LTR-Net™ 9800 Series

OPERATING MANUAL

Trunked Mobile Radio

98x3/98x6 LTR-NET™ Mobile

EFJohnson®

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

E.F. Johnson Company, which was founded in 1923, designs, manufactures, and markets radio communication products, systems, and services worldwide. E.F. Johnson produces equipment for land mobile radio and mobiletelephone services which include business, industrial, government, public safety, and personal users.

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 allow the antenna to touch or come in very close proximity with the eyes, face, or any exposed body parts while the radio is transmitting.

DO NOT operate the transmitter of a mobile radio when a person outside the vehicle is within one (1) meter of the antenna.

DO NOT operate the transmitter of a stationary radio (base station or marine radio) when a person is within one (1) meter of the antenna.

DO NOT operate the radio in explosive or flammable atmospheres. The transmitted radio 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 EFJohnson could void the user's authority to operate this equipment (FCC rules, 47CFR Part 15.19).

FCC EXPOSURE LIMITS

This mobile radio transceiver was tested by the manufacturer with an appropriate antenna in order to verify compliance with Maximum Permissible Exposure (MPE) limits set under Section 2.1091 of the FCC Rules and Regulations. The guidelines used in the evaluation are derived from Figure 1 (B) titled "Limits For General Population/Uncontrolled Exposure" which is from FCC report OET bulletin #65.

Figure 1
FCC Limits for Maximum Permissible Exposure (MPE)

(A) Limits For Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) ($mW/cm2^2$)	Averaging Time $\|E\|^2$, $\|H\|^2$, S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	$(900/f^2)$*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

(B) Limits For General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) ($mW/cm2^2$)	Averaging Time $\|E\|^2$, $\|H\|^2$, S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	$(180/f^2)$*	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = Frequency in MHz *Plane-wave equivalent power density

Figure 2 lists the antenna whips and bases recommended for use in each frequency range. Each model of this radio was tested with the appropriate antenna listed. The antenna was mounted in the center of the roof of a domestic manufactured 4-door passenger sedan. The radio manufacturer has determined that the user and service personnel should remain one (1) meter in distance away from the antenna when transmitting. By maintaining this distance, these individuals are not exposed to radio frequency energy or magnetic fields in excess of the guidelines set forth in Figure 1.

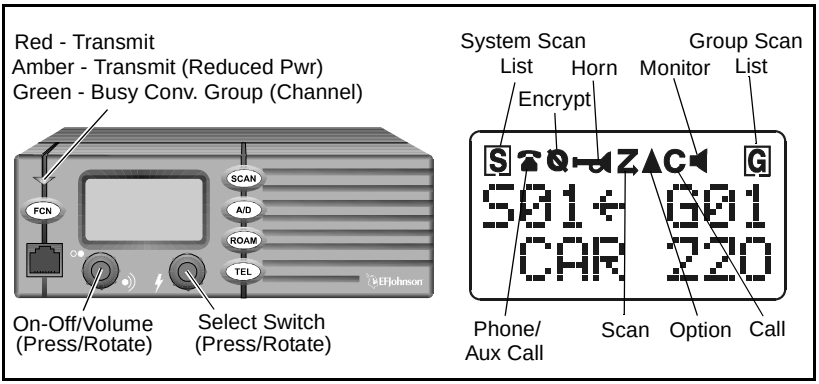
NOTE: If the installer or user changes the type or location of the antenna, they should be aware of the MPE guidelines shown in Figure 1 and take measures to comply with those guidelines.

Figure 2
Recommended Antenna Whips and Bases
(Antenna Manufacturer - Antenna Specialists)

Frequency	Whip Model No.	Base Model No.
136-144 MHz	ASPJ1415	KM220
144-152 MHz	ASPA1415	KM220
152-162 MHz	ASPB1415	KM220
162-174 MHz	ASPC1415	KM220
400-430 MHz	ASPE1615	KM220
430-470 MHz	ASPD1615	KM220
470--512 MHz	ASPF1615	KM220
806-869 MHz	ASPA1855	KM220
890-960 MHz	ASPG1865	KM220

TABLE OF CONTENTS

QUICK REFERENCE GUIDE



Power On/Off - Press on-off /volume control.

Set Volume Level - Rotate on-off/volume control.

Change System or Group - Press Select switch to enable system or group select mode (indicated by ←/→ or __). Then rotate Select switch to select desired system or group (see page 17).

Select Menu Mode - Press FCN twice or Menu switch and then rotate/press Select switch as required to display/select desired parameter (see page 33).

Select Home System/Group - Press FCN then Select sw. or HOME

Scan On/Off - Press SCAN switch. Scan on = Z, Scanning occurring = scrolling underline (see page 35).

Program System or Group Scan List - Press Select switch to enable system or group select mode (same as when changing system or group), then press A/D switch. System in list = S, Group in list = G (see page 38).

Set Squelch Level (Conv. Only) - Press FCN then rotate Select switch with conventional system selected (see page 18).

Monitor Before Transmitting (Conv. Only) - Take microphone off-hook to enable monitor mode (indicated by ◀). Channel is busy if indicator is green or someone is talking (see page 44).

FEATURES

General Features

- Up to approximately 99 systems with up to 99 groups each
- LTR-Net™, LTR®, and conventional operation
- Unique 8-character system and group identification tags
- System and group scan
- User programmable system and group scan lists
- Menu mode to control various functions
- Five programmable option switches
- Up to 16 banks selectable
- Proceed (clear-to-talk) tone
- Call indicator
- Horn alert
- Emergency quick select switch
- Companding (optional)
- Encryption (optional)
- Receive-only groups

LTR-Net Features

- Roaming (automatic locality search)
- Standard (mobile-to-mobile) calls
- Special calls including telephone, unique ID, and directed group
- Busy queuing of special calls by radio system
- Transmit inhibit
- Receive priority calls

LTR Features

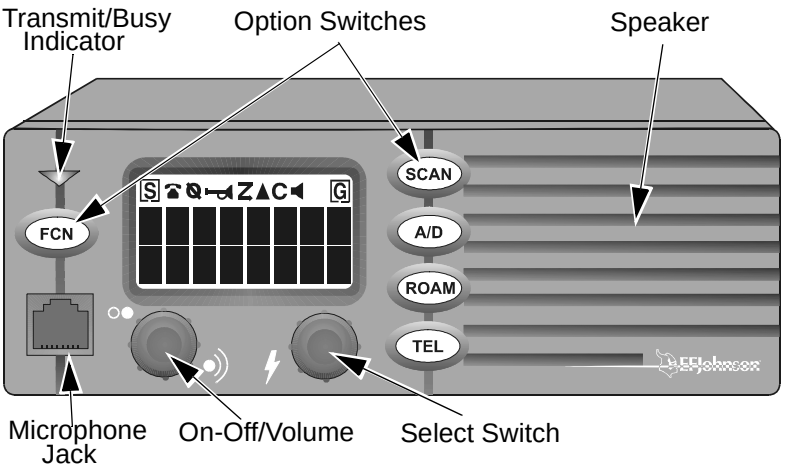
- Standard and telephone calls
- Transmit inhibit
- Receive priority calls

Conventional Features

- Busy indicator
- Talk-around
- User-adjustable squelch level
- Call Guard® squelch control
- Transmit disable on busy

NOTE: System operator programming determines the availability of many of the preceding features.

CONTROLS AND DISPLAY



Front Panel Controls

On-Off Volume - Pressing this knob turns power on and off. The vehicle ignition switch may also control power as described in "Power Turn-Off Delay" on page 24. Rotating this knob sets the speaker volume (see page 15).

Select Switch - This switch changes the selected system or group and is also used for other functions such as selecting parameters in the menu mode. To change the system or group, press this knob to switch between the system and group select modes, and then rotate it to increase or decrease the system or group. Refer to "Selecting the System and Group" on page 17 and the FCN switch description which follows for more information.

Option Switches - The five front panel option switches can be programmed by your system operator to control the functions which follow. Refer to the section indicated for more information. The keycap usually indicates the function controlled by the switch.

A/D - Scan list add/delete (see page 38)
BANK - Bank select (see page 20)
EMER - Emergency switch (see page 21)
ENCPT - Encryption select (see page 21)
FCN - Function select (see following description)
HOME - Select home system/group (see page 22)
(Menu) - Menu mode select (see page 33)
AUX - Option select (see page 24)
ROAM - Roam on-off (see page 43)
SCAN - Scan on-off (see page 35)
TEL - Selects telephone group (see "Tel Grp Select" on page 41)
(Blank) - Not used (disabled) or one of above functions

FCN (Function) Switch - This switch, if programmed, selects the following functions:

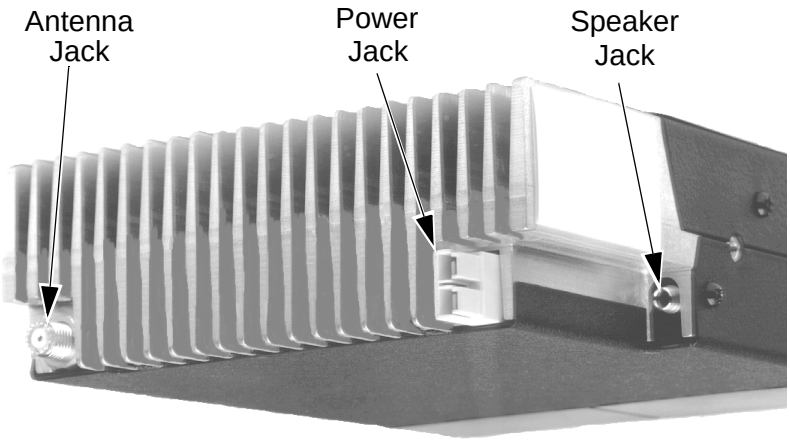
Menu Mode Select - Press FCN twice (see page 33)
Home Sys/Grp Select - FCN/press Select switch (see page 22)
Conv Squelch Set - FCN/rotate Select switch (see page 18)

Transmit/Busy Indicator - Indicates the following conditions:
Red - Transmitter keyed, normal power output
Orange - Transmitter keyed, power reduced because internal temperature is high (see page 27).
Green - Busy conventional group (channel). Refer to "Monitoring Before Transmitting" on page 44 for more information.

Microphone Jack - Connection point for the microphone.

Microphone Push-To-Talk (PTT) Switch (Not Shown) - Push-button on the microphone which is pressed to key the transmitter.

Speaker - The internal speaker is located behind the grille. An optional speaker can be connected to the external speaker jack located on the back (see "Speaker Jack" which follows).



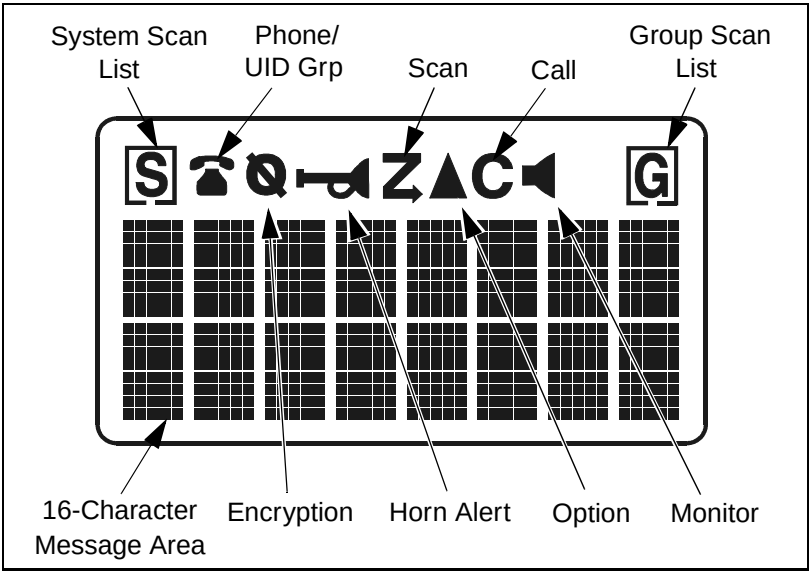
Rear Panel Jacks and Connectors

Antenna Jack - Miniature UHF jack for connecting the 50-ohm antenna.

Power Jack - Connection point for the power cable which attaches to the vehicle battery. A nominal 12-volt DC, negative ground power source is required.

Speaker Jack - Connection point for an optional external 4.7-ohm, 5-watt speaker. The internal speaker is automatically disabled when a speaker is plugged into this jack.

Accessory Cable (Not Shown) - This optional cable is used to connect functions such as ignition switch sense to the transceiver.



Display Description

16-Character Message Area - Indicates the selected system and group (see page 16) and also error conditions and status information.

S - Indicates that the displayed system is in the scan list and scanned normally (see page 38).

G - Indicates that the displayed group is in the scan list and scanned normally (see page 38).

☎ - Indicates that the selected group is programmed for telephone calls. With LTR-Net operation, it also indicates that the group is programmed for Auxiliary calls (see page 42).

Q - Indicates that optional encryption is enabled (see page 21).

- Indicates that the horn alert is enabled (see page 23).

Z - Indicates that scanning is enabled (see page 35).

▲ - Indicates that an option controlled by the AUX switch or OPTION menu parameter is enabled (see page 24).

C - Indicates that a call has been received on a group programmed for a call indicator (see page 21). To turn this indication off, press any key.

- Indicates that the monitor mode is enabled. This mode disables Call Guard squelch and other squelch control features so that all messages are heard on conventional systems (see page 44).

GENERAL OPERATION

Power-Up Sequence

When power is turned on, the backlight turns on, all segments in the display are momentarily enabled, and the last seven digits of the transceiver part number are very briefly displayed. A beep then sounds (if tones are enabled) and the transceiver is operational.

Determining Volume Level

The relative volume setting can be determined by noting the position of the index on the volume knob. You may also be able to enable a reference tone or background noise for use in setting the volume. Proceed as follows:

- If key press tones are enabled, a short tone sounds when an option switch is pressed or the Select switch is pressed or rotated.

- If a conventional system is selected, take the microphone off-hook and if someone is using the channel, voice is heard. If no one is using the channel, the squelch control can be adjusted counter-clockwise as described in “Setting Squelch Control” on page 18 and noise is heard. It is not possible to unsquelch the transceiver in this manner when an LTR-Net or LTR system is selected.

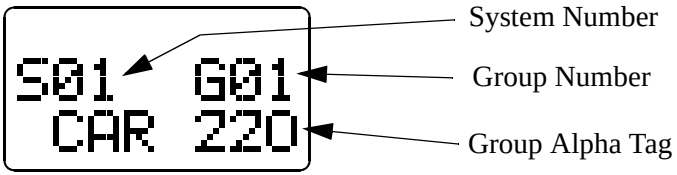
Backlight Operation

The display and keypad backlight can be controlled by the BACKLGT menu parameter (see page 33). The three states that can be selected are Bright, Dim, and Off. If this menu parameter is not selectable, the backlight is fixed in one of these states by programming.

System/Group Display Modes

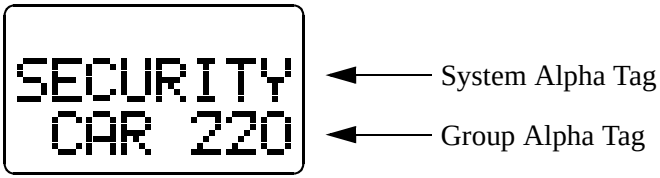
The selected system and group are displayed using either a Numeric or Alpha display mode. The display mode is selectable if the S/G DISPL menu parameter is available (see page 33). Otherwise, it is fixed in one of these modes by programming.

Numeric Mode - In this mode the selected system and group numbers are displayed on the top line as Sxx and Gxx, and the group alpha tag is displayed on the bottom line. For example, System 1, Group 1 (CAR 220) is displayed as follows. The system alpha tag is not displayed in this mode.



Numeric Display Mode

Alpha Mode - In the alpha mode, the system alpha tag is displayed on the top line and the group alpha tag is displayed on the bottom line. For example, a “SECURITY” system and “CAR 220” group are displayed as follows. The system and group numbers are not displayed in this mode.

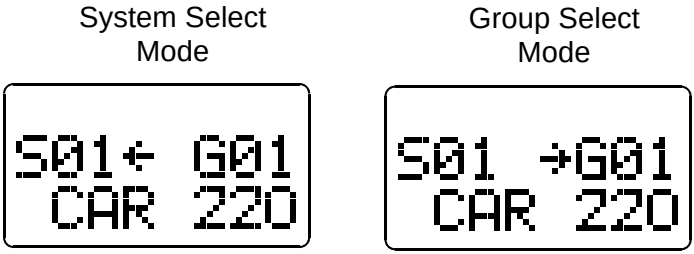


Alpha Display Mode

Selecting the System and Group

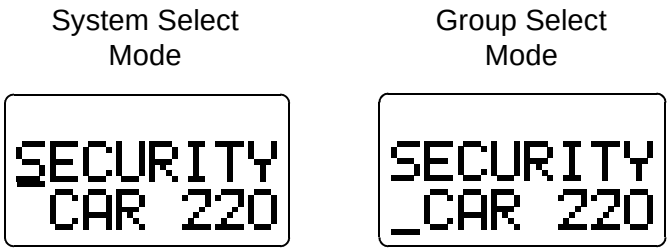
The front panel Select switch is used to change the system and group. Pressing this switch toggles between the system and group select modes, and rotating it increases or decreases the system or group.

In the Numeric display mode (see preceding description), the system select mode is indicated when the arrow points to “Sxx”, and the group select mode is indicated when it points to “Gxx” (see following illustration).



Select Mode Indication With Numeric Display

In the Alpha Tag display mode, the system select mode is indicated by an underline in the left-most character position of the system alpha tag. Likewise, the group select mode is indicated by an underline in the left-most position of the group alpha tag (see following illustration).



Select Mode Indication With Alpha Tag Display

The current mode remains selected until the menu mode is selected or transceiver power is cycled. The programmed default mode is then selected if applicable.

Setting Squelch Control

NOTE: This sets the squelch level used for conventional calls. The squelch level for LTR-Net and LTR calls is preset and not affected by this adjustment. For more information on operating modes, refer to page 19.

If conventional systems are programmed, the squelch level can be set if the FCN option switch is enabled. Proceed as follows:

1. Select a conventional system and a group that is not busy. Take the microphone off-hook to enable monitoring.

2. Press the FCN switch and then rotate the Select switch as you would a normal squelch control. Rotate it counterclockwise until receiver noise is heard and then clockwise slightly past the point where the noise mutes. The squelch adjust mode is indicated by "SQUELCH" on the upper line of the display, and the relative squelch level is indicated by a bar graph on the bottom line.

3. To select the current level and exit this mode, press the Select switch. This also occurs automatically 2 seconds after no change is made or 8 seconds after no activity.

4. If both narrow and wide band channels are used, perform this adjustment on both types because separate settings are maintained.

NOTE: Some readjustment may be required if weak messages are not heard or unsquelching occurs when no messages are present.

Microphone Off-Hook Detect

Microphone off-hook detection can be disabled by programming. Taking the microphone off-hook then does not disable scan-

ning (see page 35) or enable conventional channel monitoring (see page 44).

LTR-Net, LTR, and Conventional Operation

Introduction

Each selectable system can be programmed for LTR-Net, LTR, or conventional operation. The type of operation that is programmed is determined by the radio equipment being used by your system operator. There are only a few differences in operation that are of concern to the user. These differences are described in the following information and also noted elsewhere in this manual as required.

LTR-Net and LTR Operation

The LTR-Net and LTR modes provide automatic channel selection and monitoring before transmitting. Special tones and display messages indicate busy and out-of-range conditions, and telephone calls can be placed almost as conveniently as with your home telephone.

Selecting a system selects a collection of up to 99 groups, and selecting one of these groups selects an ID code which determines the type of call (standard group, telephone, or special). In addition, with standard group calls, it determines the specific mobile or mobiles being called and what calls are received. Priority groups may also be programmed which allow additional calls to be received (see page 41).

The LTR-Net operating mode provides the most operating features. Exclusive LTR-Net features include roaming and auxiliary calls such as Unique ID and Directed Group. Calls can be made to mobiles in your site or some other site. LTR-Net and LTR features are described starting on page 40.

Conventional Operation

In the conventional mode, selecting a system selects a specific radio channel, and selecting a group selects the special Call Guard squelch coding (if used) and other unique channel parameters such as call indicator operation. The Call Guard coding determines the mobile or group of mobiles being called and also the mobiles from which calls are received (see “Call Guard Squelch” on page 47).

In the conventional mode, a busy condition is detected automatically if the Transmit Disable On Busy feature is used. Otherwise, it must be detected manually as described in “Monitoring Before Transmitting” on page 44. Busy and no access conditions cannot be detected with conventional signaling, so are not indicated by special tones or display messages. Refer to “Operation At Extended Range” on page 54 for information on how to determine if an out-of-range condition may exist.

GENERAL FEATURES

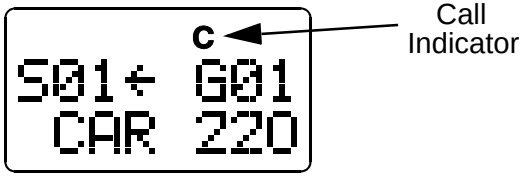
Bank Select

A bank is a collection of selectable systems that have been set up for a specific application. For example, one bank could be programmed for operation in Minneapolis and another for operation in Milwaukee. Each bank is identified by a unique alpha tag, and up to sixteen banks can be programmed.

Banks are selected by the BANK SEL menu parameter or BANK option switch. In the menu mode (see page 33), rotate the Select switch to display “BANK SEL” on the top line and the current bank is then displayed on the bottom line. Press the Select switch to change the bank. If using the option switch, when “BANK SEL” is displayed on the top line, simply press the Select switch to select the desired bank. If neither the menu parameter nor the option switch is available, banks are not selectable.

Call Indicator

The call indicator is "**C**" in the upper part of the display (see following illustration). The purpose of this indication is to show that a call was received while you were away from the vehicle. Individual groups can be programmed for this feature and it then turns on when a call is received on one of those groups.



This indicator is turned off by pressing any button or cycling transceiver power. If scanning and the "Last Received" configuration is programmed (see "Transmitting In The Scan Mode" on page 39), the system and group of the last call are displayed. Otherwise, the currently selected system/group is displayed.

Emergency Switch

If the EMER option switch is programmed (see page 33), it is used to quickly select the emergency system/group that has been programmed in the current bank. The emergency call must then be manually transmitted by pressing the PTT switch (automatic transmissions do not occur). Scanning continues if it is enabled, and calls are received normally on other systems and groups if applicable.

Encryption

Encryption is an optional feature that prevents conversations from being monitored by casual eavesdropping and 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.

Encryption is enabled and disabled by the ENCRYPT menu parameter or ENCPT option switch (see page 33). If this menu

parameter or option switch is not available, encryption may be fixed in the enabled mode by programming. When encryption is enabled,  is indicated in the upper part of the display (see page 14).

To transmit an encrypted call, encryption must be enabled as just described and the selected group must be programmed for encryption. Encrypted calls are always received regardless of the currently selected encryption mode and group programming (if the radio is equipped with encryption). When transmitting an encrypted call, wait approximately 1 second before speaking. This gives the receiving transceiver time to establish synchronization which ensures that all of the first word is received. If the proceed tone is used and an encrypted call is transmitted, two beeps instead of one sound and the tone is automatically delayed for the required time.

Function (FCN) Switch

If an option switch is programmed for FCN (function), it selects the following features. When the function select mode is active, "FCN" is displayed on the lower line of the display. This mode is automatically exited 2 seconds after a change is made or 8 seconds after no activity.

Menu Mode Select - Pressing FCN twice or the Menu option switch selects the menu mode as described on page 33.

Home System/Group Select - Pressing FCN and then the Select switch or the HOME option switch selects the home system/group as described in the next section.

Squelch Adjust - Pressing FCN and then rotating the Select switch with a conventional system selected sets the squelch level as described on page 18.

Home System/Group Select

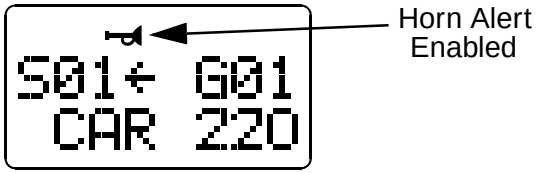
To select the preprogrammed Home system/group, simply press the FCN switch and then the Select switch. Alternatively, press the

HOME option switch if it is programmed. The Home system/group is then displayed and it becomes the selected system/group. If no home system/group or FCN or HOME option switch has been programmed, this function is not available. A different home system/group can be programmed for each bank.

Horn Alert

NOTE: The horn alert feature is not be available with some early models.

If this feature has been installed by your system operator, it activates an external alert such as the vehicle horn or lights when a call is received on a group programmed for horn alert. When the horn alert is enabled, is displayed as shown in the following illustration.



When enabled, the horn alert pulses on and off for 1-8 cycles and then goes back to the disabled state. To change the currently selected horn alert mode, the HRN ALRT menu parameter can be used if available (see page 33).

The horn alert is programmed to operate in the manual or automatic mode (see descriptions which follow). If the ignition switch does not control transceiver power, only the front panel power switch affects operation when applicable. Refer to “Power Turn-Off Delay” on page 24 for more information.

Manual Off/On Mode

The horn alert mode does not change when power is turned on and off by either the ignition switch or power switch. Therefore, the horn alert is entirely controlled by the HRN ALRT menu parameter.

Auto Off/On Mode

Ignition Switch - The horn alert always turns off when the ignition switch is turned on, and always turns on when the ignition switch is turned off (if there is a turn-off delay).

Power Switch - The horn alert always reverts to the off condition when power is turned on by the power switch.

NOTE: The preceding automatic operation overrides any mode that may have been selected by the HRN ALRT menu parameter.

Option Select

The AUX switch or OPTION menu parameter can be used to control an accessory that may have been installed by your system operator. The enabled condition is indicated by ▲ in the display.

Power Turn-Off Delay

Your transceiver may have been installed so that the vehicle ignition switch as well as the front-panel power switch control transceiver power. If this is the case, both the ignition switch and the front panel power switch must be on for transceiver power to turn on.

When the ignition switch controls power, turn-off delays of Immediate, 10, 20, 30, 40, or 50 minutes, 1, 2, 4, 8, 10, 12, or 16 hours or Forever can be programmed. The delay can be overridden at any time by turning power off using the front-panel power switch or turning the ignition switch back on.

A power turn-off delay allows features such as the call indicator to remain active for a time after the ignition switch is turned off. At the same time, advantages of ignition switch control are utilized such as preventing battery discharge that may occur if the transceiver is accidentally left on for an extended period (see page 54).

Proceed (Clear-To-Talk) Tone

This is a short tone that sounds shortly after the PTT switch is pressed to indicate that the radio system has been accessed and speaking can begin. The transceiver can be programmed so that this tone sounds on LTR-Net and LTR systems but not conventional systems. In addition, this and other tones can be disabled on all systems by the TONES menu parameter (see “Tone Select” on page 26) or system operator programming.

On LTR-Net and LTR systems, if the radio system is busy when making a call, the busy tone sounds instead of the proceed tone and “BUSY” is indicated on the bottom line of the display. If an access attempt is unsuccessful, such as because of an out-of-range condition, the intercept tone sounds and “NO ACCES” is indicated in the display. When the “NO ACCES” condition, the PTT switch must be released to make another call attempt. Refer to page 47 for more information on the busy and intercept tones.

On conventional systems, the Transmit Disable On Busy feature can be used to automatically perform monitoring (see page 46). The proceed tone then does not sound if the channel is busy. Otherwise, the proceed tone (if enabled) sounds on conventional systems even if the channel is busy. If encryption is used, two tones sound instead of one to indicate that an encrypted call is being transmitted. With other calls, a standard (single beep) or distinctive (3-beep) tone may be used. With special and telephone calls, the proceed tone may sound on only the initial access.

Receive-Only Groups

Any group can be programmed for monitoring only (transmitting is disabled). If the PTT switch is pressed with one of these groups selected, the intercept tone sounds and “TX DISBL” is displayed.

Stealth Mode

The stealth mode disables the following tones and indicators so that they do not reveal that you are transmitting or otherwise indicate your presence. The speaker audio and display remain enabled in this mode.

- All tones (see “Tone Select” on page 26)
- The front panel transmit/busy indicator (see page 11)
- Display backlight

The stealth mode can be selected by the STEALTH menu parameter (see page 33), or is fixed in the on or off mode by programming. There is no special indication that this mode is selected except that “On” is displayed under “STEALTH” when it is selected by the menu mode.

Time-Out Timer

The time-out timer disables the transmitter if it is keyed continuously for longer than the programmed time. It can be programmed for 0.5 - 5.0 minutes or disabled entirely. If the transmitter is keyed continuously for longer than the programmed time, the transmitter is disabled, “TIMEOUT” is indicated on the lower line of the display, and the intercept tone sounds. The timer and tone are reset by releasing the PTT switch.

One use of the time-out timer feature is to prevent a repeater from being kept busy for an extended period by an accidentally keyed transmitter. It can also prevent possible damage to the transmitter caused by transmitting for an excessively long period.

Tone Select

If the TONES menu parameter is selectable, the tones that sound can be selected. Otherwise, the tones that sound are fixed by programming. The following choices are available. Refer to page 33 for more information on using the menu mode.

Silent - All tones are disabled.
Keys - Only the Select switch and key press tones are enabled.
Alerts - All tones except the preceding Key Beep tones are enabled.
All - Both the Key Beep and Alert tones are enabled.

Transmitter Thermal Foldback

If the transmitter temperature increases to the point where damage to the transceiver could result, power is automatically cut back. When this happens, the transmit indicator on the front panel is orange instead of red when the transmitter is keyed. After sufficient cooling occurs, power output automatically returns to the normal level and the indicator changes back to red. One time when this indication could occur is if you transmit for an extended period.

STANDARD GROUP CALLS

General

Most calls you make are probably the standard group type described in this section. These calls are between you and another mobile or control station. The main difference between these calls and the other types that can be placed is that no number is dialed using a keypad. The following procedure applies to all three types of operation (LTR-Net, LTR, and conventional).

Placing a Standard Group Call

1. Turn transceiver power on and set the volume as described starting on page 15. With conventional operation, also make sure that the squelch is properly set as described on page 18.

2. Select the system and group of the mobile being called as described starting on page 17.

3. If a conventional call is being placed, monitor the channel manually or automatically as described on page 44.

4. Press (and hold) the microphone PTT (push-to-talk) switch to talk and release it to listen. Operation with LTR-Net, LTR, and conventional calls is as follows:

LTR-Net and LTR Operation

- If the proceed tone is enabled (see page 25), it sounds shortly after the PTT switch is pressed if the radio system was successfully accessed. If it is not enabled, no tone sounds when the system is successfully accessed. The proceed and other tones can be disabled as described in “Tone Select” on page 26.

- If the radio system is busy, the busy tone sounds (see page 47) and “BUSY” is indicated on the lower line of the display. Additional access attempts are made as long as the PTT switch remains pressed.

- If the radio system could not be accessed because of an out-of-range condition or some other reason, the intercept tone sounds (see page 48) and “NO ACCES” is indicated on the lower line of the display. The PTT switch must then be released and pressed again to make another access attempt.

- When responding, busy or no access conditions may also occur the same as when placing a call because the system is re-accessed for each transmission with these calls.

Conventional Operation

- If the channel is busy and the Transmit Disable On Busy feature is programmed (see page 46), “DSBL BSY” is indicated on the lower line of the display and the transmitter is disabled. Any channel activity is heard while the PTT switch is pressed.

- Otherwise, busy and out-of-range conditions are not indicated and speaking can begin when the PTT switch is pressed (if the channel is not busy). If the proceed tone is enabled on conventional systems, it indicates when speaking can begin but does

not indicate that the radio system has been successfully accessed.

5. When the call is complete, place the microphone back on-hook.

Receiving a Standard Group Call

1. Select or scan the system and group programmed for the call you want to receive (see page 35 for scan information).

2. When the message is received, the display usually changes to the system and group of the call. Take the microphone off-hook and press the PTT switch to talk and release it to listen. If scanning, a response may not automatically occur on the group of the call. Refer to “Transmitting In The Scan Mode” on page 39 for more information.

TELEPHONE CALLS

General

NOTE: Telephone calls can be placed and received only if that service is available to you and your transceiver has been programmed appropriately. In addition, a microphone equipped with a telephone keypad is required to dial the telephone number.

The telephone calling feature allows you to place and receive telephone calls using your transceiver. The following information describes how these calls are made with LTR-Net and LTR operation. If you can make telephone calls with conventional operation, the procedure may be somewhat different and your system operator will then provide additional information. Proceed as follows:

Placing Telephone Calls

1. Turn transceiver power on and set the volume as described starting on page 15. Select the group programmed for telephone calls. To

quickly select the telephone group in the current system, press the TEL option switch as described on page 41. When a group programmed for telephone calls is selected, ☎ is displayed.

2. To obtain the dial tone, briefly press the PTT switch. If the proceed tone is used (see page 25), press the PTT switch until this tone sounds. If a dial tone is then heard, proceed to step 4. Busy or no access conditions may also be indicated the same as described for standard group calls on page 28.

3. With the dial tone sounding, dial the number using the 0-9 keys on the microphone keypad. If the microphone has a memory, you may also be able to recall the number from memory. The PTT switch does not need to be pressed while dialing if the transmitter automatically keys. If too much time elapses between digits, the call is terminated.

4. After the number is dialed, release the PTT switch (if it was pressed). With LTR-Net operation, a short tone then sounds to indicate that the number was accepted by the system. Landside ringing (or a landside busy condition) should then be heard.

5. When the other party answers, press the PTT switch and respond. The PTT switch must be pressed to talk and released to listen the same as with mobile-to-mobile calls.

6. When the call is finished, it should be terminated. This is usually done by transmitting either the # or * # characters, and termination is indicated by three beeps. Terminating the call in this manner prevents extra billing that may occur while the system automatically detects the end of the call.

Receiving a Telephone Call

1. Select or scan the system and group programmed for telephone calls. To quickly select the telephone group in the current system, press the TEL option switch. When a telephone group is selected, ☎ is displayed.

2. When “ringing” is heard, press the PTT switch and respond. The PTT switch must be pressed to talk and released to listen the same as with standard calls.

3. When the call is finished, it should be terminated as in step 6 of the preceding section.

Landside-Originate Telephone Calls

If telephone calls can be placed, then it is usually possible to receive telephone calls from a landside telephone. With some radio systems, each mobile is assigned a unique telephone number so that it can be dialed directly. With others, the number of the radio system is dialed and then when a tone sounds, the number specifying the mobile being called is dialed using a tone-type telephone. The mobile user hears “ringing” when the call is received. Contact your system operator for the number to dial and more information on how to place these calls.

LTR-NET AUXILIARY CALLS

General

The LTR-Net Auxiliary calls include Unique ID and Directed Group calls (see page 42). Unique ID calls are to specific mobiles, and Directed Group calls are to specific talk groups. These calls can be placed to mobiles in your site or some other site that is part of your radio network.

As with telephone calls, a special number must be dialed to place these calls. Therefore, a microphone with a telephone keypad is required. The number dialed is 1-10 digits long, and is provided by your system operator. Other requirements to place these calls are you must be authorized to make them and your transceiver must be appropriately programmed.

Placing LTR-Net Auxiliary Calls

1. Select the LTR-Net system and group programmed for Auxiliary calls. When a group programmed for these calls is selected, ☎ is indicated in the upper part of the display. The group alpha tag displayed on the lower line may also indicate when one of these groups is selected.

2. To obtain a dial tone, briefly press the PTT switch. If the proceed tone is enabled, hold the PTT switch until this tone sounds. Busy or no access conditions may also be indicated the same as described for standard group calls on page 28.

3. A 1-10 digit number is dialed which specifies the destination of the call. Refer to step 3 on page 30 for more dialing information.

4. A tone then sounds to indicate that the call was accepted by the system. If this tone does not sound, an unauthorized or incorrect number may have been dialed. The call then proceeds as follows. If all system resources are busy, the call is placed in a queue as described in “Busy Queuing” on page 42.

   Unique ID Call - Ringing is heard to indicate that the other transceiver is being rung. If there is no answer, ringing automatically stops after several rings and the call is terminated. When the other party answers, respond as with a standard call.

   Directed Group Call - A second tone sounds to indicate that the path is complete and speaking should begin. No ringing occurs.

5. When the call is complete, it should be terminated by transmitting either the # or * # characters. Three beeps indicate that the call has been terminated.

Receiving Auxiliary Calls

To receive a Unique ID call, all that is required is that an LTR-Net system containing a group programmed for those calls be

selected. To receive a Directed Group call, the group of the call may need to be selected or scanned. A Unique ID call is indicated by a "ringing" tone similar to telephone calls, and a Directed Group call is indicated by the caller's voice the same as with standard group calls.

The transceiver may be programmed so that responses always occur on the last selected group. In this case, the group may need to be manually changed to respond to these calls (see "Transmitting In The Scan Mode" on page 39). Unique ID and Directed Group calls can also be placed from a landside telephone. The same numbers are dialed as when the call is mobile originated. Contact your system operator for more information.

OPTION SWITCHES AND MENU MODE

Option Switches

All five option switches on the front panel are programmable by your system operator. The available option switch functions are indicated by an entry in the "Option Switch" column of the table on the next page. More information on each function can be found on the page indicated in this table. Some functions may be controlled by both the menu mode and an option switch. The function controlled by each switch may be indicated on the switch key cap. Some switches may not be used or may have a blank key cap.

Menu Mode Introduction

The menu mode is selected by pressing the Menu option switch (the label may vary) or the FCN switch twice. If neither of these switches is programmed, the menu mode is not available. Functions which can be controlled by the menu mode are indicated by an entry in the "Menu Items" column of the preceding table. More information on each function can be found on the page indicated in this

table. Some parameters may not be displayed because they are not used or are in a fixed state or controlled by an option switch. Calls cannot be received or transmitted while the menu mode is selected.

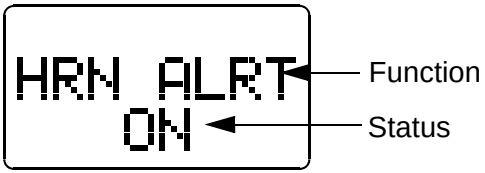
Menu Mode and Option Switch Functions

Function	Menu Items	Option Switch	See Descrip. on Page
Add/delete (scan list prg)		A/D	38
Backlight adjust	BACKLGHT		16
Bank select	BANK SEL	BANK	20
Display mode select	SG DISPL		16
Emergency sys/grp select		EMER	21
Encryption on-off	ENCRYPT	ENCPT	21
Function select		FCN	22
Home system/group select		HOME	22
		FCN then press Sel Sw	
Horn Alert on-off	HRN ALRT		23
Menu mode select		MENU	33
		FCN (twice)	
Option select	OPTION	AUX	24
Roaming on-off [1]	ROAMING	ROAM	43
Scan on-off		SCAN	35
Scan type select	SCN TYPE		35
Scan continue on-off	SCN CONT		39
Scan list save mode	SCN SAVE		38
Stealth mode select	STEALTH		26
Squelch adjust		FCN then rotate Sel Sw	18
Telephone group select		TEL	41
Tone type select	TONES		26

NOTES: Functions left blank are not available.
[1] Available with LTR-Net operation only.

Using Menu Mode

1. To select the menu mode, press the Menu switch or FCN FCN (the FCN switch twice). The top line of the display indicates the function being edited, and the bottom line indicates the current status of that function (see following illustration).



2. To display the various functions that are controllable by the menu mode (top line indication), rotate the Select switch. The currently selected status of that function is displayed on the bottom line.

3. To change the selected status, press the Select switch. The selections displayed for each menu function are shown on page 52.

4. The selected status conditions for the various functions are saved when the menu mode is exited in one of the following ways:

   - Pressing the FCN switch again
   - Pressing the PTT switch
   - Automatically when time-out occurs 2 seconds after a change is made or 8 seconds after no changes are made.

SYSTEM AND GROUP SCANNING

General

Introduction

The scan feature monitors, in sequence, the programmed systems and/or groups in the scan list. When a message is detected that the transceiver is programmed to receive, scanning stops and the

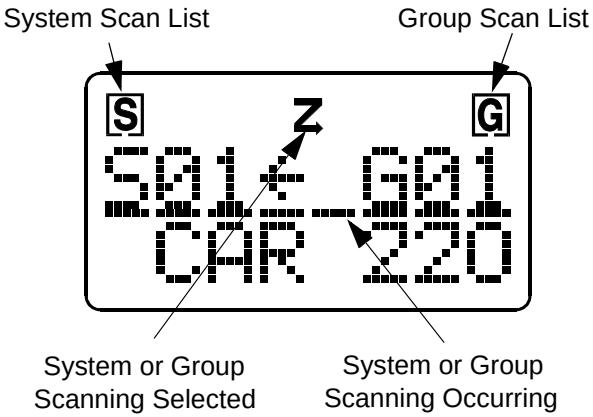
message is received. Shortly after the message is complete, scanning resumes (unless it has been disabled). Scanning is sequential through the programmed systems and groups. System and group scanning operate as follows:

System Scanning - Detects calls on all systems that are in the system scan list. When system scanning is not used, calls are detected on only the currently selected system.

Group Scanning - Detects calls on the selectable groups in the current or scanned systems that are in the group scan list. When group scanning is not used, calls are detected on only the currently selected group or if system scanning, on the last selected group of each system.

Scan On-Off

System and/or group scanning are turned on and off by the SCAN option switch. When system and/or group scanning is enabled by this switch, Z is indicated in the display (see following illustration). Then when system or group scanning is actually occurring, a scrolling underline is displayed under each character in the upper line of the display. The microphone must be on-hook for scanning to occur (unless off-hook detection has been disabled as described on page 18).



Scan Types

The type of scanning selected is determined by the menu mode SCN TYPE parameter (see page 33). If it is not selectable, the type of scanning is fixed by programming. The available scan types are as follows.

SYSTEMS - Both system and group
GROUPS - Group scanning only
OFF - Both types disabled (SCAN switch non-functional)

If the SCAN option switch is not programmed, the selected mode is always enabled. If both the switch and SCN TYPE menu parameter are disabled, the scan mode and type are fixed by programming. The selected system and group can be changed while scanning using the Select switch in the normal manner. Scanning resumes shortly after the change is made.

When a call is received in the scan mode, the display changes to the system and group of the call. Programming determines if this change is temporary or permanent, and if a response occurs on the system/group of the call or the selected system/group. Refer to “Transmitting In The Scan Mode” on page 39 for more information.

LTR-Net Mode Scanning

When system scanning with an LTR-Net system selected and roaming disabled, only the LTR-Net systems in the scan list that access the site of the selected system are scanned. LTR and conventional systems are not scanned.

When system scanning with roaming enabled, registration on other sites occurs normally and scanning operates as just described. However, if the current LTR-Net site is lost and no other LTR-Net site can be located, the LTR and conventional systems in the scan list are also scanned. If an LTR-Net site is again detected, registration on that site occurs and the LTR and conventional systems are no longer scanned. This can provide uninterrupted operation in areas which have not been converted to LTR-Net operation.

LTR and Conventional Mode Scanning

When an LTR or conventional system is selected with system scanning enabled and roaming disabled, scanning is sequential through only the LTR and conventional systems in the scan list (LTR-Net systems are not scanned). If roaming is enabled, all three system types are scanned as described in the preceding LTR-Net description. Therefore, LTR and conventional systems are not scanned while on LTR-Net site.

Scan List Programming

General

NOTE: The selected (displayed) system and group are always scanned even if they have been deleted from the scan list.

The system and group scan lists are programmed using the A/D (add/delete) option switch. Pressing this switch changes the status of either the displayed system or group, depending on whether the system or group select mode is active. This is the same select mode used for system and group selection as described on page 17. For example, to change the scan list status of the displayed system, press the Select switch if necessary so that the system select mode is indicated and then press the A/D switch.

The displayed system is in the scan list and scanned normally when S is displayed. Likewise, the displayed group is in the scan list and scanned normally when G is displayed (see preceding illustration). Deleting a system only temporarily deletes the groups associated with that system. When a system is added back into the scan list, the original group scan list is again active.

Systems and groups can be deleted from the scan list while listening to a message on the system or group by pressing the A/D switch in the normal manner. Scanning resumes shortly after the system or group is deleted. Scan list programming is not available if the A/D switch is not programmed.

Saving Scan List

If the menu mode SCN SAVE parameter is available, you can select if scan list changes are saved. If “On” is selected, changes are saved as they are made and the scan list is the same when power is turned on. Conversely, if “Off” is selected, they are not saved and the default scan list status of all systems and groups is reselected when power is turned on. If the menu SCN SAVE parameter is not selectable, the scan list save mode is fixed in one of these states.

Scan Delay and Continue Timers

When a message is received or transmitted while scanning, there is a short delay before scanning resumes. The delay after receiving a call prevents another message from being received before a response can be made. Likewise, the delay after transmitting a call ensures that you hear a response to your call instead of another message occurring on some other system or group. Scanning does not resume if it has been disabled, such as by taking the microphone off-hook.

There is also a scan continue timer that may be programmed. This timer controls the maximum time that a call is received before scanning resumes. Times up to 60 seconds can be programmed. This prevents scanning from being delayed for long periods by lengthy calls. If the menu SCN CONT parameter is selectable (see page 33), this feature can be turned on and off.

Transmitting In The Scan Mode

General

When the transmitter is keyed in the scan mode, programming determines if the transmission occurs on the last selected or last received system/group. The display usually indicates the system/group on which a transmission would occur. The exceptions are noted in the following information. The three programmable configurations are as follows.

Last Selected - Transmissions always occur on the system/group that was last selected by the Select switch. Therefore, the display may not indicate the system/group on which a response occurs. To respond to a call not on the selected system/group, first select the system/group of the call using one of the following methods:

- Select it manually using the Select switch.

- Before scanning resumes, exit the scan mode by pressing the SCAN switch. The system/group of the call then becomes the selected system/group and it is not necessary to change it manually.

Last Received - The selected system/group changes to the system/group of a call. Therefore, you can always respond to a call without having to manually change the system/group. To return to the previously selected system/group, it must be manually selected using the Select switch.

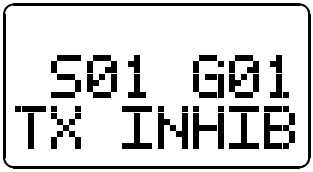
Temporary Last Received - The system/group changes to the system/group of a call for only the duration of the scan delay period (see page 39.) Then when the delay expires and scanning resumes (if it is not disabled), the selected system/group is again displayed. Therefore, you can respond to a call without changing the selected system/group as long as you do so before scanning resumes.

LTR-NET AND LTR FEATURES

Transmit Inhibit

The Transmit Inhibit feature prevents the transmitter from keying if the mobile you are calling is busy with another call. When the transmitter is disabled by this feature, the intercept tone sounds and “TX INHIB” is displayed (see following illustration). To make another call attempt, the PTT switch must be released and pressed

again. However, you may want to wait a few seconds before making another attempt because a timer must time out before another attempt will be successful. A similar Transmit Disable On Busy feature is available on conventional systems (see page 46).



Calls on Priority ID Codes

With LTR-Net and LTR systems, each selectable group is programmed with a receive priority number. If a call with a higher priority is detected while receiving a call, the current call is immediately dropped and the higher priority call is received. System or group scanning does not need to be enabled for this to occur. Some groups, such as those used to make telephone calls, may be programmed as not interruptible so that calls on those groups are not interrupted by other calls.

The system/group of the higher priority call is displayed while it is received. The programming of the Last Selected/Last Received/ Temporary parameter described on page 39 determines if the change is temporary or permanent and if a response occurs on the displayed or last selected system/group.

Telephone Group Select

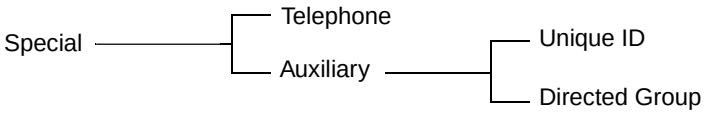
If the TEL option switch is programmed (see page 33), it can be used to quickly select the group programmed for telephone calls in the current system. When a telephone group is selected, ☎ is displayed (this icon is also displayed if an LTR-Net Auxiliary call group is selected). If more than one group is programmed for telephone calls, the first higher numbered telephone group is selected. If there is no telephone group or a conventional system is selected, “NO PHONE” is displayed and an error tone sounds.

LTR-NET FEATURES

NOTE: Other LTR-Net features are described starting on page 40.

LTR-Net Standard and Special Calls

The LTR-Net Special and Auxiliary calls are shown below. Refer to the descriptions which follow for more information.



Standard Group Calls - Standard group calls are between two mobiles or between a mobile and a control station. To place these calls in the LTR-Net or LTR mode, simply select the desired group and press the PTT switch. The procedure for placing and receiving these calls is described starting on page 27.

Telephone Calls - These calls allow you to make telephone calls using your transceiver, and they are described starting on page 29.

Auxiliary Calls - As shown in the preceding illustration, Auxiliary calls include Unique ID and Directed Group calls. Unique ID calls allow calls to be placed to specific mobiles, and Directed Group calls allow calls to be placed to specific talk groups. Auxiliary calls are described starting on page 31.

Busy Queuing

Queuing may be provided by the radio system when placing the special calls described in the preceding section if system resources are not available for the call. Standard group calls are not queued. When a call is placed in a queue, a voice message informs you that this has occurred. Then when resources become available, the call is automatically placed and the normal ringing or other tones are heard if applicable. If the call cannot be placed in the allotted time, it is terminated and another message informs you that this has occurred.

Roaming

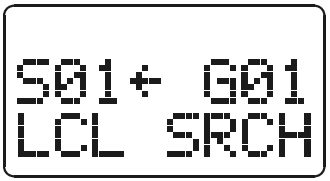
LTR-Net radio localities (sites) can be linked together to provide wide area coverage. Then as you travel from locality to locality with roaming enabled, calls are automatically routed to your current location. Both standard group and special calls may be routed to other localities. To utilize the Roaming feature, proceed as follows:

1. An LTR-Net system must be selected. When an LTR or conventional system is selected, roaming is disabled.

2. Roaming must be enabled by the ROAM option switch or ROAMING menu parameter (see page 33) if available. When roaming is enabled and disabled by the option switch, “ROAM ON” and “ROAM OFF” are momentarily displayed. If neither the menu parameter nor option switch is available, roaming is fixed in the on or off mode by programming.

3. Scanning does not need to be enabled. If it is, an LTR-Net system must be selected.

When roaming is enabled as just described and the signal from the current locality becomes weak, the transceiver automatically begins searching for another locality. While searching is occurring, “LCL SRCH” is displayed as shown below. Then when a new locality is located, registration occurs and “LCL SRCH” is no longer displayed. The displayed system is the next LTR-Net system programmed with a different locality that could be accessed, and the displayed group is usually the group that was displayed before roaming occurred.



LTR FEATURES

NOTE: Other LTR features are described starting on page 40.

Standard Group Calls

Standard group calls are between two mobiles or between a mobile and a control station. To place these calls in the LTR or LTR-Net mode, simply select the desired group and press the PTT switch. The procedure for placing and receiving these calls is described starting on page 27.

Telephone Calls

Telephone calls allow you to place and receive calls over the public telephone system using your transceiver. LTR and LTR-Net telephone calls are described starting on page 29.

CONVENTIONAL FEATURES

Monitoring Before Transmitting

General

Regulations require that conventional groups (channels) be monitored before transmitting to make sure that they are not being used by someone else. If you were to transmit when someone else is talking, you would probably disrupt their conversation. In the LTR-Net and LTR modes, monitoring is performed automatically. In the conventional mode, it must be performed automatically or manually as follows.

Automatic Channel Monitoring

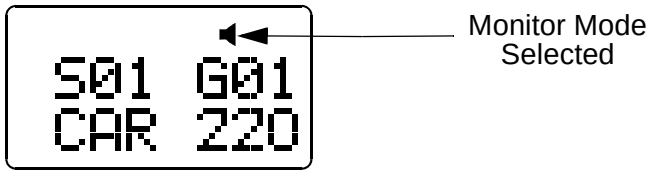
If the selected group is programmed for the Transmit Disable On Busy feature (see page 46), monitoring is performed automatically.

Busy Indicator

If the group is not automatically monitored as just described, it must be monitored manually. The simplest way to do this may be to note if a busy condition is indicated by the front panel multi-function indicator (see page 11). With scanning disabled and the squelch control properly adjusted (see page 18), note if this indicator is lighted green. If it is, a signal is being detected on the selected group (channel) and you should not transmit a message until it turns off.

Monitor Mode

There may be times when the Busy indication is displayed even though no one is using the channel. Monitor should then be performed using the monitor mode. This mode is enabled by taking the microphone off-hook, and is indicated by ◀ in the display as shown in the following illustration. The monitor mode temporarily disables Call Guard squelch (see page 47) and other squelch control techniques and also scanning so that all messages on the group are heard.



The transceiver may be programmed so that the microphone off-hook condition is not detected. The monitor mode is then not enabled when the microphone is taken off-hook. The Transmit Disable feature then may be used on all conventional groups so that manual monitoring is not required.

Monitoring may also be selectively disabled on each group by programming. Taking the microphone off-hook then does not enable monitoring on that group and monitoring is always performed by the Transmit Disable On Busy feature.

A conventional system must be selected to enable monitoring. If the microphone is taken off-hook with an LTR-Net or LTR system selected, scanning halts (unless off-hook detection is disabled) but monitoring is not selected.

Transmit Disable On Busy

The Transmit Disable On Busy feature automatically disables the transmitter if the selected group (channel) is busy and it has not been monitored when the PTT switch is pressed. When the transmitter is disabled by this feature, the busy tone sounds briefly and "DSBL BSY" is indicated on the lower line of the display.

While the PTT switch is pressed, the receiver is enabled so that activity on the channel can be monitored. The PTT switch must be released and then pressed again to make another call attempt. Occasionally, a busy condition may be detected even though no one is talking. To key the transmitter in this case, release the PTT switch and then immediately press it again.

There is also a programmable option with this feature to allow transmitting with a busy channel if the correct Call Guard signal is detected. The Transmit Disable On Busy feature is enabled or disabled on each conventional group by dealer programming. If this feature is disabled or if monitoring has been performed by taking the microphone off-hook, the transmitter keys even if the group is busy.

Talk-Around

Normally, all transmissions go through a repeater which usually increases range because the repeater transmits at a higher power level and has a higher antenna. However, this means that if you are out of radio range of the repeater, you cannot talk to anyone even if the mobile you are calling is only a short distance away. To allow communication if this occurs, talk-around groups can be programmed which enable direct mobile-to-mobile communication without going through a repeater.

Talk-around is then automatically selected when one of these groups is selected. There is no special talk-around option switch or indicator. However, the group alpha tag on the lower line of the display may be used to indicate groups programmed for this feature. Talk-around is not available on LTR-Net and LTR systems.

Call Guard Squelch

The Call Guard squelch feature eliminates distracting messages intended for others using the channel. This is done by using a subaudible tone or digital code to control the squelch. This tone or code is unique to a user or a group on that channel. It is transmitted with the voice signal but is not heard because it is in the subaudible range and attenuated by a filter. Call Guard squelch can be programmed on each conventional group. LTR-Net and LTR operation uses ID codes to perform a similar function.

MISCELLANEOUS

Supervisory Tones

The following tones are heard at various times when operating this transceiver. Some or all of these tones can be disabled by the TONES menu parameter or programming. Refer to “Tone Select” on page 26 for more information.

Busy Tone

This tone is similar to the standard telephone busy tone, and it indicates that the radio system is currently busy. The display also indicates “BUSY” while this tone is sounding. Repeated access attempts are made while the PTT switch pressed with this tone sounding. Therefore, it is not necessary to release the PTT switch to access the system. This tone sounds only with LTR-Net and LTR calls.

Intercept Tone

This is a siren-like tone (alternating high and low tones) which indicates the following no access and error conditions:

- No Access - If this tone sounds shortly after pressing the PTT switch and “NO ACCES” is displayed, the radio system could not be accessed, perhaps because of an out-of-range condition (see “Operation At Extended Range” on page 54). Once this tone sounds, no more access attempts are made until the PTT switch is released and then pressed again. This condition is indicated only with LTR-Net and LTR calls.

- Time-Out Timer - If this tone sounds after the transmitter has been keyed for an extended period and “TIMEOUT” is displayed, the transmitter has been disabled by the Time-Out Timer feature (see page 26).

- Transmit Inhibit - If this tone sounds as soon as the PTT switch is pressed with an LTR-Net or LTR system selected and “TX INHIB” is displayed, the transmitter has been disabled by the Transmit Inhibit feature (see page 40).

- Receive-Only Group - If this tone sounds as soon as the push-to-talk switch is pressed and “TX DISBL” is displayed, the group is receive-only (see page 25).

Proceed (Clear-To-Talk) Tone - This is a short single or double tone which sounds after the push-to-talk switch is pressed to indicate when talking can begin (see page 25).

Key Press Tone - This is a short tone that indicates when an option switch is pressed.

Wrap-Around Tone - This is a two-pitch tone that indicates that the highest or lowest channel was displayed and that wrap-around has occurred.

Error Tone - This is a two-pitch tone that indicates that an error condition has occurred.

LTR-Net Special Call Tones

The following tones are generated by the LTR-Net equipment and are heard when making a telephone, unique ID, or directed group special call on an LTR-Net system.

Confirmation Tone - This is a short tone that sounds when the number just dialed has been accepted by the system.

Call Proceed Tone - With LTR-Net directed group calls (see page 32), 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 landside-to-mobile telephone call (see page 31), the landside caller may enter a special number which specifies the mobile being called. This tone indicates when that number should be dialed.

LTR Telephone Call Tones

The following tones are generated by LTR interconnect equipment and are heard when making LTR telephone calls.

Reorder Tone - Three beeps which indicate that the call has been terminated by the system.

Return Time Warning Tone - Two beeps which warn that you have not transmitted for an extended period. If you do not transmit within 5 seconds, the call is automatically terminated by the system. The time between transmissions is one of the parameters used by the system to detect the end of a call when the # character is not sent.

Conversation Time-Out Tone - Calls are limited to a certain length by the system. Thirty seconds before this time is reached, a “tick” begins sounding each second. When the 30-second time expires, the call is automatically terminated by the system.

Turn-Around Tone - This is a single beep which may be used to indicate to the landside party when to respond to your transmission. It sounds when you release the PTT switch, and you may partially hear this tone.

Proceed Tone - This tone consists of two beeps and it tells the land-side caller when to enter the five-digit number specifying the mobile being called. Dialing of this number must be started within 5 sec. of hearing this tone, and a tone-type telephone must be used.

Display Messages

The following messages appear in the display to indicate various operating modes and error conditions.

BUSY - Indicates that the LTR-Net or LTR radio system is currently busy (see “Busy Tone” on page 47).

CALL SVC - Indicates that the transceiver is inoperative. Contact your system operator for service.

DSBL BSY - Indicates that the transmitter is disabled by the conventional Transmit Disable On Busy feature (see page 46). It also indicates that the transmitter was keyed while receiving an LTR-Net or LTR call.

FCN - Indicates that the function select mode is selected by the FCN option switch (see page 22).

LCL SRCH - Indicates that the transceiver is currently searching for a new locality (site) on which to register (see page 43).

Model - The last seven digits of the transceiver part number are indicated very briefly on the top line of the display when transceiver

power is turned on. This number indicates such things as frequency band, power output, and tier of the transceiver. The eighth digit is reserved and always “0”.

NO ACCES - Indicates that the radio system could not be accessed, perhaps because of an out-of-range condition. Refer to “Operation At Extended Range” on page 54 for more information.

NO PHONE - Indicates that there is no telephone group programmed in the current system when the Telephone option switch is pressed (see page 41).

NO POWER - Indicates that the transmitter temperature or supply voltage is excessive and that the transmitter has been automatically shut down. Release the PTT switch and allow the transmitter to cool. If the problem persists, contact your system operator for service.

NOT AUTH - Indicates that an attempt was made to register on a site where service was not authorized (see page 43).

NOT CONV - Indicates that an attempt was made to enable a conventional mode feature on an LTR-Net or LTR system.

NOT LNET - Indicates that an attempt was made to enable an LTR-Net mode feature on an LTR or conventional system.

OUT-LOCK - Indicates that the synthesizer is unlocked. Refer to “Transceiver Service” on page 55 for more information.

PROG ERR - Indicates an EEPROM read error. Refer to “Transceiver Service” on page 55 for more information.

SLEEPING - Indicates that the transceiver has been temporarily disabled by the system operator. It will be automatically enabled again when operation can be resumed.

SQUELCH - Indicates that the conventional squelch adjust mode is selected (see page 18).

TIMEOUT - Indicates that the transmitter has been disabled by the Time-Out Timer (see page 26).

TX DISBL - Indicates that the transmitter has been disabled because the selected group is receive-only (see page 25).

TX INHIB - Indicates that the transmitter has been disabled by the Transmit Inhibit feature (see page 40).

Menu Mode Messages

The following messages are displayed in the menu mode that is described starting on page 33. The enabled or "yes" condition is indicated by "ON", and the disabled or "no" condition by "OFF".

BACKLGT - Backlight control
- BRIGHT
- DIM
- OFF

BANK SEL - Bank select
- Bank alpha tag

ENCRYPT - Encryption select
- ON or OFF

HRN ALRT - Horn alert select
- ON or OFF

OPTION - Option on-off
- ON or OFF

ROAMING - LTR-Net roaming on-off
- ON or OFF

SCN CONT - Scan continue on-off
- ON or OFF

SCN SAVE - Scan list save
- ON = save, OFF = not saved

SCN TYPE - Selects type of scanning
- SYSTEM - Both system and group
- GROUPS - Group scanning only
- OFF - All scanning disabled

S/G DISPL - System/group display mode
- ALPHA
- NUMERIC

STEALTH - Stealth mode select
- ON or OFF

TONES - Beep tones select
- SILENT - All tones disabled
- KEYS - Only Select switch and key press tones sound
- ALERTS - All tones sound except preceding Key Beeps sound
- ALL - All the preceding tones sound

System Operator Programming

As noted several times in this manual, programming determines the availability and specific operation of many features. This refers to the programming performed by your system operator when the radio was set up, not to any programming that you can perform. If a feature is not controlled by a front panel option switch, it is fixed in the mode set by programming or not available. If you require additional information on the operation of a feature, contact your system operator.

Speaking Into Microphone

For best results, hold the microphone about 1-2 inches from your mouth and speak at a normal conversational level. Do not shout since it distorts your voice and does not increase range. Make sure that the PTT (push-to-talk) switch is pressed before you begin to

speak and released as soon as the message is complete. If the proceed tone is used, wait for that tone to sound before speaking (see description on page 25).

Operation At Extended Range

When approaching the limits of radio range, the other party may not be able to hear your transmissions and there may be an increase in background noise when messages are received. You may still be out of range even though you can hear a message. The reason for this is that the signal you are receiving is usually transmitted at a higher power level than the one transmitted by your transceiver. Communication may be improved by moving to higher ground or away from shielding objects such as tall buildings or hills.

Preventing Battery Discharge

In the standby mode (power on, not transmitting), transceiver power consumption is relatively low. Therefore, you can probably leave the transceiver on for one or two days without operating the vehicle and the battery should not become seriously discharged. However, if the outdoor temperature is low enough to significantly decrease battery capacity, the transceiver should be turned off when not in use.

Since power consumption is significantly higher when transmitting, it is good practice to have the vehicle running while transmitting. This ensures that optimum power is being delivered to the transceiver and that the battery does not become discharged.

Licensing

A government license is usually required to operate this transceiver on the air. Your system operator will normally handle the licensing requirements.

Transceiver Service

If your transceiver is not operating properly, “OUT-LOCK”, “PROG ERR”, “SLEEPING”, or “CALL SVC” may be displayed. It may be possible to clear either of the first two conditions by turning off and then on again to reset the control logic. Also make sure that the controls are properly set and that the power, external speaker (if used), and accessory (if used), cables are securely plugged into the back of the transceiver. If the transceiver still does not operate properly, return it to your system operator for service.

The “SLEEPING” message indicates the transceiver is temporarily disabled as described on page 51, and when the CALL SVC message is displayed, the transceiver must always be returned to your system operator for service.

Another indication that could be displayed is “NO POWER”. This indicates that transmitter temperature or supply voltage is excessive. Release the PTT switch and allow the transceiver to cool, and make sure that the vehicle battery voltage is within the normal range.

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

Part No. 002-9803-601
11-99hph Printed in U.S.A.