HF-LPT230

Low Power WiFi Module User Manual

V 2.0

Overview of Characteristic

- ✧ **Support IEEE802.11b/g/n Wireless Standards**
- ✧ **Based on Cortex-M4 SOC, 160MHz CPU, 352KB RAM for 1MB Flash Version, 384KB for 2MB Flash**
- ✧ **Support UART Data Communication Interface**
- ✧ **Support Work As STA/AP/AP+STA Mode**
- ✧ **Support SmartLink V8 Function (Provide APP SDK)**
- ✧ **Support SmartAPLink Function**
- ✧ **Support WeChat Airkiss 2.0, MiniAPP Config**
- ✧ **Support Wireless and Remote Firmware Upgrade Function**
- ✧ **Support Software SDK for Develop**
- ✧ **Support Different Antenna Option**
  - ■ **HF-LPT230：Internal PCB or External IPEX**
- ✧ **Small Size:**

- **HF-LPT230：22mm x 13.5mm x 3mm, SMT18 package**

✧ **FCC/CE/SRRC/RoHS Certificated**

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HISTORY

Ed. V0.2 07-25-2017 Internal Version.

Ed. V0.2 08-22-2017 Release Version

Ed. V1.1 13-10-2017 Add HF-LPT130A type module

Ed. V1.2 10-11-2017 Add HF-LPB130 type module

Ed. V1.3 03-01-2018 Update HF-LPT230 Pin，webpage config.

Ed. V1.4 03-01-2018 Add HF-LPT330 type, correct working temperature,voltage.

Ed. V1.5 04-28-2018 Add HF-LPB135 type, add 4.10.14 version software function. Add AT+TMODE, AT+PING, AT+BVER, AT+HWVER, AT+SMEM and others.

Ed. V1.6 06-15-2018 Delete 4MB version, add HF-LPT230-0 type

Ed. V1.7 08-08-2018 Add HF-LPT230-0 size, add HF-LPT130B type and 4.12.07 firmware new function(AT+CMDPW,AT+MDCH).

Ed. V1.8 10-10-2018 Add 4.12.14 version AT+SMARTAPCONFIG, AT+SMARTAPSTART, AT+BTWAIT command

Ed. V1.9 12-11-2018 Add AT+WSLKO command, fix LPB130 size picture error.

Ed. V2.0 04-12-2019 Add WeChat MiniAPP Config, add AT+NTPXXX command, AT+WSDNS, AT+WMAC, AT+DTIM, update AP MAC calculation, update power consumption

1. PRODUCT OVERVIEW

1.1. General Description

The HF-LPT230 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.HF-LPT230 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-LPT230 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-LPT230 series Wi-Fi modules provide different package with different size called HF-LPB130/HF-LPT230/HF-LPT130A/B(T means tiny). It is pin to pin compatible for HF-LPB100/HF-LPB120, HF-LPT200/HF-LPT220, HF-LPT100F/HF-LPT120A modules.

1.1.1 Key Application

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

1.1.2 Device Paremeters

Table1. HF-LPT230 Module Technical Specifications

Class	Item	Parameters
Wireless Parameters	Certification	FCC/CE/SRRC/RoHS
	Wireless standard	802.11 b/g/n
	Frequency range	2412-2472MHz
	Transmit Power	802.11b: +16 +/-2dBm (@11Mbps)
		802.11g: +14 +/-2dBm (@54Mbps)
		802.11n: +13 +/-2dBm (@HT20, MCS7)
	Receiver Sensitivity	802.11b: -87 dBm (@11Mbps ,CCK)
		802.11g: -73 dBm (@54Mbps, OFDM)
		802.11n: -71 dBm (@HT20, MCS7)
	Antenna Option	HF-LPT230: Tested antenna type: PCB antenna Antenna inferface port: IPEX port
Hardware Parameters	Data Interface	UART
		GPIO,SPI
	Operating Voltage	2.9~4.2V
	Operating Current	Peak (Continuous TX): 260mA **Average(STA, No data): 18mA(DTIM=1), 14mA(DTIM=3)** **Average(STA, Continuous TX): 24mA** Average(AP): 80mA Shutdown(reset pull low):60uA
	Operating Temp.	-40℃- 85℃ 0℃- 105℃(High Temperate Version)
	Storage Temp.	-40℃- 125℃
	Density	<85%
	Dimensions and Size	HF-LPT230: 22mm x 13.5mm x 3mm
Software Parameters	Network Type	STA/AP/AP+STA
	Security Mechanisms	WEP/WPA-PSK/WPA2-PSK
	Encryption	WEP64/WEP128/TKIP/AES
	Update Firmware	Local Wireless, Remote OTA
	Customization	Support SDK for application develop
	Network Protocol	IPv4, TCP/UDP/HTTP/TLS(SDK)
	User Configuration	AT+instruction set. Android/ iOS SmartLink APP tools

1.2. Hardware Introduction

HF-LPT230 series Wi-Fi module appearance is as following.

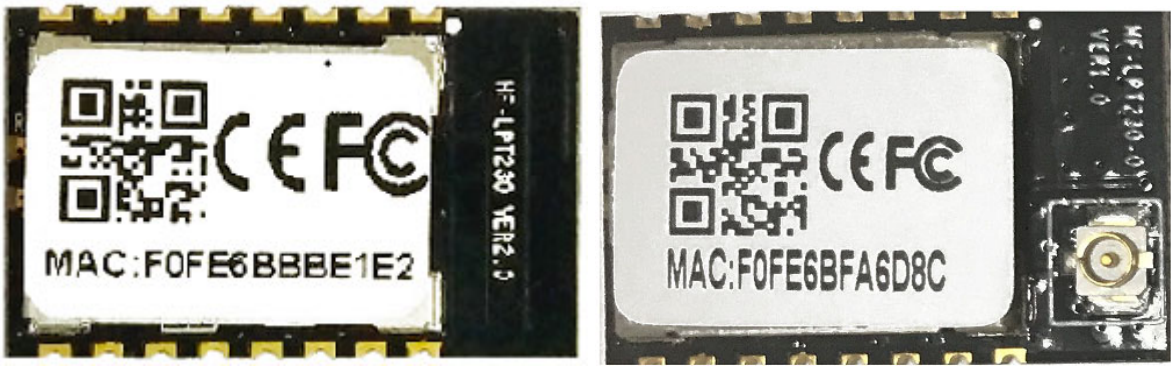


Figure 1. HF-LPT230-1 and HF-LPT230-0 Appearance

1.2.1. HF-LPT230 Pins Definition

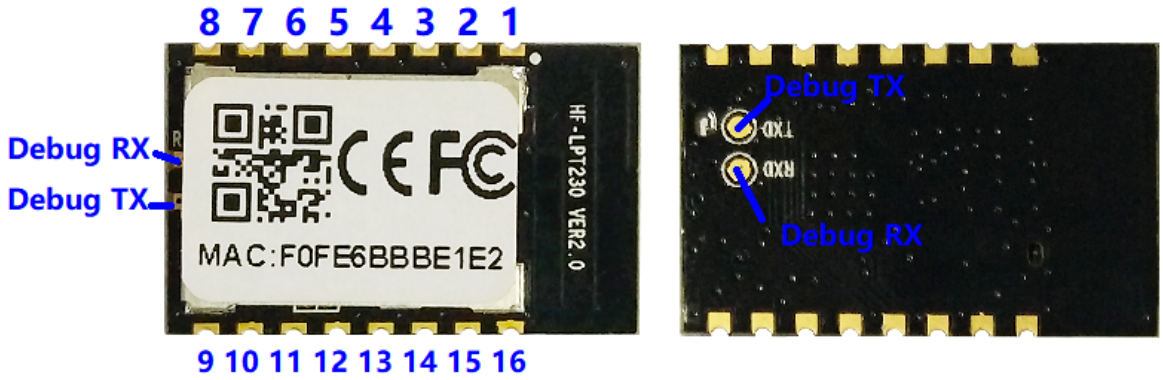


Figure 2. HF-LPT230 Pins Map

Table2. HF-LPT230 Pins Definition

Pin	Describtion	Net Name	Signal Type	Comments
1	SPI_MOSI	SPI_MOSI	O	GPIO12,
2	SPI_CLK	SPI_CLK	I/O	GPIO4,
3	SPI_MISO	SPI_MISO	I	GPIO7
4	SPI_CS	SPI_CS	I/O	GPIO5,
5	UART0	UART0_TX	O,PU	3.3V UART0 Communication Output GPIO2
6	UART0	UART0_RX	I	3.3V UART0 Communication Input GPIO1
7	UART0_CTS	UART0_CTS	I/O	GPIO22, PWM0
8	UART0_RTS	UART0_RTS	I/O,PU	GPIO23, PWM1
9	ADC	ADC	I/O,PU	GPADC0,ADC function
10	Module Reset	EXT_RESETn	I,PU	**“Low” effective reset input. There is RC reset circuit internally. External pull-up resistor is not allowed.**
11	Module Boot Up Indicator	nReady	O	“0” – Boot-up OK; “1” – Boot-up No OK;

Pin	Describtion	Net Name	Signal Type	Comments
				GPIO24, PWM2
12	Multi-Function	nReload	I,PU	**Detailed functions see <Notes>** GPIO25, PWM3
13	Wi-Fi Status	nLink	O	"0" – Wi-Fi connect to router "1" – Wi-Fi unconncted; **Detailed functions see <Notes>** GPIO8
14	GPIO3	GPIO3	I/O	GPIO3,PWM4 There will be 2ms output low when bootup, after then it works as input pull high.
15	+3.3V Power	DVDD	Power	
16	Ground	GND	Power	
	Debug RX	UART1_RXD	I	3.3V UART1 Debug Input GPIO26, Leave it if not use
	Debug TX	UART1_TXD	O	3.3V UART1 Debug Output GPIO27, Leave it if not use

<Notes>

I — Input；O — Output

PU—Internal Resistor Pull Up； I/O: Digital I/O； Power—Power Supply

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 to download software tools for customer batch configuration and upgrade firmware during mass production)**
2. **After module is powered up, short press this button (0.2s < "Low" < 1.5s) and loose to make the module go into "SmartLink " config mode, waiting for APP to set password and other information. (See Appendix to download SmartLink V8 and SmartAPLink APP)**
3. **After module is powered up, long press this button ("Low" > 4s) and loose to make the module recover to factory setting.**

High-Flying strongly suggest customer fan out this pin to connector or button for "Manufacture" upgrade or " SmartLink" application.

nReady Pin (LED) function(Low effective)：

1. **OS initial finished indicator. Only after this pin output low, can the UART function be used.**

nLink Pin (LED) function(Low effective)：

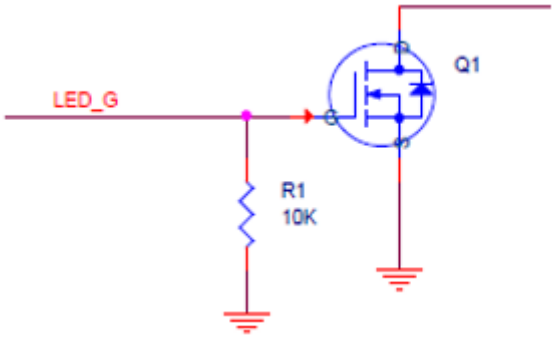
1. **At wireless firmware and config upgrade mode , this LED used to indicate configure and upgrade status.**
2. **At "SmartLink" config mode, this LED is used to indicate APP to finish setting.**
3. **At normal mode, it's Wi-Fi link status indicator. Output Low when STA mode connect to router AP or other STA connect to it when in AP mode.**

High-Flying strongly suggest customer fan out this pin to LED.

PWM function：

PWM0~PWM3 100ns period(if duty is from 0~255, then the maximum frequenry is 10M/256=39KHz), PWM4 support 800ns period.

Due to PWM pin is internal weak pull-up. So when these pins are used for LED bulb application, suggest to add strong pull-down resistor to revent the lulb on when boot.



Note：nReload pin is also used for special function, when use this pin for PWM bulb application and add external pull-down resistor, this will cause the module wait 1 second when bootup(wait "space" key to etner bootloader). Contact us to provice special bootloader in order to remove this wait time.

UART1 Debug：

1. **Is used for debug log or firmware program, baud rate 921600.**
2. **Can be used for communication in SDK.**

1.2.2. Electrical Characteristics

Table3. Absolute Maximum Ratings:

Parameter	Condition	Min.	Typ.	Max.	Unit
Work temperature range		-40		105	°C
Maximum soldering temperature	IPC/JEDEC J-STD-020			260	°C
ESD (Human Body Model HBM)	TAMB=25°C			2.5	KV
ESD (MM)	TAMB=25°C			0.25	KV

Table4. Power Supply & Power Consumption:

Parameter	Condition	Min.	Typ.	Max.	Unit
Operating Supply voltage		2.9	3.3	4.2	V
Supply current, peak	Continuous Tx		260		mA
Supply current,	STA No data transfer		27		mA
Supply current,	STA Continuous data transfer		35		mA
Supply current,	AP		80		mA
GPIO sink current	GND+0.5V		3		mA
GPIO pull current	VCC-0.5V		3		mA

1.2.3. HF-LPT230 Mechanical Size

The size of HF-LPT230-1 and HF-LPT230-0 is the same. HF-LPT230-1 does not have IPEX connector. HF-LPT230 modules physical size （Unit: mm） as follows:

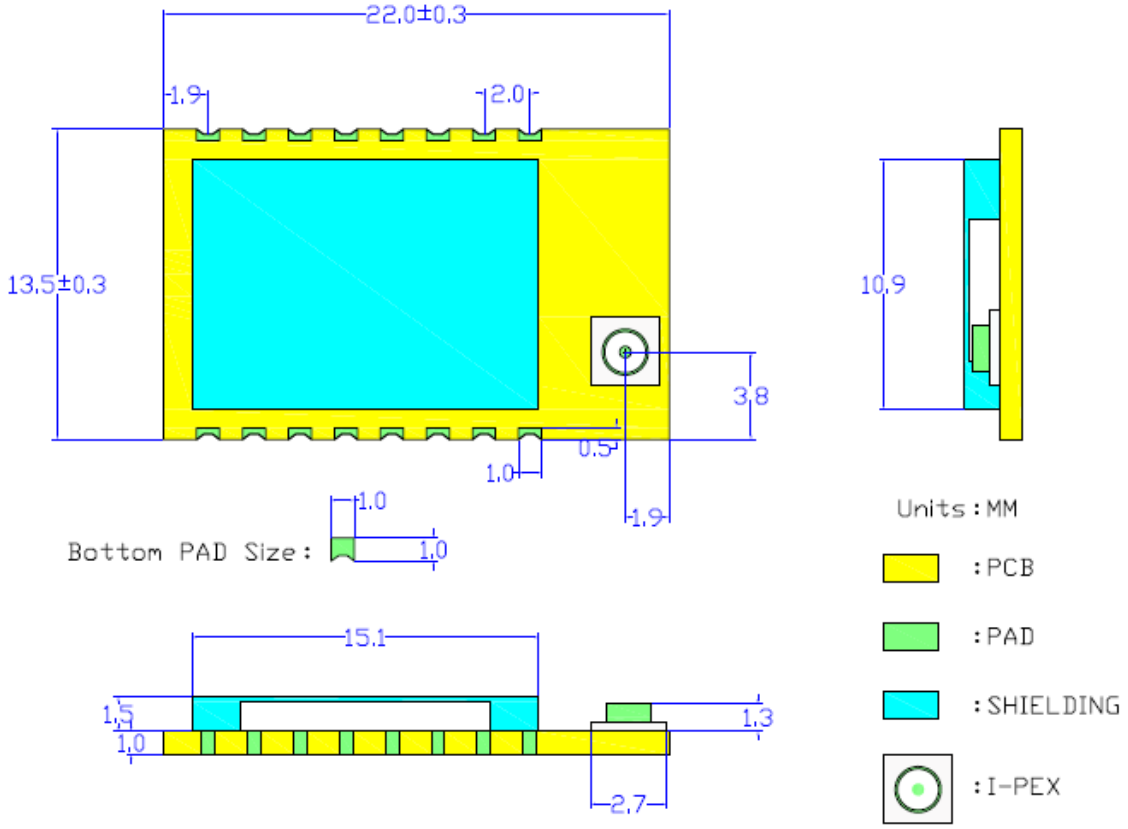


Figure 3. HF-LPT230 Mechanical Dimension

FCC Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Caution!

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Radiation Exposure Statement

The modular can be installed or integrated in mobile or fix devices only. This modular cannot be installed in any portable device, for example, USB dongle like transmitters is forbidden.

This modular complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter. This modular must be installed and operated with a minimum distance of 20 cm between the radiator and user body.

If the FCC identification number is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: “Contains Transmitter Module FCC ID: 2ASCVHF-LPT230-0 or Contains FCC ID: 2ASCVHF-LPT230-0 ”.

The devices must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

When the module is installed inside another device, the user manual of this device must contain below warning statements:

1. This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference.

(2) This device must accept any interference received, including interference that may cause undesired operation.

2. Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

3. Module is limited to OEM installation ONLY.

4.That OEM integrators is responsible for ensuring that the end-user has no manual instructions to remove or install module.

5.That module is limited to installation in mobile or fixed applications, according to Part 2.1091(b).

6.That separate approval is required for all other operating configurations, including portable configurations with respect to Part 2.1093 and different antenna configurations.