

# MPACT

## Bluetooth Smart Beacon



## Hardware Installation Guide



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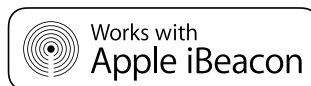
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# About This Document

## Introduction

MPact utilizes Bluetooth Smart beacons in various modes to unify Wi-Fi and Bluetooth Smart Technology to capture analytics, accuracy and insight.

Beacon placements can be adjusted within a deployment floor plan, and depending on the mode selected, their battery life can be tracked over time. Administrators can cursor over a beacon on a site's floor plan to assess the beacon's remaining battery life. This guide covers a variety of indoor, outdoor and USB type beacons, mounting options, and operational instructions for each beacon type.

This guide supports the following product families, parts, and regulatory models:

PRODUCT FAMILY	PART NAME	REGULATORY MODEL
MB 1000	MPACT-T1B10-000-WR	ALTS-T1B
MB 1000	MPACT-T1B20-000-WR	ALTS-T1B
MB 1000	MPACT-MB1000-01-WR	MPACT-INDR2
MB 1000	MPACT-SB1100-01-WR	MPACT-INDR3
MB 2000	MPACT-MB2000-01-WR	MPACT-INDR1
MB 2000	MPACT-MB2001-01-WR	MPACT-INDR1
MB 2000	MPACT-MB2001-01-KIT	MPACT-INDR1
MB 2000	MPACT-MB2001-01-ACC	MPACT-INDR1
MB 2000	MPACT-SB2000-01-WR	MPACT-INDR1
MB 3000	MPACT-MB3000-01-WR	MPACT-USB1
MB 4000	MPACT-MB4000-01-WR	MPACT-OUTR1
MB 4000	MPACT-MB4001-01-WR	MPACT-OUTR1
MB 5000	MB5000-01-WR	MPACT-HUBFXD
MB 6000	MB6000-01-WR	MPACT-BRDGM
MB 6000	MB6000-CHRGR	MPACT-CRDLE
MB 6000	MB6000-01-ACC	Replacement clip
MB 6000	MB6000CABLE-US	Power cable
MB 6000	MB6000CABLE-EU	Power cable
MB 6000	MB6000CABLE-UK	Power cable
MB 1000	MPACT-MB1000-01-ACC	Lanyard mounting plate
MB 1000	MPACT-MB1001-01-ACC	Wrist mounting plate
MB 2000	MPACT-MB2002-01-ACC	RF enhancement plate

### Icon Conventions

The following graphic icons are used throughout the documentation set; these icons and their associated meanings are described below:



**NOTE:** The text here indicates information that is supplemental for the user to know and that is not required to complete a task.



**IMPORTANT:** The text here indicates information that is important for the user to know.

### Related Documents

- MPACT Hardware Installation Guide
- IOT Bridge CLI Document
- JSON Schema for Receiver Operations
- Wi-Fi Connectivity Settings
- Integration with Receivers
- Receiver Indicators, Actions, and Details
- Hostname Support
- Beacon Toolbox User Guide
- Superbeacon Toolbox User Guide

These and other guides are available at: [www.zebra.com/support](http://www.zebra.com/support) or contact Zebra's product line management.

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- Model number or product name
- Software/firmware type or version number

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If your problem cannot be solved by Zebra Customer Support, you may need to return your equipment for servicing and will be given specific directions. Zebra is not responsible for any damages incurred during shipment if the approved shipping container is not used. Shipping the units improperly can possibly void the warranty.

If you purchased your Zebra business product from a Zebra business partner, contact that business partner for support.

### Feedback

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# Hardware Specifications and Installation

Bluetooth Low Energy beacons from Zebra can be used with Zebra Location Solutions (MotionWorks and MPact) or other third-party solutions.

## Lozier® Shelves

Beacon brackets for the MPACT-T1B20-000-WR and MPACT-T1B10-000-WR are used with the following Lozier products:

- TL Shelf
- DL Shelf
- HL Shelf
- Standard Base Deck

## MB1000 Beacon: MPACT-T1B20-000-WR

As a prerequisite, the following hardware items are required to mount the tie-wrap style beacon housing to a pole or similar structure:

- Beacon (tie-wrap style housing) part number MPACT-T1B20-000-WR
- Plastic tie wraps for attaching each beacon housing to the shelf

## Mounting and Installing

Tie-wrap beacon housings are designed to attach to vertical or horizontal poles or similar mounting surfaces. As shown in [Figure 1](#), there are openings on the back of the beacon housing allowing a tie wrap through the openings and wrapped around a pole or similar structure.

Notice the up arrow located on the middle of the beacon housing, this arrow indicates the optimal orientation for the beacon to function properly. Additionally, the smooth front of the beacon should face outward toward the aisle.

[Figure 1](#) shows a beacon with the mylar strip attached to the left-hand side of the housing.

**Figure 1** Tie Wrap Style Beacon



**NOTE:** When installing numerous beacons, group beacons by category and activate them prior to scanning the barcodes and associating them with positions in the Toolbox.

From the MPact Toolbox, select a site floor plan and an unassigned position for the beacon. Refer to the MPact Location & Analytics Deployment Guide for information on how to install and deploy the beacon from the Toolbox.

Mount the beacon to a pole or similar structure using the plastic tie wrap. Tie can be placed vertically or horizontally but the arrow should still point up.

To activate a beacon part number MPACT-T1B20-000-WR, pull the mylar strip off the beacon housing.



**IMPORTANT:** After pulling off the last mylar strip, you have 20 seconds to associate the beacon in either off-line or on-line mode using the Toolbox application.

## MB1000 Beacon: MPACT-T1B10-000-WR

As a prerequisite, the following hardware items are required to mount beacon brackets to a Lozier style shelf:

- Lozier Shelves
- Beacon part number MPACT-T1B10-000-WR
- Bracket mount (one of either):
  - MPACT Metal Lozier Bracket: MPACT-A1O10-004-WR
  - MPACT Plastic Lozier Bracket: MPACT-A1O10-001-WR
- Phillips screwdriver

## Mounting and Installing

[Figure 2](#) shows a universal style beacon. While there is no up arrow on this beacon's housing, the beacon should be oriented similar to the tie wrap style of beacon housing (see [MB1000 Beacon: MPACT-T1B20-000-WR](#) on page 3).

Notice the up arrow located on the middle of the beacon housing. This arrow indicates the optimal orientation for the beacon to function properly. Additionally, the smooth front of the beacon should face outward toward the aisle.

**Figure 2** Universal Style Beacon



**NOTE:** When installing numerous beacons, group beacons by category and activate them prior to scanning the barcodes and associating them with positions in the Toolbox.

From the MPact Toolbox, select a site floor plan and an unassigned position for the beacon. Refer to the MPact Location & Analytics Deployment Guide for information on how to install and deploy the beacon from the Toolbox.

There are two styles of bracket mounts:

- Universal Style Metal Bracket: MPACT-A1O10-004-WR

**Figure 3** Universal Style Metal Bracket



- Universal Style Plastic Bracket: MPACT-A1O10-001-WR

**Figure 4** Universal Style Plastic Bracket



To mount the universal style beacon to Lozier shelves:

1. Place the universal beacon shelf-bracket on the shelf:
  - Metal brackets: Fit in place and tighten onto the shelving unit using a Phillips screwdriver.
  - Plastic brackets: Fit in place and snap onto the shelving unit.
2. Fit the beacon's universal style housing into the bracket (mylar strip pointing up) and turn the beacon housing clockwise 90 degrees.

The barcode label should face up toward the ceiling and the smooth front of the beacon should face out toward the aisle.

Activate one or MPACT-T1B10-000-WR model beacons by pulling the mylar strip off the beacon housing.



**IMPORTANT:** After pulling off the last mylar strip, you have 20 seconds to associate the beacon in either off-line or on-line mode using the Toolbox application.

## Battery Replacement

When a the battery life is less than 20%, the beacon should be prioritized for immediate replacement.

This section includes procedures for replacing batteries for the following part numbers:

- MPACT-T1B20-000-WR
- MPACT-T1B10-000-WR

### Replacing MB1000 Battery

The battery is located within a tray in the beacon housing.

1. Remove the beacon from the shelving unit.
2. With the bottom of the beacon facing up, gently lift each corner of the beacon's battery tray.

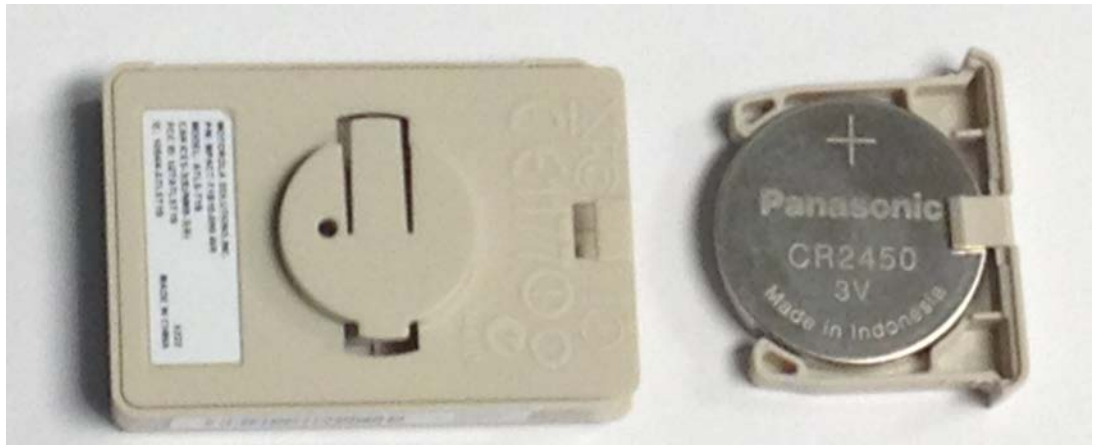
[Figure 5](#) shows the beacon battery housing for part number MPACT-T1B20-000-WR, MPACT-T1B10-000-WR, and MPACT-T1B10-000-WR. In this example, the battery tray is on the right and the corners of the battery tray are marked in red. When gently lifting each tray corner, slightly push the each corner out to dislodge corners of the tray.

**Figure 5** Beacon Battery Housing



3. With both tray corners dislodged, gently slide the battery tray open, being careful not to drop the tray. [Figure 6](#) shows an open battery housing. In this example, the battery tray is a separate piece, along with the battery, on the right-hand side.

**Figure 6** Battery Tray



4. Remove the old battery, dispose properly, and replace with a Panasonic CR2450 model battery.



**NOTE:** Pay attention to the position of the + on the battery. Installing the battery backwards may damage the Beacon.

1. Close the tray, ensuring the latch is secure.

## MPACT-MB2000-01-WR, MPACT-MB1000-01-WR, MPACT-MB2001-01-WR, MPACT-SB2000-01-WR

As a prerequisite, the following hardware is required to wall mount a beacon:

- Beacon part numbers: MPACT-MB2000-01-WR and MPACT-MB2001-01-WR
- Bracket mount kit (included with part number MPACT-MB2000-01-WR):
  - Metal bracket
  - Two 1-inch Phillips head tap screws, and two 1 inch plastic wall inserts

**Figure 7** Metal Beacon Wall Mount Bracket



**NOTE:** Ensure the beacon is positioned correctly, Once the beacon is mounted on the bracket it will be difficult to remove.

Activate one or more MPACT-MB2000-01-WR or MPACT-MB2001-WR beacons by pulling the mylar strip out from inside the beacon housing.



**IMPORTANT:** After pulling off the last mylar strip, you have 20 seconds to associate the beacon in either off-line or on-line mode using the Toolbox application.



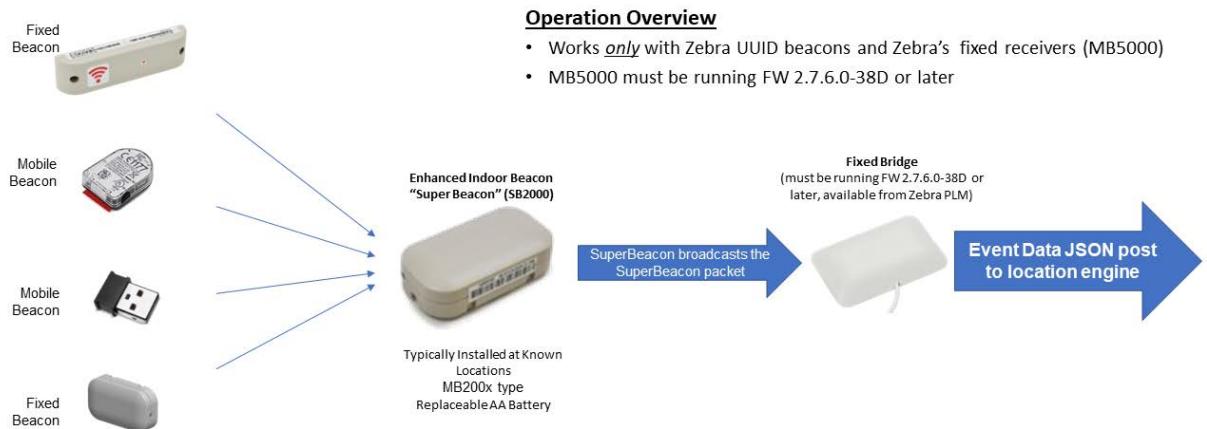
**Figure 8** Indoor Style Beacon



The MPACT-SB2000-01-WR is a unique device. It operates as a BLE beacon but also captures and broadcasts (using BLE) the information of other nearby Zebra BLE beacons. It is packaged the same as other Zebra beacons including two AA batteries.

Figure 9 shows the basic operation of the SB2000.

**Figure 9** SB2000 Basic Operation



**Operation Overview**

- Works *only* with Zebra UUID beacons and Zebra’s fixed receivers (MB5000)
- MB5000 must be running FW 2.7.6.0-38D or later

The SB2000 is configured via the Superbeacon Toolbox application which is available from Zebra product line management. The configuration of the product is done with the toolbox application and related settings in the Zebra AB5000. Refer to the JSON Schema for Receiver Operations document for more information.

## Mounting and Installing

Adhere to the following prerequisites when mounting an MPACT-MB2000-01-WR, MPACT-MB2001-01-WR, or MPACT-SB2000-01-WR model beacon:

- Do not install the cover on the unit until the beacon has been initialized and configuration verified.
- Ensure the planned installation location matches your physical deployment plans.
- Beacon mounting heights may vary by deployment but should be mounted 2 meters or lower from the supporting surface.
- Ensure the intended deployment location has good Wi-Fi coverage.

To mount a MPACT-MB2000-01-WR, MPACT-MB2001-01-WR, or MPACT-SB2000-01-WR model beacon using the MPACT-MB2001-01-ACC:

1. Before peeling the cover tape off the adhesive mounting pads, hold the wall plate portion of the accessory in its intended mounting location and mark the spot on the wall. You can use masking tape to mark the bottom of the unit. Make sure the orientation arrow on the back plate is pointing up.
2. Ensure the mounting surface is clean and dry. Clean the surface with a 50:50 mixture of isopropyl alcohol (IPA) and water. Ensure the surface is completely dry before applying the mounting tape.
3. Peel the cover tape from the adhesive pads on the rear of the wall plate, align and press to the wall.
4. Snap the beacon into the accessory wall plate.

**Figure 10** Wall Mount and attached beacon



**NOTE:** If the surface is clean and smooth, use the tape to mount the beacon. However, if the surface is wood, brick or other non-smooth surface use appropriately sized screws for mounting (not included).

- 5 Snap the top cover in place with the small gap showing on the right side and ensuring logos are correctly oriented.

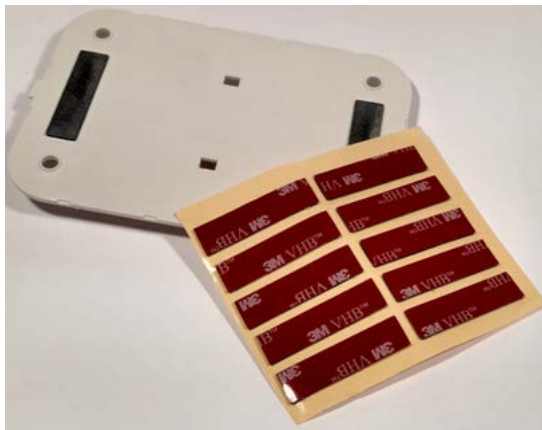
**Figure 11** Cover and Wall Mount Installed



**NOTE:** Ensure the beacon is positioned correctly, Once the beacon is mounted on the bracket it will be difficult to remove.

If the beacon is moved, the adhesive pads (MBWALL-TAPE) must be replaced.

**Figure 12** Beacon Replacement Adhesive



The cover can be removed to service the beacon by placing a small flathead screwdriver into the gap on the right side as shown in the picture.

**Figure 13** Cover Removal



## Beacon Operating Modes

Refer to the following for beacon operating modes for MPACT-MB2000-01-WR, MPACT-MB2001-01-WR, and MPACT-MB1000-01-WR model beacons:

Mode	Definition
Sleep	The beacon is not transmitting or accepting client connections.
Configuration	The beacon accepts connections from clients. Clients can configure the device when connected.
Broadcast	The beacon is transmitting packets that conform to one of the supported beacon formats (iBeacon, MPact, Battery Save and SecureCast).

Refer to the following for Indoor Style Beacon operating modes:

Mode	Sleep	Configuration	Broadcast	LED Behavior
0-2 seconds	No action	No action	No action	
2+ -5	Broadcast	Broadcast	Broadcast	Slow flash when button flashes 300 ms on / 300ms off.
5+ - 10	Move to configuration	Remain in configuration	Move to configuration	Fast flash – 100ms /on & off
+ 10	Sleep	Sleep	Sleep	Solid light

## Battery Replacement

When a beacon's battery life is less than 20%, the beacon battery should be prioritized for immediate replacement. The beacon's battery is located within a battery tray in the beacon's housing.

1. Remove the beacon from the cover and wall mount.
2. With the bottom of the beacon facing up, use your finger nail to gently lift the clip up to remove the back off the beacon's battery enclosure.
3. Remove the old batteries and dispose of properly and replace it with two new 2AA batteries.



**IMPORTANT:** Pay attention to the polarity (+ and -) of the batteries. Installing the batteries incorrectly may damage the Beacon.

**Figure 14** Open Battery Enclosure



4. Close the battery enclosure, ensuring the clip is secure.

## Battery Disposal

- Always dispose of batteries according to local laws.
- NEVER dispose of batteries in fire as they may explode.
- Where available, please recycle to reduce the impact on our environment.

## USB Beacon: MPACT-MB3000-01-WR

A USB powered interface is required to power the USB Beacon. No additional hardware is required.

## Installing

To activate a MPACT-MB3000-01-WR model beacon:

1. Insert the beacon into any standard USB power source—the beacon moves into connect mode automatically after insertion.

**Figure 15** USB Style Beacon





**NOTE:** When installing numerous beacons, group beacons by category and activate them prior to scanning the barcodes and associating them with positions in the Toolbox.

The USB beacon barcode is not on the beacon itself but on the on its plastic packaging.

1. After inserting the beacon(s) into any standard USB power source, associate the beacon in either offline or online mode in the Toolbox application.
2. From the MPact Toolbox, select a site floor plan and an unassigned position for the beacon. Refer to the MPact Location & Analytics Deployment Guide for information on how to install and deploy the beacon from the Toolbox. The guides are available at [www.zebra.com/support](http://www.zebra.com/support).

## Beacon Part Numbers: MPACT-MB4000-01-WR and MPACT-MB4001-01-WR

As a prerequisite, the following hardware items are required to mount a beacon using screws:

- Beacon part number MPACT-MB4000-01-WR
  - Two No. 6 gauge or M3.5 screws (not included) for use on the intended surface
  - Phillips screwdriver compatible with No. 6 gauge screws for mounting the Outdoor Style beacon

## Antennae Positions

The following are antennae positions for the MPACT-MB4000-01-WR Outdoor Beacon:

- MPACT-MB4000-01-WR orients its antenna down at a 20 degree angle.
- MPACT-MB4001-01-WR orients its antenna down to the side at a 20 degree angle.

**Figure 16** Antennae Positions



## Mounting and Installing

1. From the MPact Toolbox, select a site floor plan and an unassigned position for the beacon. Refer to the MPact Location & Analytics Deployment Guide for information on how to install and deploy the beacon from the Toolbox.

To prepare the Outdoor style beacon for mounting:

- a. Prepare a surface with 3M VHB double-sided tape.  
or
- b. Prepare to mount the Outdoor style beacon with two No. 6 gauge or M3.5 screws (not included).



**NOTE:** If the surface is clean and smooth, use the tape to mount the beacon. However, if the surface is wood, brick or other non-smooth surface use appropriately sized screws for mounting (not included).

### Mounting using Tape

1. Clean the surface with a 50:50 mixture of isopropyl alcohol (IPA) and water before applying 3M™ VHB™ tape.

Some surfaces may require additional preparation such as the following:

- Use degreasers or solvent-based cleaner to remove heavy oil or grease from a surface followed by cleaning with IPA/water
  - Scrape the surface, followed by cleaning with IPA/water to remove heavy dirt or oxidation and increases surface area to improve adhesion.
  - Prime the surface to improve initial and ultimate adhesion to many materials such as plastics and paints.
  - Seal porous and fibered materials such as wood, particleboard, and concrete to provide a unified surface. Mount with two No. 6 gauge or M3.5 screws (not included).
2. Peel the plastic off from the tape.
  3. Press the backside of the Outdoor style beacon firmly to a smooth, flat and clean mounting surface.

### Mounting using Screws

1. Press the backside of the beacon to the mounting surface.
2. Insert screws into the screw holes (see [Figure 18](#)).

Zebra recommends not removing the plastic backside of the 3M tape when mounting the beacon with screws.

3. Hand tighten the screws to firmly secure the beacon.

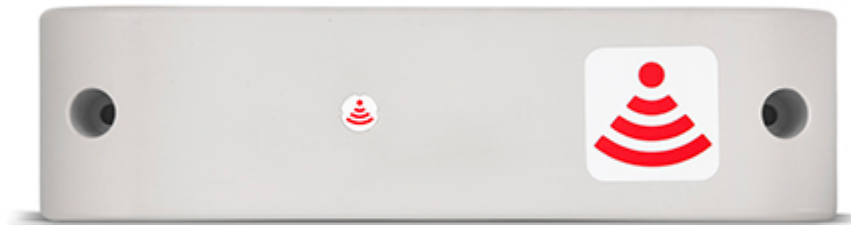


**NOTE:** Ensure the beacon is positioned correctly. Once the beacon is mounted it will be difficult to remove.

**Figure 17** Back of Outdoor Style Beacon



**Figure 18** Top of Outdoor Style Beacon



**NOTE:** On MPACT-MB4000-01-WR model outdoor beacons, the large red antenna pattern indicates that the antenna is pointing down.



**NOTE:** When installing numerous beacons, group beacons by category and activate them prior to scanning the barcodes and associating them with positions in the Toolbox.

## Activating

1. Swipe your finger across the capacitive switch several times to wake the beacon out of shipping mode into broadcast mode. The under surface LED light becomes solid and then turns off.

**Figure 19** Activating Outdoor Style Beacon



2. Put the beacon in connect mode. Press your finger on the capacitive switch for about five seconds. The under surface LED will flash slowly. Refer to the table below for information about operating modes and LED blink patterns.



**NOTE:** When installing numerous beacons, group beacons by category and activate them prior to scanning the barcodes and associating them with positions in the Toolbox.



The barcode label should face up toward the ceiling and the smooth front of the beacon should face out to where the mobile client is expected to engage.

Mode	Shipping	Sleep	Configuration	Broadcast	LED Behavior
0-2 seconds	No action	No action	No action	No action	
2+ -7	Broadcast	Broadcast	Broadcast	Broadcast	Solid light
7+ - 12		Move to configuration	Remain in configuration	Move to configuration	Slow flash when button flashes 300 ms on / 300ms off.
+ 12		Sleep	Sleep	Sleep	Fast flash – 100ms /on & off

### Beacon: MPACT-MB1000-01-WR and MPACT-SB1100-01-WR

The MPACT-MB1000-01-WR and MPACT-SB1100-01-WR beacon is a small beacon designed to be affixed to assets. The beacon and the optional mounting accessory are used to attach the asset beacon to an object lacking a flat mounting surface.

On the side of the asset beacon is a switch used to place the device in different operating modes.

**Figure 20** Beacon and Mounting Accessory



**Figure 21** Beacon with Adhesive Strip



Adhere to the following prerequisites when mounting an MPACT-MB1000-01-WR and MPACT-SB1100-01-WR model beacon:

- The asset beacon should be mounted on any smooth, flat, clean, prepared dry surface.
- There should be no structures immediately in front or to the sides that would block signals from this unit.
- There should be no material, metal or surfaces over or covering the beacon.
- Before peeling the cover off the mounting tape, hold the asset beacon in its intended mounting location and ensure it will fit as desired.

Figure 22 shows the beacon attached to a piece of equipment in the preferred orientation. The antenna pattern is omni-directional and the unit operates sufficiently in any vertical orientation.

**Figure 22** Preferred Orientation



To mount a MPACT-MB1000-01-WR or MPACT-SB1100-01-WR model beacon:

1. Peel the tape from the adhesive pads on the rear of the asset beacon (as shown below) and press the unit to the mounting surface.

**Figure 23** Adhesive Tape



**NOTE:** If the surface is clean and smooth, use the tape to mount the beacon. However, if the surface is wood, brick or other non-smooth surface use appropriately sized screws for mounting (not included).



**NOTE:** Ensure the beacon is positioned correctly, Once the beacon is mounted on the bracket it will be difficult to remove.

If the beacon is moved, the adhesive pads must be replaced.

Initialize the unit per the operating instruction.

### Mounting using Tape

1. Clean the surface with a 50:50 mixture of isopropyl alcohol (IPA) and water before applying tape.  
Some surfaces may require additional preparation such as the following:
  - Use degreasers or solvent-based cleaner to remove heavy oil or grease from a surface followed by cleaning with IPA/water
  - Scrape the surface, followed by cleaning with IPA/water to remove heavy dirt or oxidation and increases surface area to improve adhesion.
  - Prime the surface to improve initial and ultimate adhesion to many materials such as plastics and paints.
  - Seal porous and fibered materials such as wood, particleboard, and concrete to provide a unified surface. Mount with two No. 6 gauge or M3.5 screws (not included).
2. Peel the plastic off from the tape.
3. Press the backside of the Outdoor style beacon firmly to a smooth, flat and clean mounting surface.

### Mounting using a Beacon Accessory

The MPACT-MB1000-01-WR and MPACT-SB1100-01-WR can be mounted on non-flat objects using the MPACT-MB1000-01-ACC beacon accessory. [Figure 24](#) shows a tool with the asset beacon attached to the mounting accessory. The optional accessory is ordered separately from MPACT-MB1000-01 asset beacon. The beacon is attached to the mounting plastic using the adhesive strip, then a tie wrap wire or something similar is used to connect the mounting plastic to the hand tool.

**Figure 24** Beacon Accessory attached to Tool



1. Peel the tape from the adhesive pads on the rear of the asset beacon and press the unit to the mounting surface on the accessory MPACT-MB1000-01-ACC. The adhesive bonds immediately and reaches full adhesion within an hour.

**Figure 25** MPACT-MB1000-01-ACC Beacon



**NOTE:** Ensure the beacon is positioned correctly, Once the beacon is mounted on the bracket it will be difficult to remove.

If the beacon is moved, the adhesive pads must be replaced.

The MPACT-SB1100-01-WR is a small, waterproof (IP67), BLE 5.0 version of the MB1000. An NFC application for Android is available for Zebra product management and is used to turn the beacon on and off, switch modes, and change operating configurations.

**Figure 26** MPACT-SB-1100-01-WR Beacon



**NOTE:** MPACT-SB1100-01-WR mounted to the optional MPACT-MB1001-01-ACC wrist mount accessory.

## Operating Modes

Refer to the following for operating modes for MB1000-01-WR asset beacon operating modes:

Mode	Definition
Sleep	The beacon is not transmitting or accepting client connections.
Configuration	The beacon accepts connections from clients. Clients can configure the device when connected.
Broadcast	The beacon is transmitting packets that conform to one of the supported beacon formats (iBeacon, MPact, Battery Save and SecureCast).

The MPACT-MB1000-01-WR is delivered in shipping mode. To initiate beacon operation, press the button three times quickly (within 2 seconds), if unsuccessful, wait 5 seconds and repeat. The LED flashes several times and the beacon begins to broadcast. Using the table below, hold the button for the length of time shown to change modes. The LED displays a different light pattern depending on the mode it is entering.

Current Operation Mode / Button Press	Sleep	Configuration	Broadcast	LED Behavior
0-2 seconds	<b>No action</b>	No action	No action	
2+ -5	<b>Moves to Broadcast mode</b>	Moves to Broadcast mode	Moves to Broadcast mode	Slow Flash
5+ - 10	<b>Moves to Configuration mode</b>	Moves to Configuration mode	Moves to Configuration mode	Fast Flash
+ 10	<b>Moves to Sleep mode</b>	Moves to Sleep mode	Moves to Sleep mode	Solid LED

## Cleaning

Cleaning frequency is discretionary in respect to the environments the BLE devices are deployed. They may be cleaned as frequently as required.

Prolonged exposure to Metrex CaviWipes or similar chemicals may degrade the clear PC9925A material used in the asset beacon (and associated mounting accessory) and should be used with care and in small amounts per the manufacturers recommended instructions. Contact Zebra for specific product and cleaning agent information.

### Fixed IoT Bridge (hub): MB5000-01-WR

#### Installing

1. Select your desired mounting location for the unit. Verify the USB cable can reach the power supply and it's electrical outlet (nearby the device). Clean the surface with a 50:50 mixture of isopropyl alcohol (IPA) and water.
2. Peel backing tape from adhesive on the back of the rear cover and place firmly on a wall. Make sure the arrow is pointing up. Optionally, use #8 or #10 Pan Head screws to mount the unit to rough mounting surfaces. The distance between the horizontal screw hole mounting positions is 109 mm. The screw hole diameters are 5.2 mm.
3. Insert the USB cable into the unit and carefully route the cable through the cable strain lock features outlined in yellow (see [Figure 27](#)).

**Figure 27** Install Hub Components



4. Snap the cover on. Ensuring the logo is oriented correctly. The USB cable should be in the cable notch and not pinched by the cable cover. The unit's cover access slot will be on the right side if cover and unit are mounted correctly.



**Figure 28** Hub Mounted



5. Plug the power supply into an A/C outlet and plug the other end of USB cable into the power supply.

**Figure 29** Hub with Power Connected



## Initializing

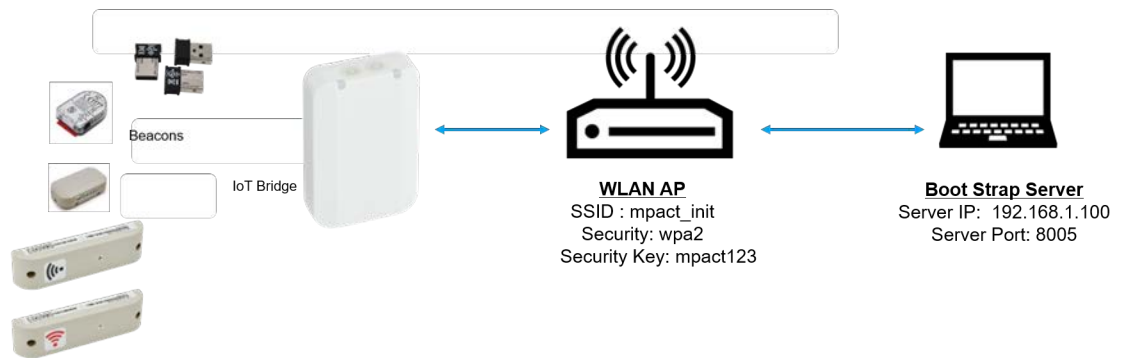
The factory default programming is set to allow compliant operation across global regulatory domains. When the hub is turned on, the unit will use the default “world safe” settings until or unless it receives 802.11d probes identifying the country of operation. The unit will automatically reconfigure for enhanced performance in that country, otherwise the factory settings remain.

The badge and hub product are tested and receive EMC regulatory certifications on a per country basis. Zebra provides a list of all approved countries where the units are able to be sold to end-customers and used by end-users. By design, the operation of the units is controlled by firmware in accordance with the approved regulatory domains (i.e., approved countries). The initial production release product (Rev. A) has a default country domain with somewhat reduced RF performance to ensure compliance with most domains globally. The units will initially operate in this “world safe” default scanning for Wi-Fi access point 802.11d country information. The units will either set the country operation to the 802.11d information (if an approved country), or if not an approved country, the units will continue to operate in the “world safe” default mode. The unit never allows use of 2.4 GHz channels 12 and 13.

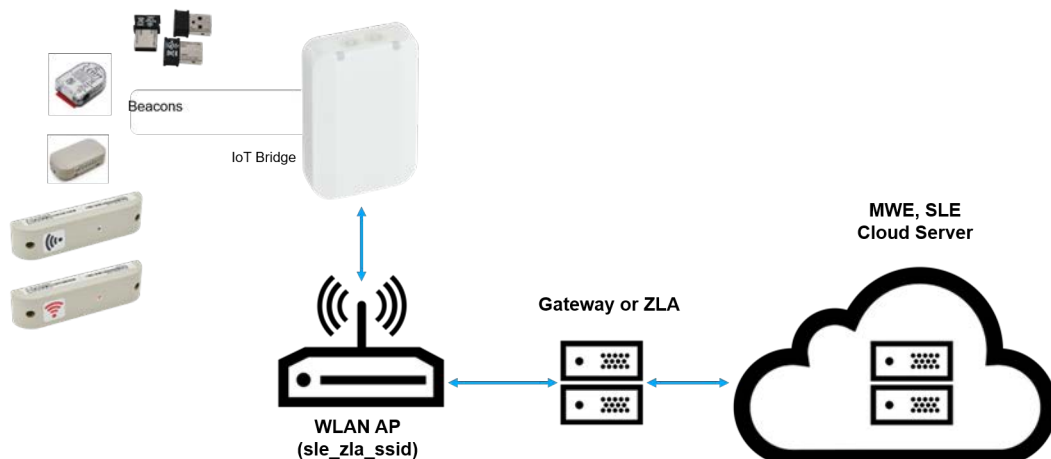
The hub scans for Bluetooth Smart beacon emissions. The hub filters based on its scanning configuration for known devices and forwards scan results to its defined administration (posting) server.

The hub ships with a default software load, but without its configuration. When the hub is initialized for the first time, it conducts an internal scan diagnostic but is unable to properly provision itself. Consequently, the hub needs to be provisioned with both an initial configuration and a scanning configuration before it can filter beacons and forward relevant scanning information.

**Figure 30** IoT Bootstrapping



**Figure 31** IoT Bridge Operation as Deployed





To provide the hub its initial and scanning configurations:

1. Initialize the hub. The hub scans for its initial configuration. The hub has a fixed SSID of mpact\_init and a preset WPA2 password of mpact123. When unable to provision itself the hub connects to 192.168.1.100 (a fixed location) and downloads its initial configuration file (badge\_config.json).



**NOTE:** The 192.168.1.100 location must be reachable from the hub's connected Access Point mpact\_init SSID to receive its required badge\_config.json file.

The hub obtains its badge\_config.json file and self-configures its initial configuration. Once completed, the hub connects to its posting server to obtain its scanning configuration. The scanning configuration is required to define the hub's scan interval and beacon profile determining how beacon data is forwarded, based on the beacon's UUID and Major values, and posted to the server for administration.

2. If you encounter issues with the setup of the hub, there's several file restoration options available.
  - Reboot the badge - Press and hold button 2 (see [Figure 33](#)) between 10–20 seconds, then release. LED 1 will blink slowly twice to confirm. Any in-process configuration activity will need to be re-started.
  - Erase to factory default configuration and reboot - Press and hold button 2 between 30–40 seconds, then release. LED 1 will blink slowly twice to confirm. The deletion of the initial configuration could be warranted if the configuration was not successfully applied on the first attempt. Once reverted to factory configuration, the initial config and scanning config can be re-applied.
  - Shutdown the badge - Press and hold button 2 between 20–30 seconds, then release. LEDs will blink 5 times to confirm the badge shutdown. Use this process when brining a deployed badge off-line.
3. For additional information about the configuration process and JSON files, contact your product line manager.

## Cleaning

Use alcohol to clean this product. When using sodium hypochlorite (bleach) based disinfectants to clean the product, always follow the manufacturers recommended instructions regarding the use of gloves during application and to remove the residue afterwards with a damp cloth to avoid prolonged skin contact while handling the scanner. Please note that due to the powerful oxidizing nature of sodium hypochlorite the metal surfaces on the product are prone to oxidation (corrosion) when exposed to this disinfectant in the liquid form and should be removed promptly after cleaning with a damp cloth.

Use pre-moistened wipes to clean the unit. Do not allow liquid cleaners to pool or remain on the unit.

Cleaning frequency is discretionary in respect to the environments the MB5000-01-WR is deployed and may be cleaned as frequently as required.

## Mobile IoT Bridge (badge): MB6000-01-WR

The factory default programming for the badge is set to allow compliant operation across global regulatory domains. When the hub is turned on, the unit will use the default “world safe” settings until or unless it receives 802.11d probes identifying the country of operation. The unit will automatically reconfigure for enhanced performance in that country, otherwise the factory settings remain.

The badge and hub product are tested and receive EMC regulatory certifications on a per country basis. Zebra provides a list of all approved countries where the units are able to be sold to end-customers and used by end-users. By design, the operation of the units is controlled by firmware in accordance with the approved regulatory domains (i.e. approved countries). The initial production release product (Rev. A) has a default country domain with somewhat reduced RF performance to ensure compliance with most domains globally. The units will initially operate in this “world safe” default scanning for Wi-Fi access point 802.11d country information. The units will either set the country operation to the 802.11d information (if an approved country), or if not and approved country, the units will continue to operate in the “world safe” default mode. The unit never allows use of 2.4 GHz channels 12 and 13.

The badge is a wearable beacon that’s clipped to one’s body, typically in the mid section or belt area.

The badge needs to be attached to a person in a manner directing RF radiation away from the body. The RF antennas radiate out from one side of the badge. A MB6000-01-WR badge is designed to enhance personal safety.

**Figure 32** Correct Clothing Mount

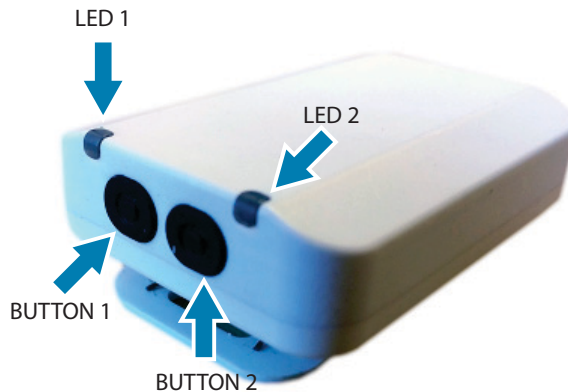


**NOTE:** The clip portion of the badge is replaceable. Refer to Part No. MB6000-01-ACC when ordering a replacement clip for a MB6000-01-WR model badge.

To mount a MB6000-01-WR model badge:

1. Clip an initialized badge to your midsection or belt area
2. If you encounter issues with the setup of the badge, there’s several file restoration options available.

**Figure 33** LEDs and Buttons



**NOTE:** With the badge clip side facing you and the buttons facing up, button 1 is on the left top and button 2 is on the top right.

- Reboot the badge - Press and hold button 2 between 10–20 seconds, then release. LED 1 will blink slowly twice to confirm. Any in-process configuration activity will need to be re-started.
- Erase to factory default configuration and reboot - Press and hold button 2 between 30–40 seconds, then release. LED 1 will blink slowly twice to confirm. The deletion of the initial configuration could be warranted if the configuration was not successfully applied on the first attempt. Once reverted to factory configuration, the initial config and scanning config can be re-applied.
- Shutdown the badge - Press and hold button 2 between 20–30 seconds, then release. All LEDs will blink 5 times to confirm the badge shutdown. Use this process when brining a deployed badge off-line.

## Initializing

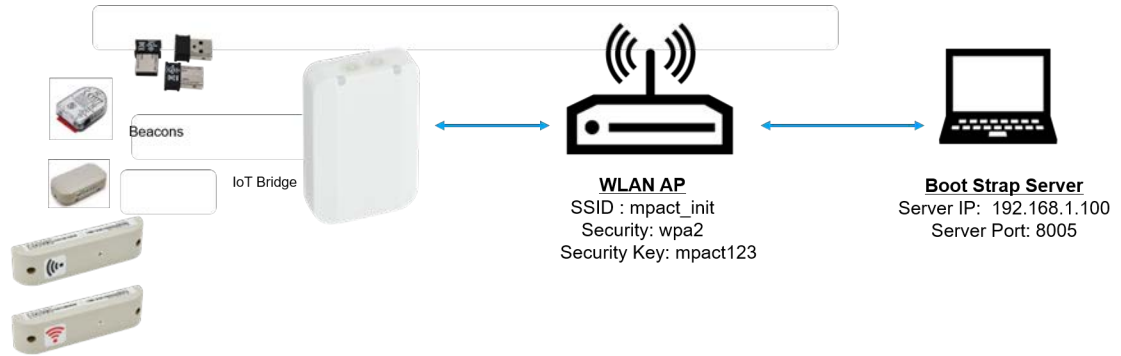
The factory default programming is set to allow compliant operation across global regulatory domains. When the hub is turned on, the unit will use the default “world safe” settings until or unless it receives 802.11d probes identifying the country of operation. The unit will automatically reconfigure for enhanced performance in that country, otherwise the factory settings remain.

The badge and hub product are tested and receive EMC regulatory certifications on a per country basis. Zebra provides a list of all approved countries where the units are able to be sold to end-customers and used by end-users. By design, the operation of the units is controlled by firmware in accordance with the approved regulatory domains (i.e. approved countries). The initial production release product (Rev. A) has a default country domain with somewhat reduced RF performance to ensure compliance with most domains globally. The units will initially operate in this “world safe” default scanning for Wi-Fi access point 802.11d country information. The units will either set the country operation to the 802.11d information (if an approved country), or if not an approved country, the units will continue to operate in the “world safe” default mode. The unit never allows use of 2.4 GHz channels 12 and 13.

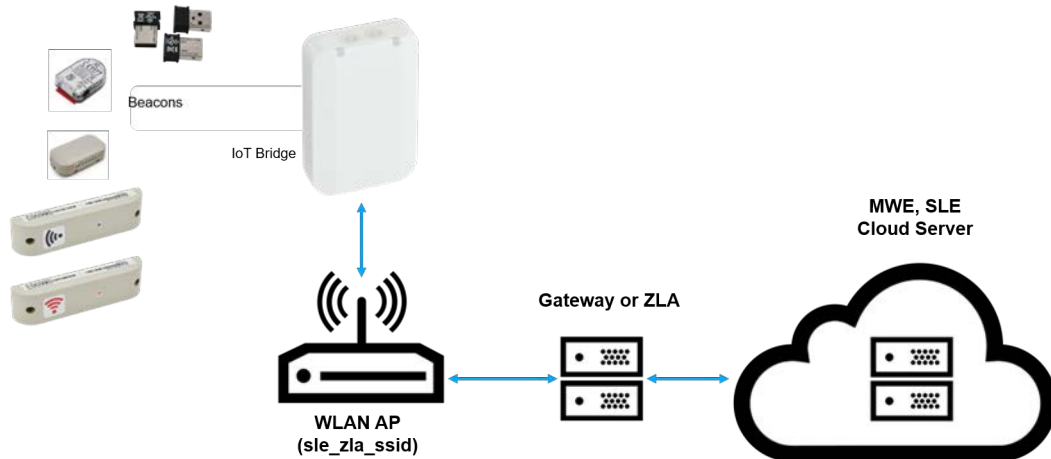
The hub scans for Bluetooth Smart beacon emissions. The hub filters based on its scanning configuration for known devices and forwards scan results to its defined administration (posting) server.

The hub ships with a default software load, but without its configuration. When the hub is initialized for the first time, it conducts an internal scan diagnostic but is unable to properly provision itself. Consequently, the hub needs to be provisioned with both an initial configuration and a scanning configuration before it can filter beacons and forward relevant scanning information.

**Figure 34** IoT Bootstrapping



**Figure 35** IoT Bridge Operation as Deployed



To provide the hub its initial and scanning configurations:

1. Initialize the hub. The hub scans for its initial configuration. The hub has a fixed SSID of mpact\_init and a preset WPA2 password of mpact123. When unable to provision itself the hub connects to 192.168.1.100 (a fixed location) and downloads its initial configuration file (badge\_config.json).



**NOTE:** The 192.168.1.100 location must be reachable from the hub's connected Access Point mpact\_init SSID to receive its required badge\_config.json file.

The hub obtains its badge\_config.json file and self-configures its initial configuration. Once completed, the hub connects to its posting server to obtain its scanning configuration. The scanning configuration is required to define the hub's scan interval and beacon profile determining how beacon data is forwarded, based on the beacon's UUID and Major values, and posted to the server for administration.

2. If you encounter issues with the setup of the hub, there's several file restoration options available.
  - Reboot the badge - Press and hold button 2 (see Figure 33) between 10–20 seconds, then release. LED 1 will blink slowly twice to confirm. Any in-process configuration activity will need to be re-started.
  - Erase to factory default configuration and reboot - Press and hold button 2 between 30–40 seconds, then release. LED 1 will blink slowly twice to confirm. The deletion of the initial configuration could be warranted if the configuration was not successfully applied on the first attempt. Once reverted to factory configuration, the initial config and scanning config can be re-applied.

- Shutdown the badge - Press and hold button 2 between 20 and 30 seconds, then release. LEDs will blink 5 times to confirm the badge shutdown. Use this process when bringing a deployed badge off-line.
3. For additional information about the configuration process and JSON files, contact your product line manager.

## Cleaning

Use alcohol to clean this product. When using sodium hypochlorite (bleach) based disinfectants to clean the product, always follow the manufacturers recommended instructions regarding the use of gloves during application and to remove the residue afterwards with a damp cloth to avoid prolonged skin contact while handling the scanner. Please note that due to the powerful oxidizing nature of sodium hypochlorite the metal surfaces on the product are prone to oxidation (corrosion) when exposed to this disinfectant in the liquid form and should be removed promptly after cleaning with a damp cloth.



**NOTE:** Use pre-moistened wipes to clean the unit. Do not allow liquid cleaners to pool or remain on the unit.

Cleaning frequency is discretionary in respect to the environments the MB6000-01-WR and the MB6000-CHRGR are deployed. They may be cleaned as frequently as required.

## Battery Safety Precautions

### Usage

Misusing the battery may cause the battery to get hot, rupture or ignite causing serious injury. Be sure to follow the safety rules listed below:

Read and follow all guidelines in the Regulatory Guide included with every shipment:

- Do not open or attempt to remove the battery from the MB6000-01-WR housing
- Do not place the battery in fire or heat the battery.
- Do not install the battery backwards so that the polarity is reversed.
- Do not connect the battery's positive terminal and the negative terminal to each other with any metal or conductive object (such as a wire).
- Do not carry or store batteries together with necklaces, hairpins or other metal objects
- Do not pierce a battery with nails, strike the battery with a hammer, step on the battery or subject it to strong impacts or shocks.
- Do not apply solder to the battery
- Do not expose the battery to water or allow the battery to get wet or exposed to moisture.
- Do not disassemble or modify the battery. The battery contains safety and protection devices which, if damaged, may cause the battery to generate heat, rupture or ignite.
- Do not place the battery on or near fires, stoves or other high temperature locations.
- Do not place the battery in direct sunlight for prolonged periods.
- Do not store the battery or use the unit in a car. Doing so may cause the battery to generate heat, rupture or ignite.
- Device is not for use by children.
- When the battery is worn out, insulate the terminals with adhesive tape or similar material before disposal.

- Immediately discontinue battery use if, while charging or storing, the battery emits an unusual smell, feels hot, changes color, shape or appears abnormal in any other way.
- Do not place batteries in microwave ovens, high-pressure containers or induction cookware.
- In the event the battery leaks, and fluid gets into one's eye, do not rub the eye. Rinse the eye with water and immediately seek medical attention. If left untreated, the battery fluid could cause permanent damage to the eye.

### Charging

Be sure to follow the rules listed below when charging the battery. Failure to do so may cause the battery to become hot, rupture, ignite and cause serious injury.

- Read and follow all guidelines in the Regulatory Guide included with every shipment
- Operating temperature for charging: 50–104°F (10–40°C)
- When charging the battery, only use the specified battery charger.
- Do not attach the battery to a power supply plug or directly to a car's cigarette lighter.
- Do not place the battery in or near fire or in direct sunlight. When the battery becomes hot, its built-in safety measure are activated, preventing the battery from charging. Heating the battery can destroy its safety equipment and result in an overheat or ignition.
- Do not continue charging the battery if it does not charge within its specified charging time. Doing so may cause the battery to become hot, rupture or ignite.

The mobile badge design includes dedicated, internal circuitry and logic for battery management, charging and reporting. The unit self-protects against various over-charging, shorting and rapid discharge conditions. If a unit is not operating as expected, it may be due to a self-protection condition. The badge may need to be manually reset with button pushes and/or placed in the charger to clear the condition before resuming normal operation. If for some reason a unit is not responding or operating normally after being reset and recharged, please contact Zebra Support.

### Disposing

The battery may only be replaced by a Zebra Authorized Repair Center and requires special handling when discarding. Always follow all local laws and regulations when discarding batteries. Fully discharge the battery before discarding it. The temperature range through which the battery should be discharged is 32–104°F (0–40°C). Discharging the battery outside of this range may damage the battery's performance or reduce its life expectancy.

Do not discharge the battery using any device except its designated original device. When the battery is used in devices aside from its designated device it may damage the performance of the battery and potentially reduce its useful expectancy. If the device causes an abnormal current flow it may result in the battery becoming hot, rupture or ignite resulting in serious injury.

## Cradle Charger: MPACT-MB6000-CHRGR

### Initial Charging and Use

When a brand new badge is received it should be inserted into the badge cradle before its initial use. The badge should be charged fully before its first use. The badge will automatically update its firmware and configuration profile if connected to the Wi-Fi network and the gateway (if there is a profile update on the server).

The badge will blink green while charging and solid green when fully charged.

The badge cradle can charge one to ten badges at a time. The AC powered charger is a wall or desk mounted cradle platform providing 5Vdc to each badge placed in individual charging slots. The charger feeds electric current through battery inside the badge. The cell inside retains the energy passing through them.

**Figure 36** Charger



Each slot has spring contacts that mate with the contacts on the badge. Badges have battery chargers and fuel gages built into each device so the charger is a power supply platform and no battery knowledge exists in the charger itself, everything to charge and protect a lithium Ion battery is built into the badge itself.

The charger's primary function is providing 5Vdc at 900 mA to each badge holder re-charge badge batteries. The charger holds badges when not in use. When badges are in the charger, they begin to charge using the 5Vdc supplied in the charger base. If there is sufficient charge detected, the badge uses the charger as a holder (without charging).



While in the charger, the badge could conduct a software or configuration update if required and a status update.

Specification	Value
Charger Capacity	1–10 badges simultaneously
Voltage	5Vdc $\pm$ 5%
Current	Each Badge requires 900 mA during charging, total 5Vdc power is 10 Amps
Power Consumption	50–60 Watts
Power Supply	External 12 Vdc, 5 Amps max, 60 watts total, enclosed power supply
Power Cord	AC power cord connecting external power supply to AC power
Power Supply Connector	Barrel connector (2.5mm outside diameter). The plastic enclosure has built-in strain relief to prevent accidental disconnects.
Power Indicator	All Badges within the charger platform have LEDs indicating charging state
Temperature	32–104°F (0–40°C) (operating), -40–158°F (-40–70°C) (storage)
Humidity	5–95% RH (operating) 85% RH (storage)
Altitude	8,000 ft @ 82.4°F (28°C) (operating), 30,000 ft @ 53.6°F (12°C) (storage)

## Installation

The charger can be wall mounted using the screw holes on the back or placed on a flat surface. The screw holes are 5.36 inches (136 mm) apart. When selecting a deployment location, ensure the power adapter cables reach from the electrical outlet to the charger. The charger and its power adapter must be deployed in a well ventilated location. The charger and power adapter should have a 1-inch clearance on each side from surrounding objects. It must only be deployed indoors, in a dry area free from spills or potential contamination. The temperature should be between 60–80°F (15–27°C).

The charger is designed so DC power cable can be installed from the rear of the charger housing without removing the base. The cable and connector do not interfere with the base lying flat on any surface. The DC cord snakes through strain relief features in the housing to prevent accidental disconnects. The external power adapter DC cable terminates with a right-angle connector at the charger interface.



**Figure 37** Routing Power Cable



### Battery Charging Guidelines

Failure to follow these guidelines may result in fire, explosion or other hazard.

- The MB6000-CHRGR is intended for use with the MB6000-01-WR only and should not be used with other products or batteries.
- The area in which the units are charged should be clear of debris and combustible materials or chemicals. Particular care should be taken when charging in a non commercial environment.
- To charge the battery, the battery and charger temperatures must be between 32–104°F (0–40°C).
- Do not use incompatible batteries and chargers. Use of an incompatible battery or charger may present a risk of fire, explosion, leakage or other hazard. If you have any questions about the compatibility of a battery or a charger, contact Zebra Support.
- Do not disassemble, open, crush, bend or deform, puncture or shred the badge or charger
- Impact from dropping the badge and charger on a hard surface could cause the battery to overheat.
- Do not short circuit a battery or allow metallic or conductive objects to contact the battery terminals.
- Do not modify, re-manufacture, insert foreign objects into the battery, immerse or expose to water or other liquids, or expose to fire, explosion or other hazard.
- Do not leave or store the equipment in or near areas that might get very hot, such as in a parked vehicle or near a radiator or other heat source. Do not place battery into a microwave oven or dryer
- If you suspect damage to your equipment or battery, contact Zebra Support to arrange for inspection.
- See Battery Safety Information in section 2.11.1.

### Cleaning the Charging Cradle

The following materials are required to clean the charging cradle:

- Alcohol wipes
- Cotton tipped applicators
- Can of compressed air

Cleaning frequency is discretionary in respect to the environments the charger and the badges are deployed. They may be cleaned as frequently as required.

When using sodium hypochlorite (bleach) based disinfectants to clean the product, always follow the manufacturers recommended instructions regarding the use of gloves during application and to remove the residue afterwards with a damp cloth to avoid prolonged skin contact while handling the scanner. Please note that due to the powerful oxidizing nature of sodium hypochlorite the metal surfaces on the product are prone to oxidation (corrosion) when exposed to this disinfectant in the liquid form and should be removed promptly after cleaning with a damp cloth.

Cleaning frequency is discretionary in respect to the environments the MB6000-01-WR and the MB6000-CHRGR are deployed. They may be cleaned as frequently as required.

Use pre-moistened wipes to clean the unit. Do not allow liquid cleaners to pool or remain on the unit.

### Cleaning the Badge Contacts

To clean the contacts on a badge before inserting into the charging cradle:

1. Dip the cotton portion of the cotton tipped applicator in isopropyl alcohol.
2. Rub the cotton portion of the cotton tipped applicator back-and-forth across the contacts. Do not leave any cotton residue on the contacts (repeat at least three times).
3. Use a dry cotton tipped applicator to clean any moisture or residue remaining on the contacts.
4. Spray compressed air on the contact area by pointing the nozzle about ½ inch away from the surface.
5. Inspect the area for any grease or dirt, repeat this process if required.

### Cleaning the Cradle Connectors

To clean the connectors within the cradle:

1. Unplug the unit from the AC wall outlet and remove the DC power cable from the cradle.
2. Dip the cotton portion of the cotton tipped applicator in isopropyl alcohol.
3. Rub the cotton portion of the applicator along the connector pins. Slowly move the applicator back-and-forth on the connector to the other. Do not leave any cotton residue on the connector. All sides of the connector should also be rubbed with the cotton tipped applicator.
4. Spray compressed air in the connector area by pointing the tube/nozzle about ½ inch away from the surface.
5. Ensure there is no lint left by the cotton tipped applicator, remove any lint if found.
6. If grease or other dirt can be found on other areas of the cradle, use a lint free cloth and alcohol to remove.
7. Allow at least 10–30 minutes (depending on ambient temperature and humidity) for the alcohol to air dry before applying power to cradle. If the temperature is low and the humidity is high, a longer drying time is required. Warm temperatures and dry humidity require less drying time.

## Troubleshooting

Refer to the following to troubleshoot issues with charging badges in the charger cradle:

Issue	Solution
Cradle is not receiving power	Ensure the power cable is connected securely to both the cradle and its AC power source
The badge is not fully seated in the cradle	Remove and re-insert the badge into the cradle, ensuring it is correctly seated
The badge was placed in the cradle upside down	Remove the badge from the cradle and re-insert in its proper orientation
All badges are in the cradle correctly, the cradle is plugged in, but none of the badges are charging	Unplug the cradle from the AC outlet and plug back in again
Badge battery is faulty (solid red light is On)	Verify other badges charge properly. If so, contact system administrator.

