



Link Booster™

User Manual

U090.0.0

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FCC Statements

15.19 – Two Part Warning

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.

15.21 – Unauthorized Modification

NOTICE: The manufacturer is not responsible for any unauthorized modifications to this equipment made by the user. Such modifications could void the user's authority to operate the equipment.

15.105(b) – Note:

This equipment has been tested and found to comply with the limits for a 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, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Industry Canada Statement

This device complies with RSS-210 of Industry Canada.

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website <https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/radiation/safety-code-6-health-canada-radiofrequency-exposure-guidelines-environmental-workplace-health-health-canada.html>.

Le présent appareil est conforme à la norme CNR-210 d'Industrie Canada.

Le programme d'installation de cet équipement radio doit s'assurer que l'antenne est située ou fait telle qu'elle n'émet pas de champ RF dépassant les limites de Santé Canada pour la population générale ; consulter le Code de sécurité 6, disponible auprès de Santé Canada site Web <https://www.canada.ca/en/health-canada/services/environmental-workplace-health/reports-publications/radiation/safety-code-6-health-canada-radiofrequency-exposure-guidelines-environmental-workplace-health-health-canada.html>.

Industry Canada Statement

This device complies with Industry Canada licence-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.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

IC Unlicensed Devices EIRP Statements for Removable Antennas

Part 1: Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Partie 1 : Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

Part 2: This radio transmitter (LOBSRF-305) has been approved by Industry Canada to operate with the antenna type listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Partie 2 : Cet émetteur radio (LOBSRF-310) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

RoHS Compliance Statement

Cervis, Inc. complies with the requirements of **Restriction of Hazardous Substances (RoHS/WEEE) Specification** based on in-house practice and declaration of compliance from our vendors. For additional information concerning RoHS compliance, please contact Cervis, Inc. at:

CERVIS, Inc.

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Phone: 724.741.9000 • Fax: 724.741.9001



This product may contain material that may be hazardous to human health and the environment. In compliance with EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE):

- ✓ Do not dispose of the product as unsorted municipal waste.
- ✓ This product should be recycled in accordance with local regulations. Contact local authorities for detailed information.
- ✓ This product may be returnable to the distributor for recycling. Contact your distributor for details.

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Cervis, Inc. Safety Precautions

- ✓ ***Read and follow all instructions.***
- ✓ ***Failure to abide by Safety Precautions may cause equipment failure, loss of authority to operate the equipment, and personal injury.***
- ✓ ***Use and maintain proper wiring. Follow equipment manufacturer instructions. Improper, loose, and frayed wiring can cause system failure, equipment damage, and intermittent operation.***
- ✓ ***Changes or modifications made to equipment not expressly approved by the manufacturer will void the warranty.***
- ✓ ***Equipment owner/operators must abide by all applicable Federal, State, and Local laws concerning equipment installation and operation. Failure to comply could result in penalties and could void user authority to operate the equipment.***
- ✓ ***Make sure that the machinery and surrounding area is clear before operating. Do not activate the remote control system until you are certain that it is safe to do so.***
- ✓ ***Turn off the handheld remote and remove power from the base unit before attempting any maintenance. This will prevent accidental operation of the controlled machinery.***
- ✓ ***Remove power from the Base Unit either by detaching the 12-pin cables from the base unit connectors P1 and P2, or by removing the source power from the circuit.***
- ✓ ***Use a damp cloth to keep units clean. Remove mud, concrete, dirt, etc., after use to prevent obstructing or clogging the buttons, levers, wiring, and switches.***
- ✓ ***Do not allow liquid to enter the handheld or base unit enclosures. Do not use high-pressure equipment to clean the handheld remote or base unit.***
- ✓ ***Disconnect the radio base unit before welding on the machine. Failure to disconnect the base unit may cause destruction of or damage to the base unit.***
- ✓ ***Operate and store units only within the specified operation and storage temperatures defined in this document's specifications.***
- ✓ ***Do not key two-way radios while using the handheld remote.***

1.0 SmaRT Link Booster (SLB) Introduction

The SmaRT Link Booster (SLB) is a 900 MHz @ 10 mW or 2.4 GHz @ 100 mW line-of-sight communications booster designed to extend the communication range between a 900 MHz SmaRT remote control unit and a 900 MHz SmaRT base unit or a 2.4 GHz SmaRT remote control unit and a 2.4 GHz SmaRT base unit. The SmaRT Link Booster is particularly useful when the handheld remote and the base unit are not in line-of-sight of each other, in which case the SLB is positioned so that it is in line-of-sight of each unit—at the corner of a structure, for instance—where the structure would typically block communications between the handheld and the base unit.



Figure 1. SmaRT Communications Link Booster

The SLB comes with four magnets installed inside the back of the case that can be used to attach the unit to any ferrous surface. Two single-use or rechargeable “C” cell batteries power the SLB. The SLB allows users to select the type of battery preferred. The removable swivel antenna can be oriented as vertical, at a 45° angle, or at 90° allowing optimal signal strength.

1.1 SmaRT Link Booster Features

- Powered by two single-use or rechargeable “C” cell batteries

- Significantly extends the communications link between the handheld remote and the target base unit
- Able to communicate line-of-sight around obstacles with proper line-of-sight to devices' positioning
- Magnetic back allows the unit to be easily attached and removed from flat ferrous surfaces
- Optional steel back-plate adapter fits a standard camera style tripod/support device
- Light-emitting diode (LED) indicators for handheld and base unit TX (transmit) and RX (receive) indicate message transmit and receive activity
- Active channel menu page
- Handheld and base unit radio frequency (RF) signal strength menu pages
- Handheld and base unit serial number menu page
- Operates at 2 V_{min} to 4.5 V_{max}
- 900 MHz @ 10mW broadcast
- Health LED
- Eight-character LED display
- 2.4 GHz @ 100 mW broadcast
- Battery life (%) menu page

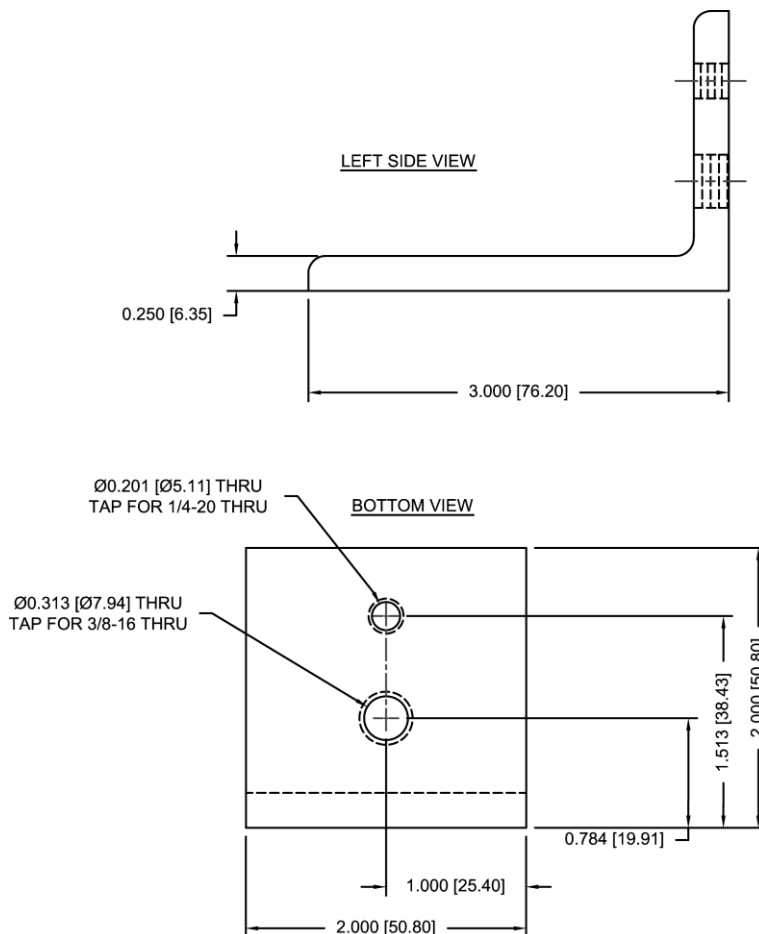


Figure 2. SmaRT Link Booster Tripod Bracket

2.0 Installing “C” Cell Batteries

Typically, two single-use or rechargeable “C” cell batteries power the SLB. Follow these steps to install the power source in the SLB.

1. Remove the battery cradle cover.
2. Insert two single-use or rechargeable “C” cell batteries into the cradle, negative end first.
3. Install the battery cradle cover by pushing against the positive end of the exposed battery with the cover while turning the cover clockwise until it is fully seated.

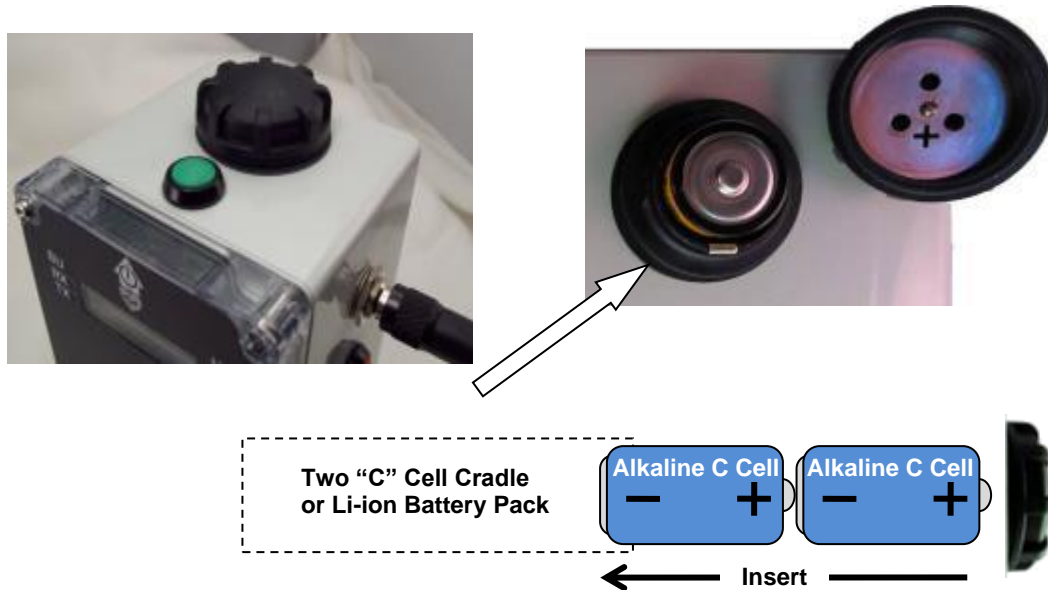


Figure 3. Installing the SLB Batteries

Caution!



Observe proper polarity when placing batteries into the cradle. Improper battery placement can cause excessive heat, battery explosion, operator injury, and damage to the unit.

3.0 Choosing the Battery

You must select an initial battery, due to the voltage differences between standard single-use and rechargeable batteries. Make this selection whenever you change to a different style battery – alkaline to Lithium Ion, or Lithium Ion to alkaline. Follow these steps to choose which battery is used.

1. Power down the SLB by holding Power button for three seconds. The display will be unlit.
2. Simultaneously press and hold the **UP** and **DOWN** buttons. Then, press and release the green power button. The display will read **BAT MENU**.
3. Simultaneously release Buttons 1 and 2. The display will read **↑=A ↓=LI**.
4. **Select ↑** to choose single-use (alkaline) batteries. Select **↓** to choose rechargeable (Lithium Ion) batteries.

The SLB immediately changes to the selected battery and will remain in service until shut down.

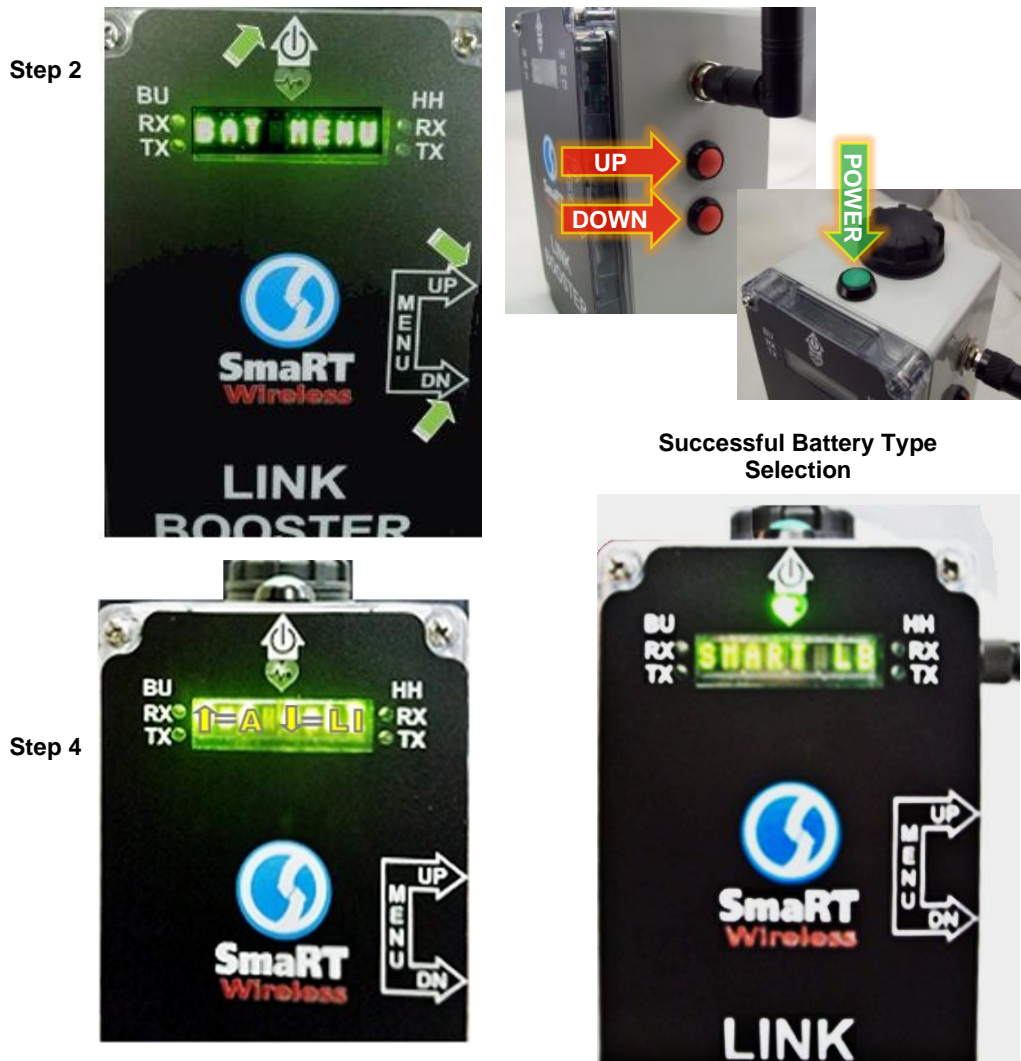


Figure 4. Choosing a Battery

4.0 SLB Indicators



Figure 5. SLB LED Indicators

4.1 Battery Strength

While under normal operation, you can see the battery strength (power left) in the Menu system as a percentage of 100, where “100%” indicates full charge.

To see the battery strength:

1. Enter the menu system by holding the **UP** and **DOWN** buttons for approximately three seconds, until “**MENU**” displays.
2. Cycle through the menu pages using the **UP** or **DOWN** buttons until the battery status page displays, as illustrated in Figure 6.
3. Exit the menu system by simultaneously pressing the **UP** and **DOWN** buttons when satisfied.



Figure 6. Battery Status

✓ **Note:** Observe all state, federal, and local disposal laws when disposing of used batteries.

4.2 Handheld and Base Unit Signal Strength Indications

While under normal operation, you can see handheld and base unit received signal strength indication (RSSI) values using the Menu system.

To view the values:

1. Hold the **UP** and **DOWN** buttons for approximately three seconds, until “**MENU**” displays.
2. Use the **UP** and **DOWN** buttons to cycle through the pages until **HH SS ##** or **BU SS ##** displays, as shown in Figure 7. Larger numbers indicate higher signal strength.
3. Exit the Menu system by simultaneously pressing the **UP** and **DOWN** buttons when satisfied.



Figure 7. Signal Strength Indication

4.3 Handheld and Base Unit Serial Number Indications

While in normal operation, you can display the handheld remote and base unit serial numbers using the SLB Menu system.

To view the serial number:

1. Hold the **UP** and **DOWN** buttons for approximately three seconds, until “**MENU**” displays.
2. Use the **UP** or **DOWN** button to cycle to the pages displaying a six-digit hexadecimal number, as shown in Figure 8.
 - a. Base unit serial number: Displayed number with leading 00####.
 - b. Handheld remote serial number: Displayed number with leading 80####.
3. Press both the **UP** and **DOWN** buttons to exit **MENU**.



Figure 8. SLB Handheld Serial Number

5.0 Using the SLB

5.1 SLB Power On

Turn on the SLB by pressing the green power button located on top of the unit, next to the battery tube cover. To conserve power, the unit shuts off the display when it is not in either scan mode or menu mode. A blinking health indicator indicates that the unit is, in fact, powered on. The TX and RX LEDs flash if the unit is paired with a HH and BU system.



Figure 9. SLB Power On

5.2 SLB Power Off

Turn off the SLB by pressing and holding the power button for three seconds. “PDOWN” displays, goes out, and displays again. When the user releases the power button, the unit powers down.



Figure 10. SLB Power Off

5.3 Establish SLB Communications Using Scan

The SLB must initially be set to scan for an associated handheld and base unit before it communicates with them. The SLB establishes the communication links once it scans and finds the system.

- If a handheld/base unit system is already associated (see your system manuals for details), immediately use the scan feature to establish communications with the system.
- If the handheld/base unit that are going to be used as a system are not associated, then use the Associate procedure detailed in the handheld remote manual or system manual before using SLB scan.

Scan to Establish Communications

The SLB must initially scan for the system before it can be used. For the following steps, assume that the handheld remote and base unit comprising the system are already associated.

Use the following instructions to scan for the system:

1. Turn on (power up) the handheld, base unit, and SLB with all devices in line of sight of and near the SLB.
2. Press and hold the SLB **UP** button for three seconds.
3. When the SLB display reads "**SCAN**," release the **UP** button, and wait while the unit scans each channel. It will scan until it finds a valid message.
4. When the unit finds a valid message, it displays the Base Unit ID. (The Base Unit ID is on the base unit's front label.)
 - a. If the ID is the one you want, press the **UP** button to use this unit pair. The SLB exits scan mode.
 - b. If the displayed ID isn't the unit you desire, press the **DOWN** button. The SLB continues to scan.

✓ **Note:** *With multiple SmaRT Systems running, it is possible that a scan will list more than one unit.*

5. When the Link Booster is finished scanning each channel, it displays "**DONE**". Press the **DOWN** button to exit scan mode.

If the SLB found an acceptable base unit ID, the SLB Handheld TX/RX and Base Unit TX/RX LEDs flash, indicating communications.

If the SLB did not find an acceptable base unit ID, the SLB Handheld and Base Unit LEDs remain unlit – unless a previously established existing pair is on.

Step 2



Step 3



Step 4

Figure 11. Using Scan to Establish the Link

6.0 Smart Link Booster Specifications

Table 1. Smart Link Booster Specifications

| Item | Description | |
|---|-----------------------|--|
| Power | V_{in} | +2 V to +4.5 VDC |
| | Batteries | Two "C" Cells – Single-use (2 V–3.3 V) or Rechargeable (3.3–4.5 V) |
| Environment | Operating Temp | –40° C to 70° C (–40° F to 158° F) |
| | Storage Temp | –40° C to 70° C (–40° F to 158° F) |
| | Humidity | 0 to 100% |
| Radio | RF | 906–924 MHz @10 mW 2.405–2.480 GHz @100 mW |
| | License | None required |
| | Modulation | Direct Sequence Spread Spectrum (DSSS) |
| | Antenna | External |
| Enclosure (Designed to IP67 Standards) | Dimensions | inch: 6 x 3 x 3¼ Antenna (inch): 8 ⁵ / ₁₆ mm: 152.4 x 76.2 x 82.55 (mm): 211.14 |
| | Weight | SLB with antenna 1.6 lbs. (0.723 kg) Tripod mounting plate 0.70 lbs. (0.32 kg) |
| | Durability | High-Impact Polymer case |
| | Magnets | Four |
| Indicators | LEDs | Five green total: Two Handheld TX, RX Two Base Unit TX, RX One Health Indication |
| Control Switches | Buttons | Three pushbuttons |
| Display | LED | Eight characters |



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