Wireless Dual Push Button

User Guide

VERSION 1.5

SEPTEMBER 2019

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1. QUICK START

To start using your sensor, simply go to:

https://console.radiobridge.com

From here you can register your device and immediately start receiving messages from the sensor.

The sensor configuration, message monitoring, and setting up alerts is usually self-explanatory through the user interface. For further explanations of any sensor features, you may refer to this user guide

2. OVERVIEW

2.1. Sensor Overview

The wireless sensors designed and manufactured by Radio Bridge provide full sensor to cloud solutions for Internet of Things (IoT) applications. The wireless dual push button sensor can be used as a panic button, PERS, remote control, or other remote push button applications. When either button is pressed, a message is sent over the wireless network.

Features include:

- Built-in radio that talks directly with LoRaWAN wireless networks
- Two types of tamper detection: enclosure tamper and wall mount tamper
    - Enclosure tamper detects if the packaging of the sensor itself is opened or broken Available on the RBSx01, RBSx05, and RBSx06 sensors.
    - Wall mount tamper detects if the sensor has been removed from the wall or mounting point. Available on the RBSx01 and RBSx05 sensors.
- 200,000+ transmissions on a single battery and a 5-10 year battery life depending on usage. See Battery section for more detail.
- Fully integrated internal antenna
- Over the air sensor configuration in the field
- Automatic low battery reporting and supervisory messages

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2.2. Revision History

Table 1 Revision History

Revision	Date	Description
1.0	April 2018	Initial release of the document
1.1	August 2018	Updated protocol definitions
1.2	October 2018	Regulatory and FCC
1.3	March 2019	Add International Part Numbers
1.4	May 2019	Add LED config
1.5	September 2019	Update common sections

2.3. Document Conventions

Table 2 Document Conventions

Font / Icon	Meaning
	Important notes
	Warnings and cautions

2.4. Part Numbers

Table 3 Part Numbers

Part Number	Rating	Wireless	Region
RBS301-2-US	Indoor	LoRaWAN	North America, South America
RBS301-2-EU	Indoor	LoRaWAN	Europe
RBS301-2-AU	Indoor	LoRaWAN	Australia, South America

3. TECHNICAL SPECIFICATIONS

3.1. Absolute Maximum Ratings

Table 4 Absolute Maximum Ratings

Parameter	Rating	Units
Operating ambient temperature	-30 to +70	°C
Storage ambient temperature	-40 to +100	°C

4. BATTERY LIFE

The sensor uses a lithium non-rechargeable battery and is capable of 200,000+ total messages depending on the wireless standard and usage. For an accurate estimate of battery life, please refer to the "Sensor Battery Estimator.xlsx" spreadsheet on the Radio Bridge website. This spreadsheet combines usage information such as average number of messages per day and estimates the battery life for a particular sensor.

Refer to the spreadsheet "Sensor Battery Estimator.xlsx" on the Radio Bridge website for specific battery life estimates.

The power required for a message transmission is much greater than the "sleep current" (the power consumed when the sensor is inactive) for high power radio technologies such as LoRaWAN. This means that the battery life for most sensors is primarily dependent on the number of transmissions per day.

Different battery types will deplete over time with different voltage profiles. For instance, a lithium battery will maintain a relatively high voltage for the life of the battery and then experience a rapid drop near the end, whereas an alkaline battery will experience a more gradual reduction in voltage over time. Radio Bridge sensors are shipped with lithium batteries, and these are recommended when the battery needs to be eventually replaced.

Temperature also plays a role in battery life. The battery life estimates in the online spreadsheet assume room temperature, but temperatures close to the maximum and minimum ratings will have a negative impact on battery life. For example, battery voltage tends to be lower in cold temperatures and the internal circuitry needs a certain minimum voltage to operate properly before it will shut down. Thus, battery life will tend to be shorter when running the sensor in cold environments.

Battery voltage will be lower in cold temperatures and thus battery life will be reduced in cold environments.

The battery voltage is reported by the supervisory messages as well as a low battery indicator. See the section on Message Protocol for more detail.

5. TEST MESSAGES

The sensor can be triggered to send test messages by placing a magnet next to the side of the sensor. The location of the magnet is indicated by the triangular notch on the side of RBSx01 and RBSx05 sensors. RBSx04 sensors do not have this capability. There is a small magnetic Hall effect sensor that will detect the presence of a magnet and send a message. This can be used for diagnostic purposes to ensure the sensor is within range and connected to the network.

6. MESSAGE PROTOCOL

This section defines the protocol and message definitions for the sensor.

Radio Bridge provides a web-based console at console.radiobridge.com to configure and monitor sensors. Usage of this console is highly recommended for most customers rather than implementing the protocols defined in this section.

If the standard Radio Bridge console (console.radiobridge.com) is not used, refer to this section to decode the sensor data and configure the sensor through downlink messages.

6.1. Common Messages

There are common messages across all wireless sensors that are defined in the document “Common Sensor Messages” which is available on the Radio Bridge website.

Refer to the document “Common Sensor Messages” for definitions of all common messages. Common messages are not defined in this document.

Common messages include basic error messages, tamper, supervisory, and downlink ack. It is important to refer to that document prior to decoding the messages defined in this section.

6.2. Uplink Messages

The uplink message (sensor to web application) specific to the sensor is defined in following table. The common uplink messages are not included in this section (see common messages document).

Table 5 Uplink Message 0x06: Push Button Event

Button ID	Event Payload	Description
0x01	0x00	Button 1 pressed
0x01	0x01	Button 1 released
0x01	0x02	Button 1 held
0x02	0x00	Button 2 pressed
0x02	0x01	Button 2 released
0x02	0x02	Button 2 held
0x12	0x00	Buttons 1 and 2 pressed together
0x12	0x01	Buttons 1 and 2 released (either button released)
0x12	0x02	Buttons 1 and 2 held together

If buttons 1 and 2 are pressed within 0.25 seconds of each other, a message indicating that they were pressed at the same time will be sent (button ID 0x12 and event 0x00). The individual button pressed messages (button ID 0x01 and 0x02) will not be sent. After the buttons have been pressed together, a released message (button ID 0x12 and event 0x01) will be sent when either button is released. Note that if the buttons are pressed together and one is released, the released button will not issue any new messages until the other button has also been released.

6.3. Downlink Messages

The downlink message (web application to sensor) specific to the sensor configuration is defined in following table. The common downlink messages are not included in this section (see common messages document).

Table 6 Downlink Configuration Message 0x06

Byte	Description
0	Disable events for Button 1 only (see table Disable Event Bit Definitions)
1	Hold delay for Button 1 only
2	Disable events for Button 2 only (see table Disable Event Bit Definitions)
3	Hold delay for Button 2 only
4	Disable events for 1-2 Button combination (see table Disable Event Bit Definitions)
5	Hold delay for 1-2 Button combination
6	LED configuration (version 2.0 or later)

The disable event bit definitions are shown in the following table.

Table 7 Disable Event Bit Definitions

Bits	Description
7:3	Unused
2	Disable button hold event. Set to disable, clear to enable.
1	Disable button released event. Set to disable, clear to enable.
0	Disable button pressed event. Set to disable, clear to enable.

6.3.1. Hold Delay

The hold delay defines the amount of time the button must be held before a button held event is sent. The field can range from 0-20 in 250ms increments (0-5 seconds). If set to 0 then the hold delay will not send an event message.

The disable event bit definitions are shown in the following table.

Table 8 Disable Event Bit Definitions

Bits	Description
7:3	Unused
2	Disable button hold event. Set to disable, clear to enable.
1	Disable button released event. Set to disable, clear to enable.
0	Disable button pressed event. Set to disable, clear to enable.

6.3.2. LED Configuration

The behavior of the LED can be controlled through the LED configuration byte defined in the following table.

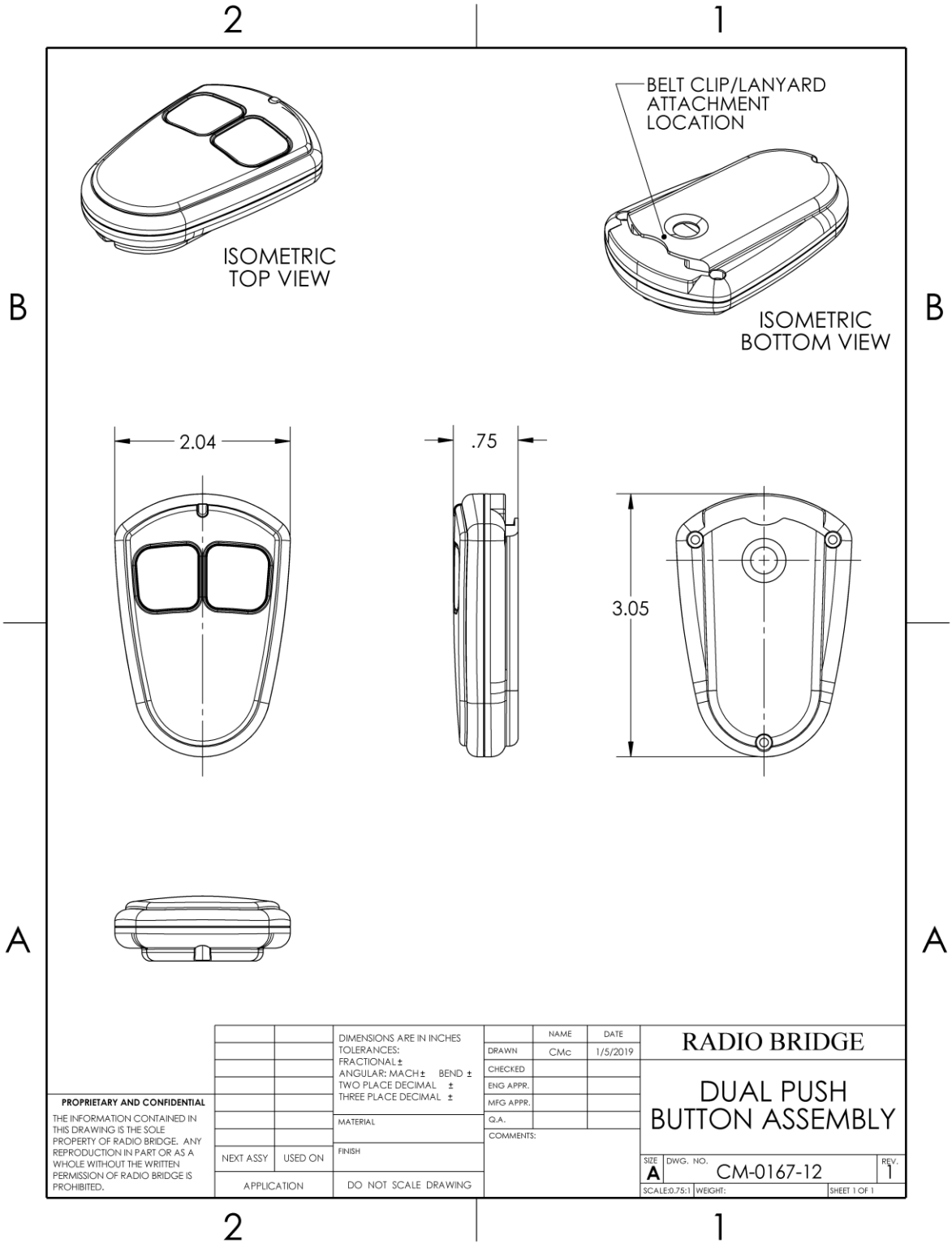
Table 9 LED Configuration

Bits	Description
7:3	Unused
2	Blink LED after message ack received (confirmed messages only). 0 means LED is blinked after a message ack is received, 1 means LED is not blinked after a message ack is received. Does not apply to unconfirmed messages.
1	Blink LED after send. 0 means LED is blinked after a send, 1 means LED is not blinked after a send.
0	LED illumination during button press. 0 means LED is illuminated during button press, 1 means LED is not illuminated during button press.

For the blink after send, note that if a message is confirmed (acknowledgements) then the blink occurs after the message is sent and an ack is received. If the message is unconfirmed (no acknowledgements) then the blink occurs after the message is sent.

Note that the LED configuration is only available in firmware v2.0 or later.

7. MECHANICAL DRAWINGS



8. REGULATORY AND COMPLIANCE

8.1. Federal Communications Commission (FCC)

Per FCC 15.19(a)(3) and (a)(4) 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.

Per FCC 15.21, Changes or modifications not expressly approved by Radio Bridge could void authority to operate the devices.

Sigfox RBS101, RBS104, and RBS105 sensors FCC ID: 2APNUSFM10R2

LoRaWAN RBS301, RBS304, and RBS305 sensors FCC ID: 2APNUCMABZ

LoRaWAN RBS306 sensors: This device contains FCC IAU792U13A16858

This device contains equipment certified under IC: 125A-0055

8.2. Harmonized Commodity Description (HS Code)

The Harmonized Commodity Description and Coding System generally referred to as "Harmonized System" or simply "HS" is a multipurpose international product nomenclature developed by the World Customs Organization (WCO).

HS Code: 8531.90

8.3. Export Control Classification Number (ECCN)

ECCNs are five character alpha-numeric designations used on the Commerce Control List (CCL) to identify dual-use items for export control purposes. An ECCN categorizes items based on the nature of the product, i.e. type of commodity, software, or technology and its respective technical parameters.

ECCN: 5a992.c

9. CUSTOMER SUPPORT

Radio Bridge offers free technical support at:

https://support.radiobridge.com

Radio Bridge also offers technical support plans and service packages to help our customers get the most out of their Radio Bridge products.

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