

SM-4000 Series

OPERATOR'S MANUAL



maxon®

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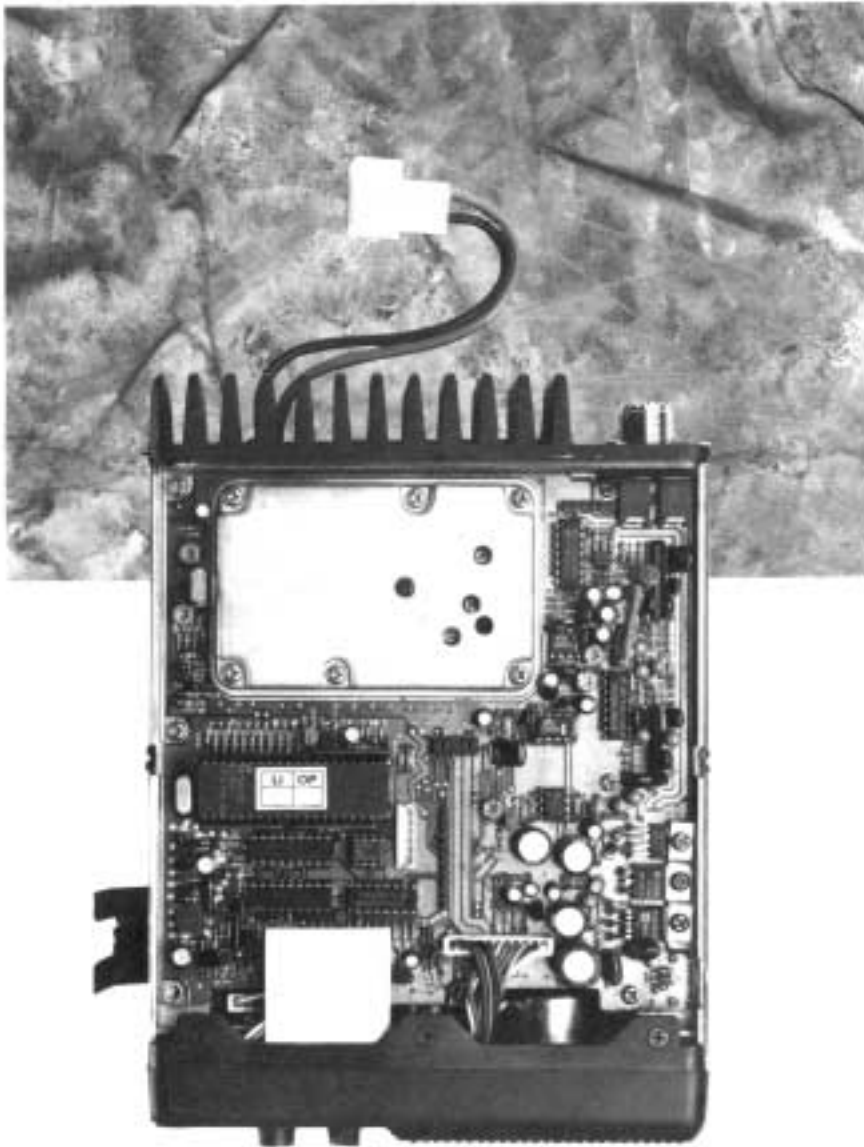
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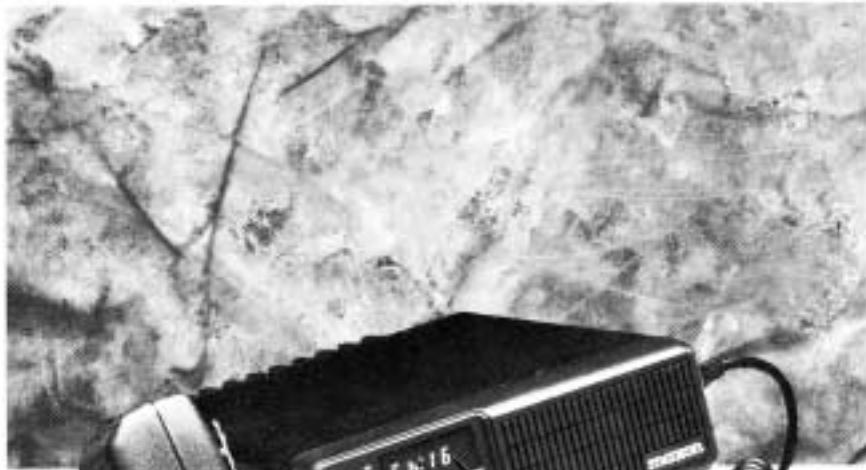


INTRODUCTION

The SM-4000 Series mobile radios provide advanced design using state-of-the-art technology. The Phase-Locked-Loop (PLL) synthesizer provides more flexibility and capability in a mobile radio than ever before offered by MAXON.

16 Channel capability, CTCSS and DCS signaling systems compatibility, as well as a fast scan function, including dual-level priority scan are all controlled by the SM-4000's microprocessor. The microprocessor reads specific channel information from an electrically erasable programmable read-only memory (EEPROM).

Flexibility results in friendly operation for you. In fact, you can program your own scan list, including priority channels, from the front panel of your SM-4000 Series.



▲ Channel Change Buttons

RED Transmit LED
YELLOW Busy LED
GREEN Call LED

Scan Push Button

Ⓢ

Monitor Button

Ⓜ

Auxiliary Speaker Button

Ⓛ

Priority Scan Push Button

Ⓟ

Channel Display

Squelch Control

On/Off Volume Control

FRONT PANEL CONTROLS, SWITCHES AND INDICATORS

ON/OFF/VOLUME CONTROL

- turns the SM-4000 Series on/off and adjusts the audio output level

SQUELCH CONTROL

- silences the radio's receiver when no signal is being received
- maximum squelch setting is at full clockwise rotation

CHANNEL CHANGE BUTTONS ▲ ▼

- assigned (programmed) channels may be selected by pressing either of the channel selector buttons; these buttons will scroll you through the programmed channels in your radio

SCAN PUSH BUTTON (S)

- turns scan on/off (ON indicated with a RED backlight)
- serves as "ENTER" during scan programming

PRIORITY SCAN PUSH BUTTON (P)

- turns priority scan on/off (ON indicated with a GREEN backlight)
- provides access to programming mode at radio turn-on

AUXILIARY SPEAKER BUTTON (1)

- silences internal speaker and connects the Auxiliary Speaker
- deletes channels from scan list in the programming mode

MONITOR BUTTON (2)

- disables tone or digital coded squelch options (only in receive mode)
- returns you to normal mode of operation from programming sequence
- controls display intensity

RED TRANSMIT LED

- indicates transmission when RED backlight is on
- will flash to indicate the synthesizer is out-of-lock

YELLOW BUSY LED

- indicates activity on receive channel when YELLOW backlight is on

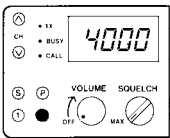
GREEN CALL LED

- indicates activity with the correct tone or code on the receive channel when GREEN backlight is on

CHANNEL DISPLAY

- the BLUE-GREEN display is easily visible under high ambient light conditions

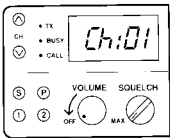
- indicates: channel number
priority scan channels
programming mode
error messages



RADIO ON/OFF, POWER UP

1. Turn the radio on by rotating the volume control $\frac{1}{2}$ turn clockwise. "4000" appears in the display for approximately 1 second. A power up alert tone is then generated to indicate that the radio has passed a self-check of the microprocessor.

2. Turn the radio off by rotating the volume control fully counterclockwise.



RECEIVING A CALL

1. Turn the radio on and select the desired channel by pressing either of the channel select buttons until the channel number is visible in the display.

2. When pushing the Monitor Button/LED 2, it will backlight and then the volume control may be adjusted to a comfortable listening level.

3. Rotate the squelch control clockwise (to the right) until the squelch noise (the rushing sound) is no longer heard from the speaker and the BUSY LED turns off. This setting should keep the receiver quiet when there is no signal present on the channel.

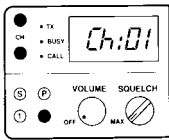
NOTE: Do not adjust the squelch control while other parties are using the channel.

4. Depress the Monitor Button/LED 2 to extinguish the GREEN backlight.

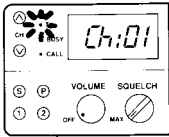
NOTE: If your SM-4000 Series is equipped with a tone or digital coded squelch options, depress the Monitor Button/LED 2 to enable the option, the CALL LED will no longer be illuminated.

TRANSMITTING

1. Turn the radio on and select the desired frequency by pressing either of the channel select buttons until the channel number is visible in the display.



2. Pick up the microphone and listen briefly to make sure that no one else is using the channel, or with the microphone On-Hook, depress the Monitor Button/LED 2 to monitor the programmed channel for activity. The Monitor LED 2 should be illuminated and the BUSY LED should be off.



3. Press the PTT bar on the microphone and from a distance of ½ to 2 inches, speak directly into it in a normal tone of voice. The TX LED will light while pressing the PTT.

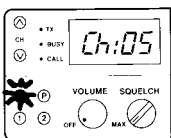
4. Release the PTT bar as soon as you have completed the transmission.

NOTE: Federal Communications Commission Rules and Regulations require that you monitor a frequency for activity before transmitting.

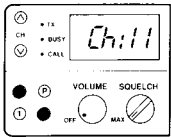
CHANNEL SCAN OPERATION

Scan on the SM-4000 Series allows you to monitor any or all programmed channels; the receiver checks each channel in the scan list in a continuous cycle for activity. The channels to be scanned are user programmable (see Scan List Programming). Channel scan on the SM-4000 Series can occur with or without priority, it's up to you.

• NON-PRIORITY SCAN



1. With microphone On-Hook, press the S button, it will light and your transceiver will start to scan the valid channels in the scan list. If your scan list is empty the S button will not illuminate, an alert tone will sound and scan will not start.

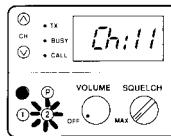


2. The scanner stops on the first scan channel with activity, and when that activity drops off, the dealer programmed SCAN WAIT TIME will go into effect (for reception of any additional transmissions on that channel). At the end of the scan wait time, the transceiver will resume scan; starting with the next channel in the list.

3. Going Off-Hook (picking up microphone) while locked onto an active channel, will stop scan, and cause the radio to remain locked on that channel.

4. Going Off-Hook while not locked onto any particular channel, scan will stop as above, however, transceiver will stop on whatever channel the scanner is on at time of microphone going Off-Hook, if no priority channel has been programmed. If a priority channel is programmed, the transceiver will revert you to a Priority Channel #1, even in Non-Priority Scan.

5. Going On-Hook (returning microphone to holder) will cause the scan sequence to resume after receive activity has ceased.

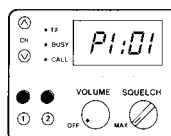


6. Exit the scan mode by pressing the S button. The SM-4000 Series will return to normal operation.

7. Transmit will occur on channel indicated.

• PRIORITY SCAN

Any of the radio's programmed channels may be designated as either the #1 Priority or #2 Priority channel (see Priority Channel Programming).



1. With microphone On-Hook, press the S button and the P button, each will illuminate and the radio will be in the priority scan mode. In this mode, the transceiver will monitor the priority channels every LOOK BACK TIME, as programmed by the dealer.

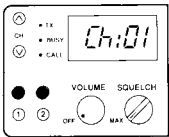
2. The scanner stops on the first scan channel with activity. If that channel is not a priority channel, the scanner will continue to monitor both priority channels every LOOK BACK TIME.

3. When the transceiver finds the #2 Priority Channel with activity, it monitors that channel activity while continuing to monitor Priority Channel #1. However, if activity is found on the First Priority Channel, the scanner will remain there until carrier drops and the SCAN WAIT TIME is over.

4. Going Off-Hook (picking up microphone) at any time during Priority Scan will result in the radio and the display reverting to the #1 Priority Channel. Transmitting will then occur on Priority #1.

5. Going On-Hook (returning microphone to holder) will cause the Priority Scan sequence to restart.

6. Exit the Priority Scan Mode by pressing both the S and the P buttons.



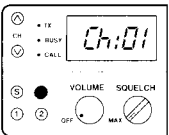
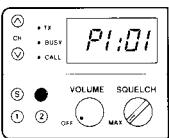
• LIMITED PRIORITY SCAN

1. With microphone On-Hook, press the P button, it will light and your transceiver will start to scan for activity on the #1 and #2 Priority Channels as well as the non-priority channel on which you entered limited priority scan.

2. As in Priority Scan, the transceiver will monitor the priority channels every LOOK BACK TIME as programmed by the dealer.

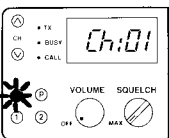
3. Operation remains the same as in Priority Scan.

4. Exit the Limited Priority Scan Mode by pressing the P button. Radio and display will remain on the non-priority channel for normal operation.



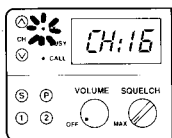
• VACANT (OR EMPTY) CHANNEL SCAN

With the microphone Off-Hook, press the S button and the SM-4000 Series will start scanning for a vacant channel on which to transmit. The S LED will blink to indicate that vacant channel scan is in process. The SCAN WAIT TIME (time radio remains on channel after carrier drops) will remain in



effect, however, the SCAN DELAY TIME (time radio takes to detect proper frequency and tone) is turned off.

The radio will lock onto the first channel with no activity. If that channel becomes active, the vacant channel scan will then resume.



If you press the PTT to transmit, the S LED will go out, the TX LED will go on, and you will have exited the vacant channel scan mode.

TRANSMIT TIME-OUT-TIMER

The Transmit Time-Out-Timer is a dealer programmable option that disables the radio's transmitter if a single transmission (i.e., an uninterrupted depression of the PTT Bar) exceeds a pre-determined period of time. The time-out timer minimizes channel occupancy and battery drain.

Following the time-out period, a continuous alert tone is generated that lasts until the PTT is released and the TX LED goes off. The radio then reverts back to the receive mode, even with the PTT Bar being depressed.

Another transmission may be initiated immediately after releasing the PTT, simply by depressing it again. If the PTT is released before the predetermined time-out, the radio operates as normal (reverts to receive mode with no alert tone).

The range for the time-out period is 10 seconds to 990 seconds (in 10 second increments).

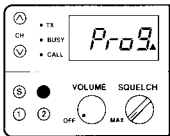
TRANSMIT INHIBIT ON BUSY CHANNEL (BUSY CHANNEL LOCK-OUT)

If your radio has this option programmed, press the PTT Bar while carrier is present (Busy LED ON or Busy and Call LEDs ON). This will cause all transmitter functions to be disabled, including the TX LED, and a warning tone to be generated. Transmitting will be enabled on a channel only if no carrier is being received (Busy LED OFF).

FRONT PANEL PROGRAMMING

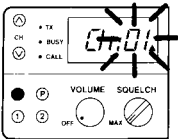
The "USER PROGRAMMING MODE" allows you to program you SCAN LIST and select up to 2 Priority Channels.

• ENTER USER PROGRAMMING MODE

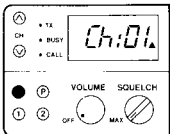


While turning the radio on, press and hold the P Priority Button/LED. The radio will sound the prompt tone and display the message "Prog". Now you can program your scan list, with or without priorities.

• SCAN LIST PROGRAMMING



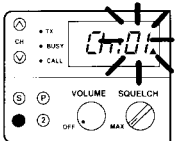
1. Press the S Scan Button/LED, the radio will display channel "1". The number will blink if channel 1 is not currently in the list.



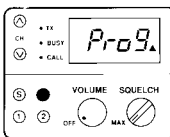
NOTE: When stopped on a channel in the programming mode, the display will blink if that channel is not in the scan list, and be continuous if already included.

2. To insert this channel (or any programmed channel) into the scan list, press the S button while the channel number is flashing in the display. The number will be displayed continuously to indicate that it is stored in the scan list.

3. Use the Channel Up \wedge or Channel Down \vee buttons to change the displayed channel number accordingly.

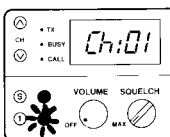


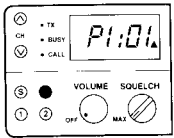
4. To delete a channel from the scan list, press the 1 Auxiliary Button/LED. The display will change from continuous to flashing, indicating the deletion was successful.



5. After you have completed programming your scan list, press the P button, the radio will sound the prompt tone and display the message "Prog".

6. Press the 2 button to exit user programming mode.





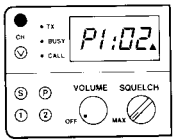
• USER PRIORITY CHANNEL PROGRAMMING

1. To enter user priority program press and hold P button while turning on radio.

2. Once in the User Programming Mode, press the P button to change the display to indicate the current priority channel.

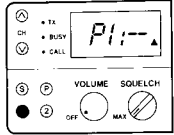
If Channel 1 is the First Priority, then the display will be "P1:01"

If no channel has been assigned priority, then the display will be "P1:—"



3. Use the Channel Up \wedge or Down \vee buttons to change the Priority Channel.

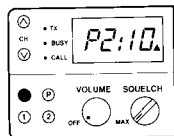
4. Use the 1 Auxiliary button to delete the priority channel.



5. After you have selected the First Priority Channel, press the S button to save it and bring up Priority 2 in the display.

6. If Channel 2 is the Second Priority, then the display will be "P2:02"

If no channel has been assigned second priority, then the display will be "P2:—"



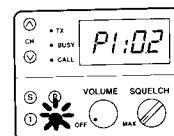
7. Use the Channel Up \wedge or Down \vee buttons to change the 2nd Priority Channel.

8. Use the 1 Auxiliary button to delete the Second Priority channel.



9. After finishing the priority channel programming, press the P button to save the priority channels programmed, to sound the prompt tone and display the message "Prog".

10. Press the 2 button to exit from the programming mode. The radio will return to the normal operating state on the last channel prior to programming.



ERROR MESSAGES

During normal operation, from turn-on to shut-off, the microprocessor is working. It is designed to keep you informed of its operating status – from initial self-check through the channel scan operation.

If your radio displays:

Er:01 - there is a problem with the EEPROM
(For example, EEPROM not installed or installed incorrectly).

Er:02 - there is a programming problem with the channel data; the radio will work, but only on correctly programmed channels.

Er:03 - indicates the synthesizer is out-of-lock or a channel is out of acceptable band; it is necessary to reprogram or realign the radio.

Er:04 - indicates improper antenna connection; the microprocessor will shut down the transmitter, generate a 3-beep alert tone and blink the TX LED as warnings.

NOTE: Should any of these messages appear on your display, MAXON recommends that you consult the dealer from whom the unit was purchased so that it can be serviced by a qualified service technician.

REAR PANEL CONNECTORS



A) EXTERNAL SPEAKER CONNECTOR

A 3.5mm diameter jack is provided for a 4 ohm external speaker. The internal speaker is silenced when the external speaker is connected.

B) AUXILIARY SPEAKER CONNECTOR

A 3.5mm diameter jack for a 4 ohm auxiliary speaker.

C) ANTENNA CONNECTOR

SO-239 type connector. Output is 50 ohms and **must be** connected to a properly installed 50 ohm antenna.

D) 13.8 V DC PLUG

Polarized plug; 13.8 volt DC input for **NEGATIVE GROUND SYSTEMS ONLY.**

GENERAL SAFETY INFORMATION

The FCC, with its action in General Docket 79-144, March 13, 1986, has adopted a safety standard for human exposure to radio frequency electromagnetic energy emitted by FCC regulated equipment. MAXON subscribes to the same safety standard for the use of its products. Proper use of this radio will result in exposure below governmental limits.

The following precautions are recommended:

- **DO NOT** operate the transmitter of a mobile radio when someone outside the vehicle is within two feet (0.6 meter) of the antenna.
- **DO NOT** operate the transmitter of any radio unless all RF connectors are secure and any open connectors are properly terminated.
- **DO NOT** operate this equipment near electrical blasting caps or in an explosive atmosphere.
- All equipment must be properly grounded according to MAXON installation instructions for safe operation.
- All equipment should be serviced only by a qualified technician.

Refer to the appropriate section of the product service manual for additional pertinent safety information.

WARNING

It is mandatory that radio installations in vehicles fueled by liquified petroleum gas conform to the following standard:

National Fire Protection Association standard NFPA 58 applies to radio installations in vehicles fueled by liquified petroleum (LP) gas with LP gas container in the trunk or other sealed-off space within the interior of the vehicles. This standard requires that:

1. Any space containing radio equipment shall be isolated by a seal from the space in which the LP gas container and its fittings are located.
2. Remote (outside) filling connections shall be used.
3. The container space shall be vented to the outside.

SOFTWARE COPYRIGHTS

The Maxon products described in this operating instruction manual may include copyrighted Maxon software programs stored in semiconductor memories or other media. Laws in the United States and other countries preserve for Maxon certain exclusive rights for copyrighted software programs, including the exclusive right to copy or reproduce in any form the copyrighted software program. Accordingly, any copyrighted Maxon software programs contained in the Maxon products described in this operating instruction manual may not be copied or reproduced without the express written permission of Maxon. Furthermore, the purchase of Maxon products shall not be deemed to grant either directly or by implication, estoppel, or otherwise, any license under the copyrights, patents or patent applications of Maxon, except for the normal non-exclusive royalty free license to use that arises by operation of law in the sale of a product.

• CAUTION • FUSE REPLACEMENT

For continual protection from Fire Hazard, replace fuse ONLY with same size, type and style: 32V 10amp 3AG fuse.

FCC LICENSE REQUIRED

The Federal Communications Commission requires that the user of this radio equipment be properly licensed under the applicable Part and/or Parts of the FCC Rules and Regulations.

Consult with your professional Maxon authorized land mobile dealer; or contact the nearest FCC Field Office for pertinent information related to obtaining a license.

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In addition to the SM-4000 Series mobile, Maxon manufactures and markets a wide selection of professional communications products, including mobile and portable FM transceivers, pagers, RF data equipment and a full complement of options and accessories.

For information on any of Maxon's top quality, affordably priced products, contact your local Maxon dealer or call Maxon America, Inc. at 1-800-821-7848 or 1-816-891-6320.

Quick Reference Card For SM-4000 Series Radio



FRONT PANEL CONTROLS, SWITCHES AND INDICATORS

- **On/Off/Volume Control**: turns radio on/off and adjusts audio output level
- **Squelch Control**: silences the radio's receiver when no signal is being received
- **Channel Change Buttons**: scroll you through the programmed channels in your radio, allow you to select the one you want
- **Scan Push Button**: turns Scan on/off (ON with RED backlight)
- **Priority Scan Push Button**: turns Priority Scan on/off (ON with GREEN backlight)
- **Auxiliary Speaker Buttons**: silences internal speaker and connects the auxiliary speaker
- **Monitor Button**: disables tone or digital coded squelch options in receive mode.
- **Transmit LED**: indicates transmission when illuminated
- **Busy LED**: indicates activity on receive channel when illuminated
- **Call LED**: indicates activity with the correct tone or code when illuminated

RADIO ON/OFF, POWER UP

1. Turn the radio on by rotating the on/off control $\frac{1}{2}$ turn clockwise. After "4000" appears in the display, the power up alert tone will be generated.
2. Turn radio off by rotating the on/off control fully counterclockwise.

RECEIVING A CALL

1. Turn the radio on and select the desired channel. With the Monitor Button/LED 2 ("2") lit, adjust the volume control to a comfortable listening level.
2. Rotate the squelch control clockwise (to the right) until the squelch noise (the rushing sound) is no longer heard.
3. Depress the "2" to extinguish the GREEN backlight.

NOTE: If your radio is equipped with coded squelch options, depress the "2" to enable the option, the CALL LED will no longer be illuminated.

TRANSMITTING

1. Turn the radio on and select the desired channel.
2. Pick up the microphone and listen briefly to make sure that no one else is using the channel. Or, with the microphone on-hook, depress the "2" to monitor the channel for activity; the "2" should be illuminated and the BUSY LED should be off.
3. Press the PTT on the microphone and from a distance of $\frac{1}{2}$ to 2 inches speak directly into the microphone in a normal tone of voice.
4. The TX LED will light RED while pressing the PTT.
5. Release the PTT as soon as you have completed the transmission.

NOTE: FCC Rules and Regulations require that you monitor a frequency for activity before transmitting.

CHANNEL SCAN OPERATION

Non-Priority Scan

1. With microphone on-hook, press the S button ("S"), it will light and your radio will start to scan the valid channels in the scan list.
2. The scanner will stop on the first scan channel with activity. When that activity falls off, the dealer programmed SCAN WAIT TIME will go into effect. At the end of the Scan Wait Time, scan resumes, beginning with the next channel in the list.
3. Going off-hook, (picking up microphone) while locked onto an active channel will stop scan, and cause the radio to remain locked on that channel. Scan will resume when the microphone is returned to hook.

2. Then insert this or any channel into the scan list, press the "S" while the channel number is flashing in the display. The channel number will be displayed continuously to indicate that it is stored in the scan list.
3. You can now use the channel up and down buttons to change the displayed channel number accordingly.
4. To delete a channel from the scan list, press the 1 button/LED ("1"). The number will change from continuous to flashing, indicating that the deletion was successful.
5. After you have complete programming your scan list, press the "P", the radio will sound the prompt tone and display the message "Prog".
6. Press the "2" to exit the user programming mode.

NOTE: Use the "1" to delete displayed channel from the scan list; use the "S" to store displayed channel in the scan list.

Priority Channel Programming

1. After you have entered the user programming mode, press the "P" to change the display to indicate the current #1 priority channel.
2. Use the Channel up and down buttons to change it.
3. After you have selected the First Priority Channel, press the "S" to save it and to bring up Priority 2 in the display.
4. Use the Channel up and down buttons to get to the desired Priority #2 channel.
5. After you have selected the Second Priority Channel, press the "P" to save the priority channels programmed, to sound the prompt tone and to display the message "Prog".
6. To exit from priority channel programming mode press the "2".

Limited Priority Scan

1. With microphone on-hook, press the "P", it will light and your transceiver will start to scan for activity on the #1 and #2 Priority Channels as well as the non-priority channel on which you entered Limited Priority Scan.
2. As in Priority Scan, the transceiver will monitor the priority channels every Look Back Time as programmed by the dealer.
3. Operating remains the same as in Priority Scan.
4. Exit the Limited Priority Scan by pressing the "P". Radio and display will remain on the non-priority channel for normal operation.

Vacant (Empty) Channel Scan

1. With the microphone off-hook, press the "S" and the radio will start scanning for a vacant channel on which to transmit.
2. The "S" will blink to indicate that vacant channel scan is in process.
3. The radio will lock onto the first channel with no activity, if that channel becomes active during the scan wait time, the vacant channel scan will then resume.
4. If you press the PTT to transmit, the "S" will go out, the TX LED will go on, and you will have exited the vacant channel scan mode. Otherwise, simply return the microphone to its holder.

FRONT PANEL PROGRAMMING

To enter the user programming mode, press and hold the "P" during the initial 4 seconds at radio turn-on. The radio will sound the prompt tone and display the message "Prog".

Scan List Programming

1. After entering the programming mode, press the "S", the radio will display channel "01". The number will blink if channel one is not in the list.

5. Going off-hook, while not locked onto any particular channel, scan will stop as above, however, the transceiver will revert you to the #1 Priority Channel, even in non-priority scan.
6. Exit the scan mode by pressing "S". Your radio will return to normal operation.

NOTE: If your scan list is empty/unprogrammed, the "S" will not illuminate, scan will not start and an alert tone will sound.

Priority Scan

1. With microphone on-hook, press the "S" and "P", each will illuminate and the radio will be in the priority scan mode.
2. The scanner stops on the first scan channel with activity. If that channel is not a priority channel, the scanner will continue to monitor both priority channels every Look Back Time.
3. When the transceiver finds the #2 Priority Channel with activity, it decodes that channel activity while continuing to monitor Priority Channel #1. However, if activity is found on Priority Channel #1, the scanner will remain there until carrier drops and the Scan Wait Time is over.
4. Going off-hook at any time during Priority Scan will result in the radio and the display reverting to the #1 Priority Channel. Transmitting will then occur on Priority #1.
5. Returning microphone to its holder will cause the Priority Scan Sequence to restart.
6. Exit the Priority Scan mode by pressing both the "S" and the "P" (to extinguish). Radio and display will return to Priority #1 channel for normal operation.

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