Installation Manual
iBOS® Pro 6 Series
Battery Manager

A MODULE OF iBOS®

Updated October 19, 2022

Philadelphia Scientific®
industrial battery innovation

iBOS®
INTELLIGENT BATTERY ORGANIZING SYSTEM
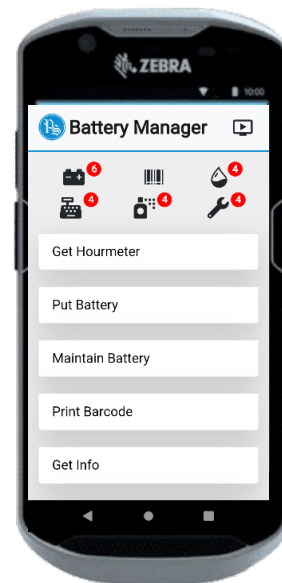
Table of Contents
iBOS® Pro 6 Series Battery Manager Installation Manual

1. Introduction

1.1 System Overview

This manual provides all information needed for a qualified person to install the iBOS® Pro 6 Series. The purpose for this type of installation is to:

1) Add a Battery Manager to an operational site with an existing iBOS® Pro 6 Series only;

2) Upgrade a Battery Tracker to a Battery Manager at an operational site with an existing iBOS® Pro 6 Series;

3) Add a Battery Manager after adding a new iBOS® Pro 6 Series to an otherwise operational site that will incorporate these systems together; or

4) Perform an installation of both the Battery Manager and immediately prior the iBOS® Pro 6 Series at a brand-new facility (i.e., Distribution Center).

This procedure focuses on installation of the Battery Manager specifically, including adding barcodes to <u>all</u> chargers on the site, and as many battery barcode holders and truck barcode labels as time permits during installation. In cases where the iBOS® Pro 6 Series is also being installed, refer first to DOC0023 and associated task documents.

1.2 Organization of Manual

This manual has been divided into each of the stages of an installation project found in the following Sections:

2. System Components

3. Pre-Installation

4. Primary System Installation

5. Barcode Label Installation

6. Training

Note that pre-installation information prior to work on-site will be managed separately.

1.3 Contact Information

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2. System Components

This Battery Manager system is composed of two components which communicate with each other and the iBOS® Pro 6 Series Controller (at left) via hardwire or Wi-Fi (using Wireless Access Point) as indicated below:

Wired

| New or Existing Controller | Battery Manager Work Center | Battery Manager Touch Computer |
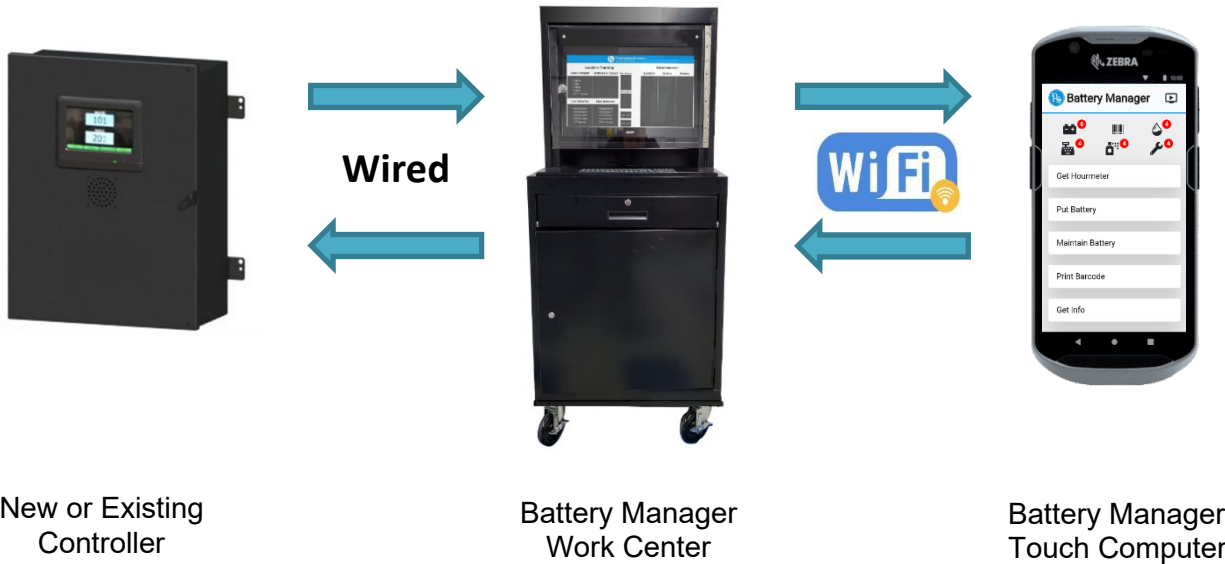
Existing or new components from the iBOS® Pro 6 Series are described separately in DOC0023, which focuses on that current or previous installation. The largest box contains the already assembled Battery Manager Work Center (BMWC), and the separate boxes include barcode holders and other accessories. Use the packing slip to verify the items received, as there may be other items included (e.g., battery watering systems). The following items are what arrive typically boxed and wrapped onto one pallet when shipped to the site:

2.1 Components Received

Battery Manager Work Center (BMWC) ①

(shipped with all the following items):

- **Keyboard** (in drawer, nothing to install) ②

- **UPS and Surge Protector** (boxed and shipped underneath cabinet on pallet) ③

- **Wireless Access Point** (boxed in lower cabinet) ④

- **Barcode Labels** (3 boxes each of wide [2-5/16" x 7-1/2"] and narrow [3/4" x 2-1/2"] barcode labels included in lower cabinet) ⑤

- **Red, Yellow, Blue and Black Cables** (attached at other end to various Battery Manager interfaces) ⑥

- **Barcode Printer** (bubblewrapped and inserted in lower cabinet) ⑦
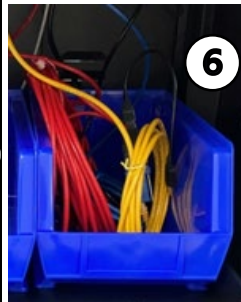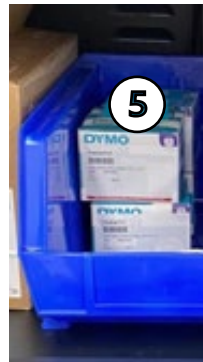
Touch Computer Cradles ⑧

Touch Computer cradles will vary based on what the end user ordered. The primary options appear below; each cradle provided will come with its manufacturer instructions, and should be installed where the client has indicated. *(These will be packed in the additional boxes.)*

Extractor Mounted ⓐ
 	
Charging Cradle
(typically one or two, depending on extractors on site)
 	
Desktop Charging Cradle
(typically this OR the Clip-on Charger below is the additional
 	
item included**)** ⓑ
 	
Clip-on Charger Cradle ⓒ
	8a
	
	  8b
	
	  8c
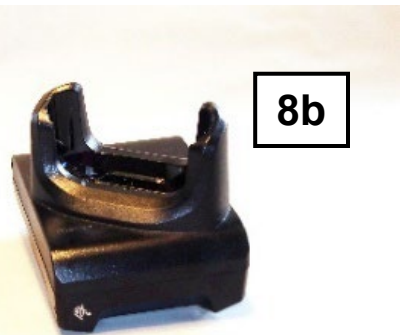
Battery Manager Touch Computer(s) ❾ Handheld with protective case and hand strap. (*This will either be shipped directly to the installer to bring to the site; or if not manufacturer-installed, will be packed in the cabinet.)* Number of units depends upon how many ordered.	⑨
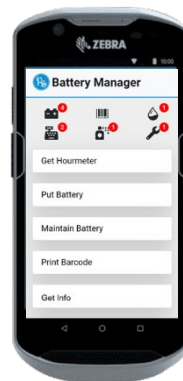
Barcode Holders ❿ A separate box will be shipped with the barcode holders (# of barcode holders determined client order, typically a minimum of the asset list quantity of batteries on site) and zip ties to be used for labeling the batteries on site *(sample barcode holder and zip tie shown)*. Barcode holders are typically blue; exceptions will be noted.	
Placards ⓫ One card is included (packaged under the keyboard); this outlines how to re-order supplies for the Battery Manager.	
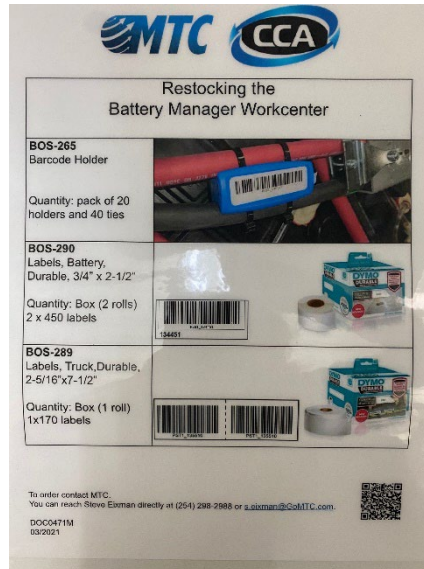
3. Pre-Installation

3.1 Locate Shipment Pallet

An Operations Manager (OM) may have guidance for location and can have pallet brought to Battery Room if not already there. Verify that all the Battery Manager hardware have been shipped (see list in 2. System Components and check actual packing list).

3.2 Update/verify Existing iBOS® Pro 6 Series System

When Installing a Battery Manager with an existing iBOS® Pro 6 Series system only:

- Prior to actively starting the Battery Manager, install a new iBOS® Pro 6 Series Controller CF card (see DOC0252). iBOS® Pro 6 Series may take up to 60 minutes to get the status of all chargers, during which time the installation team can perform other pre-installation steps.

- Check to ensure there are two new (4G LTE) antennas connected to the cell modem in iBOS® Pro 6 Series Controller, and that they are at least a foot apart from each other and as high above the Controller as possible. If not, install antennas.

- Check there are no issues with assignment and communication of Sentinels on-site; fix non-reporting or unassigned Sentinels and perform any Sentinel software upgrades needed.*

- Visually verify that the iBOS® Pro 6 Series Controller is on and running (pools and chargers show up on iDisplay).

NOTES: If a new iBOS® Pro 6 Series and Battery Manager are being installed at the same time, this step isn't needed as installers will be using the DOC0023 concurrently with this manual.

Sometimes a customer with existing system may have already noted a part of the Controller (e.g., iDisplay) that needs replacement; replacement parts may be included in the installation shipment to complete these needs during the Battery Manager installation.

For new systems entirely, ensure Sentinels are installed and running prior to installing Battery Manager.

3.3 Determine Battery Manager Work Center Location

Location considerations, depending on floor layout of Distribution Center, include:

- Keep Battery Room Attendant's accessibility and safety in mind for location.

- Ensure Battery Manager Work Center (BMWC) near A/C Power (power cord is XX ft.)

- Ensure BMWC placed within 15 ft. of the iBOS® Pro 6 Series Controller.

- Overall BMWC dimensions: 24-1/2"W x 22-1/2"D x 62-3/4"H

4. Primary System Installation

4.1 Verify Cellular Modem Operation

For all sites, iBOS® Pro 6 Series and Battery Manager installations the cellular modem may be mounted in or outside and above the iBOS® Pro 6 Series Controller.

The modem in Controller should read as follows:
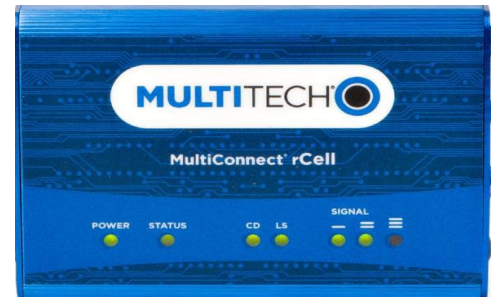
Power — On

Status — Flashing

CD — On

LS — On or Flashing

Signal Strength — 2 or 3 LEDs (bars) On

Avoid mounting antennas near something that could cause interference (e.g., conveyor with big motor). If determined that there is not enough signal strength reaching cellular modem, set up signal amplifier following DOC0520.

4.2 Unpack UPS and Set Up

UPS should be set up according to instructions in box and for ease of access is most convenient placed on second shelf from bottom of the Battery Manager Work Center (BMWC) (should be on same shelf as the barcode printer).

The power cords for the Barcode Printer, and the Touchscreen Monitor and main computer for system (both located in the backside of the BMWC), get plugged into the Battery Backup side of the UPS.

4.3 Battery Manager & Controller Connections

Once power has been established as available to the Battery Manager and the cellular modem is operating properly, connect the Battery Manager cables to the Controller.

Four colored cables with RJ-45 connectors are connected to back panel of BMWC, leading down to the bottom of BMWC cabinet:

- One ~15 ft. Blue (Cellular Modem)
- One ~15 ft. Black (Controller ENET)
- One ~15 ft. Yellow (Controller REMOTE DISPLAY)
- One 50 ft. Red (Wireless Access Point)

Note on Pulling Cables through Battery Manager Work Center to iBOS® Pro 6 Series Controller:

Minor variations in cabinets for the Battery Manager Work Center (BMWC) do not affect performance; for bringing the colored cables out from the BMWC to the Controller, the following holes may be observed in the cabinets upon delivery:

ⓐ When facing the front of the BMWC, on right side in the middle there is a hole with a removeable

plastic covering. This is typically used to pull the cables through. Sometimes due to convenience and proximity of the Controller, it is better to have a hole on the left side of the cabinet, so an equivalent one may be drilled in the similar location.

ⓑ When facing the back of the BMWC, at the very bottom shelf of the cabinet is also a hole where it is

possible the cables may be pulled through. This method is typically _not_ convenient for cable length or Controller positioning and is not recommended.
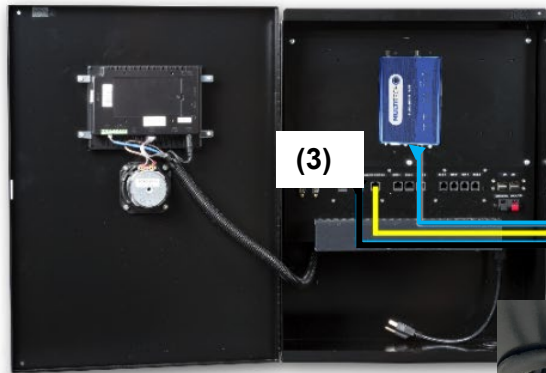
ⓐ

ⓑ
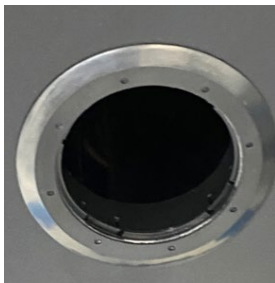
4.3.1 Black Cable

Connecting the iBOS® Pro 6 Series Controller to Battery Manager E-NET Port

- A control box without a Battery Manager installed yet shows the cell modem is connected directly to the controller thru the E-NET port by a short cable (yellow in this image, may be another color). Remove this short cable before proceeding.
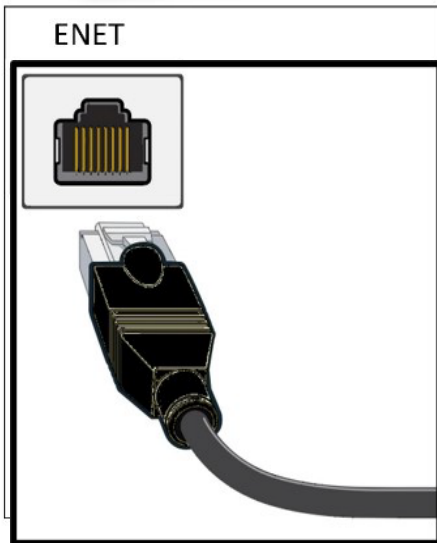

(2)

(3)

(1)

- Using the openings in the bottom of the Controller (1), connect the **black** cable from the Battery Manager Work Center (2) to the ENET port on the Controller (3).

ENET

4.3.2 Blue Cable

Connecting the iBOS® Pro 6 Series Controller to Battery Manager E-NET Modem Port

- Using the openings in the bottom of the Controller (1), connect the **blue** cable from the Battery Manager Work Center (2) to the E-NET port on the Cellular Modem (3).
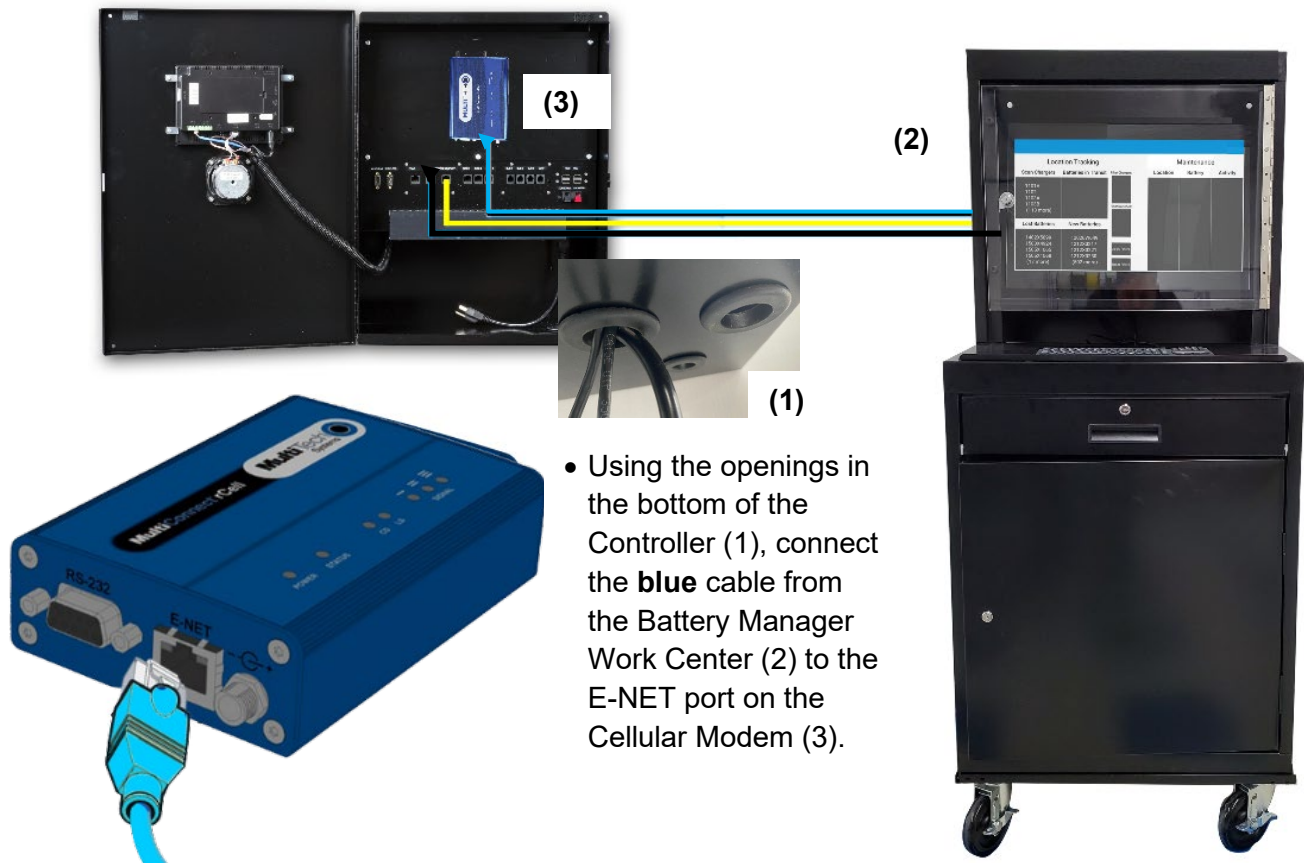
4.3.3 Yellow Cable

Connecting the iBOS® Pro 6 Series Controller to Battery Manager: Communications Connection

(3)

(2)

(1)

REMOTE DISPLAY

Using the openings in the bottom of the Controller (1), connect the **yellow** cable from the Battery Manager Work Center (2) to the Remote Display port on the Controller (3).
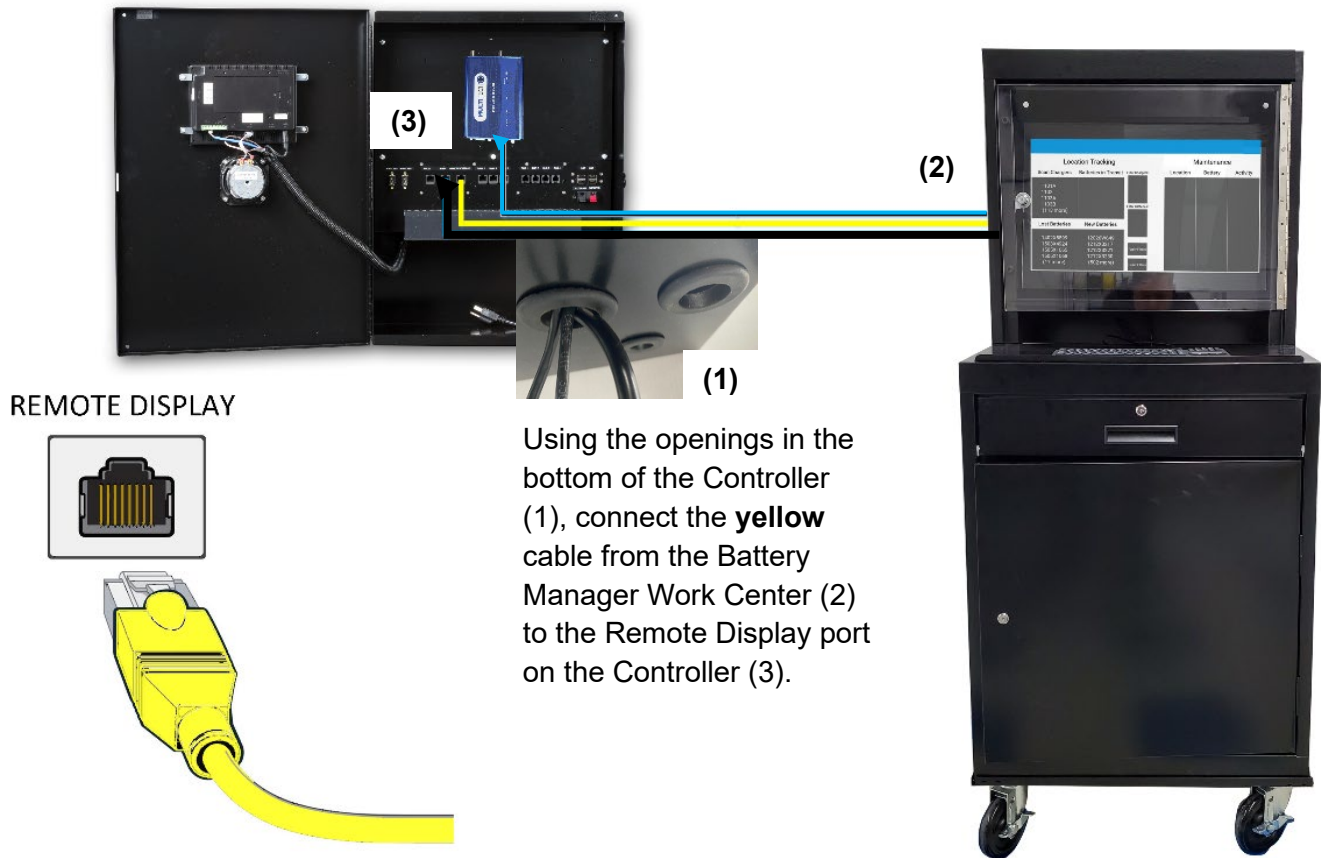

4.3.4 Red Cable

Mounting the Wireless Access Point that creates the Battery Manager Wi-Fi network, allowing use of the Battery Manager Touch Computer.

Using the mounting bracket, mount the Wireless Access Point in an area central to the battery room. *Mount in as open an area as possible; if there must be obstructions, it is better that they are NOT metal.*

Ensure that it is out of reach from trucks and potential accidents (e.g., a catwalk or similar area).
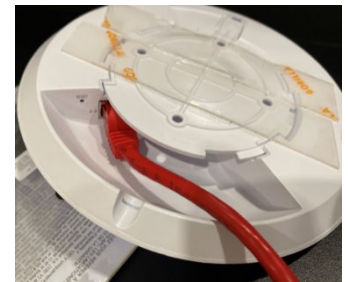
UniFi AP AC Lite

Mounting Bracket

- Attach the mounting bracket to a wall or battery rack with appropriate hardware. Make sure the mounting tab is pointing up.

- If not already connected, connect the RED cable to the RJ-45 port.
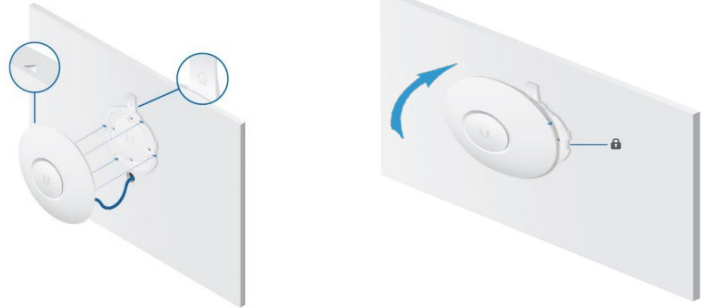
- *Before* mounting, ensure the BLUE LIGHT is lit on the Wireless Access Point (if the light is white there is an issue).

- Set the Wireless Access Point on the mounting plate as shown and twist to lock. Depending on where placed, zip ties may need to be added to secure it.

- Once mounted, ensure the BLUE LIGHT is *still* lit on the Wireless Access Point (if the light is white there is an issue).


  NOTE: actual placement of Wireless Access Point must be with blue light part facing downward, like as shown at right.
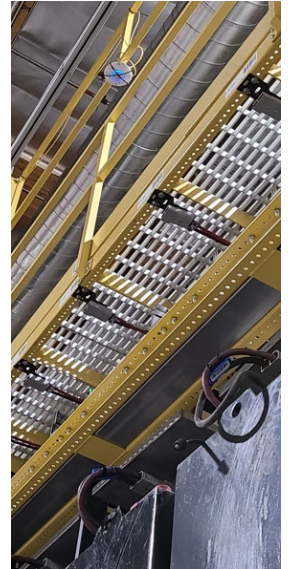
- On an installer's smartphone or computer, go to **Wi-Fi** and look for the *psbattman* network. If not available, ensure Wireless Access Point is connected and there is power to the Battery Manager Work Center (BMWC).

STOP:
Once confirmed, ensure that all installers' smartphones are now disconnected from the *psbattman* network and won't reconnect automatically.

- Once all four cables are pulled through and attached from the BMWC to the Controller, add the slit cable tubing to cover the cables in a single unit. Once the cable tubing is where desired, use zip ties on both ends of the tubing to secure in place.
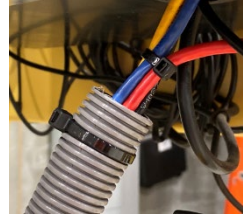
## 4.4 Battery Manager Barcode Printer Setup

- Unpack from bubble wrap, ensure USB is set up, *then* plug printer power cord into battery backup surge protected part of UPS. Printer should sit next to UPS on second shelf from bottom of BMWC.

- Press the form-feed button to eject the labels that protected the printer during shipment. Open the top cover and remove any packing material inside the label compartment.

- Remove the label spool from inside the cover and separate the spool guide from the spindle.

- Hold the spool spindle in your left hand and place the larger label roll on the spindle so that the labels feed from underneath and the left edge of the label roll is firmly against the side of the spool.

  *NOTE: Remember the **wide** barcode labels go on the **left** side of the printer and the **narrow** labels go on the **right** side.
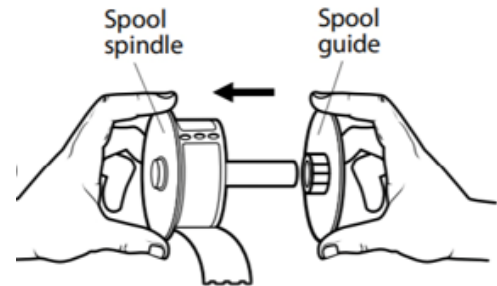
- Slide the spool guide onto the right side of the spool and press the guide tightly against the side of the label roll, leaving no gap between the roll and the spool.
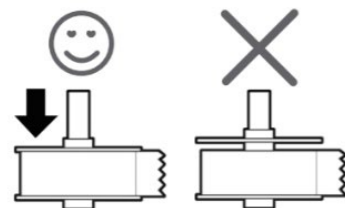
- Insert the label spool into the slot in the printer cover with the labels extending from underneath the roll.
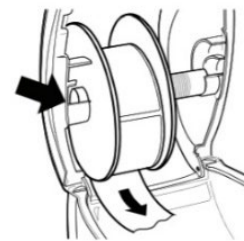
Align the left edge of the label with the left edge of the label feed slot and insert the label into the slot. The printer automatically feeds the labels, stopping at the beginning of the first label.
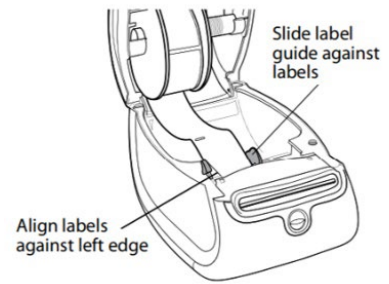
- Repeat this procedure for the **smaller roll on the right side** of the printer.
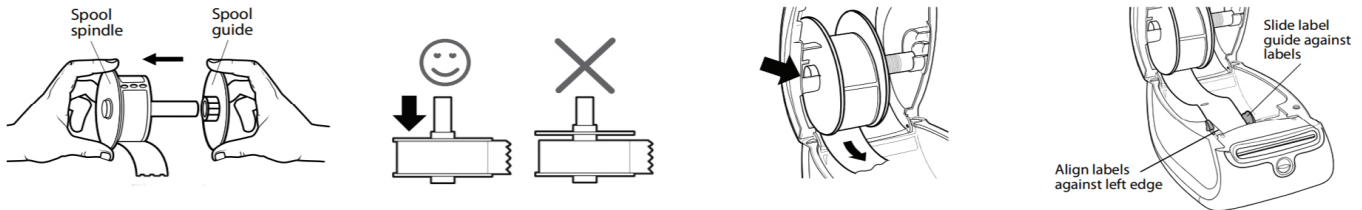

- Carefully lower top cover.

4.5 Installing Touch Computer Cradles

Depending on which type(s) and quantity of (charging) cradles were ordered by the client, they will be in the delivered materials for installation, and should be installed according to the manufacturer's directions for each type. The location(s) of cradles should be where the client has indicated they would like them to be placed. In cases where old scanners are being replaced, first remove the old hardware for any cradles, etc. from the extractors, Controller, etc. before setting up new cradles.

While waiting for BMWC to boot up, install the Cradle for the Touch Computer on the Battery Extractor(s) first. *Do not* place the Touch Computer to charge just yet.

4.6 Plugging in Battery Manager Work Center

Plug the BMWC in to 110 VAC.
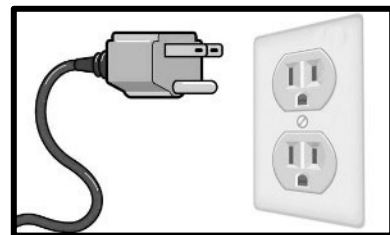
4.7 Checking Battery Manager Software Version

- The Touchscreen Monitor in BMWC will start up, and the following screen will eventually appear, ending in "**This is a new install. Do you want to update the site? [Y/N]**"

- Once this question appears, contact 215-616-0390 to determine if an updated version of Battery Manager software is available for download. *Do not proceed until this has been done.*

4.8 Starting Battery Manager Touch Computer

- Power on the Battery Manager Touch Computer (button top right).

- If the Touch Computer doesn't power up, place it in the cradle.

- The Touch Computer should automatically connect to the *psbattman* network and go to the home screen.

Contact Support located in the first section of this manual if the Battery Manager does not power up.
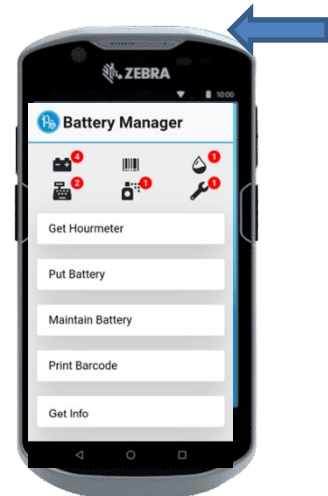
4.9 Printing Test Barcodes

- On Touch Computer, from home screen select **Print Barcode**.

- Select one charger barcode, one battery barcode and one truck barcode to print.

- If unable to print, contact support in first section*.

*See also Battery Manager Printer in **Appendix A. Troubleshooting**


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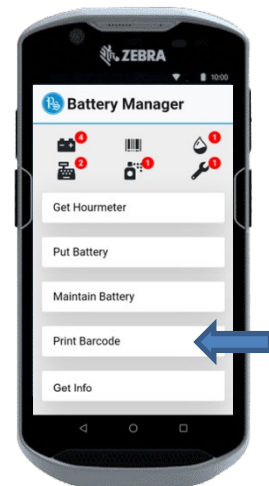
5. Barcode Label Installation

The Battery Manager system depends on applying unique barcodes to each charger, battery and truck asset. The first step to set up a site for Battery Manager once the primary system is installed, is to attach barcode labels. A primary goal of the installation team is to affix barcode labels for all chargers, and as many battery barcode holders and truck barcode labels that are needed as possible.

For non-upgrade sites only: The preprinted barcoding process enables the Battery Manager system to quickly begin collecting valuable battery location and charge cycle data, which is needed for tracking battery maintenance activities such as watering, washing and performing preventative maintenance.

5.1 Barcode Printing from the Touchscreen Monitor

Printing of barcode labels can be performed here. The following label types can be printed:

- Charger
- Truck
- Battery
- Area
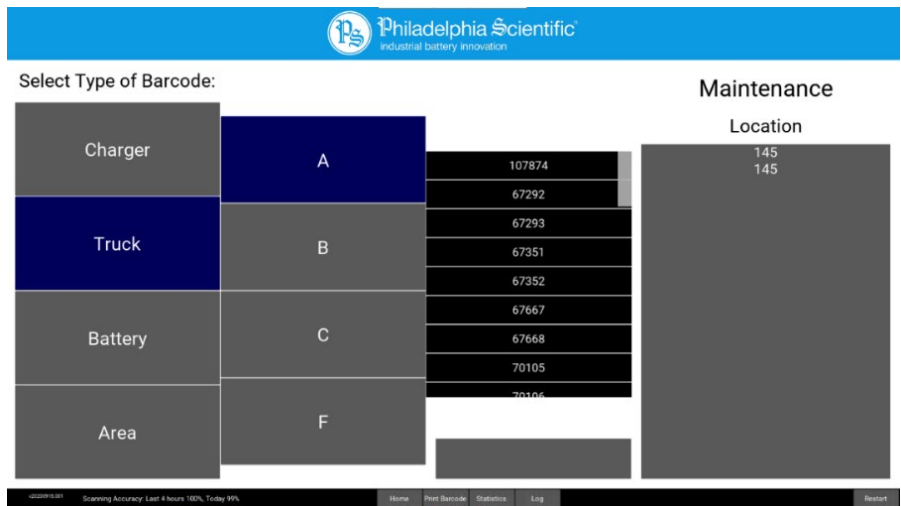
5.2 Printing and Applying Charger Barcodes

When Battery Manager installation is complete, the site's charger barcode labels should be all printed then applied before leaving the site. When the barcode printer was installed during the primary installation process, single test labels for charger, battery and truck should have already been run.

Charger labels get printed first; Battery Manager uses the chargers that were configured into iBOS® Pro 6 Series. If using the Battery Manager Work Center (BMWC) Touchscreen Monitor, all* charger labels may be selected to print at once. Note that while barcode labels may be printed from the BMWC Touchscreen Monitor during the installation process, it can be – and during actual system use it *will* almost always be – from the Touch Computer.

This feature is not available for other labels or from the Touch Computer.

5.2.1. Printing Charger Barcodes from Touchscreen Monitor:

- From home screen at bottom select **Print Barcode**.

- On next screen select **Charger**, then the appropriate **Pool**. A list of chargers in that pool will show.

- Scroll to the bottom of the list of chargers to the option **Print all*** and select.

- Repeat this step for all Pools.
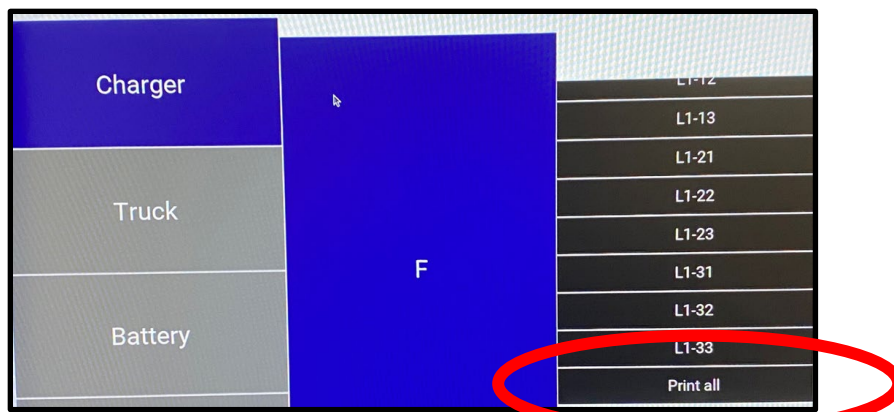
5.2.2. Printing Charger Barcodes from Touch Computer:

NOTE: The majority of the time, barcodes will be printed from the Touch Computer.

- Power on one Touch Computer and give it 10 minutes to fully receive all asset lists.

- From home screen, select **Print Barcode**.

- On next screen select **Charger**, and a list of chargers will show.

- Tap on all the chargers that need labels, then select **Print**.

5.2.3. Verify and Apply Charger Labels

- Verify barcodes are being printed properly. Note that printing a charger label may take ~18 seconds each, so that time may be factored when printing an initial set of hundreds of chargers.

- Remove the barcode labels from the Barcode Printer.

- The installer applies the charger barcode labels to the rack as shown here:

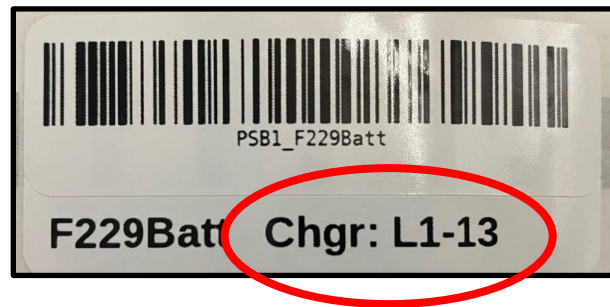### 5.3 Printing and Applying Battery Barcodes

- To print battery barcodes from either the Touchscreen Monitor or Touch Computer, follow the same directions as above in 5.2 Printing and Applying Charger Barcodes but select **Battery**, and remember there will be no option to Select All for printing.

  NOTE: Barcodes default to print two labels for batteries (for each side of the barcode holder if using), and selecting **+** or **–** will increase or decrease the number of barcodes printed.

- Apply battery barcodes on both sides of barcode holders, and/or wherever on batteries it is decided to place them for best access by the Battery Attendants. More labels may be printed for better access if desired.

Note: When printing battery barcodes, the label printed also shows the current location of the battery to assist in locating it.

5.4 Printing and Applying Truck Barcodes

- To print truck barcodes from either the Touchscreen Monitor or Touch Computer, follow the same directions as above in 5.2 Printing and Applying Charger Barcodes but select **Truck**, and remember there will be no option to Select All for printing.

  NOTE: Barcodes are a set of two on a single label for trucks (for each side of the truck mast or cowling), so **+** or **–** will increase or decrease by number of sets. This label (as shown below) gets cut in two before applying.

- Apply truck barcodes on both sides of mast or cowling, and/or wherever on trucks it is decided to place them for best access by the Battery Attendants. More labels may be printed for better access if desired.

5.5 Printing Battery Barcodes When Assets Pre-Entered

If assets (i.e., batteries) had been entered by Philadelphia Scientific® in advance of the installation, the site will receive barcode holders with preprinted barcode labels. As part of the order fulfilment process, Philadelphia Scientific® personnel used the Preprinted Barcode Printing Station to print out the correct number of battery labels and affixed two identical labels, one to each side of a white battery barcode holder, similar to the following:

While onsite, the installer will use the supplied white plastic battery barcode holders with preprinted barcode labels already attached. The installer then moves as quickly as possible to zip-tie a battery barcode holder onto any battery without one (see image of blue barcode holder on battery, below). It does not matter which label goes on which battery; therefore, the installer can move very quickly.

5.6 Printing Truck Barcodes When Assets Pre-Entered

If assets (i.e., trucks) had been entered by Philadelphia Scientific® in advance of the installation, the site will also receive preprinted truck barcode labels. As part of the order fulfilment process, Philadelphia Scientific® personnel used the Preprinted Barcode Printing Station to print out the correct number of truck labels as follows, with two identical barcodes on one label.

<center>PST2_2012150003   PST2_2012150003</center>

The installer uses the preprinted truck barcode labels and moves as quickly as possible to stick two truck barcode labels onto the mast or cowling of every truck without one. It does not matter which label goes on which truck; therefore, the installer can move very quickly.

5.7 Asset Registration When Assets Pre-Entered

Registration is the process of associating a preprinted barcode to a known physical battery or truck asset. Registration functionality will be added to the Maintain Battery feature on the Battery Manager Touch Computer when applicable. Batteries are registered during a battery PM.
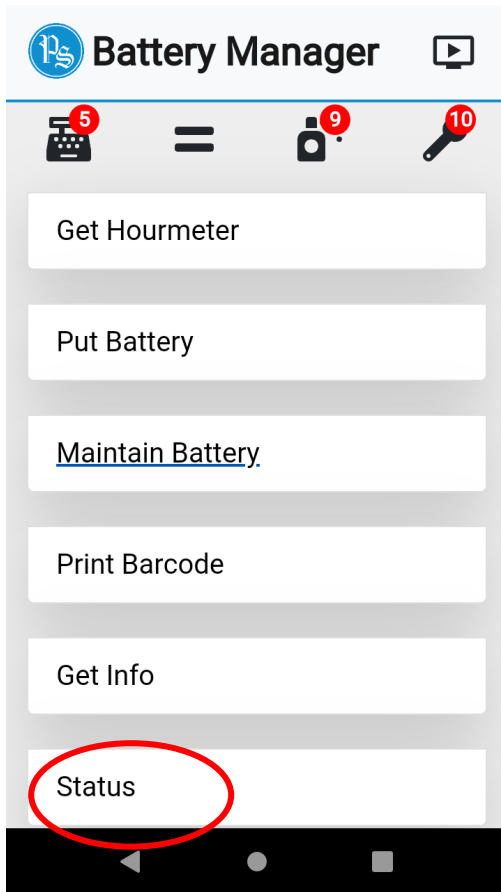
Battery Registration
The current battery registration flows work like this:
When the Battery Manager Notification Panel shows the Registration icon with a number in red circle, the user taps the icon to display a list of batteries to register.
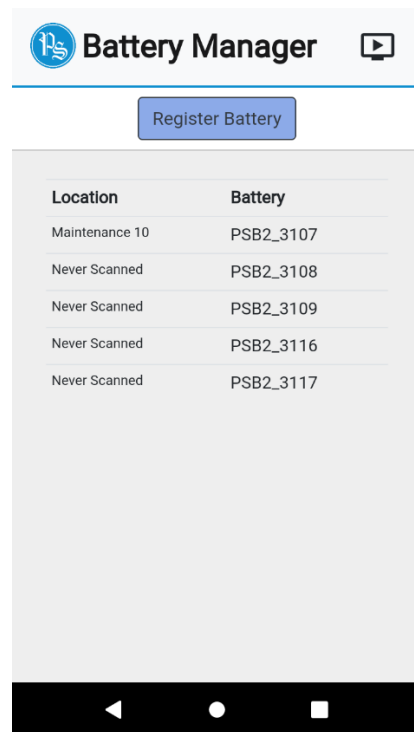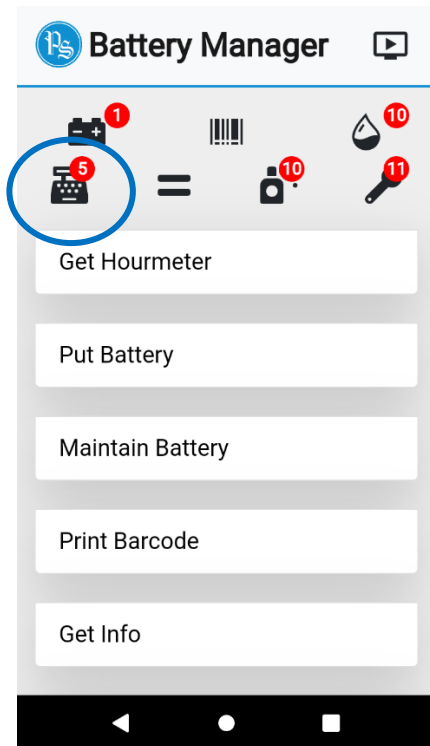
Alternatively, the user can tap the Status button on the Battery Manager homepage, then tap the numbered button next to Needs Registration (red oval).

To register a battery, the user

1. Walks to the location of the battery

2. Accesses the Register Asset screen

3. Scans the preprinted barcode on the white plastic barcode holder

4. Types in the serial number of the battery (found on the intercell connector)

5. Scans or type the asset ref of asset ID.

Using this example battery, the user enters:

The "Scan asset to register" value <u>must</u> be scanned from the preprinted label the installation team affixed to a battery (on the white barcode holder) or a truck.

The "Serial Number" value must be typed.
- Battery serial numbers are located on the intercell connector or stamped / etched into the case of the battery

- Truck serial numbers are located on the truck manufacturer's boiler plate.

The value cannot match the value scanned for the "Scan asset to register" field.

The "Asset Ref or Asset ID" value can be typed or scanned. The value cannot match the value scanned for the "Scan asset to register" field.

Truck Registration
Originally a truck registration would be completed by level 1 personnel during the truck's first battery changes.

6. Training

6.1 Training on Use of Battery Manager

Training will be performed both formally and informally throughout the installation visit, after the Battery Manager is fully operational and charger barcodes have been printed and installed. Specific training will be according to scope of customer contract and requirements. Some general recommendations include:

- Performing a "Train the Trainer" session to help the customer continue to train new onboarding personnel.

- Work with the current Battery Room Attendants working on the shift(s) during the installation so they can see the functioning firsthand as batteries, etc. are first being scanned into the system.

- The Installer can use their own Touch Computer while the trainee uses the site's Touch Computer at same time to mirror how the screen works.

- Show and explain the Digital Placards that come installed on the BMWC and physical placard on supply reordering, which gets placed inside the BMWC cabinet door.

- Show how to find/use the training videos on the Touch Computer

- OMs will be made aware of any scheduled training sessions so they may participate if they choose.

> **NOTE: Prior to leaving the site after the installation, Installer(s) should get any required form(s) signed by appropriate personnel that is intended to signify that installation and/or training has been completed.**

6.2 Remove/Attach Battery Barcode Holder

The following may be useful at start-up of the system when many batteries may be newly barcoded.

How to remove an existing battery barcode holder if a battery room attendant needs to repair the cable or connector (to remove holder and reinstall as needed)

Remove Battery Barcode Holder ① 1) Battery holder can easily be removed using any type of snipper on the zip tie to remove from the battery holder and remove from the cable.	

How to reattach or attach for first time a battery barcode holder for new batteries or those that need a new barcode holder (due to loss or breakage).
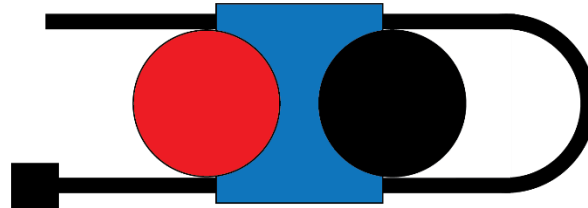
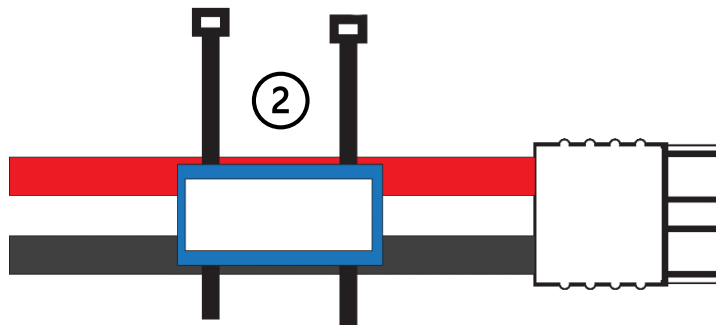|	
(Re)-Attach Battery Barcode Holder ❶ 1) Once the barcode labels are on each side of the battery holder (see section 5. Barcode Label Installation), use the heavy-duty cable ties to secure the holder on the battery cable (ensuring to use the slots on the top **and** bottom of the battery barcode holder so the ties don't cover the label).	① Overhead View Showing Zip Tie Through Slots on Both Sides of Barcode Holder
2) Install the Barcode Holder about 6" from the SB connector. ❷	
3) Cut the cable ties close to the hole after bringing them through the slots on the other side of the connector and then securing them. ❸	

Appendix A. Troubleshooting

A.1 Battery Manager Barcode Printer

Issues that can arise while printing barcodes:

- ✓ If the printer does not feed the labels, make sure the first label is fully inserted and then press the form-feed button.

- ✓ If the first label on the roll is not a full label, press the form-feed button to eject the partial label.

Note: Regardless of the label width, the left edge of the label must be aligned with the left edge of the label feed slot for the labels to feed properly. Slide the label guide to the left until the label guide aligns with the right edge of the label. Make sure that the label guide does not pinch the label.

A.2 Confirmation of Communication on Cell Modem

If cellular modem needed to be restarted, confirm communication as follows by referring to section **4.1 Verify Cellular Modem Operation**.

A.3 Confirmation of Proper Operations after Start or Restart of System

- When properly started, Battery Manager Work Center (BMWC) should come up with numbers on its home screen.

- The Wireless Access Point should have a blue circle. On an installer's smartphone or computer, go to **Wi-Fi** and look for the *psbattman* network. If not available, ensure Wireless Access Point is connected and there is power to the BMWC.
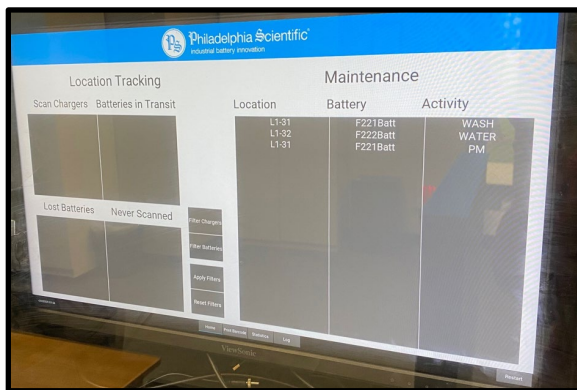
- The Touch Computer home screen displays a notification panel showing battery maintenance icons. A red circled number next to an icon indicates tasks to be performed. Tap the icon to display specific batteries that need maintenance.
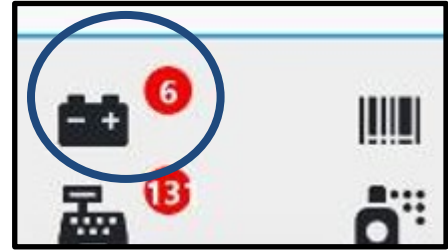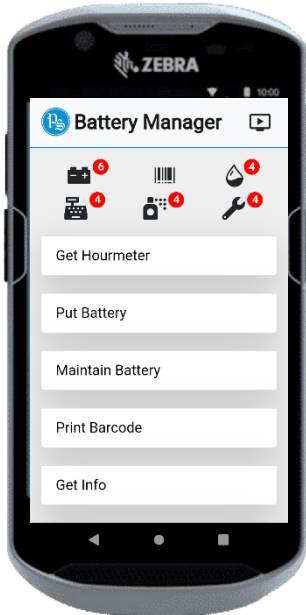

- Test a touch computer first by selecting **Put Battery** from the home screen and scanning a battery (to get the small green checkmark indicating this first step was done correctly):

- Then scan the charger where the battery is being connected to get the full green screen and checkmark indicating that this process has been completed.
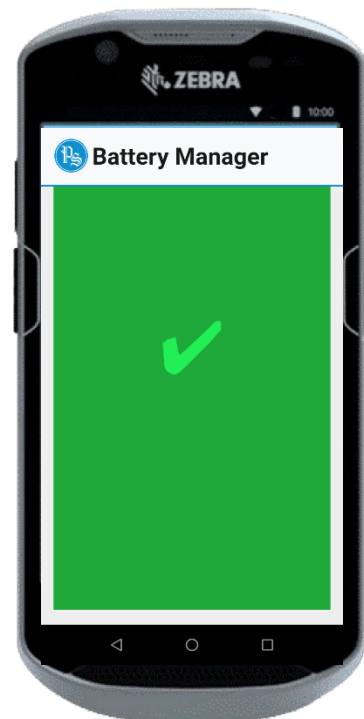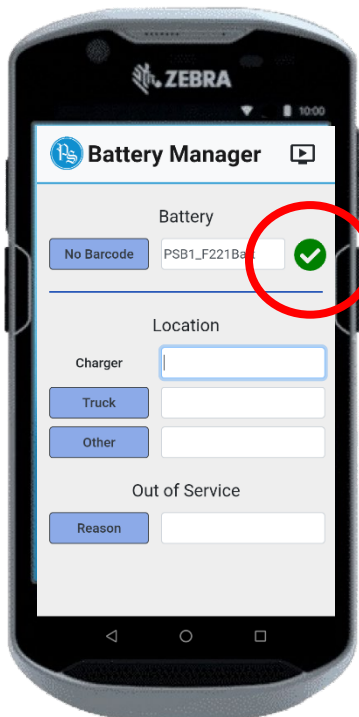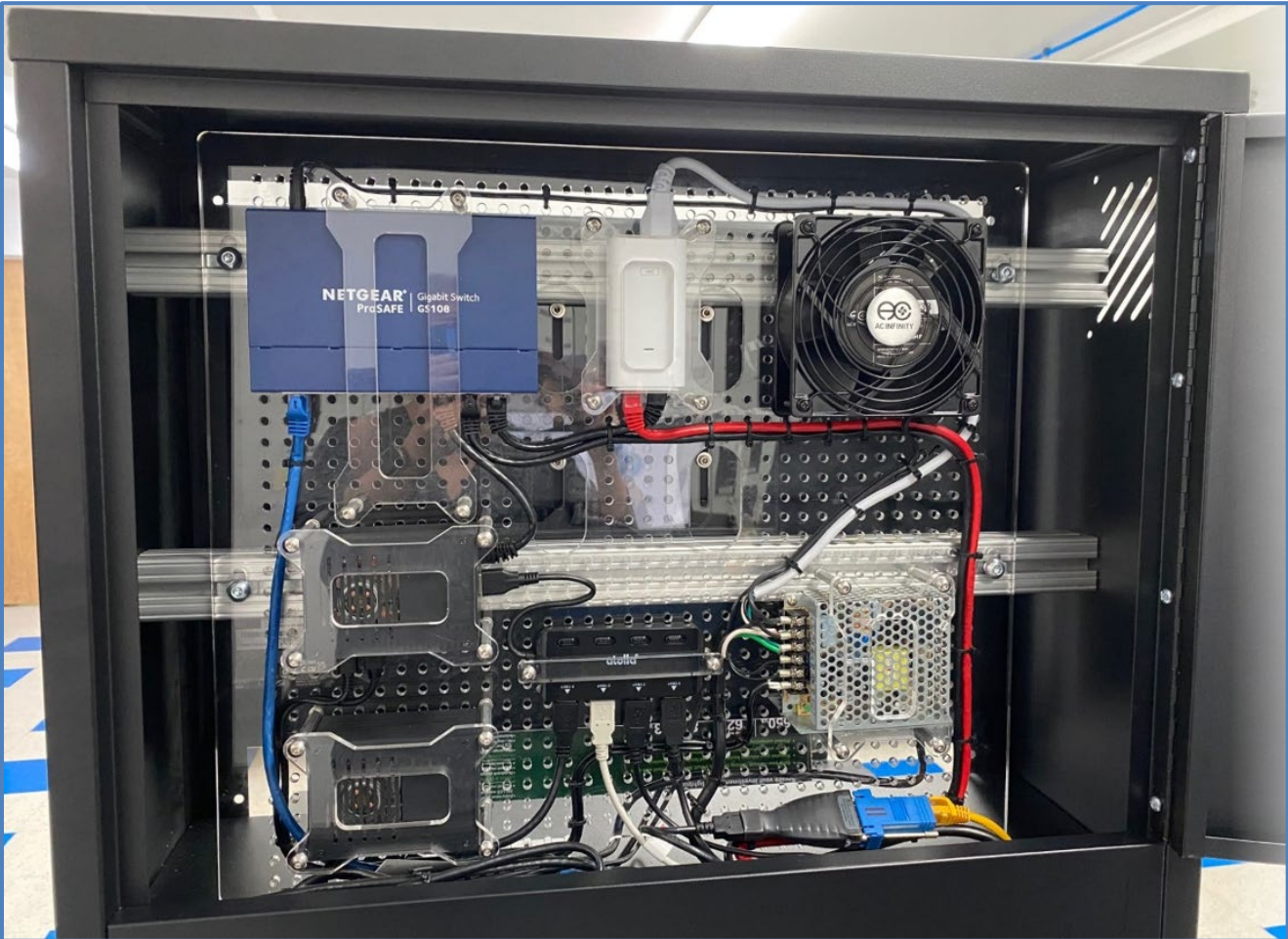
Approximation of how the components of iBOS® Pro 6 Series and Battery Manager interface
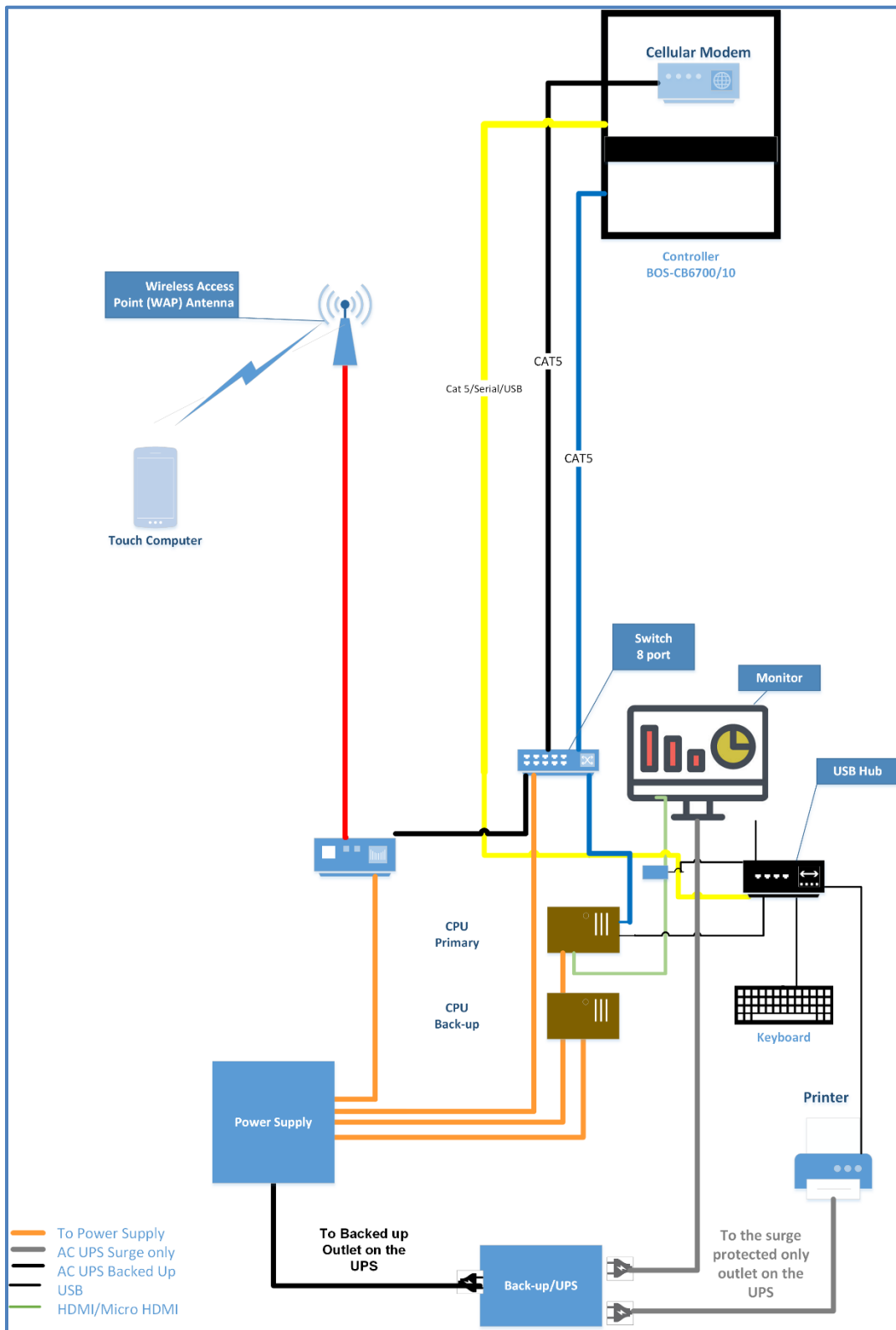
Components within Battery Manager Work Center (view from backside of top cabinet)