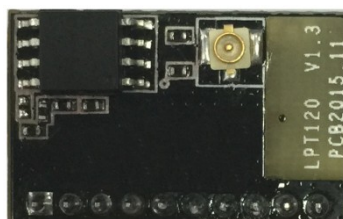


HF-LPT120

Low Power WiFi Module User Manual

V 1.1.1



Overview of Characteristic

- ◇ Support IEEE802.11b/g/n Wireless Standards
- ◇ Based on Self-developed High Cost Effective SOC
- ◇ Support UART/GPIO Data Communication Interface
- ◇ Support Work As STA/AP Mode
- ◇ Support Smart Link Function (APP program provide)
- ◇ Support Wireless and Remote Firmware Upgrade Function
- ◇ support WPS Function
- ◇ Support External I-PEX or Internal PCB Antenna Option
- ◇ Single +3.3V Power Supply
- ◇ Smallest Size: 22mm x 13.5mm x 6mm, 1x10 2mm Connector
- ◇ FCC/CE Certificated

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HISTORY

- Ed. V1.02** 11-03-2015 First Version.
- Ed. V1.03** 11-11-2015 Modify IO PIN Description.
- Ed. V1.04** 11-27-2015 Change Module PCB.
- Ed. V1.1** 12-21-2015 Update AT command supported by 2.0.01 version firmware.
- Ed. V1.1.1** 01-04-2016 Add HF-LPT100-A Type.

High-Flying

1. PRODUCT OVERVIEW

1.1. General Description

The HF-LPT120 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/PWM interface for data transfer. HF-LPT120 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.

The HF-LPT120 employs 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 data on an infrequent basis.

The HF-LPT120 integrates all Wi-Fi functionality into a low-profile, 22mm x 13.5mm x 6mm module package that can be easily mounted on main PCB with application specific circuits. Also, module provides built-in antenna, external antenna option.

1.1.1 Device Features

- Single stream Wi-Fi @ 2.4 GHz with support for WEP security mode as well as WPA/WPA2
- Based on Self-developed High Cost Performance SOC
- Includes all the protocol and configuration functions for Wi-Fi connectivity.
- Support STA/AP Mode
- Support Smart Link Function
- Support Wireless and Remote Firmware Upgrade Function
- Support External I-PEX or Internal PCB antenna connector options.
- Compact surface mount module 22mm x 13.5mm x 6mm
- Single supply – 3.3V operation.
- FCC/CE Certified.
- RoHS Compliant.

1.1.2 Device Parameters

Table 1 HF-LPT120 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: +16 +/-2dBm (@11Mbps) |
| | | 802.11g: +14 +/-2dBm (@54Mbps) |
| | | 802.11n: +13 +/-2dBm (@HT20, MCS7) |
| | Receiver Sensitivity | 802.11b: -93 dBm (@11Mbps ,CCK) |
| 802.11g: -85 dBm (@54Mbps, OFDM) | | |
| 802.11n: -82 dBm (@HT20, MCS7) | | |
| Antenna Option | External:I-PEX Connector | |
| | Internal:PCB Printed Antenna | |
| Hardware Parameters | Data Interface | UART |
| | | GPIO |
| | Operating Voltage | 2.95~3.6V |
| | Operating Current | Peak [Continuous TX]: ~280mA Average. ~20mA |
| | Operating Temp. | -20°C - 85°C |
| | Storage Temp. | -40°C - 125°C |
| | Dimensions and Size | 22mm x 13.5mm x 6mm |
| External Interface | 1x10, 2mm DIP | |
| Software Parameters | Network Type | STA /AP |
| | Security Mechanisms | WEP/WPA-PSK/WPA2-PSK |
| | Encryption | WEP64/WEP128/TKIP/AES |
| | Update Firmware | Local Wireless, Remote |
| | Customization | Support customization |
| | Network Protocol | IPv4, TCP/UDP/HTTP |
| | User Configuration | AT+instruction set. Android/ iOS Smart Link APP tools |

1.1.3 Key Application

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

1.2. Hardware Introduction

1.2.1. Pins Definition

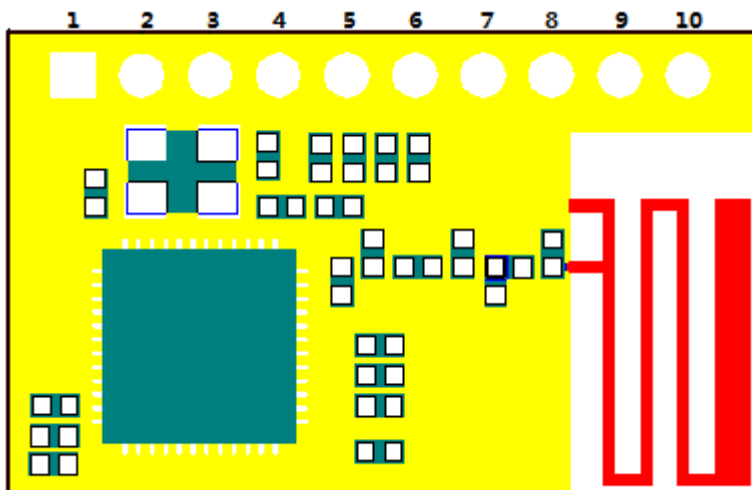


Figure 1. HF-LPT120 Pins Map

Table 2 HF-LPT120 Pins Definition

| Pin | Description | Net Name | Signal Type | Comments |
|-----|-----------------------|------------|-------------|---|
| 1 | Ground | GND | Power | |
| 2 | +3.3V Power | DVDD | Power | 3.3V@300mA |
| 3 | Restore Configuration | nReload | I/O,PU | Can be configured as GPIO_2 Detailed functions see <Notes> |
| 4 | Module Reset | EXT_RESETn | I,PU | “Low” effective reset input. |
| 5 | UART0 | UART0_RX | I | GPIO_19 |
| 6 | UART0 | UART0_TX | O,PU | GPIO_20 |
| 7 | GPIO_5 | GPIO_5 | I/O | Can be configured as UART0_RTS, UART1_TXD,GPIO_5 |
| 8 | GPI_6 | GPIO_6 | I/O | Can be configured as UART0_CTS, UART1_RXD,GPIO_6 |
| 9 | GPIO_3 | nReady | I/O | Can be configured as nReady,GPIO |
| 10 | GPIO_15 | nLink | I/O | Can be configured as nLink,GPIO Detailed functions see <Notes> |

I—Input, O—Output,PU—Internal Pullup Resistor; I/O: Digital I/O; Power—Power

<Notes>

nReload Pin (Button) function:

1. When this pin is set to “low” during module boot up, the module will enter wireless firmware and config upgrade mode. This mode is used for customer manufacture.

(See Appendix D to download software tools for customer batch configuration and upgrade firmware during mass production)

2. After module is powered up, short press this button (“Low” < 2s) to make the module go into “Smart Link “ config mode, waiting for APP to set password and other information. (See Appendix D to download SmartLink APP)
3. After module is powered up, long press this button (“Low” > 4s) to make the module recover to factory setting.

High-Flying strongly suggest customer fan out this pin to connector or button for “Manufacture” and “ Smart Link” application.

nLink Pin (LED) function:

1. At wireless firmware and config upgrade mode , this LED used to indicate configure and upgrade status.
 2. At “Smart Link “ config mode, this LED used to indicate APP to finish setting.
 3. At normal mode, it’s Wi-Fi link status indicator
- High-Flying strongly suggest customer fan out this pin to LED.

1.2.2. Electrical Characteristics

Table 3 Absolute Maximum Ratings:

| Parameter | Condition | Min. | Typ. | Max. | Unit |
|-------------------------------|---------------------|------|------|------|------|
| Storage temperature range | | -40 | | 125 | °C |
| Maximum soldering temperature | IPC/JEDEC J-STD-020 | | | 260 | °C |
| Supply voltage | | 0 | | 3.6 | V |
| Voltage on any I/O pin | | 0 | | 3.6 | V |
| ESD (Human Body Model HBM) | TAMB=25°C | | | 2.5 | KV |
| ESD (MM) | TAMB=25°C | | | 0.25 | KV |

Table 4 Power Supply & Power Consumption:

| Parameter | Condition | Min. | Typ. | Max. | Unit |
|--------------------------|---------------|------|------|------|------|
| Operating Supply voltage | | 2.95 | 3.3 | 3.6 | V |
| Supply current, peak | Continuous Tx | | 280 | | mA |
| Supply current, IEEE PS | DTIM=100ms | | 20 | | mA |

1.2.3. Mechanical Size

HF-LPT120 modules physical size (Unit: mm) as follows:

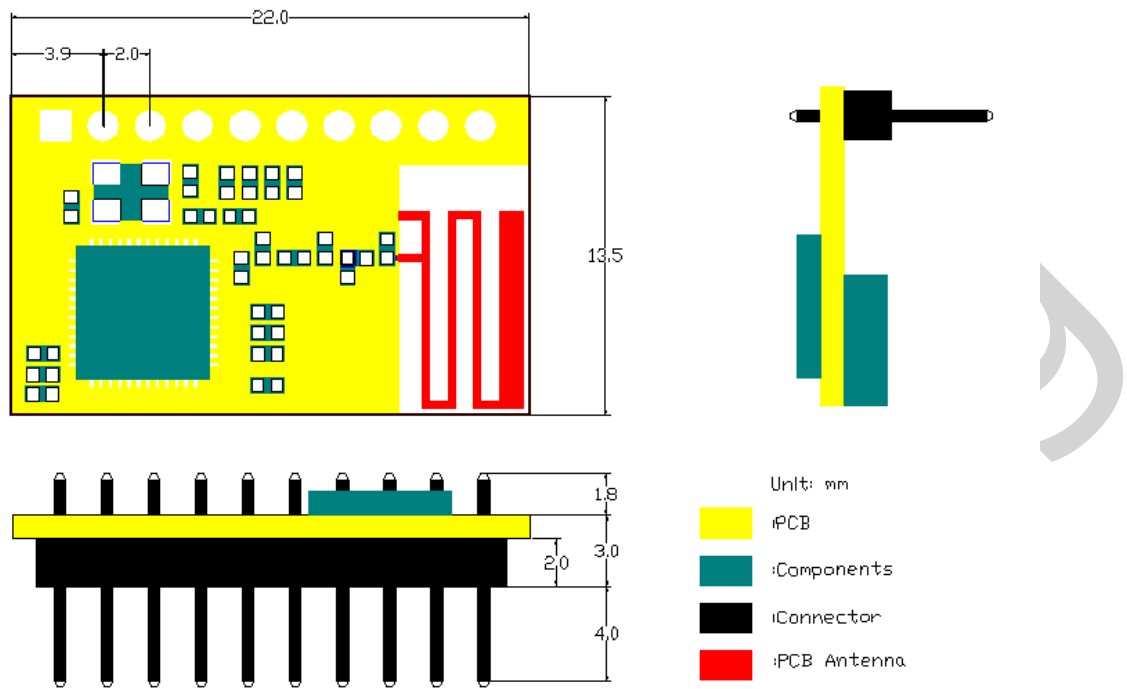


Figure 2. HF-LPT120 Mechanical Dimension

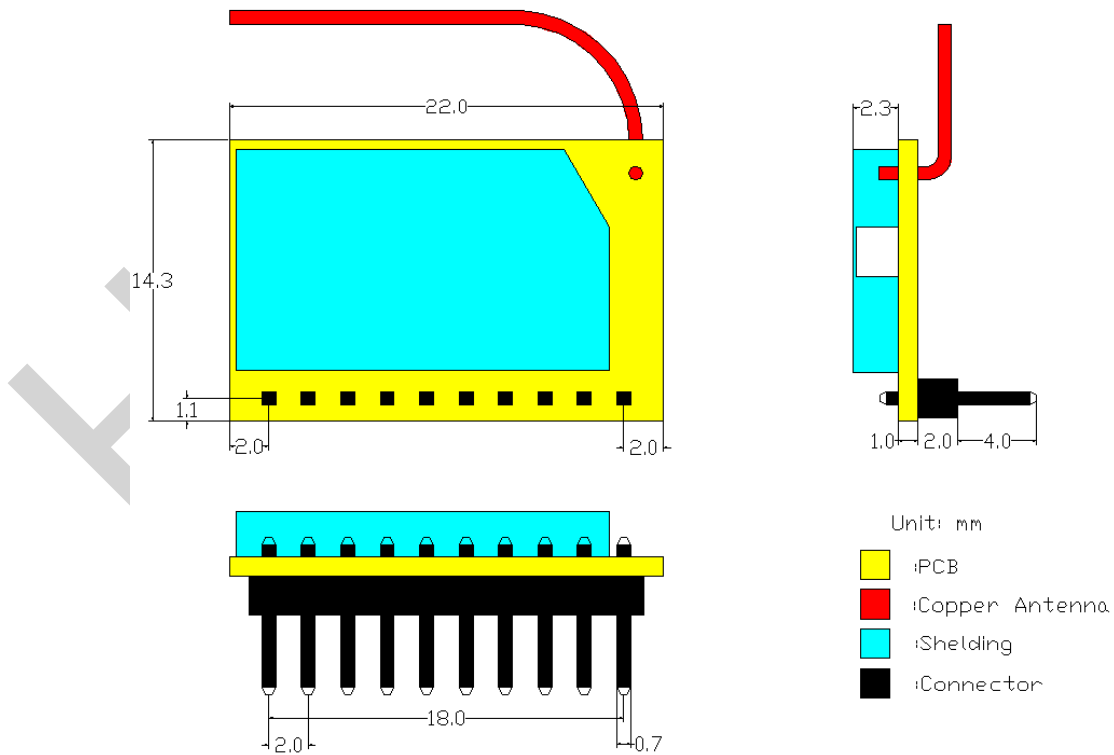


Figure 3. HF-LPT120-A Mechanical Dimension

1.2.4. On-board PCB Antenna

HF-LPT120 module support internal on-board PCB antenna option. When customer select internal antenna, you shall comply with following antenna design rules and module location suggestions:

- For customer PCB, RED color region (8x10mm) can't put componet or paste GND net;
- Antenna must away from metal or high components at least 10mm;
- Antenna can't be shielded by any metal enclosure;

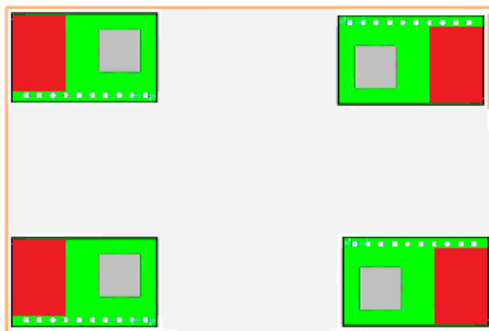


Figure 4. Suggested Module Placement Region

High-Flying suggest HF-LPB100 module better locate in following region at customer board, which to reduce the effect to antenna and wireless signal, and better consult High-Flying technical people when you structure your module placement and PCB layout.

1.2.5. External Antenna

HF-LPT120 supports two way of external antenna as the following picture show, The I-PEX interface or the PAD interface(remove the I-PEX connector). The user may choose one of them. If user select external antenna, HF-LPT120 modules must be connected to the 2.4G antenna according to IEEE 802.11b/g/n standards.

The antenna parameters required as follows:



Figure 5. HF-LPT120 External Antenna picture

Table 5 HF-LPT120 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 or populate directly |

1.2.6. Evaluation Kit

High-Flying provides the evaluation kit to promote user to familiar the product and develop the detailed application. The evaluation kit shown as below, user can connect to HF-LPT120 module with the RS-232 UART, or Wireless interface to configure the parameters, manage the module or do the some functional tests. The EVK support .5V DC power supply.



Figure 6. HF-LPT120 Evaluation Kit

The external interface description for evaluation kit as follows:

Table 6 HF-LPT120 Evaluation Kit Interface Description

| Function | Name | Description |
|--------------------|---------|--|
| External Interface | RS232 | Main data/command RS-232 interface |
| | DC5V | DC jack for power in, 5V input. |
| Button | nReload | Restore factory default configuration after push this pin more than 4s. See 1.2.1 |

1.2.7. Order Information

Base on customer detailed requirement, HF-LPT120 series modules provide different variants and physical type for detailed application.

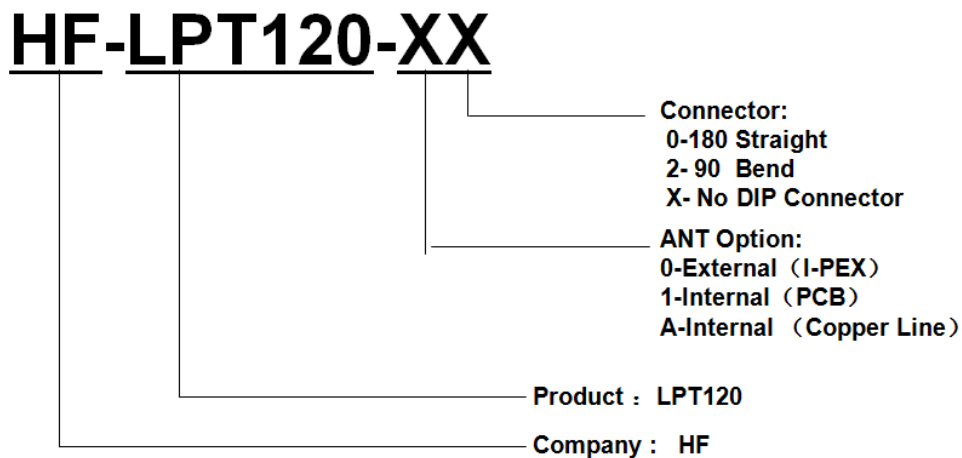


Figure 7. HF-LPT120 Order Information

1.3. Typical Application

1.3.1. Hardware Typical Application

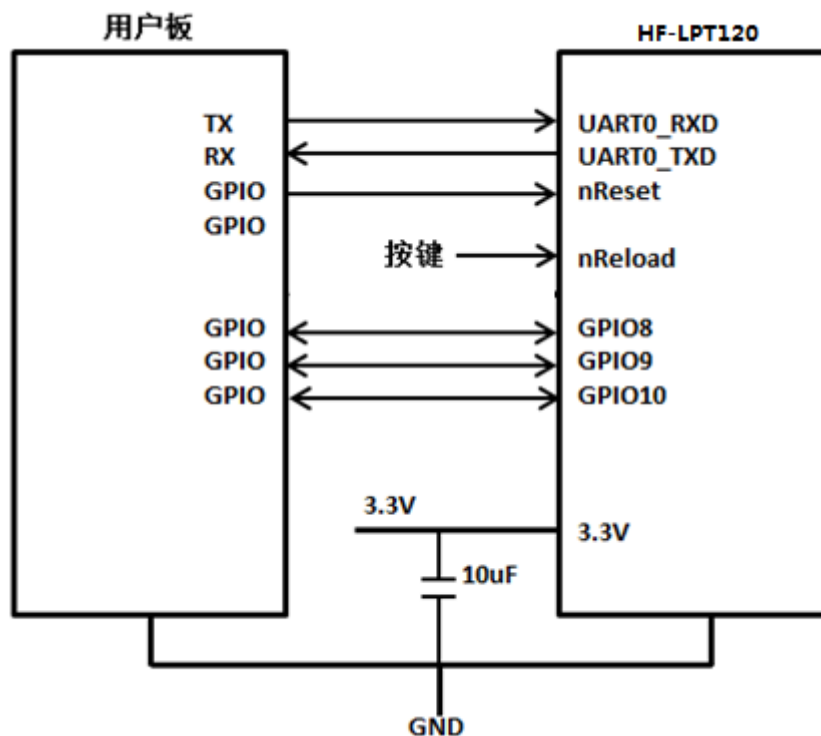


Figure 8. HF-LPT120 Hardware Typical Application

Notes:

nReset- Module hardware reset signal. Input. Logics “0” effective.

There is pull-up resistor internal and no external pull-up required. When module power up or some issue happened, MCU need assert nRST signal “0” at least 10ms, then set “1” to keep module fully reset.

nReady- Module boot up ready signal. Output. Logics “0” effective.

The module will output “0” after normal boot up. This signal used to judge if module finish boot up and ready for application or working at normal mode. If nReady function not required, can leave this pin open.

nReload- Module restore to factory default configuration. Input. Logics “0” effective.

(This pin is recommend to connect to button, is used to enter wireless upgrade mode)

User can de-assert nReload signal “0” more than 4s through button or MCU pin, then release, module will restore to factory default configuration and re-start boot up process.. If nReload function not required, can leave this pin open.

UART0_TXD/RXD- UART port data transmit and receive signal.

nLink- Module WIFI connection status indication. Output.

(This pin is recommend to connect to LED, indicate status when the module in wireless upgrade mode)

When module connects to AP (AP associated), this pin will output “0”. This signal used to judge if module already at WiFi connection status. There is pull-up resistor internal and no external pull-up required. If nLink function not required, can leave this pin open.

1.4. Internal PCB Antenna

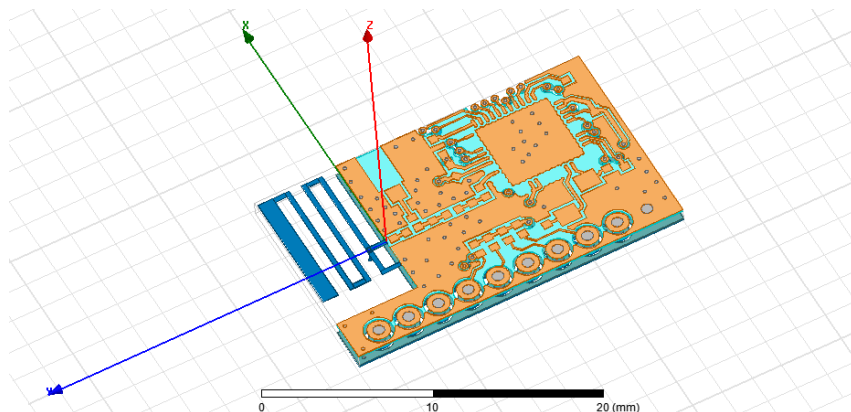


Figure 9. HF-LPT120 Antenna

Antenna radiation efficiency 49.2%

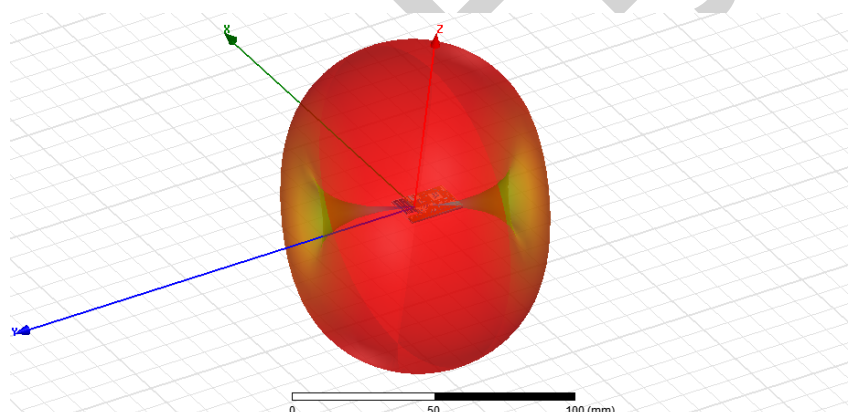


Figure 10. HF-LPT120 Antenna radiation pattern

XY plane maximum gain:-1.21dB, minimum gain: -31.55dB

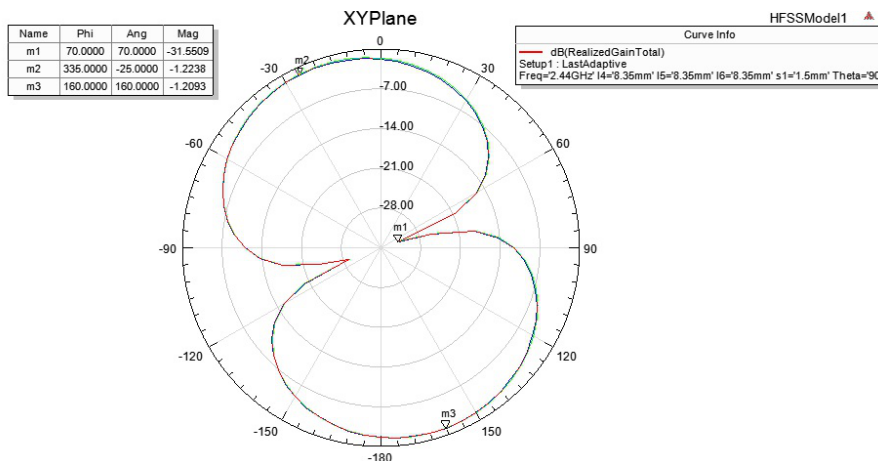


Figure 11. HF-LPT120 XY plane radiation pattern

XZ plane maximum gain:-0.99dB, minimum gain:-1.6dB

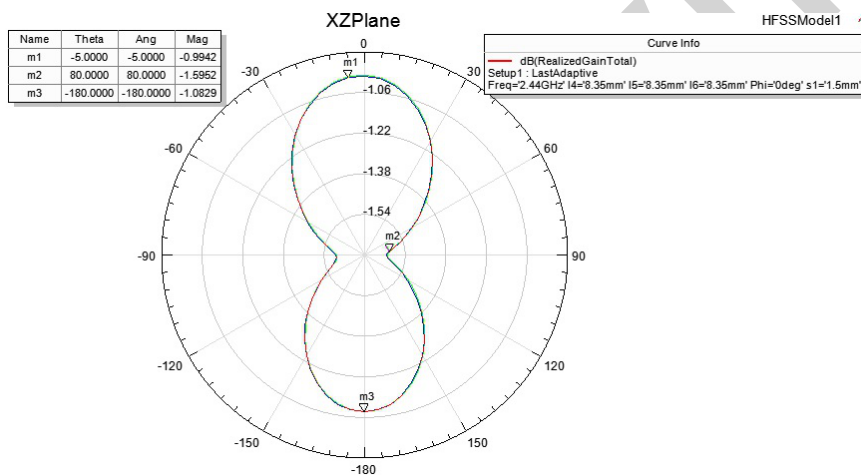


Figure 12. HF-LPT120XZ plane radiation pattern

YZ plane maximum gain:-0.99dB, minimum gain:-11.52dB

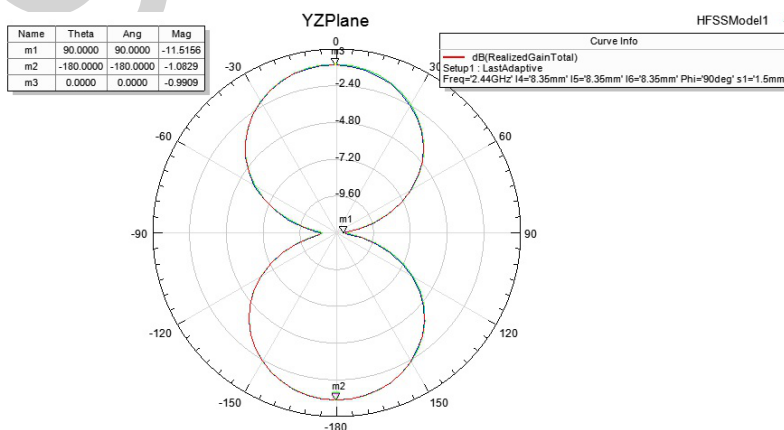


Figure 13. HF-LPT120YZ plane radiation pattern

2. FUNCTIONAL DESCRIPTION

2.1. Wireless Networking

HF-LPT120 module can be configured as both wireless STA and AP base on network type. Logically there are two interfaces in HF-LPT120. One is for STA, and another is for AP. When HF-LPT120 works as AP, other STA equipments are able to connect to HF-LPT120 module directly. Wireless Networking with HF-LPT120 is very flexible.

Notes:

AP: that is the wireless Access Point, the founder of a wireless network and the centre of the network nodes. The wireless router we use at home or in office may be an AP.

STA: short for Station, each terminal connects to a wireless network (such as laptops, PDA and other networking devices) can be called with a STA device.

2.1.1. Basic Wireless Network Based On AP (Infrastructure)

Infrastructure: it's also called basic network. It built by AP and many STAs which join in. The characters of network of this type are that AP is the centre, and all communication between STAs is transmitted through the AP. The figure following shows such type of networking.

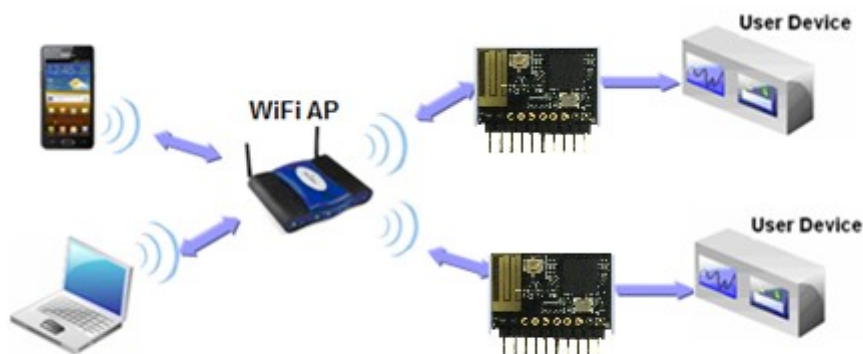


Figure 14. HF-LPT120 Basic Wireless Network Structure

2.1.2. Wireless Network Based On STA

HF-LPT120 module support STA network mode as following figure,

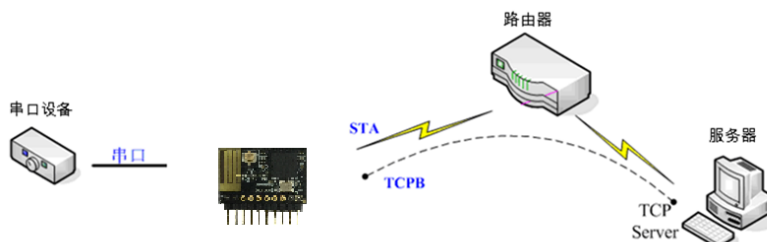


Figure 15. HF-A11 AP+STA Network Structure

Module's STA interface can connect with router and connect to TCP server in the network.

2.2. Work Mode : Transparent Transmission Mode

HF-LPT120 module support serial interface transparent transmission mode. The benefit of this mode is achieves a plug and play serial data port, and reduces user complexity furthest. In this mode, user should only 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 work in the transparent transmission 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.

The transparent transmission 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
 - Data Bit
 - Parity (Check) Bit
 - Stop Bit
 - Hardware Flow Control

2.3. UART Frame Scheme(Reserved)

2.3.1. UART Free-Frame

HF-LPT120 support UART free-frame function. If user select open this function, module will check the intervals between any two bytes when receiving UART data. If this interval time exceeds defined value (50ms default), HF-LPT120 will think it as the end of one frame and transfer this free-frame to WiFi port, or HF-LPT120 will receive UART data until 1000 bytes, then transfer 1000 bytes frame to WiFi port.

HF-LPT120's default interval time is 50ms. (If the UART data interval is less than 300ms, the data may be packaged into one fragment) User can also set this interval to fast through AT command. The UART data may be divided as fragment.

Through AT command: AT+UARTTE=fast/normal, We recommend to use just normal parameter.

2.3.2. UART Auto-Frame

HF-LPT120 support UART auto-frame function. If user select open this function and setting auto-frame trigger length and auto-frame trigger time parameters, then module will auto framing the data which received from UART port and transmitting to the network as pre-defined data structure.

- **Auto-frame trigger length:** The fixed data length that module used to transmitting to the network.
- **Auto-frame trigger time:** After the trigger time, if UART port received data can't reach auto-frame trigger length, then module will transmitting available data to the network and bypass the auto-frame trigger length condition.

Detailed UART auto-frame function can refer to AT+ instruction set "UARTF/UARTFT/UARTFL" introduction.

2.4. 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 HF-LPT120 module supports following:

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

2.5. Parameters Configuration

HF-LPT120 module supports two methods to configuration parameters: **Web Accessing** and **AT+instruction set**.

Web accessing means users can configure parameters through Web browser. When HF-LPT120 module connected to wireless network, parameters configuration is done on a PC connected to the same wireless network.

AT+instruction set configuration means user configure parameters through serial interface command. Refer to "AT+instruction set" chapter for more detail.

2.6. Firmware Update (Reserved, See Appendix C)

HF-LPT120 module supports two on-line upgrade methods:

- Webpage Wi-Fi Upgrade

■ Remote Upgrade

Webpage based Wi-Fi upgrade, please refer to 3.1.8 firmware upgrade page, user can upload firmware file from PC to HF-LPT120.

HF-LPT120 module also support upgrade from remote HTTP server, keep module connects to AP router before execute remote HTTP upgrade. Remote upgrade have two methods: **Direct Download and Upgrade, Configure File Based Upgrade.**

◆ **Configure File Based Upgrade**

AT+UPURL command to set the remote directory which the configuration file located, such as AT+UPURL=http://www.hi-flying.com/admin/down/

Notes: The last '/' can't be remove

AT+UPFILE command to set the configuration file name, such as AT+UPFILE=config.txt

AT+UPST command to start remote Application upgrade. After execute this command, the module will firstly download configuration file ("config.txt"), then download the upgrade file base on the URL address listed in the configure file.

General "config.txt" file format as following example:

[URL]="http://10.10.100.100:80/lpb.bin"

[URL]= the URL address of Application.

◆ **Direct Download and Upgrade**

AT+UPURL command to set the remote directory and file name, such as:

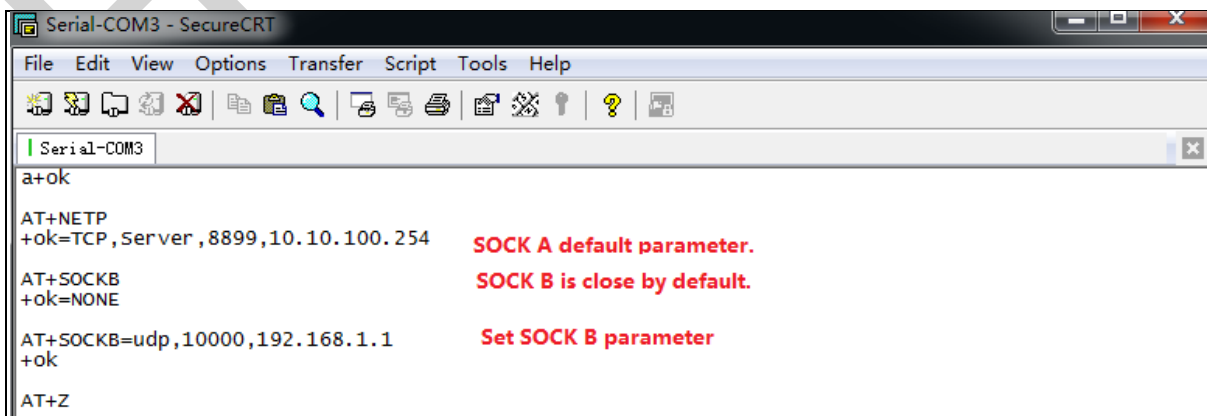
AT+UPURL=http://www.hi-flying.com/admin/down/lpb.bin

After execute this command, the module will directly download the "lpb.bin" file from remote directory and start upgrade Application.

Notes: please contact with high-flying technical people before upgrade firmware, or maybe damage the module and can't work again.

2.7. SOCKET B Function

HF-LPT120 support double socket communication, the socket B function is disabled by default.



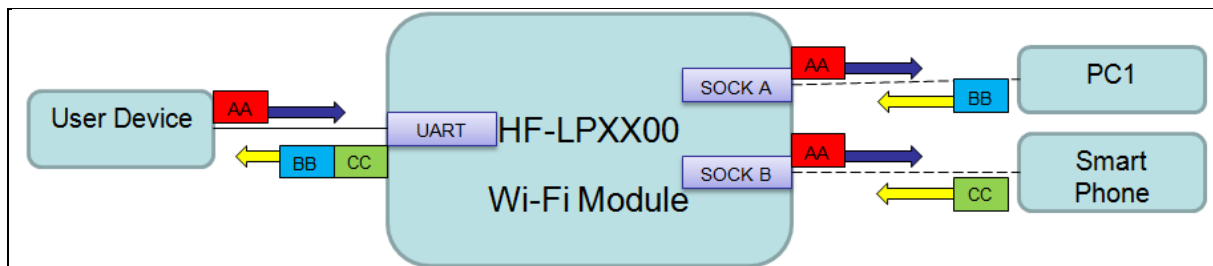


Figure 16. Socket B function demo

2.8. Multi-TCP Link Connection (Reserved)

When HF-LPT120 module configured as TCP Server, it supports Multi-TCP link connection, and maximum 5 TCP clients permit to connect to HF-LPT120 module. User can realize multi-TCP link connection at each work mode.

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 replicate and broadcast to every TCP connection or client.

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

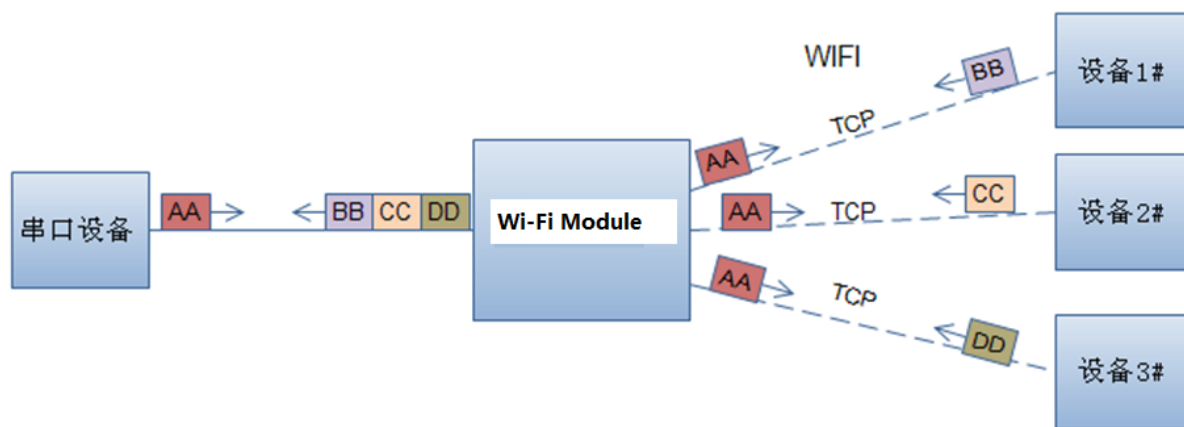


Figure 17. Multi-TCP Link Data Transmission Structure

3. OPERATION GUIDELINE

3.1. Default Parameter

When first use HF-LPT120 modules, user may need some configuration. User can connect to HF-LPT120 module’s wireless interface with following default setting information.



Table 8 HF-LPT120 Default Setting

| Parameters | Default Setting |
|-------------|-----------------|
| SSID | HF-LPT120 |
| IP Address | 10.10.100.254 |
| Subnet Mask | 255.255.255.0 |
| User Name | admin |
| Password | admin |

3.2. HF-LPT120 Usage Introduction

3.2.1. Software Debug Tools

High-Flying use two common software tools debugging and applying HF-LPT120 module. (User can also select other tools used to debug serial port).

- Serial Debugging Software: ComTools  **ComTools.exe**
- Ethernet Debugging Software: TCPUDPDbg  **TCPUDPDbg.exe**

3.2.2. Network Connection

User can select two methods to connect HF-LPT120 module base on dedicated application.

- **Use HF-LPT120 STA interface.** HF-LPT120 and debug PC2 connect to a wireless AP, another PC1 (or user device) connect to HF-LPT120 module with serial port:



Figure 18. STA Interface Debug Connection

- **Use HF-LPT120 AP interface.** Debug PC2 connect to HF-LPT120 through wireless connection, another PC1 (or user device) connect to HF-LPT120 module with serial port.



Figure 19. AP Interface Debug Connection

3.2.3. Default Parameter Setting

- Default SSID: HF-LPT120;
- Deault security mode: open,none;
- User UART parameter setting:115200,8,1,None;
- Default network parameter setting:TCP,Server,8899,10.10.100.254;
- Module IP address: dhcp,0.0.0.0,0.0.0.0,0.0.0.0;

3.2.4. Module Debug

PC1 open “CommTools” program, setting the same serial port parameters with HF-LPT120 module and open serial port connection.

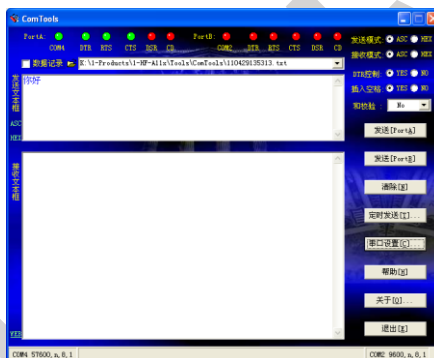


Figure 20. “CommTools” Serial Debug Tools

PC2 open “TCPUDPDbg” program, and create a new connection. If HF-LPT120 configured as Server mode, “TCPUDPDbg” Tools shall create “Client “mode connection. Or otherwise, create a “Server” mode connection.

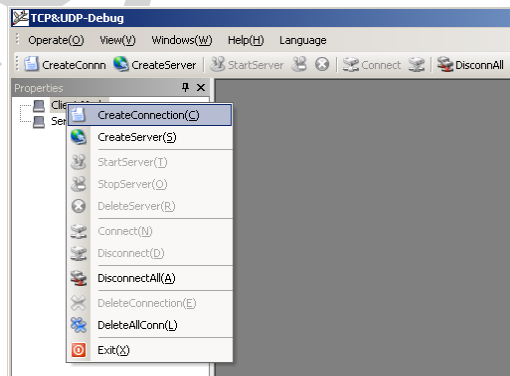


Figure 21. “TCPUDPDbg” Tools Create Connection

Then setting the TCP/UDP connection parameters. Default as following:

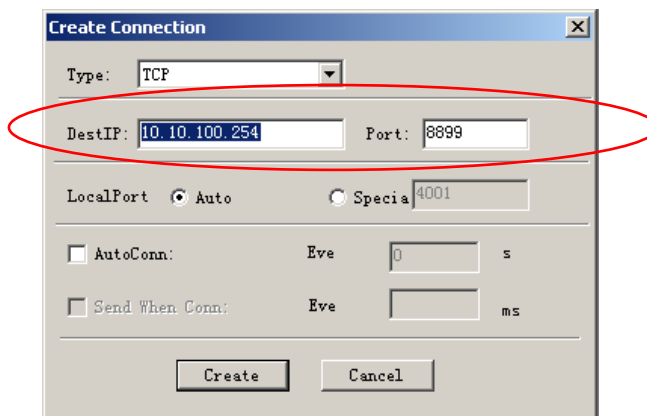


Figure 22. “TCPUDPDbg” Tools Setting

Then, click “Create” button to create a connection.

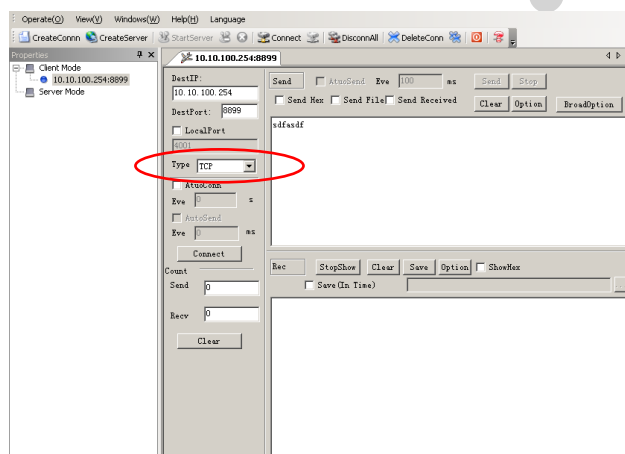


Figure 23. “TCPUDPDbg” Tools Connection

Now, in transparent transmission mode, data can be transferred from “CommTools” program to “TCPUDPDbg” program, or in reverse. You can see data in receiver side will keep same as in sender side.

3.3. Typical Application Examples

3.3.1. Wireless Control Application



Figure 24. Wireless Control Application

For this wireless control application, HF-LPT120 works as AP mode. Module’s serial port connects to user device. So, control agent (Smart phone for this example) can manage and control the user device through the wireless connection with HF-LPT120 module.

3.3.2. Remote Management Application

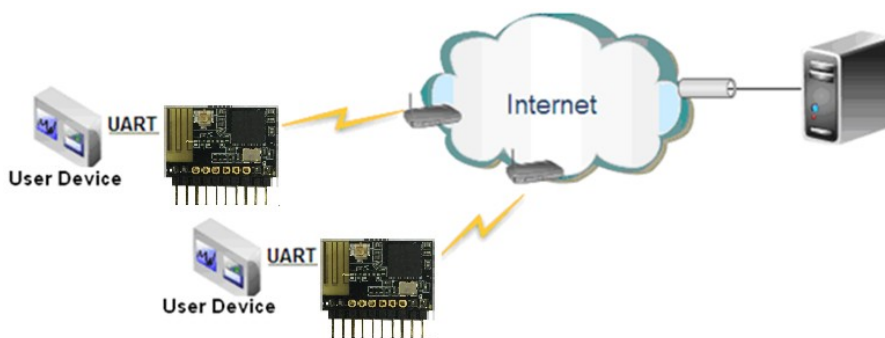


Figure 25. Remote Management Application

For this remote management application, HF-LPT120 works as STA mode and connects to Internet through wireless AP. Module configured as TCP Client and communicates with remote TCP server at Internet. Module's serial port connects to user device

So, user device's data or sampling information can send to remote TCP server for storage or processing. Also remote TCP server can send command to control and manage the user device through the wireless network.

3.3.3. Transparent Serial Port Application

For this transparent serial port application, two HF-LPT120 modules connect as below figures to build up a transparent serial port connection. HF-LPT120 works as AP mode and STA mode to connect each other.



Figure 26. Transparent Serial Port Application

4. AT+INSTRUCTION INTRODUCTION

4.1. Configuration Mode

When HF-LPT120 power up, it will default works as transparent transmission mode, then user can switch to configuration mode by serial port command. HF-LPT120 UART default parameters setting as below figure.

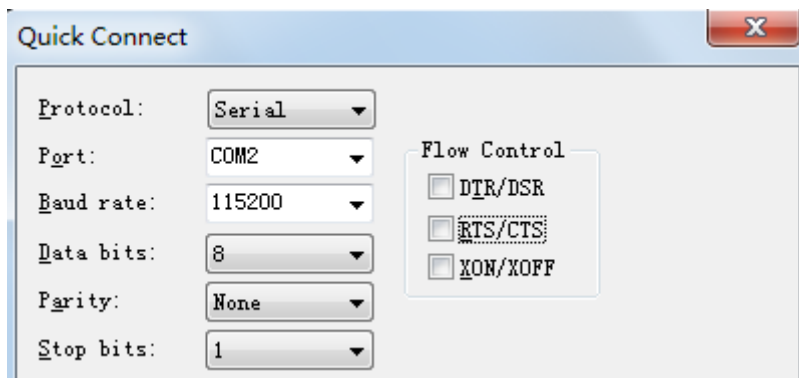


Figure 27. HF-LPT120 Default UART Port Parameters

In configuration mode, user can setting the module through AT+ instruction set, which cover all web page setting function.

4.1.1. Switch to Configuration Mode

Two steps to finish switching from transparent transmission mode to configuration mode.

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

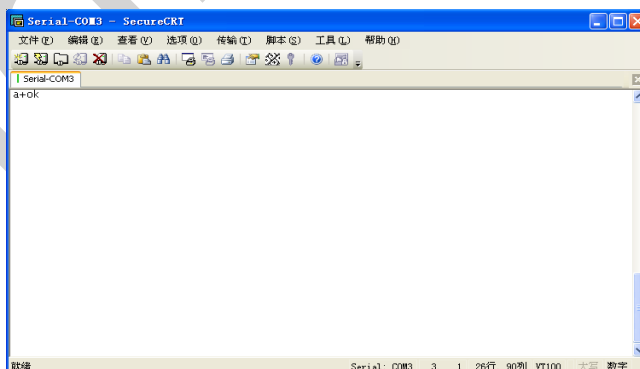
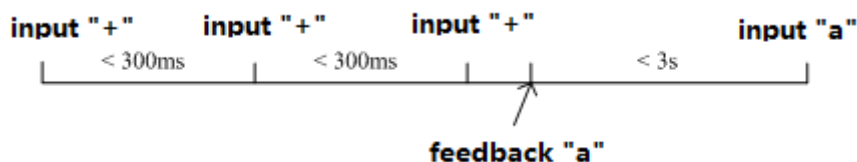


Figure 28. Switch to Configuration Mode

Notes:

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 (transparent transmission).
3. “+++” and “a” should be input in a certain period of time to make the module switch to configuration mode. Like the following sequence.



4.2. AT+ Instruction Set 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+WKEY: 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+WSQL: 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+TCPK: 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 29. "AT+H" Instruction for Help

4.2.1. Instruction Syntax Format

AT+Instruction protocol 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;

Notes: When input AT+Instruction, “AT+<CMD>” character will display capital letter automatic and other parts will not change as you input.

➤ **Response Message**

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

- +: 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 9 Error Code Description

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

4.2.2. AT+Instruction Set

Table 10 AT+Instruction Set List

| Instruction | Description |
|----------------------------------|--|
| <null> | NULL |
| Managment Instruction Set | |
| E | Open/Close show back function |
| WMODE | Set/Query Wi-Fi work mode (AP/STA) |
| ENTM | Set module into transparent transition mode |
| TMODE | Set/Query module data transfer mode |

| Instruction | Description |
|---|---|
| MID | Query module ID information |
| VER | Query module software version information |
| LVER | Query module detailed software version |
| FWSZ | Query Wi-Fi driver size |
| RELD | Restore to factory default setting |
| FCLR | Erase factory setting |
| Z | Re-start module |
| H | Help |
| Configure Parameters Instruction Set | |
| CFGTF | Copy User Parameters to Factory Default Parameters |
| UART Instruction Set | |
| UART | Set/Query serial port parameters |
| UARTFT | Open/Close UART auto-frame function |
| UARTFTT | Set/Query UART auto-frame trigger time |
| UARTFL | Set/Query UART auto-frame trigger length |
| UARTTE | Set/Query UART free-frame trigger time between two bytes |
| Command Mode Set | |
| SEND | Send Data at Command Mode |
| RECV | Receive Data at Command Mode |
| Network Instruction Set | |
| PING | Network "Ping" Instruction |
| NETP | Set/Query network protocol parameters |
| MAXSK | Set/Query TCP Client connection number |
| TCPLK | Query if TCP link already build-up |
| TCPTO | Set/Query TCP timeout |
| TCPDIS | Open/Close TCP link |
| SOCKB | Set/Query SOCKB parameters |
| TCPDISB | Open/Close SOCKB TCP link |
| TCPTOB | Set/Query SOCKB TCP timeout |
| TCPLKB | Query if SOCKB TCP link already build-up |
| SNDB | Send data to SOCKB in Command Mode |
| RCVB | Receive data from SOCKB in Command Mode |
| Wi-Fi STA Instruction Set (Effective when module works as STA) | |
| WSKEY | Set/Query STA security parameters |
| WSSID | Set/Query associated AP SSID parameters |
| WANN | Set/Query STA's network parameters |
| WSMAC | Set/Query STA's MAC address |
| WSLK | Query STA Wi-Fi link status |
| WSLQ | Query STA Wi-Fi signal strength |
| WSCAN | Scan AP |
| WSDNS | Set/Query STA's Static DNS server address |
| Wi-Fi AP Instruction Set (Effective when module works as AP) | |
| LANN | Set/Query AP's network parameters |
| WAP | Set/Query AP Wi-Fi parameters |
| WAKEY | Set/Query AP security parameters |
| WAMAC | Set/Query AP MAC address |
| WADHCP | Set/Query AP DHCP Server status |
| WADMN | Set/Query AP webpage domain name |
| WALK | Query MAC address of STA device connecting to module AP |

| Instruction | Description |
|---|---|
| WALKIND | Enable/Disable indication of connection status. |
| Remote Upgrade Instruction Set | |
| OTA | Upgrade Firmware |
| UPURL | Set/Query remote upgrade URL address |
| UPFILE | Set/Query remote upgrade configure file name |
| LOGSW | Open/Close remote upgrade log |
| LOGPORT | Set/Query UDP port of remote upgrade log |
| UPST | Start remote Application upgrade |
| Power Management Instruction Set | |
| DISPS | Set/Query power save parameters |
| Network Time Set | |
| NTPRF | Set/Query time calibration interval |
| NTPEN | Enable/Disable time calibration function |
| NTPTM | Query time |
| NTPSER | Set/Query NTP server IP |
| Others Instruction Set | |
| WRMID | Set module ID |
| RLDEN | Set/Query GPIO45 status |
| ASWD | Set/Query WiFi configuration code |
| MDCH | Set Wi-Fi Auto Switch Function |
| TXPWR | Set/Query Wi-Fi Transmit Power |
| SMTLK | Start SmartLink function |
| SMTLKVER | Set/Query SmartLink version |
| WPS | Start WPS function |
| WPSTNEN | Enable/Disable GPIO 15 WPS function |
| LPTIO | nRead/nLink/WPS function mapping |
| WIFI | Enable/Disable Wi-Fi |
| SMEM | Query RAM status |
| NDBG | Set UART debug information |

Note: Some AT is not supported yet (The above AT command with line through) . It will be updated for later firmware.

4.2.2.1. AT+E

- Function: Open/Close show back function;
- Format:
 - ◆ Set Operation
 - AT+E=<status><CR>**
 - +ok<CR><LF><CR><LF>**
- Parameters:
 - ◆ status: Echo status
 - ◇ on: Open echo
 - ◇ off: Close echo

When HF-LPB120 module firstly switch from transparent transmission to configuration mode, show back status is open, input "AT+E" to close show back function, input "AT+E" again to open show back function.

4.2.2.2. AT+WMODE

- Function: Set/Query Wi-Fi work mode. 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

4.2.2.3. AT+ENTM

- Function: Set module into transparent transmission mode;

- Format:

AT+ENTM<CR>

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

When operate this command, module switch from configuration mode to transparent transmission mode.

4.2.2.4. 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:

- ◆ tmode: data transfer mode, include:

- ◇ throughput: throughput mode
- ◇ cmd: command mode
- ◇ pwm: PWM/GPIO mode

4.2.2.5. AT+MID

- Function: Query module ID information;

- Format:

- ◆ Query Operation

AT+MID<CR>

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

- Parameters:
 - ◆ module_id: Module ID information;
 - ◇ HF-LPB120;

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

4.2.2.6. AT+VER

- Function: Query module software version information;
 - Format:
 - ◆ Query Operation
- AT+VER<CR>**
+ok=<ver><CR><LF><CR><LF>
- Parameters:
 - ◆ ver: Module software version information;

4.2.2.7. AT+LVER

- Function: Query module detailed software version information;
 - Format:
 - ◆ Query Operation
- AT+LVER<CR>**
+ok=<ver><CR><LF><CR><LF>
- Parameters:
 - ◆ ver: Module software detailed version information;

4.2.2.8. AT+FWSZ

- Function: Query Wi-Fi driver size;
 - Format:
 - ◆ Query Operation
- AT+FWSZ<CR>**
+ok=<size,version><CR><LF><CR><LF>
- Parametewrs:
 - ◆ size: Wi-Fi driver size.(Byte)
 - ◆ version: Wi-Fi driver version

4.2.2.9. AT+RELD

- Function: module restore to factory default setting;
 - Format:
 - ◆ Set Operation
- AT+RELD<CR>**
+ok=rebooting...<CR><LF><CR><LF>

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

4.2.2.10. AT+FCLR

- Function: Erase factory setting;
- Format:
 - ◆ Query Operation

AT+FCLR<CR>

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

4.2.2.11. AT+Z

- Function: Re-start module;
- Format:

AT+Z<CR>

4.2.2.12. AT+H

- Function: Help;
- Format:
 - ◆ Query Operation

AT+H<CR>

+ok=<command help><CR><LF><CR><LF>

- Parameters:
 - ◆ command help: command introduction;

4.2.2.13. 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;

4.2.2.14. AT+UART

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

AT+UART[=uart_num]<CR>

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

- ◆ Set Operation

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

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

- Parameters:
 - ◆ uart_num: UART Channel, the default is UART0.
 - 0: UART0 Channel
 - 1: UART1 Channel
 - ◆ baudrate:
 - ◇ 600,1200,1800,2400,4800,9600,19200,38400,57600,115200,230400,380400,460800,921600
 - ◆ data_bits:
 - ◇ 8
 - ◆ stop_bits:

- ◇ 1,2
- ◆ parity:
 - ◇ NONE
 - ◇ EVEN
 - ◇ ODD
- ◆ Flowctrl: (CTSRTS)
 - ◇ NFC: No hardware flow control
 - ◇ FC: hardware flow control

4.2.2.15. 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;

4.2.2.16. AT+UARTFT

- Function: Set/Query UART auto-frame trigger time;
- Format:
 - ◆ Query Operation


```
AT+UARTFT<CR>
```

```
+ok=<time><CR><LF><CR><LF>
```
 - ◆ Set Operation


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

```
+ok<CR><LF><CR><LF>
```
- Parameters:
 - ◆ time: Range 100 ~10000; Unit: ms. Auto-frame trigger time

4.2.2.17. AT+UARTFL

- Function: Set/Query UART auto-frame trigger length;
- Format:
 - ◆ Query Operation


```
AT+UARTFL<CR>
```

```
+ok=<len><CR><LF><CR><LF>
```
 - ◆ Set Operation


```
AT+UARTFL=<len ><CR>
```

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

- Parameters:
 - ◆ len: Range 8 ~1000; Unit: Byte. Auto-frame trigger length;

4.2.2.18. AT+UARTTE

- Function: Set/Query UART free-frame trigger time between two bytes;
- 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: No free-frame trigger time, the uart data may be break into two fragment
 - ✧ normal: free-frame trigger time between two bytes is 50ms;

4.2.2.19. AT+SEND

- Function: Send Data to SOCKA at Command Mode.
- Format:

AT+SEND=<data_lenth><CR>

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

- Parameters:
 - ◆ data_lenth: Lenth of send data. Range: 0~1000 Byte

The UART port will wait 3 seconds for input after this command is sent OK. The data received from UART port is sent to SOCKA. If the interval of two bytes is more than 10ms, the data will be sent instantly.

4.2.2.20. AT+RECV

- Function: Receive Data from SOCKA at Command Mode.
- Format:

AT+RECV=<data_lenth,timeout><CR>

+ok=< data_lenth, data_content><CR><LF><CR><LF>

- Parameters:
 - ◆ data_lenth: Lenth of receive data. Range: 0~1000 Byte
 - ◆ timeout: wait for timeout, 0~10 sec
 - ◆ data_content: contents of receive data.

If not receive any data in 3 second, then feedback +ok=0.

4.2.2.21. AT+PING

- Function: Network "PING" Instruction.
- Format:
 - ◆ Set Operation

AT+PING=<IP_address ><CR>

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

- Parameters:
 - ◆ sta: feedback result
 - ◇ Success
 - ◇ Timeout
 - ◇ Unknown host

4.2.2.22. AT+NETP

- Function: Set/Query 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: Network mode:
 - ◇ 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.

4.2.2.23. AT+MAXSK

- Function: Set/ Query TCP Client connection number.
- Format:
 - ◆ Query Operation

AT+MAXSK<CR>

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

- ◆ Set Operation

AT+MAXSK=<num><CR>

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

- Parameters:
 - ◆ num: TCP Client connection number. Range: 1~5. 5 is the default value it means when the module work in TCP server , it accepts max 5 TCP client connect to it.

4.2.2.24. AT+TCPLK

- Function: Query if TCP link already build-up;

- Format:

AT+TCPLK<CR>

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

- Parameters:

- ◆ sta.: if module already setup TCP link;
 - ◇ on: TCP link setup;
 - ◇ off: TCP link not setup;

4.2.2.25. AT+TCPTO

- Function: Set/Query TCP timeout; Setting is valid after reset.

- 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 time.
 - ◇ ≤ 600, (600s);
 - ◇ ≥ 0, (0 means no timeout);
 - ◇ Default, 300s;

Module begin to count time when TCP channel don't receive any data, clecherar time counter when TCP channel receive any data. If the time counter reaches the TCPTO, the tcp channel will be break. If the module 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.

4.2.2.26. AT+TCPDIS

- Function: Open/Close TCP link;

- Format:

- ◆ Query Opera

AT+TCPDIS<CR>

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

- ◆ Set Operation

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

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

- Parameters:

When query, sta.: Feedback if TCP Client can be link,

- ◇ On, TCP link close
- ◇ off, TCP link on

When setting, “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.

4.2.2.27. AT+SOCKB

- Function: Set/Query SOCKB 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: Protocol type:
 - ◇ TCP: Only for TCP Client
 - ◇ UDP: UDP Client
 - ◇ UDPS: UDP Server
 - ◆ 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.

4.2.2.28. AT+TCPDISB

- Function: Open/Close SOCKB connection
- 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 setting, “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.

4.2.2.29. AT+TCPTOB

- Function: Set/Query Operation SOCKB TCP timeout. Setting is valid after reset.
- 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

- ◇ ≤ 600:600s
- ◇ ≥ 0:0 means no timeout
- ◇ Default:300s

If the SOCKB TCP don't receive any data from TCP server for TCP tmeout setting, the module will break and reconnect the TCP server. If it receive data from server, the timeout counter will be clear.

4.2.2.30. 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

4.2.2.31. AT+SNDB

- Function: Send datas to SOCKB at Command Mode

- Format:

AT+SNDB=<data_lenth ><CR>

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

- Parameters:

- ◆ data_lenth: Lenth of send data. Range: 0~1000 Byte

The UART port will wait 3 seconds for input after this command is sent OK. The data received from UART port is sent to SOCKB. If the interval of two bytes is more than 10ms, the data will be sent instantly.

4.2.2.32. AT+RCVB

- Function: Receive datas from SOCKB at Command Mode

- Format:

AT+RCVB=<data_lenth><CR>

+ok=< data_lenth, data_content><CR><LF><CR><LF>

- Parameters:

- ◆ data_lenth: Lenth of receive data. Range: 0~1000 Byte
- ◆ data_content: contents of receive data.

If not receive any data in 3 second, then feedback +ok=0.

4.2.2.33. AT+WSSSID

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

- Format:

- ◆ Query Operation

AT+WSSSID<CR>

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

- ◆ Set Operation

AT+WSSSID=<ap's ssid ><CR>

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

- Parameters:

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

4.2.2.34. 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, in HEX format
- ◇ WEP-A: When "auth=OPEN" or "SHARED", effective, in ASCII format
- ◇ TKIP: When "auth= WPAPSK" or "WPA2PSK", effective
- ◇ AES: When "auth= WPAPSK" "WPA2PSK", effective

- ◆ key: password. When encry is WEP-H, password is in HEX format, password length is 10 or 26. When encry is WEP-A, password is in ASCII format, password length is 5 or 13. When encry is TKIP or AES, password is in ASCII code, password length shall be less than 64 and greater than 8.

4.2.2.35. 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;

4.2.2.36. 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 ACCF23FF1234

4.2.2.37. AT+WSLK

- Function: Query STA WiFi link status
- Format:
 - ◆ Query Operation

AT+WSLK<CR>

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

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

4.2.2.38. AT+WSLQ

- Function: Query STA WiFi signal strength;
- Format:
 - ◆ Query Operation

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;

4.2.2.39. AT+WSCAN

- Function: Scan AP;
- Format:
 - AT+WSCAN<CR>**
 - +ok=<ap_site><CR><LF><CR><LF>**
- Parameters:
 - ◆ ap_site: AP searched;

4.2.2.40. 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.

4.2.2.41. AT+LANN

- Function: Set/Query AP's network parameters. Setting is valid after reset.
- Format:
 - ◆ Query Operation
 - AT+LANN<CR>**
 - +ok=<ipaddress,mask><CR><LF><CR><LF>**
 - ◆ Set Operation
 - AT+LANN=< ipaddress,mask><CR>**
 - +ok<CR><LF><CR><LF>**
- Parameters:
 - ◆ ipaddress: AP's IP address;
 - ◆ mask: AP's net mask;

4.2.2.42. 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, the maximum length is 32.
 - ◆ channel: Wi-Fi channel selection:
 - ◇ AUTO;(Default CH1)
 - ◇ CH1~CH11;

4.2.2.43. 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;

4.2.2.44. AT+WAMAC

- Function: Query AP MAC address parameters;

- Format:

- ◆ Query Operation

AT+WAMAC<CR>

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

- Parameters:
 - ◆ mac_address:AP's MAC address;

Note: Module AP mode's MAC address is related to STA mode's MAC address. If user need change to others, please contact with high-flying technical people.

4.2.2.45. AT+WADHCP

- Function: Set/Query AP DHCP server status; Setting is valid after reset.

- Format:

- ◆ Query Operation

AT+WADHCP<CR>

+ok=<status>,<ip1>,<ip2><CR><LF><CR><LF>

- ◆ Set Operation

AT+WADHCP=<status>[,ip1,ip2]<CR>

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

- Parameters:

- ◆ status:AP's DHCP server function status:
 - ◇ on:DHCP Server Open;
 - ◇ off:DHCP Server Close;
- ◆ ip1: DHCP allocate IP start value.
- ◆ ip2: DHCP allocate IP end value.

4.2.2.46. AT+WADMN

- Function: Set/Query AP webpage domain name;
- Format:
 - ◆ Query Operation

AT+WADMN<CR>

+ok=<domain_name><CR><LF><CR><LF>

- ◆ Set Operation

AT+WADMN=<domain_name><CR>

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

- Parameters:

- ◆ Domain_name: Webpage domain name (within 20 characters, can't all numbers).

4.2.2.47. AT+WALK

- Function: Query MAC address of STA device connecting to module AP
- Format:
 - ◆ Query Operation

AT+WALK<CR>

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

- Parameters:

- ◆ status: MAC address of STA device connecting to module AP.
 - ◇ No Connection: No STA device connecting to module AP;

4.2.2.48. AT+WALKIND

- Function: Enable/Disable indication of module AP connection status.
- Format:
 - ◆ Query Operation

AT+WALKIND<CR>

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

- ◆ Set Operation

AT+WALKIND=<status><CR>

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

- Parameters:
 - ◆ status: indication of module AP connection status.
 - ◇ on: Enable nLink indication function. When STA device connecting to module AP, nLink output Low, otherwise output High.
 - ◇ off: Disable nLink indication function. **(default mode)**.

4.2.2.49. AT+OTA

- Function: Set OTA Upgrade
- Format:
 - ◆ Set Operation

AT+OTA<CR>

+ok=<CR><LF><CR><LF>

Note: See Appendix C Module Upgrade for detail

4.2.2.50. AT+UPURL

- Function: Set/ Query remote upgrade URL address;
- Format:
 - ◆ Query Operation

AT+UPURL<CR>

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

- ◆ Set Operation

AT+UPURL=<url,filename> <CR>

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

- Parameters:
 - ◆ url: the upgrade file url address; the last charter shall be "/" (within 20 characters).
 - ◆ filename: the upgrade file name, it's optional and not saved parameter. If provide this file name here, the module will start upgrade right away;

4.2.2.51. AT+UPFILE

- Function: Set/ Query remote upgrade configure file name;
- Format:
 - ◆ Query Operation

AT+UPFILE<CR>

+ok=<filename> <CR><LF><CR><LF>

- ◆ Set Operation

AT+UPFILE=<filename> <CR>

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

- Parameters:
 - ◆ filename: the upgrade configure file name (within 20 characters).

4.2.2.52. AT+LOGSW

- Function: Open/Close remote upgrade logfile
- Format:
 - ◆ Query Operation

AT+LOGSW<CR>

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

- ◆ Set Operation

AT+LOGSW=<status><CR>

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

- Parameters:

- ◆ status:

- ✧ on: Open. The UART Port will print some upgrade status when upgrading. the log file will be sent to UDP Port after successfully
- ✧ off: Close.

4.2.2.53. AT+LOGPORT

- Function: Set/Query remote upgrade UDP port of log file.

- Format:

- ◆ Query Operation

AT+LOGPORT<CR>

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

- ◆ Set Operation:

AT+LOGPORT =<port><CR>

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

- Parameters:

- ✧ port: The remote upgrade UDP port of log file.

4.2.2.54. AT+UPST

- Function: Start remote upgrade;

- Format:

- ◆ Query Operation

AT+UPST<CR>

+ok=<log> <CR><LF><CR><LF>

- Parameters:

- ◆ log: feedback the status of remote upgrade;

Note: After execute this command, the HF-LPB120 will automatic start upgrade base on the setting of UPURL, UPFILE command contents;

4.2.2.55. AT+DISPS

- Function: Set/Query power save parameters;

- Format:

- ◆ Query Operation

AT+DISPS<CR>

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

- ◆ Set Operation

AT+DISPS=<mode><CR><LF><CR><LF>

- Parameters:

- ◆ ret:

- ✧ No: Enable power save (default)

- ◇ Yes: Disable power save
- ◆ mode:
 - ◇ No: Enable power save
 - ◇ Yes: Disable power save

4.2.2.56. AT+NTPRF

- Function: Set /Query time calibration 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: time calibration interval, range:0~720, default:30 minutes, 10 minutes for each step, set 0 means no time calibration automatically.

4.2.2.57. AT+NTPEN

- Function: Enable/Disable time calibration function. Setting is valid after reset.
- 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: status of time calibration
 - on: Enable time calibration
 - off: Disable time calibration

4.2.2.58. AT+NTPTM

- Function: Query network time,time zone is GMT+8 by default.
- Format:
 - ◆ Query Operation


```
AT+NTPTM<CR>
+ok=<time><CR><LF><CR><LF>
```
- Parameters:
 - ◆ time: networ time, for example: 2013-10-9 16:10:42 Wed, if it shows Not Available means that the time calibration function is not enabled or the module doesn't connect to the internet.

4.2.2.59. AT+NTPSER

- Function: Set/Query NTP server IP address..

- Format:
 - ◆ Query Operation


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

```
+ok=<ipaddress><CR><LF><CR><LF>
```
 - ◆ Set Operation


```
AT+NTPSER=<ipaddress><CR>
```

```
+ok<CR><LF><CR><LF>
```
- Parameters:
 - ◆ ipaddress: NTP network server IP address, 61.164.36.105(default value).

4.2.2.60. AT+WRMID

- Function: Set module ID;
- Format:
 - ◆ Set Operation


```
AT+WRMID=<wrmid> <CR><LF><CR><LF>
```
- Parameters:
 - ◆ wrmid: set module's ID (within 20 characters).

4.2.2.61. AT+RLDEN

- Function: Set/Query nReload Pin function status
- Format:
 - ◆ Query Operation


```
AT+RLDEN<CR>
```

```
+ok=<status><CR><LF><CR><LF>
```
 - ◆ Set Operation


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

```
+ok<CR><LF><CR><LF>
```
- Parameters:
 - ◆ status: The status of module's nReload pin function
 - ◇ on: nReload pin function is enabled.
 - ◇ off: nReload pin function is disabled

4.2.2.62. AT+ASWD

- Function: Set/Query WiFi Configuration Password;
- Format:
 - ◆ Query Operation


```
AT+ASWD<CR>
```

```
+ok=<aswd> <CR><LF><CR><LF>
```
 - ◆ Set Operation


```
AT+ASWD=<aswd> <CR><LF><CR><LF>
```
- Parameters:
 - ◆ aswd: WiFi Configuration Password (within 20 characters).

4.2.2.63. AT+MDCH

- Function: Set Wi-Fi Auto Switch Function. Setting is valid after reset.

- Format:
 - ◆ Query Operation


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

```
+ok=<mode> <CR><LF><CR><LF>
```
 - ◆ Set Operation


```
AT+MDCH=<mode> <CR><LF><CR><LF>
```
- Parameters:
 - ◆ mode: Wi-Fi Auto Switch Mode
 - ◇ off: Disable Wi-Fi auto switch.
 - ◇ on: Enable Wi-Fi auto switch. When the module(STA mode) fail to connect to router, it will switch to AP mode itself in one minute.
 - ◇ auto: Enable Wi-Fi auto detect function. The module will reset itself when encounter any abnormal. The default time interval is 10 minutes. **(default mode)**
 - ◇ 3-120: unit: minute. Set the time interval to reset itself when abnormal.

4.2.2.64. AT+TXPWR

- Function: Set/Query Wi-Fi Transmit Power, Real Transmit Power=Default Transmit Power(16dBm) – [Setting Value] * 0.5dBm. Setting is valid after reset.
- Format:
 - ◆ Query Operation


```
AT+TXPWR <CR>
```

```
+ok=<num><CR><LF><CR><LF>
```
 - ◆ Set Operation


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

```
+ok<CR><LF><CR><LF>
```
- Parameters:
 - ◆ num: [Setting Value]. The default is 0, it can be sent from 0 ~ 24. If set to 24, the module transmit power will be at a minimum of 4dBm. Reboot to make this setting change valid. It will not restore to default if reload the module.

4.2.2.65. AT+SMTLK

- Function: Start SmartLink function
- Format:
 - ◆ Query Operation


```
AT+SMTLK<CR>
```

SmartLink is a One-Key config function. Config the module connecting to router easily. After start SmartLink function, the module work in SmartLink status and nLink LED is fast flashing waiting for APP to push information. See the Appendix for more details.

4.2.2.66. AT+SMTLKVER

- Function: Set/Query SmartLink config version(for LPB100U only)
- Format:
 - ◆ Query Operation

AT+SMTLKVER <CR>
+ok=<status><CR><LF><CR><LF>

- ◆ Set Operation

AT+SMTLKVER=<ver><CR>
+ok<CR><LF><CR><LF>

- Parameters:
 - ◆ status: SmartLink config version.
 - SMTLK 3.0: SmartLink V3 version, sniffer mode.
 - SMTLK 4.0: SmartLink V4 version, sonic mode
 - ◆ ver: **3**- Use SmartLink V3 version, sniffer mode, **4**- SmartLink V4 version, sonic mode. The corresponding APP can be downloaded from our website. See appendix D for details.

4.2.2.67. AT+WPS

- Function: Start WPS function
- Format:
 - ◆ Query Operation

AT+WPS<CR>
+ok=<status> <CR><LF><CR><LF>

- Parameters:
 - ◆ status: WPS status. The module will reboot and work in STA mode connecting to specific router when WPS communication is OK.
 - ◇ WPS Scan Failed: WPS communication is failed.

Note: The router WPS function must be open first then enable module WPS Scan function. The module will quit WPS scan status if there is no WPS router in 5 seconds. If the router's WPS is enabled, the module will reboot and enter WPS mode without reply +ok.

4.2.2.68. AT+WPSBTNEN

- Function: Enable/Disable WPS function.
- Format:
 - ◆ Query Operation

AT+WPSBTNEN<CR>
+ok=<status> <CR><LF><CR><LF>

- ◆ Set Operation

AT+ WPSBTNEN =<status><CR>
+ok<CR><LF><CR><LF>

- Parameters:
 - ◆ status:
 - ◇ on: Enable WPS function
 - ◇ off: Disable WPS function.

Note: The router WPS function must be open first then enable module WPS Scan function. The module will quit WPS scan status if there is no WPS router in 5 seconds.

4.2.2.69. AT+LPTIO

- Function: nReady,nLink, WPS function mapping. Setting is valid after reset.
- Format:
 - ◆ Query Operation


```
AT+LPTIO<CR>
```

```
+ok=<status> <CR><LF><CR><LF>
```
 - ◆ Set Operation


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

```
+ok<CR><LF><CR><LF>
```
- Parameters:
 - ◆ status: nReady,nLink, WPS function mapping.
 - ◇ off/lpb100: nReady,nLink, WPS function are mapping to HF-LPB120 corresponding pin.(Pin44, Pin43, Pin15)
 - ◇ on/lpt100: nReady,nLink, WPS function are mapping to HF-LPT100 corresponding pin.(Pin9, Pin10, Pin8)
 - ◇ lpt200: nReady,nLink, WPS function are mapping to HF-LPT200 corresponding pin.(Pin11, Pin13, Pin14)

4.2.2.70. AT+WIFI

- Function: Enable/Disable Wi-Fi Command, need to update to V1.0.05 firmware to use this command..
- Format:
 - ◆ Query Operation


```
AT+WIFI<CR>
```

```
+ok=<status> <CR><LF><CR><LF>
```
 - ◆ Set Operation


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

```
+ok<CR><LF><CR><LF>
```
- Parameters:
 - ◆ status: Wi-Fi status.
 - ◇ UP(boot default status): Enable Wi-Fi Chip
 - ◇ DOWN: Disable Wi-Fi Chip

Note: Some Wi-Fi status change command(AT+WMODE and so on)need to reboot before valid. But may use this command only to reboot the Wi-Fi Chip to make the corresponding command valid.This is AT+WIFI=DOWN and then AT+WIFI=UP.

4.2.2.71. AT+S MEM

- Function: Query the RAM status.
- Format:
 - ◆ Query Operation


```
AT+S MEM<CR>
```

```
+ok=<status> <CR><LF><CR><LF>
```
- Parameters:
 - ◆ status: The RAM status.

4.2.2.72. AT+NDBGL

- Function: Enable/Disable UART debug information
- Format:

- ◆ Query Operation

AT+NDBGL<CR>

+ok=<debug_level,uart_num> <CR><LF><CR><LF>

- ◆ Set Operation

AT+NDBGL =<debug_level,uart_num><CR>

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

- Parameters:
 - ◆ debug_level: UART debug level value
 - ◇ 0: Disable debug information output
 - ◇ 1~XX: Output UART debug information which is with the same(and above) debug level value
 - ◆ uart_level: UART debug information output channel
 - ◇ 0: UART0
 - ◇ 1: UART1

5. PACKAGE INFORMATION

5.1. Recommended Reflow Profile

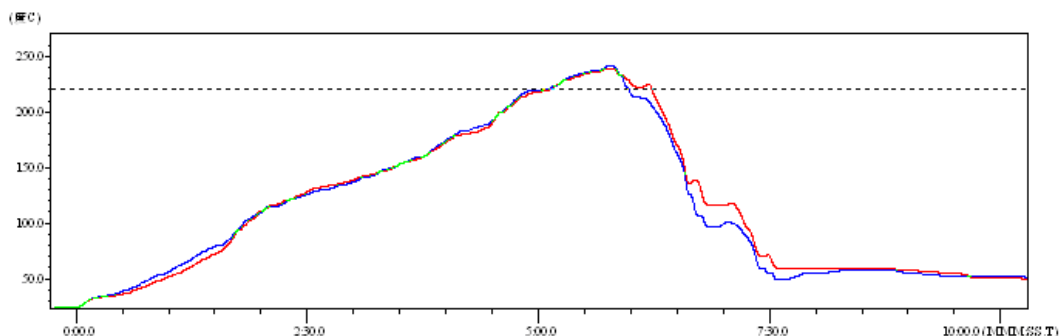


Figure 30. Reflow Soldering Profile

Table 11 Reflow Soldering Parameter

| NO. | Item | Temperature (Degree) | Time(Sec) |
|-----|-------------|----------------------|-----------|
| 1 | Reflow Time | Time of above 220 | 35~55 sec |
| 2 | Peak-Temp | 260 max | |

- Note:** 1. Recommend to supply N2 for reflow oven.
 2. N2 atmosphere during reflow (O2<300ppm)

5.2. Device Handling Instruction (Module IC SMT Preparation)

- Shelf life in sealed bag: 12 months, at <30°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
- Recommend end to reflow oven with N2 supplied
- Baked required with 24 hours at 125±5°C before rework process
- Recommend to store at ≤ 10% RH with vacuum packing
- If SMT process needs twice reflow:
 - Top side SMT and reflow
 - 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

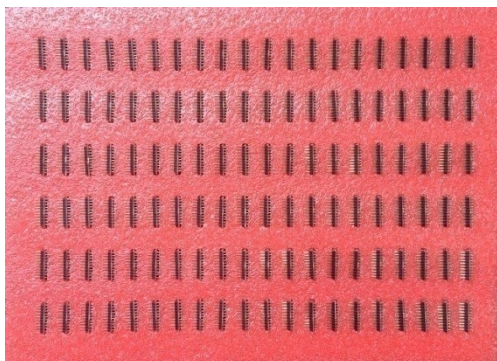
Case 2: Wifi module mounted on bottom side, follow normal bake rule before process

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

5.3. Shipping Information

TRAY

Size: 350*260*20 mm



BOX

Size: 350*260*160 mm (inside)



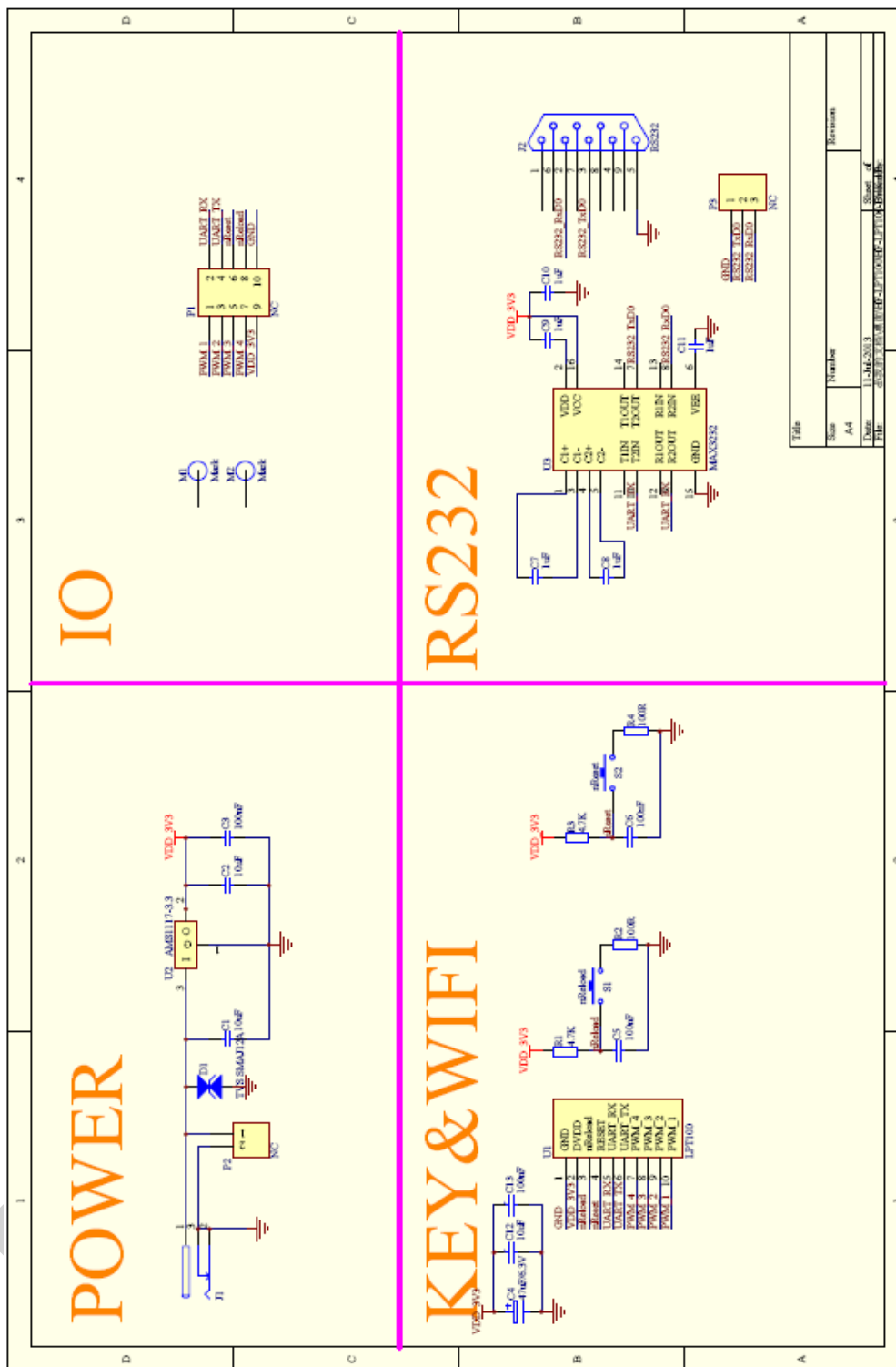
Figure 31. Shipping Information

Note:

1 tray = 20*6pcs = 120 pcs

1 box = 8 trays = 8 * 120 pcs = 960pcs

APPENDIX A: HW REFERENCE DESIGN



Detailed HF-LPT120 Evaluation Board design source files, pls access High-Flying web download page or contact with High-Flying technical support people to acquire.

APPENDIX B: HTTP PROTOCOL TRANSFER

HF-LPB120 module support http data transfer in command mode. If any detailed HTTP protocol, contact us and we may support customization.

B.1. HTTP AT command(Reserved)

B.1.1 AT+HTTPURL

- Function:Set /Query HTTP server IP address and Port Number.
- Format:
 - ◆ Query Operation


```
AT+HTTPURL<CR>
```

```
+ok=<IP,Port><CR><LF><CR><LF>
```
 - ◆ Set Operation


```
AT+HTTPURL=<IP,Port><CR>
```

```
+ok<CR><LF><CR><LF>
```
- Parameters:
 - ◆ IP: IP address.
 - ◆ Port: Port number.

B.1.2 AT+HTTPTP

- Function:Set /Query HTTP request type
- Format:
 - ◆ Query Operation


```
AT+HTTPTP<CR>
```

```
+ok=<Type><CR><LF><CR><LF>
```
 - ◆ Set Operation


```
AT+HTTPTP=<Type><CR>
```

```
+ok<CR><LF><CR><LF>
```
- Parameters:
 - ◆ Type: GET(default) or POST.

B.1.3 AT+HTTTPH

- Function:Set/Query HTTP protocol header path.
- Format:
 - ◆ Query Operation


```
AT+HTTTPH<CR>
```

```
+ok=<Path><CR><LF><CR><LF>
```
 - ◆ Set Operation


```
AT+HTTTPH=<Path><CR>
```

```
+ok<CR><LF><CR><LF>
```
- Parameters:

- ◆ Path: Max length is 50 bytes.

B.1.4 AT+HTTPCN

- Function: Set/Query Connection of HTTP protocol header

- Format:

- ◆ Query Operation

AT+HTTPCN<CR>

+ok=<Connection><CR><LF><CR><LF>

- ◆ Set Operation

AT+HTTPCN=<Connection><CR>

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

- Parameters:

- ◆ Connection: Max length is 20 bytes.

B.1.5 AT+HTTPUA

- Function: Set/Query User-Agent of HTTP protocol header.

- Format:

- ◆ Query Operation

AT+HTTPUA<CR>

+ok=<Parameter><CR><LF><CR><LF>

- ◆ Set Operation

AT+HTTPUA=<Parameter><CR>

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

- Parameters:

- ◆ Parameter: Max length is 20 bytes.

B.1.6 AT+HTTPDPT

- Function: Send HTTP request or data.

- Format:

- ◆ Set Operation

AT+HTTPDPT=<Data><CR>

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

- Parameters:

- ◆ Data: HTTP request data, send AT+HTTPDPT directly if no data to be sent.

B.2. HTTP Example

HTTP parameter settings are as follows:

| | |
|---------------------------|----------------------------------|
| AT+HTTPURL=192.168.1.1,80 | Set HTTP server address and port |
| AT+HTTPPT=POST | Set HTTP request type |
| AT+HTTPPH=/abcd | Set HTTP protocol header path |
| AT+HTTPCN= keep-alive | Set HTTP Connection area |
| AT+HTTPUA= lwip1.3.2 | Set HTTP User-Agent area |

If send “AT+HTTPD”, the data packet will be sent as the following instance including the two new line:

```
POST /abcd HTTP/1.1
Connection:keep-alive
User-Agent:lwip1.3.2
Content-Length:0
Host:192.168.0.127:8999
```

If send AT+HTTPD=abcd, the data packet will be sent as the following instance:

```
POST /abcd HTTP/1.1
Connection:keep-alive
User-Agent:lwip1.3.2
Content-Length:4
Host:192.168.0.127:8999
```

abcd

The data received from HTTP server will be output to serial port and end with “+ok”.

If the module hasn't received data from HTTP server for 5 second, it will cut the TCP link with HTTP server.

B.3. Sending HTTP Raw Data in Throughput Mode(Recommend)

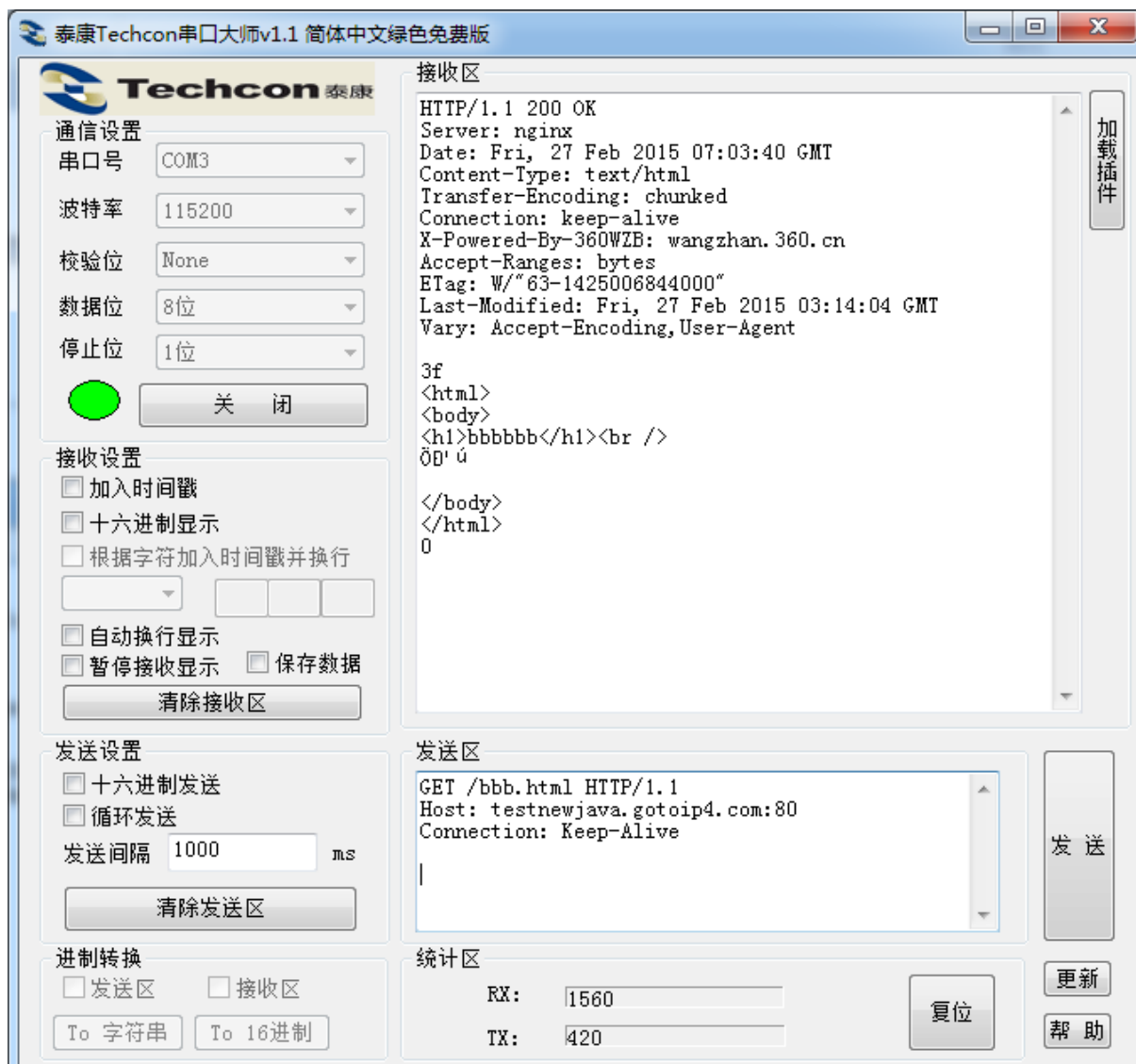
Step 1、 Configure HTTP server information

```
AT+NETP=tcp,client,80,testnewjava.gotoip4.com
+ok
```

Step 2、 Configure module connecting to router AP and reboot.

```
AT+WSSSID=Tenda_GYH
+ok
AT+WSKEY=wpa2psk,aes,12345678
+ok
AT+WMODE=sta
+ok
AT+Z
```

Step 3、 Sending HTTP raw data via UART, end the data with<CR><LF><CR><LF>



B.4. Sending HTTP Request By AT Command

Step 1. Configure HTTP AT command. SOCKB must set as None.

```

AT+HTTTPURL
+ok=testnewjava.gotoip4.com,80

AT+HTTTP
+ok=GET

AT+HTTTPH
+ok=/bbb.html

AT+HTTTPCN
+ok=Keep-Alive

AT+HTTTPUA
+ok=lwip1.3.2

AT+SOCKB
+ok=NONE
    
```

Step 2. Configure module connecting to router AP and reboot.

```
AT+WSSSID=Tenda_GYH
+ok

AT+WSKEY=wpa2psk,aes,12345678
+ok

AT+WMODE=sta
+ok

AT+Z
```

Step 3. Send HTTP request

```
AT+HTTPDPT
HTTP/1.1 200 OK
Server: nginx
Date: Fri, 27 Feb 2015 07:12:11 GMT
Content-Type: text/html
Transfer-Encoding: chunked
Connection: keep-alive
X-Powered-By-360wzB: wangzhan.360.cn
Accept-Ranges: bytes
ETag: w/"63-1425006844000"
Last-Modified: Fri, 27 Feb 2015 03:14:04 GMT
Vary: Accept-Encoding,User-Agent

3f
<html>
<body>
<h1>bbbbbb</h1><br />
中国

</body>
</html>
0
+ok
```

APPENDIX C: REFERENCES

C.1. High-Flying Mass Production Tool

Download Address: http://www.hi-flying.com/download_detail_dc/&downloadsId=07bc0a59-0a0d-4fb4-a5e5-c3403f09ab08&comp_stats=comp-FrontDownloads_list01-dc.html

C.2. SmartLink APP V7 Config Tool

IOS Platform : http://www.hi-flying.com/download_detail_dc/&downloadsId=5cc0c241-77b4-48c1-bf9c-2ad2954b3b50&comp_stats=comp-FrontDownloads_list01-dc.html

Android Platform: http://www.hi-flying.com/download_detail_dc/&downloadsId=9a0d0290-477e-4184-8636-18510eaed6b1&comp_stats=comp-FrontDownloads_list01-dc.html

C.3. EVK Quick Start Guide

Download Address: http://www.hi-flying.com/download_detail_dc/&downloadsId=b545c662-4ec7-49a4-aea4-e0997f062a62&comp_stats=comp-FrontDownloads_list01-dc.html

C.4. Module Upgrade

Download Address: http://www.hi-flying.com/download_detail_fir/&downloadsId=825a57bc-5535-4f07-bf23-6f5e7ad2700b.html

APPENDIX D: CONTACT INFORMATION

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Web: www.hi-flying.com

Service Online: [400-189-3108/18616078755](tel:400-189-3108/18616078755)

Sales Contact: sales@hi-flying.com

For more information about High-Flying modules, applications, and solutions, please visit our web site <http://www.hi-flying.com/en/>

<END OF DOCUMENT>

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