

WI04 Wifi Module

Hardware Info

Introduction

The WI04 module provides designers with a ready made component that provides a fully integrated solution for applications, using the IEEE802.11 standard in the 2.4-2.5GHz ISM frequency band, including 802.11b/g/n and also provides IEEE802.3, can be quickly and easily included in product designs. The modules integrate all of the RF components required, no need to perform expensive RF design and test. Products can be designed by simply connecting sensors and switches to the module IO pins or uart interface. The modules use ralink's chip Wireless MCU, allowing designers to make use of the serial interface to connect with their device Hence, this module allows designers to bring wireless applications to market in the minimum time with significantly reduced development effort and cost.

This product is an embedded module based on the universal serial interface network standard, built-in TCP / IP protocol stack, enabling the user **serial port, Ethernet, wireless network (wifi)** interface between the conversions. Through the WI04 module, the traditional serial devices do not need to change any configuration; data can be transmitted through the Internet network. Provide a quick solution for the user's serial devices to transfer data via Ethernet Also the Wi04 module have FCC modular approvals and is compliant with EU regulations.

Features

- 2.4GHz 802.11b/g/n, compatible
- Support IEEE 802.3, IEEE 802.3u
- WiFi Client/AP/Router Mode
- Support wps/wds
- The range of baudrate: 1200~500000bps
- Support transparent transmission mode
- Support multiple security authentication mechanisms: WEP64/WEP128/TKIP/ AES / WEP/WPA-PSK/WPA2-PSK
- Support wireless roam
- Support multiple network protocols: PPPOE/TCP/UDP/DDDNS /DHCP/DNS/HTTP/Firewre
- Support AT+ instruction set
- Support two config methods: Serial/WEB
- Device Dimensions 29mm*40mm* 8.8mm
- Lead-free and RoHS compliant

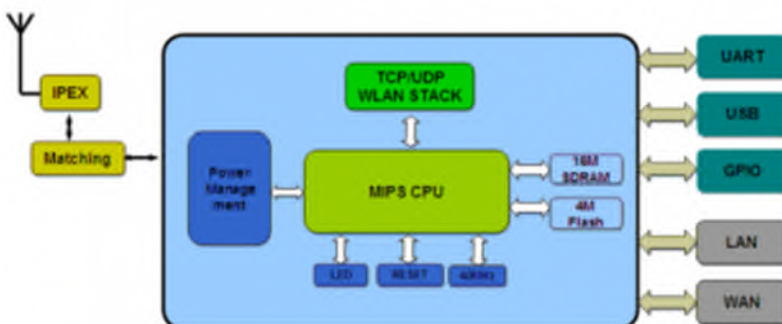
Advantages

- WiFi Router module solutions
- Ready to use in products
- Minimises product development time
- No RF test required for systems
- Compliant with CE and FCC
- Serial to Wifi; Serial to Net; Both by one module

Application

- WiFi Led Control
- WiFi Power Switch
- Home and Commercial building automation
- OBDII WiFi Diagnose
- RFID Data Transfer
- Toys and gaming peripherals
- Industrial systems
- Telemetry
- Remote Control

Module diagram

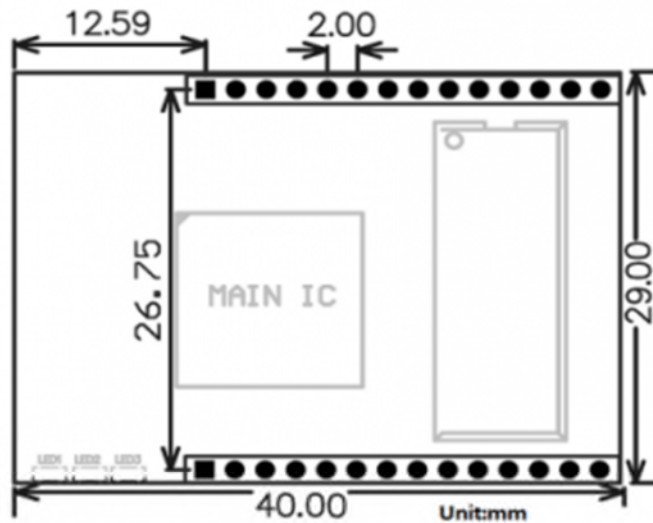


Pin Definitions



Pin No	Signal Type	Description
1	VCC5V	Supply Voltage, 5V(+/-)10%
2	GND	Analogue Ground
3	WIFI_LED	WLAN Activity LED
4	VO3.3	3.3V Output (Support Almost 300mA)
5	LINK1	10/100 PHY Port #1 activity LED
6	N/A	Reserved
7	N/A	Reserved
8	GPIO0	General GPIO Reserved
9	GPIO1	General GPIO Reserved
10	ES/RST	Exit transparent transmission mode/Restore factory value
11	TXOP1	10/100 PHY Port #1 TXOP
12	TXON1	10/100 PHY Port #1 TXON
13	RXIP2	10/100 PHY Port #2 TXOP
14	RXIN2	10/100 PHY Port #2 TXON
15	RXIN1	10/100 PHY Port #1 RXON
16	RXIP1	10/100 PHY Port #1 RXP
17	TXON2	10/100 PHY Port #2 OXN
18	TXOP2	10/100 PHY Port #2 OXP
19	GPIO2	General GPIO Reserved
20	UART_RX	UART RXD.
21	UART_TX	UART TXD.
22	GPIO3	General GPIO Reserved
23	LINK2	10/100 PHY Port #2 activity LED
24	GPIO4	General GPIO Reserved
25	WPS_RST	WiFi Protected Setup /Restore factory value
26	GPIO5	General GPIO Reserved
27	VO1.8	1.8V Output (Support Almost 300mA)
28	VCC5V	Supply Voltage, 5V(+/-)10%

Module outline



Specifications

VDD=5.8V @ +25°C

Typical DC Characteristics		Notes
Only wifi current	140mA	Wifi to serial AP mode or Client mode
One rj45 current	120mA	Serial to RJ45.
Two rj45 current	135mA	One is Wan another is LAN
WiFi and two rj45	160mA	Default Mode/Factory Mode
Centre frequency accuracy	+/-25ppm	Additional +/-15ppm allowance
Typical RF Characteristics		Notes
Receive sensitivity	-70dBm	Use Iqview to adjust
Maximum Transmit power	18dBm/15dBm/13.5dBm	802.11b/g/n
RF Port impedance – Ipeex or connector	50 ohm	2.4 - 2.5GHz
VSWR (max)	2:1	2.4 - 2.5GHz
Centre frequency accuracy	+/-25ppm	Additional +/-15ppm allowance
Peripherals		Notes
UART	2pins	1200-500kbps
RJ45(WAN)	4pins	Support pppoe
RJ45(LAN)	4pins	Support dhcp
3.3V Out	1pins	Support almost 300mA/3.3V
1.8V Out	1pins	Support almost 300mA/1.8V

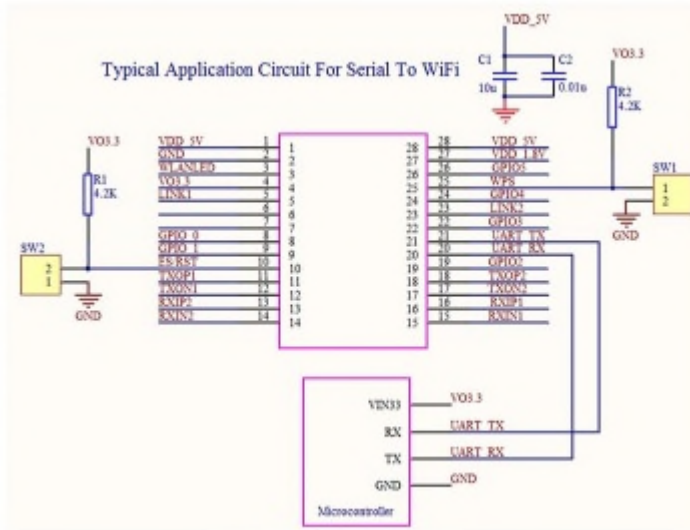
Electrical characteristics

Parameter	Min	Max
Module supply voltage VCC	3.9V	5.5V
Module Voltage Output VO3.3	3.1V	3.5
Module Voltage Output VO1.8	1.65V	1.9
GPIO Voltage	3.1V	3.5V
Storage temperature	-40°C	95°C

Reference Design

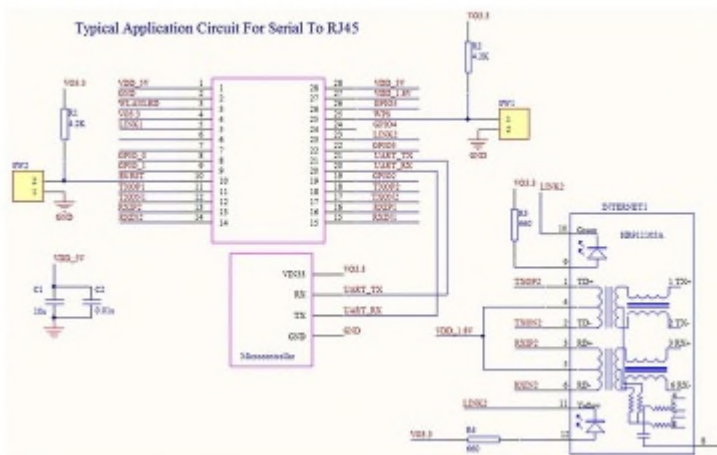
Serial to Wifi

Only use serial to wifi function, no need any RJ45 jack



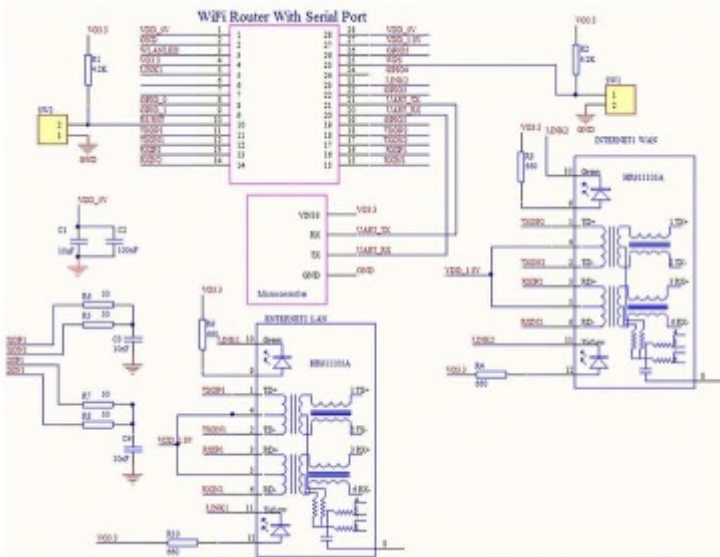
Serial To RJ45

with extra ETH1 RJ45 jack enabled



Wireless Router with Serial port(Default Mode)

with extra ETH2 RJ45 jack enabled



Quick Start Manual

Reset to Factory Settings

To ensure that all the correct configuration process, let the module to restore the factory settings. Mode at the factory module can skip this step. Provide 5V (350mA) power supply to the module is powered up, wait about 30 seconds, start after the completion pulled ES / RST pin exceeds Trst, releasing ES / RST pin, the system will automatically restart. After rebooting the system already in the factory mode.

Set Working Mode

- Choose either Cable Ethernet or wifi wireless to connect your wi04 board and the target device, for wifi option, you can set the wi04 board to AP or STA (station)
- (Optional)PC set to a static IP mode. IP address of PC set to 192.168.16.100/255.255.255.0, gateway 192.168.16.254.
- Connect through Ethernet (Port Eth2 LAN) or WIFI connection directly. (Wifi ssid default and the default password is 12345678)
- Open in browser: <http://192.168.16.254/ser2net.asp>, enter into the web configuration page, the default user name password is admin / admin.
- Through web admin the corresponding network parameters. The module ip address is 192.168.16.254.

TCP/UDP Data Transfer

- Get the TCP test tool from [wifi](#) page.
- Set PC on TCP client or TCP server mode, then the wifi module should be vice verse, for UDP, set a pair of client and server as same. This should be done by AT commands (See the ethernet commands below) or at the web console terminal

Functions

Module Working mode

There are four modes for this module



Ethernet



Wifi - Client



Wifi - AP



Default Mode

Mode	Eth1(WAN)	Eth2(LAN)	Wifi	Ethernet	DHCP/Static
Ethernet	Yes	Close	Close	Yes	DHCP or Static IP
Wifi Client	Close	Close	Yes	Yes	DHCP or Static IP

Wifi AP	Close	Close	Yes	Yes (Support all kinds of encryption)	DHCP enable or static
Default Mode	Close	Close	Yes	Yes (Support all kinds of encryption)	DHCP enable (default) or static

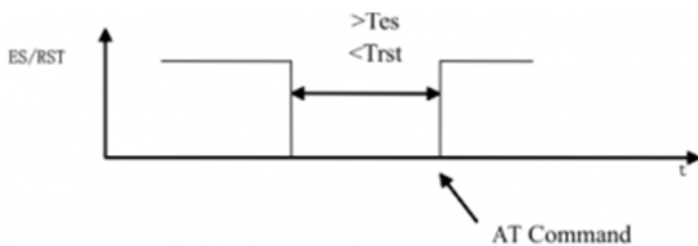
Serial Working Mode Switch (Data/AT)

There are two working status of serial port: **communication mode and AT mode**. When module power up, system will automatically check, if everything goes well, the module will enter into communication mode, otherwise enter into AT commands mode.

There are three ways to enter into At commands mode:

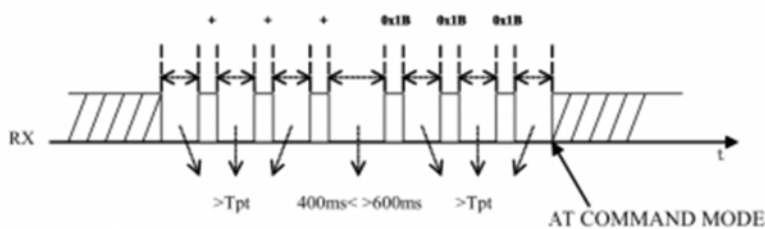
Via ES/RST pin

In any state, maintaining ES / RST pin at low for more than T_{es} time and less than T_{rst} time, will immediately enter the AT command mode.



Via sending special data during communication

When Serial exit communication function is enabled, you can send specific serial data to the module to exit. Exit serial pass-through process is as follows:



Of which:

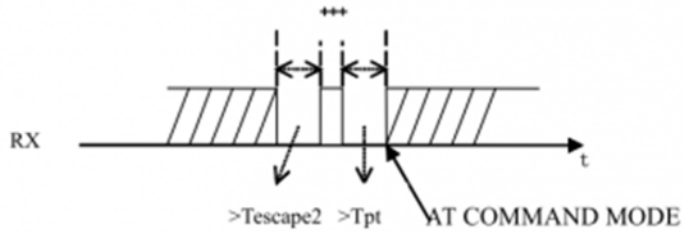
Tpt: serial group frame time.

Frame time interval greater than the group continuous transmission of three "+" then wait approximately 500ms (400ms <> 600ms), the time interval greater than the continuous transmission of frames 3 0x1B. Module to exit transparent mode.

Note: This function must exit the serial pass-through feature is turned on in the case in order to use (at + escape = 1)

Via sending special data during communication 2

Serial exit communication function 2 is enabled, you can send specific serial data 2 to the module exits. Serial exit the communication process is as follows:



Of which:

Tescape2: specific serial data 2 escape time.

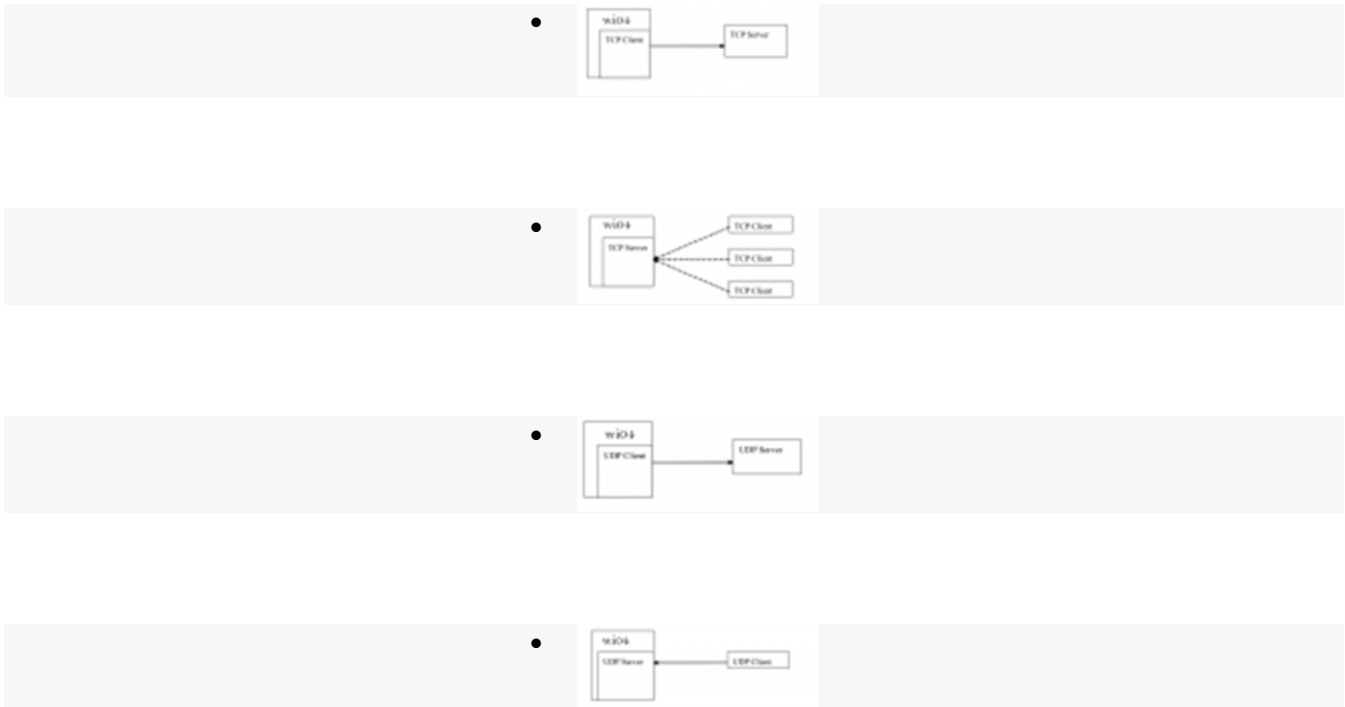
Interval greater than Tescape2 send three "+" module to exit transparent mode.

Note: This function must exit the serial pass-through feature 2222 on the case in order to use (at + escape2 = 1).

Description: The module provides two exits through the serial port communication approach - "specific serial data" and "specific serial data 2". "serial data 2" is simple, easy to implement, but the data is not strong specificity may cause false triggering." Specific serial data "is relatively complex, but a characteristic strong, less prone to false triggering. Default case, the "specific serial data" is off "specific serial data 2" is enabled.

TCP/UDP Data Transfer Modes

There are four types:



In TCP server mode, the module listen on the specified port, waiting for TCP Client connection, connection, all TCP data is sent directly to the serial port side, sending data to the serial port on all TCP Clie side.

In TCP client mode, the module connect to the specified domain / IP, port. All come from the TCP Server sends the data directly to a serial terminal for the serial port to send data to TCP Server side. Unusual network disconnection could cause the module active reconnect. TCP reconnection function enables active case, TCP Server initiative disconnected, the module will immediately take the initiative to re-connect, otherwise the module will not reconnect.

In UDP server mode, the module opens local port is specified, upon receipt of the data sent to the port, the module will send data to the serial port, and record the remote ip, port. Last connection module will record the information on the remote. Serial data received will be sent directly to the recorded remote ip, port.

In UDP client mode, the module directly to the serial data sent to the specified ip, port. The data returned from the server will be sent to the serial terminal.

Web configuration

You can set the working mode, IP address, etc in the page, the address is : <http://192.168.16.254/ser2net.asp>

At Commands List

At commands format:

- at+[command]=[value]\r basic format
- at+remoteip=192.168.11.133\r set thevalue
- at+remoteip=?\r" check the value
- Please see the at commands examples below

Commands	description	category
netmode	net working mode	wifi

wifi_conf	wifi configuration details	wifi
channel	wifi channel	wifi
dhcpc	DHCP client cong.	wifi
net_ip	net ip	wifi
net_dns	net dns	wifi
dhcpcd	DHCP server cong.	wifi
dhcpcd_ip	DHCP server IP	wifi
dhcpcd_dns	DHCP server DNS	wifi
dhcpcd_time	DHCP server deploying time	wifi
net_commit	submit network changes	wifi
out_trans	exit communication	wifi
remoteip	remote IP	Ethernet
remoteport	remote port	Ethernet
remotepro	network protocol	Ethernet
timeout	timeout	Ethernet
mode	serial uart mode	Serial

uart	serial uart cong.	Serial
uartpacklen	serial uart pack length	Serial
uartpacktimeout	serial uart pack time	Serial
escape	escape communication from serial	Serial
tpc_auto	TCP auto re-connect	Ethernet
save	save serial uart cong. and reboot	Serial
reconn	reboot service	General
default	reset to default settings	General
reboot	reboot module	General
ver	check version	General
CLport	TCP/UDP client local port	Ethernet
RTS	serial output status (485)	Serial
XON_XOFF	XON/XOFF traffic control enable	Serial
net_wanip	wan ip address	Wifi
tcp_client_check	TCP client remote status check	Ethernet
S2N_Stat	serial function status	Serial

Get_MAC	get MAC address	Wifi
wifi_ConState	wifi client connect status	Wifi
wifi_Scan	wifi scan	Wifi
Suspend	suspend	Gernal

examples and results return

Gernal Check

- at+netmode=? 0
- at+wifi_conf=? Hi-Link,wpa2_aes,12345678
- at+dhcpc=? 0
- at+dhcpc_ip=? 192.168.14.1,192.168.15.254,255.255.254.0,192.168.15.254
- at+dhcpc_dns=? 192.168.15.254,0.0.0.0
- at+dhcpc_time=? 86400
- at+dhcpc=? 1
- at+net_ip=? 192.168.15.254,255.255.254.0,192.168.11.1
- at+net_dns=? 192.168.11.1,0.0.0.0
- at+net_wanip=? ,,
- at+remoteip=? 192.168.11.245
- at+remoteport=? 8080
- at+remoteport=? tcp
- at+timeout=? 0
- at+mode=? server
- at+uart=? 115200,8,n,1
- at+uartpacklen=? 64
- at+uartpacktimeout=? 10
- at+ver=? V1.39(Dec 6 2012)

Serial to Ethernet Dynamic DHCP (Optional)

- at+netmode=1 ok
- at+dhcpc=1
- at+remoteip=192.168.11.245 ok
- at+remoteport=8080 ok

- at+remoteport=tcp
- at+timeout=0 ok
- at+mode=server
- at+uart=115200,8,n,1 ok
- at+uartpacklen=64 ok
- at+uartpacktimeout=10 ok
- at+net_commit=1

Serial to Ethernet Static IP

- at+netmode=1 ok
- at+dhcpc=0
- at+net_ip=192.168.11.254,255.255.255.0,192.168.11.1 ok
- at+net_dns=192.168.11.1,8.8.8.8 ok
- at+remoteip=192.168.11.245 ok
- at+remoteport=8080 ok
- at+remoteport=tcp
- at+timeout=0 ok
- at+mode=server
- at+uart=115200,8,n,1 ok
- at+uartpacklen=64 ok
- at+uartpacktimeout=10 ok
- at+net_commit=1

Serial to Wifi Client

- at+netmode=2 ok
- at+wifi_conf=HI-LINK,wpa2_aes,12345678 ok
- at+dhcpc=1
- at+remoteip=192.168.11.245 ok
- at+remoteport=8080 ok
- at+remoteport=tcp
- at+timeout=0 ok
- at+mode=server
- at+uart=115200,8,n,1 ok
- at+uartpacklen=64 ok
- at+uartpacktimeout=10 ok
- at+net_commit=1

Serial to Wifi AP

- at+netmode=3 ok
- at+wifi_conf=Hi-Link_,wpa2_aes,0000000000 ok
- at+dhcpcd=1 ok
- at+dhcpcd_ip=192.168.16.100,192.168.16.200,255.255.255.0,192.168.16.254 ok
- at+dhcpcd_dns=192.168.16.254,8.8.8.8 ok
- at+dhcpcd_time=86400 ok
- at+net_ip=192.168.16.254,255.255.255.0,192.168.16.254 ok
- at+net_dns=192.168.16.254,8.8.8.8 ok
- at+remoteip=192.168.11.245 ok
- at+remoteport=8080 ok
- at+remoteport=tcp
- at+timeout=0 ok
- at+mode=server
- at+uart=115200,8,n,1 ok
- at+uartpacklen=64 ok
- at+uartpacktimeout=10 ok
- at+net_commit=1

FAQ

Can I use it as a wifi hub(repeater)

Yes.

In the default mode, connect the WAN port of WI04 module to the LAN of your modern to get internet into WI04 module

Then you can connect your other device like PC to internet via the LAN port of WI04, or connect via wifi of WI04.