

HF-LPT270

Low Power Wi-Fi + BLE Module

User Manual

V 1.0

Overview of Characteristic

- ◇ **Support Wi-Fi IEEE802.11b/g/n and BLE5.0 Wireless Standards**
- ◇ **Based on RISC SOC, 160MHz CPU, 276KB RAM, 2MB Flash**
- ◇ **Support UART Data Communication with Wi-Fi or BLE**
- ◇ **Support Wi-Fi STA/AP Mode**
- ◇ **Support BLE SmartBLELink Config**
- ◇ **Support Wi-Fi AP SmartAPLink and Sniffer SmartLink V8 Config**
- ◇ **Support Wireless and Remote Firmware Upgrade Function**
- ◇ **Support Software SDK for Develop**
- ◇ **Support Different Antenna Option**
 - **HF-LPT270-0(F): External 1st IPEX or Antenna Pad Out**
- ◇ **Single +3.3V Power Supply for HF-LPT270-0(F)**
- ◇ **Size:**
 - **HF-LPT270-0(F): 22.5mm x 13.5mm x 3mm, SMT18 package**

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HISTORY

Ed. V1.0 06-09-2020 First Version.

1. PRODUCT OVERVIEW

1.1. General Description

The HF-LPT270-0(F) module is a fully self-contained small form-factor, single stream, 802.11b/g/n Wi-Fi + BLE module, which provide a wireless interface to any equipment with a Serial interface for data transfer. This module 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 and BLE solution for a variety of applications.

The HF-LPT270-0(F) module 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.

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 Parameters

Table1. HF-LPT270-0(F) Module Technical Specifications

Class	Item	Parameters
Wi-Fi Parameters	Wireless standard	802.11 b/g/n
	Frequency range	2.412GHz-2.472GHz
	Transmit Power	802.11b: +16dBm \pm 2dBm (@11Mbps)
		802.11g: +14dBm \pm 2dBm (@54Mbps)
		802.11n: +13dBm \pm 2dBm (@HT20, MCS7)
	Receiver Sensitivity	802.11b: -98 dBm (@1Mbps)
		802.11b: -91dBm (@11Mbps)
		802.11g: -93dBm (@6Mbps)
802.11g: -77dBm (@54Mbps)		
802.11n: -93dBm (@MCS0)		
802.11n: -73 dBm (@MCS7)		
BLE Parameters	Wireless standard	BLE5.0
	Frequency range	2.402GHz-2.480GHz
	Transmit Power	Max 15dBm
	Receiver Sensitivity	-90dBm

Hardware Parameters	Antenna Option	HF-LPT270-0(F): External: 1 st IPEX antenna or PAD out
	Data Interface	UART
		GPIO, SPI, PWM, ADC
	Operating Voltage	2.7~3.6V
	Operating Current	Peak (1ms for every 100ms): <350mA Average(STA, No data): 45mA Average(STA, Continuous TX): 60mA Average(AP): 70mA Standby: 200uA (Reset Pin set to low)
	Operating Temp.	-40°C- 85°C
	Storage Temp.	-40°C- 125°C
	Humidity	<85%
	MSL	Level 3
Dimensions and Size	HF-LPT270-0(F): 22.5mm x 13.5mm x 3mm	
Software Parameters	Network Type	STA/AP
	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. SmartBLELink BLE Config SmartAPLink AP Config SmartLink Config

1.2. Hardware Introduction

HF-LPT270-0(F) Wi-Fi module appearance is as following.

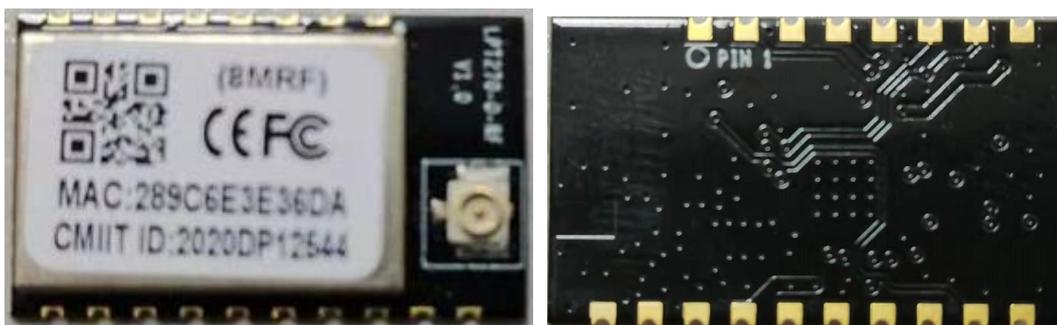


Figure1 HF-LPT270-0(F) Appearance

1.2.1. HF-LPT270-0(F) Pins Definition

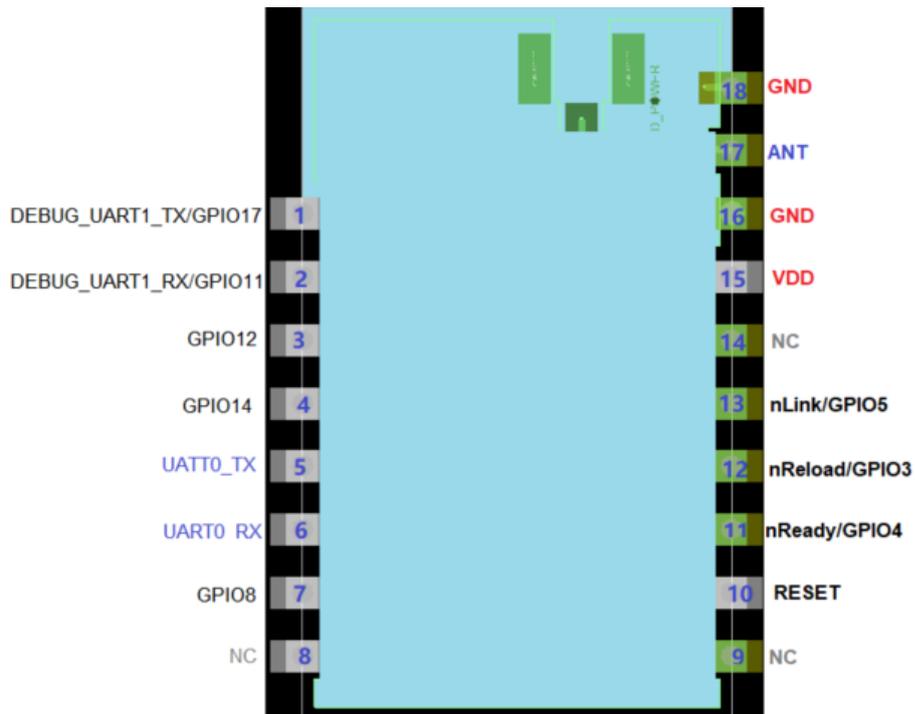


Figure 1. HF-LPT270-0(F) Pins Map

Table2. HF-LPT270-0(F) Pins Definition

Pin	Description	Net Name	Signal Type	Comments
1	UART1_TX	DEBUG_UART1_TX	O	3.3V TTL UART1 Debug Output GPIO17
2	UART1_RX	DEBUG_UART1_RX	I	3.3V TTL UART1 Debug Input GPIO11
3	GPIO12	GPIO12	I/O	GPIO12
4	GPIO14	GPIO14	I/O	GPIO14
5	UART0	UART0_TX	O,PU	3.3V TTL UART0 Communication Output GPIO16
6	UART0	UART0_RX	I	3.3V TTL UART0 Communication Input GPIO7
7		GPIO8	I/O	Boot Select, default low, leave it unconnected. Low: boot from flash. High: boot from UART.
8		NC		
9		NC		
10	Module Reset	RESET	I,PU	“Low” effective reset input. There is RC reset circuit internally. No need of external RC reset circuit.
11	Module Boot Up Indicator	nReady	O	“0” – Boot-up OK; “1” – Boot-up Fail;

Pin	Description	Net Name	Signal Type	Comments
				GPIO4, PWM2
12	Multi-Function	nReload	I,PU	Detailed functions see <Notes> GPIO3, PWM3
13	Wi-Fi Status	nLink	O	"0" – Wi-Fi connect to router "1" – Wi-Fi unconnected; Detailed functions see <Notes> GPIO5
14		NC		
15	+3.3V Power	VDD	Power	
16	Ground	GND	Power	
17		ANT	Signal	Only -0 and -2 have these two pins
18	Ground	GND	Power	Antenna Pad Out. See following for detailed.

- -0 use external IPEX antenna.
- -2 use antenna PAD out, there is two pins can be used, recommend to use PIN17.

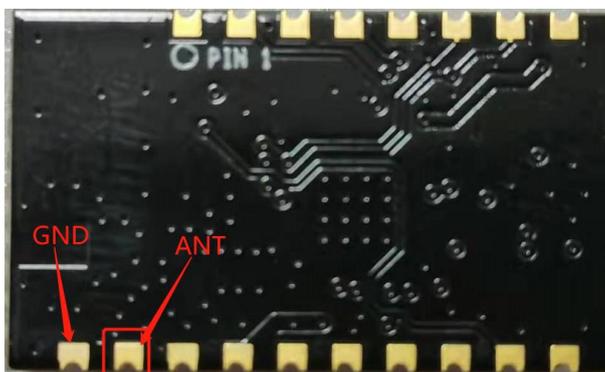


Figure 2. HF-LPT270-0(F)-2 Antenna PAD Out

<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 SmartBLELink config mode, waiting for APP to set router SSID and password, config module connect to router. **Recommend to use SmartBleLink BLE method config, may use AT+SMARTCONFIG to choose other config mode(SmartLink V8 and SmartAPLink).** See Appendix to download SmartBLELink, 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.

UART1 Debug :

1. Is used for debug log or firmware program, baud rate 921600.

1.2.2. Electrical Characteristics

Table3. Absolute Maximum Ratings:

Parameter	Condition	Min.	Typ.	Max.	Unit
Work temperature range		-40		85	°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

1.2.3. HF-LPT270-0(F) Mechanical Size

HF-LPT270-0(F) modules physical size (Unit: mm) as follows:

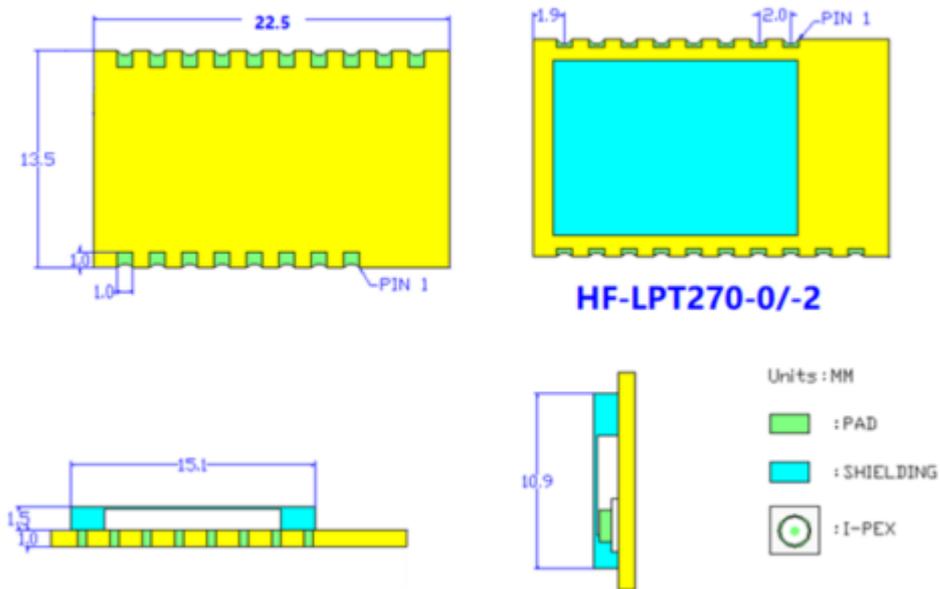


Figure 3. HF-LPT270-0(F) Mechanical Dimension

1.2.4. On-board Chip Antenna

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

- For customer PCB, module antenna area can't put componet or paste GND net;(See the following red arrow area)
- Antenna must away from metal or high components at least 10mm;
- Antenna can't be shieldedby any meal enclosure; All cover, include plastic, shall away from antenna at least 10mm;

High-Flying suggest 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.

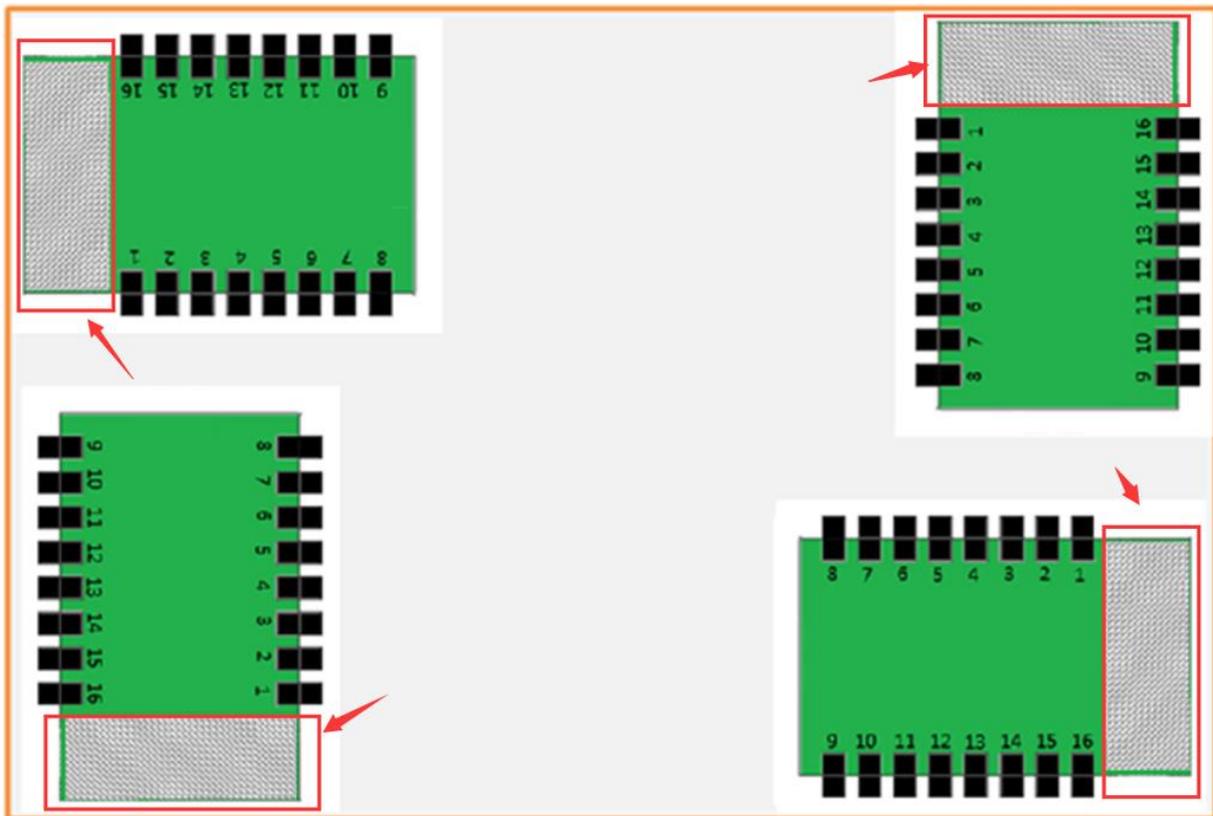


Figure 4. Suggested Module Placement Region

1.2.5. External Antenna

HF-LPT270-0(F) module supports external antenna(I-PEX) option for user dedicated application. If user select external antenna,HF-LPT270-0(F) Wi-Fi modules must be connected to the 2.4G antenna according to IEEE 802.11b/g/n standards. We can provide external antenna if needed. Contact with our salesman.

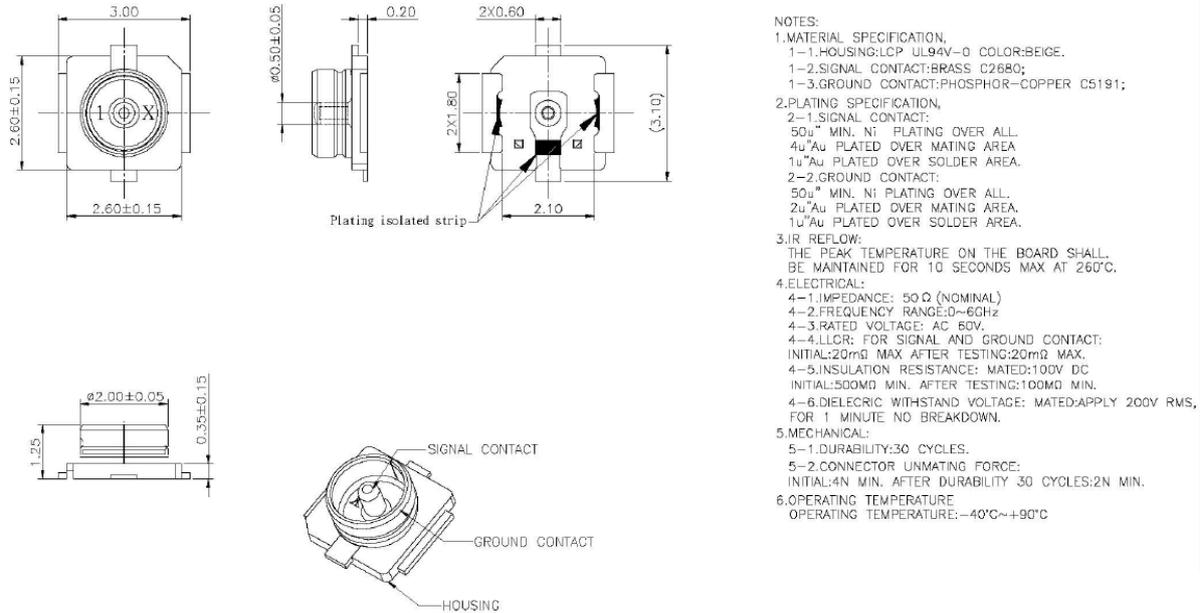


Figure 5. 1st IPEX Connector

The antenna parameters required as follows:

Table4. 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 EVK to promote user to familiar the product and develop the detailed application. The evaluation kit shown as below, user can connect to module with the RS-232 UART, USB (Internal USB to UART convetor) or Wireless interface to configure the parameters, manage the module or do the some functional tests.

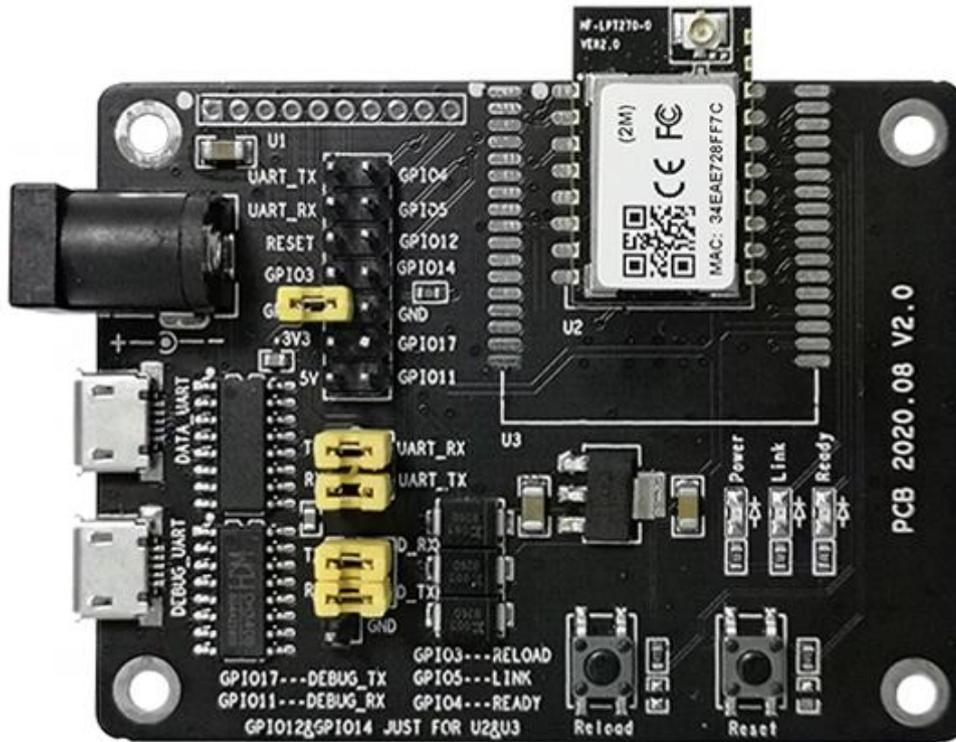


Figure 6. HF-LPX70 EVK Type Two

Notes: User need download USB to UART port driver from High-Flying web or contact with technical support people for more detail.

The external interface description for evaluation kit as follows:

Table5. Evaluation Kit Interface Description

Function	Name	Description
External Interface	RS232	Main data/command RS-232 interface, this interface maximum baud rate is 460800. Can not be used for debug UART log(It need 921600)
	USB	USB to UART interface, can be used for debug UART log
	DC5V	DC jack for power in, 5~9V input.
LED	Power	Power LED
	Ready	nReady LED
	Link	nLink LED
Button	nReload	Smartlink and Restore factory default configuration. See more for PIN Definition

1.2.7. Order Information

Base on customer detailed requirement, HF-LPT270 modules provide different variants and physical type for detailed application.

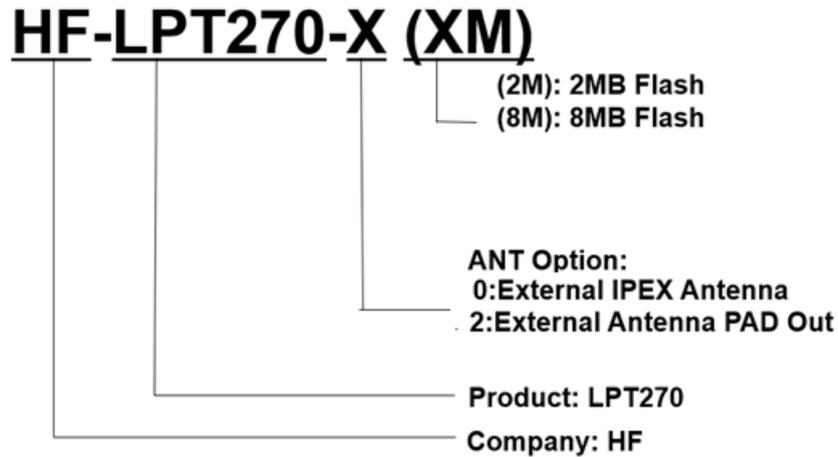


Figure 7. HF-LPT270 Order Information

1.2.8. 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.

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.

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.

1.2.9 Warning

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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

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.

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

In the event that these conditions can not be met (for example certain laptop configurations or co-location with another transmitter), then the FCC authorization is no longer considered valid and the FCC ID can not be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

Please notice that 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 FCC ID:2ACSHF-LPT270-0F” any similar wording that expresses the same meaning may be used.

The module is limited to OEM installation only.

The module is limited to installation in mobile or fixed application.

The OEM integrator is responsible for ensuring that the end-user has no manual instruction to remove or install module.

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

There is requirement that the grantee provide guidance to the host manufacturer for compliance with Part 15B requirements.

APPENDIX D: CONTACT INFORMATION

Address: [Building 17, No.1500 Zu Chongzhi Road, Pudong District, 201203, Shanghai, China](#)

Web: www.hi-flying.com

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

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

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