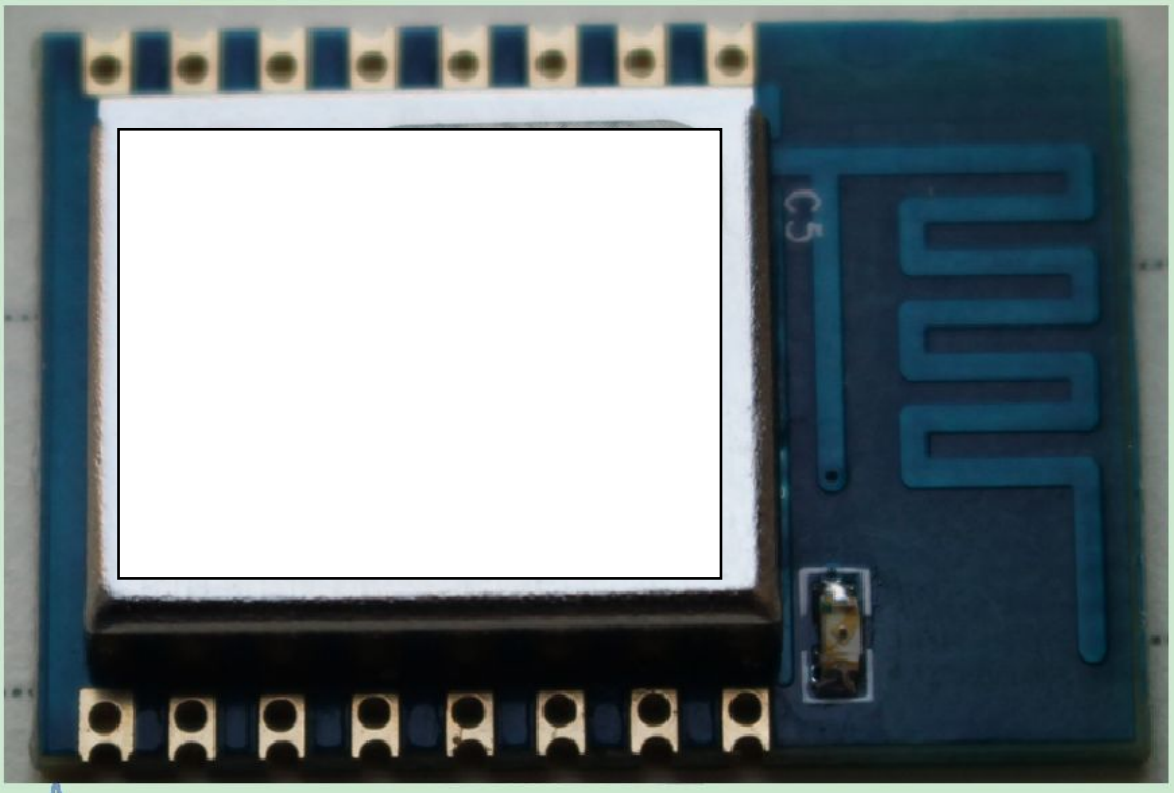
AI-THINKER ESP-12 **WiFi** Manual V1.0 **V2.1**



1. Product Introduction

ESP-12 is an ultra-low-power pass through UART-WiFi module, with the industry's highly competitive package size and ultra-low power technology,

1.1. Outline

Designed for mobile devices and networking applications designed to connect the device to the user's physical Wi-Fi wireless network for Internet or LAN through

Letter achieve networking.

ESP-12 package and diverse, the antenna can support on-board PCB antenna, three forms and stamps hole IPEX interface interface;

ESP-12 is widely used in smart grids, intelligent transportation, smart furniture, handheld devices, industrial control and other fields.**1.1.1**

Product Features

Support wireless 802.11 b / g / n standards

Support STA / AP / STA + AP three operating modes

Built-in TCP / IP protocol stack to support multiple TCP Client Connection

Support UART / GPIO data communication interface

Support Smart Link Smart Networking

Remote firmware upgrade (OTA)

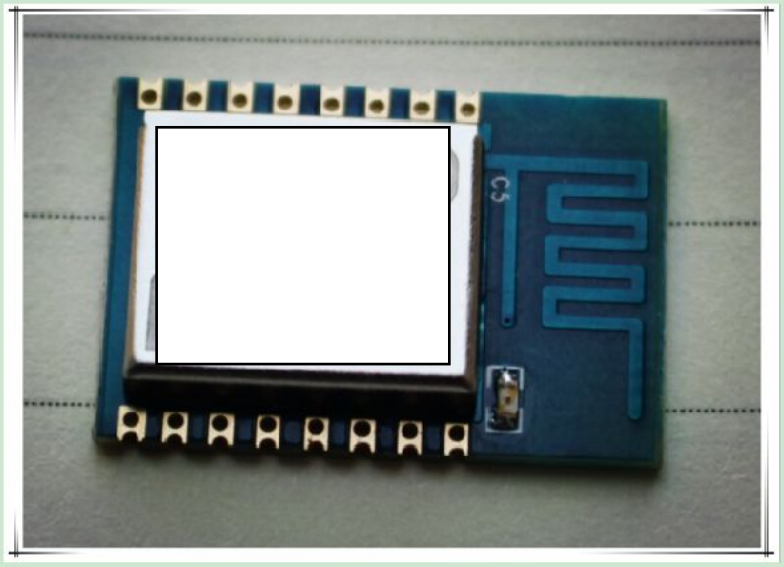
Built-in 32-bit MCU, can double as an application processor Built-in 32-bit MCU, can double as an application processor

Ultra-low power consumption, ideal for battery-powered applications

3.3V single power supply

1.1.2 Module package

ESP-12 using the stamp pad hole spacing and 2.0 output, when the SMT placement, and small quantities of experimental plug leads symmetrical double 16PIN



1.1.3 The basic parameters of the module

module		ESP-12
	main chip	ESP8266
Wireless parameters	Wireless standard	IEEE 802.11b/g/n
	Frequency Range	2.412GHz-2.462GHz
	Transmit power	802.11b: +15 +/-1dBm (@11Mbps)
		802.11g: +13 +/-1dBm (@54Mbps)
		802.11n: +12 +/-1dBm (@HT20)
	Receiversensitivity	802.11b: -93 dBm (@11Mbps ,CCK)
		802.11g: -85dBm (@54Mbps, OFDM)
		802.11n: -82dBm (@HT20)
	Antenna form	Internal: On-board PCB antenna
Hardware parameters	Hardware interface	UART, IIC, PWM, GPIO, ADC
	Operating Voltage	3.0V--3.6V
	Drive capability	Max：15ma
	Working current	Continue to send => Mean：~70mA, Peak: 300mA Normal mode => Mean: ~12mA, Peak: 300mA Standby：<200uA, Soft-Off：<10uA
	Working temperature	-40℃~125℃
	Storage Environment	Temperature：<40℃, Relative humidity：<90%R.H.
	Size	On-board PCB antenna：16mm*24mm*3.3mm;
Serial passthrough mode	Transmission rate	9600-460800bps
	TCP Client	5个
Software	Network type	STA/AP/STA+AP
	Security mechanism	WEP/WPA-PSK/WPA2-PSK
	Encryption type	WEP64/WEP128/TKIP/AES
	Firmware Upgrade	Local serial port, OTA Remote upgrade
	Network protocol	IPv4, TCP/UDP/FTP/HTTP
	User Configuration	AT, Web Android/iOSTerminal, Smart Link APP

表格 2 Module Specifications

1.3. Power

The following data is based on a 3.3V power supply, ambient temperature 25 ° measured [1] All measurements were done in the antenna interface.

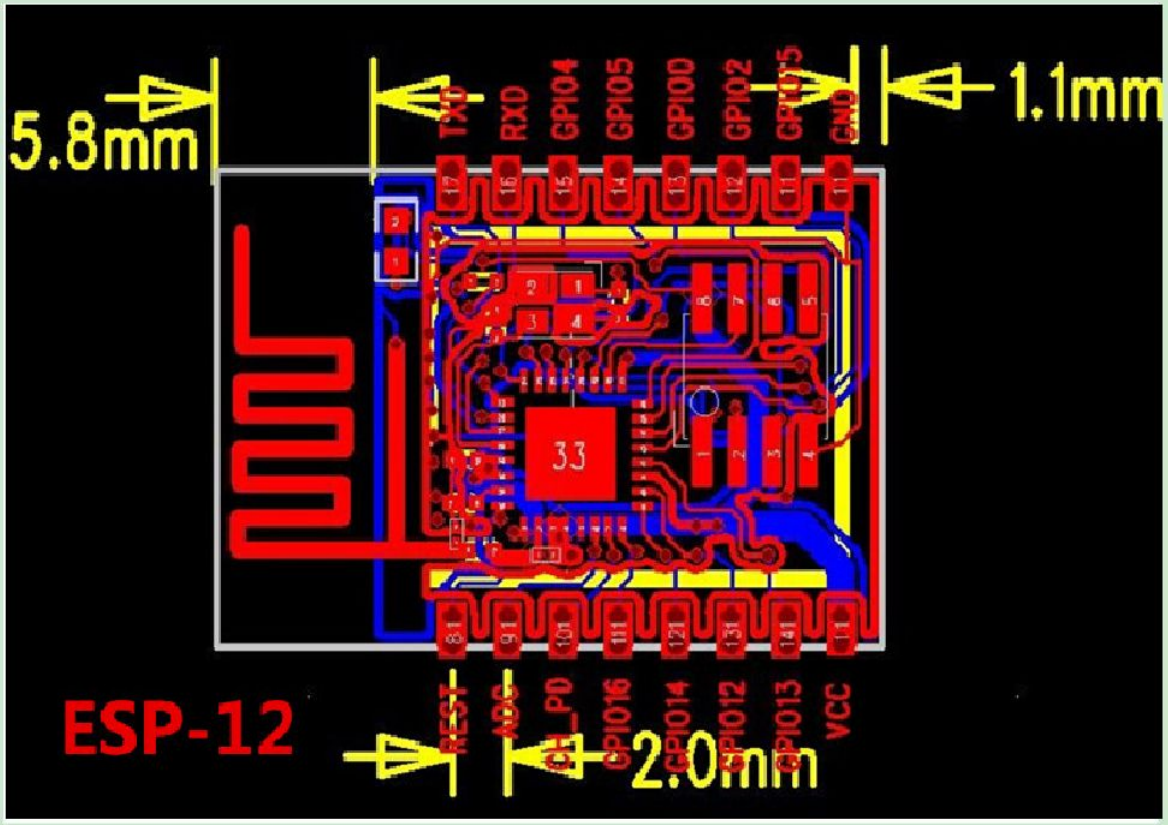
[2] All transmitted data is based on a 90% duty cycle, under continuous emission pattern measured.

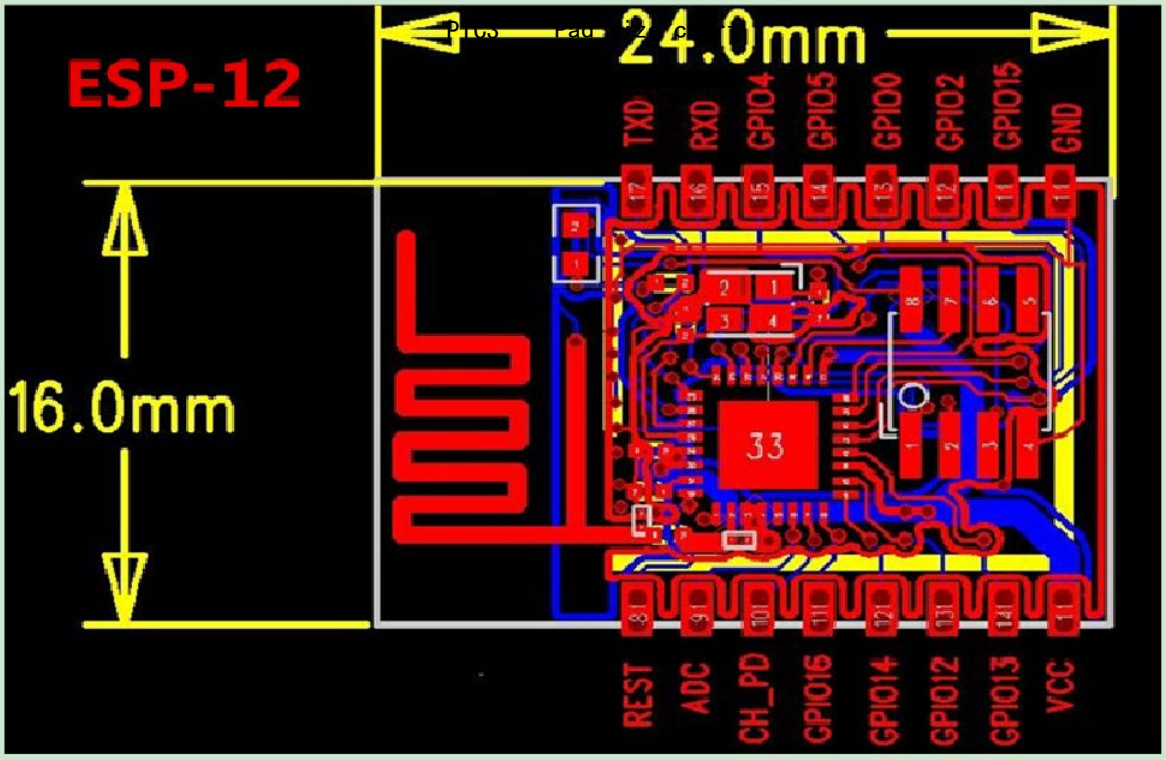
Mode	Min	General	MAX	Unit
Convey 802.11b, CCK 1Mbps, Pout=15+/-1dBm		215		mA
Convey 802.11b, CCK 11Mbps, Pout=15+/-1dBm		197		mA
Convey 802.11g, OFDM54 Mbps, Pout=13+/-1dBm		145		mA
Convey 802.11n, MCS7, Pout=+12+/-1dBm		135		mA
Receive 802.11b, 1024 bytes, -80dBm		60		mA
Receive 802.11g, 1024 bytes, -70dBm		60		mA
Receive 802.11n, 1024 bytes, -65dBm		62		mA
System Standby		0.9		mA
Deep Sleep		10		μA
Saving mode DTIM1		1.2		mA
Saving mode DTIM3		0.86		mA
Shutdown		0.5		μA

Form 4 Power Data

图 2

1.5. Package layout





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 device and its antenna(s) must not be co-located or
operating in conjunction with any other antenna or transmitter.

This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

Radiation Exposure Statement:
This equipment complies with FCC 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.
The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination.
The firmware setting is not accessible by the end user.
The final end product must be labelled in a visible area with the following:
“Contains Transmitter Module FCC ID: 2ADUIESP-12”

IMPORTANT NOTE:

This module is intended for OEM integrator. The OEM integrator is still responsible for the FCC compliance requirement of the end product, which OEM integrates this module.

Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

USERS MANUAL OF THE END PRODUCT:

In the users manual of the end product, The end user has to be informed that the FCC radio-frequency exposure guidelines for an uncontrolled environment can be satisfied. The end user has to also be informed that any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment. If the size of the end product is smaller than 8x10cm, then additional FCC part 15.19 statement is required to be available in the users manual:

This device complies with Part 15 of 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.

LABEL OF THE END PRODUCT:

The final end product must be labeled in a visible area with the following " Contains TX FCC ID: 2ADUIESP-12”". If the size of the end product is larger than 8x10cm, then the following FCC part 15.19 statement has to also be available on the label:

This device complies with Part 15 of 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.