This device may not cause harmful interference and:

1. This device may not cause harmful interference and
2. This device must accept any interference received, including interference that may cause undesired operation.

Unauthorized Modifications

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.

Industry Canada Statement

This device complies with Industry Canada licence-exempt RSS-210.

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.


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 radionucléique 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-310) 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 le type d'antenne indiqué ci-dessous avec le gain maximal admissible et l'impédance d'antenne requise pour chaque type d'antenne indiqué. Il est strictement interdit d'utiliser avec cet appareil un type d'antenne ne figurant pas dans cette liste ou ayant un gain supérieure au gain maximum indiqué pour ce type.
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 transmitter control system until certain that it is safe to do so.
✓ Turn off the transmitter and remove power from the receiver before attempting any maintenance. This will prevent accidental operation of the controlled machinery.
✓ Remove power from the receiver by detaching the cable from the receiver or by removing the source power from the receiver.
✓ Use a damp cloth to keep units clean. Remove mud, concrete, dirt, etc. after use to prevent obstructing or clogging the buttons, levers, joysticks, wiring, and switches.
✓ Do not allow liquid to enter the transmitter or receiver enclosures. Do not use high-pressure equipment to clean the transmitter or receiver.
✓ Disconnect the receiver before welding on the machine. Failure to disconnect the receiver may cause destruction of or damage to the receiver.
✓ Operate and store units only within the specified operation and storage temperatures defined in this document's specifications.
✓ Keep high-energy radio frequency (RF) devices away from transmitters. Activating high-power communication radios—for instance—in close proximity to transmitters can cause interference and “false” circuit activation.
✓ Do not key two-way radios while using the console box transmitter.

✓ Note: Refer to the custom drawing package included with each shipment for specific details not included in this manual!
1.0 Warrior CB-9X Transmitter Introduction

The Warrior CB-9X Console Box transmitter primarily controls overhead bridge cranes. It offers up to seven single-axis bi-directional levers or up to three bi-directional joysticks for crane motions – as well as toggle switches, pushbuttons, rotary switches, and potentiometer options for auxiliary functions. Housed in an extremely durable, sealed glass-filled nylon enclosure, the Warrior CB-9X is ready for duty in harsh environments, including outdoor applications.

Warrior systems operate in the 900MHz FCC Part 15 License-Free radio band. It continuously monitors its bi-directional radio transmission – the receiver acknowledges each message the transmitter sends with a message of its own. Transmitter diagnostic LEDs indicate radio signal integrity, battery life, and A/B select feedback to the operator. You can pair the reliable, ergonomically designed Warrior CB-9X transmitter with all Cervis Warrior receivers, including the MU-6E.

1.1 Features

- Up to seven single-axis bi-directional levers, or up to three bi-directional joysticks
- Stepless or up to 5-step control from stepless levers
- Options for toggles, potentiometers, pushbuttons, and rotary switches for auxiliary functions
- 900MHz @ 100mW FCC Part 15 license-free operation
- Standard four system status/diagnostic LEDs
- Operates using two C-cell batteries
- An EAO stop button
- Key on and off (usually on the right side)
- Neck/shoulder harness standard; optional belt mounting available
- Optional 8-character LED display
- Unsurpassed durability and environmental sealing

1.2 Warrior CB-9X Custom Options

Controls and Switches

Warrior CBs offer a variety of controls and switch types that provide an extensive number of configuration and control options. These include:

- Multiple two- or three-position momentary or maintained toggle switches on the top deck, and up to three toggles on either side.
- A variety of design-dependent pushbuttons, potentiometers, and rotary switches.

Figure 1 illustrates several examples of Warrior CB-9X console boxes and switch/controls variations.

Branding/Labeling Option

Cervis, Inc. offers in-house design of attractive custom labels for engineered system CBs designed to your specifications. Custom labels—made of durable Lexan™ polycarbonate—can include client logos, specific function text, and specific foreground and background colors.
2.0 Warrior CB-9X Console Box Transmitters

![Warrior CB-9X Console Box Transmitters](image)

Figure 1. Warrior CB-9X Wireless Transmitter Examples

2.1 Warrior CB-9X Diagnostic/Status LEDs

Warrior CBs have four red standard diagnostic/status LEDs.

Table 1. Warrior CB-9X Transmitter LEDs

<table>
<thead>
<tr>
<th>LED</th>
<th>Icon</th>
<th>Function</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td><img src="image" alt="L1 Icon" /></td>
<td>Transmit (TX) and Receive (RX) indication</td>
<td>Flashes when message is sent or received</td>
</tr>
<tr>
<td>L2</td>
<td><img src="image" alt="L2 Icon" /></td>
<td>Battery Status indication</td>
<td>Low battery warning when on (&lt;2.2V)</td>
</tr>
<tr>
<td>L3</td>
<td><img src="image" alt="L3 Icon" /></td>
<td>A Selection</td>
<td>Lights when A selected</td>
</tr>
<tr>
<td>L4</td>
<td><img src="image" alt="L4 Icon" /></td>
<td>B Selection</td>
<td>Lights when B selected</td>
</tr>
</tbody>
</table>
### Table 2. Advanced LED Diagnostics

<table>
<thead>
<tr>
<th>LEDs</th>
<th>Indication</th>
<th>Diagnostic</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF</td>
<td>RF Solid</td>
<td>Transmitting, looking for receiver.</td>
</tr>
<tr>
<td></td>
<td>RF Blinking</td>
<td>Transmitting to and receiving from the mounted receiver.</td>
</tr>
<tr>
<td></td>
<td>RF/A ↔ Bat/B</td>
<td>M-Stop Check: Cycle M-Stop, Blinks back-and-forth.</td>
</tr>
<tr>
<td></td>
<td>RF/Bat ↔ A/B</td>
<td>Stuck switch: Check switches/proportional not neutral.</td>
</tr>
<tr>
<td></td>
<td>RF → Bat → A → B → RF → Bat</td>
<td>Scrolling: Tilt Mode active.</td>
</tr>
<tr>
<td></td>
<td>B → A → Bat → RF → B</td>
<td>Scrolling: Signifies Maintenance Mode</td>
</tr>
<tr>
<td>Bat</td>
<td>Blinking</td>
<td>Batteries low, replace with fresh batteries soon.</td>
</tr>
<tr>
<td></td>
<td>RF/BAT/A/B</td>
<td>Shutting Off: Unit is shutting down: Inactivity timeout, M-Stop engaged, Keyswitch moved to OFF, Unit wake-up without switch S12</td>
</tr>
</tbody>
</table>
### LEDs | Indication | Diagnostic
--- | --- | ---
Select | BAT LED | Shuting Off: Batteries below operating level; unit shutting down; replace batteries with fresh set.

#### 2.2 Warrior CB-9X Battery Installation and Replacement

The Warrior console box transmitter operates between 2.0VDC to 3.2VDC powered by two 1.5V type "C" cell batteries (included when shipped). Nominal battery life expectancy is approximately 70 to 100 hours of operation\(^1\) before it becomes necessary to replace the batteries.

---

**Battery Replacement Process**

1. Remove the battery cover by unscrewing it in the counter-clockwise direction.
2. Remove the discharged batteries and properly dispose according to local regulations.
3. Place the two "C" cell batteries in the terminal cavity, observing proper polarity with the negative side inserted first and each positive battery terminal facing toward the cap. The + polarity marking is cut in the interior of the cap as illustrated in Figure 2.

---

\(^1\) At room temperature. Not only does usage affect battery life, but so does operating or storing the battery in too-high or too-low ambient temperatures. For instance, the longer batteries are exposed to extreme cold or hot temperatures, the more likely battery life will be negatively affected. Factors such as the age and initial quality of a battery also may come into play.
Replace the battery cover by threading it clockwise onto the cavity. You will feel tension as you tighten the cap. Hand-tighten the cap to compress the compartment O-ring seal embedded in the cap.

**Note:** Change batteries soon after the first low battery warning to ensure continued reliable operation. Cervis, Inc. recommends keeping fresh spare batteries on hand at all times that the system is in use. The console box transmitter senses when the voltage is at the low power threshold—approximately 2.2V—at which time, the red battery LED periodically flashes, warning the operator to change the batteries soon. The warning flashes while the unit is in use either until you replace the batteries or until the voltage drops below 2.0V, after which the unit automatically powers down (auto-shutdown). The unit will not power up and operate until you replace the depleted batteries. Cervis, Inc. recommends replacing them with two fresh batteries.

### 2.3 Neck/Shoulder Harness

The 1¾” wide neck/shoulder harness lets you conveniently and comfortably strap the CB-9X around your neck or shoulder for easy access and operation. Adjustable to lengths up to 60 inches (~1.5m), the harness conforms to most body lengths; and its rugged, heavy-duty construction and quick-release fasteners keep a single CB-9X securely against your body. Plus, its polypropylene webbing resists wear, and its bright orange color gives it high visibility against even the lightest colored garments.

#### 2.3.1 Adjusting the Harness

Before you attach the harness to your CB-9X, adjust the blue strap to the most comfortable operating length for your individual body type.
The harness’ left strap features a 6” (152mm) long quick release hook-and-loop Nylon rip cord.

Connect the two parts of the rip cord together, and press down to secure the connection.

2.3.2 Attaching the Harness to the CB-9X

Both ends of the high-visibility orange straps feature a pair of heavy-duty metal button snaps at the ends.
To attach the harness to your CB-9X, locate either the two T-shaped harness clips on the front of your CB—one is on the left side; the other is on the right—or the orange bar across the top of it.

Thread the high visibility orange straps through the harness mounts or bar—snap side up—past the first two (female) snaps.
Fold the strap over onto itself, and fasten the female snaps to their male counterparts.

✓ **Note:** You'll know the snaps are secured when you hear a clicking sound.
When you have the harness securely together, hang it around your neck—or drape it over your shoulder—and begin operating your CB-9X.
2.4 Turn CB-9X Transmitter On

Turn the console box transmitter on and make it ready for use as follows (Figure 3):

**Figure 3. Turn CB-9X Transmitter On**

1. Move the Keyswitch (S18) 90° to the ON position.
2. Press the Horn/Start pushbutton (S12) to wake the transmitter.
3. Release the STOP button by twisting it clockwise until it pops up (spring-loaded).

**Note:** If the Stop button is already up when beginning, depress it, then raise it.

4. Press the Horn/Start pushbutton (S12) to energize the main line contactor (MLC) relays.
2.5 Turn CB-9X Transmitter Off

Shut down the console box transmitter via any of the following methods:

- Push the STOP button down for immediate stop.
- Do not activate any switch and wait for the console box Switch Inactivity Timeout to expire (standard is four minutes).
- Turn the keyswitch (S18) to the OFF position.

2.6 Associate CB-9X with the System Receiver

The CB-9X system transmitter must be associated (communications link established) with a system receiver before the system can be used. The CB-9X stores the target receiver ID following successful association with a chosen receiver. Systems are associated at Cervis, Inc. before leaving the factory; but there may be times when it is necessary to associate while in the field.

Use the associate process described in the following steps to associate a receiver with the CB-9X transmitter when needed.

Associate with Receiver (Figure 4)

1. With the Console Box OFF, turn the keyswitch (S18) to the ON position.
2. Press the Horn/Start pushbutton (switch S12) to wake the transmitter.
3. Within 2 seconds after pushing the pushbutton, cycle the STOP Switch (transition from OFF to ON).
4. The B LED lights for about 1.5 seconds after cycling the STOP Switch. While this LED is active (ON), enter Maintenance Mode by simultaneously moving switches S13 and S14 DOWN for approximately one second.

 ✓ Note: Restart the process if you wait too long to perform this operation.

The LEDs cycle from bottom to top, indicating that the console box is in Maintenance Mode.

5. Simultaneously lift and hold switches S13 and S14 UP for five seconds to enter Association Mode. Release both switches when LED A starts to blink.

6. While in Association Mode, the B and RF LEDs light solid, indicating that the console box is attempting to locate any available receivers it can Link to.
7. The A and RF LEDs light solid when the console box has completed its search for available receivers. You can now pick which receiver to link to.

8. A found receiver starts to pulse its **Associate Relay**. (Wire this relay to an external indicating device—such as a light or horn—when installing). This alerts you that the indicated receiver is ready for association. Momentarily lift switch S13 (NEXT) **UP** to bypass the indicated receiver. To select that receiver, momentarily lift switch S14 (SELECT) **UP**.

9. Press the Horn/Start pushbutton (switch S12) again to pull in the MLC relays. Once a receiver is selected and the MLC relays are energized, the CB-9X is now linked to that receiver, and you can run the crane.

**Notes:**

- Each new system’s transmitters are factory associated before being shipped.
- If you purchase a spare transmitter, you will need to associate it yourself before it will work with that system.
- Each transmitter must be associated one time. Once associated with a receiver, that transmitter will work with that receiver until you clear the receiver ID. (See Section 2.7.) The transmitter works in a first-come/first-serve basis, where only one transmitter unit can ever be paired to a receiver unit at a time.
Figure 4: Associate Console Box with Receiver
2.7 Clearing CB-9X Stored Receiver ID (Factory Reset)

The CB-9X transmitter stores the associated receiver ID. It may become necessary during instances of severe interference—or perhaps when troubleshooting—to break the established communications link between the console box transmitter and the system receiver. This is called “clearing the ID” or “Factory Reset.” Use the following steps to clear the ID.

Clear the Stored Receiver ID (Factory Reset)

1. With the console box OFF, turn the keyswitch S18 to the ON position.
2. Momentarily press the Horn/Start pushbutton (S12) to wake the transmitter.
   
   ✔️ Note: Perform the next step within two seconds. Otherwise, you must restart the process.

3. Cycle (transition from OFF to ON) the Stop Switch.
4. LED B will illuminate for about 1.5 seconds after cycling the stop switch. While this LED is on, enter Maintenance Mode by simultaneously moving and holding switches S13 and S14 down until the LEDs cycle from bottom to top, indicating that the CB is in maintenance mode.

5. While in maintenance mode, simultaneously hold switches S13 and S14 Down. Press the Stop Switch while holding the switches down.

✔️ Notes:

- When a transmitter is not associated with a receiver, the transmitter lights all the LEDs and then powers down shortly after being turned on.
- The receiver does not need to be on when clearing an ID from the transmitter.
Figure 5. Clearing the ID (Factory Reset)
## 3.0 Warrior CB-9X Console Box Specifications

### Table 3. Warrior CB-9X Console Box Specifications

<table>
<thead>
<tr>
<th>Power</th>
<th>+2.0 to +3.2VDC</th>
<th>Two &quot;C&quot; 1.5V Alkaline Batteries</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Radio</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>904–926MHz @ 100mW</td>
<td></td>
</tr>
<tr>
<td>License</td>
<td>License-Free</td>
<td></td>
</tr>
<tr>
<td>Modulation</td>
<td>Channel Hopping (Direct Sequence Spread Spectrum)</td>
<td></td>
</tr>
<tr>
<td>Antenna</td>
<td>Internal</td>
<td></td>
</tr>
<tr>
<td>Inactivity Timeout</td>
<td>Standard four minutes (adjustable)</td>
<td></td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating Temp</td>
<td>-4°F to 131°F (-20°C to 55°C)</td>
<td></td>
</tr>
<tr>
<td>Storage Temp</td>
<td>-40°F to 185°F (-20°C to 85°C)</td>
<td></td>
</tr>
<tr>
<td>Humidity</td>
<td>0 to 95% Non-Condensing</td>
<td></td>
</tr>
<tr>
<td><strong>Indicators (4)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TX/RX</td>
<td>Flashes when a message is transmitted or received</td>
<td></td>
</tr>
<tr>
<td>Slow Blinks</td>
<td>Slow Blinks – below 2.2V warning (approaching discharge; replace batteries)</td>
<td></td>
</tr>
<tr>
<td>Lit when A is selected</td>
<td>Lit when A is selected</td>
<td></td>
</tr>
<tr>
<td>Lit when B is selected</td>
<td>Lit when B is selected</td>
<td></td>
</tr>
<tr>
<td><strong>Enclosure</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions</td>
<td>10.4&quot; x 5.6&quot; x 5.5&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(263.5mm x 141.5mm x 139mm)</td>
<td></td>
</tr>
<tr>
<td>Durability</td>
<td>Glass-filled nylon</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aluminum faceplate</td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>3.95 lbs. (1.8kg)</td>
<td></td>
</tr>
<tr>
<td><strong>Function Controls</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joysticks</td>
<td>Two or three single-axis; model dependent</td>
<td></td>
</tr>
<tr>
<td>Levers</td>
<td>Up to seven single-axis (Y+, Y-)</td>
<td></td>
</tr>
<tr>
<td>Toggles</td>
<td>Two- or three-position maintained or momentary; model dependent</td>
<td></td>
</tr>
<tr>
<td>Pushbuttons</td>
<td>Two (options available)</td>
<td></td>
</tr>
<tr>
<td>Stop</td>
<td>Two-position EAO</td>
<td></td>
</tr>
</tbody>
</table>
Appendix A: Exposure to Radio Frequency Energy

Warrior transmitter units contain radio transceivers. When active, a transmitter sends out radio frequency (RF) energy through its internal antenna. The Warrior transmitter complies with limits set by the United States Federal Communications Commission (FCC) for operating distance from human tissue.

Appendix B: RF Exposure Considerations

The radio module may be used in a variety of host applications that fall into two general categories:

1. **Mobile applications**: Those where any operating locations are not on a human body. In mobile applications, the host application is typically fixed to mobile equipment, with either an internal or an external antenna.

2. **Portable applications**: Those where the transmitting equipment is located on the hand, arm, or other part of the human body. In portable applications, the equipment is typically held in the hand of an operator or affixed to the torso on either a belt or harness.

Equipment containing the radio module was evaluated for RF exposure hazards by two approaches:

1. **Maximum Permissible Exposure** (MPE) for mobile applications.

2. **Specific Absorption Rate** (SAR) for portable applications.

Required separation distances are measured from the actual location of the radiated part of the antenna. An antenna may be inside the host application, affixed to the enclosure of the host application, or at the end of an optional extension coaxial cable.

**Mobile Applications**

Equipment must be located at least 20cm away from areas likely to be occupied by an unaware person.

**Handheld Applications**

All operators of handheld equipment with any type of antenna require proper equipment operation training, and such training must include RF exposure safety instructions. Once training is completed, they are considered “aware persons.”

If the portable operating pose is on the hand or arm, a 5mm separation is required between the radiating part of the antenna and nearby human tissue.

**Required Training**

All installers and operators of host applications that include an SRF310 radio transceiver module must be trained to use proper RF safety precautions.
Appendix C: Agency Identification Label Location

✓ Note: The Agency ID label for all console boxes is located in the positions shown.

Figure 6. Agency Identification Label Locations
## Appendix D: CB-9X Product Family Common Features

### Table 4. CB-9X Product Family Common Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>Two Type C-Cell Batteries</td>
</tr>
<tr>
<td>Dedicated Stop Switch</td>
<td>Oversized, Spring-Loaded 2-Position (EAO)</td>
</tr>
<tr>
<td>Activation</td>
<td>Move Keyswitch (S18) 90°.</td>
</tr>
<tr>
<td></td>
<td>Press switch S12 to sound Horn/Start.</td>
</tr>
<tr>
<td></td>
<td>Twist spring-loaded Stop Button clockwise to pop up.</td>
</tr>
<tr>
<td></td>
<td>Press switch S12 until LEDs activate.</td>
</tr>
<tr>
<td>Discrete Inputs Type</td>
<td>Momentary or Maintained Two- or Three-Position Toggles.</td>
</tr>
<tr>
<td></td>
<td>Pushbutton or Potentiometer</td>
</tr>
<tr>
<td>Attachment</td>
<td>Molded Belt Attachments Or Harness Brackets/Bar</td>
</tr>
<tr>
<td>Diagnostic Indicators</td>
<td>Four Red LEDs</td>
</tr>
</tbody>
</table>