

2.1 PACKING LIST

When the package containing the transceiver is first opened, please check it for the following contents:

- HX350S Transceiver
- CBT350 Alkaline Battery Tray
- CAW240 DC Charge Cable with 12 V Cigarette Lighter
- CNB350AS Rechargeable Battery Pack
- CCA250 Charge Adaptor with screws
- CWC151K 220VAC Wall Charger for CCA250
- CAT350 Flexible Antenna with STUD connector
- Lanyard
- Belt Clip with screws
- Owner's Manual
- Owner's Manual Supplement

2.2 OPTIONS

CMP350	Noise-canceling Waterproof Speaker/Microphone
CSA240AB	230VAC Desktop Rapid Charger for CNB350AS
CSA280	120VAC Desktop Rapid Charger for CNB350AS
CVS240	Voice Scrambler Unit
CWC232	120/230 VAC Wall Charger for CCA250

2.3 REPLACEMENT PARTS

Flexible Antenna with STUD Connector	CAT350
Rechargeable Battery Pack	CNB350AS
Belt Clip	484C258012
Screws for Belt Clip	51102604U0
Lanyard	458C156040
Volume Control Knob	406B154010
Squelch Control Knob	406B154010
SPK/MIC Connector Cover	406B067020
SPK/MIC Connector Screw	406B010010
SPK/MIC Connector Washer	406B012010

NOTE

This section defines each control of the transceiver. For detailed operating instructions refer to section 4 of this manual. Refer to Figure 1 for the location of the following controls, indicators, and connections.

3.1 CONTROLS AND CONNECTIONS

- ① **POWER SWITCH/VOLUME CONTROL**
Turns the transceiver on and off, and adjusts the volume.
- ② **SQUELCH CONTROL (SQL)**
Sets the point at which random noise on the channel does not activate the audio circuits but a received signal does. This point is called the squelch threshold. Further adjustment of the squelch control will degrade the reception of wanted transmissions.
- ③ **PUSH-TO-TALK (PTT) SWITCH**
Activates transmission.
- ④ **UP (▲) KEY**
Selects the desired channel. Each press increases the channel number. When held down, the channels increase continuously.
- ⑤ **DOWN (▼) KEY**
Selects the desired channel. Each press decreases the channel number. When held down, the channels decrease continuously.
- ⑥ **16/9 KEY**
Immediately recalls channel 16 from any channel location. Holding down this key recalls channel 9. When the **WX** key is pressed while holding down this key, the mode toggles between USA, International and Canadian.
- ⑦ **WX KEY**
Immediately recalls a weather channel from any channel location. Recalls the previous channel when the **WX** key is pressed again.

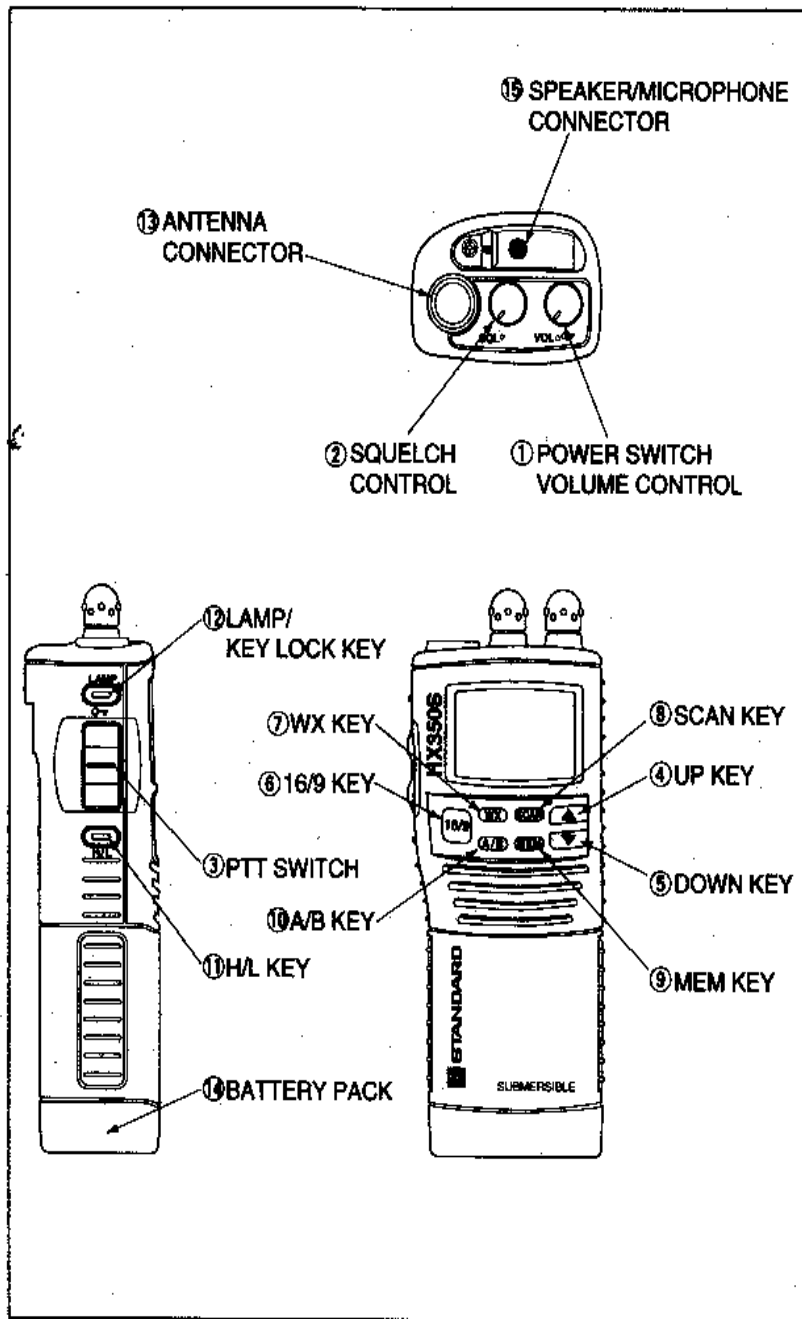


Figure 1. Controls and Connectors

⑧ SCAN KEY

Starts scanning programmed channels. Press this key for at least 1 second to turn on and off priority scan (scanning of programmed channels and priority channel) during scan.

⑨ MEM (Scrambler) KEY

Memorizes the selected channel. When pressed again, deletes the memorized channel. Hold down this key for at least 1 second, to turn the scrambler on and off. (if an optional CVS240 voice scrambler is installed)



⑩ A/B KEY

Immediately recalls two user assigned channels from any channel.

⑪ H/L KEY

Toggles between high and low power. To change from low power to high power, hold down this key on Canadian channel 13, USA channel 13 or 67.

⑫ LAMP/  (key lock) KEY

Turns the lamp for LCD and keypad back-lighting on and off. Hold down this key to lock the displayed channel functions (except the H/L, PTT and LAMP/  keys) so that they are not accidentally changed. The key lock symbol "" appears to indicate that the channel is locked. Hold down until the key lock symbol disappears to unlock the channel.

⑬ Antenna Connector

Connects the flexible antenna CAT350.

⑭ Battery Pack

Provides DC power to the transceiver.

⑮ External Speaker/Microphone Jack

Accepts optional CMP350 speaker/microphone. When the EXT jack is used, the internal speaker is disabled.

3.2 INDICATORS

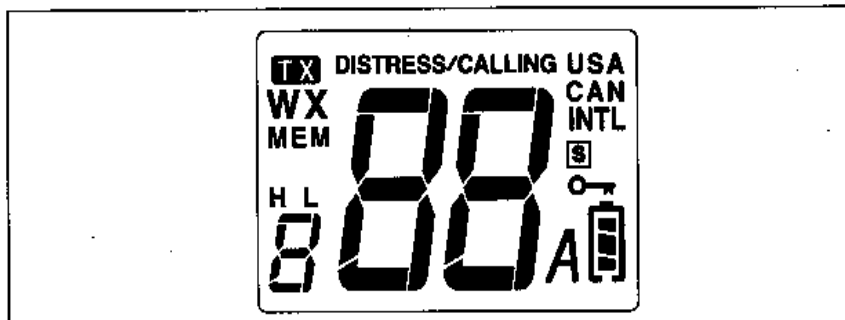


Figure 2. Indicators

Channel Display

The operating channel in both transmission and reception mode.

A Indicator

Ship-ship channel in USA or Canadian mode whose counterpart in the International mode is a public correspondence (marine operator) channel.

USA/INTL/CAN Indicator

The modes of operation for the particular channel. "USA" indicates USA mode. "INTL" indicates International mode and "CAN" indicates Canadian mode.

TX Indicator

Indicates transmission.

WX Indicator

NOAA weather channel.

MEM Indicator

The channel is in the transceiver's scan memory.

H/L Indicator





"H" is high power. "L" is low power. Blank is a reception only channel.

Key Lock Symbol Indicator

The channel is locked. All keys are disabled except for the **H/L**, **PTT** and **LAMP/** keys.

Battery Indicator

Battery life, during transmission and reception, is as follows:

-  : Over 50% charged
-  : 25% charged
-  : Less than 10% charged
-  : Need to charge (Also see Section 5.1)

NOTE

The battery life indicator is accessed immediately by pressing the **PTT** switch.

The battery indicator should be used only as a guide in charging the CNB350AS battery.

S Indicator

The small character "S" above the keylock symbol "Ⓚ" on the display indicates the scrambler code. (only when CVS240 scrambler is installed and activated)

DISTRESS/CALLING Indicator

"DISTRESS/CALLING" indicates CH16 is in use. "CALLING" indicates CH09 is in use.

4.1 INITIAL PROCEDURE

NOTE

Never key the transceiver without an antenna connected. Damage may occur to the transceiver. Do not operate the transceiver while charging.

1. Install the belt clip on the transceiver if desired. Use the 2 Phillips-head screws included with the clip to mount the clip to the back of the transceiver.
2. Install the nylon carrying strap on the belt clip if desired.
3. Install the battery pack on the transceiver. (see figure 4 and section 5.2)
4. Install the antenna to the transceiver.

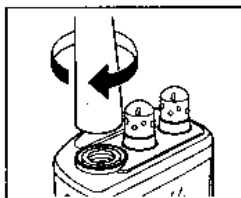


Figure 3. Antenna Installation

5. Turn the **POWER /VOLUME CONTROL** knob clockwise to turn the transceiver on.

NOTE

Water resistance of the transceiver is assured only when the battery pack and antenna are attached to the transceiver. Turn the battery lock screw clockwise 5 or 6 turns to tighten.

4.2 RECEPTION

1. Turn the **POWER /VOLUME CONTROL** knob clockwise to turn the transceiver on.
2. Turn the **SQUELCH CONTROL** knob fully counterclockwise. This state is known as squelch off.
3. Turn up the **POWER /VOLUME CONTROL** knob until the noise or audio from the speaker is at a desired level.
4. Select a channel that has no signal being received (no one is transmitting on the channel) and only noise is heard.
5. Slowly turn the **SQUELCH CONTROL** knob clockwise and stop immediately after the noise disappears. This condition is known as the "Squelch Threshold". If the knob is turned clockwise past this point, weak signals may not be received. No noise or no signal is heard until a signal is received that exceeds the squelch threshold.

6. To change channels, press the **▲** or **▼** key. Sometimes, a slight adjustment of the squelch threshold is needed as some channels have a higher noise level than others. Please refer to the Owner's Manual Supplement for a complete listing of all USA, International and Canadian VHF Marine channels and their use.
7. If necessary, press the **LAMP/↔** key to turn on the lamp. The lamp automatically turns off in about 5 seconds. To turn off the lamp sooner, press the **LAMP/↔** key again.
8. To lock the channel in the operating mode so that it is not accidentally changed, hold down the **LAMP/↔** key for about 1 second. This locks the **▲** and **▼** keys and all the front panel controls except the **H/L**, **PTT** and **LAMP/↔** keys. The key lock symbol "↔" appears on the display to indicate that the channel is locked. Hold down the **LAMP/↔** key for about 1 second to unlock the channel. The key lock symbol "↔" disappears from display.

4.3 TRANSMISSION

1. Perform steps 1 through 7 of RECEPTION.
 2. Before transmitting, monitor the channel and make sure it is clear.
- THIS IS AN FCC REQUIREMENT!**
3. For communications over short distances, press the **H/L** key until "L" is displayed on the LCD. This indicates low power, approximately 1 watt.

NOTE

Transmitting on 1 watt prolongs battery life. Low power (1 watt) should be selected whenever possible.

4. If using low power is not effective, select high power (5 watts) by pressing the **H/L** key until "H" is displayed.
5. When receiving a signal, wait until the signal stops before transmitting. The transceiver cannot transmit and receive simultaneously.
6. Press the **PTT** (push - to - talk) switch. The TX indicator is displayed during transmission.
7. Speak slowly and clearly into the microphone. Hold the microphone about 1/2 to 1 inch away from your mouth.
8. When the transmission is finished, release the **PTT** switch.
9. Refer to the **OWNER'S MANUAL SUPPLEMENT** for standard transceiver operating procedures.

4.4 TRANSMIT TIME - OUT TIMER (TOT)

While the **PTT** switch is held down, transmission time is limited to 5 minutes. This prevents prolonged unintentional transmissions. About 10 seconds before automatic transmitter shutdown, a warning beep is sounded from the speaker. The transceiver automatically switches to the receiving mode, even if the **PTT** switch is held down. Before transmitting again, the **PTT** switch must first be released and pressed again. This time-out timer (TOT) prevents a continuous transmission that would result from an accidentally stuck **PTT** switch.

4.5 USA, CANADIAN AND INTERNATIONAL MODES

1. To change the mode of the transceiver, hold down the 16/9 key and press the **WX** key. The mode changes from USA, to International, to Canadian with each press.
2. "USA" appears on the LCD for the USA mode, "INTL" appears for International and "CAN" appears in Canadian mode.
3. Refer to marine channel charts in OWNER'S MANUAL SUPPLEMENT for allocated channels in each mode.

4.6 NOAA WEATHER CHANNELS

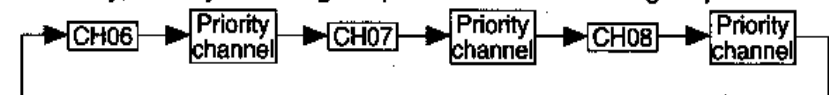
1. To receive a weather channel, press the **WX** key. The transceiver changes to the weather channel mode.
2. Press the **▲** or **▼** key to change to other weather channels.
3. To exit from the weather channels, press the **WX** key. The transceiver recalls the previous non-weather channel.

4.7 SCAN

1. Select the desired channel to be scanned using the **▲** or **▼** key.
2. Press the **MEM** key to store the channel into the transceiver's memory. "MEM" is displayed on the LCD.
3. Repeat steps 1 and 2 for all the channels to be scanned.
4. To delete a channel from the transceiver's scan memory, press the **MEM** key again while the memorized channel is displayed. "MEM" disappears.
5. All channels programmed remain in the transceiver's scan memory even if the power is turned off. See section "4.17 RESETTING THE TRANSCEIVER'S MICROPROCESSOR" to clear all the transceiver's scan memory.
6. Adjust the SQUELCH CONTROL knob until background noise is eliminated.
7. To start scan, press the **SCAN** key. The scan proceeds from the lowest to the highest programmed channel number and stops on channels when a transmission is received.
8. To stop the scan, press the **SCAN** key.

4.8 PRIORITY SCAN

1. The following channels can be set as the priority channel; 16, 09, A, and B. To set the priority channel, hold down the 16/9 key and press the **MEM** key. The channel changes from 16 to 09 to A to B channel with each press of the **MEM** key. The displayed channel is set to the priority channel.
2. For priority scanning, hold down the **SCAN** key at least 1 second during normal scanning. Scanning will proceed between the memorized channels and the priority channel. The priority channel will be scanned after each programmed channel.
3. For example, channels 06, 07, 08 are memorized in the transceiver's memory, Priority scanning will proceed in the following sequence:



4. Even when the transceiver stops and listens to the signal of a programmed channel, the transceiver will dual watch between this channel and the priority channel.

4.9 WEATHER ALERT

In the event of extreme weather disturbances such as storms and hurricanes, NOAA (National Oceanic and Atmospheric Administration) sends a weather alert accompanied by a 1050 Hz tone and subsequent weather reports on the weather channels. The transceiver is capable of receiving this alert if the following is performed:

1. Program weather channels into the transceiver's memory for scanning. Follow the same procedure as for regular channels under Section 4.7.
2. Press the **SCAN** key to start the scan.
3. The memorized weather channels are scanned along with the regular memorized channels. Scan does not stop for normal weather broadcast.
4. When an alert is received on a weather channel, scanning stops and the transceiver enters the WEATHER ALERT MODE.
5. When the transceiver is in the WEATHER ALERT MODE, a loud tone is sounded.
6. Press the **WX** key to stop the alert tone and receive the voice information on the weather channel.

4.10 EMERGENCY CHANNEL 16

1. To select the emergency channel, press the **16/9** key from any channel.
2. Transmit your emergency signal in the same manner as on regular channels. If you can not contact anyone on channel 16, switch to another channel.
3. See the OWNER'S MANUAL SUPPLEMENT for additional emergency operating practices.
4. To recall the previous channel from 16, press the **16/9** key.

4.11 CHANNEL 9

Channel 9 is used as a hailing channel for initial, non-emergency contact with other vessels. Hold down the **16/9** key for 1 second to select channel 9.

4.12 OPERATING ON CHANNEL 13

Channel 13 is used at docks, bridges and for maneuvering in port. Messages on this channel must concern navigation only, such as meeting and passing in restricted waters.

In emergencies and when approaching blind river bends, high power is allowed. Hold down the **H/L** key to temporarily switch to high power. High power can only be accessed in USA and Canadian modes. When the **H/L** key is released, the transceiver will revert low power.

4.13 OPERATING ON CHANNEL 67

When channel 67 is used for navigational bridge-to-bridge traffic between ships, high power may be used temporarily in the USA mode by pressing the **H/L** key. When the **H/L** key is released, the transceiver will revert low power.

4.14 CHANNEL A/B INSTANT ACCESS

Two user-assigned channels can be programmed for instant access. USA channels 9 and 16, and WX channels should not be assigned as A or B channels because they are readily available with the **16/9** and **WX** keys. If the **A/B** key is pressed and no channel A or B has been assigned, the LCD will display "--" and no channel number will be present.

4.14.1 Programming

1. Hold down the **A/B** key and then turn on the transceiver.
2. The blinking letter A will appear on the display, and dashes "--" indicate that no channel has been designated Channel A.
3. Press the **▲** or **▼** key until the desired channel number is displayed.
4. With the desired channel number displayed, press the **MEM** key once. The "A" will stop blinking, indicating that the displayed channel is now designated Channel A.
5. Press the **A/B** key again. The blinking letter "b" will appear on the display, and dashes "--" indicate that no channel has been designated Channel B.
6. Press the **▲** or **▼** key until the desired channel number is displayed.
7. With the desired channel number displayed, press the **MEM** key once. The "b" will stop blinking, indicating that the displayed channel is now designated Channel B.
8. Turn the radio off and then on again to return to normal radio mode.

To change A and B channel assignments, perform the following steps:

1. Hold down the **A/B** key and then turn on the transceiver. The desired channel A's number is displayed.
2. Press the **MEM** key. The "A" will blink and dashes "--" will appear on the display.
3. Set the new channel to be designated Channel A (or leave the channel unassigned). Press the **MEM** key again to save.
4. Next press the **A/B** key and press the **MEM** key. The "b" will blink and dashes "--" will appear on the display.
5. Set the new channel to be designated Channel B (or leave the channel unassigned). Press the **MEM** key again to save.
6. Turn the radio off and then on again to return to normal radio mode.

4.14.2 Operation

Pressing the **A/B** key more than once toggles between channel A and channel B. Channel A is represented by "A" to the left of the channel number on the LCD, and channel B is represented by "b". Do not confuse this "A" with the one that sometimes is displayed to the right of the channel number (described in the section 3.2 of this Owner's Manual).

4.15 SIMPLEX/DUPLEX CHANNEL USE

All channels are factory-programmed in accordance with FCC(USA), Industry Canada and International regulations. Mode of operation cannot be altered from simplex to duplex or vice-versa. Simplex or duplex mode is automatically activated, depending on the channel and whether USA, International or Canadian operating mode is selected. Refer to the channel charts in the OWNER'S MANUAL SUPPLEMENT.

4.16 VOICE SCRAMBLER

If private communication is desired, a CVS240 voice scrambler can be installed to the transceiver. Contact your dealer to have the voice scrambler installed and programmed for your transceiver. With a voice scrambler installed in the transceiver, channels to be scrambled can be programmed.

4.16.1 Programming

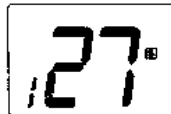
1. Hold down the **WX** key and turn on the transceiver.

The display shows:



2. Press the **▲** or **▼** key to set the scrambler code. There are 128 scrambler codes (00-127).

The display shows:



3. Press the **MEM** key to store the scrambler code in the transceiver's memory.

The display shows:



4. Press the **▲** or **▼** key to set the scrambled channel (scrambled channel = CH05).

The display shows:



5. Press the **MEM** key to store the scrambled channel in the transceiver. "MEM" will be displayed on LCD.



6. To program other channels to be scrambled, repeat steps 4 and 5. Only one scrambler code can be chosen for all channels programmed.

4.16.2 Operation with voice scrambler

1. Turn on the transceiver. Normal operation resumes.
2. Select a channel that was programmed for scrambler mode.
3. Hold down the **MEM** key for 1 second to turn the scrambler on. The display shows "B" to indicate that the scrambler is activated.
4. Hold down the **MEM** key for 1 second again to turn the scrambler off.

4.17 RESETTING THE TRANSCEIVER'S MICROPROCESSOR

Resetting the microprocessor restores the initial, factory supplied conditions in the transceiver. These are called the default conditions. To reset the microprocessor, first turn the transceiver off. Then while holding the **WX** and **SCAN** keys pressed, turn the transceiver on. The default conditions are:

- No channel numbers are in memory.
- Channel 16 is the priority channel.
- Channel 16 will be selected when the transceiver is turned on.
- WX channel 01 will be recalled when the **WX** key is pressed.
- Channels A and B are unassigned.
- No voice scrambler code is selected.

NOTE

The above procedure also resets the microprocessor. Perform this procedure if an operational problem occurs.

5

BATTERY

CAUTION

To avoid risk of explosion and injury, CNB350AS battery pack should only be removed, charged or recharged in non-hazardous environments.

5.1 BATTERY CHARGING

To check the charge status, install the battery and press the PTT switch while observing the BATT indicator. (see page 7)

The battery charge system (CCA250 and CWC151K) supplied with the transceiver recharges a completely discharged CNB350AS battery pack in about 15 hours.

Battery pack should not be charged with the supplied battery charge system for longer than 16 hours.

The CSA280 is an optional desktop rapid charger that charges the CNB350AS battery pack in approximately 1.5 hours. The transceiver and its battery can be placed into this charger, and the charger set to rapid charge. Battery condition is automatically sensed: when full charge is achieved, the charger switches to trickle-charge mode to maintain the charge indefinitely without harm to either the battery or the charger. This charger and an extra battery are highly recommended.

5.2 BATTERY REMOVAL/INSTALLATION

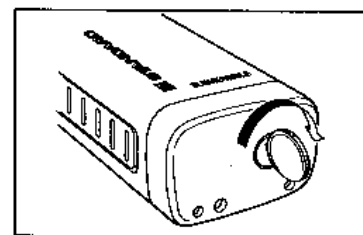


Figure 4. Installing the battery

1. Turn the transceiver off.
2. To remove, turn the battery lock screw counterclockwise 5 or 6 turns, and pull the battery pack until it slides out.
3. To install, slide the battery pack into the battery cavity until fully inserted, and turn the battery lock screw clockwise until hand-tightened. (see figure 4)

5.3 OPERATING BATTERY CHARGE SYSTEM

1. Plug the end of CWC151K wall charger to the DC IN connector of the CCA250 charge adaptor.
2. Plug the wall charger into a 220 VAC wall outlet.
3. Turn the transceiver off.
4. Insert the transceiver. The indicator lights, and charging begins.
5. Remove the battery pack from charge adaptor when charging time has passed.

NOTE

The CWC151K can be replaced by the CAW240 mobile cable, or CWC232 120/230 VAC wall charger.

CAUTION

Never plug the power supply to the CCA250 charge adaptor except with a CAW240, CWC151K or CWC232.

5.4 CBT350 BATTERY TRAY

CBT350 is a battery tray that holds six AA alkaline batteries and is used with the HX350S transceiver.

1. Push both sides of the top case and remove the bottom case.
2. Install the battery cells into the top case, paying close attention to the battery polarity markings on the case.
 - When the HX350S is operated with the alkaline batteries, the battery life is as follows: (5/5/90 duty cycle)
 - high power - 5 hours
 - low power - 12 hours

Note that battery life is more than doubled if transceiver is consistently operated on low power.

NOTE

To ensure proper alignment of screw, rotate it counterclockwise a couple of times prior to tightening.
The battery indicator on the transceiver is only applicable to the CNB350AS rechargeable battery. Disregard this indication when using alkaline batteries.

5.5 BATTERY SAFETY

Battery packs for your transceiver contain Nickel-cadmium (Ni-Cd) batteries. This type of battery stores a charge powerful enough to be dangerous if misused or abused, especially when removed from the transceiver. Please observe the following precautions:

DO NOT SHORT BATTERY PACK TERMINALS

Shorting the terminals that power to the transceiver can cause sparks, severe overheating, burns, and battery cell damage. If the short is of sufficient duration, it is possible to melt battery components. Do not place a loose battery pack on or near metal surfaces or objects such as paper clips, keys, tools, etc. When the battery pack is installed on the transceiver, the terminals that transfer current to the transceiver are not exposed. The terminals that are exposed on the battery pack when it is mounted on the transceiver are charging terminals only and do not constitute a hazard.

DO NOT OVERCHARGE

Do not charge the transceiver for more than 16 hours with the battery charge system. Heat generated by overcharging can shorten battery life and cause other battery pack component failures. The CSA280 rapid charger changes to trickle charge to maintain charge after their rapid charge cycle. Battery packs may be left in the CSA280 chargers without harm to either the battery pack or charger.

DO NOT INCINERATE

Do not dispose of any Ni-Cd battery in a fire or incinerator. The heat of fire may cause battery cells to explode and/or release dangerous gases.

DISPOSE OF BATTERY PACKS PROPERLY

Ni-Cd batteries must be recycled or disposed of properly. For requirements in your area, check with the dealer from whom you purchased your transceiver. The symbol shown below is a reminder that the battery packs are recyclable.



6 MAINTENANCE

For preventive maintenance and instructions on obtaining factory service, please refer to the OWNER'S MANUAL SUPPLEMENT. For general troubleshooting, refer to this Troubleshooting Chart.

TROUBLESHOOTING CHART		
SYMPTOM	PROBABLE CAUSE	REMEDY
The SCAN key does not start the scan.	No channels memorized.	Use the MEM key to enter desired channels into the transceiver's memory.
	Squelch is not adjusted.	Adjust the squelch to threshold or to the point where noise just disappears. Further adjustment of the squelch control may eliminate incoming signals.
The USA/INTL/CAN modes do not function.	Proper operation not followed.	Hold down the 16/9 key and press the WX key.
Rotating the squelch control does not eliminate background noise.	Low battery.	Charge battery. Refer to section 5 of this manual.
Cannot change any function.	Key Lock is on.	Turn Key Lock off.
Key Lock does not function.	Proper operation not followed.	Hold down for 1 second.
LED on CCA250 or CWC230 does not light when charging a battery.	Defective battery, CCA250 or CWC151K.	Contact your dealer

7 SPECIFICATIONS

Performance specifications are nominal, unless otherwise indicated, and are subject to change without notice.

7.1 GENERAL

Frequency Range	156.025 to 163.275 MHz
Channels	All currently allocated USA, Canadian and International channels, plus 10 weather channels.
RF Power Output with CNB350AS Battery	5.0 W (high) 1.0 W (low)
Operating Voltage	7.2 VDC
Current Drain:	
Standby	40 mA
Receive	200 mA
Transmit	1.8 A (high power), 0.7 A (low power)
Dimensions	5.51" H x 2.17" W x 1.50" D (140.0 mm x 55 mm x 38 mm)
Weight	1.0 lb. (0.45 Kg)
FCC Type Acceptance Number	APV0697
Industry Canada Type Approval Number	363822196A
Battery Life(5% TX, 5% RX, 90% Standby)	10 hrs. (high) 15 hrs. (low)

7.2 TRANSMITTER

Conducted Spurious Emissions	65 dB (high); 55 dB (low)
Audio Response	within +2/-8 of 6 dB/octave pre-emphasis characteristic from 300 Hz to 3000 Hz
AF Harmonic Distortion	3 %
Hum and Noise	37 dB
Frequency Stability (-20° to +50°C)	+/- 0.0005 %

7.3 RECEIVER

Sensitivity:	
20 dB Quieting	0.35 μ V
12 dB SINAD	0.30 μ V
Squelch Sensitivity (Threshold)	0.20 μ V
Modulation Acceptance Bandwidth	+/- 4.5 kHz
Selectivity:	
Spurious and Image Rejection	60 dB
Intermodulation Rejection	60 dB
Channel Spacing	25 kHz