

# WIFI-LPT100-B

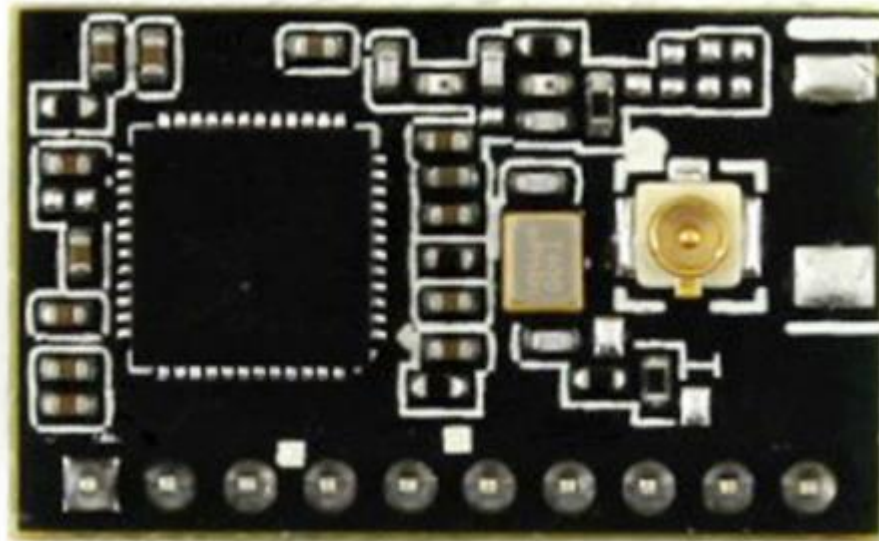
## User Manual

### Revision History

Rev.	Issue Date	Revised Content
V1.0	2017.12.07	Preliminary

# Overview

WIFI-LP Serial module ultra-low consumption embedded WIFI module, support IEEE 802.11 b/g/n. User can connect their devices to wireless network of WIFI module and transmit



WIFI-LPT100-B

- Support IEEE802.11b/g/n Wireless Standards
- Based on Self-developed High Performance MCU
- Ultra-Low-Power for Battery Applications with Excellent Power Save Scheme
- Support Work As STA/AP/AP+STA Mode
- Support RFC2217 auto-baud function
- Support usrlink quick networking setting
- Support Wireless Upgrade Function
- Support HTTP Client function
- Support Multi-TCP Link (5 Channel)
- Support Internal/External(I-PEX/SMA) Antenna Option
- Single +3.3V Power Supply
- Smallest Size: 22mm x 13.5mm x 9.2mm, 1x10 2mm Connector
- FCC/CE Certificated

# CONTENTS

<b>Overview .....</b>	<b>2</b>
<b>1 Quick Start.....</b>	<b>5</b>
<b>1.1 Hardware Connection.....</b>	<b>5</b>
<b>1.2 Network Connection.....</b>	<b>6</b>
<b>1.3 Communication Test.....</b>	<b>6</b>
<b>1.4 Application Examples .....</b>	<b>7</b>
<b>1.4.1 Wireless remote-control applications.....</b>	<b>7</b>
<b>1.4.2 Remote Connectivity Applications .....</b>	<b>8</b>
<b>1.4.3 Transparent Transmission .....</b>	<b>8</b>
<b>2 Product Overview .....</b>	<b>9</b>
<b>2.1 General Description .....</b>	<b>9</b>
<b>2.2 Device Features.....</b>	<b>9</b>
<b>2.3 Device Parameters .....</b>	<b>10</b>
<b>2.4 Module Feature Comparison.....</b>	<b>11</b>
<b>2.5 Key Application .....</b>	<b>11</b>
<b>2.6 Package Information.....</b>	<b>12</b>
<b>2.7 Device Handle Instruction .....</b>	<b>12</b>
<b>2.8 Shipping Information.....</b>	<b>13</b>
<b>3. Hardware Introduction.....</b>	<b>13</b>
<b>3.1 Pins Definition.....</b>	<b>13</b>
<b>3.2 Mechanical Size.....</b>	<b>14</b>
<b>3.3 Antenna.....</b>	<b>15</b>
<b>3.4 Evaluation Kit .....</b>	<b>16</b>
<b>4 Module Function Description .....</b>	<b>16</b>
<b>4.1 Working mode .....</b>	<b>16</b>
<b>4.1.1 Transparent Transmission Mode .....</b>	<b>17</b>
<b>4.1.2 Command Mode .....</b>	<b>18</b>
<b>4.1.3 HTTPD Client Mode.....</b>	<b>19</b>
<b>4.2 UART Parameters.....</b>	<b>19</b>
<b>4.3 RFC2217 auto-baud.....</b>	<b>20</b>
<b>4.3.1 Description .....</b>	<b>20</b>

4.3.2 RFC2217 Protocol Description .....	20
4.4 Quick Networking Protocol (usrlink) .....	21
4.5 Mechanisms of Heartbeat Packet .....	23
4.6 Wireless Networking .....	24
4.6.1 Working as STA .....	24
4.6.2 Working as AP .....	25
4.6.3 Encryption .....	26
4.7 Socket Communication .....	26
4.7.1 Socket A .....	27
4.7.2 Socket B .....	27
4.8 Parameter Configuration .....	27
4.9 Firmware and WEB upgrade .....	28
5 Module Parameter Configuration .....	28
5.1 WEB .....	28
5.1.1 Web Brief Description .....	28
5.1.2 Open Web Management Interface .....	28
5.1.3 System Page .....	29
5.1.4 Work Mode Page .....	30
5.1.5 STA Setting Page .....	30
5.1.6 AP Setting Page .....	31
5.1.7 Other Setting Page .....	31
5.1.8 Account Management Page .....	32
5.1.9 Upgrade Software Page .....	32
5.2 AT Command .....	33
5.2.1 Switch to Command Mode .....	34
5.2.2 AT+ Instruction Overview .....	35
5.2.3 AT+ Instruction Introduction .....	36
6 Appendix D: Disclaimer .....	60

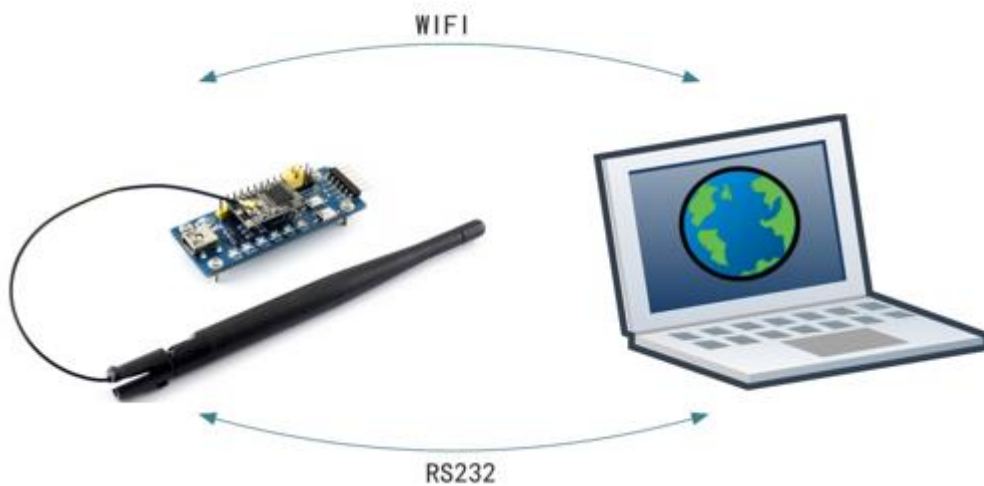
# 1 Quick Start

WIFI-LPT100/WIFI-LPB100 series product is used to transmit data between RS232 and WIFI TCPIP transparently, user can update the product to WIFI control without knowing the WIFI and TCPIP detail. All the convert work is done by the module. For users, the RS232 side is only as a serial device, the WIFI side is TCPIP Socket data. User can setup the work detail by sample settings which can setup via inside web pages or RS232 port. The setup work only need do once, then it will save the setting forever.

This chapter is a user guide for WIFI-LPT100-B series products. We suggest users follow the guide to test module at first, and will have a good understanding of the modules. Users can also choose the chapter which you are interested in to read. For specific details and instructions, please refer to the following chapters.

## 1.1 Hardware Connection

In order to test WIFI module, we need to connect serial port of module to PC and also the WIFI to PC. Due to the special need both WIFI and serial, we use PC which add USB WIFI network Card such as the following picture.



*Figure 1 Hardware Connection Diagram*

About the serial connection, because the pins on module are 3.3V TTL level, the computer cannot connect to it directly, so user needs to have a TTL to USB adapter cable and then connect to the computer. In order to facilitate the test, we provide evaluation board for users to choose.

## 1.2 Network Connection

The following is the WIFI-LPT100-B module example, except SSID, other modules are the same to WIFI-LPT100. Open Wi-Fi, search network, as shown in below, WIFI-LPT100-B is the default network name (SSID) of the module.



Figure 2 WIFI Search

Join the network, choose to automatically obtain IP. WIFI module supports DHCP Server feature and it is enabled by default.



Figure 3 WIFI Connection

Now, Link led of WIFI-LPT100-B Evaluation Board is lighting.

## 1.3 Communication Test

Module's default setting:

- **SSID:** WIFI-LPT100-B;
- **Encryption mode:** open, none;
- **UART:** 115200, 8, 1, None;
- **Network parameters:** TCP, Server, 8899, 10.10.100.254
- **IP:** DHCP,0.0.0.0,0.0.0.0,0.0.0.0

We just need to follow the parameters of the corresponding set of network communication parameters, you can make serial <--> WIFI communication, the steps are as follows:

1. Open test software TCP232;
2. COM settings area (left):  
Choose COM port which is connected the module, there is COM4, choose baud rate to 115200, this is the default baud rate of WIFI module, Click Open COM port.
3. Net Settings area (right):  
Choose TCP client mode, Server IP write 10.10.100.254, it is the WIFI default IP address, Server port to 8899. It is the default Port the WIFI module listen, click Connect to link module.

Now, you can test send data between serial port and WIFI. They transmit direction is that:

**COM Port to WIFI:** PC ->Module Serial Port->Module WIFI->PC WIFI

**WIFI to COM Port:** PC WIFI->Module WIFI->Module Serial Port->PC

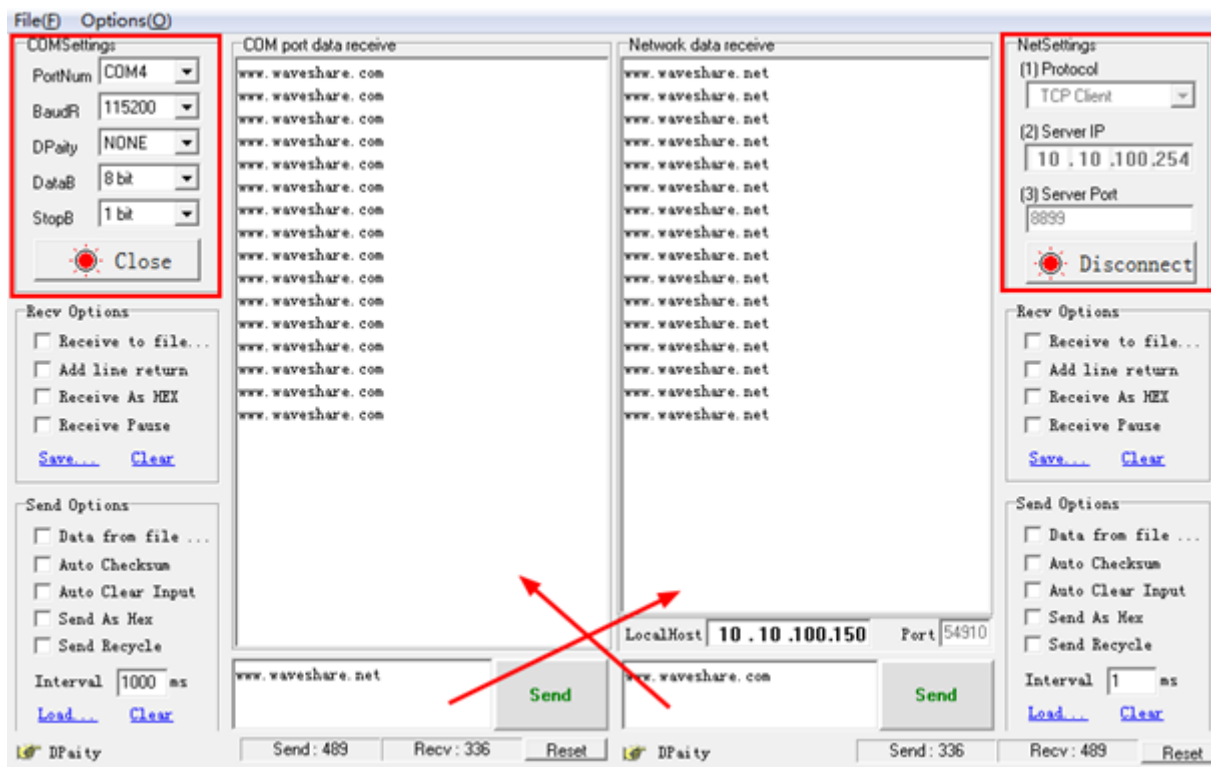


Figure 4 Serial/Network Parameter settings and transmission test

## 1.4 Application Examples

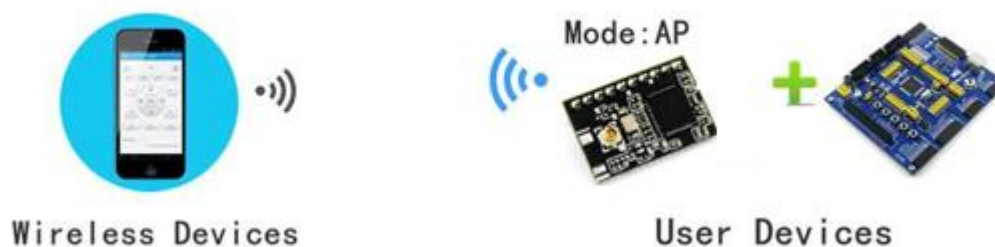


Figure 5 Wireless Remote Control Applications

### 1.4.1 Wireless remote-control applications

In the wireless remote control applications, WIFI-LPT100-B module works in AP mode. WIFI-LPT100-B module's serial is connected to user's devices. Then user

can control the user equipment via wireless network by controlling client (such as smartphones).

### 1.4.2 Remote Connectivity Applications

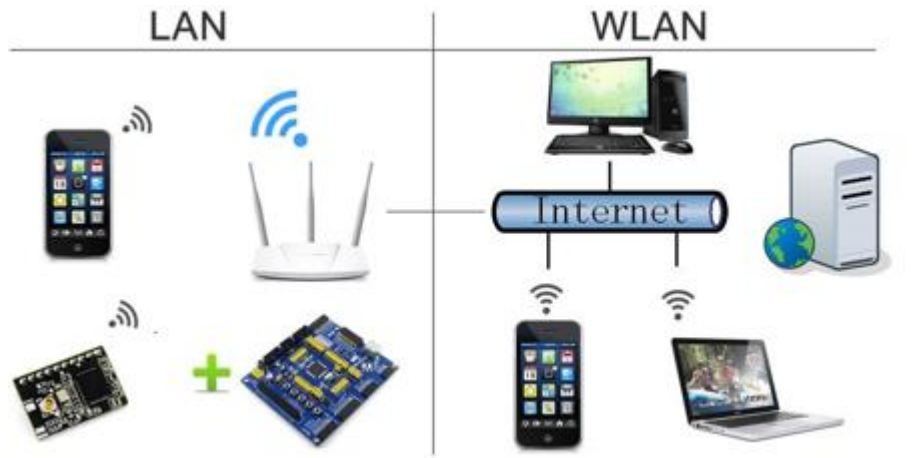


Figure 6 Remote Connectivity Applications

In remote connection applications, WIFI-LPT100-B module works in the STA mode, connect to internet through internet gateway. Module is set as TCP Client, connected to the internet TCP server. User devices connected to WIFI-LPT100-B module through the serial port. This application can collect data from the user device and send it to the server for processing and storage, the internet server can also send commands to control the user device for control. Users can use smartphone or PC to control the user device via LAN, and they also can control the user device via WAN by communicate to internet server.

### 1.4.3 Transparent Transmission

In this application, two WIFI-LPT100/WIFI-LPB100 modules connect by Wi-Fi as shown below, this application is to build a transparent serial channel between two user devices.

The following figure is set as follows:

Left of the WIFI-LPT100/WIFI-LPB100 module is set to AP mode, SSID and IP address are default setting, network protocol is set to TCP / Server mode, protocol port is 8899 by defaults.

Right of the WIFI-LPT100/WIFI-LPB100 module is set to STA mode, SSID is set to the AP's SSID which will be connected to (e.g. WIFI-LPT100-B), the IP address is DHCP by default, network protocol is set to TCP / Client mode, protocol port 8899, Target IP address is set to the left of the module, i.e. 10.10.100.254.

When the module right side startup will find AP (SSID: WIFI-LPT100), and then automatically connect to the TCP server left side as client. All connections can be completed automatically, both sides of the UART can transparently transmit data.



*Figure 7 Transparent Serial*

## 2 Product Overview

### 2.1 General Description

WIFI-LPT100-B is a fully self-contained small form-factor, single stream, 802.11b/g/n Wi-Fi module, which provide a wireless interface to any equipment with a Serial interface for data transfer.

WIFI-LPT100-B integrate MAC, baseband processor, RF transceiver with power amplifier in hardware and all Wi-Fi protocol and configuration functionality and networking stack, in embedded firmware to make a fully self-contained 802.11b/g/n Wi-Fi solution for a variety of applications.

WIFI-LPT100-B adopts the world's lowest power consumption embedded architecture. It has been optimized for all kinds of client applications in the home automation, smart grid, handheld device, personal medical application and industrial control that have lower data rates, and transmit or receive basis data at low rate.

WIFI-LPT100-B integrates all Wi-Fi functionality into a low-profile, small module package that can be easily mounted on main PCB with application specific circuits. Also, module provides built-in antenna, external antenna option.

### 2.2 Device Features

- Support IEEE802.11b/g/n Wireless Standards
- Based on Self-developed High Performance MCU
- Ultra-Low-Power for Battery Applications with Excellent Power Save Scheme
- Support Work As STA/AP/AP+STA Mode
- Support RFC2217 auto-baud function
- Support usrlink quick networking setting
- Support Wireless Upgrade Function
- Support HTTP Client function
- Support Multi-TCP Link (5 Channel)
- Support Internal/External(I-PEX/SMA) Antenna Option
- Single +3.3V Power Supply
- Smallest Size: 22mm x 13.5mm x 9.2mm, 1x10 2mm Connector

- FCC/CE Certificated

## 2.3 Device Parameters

Table 1 WIFI-LPT100-B Module Technical Specifications

Class	Item	Parameters
Wireless Parameters	Certification	FCC/CE
	Wireless standard	802.11 b/g/n
	Frequency range	2.412GHz-2.484GHz
	Transmit Power	802.11b: +18 +/-1dBm (@11Mbps, CCK)
		802.11g: +17 +/-1dBm (@54Mbps)
		802.11n: +15 +/-1dBm(@HT20, MCS7)
	Receiver Sensitivity	802.11b: -85 dBm(@11Mbps, CCK)
		802.11g: -70 dBm(@54Mbps, OFDM)
		802.11n: -68 dBm(@HT20, MCS7)
	Antenna Option	External : I-PEX connector (WIFI-LPT100-B) Internal : On-board PCB antenna (WIFI-LPB100)
Hardware Parameters	Data Interface	UART
	Operating Voltage	3.0~3.6V
	Operating Current	Peak [Continuous TX]: ~200mA Average. ~12mA, Peak: 200mA
	Operating Temp.	-40°C - 85°C
	Storage Temp.	-45°C - 125°C
	Dimensions and Size	22mm x 13.5mm x8mm
	Footprint	1x10, 2mm connector
Software Parameters	Network Type	STA/AP/STA+AP
	Security Mechanisms	WEP/WPA-PSK/WPA2-PSK
	Encryption	WEP64/WEP128/TKIP/AES
	Update Firmware	Local Wireless
	Customization	Web Page Upgrade
	Network Protocol	IPv4, TCP/UDP/HTTP
	User Configuration	AT+ command Website

## 2.4 Module Feature Comparison

Listed below are the basic functions of WIFI low-power series:

Table 2 WIFI Modules Feature Comparison

Feature		LPT100	LPB100		LPT100-B
			-A	-B	
WIFI	AP	✓	✓	✓	✓
	STA	✓	✓	✓	✓
	AP+STA	✓	✓	✓	✓
Socket	SocketA	✓	✓	✓	✓
	SocketB	✓	✓	✓	✓
UART-WIFI Transparent transmission		✓	✓	✓	✓
Embedded Web		✓	✓	✓	✓
AT+ Command		✓	✓	✓	✓
UART			✓	✓	No
Smartlink		✓	✓	✓	No
WPS		✓	✓	✓	No
usrlink		No	No	No	✓
REC2217 auto-baud		No	No	No	✓
Sonic Intelligent Networking		No	No	No	No
PWM		3	4	4	0
GPIO		3	6	6	0
Antenna Option		I-PEX connect	On-board PCB antenna	I-PEX connector	External antenna 1-PEX connect

## 2.5 Key Application

- Remote equipment monitoring
- Industrial sensors and controls
- Asset tracking and telemetry
- Home automation
- Medical devices

## 2.6 Package Information

### Recommended Reflow Profile

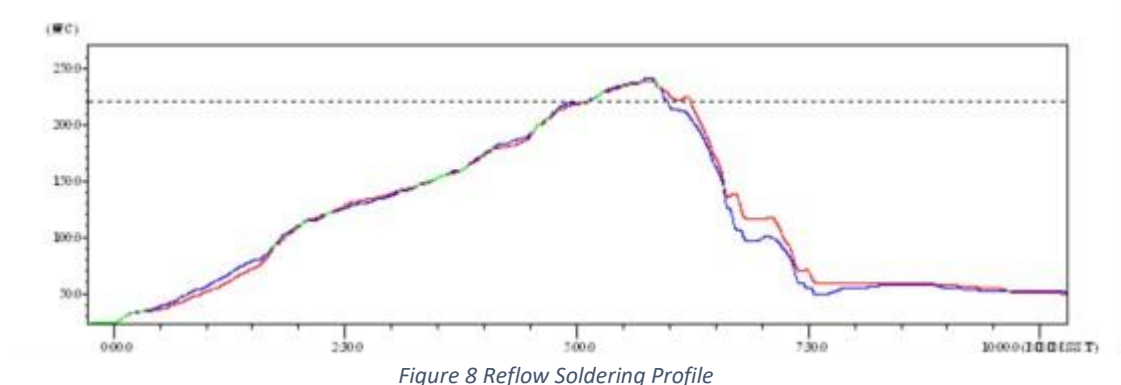


Figure 8 Reflow Soldering Profile

#### Note:

1. Recommend to supply N2 for reflow oven.
2. N2 atmosphere during reflow ( $O_2 < 300\text{ppm}$ )

## 2.7 Device Handle Instruction

- Shelf life in sealed bag: 12 months, at  $<30^\circ\text{C}$  and  $<60\%$  relative humidity (RH)
- After bag is opened, devices that will be re-baked required after last baked with window time 168 hours.
- Recommend to oven bake with N2 supplied.
- Baked required with  $24\text{ hours}$  at  $125 \pm 5^\circ\text{C}$  before rework process for two modules, one is new module and two is board with module.
- Recommend to store at  $\leq 10\%$  RH with vacuum packing.
- If SMT process needs twice reflow:
  - (1) Top side SMT and reflow (2) Bottom side SMT and reflow
  - Case 1: WIFI module mounted on top side. Need to bake when bottom side process over 168 hours window time, no need to bake within 168 hours.
  - Case 2: WIFI module mounted on bottom side, follow normal bake rule before process.

#### Note:

Window time means from last bake end to next reflow start that has 168 hours space.

## 2.8 Shipping Information



Figure 9 Shipping Information

### Note:

Tray Size: 420\*245\*34 mm

1 tray = 5\*20 pcs = 100 pcs

1 box = 2 trays = 2\*100 pcs = 200pcs

1 carton = 4 boxes = 4\*200 pcs = 800pcs

## 3. Hardware Introduction

### 3.1 Pins Definition

The pins definition of WIFI-LPT100-B:

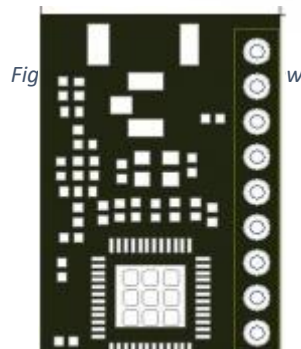


Figure 10 WIFI-LPT100-B PIN Map

Table 3 WIFI-LPT100-B pin definition

PIN	Net Name	Signal Type	Description
1	GND	P	Ground
2	VDD	P	3.3V
3	RELOAD	I	Pull-down for 1~3s to start simplelink setting. Pull-down more than 3s to restore to factory setting
4	RESET	I	Reset (Low to reset)
5	UART_RX	I	Receive Pin of UART
6	UART_TX	O	Transmit Pin of UART
7	PWR_SW	N	unavailable
8	WPS	N	unavailable
9	RELADY	O	Indicator Pin of module working status, can connect to LED (Low active)
10	nLink	O	Indicator Pin of WIFI connection, can connect to LED (Low active)

**Note:**

P: Power; I: Input; O: Output; N: No Connected

## 3.2 Mechanical Size

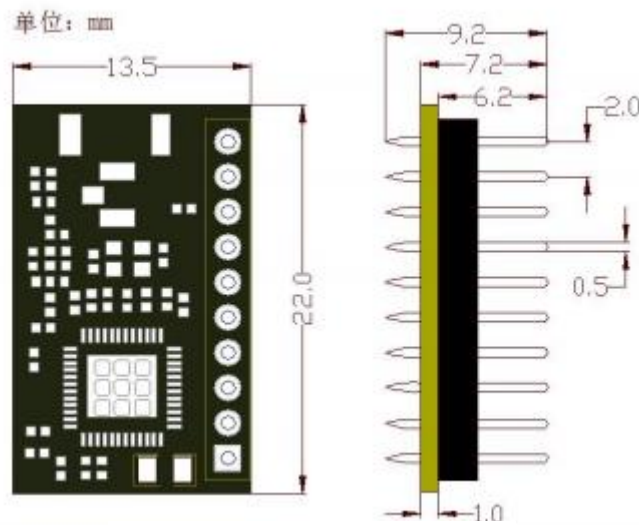


Figure 12 WIFI-LPT100-B Mechanical size

## 3.3 Antenna

WIFI-LPT100-B support I-PEX connector external antenna, modules must be connected to the 2.4G antenna according to IEEE 802.11b/g/n standards. The antenna parameters required as follows:



Figure 13 WIFI-LPT100-B I-PEX Connector

Table 4 WIFI-LPT100-B External Antenna Parameters

Item	Parameters
Frequency range	2.4~2.5GHz
Impedance	50 Ohm
VSWR	2 (Max)
Return Loss	-10dB (max)
Connector Type	I-PEX Connector

**Note:**

- For customer PCB, component cannot be set at the antenna area
- Antenna must away from metal or high components at least 10mm
- Antenna cannot be shielded by any meal enclosure; All cover, include plastic, shall away from antenna at least 10mm

## 3.4 Evaluation Kit

WS provides WIFI-LPT100-B evaluation kit to promote user to comprehend the product and develop the detailed application. The evaluation kit shown as below, user can connect to module with the RS-232, UART, and Wireless port to configure the parameters, manage the module or do some functional tests.



Figure 14 WIFI-LPT100-B Evaluation Kit

## 4 Module Function Description

### 4.1 Working mode

WIFI-LPT100-B have three work modes: transparent mode, Command mode, HTTPD Client mode. The switching method of work mode is in 5th Chapter.

- **Transparent Mode:**  
In this mode, the module can transparent transmit data between the common serial device and network device.
- **Command Mode:**  
In this mode, the user can query and set the serial port and network parameters on the module through AT Command
- **HTTPD Client Mode:**  
In this mode, user's serial device, can send request data to arm HTTP server by using this module. Then WIFI module will receive the data from HTTP server and analyze the data and send the result to serial device.

**Note:**



User can use AT+TMODE command to switch between Transparent Mode and HTTPD Client Mode.

## 4.1.1 Transparent Transmission Mode

### Transparent Mode Description

The benefit of this mode is that it achieves a plug and play serial data port, and reduces user complexity furthest. In this mode, user only need configure the necessary parameters. After power on, module can automatically connect to the default wireless network and server.

As in this mode, the module's serial port always working in the throughput mode, so users only need to think of it as a virtual serial cable, and send and receive data as using a simple serial. In other words, the serial cable of users' original serial devices is directly replaced with the module; user devices can be easy for wireless data transmission without any changes.

Transparent mode can fully compatible with user's original software platform and reduce the software development effort for integrate wireless data transmission.

The parameters which need to configure include:

- Wireless Network Parameters
  - Wireless Network Name (SSID)
  - Security Mode
  - Encryption Key
- TCP/UDP Linking Parameters
  - Protocol Type
  - Link Type (Server or Client)
  - Target Port ID Number
  - Target Port IP Address
- Serial Port Parameters
  - Baud Rate
  - Parity (Check) Bit
  - Stop Bit
  - Hardware Flow Control

### Function

Module has one serial port UART0 can transparent transmit data between Socket.

Module has two Socket (Socket A, Socket B). When module works in Transparent Mode, the data input through UART port of module will be transmit to

the two Socket automatically; As well as the data receive through Socket will be send to UART port and transmit

The working type of Socket A: TCP Server, TCP Client, UDP Server and UDP Client. The setting method please refer to the AT Instruction, use command AT\_NETP

The working type of Socket B: TCP Client, UDP Server, UDP Client. Setting method please refer to the AT Instruction, using AT+SOCKB command.

For the stability of connection, in TCP mode, module append these function:

(1) Keepalive function auto-enable, this function is used to detect dead connection. Keepalive will be send every 60s. If have no response, it will be sent tripe, interval 2s. After three sending, if there still is not any response, module will close this connection.

(2) Receive timeout function. If the module has build TCP connection and there are not transparent transmissions for some time, module will close this connection.

a. TCP Server Mode

If Socket is set as TCP Server, it can support up to 5 TCP Client connection. If there is multi TCP Client connected, the data transmit through TCP will be forwarded to UART port one by one. And the data send from the serial port will be copied and be forwarded to every TCP Client.

b. TCP Client Mode

In TCP Client Mode, module will connect to the server which have been pre-configured. If the server is unavailable or connecting failed, module will re-connect every 1s.

c. UDP Server Mode

In TCP Server Mode, module will only send data to those IP or Port which have pre-configured and only receive data transmitted by the pre-configure IP or Port. Otherwise, data will not be forwarded to UART port.

## 4.1.2 Command Mode

In this mode, the module no longer transparent transmit data. Now the serial port is used to receive AT commands. User can send AT commands to the module through the serial port, to query and set the module's parameters about serial port, network, etc. The method to enter Command Mode from throughput mode and the explanation of AT commands, are in 5th Chapter

### 4.1.3 HTTPD Client Mode

In this mode, user serial device can set request to HTTP server by using this module, then module will receive data from HTTP server and analyze it. The result will be transmitted to user device after analysis.

User need to take care about the data convertor between serial data and network packet. Just setting parameters and it could realize the transmission between serial device and HTTP server.

HTTP request have two types: GET and POST

*Table 5 HTTPD Client Command*

No.	Command	Description
1	TMODE	Query/Set Work mode
2	HTPSV	Query/Set HTTP server and Port
3	HTPTP	Query/Set HTTP request type
4	HTPHD	Query/Set HTTP head
5	HTPURL	Query/Set HTTP URL
6	HTPFT	Query/Set whether filtering HTTP head information
7	HTPTO	Query/Set timeout

### 4.2 UART Parameters

*Table 6 UART Port Parameters*

Item	Parameters
Baud rate	1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200, 128000, 230400, 460800
Data bit	7, 8
Stop bit	1, 2
Parity bit	NONE; EVEN; ODD; MARK; SPACE
Flow Control/385	No

Module will check the intervals between any two bytes when receiving UART data. In Transparent mode, if this interval time exceeds defined value (250ms default), the module will think it as the end of one frame and transfer this free-frame to WIFI port, or else the module will receive UART data until 1000 bytes, then transfer 1000 bytes frame to WIFI port. In Command Mode, the data will be abandoned if more than 256 bytes.

Interval of Packing:

bps=250ms when baud rate <= 1200;

$\text{bps} = 20\text{ms}$  when baud rate  $\geq 20000$ ;  
 $\text{bps} = 265 - \text{baud rate} \times 0x01223$ , bps round.

The flow of packing is as below:

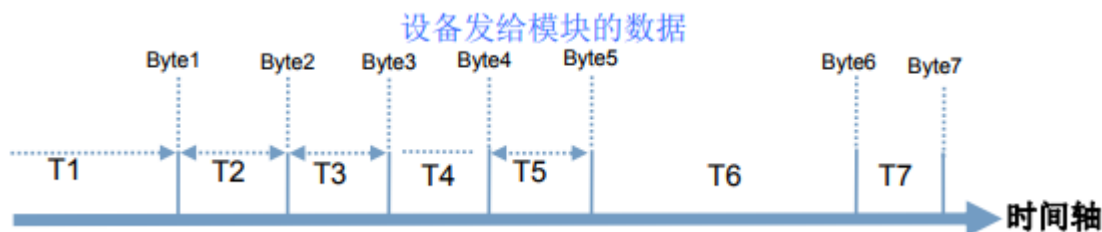


Figure 15 UART Frame mechanism

#### Note:

n: interval of packing, unit is ms

If  $T1 > n$ ,  $T2 < n$ ,  $T3 < n$ ,  $T4 < n$ ,  $T5 < n$ ,  $T6 > n$ , then Byte1-Byte5 will be handle as one frame.

## 4.3 RFC2217 auto-baud

### 4.3.1 Description

RFC2217 is a standard protocol that configure UART parameters of device via ethernet. This module supports a protocol that is similar to RFC2217, it is not the standard RFC2217, but it has same function as RFC2217 and much simply.

After sending command to device, if the command is available, the device will execute related setting and have no response. If the command is unavailable, it will be treated as common data packet and forwarded by UART port.

All the TCP Client, TCP Server, UDP Client and UDP Server support this function. The setting will be valid immediately without restart as well. And it is invalid after restart. To use this protocol you need to use the virtual COM software provide by us.

### 4.3.2 RFC2217 Protocol Description

The length of this protocol is 8 bytes. For example (in HEX):

Table 7 RFC2217 protocol

Name	Head	Baud rate	Bytes parameters	Sum check
Bytes	3	3	1	1
Description	3 bytes to reduce erroneous	3 bytes contains one baud rate value, High bit first	Different bit has different meanings. Refer to addendum	The sum check of the first four bits, ignore the carry

Example 1: (115200, N, 8, 1)	55 AA 55	01 C2 00	03	C6
Example 2: (9600, N, 8, 1)	55 AA 55	00 25 80	03	A8

Table 8 UART Parameters

Bit	Definition	Value	Description
1:0	Data bit selection	00	5 bits
		01	6 bits
		10	7 bits
		11	8 bits
2	Stop bit	0	1 bit
		1	2 bits
3	Parity enable	0	disable parity
		1	enable parity
5:4	parity bit type	00	ODD
		01	EVEN
		10	Mark set 1
		11	Clear
7:6	undefined	00	Set 0

## 4.4 Quick Networking Protocol (usrlink)

While the module is working in AP mode, it will enable an UDP port to receive command of usrlink, the port is 48899 (same as the LAN search port, configurable). Connect your phone to WIFI wireless network directly, and use UDP protocol command to query SSID list and set the SSID and password of router. After setting, the module will restart, then connect to the arm router working in STA mode.

The format of protocol:

### 1) Query

Table 9 Query Command

No.	Name	Bytes	Description
1	Head	1	fixed value: 0xFF
2	Length	2	The sum of bytes from Length (not include) to Check word (not included)
3	Command byte	1	type of command, 0x01: query
4	Check word	1	the sum of the bytes from Head (not included) to Check word (not included)

## 2) Respond

Table 10 Response of Query Command

No.	Name	Bytes	Description
1	Head	1	Fixed value: 0xFF
2	Length	2	length from Length (not include) to Check word (not included)
3	Command byte	11	type of command, 0x81: response of query
4	number of AP	1	The number of AP searched
5	SSID1		SSID of router 1
6	end mark	1	Fixed: 0x00
7	strength of signal 1	1	signal strength of router 1 network. Range: 0~100 (related real value: 0%~100%)
8	end mark	2	0x0D, 0x0A
...	...	...	...
M	SSID n		SSID of router n
M+1	end mark	1	Fixed: 0x00
M+2	Strength of signal n	1	signal strength of router n network. Range: 0~100 (related real value: 0%~100%)
M+3	end mark	2	0x0D, 0x0A
M+4	Check word	1	the sum of the bytes from Head (not included) to Check word (not included)

For example:

Phone to Module (HEX): FF 00 01 01 02

Module reply to phone (HEX): FF 00 14 81 02 54 45 53 54 31 00 40 0D 0A 54 45 53 54 32 00 37 0D 0A 1F

Description: Phone send query command to module to query the information of router. And the information replied from module is that: there are 2 routers, the SSID of router 1 is "TEST1", its signal strength is 64%. And the SSID of router 2 is "TEST2", its signal strength is 55%

**Note:** the information is order according to the signal strength of router.

## 3) Set Command

Table 11 Set Command

No.	Name	Bytes	Description
-----	------	-------	-------------

1	Head	1	Fixed: 0xFF
2	Length	2	Sum of bytes from Length (not included) to Check word (not included)
3	Command word	1	0x02
4	Reserved	1	0x00
5	SSID		SSID of router
6	Delimiter	2	0x0D, 0x0A
7	Password		Password of router
8	Check word	1	the sum of the bytes from Head (not included) to Check word (not included)

#### 4) Response of Set command

Table 12 Response of Set Command

No.	Name	Bytes	Description
1	Head	1	0xFF
2	Length	1	The sum of the bytes from Length (not included) to Check word (not include)
3	Command word	1	0x82
4	Checksum	1	Checksum of SSID. If the SSID is available, the Network value will be 0x01, otherwise, it will be 0x00
5	Checksum	1	Checksum of Password. If the format of password is correct, the value will be 0x01, otherwise it will be 0x00
6	Check word	1	the sum of the bytes from Head (not included) to Check word (not included)

Examples:

Phone to Module (HEX): FF 00 0F 02 00 54 45 53 54 31 0D 0A 31 32 33 34 35 36 CE

Module back to Phone (HEX): FF 00 03 82 01 01 87

Description: The phone sends setting command to module: set the SSID to "TEST1", password to "123456". Then the module response that: The network which SSID is "TEST1" is exist, and the format of password is correct.

## 4.5 Mechanisms of Heartbeat Packet

In transparent mode, user can set the module to send Heartbeat packet to Network server or the serial port.

To network server: To keep connecting to server, and make sure the module could check whether the connection is available when it keeps idle for a long time

(didn't send any data to server for a long time). If the connection is abnormal, module cannot send the heartbeat packet to server successfully, if the module failed to send the packet more than 3 times, it will try to reconnect to server.

To reduce the communication flow during sending query command from server to device, user could choose to send heartbeat packet (query command) to serial port of device instead.

The setting command are as below:

*Table 13 Command of Heartbeat Packet*

No.	Command	Description
1	HEARTEN	Enable/Disable Heartbeat Packet function
2	HEARTTP	Set/Query the transmit type of Heartbeat Packet
3	HEARTDT	Set/Query the data of Heartbeat Packet
4	HEARTTM	Set/Query the interval of Heartbeat Packet transmitting

## 4.6 Wireless Networking

WIFI-LPT100-B can be configured to three modes: STA, AP, AP+STA, provide flexible networking way and network topology method.

AP (Wireless Access Point): It is the center point of network. Generally wireless router we use is a kind of AP, end devices can interconnect through AP.

STA (Wireless Station): It is an end device of network, for example, a computer and PDA, etc.

### 4.6.1 Working as STA

Module could work as a STA. Commonly, the Network is made up by an AP and several STA. For example, AP is at the center, and the communication among STA is realize by forwarding through AP.



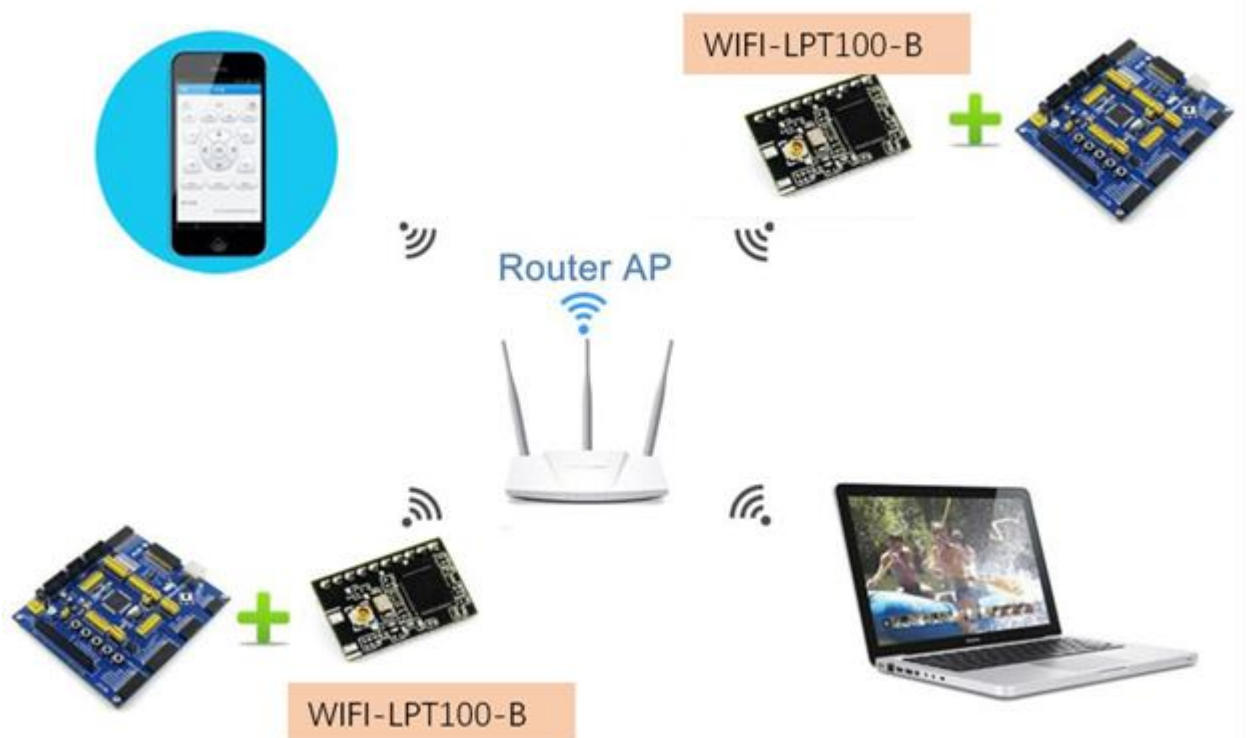


Figure 16 WIFI-LPT100-B STA Networking Structure

## 4.6.2 Working as AP

If the module work as AP, module can quickly connect to phone/PAD/PC and transmit data without any setting. One AP support to connect at most three STA devices. And user could login to the WEB for parameters setting.



Figure 17 WIFI-LPT100-B AP Networking Structure

## 4.6.3 Working as AP+STA

AP+STA is that module supports AP interface and STA interface at the same time.  
That is:

The STA interface of module connects to router, and connect to the server of network via TCP

Enable the AP interface of module, connect phone/PAD to the AP interface for controlling serial device or setting module.

With this function, user can easily monitor the user devices by mobile device like phone/PAD and so on, and don't need to change the network setting.



Figure 18 WIFI-LPT100-B AP+STA Networking Structure

### 4.6.3 Encryption

Encryption is a method of scrambling a message that makes it unreadable to unwanted parties, adding a degree of secure communications. There are different protocols for providing encryption, and the WIFI-LPT100-B module supports following:

- WEP
- WPA-PSK/TKIP
- WPA-PSK/AES
- WPA2-PSK/TKIP
- WPA2-PSK/AES

## 4.7 Socket Communication

WIFI-LPT100-B module has two TCP Socket: Socket A and Socket B. Serial data written to the module, will be sent to the Socket A and B simultaneously; TCP data that module receives through either Socket A or B, will be sent to the serial port.

Dual Socket through different settings, you can achieve a variety of network interconnect. When the module shipped only open Socket A, Socket B default is not to connect, if the user needs to use, please set by AT commands.

### 4.7.1 Socket A

Socket A has four work mode: TCP Server, TCP Client, UDP Client, UDP Server. The setting method, please refer to the AT+NETP command instruction.

When Socket A configured as TCP Server, it supports Multi-TCP link connection, and maximum 5 TCP clients permitted to connect to Socket A. Multi-TCP link connection will work as following structure:

Upstream: All dates from different TCP connection or client will be transmitted to the serial port as a sequence.

Downstream: All data from serial port (user) will be duplicate and broadcast to every TCP connection or client.

Detailed multi-TCP link data transmission structure as following figure:

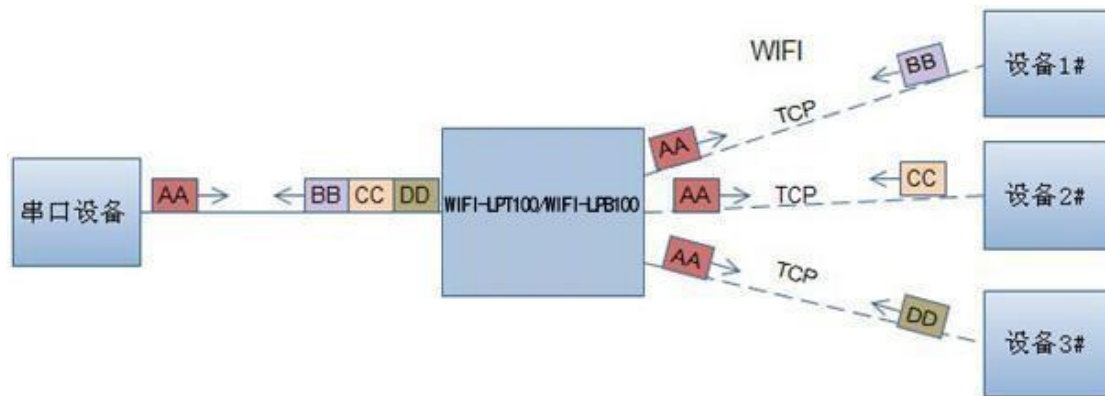


Figure 19 Multi-TCP Link Data Transmission Structure

### 4.7.2 Socket B

Socket B has three work mode: TCP Client, UDP Client, UDP Server. the setting method, please refer to the AT + SOCKB command instruction.

With variety work mode, socket B can provide users with flexible data transfer methods. For example, Socket B can be set to UDP Server mode for LAN equipment to search modules. Socket B also can be set to TCP Client connect to a remote server in order to achieve remote control.

## 4.8 Parameter Configuration

WIFI-LPT100/WIFI-LPB100 supports configurate parameter by Web and AT command.

**Web:** user can login module's built-in web to configure the parameters.

**AT command:** user can send AT command to module through the serial port to configure parameters.

Two methods of configuration parameters, please refer to Chapter 5 explains.

## 4.9 Firmware and WEB upgrade

WIFI-LPT100/WIFI-LPB100 supports upgrade firmware and web over wireless. WIFI-LPT100/WIFI-LPB100 upgrade method can refer to Section 5.1.9 firmware upgrade page.



Figure 20 Upgrade Page

Besides, you can login <http://10.10.100.254/iweb.html> to update firmware and web. Diagram is as follows:

**Note:** Before any firmware upgrade, be sure to contact WS, or else it may result in permanent damage to the module.

## 5 Module Parameter Configuration

WIFI-LPT100-B modules support two methods of Parameter configuration: web and AT command, the following will describe the detail of two methods.

### 5.1 WEB

#### 5.1.1 Web Brief Description

When first use WIFI-LPT100-B modules, user may need some configuration. User can connect to WIFI-LPT100-B module's wireless interface with following default setting information and configure the module through laptop.

Parameters	Default Setting
SSID	WIFI-LPT100
IP Address	10.10.100.254
Subnet Mask	255.255.255.0
User Name	admin
Password	admin

#### 5.1.2 Open Web Management Interface

- Step 1: Connect laptop to SSID WIFI-LPT100/WIFI-LPB100 of module via wireless LAN card;
- Step 2: After wireless connection OK. Open Wen browser and access "http://10.10.100.254";
- Step 3 Then input user name and password in the page as following and click

“OK” button.

The WIFI-LPT100/WIFI-LPB100 web management page support English and Chinese language. User can select language environment at the top right corner and click “Apply” button.

The main menu includes nine pages: “System”, “Work Mode”, “STA Setting”, “AP Setting”, “Other Setting”, “Account”, “Upgrade SW”, “Restart”, “Restore”



Figure 21 Open Web Management Page

### 5.1.3 System Page

At this page, user can check current device’s important information and status such as: device ID (MID), software version, wireless work mode and related Wi-Fi parameters.

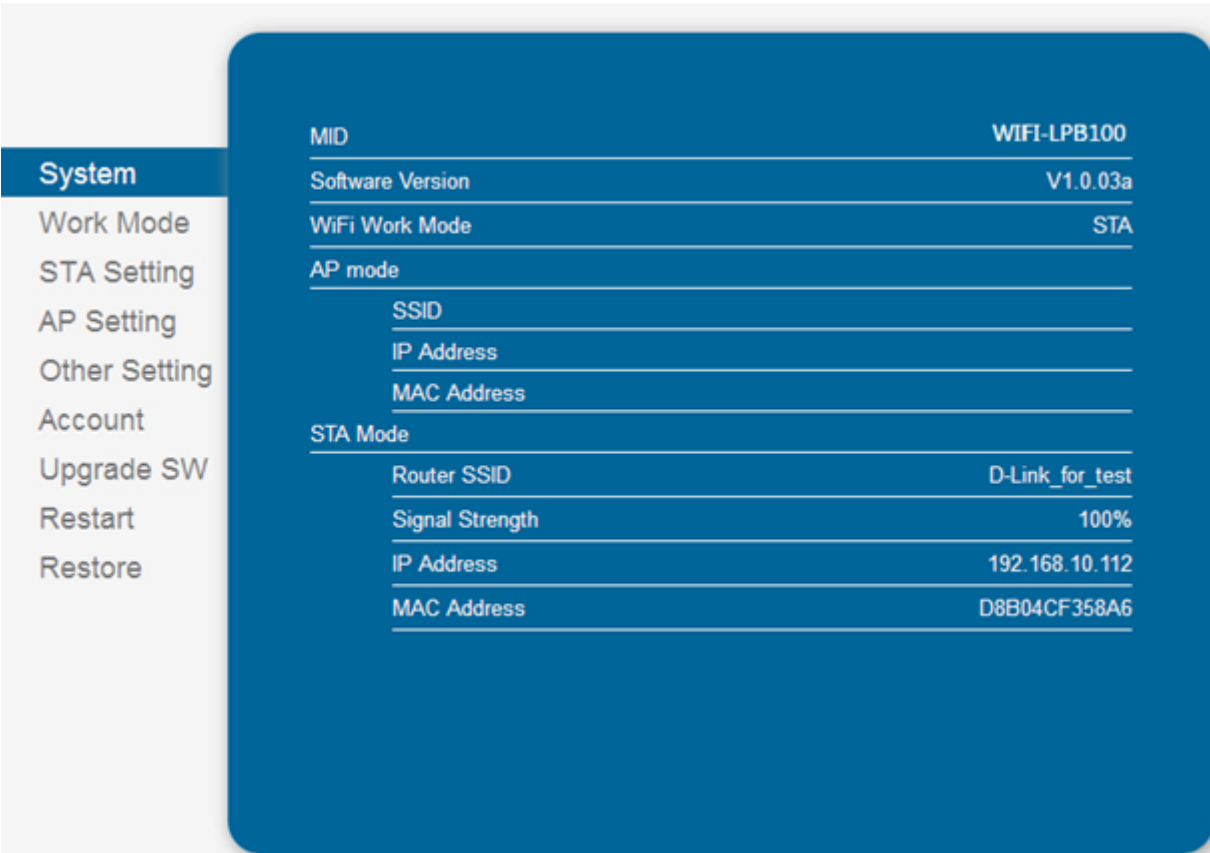


Figure 22 System Web Page

## 5.1.4 Work Mode Page

WIFI-LPT100-B module can work at AP mode to simplify user's configuration, can also works at STA to connect remote server through AP router. Also, it can configure at AP+STA mode which provide very flexible application for customers

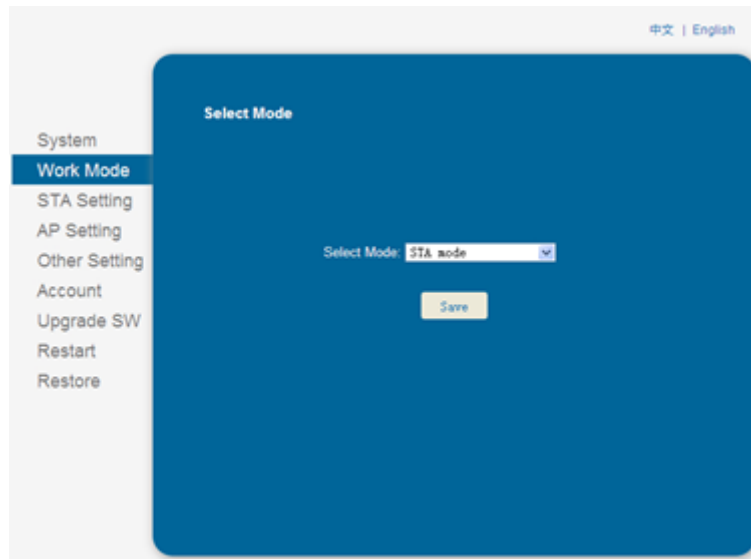


Figure 23 Work Mode Page

## 5.1.5 STA Setting Page

User can push "Scan" button to auto search Wi-Fi AP router nearby, and can connect with associate AP through some settings. Please note the encryption information input here must be fully same with Wi-Fi AP router's configuration, and then it can link with AP correctly.

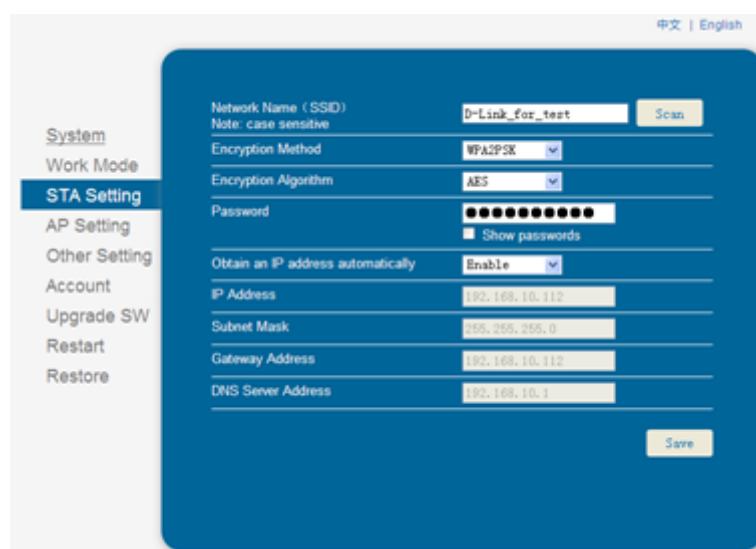


Figure 24 STA Setting Page

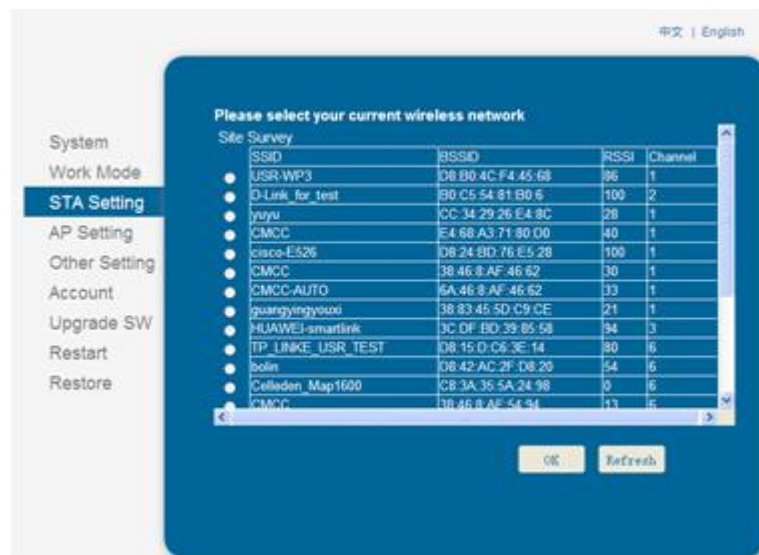


Figure 25 SSID Scanning Page

## 5.1.6 AP Setting Page

When user select module works at AP and AP+STA mode, then need setting this page and provide wireless and network parameters. Most of the system support DHCP to achieve IP address, so we suggest to “Enable” DHCP server in most applications.

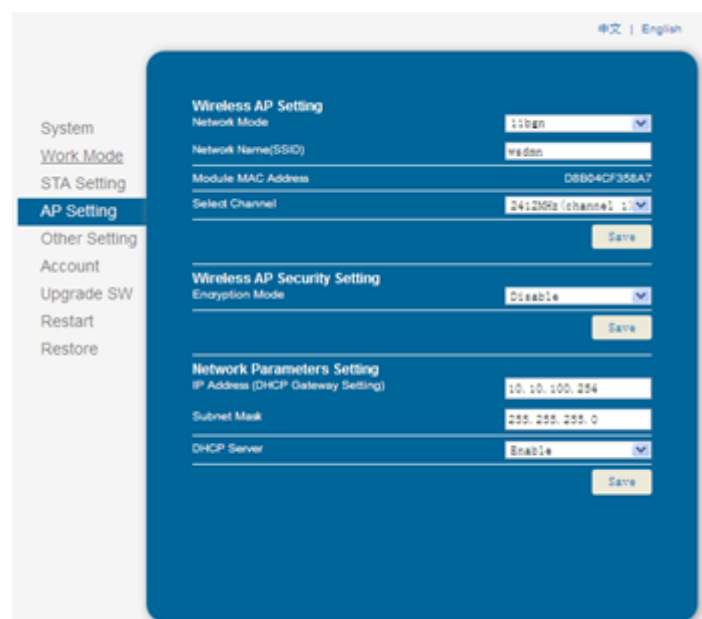


Figure 26 AP Setting Page

## 5.1.7 Other Setting Page

WIFI-LPT100-B usually works at transparent mode. At this mode, the user device which connected with WIFI-LPT100/WIFI-LPB100 will connect and communicate with remote PC or server. At this page, user need setting serial port communication parameters and defines TCP related protocol parameters.

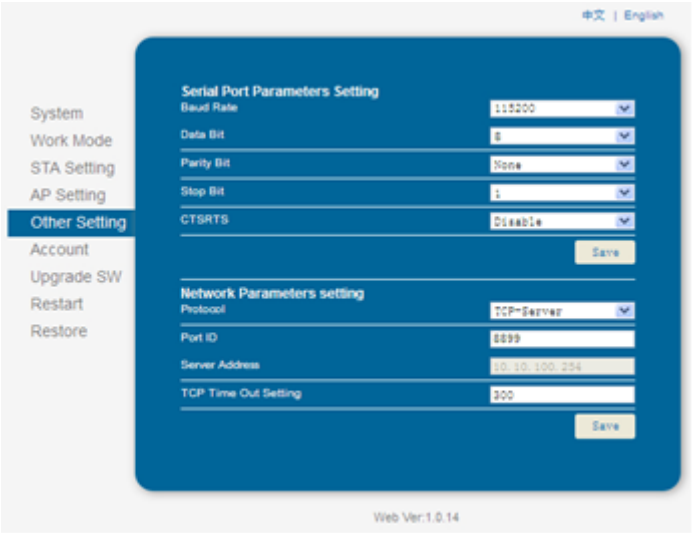


Figure 27 Other Setting Page

### 5.1.8 Account Management Page

This page set web server's user name and password.

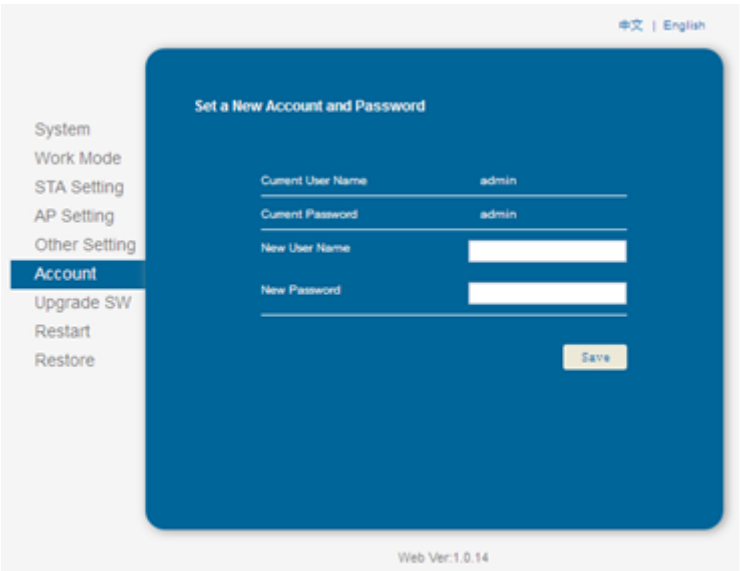


Figure 28 Account Page

### 5.1.9 Upgrade Software Page

User can upgrade new software (firmware) version through Wi-Fi.





Figure 29 Upgrade SW Page

## 5.2 AT Command

AT command means the command by which user can query and set the parameters to module in command mode through the serial port. The following will explain in detail about the method of switching module work mode and the use format of AT commands.

When WIFI-LPT100 power up, it will default works as throughput mode, then user can switch to command mode by serial port command. WIFI-LPB100 UART default parameters setting as below figure:

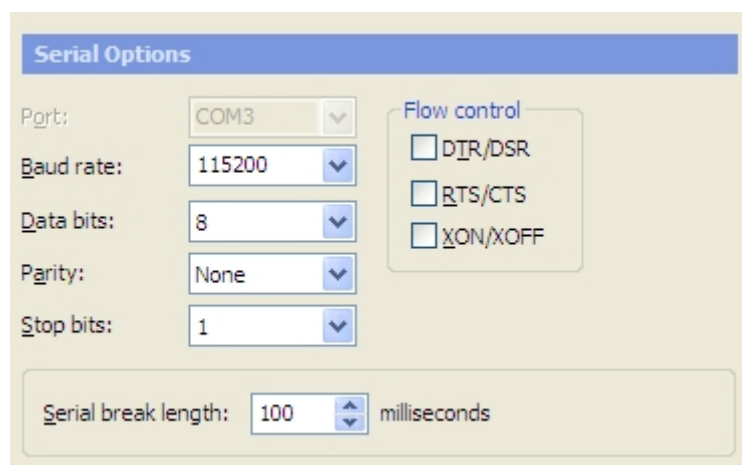


Figure 30 WIFI-LPT100 Default Parameters

In command mode, user can set the module through UART interface with AT Command.

**Note:** AT command debugging tools recommended SecureCRT App software tools or TCP232 tool. Users can be obtained the tool from WS's Web site. The following demonstration uses SecureCRT tools.

## 5.2.1 Switch to Command Mode

Two steps to finish switching from transparent mode to command mode:

- UART input “+++”, after module receive “+++”, and feedback “a” as confirmation.
- ART input “a”, after module receive “a” and feedback “+ok” to go into AT+ instruction set configuration mode.

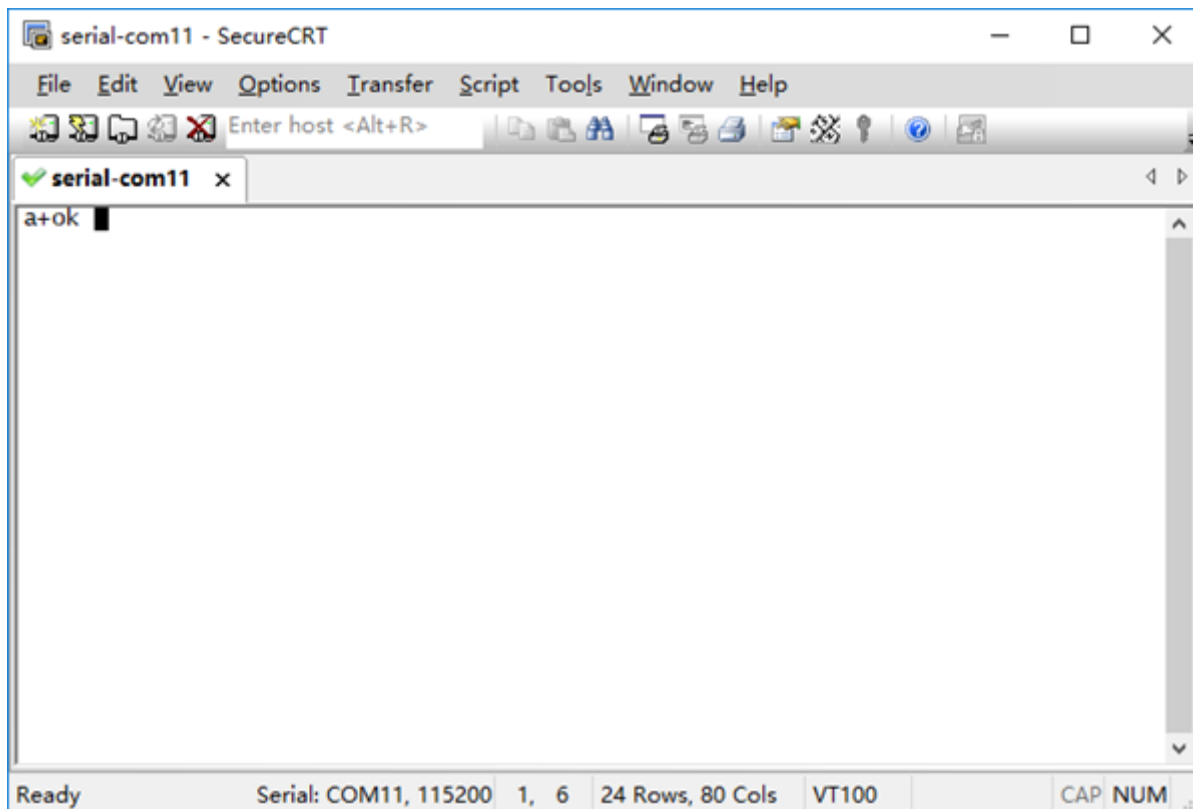


Figure 31 Switch To Command Mode

### **Note:**

1. When user input “+++” (No “Enter” key required), the UART port will display feedback information “a”, and not display input information “+++” as above UART display.
2. Any other input or wrong step to UART port will cause the module still works as original mode (throughput mode)
3. “+++” and “a” should be input in a certain period of time to make the module switch to configuration mode. Like the following sequence.

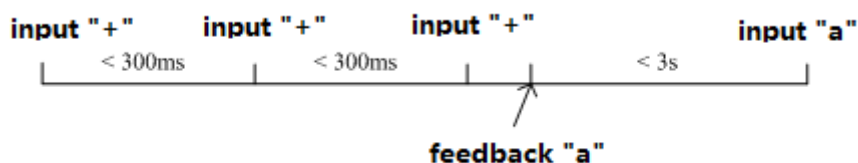


Figure 32 “+++”, “a” Time Requirements

Switching command mode to throughput mode need to use AT+ENTM command, input 'AT+ENTM' in command mode ends with the enter key, you can switch to passthrough mode.

**Notes:** Here work mode switch is temporary, module still work in the default work mode after the restart, if need to change the module default work mode, please refer to the AT+TMODE command.

## 5.2.2 AT+ Instruction Overview

User can input AT+ Instruction through hyper terminal or other serial debug terminal, also can program the AT+ Instruction to script. User can also input "AT+H" to list all AT+ Instruction and description to start.

```

AT+H
+ok

AT+: NONE command, reply "+ok".
AT+ASWD: Set/Query wifi configuration code.
AT+E: Echo ON/Off, to turn on/off command line echo function.
AT+ENTM: Goto Through Mode.
AT+NETP: Set/Get the Net Protocol Parameters.
AT+UART: Set/Get the UART Parameters.
AT+UARTF: Enable/disable UART AutoFrame function.
AT+UARTFT: Set/Get time of UART AutoFrame.
AT+UARTFL: Set/Get frame length of UART AutoFrame.
AT+UARTTE: Set/Query UART free-frame triggerf time between two byte.
AT+PING: General PING command.
AT+WAP: Set/Get the AP parameters.
AT+WKEY: Set/Get the Security Parameters of WIFI AP Mode.
AT+WMODE: Set/Get the WIFI operation Mode (AP or STA).
AT+WSKEY: Set/Get the Security Parameters of WIFI STA Mode.
AT+WSSID: Set/Get the AP's SSID of WIFI STA Mode.
AT+WSLK: Get Link Status of the Module (Only for STA Mode).
AT+WSLQ: Get Link Quality of the Module (Only for STA Mode).
AT+WSCAN: Get The AP site Survey (only for STA Mode).
AT+WEBU: Set/Get the Login Parameters of WEB page.
AT+TCPLK: Get The state of TCP link.
AT+TCPTO: Set/Get TCP time out.
AT+TCPDIS: Connect/Dis-connect the TCP client link
AT+RECV: Recv data from UART
AT+SEND: Send data to UART
AT+WANN: Set/Get The WAN setting if in STA mode.
AT+LANN: Set/Get The LAN setting if in ADHOC mode.
AT+RELD: Reload the default setting and reboot.
AT+RLDEN: Put on/off the GPIO12.
AT+Z: Reset the Module.
AT+MID: Get The Module ID.
AT+VER: Get application version.
AT+H: Help.
  
```

Figure 33 "AT+H" Command

AT command is based on the instruction of ASCII command style, the description of syntax format as follow

### ➤ Format Description

<>: Means the parts must be included  
 [ ]: Means the optional part

### ➤ Command Message

AT+<CMD>[op][para-1, para-2, para-3, para-4...]<CR>

AT+: Prefix of command message;

CMD: Command string;

[op]: Symbol of command operator;

- "=": The command requires parameters input;
- "NULL": Query the current command parameters setting

[para-n]: Parameters input for setting if required;

<CR>: "Enter" Key, it's 0x0a or 0x0d in ASCII

**Note:** If use didn't disable the echo function (AT+E), the command user input will be sent back except the end word.

#### ➤ Response Message

+<RSP>[op][para-1, para-2, para-3, para-4..]<CR><LF><CR><LF><CR>

+: Prefix of response message

RSP: Response string

- "ok": Success
- "ERR": Failure

[op]: =

[para-n]: Parameters if query command or Error code when error happened

<CR>: ASCII 0x0d

<LF>: ASCII 0x0a

#### ➤ Error Code

Table 14 Error Code Description

Error Code	Description
-1	Invalid Command Format
-2	Invalid Command
-3	Invalid Operation Symbol
-4	Invalid Parameter
-5	Operation Not Permitted

### 5.2.3 AT+ Instruction Introduction

Table 15 AT Command list

No	Command	Description
<b>Manage Command</b>		
1	E	Open/Close echo function
2	WMODE	Set/Query WIFI work mode (AP/STA/APSTA)
3	ENTM	Set module enter transparent mode
4	MID	Query ID information of module
5	RELD	Restore to factory default setting
6	Z	Re-Start module
7	VER	Query the version information
<b>Configure Parameters Command</b>		
8	CFGTF	Copy User Parameters to Factory Default Parameters
<b>UART Command</b>		
9	UART	Set/Query serial port parameters
10	UARTTE	Set/Query UART auto-frame trigger time between two bytes

<b>SOCK A Command</b>		
<b>11</b>	NETP	Set/Query SOCK A network protocol parameters
<b>12</b>	TCPLK	Query if SOCK A TCP link already build-up
<b>13</b>	TCPTO	Set/Query SOCK A TCP timeout
<b>14</b>	TCPDIS	Open/Close SOCK A TCP link
<b>SOCK B Command</b>		
<b>15</b>	SOCKB	Set/Query SOCK B network protocol parameters
<b>16</b>	TCPDISB	Open/Close SOCK B TCP link
<b>17</b>	TCPTOB	Set/Query SOCK B TCP timeout
<b>18</b>	TCPLKB	Query if SOCK B TCP link already build-up
<b>WIFI STA Command</b>		
<b>19</b>	WSTA	Set/Query SSID and password of associated AP
<b>20</b>	WSSID	Set/Query associated AP's SSID
<b>21</b>	WSKEY	Set/Query STA security parameters
<b>22</b>	WANN	Set/Query STA's network parameters
<b>23</b>	WSMAC	Set/Query STA's MAC address
<b>24</b>	WSLK	Query STA WIFI link status
<b>25</b>	WSLQ	Query STA wireless signal strength
<b>26</b>	WSCAN	Scan AP
<b>27</b>	WSDNS	Set/Query STA's Static DNS server address
<b>WIFI AP Command</b>		
<b>28</b>	LANN	Set/Query AP's network parameters
<b>29</b>	WAP	Set/Query AP Wi-Fi parameters
<b>30</b>	WAKEY	Set/Query AP security parameters
<b>31</b>	WALK	Query MAC address of STA device connecting to module AP
<b>HTTPD CLIENT Command</b>		
<b>32</b>	TMODE	Set/Query working mode
<b>33</b>	HTPSV	Set/Query Httpd server and port
<b>34</b>	HTPTP	Set/Query Httpd request type
<b>35</b>	HTPHD	Set/Query Httpd head
<b>36</b>	HTPURL	Set/Query Httpd URL
<b>37</b>	HTPFT	Set/Query if flit Httpd head information
<b>38</b>	HTPTO	Set/Query HTTP request timeout
<b>Web Command</b>		
<b>39</b>	PLANG	Set/Query Webpage Language Option
<b>40</b>	WEBU	Set/Query Webpage User name and Code
<b>D2D Command</b>		
<b>41</b>	DTDDIS	Open/Close D2D function
<b>42</b>	DTDID	Set/Query D2D ID
<b>Customized Registration Packet Command</b>		
<b>43</b>	REGDIS	Open/Close customized registration packet
<b>44</b>	REGUSR	Query/Set registration packet data
<b>NTP Time Command</b>		
<b>45</b>	NTPRF	Set/Query time calibration interval

46	NTPEN	Enable/Disable time calibration function
47	NTPTM	Query time
48	NTPSER	Set/Query NET server and time zone
<b>Other Command</b>		
49	WRMID	Set module ID
50	ASWD	Set/Query search keywords in LAN
51	WAPM	Set if MAC is following AP's SSID
52	MDCH	Set Wi-Fi Auto Switch Function
53	REGENA	Set/Query Registration Packet and its mechanism
54	DTTY	Set/Query Registration Packet's mechanism
55	PING	Network PING command
56	SEARCH	Set/Query module search port
57	SMTSL	Set/Query smart networking type
58	USERVER	Query version and time
59	RPTMAC	Query if MAC report function is enable
60	WRRPTMAC	Set MAC report function
61	HEARTEN	Set/Query Heartbeat Packet function
62	HEARTTP	Set/Query Heartbeat Packet transmit way
63	HEARTDT	Set/Query Heartbeat Packet data
64	HEARTTM	Set/Query Heartbeat Packet transmit interval

#### 1) AT+E

- **Function:** Open/Close show back function;
- **Format:**

```
AT+E<CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

When module firstly switch from throughput mode to command mode, show back status is open, input "AT+E" to close show back function, input "AT+E" again to open show back function.

#### 2) AT+WMODE

- **Function:** Set/Query Wi-Fi work mode (AP/STA/APSTA). Setting is valid after reset;
- **Format:**

Query Operation:

```
AT+WMODE<CR>
```

```
+ok=<mode><CR>< LF ><CR>< LF >
```

Set Operation:

```
AT+ WMODE=<mode><CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

- **Parameters:**

Mode: WI-FI work mode

- AP
- STA
- APSTA

### 3) AT+ENTM

- **Function:** Set module into throughput mode;
- **Format:**

```
AT+ENTM<CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

After operate this command, module switch from command mode to throughput mode.

### 4) AT+TMODE

- **Function:** Set/Query module data transfer mode. Setting is valid after reset.
- **Format:**

Query Operation:

```
AT+TMODE<CR>
```

```
+ok=<tmode><CR>< LF ><CR>< LF >
```

Set Operation:

```
AT+TMODE=<tmode><CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

- **Parameters:**
  - Transparent: transparent mode
  - cmd: command mode

### 5) AT+MID

- **Function:** Query module ID information
- **Format:**

```
AT+MID<CR>
```

```
+ok=<module_id><CR>< LF ><CR>< LF >
```

- **Parameters:**

module\_id: module ID information

WIFI-LPT100

**Notes:** User can set this parameter through AT+WRMID

### 6) AT+RELD

- **Function:** module restore to factory default setting.
- **Format:**

```
AT+ RELD<CR>
```

```
+ok=rebooting...<CR>< LF ><CR>< LF >
```

When operate this command, module will restore to factory default setting and reboot.

#### 7) AT+Z

- Function: Re-start module;
- Format:

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

#### 8) AT+VER

- **Function:** Query firmware version
- **Format:**

```
AT+VER<CR>
```

```
+ok=<ver><CR><LF><CR><LF>
```

- **Parameter:**

ver: firmware version

#### 9) AT+CFGTF

- **Function:** Copy User Parameters to Factory Default Parameters;
- **Format:**

Query Operation

```
AT+CFGTF<CR>
```

```
+ok=<status><CR>< LF ><CR>< LF >
```

- **Parameters:**

Status: feedback operation status;

#### 10) AT+UART

- **Function:** Set/Query serial port parameters. Setting is valid after reset;
- **Format :**

Query Operation:

```
AT+UART<CR>
```

```
+ok=<baudrate,data_bits,stop_bit,parity,flowctrl><CR><LF>
```

Set Operation:

```
AT+UART=<baudrate,data_bits,stop_bit,parity,flowctrl><CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

- **Parameters:**

Baudrate: 600,1200,1800,2400,4800,9600,19200,38400,57600,115200,  
230400,380400,460800

data\_bits: 8

stop\_bits: 1,2



Parity: NONE, EVEN, ODD

Flowctrl: (CTS/RTS)

NFC: No hardware flow control

FC: hardware flow control (WIFI-LPT100 don't have hardware flow control).

#### 11) AT+UARTF

➤ **Function:** Open/Close UART auto-frame function;

➤ **Format:**

Query Operation:

```
AT+ UARTF<CR>
```

```
+ok=<para><CR>< LF ><CR>< LF >
```

Set Operation:

```
AT+ UARTF=<para ><CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

➤ **Parameters:**

Para:

disable - Close auto-frame function;

enable - Open auto-frame function;

#### 12) AT+UARTTE

➤ **Function:** Set/Query auto-frame trigger time

➤ **Format:**

Query Operation

```
AT+UARTTE<CR>
```

```
+ok=<mode><CR>< LF ><CR>< LF >
```

Set Operation

```
AT+ UARTTE=<mode ><CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

➤ **Parameters:**

Mode:

fast: free-frame trigger time between two bytes is 200ms;

normal: free-frame trigger time between two bytes is 250ms;

#### 13) AT+NETP

➤ **Function:** Set/Query SOCKA network protocol parameters, Setting is valid after reset.

➤ **Format:**

Query Operation:

```
AT+NETP<CR>
```

```
+ok=<protocol, CS, port, IP><CR>< LF ><CR>< LF >
```

Set Operation:

```
AT+NETP=<protocol, CS, port, IP><CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

➤ **Parameters:**

Protocol: TCP, UDP,

CS: SERVER, CLIENT

Port: protocol port ID: Decimal digit and less than 65535.

IP: Server's IP address when module set as client.

If set as UDP SERVER, the module will save the IP address and port of the latest UDP packet received. The data will be sent to the saved IP address and port. If the module hasn't saved any IP address and port when power up. The data will be sent to the IP address and port which is set by this command.

If set as UDP CLIENT, the data will always be sent to the IP address and port set by this command.

#### 14) AT+TCPTO

➤ **Function:** Set/Query TCP timeout

➤ **Format:**

Query Operation:

```
AT+ TCPTO<CR>
```

```
+ok=<time><CR>< LF ><CR>< LF >
```

Set Operation:

```
AT+ TCPTO=<time ><CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

➤ **Parameters:**

Time: TCP timeout (<= 600s, >=0. 300s by default)

OCCA begin to count time when TCP channel don't receive any data, clear time counter when TCP channel receive any data. If the time counter reaches the TCPTO time, the TCP channel will be break. If SOCKA work in TCP Client, it will connect the TCP server instantly, and when the module work in TCP Server, the TCP client device should make the connection itself.

#### 15) AT+TCPLK

➤ **Function:** Query SOCKA connection status;

➤ **Format:**

```
AT+ TCPLK<CR>
```

```
+ok=<sta><CR>< LF ><CR>< LF >
```

➤ **Parameters:**

sta: SOCKA connection status;

on: TCP connected;

off: TCP disconnected;

## 16) AT+TCPDIS

➤ **Function:** Open/Close SOCKA TCP link;➤ **Format:**

Query Operation:

```
AT+TCPDIS<CR>
```

```
+ok=<sta><CR>< LF ><CR>< LF >
```

Set Operation:

```
AT+ TCPDIS =<on/off><CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

➤ **Parameters:**

On: TCP link close

Off: TCP link on

When query Operation, sta: Feedback if SOCKA TCP Client is link.

When Set Operation, “off” means close TCP link. After finish this command, module disconnect TCP link and not connect again. “On” means open TCP link. After finish this command, module re-connect TCP server right away.

## 17) AT+SOCKB

➤ **Function:** Set/Query SOCKB network protocol parameters. Setting is valid after reset.➤ **Format:**

Query Operation:

```
AT+SOCKB<CR>
```

```
+ok=<protocol, port, IP><CR>< LF ><CR>< LF >
```

Set Operation:

```
AT+SOCKB=<protocol, port, IP><CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

➤ **Parameters:**

Protocol: TCP, UDP, UDPS

Port: Protocol Port in decimal, less than 65535;

IP: Destination IP address, domain name is support;

If set as UDP SERVER, the module will save the IP address and port of the latest UDP packet received. The data will be sent to the saved IP address and port. If the module hasn't saved any IP address and port when power up. The data will be sent to the IP address and port which is set by this command.

If set as UDP CLIENT, the data will always be sent to the IP address and port set by this command.

#### 18) AT+TCPTOB

➤ **Function:** Set/Query Operation SOCKB timeout time;

➤ **Format:**

Query Operation:

```
AT+ TCPTOB<CR>
```

```
+ok=<time><CR>< LF ><CR>< LF >
```

Set Operation:

```
AT+ TCPTOB=<time ><CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

➤ **Parameters:**

Time: TCP timeout time. (<= 600s; >=0; Default: 300s)

SOCKB begin to count time when TCP channel don't receive any data, clear time counter when TCP channel receive any data. If the time counter reaches the TCPTO time, the TCP channel will be break. If SOCKB work in TCP Client, it will connect the TCP server instantly.

#### 19) AT+TCPDISB

➤ **Function:** Open/Close SOCKB TCP link;

➤ **Format:**

Query Operation:

```
AT+TCPDISB<CR>
```

```
+ok=<sta><CR>< LF ><CR>< LF >
```

Set Operation:

```
AT+ TCPDISB =<on/off><CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

➤ **Parameters:**

When query Operation, sta: Feedback if SOCKB TCP Client is link.

When Set Operation, “off” means close TCP link. After finish this command, module disconnect TCP link and not connect again. “On” means open TCP link. After finish this command, module re-connect TCP server right away.

## 20) AT+TCPLKB

- **Function:** Query SOCKB connection status:

- **Format:**

```
AT+ TCPLKB<CR>
```

```
+ok=<sta><CR>< LF ><CR>< LF >
```

- **Parameters:**

sta: SOCKB connection status

on: TCP connected

off: TCP disconnected

## 21) AT+WSTA

- **Function:** Set/Query associated AP's SSID and password

- **Format:**

Query Operation

```
AT+WSTA<CR>
```

```
+ok=<ssid, password><CR><LF><CR><LF>
```

Set Operation

```
AT+ WSSID=<ssid, password><CR>
```

```
+ok<CR><LF><CR><LF>
```

- **Parameters:**

ssid: AP's SSID (Max 32 bytes)

password: AP's password; (Max 64 bytes) “NONE”: NULL; off: TCP didn't connect

## 22) AT+WSSID

- **Function:** Set/Query Wi-Fi associated AP SSID parameters. Setting is valid after reset.

- **Format:**

Query Operation:

```
AT+WSSID<CR>
```

```
+ok=<ap's ssid><CR>< LF ><CR>< LF >
```

Set Operation:

```
AT+ WSSID=<ap's ssid ><CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

- **Parameters:**

ap's ssid : AP's SSID (Within 32 character);

### 23) AT+WSKEY

➤ **Function:** Set/Query STA security parameters. Setting is valid after reset.

➤ **Format:**

Query Operation:

```
AT+WSKEY<CR>
```

```
+ok=<auth,encry,key><CR>< LF ><CR>< LF >
```

Set Operation:

```
AT+ WSKEY=< auth,encry,key><CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

➤ **Parameters:**

◆ Auth: Authentication mode

- OPEN
- SHARED
- WPAPSK
- WPA2PSK

◆ Encry: Encryption algorithm

- NONE: When "auth=OPEN", effective
- WEP-H: When "auth=OPEN" or "SHARED", effective, HEX format
- WEP-A: When "auth=OPEN" or "SHARED", effective, ASCII format
- TKIP: When "auth= WPAPSK" "WPA2PSK", effective
- AES: When "auth= WPAPSK" "WPA2PSK", effective

◆ Key: password, when encry = WEP-H, the password is the hexadecimal number, must be 10 bytes or 26 bytes; When encry = WEP-A, the password is the ASCII code, must be 5 bytes or 13 bytes; other ASCII code, shall less than 64 bytes and greater than 8 byte.

### 24) AT+WANN

➤ **Function:** Set/Query STA network setting. Setting is valid after reset.

➤ **Format:**

Query Operation:

```
AT+WANN<CR>
```

```
+ok=<mode,address,mask,gateway><CR>< LF ><CR>< LF >
```

Set Operation:

```
AT+ WANN=< mode,address,mask,gateway ><CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

➤ **Parameters:**

- ◆ Mode: STA's IP network setting
  - Static: Static IP
  - DHCP: Dynamic IP
- ◆ Address: STA IP address;
- ◆ mask: STA subnet mask;
- ◆ gateway: STA gateway address;

## 25) AT+WSMAC

- **Function:** Set/Query STA MAC address parameters. Setting is valid after reset.

➤ **Format:**

Query Operation:

```
AT+WSMAC<CR>
```

```
+ok=<mac_address><CR>< LF ><CR>< LF >
```

Set Operation:

```
AT+ WSMAC=<code,mac_address><CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

➤ **Parameters:**

- ◆ Code: security code
  - 8888 (default value)
- ◆ mac\_address : STA MAC address, such as D8B0CFFF1234

## 26) AT+WSLK

- **Function:** Query STA WiFi link status;

➤ **Format:**

```
AT+ WSLK<CR>
```

```
+ok=<ret><CR>< LF ><CR>< LF >
```

➤ **Parameters:**

- ◆ ret
  - Disconnected: no WiFi connection
  - "AP' SSID (AP's MAC" ) : WiFi connection available;

## 27) AT+WSLQ

- **Function:** Query STA WiFi signal strength;

➤ **Format:**

```
AT+ WSLQ<CR>
```

```
+ok=<ret><CR>< LF ><CR>< LF >
```

➤ **Parameters:**

◆ ret

- Disconnected, if no WiFi connection
- 'AP's WiFi signal strength , if WiFi connection available;

## 28) WSCAN

➤ **Function:** Scan AP;

➤ **Format:**

```
AT+ WSCAN<CR>
```

```
+ok= <LF><CR>Ch,SSID,BSSID,Security,Indicator<LF><CR><ap_site_1><LF><CR><ap_site_2><LF><CR><ap_site_3><LF><CR>...<ap_site_N><LF><CR><CR><LF>
```

➤ **Parameters:**

- ◆ ap\_site\_n: AP site has been searched; format: <Ch, SSID, BSSID, Security, Indicator>
- ◆ Ch: Channel of WIFI
- ◆ SSID: SSID of router
- ◆ BSSID: MAC address of router
- ◆ Security: Security type of router. Indicator: Signal strength

## 29) AT+WSDNS

➤ **Function:** Set/Query STA static DNS server address;

➤ **Format:**

Query Operation:

```
AT+WSDNS<CR>
```

```
+ok=<address><CR>< LF ><CR>< LF >
```

Set Operation:

```
AT+ WSDNS =<address><CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

➤ **Parameters:**

address : STA's DNS server address; Effective right away.

## 30) AT+LANN

➤ **Function:** Set/Query AP's network parameters. Setting is valid after reset.

➤ **Format:**

Query Operation:



```
AT+LANN<CR>
```

```
+ok=<IP address, mask><CR>< LF ><CR>< LF >
```

Set Operation:

```
AT+ LANN=< ipaddress,mask><CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

➤ **Parameters:**

- ◆ IP address: AP's IP address;
- ◆ Mask: AP's net mask;

### 31) AT+WAP

- **Function:** Set/Query AP Wi-Fi parameters. Setting is valid after reset.

➤ **Format:**

Query Operation:

```
AT+WAP<CR>
```

```
+ok=< wifi_mode, ssid, channel ><CR>< LF ><CR>< LF >
```

Set Operation:

```
AT+ WAP =<wifi_mode, ssid, channel ><CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

➤ **Parameters:**

- ◆ wifi\_mode: Wi-Fi mode, include:
  - 11B
  - 11BG
  - 11BGN (Default Value)
- ◆ Ssid: SSID at AP mode
- ◆ channel : Wi-Fi channel selection: AUTO or CH1~CH11; (Default CH1)

### 32) AT+WAKEY

- **Function:** Set/Query AP Wi-Fi security parameters. Setting is valid after reset.

➤ **Format:**

Query Operation:

```
AT+WAKEY<CR>
```

```
+ok=<auth, encry, key><CR>< LF ><CR>< LF >
```

Set Operation:

```
AT+ WAKEY=< auth, encry, key><CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

➤ **Parameters:**

- ◆ Auth: include
  - OPEN
  - WPA2PSK
- ◆ Encry: include
  - NONE: When “auth=OPEN” available;
  - AES: When “auth=WPA2PSK” available;
- ◆ Key: security code, ASCII code, smaller than 64bit and bigger than 8 bit;

### 33) AT+HTPSV

➤ **Function:** Query/Set HTTPD server address and port

➤ **Format:**

Query Operation

```
AT+HTPSV<CR>
```

```
<CR><LF>+OK=<address, port><CR><LF>
```

Set Operation

```
AT+HTPSV=< address, port><CR>
```

```
+ok<CR><LF>
```

➤ **Parameters:**

address: server address

### 34) AT+HTPTP

➤ **Function:** Query/Set HTTPD request type

➤ **Format:**

Query Operation

```
AT+HTPTP<CR>
```

```
<CR><LF>+OK=<type><CR><LF><CR><LF>
```

Set Operation

```
AT+ HTPTP =<type><CR>
```

```
+ok<CR><LF><CR><LF>
```

➤ **Parameters:**

Type: GET, POST

### 35) AT+HTPHD

➤ **Function:** Query/Set HTTPD head information

➤ **Format:**

Query Operation

```
AT+HTPHD<CR>
```

```
<CR><LF>+OK=< head><CR><LF>
```

Set Operation

```
AT+ HTPHD =< head><CR>
```

```
+ok<CR><LF><CR><LF>
```

➤ **Parameters**

head: HTTP request head information

### 36) AT+HTPURL

➤ **Function:** Query/Set HTTPD request URL

➤ **Format:**

Query Operation

```
AT+HTPURL<CR>
```

```
+ok=<url><CR><LF><CR><LF>
```

Set Operation

```
AT+ HTPURL =<url><CR>
```

```
+ok<CR><LF> CR<LF>
```

➤ **Parameters:**

url: HTTP request url

### 37) AT+HTPFT

➤ **Function:** Query/Set if flit the HTTPD head information returned

➤ **Format:**

Query Operation:

```
AT+HTPFT<CR>
```

```
<CR><LF>+OK=<sta><CR><LF><CR><LF>
```

Set Operation

```
AT+ HTPFT =<sta><CR>
```

```
+ok<CR><LF><CR><LF>
```

➤ **Parameter**

sta: on/off

### 38) AT+HTPTO

➤ **Function:** Query/Set HTTPD request timeout

➤ **Format:**

Query Operation

`AT+HTPTO<CR>``+ok=<time><CR><LF><CR><LF>`

Set Operation

`AT+HTPTO=<time><CR>``+ok<CR><LF><CR><LF>`➤ **Parameters:**

time: 1~30s (10s by default)

## 39) AT+PLANG

➤ **Function:** Set/Query webpage language option;➤ **Format:**

Query Operation

`AT+PLANG<CR>``+ok=<language><CR>< LF ><CR>< LF >`

Set Operation:

`AT+PLANG =<language><CR>``+ok<CR>< LF ><CR>< LF >`➤ **Parameters:**

## ◆ Language: webpage's language

- CN: Chinese Version (Default);
- EN: English Version;

## 40) AT+WEBU

➤ **Function:** Set/ Query webpage user name and password;➤ **Format:**

Query Operation:

`AT+WEBU<CR>``+ok=<username,password><CR>< LF ><CR>< LF >`

Set Operation:

`AT+WEBU =<username, password><CR>``+ok<CR>< LF ><CR>< LF >`➤ **Parameters:**

- ◆ Username: User Name, within 15 characters, not support empty.
- ◆ Password: password, within 15 characters, support empty.

#### 41) AT+DTDDIS

- **Function:** Query/Set D2D registration packet function
- **Format:**

Query Operation

```
AT+DTDDIS<CR>
```

```
+ok=<status><CR><LF><CR><LF>
```

Set Operation

```
AT+DTDDIS=<status><CR>
```

```
+ok<CR><LF><CR><LF>
```

- **Parameters:**

status: on/off

#### 42) AT+DTDID

- **Function:** Query/Set D2D registration ID
- **Format:**

Query Operation

```
AT+DTDID<CR>
```

```
+ok=<id><CR><LF><CR><LF>
```

Set Operation

```
AT+DTDID=<id><CR>
```

```
+ok<CR><LF><CR><LF>
```

- **Parameters**

id: 1~65535

#### 43) AT+REGDIS

- **Function:** Query/Set customized registration packet function
- **Format:**

Query Operation

```
AT+REGDIS<CR>
```

```
+ok=<sta><CR><LF><CR><LF>
```

Set Operation

```
AT+REGDIS=<sta><CR>
```

```
+ok<CR><LF><CR><LF>
```

➤ **Parameters:**

sta: on/off

#### 44) AT+REGUSR

➤ **Function:** Query/Set customized registration packet data

➤ **Format:**

Query Operation

```
AT+REGUSR<CR>
```

```
+ok=<reg><CR><LF><CR><LF>
```

Set Operation

```
AT+REGUSR=<reg><CR>
```

```
+ok<CR><LF><CR><LF>
```

➤ **Parameters:**

reg: data of customized registration packet (length <=32 bits)

#### 45) AT+REGENA

➤ **Function:** Query/Set registration packet mechanism

➤ **Format:**

Query Operation

```
AT+REGENA<CR>
```

```
+ok=<status, method><CR><LF><CR><LF>
```

Set Operation

```
AT+REGENA =<status, method ><CR>
```

```
+ok<CR><LF><CR><LF>
```

➤ **Parameters:**

■ status:

- ID
- MAC
- USR
- CLOUD
- OFF

■ method

- EVERY
- FIRST

#### 46) AT+DTTY

➤ **Function:** Query/Set registration mechanism

➤ **Format:**

Query Operation

```
AT+DTTY<CR>
```

```
+ok=<sta><CR><LF><CR><LF>
```

Set Operation

```
AT+DTTY=<sta><CR>
```

```
+ok<CR><LF><CR><LF>
```

➤ **Parameters:**

sta: FIRST/EVERY

#### 47) AT+PING

➤ **Function:** Network "Ping" command;

➤ **Format:**

```
AT+PING=<IP_address><CR>
```

```
+ok=<fb><CR>< LF ><CR>< LF >
```

➤ **Parameters:**

◆ **Fb:** feedback result

- Success
- Timeout
- Unknown host

#### 48) AT+WRMID

➤ **Function:** Set module ID;

➤ **Format:**

```
AT+ WRMID =<wrmid><CR>< LF ><CR>< LF >
```

➤ **Parameters:**

wrmid: set module's ID (within 20 characters).

#### 49) AT+SEARCH

➤ **Function:** Query/Set search port of module

➤ **Format:**

Query Operation

```
AT+SEARCH <CR>
```

```
+ok=<port><CR><LF><CR><LF>
```

Set Operation

```
AT+ SEARCH =<port><CR><LF><CR><LF>
```

➤ **Parameters:**

port: 1~65535

## 50) AT+USERVER

- **Function:** Query the user version and the generated time
- **Format:**

```
AT+USERVER<CR>
```

```
+ok=<user_version,generated_time><CR><LF><CR><LF>
```

- **Parameters:**
  - user\_version: V1.1
  - generated\_time: 2017-08-15 10:15

## 51) AT+PRTMAC

- **Function:** Query if report MAC
- **Format:**

```
AT+RPTMAC<CR>
```

```
+ok=<status><CR><LF><CR><LF>
```

- **Parameters:**  
status: ON/OFF

## 52) AT+WRRPTMAC

- **Function:** Set if report MAC
- **Format:**

```
AT+WRRPTMAC=<status><CR>
```

```
+ok<CR><LF><CR><LF>
```

- **Parameters:**  
status: ON/OFF

## 53) ST+NTPEN

- **Function:** Enable/Disable Network clock calibration function
- **Format:**

Query Operation

```
AT+ NTPEN<CR>
```

```
+ok=<status><CR>< LF ><CR>< LF >
```

Set Operation

```
AT+ NTPEN=<status><CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

- **Parameters:**  
status: on/off

## 54) AT+NTPTM



- **Function:** Query Network time

- **Format:**

```
AT+ NTPTM<CR>
```

```
+ok=<time><CR>< LF ><CR>< LF >
```

- **Parameters:**

time: if receive “Not Available” means the clock is disable or disconnect to network

#### 55) AT+NTPSER

- **Function:** Query/Set NTP server and the time zone

- **Format:**

Query Operation

```
AT+NTPSER<CR>
```

```
+ok<ip, tmzone><CR><LF><CR><LF>
```

Set Operation

```
AT+NTPSER=<ip,tmzone><CR>
```

```
+ok<CR><LF><CR><LF>
```

- **Parameters:**

- ip: NTP server ip address
- tmzone: time zone

#### 56) AT+NTPRF

- **Function:** Set/Query calibrating time interval

- **Format:**

Query Operation

```
AT+ NTPRF<CR>
```

```
+ok=<num><CR>< LF ><CR>< LF >
```

Set Operation

```
AT+ NTPRF=<num><CR>
```

```
+ok<CR>< LF ><CR>< LF >
```

- **Parameters:**

num: 0~720

#### 57) AT+HEARTEN

- **Function:** Query/Set if enable Heartbeat Packet function

- **Format:**

Query Operation

```
AT+HEARTEN<CR>
```

```
+ok=< status><CR><LF><CR><LF>
```

Set Operation

```
AT+HEARTTP=<type><CR>
```

```
+ok<CR><LF><CR><LF>
```

➤ **Parameters:**

type: NET, COM

## 58) AT+HEARTDT

➤ **Function:** Query/Set Heartbeat Packet Data

➤ **Format:**

Query Operation

```
AT+HEARTDT<CR>
```

```
+ok=<data><CR><LF><CR><LF>
```

Set Operation

```
AT+HEARTDT=<data><CR>
```

```
+ok<CR><LF><CR><LF>
```

➤ **Parameters:**

data: in HEX, <= 80 bytes

## 59) AT+HEARTTM

➤ **Function:** Query/Set interval of Heartbeat Packet transmitting

➤ **Format:**

Query Operation

```
AT+HEARTTM<CR>
```

```
+ok=<time><CR><LF><CR><LF>
```

Set Operation

```
AT+HEARTTM=<time><CR>
```

```
+ok<CR><LF><CR><LF>
```

➤ **Parameters:**

time: 1~6000s (30s by default)

**Note:** The keepalive time of module is 60s, so the interval time of heartbeat packet should be less than 60s.

## 60) AT+MDCH

➤ **Function:** Query/Set WIFI Exception handling

➤ **Format:**

Query Operation

```
AT+MDCH<CR>
```

```
+ok=<sta><CR><LF><CR><LF>
```

#### Set Operation

```
AT+MDCH=<sta><CR>
```

```
+ok<CR><LF><CR><LF>
```

#### ➤ **Parameters:**

##### ■ sta

- OFF: close exception handing function
- ON; Open the WIFI mode switch function, if connecting failed at STA mode, module will auto-switch to APSTA mode. If the module auto-switch to APSTA and succeed connecting to network, it will switch back to STA mode automatically.
- 2~240: unit is minute. The interval of exception handing time. 10min by default.

## 6 Appendix D: Disclaimer

This document provides information about WIFI-LPT100/WIFI-LPB100 modules, this document does not grant any license to intellectual property rights. Except the responsibility declared in the product sale clause, WS does not assume any other responsibilities. In addition, WS does not make any warranties for the sale and use of this product, including the suitability of the product for a particular purpose, merchantability or fitness for any patent, copyright or other intellectual property infringement, etc. WS may make changes to specifications and product descriptions without notice.