

MULTI-NET® II

VIKING® CM

**FM TWO-WAY
PORTABLE RADIO**

Part No. 002-8585-378

3-98hph

Printed in U.S.A.

SAFETY INFORMATION

The FCC has adopted a safety standard for human exposure to RF energy. Proper operation of this radio under normal conditions results in user exposure to RF energy below the Occupational Safety and Health Act and Federal Communication Commission limits.

WARNING

DO NOT operate the transmitter with the antenna less than 24 cm (about 10 inches) from the eyes, face, or any exposed body part.

DO NOT operate the radio in explosive or flammable atmospheres. The transmitted energy could trigger blasting caps or cause an explosion.

DO NOT operate the radio without the proper antenna installed.

DO NOT allow children to operate or play with this radio.

NOTE: The above warning list is not intended to include all hazards that may be encountered when using this radio.

This device complies with Part 15 of the FCC rules. Operation is subject to the condition that this device does not cause harmful interference. In addition, changes or modifications to this equipment not expressly approved by Transcrypt International, Inc. could void the user's authority to operate this equipment (FCC rules, 47CFR Part 15.19).

LAND MOBILE PRODUCT WARRANTY- The manufacturer's warranty statement for this product is available from your product supplier or from the E.F. Johnson Company, 299 Johnson Avenue, Box 1249, Waseca, MN 56093-0514. Phone (507) 835-6222.

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FEATURES

- Up to 14 systems selectable
- Both Multi-Net (trunked) and conventional (non-trunked) modes of operation
- Up to 11 Multi-Net or 10 conventional groups selectable per system
- Quick select switch to select up to sixteen preprogrammed system/group combinations
- System scan
- Group scan (Multi-Net Only)
- User programmable system and group scan list
- LCD display with backlight
- A unique 5-character group identification (Multi-Net only) or 7-character system identification can be displayed
- Optional keypad for making telephone calls. Up to seven 14-digit telephone numbers can be stored in memory and later recalled.
- Low battery indicator
- Call indicator
- Busy indicator
- Clear-to-talk tone to signal when speaking can begin (Multi-Net Only)
- Time-out timer
- Compatible with optional Vehicular Adapter and Charger and remote control unit to allow mobile (vehicle) as well as hand-held use.

NOTE: Programming by your system operator determines the specific operation and availability of some of the preceding features.

QUICK REFERENCE GUIDE

Change system number

Press the “S” key to increase the system number or 2ND and then “S” to decrease the system number. The quick select switch can also be used if a position has been preprogrammed with the desired system/group.

Change group number

Same as above except press “G” key.

Program quick select sw

Turn the switch to the position to be programmed. If QLK is displayed, that position cannot be programmed. Select the system/group for that position using “S” and “G” keys and then press 2ND QSTO.

System scan on/off

Press SCN key

Momentarily suspend scan

Press Auxiliary switch on side. Pressing this switch twice halts scanning.

Monitor in conv mode

Press Auxiliary switch on side

Program scan list

Press LCK key. The lock status of either the system or group is changed, whichever was selected last. (Group scan must be programmed in order to delete a group.) To add all deleted systems or groups of the current system (whichever was selected last) back into list, press LCK key for 2 seconds.

Display Return Sys/Grp

Press RTN key twice (2ND RTN)

Select high or low power

Turn power on with auxiliary switch on side pressed. Then press auxiliary switch to display “xx POWR” and the PTT switch to select either “LO POWR” or “HI POWR”). The low-power mode is indicated by “LO” in the display. (If transceiver does not have selectable power, no power change occurs.)

Enable/disable keypad

Turn power on with auxiliary switch on side pressed. Then press the auxiliary switch to display “KP_XXXX” and the PTT switch to select either “KP_ENAB” or “KP_LOCK”.

Enable/disable key tone

Turn power on with auxiliary switch on side pressed. Then press the auxiliary switch to display “KP_xxxx” and the PTT switch to select either “KP_MUTE” or above conditions.

Loud/soft Clr-To-Tlk tone

Turn power on with auxiliary switch on side pressed. Then press the auxiliary switch to display “PTT xTN” and the PTT switch to select either “PTT 1TN” or “PTT 2TN”.

Turn on backlight

Press upper switch on side. To turn off backlight before 10 seconds, press switch again.

TELEPHONE CALLING USING OPTIONAL KEYPAD

NOTE: In phone mode, SCN = STO, LCK = CLR, RTN = RCL

Select Phone Mode

PHON or SEND

Transmit No. in Display

Briefly press PTT switch to acquire dial tone, then press SEND.

Store a No. in Memory

STO (1-7)

Recall No. From Memory

RCL (1-7)

Erase Last No. in Display

CLR

Erase Entire No. in Display

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NOTE: Before removing the battery pack, make sure that the radio power is turned off. Turning power off in the normal manner saves the current settings in memory (such as selected system/group, scan on-off, and the scan list). If the battery pack is removed with power on, memory loss and unpredictable radio operation may result.

CONTROLS

TOP PANEL CONTROLS

On-Off Volume

Turning this knob clockwise turns power on and sets the volume level. Turning it counterclockwise to the detent turns power off. Power is on when information appears in the display. Refer to “Setting Volume Level” for more information.

Quick Select Switch

This switch can be used to select up to 16 preprogrammed system/groups. The system/group selected by a position is programmed by the 2ND and QSTO keys or by your system operator. Some positions may be programmed so that they cannot be reprogrammed; if you select one of these positions, “QLK” is displayed. The “S” (System) and “G” (Group) select switches are disabled when a locked position is selected. See “Quick Select Switch” description for more information.

Emergency Switch

Used to manually or automatically place high-priority calls. Refer to “Emergency Switch” description for more information.

Side Controls

Push-To-Talk Switch

Pressing the lower half of the rubber switchpad turns the transmitter on. The transmit indicators are the red indicators on the top panel and “TX” in the display.

Auxiliary Switch

Pressing the upper middle part of the rubber switchpad momentarily halts scanning. Pressing it twice within 1 second halts scanning permanently. (To re-enable scanning, press this switch or the SCN key twice.) With a conventional system selected, this switch enables the monitor mode.

Turning power on with this switch pressed enables a menu for selecting keypad enable/disable, key press tone enable/disable, high/low power, and loud/soft clear-to-talk tone.

Backlight Switch

Pressing the upper part of the rubber switchpad turns on the backlight. The backlight automatically turns off 8 seconds after this switch is released or it can be turned off by pressing this switch again.

Front Panel Controls

S (System)

Pressing this key increases the selected system. Holding the key down causes the function to repeat. Only programmed systems can be selected. To decrease the system number, press the 2ND key and then this key.

G (Group)

Functions like the S (System) key to change the selected group.

NOTE: If equipped with the optional telephone keypad, the next three keys have a different function in the phone mode. Refer to “Optional Keys For Telephone Calls” for more information.

RTN (Return)

Pressing this key once enables the second function of the S, G, SCN, and LCK keys. The display momentarily indicates “2ND” when the second function is enabled. Pressing this key again displays the home or last active system/group (see “Return Key” description).

SCN (Scan)

Pressing this key turns the System Scan feature on and off. Scanning is enabled when “SCN” is indicated in the lower part of the display. When scanning is actually occurring, “IN SCAN” is indicated in the upper part of the display and the group number is replaced by a dash (-). See page 31 for more information.

Pressing the 2ND (RTN) key and then this key programs the current quick select switch position with the displayed system/group (unless the position is locked). Refer to “Quick Select Switch” description for more information.

LCK (Lock)

Pressing this switch changes the scan list status of either the displayed system or group, depending on which was selected last. (Group scan must be programmed to delete a group.) To add all deleted systems or groups of the current system back into the scan list, press this key for 2 seconds or more (see “Scan List Programming” description). Pressing the 2ND (RTN) key and then this key enables optional voice encryption (see “Voice Encryption” description).

Speaker and Microphone

The internal speaker and microphone are located behind the grille at the locations shown.

Battery Pack

Rechargeable nickel-cadmium (Ni-Cd) battery pack.

Optional Keys For Telephone Calls

NOTE: Refer to “Additional Phone Mode Information” for more information on the following keys.

0-9, *, #

Used for dialing a telephone number.

PHON (Phone)

Enables and disables the phone mode.

SEND

Transmits the telephone number in the display. This key can also be used to select the phone mode.

NOTE: The next three keys are multiple function keys which operate as follows in the phone mode and as described in the preceding section when in the standard mode.

STO (SCN)

Stores a number in memory. Press this key and then a number key from 1-7 to store the number in the display in that memory location.

CLR (LCK)

Erases the last digit in the display. Holding this key causes the function to repeat. Pressing RCL and then CLR erases the entire number in the display.

RCL (RTN)

Recalls numbers from memory. Pressing this key repeatedly steps through the numbers stored in memory. Pressing this key and then a number key from 1-7 recalls the number stored in that location.

DISPLAY INFORMATION

The following information appears at various times in the transceiver display. To view all the information in the display, turn power on with the backlight switch pressed. (Normal operation resumes when the switch is released.)

Alphanumeric Display

In the standard (non-phone) mode, this area of the display (SYST-ID) indicates either the 7-character system or 5-character group identification (the group identification is available only on Multi-Net systems). In the phone mode, it indicates the telephone number. Operating modes and error conditions are also displayed in this area (see “Display Messages”).

System Display (SYS)

Indicates the selected system number.

Group Display (GRP)

Indicates the selected group number.

—

This symbol next to “SYS” indicates that the displayed system has been deleted from the scan list by the LCK key (locked out). When it is displayed next to “GRP”, it indicates that the displayed group has been deleted. The lock indication also appears when system or group scanning if any scanned system or group has been deleted (see “Scan List Programming” description).

(Arrow)

Indicates that the left-most digits of the telephone number are not shown because the number is longer than 7 digits. To briefly display the overflow digits, press RCL 0.

(o)

Indicates that optional voice encryption is enabled on the displayed group. This feature is manually turned on or off by pressing 2ND OPT (RTN LCK).

U

Indicates that the group is programmed for Multi-Net unique ID calls.

MUTE

Indicates that the key press tone has been muted by the menu that is selected by turning power on with the Auxiliary switch pressed. To disable this tone, select KP_MUTE (press PTT switch); to re-enable this tone, select KP_ENAB.

QLK

Indicates that the current quick select switch position is locked and cannot be user programmed.

LO

Indicates that the low-power mode has been selected by the menu selected by turning power on with the Auxiliary switch pressed. To enable low power, select LO PWR (press PTT switch), and to enable high power, select HI PWR. (If the transceiver is not a selectable power model, no power change occurs.)

SCN

Indicates that the scan mode has been selected by the SCN key. If this indicator is flashing, the Multi-Net auto-registration feature is searching for another system (see “Auto-Registration” description).

TX

Indicates that the transmitter is on. The red indicator on the top panel also lights when the transmitter is on.

PHON

Indicates that the phone mode has been selected by the PHON or SEND key.

(Battery)

Indicates that the battery needs recharging. A beep also sounds when the push-to-talk switch is released if this indicator is on (see “Low Battery Indicator”).

MON

Indicates that the monitor mode is enabled by the Auxiliary switch when a conventional system is selected. This mode disables Call Guard squelch so that all messages are heard. To disable monitoring, press the Auxiliary switch again.

CALL

Indicates that a call has been received. To turn this indicator off, press any key.

BUSY

Indicates that the group (channel) is busy with other traffic when a conventional system is selected.

(Handset)

Indicates that the displayed group is programmed for telephone calls.

STANDARD CALLS

Introduction

Standard calls are all calls to other mobiles or control stations assigned to your site. These calls differ from telephone and special calls in that no number is dialed. Calls on conventional systems are always standard calls.

Placing a Standard Call

Proceed as follows:

1. Select the desired system and group.
2. If a conventional system is selected, the channel must be monitored before transmitting (see “Monitoring Before Transmitting”).
3. Press the push-to-talk switch and begin talking. If a Multi-Net system is selected, a clear-to-talk tone sounds to indicate when the system has been successfully accessed and speaking can begin (see “Clear-to-Talk Tone” description).
4. Release the push-to-talk switch as soon as the message is complete and listen for a response. (The push-to-talk switch must be pressed to talk and released to listen.)

Receiving a Standard Call

Proceed as follows:

1. Select the desired system and group.
2. After the message is received, press the push-to-talk switch and respond. If scanning, you should respond before scanning resumes. If you do not, another call may be received and you may have to change the system and group (see “Transmitting In Scan Mode”).

SPECIAL CALLS

Introduction

Special calls include telephone calls, calls to a specific mobile or dispatcher (unique ID), calls to other Multi-Net sites, and others. These calls differ from standard calls in that a special number must be dialed after the system is accessed. This number is usually dialed using the optional telephone keypad on the front panel. This type of call can be placed and received only if your transceiver has been programmed for that service by your system operator.

Placing a Special Call

Proceed as follows:

1. Select the system and group programmed for the special call you are making. When a group programmed for telephone calls is selected, the handset symbol appears in the display, and when a group programmed for unique ID calls is selected, a “U” is displayed.
2. Select the phone mode by pressing the PHON key. The SEND key can also be used unless the quick select switch is turned to a locked position (see “Additional Phone Mode Information” which follows). The phone mode is indicated by “PHON” in the display.
3. If you are making a telephone call, dial the telephone number. If you are making other calls, a number containing 4-8 digits is dialed. Your system operator will tell you what number to dial. You may also be able to recall the number from memory (see “Additional Phone Mode Information”).

4. Momentarily press the push-to-talk switch to acquire a dial tone. Then press the SEND key to transmit the number in the display. A short tone then sounds to indicate that the call was accepted by the system. After this tone sounds, the following ringing or second short tone sounds:

Ring Tone - A ringing tone indicates that the other party is being rung. When the party answers, continue the call as described in step e. If it is a telephone call and the line is busy, a busy tone will be heard. In this case, terminate the call by pressing the # key.

Second Short Tone - A second short tone indicates that the path is complete and your message can be transmitted. No ringing of the other party occurs. Proceed to next step.

5. Press the push-to-talk switch to talk and release it to listen as with standard calls. Since the path is one way, you cannot hear the other party while the push-to-talk switch is pressed.
6. When the call is finished, it should be terminated by transmitting the # character. This character is sent automatically by exiting the phone mode (pressing the PHON key) or manually by pressing the # key. Three beeps indicate that the call has been terminated.

Receiving a Special Call

Proceed as follows:

1. Special calls are usually received regardless of the group selected if a system programmed for Multi-Net operation is selected or scanned. If a call requires that a certain system and group be selected, your system operator will tell you which to select.
2. When “ringing” is heard, answer the call in the normal manner (press the push-to-talk switch to talk and release it to listen). It is not necessary to select the phone mode to receive a special call.
3. When the call is finished, it is usually terminated by the originating party. If you do not hear the three rapid beeps which indicate termination, press the # key to terminate the call.

Landside-Originate Calls

Calls can also be placed to mobiles from a landside telephone. If the system is designed so that mobiles can be called directly, simply dial the telephone number of the mobile being called. If mobiles cannot be called directly, proceed as follows:

1. Dial the number of the system. When the system answers, a beep is heard. You should then dial the special number specifying the mobile being called. This number is supplied by your system operator, and it must be dialed using a tone-type telephone.
2. Depending on the type of call, the landside caller then hears a ringing tone or a second tone which indicates speaking can begin. Operation is similar to that described in “Placing a Special Call”.

Additional Phone Mode Information

General

The phone mode is selected by pressing the PHON or SEND keys (see information which follows), and is indicated by the word PHON in the lower part of the display. When the phone mode is selected, the system or group identi-

fication is cleared so that the phone number can be displayed. In addition, the SCN, LCK, and RTN keys become STO, CLR, and RCL keys. Group scan is also disabled if it is programmed. Therefore, calls are received on only the displayed group when the phone mode is selected.

If the phone mode is not selected, the number keys dial a number only when the push-to-talk switch is pressed. In addition, the number does not appear in the display, so it cannot be stored or recalled. To exit the phone mode, press the PHON key again (the SEND key cannot be used). If there is a number in the display, it is erased and cannot be redisplayed unless it was stored in memory. The transceiver always goes into the standard mode when power is turned on.

Using the SEND key to select the phone mode may cause a different system/group to be displayed than when the PHON key is used. Operation with each key is as follows:

NOTE: If the quick select switch is turned to a locked position, the phone mode cannot be selected by the SEND key (see "Quick Select Switch").

Using SEND Key -The system/group preprogrammed for telephone calls is automatically selected. Then when the phone mode is exited, the system and group that were displayed when the phone mode was entered are again displayed.

Using PHON Key - The displayed system and group do not change when entering and exiting the phone mode.

Dialing The Number

In the phone mode, telephone or mobile numbers can be entered at whatever rate is convenient. To correct dialing errors, press the CLR key to erase the last digit entered or hold the key down to erase several digits. To erase the entire number, press RCL CLR. Then when the number is ready to be transmitted, simply press the SEND key.

Numbers up to 14 digits in length can be entered. However, only the last 7 digits are displayed. When there are overflow digits, an arrow appears on the left side of the telephone number. To momentarily display the overflow digits, press RCL 0. To step through the numbers programmed in memory, repeatedly press the RCL key. If a number has more than 7 digits, the overflow digits are displayed briefly and then the last 7 digits are displayed.

A number can be dialed in the phone mode without changing the number in the display. Simply dial the number with the push-to-talk switch pressed. This dialing mode allows calls to special services that require the dialing of additional numbers after the connection is made. Telephone calls can also be placed without selecting the phone mode by pressing the push-to-talk switch while dialing the number. However, if too much time elapses between digits, the call may be terminated.

Storing and Recalling Numbers From Memory

Up to seven telephone or other numbers can be stored in memory and then later recalled. This eliminates the need to re-enter frequently dialed numbers. Each of these numbers can be up to 14 digits in length. To store a number, select the phone mode and dial the number as described in the preceding section. Then press STO and a number key from 1-7 to select the memory location where the telephone number is stored. The * symbol can be stored, but is sent normally without a pause. If the # symbol is stored, it terminates the call when it is sent. To recall a telephone number, select the phone mode and press RCL and then the memory location from 1-7.

Telephone numbers can also be programmed into memory by your system operator. Numbers stored in this manner can have a unique identification in the unused positions of each 14-digit memory location. For example, if the number has seven digits, the seven-character identification "RICHARD" can be stored with the number. Then when the number is recalled, "RICHARD" is flashed in the display followed by his telephone number. These num-

bers can be locked so that they cannot be changed. If you were to change a number with a unique identification, the identification is erased and it can be reprogrammed again only by taking the transceiver back to your system operator.

Terminating a Call

When a conversation is finished, the call should be terminated by transmitting the # character. This is done automatically when the phone mode is exited by pressing the PHON key or it can be done manually by pressing the # key. Three beeps sound to indicate that the system has detected the end of the call. Terminating the call in this manner prevents additional billing that may occur for the time it takes the system to automatically detect the end of a call.

QUICK SELECT SWITCH

General

The rotary quick select switch on the top panel can be used to select up to sixteen preprogrammed system/group combinations. These positions can be programmed as described in the next section or they can be programmed by your system operator. If a position has not been programmed, the selected system/group does not change. The dot (•) position is a selectable position the same as positions 1-15. Your system operator may install stops that limit the rotation of the quick select switch to the positions that are programmed. For example, the switch may rotate only to positions 1-6.

When a position is programmed by your system operator, it can be locked so that it cannot be reprogrammed. When a locked position is selected, “QLK” is displayed and the front panel S (System) and G (Group) select keys are disabled. This ensures that the system/group programmed for that position is always selected. This is especially useful if the display cannot be viewed, such as when carrying the transceiver on a belt.

Programming a Switch Position

Programming a Switch Position

Switch positions can be programmed with any selectable system/group unless they are locked by system operator programming as described in the preceding section. Proceed as follows to program a position:

1. Set the quick select switch to the position to be programmed.
2. Select the system/group for that position by pressing the front panel S (System) and G (Group) keys. If “QLK” is displayed and these keys are disabled, the switch position is locked and cannot be reprogrammed.
3. Press the 2ND (RTN) key and then the QSTO (SCN) key. If “LOCKED” is displayed and a beep sounds when the QSTO key is pressed, this also indicates that the switch position is locked and cannot be reprogrammed.

SYSTEM SCAN

General

NOTE: In some cases, such as if your transceiver is programmed with only one system or if calls are received on only one system, you may choose not to use the system scan feature.

The System Scan feature monitors the programmed systems in sequence. When a message is detected that your transceiver is programmed to receive, scanning stops and the message is received. Shortly after the message is complete, scanning resumes.

System scanning is turned on and off by the front panel SCN key. When scanning is enabled, "SCN" is indicated in the lower part of the display.

When scanning is actually occurring, the group number is replaced by a dash and "IN SCAN" is displayed instead of a unique system or group identification. The dash also indicates that group scanning is occurring (see page 40). Since the system number continues to be displayed, you can see which system is currently selected, especially when auto-registration is used. Scanning is sequential through the programmed systems unless they are locked out as described in "Scan List Programming" which follows. The display always changes to the system of a call and usually changes to the group of a call.

The selected system or group can be changed while scanning by simply pressing the S or G keys or turning the quick select switch. This temporarily halts scanning and changes the selected system or group. To display the selected system and group while scanning, halt scanning by pressing the SCN key or Auxiliary switch. Some transceivers may be programmed so that the conventional and some Multi-Net systems are not scanned. If this is the case with your transceiver, your system operator will tell you which are not scanned.

Scan Resume Delay

After a message is received or transmitted in the scan mode, there is a programmable delay period of 1-8 seconds before scanning resumes. When a message is received, this delay prevents another message from being received before a response can be made (see next section). When a message is transmitted, this delay ensures that a response to your message is heard instead of some other message occurring on another system or group.

Transmitting In Scan Mode

When you transmit while scanning (indicated by a dash in the group display), the transmission always occurs on the currently selected system and group. If a message is received while scanning, scanning stops and the system and group of the call are displayed. If the PTT switch is pressed to respond to this call, the system/group on which the transmission occurs is controlled by the transmit revert configuration that has been programmed by your system operator. The following configurations are available:

Temporary - As long as you respond before the scan delay expires (see preceding section), the response occurs on the system/group of the call. If you respond after scanning resumes, the transmission occurs on the selected system/group which may not be the same as that of the call. For example, if System 1/Group 2 was displayed when scanning was turned on and a call is received on System 3/Group 4, System 3/Group 4 is displayed and the call is received. If a response is then made, the transmission occurs on System 3/Group 4. However, if it is not made until after scanning resumes, it occurs on System 1/Group 2.

Last Selected - Transmissions always occur on the selected system/group, even when responding to a call. Therefore, if this configuration was programmed for the preceding example, the transmission would occur on System 1/Group 2, not System 3/Group 4. To respond to that call, you would first have to manually change the selected system and group using the S or G keys or the quick select switch. You can also make the system and group of a call the selected system/group by turning off scanning before scanning resumes.

Last Received - The selected system/group changes to the system/group of the call. Therefore, you can always respond without having to manually change the system/group.

NOTE: If the current quick select position is locked (see page 29), the transmission always occurs on the selected system/group even if the “temporary” or “last received” configuration is programmed.

Scan List Programming

Systems and groups can be added to or deleted from the scan list (locked out) using the LCK key. Pressing this key changes the status of the system or group that was changed last. For example, if System 2 is selected by pressing the S key and then LCK is pressed, System 2 is deleted from the scan list and not scanned (if it was in the scan list). Then if LCK is pressed again, System 2 is added back into the scan list and so on.

All deleted systems or groups can be added back into the scan list by pressing the LCK key for 2 seconds or longer. The last selected rule also applies to this function. For example, if the system was changed last, all programmed systems are added to the scan list. Likewise, if the group was changed last, all groups of the selected system are added to the scan list (groups in other systems are not added).

The scan list delete indicator is “∇” next to “SYS” or “GRP” in the display. When system scanning (“IN SCAN” displayed), “∇” is displayed next to “SYS” if any system is deleted from the scan list. Likewise, “∇” is displayed next to “GRP” if any group of a scanned system is deleted from the scan list. To check the scan list status of the programmed systems or groups, halt scanning by pressing the SCN key once or the Auxiliary switch twice (rapidly). Then step through the programmed systems and groups while watching the lockout indicators.

A system cannot be deleted from the scan list if you have only one selectable system. In addition, groups can be deleted only on Multi-Net systems programmed for group scan (see “Group Scan” description). The scan list is stored in memory, so all systems and groups return to the same status when power is turned back on.

Scanning Multi-Net Systems

When a system programmed for Multi-Net operation is scanned, calls are received on the same groups as when system scanning is disabled. Therefore, with group scan programmed, calls are received on all groups. If group scan is not programmed, calls are received on only the selected group. A Multi-Net system may also be programmed with fixed groups on which calls are received even if group scan is not programmed (see “Priority Calls”).

Scanning Conventional Systems

Group scan is not available on conventional systems. Therefore, only the currently or last selected group of conventional systems is scanned. For example, if Group 4 is the last selected group of a conventional system, only that group is scanned. If a group is programmed with Call Guard squelch, it is detected when scanning. However, if the monitor mode is selected by the Auxiliary switch, Call Guard squelch is disabled and all messages are heard.

SUPERVISORY TONES

NOTE: The following tones are heard at various times when operating this transceiver. They are heard only when a Multi-Net system is selected unless noted otherwise.

Intercept Tone

This is a siren-like tone (alternating high and low tones) which indicates the following error conditions:

- If this tone sounds after the transmit indicator flashes several times and “NO SITE” appears in the display, an out-of-range condition is indicated. To complete a call, you may need to be closer to your radio system. Once

this tone sounds, no more access attempts are made until the push-to-talk switch is released and then pressed again.

- If this tone sounds after the transmitter has been on for an extended period and “TX TIME” also appears in the display, the transmitter has been disabled by the time-out timer feature (see “Time-Out Timer”).
- If this tone sounds as soon as the push-to-talk switch is pressed and “TX DSBL” appears in the display, a channel is selected in the conventional mode that is programmed as receive-only (see “Receive-Only Channels”).

Clear-To-Talk Tone

This is a short tone which sounds when the push-to-talk switch is pressed. It indicates that the system has been successfully accessed and speaking can begin (see “Clear-To-Talk Tone”).

Key Press Tone

This is a short tone that sounds when a key is pressed. This tone can be enabled and disabled using the menu selected by turning power on with the Auxiliary key on the side pressed (see “Key Press Tone Disable”).

NOTE: The following tones are heard only when making telephone calls.

Confirmation Tone

This is a short tone that sounds when the number just dialed is accepted by the system.

Call Proceed Tone

With some non-telephone special calls, ringing does not occur after the number is dialed. Instead, another short tone sounds after the confirmation tone to indicate that the audio path is complete and speaking can begin.

End Call Tone

Three beeps which indicate that the end of the call has been detected by the system.

Proceed Dialing Tone

When placing a landline to a mobile (refer to “Landline Originate Calls”), the landline caller may dial the system and then enter a special number which specifies the mobile being called. This tone sounds when the system answers to indicate that this special number should be dialed (see “Landline-Originate Calls”).

MULTI-NET AND CONVENTIONAL MODES

General

This transceiver can be programmed to operate in both the Multi-Net and conventional modes. Each selectable system can be programmed for either type of operation. You can probably assume that Multi-Net operation has been programmed unless your system operator tells you otherwise. The type of operation programmed is determined by the type of radio equipment in use. There are only a few differences in operation, and they are described in the following information and also elsewhere in this manual as required.

Channel Monitoring

In the Multi-Net mode, channel monitoring is performed automatically by the transceiver. In the conventional mode, it is performed manually as described in the “Monitoring Before Transmitting” section.

Group Select

When a Multi-Net system is selected, the group select switch selects an ID code. This ID code determines the mobile or group of mobiles that are being called and also the calls that are received. Up to 11 different groups can be programmed in each Multi-Net system. When a conventional system is selected, the group switch selects radio channels. Therefore, changing the group number effectively selects a different radio channel. Up to 10 groups (channels) can be programmed in each conventional system.

Supervisory Tones

In the Multi-Net mode, special tones indicate such things as when the speaking can begin and an out-of-range condition (see “Supervisory Tones”). In the conventional mode, there are no tones to indicate these conditions. A busy channel is detected as described in the next section, and an out-of-range condition may exist if you are not receiving any calls or are unable to get a response from mobiles you are calling.

MULTI-NET FEATURES

Clear-To-Talk Tone

When the push-to-talk switch is pressed to transmit a message on a Multi-Net system, a short tone sounds. This tone indicates that the radio system has been successfully accessed and speaking can begin. If no tone sounds and “BUSY” is indicated in the display, the system is busy and the message cannot be transmitted at that time. However, if you continue to hold down the push-to-talk switch, the system is accessed and the clear-to-talk tone sounds when the system is available.

An exception when the busy tone sounds is when the system is busy with busy queuing programmed (see separate description). If the system could not be accessed because of an out-of-range or other error condition, the intercept tone sounds instead of the clear-to-talk tone. Refer to “Supervisory Tones” for more information on the busy and intercept tones. The clear-to-talk and busy tones do not sound on conventional systems.

Two different clear-to-talk tones can be selected. One is a single beep and the other is a louder double beep. The clear-to-talk tone can also be disabled. To select these options, proceed as follows:

1. Turn power on with the Auxiliary switch pressed. Then quickly press the Auxiliary switch to select “PTT xTN”.
2. Press the push-to-talk switch to select “PTT 1TN” for the single tone, “PTT 2TN” for the double tone, or “PTT 0TN” to disable the clear-to-talk tone. Shortly after the desired mode is selected, normal operation resumes.

Group Scan

The group scan feature is programmable on Multi-Net systems by your system operator. There is no separate switch for selecting group scanning because it occurs whenever a system programmed for group scan is selected or scanned (system scanning does not need to be enabled). Group scanning is indicated when not system scanning by a dash in the group display. When system scanning is also occurring, “SCN” is indicated in the display. The system display continues to indicate the system number with both system and group scanning.

When group scan is programmed on a system, calls are received on all selectable groups, regardless of which is selected. In addition, the display automatically changes to the group on which the call is received. Without group scan, calls are received on only the selected group of each system. Groups can be deleted from the scan list using the LCK key as described in “Scan List Programming”. Group scan is not available on conventional systems.

Priority Calls

The Multi-Net systems of your transceiver may be programmed with fixed ID codes as well as selectable groups. Calls on fixed ID codes are received regardless of which group is selected or group scan programming. In addition, calls on these ID codes have a higher priority than calls on selectable groups. Therefore, if your transceiver detects a call on a fixed ID code while you are listening to a call on a selectable group, it will immediately switch to the call on a fixed ID code. When a call is received on fixed ID 1, “RX PRI1” is displayed, and when a call is received on fixed ID 2, “RX PRI2” is displayed. To turn off this indication, press any command key except backlight.

Transmit Inhibit

The Transmit Inhibit feature prevents your transmitter from keying if the mobile you are calling is busy with another call. It can be programmed on each Multi-Net system by your system operator. When the transmitter is disabled by this feature, the intercept tone sounds and “TX INHIB” is displayed.

To make another call attempt, the push-to-talk switch must be released and then pressed again. However, you should wait at least 5 seconds because an internal timer must count down before the attempt will be successful. One use of this feature is to prevent the accidental interruption of a call in progress. It may also be used to provide an audible indication that the mobile you are calling is busy. A different Transmit Disable On Busy feature is available on conventional systems.

Auto-Registration

In some radio systems, several sites may be linked together to provide wide area coverage. The Auto-registration (Roaming) feature may then be used so that calls can be automatically routed to the correct site. To have this feature, it must have been programmed by your system operator and system scanning must be enabled by the SCN key. In addition, the quick select switch must not be turned to a locked position (see “Quick Select Switch”).

Auto-registration operates as follows: When you move out of range of the current site, the transceiver automatically begins searching for another site. While it is searching, “SCN” flashes in the display. When a new site is located, “SCN” is again displayed continuously and the selected system/group changes to the new site. The new system is the first system programmed for a different site that could be accessed, and the group does not change (it is the same as it was before auto-registration occurred).

Busy Queuing

The Busy Queuing feature places the call in a queue if the repeater system is busy when the call is placed. Then when the system becomes available, a tone sounds and the call can be placed if desired. Busy queuing can be enabled or disabled on all Multi-Net systems by system operator programming. It functions with both standard and special calls. The Busy Queuing feature operates as follows:

If the radio system is busy, the busy tone sounds. (Without queuing, no tone sounds because the clear-to-talk tone sounds only when a successful access is made.) The queue mode is then entered automatically when the PTT switch is released. The queue mode is indicated when the busy tone stops sounding and “QUEUED” is displayed. Then when the system becomes available, either a beeping tone or dial tone sounds. The beeping tone is heard if a

standard call is being made, and the dial tone is heard if a special call is being made. The call can then be placed in the normal manner.

If no call is placed soon after the tone sounds, the queue mode is automatically exited and normal operation resumes. The queue mode is also exited if a call is received on the selected group, the system/group is changed, the push-to-talk switch is pressed, or any other keys directly under the display are pressed (while no call is being received).

Calls are received normally while in the queue mode. Group scanning continues if it is programmed on the selected system. However, system scanning is temporarily disabled, so calls are not received on other systems. If a call is received on some other group while in queue, you can respond to the call without affecting the queued call. Normal queuing of a call resumes shortly after the call on the other group is finished.

Emergency Button

The red emergency button on the top panel can be used to place high-priority calls. It can be programmed by your system operator for either manual or automatic operation:

Manual Operation - No call is placed automatically when the button is pressed. However, a specific system/group is selected and the transceiver goes into a high priority access mode. This mode minimizes, as much as possible, the chance that the system will be busy when a call is placed.

Automatic Operation - An emergency message is automatically transmitted when the button is pressed. This message occurs on a specific system/group and is transmitted at the highest priority until an acknowledgment is received from the dispatcher.

A tone sounds when the emergency button is pressed. In addition, this button is functional on all systems if it is programmed (even conventional systems if there are any). It may be necessary to turn transceiver power off and then on again to resume normal operation after the emergency call is complete. Contact your system operator for more information on operation of the emergency button in your application.

CONVENTIONAL MODE FEATURES

Monitoring Before Transmitting

Before transmitting in the conventional mode, government regulations require that you monitor the channel (group) before transmitting to make sure that it is not being used by someone else. If you were to transmit while someone else was talking, you would probably disrupt their conversation.

The simplest way to monitor the channel is to note if "BUSY" is indicated in the lower part of the display (scanning should be disabled). If "BUSY" is not indicated, the channel is not being used and you can transmit your message.

There may be times when this indication is displayed even though no one is using the channel. If this is occurring, use the following method to monitor the channel:

Press the Auxiliary switch on the side of the transceiver. This temporarily halts scanning (if it was occurring) and enables the monitor mode (indicated by "MON" in the display). The monitor mode disables Call Guard squelch (see next section) so that all messages occurring on the channel are heard. If no messages are then heard, the channel is not busy and you can transmit your message. To disable monitoring, press the Auxiliary switch again.

Call Guard Squelch

Each group (channel) of a conventional system can be programmed with Call Guard squelch. This feature eliminates the distraction and annoyance resulting from hearing messages intended for others on the channel. It does this by using a subaudible tone or digital code to control the squelch. This tone or code is unique to your transceiver or a group of transceivers on that channel. Call Guard squelch is programmed by your system operator and is available on conventional systems only. Multi-Net systems utilize ID codes to eliminate messages intended for others.

Transmit Disable On Busy

This feature automatically disables the transmitter if the channel is busy when the PTT switch is pressed. As long as the PTT switch remains pressed, Call Guard squelch is disabled and any conversation on the channel is heard. If the monitor mode is enabled by the Auxiliary switch (see “Monitoring Before Transmitting”), the transmitter keys even if the channel is busy. In some cases, the transmitter may be disabled and the “BUSY” indication present even though no one is talking. To key the transmitter in this situation, quickly release and then press the push-to-talk switch. If the Transmit Disable On Busy feature is disabled by dealer programming, the transmitter keys even if the channel is busy.

Receive-Only Channels

Receive-only channels (groups) can be programmed so that monitoring but no transmitting is permitted. If the PTT switch is pressed with one of these channels selected, the transmitter does not key, the intercept tone sounds, and “TX DSBL” is displayed. Receive-only channels are available on conventional systems only.

Talk-Around Channels

Talk-around channels can be programmed to allow you to talk directly to another mobile without having the call go through a repeater. (Normally, all Multi-Net and conventional calls go through a repeater.) This may permit communication when it would otherwise not be possible such as when you are out of range of the repeaters. This feature is available on conventional systems only.

OTHER FEATURES

High/Low Power Select

Some transceivers have selectable transmit power. If your transceiver has this feature (your system operator will tell you if it does), power output can be changed as follows:

1. Turn power on with the Auxiliary switch pressed. Then quickly press the Auxiliary switch to select “xx POWER”.
2. Press the push-to-talk switch to select “HI POWER” or “LO POWER”. Shortly after the desired mode is selected, normal operation resumes. “LO” is displayed when the low power mode is selected.

The low power setting increases battery life but may decrease range. The opposite may occur with the high power setting. If your transceiver does not have selectable power, the preceding procedure can still be performed, but no change in power occurs.

Call Indicator

The call indicator is the word “CALL” in the lower part of the display. The purpose of this indicator is to show that a call was received while you were away from the transceiver. It can be programmed by your system operator to turn on when calls are received on certain groups (Multi-Net systems) or channels (conventional systems). It may also be disabled entirely. The call indicator is turned off by pressing any key.

Low-Battery Indicator

The low-battery indicator is the (battery) symbol in the display. In addition, when this indication is present, a beep sounds whenever the push-to-talk switch is released. When the low battery indication appears or is heard, the battery should be recharged or replaced soon. It is not good practice to regularly continue using a battery until the transceiver becomes inoperative. Refer to “Rechargeable Battery Pack” for more information.

Busy Indicator

The Busy indicator is the word “BUSY” in the display, and it shows when a conventional channel (group) is busy. It does not function on Multi-Net systems. Refer to “Monitoring Before Transmitting” for more information.

Return (RTN) Key

The return function is enabled by pressing the RTN key twice. It is used to momentarily display either the “home” or last active system/group. Programming by your system operator determines which is selected and also the length of time (1-7 seconds) it is displayed. If the quick select switch is turned to a locked position (see “Quick Select Switch”), this function is disabled.

If the push-to-talk switch is pressed while the return system/group is displayed, the transmission occurs on that system/group. However, the selected system/group does not change, so once the transmit delay expires (see “Scan Resume Delay”), the transceiver returns to the selected system/group. An exception to this operation is when scanning with Fixed transmit programmed (see “Transmitting in Scan Mode”). If the return system/group is then selected, transmission always occurs on the selected system/group.

Keypad Disable

If the front-panel keys are being accidentally pressed, such as when the transceiver is carried on a belt, the keypad can be disabled. Then if a key is pressed, all that happens is “KP_LOCK” is displayed. The switches on the side (except the Auxiliary switch) and top of the transceiver remain functional with the keypad locked. To lock or unlock the keypad, proceed as follows:

1. Turn power on with the Auxiliary switch pressed. Then quickly press the Auxiliary switch to select “KP_xxxx”.
2. To disable the keypad, press the push-to-talk switch to select “KP_LOCK”. Conversely, to enable the keypad, select “KP_ENAB”. Shortly after the desired mode is selected, normal operation resumes.

Key Press Tone Disable

If the tone that sounds when a key is pressed is distracting or annoying, it can be disabled as described below. Disabling this tone does not affect the tone which sounds when the emergency button is pressed. While the key press tone is disabled, “MUTE” is indicated in the display.

1. Turn power on with the Auxiliary switch pressed. Then quickly press the Auxiliary switch to select “KP_xxxx”.

2. To disable the key press tone, press the push-to-talk switch to select “KP_MUTE”. Then to enable the tone again, select either “KP_ENAB” or “KP_LOCK” (see preceding section). Shortly after the desired mode is selected, normal operation resumes.

Time-Out Timer

This transceiver has a Time-Out Timer feature which automatically disables the transmitter if it is keyed continuously for longer than the programmed time. It is programmed by your system operator for a time from 0.5-5.0 minutes. If this timer times out, the transmitter is disabled, the intercept tone sounds, and “TX TIME” is displayed. The timer and tone are reset by releasing the push-to-talk switch. This timer prevents a blocked channel caused by an accidentally keyed transmitter. It also prevents possible transmitter damage caused by transmitting for extended periods.

Voice Encryption

Optional voice encryption prevents your conversations from being monitored by casual eavesdropping or analog scanners. It does this by encrypting your voice so that it can be understood only by someone using a transceiver equipped with a similar encryption device.

To transmit an encrypted call, encryption must be manually enabled by pressing 2ND OPT. The display indicates " Q “ when encryption is enabled. To disable encryption, press SND OPT again. Encrypted calls are received even if encryption is disabled; however, encryption must always be enabled to transmit an encrypted call. Encryption may need to be disabled to dial a telephone number. Your system operator will provide more information if this is necessary.

OPERATION WITH REMOTE CONTROL UNIT

Introduction

The remote control unit shown on the next page can be used to control the transceiver when the vehicular adapter is being used. The vehicular adapter or charger accessories can be installed in a vehicle to allow this transceiver to be converted to mobile use by simply plugging it into a special connector. The remote control unit enhances operation of the vehicular adapter by making the transceiver controls more accessible. Contact your system operator for more information on these optional accessories.

Control Unit Controls

PWR - Turns both control unit and transceiver power on and off. Power may also be controlled by the vehicle’s ignition switch. Therefore, that switch may need to be on to turn power on. The transceiver on-off/volume control is non functional when the control unit is used with the vehicular adapter.

VOLUME - Pressing the upper Volume switch increases the volume level by one step, and pressing the lower switch decreases the volume level by one step. Holding either switch down causes the function to repeat. The volume level is indicated by a bar graph on the right side of the display.

POWER SWITCH

SYSTEM/GROUP IDENTIFICATION

SYSTEM NUMBER

GROUP NUMBER

VOLUME LEVEL

VOLUME UP/DOWN SWITCHES

SYSTEM UP/DOWN SWITCHES

GROUP UP/DOWN SWITCHES

The other control unit switches and the equivalent transceiver switch are shown below. Some transceiver functions are not controllable from the remote control unit including quick select switch programming, high/low power select, keypad disable, key tone disable, and soft/loud clear-to-talk tone select.

Function	Transceiver Switch	Control Unit Switch
Volume Control	On-Off/Volume	VOLUME
System Select [1]	S	SYSTEM
Group Select [1]	G	GROUP
Scan Select	SCN	SCAN
Scan List Prog	LCK	LOCK
Phone Mode Select	PHON	P1
Return/Recall No.	RTN	P2
Monitor	Auxiliary Switch	MON/Mic hanger
Horn Alert	None	HORN
Send Phone No.	SEND	CALL
Status Select [2]	None	STATUS
Send Emer Message	Emer Button	EMER
Encryption On/Off	2ND OPT	AUX
Push-To-Talk	PTT Switch	Mic PTT Switch

[1] The System and Group switches are disabled when the quick select switch is in a locked position. Locked positions are indicated by “OPT 3” in the display.

[2] Refer to “Sending Status Information” for more information.

Display Information

The transceiver display characters and the equivalent control unit display characters are shown below.

Function	Transceiver Display	Control Unit Display
Transmitter Keyed	TX	XMIT
Monitor Mode	MON	MON
Horn Alert En	None	HORN
Call Indicator	CALL	CALL
High Power Select	None	HI
Low Power Select	LO	LOW
Locked quick sel sw pos	QLK	OPT 3
Scan List Delete	∇	LOCKOUT
Scan Mode Select	SCN	SCAN
Phone Mode Select	PHON	P1
Telephone Group	Handset Symbol	None
Unique ID Call Group	U	None
Busy conv group	BUSY	BUSY
Key Press Tone Mute	MUTE	None
Overflow Digits	Left Arrow Symbol	None
Low Battery	Battery Symbol	None
Encryption Enabled	∅	SCRAMBLE

Miscellaneous Operating Information

Microphone Hanger - The microphone hanger controls the monitor mode similar to the Monitor key (off-hook = monitor). In addition, taking the microphone off-hook disables system and group scanning if it is enabled.

Telephone Calls - The phone mode can be selected by the P1 key and numbers can be sequentially recalled from memory by pressing the P2 key. This can be done even if the transceiver is not equipped with the optional telephone keypad. However, the optional keypad is required to enter numbers into the display or store numbers in memory (a microphone keypad cannot be used). If the number is dialed using the microphone keypad, the phone mode probably does not need to be selected.

Turning Power On and Off - Power to both the transceiver and control unit is controlled by the control unit PWR switch. However, the vehicle's ignition switch also normally controls power. Therefore, it must be in the On or Accessory position for power to turn on. When the ignition switch is turned off and power has not been turned off by the PWR switch, power remains on for the programmed delay period (see next description). The control unit can also be installed so that the ignition switch does not control power. Power is then controlled only by the PWR switch and a turn-off delay is not available.

Turn-Off Delay - When the ignition switch controls power as described in the preceding paragraph, there is a turn-off delay that can be programmed by your system operator. This delay can be 0, 10, 20, or 30 minutes, 1, 2, or 4 hours, or an infinite time (no turn-off occurs). The delay period begins when the ignition switch is turned off with the control unit power on. It can be canceled by turning power off using the PWR switch or turning the ignition switch back on. This delay can be used to keep functions such as the Call indicator, horn alert, and battery charger functional for a limited time after the vehicle is turned off. It can also be used to prevent accidental discharge of the vehicle battery.

Horn Alert - The vehicle's horn or some other type of alert can be used to signal an incoming call. It can be programmed to activate when calls are received on specific groups or channels. When a call is received that activates the horn alert, the horn sounds once per second for 3 seconds and then deactivates. The horn alert is turned on and off by the HORN button on the control unit. It is enabled when "HORN" is displayed. Other requirements for the horn to sound are that the vehicle's ignition switch must be turned off and the control unit must be in the delay period described in the preceding section.

Control Unit Display - The control unit displays the same unique 7-character system or 5-character group identification as the transceiver display. Other information displayed in that area of the transceiver display is also indicated by the control unit display. The control unit display and keys are continuously lighted (when power is on) for use in low-light conditions.

Sending Status Information

When the remote control unit is used, status information can be transmitted to your dispatcher when a Multi-Net system is selected. If this feature has been programmed by your system operator, one of up to eight status conditions can be selected using the STATUS key. The currently selected status condition is transmitted whenever the transmitter is keyed. To momentarily display the currently selected status, press the STATUS key once. To change the status, press this key again while this information is displayed. This cycles through the available choices. For example, status conditions such as AT SITE, LVG SITE, or UNLOADING can be displayed. This information is not displayed by the transceiver display.

MISCELLANEOUS

System Operator Programming

As noted in the descriptions of many of the features of this transceiver, programming by your system operator may determine availability and how they operate. If you require more information on how a particular feature operates, contact your system operator. The only user-programmable features of this transceiver are the quick select switch system/groups and the seven telephone numbers (if your transceiver is equipped with the optional telephone keypad). However, even some of this information number may not be user programmable if the position has been locked by your system operator (see “Quick Select Switch” and “Telephone Calls”).

Setting Volume Level

This transceiver does not have a squelch control that can be turned to enable background noise for use in setting the volume level. However, if the key press tone is enabled, any key can be pressed and a beep will sound that is representative of the current volume level. The index on the volume knob can also be used to determine the current volume setting.

Display Messages

Messages may appear in the display which indicate operating modes and error conditions. The messages that may be displayed are as follows. Refer to the related descriptions in this manual for more information. **NO SITE** - Indicates an out-of-range condition. The intercept tone also sounds when this message is displayed. To correct this condition so that calls can again be placed, you must get closer to your repeater site. This message is displayed in the Multi-Net mode only.

BUSY - Indicates that the system being accessed is busy. Calls cannot be placed until the system becomes available. Refer to “Clear-To-Talk” description for more information. This message is displayed only in the Multi-Net mode.

TX TIME - Indicates that the transmitter has been disabled by the time-out timer.

TX DSBL - Indicates that transmitting is not allowed on the selected group because it has been programmed as receive-only. This message is displayed in the conventional mode only.

TX INHIB - Indicates that the selected group is temporarily busy. This message is displayed in the Multi-Net mode only.

SYN ERR - Indicates a frequency synthesizer error. Refer to “Equipment Servicing”.

PRG ERR - Indicates that no transmit frequency has been programmed for the selected system. Refer to “Equipment Servicing”.

RX PRI1 - Indicates that a call has been received on the first priority group (see “Priority Calls”). Press any key to turn it off. This message is displayed in the Multi-Net mode only.

RX PRI2 - Indicates that a call has been received on the second priority group (see preceding description).

IN SCAN - Indicates that system scanning is occurring.

KP_LOCK - Indicates that the keypad has been disabled (see “Keypad Disable”).

Rechargeable Battery Pack

WARNING

Do not dispose of the battery pack in fire because it may explode. Battery packs should be disposed of in accordance with local ordinances.

Battery Life - With proper care, the Nickel-Cadmium (Ni-Cd) battery pack used in this transceiver should provide many months of service. When a battery pack no longer holds a charge or provides only a short operating time, it must be replaced with a new one. To remove the battery pack from the transceiver for recharging or replacement, press the spring-loaded button on the side of the transceiver and rotate the pack counterclockwise (when viewed from the bottom). To install a new pack, simply insert it in the socket and rotate it clockwise until it locks in place. A new pack must be charged before use.

One cause of shortened battery life is repeated deep discharge. Therefore, it is good practice to recharge a battery soon after the low-battery indication "battery" appears (see "Low-Battery Indicator"). Do not continue using the battery until the transceiver becomes inoperative. Another cause of reduced battery life is recharging at the temperature extremes. For maximum life, recharge at ambient temperature of 68-77° F. It is also not good practice to regularly leave a battery in a charger for extended periods after it is fully charged.

Battery Operating Time - The typical operating times for the various configurations are shown below. These times assume that 90% of the time the transceiver is in the standby mode (receive with audio muted), 5% in the receive mode (audio present), and 5% in the transmit mode. If more time is spent in the receive or transmit modes, operating time is proportionately shorter.

Transceiver	1000 mAH Pack	1400 mAH Pack
1 watt only models	11 hours	14 hours
1.5/2.5W models, 1.5 W	Not Used	10.5 hours
1/2.5W models, 2.5 W	Not Used	9 hours

As indicated, the typical operating time before recharging depends on what transceiver and battery pack you have. The 85x0-85x3 transceivers have a single power output level of 1 watt, and the 8585-8588 transceivers have selectable power output of 1.5 and 2.5 watts. The standard 1000 mAH pack has a "0" as the last digit of the part number, and the heavy-duty 1400 mAH pack has a "1" as the last digit.

Recharging - The battery pack can be recharged while it is attached to the transceiver or it can be removed and recharged. Approximate charge times with the various chargers are shown below. These times assume that the battery is discharged to the point where the low-battery indication appears. Charging time is somewhat longer with the trickle charger if the pack is attached to the transceiver and power is left on. With the rapid and vehicle chargers, the red indicator lights in the rapid charge mode, and the green indicator lights in the trickle mode. The battery is almost fully charged when the green indicator lights.

Charger	Charger Part No.	Approx Charge Time
Trickle (100 mA)	563-0001-003	12.5 (16)* hours
Rapid	239-5800-300/-376	2 (3)* hours
Vehicle Adapter	239-5810-500	1.5 (2)* hours

** The charge time for the 1400 mAH pack is shown in parentheses.*

Speaking Into Microphone

For best results, hold the speaker grille about 1-2 inches away from your mouth and speak slowly and distinctly at a normal conversational level. Do not shout since it distorts your voice and does not increase range. Make sure the push-to-talk switch is pressed before you begin to speak and released as soon as the message is complete.

Operation At Extended Range

When approaching the limits of radio range, the other party may not always hear your transmissions and there may be an increase in background noise when messages are received. Communication may be improved by moving to higher ground or away from shielding structures such as tall buildings and hills.

Licensing

To operate this transceiver on the air, it is usually necessary to file the proper license application. Your system operator will provide you with information on what you may have to do to meet licensing requirements.

Transceiver Service

If the transceiver is not operating properly, "SYN ERR" or "PROG ERR" may be displayed. It is also possible that all segments of the display are indicated when power is turned on. To attempt to clear this condition, turn the power off and then on again to reset the control logic. Also make sure that the battery is charged, the controls are properly set, and the antenna is tight. If the transceiver still does not operate properly, contact your system operator for service.

NOTE: There are no user-serviceable components in this transceiver. Altering internal adjustments can void the warranty and cause illegal emissions, and result in improper operation that can seriously damage the transceiver.

NOTES

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