



# Hi-12FL-Kit Specification

Version V1.1.0

Copyright ©2021



## Content

1. Product Overview	
1.1. Characteristic	
2. Main parameters	
2.1. Power selection	
2.2. Static electricity requirements	
2.3. Electrical characteristics	
2.4. WiFi RF performance	
3. Appearance dimensions	
4. Indicator and button description	
5. Pin definition	
6. Schematic	
7. Product related models	
8. Product packaging information	
9. Contact us	
Disclaimer and copyright notice	
Notice	

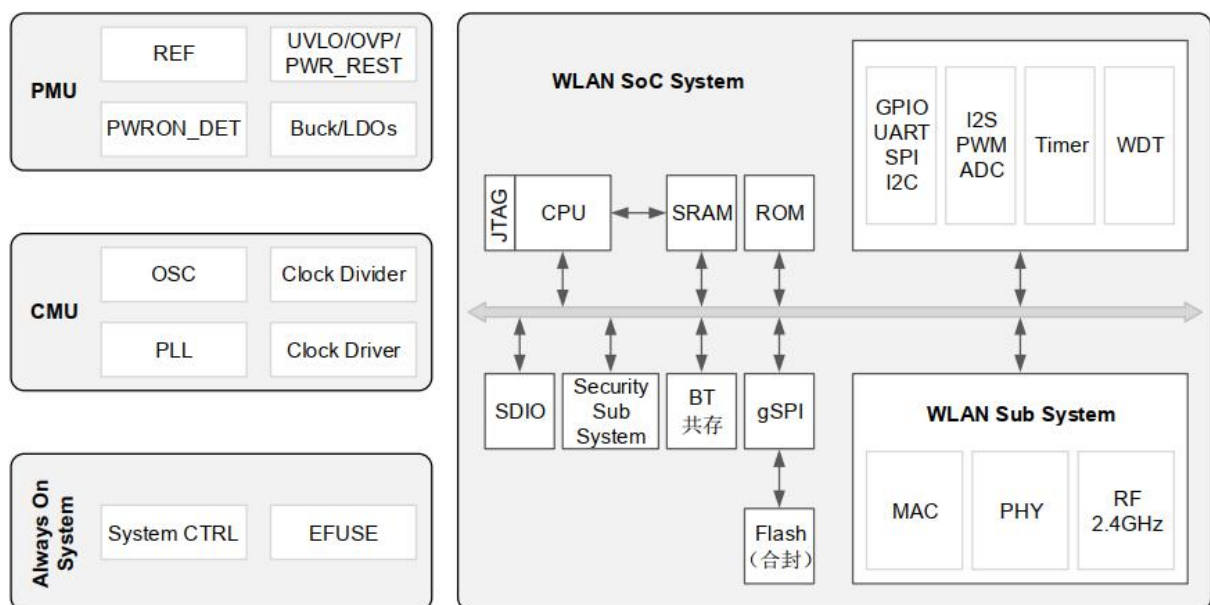
## 1. Product Overview

Hi-12FL-Kit is a Wi-Fi development board developed by Shenzhen Ai-Thinker Technology Co., Ltd. It can be widely used in the development of WiFi related Internet of Things intelligent terminal products such as smart home, intelligent security and smart city.

The Hi-12FL-Kit comes with the Hi-12FL module, which uses the Hi3861V100 core processor chip. The chip is a highly integrated 2.4GHz low power SoC WiFi chip integrating IEEE 802.11b/g/n base-band and RF circuit including power amplifier P A, low noise amplifier LNA, RF balun, antenna switch and power management,etc; supports 20MHz standard bandwidth and 5MHz/10MHz narrow bandwidth for maximum 72.2Mbit/s physical layer rate. The chip WiFi baseband supports orthogonal frequency division multiplexing (OFDM) technology and is downward compatible with Direct Sequence Amplification (DSSS) and complementary code keying (CCK) technologies supporting various data rates for IEEE 802.11 b/g/n protocols.

The Hi-12FL module on the Hi-12FL-Kit uses Hi3861V100 chips that also integrate high-performance 32bit microprocessor, hardware security engine and rich peripheral interfaces including SPI, UART, I2C, PWM, GPIO and multiplexed ADC, high-speed SDIO2.0 Slave interface up to 50MHz; inside chip with SRAM and Flash, can operate independently and support programs on Flash.

The Hi-12FL module supports Huawei LiteOS and third-party components, along with an open, easy-to-use development and commissioning operating environment.



**Figure 1 Main chip architecture diagram**

## 1.1. Characteristic

- 1×1 2.4GHz frequency band (ch1~ch14)
- Support IEEE802.11b/g/n single antenna all data rate
- Supported by the maximum rate: 72.2Mbps@HT20 MCS7
- support STBC
- Support Short-GI
- Support STA and AP forms, maximum 6 STA access is supported as an AP.
- Support for WPA WPA/WPA2 personal, WPS2.0
- High-performance 32bit microprocessor with a maximum operating frequency of 160MHz
- Built in 352KB SRAM, 288KB ROM, embedded 2MB Flash
- Internal integrated EFUSE, supports secure storage, secure start up, and hardware ID
- Support for 256-node Mesh networking
- Support for AT commands, you can quickly start
- Open OS Huawei LiteOS, provides an open, efficient, and secure system development, operating environment
- The modules were packaged in SMD-22
- Support UART/SPI/I2C/GPIO/ADC/PWM/I2S/SDIO interface

## 2. Main parameters

**Table 1 Description of the main parameters**

<b>Development board model</b>	Hi-12FL-Kit
<b>Suitable module</b>	Hi-12FL
<b>Package</b>	SMD-22
<b>Size</b>	25.40*48.26(±0.2)mm
<b>Antenna</b>	On-board PCB antenna
<b>Frequency range</b>	2400 ~ 2483.5MHz
<b>Operating temperature</b>	-40 °C ~ 85 °C
<b>Storage environmen</b>	-40 °C ~ 125 °C , < 90%RH
<b>Power supply range</b>	Voltage: 5V, Electrical current ≥ 500mA
<b>Support Interface</b>	UART/SPI/I2C/GPIO/ADC/PWM /I2S/SDIO
<b>IO</b>	14 IO, including TX0\RX0 TX1\RX1
<b>UART Rate</b>	Default 115200
<b>Security</b>	WFA WPA/WPA2 personal WPS2.0
<b>Flash</b>	2MB Flash
<b>WIFI</b>	802.11b/g/n

### 2.1. Power selection

You can supply Hi-12FL-Kit in one of two ways as below:

- Micro-USB interface power supply (default)
- 3V3 with GND or 5V with GND pin supply

It is recommended to choose the first power supply mode: the Micro-USB interface power supply.

### 2.2. Static electricity requirements

The Hi-12FL-Kit development board is an electrostatic sensitive device, and special precautions must be taken when handling it.



Figure 2 ESD anti-static diagram

### 2.3. Electrical characteristics

Table 2 Electrical characteristics table

Parameters	Conditions	Min	Typical Values	Max	Unit	
Supply voltage Micro-USB	VCC	4.5	5	5.3	V	
Supply voltage pin header	VCC	3.0	3.3	3.6	V	
I/O	Voltage	VDDIO1/ VDDIO2	3.125	3.3	3.6	V
	VIH	-	2.4	-	3.63	V
	VIL	-	-0.3	-	0.8	V
	VOH	-	2.4	-	-	V
	VOL	-	-	-	0.4	V

### 2.4. WiFi RF performance

Table 3 WiFi RF performance table

Description	Typical values	Unit
Working frequency	2400 - 2483.5	MHz
<b>Output power</b>		
11n mode HT20 PA output power	14±2	dBm
11g mode PA output power	15±2	dBm
11b mode PA output power	17±2	dBm
<b>Receiving sensitivity</b>		

11b, 1 Mbps	$\leq -96$	dBm
11b, 11 Mbps	$\leq -89$	dBm
6 Mbps (1/2 BPSK)	$\leq -92$	dBm
54 Mbps (3/4 64-QAM)	$\leq -74$	dBm
HT20 (MCS7)	$\leq -72$	dBm

### 3. Appearance dimensions

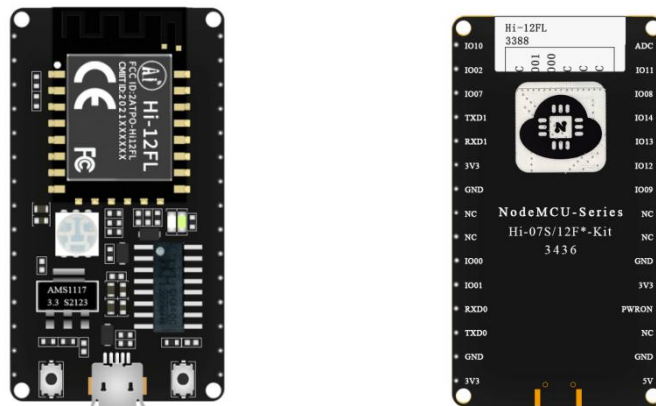


Figure 3 Appearance diagram of the development board (pictures and cover printing are for reference only, subject to physical objects)

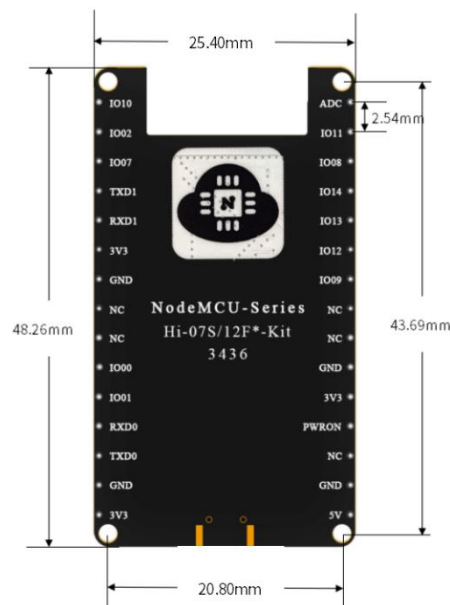
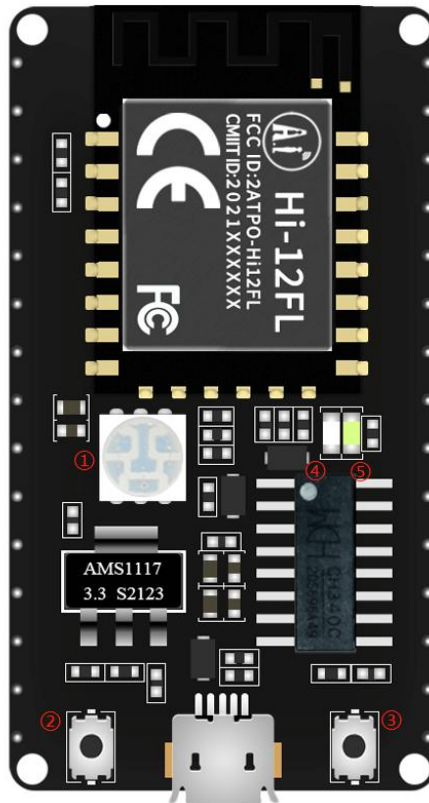


Figure 4 Development board size diagram



## 4. Indicator and button description

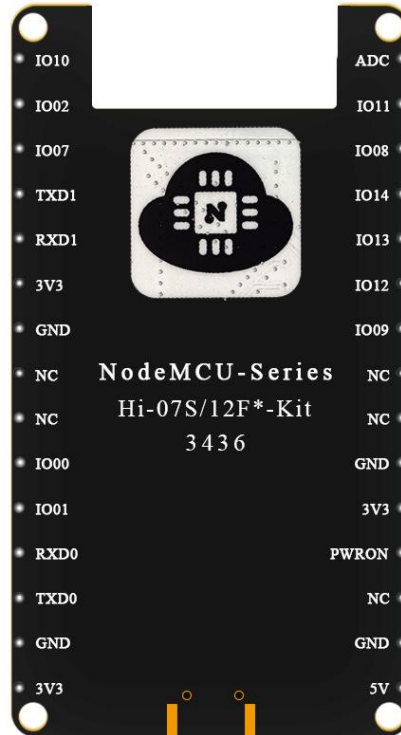


**Figure 5 Hi-12FL-Kit indicator lamp and button location**

**Table 4 Hi-12FL-Kit indicator lamp and button location**

①	IPEX
②	RGB lamp corresponding to IO12 IO13 IO09
③	Reset key corresponding to IO08
④	Button KEY2 corresponding to IO07
⑤	Warm light corresponding to IO2

## 5. Pin definition



**Figure 6 Schematic diagram of development board pins (bottom view)**

Hi-12FL-Kit has a total of 30 interfaces. As shown in the above pin diagram, the pin function definition table is the interface definition.

**Table 5 Pin function definition table**

No.	Name	Function
1	IO10	GPIO_00 UART1_TXD SPI1_CLK PWM3_OUT I2C1_SDA JTAG_TDO HW_ID0
2	IO02	GPIO_02 UART1_RTS SPI1_TXD PWM2_OUT JTAG_TRSTN REFCLK_FREQ_STATUS
3	IO07	GPIO_07 UART1_CTS SPI0_RXD ADC3 PWM0_OUT I2S0_CLK BT_ACTIVE HW_ID5
4	TXD1	GPIO_06 UART1_TXD SPI0_CLK PWM3_OUT I2S0_TX COEX_SWITCH JTAG_MODE
5	RXD1	GPIO_05 UART1_RXD SPI0_CS1 ADC2 PWM2_OUT I2S0_MCK BT_STATUS HW_ID4

6	3V3	Power supply, recommended for 3.3V, greater than 500mA
7	GND	Ground
8	NC	NC
9	NC	NC
10	IO00	32K
11	IO01	32K
12	RXD0	GPIO_04 UART0_LOG_RXD ADC1 PWM1_OUT I2C1_SCL JTAG_TMS HW_ID3
13	TXD0	GPIO_03 UART0_LOG_TXD UART1_CTS SPI1_CS1 PWM5_OUT I2C1_SDA JTAG_TDI
14	GND	Ground
15	3V3	Power supply, recommended for 3.3V, greater than 500mA
16	5V	Power supply, 5V, greater than 500mA
17	GMD	Ground
18	NC	NC
19	PWRON	Chip PMU power on the enable pin module is pulled up inside 0 power off 1 power on
20	3V3	Power supply, recommended for 3.3V, greater than 500mA
21	GND	GND
22	NC	NC
23	NC	NC
24	IO09	GPIO_09 UART2_RTS SPI0_TXD SDIO_D2 ADC4 PWM0_OUT I2S0_MCK I2C0_SCL
25	IO12	GPIO_12 UART2_RXD SPI0_CS1 SDIO_CLK ADC0 PWM3_OUT I2S0_CLK HW_ID7
26	IO13	GPIO_13 UART0_LOG_TXD UART2_RTS

		SDIO_D0 ADC6 PWM4_OUT I2S0_WS I2C0_SDA
27	IO14	GPIO_14 UART0_LOG_RXD UART2_CTS SDIO_D1 PWM5_OUT I2C0_SCL HW_ID2
28	IO08	GPIO_08,UART1_RTS,SPI0_TXD,PWM1_OUT,I2S0_WS,WLAN_ACTIVE,JTAG_ENABLE
29	IO11	GPIO_11 UART2_TXD SPI0_RXD SDIO_CMD ADC5 PWM2_OUT I2S0_RX HW_ID6
30	ADC	GPIO_11 UART2_TXD SPI0_RXD SDIO_CMD ADC5 PWM2_OUT I2S0_RX HW_ID6

**Table 6 Module start up mode description table**

Pin	Default status	Low level	High level
IO2/REFCLK_FR EQ_STATUS	pull down	40MHz (default)	24MHz
IO6/JTAG_MODE	pull down	Normal Function Mode (Default)	DFT test pattern
IO8/JTAG_ENAB LE	pull down	General IO (Default)	JTAG enable

Note: IO2/IO6/IO8 is a hardware configuration word and cannot be at high level when charged, otherwise the module cannot enter the normal operation state.

## 6. Schematic

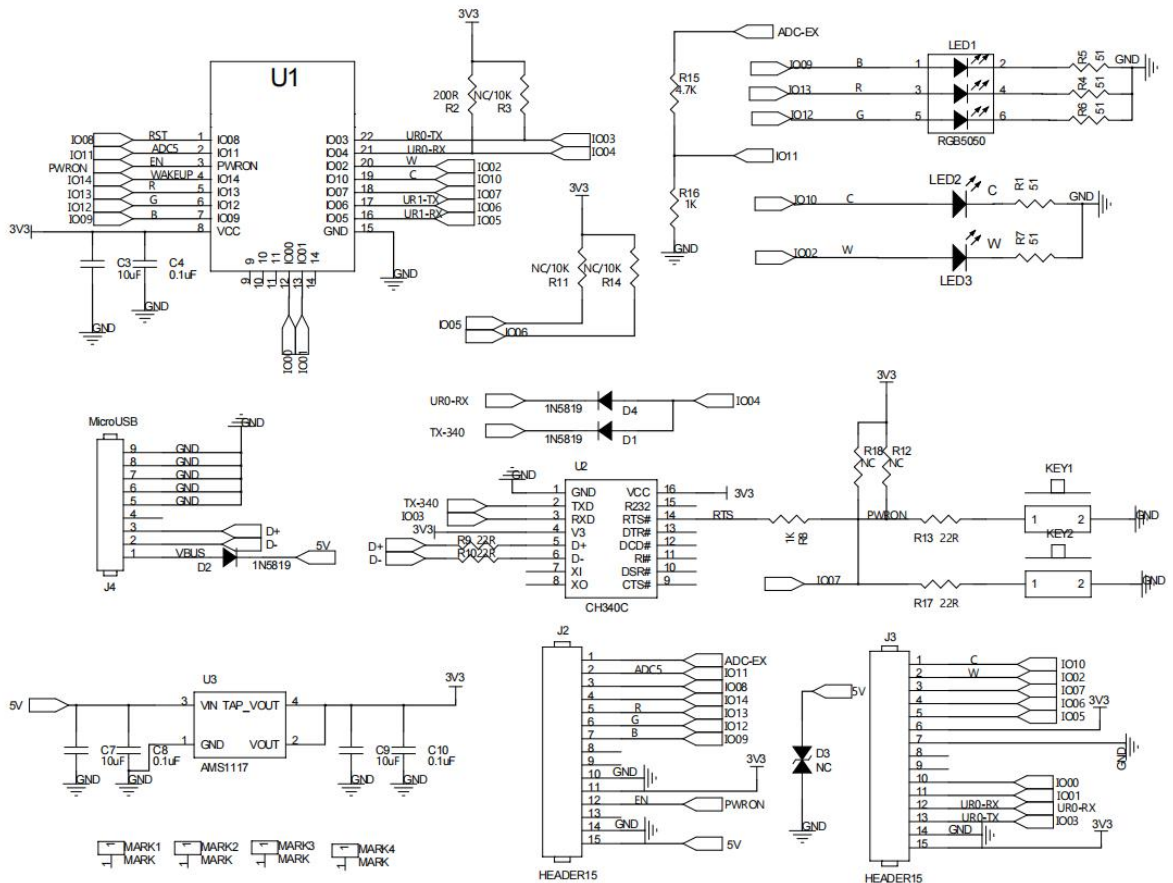


Figure 7 Schematic diagram of the development board

## 7. Product related models

Table 7 Product related model list

Model name	Power supply	Pin header TX1 and RX1	Package	Size	Note
Hi-12F module	3.3V I>500mA	/	SMD-22	24.0*16.0*3.2(±0.2)MM	
Hi-12FL module	3.3V I>500mA	/	SMD-22	24.0*16.0*3.2(±0.2)MM	
Hi-07S module	3.3V I>500mA	/	SMD-22	17.0*16.0*3.2(±0.2)MM	
Hi-07SL module	3.3V I>500mA	/	SMD-22	17.0*16.0*3.2(±0.2)MM	
Hi-12F-Kit_V1.1.0 Development board	5V, I>500mA	Support	DIP-30	25.40*48.26(±0.2)mm	
Hi-12FL-Kit_V1.1.0 Development board	5V, I>500mA	Support	DIP-30	25.40*48.26(±0.2)mm	
Hi-07S-Kit_V1.1.0 Development board	5V, I>500mA	Support	DIP-30	25.40*48.26(±0.2)mm	
Hi-07SL-Kit_V1.1.0 Development board	5V, I>500mA	Support	DIP-30	25.40*48.26(±0.2)mm	
Product-related information <a href="https://docs.ai-thinker.com/Hi3861">https://docs.ai-thinker.com/Hi3861</a>					

## 8. Product packaging information

**Table 8 Packaging Information**

Packing list	Modes of Packing	Quantity per pack (Electrostatic bag)	Quantity per pack (sealed bag)
Hi-12FL-Kit	Bubble cotton + electrostatic bag	1pcs	20pcs

## 9. Contact us

Official website <https://www.ai-thinker.com>

Development DOCS <https://docs.ai-thinker.com>

Official Forum <http://bbs.ai-thinker.com>

Sample purchase <https://aithinker.tmall.com>

<https://anxinke.taobao.com>

<https://ai-thinker.en.alibaba.com/>

Business cooperation [sales@aithinker.com](mailto:sales@aithinker.com)/[overseas@aithinker.com](mailto:overseas@aithinker.com)

Technical support [support@aithinker.com](mailto:support@aithinker.com)

Company Address Room 403,408-410, Block C, Huafeng Smart Innovation Port, Gushu 2nd Road, Xixiang, Baoan District, Shenzhen.

Tel 0755-29162996



## Disclaimer and copyright notice

The information in this article, including the URL address for reference, is subject to change without notice.

The document is provided "as is" without any guarantee responsibility, including any guarantee for merchantability, suitability for a specific purpose, or non-infringement, and any guarantee mentioned elsewhere in any proposal, specification or sample. This document does not bear any responsibility, including the responsibility for infringement of any patent rights arising from the use of the information in this document. This document does not grant any license for the use of intellectual property rights in estoppel or other ways, whether express or implied.

The test data obtained in the article are all obtained from Ai-Thinker's laboratory tests, and the actual results may vary slightly.

The Wi-Fi Alliance member logo is owned by the Wi-Fi Alliance.

All brand names, trademarks and registered trademarks mentioned in this article are the property of their respective owners, and it is hereby declared.

The final interpretation right belongs to Shenzhen Ai-Thinker Technology Co., Ltd.

## Notice

Due to product version upgrades or other reasons, the contents of this manual may be changed.

Shenzhen Ai-Thinker Technology Co., Ltd. reserves the right to modify the contents of this manual without any notice or prompt.

This manual is only used as a guide. Shenzhen Ai-Thinker Technology Co., Ltd. makes every effort to provide accurate information in this manual. However, Shenzhen Ai-Thinker Technology Co., Ltd. does not guarantee that the contents of the manual are completely free of errors. All statements and information in this manual And the suggestion does not constitute any express or implied guarantee.