WB2S Module Specifications

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目录

WB2S is an IOT Wi-Fi module developed by HANGZHOU JFTECH CO., LTD. It is composed of a highly integrated radio frequency chip ESP32-C3 and a small number of peripheral devices, which can support dual-role connection of AP and STA, and support Bluetooth low energy connection at the same time.

1 Product Description

WB2S has a built-in 32-bit MCU running at the highest speed of 160 MHz, built-in 4Mbyte flash memory and 400KB RAM.
Support JLINK cloud connection, WB2S has rich peripherals, such as PWM, UART, I2S. Up to five 32-bit PWM outputs make the chip ideal for high-quality LED control.

1.1 Characteristic

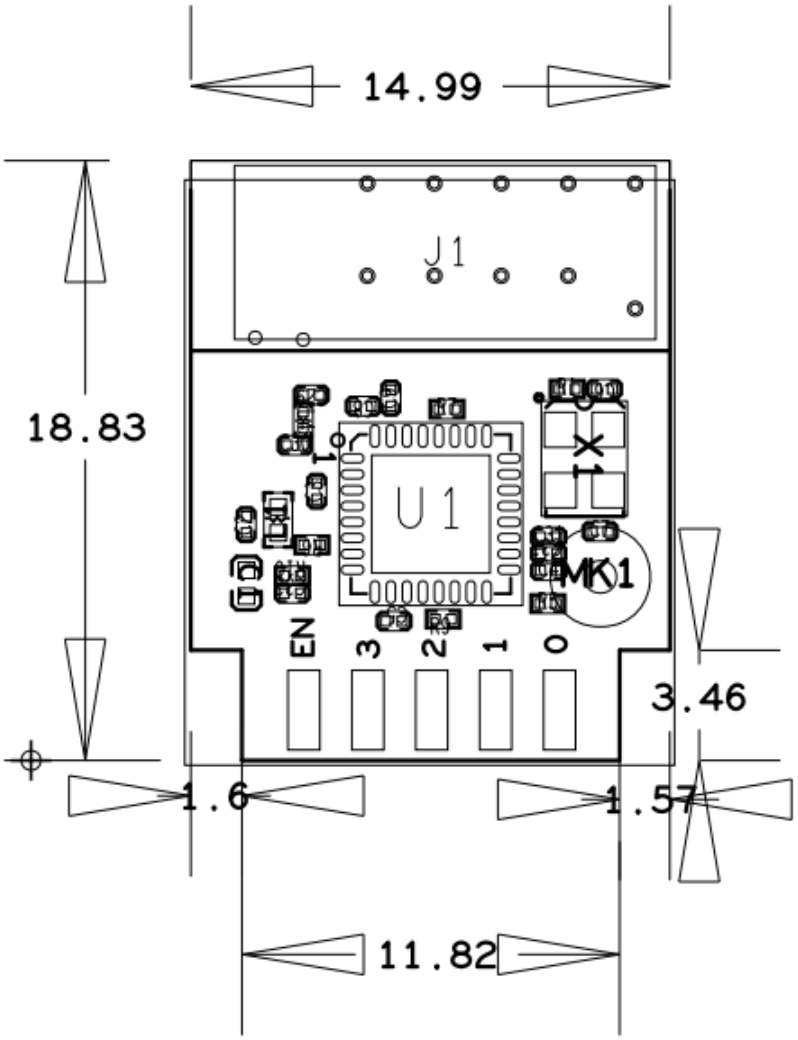
- Built-in low-power 32-bit CPU that doubles as an application processor
- Main frequency supports 160MHz
- Working voltage: 3.0V~3.6V
- Peripherals: 5×PWM, 1×UART (all IO ports of WB2S module can be multiplexed as PWM, supporting up to 5 channels working simultaneously)
- Wi-Fi connectivity
  - 802.11 b/g/n
- Channel 1-14@2.4GHz
- Supports WEP, WPA/WPA2, WPA/WPA2 PSK (AES) security modes
- Support STA/AP/STA+AP working mode
- Support SmartConfig and AP two network distribution methods (including Android and IOS devices)
- On-board PCB antenna, antenna peak gain 4.16Bi
- Working temperature: -20℃ to 85℃
- Bluetooth connectivity
- Complete Bluetooth coexistence interface
- On-board PCB antenna, antenna gain is about 4.16dBi

1.2 Application Field

- Smart Home/Appliances
- Smart sockets, smart lights

2 Module Interface

2.1 Package Size



2.2 Pin Order

Pin No.	Symbol	IO Type	Function
1	3V3	P	Power 3V3
2	G0	I/O	General GPIO port, support hardware PWM
3	GND	P	Power GND
4	G1	I/O	General GPIO port, support hardware PWM
5	G7	I/O	General GPIO port, support hardware PWM,Analog serial port U1RXD
6	G2	I/O	General GPIO port, support hardware PWM
7	G6	I/O	General GPIO port, support hardware PWM,Analog serial port U1RXD
8	ADC	I/O	ADC Port,General GPIO port,GPIO3
9	G5	I/O	General GPIO port, support hardware PWM
10	CEN	I/O	Reset pin
11	G4	I/O	General GPIO port, support hardware PWM

3 Electrical Parameters

3.1 Absolute Electrical Parameters

	Description	Minimum	Maximum	Unit
Ts	storage temp	-40	150	℃
VBAT	Supply voltage	-0.3	3.9	V
Electrostatic discharge voltage (manikin)	TAMB-25℃	-2	2	kV
Electrostatic discharge voltage (machine model)	TAMB-25℃	-1	1	kV

3.2 Normal Operating Conditions

	Description	Minimum	Maximum	Unit
Ta	Working temperature	-20	85	℃
VBAT	Supply voltage	3.3	3.6	V
VOL	IO low-level output	0.8VBAT	3.6	V
VOH	IO high-level output	0	0.1VBAT	V

3.3 RF Power Consumption

Working status	Mode	Rate	Average value	Peak (Typical)	Unit
send	11b	1Mbps		335	mA
send	11g	54Mbps		285	mA
send	11n	MCS7		278	mA
receive	11b/g/n	\		84	mA

4 RF Parameters

4.1 Basic RF Characteristics

Parameter	Detailed description
working frequency	2.412~2.484GHZ
WIFI standard	IEEE802.11b/g/n(Band 1~14)
Data transfer rate	11b 1/2/5.5/11 Mbps
	11g 6/9/12/18/24/36/48/54 Mbps
	11n HT20&HT40 MSC0~MSC7
Antenna type	PCBAntenna

4.2 WIFI Transmission Performance

Parameter	Minimum	Typical	Maximum	Unit
RF Average output power,802.11b CCK Mode 11M	-	20	-	dBm
RF Average output power,802.11g OFDM Mode 54M	-	17	-	dBm
RF Average output power,802.11n OFDM Mode MCS7	-	16	-	dBm
Frequency error	-20		20	ppm

4.3 WIFI Acceptance Performance

Parameter	Minimum value	Typical value	Maximum value	Unit
PER<8%，RX sensitivity，802.11b DSSS Mode 11M		-96		dBm
PER<10%，RX sensitivity，802.11g OFDM Mode 54M		-74		dBm
PER<10%，RX sensitivity，802.11n OFDM Mode MCS7		-72		dBm

4.4 Bluetooth RF Characteristic

Bluetooth LE 1Mbps				
Parameter	**Minimum value**	**Typical value**	**Maximum value**	**Unit**
working frequency	2402		2480	Ghz
Transmitting power	-27	0	18	dbm
Air velocity		1		Mbps
RX sensitivity		-97		dBm
Intermodulation interference		-30		dBm
Co-channel rejection ratio		8		dB

5 Antenna Information

5.1 Antenna type

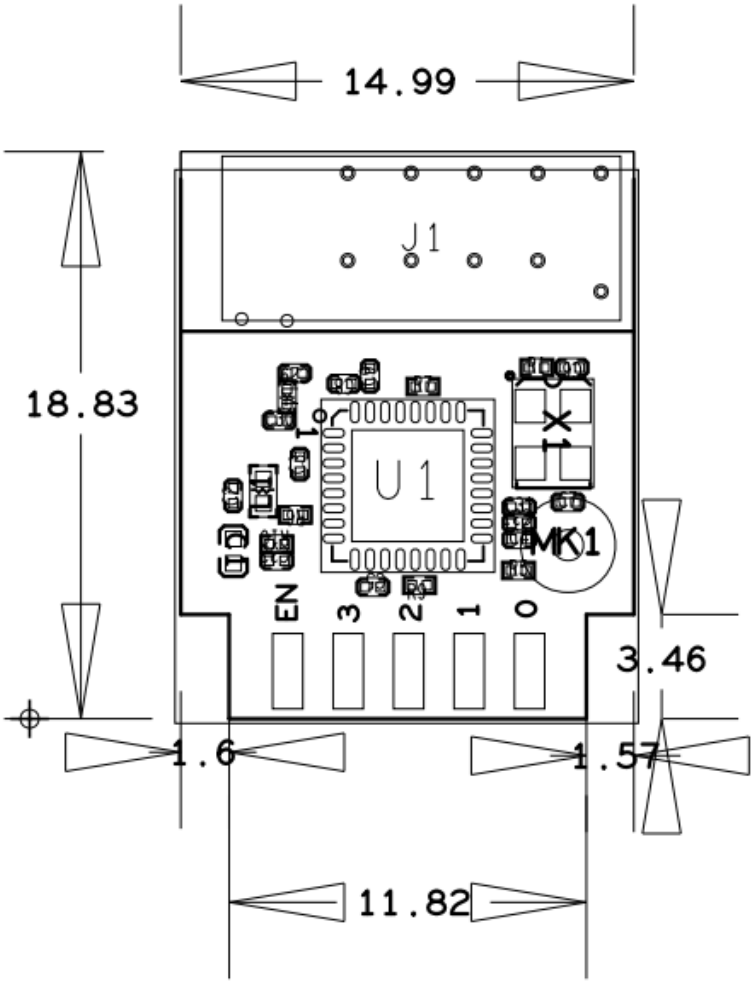
WB2S is PCB antenna

5.2 Reduce Antenna Interference

When using a PCB on-board antenna on a Wi-Fi module, in order to ensure the optimization of Wi-Fi performance, it is recommended that the distance between the antenna part of the module and other metal parts be at least 15mm or more.The user's PCB board should not be wired or even copper coated in the antenna area to avoid affecting the antenna performance.

6 Packaging Information and Production Guidance

6.1 Mechanical Size



6.2 Production Guide

- For in-line modules manufactured by JFTECH, it is recommended to give priority to wave soldering equipment for welding.Manual welding is only used when wave soldering equipment cannot be used for welding.After unpacking, it is recommended to complete the welding of the module within 24 hours, otherwise it needs to be placed in a drying cabinet with a humidity of not more than 10% RH, or re-vacuum packed and record the exposure time, the total exposure time does not exceed 168 hours.
- Equipment and materials required for welding：
- Wave soldering equipment
- Wave soldering fixture
- Thermostatic soldering iron
- Tin bar, tin wire, flux
- Furnace temperature tester
- Equipment required for baking：

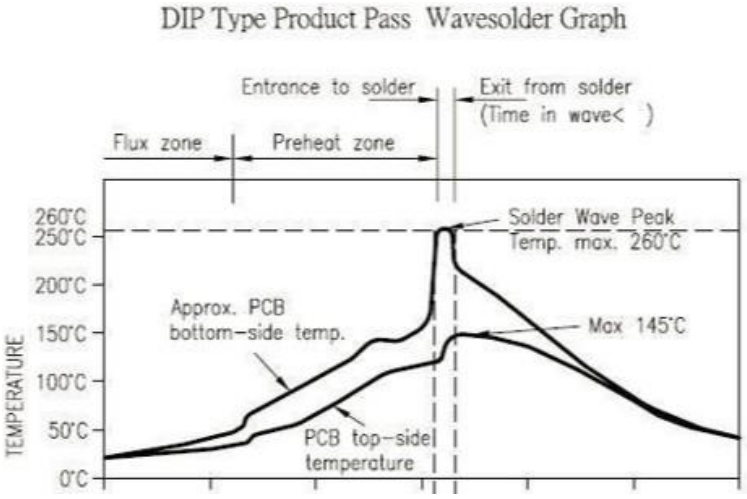
- Cabinet baking box
- Anti-static and high temperature resistant tray
- Anti-static and high temperature resistant gloves

- JFTECH modules need to be baked if they encounter the following possible moisture conditions：
  - The vacuum packaging bag was found to be damaged before unpacking
  - After unpacking, it was found that there is no humidity indicator card in the bag
  - After unpacking, if the humidity indicator card reads 10% and above, the color ring turns pink
  - The total exposure time after unpacking exceeds 168 hours
- More than 12 months from the date of the first sealed packaging
- The baking parameters are as follows：
  - Baking temperature：Reel packaging 60℃，less than or equal to 5%RH；tray packaging 125℃，less than or equal to 5%RH
  - （The high temperature resistant tray is not a blister box drag tray）
  - Baking time：Reel packaging 48 hours，tray packaging 12 hours
  - Alarm temperature setting：Reel packaging 65℃，tray packaging 135℃
  - After cooling to below 36℃ under natural conditions, production can be carried out
  - If the exposure time after baking is more than 168 hours and not run out,need to bake again
  - If the exposure time exceeds 168 hours and has not been baked, it is not recommended to use the wave soldering process to weld this batch of modules. Because the module is a level 3 moisture-sensitive device, it is likely to be dampened beyond the allowable exposure time, and high temperature welding may cause device failure or poor welding.
- Please protect the module from electrostatic discharge (ESD) during the entire production process。
- In order to ensure the good quality of the product, the production needs to focus on the amount of flux sprayed.The height of the wave peak, whether the tin slag and copper content in the wave soldering cylinder exceed the standard, whether the window opening of the wave soldering fixture and the thickness of the fixture

are appropriate, and the rationality of the temperature curve of the wave soldering furnace.

6.3 Recommended Furnace Temperature Curves and Temperature Recommendations

Please refer to the suggestion of wave peak welding furnace temperature for furnace temperature setting. The peak temperature is 260℃±5℃. The curve of wave peak welding temperature is shown below:



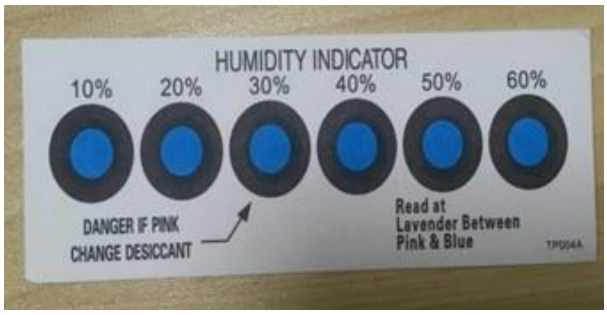
Welding temperature recommended:

Suggestion of wave soldering furnace temperature curve		Recommended temperature for manual welding	
Preheating temperature	80-130℃	Welding temperature	360℃±20℃
Preheating time	75-100S	Welding time	less than 3S/o'clock
Peak contact time	3-5S	NA	NA
Tin cylinder temperature	260±5℃	NA	NA
Ramp rate	≤2℃/S	NA	NA
Cool down the slope	≤6℃/S	NA	NA

6.4 Storage Conditions

Model from Jufeng storage conditions as below:

- Vacuum packed with moisture-proof bags and stored in an environment with temperature < 40℃ and humidity < 90%RH.
- The expiration date of dry packaged products is 12 months from the date of sealing the package.
- Humidity indicator card in sealed package:



FCC Warnning:

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 or more 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.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

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

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 and your body.

Important Note:

In the event that these conditions cannot 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 cannot 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.

End Product Labeling

The final end product must be labeled in a visible area with the following" Contains FCC ID: 2A8XQ-IOT-WB2S-LC3 ".

Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.
The end user manual shall include all required regulatory information/warning as show in this manual.

Integration instructions for host product manufacturers according to KDB 996369 D03 OEM Manual v01

2.2 List of applicable FCC rules

CFR 47 FCC PART 15 SUBPART C has been investigated. It is applicable to the modular transmitter

2.3 Specific operational use conditions

This module is stand-alone modular. If the end product will involve the Multiple simultaneously transmitting condition or different operational conditions for a stand-alone modular transmitter in a host, host manufacturer have to consult with module manufacturer for the installation method in end system.

2.4 Limited module procedures

Not applicable

2.5 Trace antenna designs

Not applicable

2.6 RF exposure considerations

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.

2.7 Antennas

This radio transmitter FCC ID: 2A8XQ-IOT-WB2S-LC3 has been approved by Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Antenna No.	Operate frequency band	Antenna Type	Maximum antenna gain
Antenna	2402-2502MHz	PCB Antenna	4.16dBi

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following" Contains FCC ID:2A8XQ-IOT-WB2S-LC3".

2.9 Information on test modes and additional testing requirements

Host manufacturer which install this modular with single modular approval should perform the test of radiated emission and spurious emission according to FCC part 15C:15.247 and 15.209 requirement, only if the test result comply with FCC part 15.247 and 15.209 requirement, then the host can be sold legally.

2.10 Additional testing, Part 15 Subpart B disclaimer

Host manufacturer is responsible for compliance of the host system with module installed with all other applicable requirements for the system such as Part 15 B.