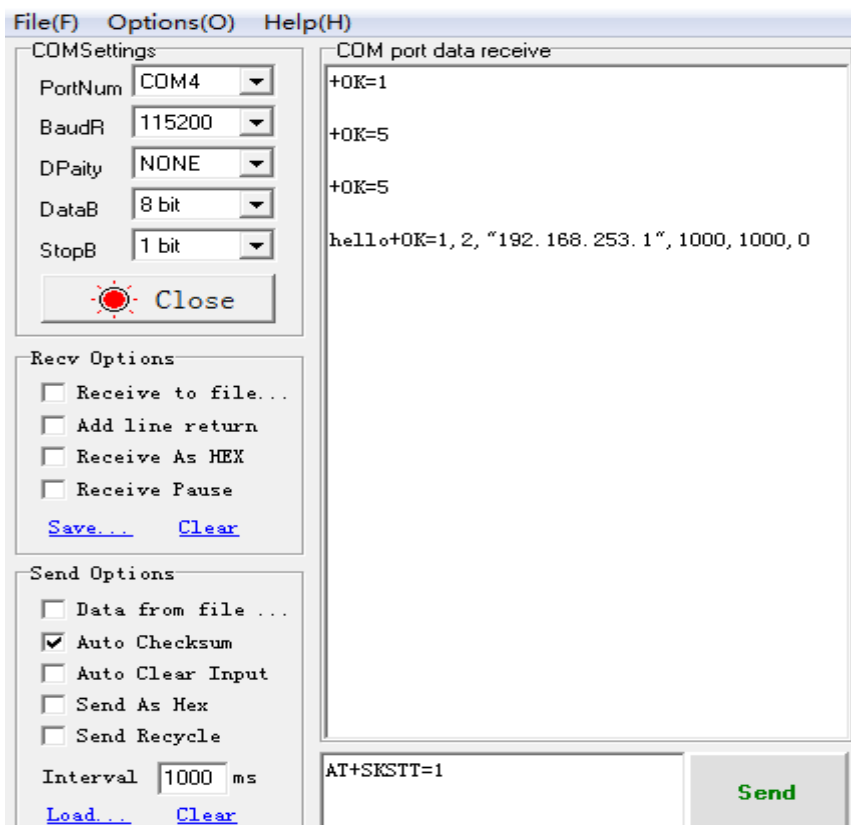
hello



(5) Query Socket status:

TX: AT+SKSTT=1

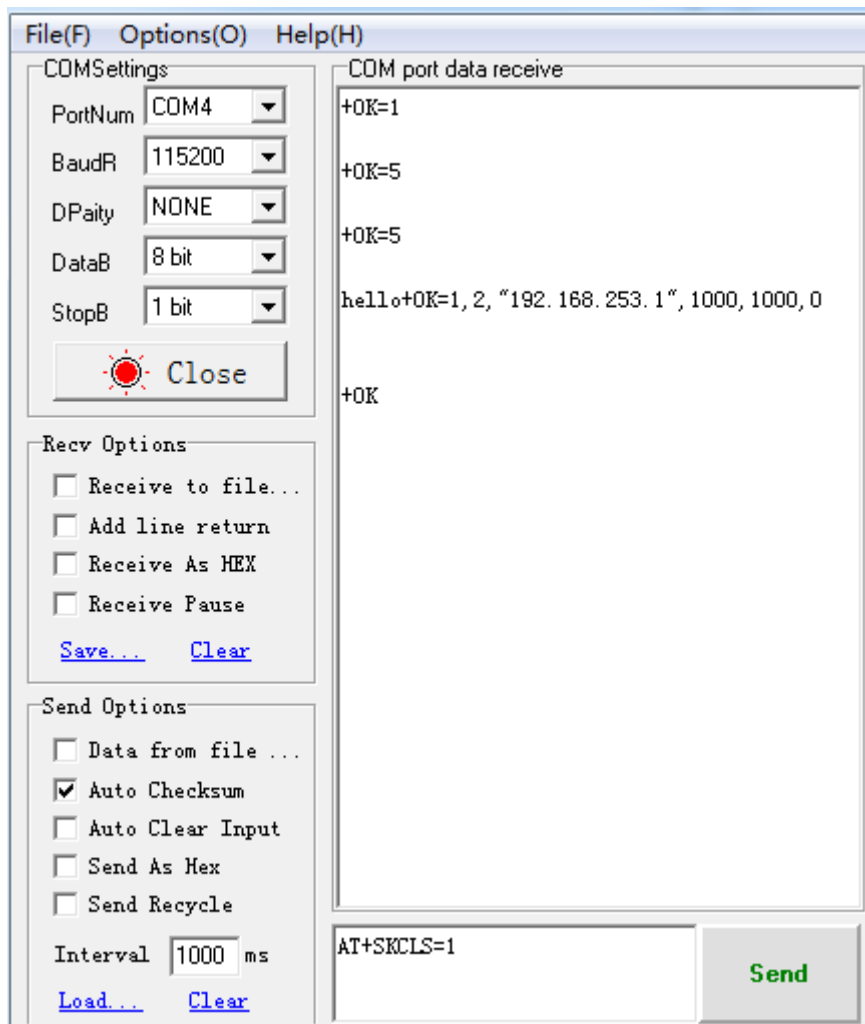
RX: +OK=1,2,"192.168.253.1",1000,1000,0



(6) Close Socket connection

TX: AT+SKCLS=1

RX: +OK



FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures: FCC RF Radiation Exposure Statement: This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. End users must follow the specific operating instructions for satisfying RF exposure compliance. This transmitter must not be collocated or operating in conjunction with any other antenna or transmitter. This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

The end product (host system) shall have a label showing: Contains FCC ID 2AGQ7WMSP02