



Pairlink Rabbit-B Bluetooth 5 BLE Module User Guide

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Main Application Domain

1. MCU data pass-through.
2. 2 Bluetooth Printer / Scanner / Digital price tag etc.
3. Remote control / Keyboard and Mouse / Toys / Smart phone self timer etc.
4. Industrial remote control / Industrial telemetry / Industrial data collection.
5. Smart home / Intelligent lighting / Intelligent access control system.

Electrical Specifications

Absolute Ratings

Parameter	Specification		Unit
	Min.	Max.	
Power Supply(V)	-0.3V	+3.6V	Burn the module permanently if it exceeds +3.6V
Storage temperature(°C)	-55	+125	
Working temperature (°C)	-40	+85	
ESD HBM	-3.5KV	+3.5KV	Human Body Model
ESD CDM	-500V	+500V	Charged Device Model

Recommended Operating Conditions

Parameter		Specification			Note
		Min.	Typical	<u>Max.</u>	
Power Supply(V)		1.8	3.3	3.6	
Communication level(V)			3.3		Can't communicate with 5V TTL level directly
Working temperature(°C)		-40	20	+85	Industry Standard
	TX Current (mA)		10.2		TX Power=+4dBm
			12.7		TX Power=+8dBm
Consume	RX Current (mA)		6.8		VBAT=3V3,1Mbps
	Sleep Current (uA)		3.8		Deep-sleep ,Supports GPIO wake-up and timer wake-up
TX Power(dBm)				+8	
Receive Sensitivity(dBm)				-97	1Mbps

Digital I/O Characteristic

Characteristics	Condition	Symbol	Specification			Unit
			Min.	Typical	Max.	
Input Low Voltage		VIL	–	0	0.9	V
Input High Voltage		VIH	2.0	3.3	3.6	V
	VBAT=3V3					
Output Low Voltage		VOL	0	–	0.33	V
Output High Voltage		VOH	2.97	–	3.3	V

Hardware Design and PCB layout

Pin assignment and Pin description

Rabbit-B Pin definition can refer to **Figure 1**.

Pin Number	Pin Name	I/O	Alternate Function Description
11	VBAT	P	Power Supply(DC1.8V~3.6V).
1,17,24,27	GND	P	Connect to Ground.
12	RESET	DI	Reset signal (active high).
13	LOG_OUT	DIO	Log_out,not intended for customer use.
20	P3_1	DIO	GPIO/UART_RX
21	P3_0	DIO	GPIO/UART_TX
25	32K_XI	A	INPUT/OUTPUT with selectable pull up/down resistor. General purpose I/O port bit or alternate function nodes. Contain state retention mechanism during power down.
26	32K_XO	A	
2	P0_0	DIO	
3	P0_4	DIO	
4	P0_2	DIO	
5	P0_1	DIO	
6	P4_0	DIO	
7	P4_1	DIO	
8	P4_2	DIO	
9	P4_3	DIO	
10	P0_6	DIO	
14	P5_0	DIO	
15	P1_0	DIO	
16	P1_1	DIO	
18	P3_2	DIO	
19	P2_3	DIO/AIN	GPIO/ADCIN3
22	P2_4	DIO/AIN	GPIO/ADCIN4
23	P2_5	DIO/AIN	GPIO/ADCIN5

Table 1: Module Pin Description

Note: GPIO has integrated pull-up and pull-down resistors.

Support GPIO super multiplexing function, WAKE_UP / UART / SPI / IIC / PWM / and other functions can be arbitrarily configured on GPIO.

For more GPIO function configuration questions, contact to Pairlink.

As shown in the following table: GPIO Pin detailed Information.

Rabbit-B Rabbit-C Rabbit-S	GPIO Index	ADC	Hardware Default Pull setting (100K) Reset state	Rom Code Setting	Pull resistor	Boot code Default	Wake up Function	Dryer current
	GPIO_0		Pull Down	Pull Down	10K/100K		Yes	
P0_1	GPIO_1		Pull Down	Pull Down	10K/100K			
P0_2	GPIO_2		Pull Down	Pull Down	10K/100K		Yes	8mA
P0_3	GPIO_3		Pull Up	Output High	10K/100K	LOG UART TX	Yes	8mA
P0_4	GPIO_4		Pull Down	Pull Down	10K/100K		Yes	8mA
P0_5	GPIO_5		Pull Down	Pull Down	10K/100K		Yes	8mA
P0_6	GPIO_6		Pull Down	Pull Down	10K/100K		Yes	8mA
P1_0	GPIO_8		Pull Up	Pull Up	10K/100K	SWDIO	Yes	8mA
P1_1	GPIO_9		Pull Up	Pull Up	10K/100K	SWDCLK	Yes	8mA
P5_0	GPIO_25		Pull Down	Pull Down	5K/50K		Yes	8mA
IO_X1	GPIO_26		Pull Down	Pull Down	10K/100K		Yes	8mA
IO_X0	GPIO_27		Pull Down	Output Low	10K/100K		Yes	8mA
P2_2	GPIO_18	ADC/I _{PC} (channel 2) Differential I ₊	Pull Down	Pull Down	5K/50K		Yes	8mA
P2_3	GPIO_19	ADC/LPC (channel 3) Differential I ₋	Pull Down	Pull Down	5K/50K		Yes	8mA
P2_4	GPIO_20	ADC/LPC (channel 4) Differential I ₊	Pull Down	Pull Down	5K/50K		Yes	8mA
P2_5	GPIO_21	ADC/LPC (channel 5) Differential I ₋	Pull Down	Pull Down	5K/50K		Yes	8mA
P2_6	GPIO_22	ADC (channel 6) Differential I ₊	Pull Down	Pull Down	5K/150K		Yes	8mA

P2_7	GPIO 2 3	ADC(char el T) Differ etiat3	Pull Down	Pull Down	5K(50K		Yes	8mA
P3_0	GPIO 2 4		Pull Up	Pull Up	101(100K	UART TX	`Yes	8mA
P3_1	GPIO_ 25		Pull Up	Pull Up	101(100K	UART RX	Yes	8mA
P3_2	GPIO_ 26		Pull Down	Pull Down	101(100K		Yes	8mA
P3_3	GPIO 2 7		Pull Down	Pull Down	10K1100K		Yes	8mA
P4_0	GPIO_ 28		Pull Down	Pull Down	101(100K		Yes	8mA
P4_1	GPIO_ 29		Pull Down	Pull Down	10K1100K		Yes	8mA
P4_2	GPIO 3 0		Pull Down	Pull Down	101(100K		Yes	8mA
P4_3	GPIO 3 1		Pull Up	Pull Up	101 100K		Yes	8mA

Appearance and Dimensions

Figure 2 shows the size of the module. The components and prominent structure are not allowed put in this size range(20.5mm*14.0mm*2.6mm).

The following land pattern size is recommended for user board design. However, user can modify it according PCB soldering conditions. Sufficient examination is necessary if use the modified land pattern.

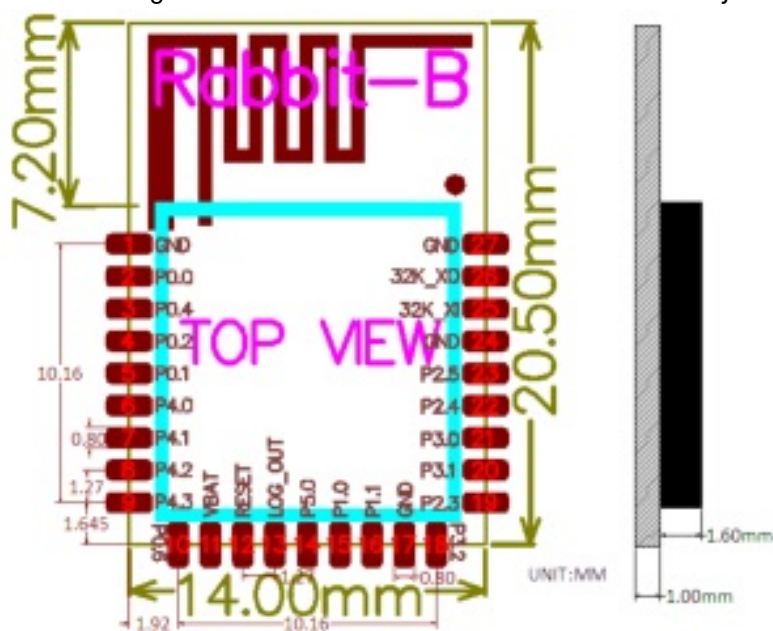


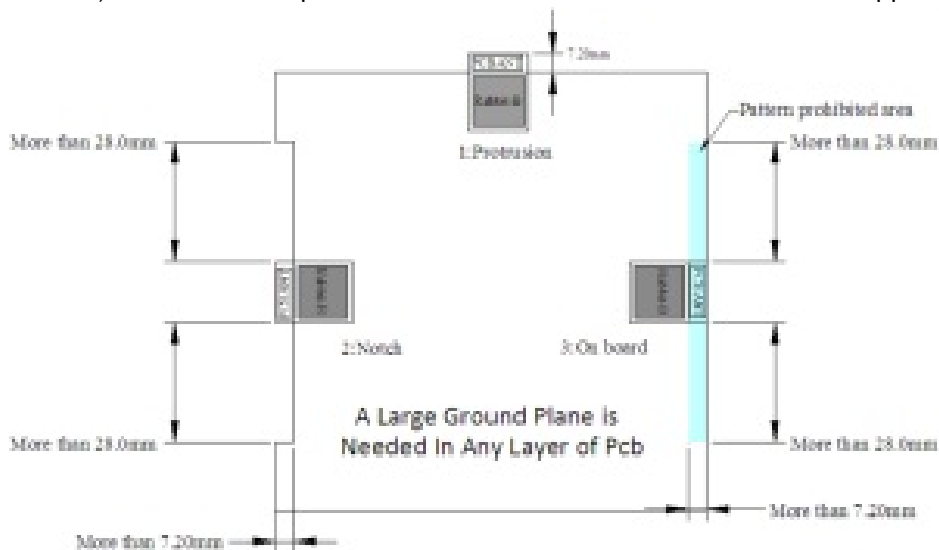


Figure 2: Mechanical Information

Module Layout Guideline

The layout on user PCB should be designed according to the following guideline.

When the module is placed on the PCB, it must be ensured that the RF antenna area (2 times the width of the module) is hollow or suspended, and there must be no traces, vias or copper.



Welding Declaration

The Rabbit-B module only supports one reflow soldering. Our company is not responsible for the module failure caused by multiple reflow soldering.

Figure 3: Reflow Soldering Temperature

Profile Feature	Sn-Pb Assembly	Pb-Free Assembly
Solder Paste	Sn63/Pb37	Sn96.5/Ag3/Cu0.5
Preheat Temperature min (T _{smin})	100°C	150°C
Preheat temperature max (T _{smax})	150°C	200°C
Preheat Time (T _{smin} to T _{smax})(t _s)	60-120 sec	60-120 sec
Average ramp-up rate(T _{smax} to T _p)	3°C/second max	3°C/second max
Liquidous Temperature (T _L)	183°C	217°C
Time (IL) Maintained Above) T _L)	60-90 sec	30-90 sec
Peak temperature T _p)	220-235°C	230-250°C
Aveage ramp-down rate (T _p to T _{smax})	6°C/second max	6°C/second max
Time 25°C to peak temperature	6 minutes max	8 minutes max

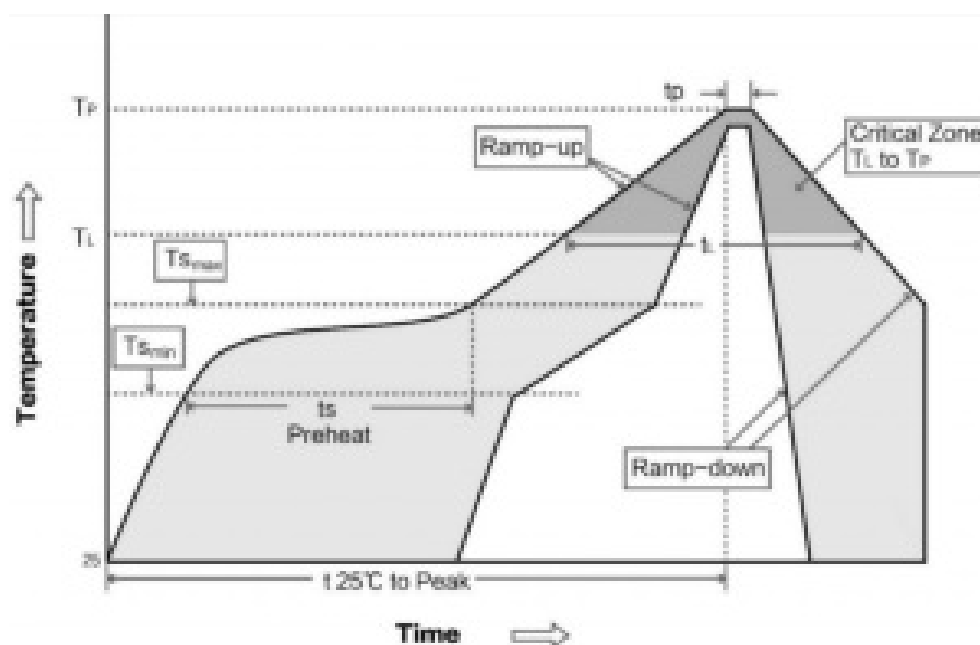


Figure 4: Reflow Soldering Curve

FCC Statement

Federal Communications Commission (FCC) Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generate, 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 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.

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 Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

RF exposure warning

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This product may not be collocated or operated in conjunction with any other antenna or transmitter.

Industry Canada (IC)

CAN ICES-003 (B)/NMB-003(B)

This device complies with Industry Canada's licence-exempt RSSs. 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.

IMPORTANT NOTE

Radiation Exposure Statement:

This equipment complies with IC 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.

OEM Integration Instructions

This device is intended only for OEM integrators under the following conditions:

The module can be used to installation in other host. The transmitter module may not be co-located with any other transmit or antenna. The module shall be only used with the integral antenna(s) that has been originally tested and certified with this module. As long as 3 conditions above are met, further transmitter test will not be required. However, the OEM integrator is still responsible for testing their end-product for any additional compliance requirement with this module installed (for example, digital device emission, PC peripheral requirements, etc.). OEM integrator is responsible for ensuring the end-user has no manual instruction to remove or install module.

IMPORTANT NOTE

In the event that these conditions cannot be met (for example certain laptop configuration or co-location with another transmitter), then the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module cannot be used on the final product. In these and circumstance, the OEM integrator will be responsible for re-evaluating. The end product (including the transmitter) and obtaining a separate FCC authorization. The final end product must be labeled in a visible area with the following: "Contains Transmitter Module FCC ID: 2AQV6RABBIT".

Antenna Specification:

Antenna Type	Manufacturer	Frequency Range (MHz)	Maximum Peak Antenna Gain(dBi)
PCB Antenna	N/A	2402 – 2480	-0.41dBi

IMPORTANT NOTE:

This Module (IC: 24210-RABBIT) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

The Host Marketing Name (HMN) must be displayed (according to e-labelling requirements) or indicated at any location on the exterior of the host product or product packaging or product literature, which shall be available with the host product or online.

The host product shall be properly labelled to identify the modules within the host product. The Innovation, Science and Economic Development Canada certification label of a module shall be clearly visible at all times when installed in the host product; otherwise, the host product must be labelled to display the Innovation, Science and Economic Development Canada certification number for the module, preceded by the word "Contains" or similar wording expressing the same meaning, as follows: Contains IC: 24210-RABBIT

Antenna Specification

Antenna Type	Manufacturer	Frequency Range (MHz)	Maximum Peak Antenna Gain(dBi)
PCB Antenna	N/A	2402 – 2480	-0.41

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RABBIT, 2AQV6RABBIT, Rabbit-B Bluetooth 5 BLE Module, Bluetooth 5 BLE Module