Specification

802.11 a/b/g/n Wi-Fi + BLE 5.0 Kit

BW16-Kit

Version: V1.0

Disclaimer and copyright notice

The information in this article, including the URL address for reference, is subject to change without notice.The Documentation is provided "as is" without any warranty, including any warranties of merchantability, fitness for a particular purpose, or non-infringement, and any warranties mentioned in the proposal, specification or sample. This document is not responsible for any infringement of any patent rights arising out of the use of the information in this document. No license, express or implied, by estoppel or otherwise, is hereby granted.

The test data obtained in this paper are all obtained by B&T laboratory , and the actual results may be   slightly different.The Wi-Fi alliance membership mark is owned by the WiFi alliance.

All trade mark names, trademarks and registered trademarks mentioned herein are the property of their respective owners and are hereby declared.
The final interpretation right is owned by Shenzhen B&T Technology Co., Ltd.

Note
The contents of this manual may be changed due to the version upgrade of the product or other reasons. Shenzhen B&T Technology Co., Ltd. reserves the right to modify the contents of this manual without any notice. This manual is only used as a guide, and Shenzhen B&T Technology Co., Ltd. makes every effort to provide accurate information in this manual, but Shenzhen B&T Technology Co., Ltd. does not ensure that the contents of the manual are completely true. All statements and information in this manual,and the recommendations do not constitute for any warranty, express or implied.

Document development / revision / revocation resume

Version	Date	Development/revision	Development	Approval
V1.0	2021.08.10	First Edition	Xiaochen Li	Xu Hong

CONTENT

1.Product Overview

The BW16-Kit development board is a core development board designed by B&T for the BW16 module, which continues the classic design of the NodeMCU development board, leading   all I/O to the pin headers on both sides, on board RGB light, developers can also connect peripherals according to their own needs.Standard pin headers on both sides make operation easier when using bread boards for development and commissioning.

BW16 is a dual-frequency Wi-Fi + Bluetooth SoC module developed based on RTL8720DN.It supports dual-frequency (2.4GHz or 5GHz) WLAN and low power Bluetooth 5.0; and integrates ARMV8 (Cortex-M4F) high performance MCU, ARM V8M (Cortex-M0) low power MCU, WLAN (802.11 a / b / g / n), MAC, Bluetooth and RF baseband, and   provides a set of configurable GPIO ports for the control of different peripherals.

BW16 also integrates internal storage and supports simple application development for full Wi-Fi and BT5.0 protocol capabilities.
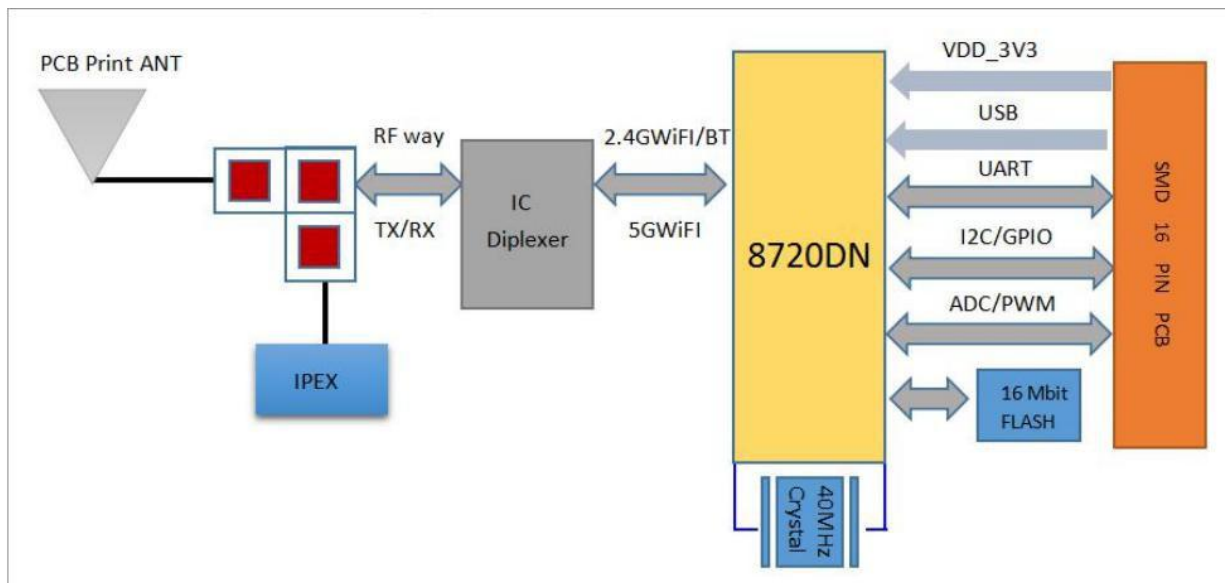
Characteristics

- Supports 802.11a/b/g/n 1x1,2.4GHz or 5GHz
- Support for HT20/HT40 mode
- Support low power beacons listening mode, low power reception mode, and low power hanging mode
- Built-in AES / DES / SHA hardware engine
- Support for TrustZone-M, supports secure startup
- The SWD debug port access protection and ban modes are supported
- Support for BLE and BT5.0
- Bluetooth supports high-power mode (7dBm, shares the same PA as Wi-Fi)
- The Wi-Fi and the BT share the same antenna

Application Solution

- Machine to machine interconnection（M2M）
- Remote control

Main parameters

Model	BW16-Kit
Module package	SMD-16
Module size	24*16*3(±0.2)MM
Antenna	PCB antenna or IPEX
Frequency range	2400-2483.5MHz or 5180-5825MHz
Bluetooth	BLE 5.0
Bluetooth frequency range	2.402GHz - 2.480GHz
Operating temperature	-20 ℃ ~ 70 ℃
Store environment	-40 ℃ ~ 125 ℃ , < 90%RH
Power supply range	Module voltage 3.0V ~ 3.6V，typical value 3.3V，Micro USB 5V power supply ,current >450mA
Support interface	UART/GPIO/ADC/PWM/IIC/SPI/SWD
Module certification	RoHS、FCC、CE、SRRC

Block diagram
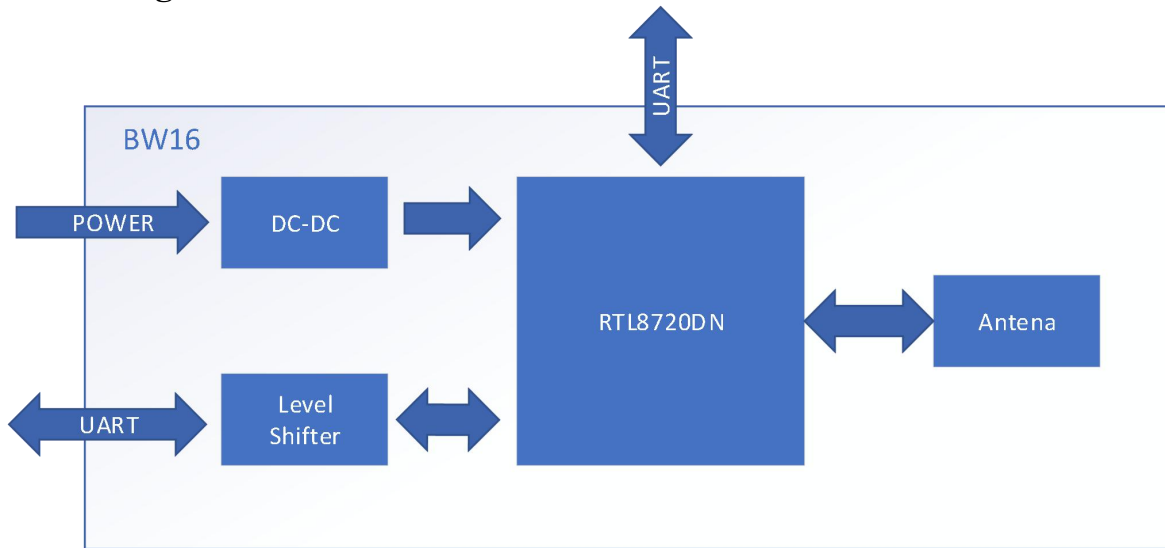
# 2.Electrical characteristics

Tips：

The BW16 module are electrostatic sensitive devices (ESD) and require special ESD precautions typically applied to ESD sensitive components. Proper ESD handling and packaging procedures must be applied throughout the processing, handling, transportation and operation of any application that incorporates the BW18 module. Don't touch the module by hand or solder with non-anti-static soldering iron to avoid damage to the module.

Parameter condition	Min	Typical	Max	Unit
DC3.3V（With an internal pressure regulator and integrate CMOSPA）	3.0	3.3	3.6	V
Digital I/O power supply voltage	1.76	1.8-3.3	3.3	mA
DC_IO_33 （3.3V I / O rated electric current）			50	mA
Electrostatic protection（VESD）			2000	V

RF performance

Description	Typical value	Unit
Operating frequency	2400-2483.5 or 5180-5825	MHz
Output power		
In 11a mode, the PA output power is	14±2	dBm
In 11n mode, the PA output power is	14±2	dBm
In 11g mode, the PA output power is	15±2	dBm
In 11b mode, the PA output power is	16±2	dBm
Bluetooth output power	7±2	dBm
Receiving sensitivity		
CCK, 1 Mbps	<=-90	dBm
CCK, 11 Mbps	<=-85	dBm
6 Mbps (1/2 BPSK)	<=-88	dBm
54 Mbps (3/4 64-QAM)	<=-70	dBm
HT20 (MCS7)	<=-67	dBm
Bluetooth sensitivity	<=-92	dBm

3.Appearance dimensions
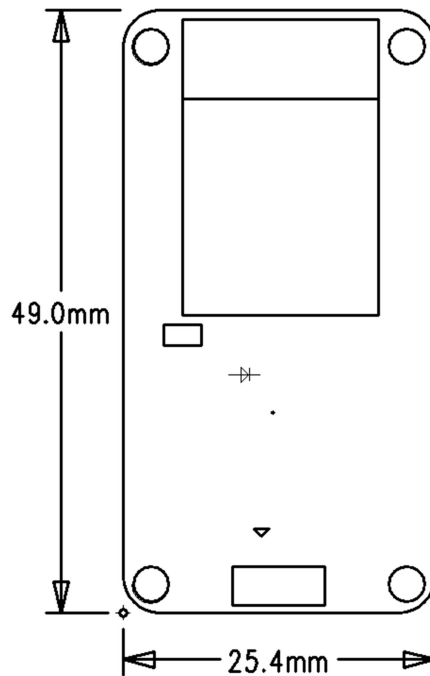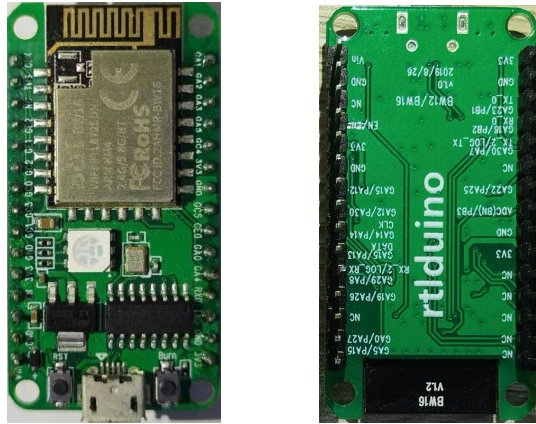
4.Pin definition

The BW16-Kit development board lead out 30 interfaces, refer to below the pin schematic diagram, and the pin function definition table is the interface definition.

Pin function definition table

NO.	Name	Function
1	PA15	SPI1_CS
2	PA27	SWD_DATA
3	NC	Not connect
4	PA26	LP_I2C_SDA/LP_PWM5
5	PA8/LOG_RX	UART_LOG_RXD
6	PA13	LP_PWM1/SPI1_MISO
7	PA14	SPI1_CLK
8	PA30	LP_PWM1
9	PA12	SPI1_MOSI/LP_PWM0
10	GND	Ground
11	3V3	3.3V power supply（VDD）；recommended greater than 500mA
12	EN	Chip enabling terminal
13	NC	Not connect
14	GND	Ground
15	Vin	5V power supply（VDD）
16	3V3	3.3V power supply（VDD）；maximum 450mA

17	GND	Ground
18	PB1	LP_UART_TXD
19	PB2	LP_UART_RXD
20	PA7/LOG_TX	UART_LOG_TXD
21	NC	Not connect
22	PA25	LP_I2C_SCL/LP_PWM4
23	PB3	ADC/SWD_CLK
24	GND	Ground
25	3V3	3.3V power supply（VDD）；recommended greater than 500mA
26	NC	Not connect
27	NC	Not connect
28	NC	Not connect
29	NC	Not connect
30	NC	Not connect

5.Schematic diagram
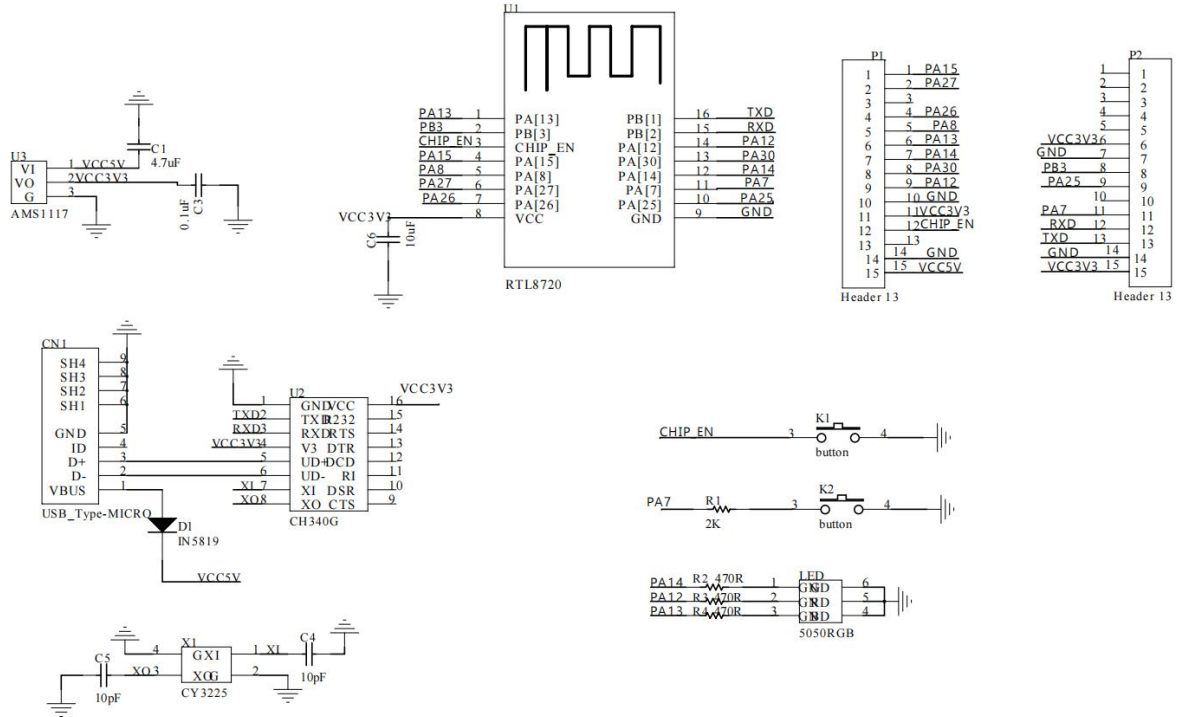

6.Design guidance

Power supply

The development board supports 3.3V or 5V voltage with peak current above 500mA

GPIO port

- Some GPIO ports are lead out from the periphery of the module, if using the proposed resistance of 10-100 ohms in series on the corresponding IO port. That can suppress the overshoot, smoother on both sides.Help for both EMI and ESD.

- The up and down of the special IO port, refer to the specification instructions, which affects the start up configuration of the module.

- The IO port of the module is 3.3V, if the master control does not match the IO level of the module, additional level conversion circuit is required

- If the IO port is directly connected to the peripheral interface, or pin header, it is recommended to reserve the ESD device at the IO line near the IPEX.

7.Reflow welding curve diagram
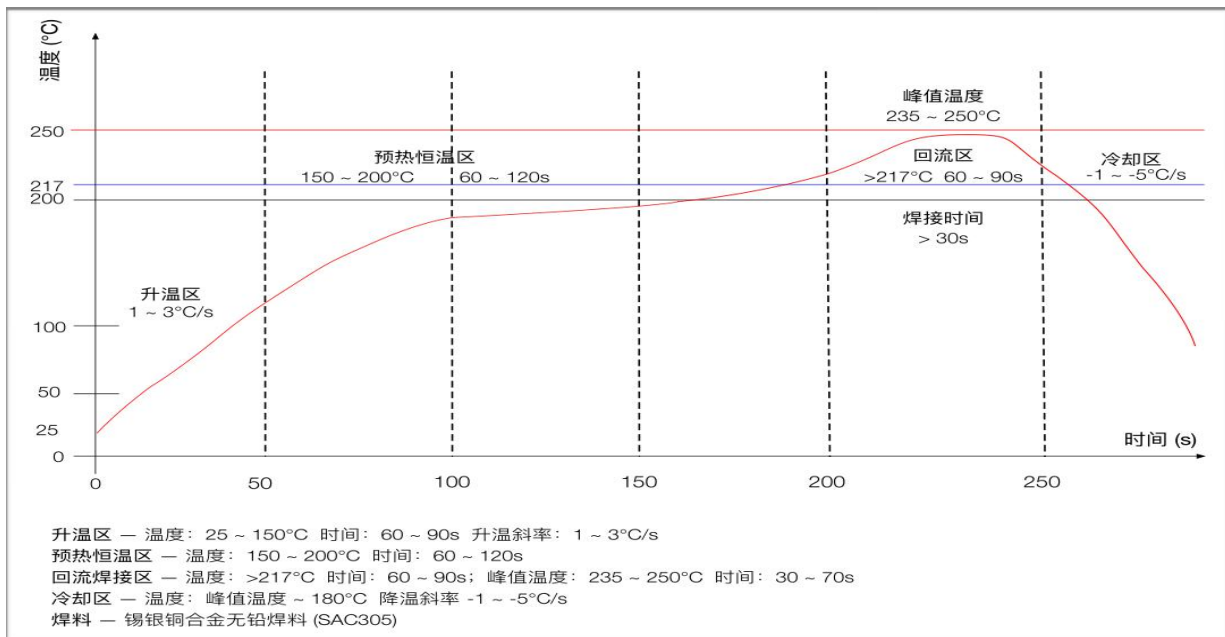
★**Notice:**

Adjust the balance time to ensure the rationalization treatment of gas when tin paste solves.If there are too much gaps on the PCB board, increase the balance time.

Considering that the product is long placed in the welding area (temperature above 180℃), to prevent components and bottom plate damage.

★**Important features of the curve:**

Rising speed =1~4 °C / sec, 25 °C to150 °C

Average preheating temperature is =140 °C to 150 °C, 60sec~90sec

Temperature fluctuation =225 °C to 250 °C, approximately 30sec

Drop speed =2~6 °C / sec, to 183 °C, approximately 15sec

Total time = is about 300sec

8. Package information

The BW16-Kit development board is packaged for inserted pearl cotton with electrostatic bags.

9. Contact us

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

http://www.tech-now.com

Develop DOCS：https://docs.ai-thinker.com

Official forum：http://bbs.ai-thinker.com

Sample purchase：https://ai-thinker.en.alibaba.com/

Business cooperation：sales@aithinker.com ; overseas@aithinker.com

Technical support：support@aithinker.com

Company address: 403,408~410, Building C, Gushu Huafeng Smart Innovation Port, Xixiang, Bao'an District, Shenzhen

Tel.: 0755-29162996