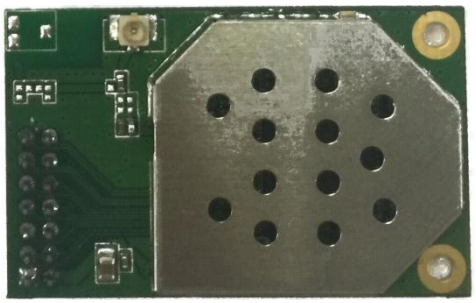
HF-A21

Embedded WiFi Module User Manual

V1.0



Overview of Characteristic

- ✧ **Support IEEE802.11b/g/n Wireless Standards**
- ✧ **Support TCP/UDP/HTTP Network Protocols**
- ✧ **Support UART/Ethernet Data Interface**
- ✧ **Support Work As STA/AP/AP+STA Mode**
- ✧ **Support Router/Bridge Mode Networking**
- ✧ **Support Internal/External Antenna Option**
- ✧ **Support AT+ Instruction Set for Configuration**
- ✧ **Support Friendly Web Configuration Page**
- ✧ **Support Heatbeat Signal**
- ✧ **Support Smart Link Application Tools**
- ✧ **Support UART Free/Auto-Frame Function**
- ✧ **Single +3.3V Power Supply**
- ✧ **Small Size: 25 x 40mm**
- ✧ **FCC/CE Certificated**

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HISTORY

Ed. V1.0 Created on 5-09-2016.

1. PRODUCT OVERVIEW

1.1. General Specification

Table 1 HF-A21 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: +20 dBm (Max.)
		802.11g: +18 dBm (Max.)
		802.11n: +15 dBm (Max.)
	Receiver Sensitivity	802.11b: -89 dBm
		802.11g: -81dBm
		802.11n: -71dBm
	Antenna Option	External:I-PEX Connector
		Internal:On-board PCB antenna
Hardware Parameters	Data Interface	UART: 1200bps - 230400bps
		Ethernet: 10Mbps/100Mpbs
		GPIO,I2C
	Operating Voltage	3.3V (+/-5%)
	Operating Current	Avg:170mA Peak:400mA
	Operating Temperature	-40℃- 85℃
	Storage Temperature	-45℃- 125℃
	Dimensions and Size	25×40×8mm
Software Parameters	Network Type	STA /AP/AP+STA mode
	Security Mechanisms	WEP/WPA-PSK/WPA2-PSK/WAPI
	Encryption	WEP64/WEP128/TKIP/AES
	Work Mode	Transparent Transmission
	Serial command	AT+instruction set
	Network Protocol	TCP/UDP/ARP/ICMP/DHCP/DNS/HTTP
	Max. TCP Connection	32
	User Configuration	Web Server＋AT command config.
	User Application SW	Support customized application SW Provide SDK package Provide smart link tools

1.2. Hardware Introduction

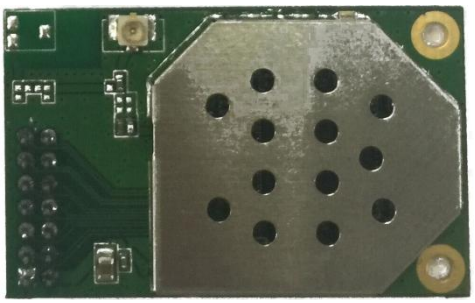


Figure 1. HF-A21 Appearance

1.2.1. Pins Definition

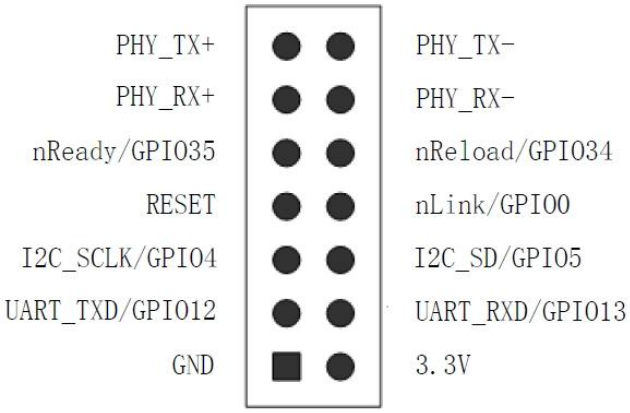


Figure 2. HF-A21 Pins Map

Table 2 HF-A21 Pins Definition

Pin	Description	Name	Direction	Note
1	Ground	GND	Power	
2	VCC	3.3V	Power	3.3V @ 350mA power input
3	UART Data Transmit	UART_TXD NOTE1	O	
	GPIO	GPIO12	I/O	
4	UART Data Receive	UART_RXD NOTE2	I	
	GPIO	GPIO13	I/O	
5	GPIO	GPIO4	I/O	
6	GPIO	GPIO5	I/O	
7	Module reset signal	RESET	I	“Low (0)” effective reset input. The reset duration should be kept more than 300ms
8	WiFi status Indication	nLink	O	“1”- WIFI connection available, “0”- No WIFI connection Can be configured as GPIO.
	GPIO	GPIO0	I/O	

9	Indicate the module status of power on process	nReady	O	“0” or “Palmodic Signal” - Finish module boot up process; “1” - Module boot up not finish. Can be configured as GPIO.
	GPIO	GPIO35	I/O	
10	Restore configuration	nReload	I	Module will Restore factory default configuration after set this pin “0” more than 3s, then set “1”.
	GPIO	GPIO34	I/O	
11	Ethernet Interface	PHY_RX+	I	Ethernet Data Interface, current driver mode.
12	Ethernet Interface	PHY_RX-	I	
13	Ethernet Interface	PHY_TX+	O	
14	Ethernet Interface	PHY_TX-	O	

Note1: These Pins should not add external pull-up resistor. It's configure pin for module bootup. There is pull-down resistor for UART_TXD. This pin must keep low when bootup.

Note2: UART_RXD has a 4.7K pulldown resistor.

1.2.2. Mechanical Size

HF-A21 modules physical size as follows:

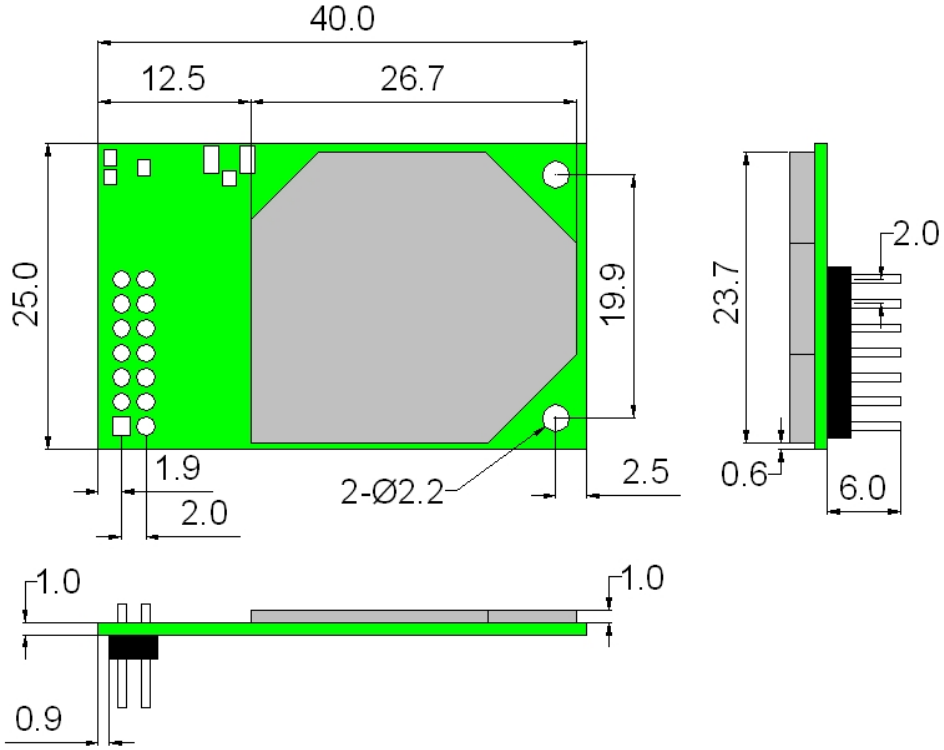


Figure 3. HF-A21 Mechanical Dimension

1.2.3. On-board Chip Antenna

HF-A11 module support internal ob-board chip antenna option. When costomer select internal antenna, you shall comply with following antenna design rules and module location suggestions:

- For customer PCB, RED color region (6x8mm) can't put componet or paste GND net;
- 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;

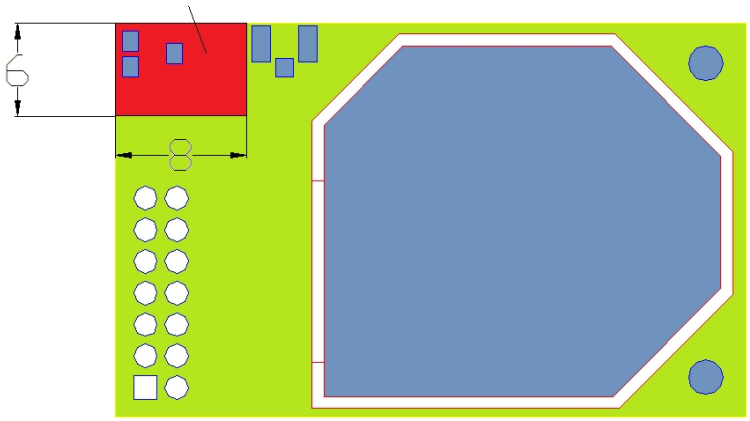


Figure 4. HF-A11 Chip Antenna Keep Out Region

High-Flying suggest HF-A11 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.

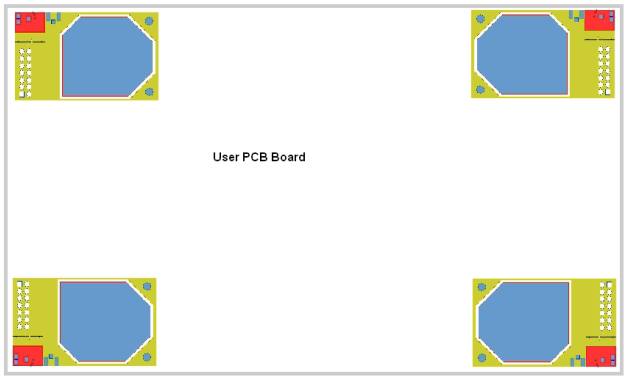


Figure 5. Suggested Module Placement Region

1.2.4. External Antenna

HF-A11 modules support internal antenna and external antenna option for user dedicated application. If user select external antenna, HF-A11 modules must be connected to the 2.4G antenna according to IEEE 802.11b/g/n standards.
The antenna parameters required as follows:

Table 3 HF-A11 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

1.2.5. 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-A21 module with the RS-232 UART port, 100M Eth port or Wireless port to configure the parameters, manage the module or do the some functional tests.

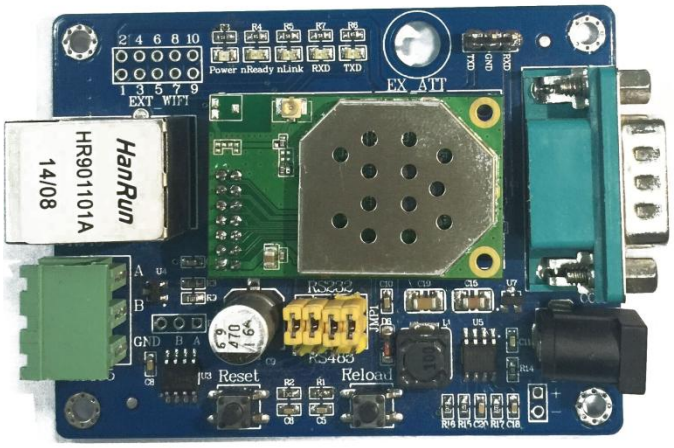


Figure 6. HF-A21 Evaluation Kit

The external interface description for evaluation kit as follows:

Table 4 HF-A21 Evaluation Kit Interface Description

Function	Name	Description
External Interface	DC jack	5~18V power input connector
	3-Pin	3-Pin RS485 interface(Reserved)
	DB9	Male serial jack of 9-pin,and used to connect to PC
	RJ-45	100M Eth Interface
	Module	2x7 2mm DIP connector
LED	Power (Red)	3.3V Power Indicator
	TXD	TXD Indicator
	RXD	RXD Indicator
	Ready	nReady/GPIO Indicator
	Link	nLink/GPIO Indicator
Button	Reset	Used to reset the module.
	Reload	Module restore to factory default configuration.

1.2.6. Order Information

Base on customer detailed requirement, HF-A21 series modules provide different variants and physical type for detailed application.

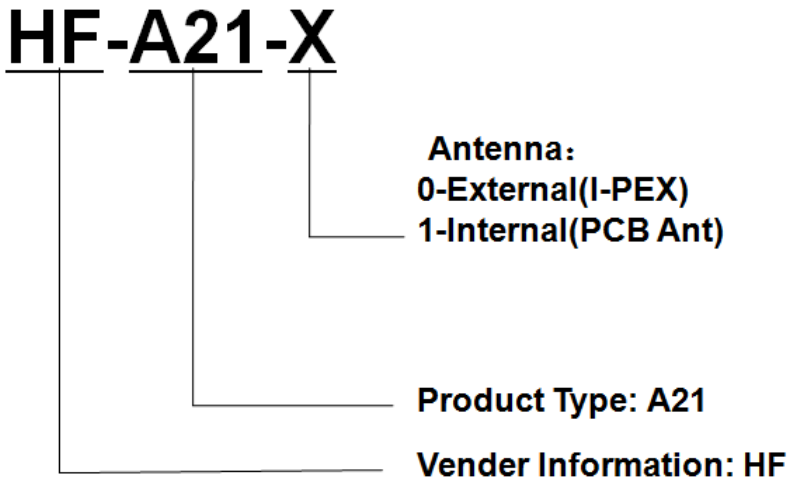


Figure 7. HF-A21 Order Information

1.3. Hardware Reference Design

1.3.1. Hardware Typical Application

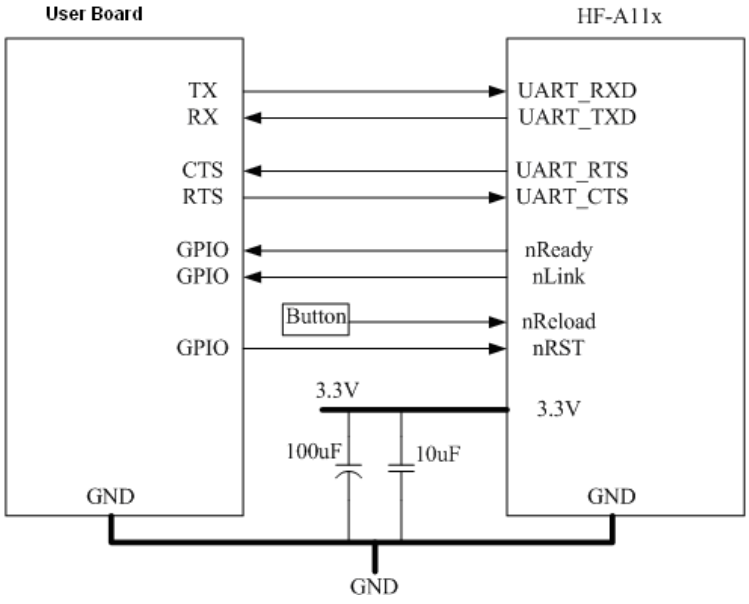


Figure 8. HF-A11 Hardware Typical Application

Notes：

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

There is 100K Ohm pull-up resister internal. When module power up or some issue happened, MCU need assert nRST signal “0” at least 300ms, then set” 1” to keep module fully reset.

nReady- Module boot up ready signal. Output. Logics “0” effective.
There is 4.7K Ohm pull-up resister internal. The module will output “0” “or “Palmodic Signal” after normal boot up. This signal used to judge if module finish boot up and ready for application or working at normal mode.

nLink- Module WIFI connection indication. Output.
There is 4.7K Ohm pull-up resister internal. When module connect to AP (STA mode) or some WiFi STA connect to module (AP mode), the module will output “0”. This signal used to judge if module already at WiFi connection status.

nReload- Module restore to factory default configuration.Input. Logics “0” effective.
User can assert nReload signal “0” more than 3’s through button or MCU pin, then release, module will restore to factory default configuration and re-start boot up process. User need add 4.7K~10K Ohm pull-up resister external the module. If not use this function, then can use AT command AT+FRLDEN=off to disable it.

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

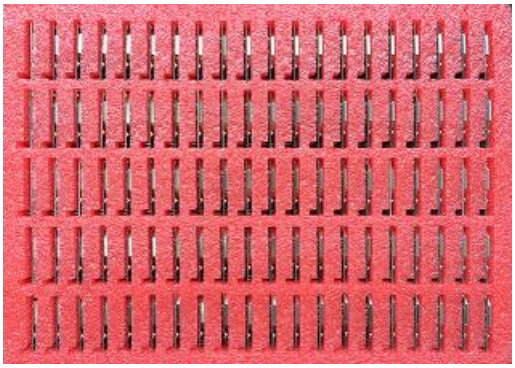
1.4. Typical Application

Refer to HF-A21-SMT user manual for detailed application and module usage.

2. PACKAGE INFORMATION

5.1 Shipping Information

TRAY
Size: 370*270*40 mm

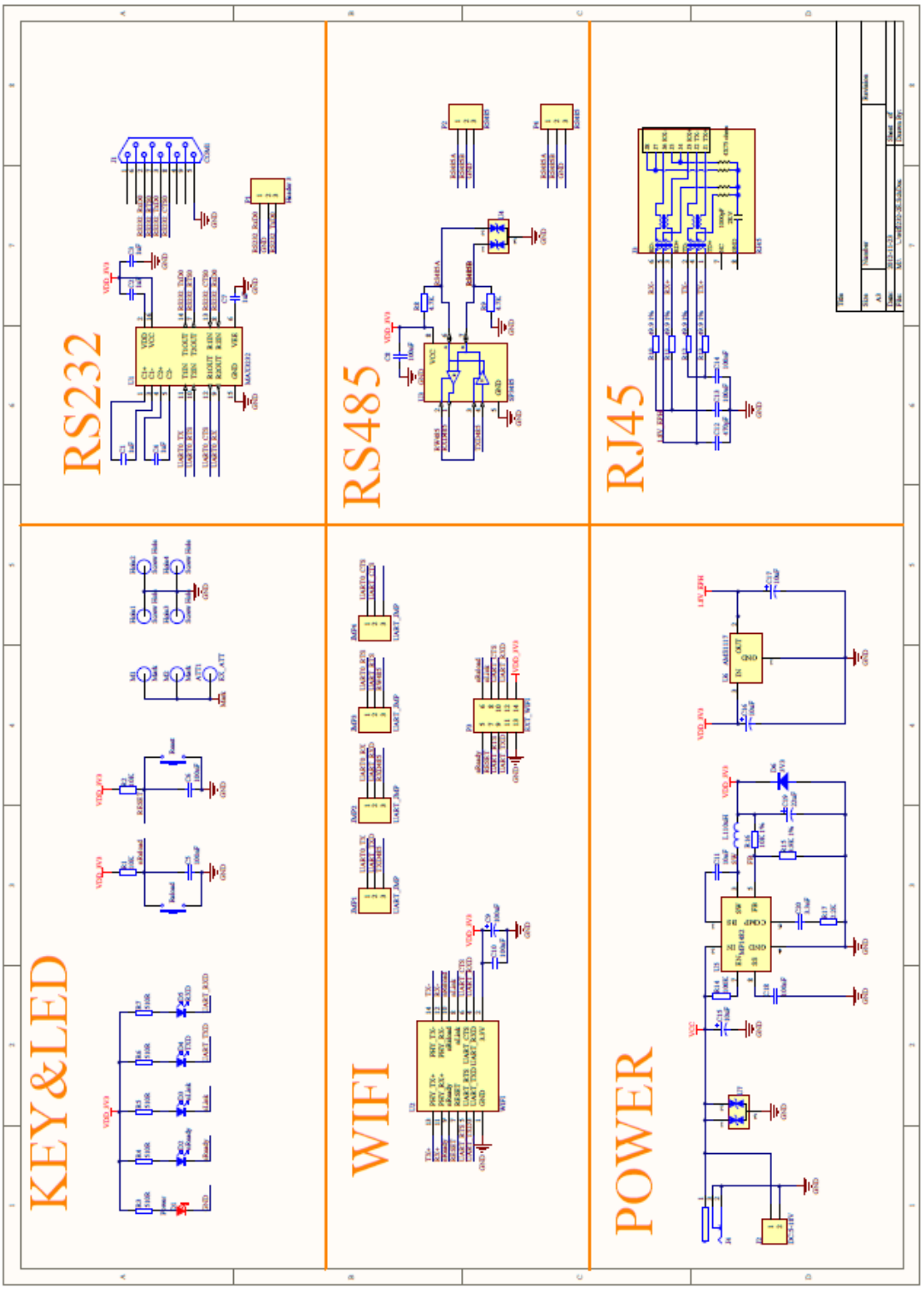


BOX
Size: 370*270*160 mm(inside)

Figure 9. Shipping Information

Note:
1 tray = 100pcs
1 box = 4 trays = 4 * 100 pcs = 400pcs

APPENDIX A: EVB REFERENCE DESIGN



APPENDIX B: CONTACT INFORMATION

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