

WisNode-UART WIFI EVB Quick Start Guide

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1. Product introduction

1.1 Overview

Arduino WisNode-UART WIFI EVB is based on the RAK473(476) module design of an Arduino-compatible development board, Can be plugged into the Arduino EVB, it also can be used as a base plate plug other Arduino series peripherals. This document will be through a detailed description make developers to quickly grasp RAK473(476) WiFi module. For example, through the PC(C) serial debugging assistant test module's AT command function, Establishment of Socket communications, Use the web or mobile phone APP to configure the module to the designated router and so on.

1.2 Evaluation Kit Introduction

After buying the Evaluation Kit on Taobao, We will use the following items box send to you, As shown in Figure 1-1. Article in the box as shown in Figure 1-2: A WisNode-UART WIFI EVB, A Micro USB line. If you buy an external antenna EVB, there will be an antenna in the box.



Figure 1-1



Figure 1-2

1.3 Hardware Introduction

As the following Figure1-3 , 1-4 shown is the Arduino WisNode-UART WIFI EVB hardware and hardware distribution. Because the RAK473 module and the RAK476 module are very similar in operation and procedure, Therefore, this document is mainly based on the case of RAK473 WiFi module. However, there are differences between the tow modules in the peripheral hardware circuit, So when you use this EVB you should pay attention to the hardware version switch. If you uses the RAK473 module, you should welded a 0Ω resistor at R3, As the Figure 1-3 show. If you uses the RAK476 module, you should welded a 0Ω resistor at R6. Besides, different modules need different external circuit. At the bottom of the EVB, you should welded 0Ω resistor follow the instructions. Use this EVB, Users only need a Micro USB line, one end connected to the EVB, one end connected to the computer, and pay attention to the use of serial jump cap jump mode.

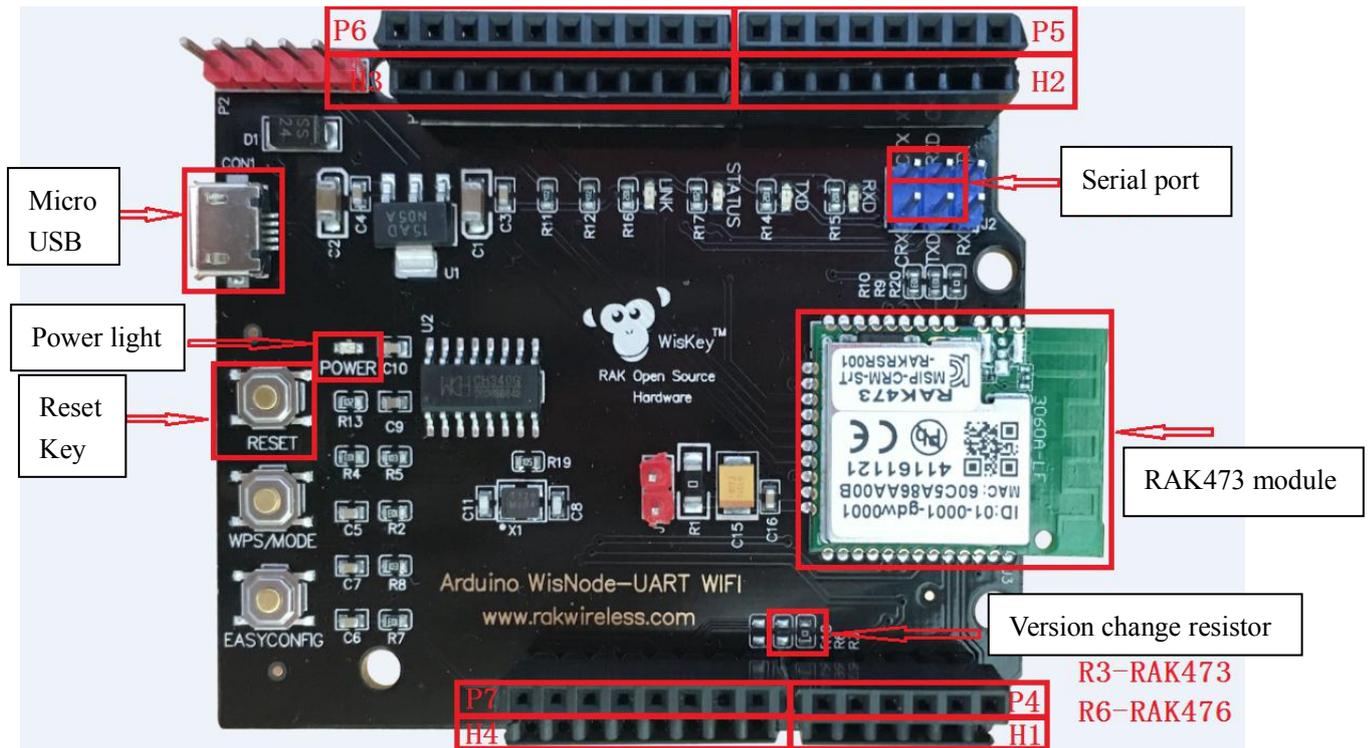


Figure 1-3 Arduino WisNode-UART WIFI Top Diagram

Slots Usage:

- (1) When WisNode-UART WIFI EVB used independently or as a host: Using H1, H2, H3, H4;
- (2) When WisNode-UART WIFI EVB as a slave or plugged into other Arduino board: Using P4, P5, P6, P7

Serial Port connect methods:

- (1) When WisNode-UART WIFI EVB used independently or as a host: RXD connect to CTX, TXD connect to CRX;
- (2) When WisNode-UART WIFI EVB as a slave or plugged into other Arduino board: RXD connect to TX, TXD connect to RX;

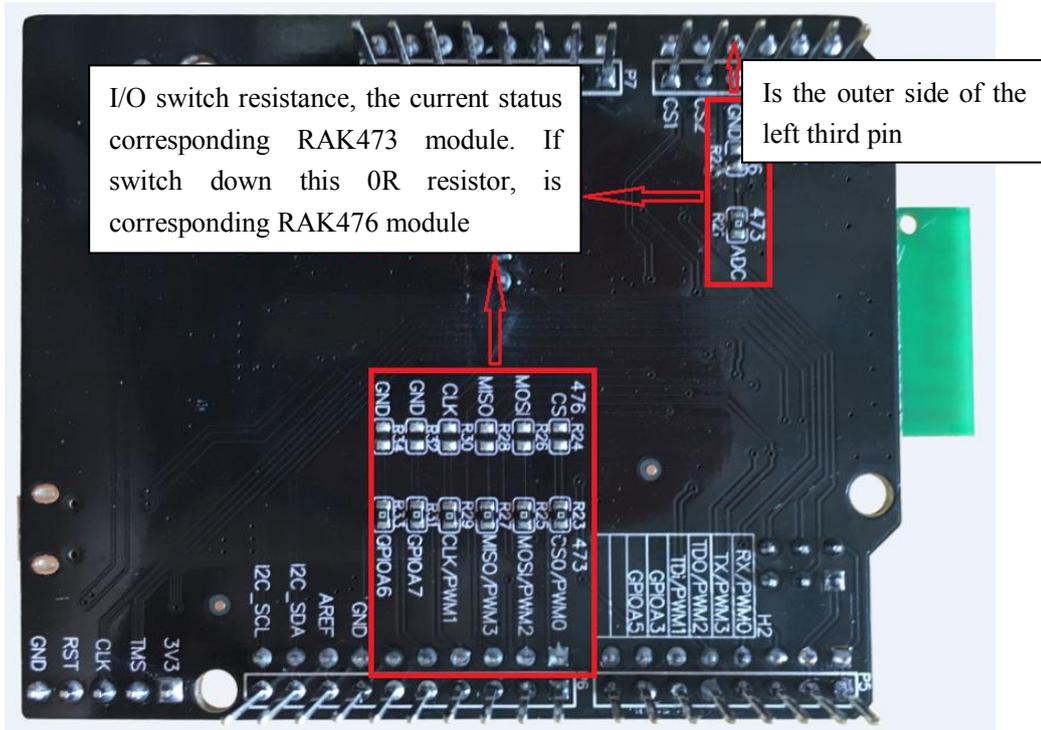


Figure 1-4 Arduino WisNode-UART WIFI Bottom Diagram

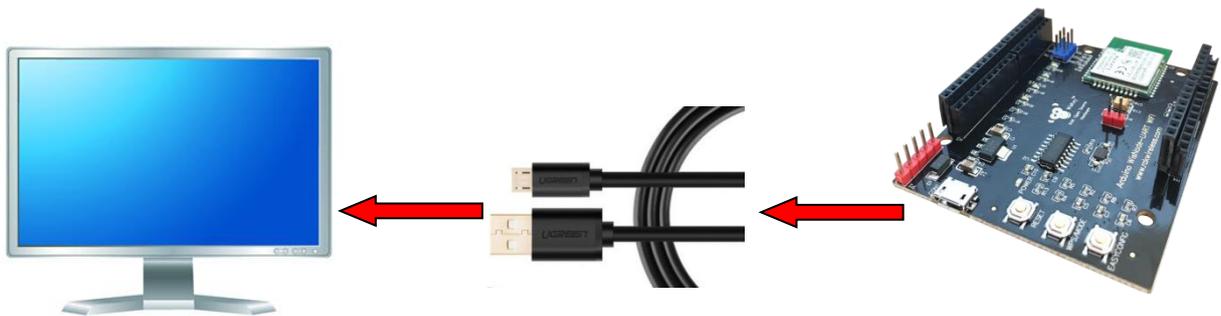
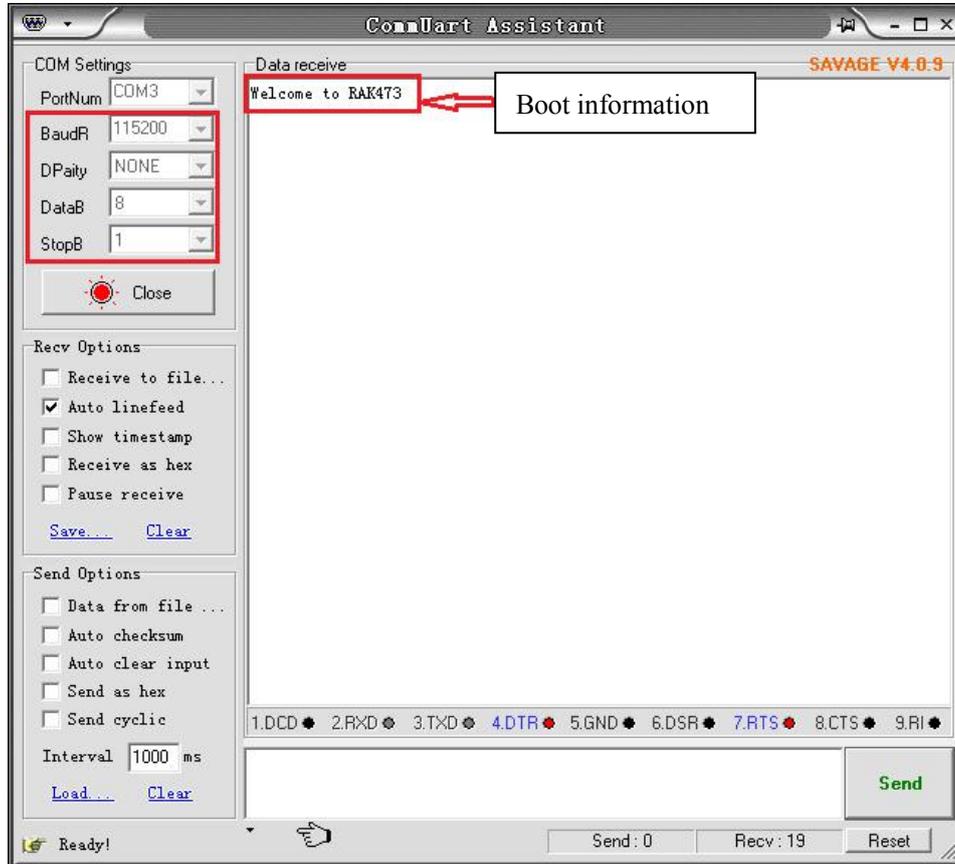


图 1-5 Arduino WisNode-UART WIFI EVB Linking Methods

2. Use Introduction

2.1 STA Mode Test



Serial debugging assistant interface diagram

Use serial debugging assistant test:

(Serial baud rate: 115200, Check bit: NULL, Data bit: 8, Stop bit: 1, Flow control: Disable)

```

Welcome to RAK473 //Boot information

at+ascii=1 //Set AT command return to the ASCII display

OK

at+psk=123456789 //Set routing password

OK

at+connect=rakwireless //Connection route

OK

at+ipdhcp=0 //Obtain the dynamic IP address

OK

mac=9C:44:3D:00:06:59

addr=192.168.31.103
    
```

```
mask=255.255.255.0

gw=192.168.31.1

dns1=192.168.31.1

dns2=0.0.0.0

at+ltcp=25000 //Establish a tcp server

OK8

at+recv_data=128,0,59231,192.168.31.180 //Receive tcp client connection event

at+recv_data=0,59231,192.168.31.180,12,hello rak473 //Receive data

at+recv_data=129,0,59231,192.168.31.180 //Receive tcp client disconnect event
```

2.2 AP Mode Test

Use serial debugging assistant test:

(Serial baud rate: 115200, Check bit: NULL, Data bit: 8, Stop bit: 1, Flow control: Disable)

```
Welcome to RAK473 //Boot information

at+ascii=1 //Set AT command return to the ASCII display

OK

at+psk=123456789 //Set AP psk

OK

at+ap=RAK473_AP //Establish AP

OK

at+ipstatic=192.168.9.5,255.255.255.0,192.168.9.1,192.168.9.1,0 //Set static IP address

OK

at+ipdhcp=1 //Open dhcp server

OK

at+ltcp=25000 //Establish tcp server

OK8

at+recv_data=connect //Receive STA connect event

at+recv_data=128,0,47466,192.168.9.2 //Receive tcp client connect event

at+recv_data=0,47466,192.168.9.2,12,hello rak473 //Receive data

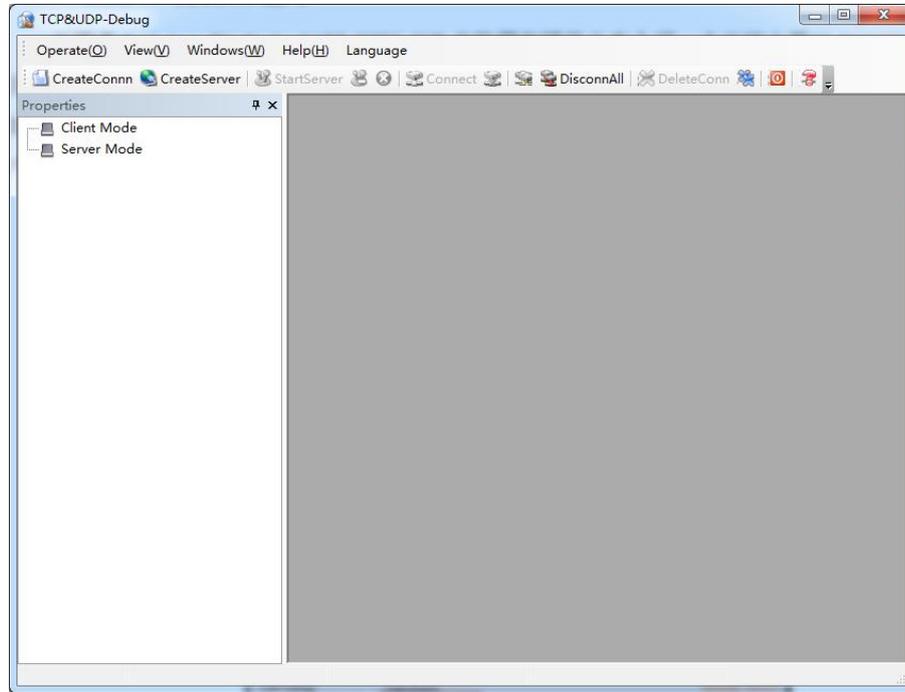
at+recv_data=129,0,47466,192.168.9.2 //Receive tcp client disconnect event

at+recv_data=disconnect //Receive STA disconnect event
```

Detailed list of AT commands please refer to RAK473(476) UART software programming manual.

2.3 Creating AP and Establish TCP_SEVER

This part gives an example process of AT command, set the module to AP mode, and establish TCP Sever, PC(C) connects to the module AP, and create TCP Client to communicate with the module.



TCP/UDP test tool interface diagram

Frequency band: 2.4GHZ

Information channel: channel 1

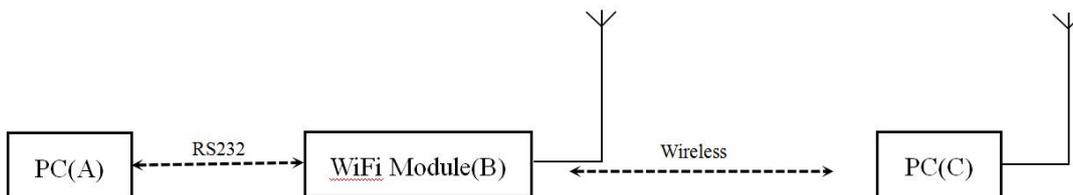
AP Name: rak_ap

AP password: rakwireless

Encryption mode: WAP2-PSK-CCMP

Module IP address: 192.168.9.4

Country code: CN



AT command flow is as follows:

Starting-up returns

```
57 65 6C 63 6F 6D 65 20 74 6F 20 52 41 4B 34 37 33 0D 0A
```

Set channel

```
Send: at+channel=1\r\n
```

```
Return: 4F 4B 0D 0A
```

Set AP psk

```
Send: at+psk=rakwireless\r\n
```

```
Return: 4F 4B 0D 0A
```

Set module to connect the wireless of rak_ap

```
Send: at+ap=rak_ap\r\n
```

```
return: 4F 4B 0D 0A
```

Set module static IP is 192.168.9.4

```
Send: at+ipstatic=192.168.9.4,255.255.255.0,192.168.9.1,0,0\r\n
```

```
Return: 4F 4B 0D 0A
```

Setting the module to automatically set the DHCP SEVER parameter

```
Send: at+ipdhcp=1\r\n
```

```
Return: 4F 4B 0D 0A
```

Module create a TCP Server with local port of 25000

```
Send: at+lcp=25000\r\n
```

```
Return: 4F 4B 08 0D 0A
```

When PC connected the module's ap, module return:

```
61 74 2B 72 65 63 76 5F 64 61 74 61 3D 82 0D 0A
```

Use PC create a TCP Client ,IP address is 192.168.9.4, target port is 25000 and connect to the TCP Server created by WiFi module, module return:

```
61 74 2B 72 65 63 76 5F 64 61 74 61 3D 80 00 18 CA 02 09 A8 C0 0D 0A
```

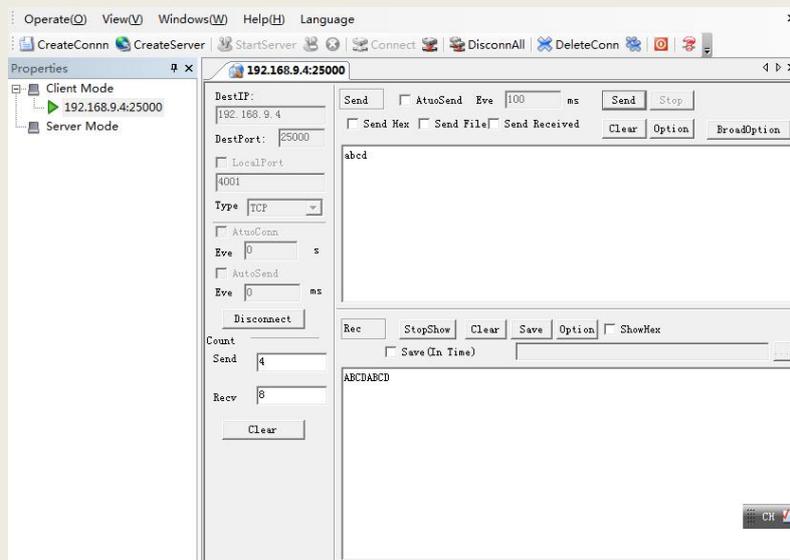
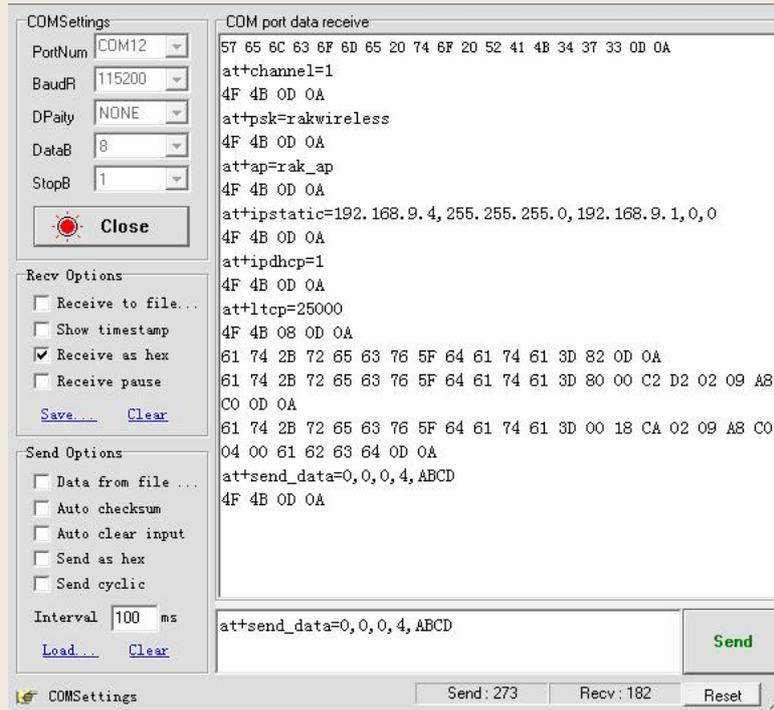
TCP Client send a string of "abcd" to TCP Sever, module return:

61 74 2B 72 65 63 76 5F 64 61 74 61 3D 00 18 CA 02 09 A8 C0 04 00 61 62 63 64 0D 0A

TCP Sever send a string of "ABCD" to TCP Client

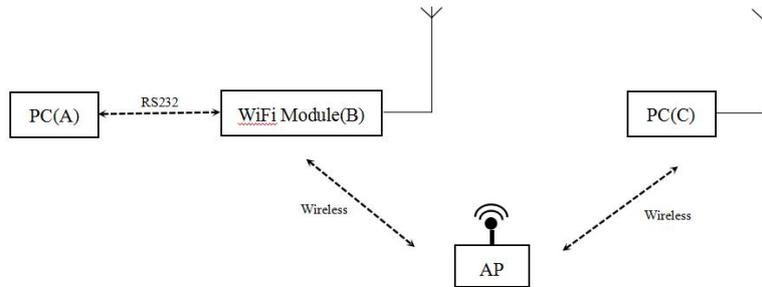
Send: at+send_data=0,49729,192.168.9.2,4,ABCD\r\n

Return: 4F 4B 0D 0A



2.4 Module connected to Router (STA) and Establish TCP Client

This part gives a sample process of AT command, connect the module with the router with SSID of RAK, PSK of rakwireless, then establish TCP sever. PC (C) establishes TCP Client and connects to the module terminal TCP SEVER to transmit data.



Frequency band: 2.4GHZ

AP name: rak_sta

AP password: rakwireless

Encryption mode: WPA2-PSK

IP address of WiFi Moudle (B): DHCP acquiring

RAK_2.4GHz

AT command flow is as follows:

Boot information

```
57 65 6C 63 6F 6D 65 20 74 6F 20 52 41 4B 34 37 33 0D 0A
```

Scan wireless network with SSID of rak_sta in all channels

```
Send: at+scan=0,rak_sta\r\n
```

```
Return: 4F 4B 01 0D 0A
```

Set wireless password is rakwireless

```
Send: at+psk=rakwireless\r\n
```

```
Return: 4F 4B 0D 0A
```

Module connects the wireless network with SSID of rak_sta

```
Send: at+connect=rak_sta\r\n
```

```
Return: 4F 4B 0D 0A
```

Open module DHCP Client, obtain module IP address

Send: at+ipdhcp=0\r\n

Return: 4F 4B 9C 44 3D 00 06 52 7F 01 A8 C0 00 FF FF FF 01 01 A8 C0 01 01 A8 C0 00 00 00 00 0D 0A

PC terminal use TCP/UDP tool to establish TCP Sever with local port of 9000, and start up the server. The module terminal establishes TCP Client, and then connects to the TCP Sever of PC terminal

Send: at+tcp=192.168.1.106,9000,25000,0\r\n

Return: 4F 4B 00 0D 0A

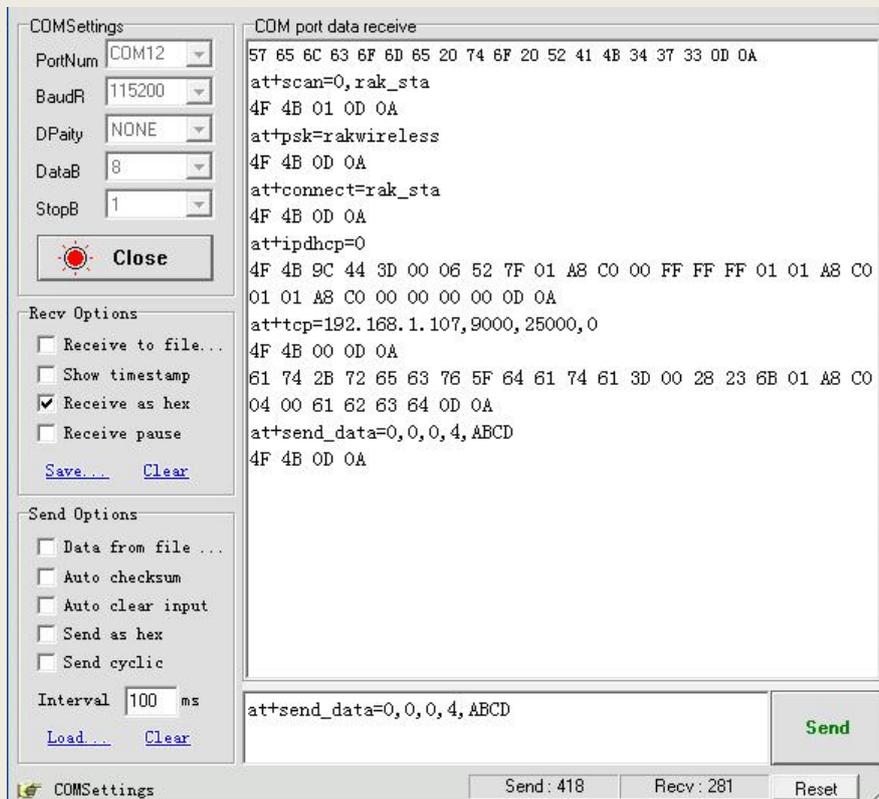
TCP Sever of PC terminal sends a string of "abcd" to TCP Client, the module returns

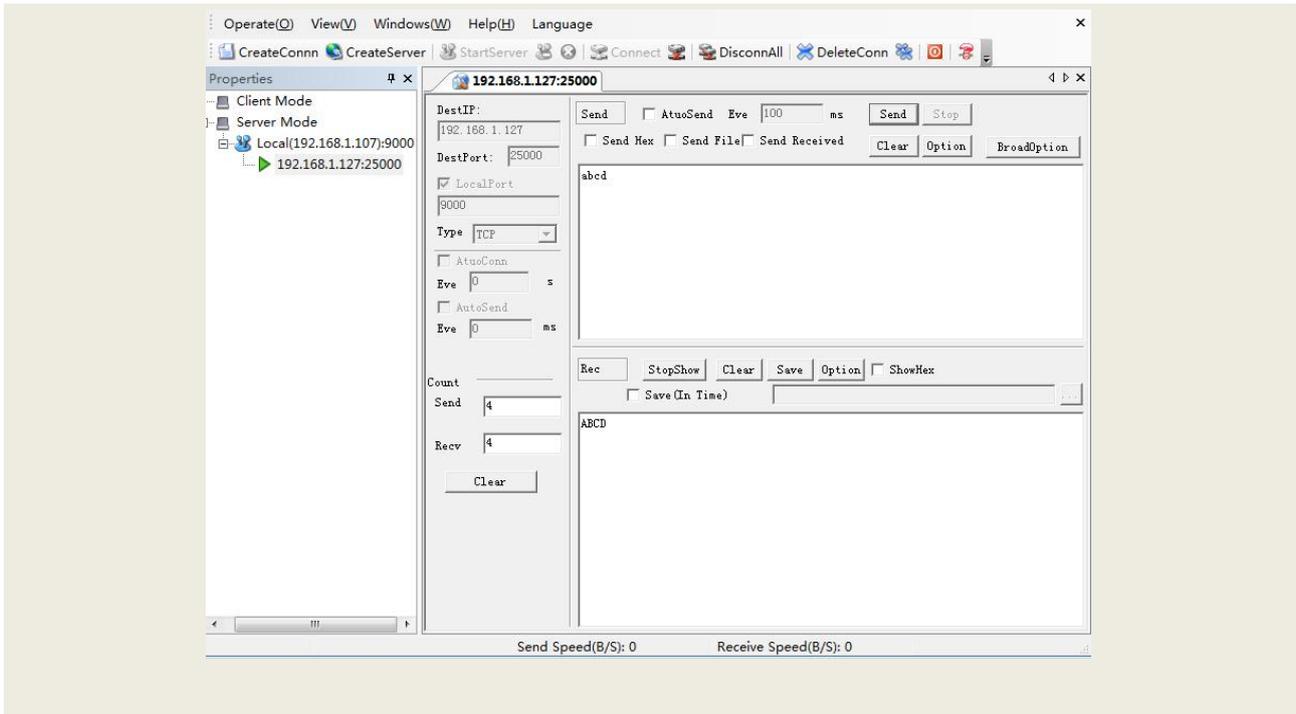
61 74 2B 72 65 63 76 5F 64 61 74 61 3D 00 28 23 6B 01 A8 C0 04 00 61 62 63 64 0D 0A

TCP Client of module terminal sends TCP Sever of PC terminal a string of "ABCD"

Send: at+send_data=0,9000,192.168.1.106,4,ABCD\r\n

Return: 4F 4B 0D 0A





2.5 Network Configuration

This part mainly introduces several network configurations of RAK473, RAK473 mainly includes three kinds of network configuration modes, that is, AP, WPS and Easyconfig.

2.5.1 AP Network Configuration

This section introduces how to use the web page to configure the module to the specified. router under the AP mode.

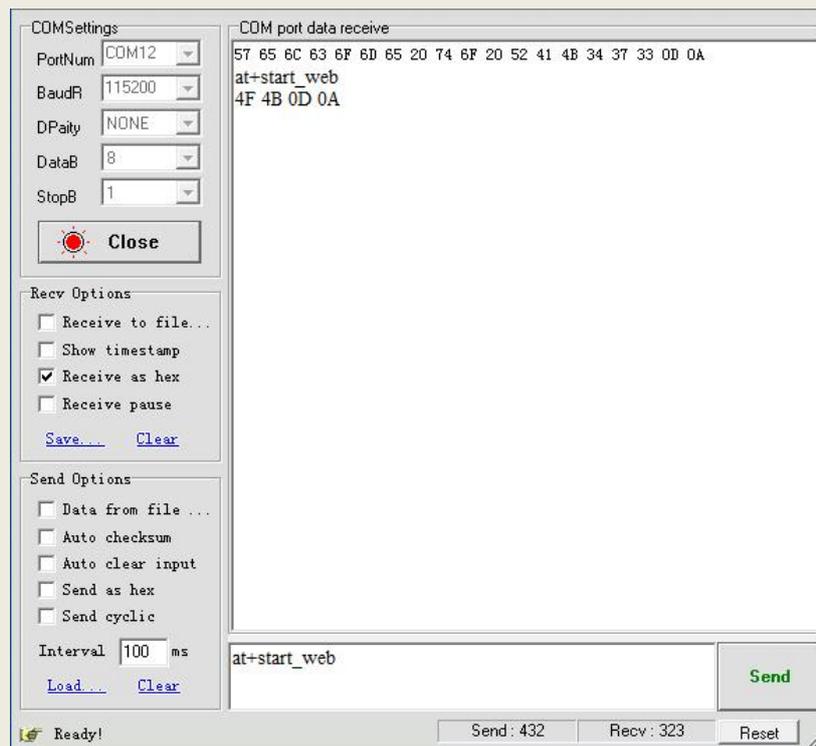
Boot information

```
57 65 6C 63 6F 6D 65 20 74 6F 20 52 41 4B 34 37 33 0D 0A
```

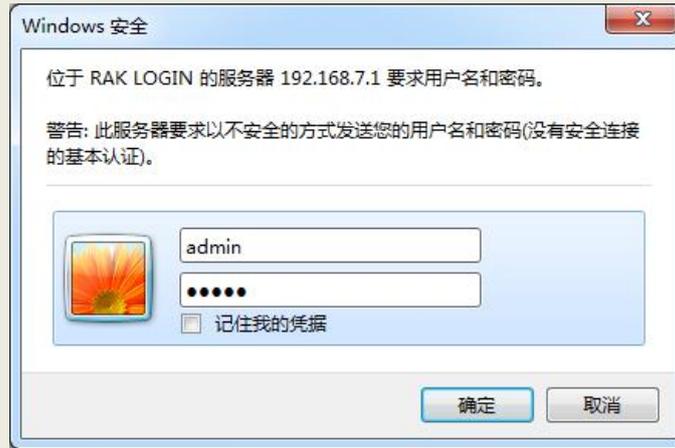
Start web configuration, the module will establish ap according to the internally stored web parameters,ap name defaults to RAK473_WEB_XXXXXX (XXXXXX is module MAC address after six bits).

```
Send: at+start_web\r\n
```

```
Return: 4F 4B 0D 0A
```

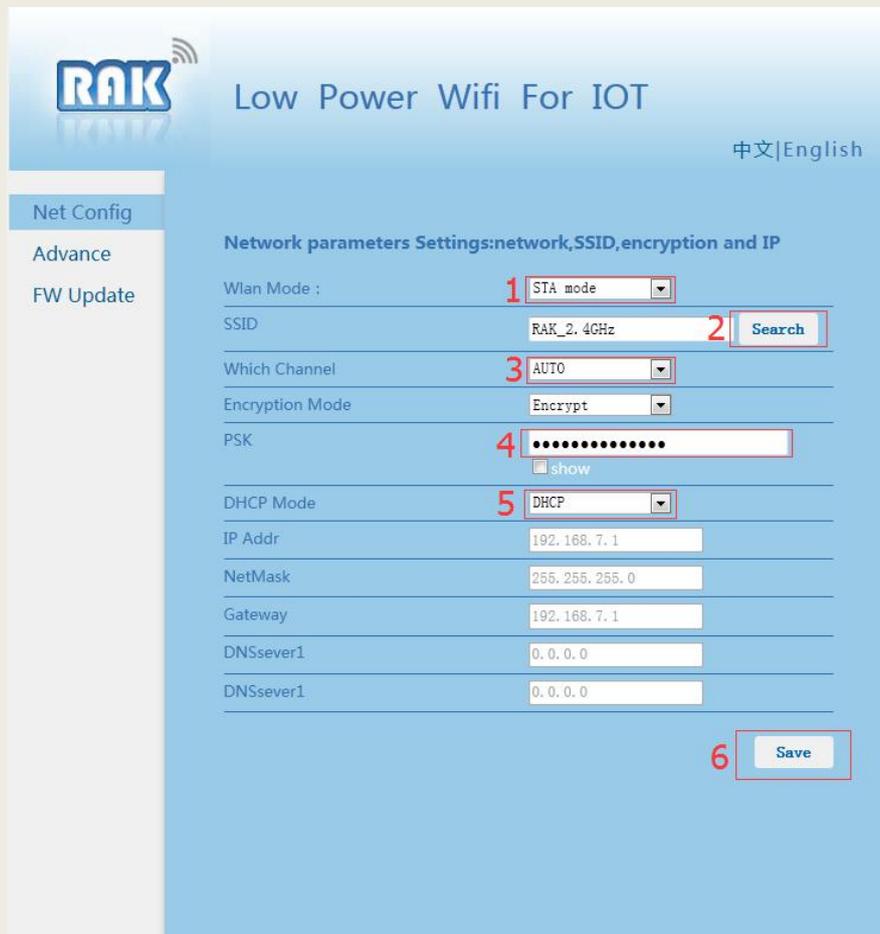


PC terminal connects module ap to open web page, input 192.168.7.1 to go to the webpage, then enter the user name "admin" and password "admin" to go into the web page.



In the network configuration page:

- 1, Slect the Wlan Mode of STA mode
- 2, Click on "Search" to search ap hot spots around the module, and choose one of the ap for the module connection
- 3, Select AUTO as channel selection mode
- 4, If ap is encrypted, then fill in password of ap
- 5, Select the DHCP Mode of DHCP
- 6, Click "Save", and jump to the next page



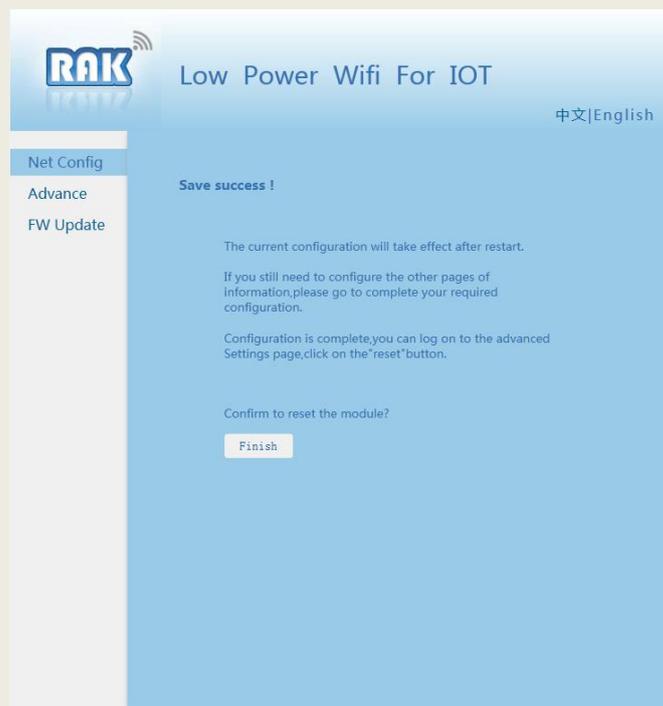
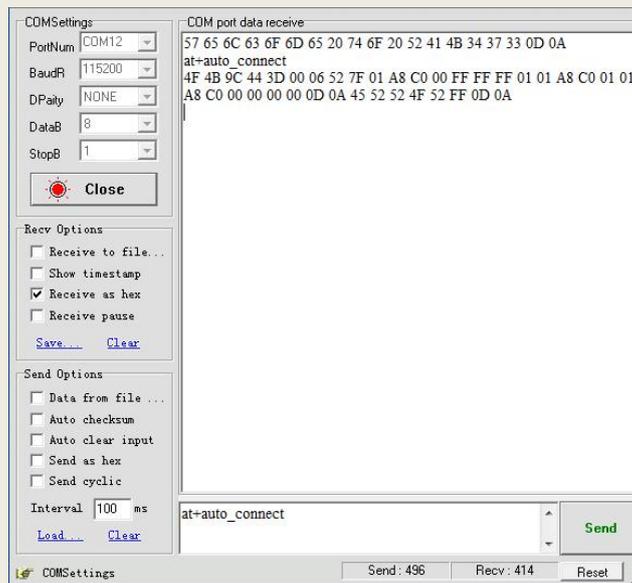
7, Save the Settings

8, Starting automatic net-connecting, The module is

connected to the designated router

Send: `at+auto_connect\r\n`

Return: `4F 4B 9C 44 3D 00 06 52 7F 01 A8 C0 00 FF FF FF 01 01 A8 C0 01 01 A8 C0 00 00 00 0D 0A 45 52 52 4F 52 FF 0D 0A`



In the "advanced management" page, the login account and password can be modified.

RAK Low Power Wifi For IOT 中文 | English

Net Config
Advance
FW Update

Modify login username and password

User Name

New Password

Again Password

Save

Module Manage

Complete configuration operation and inform to the host

In the "advanced management" page, the login account and password can be modified.

RAK Low Power Wifi For IOT 中文 | English

Net Config
Advance
FW Update

Upgrade the latest firmware, Please Seriously

Current firmware version : 1.0.0.17-2.9.4

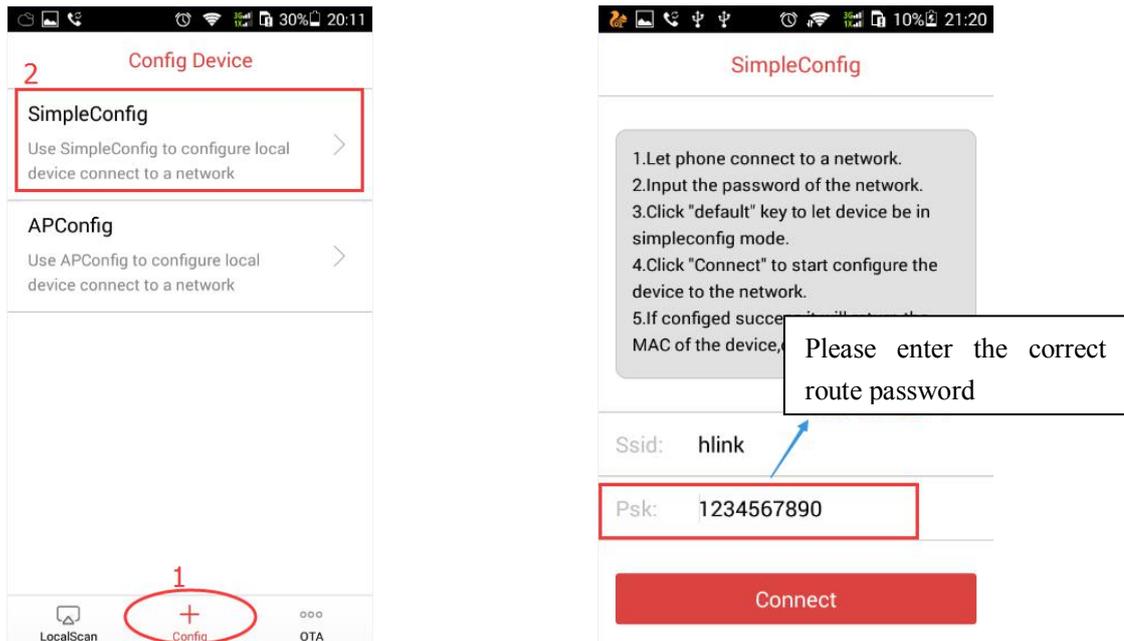
浏览...

Start

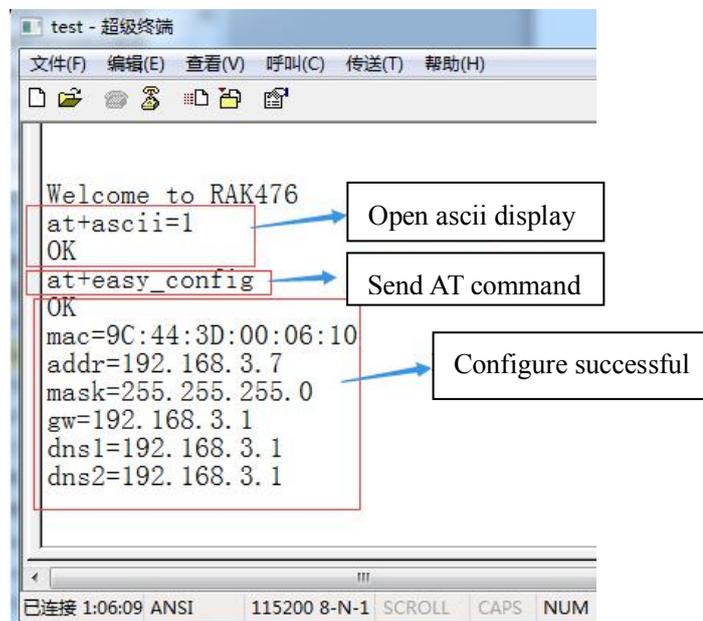
2.5.2 Easyconfig Configuration

This section introduces how to use mobile APP to one-key configure the module to the specified router. And please download RAK47X Config Tool APP from <http://www.rakwireless.com>.

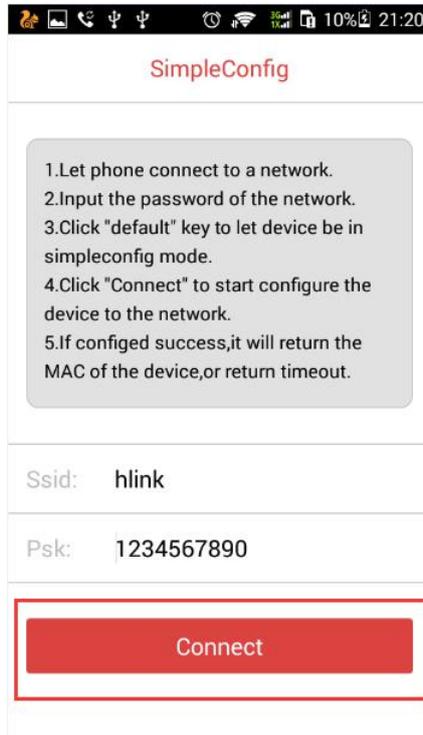
Step1: The mobile phone connects to the network that module will be connected to. Open RAK47X Config Tool APP, Ssid automatic filling, input Psk:



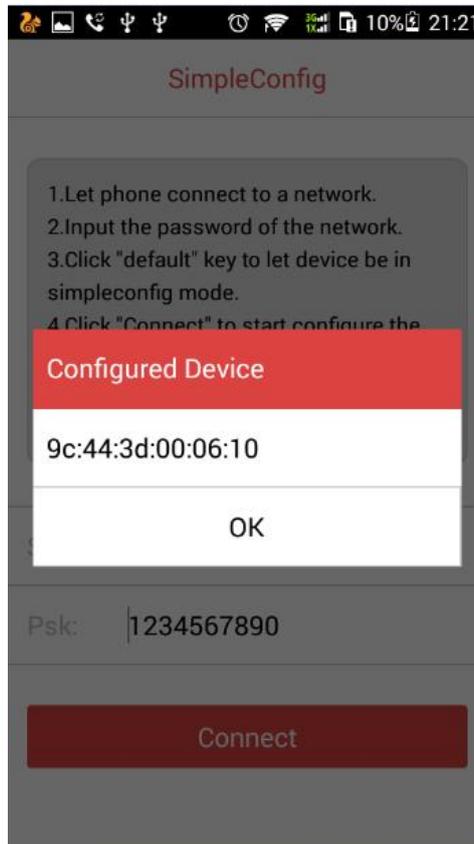
Step2: Reset wifi module, Send `at+easy_config\r\n`, make the module get into configuration status, and “link” indicator light faster flicker:



Step3: Click Connect, start configure:



Step4: If configure successful, APP will return module's mac address:



3. Modification Records

Edition	Author	Date	Modification content
V1.0	Wenyong.tang	2017/01/06	Creating document