HME
HOSPITALITY & SPECIALTY COMMUNICATIONS

®

DX100

Wireless Intercom

Operating Instructions

Illustrations in this publication are approximate representations of the actual equipment, and may not be exactly as the equipment appears.

HM Electronics, Inc. is not responsible for equipment malfunctions due to erroneous translation of its publications from their original English version.

INFORMATION TO USER

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for Class B Digital Device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures.

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

MANDATORY SAFETY INSTRUCTIONS
FOR INSTALLERS AND USERS

Use only manufacturer or dealer supplied antennas.

The Federal Communications Commission has adopted a safety standard for human exposure to RF (Radio Frequency) energy, which is below the OSHA (Occupational Safety and Health Act) limits. These instructions also meet Industry Canada RSS-GEN 7.14.

The term "IC:" before the certification number signifies that the Industry Canada technical specifications were met.

Base Station Antenna minimum safe distance: 7.9 inches (20 cm) at 100% duty cycle.

Base Station Antenna gain: This device has been designed to operate with an antenna having a maximum gain of up to 2dBi. The required antenna impedance is 50 Ohms.

Antenna mounting: The antenna(s) used for the base transmitter must be installed to provide a separation distance of at least 7.9 inches (20 cm) from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

Antenna substitution: Do not substitute any antenna for the one supplied by the manufacturer or radio dealer. You may be exposing person or persons to excess radio frequency radiation. You may contact your radio dealer or the manufacturer for further instructions.

WARNING: Maintain a separation distance from the base station transmit antenna to a person(s) of at least 7.9 inches (20 cm) at 100% duty cycle.

You, as the qualified end-user of this radio device must control the exposure conditions of bystanders to ensure the minimum separation distance (above) is maintained between the antenna and nearby persons for satisfying RF exposure compliance. The operation of this transmitter must satisfy the requirements of Occupational/Controlled Exposure Environment, for work-related use. Transmit only when person(s) are at least the minimum distance from the properly installed, externally mounted antenna.

Hereby, HM Electronics, Inc. declares that the DX100 is in compliance with the essential requirements and other relevant provisions of Radio Equipment Directive (RED).

$$C \, E$$

This product operates in the 2400 to 2483.5 MHz frequency range. The use of this frequency range is not yet harmonized between all countries. Some countries may restrict the use of a portion of this band or impose other restriction relating to power level or use. You should contact your Spectrum authority to determine possible restrictions.

IMPORTANT!

Waste Electrical and Electronic Equipment (WEEE)

The European Union (EU) WEEE Directive (2012/19/EU) places an obligation on producers (manufacturers, distributors and/or retailers) to take-back electronic products at the end of their useful life. The WEEE Directive covers most HME products being sold into the EU as of August 13, 2005. Manufacturers, distributors and retailers are obliged to finance the costs of recovery from municipal collection points, reuse, and recycling of specified percentages per the WEEE requirements.

Instructions for Disposal of WEEE by Users in the European Union

The symbol shown below is on the product or on its packaging which indicates that this product was put on the market after August 13, 2005 and must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of the user's waste equipment by handing it over to a designated collection point for the recycling of WEEE. The separate collection and recycling of waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment.
For more information about where you can drop off your waste equipment for recycling, please contact your local authority, your household waste disposal service or the seller from whom you purchased the product.

Canada IC Notice to Users English/French in accordance with RSS GEN

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil est conforme avec Industrie Canada RSS standard exempts de licence (s). Son utilization est soumise à Les deux conditions suivantes: (1) cet appareil ne peut pas provoquer d'interférences et (2) cet appareil doit accepter Toute interférence, y compris les interférences qui peuvent causer un mauvais fonctionnement du dispositif.

SECTION 1.   INTRODUCTION

The DX100 provides private, secure communication. Each base station can register up to a total of fifteen BP200 Beltpacs and/or WH220 All-in-one Wireless Headsets. Any combination of Beltpacs and/or Headsets may be registered. Four of the fifteen Beltpacs and/or Headsets can transmit simultaneously.

Beltpacs/Headsets can be used either in the Push-To-Talk (PTT) or Hands-Free (HF) mode. The base station operator can stop any Beltpac/Headset from transmitting.

The MB100 Base Station can be operated using standard AC electricity, an external DC power source or six AA batteries. A power supply, cable and a battery sled are included with the base station.

⸺ System Usage Example ⸺
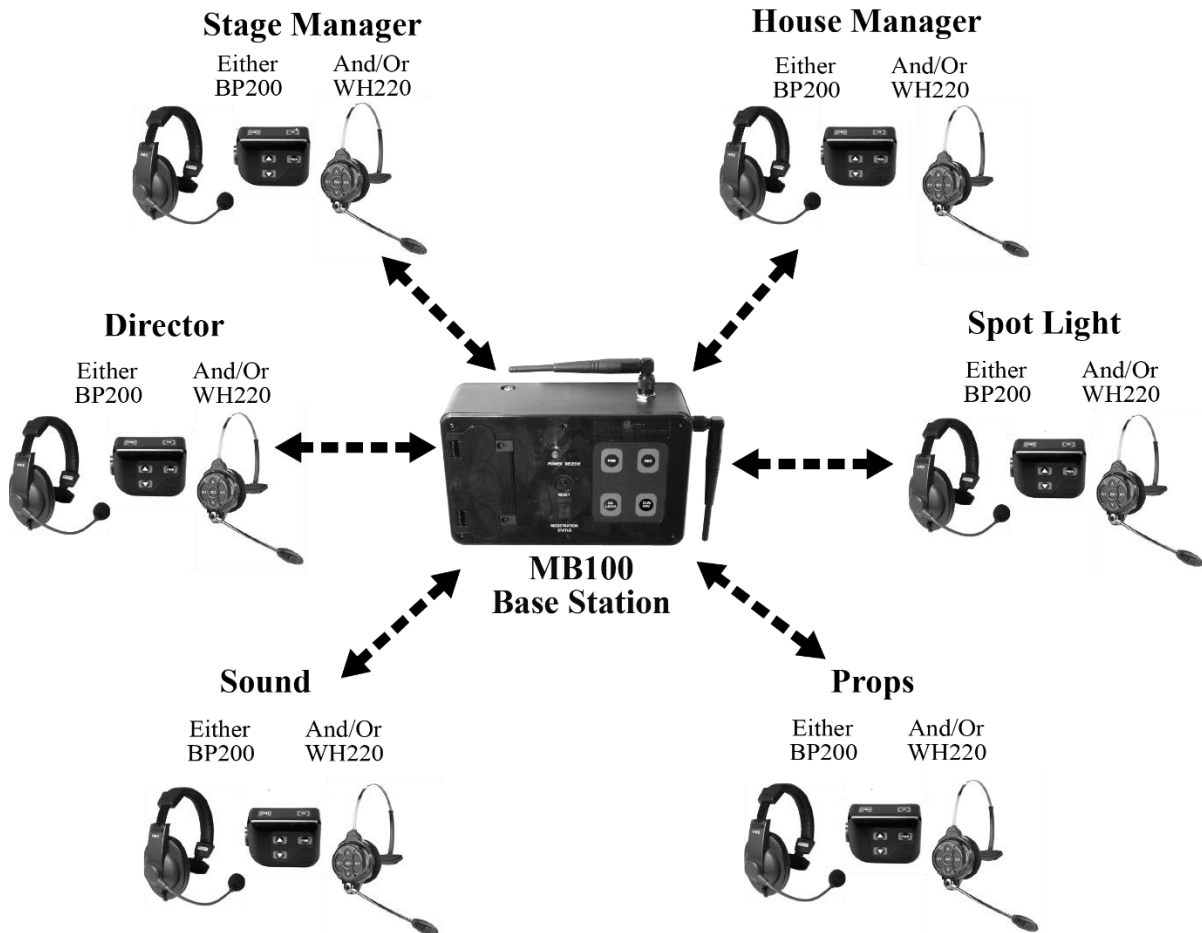
This is an example of a typical theatrical application. A variety of other uses for the DX100 are possible.

EQUIPMENT IDENTIFICATION

The following equipment is standard with the DX100 Wireless Intercom System. As you unpack the equipment, check the enclosed shipping documents to be sure you received all items listed.

MB100 Base Station

Base Station Antennas
(2 per Base Station)

Base Station Battery Sled

115/230 Volt AC Power Supply
(1 per Base Station, with Power Cord)

BAT41 Battery

AC40
Battery Charger

WH220 All-in-one
Wireless Headset

BP200 Beltpac

Beltpac Pouch

HS15 Headset

AC50
Battery Charger

AC50 Battery

AC50
Power Supply

OPTIONAL EQUIPMENT

HS4-3 Earpiece & Lapel Microphone

HS15 Single-Muff Headset

HS15D Dual-Muff Headset

HS16 Lightweight Headset

HSI6000 Headset Adapter

BAT850 Rechargeable Battery for MB1000

XLR Headset Adapters:

　　MD-XLR4M Mini-DIN to 4-Pin Male

　　MD-XLR4F　Mini-DIN to 4-Pin Female

　　MD-XLR5F　Mini-DIN to 5-Pin Female

MAIN EQUIPMENT FEATURES

Base Station Features
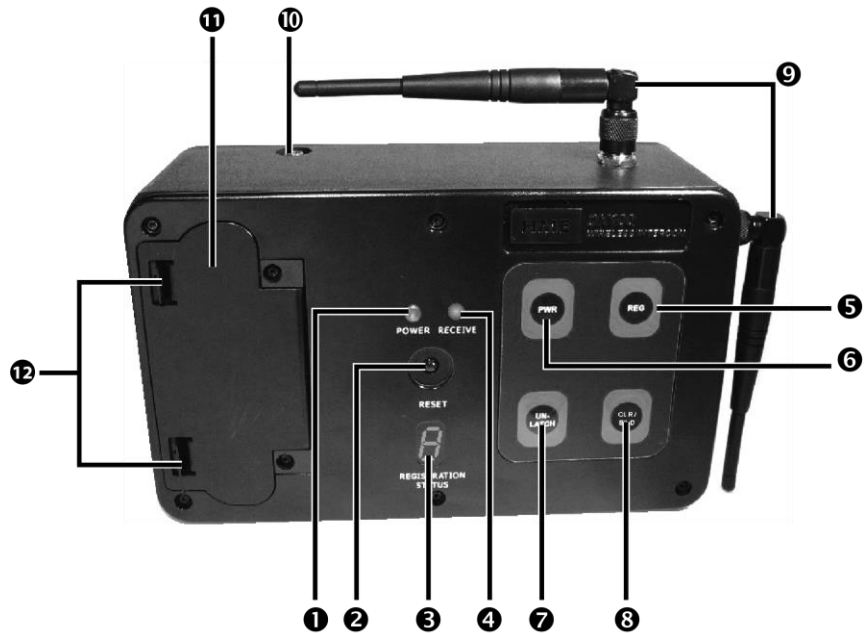
1. **POWER** indicator light	**7.** **UN-LATCH** button
2. **RESET** button	**8.** **CLR/BND** (Clear/Band) button
3. **REGISTRATION STATUS** display	**9.** Antennas
4. **RECEIVE** indicator light	**10.** Power connector
5. **REG** (Registration) button	**11.** Battery compartment cover
6. **PWR** (Power) button	**12.** Battery compartment cover release latch

Beltpac Features (Uses BAT41 battery)
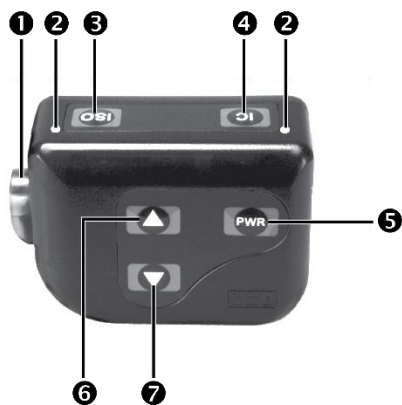
1. Headset cable connector	**6.** Volume-up ▲ button
2. Beltpac power and transmit lights	**7.** Volume-down ▼ button
3. **ISO** (Isolate) button	**8.** Battery
4. **IC** (Intercom) button	**9.** Battery release latch
5. **PWR** (Power) button	

WH220 Headset Controls (Uses BAT50 battery)
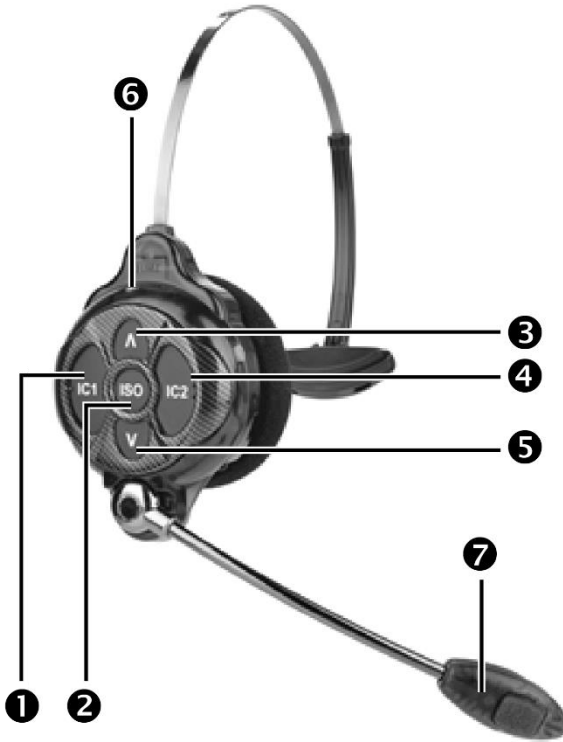
1. IC1 button
2. ISO (Isolate) button
3. Volume-up button
4. IC2 button
5. Volume-down button
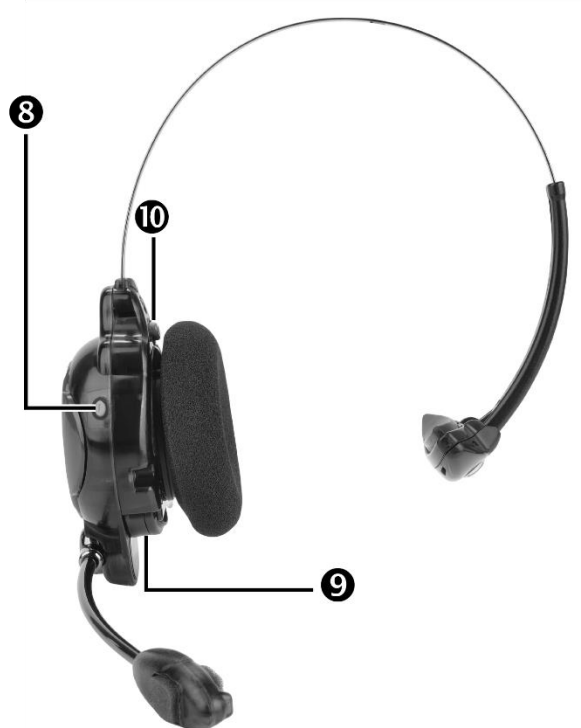
6. Power light
7. Microphone
8. Power button
9. Battery
10. Battery-release latch

AC40 BATTERY CHARGER SETUP

The AC40 is the charger for Beltpac batteries.

IMPORTANT! – Before installing the system, connect the AC power supply to the AC40 Battery Charger and plug it into an electrical outlet. Charge all the batteries for the Beltpacs while the other equipment is being installed. Charging time is about 2.5 hours.

Connect AC Power Supply

- Attach the AC power supply cable connector to the screw connector on the battery charger.
- Plug the power cord connector into the AC power supply.
- Plug the power cord into an electrical outlet.

The red lights on the charger will come on and go off, and then the yellow lights will turn on and remain on.

Power supply cable connector

Power cord connector

To electrical outlet

AC40 Battery Charger

AC power supply

Power cord
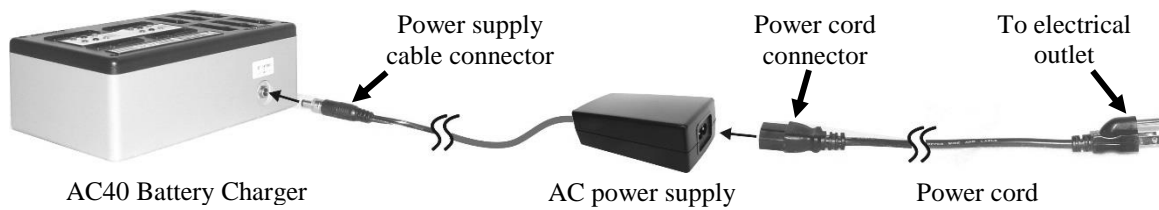
Charging the Batteries

Up to four batteries can be charged simultaneously. The battery status lights next to each charging port are explained below.
Up to six fully charged batteries can be stored in the battery storage ports.

- Insert a battery in each of four charging ports until it clicks in place.
- A <u>yellow light</u> adjacent to each charging port illuminates while the port is empty. When a battery is in a charging port, an adjacent <u>flashing yellow light</u> indicates **CHARGE PENDING**, which indicates that the battery is too hot. Adjust the room temperature or move the charger to a cooler area. When a battery is in a charging port, an adjacent, steady yellow light indicates **CHARGE FAILED**. If this happens, follow the instructions on the side of battery charger.
- A <u>red light</u> adjacent to a battery port indicates that the battery in the port is **CHARGING**. A <u>green light</u> adjacent to an inserted battery indicates a **READY**, fully charged battery.

Charged batteries in storage ports

Empty charging ports

Battery in charging port

Yellow   Red   Green

ON: NO BATTERY OR CHARGE FAILED
FLASH: CHARGE PENDING
CHARGING
READY
4
2

Yellow   Red   Green

ON: NO BATTERY OR CHARGE FAILED
FLASH: CHARGE PENDING
CHARGING
READY
3
1

AC50 BATTERY CHARGER SETUP

Before installing the system, connect the AC power supply to the battery charger and plug it into an electrical outlet. Charge all the batteries while the other equipment is being installed. Charging time is about 2.5 hours.

Connect AC Power Supply

To connect the AC power supply to the battery charger:

1. Connect the AC power supply cable connector to the power connection on the battery charger.
2. Connect the AC power cord to an electrical outlet.

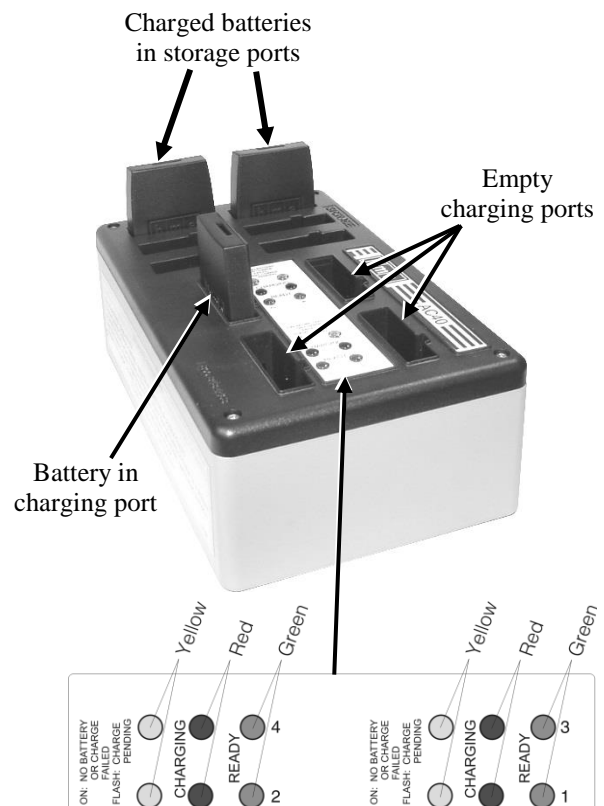The red lights on the charger will briefly display, and then the yellow lights will appear and remain on.

Charging the Batteries

Up to four batteries can be charged in the battery charger at one time. The battery status lights next to each charging port indicate the battery status. Up to four fully charged batteries can be stored in the battery Storage ports. Insert a battery in each of four Charging ports until it clicks in place.

- A yellow light next to a Charging port indicates that the port is **EMPTY**.
- A red light next indicates that the battery port is **CHARGING**.
- A green light indicates that the battery is **READY**.
- A steady yellow light indicates that the **CHARGE FAILED**. If a charge fails, refer to the instructions on the side of battery charger.
- A flashing yellow light indicates **CHARGE PENDING**, which means the inserted battery is too hot. Adjust room temperature or move the charger to a cooler area.
- Store the fully charged batteries in storage ports.

IMPORTANT: Batteries should not be left in charge ports after being fully charged. A battery left in a charging port for more than three weeks may display the yellow indicator light, but it does not indicate a faulty battery.

Batteries in Charging ports

Batteries in Storage ports
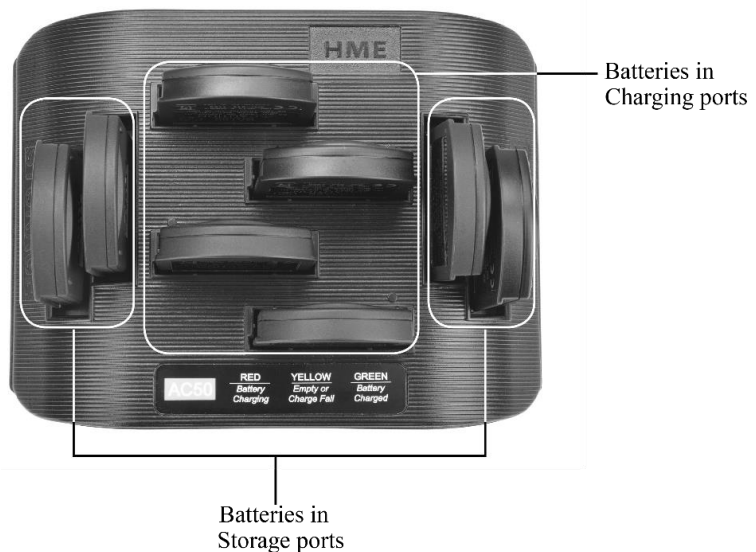
BASE STATION SETUP

Locate the two base station antennas, as well as the AC power adapter and power cord received with the base station. Connect them to the base station as described below.

Antenna and Power Setups

Step 1. Connect the two enclosed antennas to the antenna connectors on the top and right side of the base station (displayed to the right).

Position the antennas at right angles in opposite directions. The illustration below shows one possible arrangement. Turn the sleeve on each of the antenna connectors clockwise to tighten the antennas securely in position.

Antenna connectors
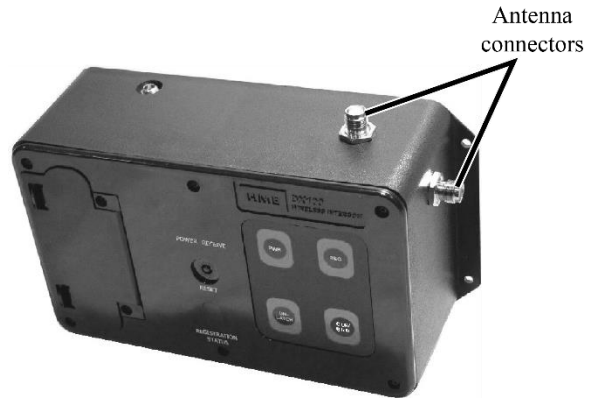
Step 2. Note which of the following applies to you.

- **If using the DX100 with AC power** — Plug the connector at the end of the AC power supply cable into the power connector on top of the base station. Turn the sleeve on the cable connector clockwise to secure it to the base station. Plug the large female connector at one end of the AC power cord into the power supply. Plug the other end of the AC power cord into an electrical outlet.

AC power supply

Power supply cable

Power supply cable connector

Threaded collar

Antenna

Power connector

Power cord

Threaded collar

POWER RECEIVE

PWR

REG

RESET

UN-LATCH

CLR / EN D

REGISTRATION STATUS

Antenna

Power light

PWR button
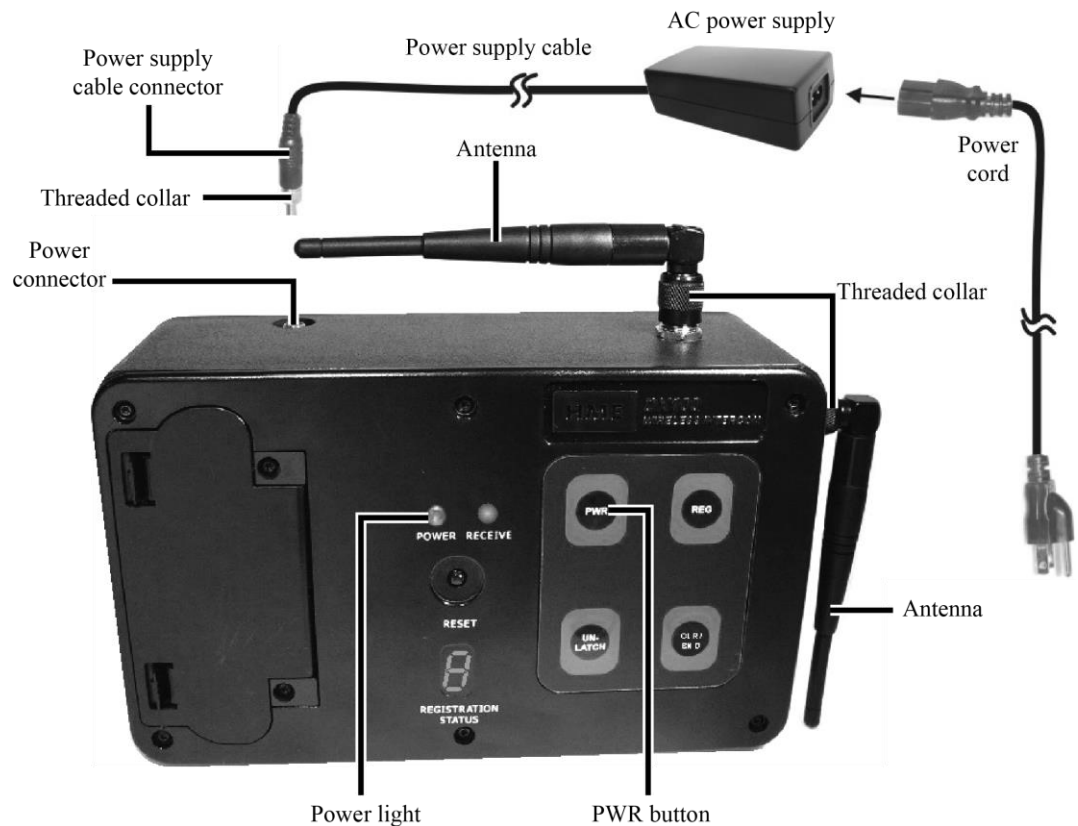
- **If using the DX100 with battery power** — Press in and up on the battery cover release latches to lift the cover and open the battery compartment.

    Insert six AA batteries into the battery sled (as illustrated inside the sled), and install the sled in the battery compartment as displayed below. An HME BAT850 Rechargeable NiMH Battery may be used instead.

Battery cover release latches

(Push latches in direction of arrows and flip lid up.)

Battery sled
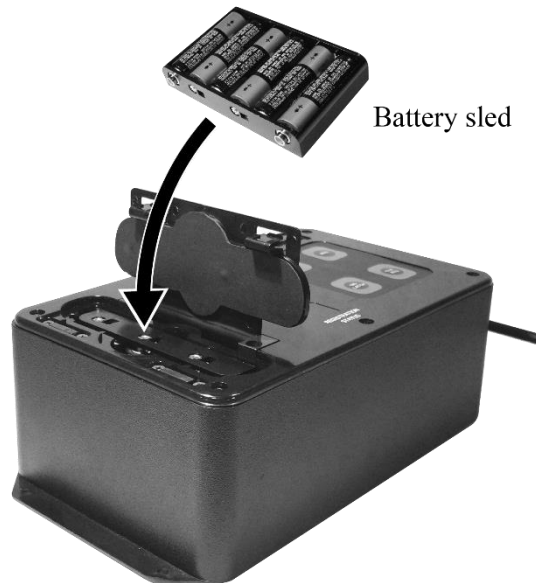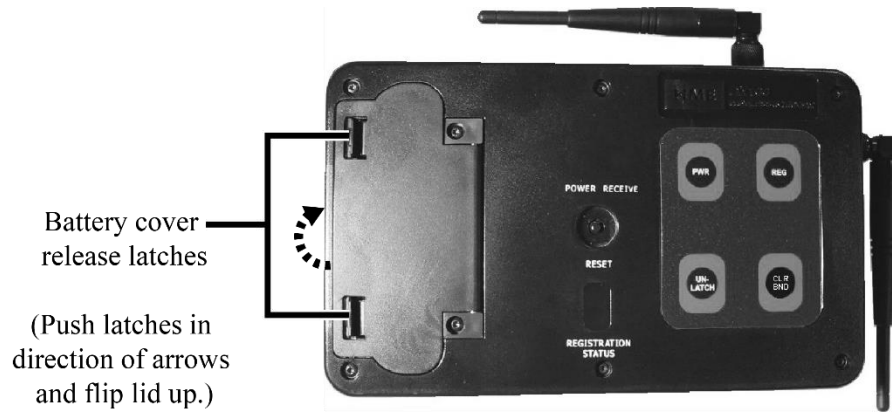
    Close the battery compartment by pressing its cover down until both latches snap in place.
    NOTE: Simultaneously pressing down on the cover next to both of the latches will assure proper closing.

- **If using the DX100 with an external DC power source** — We recommend that you purchase a 12V DC power cord adapter for a standard vehicle power port, then purchase and attach a "Switchcraft 760K" DC power plug. Follow the manufacturer's instructions to connect the external DC power source to the power connector on top of the DX100. Any power supply used with the DX100 should be rated at least 12VDC, 500mA.

NOTE: Having a fully charged (or new) battery when operating the DX100 with AC or external DC power can prevent interruption of communication during a power outage. This allows the base station to seamlessly switch to battery power.

Interference Avoidance

Interference (ex: headset popping sounds) may occur whenever other equipment, such as WI-FI systems, wireless DMX systems or other HME Base Stations use the same frequency band.

If these systems can be limited to one portion of the band, then the DX100 can be set to the opposite half of the 2.4 GHz to 2.48 GHz band. To avoid this type of interference, select the upper part of the frequency range on one Base Station (or more), and the lower part of the frequency range on the other(s). Here's how:

Step 1. Turn on the Base Station power.

The number *"8"* will appear on the REGISTRATION STATUS display for a few seconds.

Step 2. After the *"8"* disappears and the REGISTRATION STATUS display is blank (primary base) or shows a double bar (secondary base), press and hold the **CLR/BND** button. While you are still holding the **CLR/BND** button, press and hold the **REG** button and wait until a **L**, **H** or **A** appears. Release both buttons.

REG button

REGISTRATION STATUS display
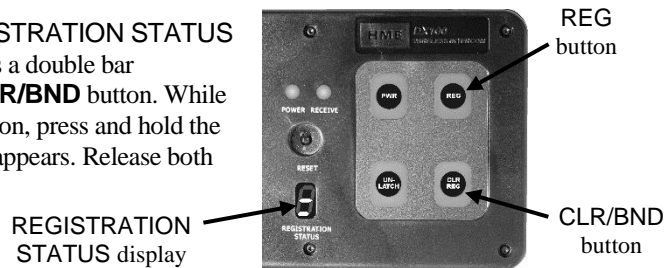
CLR/BND button

Step 3. Press the **CLR/BND** button to cycle through parts of the frequency band; **L** = Low end, **H** = High end, **A** = All, and **E** = European mode.

Step 4. Wait until *"c"* appears on the display.

NOTE: Base stations are shipped in the **A** (default) position.

"c" will only appear on the REGISTRATION STATUS display if you are setting the frequency band the first time, or you are changing the setting.

If you stop at **L**, **H** or **A** that was already set, an *"8"* will appear for a few seconds and the REGISTRATION STATUS display will become blank.

If you change a base station's existing frequency band setting, you will have to re-register all beltpacs and/or all-in-one headsets that were registered to that base station.

Multiple Base Stations

This mode of operation can be used to expand the number of users communicating through multiple HME Base Stations operating in the same portion of the 2.4 GHz to 2.48 GHz frequency band.

Primary and Secondary Base Station Settings

One base station must be designated as "primary" and all others must be designated as "secondary". You can have only one primary and up to 3 secondary base stations. Secondary base stations are assigned numbers 1, 2, or 3.

- Label the base stations as "**Primary**", "**1**", "**2**" and "**3**".
- Start with every base station and Beltpac/Headset power off.

Set DIP Switches

Open each secondary base station and set DIP switch #4 to the **ON** position as follows.

- Using a T9 torque wrench, remove the six screws from the front panel of each secondary base station. Lift the front panel carefully and set it face down.

    Be careful not to pull any wires loose.

- Locate the DIP switch on the transceiver circuit board inside the front panel of each secondary base station. Set DIP switch #4 to the **ON** position. Leave #s 1 and 3 in the **OFF** position.

DIP switch inside secondary base station
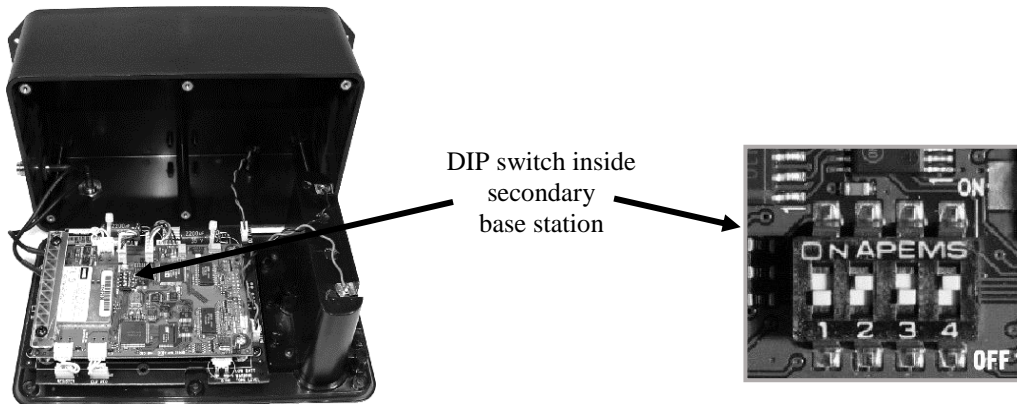
- Replace the front panel and screws on the secondary base stations.
- The primary base station DIP switch #4 should be in the **OFF** position.

Base Station Initialization

For multiple HME Base Stations to operate without interference, they must be properly initialized before performing any other setups. After initializing each base station, register each Beltpacs/Headsets to that base according to the procedures on pages 13 - 16.

NOTE: Base stations must be set up for split-band operation prior to initialization. If a different frequency band needs to be selected to avoid interference, the primary base station must be set to this frequency band before base station initialization is started. (See Interference Avoidance on page 9.)

Initialize each base station and register all Beltpacs/Headsets as follows:

Primary Base Station

- Turn the primary base station power on. Register any Beltpacs/Headsets to be used with the primary base station (See pages 13 - 16). Turn each Beltpac/Headset off after registering it.

Secondary Base Stations

Step 1. Power-on one **secondary** base station.

The REGISTRATION STATUS display will show a **double bar**, indicating the secondary base station is ready to be initialized.

Step 2. Press the **REG** button on the primary base station.

The REGISTRATION STATUS display will show a small "**o**".

Step 3. To assign a number to a secondary base station and initialize it, press the **REG** button on the secondary base. Pressing the button repeatedly cycles through the numbers **1**, **2**, and **3**. When the desired number appears, release the button and wait. While the secondary base initializes, the REGISTRATION STATUS display will continue showing the selected number. When secondary base station initialization is finished, the display will show one bar indicating that the secondary has initialized to the primary.

REG button

REGISTRATION STATUS display
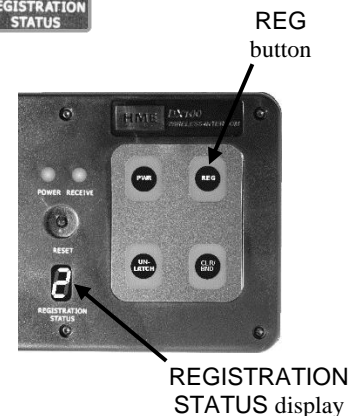
Step 4. Press the **REG** button on the primary base station.

The REGISTRATION STATUS display will go blank.

RESET button

Step 5. Register Beltpacs/Headsets to the secondary (See pages 13 - 16).

Step 6. After registration, turn off the secondary base and all Beltpacs/Headsets will be registered.

Step 7. Repeat the above steps for each remaining **secondary** base station. Use a different number for each. Only the primary base and the secondary base to be initialized should have power during initialization. All other equipment should be turned off.
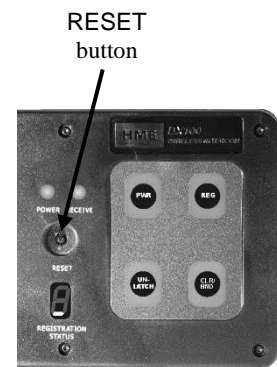
Step 8. After all secondary bases are initialized and Beltpacs/Headsets are registered, power-up all base stations.

Step 9. Press the **RESET** button on the primary base, and let it recover.

Step 10. Turn on the primary Beltpacs/ Headsets, and let them link.

Step 11. Press the **RESET** button on each secondary base station (one at a time), and let it initialize to the primary base (indicated by a single bar).

Step 12. Turn on the Beltpacs/Headsets associated with the secondary base stations. Work with one group at a time until they have all linked, and then do the next group. At this point all base stations and Beltpacs/Headsets should be powered-up, linked and ready for use.

Step 13. Now proceed with normal system configuration, setting functions and levels as required.

Step 14. If it becomes necessary to replace a secondary base station, initialize the new secondary with the same number as the replaced secondary. After initialization, you will have to register any Beltpacs/Headsets to the new secondary.

Step 15. If it becomes necessary to replace a primary base station, follow the preceding instructions completely. Before initialization of the secondary base stations, clear the previous secondary initialization as follows.

For each secondary, press the **CLR/BND** button and the **RESET** button simultaneously. Release the **RESET** button, but continue pressing the **CLR/BND** until the clear code "**c**" (lower case) appears on the REGISTRATION STATUS display.

RESET button

CLR/BND button

Any Beltpacs/Headsets associated with the old primary base station will have to be registered to the new primary, following secondary base station initialization.

All Beltpacs/Headsets associated with secondary base stations also have to be registered again.
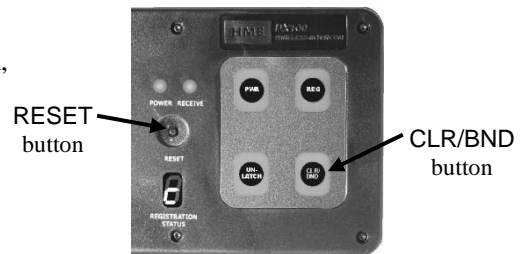
Step 16. If the primary base is shut down or powered off for more than 30 seconds, all secondary bases will drop their Beltpac/Headset connections and begin searching for the primary. If the primary is not found in 30 seconds, the secondary will automatically revert to primary-mode operation and reconnect the Beltpacs/ Headsets.

At this point, the secondary REGISTRATION STATUS displays will show three bars. If the primary is turned back on, it will be necessary to press the **RESET** button on all secondary bases to allow them to find and initialize to the primary again. It's therefore important to have all base stations connected to the same AC circuit to prevent this situation when the system is shut down after hours and powered up again the next day.

NOTE: You cannot register Beltpacs/Headsets to a base that is set to primary mode, and then switch the base mode to secondary for initialization. Once in secondary mode, the base cannot recognize the Beltpacs/Headsets registered during primary operation.

For secondary bases, the Beltpacs/Headsets must always be registered after secondary base initialization. The primary base must remain active, and the secondary base should display one bar.

BELTPAC / WH220 HEADSET SETUP AND REGISTRATION

The first time you operate the DX100 system, you must register each Beltpac and/or WH220 Headset for use with a specific base station. The base station will then recognize all registered Beltpacs/ Headsets when their power is on. They will also recognize other electronic equipment operating on the same frequencies. If a Beltpac/Headset is added, replaced or repaired later, the new one must be registered (the previous one will remain in memory). Since only 15 Beltpacs and/or Headsets can be in memory, whether currently in use or not, all memory must be cleared to remove any old Beltpac/Headset registrations.

Set Up Beltpacs

Before registering them, set up all Beltpacs as follows:

Step 2

Step 3

Step 1

Step 1. Insert a fully charged battery in the Beltpac, with the metal contacts on the end of the battery inserted first. Press it in until it snaps.

Step 2. Place the Beltpac in the pouch.

Step 3. Plug the headset cable connector into the Beltpac.
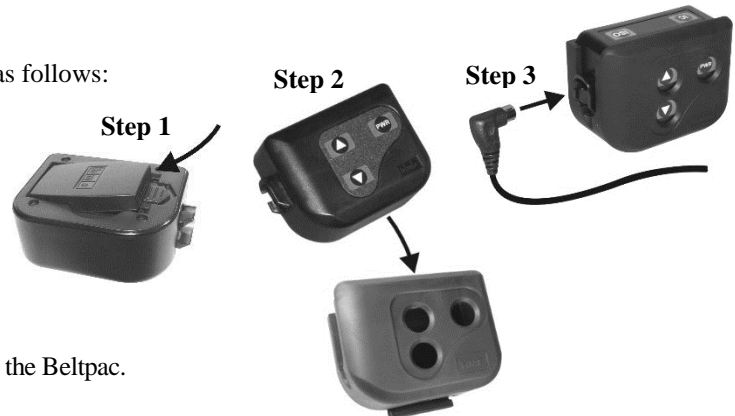
Register Beltpacs

Beltpacs must be within 6 feet (1.83 meters) of the base station during registration. Before you begin, be certain the base station power is on and each Beltpac to register is turned off. Beltpacs that have already been registered can be on or off.

NOTE: If you are setting up multiple base stations, the following steps must be repeated for Beltpacs to be registered to each base station.

Step 1. Place on your head the headset of the Beltpac to be registered.

Step 2. Press the **REG** button on the front panel of the base station.

- The REGISTRATION STATUS display on the base station will show a small "**o**" (for <u>o</u>pen).

  NOTE: If you wait too long before going on to Step 3, the base station will exit registration mode and you will have to repeat Step 2.

REG button

REGISTRATION STATUS display

Step 3. Press and hold the **ISO** button on the Beltpac while you press and release the **PWR** (power) button to turn the unit on, then release the **ISO** button. This will cause the Beltpac to enter the registration mode.

Step 4. The two power lights at the corners of the Beltpac near the **IC** and **ISO** buttons will begin blinking red. They will then blink green two or three times and turn off.

- *Wait!* There may be a short delay.
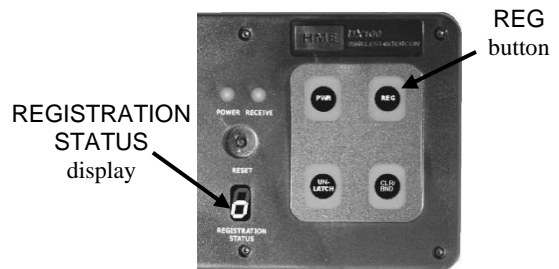
If registration is successfully completed:

- A voice message in the headset will say "Power on, Beltpac #, Version #, Begin registration, Registration complete, …"
- After a delay of up to 15 seconds, the REGISTRATION STATUS display will show the ID number assigned to this Beltpac for about 10 seconds.
  NOTE: ID numbers are assigned sequentially as 0 thru 9, A, b, C, d and E.
- The power light on the Beltpac, next to the **IC** button, will remain on steady green.
- **Repeat Steps 1 to 3 at the bottom of page 12 for each Beltpac to be registered.**

If registration failed:

- A voice message in the headset will say "Power on, Beltpac #, Version #, Begin registration, …" Both power lights on the Beltpac will be blinking red, and there may be a delay of up to 90 seconds before you hear "Registration failed".
- Press the **RESET** button on the base station. When the REGISTRATION STATUS display becomes blank, press the **REG** button on the base station and register the Beltpac again. If registration fails again, call your dealer for assistance.

If you try to register more than 15 Beltpacs and/or Headsets to a base station:

- An **F** (for registration "Full") will appear on the REGISTRATION STATUS display on the base station, and you will hear "Registration failed" in the headset.

REGISTRATION STATUS display

- Clear all current registrations by pressing the **CLR/ BND** button and the **RESET** button simultaneously. Release the **RESET** button, but continue holding the **CLR/BND** button until the clear code "**c**" (lower case) appears on the REGISTRATION STATUS display.

RESET button

REGISTRATION STATUS display

CLR/BND button
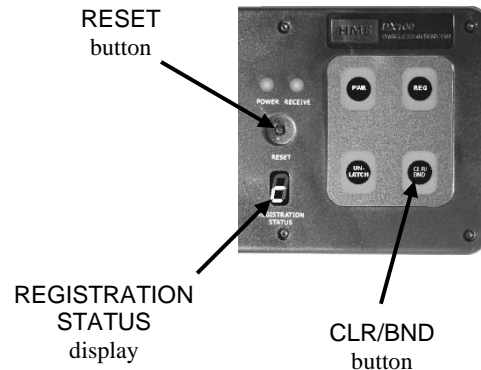
- Register all active Beltpacs, one at a time. Previously registered WH220 Headsets must also be re-registered.

Set Up WH220 Headsets

Before registering, insert a fully charged battery in each WH220 Headset with the metal contacts on the end of the battery inserted first. Press it in until it snaps.

Power On/Off

- **To turn power on**

  Press and release the power button on the inside of the Headset housing. A voice message in the earpiece will say "Headset #", and the power light on the opposite side of the earpiece will turn on.

- **To turn power off**

  Press and hold the power button for approximately 3 seconds. A voice message in the earpiece will say "Headset off", and the power light on the opposite side of the earpiece will turn off.

Power light

Power button

Battery release button

Battery
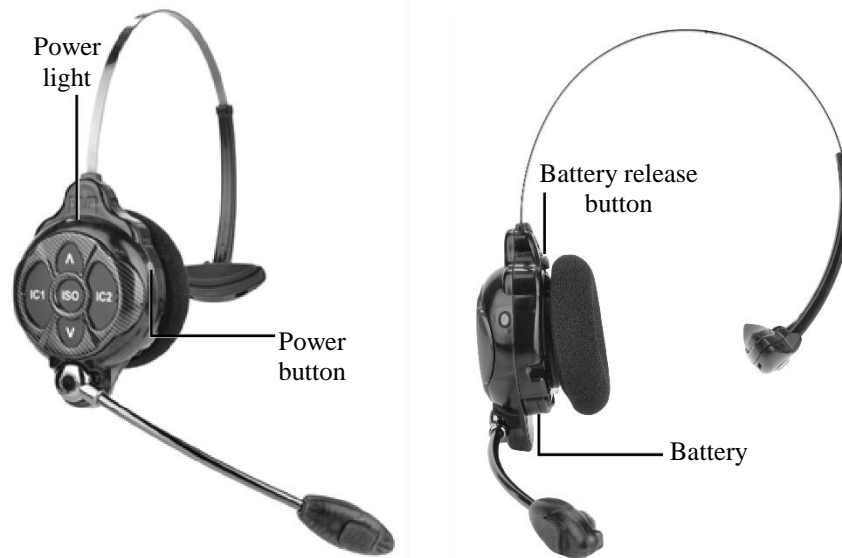
Register WH220 Headsets

Headsets must be within 6 feet (1.83 meters) of the base station during registration. Be certain the base station power is on, and each headset you are going to register is turned off before you begin. Headsets that are already registered can be turned on or off.

NOTE: If you are setting up multiple, daisy-chained base stations, the following steps must be repeated for WH220 Headsets being registered to each base station.

Step 1. Place the Headset on your head.

**Step 2.** Press the **REG** button on the front panel of the base station.

- The REGISTRATION STATUS display on the base station will show a small "**o**" (for open).

  NOTE: If you wait too long before going on to Step 3, the base station will go out of the registration mode and you will have to repeat Step 2.

REG button

REGISTRATION STATUS display

Step 3. To turn the unit on, press and hold the **ISO** button on the Headset while pressing and releasing the power button. Release the **ISO** button, and the Headset will enter the registration mode.

- The Headset power light will begin blinking red, then it will blink green two or three times and turn off.

  Wait! There may be a short delay.
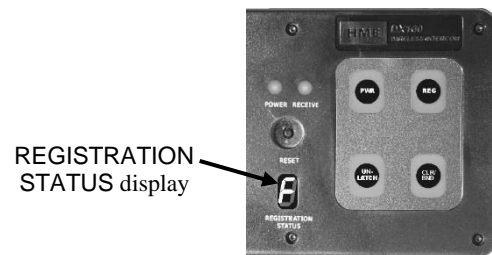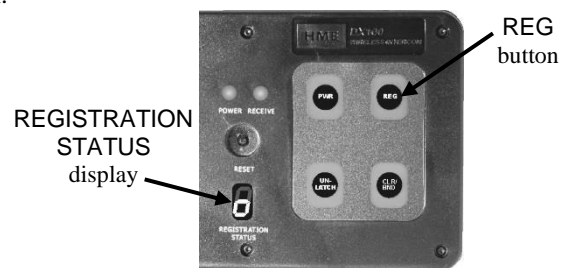
If the registration is successfully completed:

- A voice message in the Headset will say "Power on, Headset #, Version #, Begin registration, Registration complete, …"
- After a delay of up to 15 seconds, the REGISTRATION STATUS display will show the ID number assigned to this Headset for about 10 seconds.

  NOTE: ID numbers are assigned sequentially as 0 thru 9, A, b, C, d and E.

- The power light on the Headset will remain on steady green.
- **Repeat Steps 1 to 3 at the bottom of page 14 for each headset to be registered.**

If registration failed:

- A voice message in the Headset will say "Power on, Headset #, Version #, Begin registration, …" Both power lights on the Headset will be blinking red, and there may be a delay of up to 90 seconds before you hear "Registration failed" and the REGISTRATION STATUS display goes blank.
- Press the **RESET** button on the base station. When the REGISTRATION STATUS display becomes blank, press the **REG** button on the base station and register the Headset again. If registration fails again, call your dealer for assistance.

If you try to register more than 15 Beltpacs and/or Headsets to a base station:

- An **F** (for registration "Full") will appear on the REGISTRATION STATUS display on the base station and you will hear "Registration failed" in the Headset.

REGISTRATION STATUS display
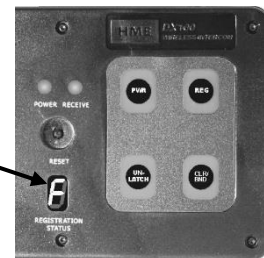
- Clear all current registrations by pressing the **CLR/BND** button and the **RESET** button simultaneously. Release the **RESET** button, but continue holding the **CLR/BND** button until the clear code "**c**" (lower case) appears on the REGISTRATION STATUS display.

RESET button

CLR/BND button

REGISTRATION STATUS display
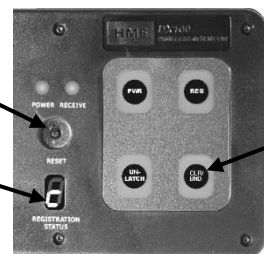
- Register all active WH220 Headsets, one at a time. Previously registered Beltpacs must also be re-registered.

BASE STATION OPERATION

Controls and Indicators

- **POWER** indicator light

  Lights red when power is on. Blinks every 8 – 10 seconds when the battery is running low.

- **RECEIVE** indicator light

  Lights green when Beltpacs/Headsets are transmitting.

- **RESET** button

  Press to reset all communication links, or press together with the **CLR/BND** button to clears all Beltpac/Headset registrations.

- REGISTRATION STATUS display

  Displays "**8**" briefly when base station power is turned on.
  Indicates status as you register each Beltpac/Headset. See pages 13 - 16.

- **PWR** (Power) button

  Press and release to turn the DX100 power on. Press and hold for 2 seconds to turn power off.

- **REG** (Registration) button

  Use this button to register each Beltpac/Headset used with the DX100. See pages 13 - 16.

- **UN-LATCH** button

  Use this button to unlatch all Beltpac/Headset transmitters. Users can configure their Beltpacs/Headsets to "latch" on, in order to talk and listen to each other. Base station operators can use the **UN-LATCH** button to stop Beltpac/Headset conversations.

  Also, if a user takes a Beltpac/Headset off and leaves it "latched on", sounds from the area where it was left are transmitted to other Beltpac/Headset users. This distraction can be stopped by pressing the **UN-LATCH** button on the base station.

- **CLR/BND** (Clear Registration) button

  The **CLR** feature of this button is used to clear Beltpac/Headset registrations. See pages 13 - 16.

  The **BND** feature of this button is used to select upper or lower portion of frequency band. See page 10.
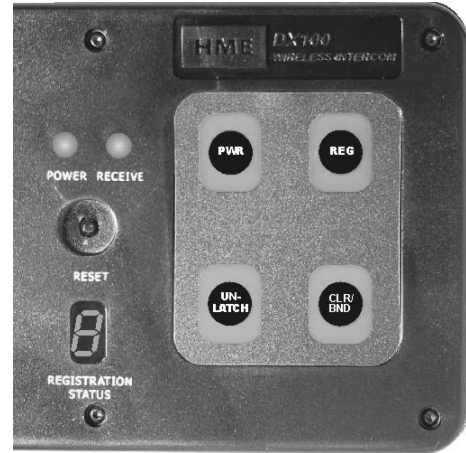
Low Battery Indicator

When the base station battery power is low, repeating beeps will be heard, and the POWER light on the base station will be blinking red. When this happens, replace the batteries in the base station immediately with ones that are new or fully charged (as instructed on page 5).

NOTE: Battery life varies with the type of batteries used. With the HME BAT850 (NimH) Battery, up to 10 hours can be expected.

BELTPAC OPERATION

The Beltpac control buttons have a snap action. They will activate when pressed firmly. Use your fingertips, not fingernails, to press the buttons.

Power lights

Power On/Off

- **Power On —** Press and release the **PWR** (power) button.
  A voice message in the earpiece will say "Power on, Beltpac #, Version #", and the red power lights at the corners of the **IC** and **ISO** buttons will turn on. After a short time, one light will turn off and the other will change to green, indicating the Beltpac is ready for use. The REGISTRATION STATUS indicator on the base station will momentarily indicate the ID of the Beltpac.

- **Power Off —** Press and hold the **PWR** button for approximately 2 seconds.
  A voice message in the earpiece will say "Power off", and the green power light will turn off.

NOTE: While the Beltpac is transmitting, the green power light will be flashing.
The green power light will be on steady whenever the Beltpac is ready, but not transmitting.

ISO (Isolate) and IC (Intercom)

Use the **ISO** button to communicate with other Beltpac/Headset users. The ISO feature can be locked out, causing the **ISO** button to function the same as the **IC** button.

Use the **IC** button to communicate via the intercom channel.

- **Push-To-Talk (PTT) Mode —** To set the Beltpac for PTT communication, with the power off, press and hold the volume-down ▼ and **ISO** buttons while you press and release the **PWR** (power) button. You will hear "Power on, Beltpac #, Version #, Hands-free off" in the headset earpiece. Press and hold the **IC** or **ISO** button while talking.

- **Hands-Free (HF) Mode —** To set the Beltpac for HF communication, with the power off, press and hold the volume-up ▲ and **ISO** buttons while you press and release the **PWR** (power) button. You will hear "Power on, Beltpac #, Version #, Hands-free on" in your headset earpiece. When set up for HF communication, the Beltpac can be operated in either HF or PTT.

- **ISO Lockout Mode —** To set the Beltpac with the ISO feature locked out, with the power off, press and hold the **IC** button while you press and release the **PWR** (power) button. You will hear "Power on, Beltpac #, Version #, ISO off" in your headset earpiece. When set up for the ISO Lockout mode, the **ISO** button will operate the same as the **IC** button, in either hands-free or PTT communication. To reset the ISO feature for normal **ISO** button communication, with the power off, press and hold the **ISO** and **IC** buttons while you press and release the **PWR** (power) button. You will hear "Power on, Beltpac #, Version #, ISO on" in your headset earpiece.

NOTE: The above settings are saved in memory and only need to be repeated when you want to change between HF and PTT operation. When changing modes, if both power lights begin blinking, turn the Beltpac off and begin again. HF and PTT mode settings affect both **IC** and **ISO**. Individual adjustment is not possible.

- **Push-To-Talk (PTT) Mode Operation —** Press and hold the **IC** or **ISO** button for more than one second. In PTT operation, audio will be transmitted only while you are pressing the **IC** or **ISO** button.

- **Hands-Free (HF) Mode Operation —** Quickly press and release the **IC** or **ISO** button to "latch" the transmitter on in the HF mode. Talk and listen, as in a normal telephone conversation. Press and release the **IC** or **ISO** button again to "unlatch", to end the conversation. If either button is held down for more than a half second, the Beltpac will function as PTT. All Beltpacs/Headsets can be unlatched by the base station operator, by pressing the **UNLATCH** button on the base station.

NOTE: In HF mode, pressing the **IC** button while latched in **ISO** will latch on **IC**. Pressing the **ISO** button while latched in **IC** will latch on **ISO**.

Volume Up/Down

- **Volume Up Adjustment —** Each time you press and release the volume-up ▲ button, you will hear a higher pitch beep in the earpiece as the volume increases one step. If you press and hold the volume-up button, you will hear beeps of ascending pitch as the volume steps up to maximum. When maximum volume is reached, you will hear "maximum" repeating until you release the volume-up button.
- **Volume Down Adjustment —** Each time you press and release the volume-down ▼ button, you will hear a lower pitch beep in the earpiece as the volume decreases one step. If you press and hold the volume-down button, you will hear beeps of descending pitch as the volume steps down to minimum. When minimum volume is reached, you will hear rapidly repeating beeps until you release the volume-down button.

Sidetone Adjustment

To adjust sidetone, the volume level of your own voice that you hear in the headset earpiece as you speak into the microphone, press and hold the **IC** button while you press the volume-up ▲ or volume-down ▼ button. If you reach the maximum volume level, you will hear "Maximum" in the headset earpiece. If you reach the minimum volume level, you will hear double beeps. Your sidetone setting will be saved in memory, and does not require readjustment each time the beltpac is turned off and on.

NOTE: This adjustment only affects the level of your voice in your own headset, not how anyone else hears you.

Microphone Gain Adjustment

Some users talk louder or softer than others. To allow for this, microphone gain adjustment is provided.

To increase microphone gain — Press the volume-up ▲ button while holding down the **ISO** button in the normal operating mode. The microphone gain increase can be monitored through sidetone, or preferably by someone else on a Beltpac/Headset or at the base station.

To decrease microphone gain — Press the volume-down ▼ button while holding down the **ISO** button in the normal operating mode. The microphone gain decrease can be monitored through sidetone, or preferably by someone else on a Beltpac/Headset or at the base station.

NOTE: You will hear "Maximum" if you attempt to go higher than maximum microphone gain.
You will hear double beeps if you attempt to go lower than minimum microphone gain.
Microphone gain will be saved in non-volatile memory and does not require readjustment each time the power is turned on.

Change Batteries

- When a battery becomes weak, a voice in the earpiece will say "Change battery".
- When this happens, take the Beltpac out of its pouch and remove its battery.
- Slide the arrow-shaped battery-release latch in the direction of the arrow.
- Pull up on the end of the battery near the battery-release latch and lift the battery out of the Beltpac, or turn the Beltpac over and catch the battery in your hand.
- When replacing a battery in the Beltpac, place the end of the battery with the metal contacts into the battery holder on the Beltpac, in the same position as the battery you removed.
- Press the top of the battery carefully into the battery holder until it snaps in place under the battery-release latch.
- Recharge batteries according to the instructions on page 5.

Battery

Battery release latch
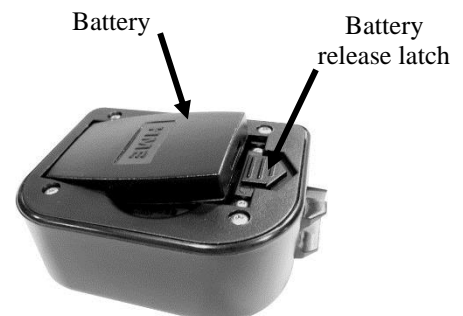
WH220 HEADSET OPERATION

The Headset control buttons will activate when pressed lightly. Use your fingertips, not your fingernails, to press the buttons.

Power On/Off

- **Power On —** Press and release the power button on the inside of the Headset housing. A voice message in the earpiece will say "Power on, Headset #, Version #" and the power light will turn on. The REGISTRATION STATUS indicator on the base station will momentarily indicate the Headset ID number.

- **Power Off —** Press and hold the power button for approximately 3 seconds. A voice message in the earpiece will say "Power off", and the power light will turn off.

ISO (Isolate) and IC (Intercom)

Use the **ISO** button to communicate with other Headset/Beltpac users. The ISO feature can be locked out, causing the **ISO** button to function the same as the **IC** button.

Use the **IC1** or **IC2** button to communicate via the intercom channel.

- **Push-To-Talk (PTT) Mode —** To set the Headset for PTT communication, with the power off, press and hold the volume-down ▼ and **ISO** buttons while you press and release the power button. You will hear "Power on, Headset #, Version #, Hands-free off" in the earpiece. Press and hold the **IC1**, **IC2** or **ISO** button while talking.

- **Hands-Free (HF) Mode —** To set the Headset for HF communication, with the power off, press and hold the volume-up ▲ and **ISO** buttons while you press and release the power button. You will hear "Power on, Headset #, Version #, Hands-free on" in the earpiece. When set up for HF communication, the Headset can be operated in either HF or PTT.

- **ISO Lockout Mode —** To set the Headset with the ISO feature locked out, with the power off, press and hold the **IC1** button while you press and release the power button. You will hear "Power on, Headset #, Version #, ISO off" in your Headset earpiece. When set up for the ISO Lockout mode, the **ISO** button will operate the same as the **IC1** button, in either hands-free or PTT communication.

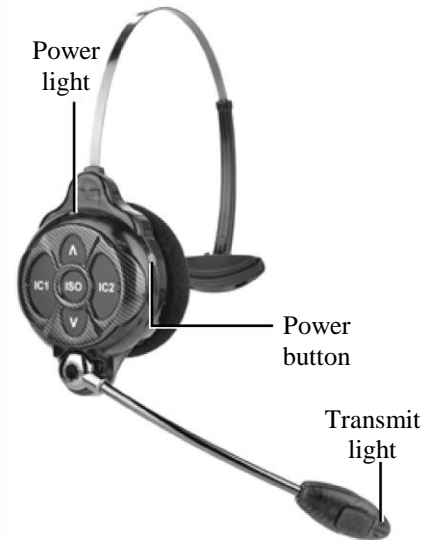 To reset the ISO feature for normal **ISO** button communication, with the power off, press and hold the **ISO** and **IC1** buttons while you press and release the power button. You will hear "Power on, Headset #, Version #, ISO on" in your Headset earpiece.

- **Lights-off Mode —** To prevent the power and transmit lights from coming on during headset operation, press and hold the **IC2** button while you press the power button to turn the headset on. To return the lights to their normal functions, turn the power off and on again without pressing the **IC2** button.

NOTE: The above settings are saved in memory and only need to be repeated when you want to change between HF and PTT operation. When changing modes, if both power lights begin blinking, turn the Headset off and begin again. HF and PTT mode settings affect both **IC** and **ISO**. Individual adjustment is not possible.

- **Push-To-Talk (PTT) Mode Operation —** Press and hold the **IC1**, **IC2** or **ISO** button while speaking. In PTT operation, audio will be transmitted only while you are pressing the **IC1**, **IC2** or **ISO** button.

- **Hands-Free Mode (HF) Operation —** Quickly press and release the **IC** or **ISO** button to "latch" the transmitter on in the HF mode. Talk and listen, as in a normal telephone conversation. Press and release the **IC** or **ISO** button again to "unlatch", to end the conversation. If either button is held down for more than a half second, the Headset will function as PTT. All Headsets/Beltpacs can be unlatched by the base station operator, by pressing the **UNLATCH** button on the base station.

NOTE: In HF mode, pressing the **IC1** or **IC2** button while latched in **ISO** will latch on **IC**. Pressing the **ISO** button while latched in **IC** will latch on **ISO**.

Volume Up/Down

- **Volume Up Adjustment —** Each time you press and release the volume-up ▲ button, you will hear a higher pitch beep in the earpiece as the volume increases one step. If you press and hold the volume-up button, you will hear beeps of ascending pitch as the volume steps up to maximum. When maximum volume is reached, you will hear "maximum" repeating until you release the volume-up button.

- **Volume Down Adjustment —** Each time you press and release the volume-down ▼ button, you will hear a lower pitch beep in the earpiece as the volume decreases one step. If you press and hold the volume-down button, you will hear beeps of descending pitch as the volume steps down to minimum. When minimum volume is reached, you will hear rapidly repeating beeps until you release the volume-down button.

Microphone Gain Adjustment

Some users talk louder or softer than others. To allow for this, microphone gain adjustment is provided.

To increase microphone gain — Press the volume-up ▲ button while holding down the **ISO** button in the normal operating mode. The microphone gain increase can be monitored through sidetone, or preferably by someone else on a Headset/Beltpac or at the base station.

To decrease microphone gain — Press the volume-down ▼ button while holding down the **ISO** button in the normal operating mode. The microphone gain decrease can be monitored through sidetone, or preferably by someone else on a Headset/Beltpac or at the base station.

NOTE: You will hear "Maximum" if you attempt to go higher than maximum microphone gain. You will hear two beeps if you attempt to go lower than minimum microphone gain. Microphone gain will be saved in non-volatile memory and does not require readjustment each time the power is turned on.

Change Batteries

When a battery becomes weak, a voice in the Headset will say "Change battery". When this happens, remove the battery from the headset by carefully sliding the battery-release latch and lifting the battery out.

When replacing a battery in the Headset, place the end of the battery with the metal contacts into the battery holder on the Headset. Press the top of the battery carefully into the battery holder until it snaps in place under the battery-release latch.

Recharge batteries according to the instructions on page 5.

Battery release latch

Battery
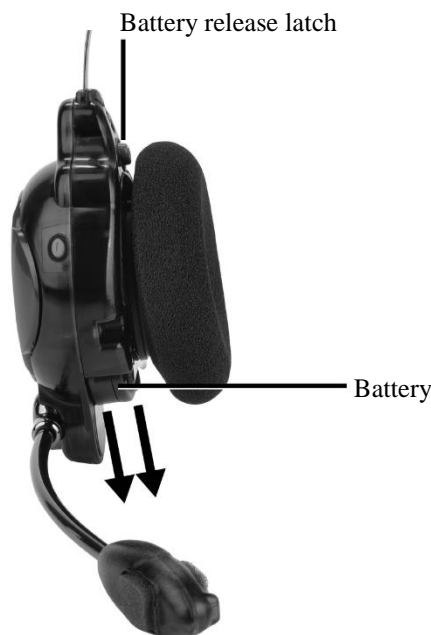
SECTION 4.   ADVANCED FREQUENCY HOPPING

Background

The Clear-Com DX wireless intercom systems utilize a **Frequency Hopping Spread Spectrum** (FHSS) radio in order to provide robust communications.

This system operates in the unlicensed 2.4 GHz band. With the proliferation of other devices over the past few years in the same 2.4 GHz band, instances where these devices and systems can interfere with each other has greatly increased.

The European Union has introduced new radio standards for equipment operating in this band in an attempt to reduce interference between equipment from different manufacturers. European Telecommunications Standards Institute (ETSI) EN 300 328 v.1.8.1 compliant when operated in the E mode.

CLEAR-COM Adaptive Frequency Hopping

In order to reduce interference with other equipment and comply with these new regulations, Clear-Com has implemented an **Adaptive Frequency Hopping** (AFH) "E" mode to base stations. The key idea behind AFH is using only the good frequencies, or channels, unoccupied by other equipment. The system scans for other signals and avoids these signals during operation. Since the radio environment is constantly changing, there is a continuous process of scanning for used frequencies and updating the list of good channels.

The Clear-Com system utilizes 46 discrete frequencies, or channels, within the 2.4 GHz spectrum in order to communicate voice and data. The process of deciding which channels should be used is a 3-stage process. The process includes scanning for occupied channels, the broadcast of a channel exclusion list and the use of the exclusion list. The process is completed in three steps coexisting in time.

Below is the process is shown in Time. First, the system performs a channel scan to determine occupied channels. This list is then broadcast to the communicator. The communicators and base station will use this list during period three. The process is continuous, and as is illustrated below, the list could be constantly changing. Depending on the radio environment, a maximum of 46 channels, and a minimum of 15 channels may be used by the system at any time.

Time $\Rightarrow$

Ch. 1	Ch. 2	Ch. 3	Ch. 4	Ch. 5	Ch. 6	Ch. 7	Ch. 8
Scan	Broadcast	Use					
	Scan	Broadcast	Use				
		Scan	Broadcast	Use			
			Scan	Broadcast	Use		
				Scan	Broadcast	Use	
					Scan	Broadcast	Use

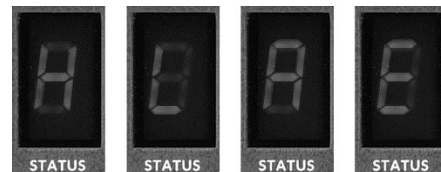For instructions describing the process of setting the base to AFH or another scanning mode, see Interference Avoidance, pg. 9. Available settings include:

High (**H**)   -   Scans the Higher frequencies.

Low (**L**)   -   Scans the Lower frequencies.

All (**A**)   -   All frequencies are scanned.

AFH (**E**)   -   (European Mode) Advanced Frequency Hopping searches for the best frequency.

Operation in Severe Environments

During normal operation, the fact that the system is constantly changing the channel list in use is transparent to the user. It is possible, however, that in an environment with severe interference that the system may experience a slight degradation. In the AFH mode, the Clear-Com system will use a minimum of 15 channels. If the environment is very crowded and less than 15 channels are truly available, there could be increased radio 'packet loss' due to the high interference. The following symptoms may be observed with AFH systems in a highly congested radio environment:

- This may result in system 'busy' indications. Channel lists are updated every few seconds, and in a severe environment it is possible that these lists get missed by the communicator.

- Slight degradation in audio fidelity between the headsets and base station. This would be due to the same symptom as the 'busy' indications. The HD audio processing is tolerant to this condition, which is why the degradation may only be slight.

- Longer times to register. Registration may take longer, since the headset has to acquire the channel list from the base station. If the base station has excluded a lot of channels, this takes longer as the communicator does not have the exclusion list and looks for the base on channels it is not using.

- Initial sync time increase. For the same reason registration may take longer, the initial headset sync on power up may take longer.

Required AFH Equipment

In order to utilize AFH, the base station must be set to European mode. The headsets and belt packs must also be AFH capable. AFH capable headsets and belt packs will have the letters 'AFH' labeled on the belt pack and headsets. AFH communicators will auto detect if the system is in AFH mode and adjust their operation accordingly.

Non-AFH Equipment

Headsets and belt packs that are not AFH capable must be operated with either a non-AFH base station or an AFH base station selected to operate in All, High or Low band mode. Headsets and belt packs that are not AFH capable will not have the letters 'AFH'.

AFH Model Chart

Model #	AFH Part #	Non AFH Part #	Comments
BP200	G29663-2B10	G26705-XXX	All BP200 Beltpacks with G26705-XXX part #'s are non AFH compatible.
BP210	G29663-4B30	G28703-XXX	All BP210 Beltpacks with G28703-XXX part #'s are non AFH compatible.
WH210		G28741-XXX	All WH210's are non AFH and will not work with Base in AFH mode.
WH200		G27593-XXX	All WH200's are non AFH and will not work with Base in AFH mode.
WH220	G29090-8D13		ALL WH220's are AFH compatible.
Part number is located on label under the battery on beltpacks and wireless headsets			

Interference Mitigation

Certain techniques can be used in an attempt to mitigate interference between different equipment in the 2.4 GHz spectrum. Some of these are:

- **Physical separation**. If possible, equipment operating in the 2.4 GHz spectrum should be operating as far as physically possible from the HME base station. A Wi-Fi access point or router is a common piece of equipment that could interfere with the DX100 system, or vice versa. These two pieces of equipment in particular should not be located close together.

- **Spectral separation**. Most Wi-Fi access points allow the administrator to set the channel and bandwidth that system operates on. Some systems employ an 'auto' mode, in which the Wi-Fi access point will automatically selected the channel. With Wi-Fi access points, it is sometimes advantageous to manually select a channel number to keep the Wi-Fi transmission at a fixed location.

NOTE: If the Clear-Com system does not have AFH, then the base station should be set to operate in the region of the 2.4 GHz band where the Wi-Fi access point is not operating. For example, if the Wi-Fi access point is set to Wi-Fi channel 1, the base station should be set to operate in the 'High' band. If the Wi-Fi access point is set to channel 11, the base should be set to operate in the 'Low'.

- **Spectral efficiency**. Wi-Fi systems employ a standard sometimes referred to as 802.11. The number "11" is simply the number given to the standard by the Institute of Electrical and Electronics Engineers (the IEEE). Modern Wi-Fi routers will allow operation employing the 802.11n mode. This mode will allow higher data rates, but it also may consume twice the number of radio channels. If the Wi-Fi router is set to 802.11n mode, it is best to limit Wi-Fi bandwidth to 20 MHz.

- **Alternate band selection**. While most Wi-Fi systems operate at 2.4 GHz, which is the same band as the DX100 system. Most allow operation at 5 GHz. If possible, move any Wi-Fi access points and equipment to 5 GHz. This of course requires all Wi-Fi equipment to be 5 GHz capable, and most older equipment may only allow 2.4 GHz operation. Selection of 5 GHz may also not be desirable if the Wi-Fi network is for customer access.

Non-Overlapping Channels for 2.4 GHz WLAN

802.11 channel width 22 MHz

2.4 GHz   2.483 GHz

Channel 1
2412 MHz

Channel 6
2437 MHz

Channel 11
2462 MHz

802.11 40 MHz ch. width

2.4 GHz   2.483 GHz

Channel 3
2422 MHz

Channel 11
2462 MHz
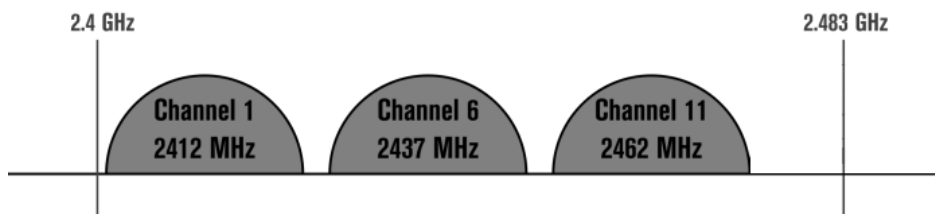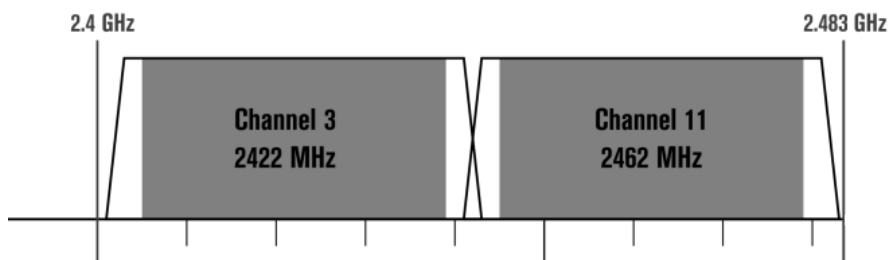
SECTION 5.   TROUBLESHOOTING

If you are unable to correct any of the problems described below, contact your dealer for assistance.

- ## Red light on base station does not come on.

  Be certain power cords are properly connected to base station, power supply and electrical outlet.

  If battery operated, be certain six AA batteries are inserted in the indicated positions in the battery sled, and the sled is installed in the base station. See pages 7-8.

- ## Beltpac power lights do not turn green and "out of range" is heard in the headset.

  Be certain your base station power is on. Turn the Beltpac/Headset and base station power on and off.

  You may be too far from the base station. The range varies with each location's layout.

  If you have more than one base station, be sure the Beltpac/Headset is registered to the base station it is being used with. If you are not sure, re-register it.

- ## When trying to register, it keeps saying registration failed.

  Check to be sure that the REGISTRATION STATUS display only goes blank, and does not show a registration number. Follow the instructions on clearing the registrations as found on page 13 or 15, and repeat the registration procedure.

- ## Others cannot hear me when I talk.

  Be certain you are pressing the **IC** or **ISO** button on the Beltpac/Headset, or the microphone gain adjust is turned up to the required level. If you are using a Beltpac, be certain the headset is securely connected to the Beltpac unit. See pages 18-21.

2400MHz cordless telephone interference —
If there is a 2400MHz cordless telephone nearby, interference may occur. However, because the DX100 is a frequency-hopping system, this problem is unlikely. If it does occur, changing frequencies on the telephone may alleviate the problem. If not, move the phone as far as practical from the base station, or use another type phone.

In the event of an electrical power outage —
such as from a lightning storm or power generator failure, if you experience problems with your HME equipment after the electricity comes on again, unplug the AC power supplies from their electrical outlets, remove any batteries and wait 15 seconds, then plug them back in.

SECTION 6.   TECHNICAL DATA

EQUIPMENT SPECIFICATIONS

Base Station

GENERAL

Frequency Range:............................All, 2400 to 2483.5 MHz
Low, 2401.92 to 2439.94 MHz
High, 2443.39 to 2481.41 MHz
Frequency Response: ....200 Hz to 3.5 kHz
Power Requirements: ....100-240VAC, 50-60Hz or 12-14VDC
Temperature Range:........................32-122°F (0-50°C)
Size:..10.2" x 6.45" x 3.33" (1-RU) (25.91 x 16.38 x 8.46 cm)
Weight:..2.35 lbs. (1.07 kg) maximum
# of Beltpacs per Base:...................15 can be registered
Any 4 can have simultaneous full-duplex communication at one time.
Others would be listen-only until a channel becomes available.
Front Panel Controls: ....Power, Register Beltpac, Reset, Unlatch and Clear/Band buttons
Front Panel Indicators: ....Registration Status display, Power and Receive LEDs
Antenna Type:................................External ½ -wave dipole (R-TNC connector)
RX/TX horizontal/vertical diversity
System Distortion:...........................<2%
Communication Security:................64-bit encryption dual-slot diversity
Splash Resistant: ....IEC529 IP Code 4 (under battery operation only)

TRANSMITTER

Type: ....Frequency hopping, spread spectrum
Transmit Power:..............................100mW burst
Modulation Type:...........................Gaussian filtered FSK, TDM
Frequency Stability: ....13 ppm
Harmonics/Spurious:.......................Exceeds FCC and ETSI specifications over temperature

RECEIVER

Type: ....Frequency hopping, spread spectrum
RF Sensitivity:................................<−90dBm w 10^{-3} BER
Frequency Stability: ....13 ppm
Distortion: ....<2%

Beltpac

    * Frequency Range:............................2400 MHz – 2483.5 MHz
     Antenna: ....Internal, horizontal/vertical diversity
     Frequency Response: ....200 Hz to 3.5 kHz
     Transmit Power:..............................100mW burst
     RF Sensitivity:................................<-90dBm w 10^{-3} BER
     Battery Requirements: ....3.6V lithium ion, rechargeable
     Battery Life: ....Hands-free – up to 14 hours, PTT – up to 20 hours
     Temperature Range: ....32-122°F (0-50°C)
     Weight:...7.4 oz (.21 kg) with battery and pouch
     Headset Connector: ....4-pin, mini-DIN
     Microphone: ....Electret
     Headset Output:..............................160mW into 32Ω
     Controls:...Power, Volume-up ▲, Volume-down ▼, IC, ISO
     Indicators:......................................Dual-color LED (red/green)

WH220 Headset

    * Frequency Range:............................2400 MHz – 2483.5 MHz
     Antenna: ....Internal
     Frequency Response: ....200 Hz to 3.5 kHz
     Transmit Power:..............................100mW burst
     RF Sensitivity:................................<-90dBm w 10^{-3} BER
     Battery Requirements:....................3.6V lithium ion, rechargeable
     Battery Life: ....Hands-free – up to 14 hours, PTT – up to 20 hours
     Temperature Range: ....32-122°F (0-50°C)
     Weight:...5.7 oz (.16 kg) with battery
     Microphone: ....Electret
     Headset Output:..............................160mW into 32Ω
     Controls:...Power, Volume-up ▲, Volume-down ▼, IC1, IC2, ISO
     Indicators:......................................Transmit LED (red/green), Power LED (red/green)

*NOTE: Communicators will follow the frequency range determined by the setting on the Base Station (e.g. All, Low or High).

GENERAL BATTERY SAFETY INSTRUCTIONS FOR BATTERY MODEL BAT41, BAT50, BAT60

BAT50 is specifically designed only for use with product(s) offered by:

HM Electronics Inc. (HME)

Clear-Com LLC, an HME Company

SAFETY PRECAUTIONS

To ensure the safety and reliability of your Battery, follow the guidelines in this section.

Using the Battery

⚠️ **WARNING!**
Do Not Abuse/Modify Battery Packs
Lithium-ion cells and battery packs may get hot, explode or ignite and cause serious injury if modified or abused.

Follow the safety instructions below:

- Do not place the battery in fire or heat the battery.
- Do not connect the battery backward, so the polarity is reversed.
- Do not connect the positive terminal and negative terminal of the battery to each other with any metal object (such as a wire).
- Do not carry or store the battery together with necklaces, hairpins or other metal objects.
- Do not pierce the battery with nails, strike the battery with a hammer, step on the battery or otherwise subject it to strong impacts to shocks.
- Do not solder directly onto the battery.
- Do not expose the battery to water or salt water, or allow the battery to get wet.
- Do not disassemble or modify the battery. The battery contains safety and protection devices which, if damaged, may cause the battery to generate heat, explode or ignite.
- The protection circuit module provided with battery packs is not to be used as a substitute for a shutoff switch.
- Do not place the battery in or near fire, on stoves or in other high temperature locations.
- Do not place the battery in direct sunlight, or use or store the battery in cars in hot weather. Doing so may cause the battery to generate heat, explode or ignite. Using the battery in this manner may also result in a loss of performance or shortened life expectancy.
- When the battery is worn out, insulate the terminals with adhesive tape or a similar non-conducting material before disposal.

- Immediately discontinue use of the battery if, while using, charging, or storing the battery, the battery emits an unusual smell, feels hot, changes color or shape or appears abnormal in any other way.
- Do not place the battery in microwave ovens, high-pressure containers or on induction cookware.

⚠️ **WARNING!**
In the event the battery leaks and the fluid gets into one's eye, do not rub the eye. Rinse well with water and immediately seek medical care. If left untreated, the battery fluid could cause damage to the eye.

⚠️ **WARNING!**
If the device causes abnormal current to flow, it may cause the battery to become hot, explode, or ignite causing serious injury.

Charger Types

Your battery must only be charged with a HME/Clear-Com recommended charger. Any attempt to use other types of chargers may cause an explosive reaction, fire or chemical burns. Do not assume that the physical form of another battery qualifies the charger for use with the HME/Clear-Com 104G041LF battery.

Charging the Battery

Be sure to follow the warnings listed below while charging the battery. Failure to do so may cause the battery to become hot, explode or ignite and cause serious injury.

- Do not continue charging the battery if it does not recharge as specified HME/Clear-Com User Guide, under charging instructions.
- Do not attach the battery to an external charger, power supply plug or directly to a car's cigarette lighter.

Recycling the Battery

If your business or household does not have a battery recycling program, go to the following URL or copy and paste the following URL into your browser, then enter your zip code for a list of recycling centers: http://earth911.com

Directives de sécurité générales pour les modèles de batterie suivants : BAT41, BAT50, BAT60

Les batteries BATXX sont spécialement conçues de manière à ne pouvoir être utilisées qu'avec les produits offerts par

HM Electronics Inc. (HME), Clear-Com LLC, une société HME

PRÉCAUTIONS
En vue d'assurer la sûreté et la fiabilité de votre batterie, respectez les directives indiquées dans cette section.

Utilisation de la batterie

⚠️ **ATTENTION !**
Ne pas faire un usage abusif des blocs-piles ni les modifier
Les cellules de lithium-ion et les blocs-piles peuvent devenir chauds, exploser ou prendre feu et ainsi causer des blessures graves si on en fait un usage abusif ou qu'on les modifie.

Respectez les directives de sécurité ci-dessous :
- Ne pas placer la batterie dans le feu ni la faire chauffer.
- Ne pas brancher la batterie à l'envers de manière à ce que la polarité soit inversée.
- Ne pas connecter la borne positive et la borne négative de la batterie l'une à l'autre avec un objet de métal (comme du fil de fer).
- Ne pas transporter ni entreposer la batterie avec des colliers, des épingles à cheveux et d'autres objets de métal.
- Ne pas percer la batterie avec des clous, la frapper avec un marteau, marcher dessus et la soumettre de quelque autre manière que ce soit à des impacts puissants.
- Ne pas faire de soudure directement sur la batterie.
- Ne pas exposer la batterie à l'eau ou à l'eau salée ni à une grande humidité, et ne pas la laisser être mouillé.
- Ne pas démonter ni modifier la batterie. La batterie contient des dispositifs de sécurité et de protection qui, en cas de dommages, pourraient l'amener à chauffer, à exploser ou à prendre feu.
- Ne pas utiliser le module de circuit de protection offert avec les blocs-piles en remplacement d'un contacteur d'isolement.
- Ne pas mettre la batterie dans ou à proximité du feu, sur des cuisinières ou dans d'autres endroits à température élevée.
- Ne pas placer la batterie directement au soleil ni l'utiliser ou l'entreposer dans des voitures par temps chaud. Ceci pourrait l'amener à chauffer, à exploser ou à prendre feu. D'utiliser la batterie de cette manière peut également la rendre moins performante et diminuer son espérance de vie.
- Quand la batterie est usée, isoler les bornes à l'aide de ruban adhésif ou d'un matériau non conducteur semblable avant de la jeter.
- Cesser immédiatement l'utilisation de la batterie si, en cours d'utilisation ou de chargement ou lorsqu'elle est entreposée, elle émet une odeur inhabituelle, dégage de la chaleur, change de couleur ou de forme ou semble anormale de quelque autre manière que ce soit.

- Ne pas mettre la batterie dans des fours à micro-ondes, des contenants à haute pression ou des ustensiles de cuisine à induction.
- Garder les batteries hors de la portée des enfants.
- Toujours débrancher la batterie avant de l'entreposer ou de la transporter.
- Toujours entreposer la batterie dans un contenant étanche à l'épreuve des flammes loi de toute matière inflammable ou corrosive.

⚠️ **ATTENTION !**
Si la batterie fuit et que le fluide entre en contact avec l'oeil de quelqu'un, ne pas frotter l'oeil. Bien rincer à l'eau et tout de suite demander des soins médicaux. Le fluide de la batterie risque de causer des dommages à l'oeil si celui-ci n'est pas traité.

⚠️ **ATTENTION !**
Si le dispositif cause la circulation d'un courant anormal, il se peut que la batterie chauffe, explose ou prenne feu et cause ainsi des blessures graves.

Types de chargeur
Votre batterie ne devrait être rechargée qu'à l'aide d'un chargeur recommandé par HME/Clear-Com. Toute tentative d'utiliser d'autres types de chargeurs risque d'entraîner une réaction explosive, un feu ou des brûlures chimiques. Ne pas présumer que la forme physique d'une autre batterie fait que le chargeur y correspondant peut être utilisé avec la batterie HME/Clear-Com.

Chargement de la batterie
S'assurer de suivre les avertissements indiqués ci-dessous au moment de charger la batterie. La batterie pourrait sinon chauffer, exploser ou prendre feu et ainsi causer des blessures graves.

- Ne pas continuer à charger la batterie si elle ne se recharge pas de la manière indiquée dans le guide de l'utilisateur HME/Clear-Com, dans la section des directives de chargement.
- Ne pas brancher la batterie à un chargeur externe, à une prise d'alimentation ou directement dans l'allume-cigare d'une voiture.
- Toujours procéder à l'inspection visuelle de la batterie avant ou après son chargement.
- Toujours laisser la batterie refroidir à une température ambiante sécuritaire avant de la charger au terme de son cycle de décharge précédent.
- Ne pas recharger la batterie sur ou à proximité de matériaux inflammables; ceci fera en sorte qu'en cas de mauvais fonctionnement, elle puisse être contenue en causant le moins de dommages et de blessures possible.

Recyclage de la batterie
Quand la batterie atteint la fin de sa vie utile, il devrait revenir à une entreprise de recyclage qualifiée ou à une entreprise de gestion des matériaux dangereux de s'en débarrasser. Ne pas mélanger cette batterie au courant de déchets solides.

Si votre entreprise ou votre foyer ne participe à aucun programme de recyclage des batteries, cliquez sur l'adresse URL suivante ou collez-la dans votre navigateur, puis entrez votre code postal en vue d'obtenir une liste de centres de recyclage : http://earth911.com

Instrucciones generales de seguridad para baterías para cada modelo de batería: BAT41, BAT50, BAT60

Las baterías BATXX están diseñadas específicamente para usarse solo con el(los) producto(s) que ofrezca:

HM Electronics Inc. (HME)

Clear-Com LLC, una compañía de HME

PRECAUCIONES DE SEGURIDAD

Para garantizar la seguridad y la fiabilidad de su batería, siga las directrices en esta sección.

Al usar la batería

¡ADVERTENCIA!
No dañe ni modifique los empaques de las baterías
Si las celdas de iones de litio y los empaques de las baterías se modifican o dañan, pueden recalentarse, explotar o incendiarse y causar heridas graves.

Siga las instrucciones de seguridad que se indican a continuación:

- No exponga la batería al fuego ni la caliente.
- No conecte la batería al revés, de modo que la polaridad estuviera invertida.
- No conecte la terminal positiva con la negativa usando objetos metálicos (como un alambre).
- No almacene ni lleve las baterías junto con collares, horquillas u otros objetos metálicos.
- No perfore con clavos, golpee con martillo ni pise la batería, ni la someta de manera alguna a golpes fuertes.
- No suelde directamente sobre la batería.
- No exponga la batería al agua, sea dulce o salada, ni a la humedad alta, ni permita que se humedezca o se moje la batería.
- No desarme ni modifique la batería. La batería contiene dispositivos de seguridad y de protección que, si se dañan, pueden causar que la batería genere calor, explote o se incendie.
- El módulo de circuito de protección incluido en los empaques de las baterías no debe usarse como sustituto de un interruptor de apagado.
- No exponga la batería al fuego ni cerca de este, en estufas ni en lugares de altas temperaturas.
- No exponga la batería bajo la luz solar directa ni use o almacene la batería en un carro en climas calientes. Hacer lo anterior, podría generar que la batería genere calor, explote o se incendie. Asimismo, usar la batería de esta manera podría resultar en una pérdida de rendimiento o disminución de la expectativa de vida útil del equipo.
- Cuando la batería se desgaste, aísle las terminales con cinta adhesiva u otro material similar que no sea conductor, antes de deshacerse de ella.
- Deje de utilizar inmediatamente la batería si, mientras la usa, carga o almacena, esta emite un olor inusual, se siente caliente, cambia de color o forma o parece anormal de cualquier otra manera.

- No coloque la batería en hornos microondas, contenedores de alta presión ni en materiales de cocina inducida.
- Mantenga las baterías fuera del alcance de los niños.
- Desconecte siempre la batería antes de almacenarla o transportarla.
- Almacénela siempre en contenedores estrictamente resistentes al fuego lejos de materiales inflamables o corrosivos.

¡ADVERTENCIA!
En caso de que la batería gotee y le entre el fluido en los ojos, no se los restriegue. Enjuague bien con agua y busque asistencia médica inmediatamente. Si no recibe tratamiento, el fluido de la batería podría causarle daño en sus ojos.

¡ADVERTENCIA!
Si el dispositivo causa que fluya corriente anormal, puede causar que la batería se caliente, explote o se incendie y cause heridas graves.

Tipos de cargador

Su batería debe cargarla únicamente con un cargador recomendado por HME/Clear-Com. Si intenta usar otro tipo de cargador, puede causar una reacción explosiva, incendio o quemaduras con sustancias químicas. No asuma que la forma física de otra batería permita que el cargador de esta pueda usarse con la batería de HME/Clear-Com.

Cargar la batería

Asegúrese de seguir las advertencias que se describen más abajo mientras carga su batería. Si no lo hace, puede causar que la batería se caliente, explote o se incendie y cause heridas graves.

- No siga cargando la batería, si no se recarga como se especifica en la guía para el usuario de HME/Clear-Com, según las instrucciones de carga.
- No conecte la batería a un cargador externo, conector de energía ni directamente al encendedor de cigarrillos de un carro.
- Inspeccione siempre visualmente su batería antes y después de cargarla.
- Deje siempre que su batería se enfríe hasta que esté en su temperatura ambiente segura antes de cargar, después de su ciclo anterior de descarga.
- No cargue las baterías sobre ningún tipo de material inflamable. Esto asegurará que, si hay una falla de funcionamiento, se pueda contener con la menor cantidad posible de daños y heridas.

Reciclar la batería

Cuando la batería llegue al fin de su vida útil, un reciclador calificado o una persona encargada de manipular materiales peligrosos deberían encargarse de desecharla. No mezcle esta batería con el flujo de residuos sólidos.

Si su negocio u hogar no tiene un programa de reciclaje de baterías, vaya a la siguiente dirección URL o pegue la siguiente dirección en su navegador y, luego, introduzca su código postal para obtener una lista de los centros de reciclaje:
http://earth911.com

배터리 모델의 일반적인 배터리 안전 지침: BAT41, BAT50, BAT60

BATXX 배터리는 다음 회사에서 제공하는 제품과 함께 사용하도록 특별히 설계되었습니다:

HM Electronics Inc. (HME), Clear-Com LLC, HME Company

안전 주의사항

배터리의 안전과 신뢰성을 보장하려면 이 섹션의 지침을 따르십시오.

배터리 사용

⚠️ **경고!**
배터리 팩을 개조하거나 과도하게 사용하지 마십시오.
리튬 이온 셀 및 배터리 팩을 개조하거나 과도하게 사용하면 뜨거워지거나 폭발하거나 발화되어 심각한 부상을 입을 수 있습니다.

아래의 안전 지침을 따르십시오:

- 배터리를 불 속에 넣거나 가열하지 마십시오.
- 배터리를 거꾸로 연결하지 마십시오. 그러면 극성이 바뀌게 됩니다.
- 배터리의 양극 단자와 음극 단자를 금속 물체(전선 등)로 서로 연결하지 마십시오.
- 배터리를 목걸이, 머리핀 또는 기타 금속 물체와 함께 휴대하거나 보관하지 마십시오.
- 배터리를 손톱으로 흠집을 내거나, 망치로 두드리거나, 밟거나 강한 충격을 가하지 마십시오.
- 배터리에 직접 납땜하지 마십시오.
- 배터리를 물이나 바닷물 또는 높은 습도에 노출시키거나 젖지 않도록 하십시오.
- 배터리를 분해하거나 개조하지 마십시오. 배터리에는 안전 장치와 보호 장치가 포함되어 있고, 손상될 경우 배터리가 뜨거워지거나 폭발하거나 발화할 수 있습니다.
- 배터리 팩과 함께 제공되는 보호 회로 모듈은 차단 스위치의 대체품으로 사용되어서는 안됩니다.
- 배터리를 화기 근처나 난로 위 또는 기타 고온이 발생하는 장소에 두지 마십시오.
- 배터리를 직사광선이 비치는 곳에 두거나 더운 날씨에 자동차 안에서 사용하거나 보관하지 마십시오. 그러면 배터리가 뜨거워지거나 폭발하거나 발화할 수 있습니다. 그러한 방식으로 배터리를 사용하면 성능이 저하되거나 예상 수명이 단축될 수 있습니다.
- 배터리를 다 쓴 후에 폐기하기 전에 단자를 접착 테이프 또는 이와 유사한 비전도성 재료로 절연 처리하십시오.
- 배터리를 사용, 충전하거나 보관하고 있는 동안, 배터리에서 이상한 냄새가 나거나 뜨거워지거나 색이나 모양이 변하거나 기타 비정상적인 상태를 보이면 즉시 사용을 중단하십시오.
- 전자레인지, 고압 용기 또는 인덕션 조리기구에 배터리를 넣지 마십시오.
- 배터리를 어린이의 손이 닿지 않는 곳에 두십시오.
- 배터리를 보관하거나 운반하기 전에 항상 분리하십시오.
- 항상 가연성 또는 부식성 물질이 없는 밀폐된 방염 용기 안에 배터리를 보관하십시오.

⚠️ **경고!**
배터리가 새어나와 액체가 눈에 들어가면 눈을 문지르지 마십시오. 물로 잘 씻은 다음 즉시 병원으로 가십시오. 치료하지 않고 그대로 두면 배터리 액체로 인해 눈이 손상될 수 있습니다.

⚠️ **경고!**
기기에 비정상적인 전류가 흐를 경우, 배터리가 뜨거워지거나 폭발하거나 발화되어 심각한 부상을 입을 수 있습니다.

충전기 유형

이 배터리는 HME/Clear-Com 권장 충전기로만 충전해야 합니다. 다른 유형의 충전기를 사용할 경우 폭발 위험이 있으며 화재나 화상을 입을 수 있습니다. HME/Clear-Com 배터리용 충전기를 다른 형태의 배터리에도 사용할 수 있다고 가정하지 마십시오.

배터리 충전

배터리를 충전하는 동안 아래 명시된 경고를 따르십시오. 그렇지 않으면 배터리가 뜨거워지거나 폭발하거나 발화되어 심각한 부상을 입을 수 있습니다.

- HME/Clear-Com 사용 설명서의 충전 지침에 나오는 대로 충전되지 않으면 배터리를 계속 충전하지 마십시오.
- 배터리를 외부 충전기, 전원 플러그 또는 자동차의 시가 라이터에 직접 연결하지 마십시오.
- 충전하기 전과 충전한 후에 항상 배터리를 육안으로 점검하십시오.
- 방전 사이클을 거친 후 배터리를 충전하기 전에 항상 안전한 주변 온도에 맞게 식히십시오.
- 가연성 물질이 있는 곳이나 근처에서 배터리를 충전하지 마십시오. 그러면 오작동이 발생할 경우 손상이나 부상 가능성을 최소화할 수 있습니다.

배터리 재활용

배터리의 수명이 다하면 유자격 재활용 업체나 위험 물질 취급업체를 통해 다 쓴 배터리를 폐기 처리해야 합니다. 이 배터리가 일반 쓰레기와 함께 섞이지 않도록 하십시오.

회사나 주거지에 배터리 재활용 프로그램이 없는 경우, 다음 URL로 이동하거나 브라우저에 URL을 복사하여 붙여넣고, 재활용 센터 목록의 우편번호를 입력하십시오: http://earth911.com