BC02 Badge User Guide

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(Please read the instruction carefully before installation and use)

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Catalog

Warning

1. Do not disassemble, replace or charge the battery in dangerous places.

2. Do not rub the surface of the shell with other objects to prevent static electricity.

3. Do not open the shell in a dangerous place to repair the equipment.

4. The model, specification and other parameters of intrinsically safe products and electronic components related to intrinsically safe circuits shall not be changed at will during maintenance.

5. Do not connect with the equipment outside the specification. When connected with other equipment, it must pass explosion-proof inspection.

6. Before using the product, release static electricity and wipe it with a damp cloth.

FCC Warning

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.

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, 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. The device has been evaluated to meet general RF exposure requirement.

The device can be used in portable exposure condition without restriction.

Specific Absorption Rate (SAR) information:

This Smart Badge meets the government's requirements for exposure to radio waves. The guidelines are based on standards that were developed by independent scientific organizations through periodic and thorough evaluation of scientific studies. The standards include a substantial safety margin designed to assure the safety of all persons regardless of age or health.

FCC RF Exposure Information and Statement

– This radio is designed for and classified as “General population/uncontrolled Use”, the guidelines are based on standards that were developed by independent scientific organizations through periodic and thorough evaluation of scientific studies. The standards include a substantial safety margin designed to assure the safety of all persons regardless of age or health. The exposure standard for wireless radio employs a unit of measurement known as the Specific Absorption Rate, or SAR, the

SAR limit set 1.6W/kg.

– Body-worn operation; this device was tested for typical body-worn operations with the back of the handset kept 0mm for body worn. To maintain compliance with RF exposure requirements, use accessories that maintain a 0mm for body worn. The use of belt clips, holsters and similar accessories should not contain metallic components in its assembly. The use of accessories that do not satisfy these requirements may not comply with RF exposure requirements, and should be avoided.

– The highest reported SAR value for worn on the body is 0.797 W/kg.

1. Specification

Positioning Mode	BLE/GNSS
Protocol	LoRaWAN
Frequency	902.3~914.9MHz
Sensitivity	-130dBm@SF9, -123dBm@SF8, -115dBm@SF7
Operating Current	17uA@sleep mode
	Max 102mA@20dBm
Standby Time	6 months
Operating Temperature	-15~+45℃
Charging Temperature	-10~+40℃
Storage Temperature	-40~+85℃
Communication Distance	>1.5km in urban area

2. Product introduction

2.1 Function

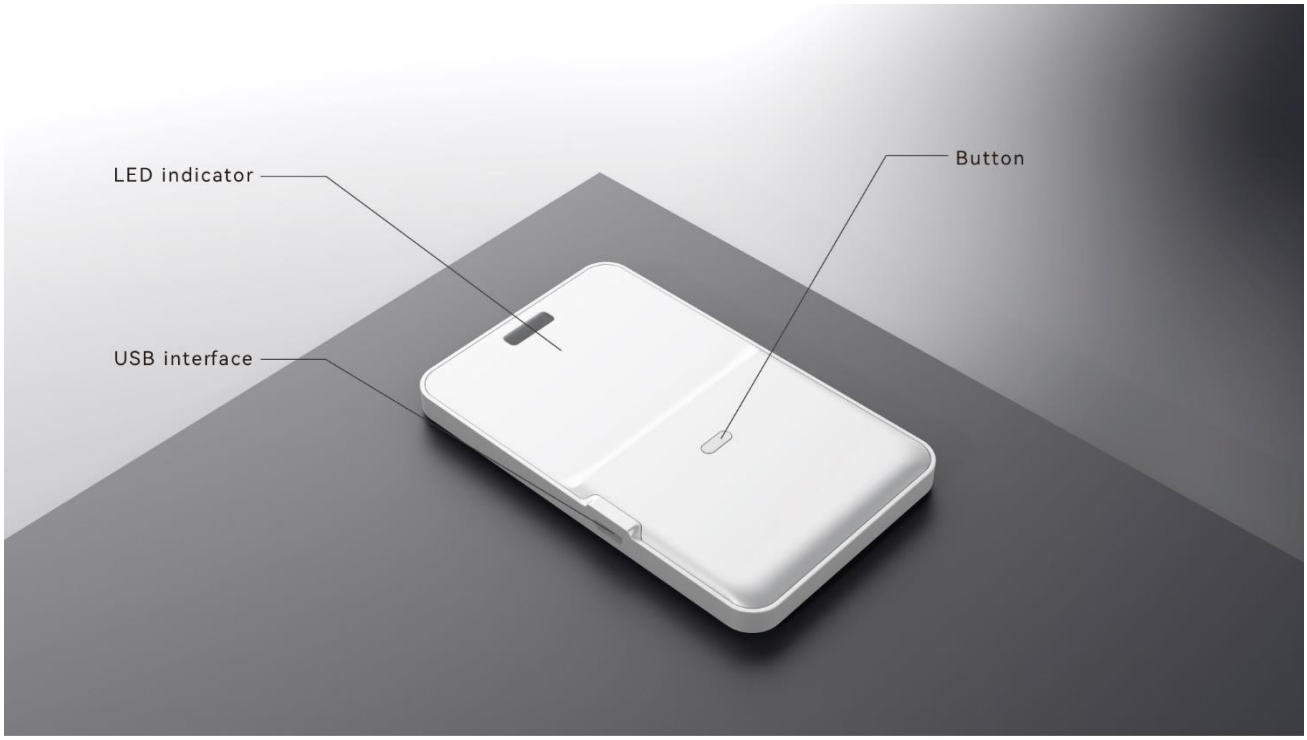
BC02 is a card-type low power locator product independently developed by our company based on LoRaWAN technology. BLE technology is used indoors and GNSS is used outdoors for positioning and long-distance transmission via standard LoRaWAN. The product has the following functions:

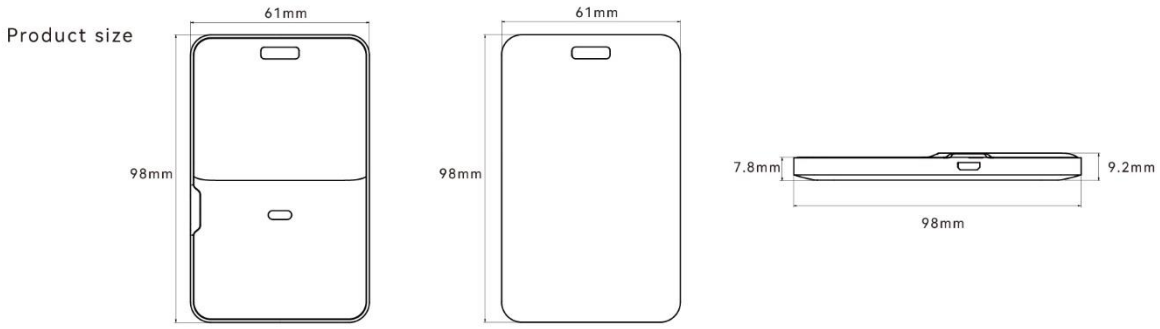
- Indoor location is based on BLE, cooperate with our company localization algorithm, provide precision of 1 ~ 5 meters, the probability of less than three meters is 70%.
- Outdoor location is based on GPS, with precision of 10 meters, the probability of less than 10 meters is 80%.
- Support Quuppa system, based on the BLE AOA high precision positioning, precision is less than 1 m.
- 800 ma rechargeable lithium battery, support overcharge and high temperature protection, standby time can be up to 6 months.
- Bluetooth OTA upgrade, supports batch update.
- Support iBeacon protocol and third-party custom defined BLE formats, support for up to five kinds of BLE custom formats.
- Beacon white list mechanism, scan only specific UUID beacon, support for up to

five different UUID.

- Intelligent motion sensor, enter sleep state when stationary, power consumption is less than 17uA.
- During specified time, such as night, device can enter deep sleep, power consumption is less than 5uA.
- Intelligent scanning to save power, don’t start BLE scanning if move steps under the threshold.
- Precise step counting, error is less than 5%.
- Security social distance monitoring, device will sound or vibrate if people are too close, the distance threshold is adjustable；
- Support SOS alarm, entering hazardous area alarm；
- Cooperate with our BLE gateway, badges can work in places without Lora signals, such as the cabin, shielding room.
- Badge can also detect asset beacons to implement localization and asset management dual mode.
- Badge can be set as a BLE gateway, to detect and report at most 50 BLE beacons in one single transmission.

2.2 Size





2.3 Parameters

Type	BC02
Frequency	902.3~914.9MHz
Tx Power	17dBm +/-2dB
Lora Protocol	LoRaWAN1.0.3
BLE	2.4G Hz
RSSI	-92dBm
BLE Protocol	BLE 4.2, iBeacon
Chip	Nordic NRF52832,Semtech LLCC68
Charge	MicroUSB,5V/250mA
Battery	800mah, 622452 Polymer lithium battery

Sleep Current	17uA
Data Interval	Configurable, 10s by default
Range	LoRa: >1000m, BLE: >50m
Sensor	G-Sensor
Upgrade	BLE OTA
Alarm	SOS, hazardous area alarm
Temperature	-15℃ ~ 60℃
Protection Grade	IP66
Size	98mm x 60mm x 7.7~9.1mm（L x W x H）
Weight	50g
Shell material	ABS
Installation	Rope

3. Operate guide

3.1 Charge

The charging port is standard MicroUSB, which is used to charge regular Android phones. When charging, the indicator is blinking red. After charging, the indicator turns to be steady green. After removing the charging head, the green indicator is off.

The locator has a built-in battery management chip that automatically terminates charging when the battery is fully charged. A full battery takes about three hours.

3.2 Power on

The badge can be turned on by pressing the power button. To power on the badge, need to press the button till the green LED on and red LED blinks and buzzer beep. The badge can’t be turned off by pressing the button for security reason.

3.3 Power off

After startup, the worker card cannot be shut down by pressing the button, but can only be shut down remotely by command. When receiving the shutdown command, the buzzer will ring three times, and the red light will be on for three seconds and then off.

3.4 SOS

Press the button three times in three seconds can trigger a SOS alarm. If the alarm is generated successfully, the buzzer beep for one time and the red LED blinks. The server needs to send an acknowledgement message after receiving the alarm, then the red LED turn off and green LED blinks, it tells the caller that the alarm has been received. After that,

the platform administrator needs to dismiss SOS by downlink command; otherwise, the green LED keeps flashing. The caller can also restart the device to deactivate the alarm.

3.5 Reboot

under startup state, long press the button above three seconds, the LED light will blink three times, and the buzzer will beep, then the device restart.

3.6 Status Check

Short press the button to check whether the tracker is working, if the green LED blinks, it indicates the tracker is working and the left power of battery is above 70%. If both green LED and red LED blink, the power is above 40%. If only red LED blinks, the power is below 40%, need to be charged ASAP.

4. Configuration

The working parameters of the device can be configured online through the Lora network or through the Bluetooth connection established through the APP. In addition, if the device number, Key, frequency point and working mode of the device are changed, they can only be changed through the APP. For details, please visit the following link：

https://www.rctiot.com/rct/RCT_Tracker_Datasheet.pdf

5. Upgrade

Devices can be upgraded by establishing a Bluetooth connection through the NRF Connect. The NRF Connect interface is slightly different between Android and Apple iPhones. For details on how to upgrade, please visit the following link：

https://www.rctiot.com/rct/RCT_Tracker_Datasheet.pdf

6. Unpacking and checking

1. Check whether the number, instruction manual, certificate, packing list and accessories of the packing case are complete.

2. The appearance of the product should be intact and marked clearly.

7. Maintenance guide

1. The light does not respond when the device button is pressed?

In this case, the device may be powered off or hibernated in low power state. You can view the latest power of the device through the platform.

2. How to extend the working time of the equipment

The sleep time of the device can be set through the platform, which does not consume power when it is not working。

3. Do I need to restart the device after it is shut down and charged in low power?

Don't need. The shutdown of the device due to low power is actually deep hibernation, and the device itself has a certain amount of power, which can automatically resume work after charging.

4. The device is always in a static state, how to obtain its position?

You can obtain the current location by issuing the request location command from platform.