

CareBand® Wearables User Manual

CareBand 4

Firmware v4.0.3R

© Copyright 2022 CareBand All Rights Reserved

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.

Changes or modifications not expressly approved by CareBand Inc. could void the user's authority to operate the equipment.

All content herein is the property of CareBand Inc., its Affiliates, or their content suppliers and is protected by the United States and international copyright laws. The compilation of all content is likewise the exclusive property of CareBand Inc. and is protected by the United States and international copyright laws.

The trademarks, service marks, and logos (the 'Trademarks') used and displayed in this publication are registered and unregistered Trademarks of CareBand Inc. Nothing herein should be construed as granting, by implication, estoppel or otherwise, any license or right to use any Trademark displayed herein without the prior consent of the Trademark owner. CareBand design, CareBand TECHNOLOGIES, and the CAREBAND design are some of the registered and unregistered trademarks owned by CareBand Inc. ("CareBand Trademarks"). CareBand Trademarks may not be used in connection with any product or service that is not manufactured by or under license from CareBand Inc. LoRaWAN® is a mark of the LoRa Alliance®.

© 2022 CareBand Inc. - Created in the USA

Table of Contents

1 INTRODUCTION **5**
1.1 Document Purpose 5
1.2 Product Overview 5
1.3 Typical Applications 6

2 DEVICE FEATURES **7**
2.1 Specifications 7
2.2 Appearance 9

3 GETTING STARTED **10**
3.1 Register on a LoRaWAN Network 10
3.2 Charging for the first time 10
3.3 Wearable Best Placement 10
3.4 Charging 11
3.5 Battery Life 11
3.6 Water Resistance 12
3.7 Cleaning 12

4 FUNCTIONING/OPERATION **12**
4.1 Overview 12
4.2 Main Operating Modes 12
4.3 Configurable Functions 13
4.3.1 Beacon Data 13
4.3.2 Help mode 14
4.3.3 Wearable Worn/Removed 15
4.3.4 Movement/No Movement 15
4.3.5 Light Patterns 15
4.3.6 Vibration Patterns 16
4.3.7 Tap for Battery Status 16

5 LoRaWAN UPLINK MESSAGES **17**
Overview 17
5.1 Beacon data messages 18
5.1.1 Beacon Data Structure 18
5.2 Battery Status messages 19
5.3 Button Press messages 20
5.4 Button Clear messages 20
5.5 Wearable Worn messages 21
5.6 Wearable Removed messages 21

© Copyright 2022 CareBand All Rights Reserved

5.7 No Movement Alarm messages 22
5.8 Movement messages 22
5.10 Version messages 23

6 LORAWAN DOWNLINK MESSAGES 24
Overview 24
6.1 Set Off Mode 24
Response 25
6.2 Beacon Scan Parameters 25
Response 26
6.3 Configuration Parameters 26
Response 28
6.3 System Test 28
Response 28
6.4 Help Mode Control 29
Response 29

7 CAREBAND MANAGER MOBILE APP 29
Features 30

8 HANDLING AND SAFETY 30

9 CERTIFICATION AND REGULATORY 31
9.1 FCC Radio Certification 31

10 REVISION LOG 32

11 TROUBLESHOOTING & SUPPORT 32
11.1 Troubleshooting 32
11.2 Support 32

© Copyright 2022 CareBand All Rights Reserved

1 INTRODUCTION

1.1 Document Purpose

This document describes in detail the usage of the CareBand wearable with Firmware 4.0.3R. Each section will share more on the features, customizations, and use cases.

This document is intended to support distributors, system integrators, and integration teams in understanding how the wearable operates and can be configured for different use cases.

1.2 Product Overview

CareBand wearables are patent-pending LoRaWAN devices that all include BLE, wireless charging, on-body sensing, accelerometer, front & back-facing LEDs, and haptic feedback.

Designed for energy efficiency, the CareBand wearable enables patient and employee monitoring applications in healthcare, industrial, and hospitality environments. The devices also have different battery capabilities depending on the application and customer requirements. Moreover, the wearables are supported globally for deployment in North America, Europe, and Asia.

All wearables comply with the LoRaWAN Specification v1.0.2 and operate as a Class A device.

CareBand 3	CareBand 4	CareBand 5
		

• BLE, LoRa
• Accelerometer
• Vibration
• Lights
• Wireless Qi charging
	• All of CB3 plus,
	  ○ Button
	  ○ NFC (optional)
		• All of CB4 plus,
		  ○ GPS
		  ○ Fall detection
		  ○ Gas detection
		  ○ NFC (optional)

© Copyright 2022 CareBand All Rights Reserved

All wearables can be personalized with custom logo or branding via the CareBand Skins.



Disclaimer: The CareBand Skins above are examples of what is possible and does not imply rights to the images. CareBand does not take any responsibility for the logo, branding, or images that are used for CareBand Skins. All customers who use the CareBand Skins must have the rights to the images used.

1.3 Typical Applications

The CareBand was initially developed for the healthcare sector but has evolved to other use cases and applications with more added daily. The wearable's unique capabilities, combined with the flexibility of the Third Wave platform and systems solutions, lend themselves to various uses, including Healthcare, Industrial, Hospitality, Education, and Defense.

Healthcare
- Senior Living
- Hospital Patients & Staff
- Digital clinical trials
- Behavioral health
- Developmental disabilities & autism

Industrial
- Manufacturing
- Oil & Gas
- Mining
- Warehouse
- Construction

Hospitality
- Hotels
- Resorts & cruise ships
- Amusement parks
- Large events & concerts

Defense
- Military
- First responders
- Search and rescue

© Copyright 2022 CareBand All Rights Reserved

Some notable capabilities of the wearable are highlighted below:

Indoor location tracking
There are many industries where knowing the location of people is important. For example, for senior living communities knowing where all the staff and residents are is crucial for the safe operation of the community. CareBand wearables enable precise indoor location tracking down to the room and floor.

Next-Generation wander management
With the indoor location tracking system enabled, and the CareBand wearables can be set up for wander management, staff can be alerted when residents, patients, or visitors are approaching an unsafe or unpermitted area. This may be an elevator, staircase, kitchen, or an outside-facing exit.

Mobile help or staff call
For example, in hospitals and senior living communities, patients are often equipped with a help button that alerts staff to the person who requires help. With the CareBand wearables, staff can be alerted to the location of the individual who needs assistance. The CareBand wearables can also track who helped the person in need with the Help Clear alert function.

© Copyright 2022 CareBand All Rights Reserved

2 DEVICE FEATURES

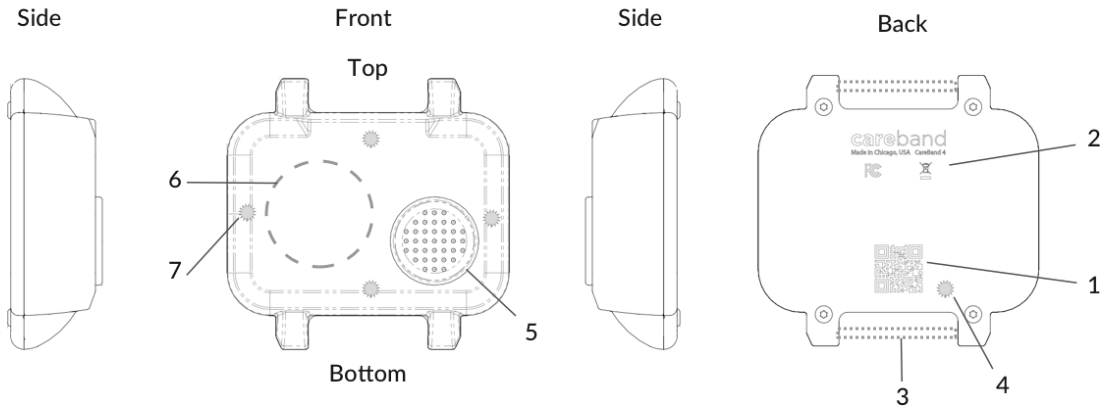
2.1 Specifications

The following table summarizes the CareBand 4 features and technical specifications:

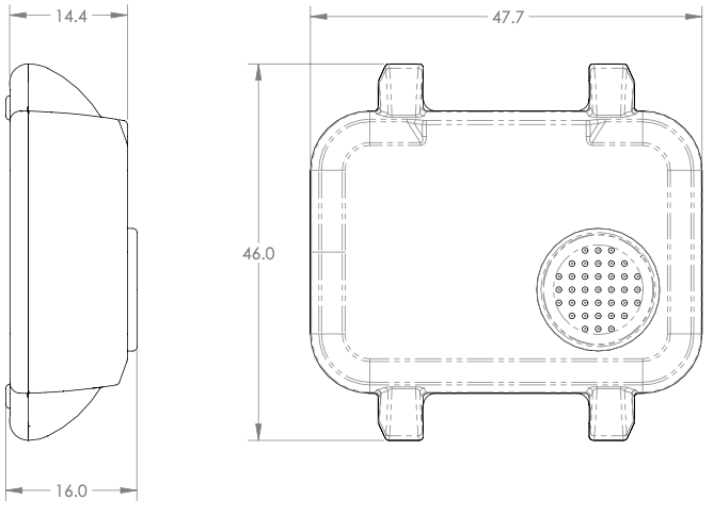
Typical Use Cases	Indoor location tracking, wander mgmt, panic button
Communication protocols	LoRaWAN, BLE
LoRa Frequency Plans	US928, EU868, AU915, AS923
Indoor Location	Yes Compliant with BLE 4.2 & 5.0
Outdoor Location	No
Motion detection	Built-in G-sensor & 3-axis accelerometer
On-body detection	Yes
Help button	Yes Single, double, long- press options
Vibration	Yes Single, double, long vibration patterns; controllable intensity
LEDs	4 LEDs on the front 1 LED on the back
Waterproof level	IP66
Charging Method	Wireless charging (Qi)
Battery	Embedded 120 mAh rechargeable lithium polymer
Operating Temperature	-30 to +70 C
Dimensions	47.7 x 34.5 x 13.5 mm
Weight	1.3 oz / 34g

© Copyright 2022 CareBand All Rights Reserved

2.2 Appearance



1 - CareBand serial # QR code
2 - FCC ID markings
3 - 20mm watch band lugs
4 - Back charging light
5 - Help button
6 - Wireless charging coil
7 - Front lights



Measurements are in millimeters (mm)

© Copyright 2022 CareBand All Rights Reserved

3 GETTING STARTED

3.1 Register on a LoRaWAN Network

Your wearable needs to be registered on a LoRaWAN Network. Each wearable comes with default network keys. We recommend changing your network keys via the CareBand Manager Mobile App.

All CareBand wearables use OTAA (Over the Air Activation) mode for network configuration. If you need your wearable to work in ABP, please contact CareBand Support.

Note
Each network has a channel configuration. Be sure you set the right channel configuration on your device to operate. Depending on your LoRaWAN Network Operator configuration needed to be done, please refer to your LoRaWAN Network provider documentation for more information.

Once your wearable is registered on the LoRaWAN Network, the wearable will start trying to join the network until join is completed.

3.2 Charging for the first time

The wearable is shipped to the customer in OFF mode to preserve battery lifetime. The wearable exits the OFF when first actively charging. Once the wearable reaches a 5% battery, the wearable will start the JOIN procedure, which can be seen in your LoRaWAN Network server logs.

3.3 Wearable Best Placement

The wearable was optimized and designed for the wrist facing upright. However, the wearable can also be worn on the ankle, the neck, the arm, or other places of the body. For additional questions, please contact CareBand Support.

Note
The orientation of the tracker can influence the radio performance. Keep the side where the button is on the CareBand wearable, clear from any conducting materials or magnetic fields for optimum results.

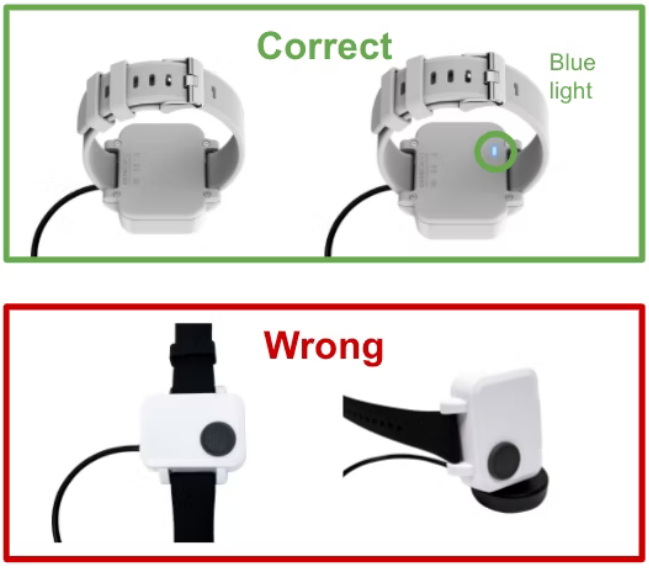
© Copyright 2022 CareBand All Rights Reserved

3.4 Charging

Connect the wireless charging cable to a compatible power source (5V USB wall adapter with at least a 500mA output) and set it blank side up on a flat surface. Typical charging time is 1-2 hours, depending on the state of the battery of the device.

Place the device face-down on the charger and a flashing blue light should appear (shown in the top image below). When placed correctly a magnetic alignment to the charger and the wearable should be felt. Do not place the unit with the button side face up or on its side as this is incorrect positioning (shown in the bottom image below).

When charging is complete the blue front LEDs and blue LED on the back will blink.



NOTE
For optimal battery performance, the device should be removed from the charger once fully charged. Charging the wearable for an extended period of time may cause the battery, charger, or other components to overheat. If the wearable does get too hot, it will stop charging, wait to cool then start again.

3.5 Battery Life

Battery life is determined by the number of messages sent via LoRaWAN. With the default configuration, the CareBand wearable will last for 3 days. By changing the update frequency and adjusting other variables, the wearable can last up to 7 days.

© Copyright 2022 CareBand All Rights Reserved

3.6 Water Resistance

The wearable is IP66 rated, which means it is protected from hose-directed water from any direction. It is not intended to be submerged in water. However, it can resist water droplets when washing hands, showering, or other similar activities.

3.7 Cleaning

The wearable and wristband may be cleaned with a damp cloth.

© Copyright 2022 CareBand All Rights Reserved

4 OPERATION

4.1 Overview

The CareBand wearables are highly configurable by using various operating modes and adjusting the configurable functions.

You can update the settings of the wearables by using the CareBand Manager Mobile app or LoRaWAN downlink messages.

Additional configurations include new firmware, embedded algorithms

4.2 Main Operating Modes

Operating Mode	**Description**
OFF	Deep sleep mode where no LoRaWAN messages are sent. Typically used for shipping.
Motion Activated Location Tracking	Wearable monitors motion. Once a threshold is reached, location tracking starts. Periodic uplink messages are sent.
Continuous Location Tracking	Wearable performs location tracking without a motion threshold. Real-time uplink messages are sent.
No location tracking	Wearable does not do any location tracking. Other functions report as configured

© Copyright 2022 CareBand All Rights Reserved

4.3 Configurable Functions

Regardless of the operating mode (except OFF Mode), the wearables support configurable functions that can be turned on/off and be customized. See the table below:

Uplink Messages	**Default**	**Configurations**
Beacon Data	On	• Scan details
Button	Single button press for 2 seconds	• Single button press (1-3 seconds)
Clearing the button	Staff members will be within 15 feet of the user and press/hold the button to clear the help alert.	• Proximity of the Staff and the Wearer • Proximity and button press • Button press
Movement	On Triggered by a movement of the arm	• On/off
No Movement	On	• On/off • Update rate (5, 15, 30 min of no movement)
Lights (LEDs)	See Light Patterns	No configuration possible. Contact CareBand Support for questions.

4.3.1 Beacon Data

Overview
CareBand wearables use Bluetooth Low Energy (BLE) beacons to support indoor location tracking. CareBand requires the use of CareBand-specific beacons for the system. There are three types of beacons: Room beacons, Exit beacons, and Staff beacons.

Room beacons are placed in bedrooms, bathrooms, hallways, and other rooms around the building. Exit beacons are placed at exit doors, elevators, staircases, and other unsafe areas. Staff beacons are worn or otherwise carried by staff to support the Help mode feature.

If you have your own beacons or have a question about this functionality, please CareBand Support.

© Copyright 2022 CareBand All Rights Reserved

Configurations
Beacon data is sent when a wearable is close to a beacon. The wearable senses 1 to 3 beacons that are currently estimated to be the closest to the wearable. Each message contains a flag to indicate the type of beacons.

Beacon logic can be configured based on the beacon scan time, beacon scan period, and beacon distance reporting threshold. Refer to the CareBand installation video for more information on beacon installation and configuration.

4.3.2 Help mode

Activation
Press the button
Downlink message

Once the button is pressed, the wearable enters Help mode.

1. Wearer presses the button
2. Wearable begins flashing the Help mode pattern, vibrates once, and sends a LoRaWAN uplink message saying the button was pressed
    a. This message will include indoor location data when available
    b. If indoor location services are configured, the wearable will continue to send location updates corresponding to the selected update rate
3. Staff person/wearer disables the Help mode by
    a. A LoRaWAN downlink message
    b. Using one of the configured clear conditions:
        i. A staff member is detected within 15 feet of the wearer (via a staff beacon), and the button is pressed
        ii. The button is pressed while help mode is active
        iii. A staff member is detected within 15 feet of the wearer
4. A LoRaWAN uplink message is sent indicating the time Help mode was disabled and the nearest detected staff member (if applicable)

4.3.3 Wearable Worn/Removed

CareBand wearables can detect whether the wearable is being worn or not worn by the user. Algorithms within the device reduce excess noise that might trigger false detections, such as when someone is walking or during other activities in which the device is exposed to unintentional movement.

© Copyright 2022 CareBand All Rights Reserved

4.3.4 Movement/No Movement

CareBand wearables can detect movement based on a threshold. No movement messages are triggered when movement is not detected after a certain configurable amount of time.

4.3.5 Light Patterns

The lights provide feedback to the user by displaying various patterns. There are four lights along the four edges of the front face of the wearable and one on the back.

Refer to the Product Specifications section under Appearance for a diagram of the light locations. View the Troubleshooting section for additional light patterns.

Several patterns are defined for different states.

State	Location	Pattern
Wearable turns on or goes from a dead battery to a charged battery	Front	10 short blinks
Help button active	Front	Rapidly cycle three pairs of LEDs in a circular pattern
Help alert cleared	Front	Lights will turn off
Charging	Front Back	Each pair of lights blink in a circular motion, followed by a pause Continuous blue light
Charging Complete	Front Back	Continuous blue blinking Continuous blue blinking
Low battery	Front	4 short red blinks AND single vibration
CareBand Manager App connects to a CB4	Front	Blue lights rapidly blink 4 times
Software update is in process	Front	All 4 blue lights and 2 red lights are solid
Software update is complete, boot-up	Front	10 short blinks
Battery power status	Front	See Tap for Battery Status

© Copyright 2022 CareBand All Rights Reserved

4.3.6 Vibration Patterns

Vibration feedback is used to indicate certain events or alerts for the user.

State	Vibration Pattern
Help Button pressed	1-second pulse
Battery <10%	1-second pulse

4.3.7 Tap for Battery Status

The user can tap the top of the wearable once to display the battery status:

Pattern	Description
4 Blue lights flashing	Battery level 50%+
2 Blue lights flashing	Battery level 10-50%
4 Red lights flashing	Battery level <10%

© Copyright 2022 CareBand All Rights Reserved

5 LoRaWAN UPLINK MESSAGES

Overview

This section describes the payload messages supported by the wearable.

The LoRaWAN “port” field will be used to identify the type of message that is being received

Note

All messages will be transmitted as confirmed messages.

The following uplink messages are supported:

Message Type	Port
Beacon Data	0x01
Battery Status	0x04
Button Press	0x05
Button Clear	0x06
Wearable Worn	0x07
Wearable Removed	0x08
No Movement Message	0x09
Movement Message	0x0A
Software Version Message	0x0C

The LoRaWAN “dev_eui” uint64_t are used to identify which CareBand wearable the message was received from.

All Confirmed Messages will have as a first byte the delay from when the message was generated by the CareBand wearable to when it was sent on the radio link. Any delays greater than 255 seconds will be reported as a 255-second delay.

© Copyright 2022 CareBand All Rights Reserved

5.1 Beacon data messages

Packet format:

MSG Port	Message Offset	
	0	1-10
0x01	Delay	Beacon Data

Data Descriptions:

Message Field	Description
Delay	Number of seconds message was held before it was sent to the LoRa module. Note: 255 is the max value, and means more than 4 minutes and 24 seconds.
Beacon Data	See Beacon Data for the data description

© Copyright 2022 CareBand All Rights Reserved

5.1.1 Beacon Data Structure

A beacon data structure will contain from 1 to 3 beacons that are currently estimated to be the closest to the wearable.

The beacon entries will be filled in in the order of 1, 2, then 3. Unused entries will have a strength of 0xff.

The last byte of the Beacon Data message will include a flag value to indicate whether beacons were identified as exit beacons.

A special case of all bytes set to 0xff will be issued by the CareBand wearable in case no beacons were seen in the last scan. This could be interpreted as the start of a wandering event.

Data Format:

Data	Offset (Bytes)	Length (bytes)	Description
Instance 1	0	2	The last 2 bytes of the UID instance of beacon 1
Distance 1	2	1	The distance to beacon 1 in decimeters
Instance 2	3	2	The last 2 bytes of the UID instance of beacon 2
Distance 2	5	1	The distance to beacon 2 in decimeters
Instance 3	6	2	The last 2 bytes of the UID instance of beacon 3
Distance 3	8	1	The distance to beacon 3 in decimeters
Type Flags	9	1	A bit field indicating which beacons in the packet identify themselves as exit beacons. **Bit 0 set (0x01):** Beacon 3 is Exit beacon **Bit 1 set (0x02):** Beacon 2 is Exit beacon **Bit 2 set (0x04):** Beacon 1 is Exit beacon

© Copyright 2022 CareBand All Rights Reserved

5.2 Battery Status messages

The Battery message will have a “port” number of 0x04. It will contain the status of battery charge as a percentage of the battery left from 0% to 100%. The message will be issued by the wearable at a regular interval.

MSG Port	Message Offset	
	0	1
0x04	Delay	State Of Charge (SOC)

Message Field	Description
Delay	Number of seconds message was held before it was sent to the LoRa module. Note: 255 is the max value, and means more than 4 minutes and 24 seconds.
State Of Charge	Percentage (0-100%) charge of the battery

© Copyright 2022 CareBand All Rights Reserved

5.3 Button Press messages

Message sent when a button press is activated.

MSG Port	Message Offset		
	0	1	2-11
0x05	Delay	Location Type	Location Data

Message Field	Description
Delay	Number of seconds message was held before it was sent to the LoRa module. Note: 255 is the max value, and means more than 4 minutes and 24 seconds.
Location Type	The type of location data being sent (always beacon data for CB4) **0:** Beacon Data
Location Data	The location data See Beacon Data for the data description

© Copyright 2022 CareBand All Rights Reserved

5.4 Button Clear messages

The Button Clear message will have a “port” number of 0x06. This message is issued when the Help mode is deactivated.

MSG Port	Message Offset							
	0	1	2	3	4	5	6	7
0x06	Delay	UUID						Distance

Message Field	Description
Delay	Number of seconds message was held before it was sent to the LoRa module. Note: 255 is the max value, and means more than 4 minutes and 24 seconds.
UUID	The unique identifier of the closest Staff beacon at the time the Help mode was cleared
Distance	Estimated distance to the Staff beacon in units of 0.1 meters.

© Copyright 2022 CareBand All Rights Reserved

5.5 Wearable Worn messages

The Wearable Worn message will have a “port” number of 0x07. This message is issued when the wearable detects that it is being worn.

MSG Port	Message Offset
	0
0x07	Delay

Message Field	Description
Delay	Number of seconds message was held before it was sent to the LoRa module. Note: 255 is the max value, and means more than 4 minutes and 24 seconds.

5.6 Wearable Removed messages

The Wearable Removed message will have a “port” number of 0x08. This message is issued when the wearable detects that it has been removed.

MSG Port	Message Offset
	0
0x08	Delay

Message Field	Description
Delay	Number of seconds message was held before it was sent to the LoRa module. Note: 255 is the max value, and means more than 4 minutes and 24 seconds.

© Copyright 2022 CareBand All Rights Reserved

5.7 No Movement Alarm messages

The No Movement message will have a “port” number of 0x09. This message is issued when the wearable detects no movement after a set period of time.

MSG Port	Message Offset		
	0	1	2
0x09	Delay	Stationary Time	

Message Field	Description
Delay	Number of seconds message was held before it was sent to the LoRa module. Note: 255 is the max value and means more than 4 minutes and 24 seconds.
Stationary Time	Number of seconds the user has been stationary. This field will report 65535 for times longer than 65535 seconds.

5.8 Movement messages

The Movement message will have a “port” number of 0x0A. This message is issued when the user begins moving after having been stationary.

MSG Port	Message Offset
	0
0x0A	Delay

© Copyright 2022 CareBand All Rights Reserved

5.10 Version messages

The SW Version message will have a “port” number of 0x0C. This message is issued when the device resets

MSG Port	Message Offset							
	0	1	2	3	4	5	6	7-10
0x0C	Delay	FW Major	FW Minor	FW Point	HW Version	Protocol Version Major	Protocol Version Minor	Reset Reason

Message Field	Description
Delay	Number of seconds message was held before it was sent to the LoRa module. Note: 255 is the max value and means more than 4 minutes and 24 seconds.
FW Major	Firmware Major Version Number
FW Minor	Firmware Minor Version Number
FW Point	Firmware Point Version Number
HW Version	Hardware Version Number
Protocol Version Major	Protocol Major Version Number -- The LoRa Interface Version. IE The implementation of this specification would be 1.6
Protocol Version Minor	Protocol Major Version Number
Reset Reason	The reset reason

The fields Major, Minor, and Revision from the firmware version as follow: Major. Minor-Iteration

Example:
2.1-0 is coded as 0x020100

© Copyright 2022 CareBand All Rights Reserved

6 LORAWAN DOWNLINK MESSAGES

Overview

Downlink messages are enabled with CareBand wearables, yet you must work with your network server/operator to implement them. Some operators have GUIs to send configurations down on their portals, and others require you to a custom application from your application server. Please review your LoRaWAN Network Server documentation.

These messages are sent from the server to the wearable through the LoRaWAN network. They are used to configure or manage the wearable.

To set multiple configurations and beacon scan parameters, place all desired updates in the device's uplink queue on the LoRaWAN network. The device will send a response acknowledging the update, allowing the next parameter in the queue to be updated

NOTE
In order to set your LoRaWAN Network Keys, use the CareBand Manager mobile app. All other configurations can occur via downlink messages.

6.1 Set Off Mode

This message is sent to put the device in "OFF" mode.

NOTE: There will be a delay between when this message is queued and when the device is turned off based on the frequency at which the device is sending messages.

MSG Port	Message Offset	
	Byte 0	Bytes 1-4
0x14	Off Mode byte (0x0e)	Set off mode pattern (0xED6F5716)

The full message data should be 0x0EED6F5716 sent on port 0x14

Response

The device will not respond to this message.

© Copyright 2022 CareBand All Rights Reserved

6.2 Beacon Scan Parameters

This is used to update the interval between beacon scans, the time the device will actively scan in each interval, and the amount of movement needed to report a change in location in motion-based location tracking mode.

All multi-byte parameters should be sent as little-endian (least significant byte first) (e.g. a 4-byte parameter value of 240000 would translate to in hex 0x0003A980 and should be sent as 0x80A90300)

MSG Port	Message Offset				
	0	1	2-5	6-9	10-11
0x14	Write scan parameter byte (0x06)	Type of Scan	Scan Active Time (milliseconds)	Scan Interval Time (milliseconds)	Change in Distance (decimeters)

Message Field	Description
Type of Scan	The type of scan to modify. Valid values are: 0x01 - User stationery, no exit beacon nearby This type of scan is used when the wearable determines the wearer is not in motion, and no exit beacons were found in the previous scan 0x02 - User moving, no exit beacon nearby This type of scan is used when the wearable determines the wearer is in motion, and no exit beacons were found in the previous scan 0x81 - User stationary, exit beacon nearby This type of scan is used when the wearable determines the wearer is not in motion, and exit beacons have been seen in a the previous scan 0x82 - User moving, exit beacon nearby This type of scan is used when the wearable determines the wearer is in motion, and exit beacons have been seen in a the previous scan
Scan Active Time	The number of milliseconds the wearable will be actively scanning for beacons in each interval
Scan Interval Time	The number of milliseconds between the initiation of beacon scans
Movement to report new location	Change in distance to a beacon needed before new beacon data is reported in motion-activated tracking mode (decimeters)

© Copyright 2022 CareBand All Rights Reserved

Response

MSG Port	Message Offset	
	0	1
0x14	Success Indicator	Type of Scan or Error Code

Message Field	Byte(s)	Values
Success Indicator	0	0x06: Update successful 0x86: Update error
Type of Scan	1	The type of scan updated (see message table above)
Error code	1	An error code indicating why the update could not be applied. Please contact CareBand Support for questions.

© Copyright 2022 CareBand All Rights Reserved

6.3 Configuration Parameters

Any parameter can be remotely modified with a downlink LoRaWAN message. Such messages are built according to the following format:

MSG Port	Message Offset		
	0	1	2
0x14	Write configuration byte (0x08)	Parameter ID	Parameter Value

Parameter	**ID**	**Unit**	**Values**	**Description**
Motion Alert Time	0x00	minutes	5-30	The amount of time a user must be stationary before receiving a no movement alarm message
Location Tracking	0x01	minutes	0, 5-30, 255	The amount of time between beacon data messages. **Note** The special values 0 and 255 have the following meanings: **0:** Continuous location tracking **255:** Location tracking off
Help Clear condition	0x02	N/A	0-2	Defines how the help condition is cleared. Values have the following meanings: 0: Button press on the wearable 1: Staff beacon nearby 2: Staff beacon nearby *and* button press on the wearable

© Copyright 2022 CareBand All Rights Reserved

Example:

To modify the location tracking time period to 30 minutes, the command 0x08011E should be sent on port 0x14. Description:

(0x08): set a configuration parameter

(0x01): set the location tracking time

(0x1E): 30 minutes

Response

MSG Port	Message Offset	
	0	1
0x14	Success Indicator	Type of Scan or Error Code

Message Field	Byte(s)	Values
Success Indicator	0	0x08: Update successful 0x88: Update error
Parameter updated	1	The type of parameter updated (see message table above)
Error code	1	An error code indicating why the update could not be applied. Please contact CareBand Support for questions.

© Copyright 2022 CareBand All Rights Reserved

6.3 System Test

Wearable will vibrate and flash all lights for 2 seconds after receiving this message. There is no data associated with this message.

MSG Port	Message Offset
	N/A
0x12	N/A

Response

The wearable will not respond to this message

© Copyright 2022 CareBand All Rights Reserved

6.4 Help Mode Control

This message is used to remotely activate or clear help mode

MSG Port	Message Offset
	0
0x15	Help mode on

Message Field	Message offset	Possible Values
Help mode on	0	**0:** Turn off the Help mode (clear the alert) **1:** Turn on the Help mode **NOTE** Help mode state will be updated when the wearable receives this message. The timing of when the Help mode is turned on will vary depending on the frequency of LoRa messages received by the Network Server for the intended wearable. When Help mode is turned off, the wearable lights will stop blinking in the help pattern when the status is cleared by staff, and the device will send an uplink message indicating that help mode was cleared

Response

If the Help mode state is updated by this message, the wearable will respond with either a “Button Press” message (help mode activated) or a “Button Clear” message (help mode cleared).

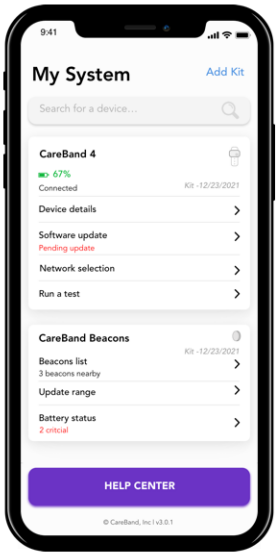
© Copyright 2022 CareBand All Rights Reserved

7 CAREBAND MANAGER MOBILE APP

The CareBand Manager is a mobile application for you to use to update, configure, and manage your CareBand wearables. You can download the CareBand Manager by searching on the Apple App Store.

Features

- Device Details
  - View device details
  - Change the wearable alias name
- Software Update
  - Update the wearable to a new firmware from the CareBand team
  - This could be due to a security issue or a specific application you are working on requires custom software
- Network Configuration
  - View LoRaWAN network keys and configuration
  - Change the network keys and update them on the wearable
- Run a Test
  - Send a test uplink message to the server
- Support
  - Access our help center



CareBand Manager

© Copyright 2022 CareBand All Rights Reserved

8 HANDLING AND SAFETY

If there is any reason to suspect that the safety of wearable has been compromised such as broken casing, battery leakage, or abnormal temperature, the wearable **must be withdrawn from use.**

These products use an internal and built-in rechargeable lithium-polymer battery that should last the lifetime of the wearable. To ensure optimum performance and a long battery lifetime, keep the wearable between -10°C to 60°C.

The wearable should be charged with an adequate 5V USB charge power adapter capable of at least 500mA output.

Do not leave a fully charged battery connected to a charger since overcharging may shorten its lifespan. Similarly, never drain the battery to 0%. It is recommended that you charge the wearable when the battery reaches 20% capacity.

CAUTION:

Rechargeable batteries have a limited number of charge cycles. Battery life and the number of charge cycles vary by use and settings. If you suspect your battery may be dead, try charging it several times. Do not attempt to open the casing or repair the wearable, if the battery does not recharge, please contact customer service for repair information.

The wearable must not be exposed to abrasive acids or bases and be kept away from extreme cold or heat (e.g., fire or heating equipment).

Do not leave the wearable submerged in water for a prolonged period or placed under the influence of a high-pressure water jet.

© Copyright 2022 CareBand All Rights Reserved

9 CERTIFICATION AND REGULATORY

9.1 FCC Radio Certification

Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
This equipment has been tested and found to comply with the limits for a Class B digital wearable, 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. complies with part 15 of the FCC rules.

The product is compliant with the REACH regulation (Regulation EC No 1907/2006) and RoHS directive 2011/65/UE.



Waste Electrical and Electronic Equipment (WEEE): This symbol on the wearable indicates that the wearable complies with European directive 2013/56/UE and it should not be disposed of as household waste. This product should be disposed of at an appropriate facility to enable recovery and recycling. For more detailed information, contact your local city office, household waste disposal service, or retail store.

© Copyright 2022 CareBand All Rights Reserved

10 REVISION LOG

Revision	Date	Author	Description of Change
1.0	January 10, 2022	AS	Initial release
1.1	July 20, 2022	AS	Added and reformatted sections

11 TROUBLESHOOTING & SUPPORT

11.1 Troubleshooting

State	Location	Pattern
Charging issue due to overheating	Front & Back	Blue light on back will flash irregularly -AND- Lights on the front will flash in the charging pattern, restarting each time the LED on the back flashes
Software update fails	Front	An error message will be seen in the CareBand Manager app

11.2 Support

The CareBand team is available to support you in the set up, configuration, test, and launch phases of the deployment process. Some helpful resources are below:

1. Review the CareBand Documentation at https://docs.careband.co
2. Email us at support @ careband.co with any questions, comments, or requests.

© Copyright 2022 CareBand All Rights Reserved