

AT Instruction User Guide

V1.0.0

Beijing Winner Microelectronics Co., Ltd.

Address: 18th floor, Yindu Building, No.67 Fuchen Road, Haidian District, Beijing, P.R.China

Tel: +86-10-62161900

Company Website: www.winnermicro.com

[illegible]

Content

1	Introduction.....	2
1.1	Overview.....	2
1.2	Control instruction protocol.....	2
1.2.1	User Command.....	2
1.1.1	Error flag.....	4
2	AT instruction.....	5
2.1	Grammatical description.....	5
2.1.1	Grammatical format.....	5
2.2	Instruction definition.....	8
2.2.1	System control commands.....	8
2.2.2	Parameter setting commands.....	12
2.2.3	Network control commands.....	24
3	Common operation.....	34
3.1	Create AP process.....	34
3.2	Scan AP process.....	35
3.3	STA joins the AP process.....	35
3.4	Create APSTA process.....	36
3.5	STA disconnect the AP.....	37
3.6	STA query the current state.....	37
3.7	Socket function.....	37

1 Introduction

1.1 Overview

This document is used to introduce the WinnerMicro' s AT+ instruction communication protocol of embedded Wi-Fi chip. AT+ instruction is an instruction set based on ASCII command, which communicates with Wi-Fi chip through UART interface.

1.2 Control instruction protocol

1.2.1 User Command

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

	Instruction name	Function Description
1.	<u>(null)</u>	Empty instruction
2.	<u>ATM</u>	Set or Query working mode
3.	<u>ATRM</u>	Set or Query create socket link under auto mode automatically
4.	<u>BSSID</u>	Set or Query BSSID of specified AP
5.	<u>BRDSSID</u>	Enable/Disable SSID broadcast of AP
6.	<u>CHL</u>	Set or Query assign wireless channel mode
7.	<u>CHLL</u>	Set or Query list of wireless channel
8.	<u>CNTPARAM</u>	Query the parameters of configuration
9.	<u>CUSTDATA</u>	Receive user data from One shot configuration tool
10.	<u>DNAME</u>	Set or Query device name
11.	<u>DNS</u>	Set NIC domain name
12.	<u>E</u>	Switch characters from serial port echo
13.	<u>ENCRY</u>	Set or Query wireless network safe mode
14.	<u>ENTM</u>	Enter serial port transparent mode
15.	<u>ENTS</u>	Enter power saving mode
16.	<u>HTTPC</u>	Function of HTTP post getting data

17.	<u>KEY</u>	Set or Query wireless network key
18.	<u>LKSTT</u>	Query state of network linking
19.	<u>LKSTT2</u>	Query state of network linking, only work under APSTA mode
20.	<u>NIP</u>	Set or Query local IP address
21.	<u>ONESHOT</u>	Enable or Disable one shot configuration function
22.	<u>PASS</u>	Set or Query system password
23.	<u>PMTF</u>	Update all parameters from RAM to Flash
24.	<u>PORTM</u>	Set wireless NIC port mode
25.	<u>QMAC</u>	Query physical address
26.	<u>QMAC2</u>	Query physical address, only work under APSTA mode
27.	<u>QVER</u>	Query version information
28.	<u>RSTF</u>	Factory data reset
29.	<u>SKCLS</u>	Close socket link
30.	<u>SKCT</u>	Create socket link
31.	<u>SKGHBN</u>	Get server IP
32.	<u>SKRCV</u>	Link receive data through socket
33.	<u>SKRPTM</u>	Enable/Disable function of reporting receive data actively by socket
34.	<u>SKSDF</u>	Set send socket link default
35.	<u>SKSND</u>	Link transmit data through socket
36.	<u>SKSRCIP</u>	Query IP address of socket data source
37.	<u>SKSTT</u>	Query state of socket linking
38.	<u>SLIST</u>	Query already connected STA, only work under AP, APSTA mode
39.	<u>SSID</u>	Set or Query name of wireless network
40.	<u>SSID2</u>	Set or Query name of wireless network, only work under APSTA mode
41.	<u>UART</u>	Set or Query format of serial port data
42.	<u>WATC</u>	Set or Query create ADHOC network automatically

43.	WEBS	Set or Query web server
44.	WJOIN	Join or Create wireless network
45.	WLEAV	Disconnect wireless network
46.	WPRT	Set or Query type of wireless network
47.	WPSM	Enable or Disable power saving mode
48.	WSCAN	Scanning network
49.	WWPS	Set or Query WPS function
50.	Z	reset

1.1.1 Error flag

The error flag description is as follows, which used for response message in AT+ instruction protocol.

ASCII	Description
-	Successful
-1	Invalid command format
-2	Command not found
-3	Invalid operator
-4	Invalid parameters
-5	Operation not permitted
-6	Out of memory
-7	FLASH error
-8	System busy
-10	Join the network failed
-11	Unavailable socket
-12	Invalid socket
-13	socket connect failed
-62	socket transmit failed
-63	socket receive failed
-64	not define

2 AT instruction

2.1 Grammatical description

This module uses AT+ protocol as user control protocol. The AT+ instruction protocol uses a set of command line format instruction based on ASCII, and its syntax and processing flow are described below.

2.1.1 Grammatical format

■ Format description

<>: the part that must be included

[]: the part that can be included

■ Command message

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

AT+: prefix of command message

CMD: instruction string

[op]: instruction operator, can specify operation types of parameters, when command have parameters.

=, parameter/return guide

!=, in the parameter command, it means the modify will be synchronized to flash.

=?, in the setting command, it means query current setting.

<CR>: enter, ASCII character 0x0d

■ Response message

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

+: prefix of response message

RSP: response string

OK successful

ERR failed

<CR>: enter, ASCII character 0x0d

<LF>: newline, ASCII character 0x0a

■ data type

String: surrounded by double quotes, content without quotes, for example: "this is a string"

Dec: decimal digits, for example: 10

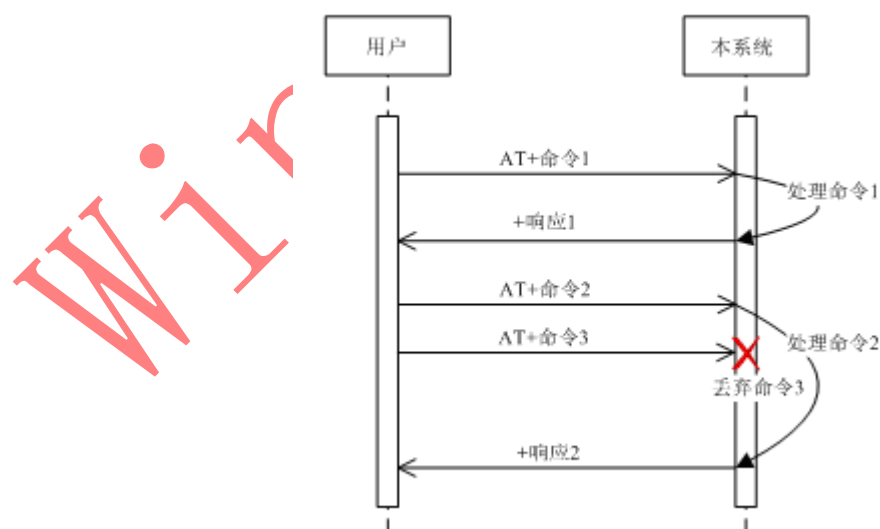
Hex: hexadecimal digits, for example: a

IP: IP address, for example: 192.168.0.1

MAC: consists of 12 hexadecimal digits, for example: 001EE3A80102

2.1.1.1 Processing flow

The AT+ instruction protocol adopts the form of command and response, and most of the instructions require the recipient to return the response message after the processing is completed. If the new command is received during the previous command processing, it will be discarded and does not return any message, as shown in the following figure.



For special commands, such as AT+SKSND, AT+SKRCV, need to transmit binary data after instruction or response, at this time, the receiver enters the transparent

The figure contains two sequence diagrams illustrating the interaction between a User (用户) and the System (本系统) for the AT+SKRCV and AT+SKSND commands.

Left Diagram (AT+SKRCV):

- The User sends the command `AT+SKRCV` to the System.
- The System returns a response message (返回响应消息) to the User.
- The System sends `+OK=<size>` to the User.
- The System sends `<data stream>` to the User via a dashed line.
- The User's lifeline has a self-loop labeled "进入透明接收状态并接收完成后自动退出" (Enter transparent reception state and automatically exit after reception is complete).

Right Diagram (AT+SKSND):

- The User sends the command `AT+SKSND=<size>` to the System.
- The System returns a response message (返回响应消息) to the User.
- The System sends `+OK=<size>` to the User.
- The System sends `<data stream>` to the User via a dashed line.
- The User's lifeline has a self-loop labeled "进入透明接收状态并接收完成后自动退出" (Enter transparent reception state and automatically exit after reception is complete).

Example 1: return a successful message

Example 2: return an error message

Example 3: Use input parameters

Example 4: Use the operator `<!`, parameters synchronize to the Flash

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

```
+OK
```

Example 5: Use the operator <?>, query operator

```
AT+ATPT=?
```

```
+OK=500
```

2.2 Instruction definition

2.2.1 System control commands

2.2.1.1 AT+

Function:

Empty operation, which can be used to detect the response of the program

Format (ASCII) :

```
AT+<CR>
```

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

Parameters:

Empty

2.2.1.2 AT+Z

Function:

System reset

Format (ASCII) :

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

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

Parameters:

Empty

2.2.1.3 AT+E

Function:

Switching serial command and display

Format (ASCII) :

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

Parameters:

Empty

2.2.1.4 AT+ENTS

Function:

Set the system into energy saving mode (sleep/standby)

Format (ASCII) :

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

Parameters:

ps_type: energy saving mode

value	represents
0	Sleep
1	Standby

wake_type: Sleep mode/Standby wakeup mode

value	Sleep mode	Standby wakeup mode
0	quit Sleep	GPIO
1	Enter Sleep	Timer

delay_time: time delay for entering Standby mode, unit 10ms. Effective value is 100ms to 10000ms, which is meaningless in Sleep mode.

wake_time: wakeup time from Standby mode use timer0, unit ms. Effective value is 1000 ~65535ms, which is meaningless in Sleep mode.

2.2.1.5 AT+ENTM

Function:

The serial port enters the transparent transmission mode. The system exits the mode when it meets the trigger condition escape string in the transparent transmission mode.

Note: before entering the transmissions, the following conditions must be met

- 1、networking,
- 2、build socket,
- 3、Set the currently created socket as the default transparent connection.

Format (ASCII) :

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

Parameters:

Empty

2.2.1.6 AT+RSTF

Function:

Restore the factory settings in FLASH. It will take effect after reset.

Format (ASCII) :

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

Parameters:

Empty

2.2.1.7 AT+PMTF

Function:

Update the parameters in Flash from memory

Format (ASCII) :

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

Parameters:

Empty

2.2.1.8 AT+QMAC

Function:

Get the physical address of the wireless network card.

Format (ASCII) :

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

Parameters:

MAC address: Physical address, return format as follows

	represents
Command of ASCII format	12 hexadecimal number, the format is 001EE3A34455

2.2.1.9 AT+QMAC2

Function:

In APSTA mode get the physical address 2 of the wireless network card.

Format (ASCII) :

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

Parameters:

MAC address: Physical address, return format as follows

	represents
Command of ASCII format	12 hexadecimal number, the format is 001EE3A34455

2.2.1.10 AT+QVER

Function:

Get version information of system, including hardware version and firmware version.

Format (ASCII) :

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

Parameters:

Hard: hardware version information, two formats as follows

Format	represents
ASCII	String format, for example "H1.00.00.1029"

Firm: firmware version information

ASCII	String format, for example "F6.10.11@ 18:25:25 Jul 28 2012"
-------	--

Time: firmware creation time

Date: firmware creation date

2.2.2 Parameter setting commands

2.2.2.1 AT+NIP

Function: ●

When the wireless network card is used as STA, the instruction is used to set or query the local IP address. When the address type is set to DHCP, this command cannot query the IP address information which dynamically allocated to the wireless network adapter. Query can use the AT+LKSTT command.

When the wireless network card is used as AP, the instruction is used to set or query the local IP address and enable or disable DHCP server. In the AP mode the instruction "type" domain is different from the meaning of the STA mode, and can still query the local IP address.

Format (ASCII) :

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

Parameters:

Type: address type

value	represents
0	Using a DHCP dynamic allocation/enable DHCP Server
1	Using a static IP address/disable DHCP Server

IP: IP address, data format is “192.168.1.22”, no quotation marks

Netmask: netmask, data format is the same as IP address

Gateway: gateway address, data format is the same as IP address

dns: DNS address, data format is the same as IP address

2.2.2.2 AT+DNS

Function:

Set or query the domain name of the network card, which is only valid when it is used as AP.

Format (ASCII) :

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

Parameters:

DNS name: network card domain name, 1~31 character, double quotes encircling

2.2.2.3 AT+ATM

Function:

Set or query working mode

Format (ASCII) :

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

Parameters:

Mode: working mode

value	represents
0	Automatic working mode
1	Command working mode

2.2.2.4 AT+ATRM

Function:

Set or query the information of automatically creation for socket connection under automatic working mode.

Format (ASCII) :

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

Parameters:

Protocol: protocol type

value	represents
0	TCP
1	UDP

cs: C/S mode

value	represents
0	Client
1	Server

host_timeout: according to protocol and CS, the meaning is as follows

cs	protocol	represents
0	X	Destination server name, enter a domain name or IP address, such as "192.168.1.100" or "www.sina.com.cn"
1	0	TCP connection timeout time, that is, the client connected to this server is kicked

		off automatically after it does not send any data over this time. The effective range is 1~100000000, unit: second, 0 is never, 120 seconds default.
1	1	meaningless

Port: port number

2.2.2.5 AT+SSID

Function:

Set or query wireless network name, SSID.

Format (ASCII) :

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

Parameters:

SSID: wireless network name, 1~32 Characters, double quotes encircling

2.2.2.6 AT+SSID2

Function:

Set or query wireless network name 2, SSID, only valid in APSTA mode.

Format (ASCII) :

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

Parameters:

SSID: wireless network name, 1~32 Characters, double quotes encircling

2.2.2.7 AT+ENCRY

Function:

Set or query the wireless network security mode. In addition to the OPEN mode, other security modes need to set up the correct network key with the AT+KEY

instruction, in addition to the AP or AD-HOC mode, the modules only support the setting of OPEN, WEP64, and WEP128.

Format (ASCII) :

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

Parameters:

encry mode: Security mode

value	represents
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 or query network key. Before using this command to set up the network key, first use the AT+ENCRY command must be set up the network security mode.

Format (ASCII) :

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

Parameters:

Format: key format

value	represents
0	HEX
1	ASCII

Index: key index, 1~4 for WEP, 0 for others

Key: The key string is surrounded by double quotes. According to different security modes, the length and format of the key are defined as follows

Security mode	Key format	
	HEX	ASCII
WEP64	10 hexadecimal numbers ^(note 1)	5 ASCII characters ^(note 2)
WEP128	26 hexadecimal numbers	13 ASCII characters
WPA-PSK (TKIP)	64 hexadecimal numbers	8~63 ASCII characters
WPA-PSK (CCMP/AES)	64 hexadecimal numbers	8~63 ASCII characters
WPA2-PSK (TKIP)	64 hexadecimal numbers	8~63 ASCII characters
WPA2-PSK (CCMP/AES)	64 hexadecimal numbers	8~63 ASCII characters

Note 1: Hexadecimal number: refers to 0~9, a~f (case insensitive), such as "11223344dd"

Note 2: ASCII character refers to the number 0~9 and the letter a~z (case sensitive) in the standard ASCII character set stipulated by the international organization for Standardization (ISO), such as "14u6E"

2.2.2.9 AT+BSSID

Function:

Set or query the BSSID address of the AP. This setting is valid only when the module is STA and infra network.

Format (ASCII) :

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

Parameters:

Mode: BSSID

value	represents
0	Automatic
1	Specified

BSSID: BSSID, The length is 12 hexadecimal numbers, 001EE3A34455

2.2.2.10 AT+CHL

Function:

Set or query the wireless channel mode

Format (ASCII) :

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

Parameters:

Mode: channel mode

value	represents
0	Automatic
1	Specified

Channel: wireless channel number, range of value 1 to 14

2.2.2.11 AT+CHLL

Function:

Set or query the wireless channel list. The parameters of the wireless channel list are used to specify the range of the work channel of the module. The channels not included in the list will not be scanned. The reasonable use of the parameters can speed up the scanning of the module and the speed of the networking.

Format (ASCII) :

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

Parameters:

The list of wireless channels, using hexadecimal format, starts from the lowest bit, each bit represents a channel, and the default is 3fff, which represents all 1~14 channels

2.2.2.12 AT+WPRT

Function:

Set or query wireless network type

Format (ASCII) :

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

Parameters:

Type: network type

value	represents
0	Infra network (STA)
1	ADHOC network
2	Infra network (AP)
3	Infra network (APSTA)

2.2.2.13 AT+WATC

Function:

Set or query the function for enable automatic creation of ADHOC network. This setting is valid only when the wireless network type is set to ADHOC, indicating whether create an ADHOC network with the same name when the network fails.

Format (ASCII) :

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

Parameters:

Enable: enable flag

value	represents
0	Disable
1	Enable

2.2.2.14 AT+WPSM

Function:

Open or close automatic energy saving mode

Format (ASCII) :

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

Parameters:

Enable: enable flag

value	represents
0	Disable
1	Enable

2.2.2.15 AT+BRDSSID

Function:

Enable or stop AP SSID Broadcast, this setting is valid only when the module is AP

Format (ASCII) :

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

Parameters:

Enable: enable SSID broadcast

value	represents
0	Stop AP SSID Broadcast
1	Enable AP SSID Broadcast

2.2.2.16 AT+UART

Function:

Set or query UART data format

Format (ASCII) :

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

Parameters:

Baud rate: range of value 1200~115200bps

value	represents
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:

value	represents
0	8 bit
1	7 bit

Stop bit:

value	represents
0	1 bit
1	Not support
2	2 bit

Parity:

value	represents
0	No parity check
1	Odd parity check
2	Even parity check

2.2.2.17 AT+WEBS

Function:

Set or query build in enable WEB management server

Format (ASCII) :

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

Parameters:

Enable: enable flag

value	represents
0	Disable
1	Enable

Port: Server port number, default 80

2.2.2.18 AT+DNAME

Function:

Set or query device name

Format (ASCII) :

```
AT+DNAME=[!?][devicename] <CR>
+OK[=devicename]<CR><LF><CR><LF>
```

Parameters:

Devicename: device name, 1 to 32 characters

2.2.2.19 AT+PASS

Function:

Set or query system login password

Format (ASCII) :

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

Parameters:

Pass: 6 ASCII characters

2.2.2.20 AT+CUSTDATA

功能:

Receiving user data sent by one shot configuration tool, the AT+ONESHOT=1 command is sent before the module is configured into one shot configuration mode.

Format:

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

Parameters:

Empty

2.2.2.21 AT+CNTPARAM

Function:

Query the configured networking parameters

Format (ASCII) :

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

Parameters:

Empty

Return value: the meaning of bssid_en

value	represents
0	Not enabled BSSID networking
1	Enable BSSID networking

If BSSID is enable, then return 1, BSSID, key

If BSSID is not enabled, then return 0, SSID, key

2.2.3 Network control commands

2.2.3.1 AT+PORTM

Function:

Set or query the interface mode of network card

Format (ASCII) :

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

Parameters:

Mode: interface mode

value	represents
0	Low speed UART
1	High speed UART
2	H-SPI
3	H-SDIO

2.2.3.2 AT+SKGHBN

Function:

Get the IP address of the domain name

Format (ASCII) :

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

Parameters:

URL: network domain name

IP: corresponding IP address

2.2.3.3 AT+WWPS

Function:

Set or query WPS function

Format (ASCII) :

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

Parameters:

Mode: WPS Function selection, empty parameters do not need to be filled in

mode	pin	represents
get_pin		Get pin code
set_pin	Pin code	Set pin code
start_pin		Start networking
start_pbc		Start networking

Pin: PIN code for wireless routers

2.2.3.4 AT+WJOIN

Function:

Add or create the specified network according to the different network types. If the current network type is STA, this instruction function is to connect AP. If the current network type SOFTAP, this instruction function is to create SOFTAP. If the current network type is ADHOC, the instruction function is to connect the ADHOC network, and according to the parameters can automatically create the network by the specified SSID is not detected.

If the current network is already in the state of networking or creation, it will return the network connection information directly.

For the ASCII format, the system returns the response message after the network connection is successful.

Format (ASCII) :

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

Parameters:

bssid: BSSID, The length is 12 hexadecimal number, for example 001EE3A34455

Type: Network type

value	represents
0	STA
1	Adhoc
2	SoftAP
3	APSTA

Channel: Channel number

b_encry: Encryption type

value	represents
0	Open
1	Encryption

SSID: Wireless network name, 1 to 32 characters, double quotes encircling

rssi: Network signal strength, without the minus sign, unit db, 50 signal strength is -50db

2.2.3.5 AT+WLEAV

Function:

The instruction is valid only when the module is STA. It is used to disconnect the wireless network.

Format (ASCII) :

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

Parameters:

Empty

2.2.3.6 AT+WSCAN

Function:

The instruction is valid only when the module is STA. It is used to scan the wireless network and return after 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>
```

Parameters:

The same as AT+WJOIN

2.2.3.7 AT+LKSTT

Function:

Query local network connection state

Format (ASCII) :

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

Parameters:

Status: connection state

value	represents
0	Disconnect
1	Connect

IP: IP address, data format is “192.168.1.22”, no quotation marks

Netmask: netmask, data format is the same as IP address

Gateway: gateway address, data format is the same as IP address

dns1: DNS1 address, data format is the same as IP address

dns2: DNS2 address, data format is the same as IP address

2.2.3.8 AT+LKSTT2

Function:

In APSTA, query the network connection status 2

Format:

AT+LKSTT2<CR>

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

Parameters:

Status: connection state

value	represents
0	Disconnect
1	Connect

IP: IP address, data format is “192.168.1.22”, no quotation marks

Netmask: netmask, data format is the same as IP address

Gateway: gateway address, data format is the same as IP address

dns1: DNS1 address, data format is the same as IP address

dns2: DNS2 address, data format is the same as IP address

2.2.3.9 AT+SLIST

Function:

Query connected station.

Format:

AT+SLIST<CR>

+OK[=sta_number, sta_mac1, sta_ip1, sta_mac2, sta_ip2...]<CR><LF><CR><LF>

Parameters:

sta_number: The number of connected station

sta_mac: MAC address of station

sta_ip: IP address of station

2.2.3.10 AT+SKCT

Function:

Build socket. In client mode wait for connection completion (success or failure) and return; in server mode, after creation is completed return.

Format (ASCII) :

AT+SKCT=[protocol],[cs],[host_timeout],<remote_port>,<local_port><CR>
+OK=<socket><CR><LF><CR><LF>

Parameters:

Protocol: protocol type

value	represents
0	TCP
1	UDP

CS: C/S mode,

value	represents
0	Client
1	Server

host_timeout: according to protocol and CS, the meaning is as follows

cs	protocol	represents
0	X	Destination server name, enter a domain name or IP address, such as "192.168.1.100" or "www.sina.com.cn"
1	0	TCP connection timeout time, that is, the client connected to this server is kicked off automatically after it does not send any data over this time. The effective range is 1~10000000, unit: second, 0 is never, 120 seconds default.
1	1	Meaningless

remote_port: remote port number

local_port: local port number

Socket: socket number

2.2.3.11 AT+SKSND

Function:

Sends data through the specified socket, return after complete. This command sends data in binary format, and the user should start sending the data after receiving the module's response message (+OK). After receiving the specified length data, the module automatically finish the data transmission stage and sends the data to the network, and the redundant data will be discarded. Otherwise, after waiting for the timeout (1s), the module will force the end of the data transmission phase and send the received data to the network.

Format (ASCII) :

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

Parameters:

Socket: socket number

Size: The length of the data ready to send, unit byte

actualsize: the length of data allowed to send, unit byte

Data steam: initial data

2.2.3.12 AT+SKRCV

Function:

Read the data in the receive buffer of the specified socket, and return after completion. After receiving this command, the module will transmit the specified length binary data after sending the corresponding message (+OK).

Format (ASCII) :

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

Parameters:

Socket: socket number

Maxsize: maximum received date length

Size: received data length

Data steam: initial data

2.2.3.13 AT+SKSTT

Function:

Getting the specified socket state, the first line of the return value is the state information of the user specified socket. If the socket type is a TCP server, then each line, start from the second line, represent the socket state of an access 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>
```

Parameters:

Socket: socket number

Status: socket state

value	represents
0	Disconnect
1	Listening
2	Connection

Host: End IP address

HostPort: End port number

LocalPort: local port number

rx_data: data length in receiving buffer

2.2.3.14 AT+SKCLS

Function:

Close the specified socket.

Format (ASCII) :

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

Parameters:

Socket: socket number

2.2.3.15 AT+SKSDF

Function:

Set the default socket sent by the system. When users need to enter transparent transmission mode in command mode, we can use this command to send transparent data of serial port to the destination.

Format (ASCII) :

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

Parameters:

Socket: socket number

2.2.3.16 AT+SKSRCIP

Function:

Get the source IP address of the current socket received data

Format (ASCII) :

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

Parameters:

Host: source IP address of the data

2.2.3.17 AT+SKRPTM

Function:

Open or close socket actively reports Function of receiving data

Format (ASCII) :

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

Parameters:

Mode:

value	represents
0	Close
1	Open

2.2.3.18 AT+ONESHOT

Function:

Open or close one shot configuration function

Format (ASCII) :

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

Parameters:

Status:

value	represents
0	Close
1	Open

2.2.3.19 AT+HTTPC

Function:

Post get function at HTTP client

Format (ASCII) :

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

Parameters:

URL: remote HTTP server end address

Verb:

value	represents
0	http get
1	-
2	http post
3	http put

Post data:

Verb is used for 2 and 3 and uploads data for HTTP.

Note: before using the httpc instruction, you need to open the actively report function in socket AT+SKRPTM=1.

3 Common operation

3.1 Create AP process

(1) WPRT set AP as network card work mode

AT+WPRT=2

(2) SSID set MyAp as the network name of the wireless network card for the STA

AT+SSID=MyAp

(3) ENCRY set WEP64 as the security mode of the wireless network card

AT+ENCRY=1

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

(4) KEY set the wireless key, 12345, of the AP to be joined

AT+KEY=1, 1, 12345

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

Parameter 2: index: key index, 1~4 for WEP, others is 0

Parameter 3: wireless key, for example: 12345678

(5) NIP setting the 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 for dynamic allocation of using DHCP, 1 for 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 the parameters in spi flash

AT+PMTF

(7) Z reset wireless network card

AT+Z

(8) delay one second

(9) WJOIN create a wireless network MyAp

AT+WJOIN

3.2 Scan AP process

The AT instruction for scan AP is AT+WSCAN

3.3 STA joins the AP process

(1) WPRT set STA as work mode

AT+WPRT=0

(2) SSID set the AP name, for example WinnerMicro, which to be joined

AT+SSID=WinnerMicro

(3) KEY set the wireless key, 12345, of the AP to be joined

AT+KEY=1, 0, 12345678

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

Parameter 2: index: key index, 1~4 for WEP, others is 0

Parameter 3: wireless key, for example: 12345678

(4) NIP start DHCP

AT+NIP=0

(5) PMTF save the parameters in spi flash

AT+PMTF

- (6) Z reset wireless network card to make the configuration effective

AT+Z

- (7) delay one second

- (8) WJOIN join the wireless network WinnerMicro

AT+WJOIN

3.4 Create APSTA process

- (1) WPRT set APSTA as work mode

AT+WPRT=3

- (2) SSID set the AP name, for example WinnerMicro, which to be joined

AT+SSID=WinnerMicro

- (3) KEY set the wireless key, 12345, of the AP to be joined

AT+KEY=1,0,12345678

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

Parameter 2: index: key index, 1~4 for WEP, others is 0

Parameter 3: wireless key, for example: 12345678

- (4) SSID2 set the network name of the created SOFTAP

AT+SSID2="MYSoftAP"

- (5) NIP start DHCP

AT+NIP=0

- (6) PMTF save the parameters in spi flash

AT+PMTF

- (7) Z reset wireless network card to make the configuration effective

AT+Z

- (8) delay one second

- (9) WJOIN join the wireless network WinnerMicro

AT+WJOIN

3.5 STA disconnect the AP

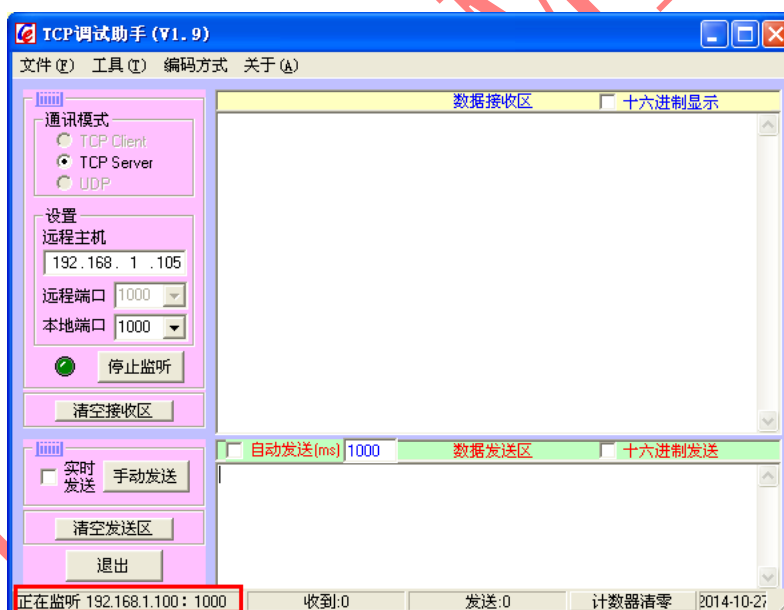
The AT instruction for disconnect the AP is AT+WLEAV.

3.6 STA query the current state

The AT instruction for query the current state of network card is AT+LKSTT.

3.7 Socket function

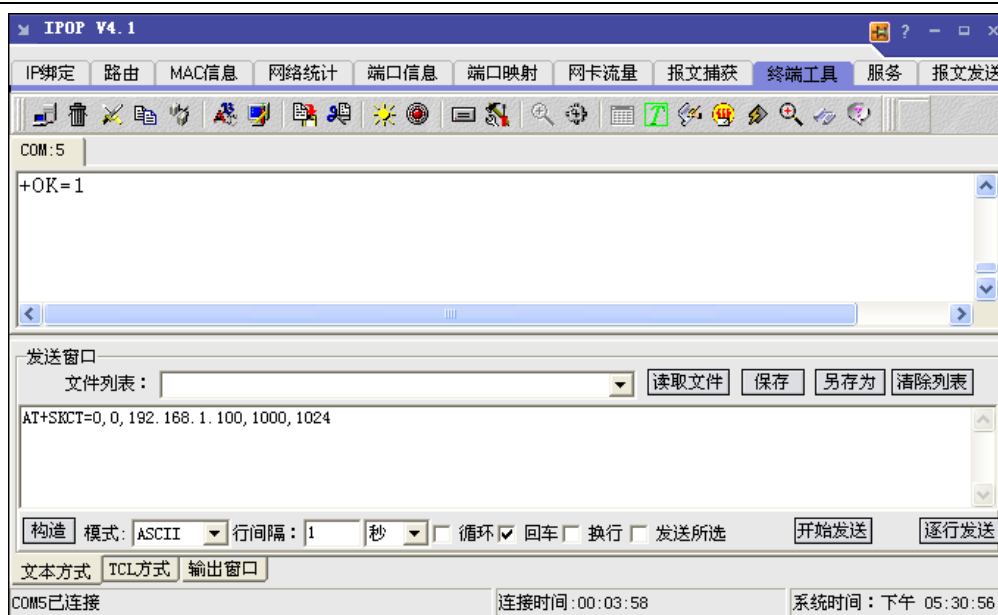
(1) Build TCP server in PC, such as TCP debugging assistant, TCP server address 192.168.1.100, and monitor port 1000.



(2) setup Socket:

TX: AT+SKCT=0, 0, 192.168.1.100, 1000, 1000

RX: +OK=1 ---> 1 为 socket 号

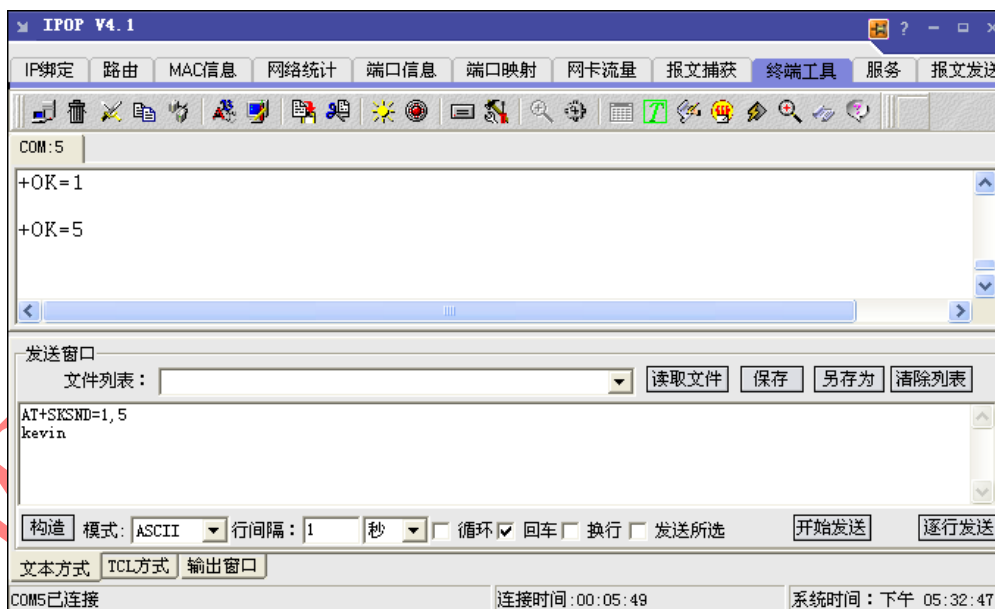


(3) data transmitting

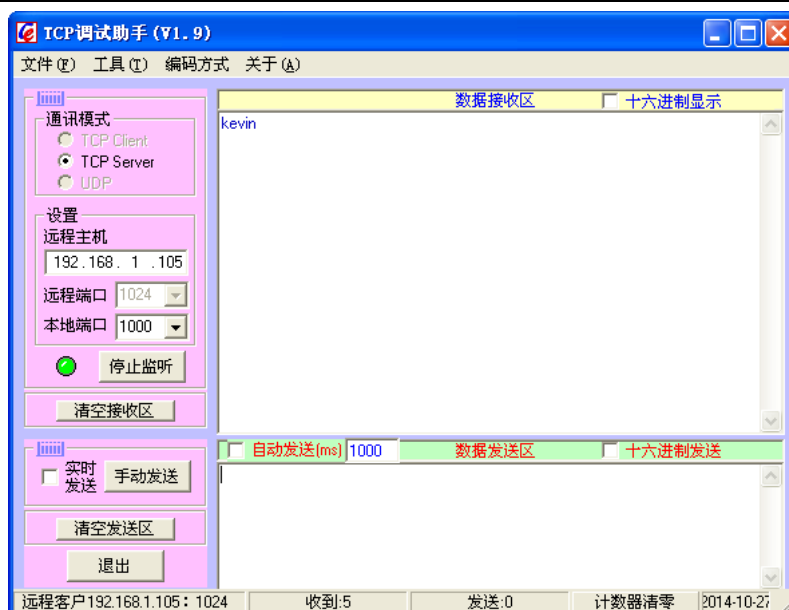
TX: AT+SKSND=1, 5

kevin

RX: +OK=5

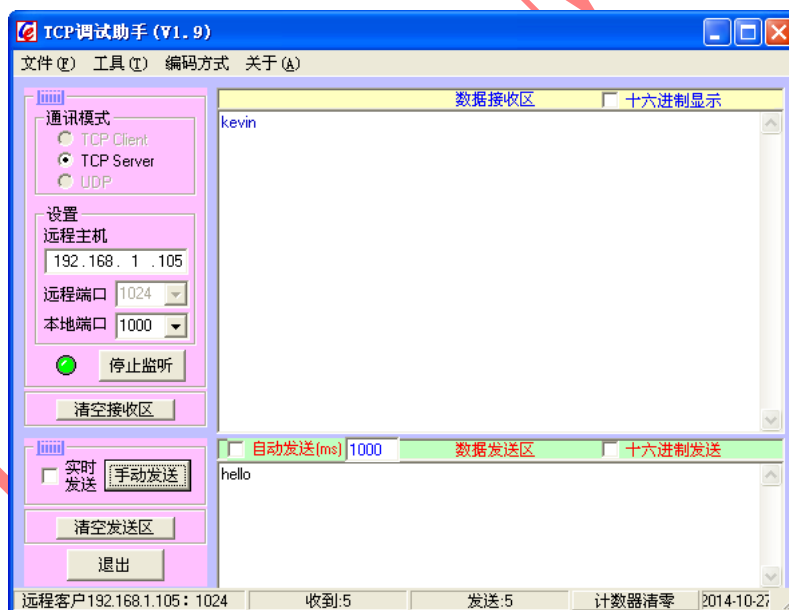


The interface of the data receiving in TCP server



(4) data receiving

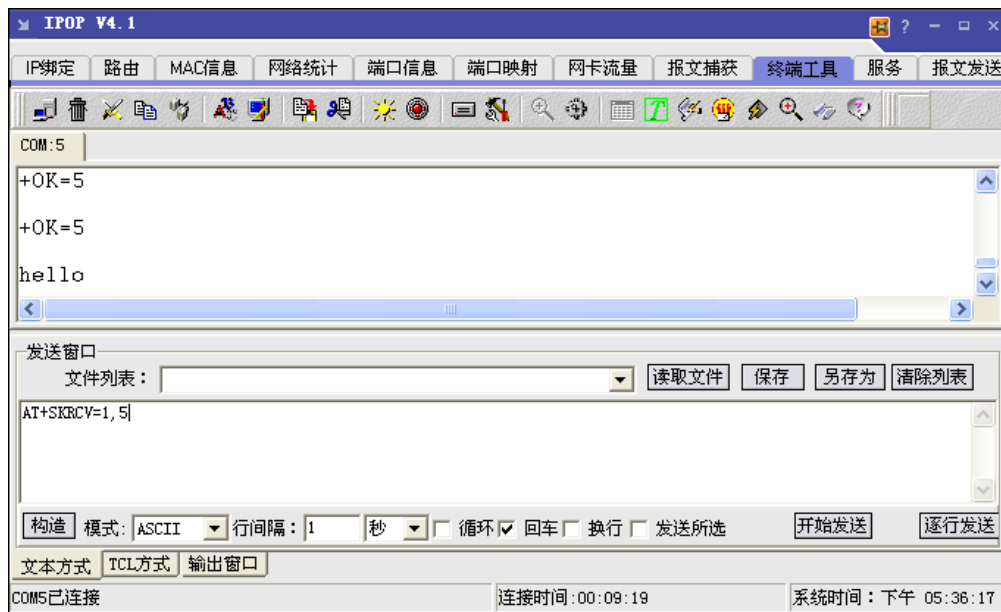
In the TCP debugging assistant interface, enter the data “Hello” and click send.



TX: AT+SKRCV=1, 5

RX: +OK=5

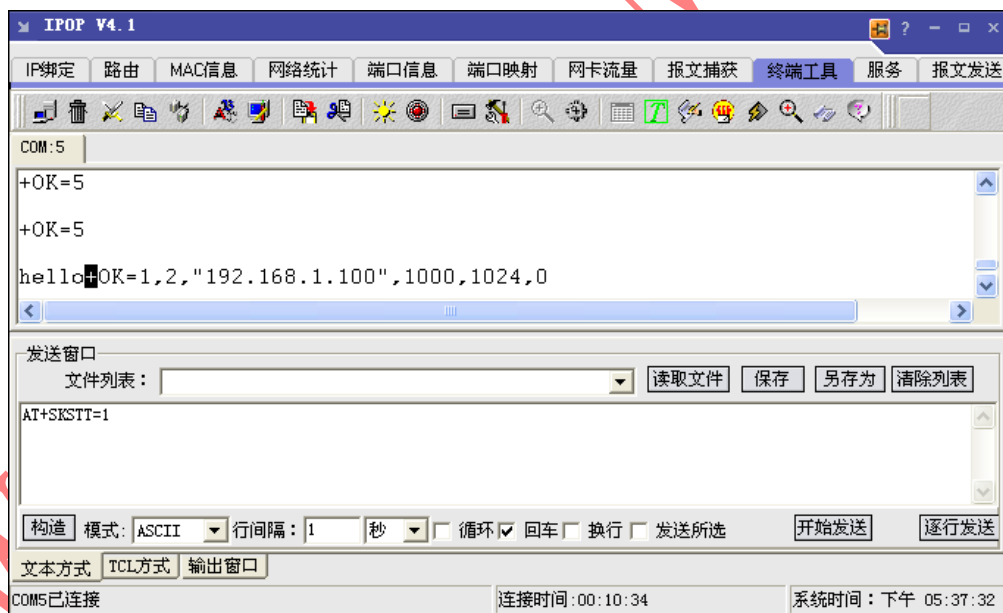
hello



(5) query the Socket state

TX: AT+SKSTT=1

RX: +OK=1, 2, "192.168.1.100", 1000, 1024, 0



(6) close the Socket connection

TX: AT+SKCLS=1

RX: +OK

