WAC LIGHTING WB-IA62C1 BLE Module Owner's Manual

Contents

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A LIGHTING NEW YORK STORE

WAC LIGHTING WB-IA62C1 BLE Module

Specifications

- **Module Type:** BLE Module WB-IA62C1
- **Module Size:** 12mm x 18mm
- **Chipset:** Realtek RTL8762CMF
- **Operating Voltage:** 3.3V IO voltage: 3.3V / 1.8V
- **Bluetooth Standard:** Bluetooth 5
- **Memory:** 160kByte RAM, 8MByte Flash Address Space
- **Max TX Power: 8dBm, RX Sensitivity:** -97dBm BLE(min)
- **Operating Temperature:** -40°C to +85°C

Product Description	**BLE Module**
Module NO	**WB-IA62C1**
Customer Name	
Customer PN	

Wrote By Xiekehuang 2024-05-28	Check LIDAYU 2024-05-28	approve MAXZHANG 2024-05-28

Customer acknowledgement column		
R&D Department	Engineering Department	Quality Department

Basic Information

Module type

Module	Size	Process types	Mark
WB-IA62C1	12mm*18mm*2.2mm±0.2 mm	SMD	

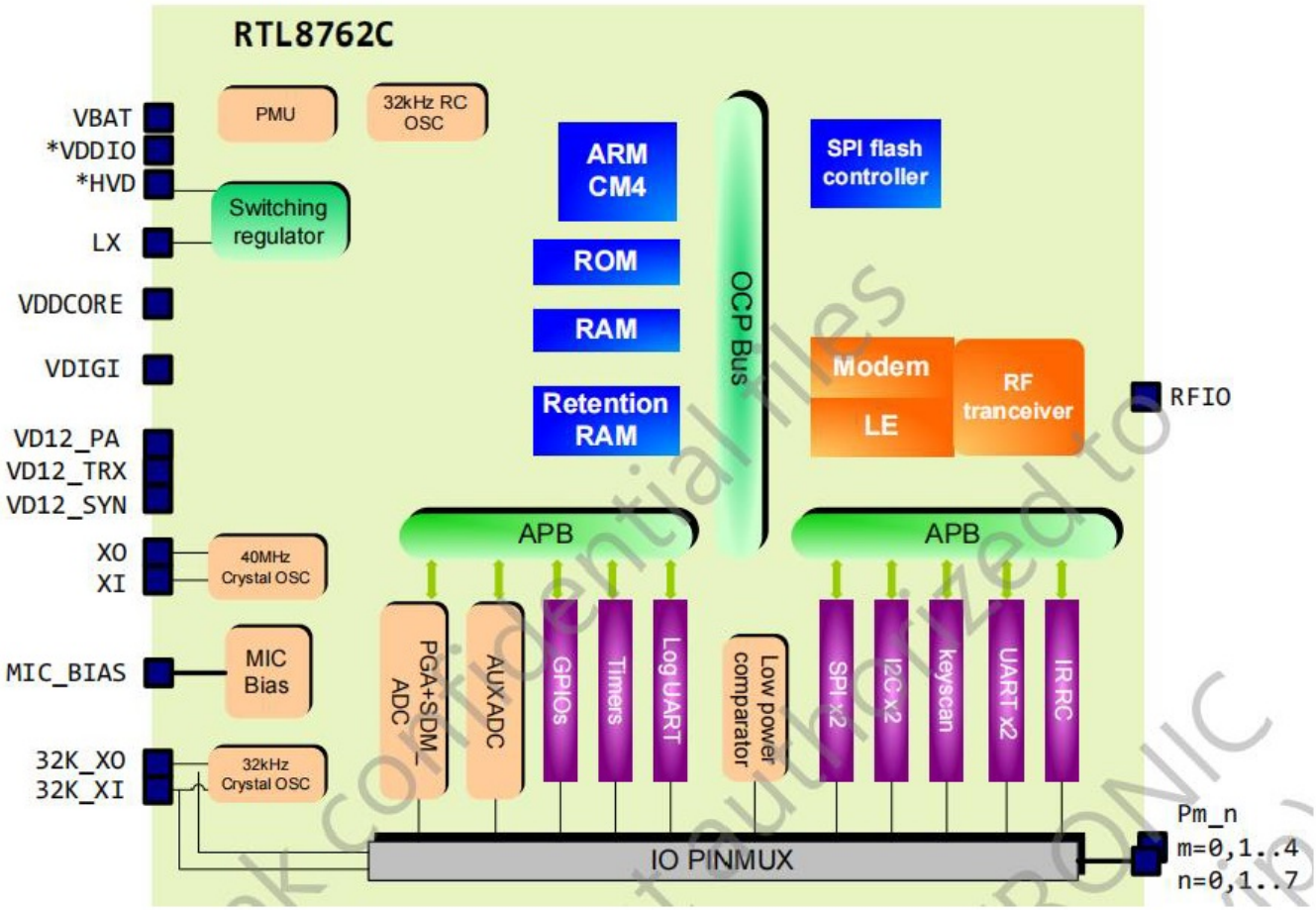
Revision History

Date	Version	Authorized	Remarks
2024-05-28	1.0	MaxZhang	First release

General Description

- WB-IA62C1 is a 12mmx18mm size module. It is based on a Realtek RTL8762CMF chip.
- WB-IA62C1 is an ultra-low-power system on-module solution for Bluetooth 5 low energy applications that combine the excellent performance of a leading RF transceiver with a low-power ARM Cortex-M4F and rich powerful supporting features and peripherals.
- The embedded ARM Cortex-M4F 32-bit CPU features a 16-bit instruction set with 32-bit extensions that delivers high-density code with a small memory footprint. By using a single-cycle 32-bit multiplier,a 3-stage pipeline, and a Nested Vector Interrupt
- Controller, the ARMCortex-M4F makes program execution simpe and hihly efficient.The RTL8762c memory architecture includes ROM,160kByte RAM and 8MByte Flash Address Space.

Block Diagram



Features

General

- Ultra-low power consumption with intelligent PMU
- Supports Bluetooth 5 core specification
- Supports 2Mbps LE
- LE advertising Extensions
- LE Long Range
- Channel Selection #2
- High Duty Cycle Non-Connectable Adv
- Integrated MCU to execute Bluetooth protocol stack
- Supports multiple-level Energy states
- Supports LE L2CAP Connection Oriented Channel Support
- Supports LE low-duty directed advertising
- Supports LE data length extension feature
- Supports OTA (Over-the-Air) programming mechanism for firmware upgrade
- Generic Applications for GAP Central, Peripheral, Observer and Broadcaster Roles
- The module has a 1db Bluetooth 2.4G Antenna built-in.

Interface

- Timers x 8

- I2C x 2
- PWM x 8
- UART x 2
- GPIO x 24
- I2S/PCM interface for external audio codec

Features

- ARM Cortex-M4F with a floating-point unit (Maximum 40MHz)
- Serial flash controller with 16kB 4-way cache
- Total 160kB SRAM
- 160kB SRAM
- 4Kbits eFUSE for manufacturer use
- Embedded 4Mbits flash
- **Max TX power:** 8dBm
- **RX sensitivity:-**97dBm BLE(min)

Operating Condition

- **Operating voltage:** 3.3V
- **IO voltage:** 3.3V /1.8V
- **Temperature range:** -40°C to +85°C

Applications:

- MESH LED

Characteristic Description

Hardware features

Module	WB-IA62C1
Major Chipset	RTL8762CMF
Standards	Bluetooth 5
Operating Voltage	Operating voltage: 3.3V IO voltage:3.3V /1.8V

Electrical features
power on timing is shown in the figures below

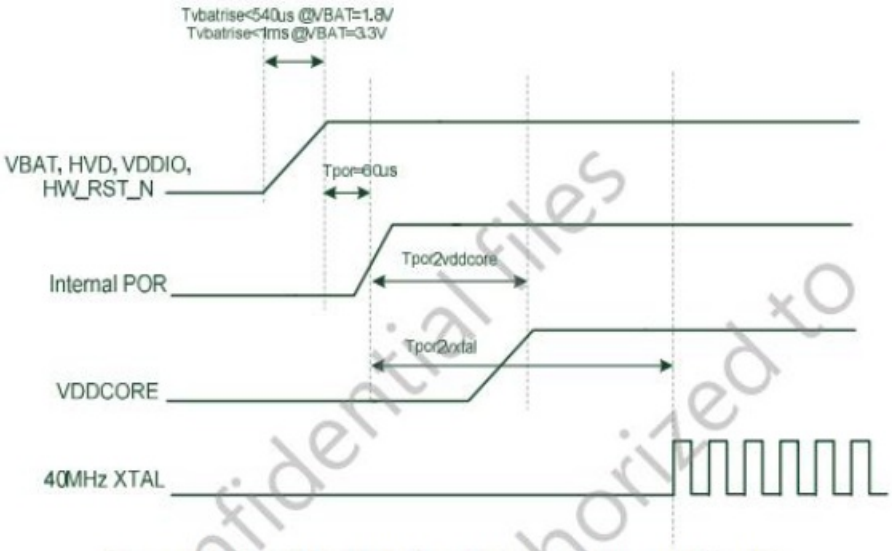


Figure 13. Boot Up By Internal Power On Reset Circuit

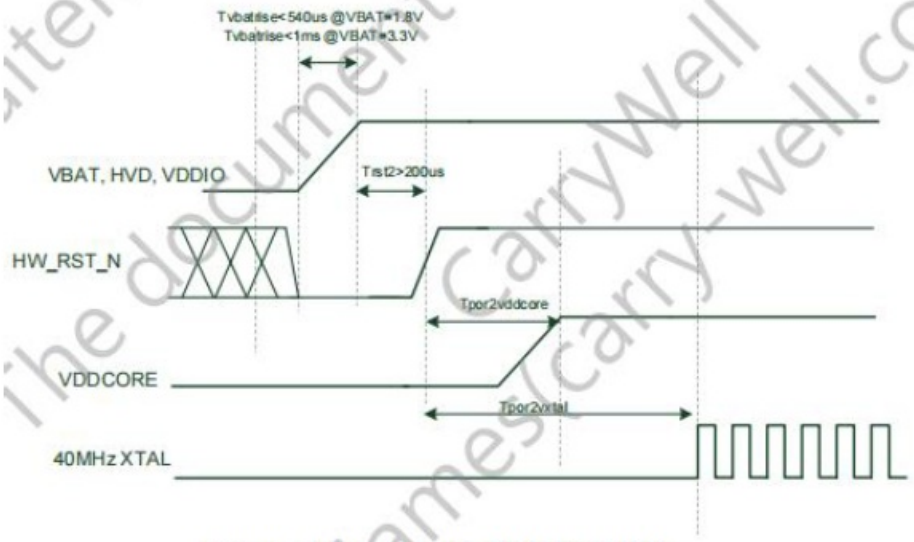


Figure 14. Boot Up By HW_RST_N Pin

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Module WB-IA62C1

Low Power Mode

Condition: VBAT=3V, VDDIO=3V, ambient temperature: 25 C

Table 26. Low Power Mode

Power Mode	Always on Registers	32k RCOSC/XTAL	Retention SRAM	CPU	Wakeup Method	Current Consumption (typical)
Power down	ON	OFF	OFF	OFF	Wakeup by GPIO	450nA
Deep LPS	ON	ON	Retention	OFF	Wakeup by GPIO, timer	2.5μA (with 160K SRAM in retention state)

Active Mode Power Consumption

Condition: VBAT=3V, VDDIO=3V, ambient temperature: 25 C

Table 27. Active Mode (RTL8762CMF with Switching Regulator)

Power Mode	Current Consumption (Typical)
Active RX mode	7.3 mA
Active TX mode (TX power: 0dBm)	7.9 mA
Active TX mode (TX power: 4dBm)	9.6 mA
Active TX mode (TX power: 7.5dBm)	11.3 mA

I2C Timing Characteristics

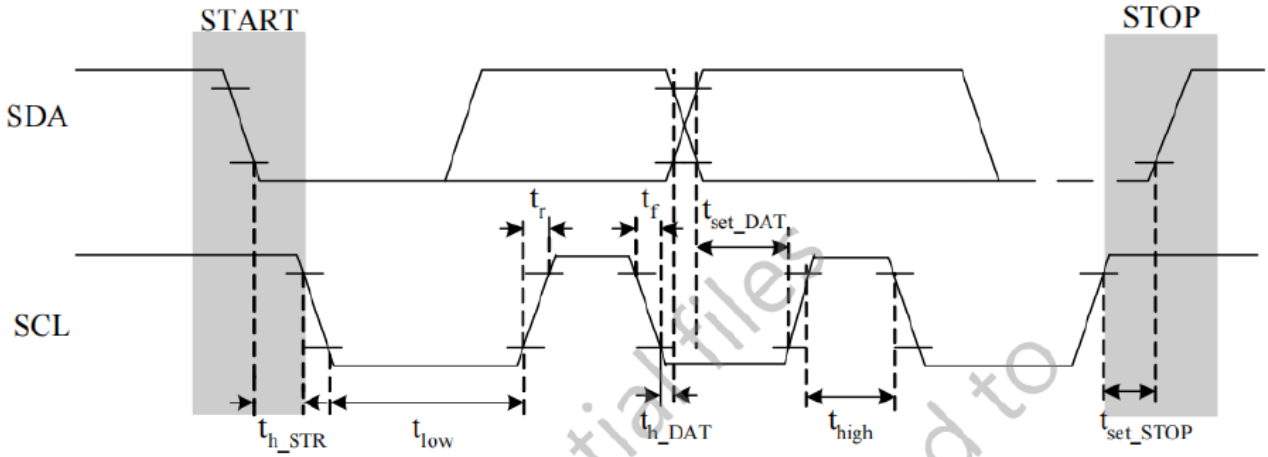


Figure 16. I2C Interface Timing Diagram

Table 25. I2C Timing Characteristics

Parameter	Symbol	Min	Typical	Max
SCL clock frequency (kHz)	-	-	-	400
High period of SCL (ns)	t_{high}	600	-	-
Low period of SCL (ns)	t_{low}	1300	-	-
Hold time of START (ns)	t_{h_STR}	600	-	-
Hold time of DATA (ns)	t_{h_DAT}	0	-	-
Setup time of STOP (ns)	t_{set_STOP}	600	-	-
Setup time of DATA (ns)	t_{set_DAT}	100	-	-
Rise time of SCL and SDA (ns) (with 4.7k ohm resistor pulled high)	t_r	See note	-	-
Fall time of SCA and SDA (ns)	t_f	See note	-	-

Note: Depends on the external bus pull up resistor.

UART Characteristics

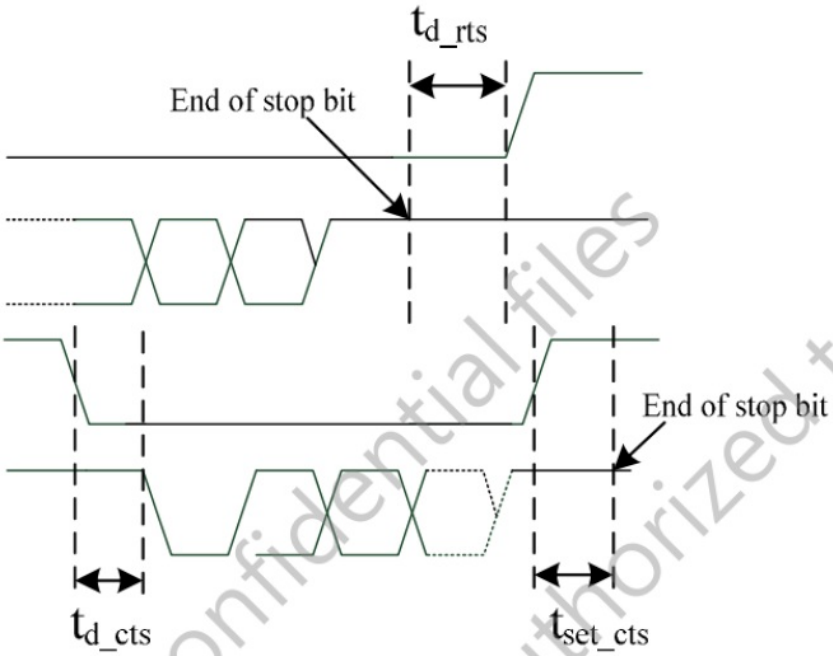


Figure 15. UART Characteristics

Table 24. UART Timing Characteristics

Parameter	Symbol	Min	Typical	Max
Timing between RX Stop bit and RTS go high when RX FIFO is full (symbol time)	t_{d_rts}	-	-	0.5
Timing between CTS go low and device send first bit (ns)	t_{d_cts}	-	-	25
Timing between CTS go high and TX send stop bit (ns)	t_{set_cts}	75	-	-

AUX ADC

The RTL8762CMF/RTL8752CMF provides a built in (maximum 8 channels; the maximum number of ADC channels depends on the package type) 12bits, 400kbps AUXADC for external analog signal sensing and internal VBAT voltage monitoring. The functional block is shown in Figure 12.

A 12bits, max 400ksps AUXADC with 8 channel sharing

Flexible sampling schedule table for multi-channel sampling

Divided mode: Supports 0~VBAT input range with internal resistor divider

Internal VBAT voltage sensing

Supports single-ended mode and differential mode

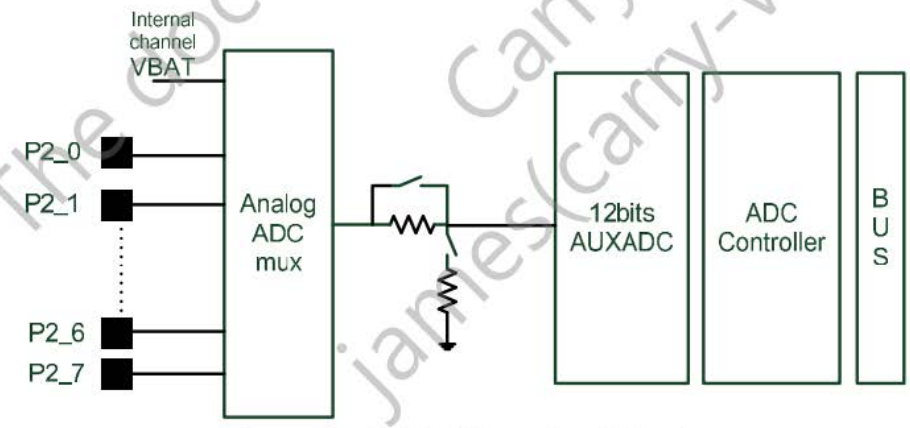


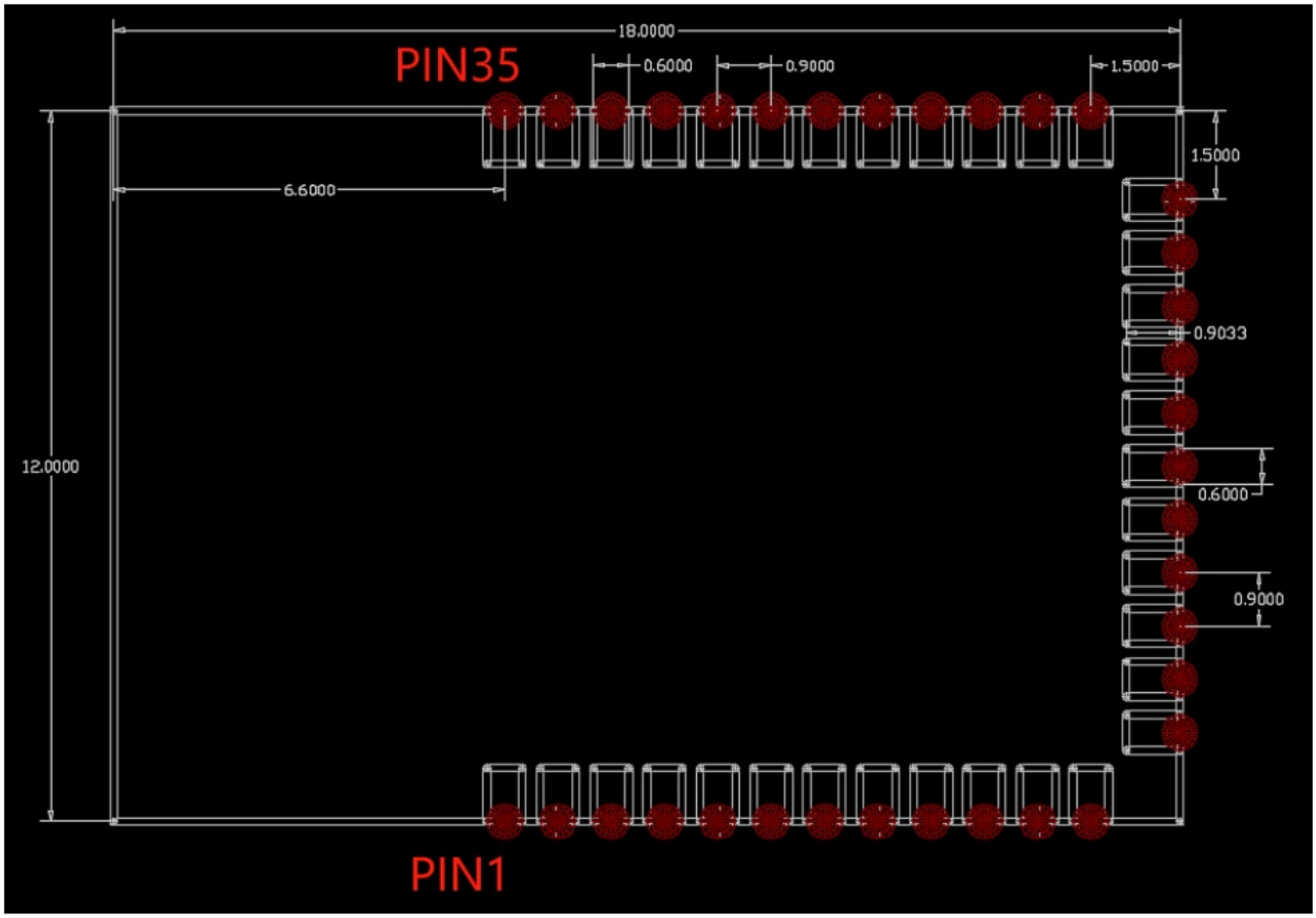
Figure 12. AUXADC Functional Block

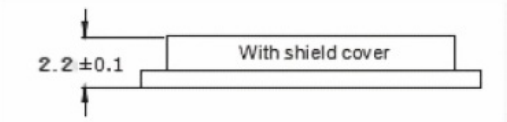
Environmental Requirement

Input power ripple	≤50mV
VDD Power input requirements	3.3V/0.3A
Operating Temperature	-40℃ ~ +85℃

Mechanical Specifications

Size (unit:mm) 12*18*2.2mm ±0.2





Pin definition and description

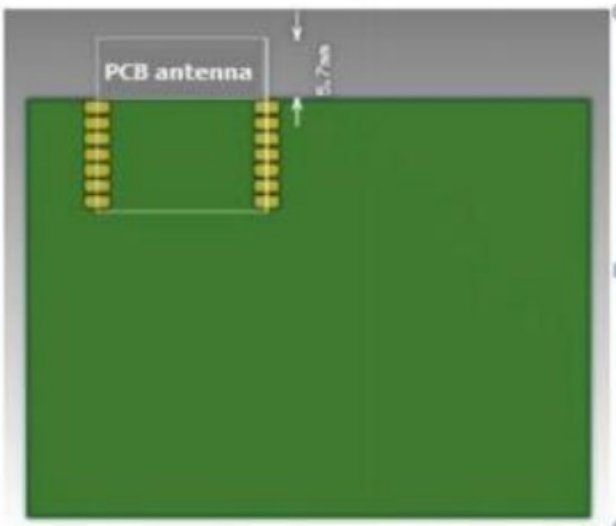
Pin Number	Name	Description
1	GND	GND
2	P2_3	GPIO;With wakeup function;AUXADC input 3.
3	P2_4	GPIO;With wakeup function;AUXADC input 4.
4	P2_5	GPIO;With wakeup function;AUXADC input 5.
5	P2_6	GPIO;With wakeup function;AUXADC input 6.
6	P2_7	GPIO;With wakeup function;AUXADC input 7.
7	P0_5	GPIO;With wakeup function
8	P0_6	GPIO;With wakeup function
9	P4_0	GPIO;With wakeup function
10	GND	GND

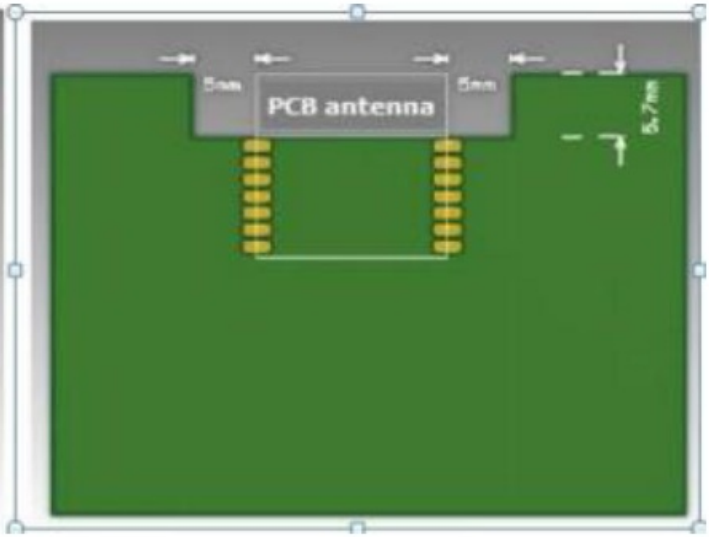
11	P0_1	GPIO;With wakeup function
12	VDDIO	1.8V or 3.3V
13	P4_2	GPIO;With wakeup function
14	P4_1	GPIO;With wakeup function
15	P4_3	GPIO;With wakeup function
16	P0_4	GPIO;With wakeup function
17	P0_3	GPIO;With wake-up function; Log_UART_TX; Pull-down to bypass executing program code in flash
18	P0_2	GPIO; With wakeup function
19	32.768KHz_out	32.768KHz crystal input or external clock output(Optional);
20	32.768KHz_in	32.768KHz crystal input or external clock input(Optional);
21	GND	GND
22	P0_0	GPIO; With wakeup function
23	GND	GND
24	P5_0	GPIO; With wakeup function
25	P1_0	GPIO; With wakeup function; SWDIO (default).
26	GND	GND
27	P2_2	GPIO; With wakeup function; AUXADC input2.
28	P1_1	GPIO; With wakeup function; SWDCLK (default).
29	P3_2	GPIO; With wakeup function
30	VCC	3.3V/0.3A Main Power input
31	P3_3	GPIO; With wakeup function
32	P3_0	GPIO; With wakeup function; HCI_UART_TX (default).
33	P3_1	GPIO; With wakeup function; HCI_UART_RX (default).

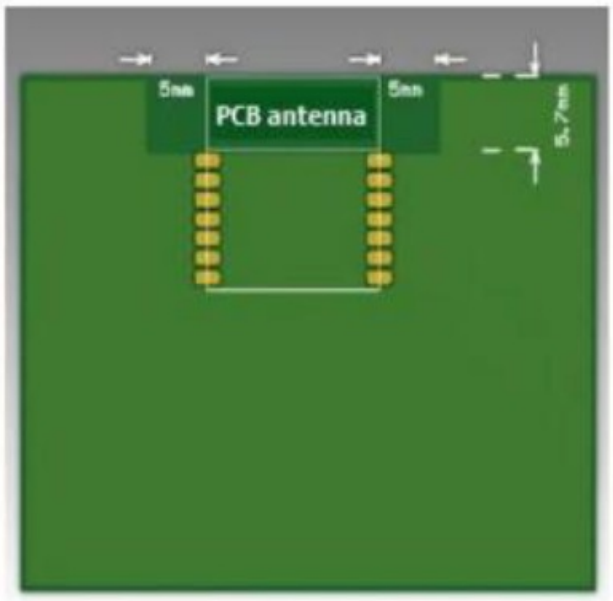
34	BT_RST	Hardware Reset; If not use, Please NC
35	GND	GND

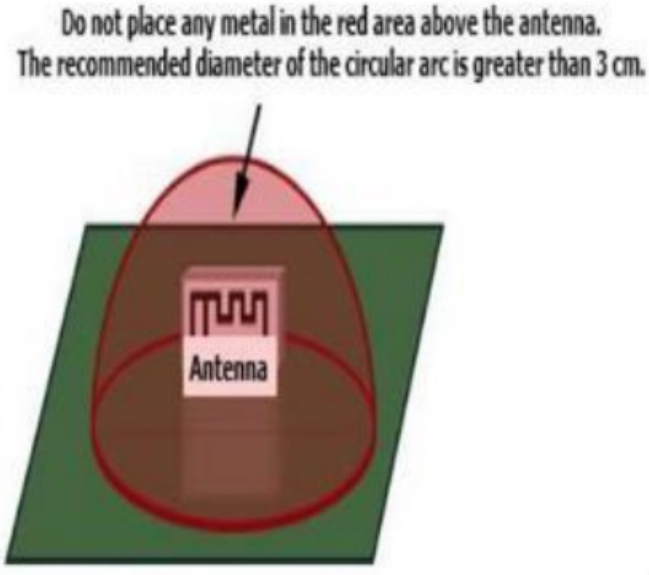
PCB layout Attention

It is recommended that the distance between the module antenna part and other metal parts should be at least over 15mm or above. The user PCB board in the antenna area do not line or even copper, so as not to affect the antenna performance.



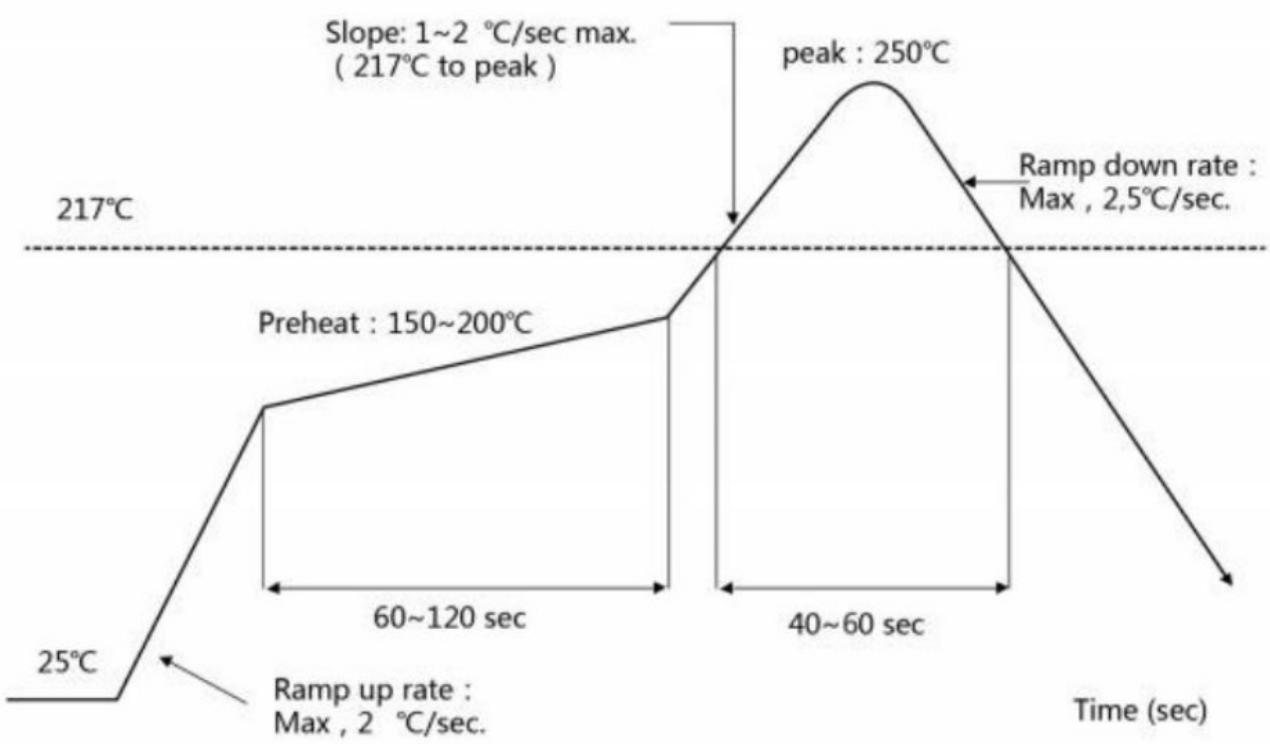






Reflow – furnace temperature curve

- Referred to IPC/JEDEC standard.
- **Peak Temperature:** <250°C
- **Number of Times:** <2 times



Patch BT modules installed before the notice
BT module installed note:

1. **Please press 1:** 1 and then expand the outward proportion to 0.7 mm, 0.12 mm thickness When opening a stencil.
2. Take and use the WIFI module, please ensure the electrostatic protective measures.
3. The reflow soldering temperature should be according to the customer the main size of the products, such as the temperature set at 250 + 5℃ for the MID motherboard.

About the module packaging, storage and use of matters needing attention are as follows:

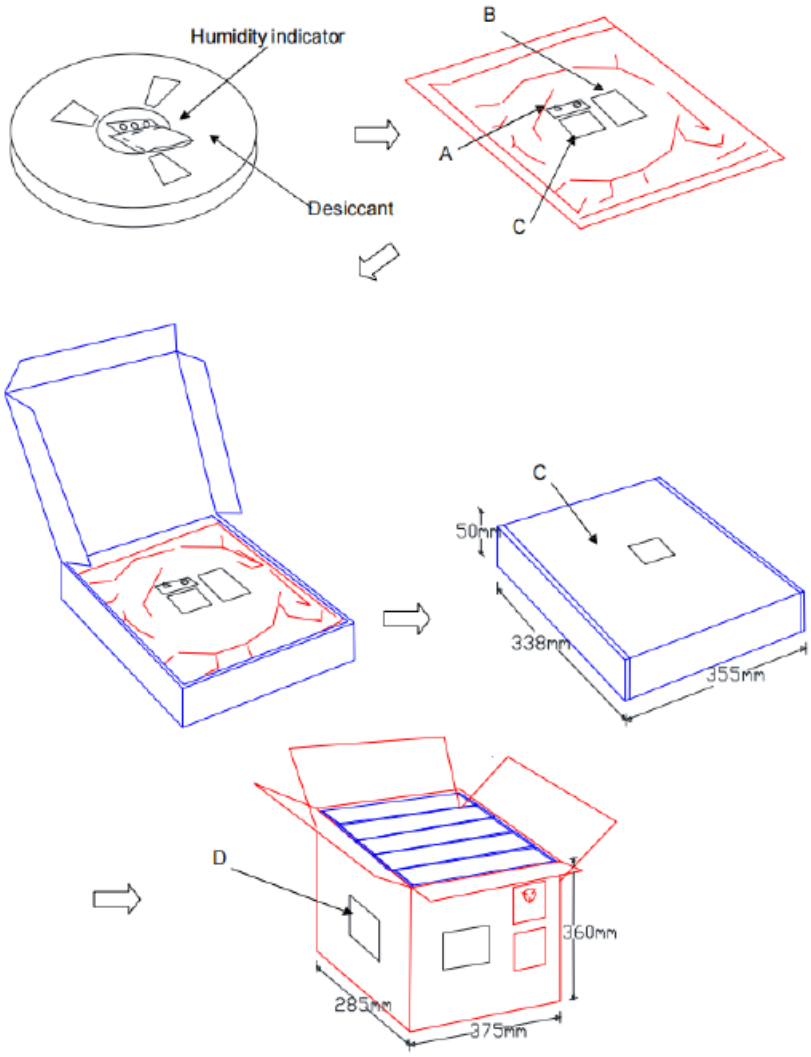
1. The module of the reel and storage life of vacuum packing: 1). Shelf life: 8 months, storage environment conditions: temperature in: < 40℃, relative humidity: < 90% r.h.
2. The module vacuum packing once opened, time limit of the assembly: Card:
    1. check the humidity display value should be less than 30% (in blue), such as 30% ~ 40% (pink), or greater than 40% (red) the module have been moisture absorption.
    2. factory environmental temperature humidity control: ≦ -30 ℃, ≦ 60% r.h..
    3. Once opened, the workshop the preservation of life for 168 hours.
3. Once opened, such as when not used up within 168 hours:
    1. The module must be again to remove the module moisture absorption.
    2. The baking temperature: is 125 ℃, 8 hours.
    3. After baking, put the right amount of desiccant to seal packages

Package

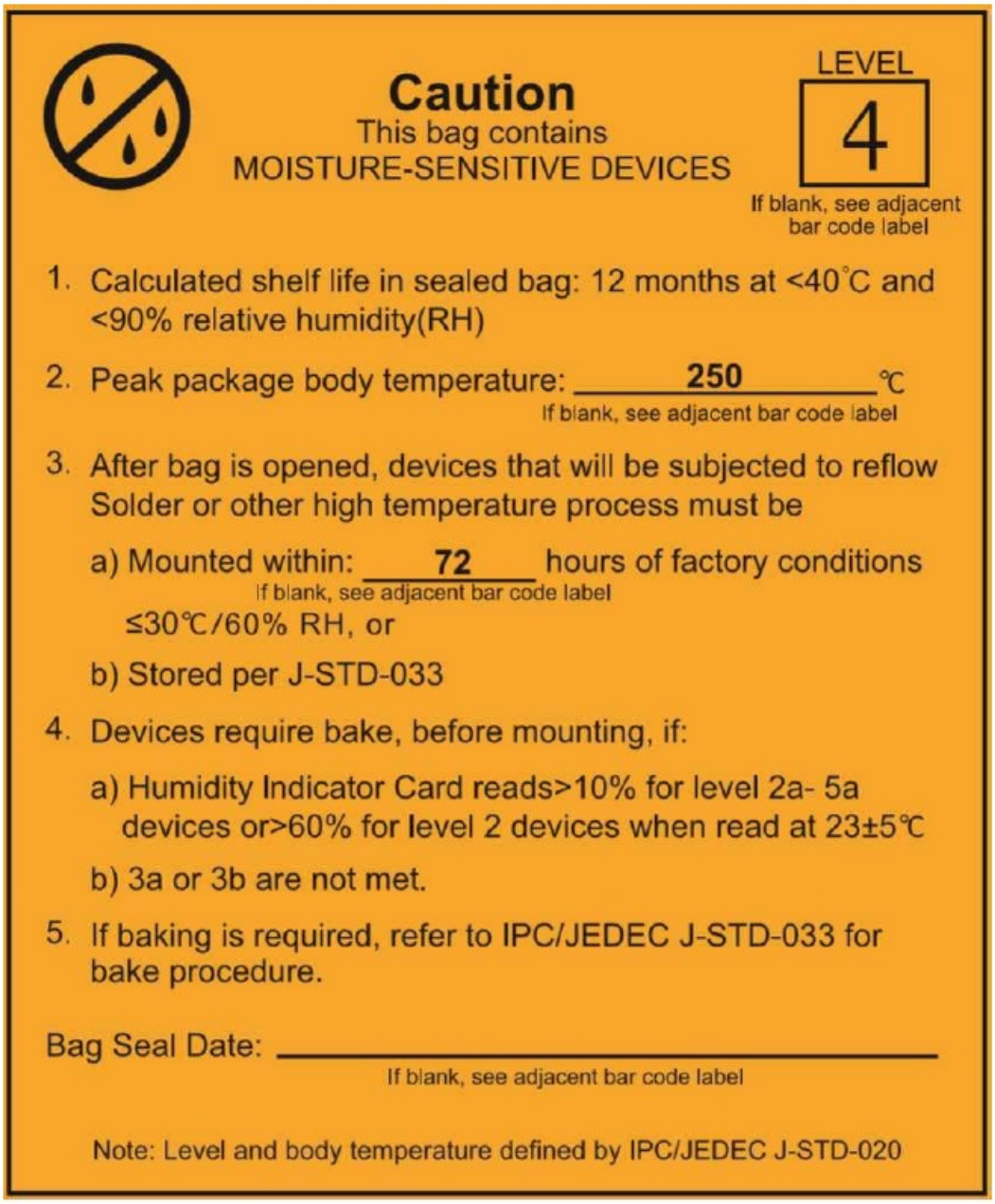
Reel A roll of 1500pcs

1> 1500pcs of per disc

2> 1500pcs * 5 =7500pcs (one Cartoon)



MSL Level / Storage Condition



❖**NOTE:** Accumulated baking time should not exceed 96hrs

FCC

FCC Warning

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

List of applicable FCC rules

- FCC Part 15.247

Specific operational use conditions

- This transmitter/module and its antenna(s) must not be co-located or operating in conjunction with any transmitter. This information also extends to the host manufacturer’s instruction manual.

Limited module procedures Not applicable Trace antenna designs

- Explanation: Yes, The module with trace antenna designs, and This manual has shown the layout of trace design, antenna, connectors, and isolation requirements.

RF exposure considerations

- This equipment complies with FCC, RF radiation exposure limits set forth for an uncontrolled environment

Antennas

- PCB Antenna; 0.9dBi; 2.402 GHz~2.480GHZ
- Rod Antenna ;2.87dBi; 2.402 GHz~2.480GHZ

Label and compliance information

- The end product must carry a physical label or shall use e-labeling followed by KDB784748D01 and KDB 784748 stating “Contains Transmitter Module FCC ID: 2APNFWAC000005.

Information on test modes and additional testing requirements

- For more information on testing, please contact the manufacturer.

Additional testing, Part 15 Subpart B disclaimer

- The modular transmitter is FCC-authorized for the specific rule parts (FCC Part 15.247) listed on the grant, and the host product manufacturer is responsible for compliance with any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. The final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed when contains digital circuity.

FCC Statements

(OEM) Integrator has to assure compliance of the entire end-product incl. the integrated RF Module. For 15 B ($15.107 and if applicable $15.109) compliance, the host manufacturer is required to show compliance with 15 while the module is installed and operating. Furthermore, the module should be transmitting and the evaluation should confirm that the module’s intentional emissions (15C) are compliant (fundamental/out-of-band). Finally, the integrator has to apply the appropriate equipment authorization (e.g. Verification) for the new host device per definition in $15.101. The integrator is reminded to ensure that these installation instructions will not be made available to the end-user of the final host device. The final host device, into which this RF Module is integrated” has to be labeled with an auxiliary label stating the FCC ID of the RF Module, such as “Contains FCC ID: 2APNFWAC000005

Module statement
The single-modular transmitter is a self-contained, physically delineated, component for which compliance can be demonstrated independent of the host operating conditions, and which complies with all eight requirements of S 15.212(a)(1) as summarized below.

1. The radio elements have the radio frequency circuitry shielded.

2. The module has buffered modulation/data inputs to ensure that the device will comply with Part 15 requirements with any type of input signal.
3. The module contains power supply regulations on the module.
4. EUT has two antennas: one is a PCB antenna, which is nonremovable; Another type is the rod antenna, which does not use standard antenna sockets or electrical connectors to replace the antenna
5. The module demonstrates compliance in a stand-alone configuration.
6. The module is labeled with its permanently affixed FCC ID label.
7. The module complies with all specific rules applicable to the transmitter, including all the conditions provided in the integration instructions by the grantee.
8. The module complies with RF exposure requirements.

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.

FCC warning:
Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
Note: This equipment has been tested and found to comply with the limits for a Class B digital device, under 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 by 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 the receiver.
- Connect the equipment to 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.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator & your body.

FAQs

- **Q: What is the maximum transmission power of the module?**
  - **A:** The module has a maximum transmission power of 8dBm.
- **Q: What is the operating temperature range of the module?**
  - **A:** The module can operate in temperatures ranging from -40°C to +85°C.

Documents / Resources

Product Specification

Product Description	BLE Module
Module NO.	WB-IA62C1
Customer Name	
Customer PN	

Made By: Xiaohuang 2024-05-20	Check: LI DAIYU 2024-05-20	approve: KAICHAO 2024-05-20

Customer acknowledgement column		
R&D Department	Engineering Department	Quality Department

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WB-IA62C1, WB-IA62C1 BLE Module, BLE Module, Module

References

- **User Manual**