



*Warrior*  
**HH2S-9XL10**  
**Handheld Remote Manual**

**U101.1.0**



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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 Canadian 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 [www.hc-sc.gc.ca/rpb](http://www.hc-sc.gc.ca/rpb).

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.

#### 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.**

*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.**

*Le présent émetteur radio (LOBSRF-305) 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.*

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**Cervis Inc. Safety Precautions**

- ✓ ***Read and follow all instructions.***
- ✓ ***Failure to abide by Safety Precautions may result in 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.***
- ✓ ***Owner/operators of the equipment must abide by all applicable Federal, State, and Local laws concerning installation and operation of the equipment. 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 certain that it is safe to do so.***
- ✓ ***Turn off the handheld remote remove and power from the receiver before attempting any maintenance. This will prevent accidental operation of the controlled machinery.***
- ✓ ***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 receiver enclosures. Do not use high pressure equipment to clean the handheld remote or receiver.***
- ✓ ***Disconnect the receiver before welding on the machine. Failure to disconnect the receiver may result in destruction of or damage to the receiver.***
- ✓ ***Operate and store units only within the specified operation and storage temperatures defined in the specifications of this document.***
- ✓ ***Keep high-energy RF devices away from handheld remotes. Activation of high-power communication radios, for instance, in close proximity to handheld remotes can result in interference and “false” circuit activation.***
- ✓ ***Do not key 2-way radios while using the handheld remote.***

## Warning: Operator Control Check

Figure 1 is intended to be used by an operator prior to operating the crane as a checklist for safe operation. The tag can be removed from this manual and attached to the transmitter or kept in a toolbox for operator convenience.

This tag can be ordered in an industrial tear-resistant material by contacting:

Cervis, Inc. (724) 741-9000 — (P/N: L159.0.0 15100450-0-0)



<div style="background-color: black; color: yellow; text-align: center; padding: 10px;">  <h1 style="margin: 0;">WARNING</h1> </div> <p><b>OPERATOR CONTROL CHECK</b></p> <ul style="list-style-type: none"> <li>✓ Check radio system battery indicator. Replace/ recharge if low.</li> <li>✓ After startup, use horn device ONLY (no motion) to assure radio control is linked with the desired device.</li> <li>✓ Test machine warning devices before operating machine.</li> <li>✓ Make sure radio control moves functions in indicated directions.</li> <li>✓ Cycle radio stop button to confirm all functions stop when pressed.</li> <li>✓ Check all radio control switches for damaged. Repair if broken.</li> </ul> <p><b>DO</b></p> <ul style="list-style-type: none"> <li>• Read the supplied radio control manual before operation.</li> </ul> <div style="display: flex; justify-content: space-around; margin: 20px 0;"> <div style="border: 1px solid red; border-radius: 50%; width: 40px; height: 40px;"></div> <div style="border: 1px solid red; border-radius: 50%; width: 40px; height: 40px;"></div> </div> <div style="display: flex; justify-content: space-around; margin: 20px 0;"> <div style="border: 1px solid red; border-radius: 50%; width: 40px; height: 40px;"></div> <div style="border: 1px solid red; border-radius: 50%; width: 40px; height: 40px;"></div> </div> <ul style="list-style-type: none"> <li>• Have trained and authorized radio control operators using the system.</li> <li>• Have training and knowledge of safety rules for radio controlled equipment.</li> <li>• Have training and knowledge of safe and proper operation of the equipment with radio controls.</li> <li>• Know how to properly test the radio control equipment before each use.</li> <li>• Have training and knowledge of radio controlled equipment warning light, sounds and alarms.</li> <li>• Continuously watch and monitor machine and radio control status of lifted loads.</li> <li>• Know how to keep the operator and other people clear of hazardous situation.</li> <li>• Know and follow cable and hook inspection procedures.</li> </ul> <p><b>DO NOT</b></p> <ul style="list-style-type: none"> <li>• try to repair any part of the radio controlled equipment unless authorized.</li> </ul>	<p><b>DO NOT</b></p> <ul style="list-style-type: none"> <li>• operate any equipment with a damaged radio controller; the control may be unsafe.</li> <li>• operate if direction of hook does not agree with that indicated on the radio transmitter.</li> <li>• change any setting or controls without authorization.</li> <li>• remove or obscure any warning or safety labels like this one.</li> <li>• leave power on the radio controlled equipment when not in use.</li> <li>• use the crane, hoist, or lifting device to lift, support, or transport people.</li> <li>• lift or carry loads over any people.</li> <li>• lift or move more than the rated load.</li> <li>• leave any load unattended while lifted.</li> <li>• operate the crane, hoist, or lifting device unless all persons including the operator remain clear of the supported load, pinch points, and any other potential dangers.</li> </ul> <div style="display: flex; justify-content: space-around; margin: 20px 0;"> <div style="border: 1px dashed red; border-radius: 50%; width: 40px; height: 40px;"></div> <div style="border: 1px dashed red; border-radius: 50%; width: 40px; height: 40px;"></div> </div> <div style="display: flex; justify-content: space-around; margin: 20px 0;"> <div style="border: 1px dashed red; border-radius: 50%; width: 40px; height: 40px;"></div> <div style="border: 1px dashed red; border-radius: 50%; width: 40px; height: 40px;"></div> </div> <ul style="list-style-type: none"> <li>• operate radio control equipment when low battery indicators are on.</li> <li>• operate a crane, hoist, or lifting device when the device is not centered over the load.</li> <li>• operate a crane, hoist, or lifting device if the chain or wire rope is not seated properly in the sprocket, drum, or sheave.</li> <li>• operate a crane, hoist or lifting device if the chain or wire rope is kinked, snagged, or attached to items not pertained to the lift; correct any issues before continuing with the lift.</li> <li>• operate any damaged or malfunctioning equipment.</li> </ul> <div style="text-align: center; margin-top: 20px;">  <p><b>CERVIS INC.</b></p> <p>170 Thorn Hill Road • Warrendale, PA 15086  P: 724 • 741 • 9000 F: 724 • 741 • 9001  <a href="http://www.cervisinc.com">www.cervisinc.com</a></p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>CRANE ID: _____</p> </div>
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Figure 1. Warning: Operator Control Check Label

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## 1.0 Warrior Handheld Remote (HH2S-9XL10)

The HH2S-9XL10 handheld is a small, compact handheld remote control that interfaces with Warrior 32 MU-9X15 receiver. The HH2S-9XL10 is made up of ten two step actuators. The HH2S-9XL10 utilizes two AAA batteries for power. The HH2S-9XL10 enclosure is constructed of rugged polycarbonate designed to meet an ingress protection rating of IP55 according to IEC 60529. The unit has four diagnostic LEDs that indicate wireless link, Battery, A and B selection.

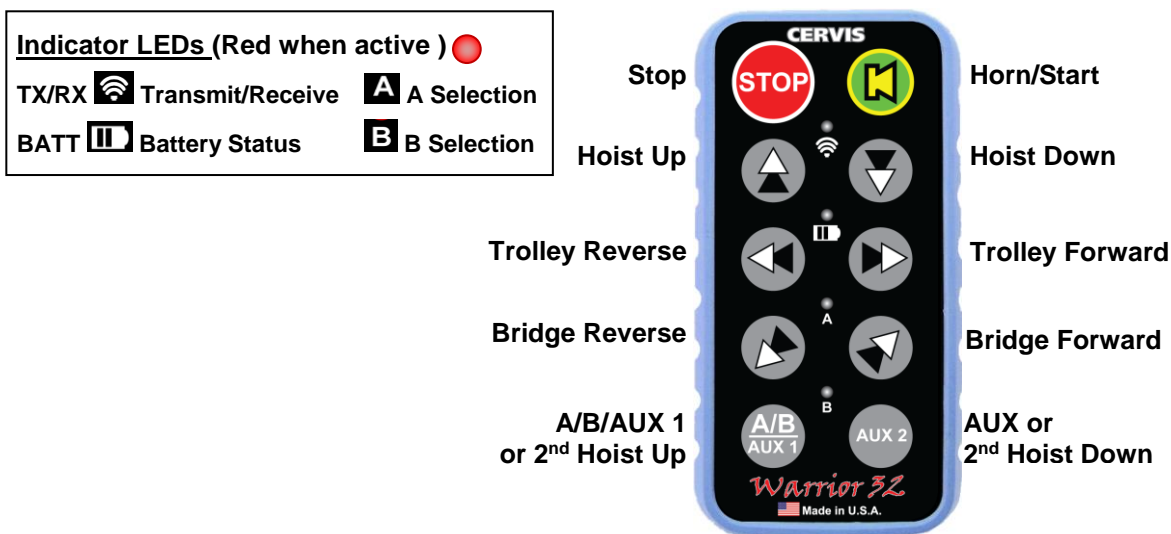


Figure 2. HH2S-9XL10 LED and Button Descriptions

✓ **Note:** The HH2S-9XL10 handheld remote button functions are configured by manipulating the receiver DIP Switch SW01 mode settings. Please refer to the manual for the receiver being used or specific project documentation for details on relay operation.



Figure 3. Warrior HH2S-9XL10 Transmitter Warnings and Precautions

Figure 3 is the label that is permanently attached to the battery compartment cover. This label describes warnings and precautions that are to be followed when using the transmitter



## 1.1 HH2S-9XL10 Battery Installation

HH2S-9XL10 handheld units are powered by two AAA alkaline batteries. When installing batteries, be sure to observe proper polarity as marked on the inside of the compartment to avoid damaging the unit. To replace or install batteries in the handheld:

1. Loosen the four small Phillips screws from the Battery Compartment cover and lift the cover from the handheld. The screws remain attached to the cover.
2. If installing batteries in an empty battery compartment, install two fresh size AAA alkaline batteries. Be sure to position the batteries as shown in Figure 4.
3. If replacing expired batteries, remove the old batteries and install two fresh size AAA batteries. (Discard the used batteries in accordance to local regulations.) Be sure to position the batteries as shown in Figure 4.
4. Replace the compartment cover and tighten the four Phillips screws. These screws should not be over-tightened, but they should be tight enough to ensure the gasket provides a proper seal.

✓ **Note:** Discard expired batteries in accordance with local regulations.

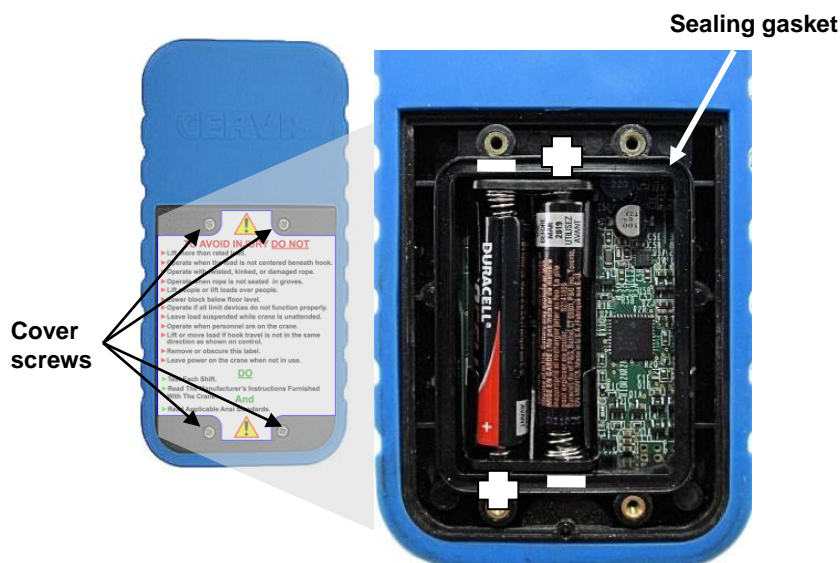



Figure 4. HH2S-9XL10 Battery Installation

 <p><b>Caution!</b></p>	<p>Be sure to observe proper polarity when placing batteries in the handheld battery compartment.</p>
--	---



## 1.2 HH2S-9XL10 Battery Warning and Shutdown

HH2S-9XL10 will alert the user if the remaining battery life is getting low or is too low for normal operation.

### LOW BATTERY

BATTERY LED flashes once per second indicating a LOW BATTERY (2.2V or less) situation is present. Two fresh AAA batteries should be replaced as soon as possible. The LED will continue to flash at one second intervals until the batteries are changed, or until the voltage level drops to 2.0V and Auto-Shutdown occurs.

✓ **Note:** *The receiver LED will quickly flash three times, once per minute when handheld low battery is indicated.*

### AUTO-SHUTDOWN

At 2.0V, the BATTERY LED flashes briefly for approximately 1.25 seconds before the handheld remote automatically shuts down.

Two fresh AAA batteries must be installed before the handheld can be used again.

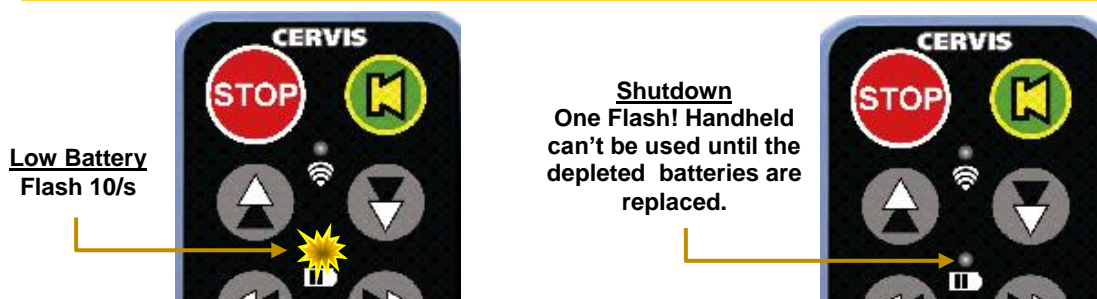


Figure 5. HH2S-9XL10 Remote Low Battery Warning and Auto-Shutdown

## 1.3 System Startup

The following assumes that power is applied to the Warrior 32 MU-9X15 receiver.

1. Press the handheld STOP button (B1).
2. Wait while the LEDs cycle and then the RX/TX begins to flash.
3. Press the Horn/Start button (B2). This energizes the MLC relays in the receiver.

The handheld is ready for normal functional operation.



Figure 6. System Startup

## 2.0 Associating a Handheld with a Receiver

Warrior 32 system handhelds are associated to the receiver before the system is shipped and the Associate process is locked by MU-9X15 receiver SW01 DIP switch 8 (Figure 7) being 0 (OFF). The receiver will only communicate with handhelds to which it is associated. Other Warrior 32 handhelds can be associated to the receiver when necessary as additional spares or to replace damaged handhelds, but the receiver association ability must be first unlocked.

### 2.1 Two Unlock Association Methods

#### 2.1.1 Unlock Association Method 1

Method 1 is by manually changing the position of receiver SW01 DIP switch 8. To unlock association, the receiver enclosure must be opened and SW01 DIP Switch 8 (Associate Lock) must be changed from its default position 0 (OFF) to 1 (ON). Unlocking the receiver DIP switch will allow association until DIP switch 8 is changed back to the 0 (OFF or LOCKED) position.

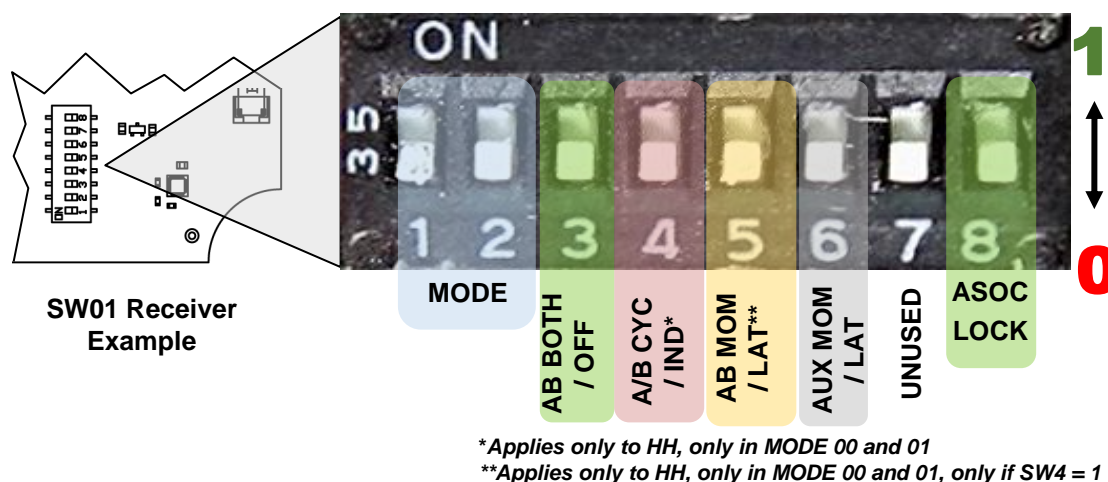



Figure 7. Receiver SW01 DIP Switch 8 (Associate Lock)

#### Associating a Handheld Using the DIP Switch Unlock Option

This process will unlock association of the receiver allowing the user to associate handhelds to the receiver until the DIP switch is set back to the locked position.

1. Set machine unit SW01 DIP Switch 8 ON (Figure 7).
2. If machine unit is **Off** (powered down), the Horn/Light relay will activate when it is powered. If machine unit is **On** (powered), the Horn/Light relay will immediately activate.
3. Go to Heading 2.2.



**Caution!**

It is not recommended to leave receivers in an UNLOCKED state. Move DIP switch 8 to the "0" (OFF) position once association is complete.

## 2.1.2 Unlock Association Method 2

Method 2 is to use an already associated handheld to perform a “virtual” UNLOCK. This process allows users to unlock the receiver from a distance without needing to directly access the MU-9X15 receiver. A virtual unlock will allow the user to associate with the receiver for a limited time (five minutes) after which the virtual unlock will expire and the receiver will again become locked; or, after a successful handheld association, where again, the receiver will automatically become locked.

### Associating a Handheld Using the Virtual Unlock Process

✓ **Note:** *Associating a new transmitter using Virtual Unlock can only be performed from a transmitter that is already associated to the receiver.*

This process will unlock association for **five** minutes allowing the user to associate another handheld to the machine unit. Once a handheld attempts to associate, the RECEIVER will return to a locked state.

✓ **Note:** *The target receiver must be powered.*

1. Turn on the handheld by pressing the STOP button.
2. Wait for the RX/TX LED to begin blinking rapidly.
3. Press and hold buttons A/B Aux1, AUX2, and then STOP.

Receiver will activate the Association relay to confirm the receiver is now unlocked. The handheld will then power down.

4. Go to Heading 2.2.

✓ **Note:** *If there is an external horn/light wired to the receiver, that device will sound/light with the activation of the Associate relay.*

## 2.2 Associate a Handheld to a Receiver

This process is required when the handheld memory slot is either empty or the user wishes to associate to a different receiver.

✓ **Note:** *During this process, a receiver that is in use with another handheld cannot be associated.*

1. Turn on the handheld by pressing and releasing the STOP button.
2. Within 1 second, while the B Select LED is active, simultaneously press and release buttons A/B-AUX 1 and AUX 2.



**Figure 8. Associate Step 2**

**Handheld LEDs will begin cycling indicating the handheld is in maintenance mode.**

3. Simultaneously press and hold buttons 3 (UP) and 4 (DOWN) for approximately 5-seconds.
4. Release the buttons when LED A starts to blink.
5. TX/RX LED and B Selection LED will become active indicating the handheld is attempting to locate all available Warrior receivers.
6. Once the handheld has completed its search and one or more receivers have been found, the TX/RX LED and A Selection LED become active.

If there are no receivers available, the handheld will stay in scan mode until the handheld times out or is turned off.

7. A detected receiver will start blinking the association LED indicator and the Horn/Light relay is engaged to sound the horn. In order to select this receiver press button AUX 2. TX/RX LED will start blinking rapidly indicating communication is established. The receivers ID is now stored in the handheld memory slot.
8. If the found receiver unit is **NOT** the receiver desired, press A/B-AUX 1 button to scroll through detected receivers until the desired receiver is found and blinking its association LED indicator and pulsing the Horn/Light relay that is engaged to sound the horn. Press button AUX 2 to select the receiver. The TX/RX LED will start blinking rapidly indicating communication is established. The selected receiver is stored in the handheld memory slot.

## 3.0 HH2S-9XL10 Handheld Factory Reset (Memory Clear)

The following steps will perform a factory reset on the handheld. Once this process is complete, the handheld memory slot is cleared and it will not communicate with any receivers.

✓ **Note:** *The memory of spare handhelds from the factory will be clear upon arrival.*

1. Turn on the handheld by pressing and releasing button 1 (STOP).
2. Within 1s of activating the handheld, while only LED 4 is active, simultaneously press and release buttons 9 and 10. The LEDs will start scrolling indicating maintenance mode.
3. Simultaneously press and hold buttons 9 and 10.
4. Press and release button 1 (STOP).
5. The handheld will turn off indicating the factory reset was successful.

A handheld that has been cleared will power up and immediately shutdown indicating that it has no receiver in its memory.



**Figure 9. HH2S-9XL10 with Numbered Buttons**

## 4.0 HH2S-9XL10 Handheld Specifications

*Table 1. HH2S-9XL10 Handheld Specifications*

Item	Description	
Power	<b>Vin</b>	+2.1V to +3.2V
	<b>Source</b>	Two (2) AAA alkaline batteries
	<b>Low Battery Warning</b>	~2.1V - batteries should be immediately replaced
	<b>Low Battery Shutdown</b>	<2.0V - batteries must be replaced to operate
Environment	<b>Operating Temp</b>	-40°C to 60°C (-40°F to 140°F)
	<b>Storage Temp</b>	-40°C to 85°C (-40°F to 185°F)
	<b>Humidity</b>	0-95% non-condensing
Radio	<b>Frequency</b>	904-926 MHz @ 100mW
	<b>License</b>	No license required
	<b>Modulation</b>	DSSS
	<b>Antenna</b>	Internal
Enclosure	<b>Dimensions</b>	mm: 136.38 x 68.96 x 28.42 Inches: 5.37" x 2.68" x 0.92"
	<b>Weight</b>	200 gr. / 7.2 oz. (With lanyard or belt clip)
	<b>Durability</b>	High Impact Polymer case
		Polycarbonate faceplate Impact absorbing bumper
Indicators	<b>Wireless</b>	Indicates wireless communications
	<b>Battery</b>	Provides battery status
	<b>A</b>	Indicates A selected when lit
	<b>B</b>	Indicates B selected when lit
Buttons	(10)	Two-step pushbuttons

## Appendix A: Exposure to Radio Frequency Energy

**Warrior 32** handheld remote units and machine units contain radio transceivers. When active, a handheld remote sends out radio frequency (RF) energy through its internal antenna. The **Warrior 32** handheld remote complies with limits set by the FCC for operating distance from human tissue.

## Appendix B: RF Exposure Considerations

The radio module may be used in a variety of host application that fall into two general categories: mobile or portable. Mobile applications are any operating locations that are **not** on a human body. Portable applications are those where the transmitting equipment **is** located on the hand, arm, or other part of the human body. In mobile application the host application is typically fixed to mobile equipment, with either an internal or external antenna. In portable applications the equipment is typically held in the hand of an operator or affixed to either a belt or harness on the torso.

Equipment containing the radio module has been evaluated for FR exposure hazards by two approaches: Maximum Permissible Exposure (MPE) for “mobile” applications and SAR for portable applications. Mobile applications are any operating locations that are not on a human body.

The 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 in a location at least 20cm away from areas likely to be occupied by an unaware person.

### **Handheld Applications**

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

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

### **Required Training**

All installers and operators of host applications that include an SRF310 FT module must be trained to use proper RF safety precautions as presented in this section.





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