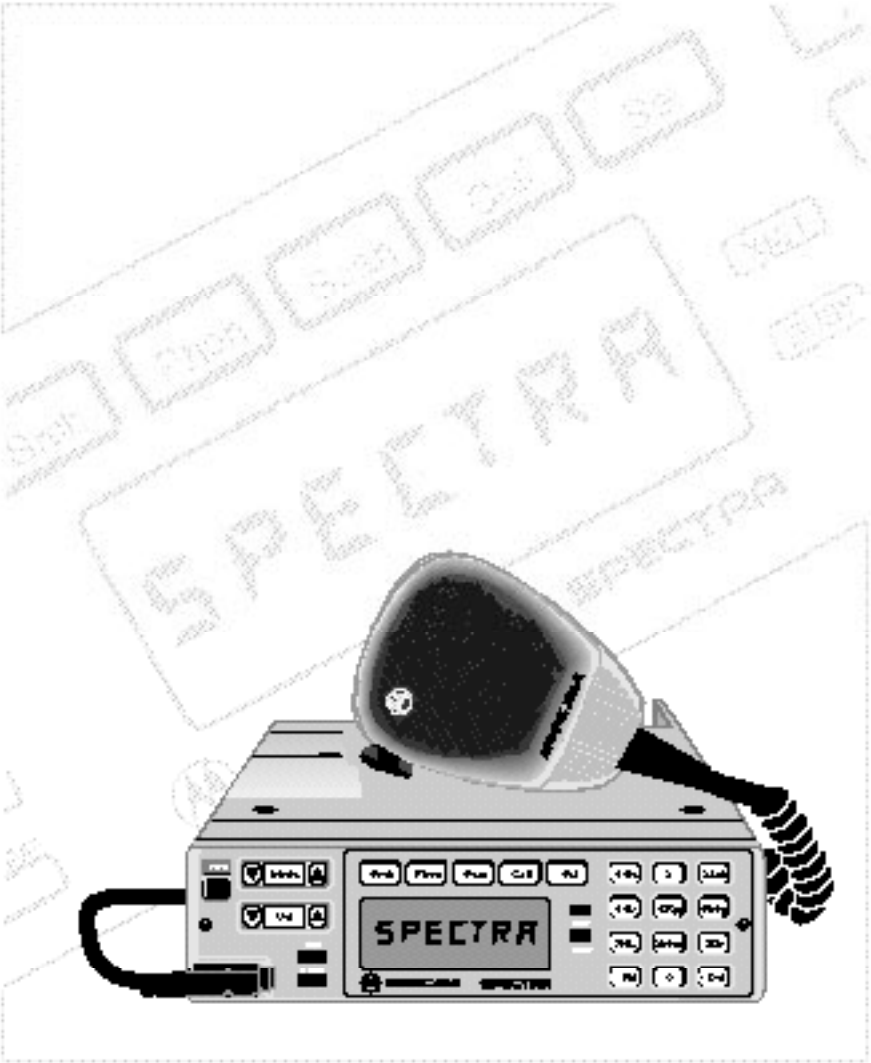
Spectra®
SMARTNET™ Radio System



6880102W89

Motorola
8000 West Sunrise Boulevard
Fort Lauderdale, Florida 33322

MOTOROLA

68P80102W89-C

operating instructions

MOTOROLA

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Spectra® SMARTNET™ Radio System

The Federal Communications Commission (FCC), with its action in the General Docket 79-144, March 13, 1985, has adopted a safety standard for the human exposure to radio frequency (rf) electromagnetic energy emitted by FCC-regulated equipment. Proper operation of this radio will result in user exposure substantially below the FCC recommended limits.

DO NOT operate the transmitter of a mobile radio when someone outside the vehicle is within two feet (0.6 meter) of the antenna.

DO NOT operate the transmitter of a fixed radio (base station, microwave, and rural telephone rf equipment) or marine radio when someone is within two feet (0.6 meter) of the antenna.

DO NOT operate the transmitter of any radio unless all rf connectors are secure and any open connectors are properly terminated.

In addition,

Under certain conditions, radios can interfere with blasting operations. When you are in the vicinity of construction work, look for, and observe, signs cautioning against radio transmissions. If radio transmission is prohibited, you must not transmit until you are out of the area. To avoid accidental transmission near electrical blasting caps or in an explosive atmosphere, *you must turn off this equipment.*

All equipment must be properly grounded according to Motorola installation instructions for safe operation.

All equipment should be serviced only by a qualified technician.

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

General Safety Information

Description

The following will help you understand how your Spectra radio operates in the Motorola trunked radio system.

Communication trunking improves operating efficiency by sharing system resources among the users. Trunking techniques are well established in the communications industry and are used by telephone companies to support the millions of calls they service. Motorola has adapted similar trunking methods to the two-way radio industry.

A trunked radio system allows many users to share a relatively few number of frequencies. When you want to communicate with someone else in the system, a repeater or communications path is assigned to you. When your conversation has ended, the repeater is freed for other users. Frequency-sharing, an automatic feature of the Motorola trunked radio system, uses multiple repeaters and a central controller. Trunking simultaneously pools all of the repeater air time to maximize the air time available to any one mobile unit and minimize channel congestion.

Some of the key benefits of the Motorola trunked radio system are:

- No channel monitoring required prior to transmission
- Fast system access
- Automatic channel selection
- Privacy among members of the same group
- Uninterrupted conversations

Trunked Radio Systems

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Call Priority

Your radio includes more than one type of trunked call capability. Table 1 shows the types of calls which may be received during each of these call states.

Type of Operation	**Additional Calls Which Can be Received**
Subfleet Operation (**Mode** switch set to trunked subfleet mode)	Private Conversation Calls Fleetwide Calls Systemwide Calls Call Alerts Land-to-Mobile Telephone Calls
Fleetwide Operation (**Mode** switch set to a fleetwide mode)	All Subfleet Calls Fleetwide Calls Systemwide Calls Call Alerts Private Conversation Calls Land-to-Mobile Telephone Calls
Private Conversation Operation (Call in process)	Systemwide Calls
Telephone Interconnect Operation (Call in process)	None
Dynamic Reprogramming Mode	Private Conversation Calls Call Alerts Fleetwide Calls Systemwide Calls Land-to-Mobile Telephone Calls
Emergency Alarm Mode	All Subfleet Calls Fleetwide Calls Systemwide Calls
Emergency Call Mode	All Subfleet Calls Fleetwide Calls Systemwide Calls

Table 1. Types of Trunked Operation / Received Calls

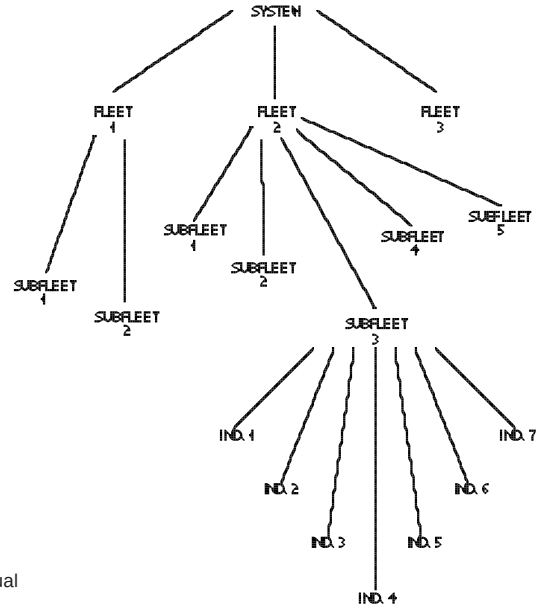
Subfleet / Fleetwide Call Capabilities

In a trunked radio system, a mobile fleet can be segmented into different subfleets. Each subfleet can operate independent of all other subfleets. Subfleet segmentation allows the fleet to be organized into predetermined groups according to function. Members of a specific subfleet hear only those messages intended for them. You select fleet / subfleet combinations with the **Mode** rocker switch, or **Mode** knob, on the radio's front panel.

A radio can receive only one subfleet message at a time. Consequently, if the **Mode** rocker switch or **Mode** knob is set to one subfleet, calls originating from another subfleet are not heard.

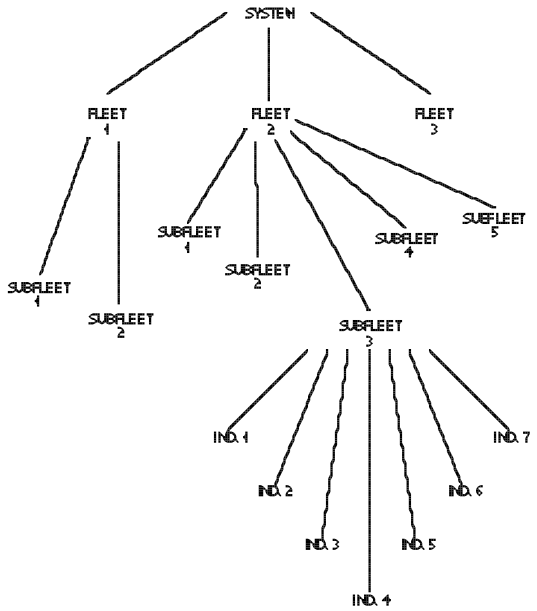
With a radio equipped with fleetwide announcement capability, you can make announcements to the entire fleet. Figure 1 illustrates a typical subfleet configuration. Refer to the trunked fleetwide announcement page for more information.

In addition to fleetwide announcement, on some SMARTNET systems the dispatcher can temporarily "patch" two or more subfleets together. This operation, however, is simply handled as another subfleet call and has no effect on the way you operate the radio.



IND. = Individual

Figure 1. Typical Fleet / Subfleet Configuration


SYSTEM
FLEET 1
FLEET 2
FLEET 3
SUBFLEET 1
SUBFLEET 2
SUBFLEET 1
SUBFLEET 2
SUBFLEET 4
SUBFLEET 5
SUBFLEET 3
IND. 1
IND. 2
IND. 3
IND. 4
IND. 5
IND. 6
IND. 7

The following will help you understand how your Spectra radio operates in a conventional radio system:

In a conventional radio system, a fixed frequency or set of frequencies is shared with other users. Therefore, each user must monitor the channel before attempting to transmit to ensure that standard two-way radio transmission protocol is observed by not “talking over" someone who is transmitting.

Coded squelch (Private-Line® [PL] or Digital Private-Line™ [DPL]) may be used on conventional channels to make sure the user hears only the messages intended for him by other users in his talk group who share the same coded squelch. Coded squelch is also used to prevent unauthorized use of a conventional repeater.

Your radio has one or more conventional types of operation. Table 2 indicates the types of calls which may be received during each of these call states.

Operation	Channel Activity Heard
Carrier Squelch	All channel activity that exceeds the preset level of your radio’s squelch circuit.
Coded Squelch (On Hang-Up Box)	All channel activity that has the correct PL or DPL code.

When operating in a coded squelch mode, the radio’s amber busy indicator will light to indicate when a signal is received, regardless of squelch code. (The channel is busy; don’t try to use it.)

Conventional Radio Systems

Table 2. Types of Conventional Operation

Note:

- Two high-pitched tones indicate that a private call has been received.

- Four high-pitched tones every six seconds indicate that a Call Alert page has been received.

- A single high-pitched tone indicates that a Call Alert, emergency alarm, reprogram request, or status / message transmission has been received by the system's central controller.

- Four high-pitched tones indicate that a Call Alert page has been received by the intended unit, or the emergency alarm, reprogram request, or status / message transmission has been acknowledged by the intended dispatcher.

- A sound similar to a telephone busy signal, when you press the microphone's PTT button, indicates that you cannot transmit because all system radio channels are in use. Release the PTT button and wait for call back.

- A series of three, short, high-pitched tones indicate that a channel is now available for your previously requested transmission.

- A series of three, short, high-pitched tones (same as automatic call back), when you press the microphone's PTT button, indicate that the system is accepting your transmission.

- Four telephone-type busy tones (after you initiate a phone call) indicate that all interconnect repeaters are busy. If you do not press the **Home** button (to exit phone mode), a dial tone sounds when an interconnect repeater becomes available.

- A continuous, low-pitched tone, when you press the microphone's PTT button, indicates that either you are out of the range of the trunked radio system, or the system is out of service.

- A single high-pitched beep every ten seconds, in an unmuted receive condition, indicates a system central controller failure. The radio reverts from trunked operation to a system similar to conventional radio repeater operation. Other system users may be heard sharing the channel.

Alert Tones

Private Conversation™ / Selective Call

Call Alert™

Central Acknowledge

Mobile Unit Acknowledge

System Busy

Automatic Call Back

Talk Permit (optional)

Telephone Interconnect Busy

Talk Prohibit / Out-of-Range

Failsoft

- A continuous low-pitched tone indicates that you have entered a mode where normal system traffic will be missed, or you are attempting something which is not allowed. Examples include: you forget to exit the telephone interconnect mode after a call ends (fleet and subfleet calls cannot be received); you attempt to transmit on a receive-only conventional mode; you attempt to select a dynamic mode where no dynamic ID assignment has been made.

- Sounds to indicate the volume level when you press the **Vol** rocker button on a quiet channel (models C2 / E2, C5 / E5, and C7 / E7 only).

- A continuous low-pitched tone indicates that your present transmission will soon be disabled.

- A single, short, high-pitched tone indicates that you pressed a valid key, or you entered a feature configuration state, or you are receiving or transmitting in the clear mode on SECURENET models.

- A single, low-pitched tone indicates either that you tried to make an invalid key press, or that a Call Alert, emergency alarm, reprogram request, or status / message was not acknowledged.

- A high-pitched tone, when you press the microphone's PTT button, indicates that a Unit ID, Single Tone™, or MDC RAC (repeater access control) is being sent.

- A unique "chirp" indicates that a dynamic ID is assigned.

Illegal Mode

Volume Set Tone

Time-Out Timer

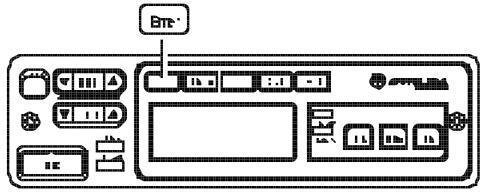
Valid Key

Invalid Key

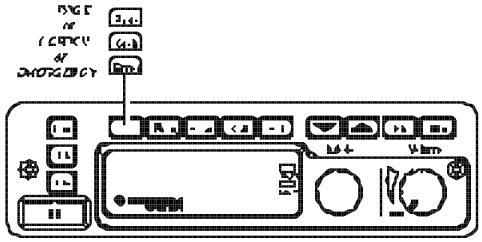
Conventional Sidetone

Dynamic Reprogramming

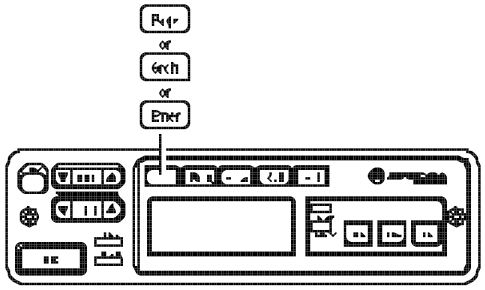
Models C2 / E2



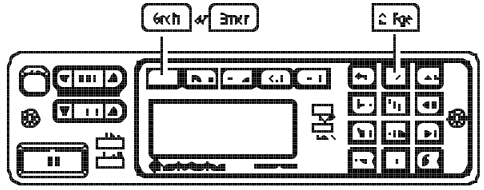
Models C4 / E4



Models C5 / E5



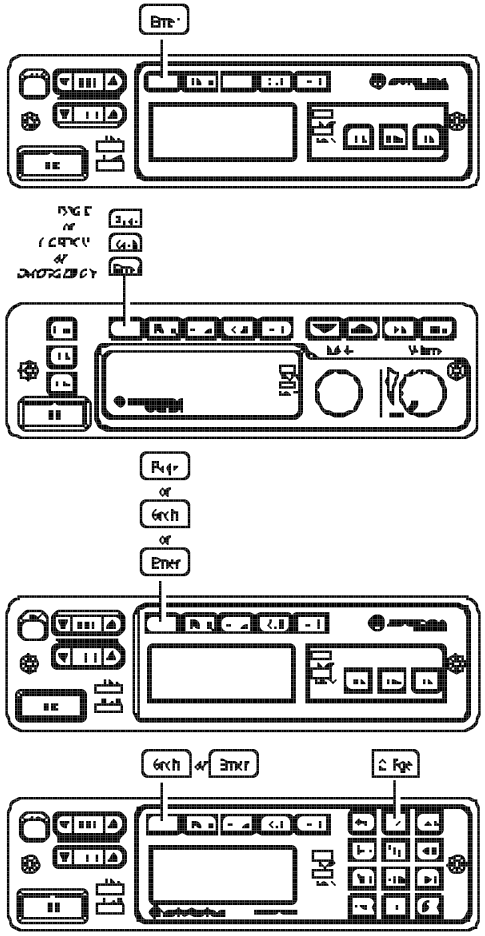
Models C7 / E7



The Spectra radios are among the most sophisticated two-way radios available. It operates on 800MHz, 900MHz, VHF, or UHF channels to give maximum communications capability under varying operating conditions.

One of the newest in a long line of quality Motorola products, the Spectra radio is smaller, lighter in weight, yet more rugged than comparable radios. Its many features give powerful communications capabilities that can enhance the efficiency of any operation. Such features add up to better, more cost-effective two-way radio communications.

Introduction



Identifying Your Spectra Radio

The Spectra radio's capabilities, and the operation of its features, differ with each model. Your radio is one of the following models (see the illustrations on the previous page):

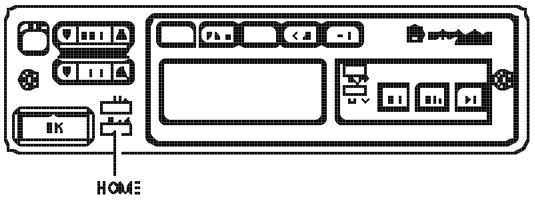
Models C2 / E2 and C5 / E5: Have a limited set of control buttons; no 12-button keypad.

Models C4 / E4: Have rotary **Mode** and **Volume** knobs and a limited set of control buttons; no 12-button keypad.

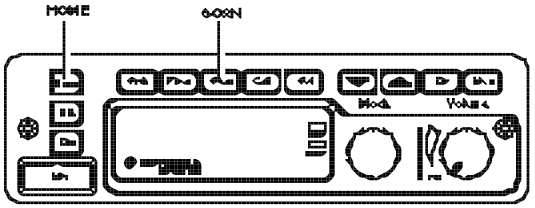
Models C7 / E7: Have all the keys the C2 / E2 and C5 / E5 have, plus a 12-button keypad.

Each higher-numbered model has more feature capabilities than the previous versions. Be sure to follow the feature operations described for your specific model in the following sections of this manual.

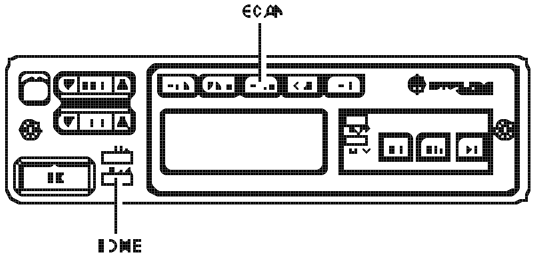
Models C2 / E2



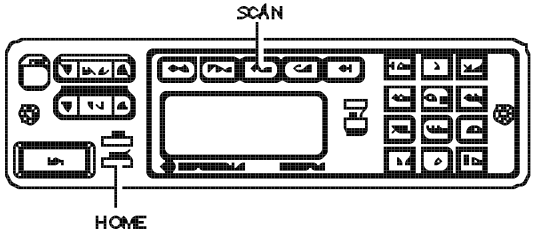
Models C4 / E4



Models C5 / E5



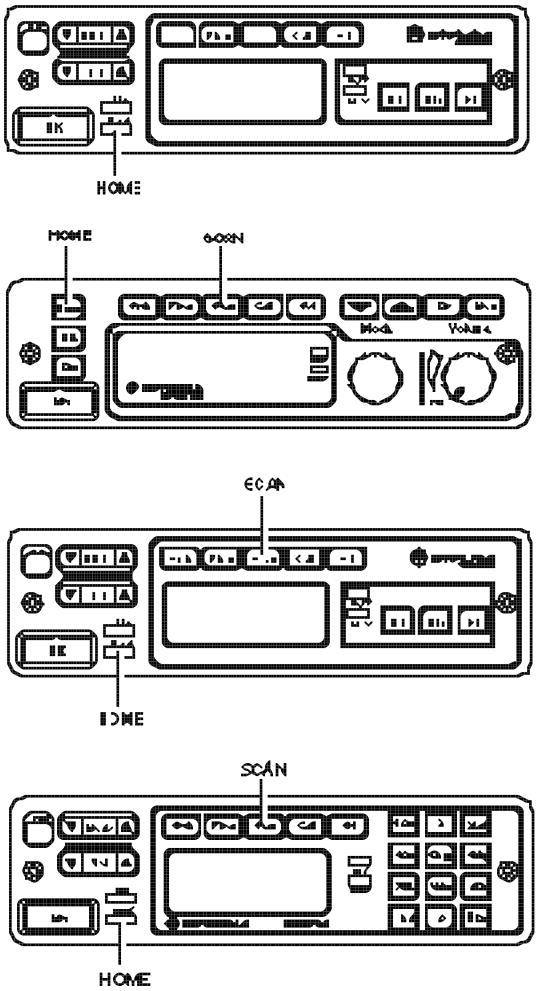
Models C7 / E7



Spectra Control Head Operation

Your Spectra advanced control head is designed for ease of use and flexibility of feature control. Before operating the radio, familiarize yourself with the various operating controls, indicators, and alert tones.

Control Head Operation



You can select trunked talkgroups (system / fleet / subfleet) or conventional channels on your Spectra radio by selecting the desired “mode,” which is a preprogrammed combination of operating parameters. For trunked modes, this consists of the system / fleet / subfleet combination and a time-out timer value. For conventional channels, a mode consists of a transmit and receive frequency pair, an associated squelch code pair, and a time-out timer value.

To further simplify operation, other radio features may be “slaved” to the selected mode via field programming. This “mode-slaving’’ means that the radio is preprogrammed to automatically give you the proper operation for each mode you select.

Through field programming, the Spectra control head allows you to program your own mode names. The names you assign are clearly shown in the eight-character, alphanumeric display. At a glance, you can see all the key operating information, including the mode selected or being scanned, and the on / off status of various features. The operating conditions are shown either by the display or by indicators.

Operator-Selectable Operation

Some radio features are “operator selectable,” depending on which model you have. “Operator selectable” means that you can choose or configure the feature to meet your specific needs, independent of the selected mode. With operator-selectable scan, for example, this means that you can select the scan list members you need. The display shows the programming inputs during configuration of these features, guiding you through the selection process.

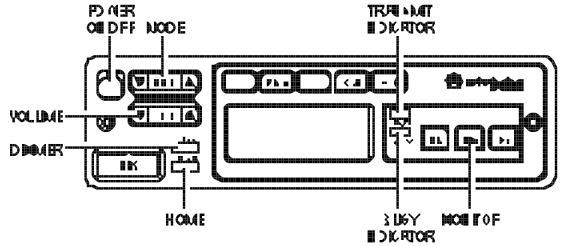
Normal State

At all times, the Spectra control head operates in essentially one of two states: “normal” or “configuration.” In the normal state, the control head display indicates your selected mode, or the currently active receive mode when scan is on. You can turn the various radio features on or off, change modes, and adjust volume.

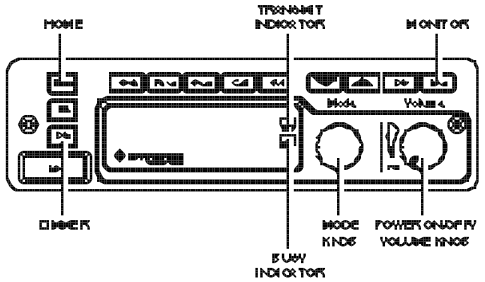
Configuration State

On models with operator-selectable features, you can enter the configuration state and change those features (for example, the scan list) by holding the **Scan** button until the radio responds by changing the display and beeping. Then, after making changes, press the **HOME** button to exit the configuration state. Details of the selection procedure are covered under the appropriate feature.

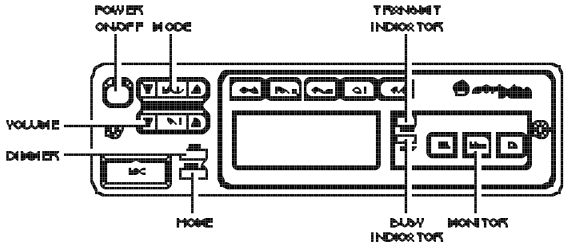
Models C2 / E2



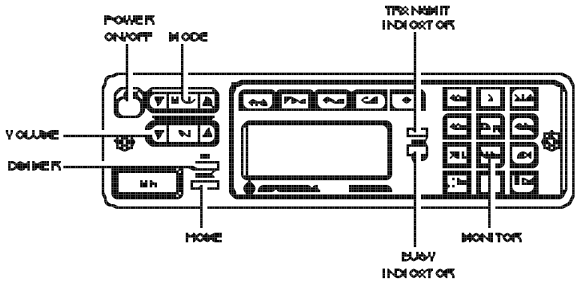
Models C4 / E4



Models C5 / E5

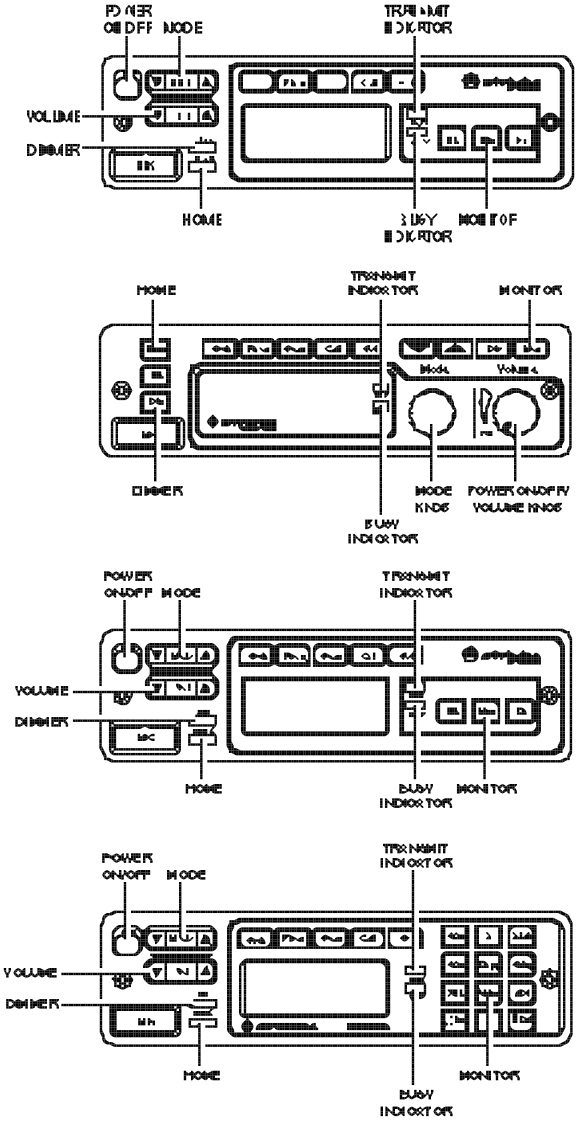


Models C7 / E7



Basic operation is the same for all radio models. Models with additional features are noted.

Basic Operating Procedures



To Turn On the Radio

1. Press the power switch in the upper left corner of the control unit once; on C4/E4 models, rotate the **Volume** knob. The display and graphics illuminate to indicate that the radio is on.
2. When the radio is turned on, "***SELF CHK***" is displayed and your radio checks itself for problems.

If "***FL##/##***" appears in the display when the radio is turned on, the radio will not function until the condition has been corrected. If "***ER##/##***" appears, some non-critical data has been changed. If either of these displays appear, if the display goes blank, or if the unit appears to be "locked up," refer to the Proper Connections and Operational Problem Troubleshooting page.

To Set Volume for Receiving Calls

On C2/E2, C5/E5, and C7/E7 model radios, press and hold the **Vol** rocker button. A volume indication (0-15) appears on the display; for example, "***VOL 10***." Hold the button until the sound level increases (or decreases) to the desired level.

On C4/E4 model radios, rotate the **Volume** knob clockwise to increase the volume and counterclockwise to decrease the volume.

To Change Modes

1. Use the **Mode** rocker switch (C2/E2, C5/E5, and C7/E7 models) or turn the **Mode** knob (C4/E4 models) to scroll forward or backward through the list of modes programmed into the radio. All radio models will display mode numbers as shipped, or mode names which have been field programmed.
2. For fast access to a single preprogrammed home mode, press the **HOME** button momentarily and the radio will go immediately to that mode.

   For C7/E7 model radios, another method of selecting modes is available if you know the desired mode number. Press and hold the **HOME** button until a beep sounds. Use the numeric keypad to enter the new mode number, then press **HOME** to go to that mode.

To Transmit

For Trunked Modes

Lift the microphone off-hook and press the microphone's PTT button, then:

If you hear three quick tones, or if you hear no tone and the red transmit indicator lights steadily, hold the microphone about two inches from your lips and speak slowly into the microphone in a normal voice. State your FCC call sign and proceed with your message. Release the PTT button to receive.

Note:

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Note:

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If you hear a busy tone, all trunked channels are in use. Release the PTT button and wait for three, quick, call-back tones. When a call back is received, your radio will automatically "key up" for three seconds so that you can begin talking. During this time, press and hold the PTT button, state your FCC call sign, and proceed with your message. Release the PTT button to receive.

If you hear a continuous low-pitched tone, you are out of the system's range. The red **XMIT** (transmit) indicator may flash several times as the radio tries to access the system. Release the PTT button and try again when the vehicle is driven within range of the system.

For Conventional Modes

Lift the microphone off-hook and listen for activity on that mode. If you hear no activity, press and hold the microphone's PTT button.

If you hear a continuous tone when you press the PTT button, the radio is sending your unit ID number. Continue to hold down the PTT button and wait until the tone stops before talking.

To Adjust Display Brightness

Press the **DIM** button to change the display brightness to one of four levels: from off to high, high to medium, medium to low, or low to off. In off, both display and backlight are off (used for surveillance operations). When the radio is turned on, the dimmer automatically resets to high to ensure that the display will be visible. The backlight is off at the high level.

To Monitor Conventional Mode Activity

To monitor channel traffic in conventional modes, either take the microphone off hook, or press the **Mon** button momentarily. "***MON ON***" on the display indicates that the radio is monitoring. In coded squelch modes, this turns off receive coded squelch operation and allows monitoring of all activity on the channel. The **BUSY** indicator will also be illuminated when channel activity is present and the radio is unsquelched.

To Adjust Conventional Mode Squelch Level

Press and hold the **Mon** button until a beep sounds and the display indicates the current squelch setting (for example, "***SQL 10***"). Use the **Mode** rocker switch (C2 / E2, C5 / E5, and C7 / E7 models), or turn the **Mode** knob (C4 / E4 models) to scroll to the desired squelch level (0-15). Press **HOME** to enter the new selection and return to normal operation.

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Note:

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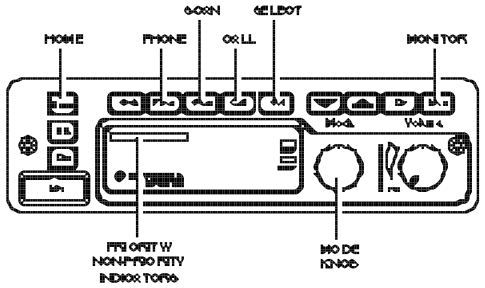
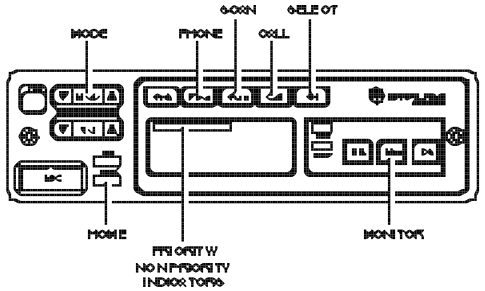
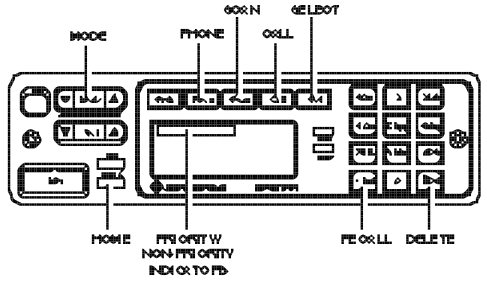
Models C4 / E4



Models C5 / E5

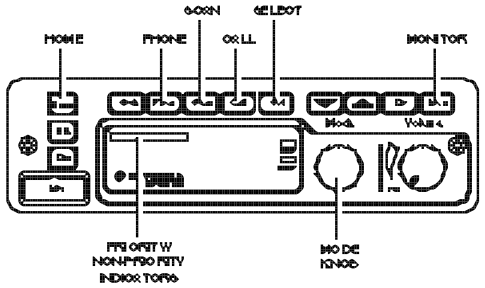


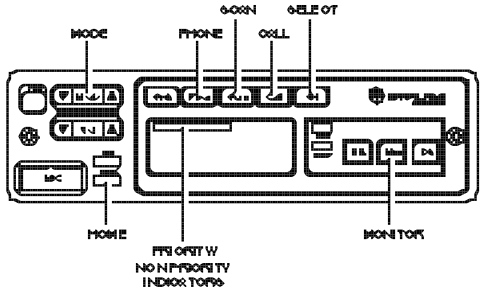
Models C7 / E7

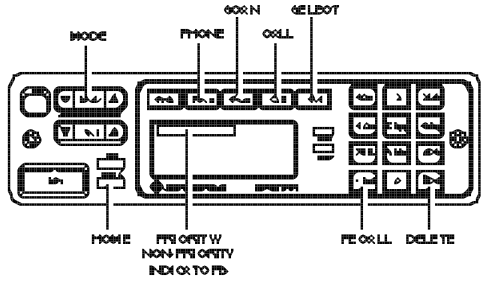


C4 / E4, C5 / E5, and C7 / E7 radio models are capable of talkgroup scan. *Fixed-list talkgroup scan* has preprogrammed, fixed scan lists that can be reviewed, but cannot be modified except through field programming. *Operator-selectable talkgroup scan* has a scan list that can be changed by the operator as many times as desired. The type of list capability of the radio can be changed with the field programmer.

Talkgroup Scan
(C4 / E4, C5 / E5, and C7 / E7 Models Only)







C4 / E4, C5 / E5, and C7 / E7 radio models can include two different types of scan, depending upon how the radio was ordered or field programmed. These two scan types can be mixed within a SMARTNET radio via field programming according to personality or conventional mode basis. If multiple scan types are enabled in the radio, the type of scan that is activated depends on the personality of the mode selected when the **Scan** button is pressed. For both types of scan, the selected mode will always be a member of its own scan list and cannot be deleted.

Fixed- and operator-selectable scan lists stay in memory when you turn scan off, or turn the radio off, or disconnect the radio from the battery.

PRIORITY TALKGROUP SCAN

This feature allows monitoring (scanning) of up to 16 type II trunked modes in the same system, or up to 8 type I trunked modes in the same system, or 16 conventional modes. The list can include a priority-one and a priority-two mode. A first-priority message is heard, regardless of activity on the second-priority or non-priority mode. Activity on the second-priority mode is heard over all but first-priority activity. The trunk system must be properly equipped for priority talkgroup scan.

Models with operator-selectable priority talkgroup scan have one scan list for each trunked system and one scan list for all the conventional modes. Fixed-list scan has one priority talkgroup scan list for each trunked personality (a single system may contain multiple trunked personalities), and one list for each conventional mode.

TALKGROUP SCAN

SMARTNET units can also be ordered with, or field programmed for, talkgroup scan, which allows up to 16 modes (any in the radio) to be scanned. Trunked modes from different systems, and conventional modes, can be included in the list. Only eight type I trunked modes from the same system are allowed in the list. No priorities can be assigned to any of the modes. The trunked systems to be scanned require no special programming for this feature to function.

On models with operator-selectable talkgroup scan, there is one scan list for each radio. With fixed-list talkgroup scan, there is one list for each trunked personality (a single system may contain multiple trunked personalities), and one list for each conventional mode.

To Turn Scan On

Press the **Scan** button momentarily to start scanning. The **Scan** indicator lights and a list of modes is scanned for activity.

If no activity exists, the display shows your selected mode. When a scanned mode becomes active, the display changes to show the active mode name, the appropriate priority indicator lights, and the radio unmutes. The radio will not begin scanning again for a predetermined “hang time” after the call ends, giving you time to respond. (The hang time is typically five seconds, but can be changed by field programming.)

A lit **N PRI** (non-priority) indicator means that the active mode is a non-priority mode (for all scan types).

A solidly-lit **PRI** (priority) indicator means that the active mode is the second-priority mode (priority talkgroup scan only).

A blinking **PRI** indicator means that the active mode is the first-priority mode (priority talkgroup scan only).

For Conventional modes: To scan without regard to squelch code, press the **Mon** button momentarily while scan is on.

If, when scanning in coded-squelch, another user with a different squelch code is active on your priority mode’s frequency, your unit will lock onto the priority mode and not unmute (because your squelch code is different) for the duration of the activity. Non-priority mode activity will be missed. Avoid this situation by designating all scan list members as non-priority status.

While scanning for activity, fleetwide, systemwide, dynamic regrouping, incoming telephone interconnect and Private Conversation / Call Alert calls are received. Respond to these types of calls as you would normally.

When scanning different trunked systems while in talkgroup scan, incoming Private Conversation / Call Alert calls may be missed.

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To Review a Scan List

1. Press and hold the **Scan** button until the **Scan** indicator blinks and a beep is heard. The radio neither scans nor receives calls while a list is being reviewed.
2. *C4/E4 and C5/E5 Models:* Turn the **Mode** knob or press the **Mode** rocker switch to scroll up or down through the programmed modes. Those modes which are in the scan list are indicated by a **N PRI**, **PRI** or blinking **PRI** indicator (indicating the mode's assigned priority).

   C7/E7 Models: Press the **Mode** rocker switch to scroll up or down through the programmed modes. Those modes which are in the scan list are indicated by a **N PRI**, **PRI** or blinking **PRI** indicator (indicating the mode's assigned priority as previously described). Press the **Rcl** button to review only the modes that are already in the scan list.
3. Press the **HOME** button momentarily to return to normal operation. A beep sounds and the radio resumes scanning.

To Transmit While Scan Is On

If the radio is programmed for talkback scan, press the microphone's PTT button to transmit on the mode indicated by the display. The radio will not begin scanning again for a predetermined "hang time" (also field programmable; typically five seconds) after you release the PTT button, allowing the other party to respond. If the other party responds within the hang time, scanning will not resume until five seconds after they have finished speaking, allowing the conversation to be completed.

To transmit on the selected mode if another mode is active, turn scan off first by pressing the **Scan** button momentarily.

To make a telephone interconnect, Call Alert page, or Private Conversation call while scanning, press the **Phon**, **Page**, or **Call** button. The call will be entered on the active mode (or selected mode if there is no activity), and scanning will be halted until the call is exited by pressing **HOME**.

If the radio is programmed for non-talkback scan, press the microphone's PTT button at any time to transmit on the selected mode.

To make a telephone interconnect, Call Alert page, or Private Conversation call while scanning, press the **Phon**, **Page**, or **Call** button. The call will be entered on the selected mode and scanning will be halted until the call is exited by pressing **HOME**.

To Select a Scan List (Operator-Selectable Priority Models Only)

1. The select state may be entered with scan on or off. Press and hold the **Scan** button until its indicator blinks and a beep sounds. You may now enter, modify, or review your existing scan list. (The radio is *NOT* receiving calls or scanning while you are selecting or reviewing the list.)
2. The display shows "***SEL MODE***" or a mode name. If the mode is already in the list, one of the priority indicators lights. The selected mode, shown as "***SEL MODE***," is automatically included in the list.
3. To enter or modify a list, turn the **Mode** knob or press the **Mode** rocker switch to scroll to the desired mode (or you can enter the mode number directly from the keypad on C7/E7 models).
4. To add the desired mode to the list, press the **Sel** button once. The **NPRI** indicator lights to indicate that the displayed mode has been added to the list as a non-priority mode.

   Priority talkgroup scan only: Press the **Sel** button again to designate the mode as second-priority status, causing the **PRI** indicator to light solidly. Press **Sel** a third time to designate first-priority status; the **PRI** indicator will blink.

   If there are already 16 modes in the list or 8 modes from the same type I system, and you try to add another mode from that system, a low-pitched beep sounds and the display shows "***LST FULL***." One of the modes already in the list must be deleted before another mode can be added (see step 5).
5. To delete a mode from the list, scroll to the mode to be deleted and press the **Sel** button (C4/E4 and C5/E5 models) or the **Del** button (C7/E7 models) up to three times until the **NPRI** and **PRI** indicators turn off, indicating the mode is no longer in the scan list. The selected mode cannot be deleted from the list.

   Fleetwide announcement calls for selected talkgroups will also be received. It is not necessary to add the fleetwide mode to the scan list to receive fleetwide calls.
6. When you have finished modifying your scan list, press the **HOME** button. A beep sounds and the radio resumes scanning.

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To Delete a Nuisance Mode With Scan On (Models C7 / E7 Only)

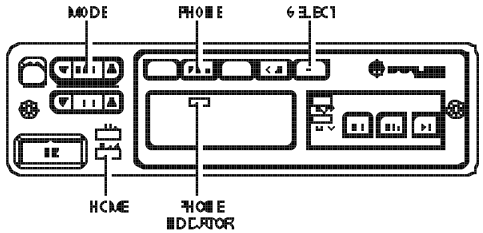
1. To temporarily delete an undesirable mode (nuisance mode), press **Del** once while the mode is active (indicated by the display). Only one mode is deleted at a time. If a second mode is deleted, the first mode returns to the scan list. The selected mode and / or priority modes cannot be deleted.
2. To restore the original list, either:
   a. press the **Rcl** button,
   b. turn scan off, then on,
   c. change modes, or
   d. turn the radio off, then on.

   This feature may be disabled via field programming.

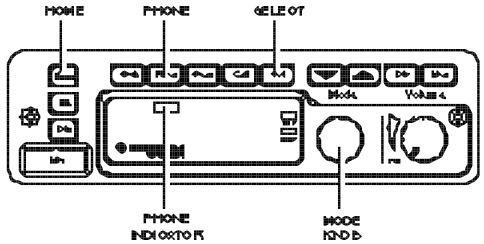
To Change Priorities While Scan Is On (Models C7 / E7 Only)

1. *Priority talkgroup scan only:* This dynamic priority feature allows the priority of a non-priority mode in the scan list to be increased, when active, by pressing the **Sel** button. A non-priority mode becomes second priority, and the previous second priority becomes non-priority. The first-priority mode remains unchanged.
2. To restore the original list, either:
   a. turn scan off, then on,
   b. change modes, or
   c. turn the radio off, then on.

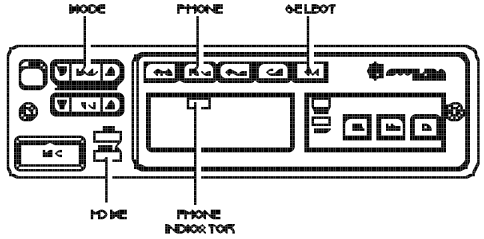
Models C2 / E2



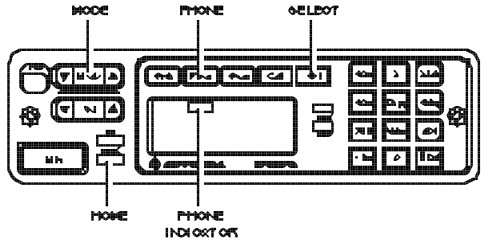
Models C4 / E4



Models C5 / E5

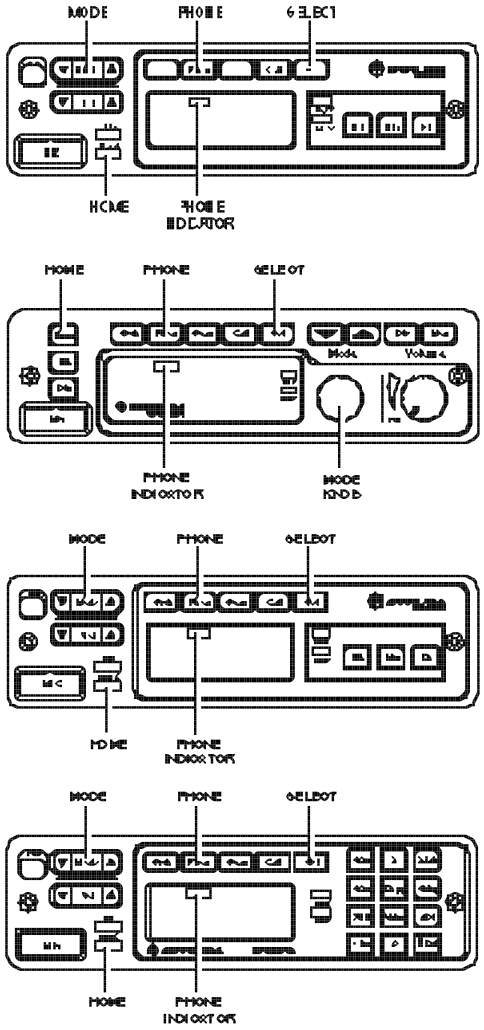


Models C7 / E7



With any of the models you may initiate and receive telephone calls if the trunked system is properly equipped. The centralized telephone interconnect functions through the system's central controller, and all calls between the mobile operator and the land line are private, regardless of who initiates the call. You may also initiate telephone calls in conventional modes if the conventional system is properly equipped.

Telephone Interconnect List



The C2/E2, C4/E4, and C5/E5 models feature phone list capability through a list of up to nine preprogrammed phone numbers. With field programming, a name may be assigned to each number in the list for your convenience. In addition to the nine preprogrammed phone numbers, the C7/E7 models feature unlimited dialing capability with its full 12-button telephone keypad.

To Receive a Phone Call (Trunked Modes Only)

1. When a phone call is received, telephone-type ringing sounds and the display shows "***PHONE***."
2. Press the **Phon** button; the phone conversation may begin.
3. When the call is completed, press **HOME** to hang up and return to normal operation.

   If the unit is equipped with the external alarms feature, see that section for details about its operation.

To Initiate a Telephone Call From the List

1. Press the **Phon** button momentarily to select the phone function; the **Phone** indicator lights.
2. The display will:

   (On C2/E2, C4/E4, and C5/E5 Models) Indicate the first phone number in the pre-stored list.

   (On C7/E7 Models) Indicate "***SCRTCHPD***;" then show the last number dialed.
3. Use the **Mode** rocker switch or turn the **Mode** knob, to scroll to the number you wish to call. If a name has been programmed, the display will first show the name, then display the associated number.
4. Press the **Sel** button and the displayed number will be automatically dialed.

   In conventional modes, when initiating a phone call, an access code is usually required. Press **Sel** and the radio automatically sends a pre-stored access code. After the access code is sent, the radio automatically pauses. When you get a dial tone, press the **Sel** button again to dial the displayed number. If no dial tone sounds, press the **HOME** button to hang up.

Note:

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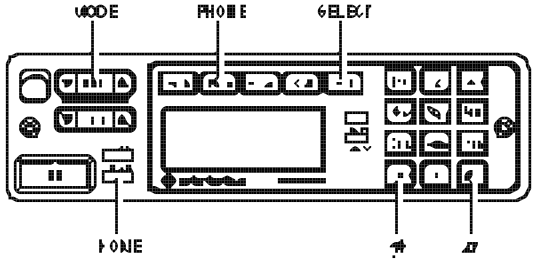
5. If the number contains a programmed pause, the dialing will stop when *"**P**"* is displayed. After the desired pause, press **Sel** to continue dialing.
6. If you are out of range of the trunked system, *"**NO SYS**"* will be displayed, and a continuous low-pitched tone will sound. Press **HOME** to resume normal operation.
7. If the trunked phone interconnect is in use or the phone interconnect is out of service, a busy tone sounds and the display shows "***PHN BUSY***." Your number will be automatically dialed when the phone interconnect becomes available. If you hang up, you will lose your place in line.
8. When the call is completed, press the **HOME** button to hang up and return to normal operation.

To initiate a Telephone Call From the List (cont.)



To Dial a Phone Number Not In the List

1. To dial a number not in the pre-stored list, press the **Phon** button momentarily to select the phone function. The **Phone** indicator lights.

2. The display shows "***SCRTCHPD***," then shows the last number dialed.

3a. *To autodial*, enter the desired phone number from the keypad. The display will be updated as the numbers are entered. Then:

   (1) After you get a dial tone, press the **Sel** button to automatically dial the displayed number.

   In conventional modes, when initiating a phone call, an access code is usually required. Press the **Sel** button and the radio automatically sends a pre-stored access code. After the access code is sent, the radio automatically pauses. When you get a dial tone, press the **Sel** button again to automatically dial the displayed number. If no dial tone sounds, press the **HOME** button to hang up.

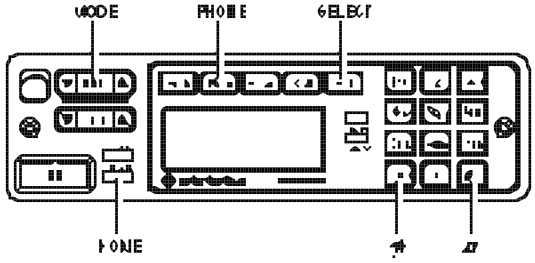
   (2) When the call is completed, press the **HOME** button to hang up and return to normal radio operation.

3b. *To direct dial*, press the **Mode** rocker switch to scroll to the "***KEYPAD***" display. Then:

   (1) *In trunked modes*, press the **Sel** button to enable the keypad. The display shows "***OK DIAL***."

   (2) Enter the desired number from the keypad or the DTMF microphone. The numbers will be dialed as they are entered.

Unlimited Telephone Interconnect (C7 / E7 Models Only)



Note:

In conventional modes, to use the pre-stored access code, before entering the desired number from the keypad, press the **Sel** button and wait for a dial tone. After you hear a dial tone, enter the desired number from the keypad (or DTMF microphone). The numbers will be dialed as they are entered.

If a different access code is required, do not press the **Sel** button. Instead, enter the access code directly from the keypad, wait for a dial tone, then continue dialing.

(3) When the call is completed, press the **HOME** button to hang up and return to normal radio operation.

Additional dialing can be performed during the course of the call by:

(a) using the **Mode** rocker switch to scroll to the "***SCRTCHPD***" display, then entering the number from the keypad, then pressing **Sel** to autodial; or,

(b) using the **Mode** rocker switch to scroll to the "***KEYPAD***" display, then pressing **Sel** to enable the keypad, then direct-dialing the digits.

To Store a Phone Number In the List

1. Press the **Phon** button momentarily to select the phone function; the **Phone** indicator lights.
2. Press the **Mode** rocker switch to scroll to the "***STOR PHN*** " display.
3. Press the **Sel** button to select the phone number storage function. The first number in the pre-stored list is displayed.
4. Press the **Mode** rocker switch to scroll to the number you wish to change.
5. Enter the new phone number on the keypad.

   If you make an error, press the **#** button twice to backspace over (erase) each incorrect digit. Enter a pause by pressing the ***** button, then the **#** button.
6. When the complete number has been entered, press the **Sel** button to store the new number.

   If you press the **Mode** rocker switch before pressing the **Sel** button, the number just entered will not be stored.
7. Press the **HOME** button to return to normal radio operation.

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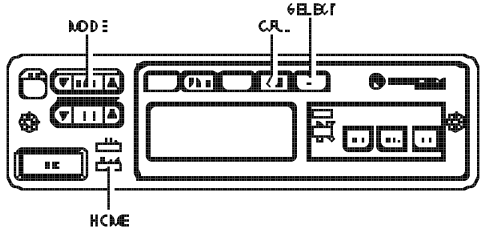
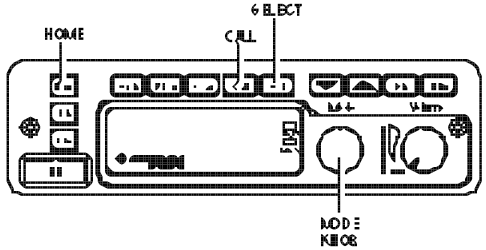
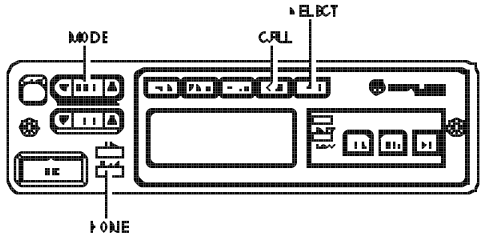
Models C2 / E2



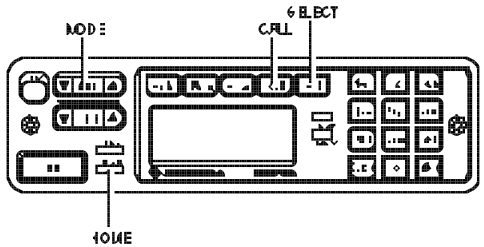
Models C4 / E4



Models C5 / E5

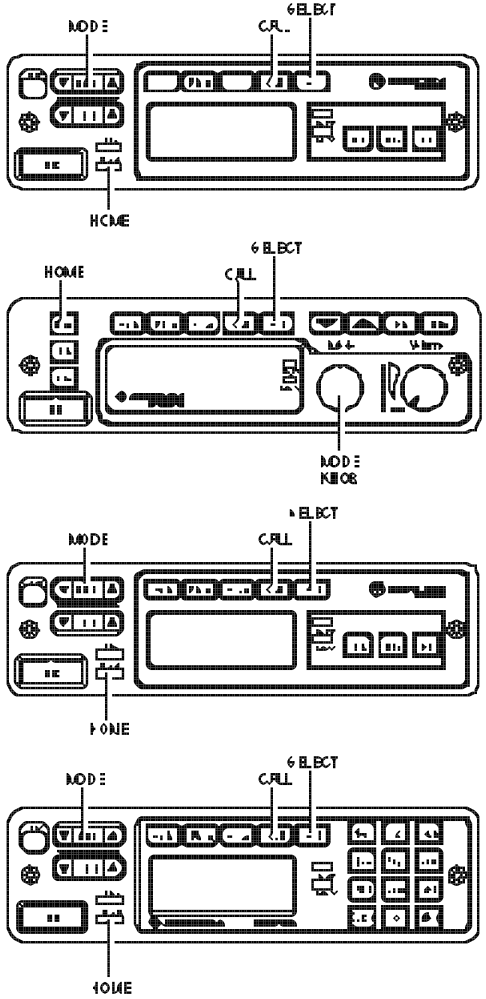


Models C7 / E7



The enhanced Private Conversation feature not only allows you to carry on a conversation that is heard only by the two parties involved, but also enables you to determine whether the unit you are calling is in service. The unit being called can also view the calling unit's ID before answering. You can then choose whether or not to leave your unit ID number (with a Call Alert page) with the unit you are calling so that you may be called back. Enhanced Private Conversation operation is similar to that of telephone interconnect.

Trunked Enhanced Private Conversation (900 MHz, VHF, and UHF Only)



All models are capable of responding to a Private Conversation call initiated by another radio. The following further describes each model's capability:

C2/E2 Models: You can respond to or return the call of a unit who calls you.

C4/E4 and C5/E5 Models: Feature a unique list of up to eight preprogrammed ID numbers for each trunked personality. With field programming, a name may be assigned to each ID in the list for your convenience.

C7/E7 Models: In addition to a list of eight IDs, features unlimited enhanced Private Conversation capability, using a full, 12-button keypad.

To Receive a Private Conversation Call

1. When a Private Conversation call is received, two alert tones sound and the display shows "***CALL***."
2. To answer the call, press the **Call** button within 20 seconds of receiving the call. The display shows "***ID RCVD***," then shows the ID number of the calling unit. To respond to the call, press the microphone's PTT button and talk.

   If you do not press the **Call** button before pressing the PTT button, your conversation will be heard by all members of the talk group.
3. If 20 seconds pass before you press the **Call** button, you will not respond privately to the call just received. Instead, when you press **Call**, you enter the "Initiate a Private Conversation Call" state, as described on the following pages.
4. If the system is busy when you attempt to answer the call, a busy tone sounds and your radio's **BUSY** indicator lights. When a channel becomes available, you will receive a call back and your radio will automatically key up for three seconds so that you can begin talking.
5. After completing the Private Conversation, press the **HOME** button to hang up.

Note:

To Initiate an Enhanced Private Conversation Call

Select a Unit to Call

1. Press the **Call** button; the **Call** indicator lights. The display shows:

   C2 / E2 Models: "***THIS ID***," then shows your unit ID.

   C4 / E4 and C5 / E5 Models: the first unit ID name / number in the pre-stored list.

   C7 / E7 Models: "***SCRTCHPD***," then shows the last selected unit ID number.

   If a Private Conversation or Call Alert page has been received, the display shows "***ID RCVD***," then shows the unit ID of the caller.

2. Select a unit as follows:

   C2 / E2 Models: Select "***ID RCVD***" if you wish to call the person with whom you last had a Private Conversation or the person who last Call Alert paged you.

   C4 / E4 and C5 / E5 Models: Do nothing if you wish to call the presently displayed unit ID; or use the pre-stored list by turning the **Mode** knob (C4 / E4 models) or pressing the **Mode** rocker switch (C5 / E5 models) to scroll to the name / ID you wish to call.

   C7 / E7 Models: Do nothing if you wish to call the presently displayed unit ID; or use the pre-stored list by pressing the **Mode** rocker switch to scroll to the name / ID you wish to call; or use unlimited call capability by entering a new unit ID with the keypad.

Place the Call

1. Press the **Sel** button. A telephone-type ringing sounds if the unit you are calling is in service.
2. If the called unit is not in service, no ringing will sound. After six seconds, the display shows "***NO ACK***" and a momentary, low-pitched tone sounds. Try again or press the **HOME** button to return to normal operation.
3. If you are out of the system's range, the display shows "***NO SYS***," and a low-pitched tone sounds. Try again or press **HOME** to return to normal operation.
4. If the system is busy when the called unit attempts to answer your call, the called unit will hear a telephone-type busy tone and both radios' **BUSY** indicators will light. When a channel becomes available, the called radio will receive a call back, and will automatically key up for three seconds so that conversation can begin.

Note:

5. If the receiving unit answers, identify yourself and begin your Private Conversation.
6. When the conversation is completed, press the **HOME** button to hang up.

   If you do not press **HOME** to hang up, your unit will remain in the Private Conversation state with the other unit. You will miss all subfleet traffic and incoming phone calls.

To Send a Call Alert Page

If the called unit is in service, but fails to respond within 20 seconds, the display shows "***NO ANSWR***," the ringing stops, and a low-pitched tone sounds. If you do not wish to "leave your number" press **HOME** to return to normal operation; otherwise, press the **Sel** button again to send a Call Alert page. This leaves a "***CALL***" display and your ID on the called unit, indicating that you called. It also triggers external alarms (if enabled) on the called unit. See the Call Alert Page section for more details about its operation.

To See Your Own ID

1. Press the **Call** button momentarily to select the Private Conversation feature; the **Call** indicator lights. If no call has been received, the display shows:

   C2/E2 Models: "***THIS ID***," then shows your unit ID.

   C4/E4 and C5/E5 Models: the first unit ID name/number in the pre-stored list.

   C7/E7 Models: "***SCRTCHPD***," then shows the last selected unit ID number.
2. If a call has been received, the display shows "***ID RCVD***," then shows the ID of the calling unit.
3. To see your ID, press the **Mode** rocker switch or turn the **Mode** knob to scroll to the "***THIS ID***" display, which will alternate with your ID number.

Your ID can be viewed at any time during an enhanced Private Conversation simply by pressing the **Mode** rocker switch or turning the **Mode** knob to scroll to the "***THIS ID***" display.

Note:

Note:

To Store a Unit ID Number in the List (C7 / E7 Models Only)

1. Press the **Call** button momentarily to select the Private Conversation feature; the **Call** indicator lights.
2. Press the **Mode** rocker switch to scroll to the "***STORE ID***" display.
3. Press the **Sel** button to select the unit ID store function.
4. Press the **Mode** rocker switch to scroll to the ID you wish to change.
5. Enter the new unit ID number on the keypad.

   If you make an error, press the **Del** button to erase each incorrect digit.
6. When digits of the ID are entered, press **Sel** to store the new ID, or press **HOME** to store the ID and exit.

   If you press the **Mode** rocker switch before **Sel**, you will advance to the next number, but will not store the number just entered.
7. Repeat steps 4, 5, and 6 until all the desired IDs have been entered. Press **HOME** to exit to normal operation. You must exit the ID storage function and press **Call** again to initiate a Private Conversation call.

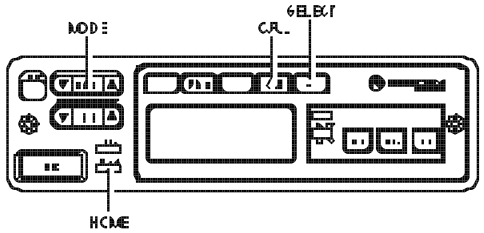
   The Private Conversation and Call Alert page features share the same pre-stored list of units' IDs.

Note:

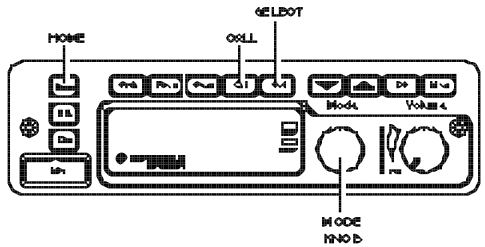
Note:

Note:

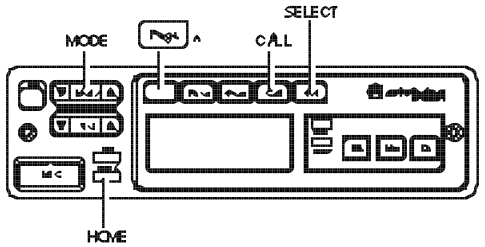
Models C2 / E2



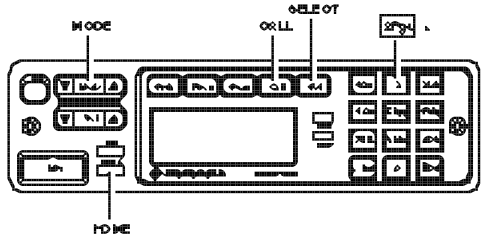
Models C4 / E4



Models C5 / E5



Models C7 / E7

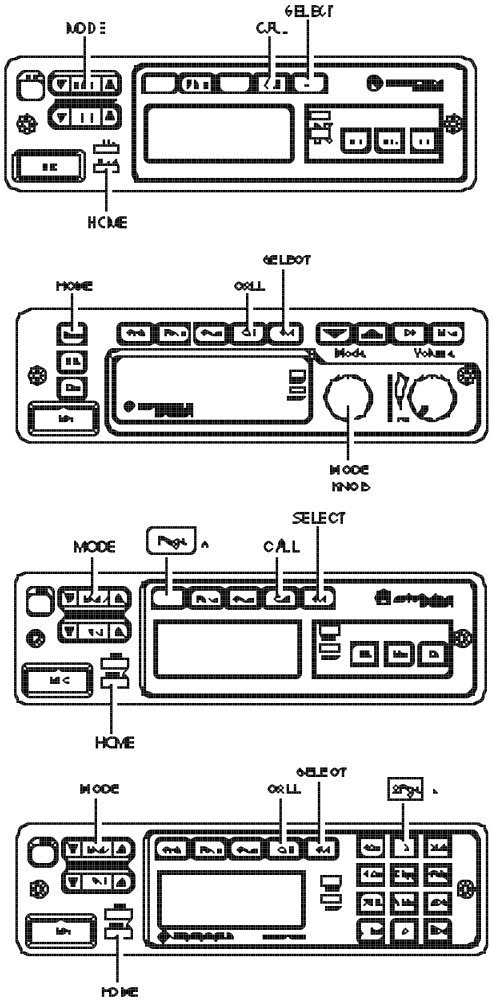


* Optional button (included but not installed).

The Private Conversation feature allows you to carry on a conversation that is heard only by the two parties involved. With Private Conversation II, the unit being called can view the calling unit's ID before answering.

All models are capable of responding to a Private Conversation call initiated by another radio. The following further describes each model's capability:

Trunked Private Conversation I and II (800 MHz Only)



C2/E2 Models: You can respond to or return the private call of a unit that calls you.

C4/E4 and C5/E5 Models: Feature a unique list of up to eight preprogrammed ID numbers for each trunked personality. With field programming, a name can be assigned to each ID in the list for your convenience.

C7/E7 Models: In addition to a list of eight ID's, features unlimited Private Conversation capability, using a full, 12-button keypad.

To Receive a Private Conversation Call

1. When a Private Conversation call is received, two alert tones sound, the display shows "***CALL***," and you will hear the caller. If your external alarms are enabled, they will be triggered.
2. To answer the call, press the **Call** button. The display shows "***ID RCVD***," then shows the ID number of the calling unit. To respond to the call, press the microphone's PTT button and talk.

   If you do not press the **Call** button before pressing the PTT button, your conversation will be heard by all members of the talk group.
3. If the system is busy when you attempt to answer the call, a busy tone sounds and your radio's **BUSY** indicator lights. When a channel becomes available, you will receive a call back and your radio will automatically key up for three seconds so that you can begin talking.
4. After completing the Private Conversation, press the **HOME** button to hang up.

Note:

To Initiate a Private Conversation Call

Select a Unit to Call

1. Press the **Call** button; the **Call** indicator lights. The display shows:

   C2 / E2 Models: "***SUPRVISR***" if Private Conversation I; "***THIS ID***," then shows your unit ID if Private Conversation II.

   C4 / E4 and C5 / E5 Models: The first unit ID name / number in the pre-stored list.

   C7 / E7 Models: "***SCRTCHPD***," then shows the last selected unit ID number.

   If a unit ID has been received from a Private Conversation or Call Alert page, the display shows "***ID RCVD***." With trunking type II, the display then shows the unit ID of the caller.

2. Select a unit as follows:

   C2 / E2 Models: Select "***SUPRVISR***" if Private Conversation I to call your supervisor. Select "***ID RCVD***" if Private Conversation II to call the last person with whom you had a Private Conversation or who Call Alert paged you.

   C4 / E4 and C5 / E5 Models: Do nothing if you wish to call the presently displayed unit ID; use the pre-stored list by turning the **Mode** knob (C4 / E4 models) or pressing the **Mode** rocker switch (C5 / E5 models) to scroll to the name / ID you wish to call.

   C7 / E7 Models: Do nothing if you wish to call the presently displayed unit ID; use the pre-stored list by pressing the **Mode** rocker switch to scroll to the name / ID you wish to call; or use unlimited call capability by entering a new unit ID with the keypad.

Place the Call

1. Press the PTT button to initiate the call. Pause for a second to allow the alert tone to sound in the receiving unit, then begin the conversation.
2. When the conversation is completed or the unit does not respond, press the **HOME** button to hang up.

   If you do not press **HOME** to hang up, your unit will remain in the Private Conversation state with the other unit. You will miss all subfleet traffic and incoming phone calls.

3. If the unit does not respond, then the **Sel** button may be pressed to send a Call Alert page to the called unit. See the Call Alert page section for details about its operation.

Note:

Note:

To See Your Own ID

1. Press the **Call** button momentarily to select the Private Conversation feature. If no unit ID has been received, the display shows:

   C2 / E2 Models: "***SUPRVISR***" if Private Conversation I; "***THIS ID***," then shows your unit ID if Private Conversation II.

   C4 / E4 and C5 / E5 Models: The first unit ID name / number in the pre-stored list.

   C7 / E7 Models: "***SCRTCHPD***," then shows the last selected unit ID number.

2. If a unit ID has been received from a Private Conversation or Call Alert page, the display shows "***ID RCVD***," then shows the ID of the calling unit.

3. To see your ID, press the **Mode** rocker switch or turn the **Mode** knob to scroll to the "***THIS ID***" display, which will alternate with your ID number.

   With Private Conversation I, the unit ID shown is the unit's Call Alert page ID, not its Private Conversation ID.

To Store a Unit ID Number in the List (C7 / E7 Models Only)

1. Press the **Call** button momentarily to select the Private Conversation feature.
2. Press the **Mode** rocker switch to scroll to the "***STORE ID***" display.
3. Press the **Sel** button to select the unit ID store function.
4. Press the **Mode** rocker switch to scroll to the ID you wish to change.
5. Enter the new unit ID number on the keypad.

   If you make an error, press the **Del** button to erase each incorrect digit.

6. When all digits of the ID are entered, press **Sel** to store the new ID or press **HOME** to store it and exit.

   If you press **Mode** before **Sel**, you will advance to the next number, but will not store the number just entered.

7. Repeat steps 4, 5, and 6 until all the desired IDs have been entered. Press **HOME** to exit to normal operation. You must exit the ID storage function and press **Call** again to initiate a Private Conversation call.

   The Private Conversation and Call Alert page features share the same pre-stored list of unit IDs.

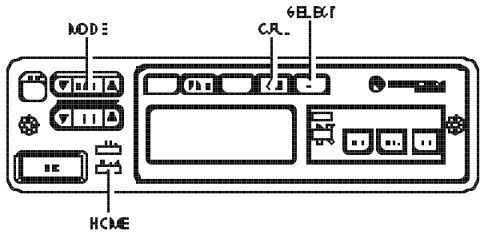
Note:

Note:

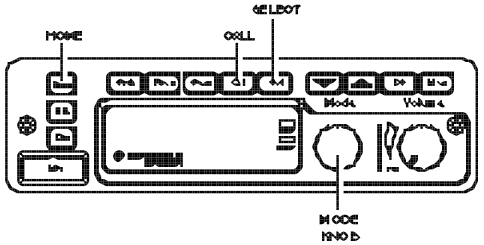
Note:

Note:

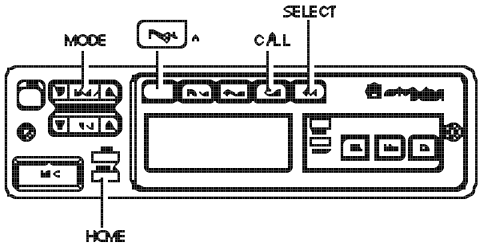
Models C2 / E2



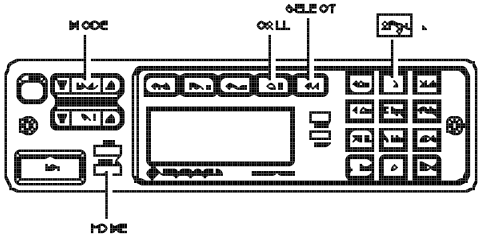
Models C4 / E4



Models C5 / E5



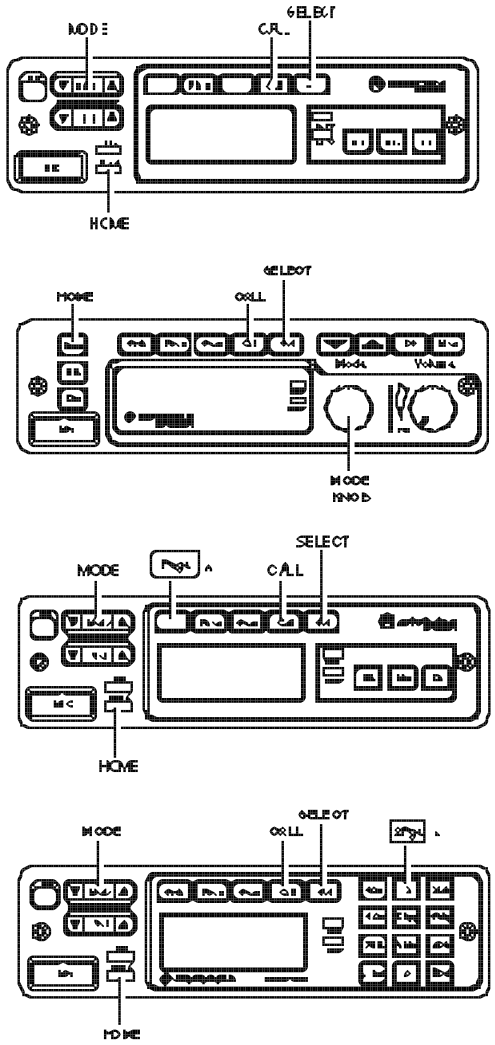
Models C7 / E7



* Optional button (included but not installed).

The Call Alert feature allows a unit to selectively alert another unit, and to determine whether or not that unit received the alert. A Call Alert page can be initiated after an unsuccessful Private Conversation call, or as a separate feature.

Trunked Call Alert Page



All models are capable of responding to a Call Alert initiated by another radio. The following further describes each model's capability:

C2/E2 Models: Can only respond to a Call Alert page; cannot initiate a page.

C4/E4 and C5/E5 Models: Feature a unique list of up to eight preprogrammed ID numbers for each trunked personality. With field programming, a name can be assigned to each ID in the list for your convenience.

C7/E7 Models: In addition to a list of eight ID's, features unlimited Call Alert page capability, using a full, 12-button keypad.

To Send a Call Alert Page (C4/E4, C5/E5, and C7/E7 Models Only)

Select a Unit to Call

1. Press the **Call**, **Page**, or **2Pge** button; the **Call** indicator lights. The display shows "***SCRTCHPD***," then shows the last-selected unit ID number.

   If a unit ID has been received from a Private Conversation or Call Alert page, the display shows "***ID RCVD***." With trunking type II, the display then shows the unit ID of the caller.

2. Do nothing if you wish to call the presently-displayed unit ID; or use the pre-stored list by turning the **Mode** knob or pressing the **Mode** rocker switch to scroll to the name/ID you wish to call; or use unlimited call capability by entering a new unit ID with the keypad (C7/E7 models only).

Place the Call Alert Page

1. Press the **Sel** button; the display changes to "***PLS WAIT***."
2. If you are out of the range of the system, the display shows "***NO SYS***," and a low-pitched tone sounds. Try again or press **HOME** to return to normal operation.

   If the Call Alert page feature was entered from the **Call** button and the radio is equipped with enhanced Private Conversation, the **Sel** button must be pressed twice. The first press initiates an enhanced Private Conversation; the second press sends the Call Alert page.

3. If you are in the range of the system, a single beep sounds when the page is received by the trunked central controller.
4. When the called unit acknowledges the page, four additional beeps sound and the display changes to "***ID ALRTD***." The radio returns to normal operation.
5. If, after six seconds, the called unit fails to acknowledge the alert, a low-pitched tone sounds and the display changes, first to "***NO ACK***," then to the selected ID. Try again or press **HOME** to exit.

Note:

Note:

To Respond to a Call Alert Page

If you have been out of your vehicle, a caller may have sent you a Call Alert page to leave a "***CALL***" message and his ID, and triggered any external alarms you enabled before you left your vehicle. If so, your radio display will show "***CALL***," and four beeps will repeat every five seconds.

To respond with a normal dispatch call, press the PTT button and inquire about the page.

With trunking type II, you may instead respond with a Private Conversation. Press **Call**. The display changes to "***ID RCVD***," followed by the unit ID of the caller. Press the **Sel** button to initiate an enhanced Private Conversation (900MHz, VHF, and UHF only), or the PTT button to initiate a Private Conversation I or II call (800MHz only) to the caller.

Pressing the PTT button, changing systems, or pressing **Call**, **Page**, or **2Pge** clears the "***CALL***" display. The original "***ID RCVD***" is retained until another Call Alert or Private Conversation call is received.

To See Your Own ID

Press the **Call**, **Page**, or **2Pge** button momentarily to select the Private Conversation or Call Alert page feature.

To see your ID, turn the **Mode** knob or press the **Mode** rocker switch to scroll to the "***THIS ID***" display, which will alternate with your ID number.

-
-

To Store a Unit ID Number In the List (C7 / E7 Models Only)

1. Press the **Call**, **Page**, or **2Pge** button momentarily to select the Private Conversation or Call Alert page feature.
2. Press the **Mode** rocker switch to scroll to the "***STORE ID***" display.
3. Press the **Sel** button to select the unit ID store function.
4. Press the **Mode** rocker switch to scroll to the ID you wish to change.
5. Enter the new unit ID number on the keypad.

   If you make an error, press the **Del** button to erase each incorrect digit.
6. When all digits of the ID are entered, press the **Sel** button to store the new ID or press **HOME** to store it and exit.

   If you press the **Mode** rocker switch before **Sel**, you will advance to the next number, but will not store the number just entered.
7. Repeat steps 4, 5, and 6 until all the desired IDs have been entered. Press **HOME** to exit to normal operation. You must exit the ID storage function and press **Call**, **Page**, or **2Pge** again to initiate a Call Alert page.

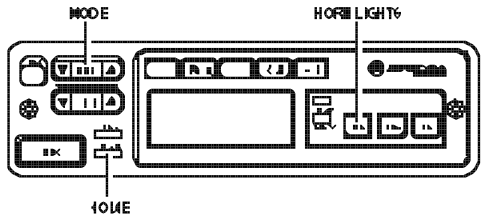
   The Private Conversation and Call Alert page features share the same pre-stored list of unit IDs.

Note:

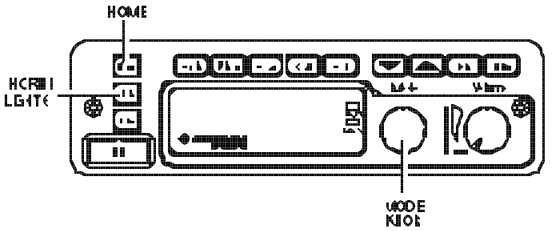
Note:

Note:

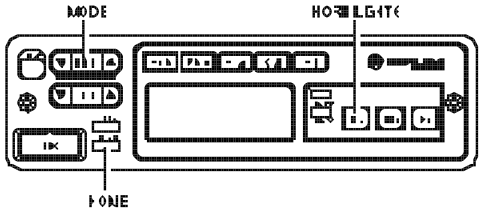
Models C2 / E2



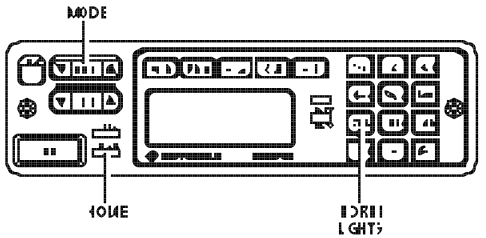
Models C4 / E4



Models C5 / E5

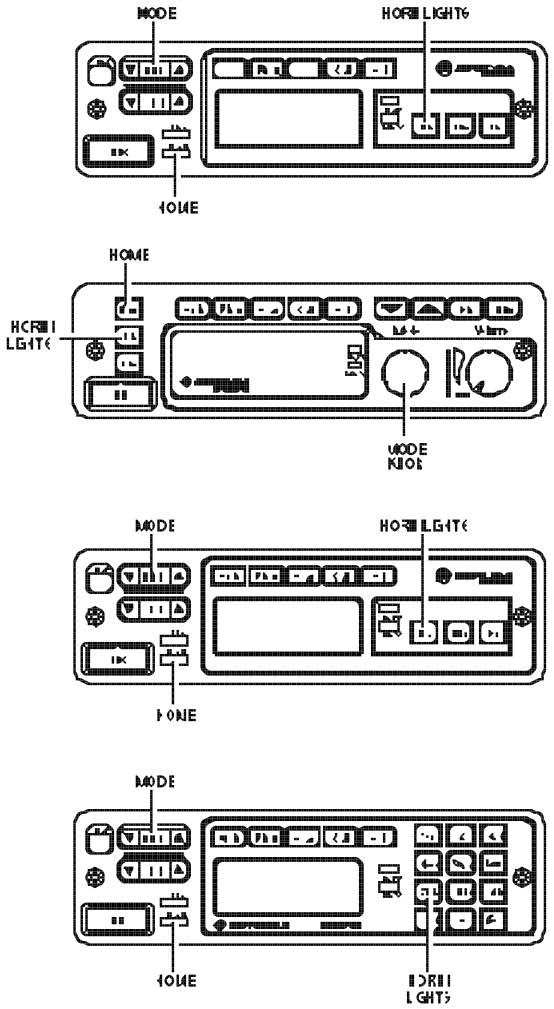


Models C7 / E7



All models can be equipped for external alarms (horn and lights) that are activated by received telephone interconnect calls, Call Alert pages, or Private Conversation I or II calls. These features are useful when you must leave the vehicle, but need to receive any incoming messages. See the Spectra service and installation manuals for the optional relays needed for these features.

Optional External Alarms (Horn and Lights)



To Turn External Alarm(s) On

Press the **H/L** button momentarily. The last selected alarm(s) are enabled, and the display alternately shows the enabled alarm(s), then the selected mode. Press the **H/L** button a second time to turn off the alarm(s).

To Change the Selected Alarms

1. Press and hold the **H/L** button until a beep sounds and the display indicates the currently selected alarm.
2. Press the **Mode** rocker switch or turn the **Mode** knob to scroll through the choices: "***HORN ON***," "***LITES ON***," and "***H/L ON*** " (both horn and lights) until the desired alarm is displayed.
3. Press the **HOME** button to select the desired alarm and return to normal operation.

When a Call Alert Is Received While Alarms Are Turned On

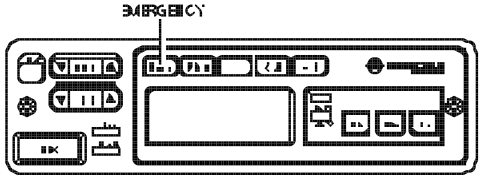
When a call has been received, the vehicle's horn sounds for four seconds, and/or the car lights turn on for sixty seconds. (This time interval may be changed with the field programmer.) The display alternates between the type of call received ("***CALL***" or "***PHONE***") and the selected mode name.

To turn the alarm(s) off, press the **H/L** button or any other control head button.

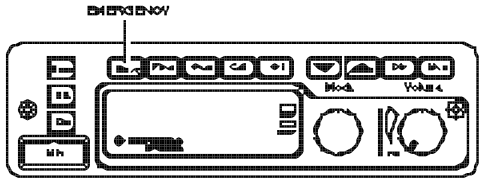
After returning to the vehicle, disable the external alarms feature by pressing the **H/L** button momentarily. To reactivate the alarms, press the **H/L** button a second time. Responding to a call also automatically disables the alarms; press the **H/L** button again to reactivate them.

Note:

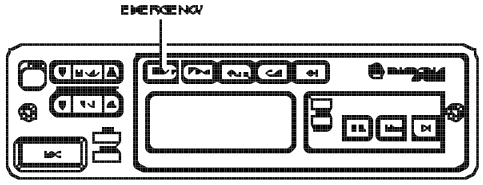
Models C2 / E2



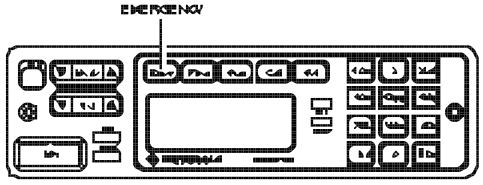
Models C4 / E4



Models C5 / E5



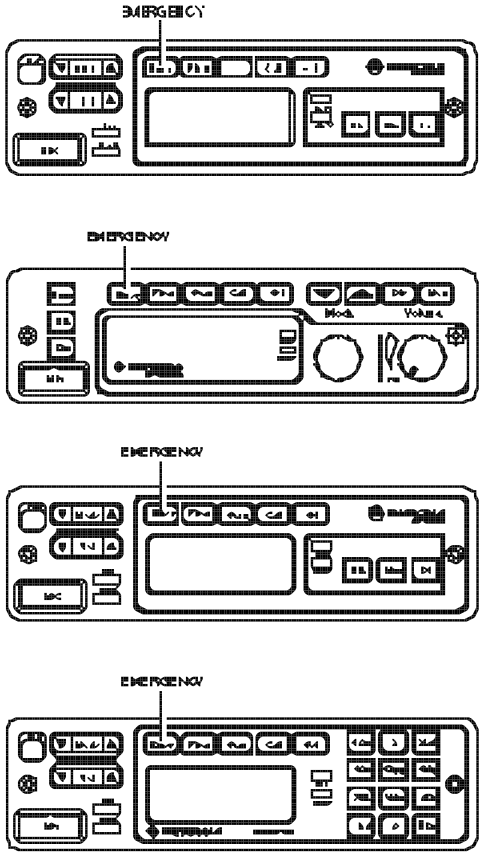
Models C7 / E7



The emergency call and alarm features allow you to have priority channel access and / or send an emergency data transmission to the dispatcher in an emergency situation. The “emergency” state may be accessed by momentarily activating an optional foot switch, hidden push button, or field-installed **Emer** button. (See the Spectra Service and Installation manuals for more information on the switches.)

The desired type of trunked emergency feature—call, alarm, call and alarm, or silent alarm—may be either specified at the time of order or field programmed. MDC emergency, for conventional channels, must be field programmed to be operational.

Emergency Call and Alarm



With the radio turned off, you can still send emergency alarms (but not calls) if you use the external device (foot switch or push button) to activate it. (Main battery power must, of course, be connected.) In this case, the radio automatically turns itself on, sends the emergency alarm, and then turns itself off after the acknowledgement. All alert tones sound (except for silent alarm) but no displays occur.

The radio must be turned on from the control head's **PWR** button (C2 / E2, C5 / E5, and C7 / E7 models) or **Volume** knob (C4 / E4 models) to make emergency calls or send alarms using the field-installed **Emer** button.

Emergency Call (Trunking Operation Only)

Emergency call gives you priority access to a voice channel for all subsequent transmissions after you press the emergency button. The level of priority access is determined by the system manager (that is, ruthless preemption, top of queue, etc.).

1. Press the emergency button; an alert tone (beep) sounds and the display flashes "***EMERGNCY***."
2. Press the PTT button to initiate the emergency call.
3. After completing the emergency call, press and hold the emergency button until an alert tone sounds. The flashing "***EMERGNCY***" display goes away and the radio returns to normal operation.

Emergency Alarm

The emergency alarm feature sends a data transmission on the trunked control channel or designated conventional channel to alert the dispatcher of your emergency condition and identify your unit ID.

1. Press the emergency button; an alert tone (beep) sounds and the display flashes "***EMERGNCY***."
2. A "central acknowledgement" (beep) indicates that the alarm was received by the system's central controller. A "dispatcher acknowledgement" (four beeps) and an "***ACK RCVD*** " display follow. The radio then automatically returns to normal operation. No further action is required.

Note:

Silent Emergency Alarm

Press the emergency button to activate the silent alarm feature. During a silent emergency alarm, there are no display changes and the receiver audio mutes so that no indication is given that an emergency alarm has been sent.

To exit the silent alarm mode, press the PTT button or press and hold the emergency button until an alert tone sounds.

Emergency Call and Alarm (Trunked Operation Only)

If the radio has both the emergency call and alarm features, it automatically proceeds to the call mode after the alarm is acknowledged.

1. Press the emergency button to activate the emergency call / alarm feature. A central acknowledgment (beep) sounds, indicating that the alarm has been received by the system's central controller. A dispatcher acknowledgement (four beeps) follows, accompanied by an "***ACK RCVD***" display. The display then begins flashing "***EMERGNCY***."
2. Press the PTT button to initiate the emergency call.

   If silent emergency alarm is used with emergency call, pressing PTT exits the silent mode.
3. To exit from the emergency state altogether, press and hold the emergency button until an alert tone sounds. The flashing "***EMERGNCY***" display goes away and the radio returns to normal operation.

Special Considerations

If you press the emergency button while in a mode which has no emergency capability, an "invalid key" tone sounds.

If the unit is out of the range of the system and / or the emergency alarm is not acknowledged, a tone sounds and the display shows "***NO SYS***" or "***NO ACK***."

If you press the emergency button, then change to a mode which has no emergency capability, a "***NO EMERG*** " display alternates with the mode name display until a valid emergency mode is selected or until the emergency is cancelled.

When an emergency is active, changing to another mode where emergency is enabled (trunked or conventional) will cause an emergency alarm to be present and / or emergency call to be active on the new mode.

Note:

The FCC (Federal Communications Commission) requires you to obtain a station license for your radio equipment before you transmit on it, but it does not require an operating license or permit. The station licensee is responsible for ensuring that the transmitter power, frequency, and deviation are within the maximum limits allowed by the station license.

The licensee of the station is at all times responsible for the proper operation and maintenance of the equipment. No FCC license is required for personally maintaining the equipment. The frequency and deviation of the transmitter must be checked upon installation, and at least once yearly.

IMPORTANT

FCC regulations state that:

1. The grantee of a license has the responsibility of ensuring that all equipment operated under that license conforms to the specifications of the license.

2. The rf power output of a radio transmitter shall be no more than that required for satisfactory technical operation, considering the area to be covered and local conditions.

3. The frequency, deviation, and power of a radio transmitter must be maintained within specified limits. It is recommended, therefore, that these three parameters be checked before the station is placed in service.

REMEMBER

The efficiency of the equipment depends upon a good installation. Motorola recommends that adjustments to this equipment be made *ONLY* by a certified technician.

To buy a service contract for your Motorola equipment:

Motorola Communications Group
1301 E. Algonquin Road
Schaumburg, Illinois 60196

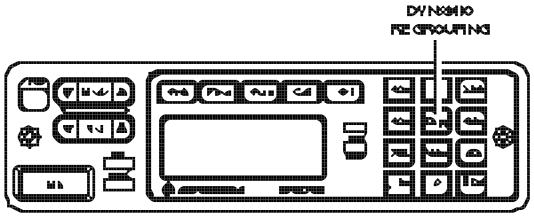
Motorola instruction manuals contain complete testing and servicing instructions. You can buy one of these from:

Motorola
Worldwide System and Aftermarket Products Division
1313 E. Algonquin Road
Schaumburg, Illinois 60196
1-800-422-4210

FCC Requirements

Service

Service Manuals



The dynamic regrouping feature allows the dispatcher to temporarily reassign selected individuals, operating in separate trunked fleets and / or talkgroups, into a single group so that they can communicate.

Receiving a Dynamic Regrouping ID Assignment

When your unit receives a dynamic regrouping ID assignment, a unique “chirp” sounds to alert you that your unit has been dynamically regrouped. The display shows the new dynamic mode name assignment. Examples of the field-programmable dynamic mode names include “***16 DYNMC***,” “***8 TACTCL***,” etc.

When you press the PTT button, the radio transmits on the dynamically assigned mode.

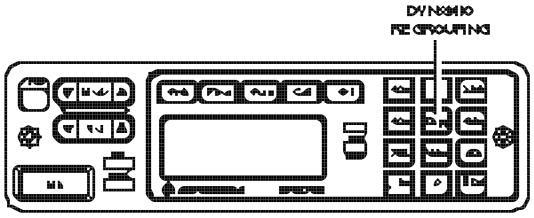
After the dispatcher releases your mobile from the dynamic ID assignment, your radio returns to the last selected, non-dynamic regrouping mode.

If no dynamic regrouping assignment has been made, an illegal-mode tone sounds if you attempt to select a dynamic mode. This means that the selection is not valid.

Select Enable and Disable

The dispatcher may classify regrouped units into one of two categories: “select enabled” or “select disabled.” *Select-enabled* units are free to make mode changes to any of the available talkgroups, including the dynamic group. *Select-disabled* units cannot change modes, because the dispatcher has specifically chosen to force the unit to remain in the dynamic mode.

Dynamic Regrouping



To View the Dynamic Regrouping Status (C7 / E7 Models Only)

1. Momentarily press the **5Rpg** button to see if the radio has a dynamic ID assignment.

   If you press the **5Rpg** button on a mode where dynamic regrouping is not enabled, an invalid-key tone sounds.

2. If the radio *has been* dynamically regrouped, and the unit has not been released from that dynamic ID assignment, the display shows "***RPG ON***."

   If the radio *has not been* regrouped, the display shows "***RPG OFF***," indicating that the dynamic mode is invalid.

Requesting a Dynamic Regrouping (C7 / E7 Models Only)

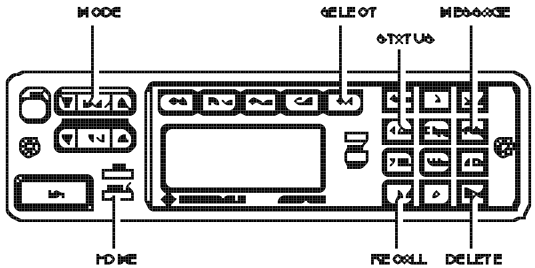
1. Press and hold the **5Rpg** button to request regrouping.

   A central-acknowledgment (beep) sounds, indicating your request was received by the system's central controller. The display changes to "***PLS WAIT***" while the request is being processed.

2. When the regroup request *is acknowledged*, a dispatcher-acknowledge sounds (four beeps) and the display shows "***ACK RCVD***," then returns to normal operation. These signals indicate that the dispatcher terminal has logged the regroup request.

   If the regrouping request *is not acknowledged* within six to eight seconds, the display shows "***NO ACK***," an invalid-key tone sounds, and the radio returns to normal operation.

Note:



Radio *status* transmissions are used to inform the dispatcher of the present state of the mobile unit, while *message* transmissions indicate a temporary condition and / or a response to a dispatcher's query. A status / message transmission can be sent in any properly equipped conventional or trunked system. For example, a status might be "***ENROUTE***" or "***AT SITE***," and a message might be "***PLS CALL***" or "***10 4***." Status and message names are field programmable. Each radio can have up to eight separate statuses and eight separate messages.

To Send a Status or Message Transmission

1. Press the **Sts** or **Msg** button. The last-acknowledged status or message name is displayed. (If no status or message has been acknowledged previously, "***NO STS*** " or "***NO MSG*** " is displayed.)

2. *Use the* **Mode** rocker switch to scroll through the list of status or message names, or use the keypad to enter the number of the status or message you wish to send. If a keypad numeric button is pressed, the display will change to "***STS X***" OR "***MSG X***," where "***X***" is the number you pressed.

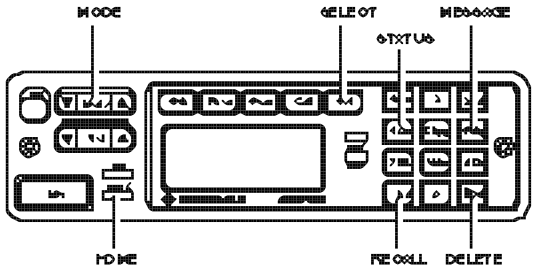
   Alternatively, use the **Rcl** *button* to recall the last acknowledged status / message.

3. With the desired status / message name or number displayed, press the **Sel** button to send the transmission.

   The radio display flashes the selected status / message name until the transmission is received and acknowledged. A central-acknowledge (beep) sounds when the status / message is received by the trunked central controller. When the dispatcher acknowledges the status / message, a dispatcher-acknowledge (four beeps) sounds and the display shows "***STS RCVD***" or "***MSG RCVD***." The radio then returns to normal operation.

   If no acknowledgement is received, the display shows "***NO ACK***," or "***NO SYS***," or "***OUT RNGE***," and an illegal-key tone sounds. The display changes back to the last-acknowledged status / message. You now have the choice of either sending the desired status / message again by pressing the **Sel** button, or exiting by pressing **HOME** or **Del** to exit.

Status / Message Transmissions (C7 / E7 Models Only)



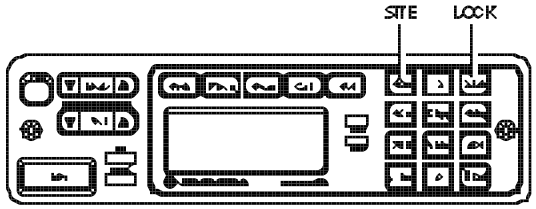
Note:

Every radio model includes data communications capability, providing automatic PTT unit identification in properly equipped conventional and trunked systems. Trunked PTT-ID can be either specified when the unit is ordered or field-programmed. Field programming is required for PTT-ID to be operational on conventional systems.

To Send Your Unit Identification

Each time you press the microphone's PTT button while in a mode that has PTT-ID enabled, the radio automatically sends your radio's unit identification code to your dispatcher. In conventional modes, you will hear a continuous alert tone when you press the PTT button. Continue to hold down the PTT button and wait until the tone stops before you begin talking.

Push-to-Talk Identification (PTT-ID)



Communications are extended beyond the reach of a single trunked site (antenna location) by the automatic multiple site switching (AMSS) feature. In a system where wide-area coverage is required, multiple trunking sites are used.

AMSS automatically switches the radio to a different site when the current-site signal becomes too weak. Typically, this happens when the vehicle in which the radio is located is driven out of the range of one site, and into the range of another.

Under normal conditions, an AMSS-enabled radio functions invisibly to the operator. However, on the C7 / E7 models, the operator does have manual controls: the **1Ste** and **3Lck** buttons. These buttons can be used to check, or change, the AMSS operation as described below.

Operator-Initiated AMSS (C7 / E7 Models Only)

Check which site the radio has currently selected by pressing the **1Ste** button momentarily. The current site name (field programmable) is displayed for three seconds. If the radio is not locked onto a site, but is scanning for a new site, "***SITE SCN***" is displayed.

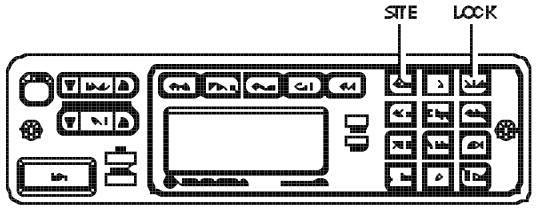
Manually initiate a scan to another site during weak signal conditions by pressing and holding the **1Ste** button until an alert tone sounds. The display then shows "***SITE SCN***."

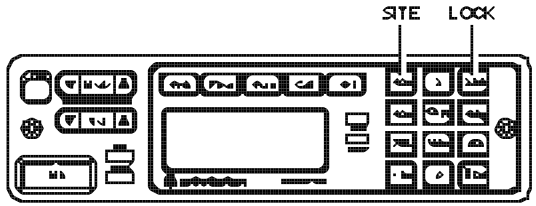
Locking Onto a Site (C7 / E7 Models Only)

If you are aware that weak signals are common to particular areas, use the AMSS lock function to prevent the radio from automatically scanning for a new site.

1. Press the **3Lck** button momentarily to display the current lock status: either "***SITE LCK***" or "***SITE UNL***."
2. To change the locked or unlocked condition, press and hold the **3Lck** button until a beep is heard and the display changes. After temporarily displaying the new condition, the radio returns to normal operation.

Automatic Multiple Site Switching (AMSS) (C4 / E4, C5 / E5, and C7 / E7 Models Only)





Communications are extended beyond the reach of a single-trunked site (antenna location) by the SmartZone feature when operating in a SmartZone system. SmartZone unit provides expanded wide-area coverage.

SmartZone automatically switches the radio to a different site when the current site signal becomes unacceptable. Typically, this happens when the vehicle in which the radio is located is driven out of the range of one site, and into the range of another.

Under normal conditions, a SmartZone-enabled radio functions invisibly to the operator. However, the operator does have some manual controls on the E7 model: the **Site** and **Lock** buttons. These buttons can be used to check, or change, the SmartZone operation as described below.

Site Button Operation in SmartZone (E7 Model Only)

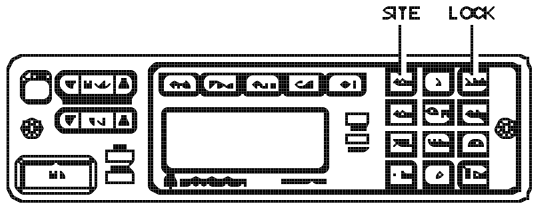
Check which site the radio has currently selected by pressing the **Site** button momentarily. The current site name (field programmable) displays for three seconds. If the radio is not locked onto a site but is scanning for a new site, "***SCANNING***" is displayed. If the radio has not yet received site ID information for the current site, the radio will display "***SITE XX***."

Locking Onto a Site (E7 Model Only)

If you are aware that weak signals are common to particular areas, use the SmartZone lock function to prevent the radio from automatically scanning for a new site.

1. Press the **Lck** button momentarily to display the current lock status: either "***SITE LOCK***" or "***SITE UNLOCK***."
2. To change the locked or unlocked condition, press and hold the **Lck** button until a beep is heard and the display changes. After temporarily displaying the new condition, the radio returns to normal operation.

SmartZone™
(E2, E4, E5, and E7 Models Only)



Busy Override

In a SmartZone system, it may be possible for a site to have all available repeaters in use. If an operator at another site tries to make a call, and members of his talkgroup are present at the busy site, the operator will receive a system busy.

The busy override feature allows the operator making the call to rekey the radio during the system busy and bring up available repeaters for his talkgroup. Note that this means that not everyone in your group will hear the call.

After receiving a system busy, release and then press and hold the PTT button. After the programmable busy override time expires (three seconds nominal), the radio will resend its call request, and the controller will either send a reject or, a grant, or another system busy to the radio. Note that the busy tone will sound while PTT is pressed before resending the call request. The radio can be programmed to sound a short tone when the call request is present to alert the user that PTT can be released.

Busy overrides are allowed in dispatch operation, multi-group, patch, emergency and talkgroup scan.

Site Trunking

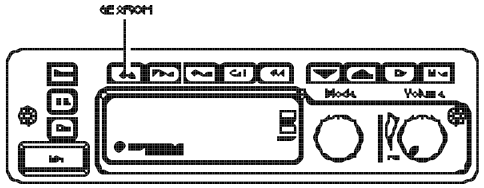
In a SmartZone system, if the zone controller for a particular site fails, the site will enter into a site-trunking mode of operation. When operating in site trunking, the user will be allowed to make normal trunking calls; however, the user will only be able to communicate with other units at the same site.

Radios in a SmartZone system may be programmed to display "***SITE TRUNK***" when site trunking becomes active. The display will alternate with the current mode display as long as the radio remains in site trunking. The radio will also sound a valid-key chirp when it first detects site trunking.

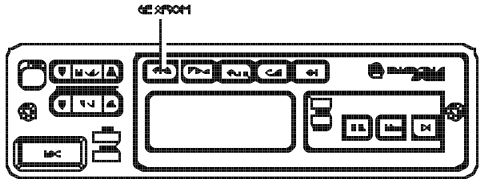
Emergency Call Receive Operation

A radio configured for SmartZone operation will display "***EMER RCV***" whenever it receives an emergency call. The display will alternate with the selected-mode display as long as the radio is unmuted to the emergency call.

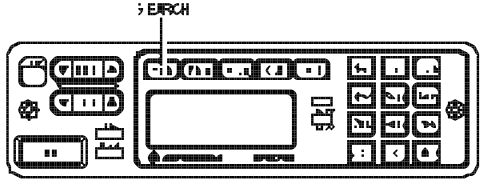
Model C4



Model C5



Model C7



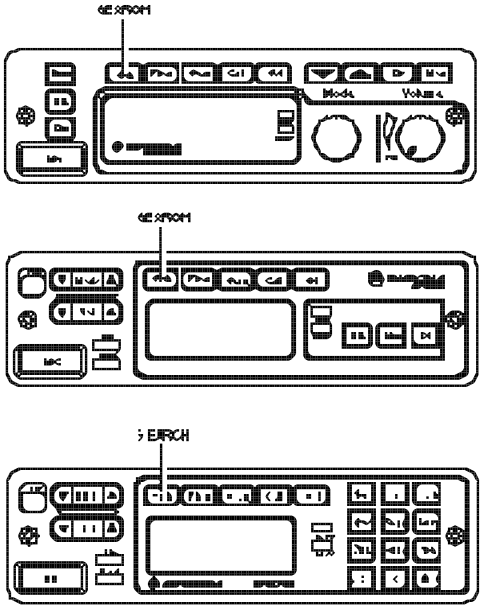
The system search and lock feature allows you to communicate beyond the reach of a single conventional repeater or trunked system. When your vehicle moves out of range of a repeater or system, the radio automatically searches through a predetermined list of alternate repeaters / systems and locks onto one that is in the current coverage area. Periodically, the radio “looks back” for the original system and, when in range, locks onto it.

To Turn On System Search and Lock

Press the **Srch** button momentarily to start the search. The **Search** indicator (below the button) lights solidly if your radio is in the range of the currently selected repeater / system. However, if your radio is outside that range, the **Search** indicator flashes while the radio looks for a repeater / system that is in range. Also, any time the radio is searching for a new repeater / system (or looking back for the original repeater / system), the mode name being looked for is displayed and the **Search** indicator flashes.

When a new repeater / system has been locked onto, the **Search** indicator lights solidly and the new mode name is displayed.

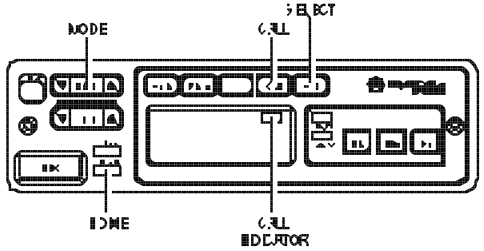
System Search and Lock (C4, C5, and C7 Models Only)



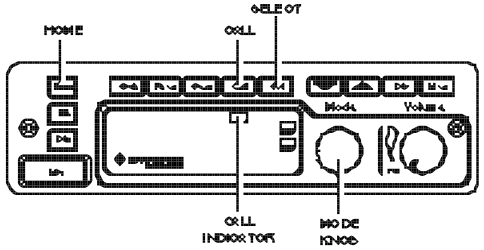
To Manually Force a System Search

Press and hold the **Srch** button to initiate a scan. A beep sounds and the **Search** indicator flashes as the radio looks for a new repeater / system. When a new repeater / system is found, the **Search** indicator lights solidly and the display shows the new mode name.

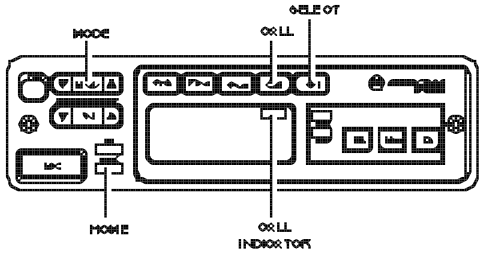
Models C2 / E2



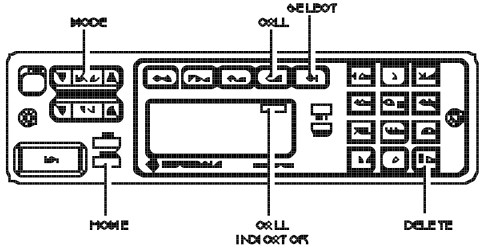
Models C4 / E4



Models C5 / E5

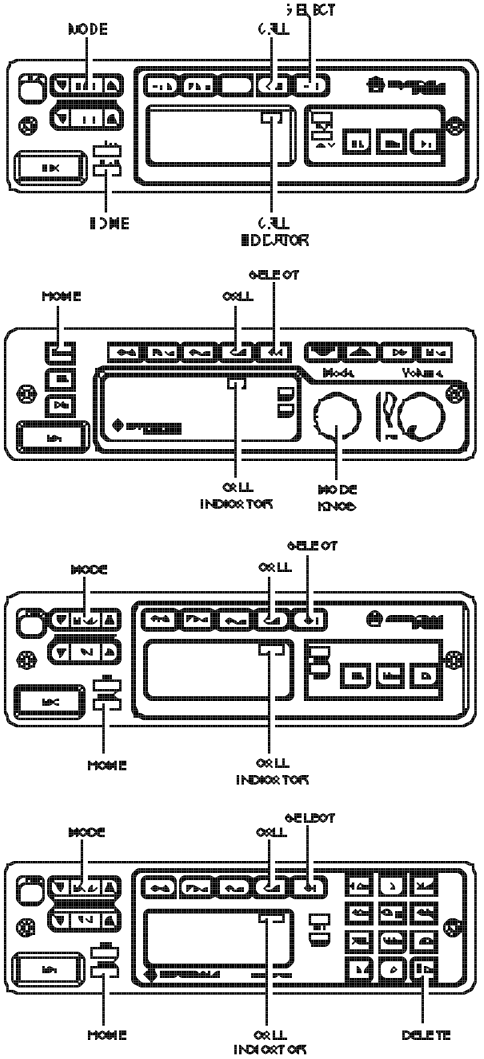


Models C7 / E7



MDC-1200™ selective calling is a set of conventional features that allows the dispatcher, or a mobile radio unit, to communicate with one or more mobile radio units with a certain degree of privacy. The different types of selective calling features currently available are: enhanced select call, automatic select call, and Call Alert.

MDC Selective Calling



Enhanced select call (private call) allows one mobile unit to selectively place a call to one other mobile unit. Group-wide and fleet-wide enhanced select calls are not allowed. This type of selective calling is termed “polite” because the target unit has the option of accepting or cancelling the incoming call.

Automatic select call allows one mobile unit to selectively direct communications to one other mobile unit, or to a group or fleet of mobile units. The target unit(s) automatically unmute to the automatic selective call. This type of selective calling is termed “impolite” because the target unit cannot disregard the incoming call.

Call Alert (also known as “page”) allows one mobile unit to leave its ID with one other mobile unit. Group-wide and fleet-wide Call Alerts are not allowed. Upon receiving the initiating unit’s ID, the target unit will begin sounding alert tones, and its display will indicate that a Call Alert has been received. The target unit will also activate external alarms (horn and / or lights) if they are enabled. The operator can then cancel the display and alarms and retrieve the ID if desired.

To Receive an Enhanced Selective Call

When an enhanced selective call is received from the dispatcher, two alert tones sound and the display shows “***CALL***” for two seconds. To respond to the call, first press the **Call** button, then press the microphone’s PTT button and talk.

To Initiate an Enhanced Selective Call

Select a Unit to Call

1. Press the **Call** button; the **Call** indicator lights. The display shows:

   (If “list only / response only” is enabled) “***THIS ID***,” then shows your unit ID.

   (If “unlimited calling” is enabled) “***SCRTCHPD***,” then shows the last selected unit ID number.

   If an enhanced selective call or Call Alert page has been received, the display shows “***ID RCVD***,” then shows the unit ID of the caller. Units programmed for “response only” can only call “***ID RCVD***.”

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Note:

2. Select a unit to call as follows:

   Select "***ID RCVD***" if you wish to call the person with whom you last had an enhanced selective call, or the person who last Call Alert paged you.

   If "list only" is enabled, use the pre-stored list by turning the **Mode** knob or pressing the **Mode** rocker switch to scroll to the name / ID you wish to call. (You cannot send a call to *"**THIS ID**"*.)

   If "unlimited calling" is enabled, do nothing if you wish to call the presently displayed unit ID; or use the pre-stored list by turning the **Mode** knob or pressing the **Mode** rocker switch to scroll to the name / ID you wish to call; or use "unlimited call" capability by entering a new unit from the keypad.

Place the Call

1. Press the **Sel** button; the display shows "***PLS WAIT***" while the radio is attempting to call the selected unit.

   If the unit you are calling is in service, a telephone-type ringing sounds, and the display shows "***ACK RCVD*** " for two seconds, followed by the ID of the unit you are calling.

   If the called unit *is not in service*, no ringing sounds. After 20 seconds, the display shows "***NO ACK***," and a momentary low-pitched tone sounds. Try again or press the **HOME** button to return to normal radio operation.

   If the called unit *is in service,* but the operator does not answer within 20 seconds, the ringing stops and the display shows "***NO ANSWR***."

2. If the receiving unit answers, identify yourself and begin your enhanced selective call.

3. When the conversation is completed, press the **HOME** button to hang up.

   If you do not press the **HOME** button to hang up, your unit will remain in the enhanced selective call state with the other unit.

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Note:

To Receive an Automatic Selective Call

When an automatic selective call is received from the dispatcher, two alert tones sound, and the display shows "***CALL***" for two seconds. To respond to the call, first press the **Call** button and then press the microphone PTT button and talk.

To Initiate an Automatic Selective Call

Select a Unit to Call

1. Press the **Call** button; the **Call** indicator lights. The display shows:

   (If "list only" is enabled) "***THIS ID***," then shows your unit ID.

   (If "unlimited calling" is enabled) "***SCRTCHPD***," then shows the last selected unit ID number.

   If an automatic selective call or Call Alert page has been received, the display shows "***ID RCVD***," then shows the unit ID of the caller.

2. Select a unit to call as follows:

   Select "***ID RCVD***" if you wish to call the person with whom you last had an automatic selective call or the person who last Call Alert paged you.

   If "list only" is enabled, use the pre-stored list by turning the **Mode** knob or pressing the **Mode** rocker switch to scroll to the name/ID you wish to call. (You cannot send a call to "***THIS ID.***")

   If "unlimited calling" is enabled, do nothing if you wish to call the presently displayed unit ID; or use the pre-stored list by turning the **Mode** knob or pressing the **Mode** rocker switch to scroll to the name/ID you wish to call; or use "unlimited call" capability by entering a new unit from the keypad.

   "***GRP CALL***" and "***FLT CALL***" are available with automatic selective call to allow you to call multiple units at the same time.

Place the Call

1. Press the PTT button.
2. Identify yourself and begin your conversation.
3. When the conversation is completed, press the **HOME** button.

   Until you press the **HOME** button after a conversation has been completed, your unit remains in the automatic selective call state with the other unit(s).

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To Receive a Call Alert

When a Call Alert is received, four alert tones sound and the display alternates between "***CALL***" and the normal radio display until you clear the Call Alert state. If you enabled external alarms before leaving your vehicle, those alarms will engage when the alert is received (see the "Optional External Alarms [Horn and Lights]" section). Press either the microphone's PTT button or the **Call** button to clear the Call Alert state.

To Send a Call Alert

Select a Unit to Call

Select a unit to call by following *Select a Unit to Call* steps 1 and 2 of either the "enhanced selective call" or "automatic selective call" sections, above.

To Place the Call Alert

1. Place the Call Alert in one of three ways:

   With "enhanced selective call" enabled, press the **Sel** button once to send the enhanced selective call; press the **Sel** button again to send the alert.

   With "automatic selective call" enabled, press the **Sel** button once to send the alert.

   With "Call Alert only" enabled, press the **Sel** button once to send the alert.

2. The display will show "***PLS WAIT***" while the radio is attempting to Call Alert the selected unit.

3. *If the called unit responds*, your display will show "***ACK RCVD***," and five alert tones will sound, indicating that the called unit successfully received your Call Alert. After sending a successful alert, your unit automatically exits the Call Alert mode; you need not press the **HOME** button to exit this state.

   If the called unit does not respond after about 20 seconds, your display will show "***NO ACK***," and a momentary low-pitched tone will sound. Try again, or press the **HOME** button to return to normal radio operation.

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To See Your Own ID

1. Press the **Call** button momentarily; the **Call** indicator lights.
2. To see your ID, turn the **Mode** knob or press the **Mode** rocker switch to scroll to the "***THIS ID*** " display, which will alternate with your ID number.

   Your ID can be viewed at any time while in the call state simply by turning the **Mode** knob or pressing the **Mode** rocker switch to scroll to the "***THIS ID***" display.

To Store a Unit ID Number In the List ("Unlimited Calling" Enabled)

1. Press the **Call** button momentarily; the **Call** indicator lights.
2. Turn the **Mode** knob or press the **Mode** rocker switch to scroll to the "***STORE ID***" display.
3. Press the **Sel** button to select the "unit ID store" function.
4. Turn the **Mode** knob or press the **Mode** rocker switch to scroll to the ID you wish to change.
5. Enter the new unit ID number on the keypad.

   If you make an error, press the **Del** button to erase each incorrect digit.
6. When digits of the ID are entered, press the **Sel** button to store the new ID, or press the **HOME** button to store the ID and exit.

   If you turn the **Mode** knob or press the **Mode** rocker switch before pressing the **Sel** button, you will advance to the next number, but will not store the number just entered.
7. Repeat steps 4, 5, and 6 until all desired IDs have been entered. Press the **HOME** button to exit to normal radio operation. You must exit the ID storage function and press the **Call** button again to initiate a call to another unit.

   There is only one list of unit IDs that is shared by all MDC-1200 selective calling features.

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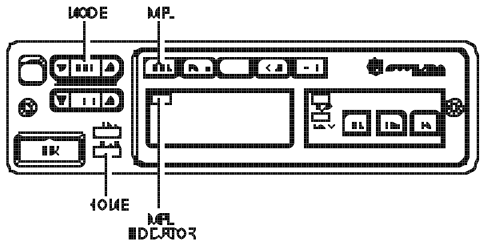
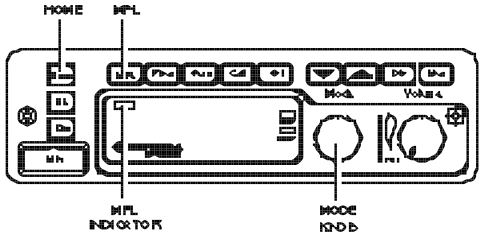
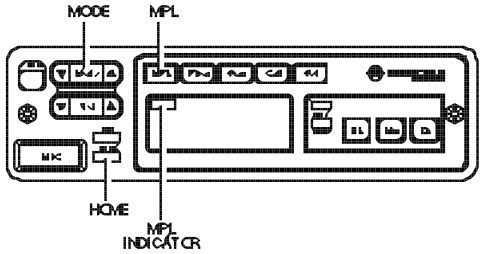
Models C2 / E2



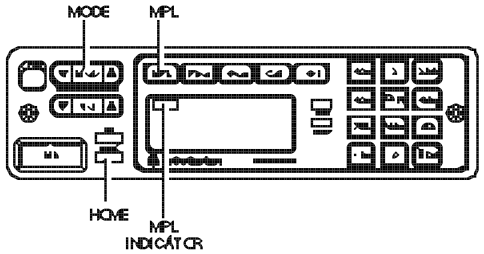
Models C4 / E4



Models C5 / E5

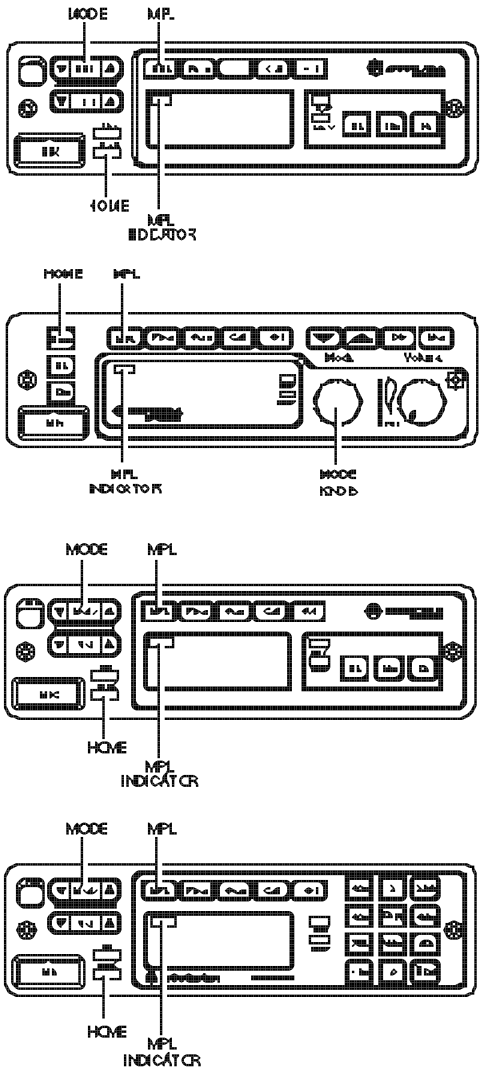


Models C7 / E7



This option adds an **MPL** (multiple coded squelch) button to the control head; this button will enable the operator to override mode-slaved coded squelch. Up to 16 selections are allowed; each selection can be programmed with a user-defined name.

Conventional Operator-Selectable Multiple Coded Squelch



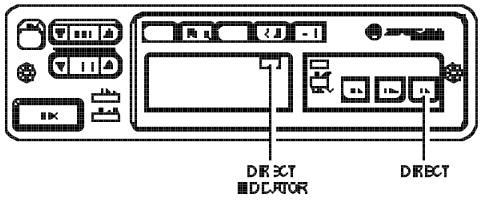
Repeater access and other system uses are enhanced by allowing a single radio to operate on many combinations of operator-selected Private-Line™ (PL), Digital Private-Line™ (DPL), and carrier-squelched systems.

Through programming, this option can be restricted, by mode, to operate on transmit-only or receive-only, or it can be disabled.

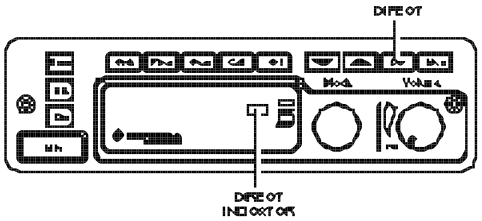
To Activate Multiple Coded Squelch (MPL)

1. Press the **MPL** button; the **MPL** indicator lights and the last operator-selected value is activated and momentarily displayed.
2. To select another squelch scheme, hold the **MPL** button down; a beep sounds and the **MPL** indicator flashes. The radio is now in a “configuration” state.
3. To select a new value, use the **Mode** knob or **Mode** rocker switch to scroll through the selections, or use the keypad (C7 / E7 models) to directly enter the value.
4. Press the **HOME** button. This stores and activates the new selection, and returns the radio to normal operation.

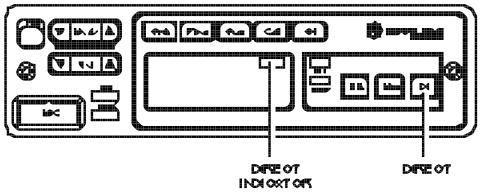
Models C2 / E2



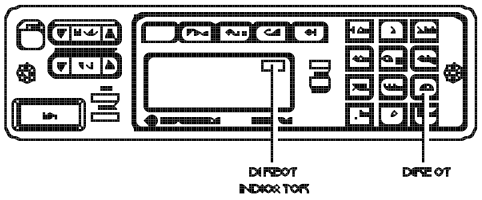
Models C4 / E4



Models C5 / E5



Models C7 / E7

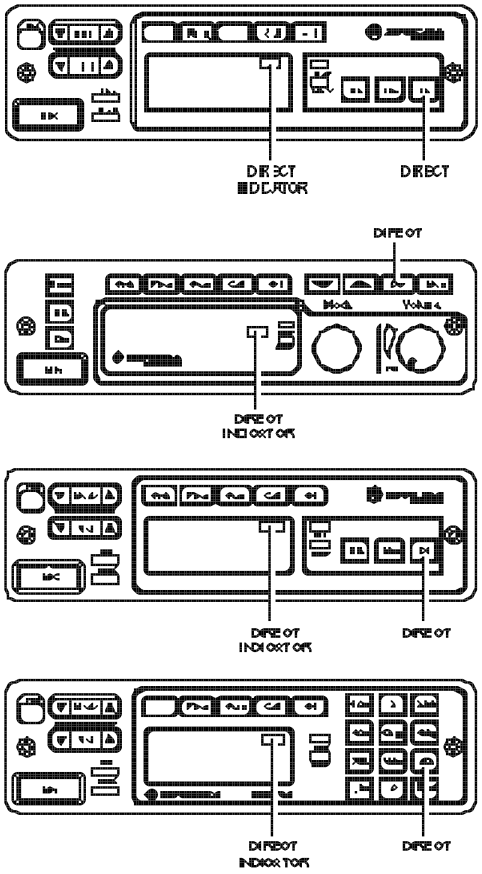


To Talk Direct (Mobile-To-Mobile)

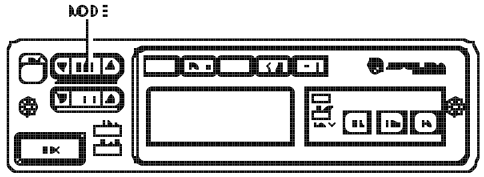
Press the **Dir** button momentarily; the **Dir** indicator lights, indicating that the radio will now transmit directly to another unit without going through the conventional repeater system. This is useful when you are close to other mobiles with whom you wish to talk, or are outside the range of your repeater system.

To return to repeater operation, press the **Dir** button a second time; the **Dir** indicator goes out.

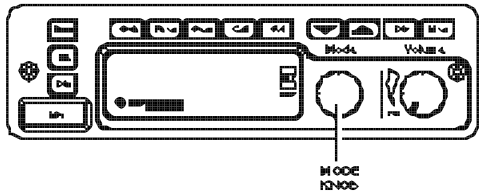
Conventional Talkaround



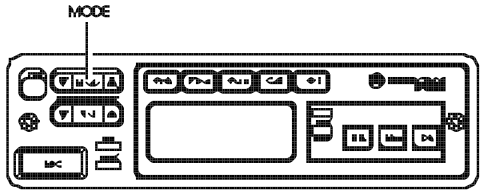
Models C2 / E2



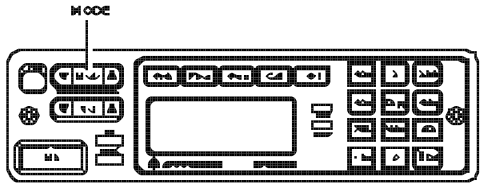
Models C4 / E4



Models C5 / E5

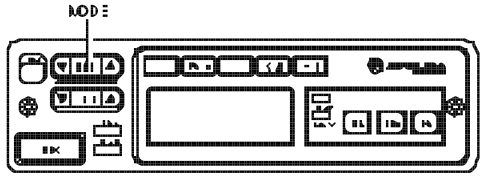


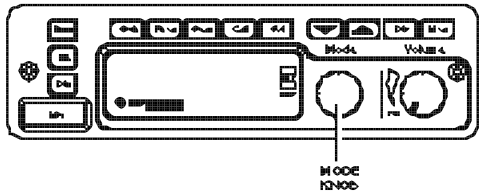
Models C7 / E7

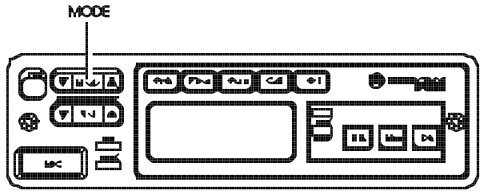


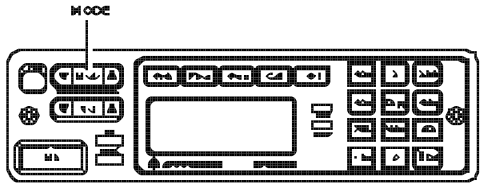
Fleetwide announcement capability allows the user to make announcements to the entire fleet, as well as monitor subfleet calls and other fleetwide announcements.

Trunked Fleetwide Announcement









To Initiate a Fleetwide Announcement

If your radio has been programmed to allow fleetwide announcement calls, turn the **Mode** knob or press the **Mode** rocker switch to scroll to the fleetwide mode.

Press the microphone's PTT button to initiate the announcement. Announcement calls are handled in two different ways, depending on the trunked central controller configuration. The two types are called "ruthless" and "non-ruthless" preemption.

Ruthless Preemption

When this type of announcement call is initiated, the requesting radio begins transmitting immediately. All associated subfleet calls taking place on other channels are immediately halted, and the radios are steered to the announcement call. Transmitting radios will continue to transmit until the PTT button is released, at which time they will also unmute for the announcement call. Individual calls (Private Conversation and telephone interconnect) are not affected.

Non-Ruthless Preemption

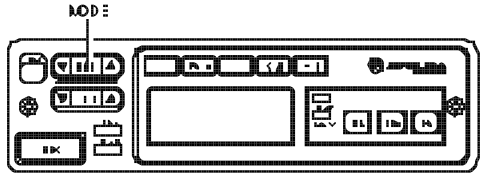
When this type of announcement is initiated, the initiating unit will receive a busy tone, followed by a call back when all associated subfleet conversations end. Once a fleetwide announcement call is pending, any attempts by other users to initiate a subfleet call will result in a busy tone. These users will not receive a call back until the fleetwide announcement call is complete.

Fleetwide Monitoring

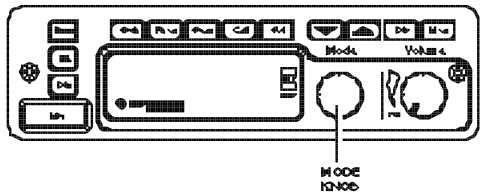
While receiving in the fleetwide mode, subfleet and fleetwide traffic (for that fleet) will be heard on a first-come, first-served basis.

For type II personalities, up to 15 subfleets for each fleet can be monitored. The list of subfleets can be changed by field programming; the default list (as shipped from the factory) will be up to the first 15 subfleets associated with the fleet, including the fleetwide talkgroup (but not dynamic modes).

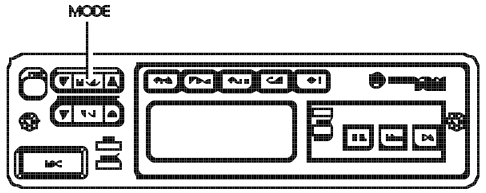
Models C2 / E2



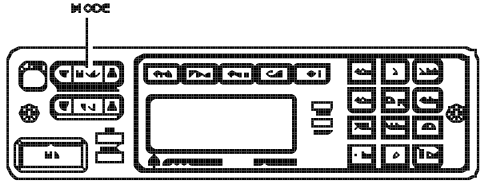
Models C4 / E4



Models C5 / E5

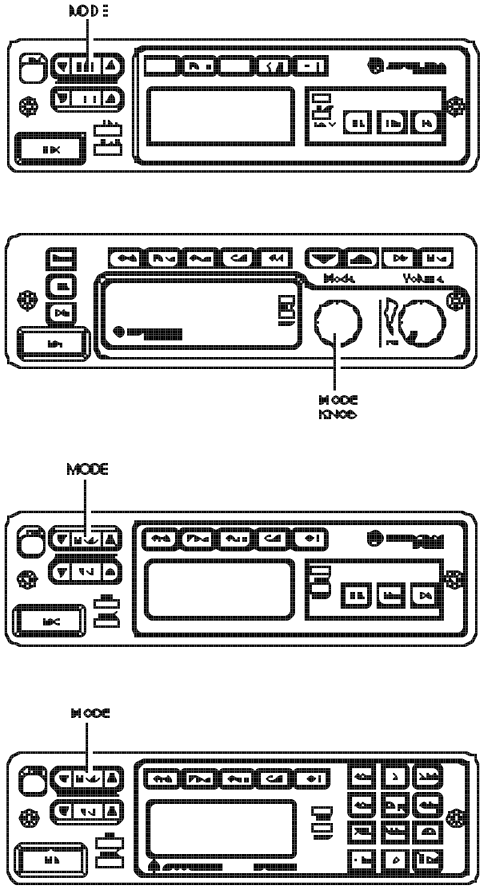


Models C7 / E7



If the trunked system's central controller fails for any reason, the radio goes into "failsoft." In this condition, the radio transmits and receives on a pre-determined frequency in a conventional (although conventional features such as Private-Line are not available), as opposed to trunked, type of operation. Failsoft ensures that you will have communications capability at all times. Radios may be programmed so that units which normally communicate on the same trunked mode will be assigned to the same failsoft repeater frequency.

Failsoft (Trunking Only)



The **Mode** knob or **Mode** rocker switch can be used to change to different repeater frequencies during failsoft in order to communicate with other talkgroups.

The failsoft condition is indicated by a faint beeping tone every ten seconds (radio unsquelched). When the trunking system returns to normal operation, that beeping stops.

Since the normal trunking features do not operate during failsoft, much of the privacy of trunked systems is lost. You will have to share the channel with other users until the failure is corrected.

Press PTT button to talk; release the button to listen.

If a system which is in failsoft is accessed while in scan, the radio freezes scan and remains on the failsoft frequency for a period of six seconds (this time can be changed through field programming). This allows the operator to monitor the failsoft frequency for activity before resuming scanning. On C7 / E7 models, the nuisance-delete feature can be used to temporarily delete the system in failsoft from the scan list, if desired.

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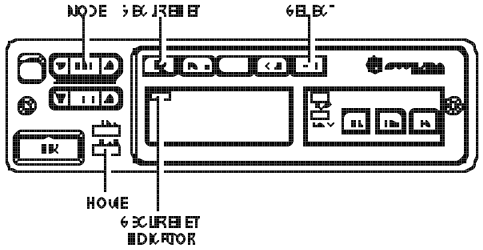
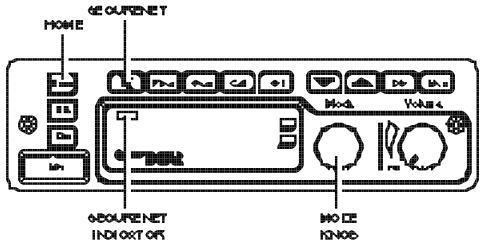
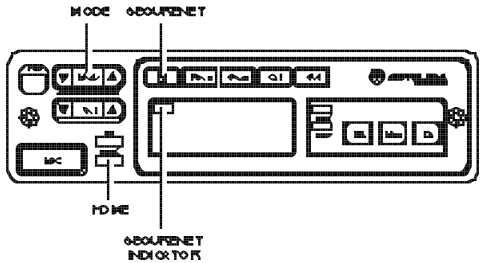
Models C2 / E2



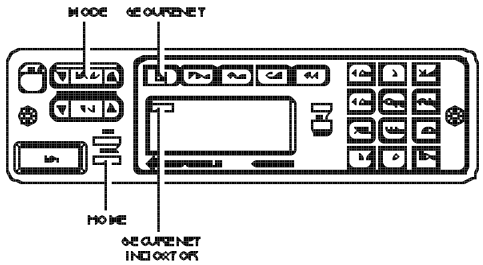
Models C4 / E4



Models C5 / E5



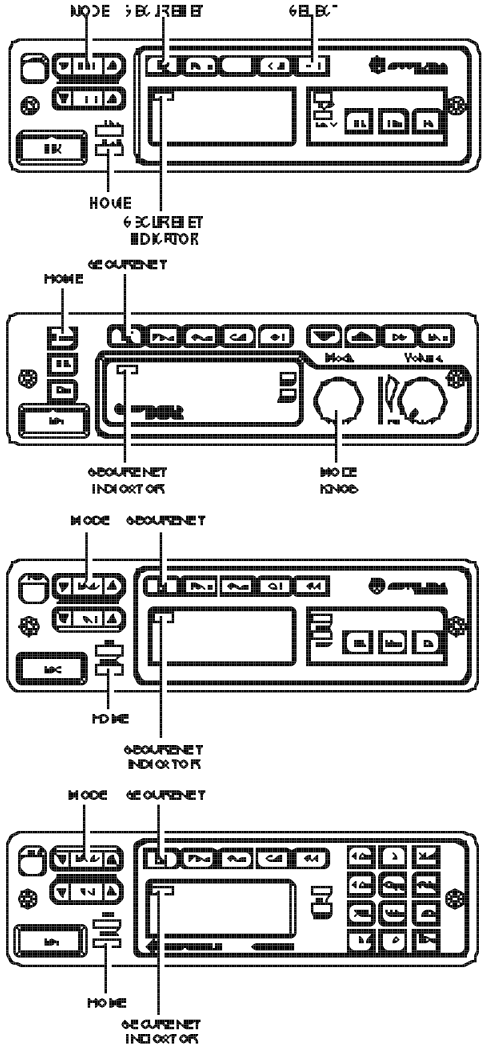
Models C7 / E7



To Receive

1. Select a mode with the **Mode** knob or **Mode** rocker switch. Adjust the volume to a comfortable listening level.

SECURENET™ Operation



2. In conventional modes, when the radio is receiving a private message, the **BUSY** light blinks and the radio unmutes.

   Private messages encrypted with a different key will unmute the radio, but will only produce noise in the speaker (the “proper code” option eliminates this noise). In PL modes and on models equipped with the “proper code” option, you can monitor the channel continuously by removing the microphone from the hang-up box or turning the monitor on. An alert tone can be enabled to sound at the beginning of a clear reception.

   The SECURENET on / off state does not affect received messages. The radio will automatically receive coded or clear messages.

To Transmit

1. Press the button to turn on SECURENET. Some radio modes may have SECURENET automatically set *on* or *off* if the “mode-strapped SECURENET” feature is enabled. The current code is displayed if “dual code” and / or “dual hybrid” has been enabled.

   If private (encrypted) mode is selected, the indicator is *on*. If standard (clear) mode is selected, the indicator is *off*. An alert tone sounds when transmitting in the standard mode.

2. Monitor the mode to be sure it is not in use. Then, press and hold the PTT button to transmit. The **XMIT** indicator lights, and the display shows the current code selected when transmitting in private mode, if “dual code” or “dual hybrid” has been enabled.

3. Hold the microphone about two inches from your lips and speak slowly and clearly. Proceed with your message.

To Select Code Type

The mode-strapped code option must be disabled, and either the “dual code” or the “dual hybrid” option must be enabled, to enter the code configuration state.

1. Press and hold the button to enter the configuration state. A valid-key alert will sound.

2. Use the **Mode** knob or **Mode** rocker switch to scroll through all available codes, and stop on the desired code.

3. Press the **HOME** button to exit the configuration, and save only the changes that may have been made.

Note:

Note:

Key Insertion

Perform the following steps to load an encryption key into your radio system:

1. Turn on the radio and set the volume. The position of the button is not important.
2. Connect the cable from the key variable loader to the microphone connector on the radio.
3. Push the push-to-transfer switch on the side of the key variable loader. When the transfer is complete, a pure tone sounds in the speaker and the message "***PASS***" appears on the inserter's display. If the key transfer was unsuccessful, "***FAIL***" appears on the display and the key variable loader emits a series of short beeps.

Loss Indication

If you press the PTT button while in the private mode with SECURENET on and the encryption hybrid *does not* contain a valid key, bursts of alert tones sound in the speaker until you release the PTT button. The display shows "***NO KEY***" for approximately three seconds after the PTT button is pressed.

Multiple Key Selection (Advanced SECURENET Option Only)

Advanced SECURENET radios are capable of multiple-key operation. Up to 16 keys are possible. A default key, "***DEF KEY***," is included and is associated with the current mode. The keys are strapped to a given mode, or operator-selectable, and may be indexed into groups of keys (for example, 16 keys may be indexed into two groups of eight keys).

To Change the SECURENET Index

1. Press and hold down the button until a beep sounds. If indexing has been enabled, the radio will display the key index that the radio is currently operating with.
2. Use the **Mode** knob or **Mode** rocker switch to scroll to the desired key index.
3. Press the **Sel** button to enter the desired index. The display shows the currently selected key.
4. Press **HOME** to return to normal radio operation.

To Change the SECURENET Keys

1. Press and hold down the button until a beep sounds.

   a. If indexing has been *disabled*, the radio will display the key that the radio is currently operating with. Go directly to step 2.

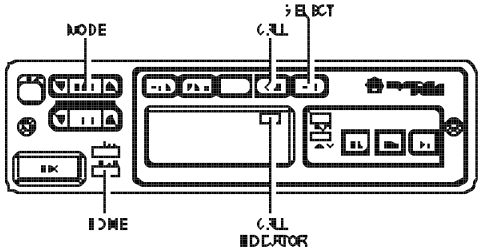
   b. If indexing has been *enabled*, the radio will display the key index that the radio is currently operating with. Use the **Mode** knob or **Mode** rocker switch to scroll to the desired key index; then press the **Sel** button.

2. Use the **Mode** knob or **Mode** rocker switch to scroll to the desired key.

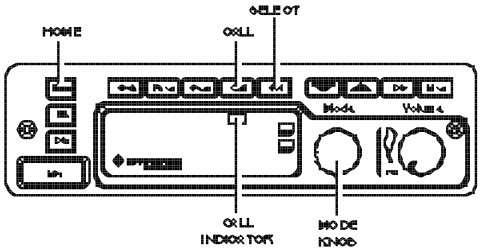
3. Press the **Sel** button to enter the selected key.

4. Press **HOME** to return to normal radio operation.

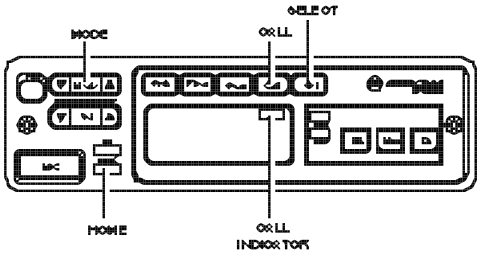
Model C2



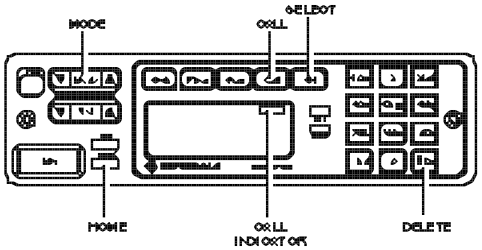
Model C4



Model C5

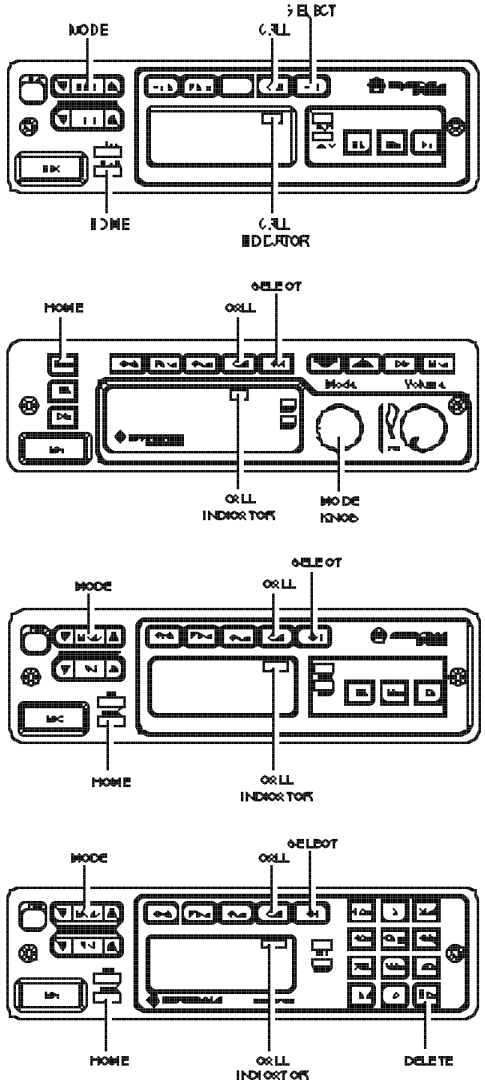


Model C7



Dual-tone, multiple-frequency (DTMF) selective call allows you to direct a conversation to another distinct unit.

Conventional DTMF Selective Call Encode



To Make a DTMF Selective Call From a Pre-Stored List

1. Turn the **Mode** knob (C4 model) or use the **Mode** rocker switch (C2, C5, and C7 models) to scroll to a mode which has DTMF selective call enabled.
2. Press the **Call** button to enter the call mode.
3. Turn the **Mode** knob (C4 model) or use the **Mode** rocker switch (C2, C5, and C7 models) to scroll through the pre-stored list. (If you scroll through the list at a slow enough rate, the ID number alternates with the associated name.)
4. When the ID you want to call is displayed, monitor for channel activity. Press the **Sel** button to call this unit when a channel is free.

   If the called unit does not answer, you may send your unit ID as a "call-back number," which will appear on the called unit's display. If you wish to leave your number, go to step 5; if not, go to step 6.
5. Press the **Sel** button to send your call-back number.
6. Press the **HOME** button to exit the call mode and go back to normal operation.

To Make a DTMF Selective Call From the Scratchpad (Model C7 Only)

1. Use the **Mode** rocker switch to scroll to a mode which has DTMF selective call enabled.
2. Press the **Call** button to enter the call mode. The display will show "***SCRTCHPD***."
3. Use the keypad buttons to enter the unit ID of the mobile radio to be called. The digits entered are shown on the display.
4. When the ID you want to call is displayed, monitor for channel activity. Press the **Sel** button to call this unit when a channel is free.
5. Press the **HOME** button to exit the call mode and go back to normal operation.

Note:

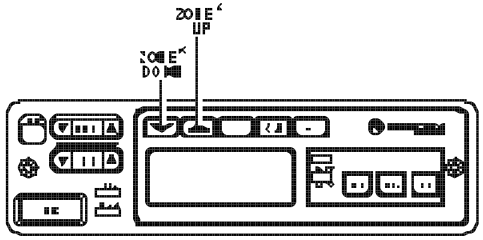
To Make a DTMF Selective Call From the Keypad (Model C7 Only)

1. Use the **Mode** rocker switch to scroll to a mode which has DTMF selective call enabled.
2. Press the **Call** button to enter the call mode.
3. Press the **Mode** rocker switch until the display shows "***KEYPAD***."
4. Monitor for channel activity, then press the appropriate keypad buttons to send out the desired ID. (In this mode, each digit is transmitted as the keypad button is pressed.)
5. If you receive no acknowledgement, press the **Sel** button to send your call-back number, or press the **HOME** button to exit the call mode and go back to normal operation.

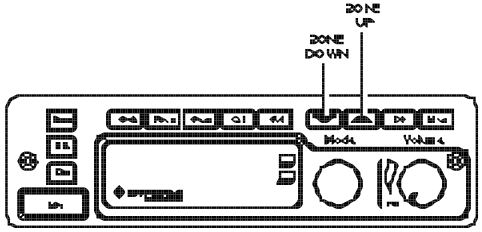
To Store a DTMF Selective Call ID (Model C7 Only)

1. Use the **Mode** rocker switch to scroll to a mode that has DTMF selective call enabled.
2. Press the **Call** button to enter the call mode.
3. Press the **Mode** rocker switch until the display shows "***STORE ID***."
4. Press the **Sel** button to enter the store mode.
5. Press the **Mode** rocker switch to scroll to the unit ID to be changed.
6. Use the keypad to enter the desired ID number. Press **Sel** when the number is complete.
7. Press **HOME** to save this number, exit the call mode, and go back to normal radio operation.

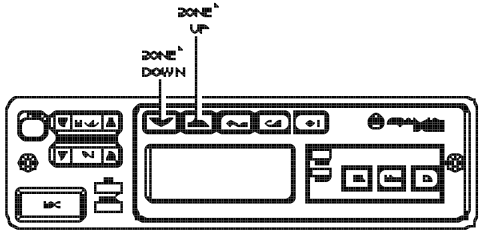
Models C2 / E2



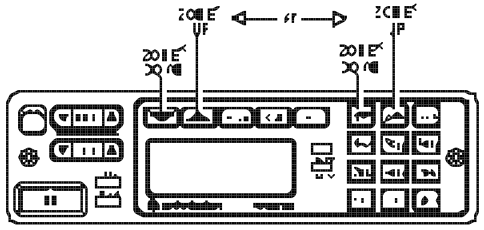
Models C4 / E4



Models C5 / E5



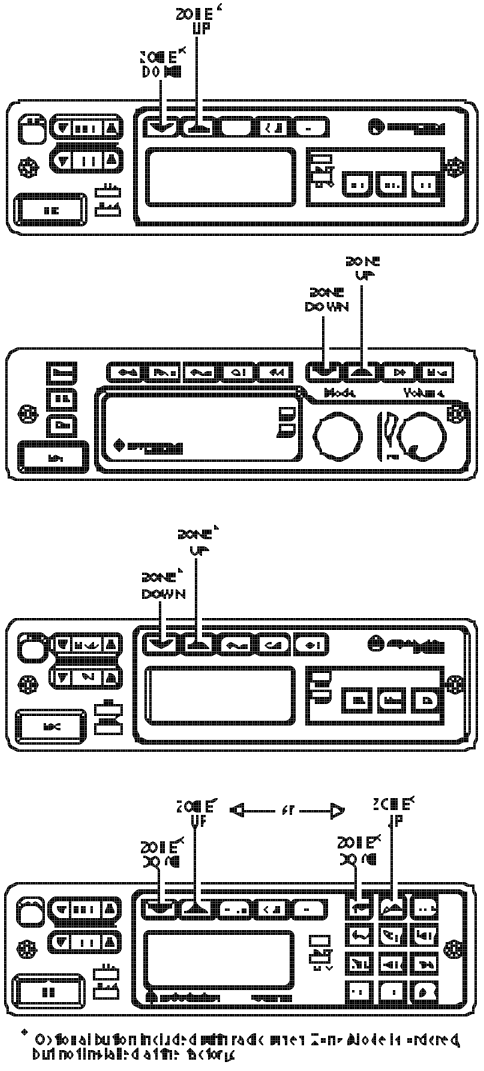
Models C7 / E7



* Optional button included with radio when Zone Mode is ordered, but not installed at the factory.

All radio models can have up to 25 zones. A zone is a grouping of modes. A mode is a group of characteristics such as transmit / receive frequencies, Private-Line™ codes, radio parameters, and an alphanumeric name.

Zone / Mode



* Optional button included with radio when Zone Mode is ordered, but not installed at the factory.

The “zone / mode” option adds a zone up ▲ button and a zone down ▼ button to the C2 / E2, C5 / E5, and C7 / E7 models; these buttons are already in place on the C4 / E4 models.

To Select or Change Zones

To change zones in a radio programmed for zone / mode operation, press the zone up ▲ button or zone down ▼ button.

The radio will always temporarily display the name of the new zone as the zone changes.

The radio can be programmed to temporarily display the current zone’s name when the zone up ▲ or zone down ▼ button is momentarily pressed. If the zone up ▲ or zone down ▼ button is pressed again while the zone name is displayed, the zone will change.

The Spectra radio is factory programmed (default setting) to change zones on ANY press (momentary or continuous) of the zone up ▲ button or zone down ▼ button.

To Select or Change Modes

1. To access a mode within the current zone, turn the **Mode** knob or press the **Mode** rocker switch until the desired mode name is displayed.
2. To access a mode that is not in the current zone, press the zone up ▲ button or zone down ▼ button to move to the zone containing the mode. Then use the **Mode** knob or **Mode** rocker switch to select the desired mode.

Scan Lists in Radios with Zone / Mode

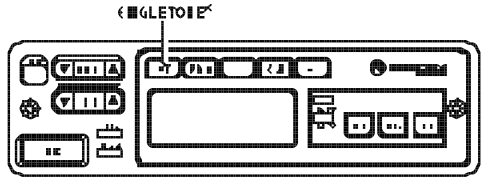
In a radio with zone / mode operation enabled, each zone will have its own scan list. Programming of the scan lists is exactly the same as programming a scan list in a non-zone / mode radio.

To Select the Home Mode

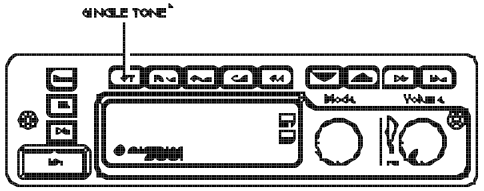
The **HOME** button can be used to select the home mode, contained within the home zone, from any other zone and mode in the radio.

Note:

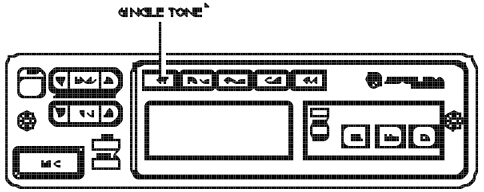
Model C2



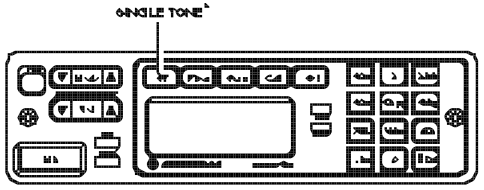
Model C4



Model C5



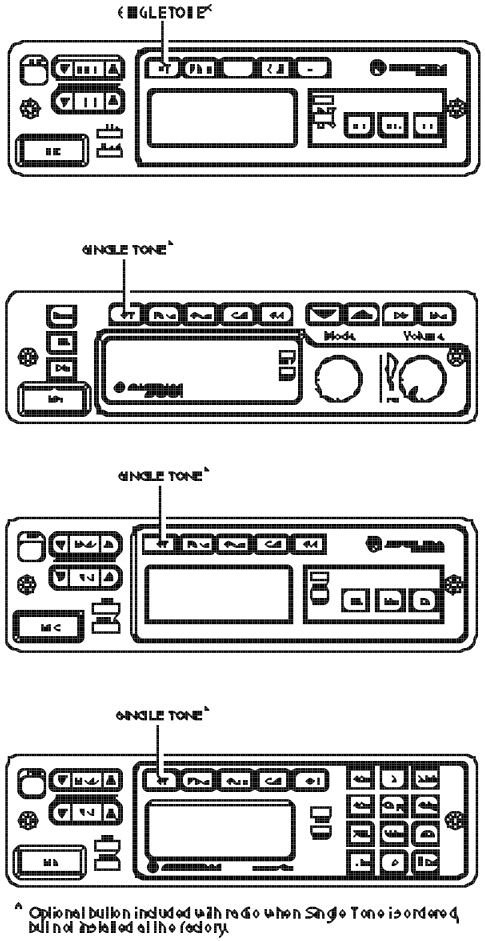
Model C7



^ Optional button included with radio when Single Tone is ordered, but not installed at the factory.

The Single Tone option is a transmit-only feature. Radios with this option enabled will send a Single Tone frequency automatically. This option adds an **ST** (Single Tone) button to the control head. This button will allow the operator to enable or disable the Single Tone option and enter the Single Tone selection mode. Up to 16 selections are allowed; each selection can be programmed with a unique user-defined name.

Conventional Operator-Selectable Single Tone™



* Optional button included with radio when Single Tone is ordered, but not installed at the factory.

Repeater access and other system uses are enhanced by allowing a single radio to operate on many combinations of operator-selected Single Tones.

Through programming, this option can be restricted, by radio, to operate automatically on transmit (only when the user has enabled the Single Tone option), or it can be disabled.

A Single Tone is normally transmitted with a side tone. The side tone is programmable and may be enabled or disabled. When a Single Tone is being transmitted, its (programmable) name is displayed.

To Activate Single Tone (ST)

1. Press the **ST** button; the **ST** indicator lights and the last operator-selected value is activated.
2. To select another Single Tone, hold the **ST** button down; a beep sounds and the **ST** indicator flashes. The radio is now in a “configuration state.”
3. To select a new value, use the **Mode** knob or **Mode** rocker switch to scroll through the selections.
4. Press the **HOME** button. This stores and activates the new selection and returns the radio to normal operation.

   When a transmission is initiated with Single Tone, a short tone burst is sent at the beginning of the transmission.

Note:

The MDC-1200 repeater access controller feature allows selective repeater access in properly equipped systems. Field programming is required for RAC to be operational.

Use the field programmer to assign a repeater ID to each mode.

Each time you press the microphone's PTT button while in a mode that has the RAC enabled, the radio automatically sends repeater access data with the mode-slaved repeater ID. You will hear an alert tone when you press the PTT button. Continue to hold down the PTT button and wait until the tone stops before you begin talking.

Conventional MDC-1200™ Repeater Access Controller (RAC)

Note:

All Spectra models provide a time-out timer function to prevent locking up a repeater or channel by prolonged keying of the transmitter. You may not transmit longer than the preset timer setting; if you attempt to do so, the radio automatically stops your transmission. You will hear a low-pitched, continuous warning tone four seconds before the transmission times-out. As shipped from the factory, this timer is programmed for 60 seconds, but it may be field reprogrammed for 30, 60, 90, 120, 150, 180, or 210 seconds (or be disabled entirely) for each radio mode.

Time-Out Timer

The following are suggestions to assist you in making proper electrical connections to your Spectra radio and troubleshooting possible operating problems.

When connecting the cables to the radio, always plug in the large multi-pin connector first. Otherwise, the radio may begin transmitting an emergency alarm (even if the unit is turned off).

If your radio is "locked up" or the display shows "***FL 01/90***," turn it off and then back on. If this does not correct the condition, check both power line fuses, then turn the radio off and carefully remove and reconnect the cables at the rear of the unit in the sequence specified above.

If radio operation is intermittent, check with others using the system for similar problems before taking the radio in for service. Similar problems would indicate a system malfunction rather than a radio failure.

If symptoms persist or if your unit exhibits other problems, contact service personnel.

Proper Connections and Operating Problem Troubleshooting

CAUTION

The cables which connect to the rear of the radio may have live voltage on some of their pins. Be careful not to short the pins to a grounded surface during installation. A blown fuse could result.

The Spectra radio uses an electrically erasable, programmable read-only memory (EEPROM) device to store information on frequencies, squelch codes, signalling codes, time-out timer durations, and other parameters.

The Spectra radio can be programmed in the field any number of times without ever removing the EEPROM from the radio. To program, an IBM PC®, PC-XT®, or PC-AT® computer is connected to the radio through the rear accessory connector. Once the computer is connected to the radio, the prompts provided by the user-friendly software can be followed.

The following items, available through Worldwide System and Aftermarket Products Division, are required when programming a Spectra radio.

Description	**Type or Part Number**
Computer	IBM PC, PC-XT, or PC-AT
Radio Interface Box (RIB)	0180353A74
Cable—Radio to RIB	3080369B73
Cable—IBM Computer to RIB:	
IBM PC or PC-XT	3080369B71
IBM PC-AT	3080369B72
Software Programming Package (Includes Manual):	
5-1 / 4" Floppy Disk	RVN4001
3-1 / 2" Floppy Disk	RVN4000

Field Programming

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Computer Software Copyrights

Motorola radio communications products are warranted to be free from defects in material and workmanship for a period of ONE (1) YEAR, (except for crystals and channel elements which are warranted for a period of ten [10] years) from the date of shipment. Parts, including crystals and channel elements, will be replaced free of charge for the full warranty period, but the labor to replace defective parts will only be provided for one-hundred-twenty (120) days from the date of shipment. Thereafter, purchaser must pay for the labor involved in repairing the product or replacing the parts at the prevailing rates together with any transportation charges to or from the place where warranty service is provided. This express warranty is extended by Motorola Communications and Electronics, Inc., 1301 E. Algonquin Road, Schaumburg, Illinois 60196, to the original purchaser only, and only to those purchasing for purpose of leasing or solely for commercial, industrial, or governmental use.

THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED WHICH ARE SPECIFICALLY EXCLUDED, INCLUDING WARRANTIES OR MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL MOTOROLA BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES TO THE FULL EXTENT SUCH MAY BE DISCLAIMED BY LAW.

In the event of a defect, malfunction, or failure to conform to specifications established by seller, or if appropriate, to specifications accepted by seller in writing, during the period shown, Motorola, at its option, will either repair or replace the product or refund the purchase price thereof, and such action on the part of Motorola shall be the full extent of Motorola's liability hereunder.

This warranty is void if:

a. the product is used in other than its normal and customary manner;
b. the product has been subject to misuse, accident, neglect, or damage;
c. unauthorized alterations or repairs have been made, or unapproved parts used in the equipment.

This warranty extends only to individual products, batteries are excluded, but carry their own separate limited warranty. Because each radio system is unique, Motorola disclaims liability for range, coverage, or operation of the system as a whole under this warranty except by a separate written agreement signed by an officer of Motorola.

Non-Motorola manufactured products are excluded from this warranty, but subject to the warranty provided by their manufacturers, a copy of which will be supplied to you on specific written request.

In order to obtain performance of this warranty, purchaser must contact its Motorola salesperson or Motorola at the address first above shown, attention Quality Assurance Department.

This warranty applies only within the United States.

Commercial Warranty (Standard)