5300-Series

OPERATING MANUAL

Digital Mobile Radio

Project 25 Compatible Digital Radio

VHF
800 MHz

EFJohnson®

CHANGES FOR 7-01 REPRINT

Added Encryption key select and Select Sq Select sw info which required reformatting entire manual. Chg'd PN to -005.

Page 9 - Added Hardware Key Select switch

Page 10 - Added Hardware Key Sel and Selective Sq Sel Sw

Page 11 - Moved Securenet info to General and added P25 to emerg

Page 17 - Changed view angle adj procedure

Page 19 - Added keypad programming info to squelch adj description

Page 21 - Added microphone hook info to scan description

Page 26 - Added hardware key select info to secure comminication

Page 29 - Added mic hook info to Monitor mode. Also, chg'd operation when Mon switch pressed for 2 seconds

Page 31 - Added Selective Sq Select switch info

Page 33 - Adde P25 only to Emer Sw

Page 47 - Added "4 low tones' bullet

Page 56 - Changed Site Lock description

LAND MOBILE PRODUCT WARRANTY - The manufacturer's warranty statement for this product is available from your product supplier or from E.F. Johnson, 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.

To comply with FCC RF exposure limits, DO NOT operate the transmitter of a mobile radio when a person outside the vehicle is within one (1) meter of the antenna.

To comply with FCC RF exposure limits, 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 Table 1 (B) titled “Limits For General Population/Uncontrolled Exposure” which is from FCC report OET bulletin #65.

Table 1
FCC Limits for Maximum Permissible Exposure (MPE)

(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/cm^2)
0.3-1.34	614	1.63	(100)*
1.34-30	824/f	2.19/f	($180/f^2$)*
30-300	27.5	0.073	0.2
300-1500	--	--	f/1500
1500-100,000	--	--	1.0

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

Table 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 domestically manufactured four-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 Table 1.

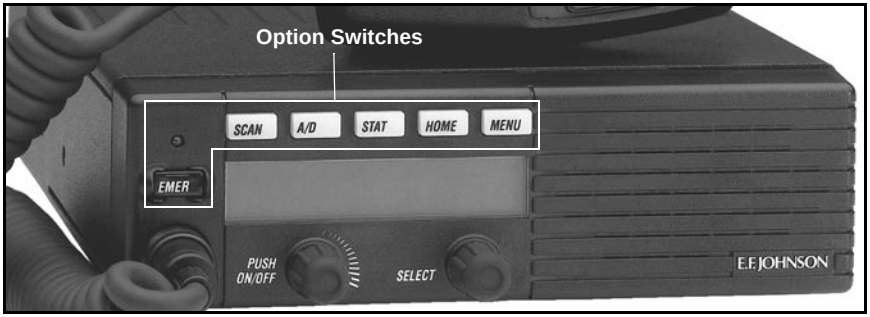
NOTE: Other antennas or installation configurations that have not been tested may not comply with FCC RF exposure limits and therefore are not recommended.

Table 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

OPTION SWITCH FUNCTIONS



The six option switches with sample labels are shown above. Each of these switches can control one function in the conventional mode and another in the SMARTNET®/SmartZone™ mode.

The following tables indicate the functions available in each mode, the key cap label normally used, and the page in this manual on which the function is described. Since keys can control two different functions, the key cap may not always indicate the correct function or a blank key cap may be used. Consult your system operator to determine if some switches control two different functions. Refer to page 19 for more option switch information.

CONVENTIONAL MODE		
Key Cap Label	**Function**	**See Page**
BKLHT	Backlight On-Off	17
C/S	Clear/Secure	26
TG SEL	Talk Group Select	37
DISP	Displayed Information	33
EMER	Emergency	33
-	Hardware Key Select	26
TX PWR	Transmit Power	32
HOME	Home Zone	20
CALL	Individual ID Call (or Private Call)	37

CONVENTIONAL MODE (Cont'd)		
Key Cap Label	**Function**	**See Page**
PROG	Keypad Programming	38
MON	Monitor	29
SEL SQ	Normal/Selective Squelch	30
PRI SEL	Priority	34
RWS	Radio Wide Scan	22
RTA	Repeater Talk-Around	32
SEL SQ	Selective (Call Guard) Squelch Select	30
SCAN	Scanning On-Off	21
SCN ED	Scan List Edit	25
TONES	Tones On-Off	20

SMARTNET/SMARTZONE MODE		
Key Cap Label	**Function**	**See Page**
BKLHT	Backlight	17
ALERT	Call Alert	50
RESP	Call Response	48
C/S	Clear/Secure	26
EMER	Emergency	53
-	Hardware Key Select	26
HOME	Home Zone	20
MSG	Message	52
PHONE	Phone	48
CALL	Private Call (or Individual ID Call)	45
RWS	Radio Wide Scan	22
SCAN	Scanning On-Off	54
SCN ED	Scan List Edit	25
LOCK	Site Lock	56
SEARCH	Site Search	56
STATUS	Status	52
TONES	Tones On-Off	20

FEATURES

General Features

- Programmable for the following modes of operation:
  - Conventional analog
  - Conventional Project 25 (digital)
  - SMARTNET™/SmartZone® trunked (analog or digital)
- Up to 16 zones with up to 16 channels each programmable (256 channels total)
- Large liquid crystal display (LCD) with backlight.
- Six programmable option switches
- Standard and radio wide scan modes
- Time-out timer
- SecureNet™ or 460 secure communication available on analog channels, DES-OFB on digital channels

Conventional Features

- Up to 256 channels or talk groups programmable
- Repeater talk-around
- Monitor mode selected by microphone hanger or option switch
- Carrier or Call Guard® controlled squelch on analog channels
- Penalty and conversation timers
- Priority channel sampling when scanning
- Busy Channel Lockout (Transmit Disable On Busy)
- Individual ID calls on Project 25 channels
- User selectable high and low power output
- Emergency switch (P25 channels only)
- Keypad programming

SMARTNET™ II/SmartZone® Features

- Up to 256 talk groups programmable
- Group, Enhanced Private Conversation™, Private Conversation II™, and Telephone Calls
- Emergency alarms to alert dispatcher of emergency conditions
- Emergency calling for high priority system access

- Failsoft operation on a predefined conventional channel if trunked system fails
- Priority group calls detected while listening to other group calls
- Call Alert™ (send and receive pages)
- Predefined messages (up to 16) can be sent to a dispatcher
- Predefined status conditions (up to 8) can be sent to a dispatcher
- Dynamic regrouping (dispatcher can automatically gather users on a channel to receive a message)
- Roaming (SmartZone only)
- SecureNet™ or 460 secure communication available

NOTE: The availability of many of the preceding features is controlled by dealer programming of your transceiver, installed options, and the capabilities of the radio system being accessed.

CONTROLS AND DISPLAY

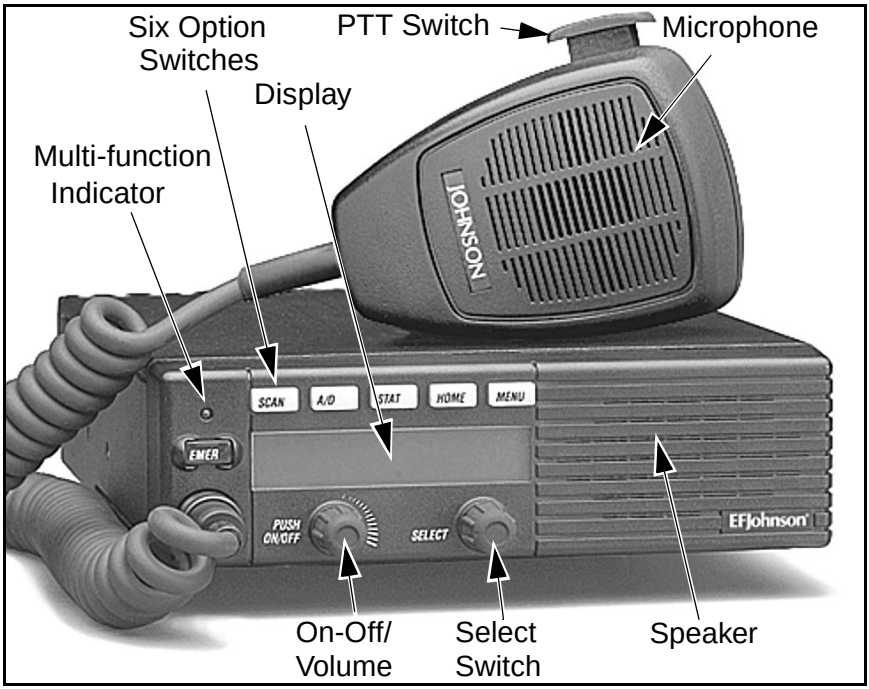


Figure 1 Front Panel Controls

Front Panel Controls

On-Off/Volume - Pressing this control turns power on and off, and rotating it sets the volume level.

Select Switch - Selects zones/channels and is also used for other functions such as selecting names from a call list. When selecting zones/channels, a bar above the zone or channel display (see Figure 3) indicates which is being changed. This bar is switched between displays by pressing this switch, and zone or channels are selected by rotating it (see "Zone/Channel Select" on page 18).

Multi-function Indicator - This is a two-color LED that indicates the following:

Red (constant) - Transmitter keyed (PTT switch pressed).
Green (constant) - Busy condition (carrier detected in receive mode).

Option Switches - Each of the six options switches on the front panel (including the one located to the left of the display) can be programmed by your system operator to control some function. The switch functions can be different for each operating mode (conventional and SMARTNET/ SmartZone). Therefore, up to 12 functions can be controlled by these switches. Refer to page 9 for more information on option switch functions.

Speaker - An internal speaker is located behind the grille. An optional external speaker may be used if desired. The internal speaker is disabled when an external speaker is used.

PTT Switch - This push-button switch on the microphone is pressed to talk (key the transmitter) and released to listen.

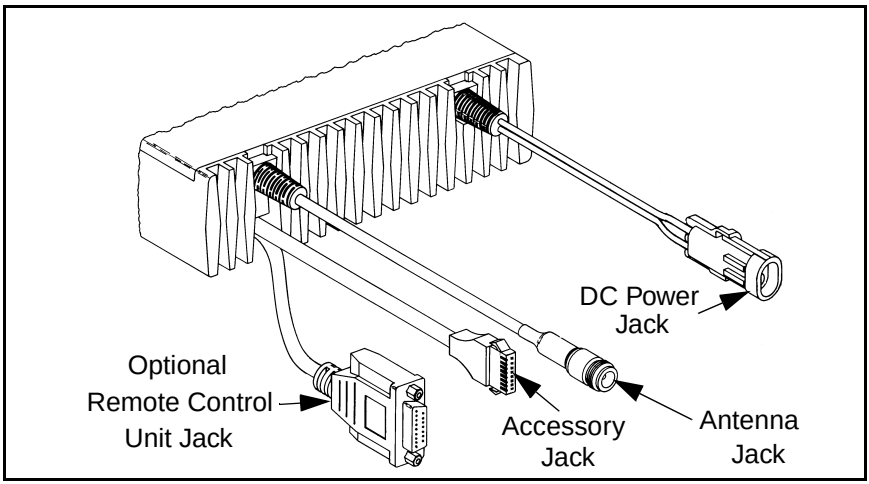


Figure 2 Rear Panel Jacks

Rear Panel Jacks

DC Power Jack - Connection point for the nominal 12-volt, negative ground power source (see Figure 2).

Antenna Jack - Type N jack for connecting the antenna.

Accessory Jack - Connection point for optional accessories such as an external speaker (4-ohm, 12-watt) and ignition sense line.

Remote Control Unit Jack - Connection point for a remote control unit if used. This cable is optional with front-mount models.

Display

Alphanumeric Display - This 10-character area of the display indicates the alias (unique identification) for the selected channel. Depending on the current mode, it may also indicate such things as the channel frequency, system/group number, and status and error messages.

Zone Number - Indicates the currently selected zone from 1 up to 16. A zone is a collection of channels that can be any combination of the conventional and SMARTNET/SmartZone types.

Channel Number - Indicates the currently selected channel.

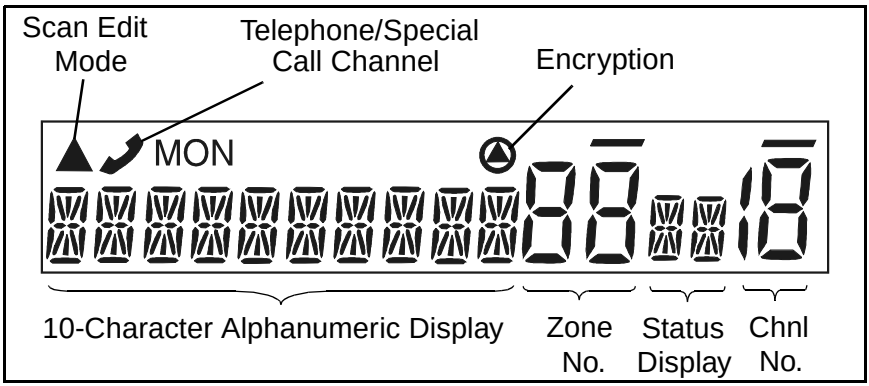


Figure 3 Front Panel Display

Status Display - These two characters indicate the following status information:

 - This symbol in the left position indicates that the displayed channel is in the scan list (scanned normally).

 - A “P” in the left position indicates that the selected conventional channel is a priority channel.

 - This rotating clock-like symbol in the right position indicates that scanning is enabled.

 - Indicates that the displayed channel (or talk group) is programmed for telephone calls.

 - Indicates that voice encryption is enabled.

MON - Indicates that the monitoring is enabled by the Monitor option switch (conventional operation only). This switch unsquelches the receiver so that all messages are heard on the channel. Refer to page 29 for more information.

 - The lines above the zone and channel displays indicate which display is changed if the Select switch is turned. To switch between displays, press the Select switch (see page 18).

 - When this triangle is displayed, the scan list edit mode is indicated (see page 25).

GENERAL OPERATION

Turning Power On

When power is turned on by pressing the On-Off/Volume knob, the multi-function indicator flashes green, a series of beeps sound, and an initial greeting and operating mode are indicated by the alphanumeric display. The zone and channel displays then indicate the currently selected zone and channel. Programming determines if the last selected or home zone is selected at power up.

Backlight Control and Display Viewing Angle Adjust

The backlight for the display and option keys can be manually turned on and off if the BKLHT option switch is programmed. Otherwise, it is fixed in the on or off mode by programming.

If the display is difficult to read from the angle you normally view it, the viewing angle can be adjusted. Simply press and hold the last option switch above the display and then press the first option switch above the display. Then release both switches and turn the Select switch until the best contrast is obtained. This function times out in 3-5 seconds.

Setting Volume Level

The relative volume setting can be determined by noting the position of the index on the On-Off/Volume knob. Otherwise, enable a reference tone for use in setting the volume as follows:

- If the key press tones are enabled (see page 20), a short tone sounds when an option switch is pressed or the Select switch is pressed or rotated.

- If a conventional channel is selected, take the microphone off-hook and if someone is talking, voice is heard. If the MON (Monitor) option switch is programmed (see page 29), pressing it unsquelches the transceiver and either voice or background noise is heard. If a SMARTNET/SmartZone channel is selected, the transceiver cannot be manually unsquelched.

Zone/Channel Display

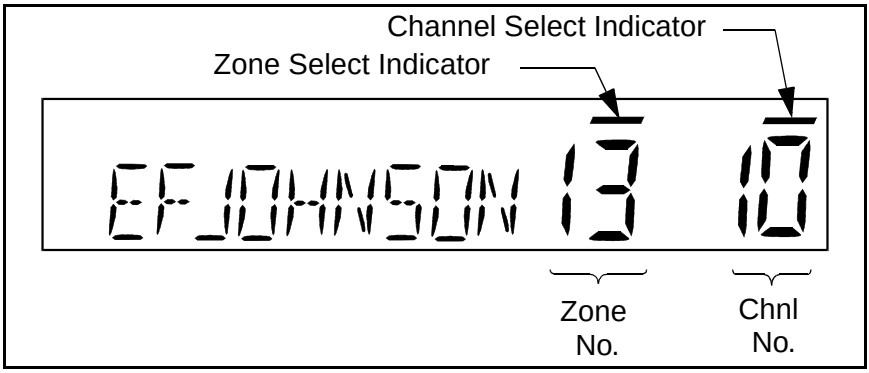
The selected zone and channel are displayed by the zone and channel displays shown in Figure 3 on page 15. In addition, a unique alphanumeric identification tag (alias) is displayed for each channel in the alphanumeric display area. This unique identification is programmed by your system operator.

A zone can include any mix of channels. Up to 16 zones can be programmed, and up to 16 channels can be programmed in each zone for a total of up to 256 channels. Zones may be used for operation in different geographical areas or radio systems. Consult your system operator for more information on how to use the zones and channels that have been programmed in your transceiver.

Zone/Channel Select

The front panel Select switch is used to change the zone and channel. Pressing this switch toggles between the zone and channel select modes, and rotating it changes the zone or channel.

The current mode is indicated by the bar over the zone or channel display. For example, when the bar is over the zone display (see following illustration), the zone select mode is enabled. Rotating the Select switch clockwise increases the zone or channel and rotating it counterclockwise decreases the zone or channel number. After the



highest zone or channel is displayed, wrap-around to the lowest zone or channel occurs and vice versa. If an unprogrammed channel is selected, “UNPROGRAMD” is displayed and a tone sounds. The transceiver may also be programmed so that only programmed channels are selected.

The transceiver can be programmed so that the bar defaults to either the zone or channel display when power is turned on and after a change is made. The delay that occurs before it returns is programmed for 1-15 seconds or infinite (“infinite” causes it to remain in the last selected mode).

Setting Squelch Control

This transceiver does not have a squelch control. The squelch level is preset and usually does not require readjustment. However, if the squelch level needs to be changed on a conventional channel, it can be changed using keypad programming if available (see page 43).

Option Switches

The six option switches on the front panel (one is located to the left of the display) can be programmed by your system operator to control a different set of functions for each of the two different operating modes (see page 27). Refer to page 9 for more information on these switches.

Time-Out Timer

The time-out timer disables the transmitter if it is keyed for longer than the programmed time. It can be programmed on each channel for times from 15 seconds up to 3 minutes, 45 seconds or it can be disabled. If the transmitter is keyed continuously for longer than the programmed time, the transmitter is disabled, a continuous tone sounds, and “TX TIMEOUT” is displayed. Five seconds before time-out occurs, a warning beep sounds to indicate that time-out is approaching. The timer and tone are reset by releasing the PTT switch.

One use of this feature is to prevent a channel from being kept busy for an extended period by an accidentally keyed transmitter. It can also

prevent possible transmitter damage caused by transmitting for an excessively long period.

Home Zone Select

If the HOME zone option switch is programmed, pressing it selects the preprogrammed home zone. This provides a quick way of returning to the home zone. The transceiver may also be programmed so that whenever power is turned on, the home or last selected zone is automatically selected.

Tone Select

The various alert tones that sound are described starting on page 56. These tones can be enabled and disabled if the TONE option switch is programmed. To turn all tones off, press this switch and “TONE OFF” is displayed. Then to turn all tones on again, press it and “TONE ON” is displayed. If this switch is not programmed, tones are fixed in the on or off condition by programming.

Power Turn-Off Delay

Your transceiver can be 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, a turn-off delay of up to 254 minutes 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 turn-off delay allows calls to be received for a time after the ignition switch is turned off. At the same time, advantages of ignition switch control are utilized such as preventing the battery discharge that may occur if the transceiver is left on for an extended period (see page 59).

Scanning

Introduction

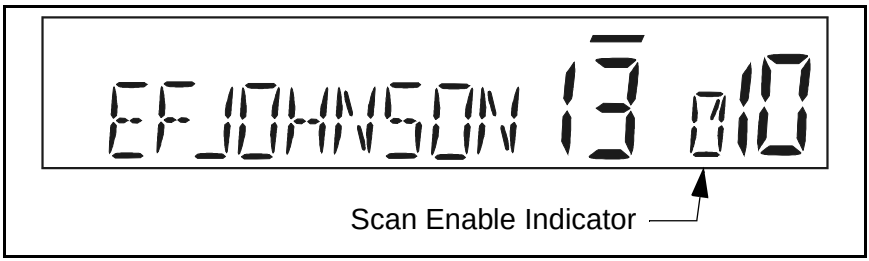
Scanning monitors the channels in the scan list for messages your transceiver is programmed to receive. When a message is detected, scanning stops and the message is received. Shortly after the message is complete, scanning resumes (unless it has been disabled). The microphone must on-hook for scanning to occur (unless the transceiver is programmed to not detect the off-hook condition).

There are two scan modes available: Standard and Radio Wide. The standard type is unique to the type of channel selected, and the Radio Wide type is the same for all channel types. Only one type of scanning can be enabled at a time. Therefore, if standard scanning is enabled when the Radio Wide Scan switch is pressed, standard scanning is automatically disabled and vice versa. Refer to the following for more information.

Standard Scanning

Standard scanning monitors only channels that are the same type as that currently selected. For example, if a conventional channel is selected, only conventional channels are scanned. Standard scanning operates as follows.

- To turn standard scanning on, press the SCAN option switch. Scanning is enabled when a rotating ▯ is indicated in the right status display as follows and “SCAN ON” is briefly displayed.



- To turn scanning off, press the SCAN option switch again and  is no longer indicated in the status display and “SCAN OFF” is briefly displayed.

- If the zone or channel is changed while scanning is selected, scanning continues on the same or a different scan list (see page 23).

Radio Wide Scanning

Radio wide scanning monitors the channels in the preprogrammed radio wide scan list. This list may contain up to 16 channels of any type assigned to any zone (see scan list description on page 23). Radio wide scanning is turned on and off by the RWS option switch as follows. If this switch is not programmed, radio wide scanning is not available.

- To turn radio wide scanning on, press the RWS option switch and “RSCN ON” is briefly displayed. In addition,  is displayed the same as with standard scanning.

- To turn radio wide scanning off, press the RWS option switch again and “RSCN OFF” is briefly displayed and  is no longer displayed.

- If the zone or channel is changed while radio wide scanning, scanning continues normally.

Scan Resume Delay

When a message is received or transmitted while scanning, there is a system operator programmed delay before scanning resumes. The delay after receiving a call prevents another message from being received before you can make a response, and the delay after transmitting a call ensures that you hear a response to your call instead of another message occurring on some other channel.

Transmitting in the Scan Mode

If the transmitter is keyed while scanning is enabled, the transmission may occur on the receive, selected, or priority channel depending on the operating mode and programming.

Standard Mode Scan List

NOTE: The selected channel is always scanned.

With conventional operation, up to three scan lists can be programmed. The list that is scanned is selected by the SCAN option switch as described on page 33. Selecting another conventional channel does not change the current scan list. The scan lists are user programmable if the SCN ED (Scan Edit) option switch is programmed (see page 25).

With SMARTNET/SmartZone operation, each channel can be programmed so that one of up to three different scan lists is selected or scanning is disabled. As with conventional channels, the selected scan list is user programmable if the SCN ED option switch is programmed.

Radio Wide Mode Scan List

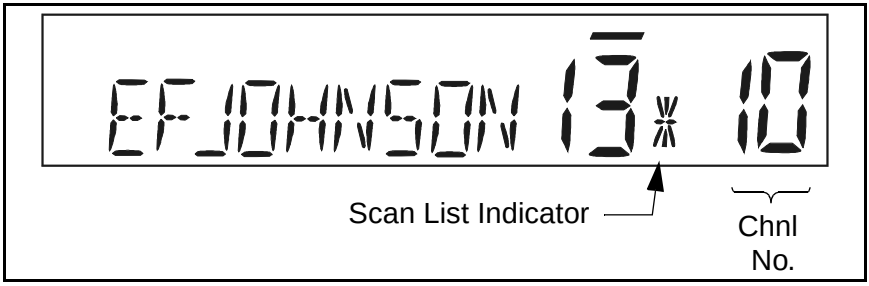
With radio wide scanning, there is only one preprogrammed scan list available regardless of the type of channel selected, and it is not user programmable.

Determining Which Channels are in Scan List

Channels in the radio wide and conventional standard scan lists are determined as follows. Channels in the SMARTNET/SmartZone standard scan lists are indicated only when editing a list (see page 25).

1. Enable Standard scanning to view the standard list or Radio Wide scanning to view the radio wide scan list (the procedure is on page 21). With conventional standard scanning which can have up to three lists, also select the scan list if applicable as described on page 33.

2. Select the desired zone and then scroll through the channels by rotating the Select switch. When the displayed channel is in the scan list (scanned normally), the symbol is displayed next to the zone number as shown in the following illustration.



Nuisance Channel Delete

With standard scanning, channels can be temporarily deleted from the scan list, for example, if messages on a channel become annoying. This feature is not available with radio wide scanning. Proceed as follows:

NOTE: The selected channel and also conventional priority channels cannot be deleted from the scan list.

1. While receiving a message on the channel to be deleted, press and hold the SCAN option switch until a tone sounds (approximately 2 seconds).

2. The channel is then deleted and scanning of the remaining channels in the scan list resumes.

3. Deleted channels are added back into the scan list if any of the following events occur:

   - Scanning is turned off and then on again using the SCAN switch.
   - Transceiver power is turned off and then on again.
   - The scan list is reselected by changing channels (SMARTNET/ SmartZone) or using the SCAN option switch (conventional).

Programming a Scan List

If the SCN ED (Scan Edit) option switch is programmed, conventional and SMARTNET/SmartZone standard scan lists can be user programmed as follows:

1. Make sure that both standard and radio wide scanning are off (the rotating icon is not indicated in the right status display). Then press the SCN ED option switch and the scan edit mode is indicated by a triangle in the upper left part of the display (see illustration on page 15).

2. With conventional channels, if applicable, select the list to be edited (1-3) by rotating and then pressing the Select switch. The scan list is indicated as “SCAN LIST x” (see page 33). If user programming is disabled on a list, “NO LIST” is momentarily displayed and it cannot be edited.

   With SMARTNET/SmartZone channels, the scan list for the selected channel is fixed and cannot be changed. Scanning may also be disabled on the selected channel in which case “NO LIST” is momentarily displayed and scan list editing is not available.

3. Select the channel you want to add or delete by rotating the Select switch. After the last channel in the current zone is displayed, the first valid channel in the next zone is displayed and vice versa. SMARTNET/SmartZone lists are limited to 16 channels. If an attempt is made to add more than 16, “LIST FULL” is displayed and a channel must be deleted before another can be added.

4. If the selected channel is in the scan list (scanned), the symbol is displayed next to the zone number as described on page 23. To change the scan list status of the displayed channel, press the Select switch.

   NOTE: The priority channel cannot be deleted (see “Priority Channel Sampling” description which follows).

5. To exit this mode and save the changes, press the SCN ED option switch again.

Secure Communication

General

This transceiver may be optionally equipped to provide secure communication on some or all channels. This feature encrypts your voice so that it can be understood only by someone using a transceiver equipped with a similar encryption device and encryption codes. If your transceiver has this feature, consult your system operator for more information on how it functions in your application.

When a secure call is received or transmitted,  is indicated in the display. Secure communication can be programmed on a per channel basis to operate in various ways. If equipped with the C/S (Clear/Secure) option switch and the current channel is programmed to allow switch selection, secure communication can be manually enabled and disabled by that switch. In the receive mode, secure calls may be autodetected or only calls coded like the transmit signal may be received.

Hardware Key Select

With SecureNet encryption, up to sixteen hardware keys can be programmed into the transceiver, and then each encrypted channel is programmed to select a specific hardware key. The hardware key is actually the location in the transceiver of the encryption key that is used for a call. The same encryption key may need to be selected in both the transmitting and receiving transceivers for secure communication to occur.

If multiple keys have been programmed, the Hardware Key Select option switch (if available) can be used to change the key associated with a channel. This permanently changes the key for the channel (cycling power or selecting another channel does not re-select the original key). Therefore, to switch back to the original key, it must be manually reselected. Proceed as follows to change a key:

1. Select the desired channel. Then press the Hardware Key Select option switch and “HWKEY x” is displayed. The “x’ indicates the currently selected key from 0-15.

2. To select another key, rotate the Select switch to display the desired key and then press the Select switch to select it. Press the Hardware Key Select switch again to return to normal operation.

Transceiver Operating Modes

Each selectable channel can be programmed for either the conventional or SMARTNET/SmartZone operating mode. For example, Zone 1/ Channel 1 could be a conventional channel, Zone 1/Channel 2 a SMARTNET channel, and so on. Consult your system operator to determine the type or types of operation programmed in your transceiver. More information on these modes follows.

Conventional - This is a non-trunked operating mode which accesses independent radio channels (there is no automatic access to several channels). Monitoring before transmitting may not be automatic in this mode, so you may need to manually monitor the channel before transmitting to make sure that it is not in use. Either analog or digital (Project 25) signaling may be used. Channel monitoring and other operating features unique to conventional channels are described starting on page 28.

SMARTNET™/SmartZone® -This is a trunked operating mode that uses ID codes to select what mobiles are being called and what calls are received. Monitoring is performed automatically and special messages and tones indicate busy and out-of-range conditions. Enhanced features include roaming (SmartZone only), telephone, private, and emergency calls, Call Alert™, and messaging. Either analog or digital signaling may be used. Operating features unique to SMARTNET/SmartZone channels are described starting on page 44.

When a SMARTNET or SmartZone channel is selected or the radio is powered up on one of those channels, it searches for a control channel and attempts to register on the radio system. Once a control channel is found, the alias (name) of the selected channel is displayed. If a control channel could not be found (because of an out of range condition or the system ID is not correct, for example), “NO SYS” is displayed and the radio continues to search for a control channel.

The control channel transmits and receives system information to and from all radios registered on the system. Therefore, once a control channel is found, it is continuously monitored for incoming call information and is used to make call requests. The radio automatically changes to a traffic channel to place and receive calls and then returns to the control channel when the call is complete.

CONVENTIONAL FEATURES

Introduction

An overview of the conventional operating mode is located on the preceding page. The following information describes the features unique to standard (analog) and Project 25 digital conventional operation. Refer to the preceding "General Operation" section for information on features common to all operating modes.

Monitoring Before Transmitting

With conventional operation, you may need to manually monitor the channel before transmitting to make sure that it is not being used by someone else. If you were to transmit while someone else was using the channel, you would probably disrupt their conversation. Monitor conventional channels automatically or manually as follows:

Automatic Channel Monitoring

If the selected channel is programmed for Busy Channel Lockout feature (consult your system operator), monitoring is performed automatically. Refer to the description of this feature on the next page for more information.

Manual Channel Monitoring

The automatic monitoring just described may occasionally disable the transmitter when the channel is not in use. In this case, it may not be used and the channel must then be monitored manually as follows:

Busy Indicator - With scanning disabled, note if the multi-function indicator on the front panel (see Figure 1 on page 13) is steady green. If it is not, the channel is not being used and you can transmit your call. If it is green, the channel may be busy and you should not place your call (see next paragraph).

Monitor Mode - There may be times when the busy indication is displayed even though no one is using the channel. Monitoring should then be performed using the monitor mode which follows.

Monitor Mode

The Monitor Mode temporarily disables squelch control features (such as Call Guard squelch) so that all messages are heard on the channel. To enable the monitor mode, briefly press the SEL SQ option switch (if available) so that "Normal" is briefly displayed. Then to return to normal operation, press this switch again (see page 30 for more information).

The monitor mode can also be enabled by taking the microphone off-hook (if off-hook detection is enabled by programming). This also temporarily disables scanning if applicable. To return to normal operation, place the microphone back on-hook.

If the MON option switch is programmed, it can also be used to enable monitoring and disable scanning. When monitoring is enabled by this switch, "MON" is indicated in the display (see Figure 3 on page 15). Pressing it a second time returns to normal operation. This function unsquelches the receiver so that all activity, including background noise, is heard. Therefore, it may also be useful during weak signal conditions if intermittent squelching is making a message difficult to understand.

Pressing and holding the MON switch for at least 2 seconds when scanning monitors the current scanned channel instead of the selected channel (which may be different when receiving a call).

Busy Channel Lockout

The Busy Channel Lockout feature (also called Transmit Disable On Busy) automatically disables the transmitter if the channel is busy when the PTT switch is pressed. When the transmitter is disabled by this feature, “BUSY” is displayed and a tone sounds. This feature is programmed to operate for one of the following modes:

Off - The feature is disabled and the transmitter keys even if the channel is busy.
Noise - The transmitter is disabled if any signal is detected on the channel.
Tone - The transmitter is disabled if the detected squelch coding is not correct.

If busy channel override is enabled by programming, it is possible to transmit when the transmitter is disabled by this feature. Simply release the PTT switch and then quickly press it again.

Call Guard Squelch

General

Call Guard® squelch (also called CTCSS/DCS or selective signaling) may be programmed on conventional channels. This feature eliminates distracting messages intended for others using the channel. This is accomplished by using a subaudible tone or digital code to control the squelch. This tone or code is unique to a user or talk group on that channel. It is transmitted by the mobile placing a call, and if Call Guard squelch is programmed in the mobile receiving the call, it must detect the correct tone or code to receive the call.

Call Guard Squelch Enable/Disable

The SEL SQ option switch (if available) can be used to temporarily disable receive Call Guard squelch on the current channel. When it is disabled, “NORMAL” is flashed in the display, and when it is enabled, “SELECTIVE” is flashed. It is automatically re-enabled when another

channel is selected or transceiver power is turned off and on. Call Guard squelch can also be disabled by taking the microphone off-hook or pressing the MON option switch as described on page 29.

Selective (Call Guard) Code Select

If the Selective Squelch Select option switch is programmed, the Selective Squelch (Call Guard) code can be temporarily changed. This switch is used to select a code from a pre-programmed list of up to 16 codes. Proceed as follows to change a code using this switch:

1. Press the Selective Squelch option switch and then rotate the Select switch to select the desired code. The display indicates “SEL SQ xx” where, “xx” is the selected code from 1-16.

2. To select the displayed code and return to the normal operation, press the Selective Squelch switch again.

3. To check which code is selected, press the Selective Squelch switch once to display the current selection and then again to return to normal operation.

4. To return to the normal selective squelch codes, select “DEFAULT” in this mode. The normal codes are also automatically reselected whenever transceiver power is cycled or a talk-around channel is selected.

NOTE: Call Guard codes can also be changed using the keypad programming function described on page 38.

Penalty Timer

A penalty timer may be programmed on conventional channels to prevent transmissions for a short period of time after the time-out timer disables the transmitter (see page 19). The penalty timer starts when the PTT switch is released after the transmitter has been disabled. If the PTT switch is pressed during the penalty time, the time-out indication occurs again. When the penalty timer expires, a beep sounds and the transmitter can then be keyed.

Conversation Timer

Besides the time-out timer described on page 19 and the penalty timer just described, there is also a conversation timer that can be programmed with conventional channels. This timer limits the total length of a conversation rather than just the length of each transmission as with the time-out timer.

If this timer is used, a warning tone sounds 5 seconds before it expires. Then when it expires, the transmitter is disabled and a warning tone sounds. The transmitter remains disabled for the length of the penalty time just described, and a beep sounds when it can be keyed again.

Repeater Talk-Around

Normally, all your transmissions go through a repeater which usually increases range. However, if you are out of range of the repeater, you cannot talk to anyone else on that repeater even though the mobile you are calling may be only a short distance away. To allow communication when this situation occurs, repeater talk-around can be selected to allow direct mobile-to-mobile communication.

Repeater talk-around can be selected if the RTA option switch is programmed. When talk-around is enabled by this switch, “RTA ON” is flashed in the display, and when it is disabled, “RTA OFF” is flashed. This feature remains enabled during scanning, and changing channels or turning power off does not change the selected mode.

Power Output Select

If the Tx PWR option switch is programmed and selectable power is permitted on the current channel, high and low transmitter power can be selected. Generally, the high power setting allows you to transmit longer distances but uses more battery power. The opposite occurs with the low power setting.

Pressing the TX PWR switch toggles the power setting. The new level is flashed in the display when this switch is pressed as “HIGH POWER” or “LOW POWER”. If selectable power is not permitted on the current channel, the fixed power level is flashed and no power change occurs.

Displaying Transmit/Receive Frequency

If the DISP option switch is programmed, it can be used to display the channel frequency in megahertz. Pressing this switch toggles between displaying the standard channel identification and the frequency. The receive frequency is displayed while receiving and the transmit frequency is displayed while transmitting.

Emergency Mode

An EMER option switch may be programmed for use on conventional Project 25 (digital) channels. This function could be used, for example, to alert your dispatcher of an emergency condition. If you have this switch, consult your system operator for more information on how it is used in your application.

Conventional Mode Scanning

General

The following information describes scanning features unique to conventional operation. Scan operation common to all modes is described starting on page 21, and scan operation common to SMARTNET/SmartZone operation is described starting on page 54.

Selecting Scan List

Up to three scan lists are available when standard scanning with a conventional channel selected. These lists are preprogrammed by your system operator, and the list to be scanned is selected by the SCAN option switch as follows:

1. Press the SCAN option switch to enable scanning and Scan List 1. This is indicated when “SCAN LIST 1” is momentarily displayed.

2. To select Scan List 2 (if available), press the SCAN option switch again and “SCAN LIST 2” is momentarily displayed. Repeat to display Scan List 3 if available.

3. To disable scanning, press the SCAN switch again. Scanning is disabled when scan indicator  is no longer displayed.

Transmitting in Scan Mode

When the transmitter is keyed with scanning enabled, the transceiver can be programmed so that the transmission always occurs on one of the following channels:

- Priority channel (see following)
- Selected channel
- Channel of a call if the response is made before scanning resumes

Priority Channel Sampling

General

The priority channel sampling feature ensures that messages on the priority channel are not missed while listening to a message on some other channel. Your transceiver can be programmed so that the priority channel is a fixed channel associated with the current scan list, the currently selected channel, or not used.

Priority channel sampling occurs only with Standard conventional scanning. It does not occur with Radio Wide scanning, when listening to any type of SMARTNET/SmartZone call, or when transmitting. A series of “ticks” may be heard when the priority channel is sampled while listening to a message on some other channel. When the selected channel is a priority channel, “P” is indicated in the left status display next to the zone number as follows:

Changing The Priority Channel

If a specific priority channel is associated with the current scan list, it can be changed if the PRI SEL option switch is programmed. Proceed as follows:

1. Make sure that both standard and radio wide scanning are off (the rotating icon is not indicated in the right status display).

2. Select the channel that you want to be the priority channel using the Select switch in the normal manner. If the channel is in a different zone, also select the appropriate zone.

3. Press the PRI SEL option switch and "P" is indicated in the left status display as just described to indicate that the selected channel is now the priority channel.

Standard Conventional Calls

Standard conventional calls can be placed to other mobile units monitoring the selected channel. The proper coded Call Guard squelch tone or code may need to be transmitted by your transceiver for them to receive your call (see page 30).

Placing a Standard Conventional Call

1. Turn power on and set the volume as described on page 17. Select the channel programmed for the mobile you want to call (see "Zone/ Channel Select" on page 18).

2. Monitor the channel automatically or manually as described on page 28.

3. Press the PTT switch and the call proceeds as follows:

   - If the Busy Channel Lockout feature is programmed on the channel, the transmitter is automatically disabled if the channel is busy (see description on page 30).

   - Otherwise, busy and out-of-range conditions are not indicated and speaking can begin after monitoring the channel.

4. Press (and hold) the PTT switch to talk and release it to listen. When the call is finished, place the microphone back on-hook.

Receiving a Standard Conventional Call

1. Select or scan the channel programmed for the call you want to receive (refer to pages 21 and 33 for more scanning information).

2. When the call is received, take the microphone off-hook and press the PTT switch to talk and release it to listen. If scanning, you may have to respond before scanning resumes to ensure that the response occurs on the channel of the call.

3. When the call is finished, place the microphone back on-hook.

Project 25 Mode Features

Viewing Individual ID

Each transceiver which operates on Project 25 (digital) channels is assigned an eight-digit individual ID. When power is turned on with a Project 25 channel selected, the individual ID of your radio is briefly displayed.

Group IDs

Each Project 25 channel is programmed with a group ID code that determines the group of mobiles which will receive your call on that channel and also which calls you can receive.

Coded Squelch

Project 25 conventional channels use a NAC (Network Access Code) instead of Call Guard squelch (see page 30) to control which calls are received on a channel. Both the correct group ID and NAC must be detected to receive a call. However, other operation, such as monitoring, is similar to when Call Guard squelch is used.

Changing Talk Group Assigned To A Channel

If the TG SEL option switch is programmed, the talk group assigned to a channel can be changed. This change is permanent (cycling power does not reselect the old talk group). Proceed as follows:

1. Select the channel to be changed and then press the TG SEL option switch.

2. Rotate the Select switch to display talk group to be assigned to that channel. Talk groups are indicated by a unique identification in the alphanumeric display.

3. To select that talk group and return to normal operation, press the TG SEL switch again or press the Select switch. If talk group selection has been disabled on the channel by programming, the talk group does not change, “NO LIST” is displayed, and a tone sounds.

Individual Calls

If the CALL option switch is programmed, individual calls can be placed to a specific mobile radio on Project 25 channels. This call differs from standard group calls in that only one mobile instead of entire groups of mobiles may receive the call. To respond to an individual call, simply

press the PTT switch and begin talking before a call timer expires. Proceed as follows to place this call:

1. Press the CALL option switch and the identification of the last individual call placed is displayed.

2. If required, rotate the Select switch to display the identification of the mobile you are calling.

3. Press the PTT switch and begin talking.

When individual calls are received, the transceiver may be programmed to display the selected talk group, the talk group of the call, or the ID of the calling radio.

Keypad Programming

Introduction

Keypad programming is available if the PROG option switch is programmed. It is then selected by simply pressing that switch. The keypad programming mode is indicated by “ZONE CHG” and blanked Zone and Channel displays as follows:

Keypad programming allows conventional channel parameters such as the transmit and receive frequency and Call Guard squelch code to be changed. In addition, several conventional mode timers can be changed. It cannot be used to reprogram unavailable channels or any SMARTNET/ SmartZone information.

Menu Description

A menu system is used to select parameters to be changed in the keypad programming mode. When the Keypad Programming mode is selected by pressing the PROG option switch, the first menu parameter "ZONE CHG" is displayed as just described. Rotate the Select switch to scroll through the available parameters which are as follows. Additional information on these parameters is located in the sections which follow.

- **ZONE CHG**
- **CHAN CHG**
- **SYS PRM**
- **CHAN PRM**

Press the Select switch or F6 key (see following illustration) to select the displayed parameter. Press the F5 key from one of the main menus to exit keypad programming. Pressing the F5 key in the other menus returns to the previous menu. A flowchart showing the keypad programming mode menu structure follows in Figure 4.

Key Identification For Keypad Programming

Zone Password

Your transceiver may be programmed so that a special password must be entered before the system and channel parameters of a particular zone can be changed. A different password may be required for each zone. The first time a system or channel parameter of a password-protected zone is selected by keypad programming, "PASSWORD" is flashed. The eight-digit password must then be entered by rotating and pressing the Select switch. After the correct password is entered, the parameters for that zone can be reprogrammed normally.

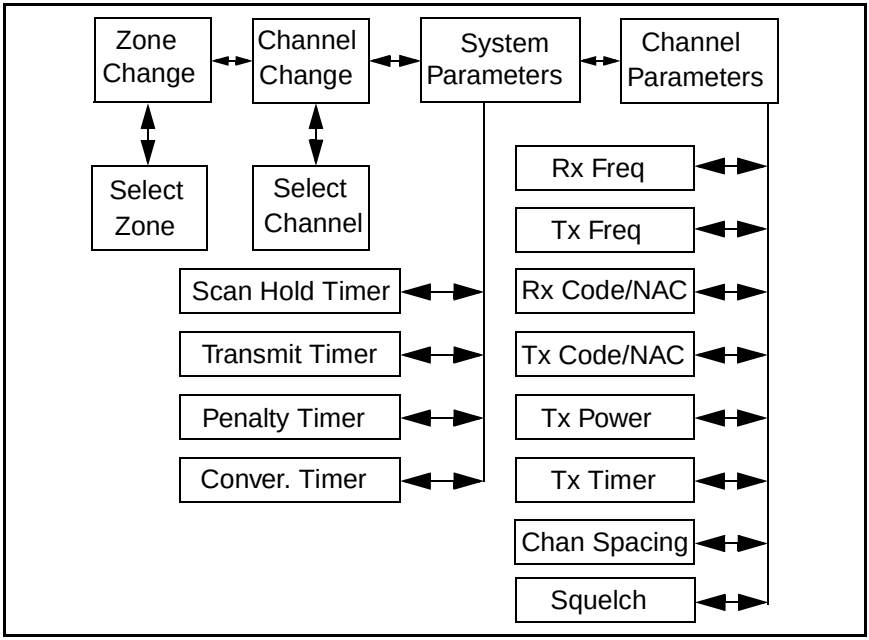


Figure 4 Keypad Programming Menu Flowchart

Zone Change Parameter

The “ZONE CHG” menu parameter selects the zone containing the conventional channel to be reprogrammed. It does not change the zone selected for normal operation. Press the Select switch to select the “ZONE CHG” parameter and then scroll through the programmed zones by rotating that switch. When the desired zone is displayed, select it by pressing the Select switch.

Channel Change Parameter

The “CHAN CHG” menu parameter selects the conventional channel to be reprogrammed. Unavailable or SMARTNET/SmartZone channels cannot be selected. This does not change the channel selected for normal operation. Press the Select switch to display “CHAN CHG”

and then scroll through the programmed channels by rotating that switch. When the desired channel is displayed, select it by pressing the Select switch.

System Parameters

The “SYS PRM” menu parameter selects the conventional mode timer to be reprogrammed (see following). Press the Select switch to select “SYS PRM” and then rotate that switch to display the desired parameter. Then press the Select switch again to select it. If “PASSWORD” is briefly displayed, the zone password must be entered as described on page 39 before parameters can be selected.

SCAN TMR - Selects the Scan Hold timer (see “Scan Resume Delay” on page 22). Rotate the Select switch to decrement/increment the timer in 0.5-second steps, and press the F2 key (see illustration on page 39) to disable the timer (set it to 0 seconds). When the desired value is displayed, store it by pressing the Select switch.

TX TMR - Selects the transmit time-out timer (see page 19). Rotate the Select switch to decrement/increment the timer in 15-second steps, and press the F2 key to disable the timer (set it to 0 seconds). When the desired value is displayed, store it by pressing the Select switch.

PEN TMR - Selects the penalty timer (see page 31). Rotate the Select switch to decrement/increment the timer in 15-second steps, and press the F2 key to disable the timer (set it to 0 seconds). When the desired value is displayed, store it by pressing the Select switch.

CONV TMR - Selects the conversation timer (see page 32). Rotate the Select switch to decrement/increment the timer in 30-second steps, and press the F2 key to disable the timer (set it to 0 seconds). When the desired value is displayed, store it by pressing the Select switch.

Channel Parameters

The “CHAN PRM” menu parameter selects the following conventional channel parameters that can be reprogrammed. Press Select switch to select the “CHAN PRM” parameter and then rotate that switch to display the desired parameter. Then press the Select switch again to select it. If “PASSWORD” is briefly displayed, the zone password must be entered as described on preceding page before parameters can be selected. The squelch control parameters are unique to the type of conventional channel selected (analog or Project 25).

RX FREQ - Selects the receive channel frequency. To select the digit to change, move the cursor right by pressing the Select switch or F4 key (see illustration on page 39) and move it left by pressing the F3 key. Then to display the desired digit, rotate the Select switch. When the desired frequency is displayed, store it by pressing the F6 key. If an invalid frequency is entered, a beep sounds, “INVALID” is briefly displayed, and the frequency editing mode continues to be selected.

TX FREQ - Selects the transmit frequency the same as RX FREQ above.

Squelch Control (Analog Channel)

RX CODE - Selects the receive Call Guard (CTCSS/DCS) code (see page 30). Rotate the Select switch to scroll through the available codes. Press the F2 key (see illustration on page 39) once to display the first available code, and press it again to toggle between types (CTCSS and DCS). When the desired code is displayed, store it by pressing the Select switch.

TX CODE - Selects the transmit codes the same as RX CODE above.

Squelch Control (Project 25 Channel)

RX NAC - Selects the Network Access Code (NAC) which can be any number from 0-4095 (see “Coded Squelch” on page 37). Select

the code using the Select switch and F3 and F2 keys the same as when setting the receive frequency as described above. Press the F2 key (see illustration on page 39) to reset the NAC to 0. When the desired code is displayed, store it by pressing the F6 key. If an invalid code is entered, a beep sounds, “INVALID” is briefly displayed, and the NAC editing mode continues to be selected.

TX NAC - Selects the transmit NAC the same as RX NAC above.

TX POWER - Selects the desired power output level. Rotate the Select switch to scroll through the following choices. When the desired setting is displayed, store it by pressing the Select switch.

- POWER HI - High transmit power
- POWER LO - Low transmit power
- POWER SW - Switchable power selectable by the High/Low power switch. This choice is not available if that switch is not programmed.

TX TMR - Enables or disables the time-out timer on the current channel. Rotate the Select switch to toggle between the on and off mode, and when the desired setting is displayed, store it by pressing the Select switch.

CHAN SPC - Selects either wide or narrow band channel spacing on analog channels only. Rotate the Select switch to toggle between “WIDE” and “NARROW”, and when the desired setting is displayed, store it by pressing the Select switch.

SQ ADJ - Changes the preset squelch level on the channel. The default setting is “0” and values of –7 to +7 can be selected. Increasing this setting causes the squelch to open sooner so that weaker signals can be received, and decreasing it causes the opposite to occur.

SMARTNET/SMARTZONE FEATURES

Introduction

An overview of the SMARTNET/SmartZone operating mode is located on page 27. The following information describes the features unique to the SMARTNET and SmartZone operation. Refer to the "General Operation" section starting on page 17 for information on features common to all operating modes.

Viewing Unit ID

When power is turned on with a SMARTNET/SmartZone channel selected, the six-digit Unit ID is briefly displayed as IDxxxxxx.

Standard Group Calls

Standard calls are between you and another mobile or control station. Most calls you make will probably be this type.

Placing a Standard Group Call

1. Turn power on and set the volume as described on page 17. Select the channel programmed for the talk group you want to call (see "Zone/ Channel Select" on page 18). A regular or announcement talk group can be selected.

2. If encryption is used, it may be automatically selected. If not, select the secure mode if desired by pressing the C/S (Clear/Secure) option switch. Refer to "Secure Communication" on page 26 for more information.

3. Press the PTT switch and begin talking. A talk permit tone may sound to indicate when talking can begin. Other indications that may occur are as follows:

- If in the secure mode and your transceiver does not have the proper encryption key, “KEYFAIL” is displayed and the call must be made in the clear mode.

- If the busy tone sounds and “BUSY” is displayed, the system is busy. Release the PTT switch and wait for the call back tone to sound. Then press the PTT switch within 3 seconds.

- If a continuous tone sounds and “NO SYS” is displayed, you may be out-of-range. Drive closer or away from shielding objects and try again.

- If your unit ID is invalid, the call is being made to an invalid group ID, or if the talk group is not programmed for the selected secure mode, “DISABLED ID” is displayed and an alert tone sounds.

- If an attempt is made to select the secure mode and there is no available secure channel, “NO SEC” is flashed and the call continues in the clear mode.

- If an attempt is made to change from the secure to the clear mode and this is not permitted, “SEC ONLY” is displayed and the call continues in the secure mode.

Receiving a Standard Call

Group calls are automatically received if a SMARTNET/SmartZone channel is selected. The display alternates between the selected channel tag (alias) and the received talk group tag. The transceiver may also be programmed so that the individual ID of the mobile placing the call is briefly displayed before this information.

Private (Unit-To-Unit) Calls

General

Private calls allow you to place a call to a specific mobile unit. Either the Enhanced Private Conversation™ or Private Conversation II™

mode may be programmed depending on the capabilities of the radio system. Operation in both modes is described in the following information. The CALL option switch is required to place these calls, and either that switch or the RESP (Response) switch is required to receive them. Proceed as follows.

Placing an Enhanced Private Conversation Call

1. Momentarily press the CALL (Private Call) option switch. The tag (alias) of the last called mobile is displayed.

2. To select another mobile, rotate the Select switch until the tag for the desired mobile is displayed.

3. Press the PTT switch and one of the following events then occurs:

   - If the mobile being called is on the air, “WAIT” is displayed and ringing is heard until the called party answers or for 20 seconds, whichever occurs first. When the call is answered, the voice of the called party is heard.

   - If the called mobile does not answer within 20 seconds, a continuous tone sounds and “NO ANS” is displayed.

   - If the called mobile is not on the air, a continuous tone sounds instead of the ringing tone and “NO ACK” is displayed.

   - If the busy tone sounds and “BUSY” is displayed, the called mobile has answered the call but the system is busy. When the system is no longer busy, the call back tone sounds.

   - If your transceiver or the called transceiver is inhibited or not programmed to make this type of call or for the requested secure mode, “REJECT” is displayed and an alert tone sounds.

   - If your transceiver does not have the proper encryption key, “KEYFAIL” is displayed and the call must be made in the clear mode

(selected by pressing the C/S (Clear/Secure) option switch if enabled on the channel).

4. When the call is finished or is not answered, end it by pressing the Private Call option switch and placing the microphone back on-hook.

Placing a Private Conversation II Call

1. Momentarily press the CALL (Private Call) option switch. The tag (alias) of the last called mobile is displayed.

2. To select another mobile, rotate the Select switch until the tag for the desired mobile is displayed.

3. Press the PTT switch and one of the following events then occurs:

   - The called party answers the call.

   - The called party does not answer. Press the CALL option switch to end the call.

   - If the selected mobile ID is not valid, “INVALID” is displayed and an alert tone sounds.

   - If the radio system is busy, four low tones sound and “BUSY” is displayed. When the system is no longer busy, the call back tone (four beeps) is heard and the channel is automatically acquired. Press the PTT switch to continue the call.

   - If the call is in the secure mode and your transceiver does not have the proper encryption key, “KEYFAIL” is displayed and the call must be made in the clear mode (selected by pressing the C/S (Clear/Secure) option switch if enabled on the channel).

4. When the call is finished or if it is not answered, end it by pressing the CALL option switch and placing the microphone on-hook.

Receiving a Private Call (All Types)

1. When a private call is received, “CALL” is displayed and a recurring call tone sounds.

2. To answer the call, press the CALL (Private Call) option switch and then the PTT switch and begin speaking. The unit ID of the calling mobile is displayed. More information follows:

   - If the PTT switch is pressed before the CALL switch, the call is transmitted as a group call.

   - If private calls are not permitted (CALL switch not programmed) press the RESP (Call Response) option switch to respond.

   - The call must be answered within 20 seconds or it is automatically terminated.

   - If the system is busy when a response is made, “BUSY” is displayed and the busy tone sounds.

Telephone Calls

Telephone calls allow you to place and receive calls over the public telephone system using your transceiver. The type of call (secure/clear) is determined by the mode selected by the C/S (Clear/Secure) option switch. Telephone calling is programmed to operate in one of the following modes:

- Disabled (telephone calls not available)
- Answer-only capability
- Telephone numbers can be recalled from memory only

Placing a Telephone Call by Recalling a Number From Memory

1. With a SMARTNET/SmartZone channel selected, momentarily press the PHONE option switch. The tag (alias) of the last called telephone number is displayed.

2. If required, rotate the Select switch to display the desired number. The tag of each number is displayed.

3. Press and then release the PTT switch and "DIALING" is displayed. One of the following conditions then occur:

   - If the access is successful, a dial tone sounds and the dialed number is displayed and sent. Either ringing or a busy signal is then heard as with a standard telephone call. When the called party answers, press the PTT switch to talk and release it to listen (since the transceiver operates half-duplex, it is not possible to talk and listen at the same time).

     Each time the PTT switch is released, a go-ahead tone is sent to the landside party to indicate when they can respond. To dial a number after the connection is made, press the PTT switch and dial the number using the microphone keypad (if available).

   - If the selected telephone number is not valid, "INVALID" is displayed and an alert tone sounds. Select a valid number.

   - If the system is busy, "BUSY" is displayed and the busy tone sounds. The call will automatically proceed when the system becomes available.

   - If you are out-of-range or the radio cannot be accessed for some reason, "NO PHONE" is displayed and an alert tone sounds.

   - If the interconnect call you are making or the selected secure mode is not authorized, "REJECT" is displayed and an alert tone sounds.

   - If your transceiver does not have the proper encryption key, "KEYFAIL" is displayed and the call must be made in the clear mode (selected by pressing the C/S (Clear/Secure) option switch if enabled on the channel).

4. When the telephone call is finished or it could not be completed for some reason, end it by pressing the PHONE option switch and placing the microphone back on-hook.

Answering a Telephone Call

1. When a telephone call is received, “ringing” similar to a standard telephone is heard and “PHONE” is displayed.

2. To answer the call, press the PHONE option switch and press the PTT switch to talk and release it to listen (since the transceiver operates half duplex, it is not possible to talk and listen at the same time).

3. When the call is finished, end it by pressing the PHONE option switch and placing the microphone back on-hook.

Call Alert

The Call Alert™ feature allows pages to be sent and received. Either the Enhanced Private Conversation™ or Private Conversation II™ mode may be programmed depending on the capabilities of the radio system. The operation differences are noted in the procedure which follows.

Answering a Page

1. When a page is received, four beeps sound and “PAGE” is displayed. The ID of the mobile paging you is stored as the last ID received.

2. To clear or ignore the page, press any option switch. If the PTT switch is pressed, a group call is placed on the selected channel.

3. To answer the page as a private call (see page 45), press the CALL (Private Call) option switch and the tag (alias) of the mobile paging you is displayed. Press the PTT switch and respond. One of the conditions that follow may also occur:

Enhanced Private Conversation™ Mode

- If the mobile being called is on the air, ringing is heard until the called party answers or for 20 seconds, whichever occurs first. If no answer occurs within 20 seconds, “NO ANS” is displayed.

- If the mobile being called is not on the air, no ringing is heard and "NO ACK" is displayed.

Private Conversation II™ Mode

- If the mobile being called is not on the air or does not answer, you will simply not hear a response.

4. When the call is finished or it could not be completed for some reason, end it by pressing the CALL option switch and placing the microphone back on-hook.

Initiating a Page

1. With a SMARTNET/SmartZone channel selected, momentarily press the ALERT option switch. The tag (alias) of the last ID called is displayed.

2. If required, rotate the Select switch to display the desired mobile. The tag of each number is displayed.

3. Press the PTT switch and one of the following then occur:

   - If a continuous tone sounds, the system received the page but the called mobile is not on the air. Try again later or cancel the page by pressing the ALERT switch again.

   - If the called mobile does not answer within 6 seconds, a continuous tone sounds and "NO ACK" is displayed. Try again later or cancel the page by pressing the ALERT switch again.

   - If five beeps sound, the system received the page and the paged mobile is on the air and received it. The normal mode is automatically reselected.

Messaging

The messaging feature allows preprogrammed messages to be sent to your dispatcher. Up to 16 messages can be preprogrammed, and they are identified by a tag (alias). If an MSG option switch is programmed, messages are sent as follows:

1. Momentarily press the MSG option switch. The tag of the last message sent is displayed.

2. If required, rotate the Select switch to display the desired message. Then send the message by momentarily pressing the PTT switch. One of the following then occurs:

   - If five beeps sound, the message was received and acknowledged by the dispatcher.

   - If after 6 seconds, the message is not acknowledged, a tone sounds, and "NO ACK" is displayed. Press and release the PTT switch to send it again or press the Message option switch to exit the messaging mode.

Sending Status Conditions

The status feature allows you to manually or automatically send your current status to your dispatcher. Up to eight status conditions can be preprogrammed, and they are identified by a tag (alias). If the STATUS option switch is programmed, status conditions are sent as follows:

1. Momentarily press the STATUS option switch. The tag of the current status condition is displayed.

2. To change the current status, rotate the Select switch until the desired status is displayed. Then press the Select switch to accept that status.

3. You can wait to send the current status until polled by the dispatcher or it can be sent immediately by briefly pressing the PTT switch. One of the following then occurs:

- If five beeps sound, the status was received and acknowledged by the dispatcher.

- If after 6 seconds, the message is not acknowledged, a tone sounds and "NO ACK" is displayed. Press and release the PTT switch to send it again or press the Status option switch to exit this mode and return to normal operation.

Emergency Alarm and Emergency Call

Emergency alarms and emergency calls are separate functions that can be individually programmed on SMARTNET/SmartZone channels. The EMER option switch is also required to have these functions. An emergency alarm is a special data transmission to alert your dispatcher of an emergency situation, and an emergency call is an urgent request for access to a voice channel. The emergency alarm and call are transmitted on the programmed emergency talk group. Proceed as follows to initiate an emergency alarm or call:

1. To transmit an emergency alarm, select a SMARTNET/SmartZone channel that has that feature enabled and then press the EMER option switch.

2. The emergency alarm is then transmitted and "EMERGENCY" is indicated in the display for a short time. Transmitting continues until an acknowledgment is received (indicated by two beeps) or the programmed number of attempts have occurred.

3. To transmit an emergency call, press the EMER option switch with a SMARTNET/SmartZone channel selected that has that feature enabled. Then manually press the PTT switch and begin speaking as with a standard call. All calls that follow are then emergency calls and they occur on the emergency talk group.

4. To exit the emergency mode, power must be turned off and then on again.

Failsoft Operation

If a failure occurs in the SMARTNET/SmartZone system so that it cannot be used, the transceiver automatically enters the failsoft mode. When in this mode, “FAILSOFT” and the tag (alias) of the selected channel are alternately displayed.

When in the failsoft mode, operation is in the conventional mode on a preprogrammed failsoft channel. If a transmission is attempted before a failsoft channel is located, a continuous tone sounds until the PTT switch is released. When the radio system returns to normal operation, this condition is automatically detected and normal operation resumes. The secure mode is controlled by the C/S (Clear/Secure) option switch and indicated by in the display. Secure calls are always automatically detected.

SMARTNET/SmartZone Scanning

Scanning on a SMARTNET/Smartzone channel is similar to the standard and radio wide scanning described starting on page 21. Each channel can be programmed with a different scan list that includes up to 16 channels, on of which can be a priority channel. The scan lists are programmable as described on page 25 if the SCN ED (Scan Edit) option switch is programmed. In addition, channels can be programmed so that scanning automatically starts or is disabled whenever the channel is selected.

Messages on the priority channel are received while listening to lower priority messages. However, unit-to-unit and telephone calls are not interrupted by priority messages. Pages, unit-to-unit calls, and telephone calls are received while scanning.

Dynamic Regrouping

The dynamic regrouping feature allows a dispatcher to switch mobiles to a newly defined channel to receive an important message. Dynamic regrouping operates as follows:

1. When this command is received, an alternating tone sounds for 5 seconds, the transceiver automatically changes to that channel, and the display indicates the tag (alias) of the channel.

2. Manually select the channel corresponding to that tag. If this is not done, transmission still occurs on the new channel, but an alternating tone sounds each time the PTT switch is pressed.

3. Talk and listen as usual. The dispatcher will cancel dynamic regrouping. If a standard channel is not selected after this occurs, an error tone periodically sounds.

SmartZone Features

Introduction

As described on page 27, the SmartZone® mode provides wide area coverage by allowing roaming between SMARTNET and conventional sites. SmartZone operation is the same as SMARTNET with the following additional features:

Busy Override

The busy override feature allows a call to be placed even if all of the sites you are calling do not have a free traffic channel. This feature is enabled and disabled by the system manager, and it operates as follows:

1. Assume that you have attempted to place a call and the system was busy ("BUSY" displayed and busy tone sounded).

2. Release the PTT switch and then press it for 5 seconds or more. If a chirp-like tone sounds with the PTT switch pressed, busy override is occurring.

   NOTE: Remember that not all members of the talk group are receiving your message. Missing members will start receiving your message as channels become available.

Determining Current Site and Searching For a New Site

To determine the current radio site and the signal level of that site, press the SEARCH option switch. The display then alternately indicates the current site number as “SITE xx” and the signal level as “RSSI xx”. To exit, press the SEARCH option switch again.

To scroll through the other programmed sites, rotate the Select switch while “Site xx” or “RSSI xx” is displayed. To select the displayed site and exit this mode, press the SEARCH option switch again. If site lock is on when site search is entered (see following), the radio will be locked on the new site when this function is exited.

Locking/Unlocking a Site

It is sometimes desirable to stay on a site. To prevent the transceiver from searching for a new site, it can be locked on the current site. To lock on the current site, press the LOCK option switch. The display momentarily indicates “LOCK x” to indicate that the current site is locked (“x” is the current site number). To unlock the site, press the LOCK option switch again and “UNLOCK” is momentarily displayed.

MISCELLANEOUS

Supervisory Tones

Single Beep (Alert Tone)

- Power was turned on and a successful power-up sequence occurred (see “Turning Power On” on page 17).
- The time-out timer is about to expire or the penalty timer has expired (page 19).
- The conversation timer is about to expire (page 32).
- The system received your page but the paged mobile is not on the air (page 50).
- Telephone interconnect is not operational (page 48).

Continuous Tone (Invalid Condition)

- A transmission is being attempted on a conventional channel programmed as receive-only.
- The transmitter is disabled by the transmit disable on busy feature (page 30).
- The transmitter has been disabled by the time-out timer feature (page 19).
- The transmitter has been disabled by the conversation timer (page 32).
- An out-of-range condition exists (SMARTNET/SmartZone only).
- A transmission is being attempted before the penalty timer has expired (page 19).
- Dynamic regrouping has been exited but the dynamic regrouping channel is still selected (page 54).

Single Short Medium-Pitch Tone

- A valid key has been pressed.

Single Short Low-Pitch Tone

- An invalid key has been pressed.

Medium Tone (No Acknowledge)

- The paged mobile did not acknowledge the page (page 50).
- The message that was sent has not been acknowledged (page 52).
- The status condition that was sent has not been acknowledged (page 52).

Five Beeps (Recurring)

- The page was received (page 50).

Two Short Tones

- A unit-to-unit call was received (page 45).

Five Beeps

- The paged mobile received the page and acknowledged it (page 50).
- The message that was sent has been received and acknowledged (page 52).
- The status condition that was sent has been received and acknowledged (page 52).

Four Beeps

- The emergency alarm condition was acknowledged (page 53).

Gurgle-Like Tone

- Dynamic regrouping has occurred (page 54).
- Dynamic regrouping has occurred but the regrouping channel is not selected (page 54).

Busy Signal

- The radio system is busy or a busy condition exists when making a telephone call.

Three Medium Pitch Tones

- A channel is available after a busy condition occurred (SMARTNET/ SmartZone only).

System Operator Programming

As noted several times in this manual, programming determines the availability and specific operation of many features. This usually 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 controlled by a front panel option switch and that switch is not available, it is probably not available.

If you require additional information on the operation of a feature, contact your system operator. If the Keypad Programming option switch is available, you can reprogram some conventional channel parameters. Refer to “Keypad Programming” on page 38 for more information.

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.

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 "UNPROGRAMD" is displayed, the cause could be any of the following:

- An unprogrammed channel is selected. Select a programmed channel.
- The selected channel is programmed for an option that is not installed or an error in programming was detected. Contact your system operator for service.

If no characters or all characters appear in the display, the viewing angle may be incorrect. Refer to page 17 for more information. If some other problem is occurring, turn power 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, and accessory cables (if used) are securely plugged into the back of the transceiver. If the transceiver is completely inoperative, check the power cable fuse that is usually located near the vehicle battery. If it is blown, remedy the cause if possible and replace it with the same type (15A). If the transceiver still does not operate properly, return it to your system operator for service.

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.

INDEX

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