

LBI-38888C

Operator's Manual

EDACS[®] ORION

MOBILE RADIO



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SAFETY INFORMATION

The operator of any mobile radio should be aware of certain hazards common to the operation of vehicular radio transmissions.

A list of the possible hazards are:

1. Explosive Atmospheres

Just as it is dangerous to fuel a vehicle with the motor running, be sure to turn the radio off while fueling the vehicle. Do Not carry containers of fuel in the trunk of the vehicle when the radio is mounted in the trunk.

2. Interference To Vehicular Electronic Systems

Electronic fuel injection systems, electronic anti-skid breaking systems, electronic cruise control systems, etc., are typical of the types of electronic devices that may malfunction due to the lack of protection from radio frequency energy present when transmitting. If the vehicle contains such equipment, consult the dealer for the make of vehicle and enlist his aid in determining if such electronic circuits perform normally when the radio is transmitting.

3. Dynamite Blasting Caps

Dynamite blasting caps may be caused to explode by operating a radio within 500 feet of the blasting caps. Always obey the "**Turn Off Two Way Radio**" signs posted where dynamite is being used. When transporting blasting caps in your vehicle:

- a. Carry the blasting caps in a closed metal box with a soft lining.
- b. Leave the radio **OFF** whenever the blasting caps are being put into or removed from the vehicle.

4. Radio Frequency Energy

To prevent burns or related physical injury from radio frequency energy, do not operate the transmitter when anyone outside of the vehicle is within two feet of the antenna.

CAUTION

Before jump starting or changing the vehicle battery, it is strongly suggested that the 3A fuse located in the Yellow lead (IGN A+) be removed. This will insure that the radio is protected from damage during the battery charging process. Replace fuse when charging is completed.

INTRODUCTION

This manual describes how to use the EDACS **ORION** Mobile Radio. The **ORION** is a synthesized, microprocessor-based, high performance mobile FM radio providing reliable two-way communications in both the Enhanced Digital Access Communications System (**EDACS**) trunking environment and conventional communication systems.

In the EDACS or trunked system mode, the user selects a communications system and group. In this mode, channel selection is transparent to the user and is controlled via digital communication with the system controller. This provides advanced programmable features and fast access to communication channels.

In the conventional mode, the user selects a channel and directly communicates on that channel. In this mode, a system refers to a set of channels. A channel is a transmit/receive radio frequency pair.

The exact operation of the radio will depend on the operating mode, the radio's programming and the particular radio system. Most features described in this manual may be enabled or disabled through programming. Consult the system administrator for the particular features that are programmed into the **ORION**.

USER INTERFACE

The **ORION** operating controls are located on the radio's front panel (See Figures 1 & 2). A keypad, vacuum florescent display for radio status information and a microphone jack are on the front panel. The front panel also provides a rotary **SYSTEM/GROUP/CHANNEL** knob, **POWER ON-OFF/VOLUME** control, a ramp up/ramp down control, Scan add/delete control, and a SCAN on-off control for scan operation.

The keypad is used for manual number entry for individual calls, access to a telephone interconnect system and activation of various EDACS or conventional features such as menu selection. Each key has an associated LED for status indication.

The display has two lines with eight alphanumeric-characters used to show the operational mode of the radio. There is one LED for indicating transmitter **ON** and one LED to indicate **CHANNEL BUSY** located below the **POWER ON-OFF/VOLUME** Control.

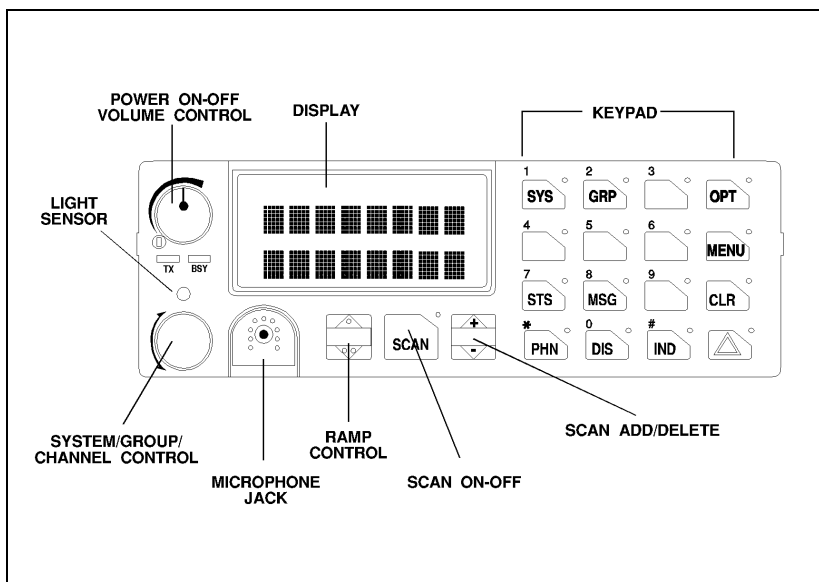


Figure 1 - EDACS ORION Mobile Radio SYSTEM Model Front Panel

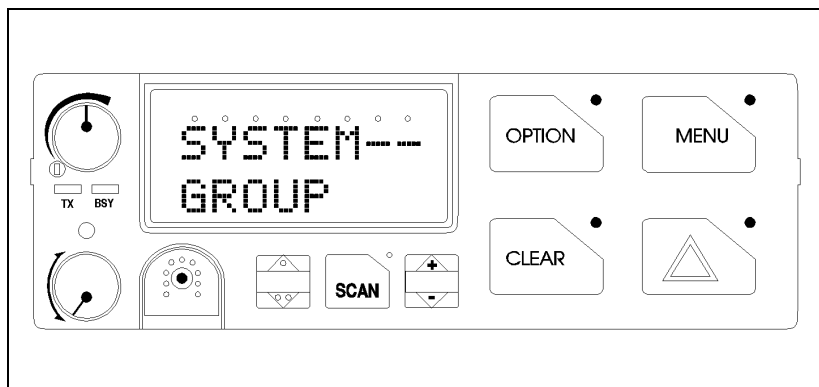


Figure 2 - EDACS ORION Mobile Radio SCAN Model Front Panel

CONTROLS

This section describes the buttons, keys and rotary knobs used to control the Orion Scan and System Model radios. All functions and controls of the Scan radio operate the same as the corresponding functions and controls on the System radio. The Scan radio is equipped with a 4-button keypad and the System radio is equipped with a 16-button keypad.

Many of the control buttons and keys have or can be programmed to have a primary function and a secondary function. The SCAN button can be programmed (as a secondary function) to toggle the keypad keys between their primary function and their secondary function.

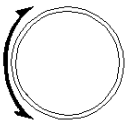
POWER ON-OFF VOLUME KNOB



This rotary Knob applies power to the radio and adjusts the receiver volume. Rotating the control clockwise out of detente applies power to the radio. A single alert tone sounds (if enabled through programming) to indicate the radio is operational.

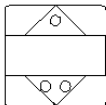
Rotating the control clockwise increases the volume level. Minimum volume levels may be programmed into the radio to prevent missed calls due to allow volume setting. While adjusting the volume, the display will momentarily indicate the volume level (i.e. VOL = 31). The volume range is from a minimum level of zero (displayed as "OFF" in the display) up to 31 which is the loudest level.



System/Group Channel Knob



This rotary knob selects the systems or groups/channels, depending upon programming. This 16 position knob has no stop. See **SYSTEM/GROUP/CHANNEL SELECTION** for more details.

RAMP CONTROL



The primary function of this rocker type button is to scroll through the System list or the Group/Channel list depending upon programming. The secondary function is to increment or decrement items within a list (phone list for example). Press  to scroll in increasing order and press  to scroll in decreasing order. To auto-ramp, press and hold the button.

SCAN ON/OFF



The primary function of this button is to toggle scan operation on and off. When the radio is scanning, the SCAN LED is on and all groups or channels in the scan list of the currently selected systems are scanned.

The secondary function of the SCAN button is to toggle the keypad buttons between their primary function and their secondary function.

SCAN ADD/DELETE



This rocker type button is used to display the current SCAN status for a group/channel and then either add or delete the group/channel from the system scan list.

INDICATORS



Transmitter enabled - ON when the radio is transmitting.



BuSY - On indicates a carrier is being received (the channel is busy). Note that if the selected channel is programmed for Channel Guard (CG), Digital Channel Guard (DCG) or Type 99 (T99) tone decode operation, the radio will not un-squelch if a valid tone or code is not received; the BSY indicator will be on.

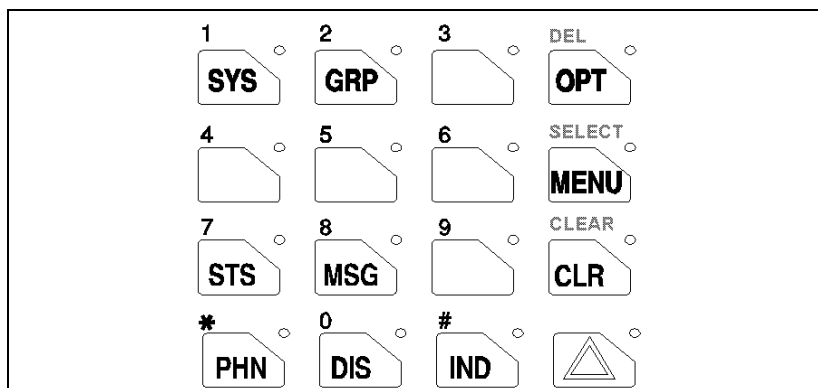


Figure 3 - ORION System Model Keypad

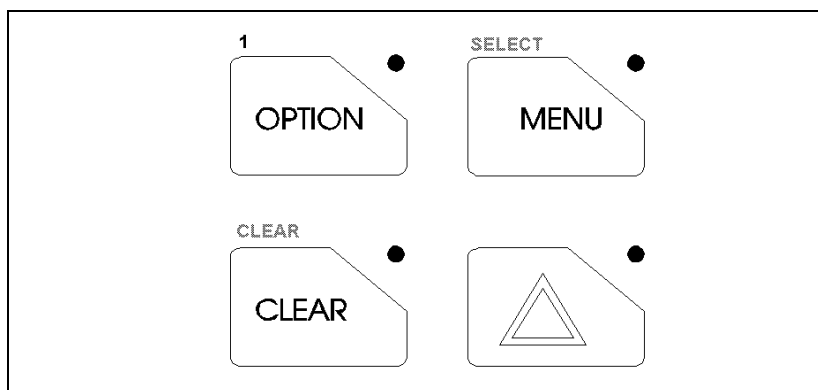


Figure 4 - ORION Scan Model Keypad


KEYPAD

The keypad is similar to a telephone keypad but with four (4) additional buttons on the side for a total of 16 keys. In addition to numbers (1-9, *, 0 and #), which is a secondary function, most of the keys have or can be programmed to have a primary function. A symbol or abbreviated word describing its primary function is labeled on the keycap. Each labeled keycap is associated with a radio feature (or primary function). The radio must be programmed to operate with the Standard or the Optional keypad configuration.

The keypad key functions can be remapped to any of the primary function keys using the PC programming software. It is suggested that the blank keypad (located at the back of this manual) be completed if the keypad key functions are changed.

Standard Keycap Configuration

The Standard keycap package for the System radio includes five (5) labeled keycaps (MODE, HOME, CHN, AUX1 and AUX2) and six (6) blank keycaps, which can be placed on any of the five key locations (numbers 3-6 and 9) shown in Figure 5. The keycap represents the primary function programmed for that key location. See the **Key Description** section for a description of the primary function associated with these five (5) keycaps.

The Standard keycap package for the Scan radio includes five (5) labeled keycaps [MENU, CLEAR, SELECT, EMERGENCY (), OPTION] and five (5) blank keycaps, which can be placed on any of the four (4) keypad keys. The keycap represents the primary function programmed for that key location.

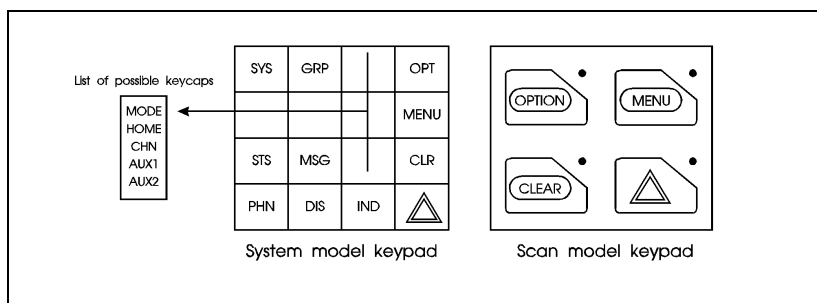


Figure 5 - Standard ORION Keycaps Configuration

Optional Keycap Configuration

The Optional keycap package for the System radio includes sixty (60) additional keycaps (shown in the Key Description section), which can be placed on any key location desired. Keep in mind, the keycap represents the primary function programmed for that key location.

Key Descriptions

- MODE** This key function is used to enter the Conventional System selection mode.
- HOME** This key function returns the radio to the Home System/Group where it is programmed.
- CHN** This key is used to enter the Channel select mode.
- AUX1 & 2** Currently not supported.



This key is used to enter the System select mode.





This key is used to enter the Group select mode.



This key function is used to toggle a PC programmable feature On and Off.



Primary function - accesses the menu list. This is a list of additional features that are not available directly from the keypad. See MENU for details.

Secondary function - activates a selected item within a list. After the menu list is accessed, select a menu item from the list via RAMP control  or  and activate it with this key. Once activated, MENU continues its secondary function for activating a selected parameter setting until the radio returns to its normal receive state. This is similar to an enter key.



The Status key permits the transmission of a pre-programmed status message to an EDACS site.



The Message key permits the transmission of a pre-programmed message to an EDACS site.



Serves several purposes depending on the operating mode. In trunked mode, the CLR button exits the current operation and removes all displays associated with it. The radio and display then return to the group receive state. In Conventional mode, pressing this button unmutes the receiver so activity on the selected channel can be monitored. When pressed and held for approximately 3 seconds, this button toggles conventional channel decoding (Channel Guard, Digital Channel Guard, T99) on and off if programmed for the selected channel.



Used to place telephone calls through the radio by selecting the interconnect special call function. See Telephone Interconnect Calls for details.



Used to adjust the current display intensity and the keypad backlight level.






Used to call individual or make an all-call by selecting the individual call function. See Individual Calls for details.



This key function is used to declare emergencies.

ALM	Toggles the external alarm On/Off. The external alarm is used to indicate the radio is receiving an Individual Call. Press the key once to enable external alarm and press again to disable external alarm.
SG1-SG5	Corresponds to five (5) pre-programmed System/Groups. Pressing a key programmed for SG1 would switch the radio to the pre-programmed System/Group 1. Pressing a key programmed for SG2 would switch the radio to the pre-programmed System/Group 2, etc.
WAIL, YLP, RST, SL1-SL8	The WAIL and YLP (Yelp) keys are designed to control an optional Siren package. The SL1-SL8 (Siren/Light) keys are designed to control an optional Siren/Light package. The RST (Reset) key is used to turn all sirens and lights off.
SPK	This key function is used to toggle the external speaker On/Off.
STO-ST9	The status 0-9 keys are used to send pre-programmed status message to the EDACS site.
PVT	Enables or disables Private Mode for the System/Group displayed. See the PRIVATE OPERATION section.
KEY	Displays the Encrypted Keys. This selects the DISP KEY operation from the menu functions.
GE*	This key function is used in Conventional Mode to send GE-STAR emergency signalling.
PA	This key function enables and disables the Public Address feature.
#	DTMF keypad function.
1-9	Keypad numbers.
*	DTMF Keypad function.

Primary Functions (Quick Access)

The secondary function of the  button is to toggle the keypad buttons between their primary function and their secondary function. When the secondary keypad is active, i.e. entering phone digits for an interconnect call, the  button can be used to toggle the keypad buttons back to their primary function, perform a task (siren/light enable), and then toggle back to finish entering the digits for the phone number. "**PRIMARY**" is displayed when the  button is used to toggle the keypad keys back to their primary func-

tions. This provides quick access to the primary functions of the keypad. This is a programmable feature of the **SCAN** button only. Careful consideration should be given to possible operational conflicts before enabling this feature.

Several keys on the Scan version have sel secondary function. The **MENU** key is the **SELECT** secondary function with the **CLEAR** key remaining the same for the secondary function. On the system version, the **OPT** has a secondary function for **DEL**, **MENU** is **SELECT** and **CLR** retains its **CLEAR** function.

DISPLAY

The radio's display is shown in Figure 6. The two character lines are used to display system, group and channel names and also operational messages to the user. Each line contains eight alphanumeric character blocks. See Figure 2 for a typical display.

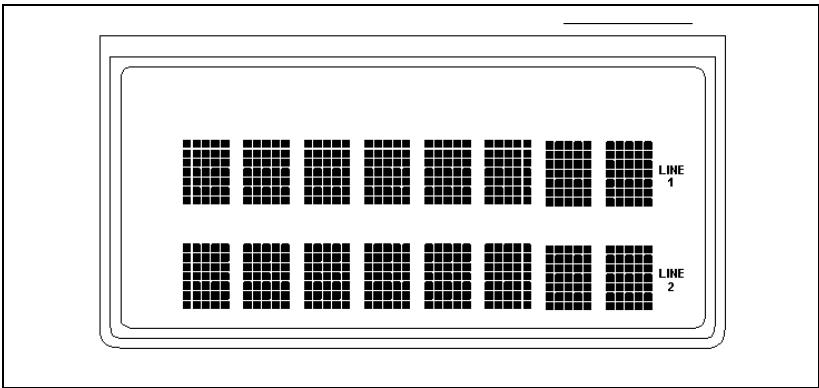


Figure 6 - ORION Display

MESSAGES

During radio operation, various messages are displayed on either line one or line two. Typical messages include control channel status information, such as system busy or call denied, or messages associated with the radio's operation, (i.e. volume adjust). These messages are described as follows:

Message	Name	Description
QUEUED	Call Queued	Trunked mode only. Indicates the system has placed the call in a request queue.
SYS BUSY	System Busy	Trunked mode only. Indicates the system is busy, no channels are currently available, the queue is full or an individual call is being attempted to a radio that is currently transmitting.
DENIED	Call Denied	Trunked mode only. Indicates the radio is not authorized to operate on the selected system.
CC SCAN	Control Channel Scan	Trunked mode only. Indicates the control channel is lost and the radio has entered the Control Channel Scan mode to search for the control channel.
WA SCAN	Wide Area Scan	Trunked mode only. Indicates the control channel is lost and radio has entered the Wide Area Scan mode to search for a new system (if enabled through programming).
TALKARND	Talk-around	Conventional mode only. Indicates the radio is operating on conventional channels in talk-around mode (no repeater).
RXEMER	Receive Emergency	Trunked mode only. Indicates an emergency call is being received. This message will be flashing on line two.
TXEMER	Transmit Emergency	Trunked mode only. Indicates an emergency call has been transmitted. This message will be flashing on line two.
VOL=31	Volume Level	Indicates the current volume level. The volume level display ranges from OFF (silent) to 31 (loudest).
UNKNOWN	Caller's ID Not Received	Indicates that an individual call is being received, but the caller's ID was not received.
TX DATA	Transmit Data	Trunked mode only. Indicates the radio is transmitting a data call.
RX DATA	Receive Data	Trunked mode only. Indicates the radio is receiving a data call. Displayed on line 2.
DATA OFF	Data Off	Trunked mode only. Indicates radio is in the data disabled state. Displayed on line 1.
DATA ON	Data On	Trunked mode only. Indicates radio has been toggled to the data enable state. Displayed for two seconds on line 1 when toggled to enable state.

Message	Name	Description
PA ON	Public Address On	Indicates that the public address function of the radio is enabled.
PA OFF	Public Address Off	Momentary (2 seconds) indicates that public address function of the radio was disabled.
ALRM ON	External Alarm Enabled	Indicates that the external alarm function of the radio is enabled.
ALRM OFF	External Alarm Disabled	Momentary (2 seconds) indicates that external alarm function of radio was disabled.
PVT DIS	Private Mode Disabled	Indicates that private mode is disabled or no encryption key has been programmed for the selected group/channel or special call.
FRCD PVT	Forced Private Operation	Indicates that forced private operation has been pre-programmed into radio.
NO KEY #	Encryption Key Missing	Flashing indicator indicates that no encryption key or an incorrect encryption key is programmed into the radio.
BCKL=1-6	Backlight	Display intensity and keypad back light level.
GR	Group ID	This indicates that the call is a group call and is followed by the GID of the caller (trunked mode only).
ID	Individual ID	This indicates the call is an individual call and the ID number of the caller, example "ID 2725" (trunked mode only).
WHC=1	Who Has Called	This display indicates the number from the <i>Who Has Called</i> list. Individual calls received but not responded to are stored in a <i>Who Has Called</i> list. This list is accessible by pressing the # key and then the INDV key after the Individual call has timed out or the Clear button is pressed. This display is on line 2 and the LID of the caller is displayed on the top line. Currently the list is not implemented and the display will always be WHC=1.
PHONE	Phone Call	Displayed when a phone call is received from the site. It is displayed in line one of the display. Line 2 of the display will contain the display *INDV* when line 1 contains this message. The radio interprets a received phone call as an individual call.
CONV FS	Conventional Failsoft	Displayed when a failure of the EDACS system occurs. All communication will be in conventional mode (trunked mode only).

Message	Name	Description
MENU		Displayed when the menu key is pressed and remains displayed in line 1 until one chooses a menu item.
SYS=1-64	System = 1 - 64	This is the system number for the current base station of the system displayed in line 1. It is displayed in line 2 of the display. Press the system key to obtain this display.
GRP=1-64	Group = 1 - 64	This is the group number of the group displayed in line 2 of display. It is displayed in line 1 of the display. Press the group key to obtain this display. There are up to 48 groups available (i.e. 3 banks of 16). The maximum groups programmed in a radio is determined by the personality.
INDV=1-99	Individual = 1 - 99	This display indicates which item in the individual call list is being displayed. It is displayed in line 2 of the display. The name or ID of the item in the list is displayed in line 1 of the display.
PHN=1-99	Phone = 1 - 99	This display indicates which item in the phone list is being displayed. It is displayed in line 2 of the display. Line 1 of the display will be the last 3 characters of the list item contents.
SEL PHN	Select Phone	After pressing the PHN key, selecting an entry from the phone list by typing the entry number will display this message on Line 1.
SEL INDV	Select Individual ID	This is displayed on line 1 when an entry from the individual ID list is selected after pressing the INDV key. The entry is a number between 1 and 32 inclusive (trunked mode only).
SYS ALL	System All Call	Displayed on line 1 to indicate a system all call has been received (trunked mode only).
Ggg-v.vv	Code Group and Revision Number	This is code group and revision number that is displayed in line 2 when menu item "REVISION" is selected. The 'gg' is the group number of the software. The first 'v' is the hardware version. The last two, 'vv', is the revision of the software.
PHONE	Phone Call	This is displayed when an initiated phone call is in progress. This is displayed on line 2 of the display.
DUAL	Dual Control Operation	Displayed on idle control unit when configured as dual control operation.

Message	Name	Description
DUAL	Dual Control Mode	Indicate that the Control Unit is the idle controller in a dual contro with System. Displayed on line 1.
N0 ENTRY		This indicates that there is no data stored in one of the programmable items in either the phone list or individual call list. The user programmable items are items 1 through 10 in each list.
INV SYS	Invalid System	Displayed when the current system is an invalid type.
CHN=1-99	Channel = 1 - 99	This is displayed on line 1 of the display is conventional channel index when the group key is depressed.
FIX LIST	Fixed List	Priority scan list is fixed and cannot be changed using add and delete keys.
FIXED P1	Fixed Priority 1	Priority 1 scan channel is fixed and cannot be changed using add and delete keys.
1993 EGE		This is displayed in line 2 when the message "COPYRIGHT" is displayed in line 1 of the display while displaying different items under menu when 'REVISION' is selected by the operator.
EM	Emergency	This indicates an emergency has been declared by the LID that follows the display, 'EM'. An example of this is "EM 01201".
INDV	Individual Call	This is displayed in line 2 of the display when an individual call is in progress (trunked mode and T99 mode only).
GROUP	Group Call	This indicates a group call is in progress and is displayed on line 1 of the display (trunked mode and T99 mode only).
SPKR ON	External Speaker On	This is displayed when the external speaker is enabled.
SPKR OFF	External Speaker Off	This is displayed when the external speaker is disabled.
BANK=1-8		This is the bank of keys which are going to be loaded when the key loader loads encryption keys. This is only valid for radios which support VGS, VGE, or DES encryption. It is displayed on line 2 of the display when the encryption key loader is connected.
REGR_0x	Dynamic Regroup	Indicates which group in dynamic regroup operation has been enabled where "x" is a digit of 1 to 8 (trunked mode only).

Message	Name	Description
KEY LOAD		This is displayed in line 1 of the display when the encryption key loader is connected.
KEY ZERO		This is displayed on line 2 of the display when the operator depresses the reset and option buttons simultaneously for approximately two seconds. The encryption keys are zeroed.
SYS KEY	System Key	This is displayed on line 1 of the display in the display key mode of the menu. The key of the key name display is displayed in line 2.
GRP KEY	Group Key	This is displayed on line 1 of the display in the display key mode of the menu for trunked systems only. It is followed in the second line with a key number 'KEY = <1..7>'.
CHN KEY	Channel Key	This is displayed on line 1 of the display in the display key mode of the menu for conventional systems only. It is followed in the second line with a key number 'KEY = <1..7>'.
KEY=1-7		This is displayed on line 2 of the display in the display key mode of the menu for conventional when 'SYS KEY' or 'CHN KEY' are displayed in line 1 and for trunked when 'SYS KEY' or 'GRP KEY' are displayed in line 1.
PRIMARY		This is displayed on line 1 of the display when primary keys are enabled.
PRS NAME	Personality Name	This is displayed in line 1 of the display under the revision selection of menu. The personality name is displayed on line 2 at the same time.
COPYRGHT		This is displayed on line 1 of the display under the revision selection of menu. The copyright year is shown in line 2 of display at the same time.

ALERT TONES

The ORION radio also provides audible alert tones or "beeps" to indicate the various operating conditions. These alert tones can be enabled or disabled through programming.

CALL ORIGINATE

A short mid-pitched alert tone sounds after keying the radio (Push-To-Talk button is pressed). This indicates the radio has been assigned a working channel or that the radio is transmitting on a conventional channel and voice communication may begin immediately. In conventional mode, this tone may be delayed after the PTT button is pressed due to GE-STAR signaling (if enabled through programming).

AUTOKEY (TRUNKED MODE ONLY)

After being placed in queue or releasing the PTT button prior to a working channel assignment, the site calls the radio when a channel becomes available. At this point, the radio automatically keys the transmitter (autokey) for a short period to hold the channel. The radio sounds a mid-pitched tone when it is clear to talk; immediately press the PTT button to keep the assigned channel.

CALL QUEUED (TRUNKED MODE ONLY)

A high-pitched tone after pressing the PTT button indicates the system has placed the call request in the queue. The receiving unit(s) also hear the tones, indicating they will receive a call shortly. If the PTT button is released, the radio will autokey whenever a channel becomes available (see Autokey).

SYSTEM BUSY (TRUNKED MODE ONLY)

Three low-pitched beeps will be heard if the radio is keyed when the system is busy, if no channels are available for sending the message, if the call queue is full, or if an individual call is being attempted to a radio that is transmitting. Releasing the PTT button and rekeying initiates a new channel request.

CALL DENIED (TRUNKED MODE ONLY)

If the radio is keyed and a low pitched tone is heard then the radio is not authorized on the system that has been selected.

CARRIER CONTROL TIMER

If the programmed time for continuous transmission is exceeded, five short high-pitched warning tones followed by a long low-pitched tone will be heard. The transmitter will shut down shortly after hearing the alert, interrupting communications. Release and re-key the PTT button to maintain communications. This will reset the carrier control timer and turn the transmitter back on.

KEY PRESS ALERT

A short tone or "beep" sounds to indicate a key has been pressed. A short low-pitched tone indicates no action was taken because the key is not active in the current mode.

DUAL CONTROL SWITCHING

When control is switched to a previously idle control unit, two short high-pitched tones will sound at the control unit where PTT was pressed, that is now the active controller.






OPERATION

TURNING ON THE RADIO


Rotate the **POWER ON-OFF/VOLUME** knob clockwise, out of detente to turn the radio on. A short beep (if enabled through programming) indicates the radio is ready for operation. The display indicates, if programmed, the last selected system name on line one and the last selected group or channel name on line two.

In the EDACS trunked environment, if communication with the system's control channel cannot be established, the **CC SCAN** message will be displayed. This may occur if, for example, the radio is out of range of the trunking site. It may be necessary to move to another location or select another trunking system to re-establish the control channel link for trunked mode operations.

SELECTION MODE RULES

Many operations require selection from a list such as system, group or phone number. This selection process is handled in the same manner for all lists. The RAMP control  and , , 0-9, *, #, the  button and the  button are used during the selection process. The following example systems list is used to explain the process:

NOTE

The hookswitch functions the same as the  key in I-Call, phone call, and menu modes.


The following example systems list is used to explain the process:

<u>SYSTEM</u>	
1	NORTH
2	SOUTH
3	EAST
4	WEST

After entering a selection mode, the following generic display format will appear.

X X X X X X X X

Y Y Y = Z Z Z

Line one shows the currently selected item name (XXXXXXXXX) from the list. Line two indicates the list (YYY) that the selection is to be made from and the number of the selected item (ZZZ) within the list. (In some cases the information on lines 1 and 2 will be exchanged. Enter the system selection mode by pressing the  key. If SYSTEM 2 is the current selection, the display appears as follows:

S O U T H

S Y S = 2

Line one contains the current system name, SOUTH, and line two, SYS = 2, indicates that selection is from the system list and it is the second system within the list.

A new system from the list is selected by using the RAMP control \triangle or ∇ or by directly entering the system number with the numeric keys. The RAMP control \triangle or ∇ scrolls through the list in increasing and decreasing order. In the previous example, pressing the RAMP control \triangle selects the EAST system as shown in the next display.

E A S T
S Y S = 3

The radio may be programmed to wrap around from one end of a list to the other end or to stop at the ends.

DIRECT ACCESS

To directly access a selection, enter the corresponding number (i.e. 4) followed by $\boxed{\text{MENU}}$ to activate the selection. The entered number is displayed on line two as shown below. Line one shows the current list being used for selection.

S E L S Y S
4






If a mistake is made while entering the number, press the $\boxed{\text{OPT}}$ button to back-space once and correct the entry. If an invalid number is entered, a short low-pitched tone sounds when $\boxed{\text{MENU}}$ is pressed.




To exit the selection mode, press the $\boxed{\text{CLR}}$ button or wait for the time-out. If the selection mode is cleared while an entry is pending (i.e., numbers are entered on line 2, but $\boxed{\text{MENU}}$ has not been pressed), the entry on line two will be disregarded and the previous selection will remain active. If the time-out activates while an entry is pending, the entry on line two will be selected if it is within the valid range; if it is out of range, the entry on line two will be disregarded and the previous selection will remain active.

NOTE: While in system, group or channel selection mode, the radio continues to receive calls normally and continues scanning if it is enabled. If a call is received during the selection mode process the radio will return to the nor-

mal receive mode display. Continuing with the selection process will return the display to the same point in the selection process if the selection mode time out has not yet expired. Any press of the PTT button during the selection mode process will initiate transmission and exit the selection mode.

MENU

The menu function accesses features that are not available directly from the keypad. The order and specific number of menu items available is configurable through programming. Upon radio power up, the menu item that is at the beginning of the menu list will always be displayed first. Subsequent access to the menu function will return the last menu item that was shown in the display. To enter the menu mode, press . The RAMP control  and , the  and the  buttons are used during the selection process. All of the selection mode rules previously detailed apply to the menu item selection process with the exception of direct access. The radio will continue to receive and transmit normally while in the menu function.

A new item is displayed by using the RAMP control  and  to scroll through the list in increasing and decreasing order. The displayed menu item is made active by pressing .

After entering the menu selection mode, the following generic display format will appear.



M E N U

Y Y Y Y Y Y Y Y

Line one indicates the radio is in the menu selection mode. Line two indicates the menu item (YYYYYYYYYY) that is to be viewed or changed (some menu items provide radio information and do not have changeable parameters).


An example of the menu item selection process and menu item parameter change is detailed below for the backlight menu item.

PRESS: 
The menu mode is entered.

PRESS: The RAMP control  and  until the display shows:

M E N U

B C K L G H T

PRESS: 

The backlight menu item is activated and the display will be similar to the following:

B C K = X X X

Y Y Y Y Y Y Y Y

Line one shows the active menu item and its current parameter setting (XXX). Line two shows the currently selected system or group name (YYYYYYYYY).






The menu item’s parameter setting shown in the display can now be changed by using the RAMP control  and  to scroll through the list of parameter values. Once the desired setting is reached press  to store the value and return the normal display. For menu items that display radio information pressing  and  will scroll through a list of informational displays. The menu items are listed Table 1.

TABLE 1 - MENU ITEM INFORMATION







FEATURE	DISPLAY	PARAMETER SETTINGS	COMMENT
Backlight Adjust	Menu Item: BCKLIGHT Once selected: BCKL=	OFF, 1, 2, 3, 4	Selects the light level for backlighting.
Radio Revision Information	Menu item: REVISION	Informational displays only (see radio); no user selectable settings.	Selects the information display to view.



TABLE 1 - MENU ITEM INFORMATION

FEATURE	DISPLAY	PARAMETER SETTINGS	COMMENT
PHONE CALL	Menu item: PHN CALL Once selected: See Telephone Interconnect Call Section		Allows access to the Phone Call Feature.
Individual Call (Trunked Systems Only)	Menu Item: IND CALL Once Selected: See Individual Call Section		Allows access to the Individual Call Feature.
External Alarm	Menu Item: EXTALARM Once Selected: EXTALARM	ON, OFF	EXTALARM replaces the system name on the display as long as the external alarm feature is enabled.
PUBLIC ADDRESS	Menu item: PUB ADDR Once selected: PA ON or PA OFF	ON, OFF	Public Address is toggled on and off.
EXTERNAL SPEAKER	Menu item: EXT SPKR Once selected: SPKR ON or SPKR OFF	ON, OFF	External Speaker is toggled on and off.
Encryption Key Loading	Menu item: KEYLOAD Once selected: KEY LOAD BANK = N	Up to 8 banks of 7 keys	Enables the radio to accept the loading of encryption keys.
Display Current Encryption Key(s)	Menu item: DISP KEY Once selected: SYS KEY, GRP KEY or CHN KEY and KEY = N		Displays current encryption key number.
Front Panel Squelch Adjust (Conventional Only)	Menu item: SQUELCH Once selected: SQLCH=xx	1-16	Allows setting of squelch.

SYSTEM/GROUP/CHANNEL SELECTION

In the following description of **SYSTEM/GROUP/CHANNEL SELECTION**, the term group is used for both group and channel.





The **ORION SYSTEM/GROUP/CHANNEL** knob and the RAMP control  ,  pair are programmable for maximum flexibility. If the SYSTEM/GROUP/CHANNEL knob is assigned to select groups, then the RAMP control  ,  is assigned to select systems. If the SYSTEM/GROUP/CHANNEL knob is assigned to select systems, then the RAMP control  ,  keys are assigned to select groups. System, group and channel selection is the primary function for these controls.




Either systems or groups can also be selected by entering the select mode and following the selection mode rules described earlier. The system select or group select modes are entered by pressing SYS or GRP, respectively, from the standard receive mode. Using the RAMP control  ,  after entering a particular selection mode in this manner is the secondary function of these keys.

System Selection

Several methods, some of which depend on programming, can be used to select a new system. These procedures are presumed to be starting from the normal receive display.

METHOD 1 If system selection is programmed to the SYSTEM/GROUP/ CHANNEL knob, select a system by turning the SYSTEM/ GROUP/CHANNEL knob to the desired system position. The display registers the new system name on line one. If the wrap option is off and the knob is moved to a position greater than the number of programmed systems, the highest programmed system will remain selected.





METHOD 2 If system selection is programmed as the primary function of the RAMP control  and  , select a system by pressing  or  to scroll through the system list. The display registers the new system name on line one.


METHOD 3 Press  to enter the system select mode and follow the selection mode rules detailed earlier. Presses of the RAMP control  or  will now scroll through the systems.

Group And Channel Selection

Several methods, some of which depend on programming, can be used to select a new group or channel. These procedures are presumed to be starting from the normal receive display.

METHOD 1 If group selection is programmed to the SYSTEM/GROUP/CHANNEL knob, select a group by turning the SYSTEM/GROUP/CHANNEL knob to the desired group. The display registers the new group name on line two. If the wrap option is off and the knob is moved to a position greater than the number of programmed groups, the highest programmed group will remain selected.

METHOD 2 If group selection is programmed as the primary function of the RAMP control  and , selects a group by pressing  or , to scroll through the group list. The display registers the new group name on line two.

METHOD 3 Press  to enter the group select mode and follow the selection mode rules detailed earlier. Presses of the RAMP control will now scroll through different groups.

TRUNKED MODE OPERATION

Digital trunking provides fast communication access at all times, even during busy hours. In this mode the operator selects a communications system and group and the audio communication or working channel (WC) is allocated through digital signaling with the site.

Receiving A Call

1. Turn on the radio by rotating the POWER ON-OFF/VOLUME knob clockwise (out of detente). A short alert signal (if enabled through programming) indicates the radio is ready to use.
2. The display shows the last selected or the power up (depending on programming) system and group names. If the radio is unable to obtain a control channel, line two shows **CC SCAN**.
3. Adjust the POWER ON-OFF/VOLUME knob to the desired volume level.

4. Select the desired system and group. The display indicates the current system and group names.
5. The radio is now ready to receive calls.
6. When the radio receives a group call, it unmutes on the assigned working channel and **BSY** indicator comes on. Line one shows GR followed by the logical ID number (if received) of the unit sending the message, or the associated name if the ID number is found in the individual call list.

Sending A Call

1. Turn on the radio and set the POWER ON-OFF/VOLUME knob to the desired volume level. Select the desired system and group.
2. Press and hold the PTT button. The radio will display the system and group names and perform the necessary signaling required to obtain a communication channel.
3. When the working channel is assigned, **TX** and **BSY** indicators are turned on and a short beep sounds indicating that communication can begin. (**NOTE:** If two or more tones, or a high pitched tone is heard, the system may be busy and the call request has been placed in queue or the request has been denied for some reason. Refer to the ALERT TONES section for more details).
4. Hold the microphone approximately three inches from the mouth and speak in a normal voice.
5. Release the PTT button when the transmission is complete and listen for a reply.

Conventional Failsoft

In the unlikely event of a failure of the EDACS System, communications may take place in conventional failsoft mode. The radio will be automatically directed to a communications channel set up for this purpose. During this mode of operation, the control unit will display "**CONV FS**" in the alphanumeric display. An increase in activity on the channel during conventional failsoft operation may be noticed, so be careful not to transmit until the channel is clear.

Operation during conventional failsoft will be the same as operation on a conventional system, except that it will not be possible to select a communications channel, or use emergency and special call. When trunking is restored, the radio will automatically be returned to normal operation.

NOTE

Emergency and Special Call are not operational during conventional failsoft. Also, the **GROUP** control will not operate.

Emergency Operation


The radio's ability to declare an emergency, clear an emergency, remain locked on an emergency and group, and the emergency audio and display freeze can each be enabled or disabled through programming. When an emergency is declared scanning will stop and restarts only after the emergency has been cleared.



Receiving An Emergency Call

When receiving an emergency call from the selected group and system, an alert beep is heard and the **BSY** indicator comes on. The message ***RXEMER*** flashes in the display on line two until the emergency condition is cleared. Follow standard emergency procedures.

Declaring An Emergency Call

To send an emergency call to the selected system and group (or on an optionally pre-programmed emergency group), proceed as follows:

1. Press and hold the red  button for approximately one second (this time is programmable and therefore could be longer or shorter; check with the system administrator). The radio will transmit an emergency call request with the radio ID until an emergency channel assignment is received.
2. When the working channel assignment is received, the radio sounds a single beep (Autokey alert tone) indicating it is ready for voice transmission. ***TXEMER*** flashes on line two in the display until the emergency is cleared.
3. Press PTT and speak into the microphone in a normal voice.

4. Release PTT when the transmission is complete and listen for a reply.
5. The emergency can be cleared by pressing and holding the  button followed by pressing the  button then releasing both buttons.

System Scan Operation

Wide Area System Scan

The **ORION** radio may be programmed for wide area system scan operation for multi-site applications. Upon the loss of the currently selected system's control channel, radios may be programmed to automatically scan the control channels of other systems. If a new control channel is found, the radio will switch to the new system and sound an alert tone.

Priority System Scan

The radio may also be programmed for priority system scan. A priority system may be assigned among the systems programmed into the radio. Radios programmed in this manner will check for the priority trunked system's control channel at a programmable rate ranging from 1 to 16 minutes. This priority scan timer is reset each time the PTT button is pressed or a call is received. If the priority system control channel is found, the radio will automatically switch to the priority system.

Group Scan Operation

Only Groups that are part of the radio's scan list may be scanned. Groups are added to the scan list on a per system basis by PC Programming, the radio keypad or both, dependent upon programming. This scan list may be changed by the user from the keypad unless programmed otherwise. Each system's group scan list is retained in memory when the radio is turned off. The Orion mobile radio may also be programmed to provide Trunked Priority Group Scan capability which operates similar to priority scan in Conventional mode.

The following is a description of PC-Programmable scan features that should be helpful in understanding the Group Scan Operation of the radio:

Scan Hang Time - the delay time the radio waits before resuming scan after the push-to-talk is released or after the carrier has dropped a channel.

TX Select - the group the radio will transmit on while scanning. The radio is programmed to transmit on either the scanned group or the selected group.






Scan List (privileges) - this feature allows or prohibits scan list changes by the user.

P1 Programming - priority group programming is accomplished by one (and only one) of three methods:

1. From the keypad, where the Priority programming is not fixed and does not follow the selected channel.
2. Priority 1 group programming follows the selected channel.
3. Priority 1 group programming is fixed during PC Programming and cannot be changed by the user.




P1 Always Scan - determines if the Priority 1 Group will always be scanned, regardless of the scan state set by the user.

Adding Groups To A Scan List


1. With scan operation turned off, select the desired group to add to the selected Trunked system group scan list.
2. Press  or  on the SCAN add/delete control. The current priority status of the group will be displayed in column 1 of line one for a time-out period. If the group is not part of the scan list the status will be blank.
3. While the status is displayed press  to add the group to the scan list. "S" is displayed on line one.
4. Press  a second time to set the group to Priority 2. A "2" is displayed on line one.
5. Press  a third time to set the group to Priority 1. A "1" is displayed on line one. The priority level selection sequence only advances the group to next higher priority level and stops at priority level 1. To select a lower priority level, the group must be deleted from the scan list and then added back to the scan list. Each new group added to the scan list starts at the lowest priority. If the the Priority 1 and Priority 2 groups are

already set and a new group is assigned as Priority 1 or Priority 2, the previously assigned group will change to non-priority scanning.


Deleting Groups From A Scan List

1. With scan operation turned off, select the desired group to delete from the selected trunked system's group scan list.
2. Press  or  on the SCAN add/delete control. The current status of the group is displayed for a time-out period.
3. Press  to delete the group from the scan list. "S", "2" or "1" turns off. Any group that is not in a trunked system group scan list will show a "blank" for the time period when it is the selected channel.

Nuisance Delete

A group can also be deleted from the scan list, if it is not the currently selected group, by pressing  during scan operation while the radio is displaying the unwanted group. The group will be deleted from the system's group scan list in the same manner as if done using the steps above. Deletions done in this manner will not remain deleted if the radio is turned off and then back on.


Turning Scan On

1. Toggle scan operation by pressing . The SCAN indicator will turn on when the radio is scanning.

NO

Scanning will stop while microphone is off-hook if hookswitch feature is enabled through programming.

2. When a group on the scan list receives a channel assignment, the radio unmutes on the assigned channel, **BSY** indicator comes on and the received scan group is displayed.
 - The radio will continue scanning if a new group is selected when scan is on.
 - Pressing the PTT button when scan is on will cause the radio to transmit on the displayed group or to the currently selected group depending on programming.


- Pressing  when scan is on will cause the radio to recall the scanned group that was last received. This group is recalled for a period equal to the scan hang time.

Priority Group Scanning

When scan is enabled and the Priority 1 and Priority 2 groups have been identified, the radio will listen to calls on those groups and the selected group. While receiving a scanned group call, the radio will continue to monitor the selected, Priority 1 and Priority 2 groups and will drop the call if the selected group or other higher priority call becomes active. During a Priority 2 call the radio will continue to monitor for a Priority 1 group call.



The radio will monitor for Agency and Fleet calls which correspond to the Agency and Fleet associated with the Priority 1 and Priority 2 groups. Priority Agency and Fleet calls will be indicated by displaying **AGENCY** or **FLEET** on the System line of the display and associated Priority 1 or 2 group on the Group line of the display.

Turning Scan Off


Toggle scan operation off by pressing . The radio will resume operation on the selected group.

Individual Calls



Receiving and Responding To An Individual Call

When the radio receives an individual call (a call directed only to the user's radio), it unmutes on the assigned working channel and turns on the **BSY** indicator. Line one shows ID followed by the logical ID number of the unit sending the message, or the associated name if the ID number is found in the individual call list. The individual call indicator display ***INDV*** is displayed on line two. The radio can be programmed to ring when an individual call is received. If enabled, the ring begins five seconds after the caller unkeys and will continue until the PTT button, the  button, or  is pressed.

NOTE




Hookswitch functions the same as  key in I-CALL, phone call, and menu modes.

If a response is made to the call prior to the programmed call-back time-out, the call will automatically be directed to the originating unit. If a response is not made before the call-back time-out, the radio will return to normal receive mode, but * **WHC** * will be displayed. If the caller's ID is not received, **UNKNOWN** will display for the duration of the call and there will be no call-back hangtime.

To respond after the call-back time-out, press  or select I-CALL mode from the menu while * **WHC** * is displayed. The display will show the caller's ID. The individual call selection mode is now active and the selection mode rules apply. The caller can be responded to by pressing the PTT button if no other selection is made. Because the latest caller's ID is stored in location 0 and the radio is now in the individual selection mode, the caller can be selected directly by pressing 0 then  (System Model only). If the caller is selected in this manner proceed with the call by pressing the PTT button.

Sending An Individual Call

The following procedures describe how to initiate and complete an individual call.

1. To select a previously stored individual, select the I-Call mode from the menu or press  followed by the RAMP control  or  to scroll through the list of stored individuals. The selection mode rules apply. While in the individual call list, the menu key will toggle the display between the call name and the unit ID number. If the individual is not stored in this list but the individual's unit ID is known, it can be entered directly from the keypad.
2. Press the PTT button; the radio performs the necessary signaling to obtain a communication channel. When the signaling is complete and the radio is clear to transmit, **TX** indicator turns on and the channel access tone sounds. Line one shows the called individual's name if found in the list of stored individuals or ID followed by the logical ID number of the unit being called. The message ***INDV*** displays on line two. Proceed with the message.



TELEPHONE INTERCONNECT CALLS

Receiving A Telephone Interconnect Call (Trunked Mode Only)

Receiving a telephone interconnect call is identical to receiving an individual call. See the DTMF Overdial Operation section if access to services requiring "over-dial" is needed. Overdial operations are available for any special call whether it is an individual call or a telephone interconnect call.

Sending A Telephone Interconnect Call (Trunked Mode Only)

Use the following procedures to initiate and complete a Telephone Interconnect call:


1. To select a previously stored phone number, select phone call mode from the menu, press **[PHN]** and use the **RAMP** control  or  to scroll through the list of stored phone numbers. The selection mode rules apply. While in the phone call list, the **[MENU]** key will toggle the display between the phone call name and the phone call number. If the phone number is not stored in this list but the phone number is known, it can be entered directly from the keypad. If necessary, a pause can be entered by pressing and holding **0-9**, *****, or **#** until an underscore appears in the display.
2. Press and release the PTT button; the radio performs the necessary signaling to obtain a communication channel. When the signaling is complete and the radio is clear to transmit, **TX** indicator turns on and the channel access tone sounds. Line one shows the accompanying name if selected from the list of stored numbers or the phone number if entered directly. The message ***PHONE*** displays on line two. The radio then automatically transmits the programmed number stored in the special call queue.
3. The telephone ringing will be heard. When someone answers the phone, press the PTT button and speak into the microphone. Release the PTT button to listen to the caller. Unsuccessful interconnect signaling returns the radio to the normal receive mode and the number remains displayed until the special call is cleared by pressing the **[CLR]** button or the time-out expires or another group or system is selected.

4. To terminate the call, momentarily press the  button.

NOTE

The ORION radio is capable of simplex (one-way) conversation only. The caller can only hear the radio if the PTT button is pressed (the radio is transmitting) and the caller can only be heard when PTT is released (the radio is receiving).


DTMF Overdial/Conventional Mode Telephone Interconnect

Once the radio has established a connection to the public telephone system, it may be necessary to "over-dial" more digits to access banking services, answering machines, credit card calls or other types of systems that require DTMF (Dual-Tone Multi-Frequency) access digits. Overdial operation can also be used to initiate a telephone interconnect call via DTMF signaling if a dial tone has already been accessed on the system. This is the method that is used for making a telephone interconnect call while operating in the conventional mode but will also function in trunked mode if a dial tone is directly accessible. Telephone numbers and other number sequences for overdialing can be stored in the phone list when programming the radio or stored by the operator in the first ten phone list entries. These numbers are accessed by pressing  then following the selection mode rules.



The following steps are required to dial these numbers:

1. Follow the procedure in **Sending A Telephone Interconnect Call (Trunked Mode Only)** to establish a connection to the telephone system or consult the system administrator for the procedure to access a dial tone on the trunked or conventional system.
2. Overdial numbers are transmitted using either method as follows:

METHOD 1: Press and hold PTT while entering the overdial number sequence from the keypad. This method sends DTMF tones during individual, telephone interconnect, trunked group or conventional channel calls. Anytime the PTT button is pressed and held, the keypad is enabled for DTMF entry.

METHOD 2: Press  to enter the overdial select/entry mode and follow the selection mode rules to call up a stored number from the






phone list or to directly enter the overdial digits. Press PTT to send the overdial sequence once. If the number needs to be transmitted again it must be selected or entered again (this prevents unwanted numbers from being sent the next time the PTT button is pressed during the call).

This overdial select/entry mode remains active until the call is dropped, cleared, or  is pressed. The overdial select/entry mode can be re-entered if the call is still active by pressing .

Programmable Entries


Individual call ID numbers, telephone numbers and other number sequences for overdialing are stored in the special call lists when programming the radio. The first ten entry locations of these lists can be changed by the radio operator. The keypad is used when adding, changing and storing numbers in these entry locations.

Use the following procedure to store a number in one of the first ten entries of a special call list:

1. Press  or  to enter the individual call list or the phone call list. The selection mode rules apply.
2. Scroll through the list using the **RAMP** control  or  until one of the first ten entries is reached. **NO ENTRY** is displayed if the location is empty.
3. Enter the desired number. If necessary, a pause can be entered by pressing and holding **0-9**, **(*)**, or **(#)** until an underscore appears in the display. The individual call list entries will accept up to 5 digits. The phone call list entries accept a combination of up to 31 digits and pauses.
4. Press and hold  until the display changes indicating that the number has been stored.
5. Repeat the steps above if the number stored in an entry location needs to be changed.

CONVENTIONAL MODE OPERATION


The radio functions in the conventional mode when using conventional communications channels (non-trunked). Each channel consists of a preset frequency pair for transmit and receive during repeater operation, or a single frequency for both transmit and receive during talk-around (no repeater) operation. To use this mode, the operator selects a conventional system which includes one or more conventional channels. Each conventional channel may have one or more features, such as Channel Guard, programmed when the channel is selected.

The  button unmutes the receiver so activity on the selected channel can be monitored. When pressed and held for approximately 3 seconds this button toggles conventional channel decoding (Channel Guard, Digital Channel Guard or T99) on and off if programmed for the selected channel.

Receiving A Call

1. Turn on the radio by rotating the **POWER ON-OFF/VOLUME** knob clockwise (out of detente). A short alert signal (if enabled through programming) indicates the radio is ready to use.
2. Adjust the **POWER ON-OFF/VOLUME** knob to the desired volume level.
3. Select the desired conventional system and channel. The display indicates the current conventional system and channel names.
4. The radio is now ready to receive calls.
5. When the radio receives a call (and the correct encoding is decoded, if programmed and enabled), it unmutes on the channel and the **BSY** indicator comes on.

Sending A Call


1. Turn on the radio and set the **POWER ON-OFF/VOLUME** knob to the desired volume level. Select the desired conventional system and channel.
2. Ensure that the channel is not busy by pressing the  button to momentarily disable any channel decoding and unmute the receiver or ob-

serve the unlit **BSY** indicator. If the Channel Busy Lockout feature is programmed for the selected channel, the radio will not transmit when the channel is busy.

3. Press and hold the PTT button. The **TX** indicator will turn on and a short beep sounds (if programmed) indicating that communication can begin.
4. Hold the microphone approximately three inches from the mouth and speak in a normal voice.
5. Release the PTT button when the transmission is complete and listen for a reply.

Emergency Operation

If enabled, GE-STAR emergency signaling can be transmitted when operating in the conventional mode. This GE-STAR signaling will transmit 5 times with a delay between each transmission. To send an emergency call on the selected conventional system and channel (or on an optionally pre-programmed conventional emergency system and channel), proceed as follows:

Press and hold the red  button for approximately one second (this time is programmable and therefore could be longer or shorter; check with the system administrator). The radio turns on the **TX** indicator and proceeds to transmit the pre-programmed GE-STAR emergency signaling sequence.

GE-STAR is programmed to transmit in one of the following methods:

METHOD 1: GE-STAR is transmitted on the selected channel. If the channel is changed the emergency signaling will continue to be transmitted on the newly selected channel.

METHOD 2: Same as METHOD 1 but the radio will lock on to the currently selected channel. Any attempts to change the system or channel will be disabled.

METHOD 3: GE-STAR is transmitted on a pre-programmed conventional emergency system and channel regardless of the selected channel. In this case the selected channel is available for voice transmission and the radio will periodically change to the pre-programmed emergency system and channel to send

the emergency signaling and then change back to the selected channel.

METHOD 4: Same as METHOD 3 but the radio will lock on to the pre-programmed emergency system and channel. Any attempts to change the system or channel will be disabled.






The emergency state can be cleared by turning the radio off and then back on.


Scanning Conventional Channels

Channels which have been previously added to the scan list on a per system basis may be scanned. The selected channel is scanned (if enabled through programming) whether or not it is in the scan list. Each conventional system's channel scan list is retained in memory when the radio is turned off.




The scan rate will vary depending upon the number of channels in the scan list and whether or not the radio is programmed to scan for channels with decoding enabled. Fewer channels will result in a faster scan rate. If programmed for dual-priority scan operation, the priority-one, priority-two and the remaining scan list channels are scanned. Once a signal is detected and the correct encoded squelch signal is decoded (if programmed), the radio receives the message and displays the received scan channel. At the same time, scanning continues on the priority-one and priority-two channels. Should the priority-one or priority-two channel carrier, regardless of encoded squelch decoding, be detected while a non-priority channel is being received, the display name is updated and the received channel is switched to the priority channel. Scanning of the priority-one channel will continue if a message is being received on the priority-two channel.

Adding Channels To A Scan List:


1. With scan operation turned off select the desired channel to add to the selected conventional system channel scan list.
2. Press  or  on the **SCAN** add/delete control. The current status will be displayed in column 1 of line one for a time-out period. Press  to add the channel to the scan list. **S** is displayed on the line. This sets the selected channel for non-priority scanning. A second press of  sets the channel for priority-two scanning and **2** is displayed on line one. An additional press of  sets the channel for priority-one scan-

ning and **1** is displayed on line one. If the priority-one or priority-two channels are already set and a new channel is then assigned as the priority-one or priority-two channel, the previously assigned priority channel will change to non-priority scanning. The priority setting selection sequence is set and stops at priority-one therefore the channel must be deleted from the scan list by pressing  before the channel is set to a previous priority setting. Any channel that is in a system's channel scan list will show **S, 2** or **1** for the time-out period when it is the selected channel.


Deleting Channels From A Scan List:

1. With scan operation turned off select the desired channel to delete from the selected conventional system's channel scan list.
2. Press  or  on the **SCAN** add/delete control. The current status is displayed for a time-out period. Press  to delete the channel from the scan list. **S, 2** or **1** turns off. Any channel that is not in a conventional system channel scan list will show a "**blank**" for the time-out period when it is the selected channel.

Nuisance Delete

A channel can also be deleted from the scan list, if it is not the currently selected channel, by pressing  during scan operation while the radio is displaying the unwanted channel. The channel will be deleted from the conventional system's channel scan list in the same manner as if done using the steps above. Deletions done in this manner will not remain deleted if the radio is turned off and then back on.


Turning Scan On

1. Toggle scan operation on by pressing . The **SCAN** indicator will turn on when the radio is scanning.


NOTE

Scanning will stop while microphone is off-hook if hookswitch feature is enabled through programming.

2. When a channel on the scan list receives a channel assignment, the radio unmutes on the assigned channel, **BSY** indicator comes on and the received scan channel is displayed.

- The radio will continue scanning if a new channel is selected when scan is on.
- Pressing the PTT button when scan is on will cause the radio to transmit on the displayed channel or to the currently selected channel depending on programming.
- Pressing  when scan is on will cause the radio to recall the scanned channel that was last received. This channel is recalled for a period equal to the scan hang time.

Turning Scan Off

Toggle scan operation off by pressing . The radio will resume operation on the selected channel.

Squelch Adjust

In the conventional mode of operation, the squelch may be re-adjusted in the MENU selection mode or a front panel key on the keypad has been pre-programmed by the PC programming software. A default value of 9 or any user level between 1 and 16 can be selected by the PC programming software. The user can change this setting either of two ways from the front panel keys.





NOTE






A value of 16 required a strong signal to open squelch, a value of 2 requires a very weak signal to open squelch and a value of 1 is open squelch.

NOTE





When squelch adjust feature is activated, Channel Guard, T99 decode and Scan are disabled. When the squelch adjust feature is exited, Channel Guard, T99 decode and Scan are restored to their previous states.

Menu Selection

1. Press the  key and then use the RAMPcontrol  or  to scroll through the selections until SQUELCH is displayed. Then press  again.

2. The display will show **SQLCH=xx**, where "xx" is the value between 1 and 16.
3. Use the RAMP control  or  to scroll through the values. Then press the  key to save the new value after the display time-out (2 seconds). The displayed value will be selected and saved.
4. If the  or  key is pressed before the time-out, the menu feature will exit and the squelch level will not be updated. The original value will be restored.

Pre-Programmed Keypad Key

1. Press the pre-programmed key and the display will indicate **SQLCH=xx**, where "xx" is the value between 1 and 16.
2. Use the RAMP control  or  to scroll through the values. Then press the  key to save the new value or wait for the display time-out (2 seconds). The displayed value will be selected and saved.
3. If the  key is pressed before the time-out, the squelch level will not be updated and the original value will be restored.

SIREN/LIGHT OPERATION

Each siren/light key is designed to control an optional siren/light package. Pressing a siren/light key will light the key indicator. Each siren/light key (except RESET) can be programmed for either CANCEL or ADDITIVE operation. If programmed for CANCEL, then all other siren/light activity is cancelled except for the activity associated with this key. If programmed for ADDITIVE, then a key press will add its respective siren/light activity to the current siren/light activity. It is important to note that while the lights are additive, only a single siren can be active at a time. The current siren will be determined from the recently pressed key that contains a siren assignment.

Each siren/light key (except RESET) can be programmed for either Toggle, Momentary or Timed. In **Toggle**, each key press will toggle the state of the key between On and Off. In **Momentary**, a key's respective feature will only be active while the key is pressed and held. When programmed for **Timed**, the siren/light key activity will only be active during the programmable time-out window. The duration of the time-out window is program-

mable between from .5-127.5 seconds. During the time-out window the respective key indicator will be on. When the timer expires, the activity will be terminated and the indicator will turn off. If an additional time-out key (programmed for ADDITIVE) is pressed during the time-out window, then the time-out window is reset and both activities will terminate at the same time.

AEGIS AND VOICE GUARD OPERATION

VOICE MODES

Each system (trunked or conventional) in the radio is programmed for either Aegis or Voice Guard communications. Aegis programmed systems have three (3) different voice modes: clear (analog), digital and private. Voice Guard systems have two (2) voice modes: clear (analog) and private. The voice modes are programmed on a per-group basis within each trunked system and on a per-channel basis within each conventional system. A radio must be equipped with the encrypt/decrypt option before it will operate in Aegis or Voice Guard modes.

TRANSMIT/RECEIVE MODE COMPATIBILITY FOR AEGIS OPERATION

GROUP/CHANNEL PROGRAMMING (TRANSMIT)	CLEAR RECEIVE	DIGITAL RECEIVE	PRIVATE RECEIVE
CLEAR	Yes	No	No
DIGITAL	Yes	Yes	No
PRIVATE	Yes	No	Yes*

TRANSMIT/RECEIVE MODE COMPATIBILITY FOR VOICE GUARD OPERATION

GROUP/CHANNEL PROGRAMMING (TRANSMIT)	CLEAR RECEIVE	PRIVATE RECEIVE
CLEAR	Yes	No
PRIVATE	Yes	Yes*

*assumes the proper cryptographic key is loaded

NOTE

Conventional Aegis or encrypted channels require Channel Guard on the channel to operate correctly.

CLEAR MODES

Aegis clear and Voice Guard clear modes are identical voice modes in which the radio transmits and receives only clear (analog) voice signals. These analog signals are non-digitized and non-encrypted. Clear mode transmissions can be easily monitored by unauthorized persons. Groups or channels programmed for clear operation cannot transmit or receive Aegis digital or private messages.

AEgis DIGITAL MODE

Aegis digital mode allows the radio to transmit and receive digitized voice signals. Aegis digital signals provide improved weak signal performance and they cannot be easily monitored with a standard receiver. Groups and channels programmed for Aegis digital operation transmit only digital signals. Private calls cannot be received or transmitted when the radio is in the Aegis digital mode because the radio does not know the cryptographic key used.

Message trunked group calls and individual calls will be answered back in the mode they were received, assuming the call or hang time is still active. Individual, phone, all and emergency calls will be transmitted clear if digital mode is disabled or inoperative.

1. If receiving an analog message trunked call, the radio will respond in analog mode during the hang time on the working channel.
2. If receiving an analog I-Call, the radio will respond in analog mode during the hang time.
3. When using the "WHC" feature to respond to an I-Call (after the hang time has expired), the call will be transmitted in the mode defined by the system mode as programmed for the current system if the ID being called is not in the I-Call list. If the ID is in the I-Call list, then the call will be transmitted as defined by the I-Call mode programmed in the list for that ID.

DTMF

The overdial and hot keypad features for transmitting DTMF tones are not available while in the Aegis Digital Mode.

ERROR Messages

If either of the following error messages are displayed, the radio was either programmed incorrectly or needs servicing:

DSPERR ERR=xxxx

*(Power
Up Only)*

DSPERR

If the Aegis circuit board is not responding, the following error message will be displayed and the radio needs servicing:

HARDWARE ERR= 30

AEGIS Private And Voice Guard Private Modes



The Aegis private and Voice Guard private modes allow the radio to transmit encrypted messages and receive clear or private transmissions. The radio will transmit private if the group/channel is programmed for private operation and forced operation is pre-programmed. If autoselect operation was pre-programmed and the radio is in private mode, the radio will transmit in the mode of the received call if the hang time is active. If no hang time is active, the radio will transmit private.

Aegis transmissions cannot be received by a radio set to receive a Voice Guard transmission. Accordingly, a Voice Guard transmission cannot be received by a radio set to receive an Aegis transmission.

Cryptographic keys are transferred to the radio using a cryptographic Keyloader. Up to seven (7) different cryptographic keys, numbered 1-7, can be transferred from a Keyloader and stored in the radio. An individual key is automatically selected on a per-group/channel basis according to the radio's programming. Groups and channels within Aegis systems can be programmed for keys 1-7. Groups and channels within Voice Guard systems can




be programmed for keys 1-7. Up to 8 banks of 7 keys can be stored for Aegis (DES and VGE) systems.



DES radios require a DES Keyloader (Option V4025 with software version 3.n or later). VGE radios require a VGE Keyloader (Option V4028 with software version 2.n or later).

When operating on a group or channel programmed for private mode, all transmissions will be private transmissions and the radio will receive clear and private signals. The PVT keylight (System Model) or OPTION keylight (Scan Model) turns on when the private mode is enabled. If the selected group or channel is programmed for autoselect capability, the mode may be toggled between private and clear with the PVT button (System Model) or  button (Scan Model). Radios programmed for forced private operation do not allow a change of the transmit mode; therefore, the PVT button (System Model) or  button (Scan Model) has no effect.

Transferring Keys Into The Radio







The following procedure outlines basic key transferring steps.

1. Turn the radio off.
2. Plug the modular connector of the Keyloader cable into the Keyloader modular jack.
3. Connect the Keyloader cable to the extended options cable on the rear of the radio.
4. Press the PWR button on the Keyloader and wait for the Keyloader to display "MASTER MODE".
5. Press the TRN button on the Keyloader. If necessary, select a different cryptographic key to be transferred into the radio.
6. Turn the radio on. Use the  button to access the menu options then the RAMP  ,  control to select "KEYLOAD".
7. Press the EXE button on the Keyloader to transfer the key. The Keyloader will display "GOOD 1.x TRANSFER" where "x" is the selected cryptographic key number.

8. Disconnect the cable from the control unit's microphone connector. Press the  (Scan Model) or  (System Model) button to exit the key-load operation. The radio will change to the selected group or channel as indicated in the display.





Displaying The Currently Used Cryptographic Key Number

To display the cryptographic key currently in use for either the system encryption key (for special call such as individual, phone, all, agency or fleet) or the group/channel key (for group or conventional calls), perform the following procedure:

1. Press the  button.
2. Use the  or  button (ramp control) to select "DISP KEY". Then press the  button.
3. Then use the  ,  button to toggle between displaying the system key or the group/channel key.

ENCRYPTION KEY DISPLAYED	MESSAGE DISPLAYED
System	"SYS KEY" "KEY = 1"
Group/Channel	"GRP KEY"/"CHN KEY" "KEY = 2"/"KEY = 2"

Key Zero

All cryptographic keys can be zeroed (erased from radio memory) by pressing the  button (System Model) or  (Scan Model) and while still pressing this button, press and hold the  button (System Model) or  (Scan Model). Press both buttons for 2 seconds. A series of warning beeps will begin at the start of this 2 second period and then switch to a solid tone after the keys have been zeroed. The display will indicate "**KEY ZERO**".


If the cryptographic key(s) are zeroed, one or more keys must be transferred from the Keyloader into the radio before private communications may continue.

PRIVATE OPERATION

Receiving An Encrypted Call

When receiving, the radio automatically switches between clear or private operation. If the transmission being received is an encrypted transmission, it will be decrypted, the PVT keylight (System Model) or OPTION keylight (Scan Model) will flash, the receiver will unsquelch and the message will be heard in the speaker. For this to occur, the selected group or channel must be programmed for private operation and the correct cryptographic key must be loaded into the radio.

Transmitting An Encrypted Call

1. Select the desired group or channel.
2. Place the radio in private mode by pressing the PVT button (System Model) or  (Scan Model). When private mode is enabled, the PVT keylight (System Model) or OPTION keylight (Scan Model) will be on.

If the last state of the radio was private mode, the private mode will be enabled on power up. Also the private mode will be enabled if forced operation has been programmed in the radio

If a group or channel is not programmed for private mode operation, **PVT DIS** will be displayed if an attempt is made to enable private transmit mode. It is not possible to operate on this group/channel in private mode.

If the radio is programmed for forced private transmit operation, **FRCD PVT** will be displayed if an attempt is made to disable private transmit mode. It is not possible to transmit on this group/channel in clear mode.

If the radio does not have the correct encryption key loaded, **NO KEY #** will be displayed and the call will not be transmitted.

3. Continue with standard transmission procedures. A private mode access tone will be heard when the PTT button is pressed.

Scanned Group Calls

Receiving a scanned group call is the same as receiving a selected group call. During the scan hang time, if the radio was programmed for autoselect, it will transmit back in the same mode it received the call. For example, if a clear group is entered in the scan list, it will only receive clear calls. If the same group was available in private and entered in the scan list, it can receive clear and private calls, provided autoselect was programmed in the radio. The user can select transmitting on the scanned or selected group. If a group is entered in the scan list more than once and in different modes (clear, digital, private), only the first occurrence of the group will be used.

CONVENTIONAL OPERATION

Outside Address

The same outside address (works similar to Channel Guard operation) must be programmed in the transmitting and receiving radios when Aegis digital or private operation is enabled. If address is not correct, the radios will not communicate.

Channel Guard

Channel Guard encode is transmitted on analog clear channels only. Channel Guard decode will operate on either a clear or private channel. The exception is when GE•STAR signaling is used (see GE•STAR paragraph).

GE•STAR

When GE•STAR is programmed on a private channel, the radio will transmit GE•STAR in clear mode and then switch to private for the voice portion of the call. If GE•STAR is sent with Channel Guard, then both are sent in clear mode and then radio switches to private mode. Emergency GE•STAR data burst is transmitted in clear mode.

MOBILE DATA

The **ORION** radios when operating in the EDACS configuration permit either voice or data calls to be transmitted or received. The radio can handle only one type of call at a time; however, selection of either data or voice is

selected transparently by the operator through normal usage of the radio. Data communications is not supported in the conventional mode.

The mobile radios may be connected to Mobile Data Terminals (MDT) or to a host computer. Any RS-232 compatible device that supports the Radio Data Interface (RDI) protocol (Version 1.91 or greater) may be connected to the mobile radio. Support for MDT's or host computers is a programmable option per radio. Additionally, radios programmed for host computers may also be programmed for data only operation (no voice calls transmitted or received).



DISPLAYS


The following will be displayed on the control unit during the various states of data mode of operation.

TX DATA	Displayed on bottom line of display when the radio is transmitting a data call.
RX DATA	Displayed on bottom line of display when the radio is receiving a data call.
DATA OFF	Displayed on top line of display when the radio is in the data disabled state.
DATA ON	Displayed for two seconds on top line of display when the radio is toggled to the data enabled state.

DATA OFF OPERATION

The radio can be placed in the data disable state by any of the following methods. When the data state is disabled, the control unit displays "DATA OFF" on the top line. An ongoing data call is allowed to complete except in the case of declaring an emergency.

- Removing the microphone from the hookswitch (hookswitch option must be enabled by pre-programming).
- Declaring an emergency (not to be used unless an actual emergency condition exists). Alert tone will sound.
- Pressing the  button (System Model) or  (Scan Model) (pre-programmed). Alert tone will sound.

- Selecting the function using the  button (pre-programmed).
- Pressing the ND button (System Model Only) (pre-programmed).

DATA ON OPERATION

The data state is enabled by one of the following (depending on how it was disabled). "DATA ON" will be displayed top line of display for 2 seconds then the display returns to normal.

- Replacing the microphone into the hookswitch (going on-hook). Only valid if the data off operation was entered by removing the microphone from the hookswitch (going off-hook).
- Pressing the ND key toggles data state on or off.
- Clearing an emergency but valid only if emergency caused data off operation.

EXITING DATA CALLS


Under normal conditions, the radio enters the scan lockout mode and returns to the control channel after completion of a data call (transmit or receive). If, during a data call, one of the following conditions occurs, the data call is immediately terminated and the radio performs the desired function:

- PTT activated.
- PTT in Public Address mode.
- Emergency declared by pressing the pre-programmed emergency button.
- A group or system change.

SCAN LOCKOUT MODE



Following the transmission or reception of a data call, if scan is enabled, scanning will stop temporarily (duration pre-programmed). During this time the scan LED will flash to indicate that scan is enabled but temporarily suspended. This mode is normally exited when the pre-programmed time expires; however, the following actions will terminate the scan lockout mode before the timeout is completed.

- The  (System Model) or  (Scan Model) button is pressed.

- PTT is pressed.
- A group or system change.
- Entering phone call mode
- Entering individual call mode.
- A new emergency assignment has been received.
- PTT pressed in Public Address Mode.
- An emergency declared or cleared.
- Microphone removed from hookswitch (off-hook).
- Receiving an individual or phone call.
- Receiving Agency, Fleet or System All Call.
- Pressing the  button to turn scan on or off.

DATA LOCKOUT MODE

The data lock mode is a pre-programmed mode when the radio will not respond to any data channel assignments and prevents receive data calls from interrupting voice calls. Transmit data calls will still be initiated when needed by the operator. After a pre-programmed time, the radio will respond to receive data calls; however, the following conditions will clear the data lockout mode:

- The  (System Model) or  (Scan Model) button is pressed.
- Transmitting a data call.
- Changing a system.
- An emergency.
- Pressing PTT while in Public Address mode.
- Turning scan on with the SCAN button.

DUAL CONTROL OPERATION

The ORION mobile radio may be programmed to operate from two separate Control Units. This permits radio operation from two separate locations in the vehicle. Dual control operation is available in both trunked and conven-

tional modes. Only one control unit can control the mobile radio unit at a time. The control unit which controls the radio operation is called the active controller and the second unit is called the idle controller.


SWITCHING CONTROL

Control can be switched to the idle controller by pressing the push-to-talk (PTT) on the microphone associated with the idle controller. Once PTT is pressed, the radio will switch control to the idle controller unless the active controller is currently transmitting (i.e., PTT pressed on active controller), in which case the switch will not occur. When control is switched to the idle controller, two short high-pitched tones will sound at the controller where PTT was pressed to indicate that the idle controller is now the active controller and the previous active controller is now the idle controller.

CONTROL SWITCHING MODES

The radio can be pre-programmed for two modes of dual operation, Slaved and Independent. In the Slaved mode the two controllers will use the same radio System and Group settings. The Independent mode permits each controller to have its own saved System and Group settings.


Slaved Mode Operation


During Slaved mode operation either controller can operate the radio with no change in System and Group settings when control is switched. Both controllers display the current information. If a key is pressed at the idle controller, other than PTT,  or siren and light keys as noted in following paragraphs, a low tone will sound and the display will temporarily show **DUAL** on line one of the idle controller.

When control is switched in a Slaved mode system, all of the radio settings and states will remain in effect that have been selected on the active controller.

Independent Mode Operation

During Independent operation, the radio system operates as if there are two radio units each controlled by a separate control unit. Each control unit maintains its own System and Group settings which are restored when control is switched.

The idle controller will display **DUAL** on line one to indicate that it is idle. If a key is pressed at the idle controller, other than PTT,  or siren and light keys as noted in following paragraphs, a low tone will sound at the idle controller.

When control is switched in Independent mode, the idle controller will restore its own System and Group settings instead of using the settings of the previously active controller. Any pending operations at the active controller, other than  or siren and light operations, will be terminated.

EMERGENCY OPERATION

Either control unit (active or idle controller) can declare an emergency, provided radio has been pre-programmed to enable emergency declaration. If the idle controller declares an emergency, control is switched to the idle controller and any current transmission from the previously active controller is terminated.

SIREN AND LIGHT CONTROL

Siren and light control is only available from the control unit that is pre-programmed for these functions. Typically, the control unit at the driver's location would be programmed. The control unit that has these functions programmed can activate them regardless of whether it is an active or an idle controller.

DUAL CONTROL AUDIO

Audio output during dual control operation is a pre-programmed function. Default operation routes audio only to the active controller.

STATUS/MESSAGE OPERATION

Status and message operation is possible with either the Scan or System version of the ORION radio unit. The following procedure is applicable for the System version. For operation with the Scan version the four primary key-caps must be reconfigured and pre-programmed for status/message operation.

STATUS OPERATION

Status operation permits the transmission of a pre-programmed status condition to the EDACS site.

To send a status condition, press the **[STS]** button then press one of the number buttons (0-9) to select the pre-programmed status. If no status has been programmed for the selected number button, the radio will display **NO ENTRY**. A valid selection will permit the status text to appear in the display for a pre-programmed time. After the time-out expires or the **[MENU]** button has been pressed (the **[MENU]** button will override the time-out period), the status is selected and will be transmitted to the site or stored in the radio memory where it can be polled by the site at a future time. If the site does not receive the status properly, the radio will sound a low pitched tone.

If an incorrect status was selected or the incorrect number button was pressed, the status can be changed during the pre-programmed time-out period by pressing another number button. The status selection can also be cancelled by pressing the **[CLR]** button prior to the time-out period.

To view the currently selected status after it has been transmitted, press the **[STS]** button and then the **[CLR]** button prior to the time-out period. If the status was not sent successfully to the site, the text associated with the status will flash in the display.

The radio can also be pre-programmed to redesignate the keypad buttons for ST0 thru ST9 to send status condition. In this configuration the radio status operation will operate as previously described except the **[STS]** button is not required.

MESSAGE OPERATION

Message operation permits the transmission of a pre-programmed message text to an EDACS site.

To send a message, press the **[MSG]** button then press one of the number buttons (0-9) to select the pre-programmed message text. If no message text has been programmed for the selected number button, the radio will display **NO ENTRY**. A valid selection will permit the message text to appear in the display for a pre-programmed time. After the time-out expires or the **[MENU]** button has been pressed (the **[MENU]** button will override the time-out period), the message text is selected and will be transmitted to the site. If the site does not receive the message properly, the radio will sound a low pitched tone.

If an incorrect message text was selected or the incorrect number button was pressed, the message text can be changed during the pre-programmed time-out period by pressing another number button. The message text selection can also be cancelled by pressing the **[CLR]** button prior to the time-out period.

To view the currently selected message text after it has been transmitted, press the **[MSG]** button and then the **[CLR]** button prior to the time-out period. If the message text was not sent successfully to the site, the text associated with the message will flash in the display.

EDACS CONVENTIONAL P1 SCAN

This feature permits the radio user to scan a pre-programmed conventional system and channel as a Priority 1 (P1) channel while the radio is selected for EDACS trunked system. If activity is detected on the conventional P1 channel, the radio will unmute and remain on this conventional channel for the programmable hang time.

The radio must be pre-programmed to designate a button for scan on/off operation.

MULTIPLE RADIO OPERATION

Orion mobile radio may be configured to operate in a multiple radio mode that permits more than one radio to be controlled from a single control unit or control location. The radios could be different frequency splits, trunked/conventional, etc.

In the multiple radio operation, the radios continue to operate as individual radios except with a common control unit. The control unit is used for dis-

play and control. The control unit display is shared by the multiple radio units and, when selected, a radio can be controlled by the control unit.

For multiple radio operation the control unit keypad must be pre-programmed for a variety of multiple radio buttons such as radio selection and radio mute.

CHANGING SELECTED RADIO

A radio unit may be selected by pressing the radio selection button (pre-programmed) on the control unit. Also, a button may be pre-programmed to rotate selection through the radio units; e.g., if radio #1 is selected, pressing the radio select button will select radio #2. Similarly, radio #2 will be selected if the radio select button is pressed when radio #1 was selected.

SHARED CONTROL UNIT DISPLAY MODES

Radios in the multiple radio operation share the control unit display. Pre-programming the radios determines what the control unit displays. There are two modes of display: alternating radio display or first come first serve display. See also the following paragraph on Audio Modes.

Alternating Radio Display

In this mode the control unit display will alternate between showing the call information for the radios when more than one call is being received. This mode is available only if audio is summed (see following paragraph on Audio Modes).

First Come First Serve Display

In this mode the control unit display will show the call information of the radio that is providing the audio. A call in process prevents audio from other radios from being heard for the duration of the call or hang time (if enabled). This mode corresponds with the first come first serve audio mode (see following paragraph on Audio Modes).

AUDIO MODES

In multiple radio operation, the audio from the mobile radio units can be pre-programmed to be summed or available on a first come first serve process.

Audio Summed

When audio is summed, the audio from all radios will be available whenever the radios receive a call. If two radios receive a call simultaneously both calls will be heard in the speaker.

Audio First Come First Serve

When audio is pre-programmed for first come first serve, the audio from the radio that receives a call first will be heard from the speaker for the duration of the call and hang time (if enabled). During this time audio from the other mobile radios will be muted.

TEMPORARILY SELECTING A NON-SELECTED RADIO

If a non-selected radio is receiving a call, pressing the control unit SCAN ADD button while the control unit is displaying the receiving radio's call information, temporarily makes the radio the selected unit. The temporarily selected radio remains selected for a pre-programmed duration. During this time the radio can be manipulated with the control unit. Each time a call is received or a button is pressed during this pre-programmed time, the timer restarts. After the time period expires, the formerly selected radio resumes its selected mode. The user may also force the timeout by pressing the radio selection button.



MUTING A SPECIFIED RADIO

Pressing the control unit mute button associated with a particular radio will mute its audio for a pre-programmed time period. The time period can be cleared by pressing the control unit mute button or the radio selection button.

DYNAMIC REGROUP OPERATION

Dynamic regroup operation permits multiple talk groups (up to eight) to be added to a radio via the system manager. The radio must be pre-programmed to respond to regrouping. Dynamic regrouping will not be activated in a radio until an activation message is sent by the system manager. Each radio

that receives and acknowledges a regrouping instructions is successfully regrouped.

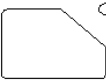
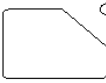
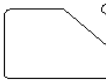
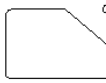
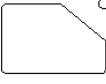
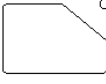
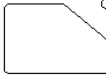
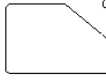
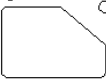
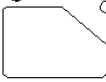
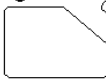
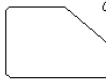

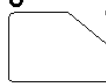


Pressing and holding the  (Scan Model) or  (System Model) button for 2.5 seconds toggles the user into and out of the dynamic regroup groupset. A double beep will sound for entry or exit. The display will indicate **REGR_0x** where "x" is a digit of 1 to 8 indicating the group when dynamic regroup has been enabled by the user. If the radio is in dynamic regroup and the user selects a group that has not been regrouped, the display will show **NO ENTRY**. The radio will be prevented from transmitting and receiving calls in this condition except for scanned groups.

EMERGENCY OPERATION

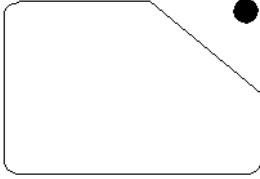
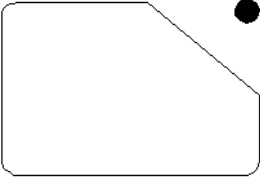
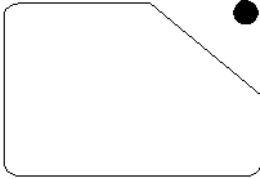
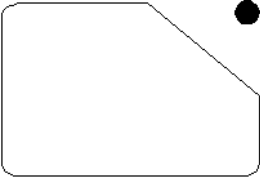
If the pre-programmed groupset on the currently selected system contains an EMER/HOME group and the radio is in dynamic regroup, the radio will exit dynamic regroup and declare the emergency on the HOME group. If no EMER/HOME group is present, the radio will declare the emergency on the currently selected dynamic regroup group.

KEYPAD REMAPPING

If the keys have been remapped to provide new functions, please fill in the following for future reference.

1 	2 	3 	
4 	5 	6 	
7 	8 	9 	
* 	0 	# 	

ORION System Model Keypad

ORION Scan Model Keypad

OPERATING RULES AND REGULATIONS

Two way FM radio systems must be operated in accordance with the rules and regulations of the Federal Communications Commission (FCC). As an operator of two way radio equipment, the user must be thoroughly familiar with the rules that apply to the intended type of radio operation. Following these rules will help to eliminate confusion, assure the most efficient use of existing radio channels, and result in a smoothly functioning radio network.

When using the radio, remember these rules:

1. It is a violation of FCC rules to interrupt any distress or emergency message. In conventional mode the radio operates in much the same way as a telephone "party line" therefore always listen to make sure that the line is clear--that no one else is on the air--before sending any messages. If someone is sending an emergency message--such as reporting a fire or asking for help in an accident- **-KEEP OFF THE AIR!**
2. Use of profane or obscene language is prohibited by Federal Law.
3. It is against the law to send false call letters or a false distress or emergency message.
4. The FCC requires that conversations be brief and confined to business. To save time, use coded messages whenever possible.
5. Using the radio to send personal messages (except in an emergency) is a violation of FCC rules. Only those messages essential for the business operation may be sent.
6. It is against the Federal law to repeat or otherwise make known anything overheard on the radio. Conversations between others sharing a communications channel must be regarded as confidential.
7. The FCC also requires that the caller be identified at certain specific times by means of call letters. Refer to the rules that apply to the particular type of operation for the proper procedure.
8. No changes or adjustment shall be made to the equipment except by an authorized or certified electronic technician.

GLOSSARY

Agency	- An agency is composed of multiple fleets. Units can be programmed to initiate agency calls to access multiple fleets. (Trunked Mode Only)
Base/Unit Operation	- A programmed option used in some fleets so units can only hear and talk to a base dispatch unit, not to other mobiles or personals in the group. In this mode of operation, when a unit in a particular group is talking to the base dispatch unit, all other mobile and personal radios in that group will receive a “System Busy” tone if they try to access the system. (Trunked Mode Only)
Control Channel	- a radio channel in a trunked system that is used to digitally communicate with the radios operating on the system when they are not engaged in active voice communications.
Conventional Channel	- a radio channel (transmit/receive) that is allocated for conventional (non-trunked) use and may be manually selected by the operator.
Conventional Mode	- communicating on radio channels allocated for conventional use (i.e. conventional system).
CCT	- Carrier Controlled Timer - a programmable timer that will disable a transmission if the length is exceeded.
CG	- Channel Guard - a method of controlling speaker mute with a tone or digital code.
Fleet	- A fleet of users consists of multiple groups (sub-fleets). Radios can be programmed to make fleet calls to simultaneously access multiple user groups. (Trunked Mode Only)

Group Or Subfleet	- A group of users share the same program group identification number in their mobile and personal radios. All units in the same group will receive a dispatch call placed by any one unit in the group. (Trunked Mode only).
Group Scan	- Programming that allows the radio to monitor up to 48 separate groups simultaneously (multi-group decode), permitting the user to both monitor and receive calls from these groups. When a radio receives a call from one of these groups, it will “lock out”, and not send or receive calls from other groups for a programmed period of 5, 10, or 15 seconds, permitting the user to respond to the group call. (The radio may also be programmed for no lock out period.) At the end of the “lock out” period, the radio sounds two short low pitched “beeps” and is again ready to receive a call from any of the programmed groups. (Trunked Mode Only)
Individual Call	- Every radio in the system is programmed with a unique individual identification code. A mobile or personal unit can be programmed to call another particular unit by selecting the individual by name or ID number. (Trunked Mode Only)
Queueing	- The process that occurs when all channels in a trunked system are busy and calls must be addressed on a priority basis.
Site Controller	- The computer controlled radio equipment at the repeater site that controls a trunking system.
System (area)	- The terms “system” and “area” are used interchangeably to refer to the particular group of station repeaters currently providing service to the radio.
System Manager	- A computer that performs the data basing and system monitoring for the site controller.
System Scan	- A programmed feature to scan (monitor activity on) separate trunked systems and receive calls on any of these systems. (Trunked Mode Only)

Talk-around Mode	- Also referred to as “direct mode”, talk-around provides a direct unit-to-unit short range communications link. It is intended to maintain communications outside of the main system coverage area.
Telephone Inter-Connect	- This feature allows the user to initiate or receive telephone calls through the radio if the system is configured for this operation. (Trunked Mode Only)
Trunked Group	- A radio communications path shared by two or more users.
Trunked Operation	- Trunked Operation refers to the use of a set of radio frequency channels by multiple user groups. By using high speed digital data the radio goes to an unused channel when a call is initiated and will also only respond to calls in the same user group. In this way conversation privacy between user groups is assured.
Trunked Radio System	- A radio system in which a limited number of radio channels is dynamically allocated to groups of people for communication purposes.
Trunked System	- A set of one or more trunked groups.
T99	- Type 99 - a method of opening mute for selective page operations using sequential tones.
Wide Area Encode	- A programmed option which ensures all system scanning mobile and personal radios have time to lock onto the call before the initiating unit is allowed to talk.
Working Channel	- A radio channel (transmit/receive) that is automatically assigned by the site controller for voice or data communications.

OPERATOR’S RADIO SETUP

RADIO TYPE:

FREQUENCY BAND:

OPERATOR’S NAME:

EMERGENCY GROUP:

SYSTEM NUMBER	SYSTEM NAME	TRK/CNV	GRP/CHN NUMBER	GRP/CHN NAME	USE

SYSTEM NUMBER	SYSTEM NAME	TRK/CNV	GRP/CHN NUMBER	GRP/CHN NAME	USE

SYSTEM NUMBER	SYSTEM NAME	TRK/CNV	GRP/CHN NUMBER	GRP/CHN NAME	USE

SYSTEM NUMBER	SYSTEM NAME	TRK/CNV	GRP/CHN NUMBER	GRP/CHN NAME	USE

WARRANTY

- A. Ericsson Inc. (hereinafter "Seller") warrants to the original purchaser for use (hereinafter "Buyer") that Equipment manufactured by Seller shall be free from defects in material, workmanship and title, and shall conform to its published specifications. With respect to any Equipment not manufactured by Seller (except for integral parts of Seller's Equipment to which the warranties set forth above shall apply). Seller gives no warranty, and only the warranty, if any, given by the manufacturer shall apply. Batteries are excluded from this warranty but are warranted under a separate Nickel-Cadmium Battery Warranty.
- B. Seller's obligations set forth in Paragraph C below shall apply only to failures to meet the above warranties (except as to title) occurring within the following periods of time from date of sale to the Buyer and are conditioned on Buyer's giving written notice to Seller within thirty (30) days of such occurrence:
1. for fuses, incandescent lamps, vacuum tubes and non-rechargeable batteries, operable on arrival only.
 2. for parts and accessories (except as noted in B.1) sold by Seller's Service Parts Operation, ninety (90) days.
 3. for all other Equipment of Seller's manufacture, one (1) year.
- C. If any Equipment fails to meet the foregoing warranties, Seller shall correct the failure at its option (i) by repairing any defective or damaged part or parts thereof, or (ii) by making available at Seller's factory any necessary repaired or replacement parts. Any repaired or replacement part furnished hereunder shall be warranted for the remainder of the warranty period of the Equipment in which it is installed. Where such failure cannot be corrected by Seller's reasonable efforts, the parties will negotiate an equitable adjustment in price. Labor to perform warranty service will be provided at no charge only for the Equipment covered under Paragraph B.3, and only during the first three (3) months following the date of sale to the Buyer. Thereafter, labor will be charged at prevailing rates. To be eligible for no-charge labor, service must be performed by an Authorized Service Center or other Servicer approved for these purposes either at its place of business during normal business hours, for mobile or personal equipment, or at the Buyer's location, for fixed location equipment. Service on fixed location equipment more than thirty (30) miles from the Service Center or other approved Servicer's place of business will include a charge for transportation. Equipment located off-shore is not eligible for no-charge labor.
- D. Seller's obligations under Paragraph C shall not apply to any Equipment, or part thereof, which (i) has been modified or otherwise altered other than pursuant to Seller's written instructions or written approval or, (ii) is normally consumed in operation or, (iii) has a normal life inherently shorter than the warranty periods specified in Paragraph B, or (iv) is not properly stored, installed, used, maintained or repaired, or, (v) has been subjected to any other kind of misuse or detrimental exposure, or has been involved in an accident.
- E. The preceding paragraphs set forth the exclusive remedies for claims (except as to title) based upon defects in or nonconformity of the Equipment, whether the claim is in contract, warranty, tort (including negligence), strict liability or otherwise, and however instituted. Upon the expiration of the warranty period, all such liability shall terminate. The foregoing warranties are exclusive and in lieu of all other warranties, whether oral, written, expressed, implied or statutory. NO IMPLIED OR STATUTORY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE SHALL APPLY. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, SPECIAL, INDIRECT OR EXEMPLARY DAMAGES.

*This warranty applies only within the United States.
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EMERGENCY NUMBERS

Police

State Police

Fire

Poison Control

Ambulance

Life Saving and Rescue Squad

OPERATING TIPS

The following conditions tend to reduce the effective range of two-way radios and should be avoided whenever possible.

Operating the radio in low areas of terrain or while under power lines or bridges.

In areas where transmission or reception is poor, some improvements may be obtained by insuring that the antenna is vertical (particularly if a glass mount antenna is used.). Moving a few yards in another direction or moving to a higher elevation may also improve communications.

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Lynchburg, Virginia 24502

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