

# WM\_W60X\_SDK\_AT Command User Manual

## V1.0.2

Beijing Winner Microelectronics Co., Ltd. (Winner Micro)

Addr: 18<sup>th</sup> Floor, Yindu Building, 67<sup>th</sup> Fucheng Road, Haidian District, Beijing, P.R.China

Tel: +86-10-62161900

Company Website: [www.winnermicro.com](http://www.winnermicro.com)

### Document History

Version	Completion Date	Revision Record	Author	Auditor	Approver
V1.0.0	2018-03-29	Initial release	PF Zhang	Kevin	Kevin
V1.0.1	2018-08-01	Modify LKSTT2, SSID2, QMAC2 etc.	PF Zhang	Kevin	Kevin
V1.0.2	2018-10-25	Modify Onemode Command etc.	Laychin	WM	WM

# Content

1	Introduction .....	2
1.1	Overview .....	2
1.2	Control protocol .....	2
1.2.1	User Command .....	2
1.2.2	Error Code .....	4
2	AT Command Protocol .....	5
2.1	Syntax Introduction .....	5
2.1.1	Syntax Format .....	5
2.2	Command Sets .....	8
2.2.1	System control type .....	8
2.2.2	Parameter setting type .....	13
2.2.3	Network control class .....	25
3	Common Operations .....	36
3.1	Create SoftAP process .....	36
3.2	Scan AP process .....	37
3.3	STA joins AP process .....	37
3.4	Create APSTA mode process .....	38
3.5	How to disconnect AP by STA .....	39
3.6	How to destroy SoftAP .....	39
3.7	How to check the current status by STA .....	39
3.8	How to check the current status by SoftAP .....	40
3.9	How to use socket function .....	40

## 1 Introduction

### 1.1 Overview

This document is used to introduce the Winner Micro's AT instruction communication protocol of embedded Wi-Fi System on Chip (SoC). AT instructions are command sets based on ASCII commands, which communicate with Wi-Fi chip through UART interface.

### 1.2 Control protocol

#### 1.2.1 User Command

User commands are used to configure parameters and network transmission functions. The command list is as follows:

	Instruction name	Function Description
1.	<a href="#"><u>(null)</u></a>	Empty instruction
2.	<a href="#"><u>APCHL</u></a>	Set/Query wireless channel number under SoftAP mode
3.	<a href="#"><u>APENCRY</u></a>	Set/Query encryption mode of wireless network under SoftAP mode
4.	<a href="#"><u>APKEY</u></a>	Set/Query key of wireless network under SoftAP mode
5.	<a href="#"><u>APLKSTT</u></a>	Query the network connection status under SoftAP mode
6.	<a href="#"><u>APMAC</u></a>	Query the physical address under SoftAP mode
7.	<a href="#"><u>APNIP</u></a>	Set/Query local IP address under SoftAP mode
8.	<a href="#"><u>APSSID</u></a>	Set/Query SSID under SoftAP mode
9.	<a href="#"><u>ATM</u></a>	Set/Query operation mode of the module
10.	<a href="#"><u>ATRM</u></a>	Set/Query socket connection message automatically created by the module in automatic operation mode
11.	<a href="#"><u>BSSID</u></a>	Set/Query BSSID address of target AP
12.	<a href="#"><u>BRDSSID</u></a>	Enable/Disable AP SSID broadcast
13.	<a href="#"><u>CHL</u></a>	Set/Query target wireless channel number
14.	<a href="#"><u>CHLL</u></a>	Set/Query wireless channel list
15.	<a href="#"><u>CNTPARAM</u></a>	Query network configuration parameters.

16.	<a href="#"><u>CUSTDATA</u></a>	Receiving user data via one-shot configuration tools.
17.	<a href="#"><u>DNS</u></a>	Set NIC domain
18.	<a href="#"><u>E</u></a>	Switch to command echo
19.	<a href="#"><u>ENTM</u></a>	Set the module into the serial transparent transmission mode
20.	<a href="#"><u>ENTS</u></a>	Set the module into power-saving mode
21.	<a href="#"><u>FWUP</u></a>	Set URL included firmware's name and start OTA update.
22.	<a href="#"><u>HTTPC</u></a>	HTTP post or get data function.
23.	<a href="#"><u>KEY</u></a>	Set/Query key of the wireless network
24.	<a href="#"><u>LKSTT</u></a>	Query the network connection status(IP,netmask,dns)
25.	<a href="#"><u>NIP</u></a>	Set/Query local IP address
26.	<a href="#"><u>ONESHOT</u></a>	Enable/Disable one shot configuration function
27.	<a href="#"><u>ONEMODE</u></a>	Set one shot configuration mode(UDP, socket or webserver)
28.	<a href="#"><u>PASS</u></a>	Set/Query system password
29.	<a href="#"><u>PING</u></a>	Start ping operation
30.	<a href="#"><u>PMTF</u></a>	Update all parameters from RAM to Flash
31.	<a href="#"><u>PORTM</u></a>	Set wireless NIC port mode(UART,HSPI)
32.	<a href="#"><u>QMAC</u></a>	Query MAC address
33.	<a href="#"><u>QVER</u></a>	Query SDK version information
34.	<a href="#"><u>RSTF</u></a>	Reset to Factory data
35.	<a href="#"><u>SKCLS</u></a>	Close socket link
36.	<a href="#"><u>SKCT</u></a>	Create socket link
37.	<a href="#"><u>SKGHBN</u></a>	Get server's IP
38.	<a href="#"><u>SKRCV</u></a>	Receive data through socket
39.	<a href="#"><u>SKRPTM</u></a>	Enable/Disable the function of active reporting data received by socket
40.	<a href="#"><u>SKSDF</u></a>	Set default socket connection using to data communication
41.	<a href="#"><u>SKSND</u></a>	Send data through socket connection
42.	<a href="#"><u>SKSRCIP</u></a>	Query socket data source IP address
43.	<a href="#"><u>SKSTT</u></a>	Query status of connected socket

44.	<a href="#">SLIST</a>	Query STAs connected to AP created by module
45.	<a href="#">SSID</a>	Set/Query name of SSID
46.	<a href="#">UART</a>	Set/Query serial configuration(baud rate, stop bits, data bits and parity)
47.	<a href="#">WATC</a>	Set/Query creating ADHOC network automatically
48.	<a href="#">WEBS</a>	Set or Query web server's configuration
49.	<a href="#">WJOIN</a>	Join AP or Create AP
50.	<a href="#">WLEAV</a>	Disassociated from wireless network
51.	<a href="#">WPRT</a>	Set/Query type of wireless network
52.	<a href="#">WPSM</a>	Turn on/off power-saving mode
53.	<a href="#">WSCAN</a>	Scan AP
54.	<a href="#">WWPS</a>	Set/query WPS function
55.	<a href="#">Z</a>	Reset system

### 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
-8	System busy
-10	Failed to join the network
-11	No available socket
-12	Invalid socket
-13	Socket connection failed
-62	Socket send data failed

-63	Socket receive data failed
-64	Undefine error

## 2 AT Command Protocol

### 2.1 Syntax Introduction

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

#### 2.1.1 Syntax Format

##### ■ Format description

All AT+ commands and the parameters are case-insensitive except for the "SSID" and "Key". The parameters are separated by ",".

<>: mandatory, indicates the part must be included at the command

[]: optional, indicates the part is optional.

##### ■ 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: Decimal Number, such as 10

Hex: Hexadecimal Number, such as a

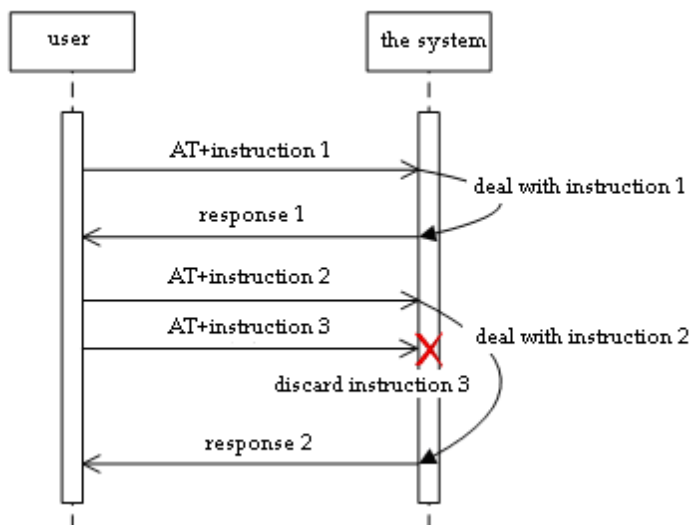
Ip: IP address string, such as 192.168.0.1

MAC: 12 consecutive hexadecimal numbers, such as 001EE3A80102

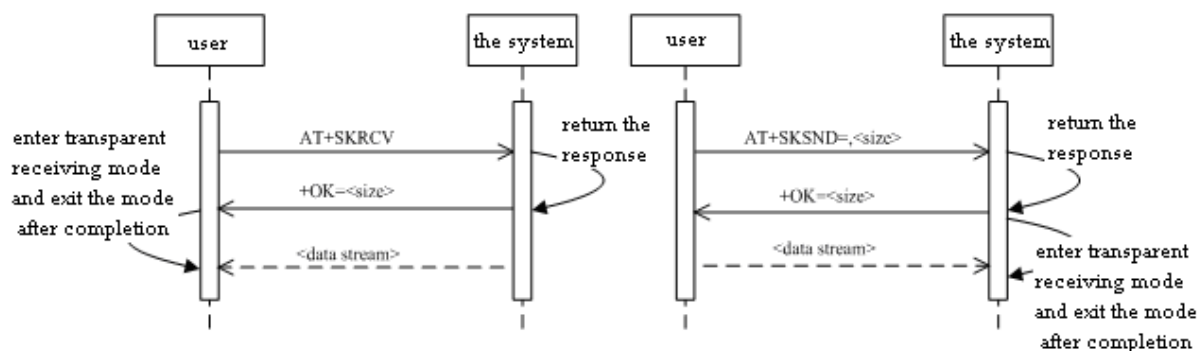
2.1.1.1 Process Flow

AT+ command protocol uses the form of command + response. The majority of commands need the response returned by the receiver to complete the command process. If the previous command is processing and a new command is received again, it will be silently discarded without returning any message, 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: Successful response message

AT+  
+OK

Example 2: Failure response message

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

Example 3: Command with parameters

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

Example 4: Command with parameter sync to Flash operator <!>

```
AT+SSID=!Test_AP  
+OK
```

Example 5: Query Command

```
AT+SSID=?  
+OK=Test_AP
```

## 2.2 Command Sets

### 2.2.1 System control type

#### 2.2.1.1 AT+

**Function:**

Null command, to confirm 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 to command echo.

**Format (ASCII):**

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

**Parameter:**

None

#### 2.2.1.4 AT+ENTS

**Function:**

Make system enter in different power-saving mode.

**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	Wi-Fi Sleep

1	Standby
---	---------

wake\_type:

For ps\_type = 1

Value	Meaning
0	gpio
1	Timer0

For ps\_type = 0

Value	Meaning
0	Open Wi-Fi
1	Close Wi-Fi

delay\_time: delay time, valid only when wakeup source is timer0, unit ms, 100 ~10000ms

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

#### 2.2.1.5 AT+ENTM

##### Function:

Make the module enter 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 factory settings in FLASH. The system needs to restart and then the settings 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 will 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 MAC address of the module.

**Format (ASCII):**

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

**Parameter:**

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

### 2.2.1.9 AT+APMAC

**Function:**

Acquire MAC address of SoftAP, valid in SoftAP and APSTA mode.

**Format(ASCII):**

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

**Parameter:**

mac address: 12 consecutive 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

2.2.1.11 AT+FWUP

**Function:**

Set URL included firmware's name and start up OTA. Attention, the chipset should have been connected with Server during OTA operation.

**Format(ASCII):**

```
AT+FWUP=<URL><CR>
Return<URL><CR><LF><CR><LF>
```

**Parameter:**

URL: The URL included firmware's name during OTA update, such as [http://192.168.104.100:80/gnu-linux-W600\\_SEC.img](http://192.168.104.100:80/gnu-linux-W600_SEC.img).

**For example:**

AT+FWUP=http://192.168.104.100:80/gnu-linux-W600\_SEC.img

Location: [http://192.168.104.100/gnu-linux-W600\\_SEC.img](http://192.168.104.100/gnu-linux-W600_SEC.img)

content\_length: 318824

download 1460 / 318824

download 2484 / 318824

## 2.2.2 Parameter setting type

### 2.2.2.1 AT+NIP

#### Function:

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

#### 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
1	Use a static IP address

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+APNIP

#### Function:

When the chipset is in SoftAP mode, this command is used to set/query the local IP address and enable/disable DHCP server. When enable DHCP server, this command also can query the IP

address.

#### Format(ASCII):

```
AT+APNIP=[!][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

#### 2.2.2.3 AT+DNS

##### Function:

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

#### 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.

#### 2.2.2.4 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

2.2.2.5 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 value, 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

#### 2.2.2.6 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 surrounded by double quotation marks.

#### 2.2.2.7 AT+APSSID

##### Function:

Set/query the softAP name of the module created in AP or APSTA mode, that's ssid.

##### Format (ASCII):

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

##### Parameter:

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

#### 2.2.2.8 AT+APENCRY

##### Function:

Set/query wireless network encryption mode in SoftAP. It should be specially noted that other

encryption modes except OPEN mode need to set correct network key cooperating with AT+KEY command.

**Format (ASCII):**

```
AT+AP 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)

### 2.2.2.9 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 surrounded by double quotation marks. According to 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"

#### 2.2.2.10 AT+APKEY

##### Function:

Set/query the network key in SoftAP mode. 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+APKEY=[!?][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 surrounded in double quotation marks. According to 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”

#### 2.2.2.11 AT+BSSID

##### Function:

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

##### 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

#### 2.2.2.12 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.

### 2.2.2.13 AT+APCHL

**Function:**

Set/query specified wireless channel mode in SoftAP mode.

**Format(ASCII):**

```
AT+APCHL=[!?][ 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.

### 2.2.2.14 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 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

2.2.2.15 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 ( <b>not supported currently</b> )
2	infra network (the module as AP)
3	infra network (the module as APSTA)

2.2.2.16 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

2.2.2.17 AT+WPSM

**Function:**

Turn on/off automatic power-saving mode after module connects to AP.

**Format (ASCII):**

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

**Parameter:**

enable:

Value	Meaning
0	Disabled
1	Enabled

2.2.2.18 AT+BRDSSID

**Function:**

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

**Format (ASCII):**

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

**Parameter:**

enable: Whether to enable SSID broadcast or not

Value	Meaning
0	Disable AP SSID broadcast



1	Enable AP SSID broadcast
---	--------------------------

### 2.2.2.19 AT+UART

#### Function:

Set/query UART interface parameter (only effective in UART1).

#### 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+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:

Value	Meaning
0	Disabled
1	Enabled

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

#### 2.2.2.21 AT+PASS

##### Function:

Set/query system login password for webserver.

##### Format (ASCII):

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

##### Parameter:

pass: 6 ASCII characters

#### 2.2.2.22 AT+CUSTDATA

**Function:**

Receiving user data via one-shot configuration tool.

**Format(ASCII):**

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

**Parameter:**

None

#### 2.2.2.23 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+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

### 2.2.3.2 AT+SKGHBN

**Function:**

Get IP of the extranet domain name such as www.xxx.com.

**Format (ASCII):**

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

**Parameter:**

URL: extranet domain name

IP: ip address.

### 2.2.3.3 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

#### 2.2.3.4 AT+WJOIN

##### Function:

This command is only valid when the module joins wireless network as STA or create a wireless network as access point (AP). 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>,<rssi><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 (No Used currently)
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

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

#### 2.2.3.5 AT+WLEAV

**Function:**

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

**Format (ASCII):**

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

**Parameter:**

None

Note: When in SoftAP or APSTA mode, the AT command is AT+WLEAVE=2 to destroy the SoftAP.

#### 2.2.3.6 AT+WSCAN

**Function:**

This command is valid only when the module is in STA mode, and it can be used to scan wireless network and return the access point's list after scan 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

#### 2.2.3.7 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

### 2.2.3.8 AT+APLKSTT

**Function:**

Query the soft ap network connection status of the module created in SoftAP or APSTA mode.

**Format(ASCII):**

AT+APLKSTT<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

### 2.2.3.9 AT+SLIST

#### Function:

Query the STA information already connected. Valid only in ap or 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 STA already connected.

sta\_mac: STA MAC address already connected

sta\_ip: STA IP address already connected

### 2.2.3.10 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

### 2.2.3.11 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

#### 2.2.3.12 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 and respond to the correspondent message (+OK) after finishing.

##### 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

#### 2.2.3.13 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

#### 2.2.3.14 AT+SKCLS

**Function:**

Close the specified socket.

**Format (ASCII):**

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

**Parameter:**

socket: socket number

#### 2.2.3.15 AT+SKSDF

**Function:**

Set the default sending socket of the system. If users need to enter the transparent transmission mode in command mode, this command can be used to specify the destination that transparent serial data transfers to or receives from.

**Format (ASCII):**

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

**Parameter:**

socket: socket number

#### 2.2.3.16 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

#### 2.2.3.17 AT+SKRPTM

##### Function:

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

##### Format (ASCII):

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

##### Parameter:

Mode:

Value	Meaning
0	Close
1	Open

#### 2.2.3.18 AT+ONEMODE

##### Function:

Set one-shot config mode.

##### Format(ASCII):

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

**Parameter:**

Mode:

Value	Meaning
0	One-shot config mode
1	SoftAP config mode
2	Web config mode

2.2.3.19 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

2.2.3.20 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.

### 2.2.3.21 AT+PING

#### Function:

Start to PING.

#### Format(ASCII):

```
AT+PING=<host,interval,count,operate><CR>
+OK<CR><LF><CR><LF>
```

#### Parameter:

Host: The IP or domain's name on the other end. The IP address is dotted decimal format.

Interval: ping packet interval, in milliseconds

Count: ping packet count, 0 means continuous PING

Operate: 1 means start ping, 0 means stop ping

## 3 Common Operations

### 3.1 Create SoftAP 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+APSSID="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) APNIP Set IP address and subnet mask

AT+APNIP=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 flash

AT+PMTF

(7) Z Reset wireless NIC

AT+Z

(8) Delay 1 second

(9) WJOIN Create wireless network MyAp

AT+WJOIN

(10) SLIST Query connected STAs' information

AT+SLIST

### 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 target AP name , such as WinnerMicro

AT+SSID="WinnerMicro"

- (3) KEY              Set the target AP wireless key 12345678

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

- (4) NIP              Start DHCP

AT+NIP=0

- (5) PMTF              Save parameters to flash

AT+PMTF

- (6) Z                  Reset wireless NIC

AT+Z

- (7) Delay 1 second

- (8) WJOIN              Join wireless network WinnerMicro

AT+WJOIN

### 3.4 Create APSTA mode process

- (1) WPRT              Set operating mode as APSTA

AT+WPRT=3

- (2) SSID              Set the target AP's name to be connected, such as WinnerMicro

AT+SSID="WinnerMicro"

- (3) KEY              Set the target AP's key number, such as 12345678

AT+KEY=1,0,"12345678"

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

Parameter 2: index: key's reference number, 1~4 used for WEP encryption, 0 for other encryptions.



Parameter 3: wireless key, such as 12345678

- (4) APSSID                      Create SoftAP's name, such as MYSoftAP

AT+APSSID="MYSoftAP"

- (5) APENCRY                      Set encryption type by SoftAP, such as WPA2-TKIP

AT+APENCRY=5

- (6) APKEY                        Set the key used by SoftAP, such as 87654321 in ASCII

AT+APKEY=1,0,"87654321"

- (7) APNIP                        Set IP address and subnet mask

AT+APNIP=1,"192.168.1.1","255.255.255.0","192.168.1.1","192.168.1.1"

- (8) PMTF                        Save parameters to flash

AT+PMTF

- (9) Z                              Reset

AT+Z

- (10) Delay 1 second

- (11) WJOIN                      Join the wireless network WinnerMicro and create softAP

AT+WJOIN

### 3.5 How to disconnect AP by STA

AT cmd for wireless NIC disconnecting AP: AT+WLEAV

### 3.6 How to destroy SoftAP

AT cmd for destroying SoftAP: AT+WLEAV=2

### 3.7 How to check the current status by STA

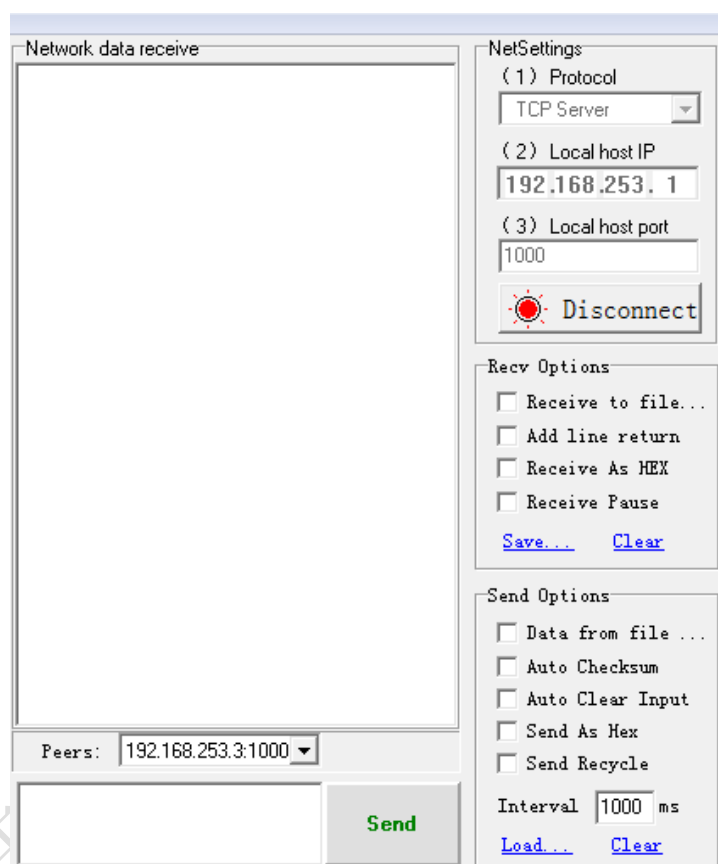
AT cmd for wireless NIC querying current NIC status: AT+LKSTT

### 3.8 How to check the current status by SoftAP

AT cmd for view the status by SoftAP mode: AT+APLKSTT

### 3.9 How to use socket function

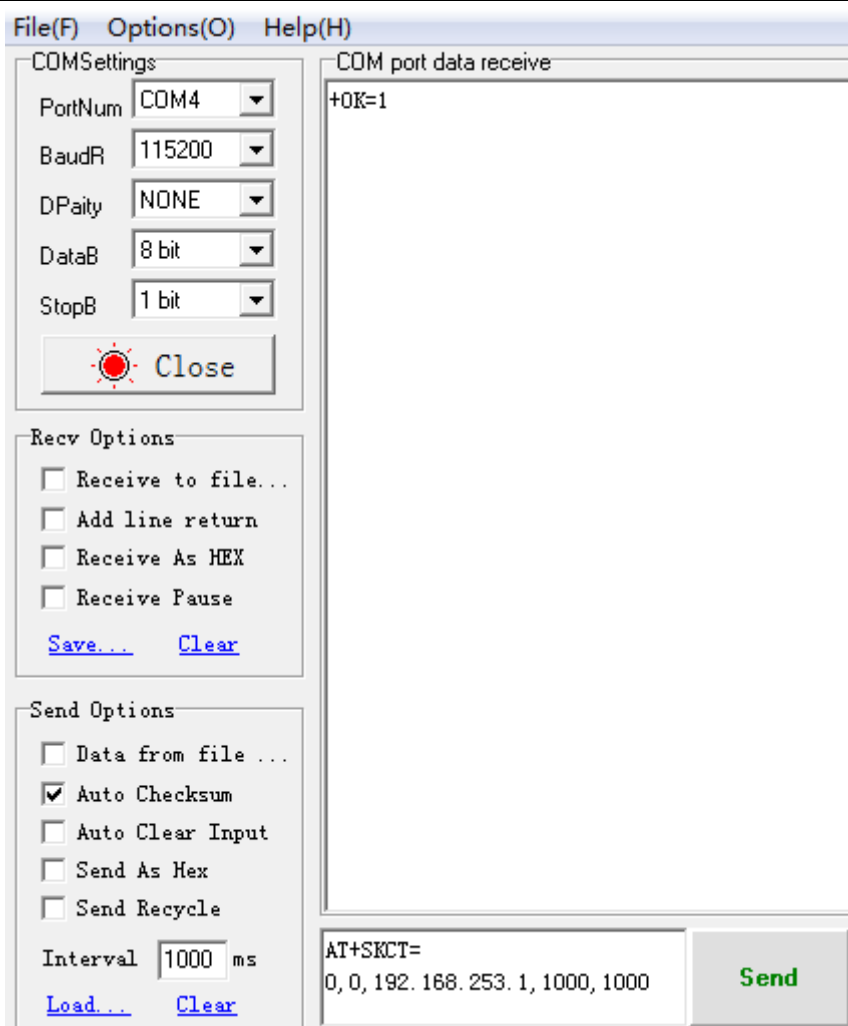
(1) Build a PC-side TCP server. If using TCP debugging assistant, TCP server address is 192.168.253.1, listening port 1000.



(2) Set up Socket:

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

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

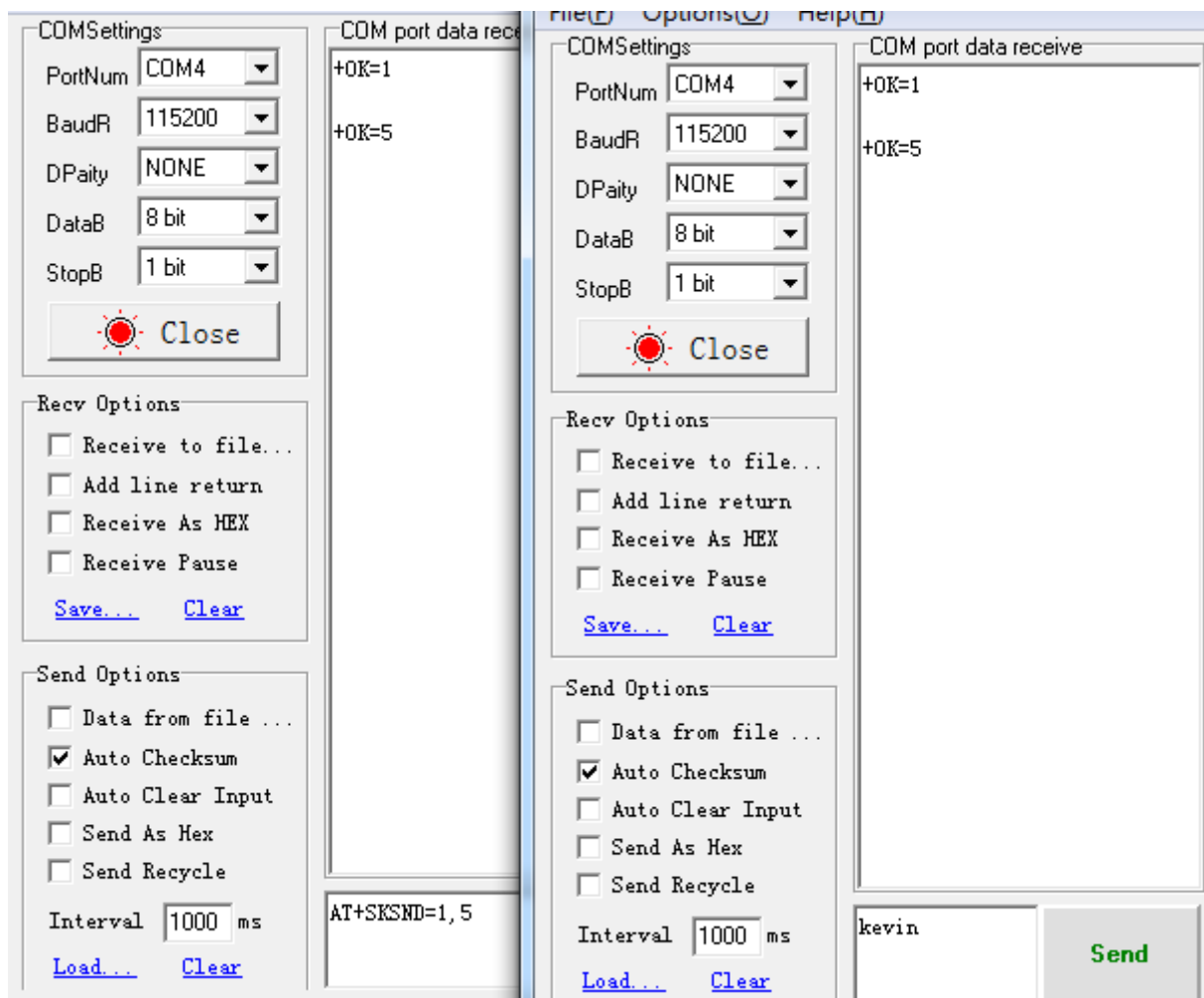


(3) Sending data:

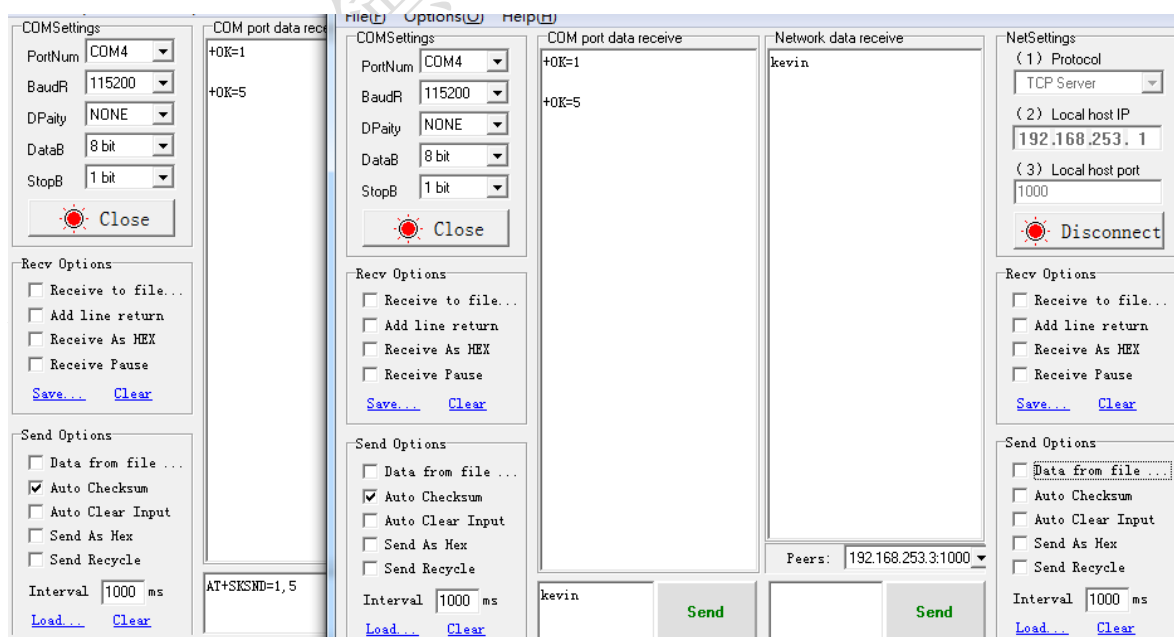
TX: AT+SKSND=1,5

kevin

RX: +OK=5



The data interface received by TCP server is as follows:



(4) Receiving data:

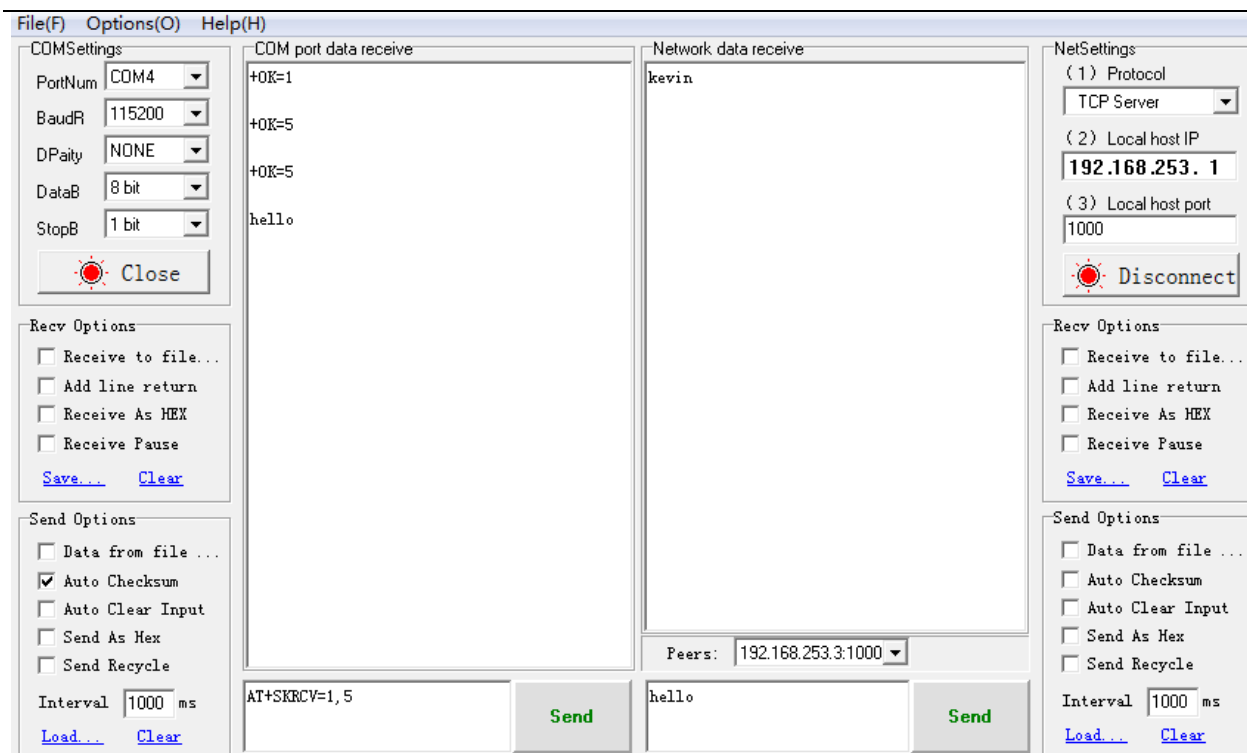
Input sending data *hello* in the TCP debugging assistant interface, and click *Sending*.



TX: AT+SKRCV=1,5

RX: +OK=5

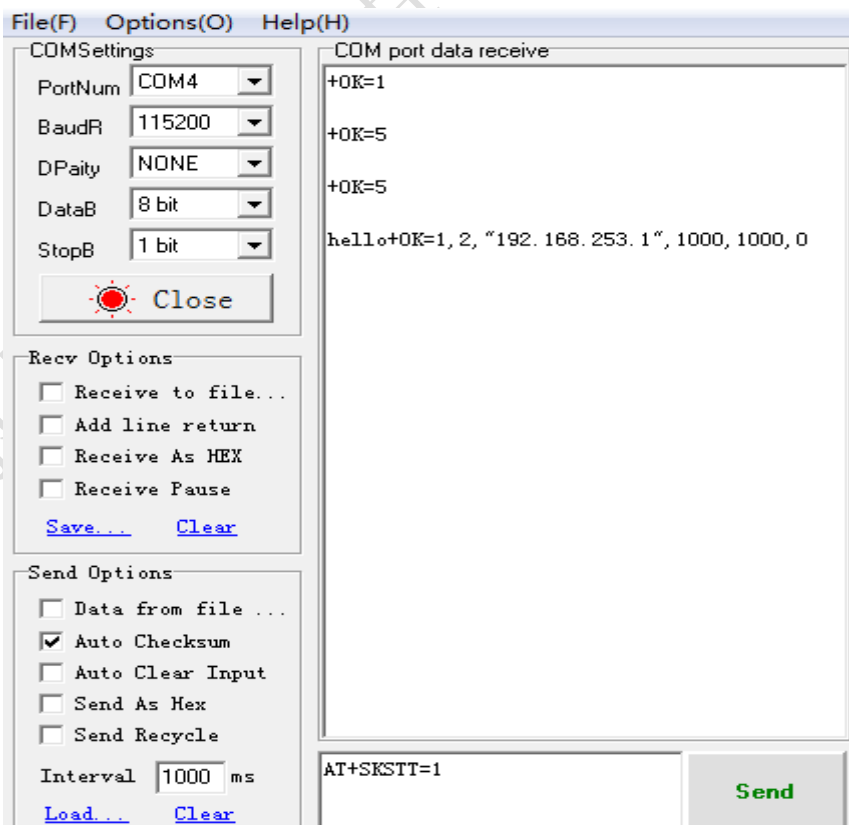
hello



(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

