



Communications Systems



# RCA

Communications Systems

## BR850™

INTRINSICALLY SAFE TWO-WAY RADIO

**BR850U**  
UHF MODEL

**BR850V**  
VHF MODEL



ANSI/UL 913  
CSA C22.2 No. 157

## INSTRUCTION MANUAL

**Congratulations on selecting the BR850™ Intrinsically Safe Radio from  
RCA Communications Systems - *The most trusted name in radio!***

Our new series of professional communications equipment establishes a new benchmark in premium radio products made to perform flawlessly under the most demanding commercial conditions. Cutting edge design, professional grade materials and components, simple operation and superior assembly quality: RCA Communications Systems has it all, including our exclusive no-nonsense, three-year “Warranty Protection Program,” one of the most comprehensive warranties in the communications industry.

To ensure you achieve maximum performance from your BR850™ radio, please be sure to carefully read this manual.

#### MODELS COVERED IN THIS MANUAL:

- BR850™ VHF Two-Way Radio
- BR850™ UHF Two-Way Radio



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## SAFETY AND GENERAL INFORMATION

Please observe the following general safety precautions during all phases of operation, service and repair of this equipment.

- » Unauthorized modification of the radio may result in failure of the Intrinsically Safe protection.

**Note:** “Intrinsically Safe” is for equipment used in areas where explosion risk can exist.

- » Unauthorized service or repair is prohibited.
- » Do not disassemble any Intrinsically Safe products.
- » The radio must not be opened in a hazardous area.
- » The battery must be changed in a non-hazardous area.
- » Additional or spare batteries must not be carried into a hazardous area.
- » Use only the intrinsically safe battery (B850LI-IS) specified by RCA. The use of other batteries is strictly prohibited and

will result in failure of the Intrinsically Safe protection.

- » The battery must be charged in a non-hazardous area with the designated charger CH850R1-IS or CH850R6-IS.
- » Use only RCA approved accessories.
- » Ensure that the radio is not taken into Zone 0 areas.
- » To avoid electromagnetic interference and/or compatibility conflicts, turn off your radio in any area where posted notices instruct you to do so.
- » Turn off your radio before boarding an aircraft. Any use of a radio must be in accordance with airline regulations or crew instructions.
- » Turn off your radio before entering a blasting area.
- » For vehicles with an air bag, do not place a radio in the area over an air bag or in the air bag deployment area.

- » Do not use any portable radio that has a damaged antenna. If a damaged antenna comes into contact with your skin, a minor burn can result.
- » Do not expose the radio to direct sunlight over a long time, nor place it close to heating source.
- » When transmitting with a portable radio, hold the radio in a vertical position with the microphone 3 to 4 centimeters away from your lips. Keep antenna at least 2.5 centimeters away from your body when transmitting.



**Warning:**

Please use the Intrinsically Safe BR850™ radio unit only with RCA dedicated Intrinsically Safe batteries and accessories in a hazardous location; otherwise, a dangerously unsafe condition may result.

## Intrinsically Safe Radio Information

### Certification - Intrinsically Safe



### I.S. Classes I, II, III, Division 1, Groups CDEFG, T3

#### Intrinsically Safe Classification

"Intrinsically Safe" is a fire safety rating given to the equipment by SGS North America Inc. according to ANSI/UL 913 (U.S.) and CSA C22.2 No. 157 (Canada) certification standards. When the equipment is given this rating, it is considered safe to use in certain flammable or combustible atmospheres. Flammable atmospheres have been categorized by Class, Division, and Group as described below:

#### Area Classification:

Class	Material
I	Gas, Vapor, Liquid
II	Dust
III	Fiber, Flying

Division	Description
1	An area where there is or could be an explosive atmosphere most of the time under normal operating conditions
2	An area where an explosive atmosphere exists only under fault conditions

**Classification of Atmospheres:**

Group	Typical Hazard
<b>A</b>	Acetylene
<b>B</b>	Hydrogen
<b>C</b>	Ethylene, ethyl ether, cyclopropane
<b>D</b>	Gasoline, naphtha, butane, propane, alcohol, acetone, benzol, natural gas
<b>E</b>	Metal dust including aluminum, magnesium, and their alloys
<b>F</b>	Carbon black, coal or coke dust
<b>G</b>	Flour, starch, or grain dust

**Classification of Atmospheres:**

Class	Maximum Surface Temperature
<b>T1</b>	842°F (450°C)
<b>T2</b>	572°F (300°C)
<b>T2A</b>	536 °F (280°C)
<b>T2B</b>	500 °F (260°C)
<b>T2C</b>	446 °F (230°C)
<b>T2D</b>	419 °F (215°C)
<b>T3</b>	392 °F (200°C)
<b>T3A</b>	356 °F (180°C)
<b>T3B</b>	329 °F (165°C)
<b>T3C</b>	320 °F (160°C)
<b>T4</b>	275 °F (135°C)
<b>T4A</b>	248 °F (120°C)
<b>T5</b>	212 °F (100°C)
<b>T6</b>	185 °F (85°C)



## PRODUCT INSPECTION

Prior to unpacking the BR850™ portable radio, please inspect the packaging for signs of damage and report any damage or missing components immediately to your RCA Communications Systems Sales and Service Outlet. Every BR850™ portable radio comes with the following items:

Item	Qty.(PCS)
<b>BR850-IS</b> - Handheld Radio	1
<b>B850LI-IS</b> - Li-Ion Battery (1700 mAh)	1
<b>AN850U</b> - Antenna for UHF Models <b>AN950V</b> - Antenna for VHF Models	1
<b>BC850</b> - Belt Clip	1
<b>STR850</b> - Handy Carry Strap (prevents dropping the BR850™)	1
Instruction Manual	1
<b>CH850R1-IS*</b> - Desktop Rapid Charger	1
<b>PS250R*</b> - Power Supply	1



**BR850-IS**  
Handheld Radio



**B850LI-IS**  
Li-Ion Battery (1700 mAh)



Antenna  
**AN850U** - UHF models  
**AN950V** - VHF models



**BC850**  
Belt Clip



**STR850**  
Handy Carry Strap

\* Items come in separate box if ordered.



**CH850R1-IS**  
Desktop Rapid Charger

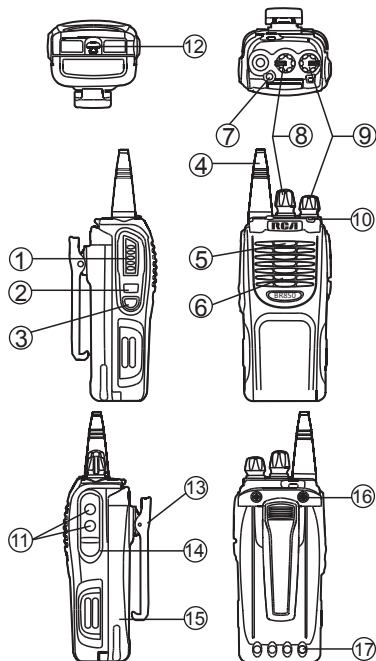


**PS250R**  
Power Supply

**Note:**

The frequency band of the BR850™ is marked on the radio label. If it is not visible, identify the frequency band according to the color circle on the antenna: red indicates UHF and green indicates VHF.

## RCA BR850™ Overview



- |   |
|---|
| <b>(1)</b> PTT (Push-to-Talk) key           |
| <b>(2)</b> SK1 (Side Key 1) (programmable)  |
| <b>(3)</b> SK2 (Side Key 2) (programmable)  |
| <b>(4)</b> Antenna                          |
| <b>(5)</b> Microphone                       |
| <b>(6)</b> Speaker                          |
| <b>(7)</b> TK (Top Key)                     |
| <b>(8)</b> Channel Selector Knob            |
| <b>(9)</b> Radio On-Off/Volume Control Knob |
| <b>(10)</b> LED Indicator                   |
| <b>(11)</b> Accessory Jack                  |
| <b>(12)</b> Battery Latch                   |
| <b>(13)</b> Belt Clip                       |
| <b>(14)</b> Accessory Cover                 |
| <b>(15)</b> Battery                         |
| <b>(16)</b> Screw                           |
| <b>(17)</b> Electrode Charging Piece        |

**PTT (Push-to-Talk) Key**

Press and hold down the PTT key to transmit, release it to receive.

**SK1 (Side Key 1)**

Side Key 1 is the programmable key to which your dealer can assign long and short press function. (See Glossary for definitions of long and short press.)

**SK2 (Side Key 2)**

Side Key 2 is the programmable key to which your dealer can assign long and short press function. (See Glossary for definitions of long and short press.)

**Channel Selector Knob**

Turn the knob to select a desired channel.

**TK (TopKey)**

Programmable function key.

**Radio On-Off/Volume Control Knob**

Turn the knob clockwise to turn the radio on, and turn the knob fully counter-clockwise until it clicks to turn the radio off.

Turn the knob clockwise to increase the volume, or counter-clockwise to decrease the volume. **WARNING!!** Make sure the BR850™ is at low volume prior to using any earpiece accessory, and then adjust the volume to a comfortable level. Failing to do so may cause hearing damage.

**Accessory Cover & Accessory Jack**

The jack is used to connect speaker, microphone, external PTT, earpiece, headset, programming cable and cloning cable.

## LED Indicator

The following tables explain the functions of the LEDs and beeps.

<b>Wired Clone</b>	Source radio: Turn the source radio on while holding down the PTT and SK2 keys. Target radio: Rotate the Radio On-Off/Volume Control knob clockwise to turn the target radio on.	The LED flashes orange twice.
	Source radio (power on the target radio and connect the cloning cable, and then press the PTT key of the source radio to initiate cloning.)	1. The LED solidly glows red during cloning; 2. The LED goes out when cloning is finished. Note: The LED flashes red when cloning fails.
	Target radio	1. The LED solidly glows green during cloning; 2. The LED goes out when cloning is finished.

**LED Indicator** *(continued)*

<b>Wireless Clone</b>	Turn on both the source radio and target radio while holding down the PTT and SK1 keys. Both radios are required to be on the same channel for cloning.	The LED flashes orange once.
	Source radio (turn on both the source radio and target radio while holding down the PTT and SK1 keys, and then press the PTT key of the source radio while both radios are on the same channel to initiate cloning.)	The LED solidly glows red during cloning.
	Target radio	<ol style="list-style-type: none"><li>1. The LED solidly glows green during cloning;</li><li>2. The LED flashes green and the radio sounds the beep tone, when cloning is finished.</li></ol> <p>Note: The LED flashes red when cloning fails.</p>

**LED Indicator** *(continued)*

Power On	The LED flashes green once.
Low Battery Alert	The LED flashes red, and the radio sounds three beeps every 30 seconds.
Transmitting	The LED glows red
Receiving	The LED glows green when carrier presents.
Scanning	The LED flashes green once every 1 second.
Programming	Reading: the LED glows red; Writing: the LED glows green.
Encoding (DTMF/PTT ID/2-Tone /MDC 1200/RDC2400™)	1. The LED glows red while transmitting; 2. The LED glows orange when transmission is over.
Decoding (2-Tone/MDC 1200/RDC2400™)	The LED flashes orange after the signalling is successfully decoded.
Select Power Level	1W: One beep is heard. 2W: Two beeps are heard. 4W/5W: Three beeps are heard.
Function Key Press	One beep to enable, two beeps to disable.

## BATTERY INFORMATION

### Initial Use

New batteries are shipped from the factory uncharged. Charge a new battery approximately 12 hours prior to initial use (applies to Ni-CD, Ni-MH and Li-Ion batteries charged with slow or rapid rate charger). NOTE: The Indicator Light will turn GREEN approximately one hour after battery is placed in a Rapid Rate Charger; however, it is strongly recommended the battery charge for 12 hours. This initializes it and allows for the best performance. Maximum battery capacity is normally achieved after two or three full charge / discharge cycles. If battery power runs low, recharge the battery. Batteries that are brand new or that have been stored for an extended period of time (several weeks), may require more time to fully charge.

### Applicable Battery Packs

To reduce the risk of injury, use only batteries specified by RCA Communications Systems.

#### Caution:

1. To avoid risk of personal injury, do not dispose of batteries in a fire.
2. Dispose of batteries according to local recycling regulations. Do not dispose as household waste.
3. Never attempt to disassemble the battery.

#### Battery Tips:

1. When charging a battery, keep it at a temperature between 41°F ~ 104°F (5°C ~ 40°C) to ensure a full charge. Temperatures outside this range significantly reduce battery life.
2. Before charging a battery attached to a radio, turn the radio off to ensure a full charge. Never leave a radio on while in the



charger, as it can damage both the battery and the radio; the charger is not a radio stand.

3. Do not cut off the power supply or remove battery while charging.
4. Never charge a battery that is wet. Dry it with soft cloth prior charging.
5. The battery will eventually weaken. When the operating time (talk-time and standby time) is noticeably shorter than normal, replace the battery.
6. Charge the Intrinsically Safe battery **B850LI-IS** outside the hazardous area with the designated charger **CH850R1-IS**. Unauthorized chargers could damage the battery.

### Tips To Prolong Battery Life:

1. Battery performance greatly decreases at temperatures below -4°F (-20°C). Having a spare battery is always necessary in extremely cold environments. A cold battery may work again when it returns to room temperature, so keep it for later use.
2. Dust on the battery contact may cause the battery not to work or charge properly. Use a clean dry cloth to wipe it before attaching the battery to the radio.
3. Batteries with damaged contacts can be extremely dangerous. Any battery with damage to one or more contacts should be replaced immediately and not used under any circumstances.

### Battery Storage

1. Fully charge a battery before storing it for an extended period of time to avoid battery damage due to over-discharge.
2. Recharge a battery after three months storage to avoid reduced battery capacity due to over-discharge.
3. When storing a battery, keep it in a dry

place at room temperature.

## Charging the Battery

1. When the battery level is very low, recharge it. It is never recommended to completely drain the battery, which may cause your battery to malfunction and no longer accept a charge.
2. Use only chargers specified by RCA Communications Systems. When the charger's LED illuminates red, it is an indication that the battery is being correctly charged. When the LED illuminates green, the battery charge is complete.

Status	Charger LED
<b>Standby (no-load)</b>	Red LED slowly flashes (0.2s on/3s off )
<b>Battery is charging</b>	Red LED solidly glows
<b>Battery is fully charged</b>	Green LED solidly glows
<b>Error</b>	Red LED rapidly flashes (0.2s on/0.2s off)

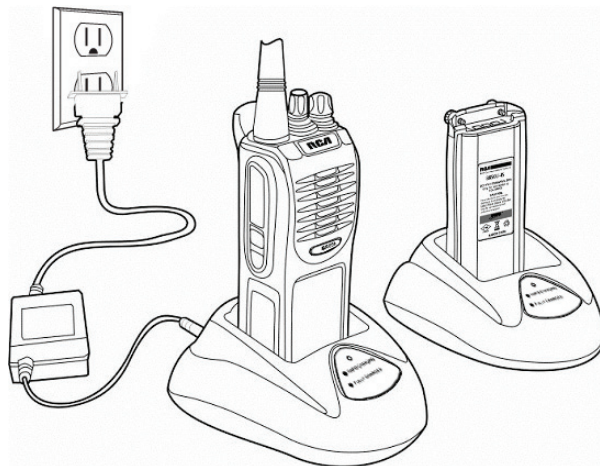
### Steps for setting up your charger:

1. Plug the power cord into the adapter.
2. Plug the AC connector of the adapter into the AC outlet socket.
3. Plug the DC connector of the adapter into the DC socket on the back of the charger.
4. Place the radio with the battery attached, or the battery alone, in the charger.
5. Make sure the battery is in well contact with the charging terminals. The charging process initiates when the red LED lights.
6. The green LED lights about 3 hours later indicating the battery is fully charged. Then remove the radio with the battery attached or the battery alone from the charger.

### Notes:

- It is normal that the charger LED flashes before inserting battery into the charger.
- Do not change the battery in the charger until the charger LED is stabilized.

- After the battery is placed properly, the LED solidly glows red indicating the battery is charging, or flashes indicating that the battery is damaged or the ambient temperature is over high/low.



## ASSEMBLY AND DISASSEMBLY

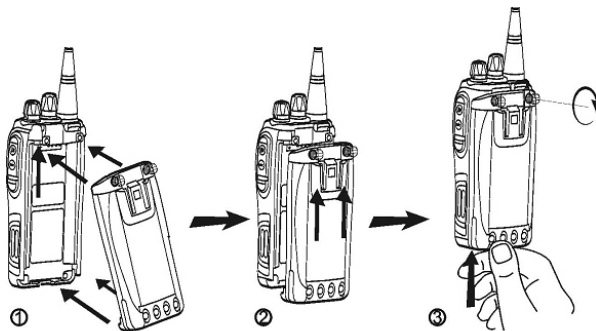
### Attaching the Battery

*Step 1* -Insert the battery top into the aluminum chassis, and make sure the battery top is positioned correctly. (see figure 1)

*Step 2* - Press the battery to make it cling to the guide rails, and make sure the battery and the

aluminum chassis are connected completely. Then push the battery upward until you hear a "click." (see Fig. 1)

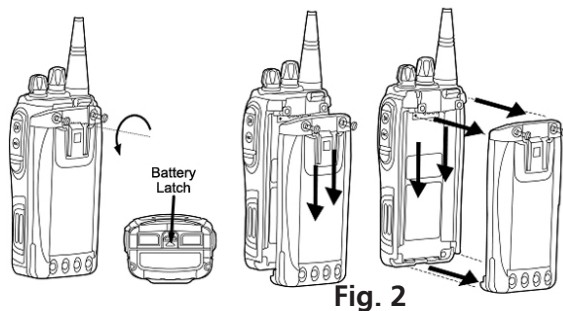
*Step 3* -Hold the battery bottom and push the battery upward. Align the two screws on the battery with the screw holes on the radio body, and then tighten the screws (see Fig. 1).



**Fig. 1**

## Removing the Battery

With the radio off, loosen the screws, but never remove them from the battery. Slide the battery latch away from the battery, and slide down the battery for 1 to 2 centimeters. Then remove the battery from the radio unit. (see Fig. 2).



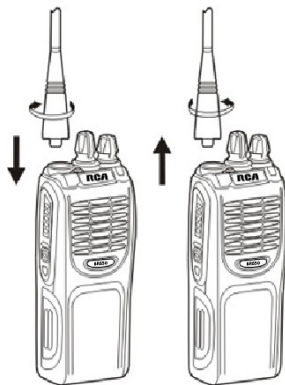
## ATTACHING/REMOVING THE ANTENNA

### Attaching the Antenna

1. With the radio off, insert the antenna into the big screw thread hole on top of the main unit.
2. Turn the antenna clockwise until it is screwed down as shown. (see Fig.3)

### Removing the Antenna

With the radio off, remove the antenna by turning it counter-clockwise as shown. (see Fig.3)



## ATTACHING/REMOVING THE BELT CLIP

### Attaching the Belt Clip

Align the metal holder with the groove of the battery, and press the belt clip downwards to attach it (see Fig. 4).

### Removing the Belt Clip

Lift up the dome, and slide the belt clip upwards to remove it (see Fig. 4).

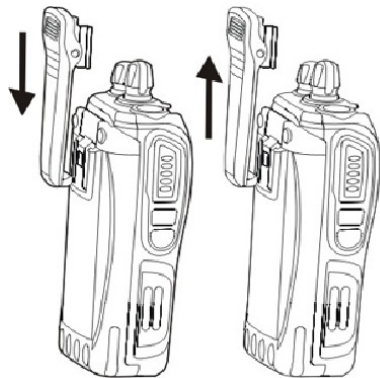


Fig. 4

## ATTACHING EARPIECE / SPEAKER MIC

Open (**don't remove**) the accessory cover, and plug the audio accessory firmly into the accessory jack. Then secure the screw using your hand or a coin. Please loosen the screw prior to removing the audio accessory. (See Fig. 5).

**Note:** Use of the audio accessory may affect the waterproof performance of the radio.

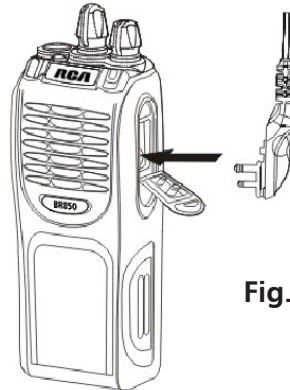


Fig. 5

## BASIC RADIO OPERATIONS

1. Rotate the **Radio On-Off/Volume Control** knob clockwise to turn the radio on, with green LED flashing once. You will hear a beep if the alert tone is already set by your dealer.
2. Press the programmed **Monitor** key or **Squelch Off** key to hear activities on the current channel, and then rotate the **Radio On-Off/Volume Control knob** clockwise to adjust the volume.
3. Rotate the **Channel Selector** knob to select a desired channel. If the Channel Annunciation feature is enabled by your dealer, your radio will automatically announce the channel the knob is set at.
4. To transmit, press and hold down the **PTT** key, and speak into the microphone at your normal voice level. Hold the radio about 2.5 to 5 centimeters away from your mouth.
5. Release the **PTT** key to receive.

## PROGRAMMABLE AUXILIARY FUNCTIONS

Your dealer may assign the **TK, SK1, SK2** (long or short press) keys with the following auxiliary functions.

- None
- Call1/Call2
- Emergency
- Emergency Cancel
- Lone Worker
- Lone Worker Backup
- Man Down (optional)
- Man Down Backup (optional)
- Monitor
- Monitor Momentary
- Nuisance Channel Temporary Delete
- Nuisance Channel Delete
- Squelch Level Check
- Selectable Squelch Level (SQL)
- Scan
- Scan Backup

- Scrambler
- Scrambler Backup
- Squelch Off
- Squelch Off Momentary
- Talk Around
- Output Power Check
- Adjust Power Level
- Whisper
- Whisper Backup
- Battery Power Indicator
- Rental Time Indicator
- Channel Annunciation Temporary Enable
- Channel Annunciation
- External Scrambler (optional)
- External Scrambler Backup (optional)
- Auto Contact
- Auto Contact Temporary Delete
- Channel Lock
- Patrol Event Select
- Transmit Affirm

## ADVANCED OPERATIONS

The following functions are not active by default, but can be programmed by your dealer upon request.

### Call1/Call2 (optional)

Press the programmed **Call1/Call2** key to transmit the stored DTMF code, 2-Tone, MDC1200 or RDC2400™ signalling.

### Emergency (optional)

Press the programmed **Emergency** key to transmit emergency alarm, or send ENI (Emergency Number Identity)/background tone to a pre-defined person or the dispatcher (selectable via the programming software). You may long or short press the function key to cancel the emergency procedure.

### Lone Worker (optional)

The feature provides added security and safety for individuals who work remotely from their team. Press the programmed function key to



activate the Lone Worker feature. The radio is set to request a response from a user at regular intervals. Should a user not press any key as a response to a regular warning tone, a defined emergency procedure will be activated.

The Lone Worker status will not be memorized once the radio is powered off.

### **Lone Worker Backup (optional)**

The feature provides added security and safety for individuals who work remotely from their team. Press the programmed function key to activate the Lone Worker feature. The radio is set up to request a response from a user at regular intervals. Should a user not press any key as a response to a regular warning tone, a defined emergency procedure will be activated.

The Lone Worker status will be memorized after the radio is powered off and on again.

### **Man Down (optional)**

Press the programmed function key to activate

the Man Down mode, in which horizontally or inversely positioning the radio will activate an alert tone. A defined emergency procedure is activated if the radio is horizontally or inversely positioned for a certain length of time. Place the radio vertically to cancel the emergency procedure.

The Man Down status will not be memorized once the radio is powered off.

### **Man Down Backup (optional)**

Press the programmed function key to activate the Man Down mode, in which horizontally or inversely positioning the radio will activate an alert tone. A defined emergency procedure is activated if the radio is horizontally or inversely positioned for a certain length of time. Place the radio vertically to cancel the emergency procedure.

The Man Down status will be memorized after the radio is powered off.

### Monitor/Squelch Off (optional)

- **Monitor**  
In this mode, the receiving party can receive incoming calls from the transmitting party regardless of CTCSS/CDCSS condition. If carrier condition is not satisfied, the receiving party will fail to receive any incoming calls. Press the **Monitor** key to open signalling squelch. Press the key again to close it.
- **Monitor Momentary**  
Refer to Monitor. Press the **Monitor Momentary** key to open signalling squelch. Release the key to close it.
- **Squelch Off**  
In this mode, the speaker is unmuted in any condition and receives any sound on the current channel. When audio signal is received on the channel, audio will be heard. Otherwise, background noise will be heard. Press the **Squelch Off** key to open noise squelch. Press the key again to close it.

- **Squelch Off Momentary**

When audio signal is received on the channel, audio will be heard. Otherwise, background noise will be heard. Hold down the programmed key continuously to enter this mode, and release the key to exit. Press the **Squelch Off Momentary** key to open noise squelch. Release the key to close it.

### Squelch Level Check/Selectable Squelch Level (SQL)

Upon long press of the programmed Squelch Level Check key, the radio reports the squelch level set on the current channel.

Short press the **Adjust Squelch Level** key to change the squelch level. The squelch increases by 1 level upon every press of the function key (level 9~0 cycle, selecting level 0 activates a beep tone with the squelch always open), and then save your change.

### Scan (optional)

Press the programmed **Scan** key to initiate radio scanning from the current channel, and scanning ascends through the channel numbers in the Scan list. The green LED flashes when scanning proceeds, and solidly glows when a signal is received with signalling match on a channel. Press the **Scan** key again to exit radio scanning. The Scan status will not be memorized once the radio is powered off.

- **Nuisance Channel Temporary Delete**

1. When scanning pauses on an unwanted channel such as a nuisance channel, press the programmed **Nuisance Channel Temporary Delete** key to temporarily delete the channel from the Scan list.
2. The priority channel can be deleted temporarily only.
3. If the current Scan list contains only one or two channels, Nuisance Channel Temporary Delete is not possible.
4. Once the radio exits the Scan mode, or is

powered off and on again, the temporarily deleted channel will appear in the Scan list again.

- **Nuisance Channel Delete**

When scanning pauses on an unwanted channel such as a nuisance channel, press the programmed **Nuisance Channel Delete** key to permanently delete the channel from the Scan list. The deleted channel will not appear in the Scan list once the radio exits the Scan mode, or is powered off and on again.

1. The priority channel can be deleted temporarily only.
2. If the current Scan list contains only one or two channels, Nuisance Channel Delete is not available.

### Scan Backup (optional)

Press the programmed **Scan** key to initiate radio scanning from the current channel, and scanning ascends through the channel numbers in Scan list. The green LED flashes when scanning proceeds, and solidly glows

when a signal is received with signalling match on a channel. Press the **Scan** key again to exit radio scanning.

The Scan status will be memorized after the radio is powered off and on again.

### **Scrambler (optional)**

The feature includes Scrambler and Scrambler Backup.

In order for members of your own group to understand your call while you are using the Scrambler, all other members must also activate the Scrambler on their radios. When the feature is activated, any other party listening on your channel will be unable to understand your conversation.

#### **♦ Scrambler**

Press the programmed function key to activate the Scrambler feature. When the feature is activated, any other party who is on your channel is prevented from listening to your conversation.

The Scrambler status will not be memorized once the radio is powered off and on again.

#### **♦ Scrambler Backup**

Press the programmed function key to activate the Scrambler Backup feature. When the feature is activated, any other party listening on your channel is prevented from eavesdropping your conversation.

The Scrambler status will be memorized after the radio is powered off and on again.

#### **♦ External Scrambler (optional)**

The external scrambler is controlled from the programmed **External Scrambler** key.

The External Scrambler status will not be memorized once the radio is powered off and on again.

#### **♦ External Scrambler Backup (optional)**

The external scrambler is controlled from the programmed **External Scrambler** key.

The External Scrambler status will be memorized after the radio is powered off and on again.

**Talk Around (optional)**

Press the programmed function key to activate the Talk Around feature. With the feature activated, the Rx frequency will be used in place of the Tx frequency during transmission.

**Output Power Check/Adjust Power Level**

Upon long press of the programmed **Output Power Check** key, the radio reports the output power level set on the current channel, with one beep for low power level, two beeps for medium power level, or three beeps for high power level.

Short press the **Adjust Power Level** key to change the power level. The power increases by 1 level upon every press of the function key (low~med~high cycle), and then save your change.

**Whisper (optional)**

Press the programmed function key to activate the Whisper feature. When the feature is activated, you can speak quietly into the radio and still be heard clearly. Press the key again to

exit the feature. The Whisper status will not be memorized once the radio is powered off and on again.

**Whisper Backup (optional)**

Press the programmed function key to activate the Whisper feature. When the feature is activated, you can speak quietly into the radio and still be heard clearly. Press the key again to exit the feature. The Whisper status will be memorized after the radio is powered off and on again.

**Battery Power Indicator**

Upon press of the programmed **Battery Power Indicator** key, the radio sounds "1", "2", "3", or "4" to indicate the current battery level.

Audible Indicator	Battery Level
"1"	Very Low
"2"	Low
"3"	Satisfactory
"4"	High

**Rental Timer Indicator (optional)**

Upon press of the programmed **Rental Time Indicator** key, the radio sounds "1", "2", "3", "4", or "5" to indicate the remaining time that the user is allowed to use the radio. The Rental Time is programmable by your dealer.

**Channel Annunciation Temporary Enable**

Press the programmed **Channel Annunciation Temporary Enable** key to activate the following two situations:

- a. If the current channel number is heard:  
Press the function key. If two beeps are heard, the Channel Annunciation will be temporarily canceled. The current channel number will be heard when the radio is turned on again.  
If one beep is heard, the Channel Annunciation will be temporarily activated. The current channel number will be heard when the radio is turned on again.
- b. If the current channel number is not heard:

Press the function key. If two beeps are heard, the Channel Annunciation will be temporarily canceled. The current channel number will not be heard when the radio is turned on again.

If one beep is heard, the Channel Annunciation will be temporarily activated. The current channel number will not be heard when the radio is turned on again.

**Channel Annunciation (optional)**

Press the programmed **Channel Annunciation** key. If two beeps are heard, the Channel Annunciation will be canceled. The current channel number will not be heard when the radio is turned on again.

If one beep is heard, the Channel Annunciation will be activated. The current channel number will be heard when the radio is turned on again.

**Auto Contact (optional)**

When a group of radios is set with Auto

Contact, the radio will automatically sound the alert tone if the user is out of the communication range.

### **Auto Contact Temporary Delete**

Press the programmed **Auto Contact Temporary Delete** key to temporarily delete the selected ID from the current Auto Contact list.

### **Channel Lock (optional)**

When the Channel Lock feature is activated, channels cannot be selected via the **Channel Selector** knob.

### **Time-out Timer (TOT) (optional)**

The feature allows for more efficient use of channels by limiting the maximum time of each transmission. Once a continuous transmission exceeds the preset time (programmable by your dealer), the transmission will be automatically terminated and an alert tone will be heard. Release the **PTT** key to cancel the alert tone. Your dealer may program the alert tone sounds before the TOT timer nearly expires.

### **Busy Channel Lockout (BCL) (optional)**

When the BCL feature is enabled, you are prevented from transmitting on a channel that is already in use. Press the **PTT** key on a channel that is already in use, the radio will sound an alert tone and turn back to the Receive mode.

*Carrier:* If BCL is set on the current channel, press the **PTT** key while the channel is already in use, and the radio will sound beeps without transmission.

*CTCSS/CDCSS:* If CTCSS/CDCSS and BCL are

set on the current channel, press the **PTT** key while the channel is already in use, and the radio will sound beeps without transmission.

*Optional Signalling:* If 2-Tone/MDC1200/RDC2400™ signalling and BCL are set on the current channel, press the **PTT** key while the channel is already in use, and the radio will sound beeps without transmission.

### **Battery Save (optional)**

If the feature is programmed by your dealer, Battery Save will be automatically activated once no activity is present on the channel and no operation is performed (no key press and no knob selection) for extended operation time.

Once the radio detects no activity on the channel and no operation is performed during standby time, it will automatically enter Battery Save mode in 12 seconds. Pressing any key or receiving a signal will cause the radio to restore to normal operation and exit from

Battery Save.

### **Low Battery Alert (optional)**

For extra convenience, the red LED flashes and the radio sounds three beeps every 30 seconds, to alert the user to recharge the battery if the battery level runs low.

### **Safety Check (optional)**

Once the radio receives a safety check signal, an alert tone will be heard, requesting the user to make some operation (pressing any key). Should the user not respond to a safety check signal, a defined emergency procedure will be activated.

### **CTCSS/CDCSS**

If CTCSS/CDCSS is set on the current channel, a CTCSS/CDCSS match is required on an incoming signal for the radio to unmute. Radios set with the same CTCSS/CDCSS, or not set with CTCSS/CDCSS, can receive from you.



Your dealer may program the current channel with CTCSS/CDCSS, to prevent unwanted conversations on the same frequency.

The radio will not unmute to an incoming call with invalid CTCSS/CDCSS. This feature does not mean that your conversation will not be heard by others.

### **DTMF (optional)**

The DTMF signalling can be enabled/disabled by your dealer. If DTMF signalling is set on the current channel, press the programmed key to transmit DTMF code.

The red LED solidly glows during encoding, and goes out when encoding is over.

### **2-Tone/MDC1200/RDC2400™ (optional)**

The 2-Tone/MDC1200/RDC2400™ signalling can be enabled/disabled by your dealer. If 2-Tone/MDC1200/RDC2400™ signalling is set on the current channel, press the programmed **Call 1/Call 2** key to transmit 2-Tone/MDC1200/

RDC2400™ signalling. The preset function will be performed when the radio receives an incoming signal with match 2-Tone/MDC1200/RDC2400™. Radios set with match 2-Tone/MDC1200/RDC2400™ can receive from you.

- The red LED solidly glows during encoding; after encoding, the orange LED solidly glows until the preset time expires.
- The green LED solidly glows during decoding; after successful decoding, the orange LED flashes until the preset time expires.

### **Signalling Logic**

CTCSS/CDCSS “AND” / “OR” 2-Tone/MDC1200/RDC2400™

“AND”: The radio unmutes when both the CTCSS/CDCSS and 2-Tone/MDC1200/RDC2400™ conditions are satisfied.

“OR”: The radio unmutes when either the CTCSS/CDCSS or 2-Tone/MDC1200/

RDC2400™ condition is satisfied.

**BOT ID and EOT ID (PTT ID) (optional)**

Your dealer may configure whether to transmit Connect ID (BOT ID) or Disconnect ID (EOT ID), to connect or disconnect to a repeater or telephone system.

BOT ID: sent upon each press of the **PTT** key.

EOT ID: sent upon each release of the **PTT** key.

Both: sent upon each press and release of the **PTT** key.

**CARE AND CLEANING**

- Do not directly handle the radio by its antenna or external microphone.
- Do not place the radio in a dusty or dirty environment.
- Clean the radio with a lint-free cloth moistened with clean water and/or a mild dish washing liquid to remove dirt, grease, and dust.
- Avoid subjecting the radio to corrosives, solvents or spirits.

## TROUBLESHOOTING

Symptom	Solution
<b>Cannot power on the radio</b>	<ul style="list-style-type: none"><li>a. The battery needs charging. Recharge the battery or replace it with a fresh one.</li><li>b. The battery is not properly installed. Remove the battery and reattach it.</li></ul>
<b>The operating time is noticeably shorter than normal even though the battery is properly charged.</b>	<ul style="list-style-type: none"><li>a. The battery has worn out; it is time to buy a new battery.</li><li>b. The battery is not fully charged. Make sure that the battery is removed after LED indicator has turned green.</li></ul>
<b>Cannot talk to or hear group members</b>	<ul style="list-style-type: none"><li>a. Make sure that your radio operates on the same frequency and has the same CTCSS/CDCSS settings as your group members.</li><li>b. Make sure you are within their communication range.</li></ul>
<b>Hear non-group members</b>	Please change your CTCSS/CDCSS settings and have your group members do so, also.
<b>No voice or low voice while transmitting</b>	<ul style="list-style-type: none"><li>a. Turn the volume control knob to its maximum volume.</li><li>b. Return the radio to your dealer to check for microphone damage.</li></ul>
<b>Noise always on</b>	Move within communication range of other group members. Next, turn the radio off and back on again to retry communication.

## Optional Accessories (Intrinsically Safe)



### Multi-Unit Rapid-Rate Charger

#### **CH850R6-IS**

More convenient and saves space by using one power outlet for 6 radios.



### Remote Speaker Microphone

#### **SM850L-IS**

No need to remove the radio from your waist, which prevents radio damage or loss.

**Optional Accessories** *continued*

Leather Holster fixed belt loop

**HL850L**

Durable and strong, the leather holster offers the best protection for your BR850™ radio.



Leather Holster w/ swivel belt loop

**HL850SL**

Durable and strong, the leather holster offers the best protection for your BR850™ radio.



Nylon Holster fixed belt loop

**HN850L**

Durable and strong, nylon holster offers great protection for your BR850™ radio.

## Optional Accessories *continued*



Nylon Holster w/ swivel belt loop

**HN850SL**

Durable and strong, nylon holster offers great protection for your BR850™ radio.

**RADIO SPECIFICATIONS**

Frequency Range	VHF: 136-174 MHz UHF: 400-470 MHz
Channel Capacity	16
Operating Voltage	DC 7.4V
Channel Spacing	12.5KHz
Dimensions (H×W×D) (with battery, without antenna)	122×55×38mm
Weight (with antenna & battery)	426g
Sensitivity	0.25/0.35μV
RF Power Output	H: 4W(UHF)/5W(VHF) L: 1W
Rated Audio Power Output	0.5W
Ambient Temperature	-4°F ~ +122°F (-20 °C ~ +50 °C)
Storage Temperature	-4°F ~ +140°F (-20 °C ~ +60 °C)
Charging Temperature	32°F ~ +104°F (0°C ~ +40°C)
Battery Part No.	B850LI-S
Battery Life (5-5-90 duty cycle)	Approx. 14 Hours
Charging Time	Approx. 4 Hours
Max. Charging Voltage	DC 12V

## GLOSSARY

**Short Press** - Key press shorter than 1.5 seconds

**Long Press** - Key press longer than 1.5 seconds

**Standby Status** - In normal mode, no key operation is made on the radio and the radio is in receiving status.

**CTCSS/CDCSS** - The setting of CTCSS/CDCSS code in transmitting party must match that in the receiving party for the receiver to unmute its output audio.

**Battery Save** - The function is to save battery power and prolong the operation time. Once no activity or operations are occurring on the channel, the radio will be on and off alternately.

**Time-out Timer (TOT)** - The time-out timer feature stops someone from talking too long and tying up the channel.

**Squelch** - The purpose of squelch is to mute audio output from the speaker when no signals are present. Open the squelch to unmute radio speaker.

**Squelch Off** - Always unmute speaker to receive audio as well as background noise.

**Monitor** - Carrier condition must be satisfied for the radio to unmute to an incoming call, regardless of CTCSS/CDCSS condition.

*continued >*



**Momentary** - Hold down the Function key to activate the status, and release it to turn it off.

**Scan** - The scan feature enables the radio to continuously scan each channel for activity.

**Busy Channel Lockout** - Avoid interference with users on same channel by preventing transmission if another talk group is already on the air.

**VOX** - The radio will automatically begin transmitting when you speak.

## WARRANTY STATEMENT

RCA Communications Systems warrants each new radio product it supplies to be free from defects in material and workmanship under normal use and service for the time period listed below, provided that the user has complied with the requirements stated herein.

The warranty period begins on the date of purchase from an Authorized RCA Communications Systems Sales and Service Outlet. This warranty is offered to the original end user and is not assignable or transferable. RCA Communications Systems is not responsible for any ancillary equipment which is attached to or used in conjunction with RCA Communications Systems products.

RCA Communications Systems offers to the original end user a Three (3) Year Limited Warranty on the RCA BR850™ Radio Handset. The BR850™ Antenna, BR850™ Battery and the BR850™ Battery Charger are covered under a One (1) Year Limited Warranty. The BR850™ Belt Clip is not covered under the warranty.

During this period, if the product fails to function under normal use because of manufacturing defect(s) or workmanship, it should be returned to the Authorized RCA Communications Systems Sales and Service Outlet from which it was purchased. The Sales and Service Outlet will repair the product to full operating specifications or replace the product with a new product of the same make and model. The user is responsible for all charges incurred in returning the product to the Authorized RCA Communications Systems Sales and Service Outlet. RCA Communications Systems will be responsible for all charges in returning the product to the end user via standard ground shipping service.

RCA Communications Systems shall have no obligation to repair or replace the product, if there is damage as a result of normal wear and tear or if the damage is caused in whole or in part by catastrophe, fault or negligence of the user, improper or unauthorized alterations or repairs to the product, incorrect wiring, use of the product in a manner for which it was not designed, or by causes external to the product. This warranty is void if the product serial number is altered, defaced or removed.

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FOR ANY PRODUCT WHICH DOES NOT COMPLY WITH THE WARRANTY SPECIFIED, THE SOLE REMEDY WILL BE REPAIR OR REPLACEMENT. IN NO EVENT WILL RCA COMMUNICATIONS SYSTEMS BE LIABLE TO THE BUYER OR ITS CUSTOMERS FOR ANY DAMAGES, INCLUDING ANY SPECIAL,

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The end-user of any two-way radio is solely responsible for obtaining any license or other authorizations required by the Federal Communications Commission (FCC). For further information visit [www.fcc.gov](http://www.fcc.gov) or call 1-888-CALL-FCC (1-888-225-5322).

For Sales, Warranty and Customer Support please contact:

Discount Two-Way Radio Corporation – North American Distributor

1430 240th Street

Harbor City, CA 90710

Phone: 310-224-5100 / Fax: 310-224-5101

[www.discounttwo-wayradio.com](http://www.discounttwo-wayradio.com)

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## This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



Communications Systems

## **RF Energy Exposure Awareness and Control Information and Operational Instructions for Occupational Use**

**NOTICE:** This radio is intended for use in occupational / controlled conditions where users have full knowledge of their exposure and can exercise control over their exposure to meet the occupational limits in FCC and International standards. This radio device is NOT authorized for general population consumer use.

This two-way radio uses electromagnetic energy in the radio frequency (RF) spectrum to provide communications between two or more users over a distance. It uses radio frequency (RF) energy or radio waves to send and receive calls. RF energy is one form of electromagnetic energy. Other forms include, but are not limited to, sunlight and x-rays. RF energy, however, should not be confused with these other forms of electromagnetic energy, which when used improperly, can cause biological damage. Very high levels of x-rays, for example, can damage tissues and genetic material.

Experts in science, engineering, medicine, health, and industry work with organizations to develop standards for safe exposure to RF energy. These standards provide recommended levels of RF exposure for both workers and the general public. These recommended RF exposure levels include substantial margins of protection.

All RCA Communications Systems' two-way radios are designed, manufactured, and tested to ensure they meet government-established RF exposure levels. In addition, manufacturers also recommend specific operating instructions to users of two-way radios. These instructions are important because they inform users about RF energy exposure and provide simple procedures on how to control it.

Please refer to the following websites for more information on what RF energy exposure is and how to control your exposure to assure compliance with established RF exposure limits:

<http://www.fcc.gov/oet/rfsafety/rf-faqs.html>

<http://www.osha.gov/SLTC/radiofrequencyradiation/index.html>

### **Federal Communication Commission (FCC) Regulations**

The FCC rules require manufacturers to comply with the FCC RF energy exposure limits for portable two-way radios before they can be marketed in the U.S. When two-way radios are used as a consequence of employment, the FCC requires users to be fully aware of and able to control their exposure to meet occupational requirements. Exposure awareness can be facilitated by the use of a product label directing users to specific user awareness information. RCA Communications Systems' two-way radio has a RF Exposure Product Label. Also, RCA Communications Systems' user manual or separate safety booklet includes information and operating instructions required to control your RF exposure and to satisfy compliance requirements.

### **Compliance with RF Exposure Standards**

RCA Communications Systems' two-way radio is designed and tested to comply with a number of national and International standards and guidelines (listed below) for human exposure to radio frequency electromagnetic energy. This radio complies with the IEEE (FCC) and ICNIRP exposure limits for occupational / controlled RF exposure environments at operating duty factors of up to 50% talk - 50% listen and is authorized by the FCC for occupational use only. In terms of measuring RF energy for compliance with these exposure guidelines, your radio generates measurable RF energy only while it is transmitting (during talking), not when it is receiving (listening) or in standby mode.

RCA Communications Systems' two-way radio complies with the following RF energy exposure standards and guidelines:

- United States Federal Communications Commission, Code of Federal Regulations; 47CFR part 2 sub-part J
- Ministry of Health (Canada) Safety Code 6. Limits of Human Exposure to Radio frequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz, 1999
- Australian Communications Authority Radio Communications (Electromagnetic Radiation - Human Exposure) Standard, 2003

- American National Standards Institute (ANSI) & Institute of Electrical and Electronic Engineers (IEEE) C95.1-1992
- Institute of Electrical and Electronic Engineers (IEEE) C95.1-2005 Edition
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998
- ANATEL ANNEX to Resolution No. 303 of July 2, 2002 "Regulation of limitation of exposure to electrical, magnetic and electromagnetic field in the radio frequency range between 9 KHz and 300GHz "and "Attachment to resolution # 303 from July 2, 2002."

### **RF Exposure Compliance and Control Guidelines and Operating Instructions**

To control your exposure and ensure compliance with the occupational / controlled environment exposure limits, always adhere to the following procedures.

#### **Guidelines:**

- Do not remove the RF Exposure label from the device.
- User awareness instructions should accompany device when transferred to other users.
- Do not use this device if the operational requirements described herein are not met.

#### **Operating Instructions**

- Transmit no more than the rated duty factor of 50% of the time. To transmit (talk), push the Push-To-Talk (PTT) button. To receive calls, release the PTT button. Transmitting 50% of the time, or less, is important because this radio generates measurable RF energy exposure only when transmitting (in terms of measuring for standards compliance).

#### **Two-Way Radio Operation**

- Hold the radio in a vertical position in front of the face with the microphone (and other parts of the radio including the antenna) at least one inch (2.5 centimeters) away from the nose or lips. Antenna should be kept away from the eye. Keeping the radio at a proper distance is important since RF exposures decrease with increasing distance from the antenna.

#### **Body Worn Operation**

- When worn on the body, always place the radio in a RCA Communications Systems -approved clip, holder, holster, case, or body harness for this product. Using approved body worn accessories is important because the use of non- RCA Communications Systems -approved accessories may result in exposure levels, which exceed the FCC occupational/controlled environment RF exposure limits.
- If you are not using a body-worn accessory and are not using the radio in the intended use position in front of the face, ensure the antenna and the radio are kept at least one inch (2.5 centimeters) from the body when transmitting. Keeping the radio at a proper distance is important because RF exposures decrease with increasing distance from the antenna.
- DO NOT hold the antenna when the radio is transmitting. Holding the antenna affects call quality and may cause the radio product to operate at higher or lower level than needed.
- DO NOT touch the metal surface of the antenna (in extended position) when the radio is transmitting. RF discomfort may result.

Use only RCA-approved supplied or replacement antennas, batteries, and accessories. Use of non-RCA-approved antennas, batteries, and accessories may exceed the FCC (IEEE) and ICNIRP RF exposure guidelines.