LBI-39012B

Operator's Manual

MDX™ Conventional Mobile Radio

ERICSSON

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NOTICE!

This manual covers Ericsson and General Electric products manufactured and sold by Ericsson Inc.

NOTICE!

Repairs to this equipment should be made only by an authorized service technician or facility designated by the supplier. Any repairs, alterations or substitution of recommended parts made by the user to this equipment not approved by the manufacturer could void the user's authority to operate the equipment in addition to the manufacturer's warranty.

NOTICE!

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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 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.

2. Interference to Vehicular Electronics Systems

   Electronic fuel injection systems, electronic anti skid braking systems, etc., are typical of the type 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 the 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 Radios"** 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.

5. Liquefied (LP) Gas Powered Vehicles

   Mobile radio installations in vehicles powered by liquefied petroleum gas with the LP gas container in the trunk or other sealed-off space

within the interior of the vehicle must conform to the **N**ational **F**ire **P**rotection **A**ssociation standard (**NEPA**) **58** which requires that:

a. The space containing the radio equipment shall be isolated by a seal from the space containing the LP gas container and its fittings.

b. Outside filling connections shall be used for the LP gas container.

c. The LP gas container shall be vented to the outside of the vehicle.

SAFE DRIVING RECOMMENDATIONS FOR USERS OF MOBILE RADIOS*

Read the literature on the safe operation of the radio.

- Keep both hands on the steering wheel and the microphone in its cradle whenever the vehicle is in motion.

- Place calls only when vehicle is stopped. Use recall dialing to speed the time it takes to call.

- When talking from a moving vehicle is unavoidable, drive in the slower lane. Keep conversations brief.

- If conversation requires taking notes or complex thought, stop the vehicle in a safe place and continue the call.

Whenever using a mobile radio exercise caution.

*As recommended by the AAA

OPERATING PROCEDURES

Two-way **FM** radio systems must be operated in accordance with the rules and regulations of the Federal Communications Commission (FCC). Operators of two-way radio equipment 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 this two-way radio remember these rules:

1. It is a violation of FCC rules to interrupt any distress or emergency message. As the radio operates in much the same way as a telephone "party line", always listen to make sure that the line is clear - that no one else in on the air - before sending messages. If someone is sending an emergency message - such as reporting a fire, or asking for help in an accident - **KEEP OFF THE AIR**! Emergency calls have priority over all other messages.

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 kept brief and confined to business. To save time, use coded messages whenever possible.

5. Using a radio to send personal messages (except in an emergency) is a violation of the FCC rules. Send only those messages that are essential for business operation.

6. It is against Federal law to repeat or otherwise make known anything overheard on the radio. Conversations between others sharing a channel must be regarded as confidential.

7. The FCC requires the operator to identify himself at certain 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 adjustments shall be made to the equipment except by an authorized or certified electronics technician.

INTRODUCTION

This manual describes how to use the MDX Conventional Mobile Radio. The MDX is a synthesized, microprocessor-based, high performance simplex mobile FM radio providing reliable two-way communications. Direct mobile to mobile communication, when out of repeater range, is also provided.

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 and 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 your MDX radio.

The following feature encrypted options are standard with the MDX conventional mobile radio:

PMPL3M	Serial Control Unit (Control Head Operation)
PMPL3K	Scan, Dual Priority
PMPL3F	16 channel operation
PMPL3G	32 channel operation
PMPL3H	64 channel operation
PMPL3J	128 channel operation

The following feature encrypted options can also be ordered:

PMPL3C	Type 99 Decode
PMPL3D	Public Address and External Speaker Switch (Requires option PMSU5A)
PMPL3E	Emergency (GE-STAR) and GE-STAR ANI

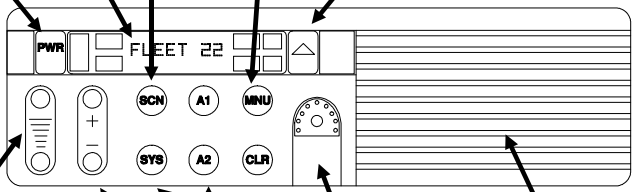
8-Character Alphanumeric Dot Matrix LED allows you to identify channel selections by descriptive names. Names, menu options, and status information are displayed here.

MENU button allows access to functions and options, including scan add/delete for modifying the radio's scan list and alarm on/off for the external alarm option that uses your horn or head lights to signal an incoming call.

Emergency ID/ Alarm (optional) sends an emergency (GESTAR) alert and identifying code to the dispatcher. If no emergency function is required, this can be programmed as a "HOME" switch.

Scan Button enables scan operation for the selected system.

PWR



Volume Up/Down Ramp sets the volume of the received audio.

Channel/SEL Ramp scrolls through the names of channels programmed into the radio, displaying them on the Dot Matrix display.

Two Flex Keys give you one-touch access to the menu or optional features. Optional keycaps are available to identify the functions of pre-programmed buttons, including T99 decode, Scan Add/ Delete, Public Address, Home, Private, External Alarm, and display brightness.

Front-Mounted Microphone Connector provides easy access to the microphone and programming capabilities.

System Key scrolls through the names of the system (groups of channels) programmed into the radio, displaying them on the Dot Matrix display

Front Mount Speaker with 4 watts of audio. An optional 10-watt external speaker is also available, for use in noisy environments.

Figure 1 - MDX SCAN Radio

CONTROLS, INDICATORS, AND DISPLAYS

The MDX Conventional mobile radio contains ten buttons, an eight character DOT MATRIX display and seven indicators (see Figure 1). In addition, there are times when part of the eight character display is used to display the radio status. Backlighting on buttons illuminate the Legends.

CONTROLS

POWER — Momentary push-push switch. Press once to turn the radio ON. Press again to turn the radio OFF.

VOLUME — The momentary switches (auto ramping) VOLUME + and VOLUME -. Beeps each time the VOLUME button is pressed, except when a call is in process. Hold the button (up or down) to auto ramp the volume.

MENU — Momentary switch. The **MENU** button is used to access options on the MDX mobile. Menu operation is coupled with the **CHANNEL/SEL** buttons and the **CLR** button. To increment from one menu selection to the next, simply press and release the **MENU** button. Press the **CLR** button to return to normal operation. The menu choices are listed below with a description of how to change the choices (Note: You may have some or all of these menu choices programmed in your radio, and they may be programmed in a different order than presented here).

BACKLIGHT: Press the **MENU** button until "BRIGHT" appears in the display. To change the state of the backlight press the CHANNEL/SEL + or - button.

PUBLIC ADDRESS: Press the **MENU** button until "PUB ADDR" appears in the display. Press PTT to transmit in PA mode.

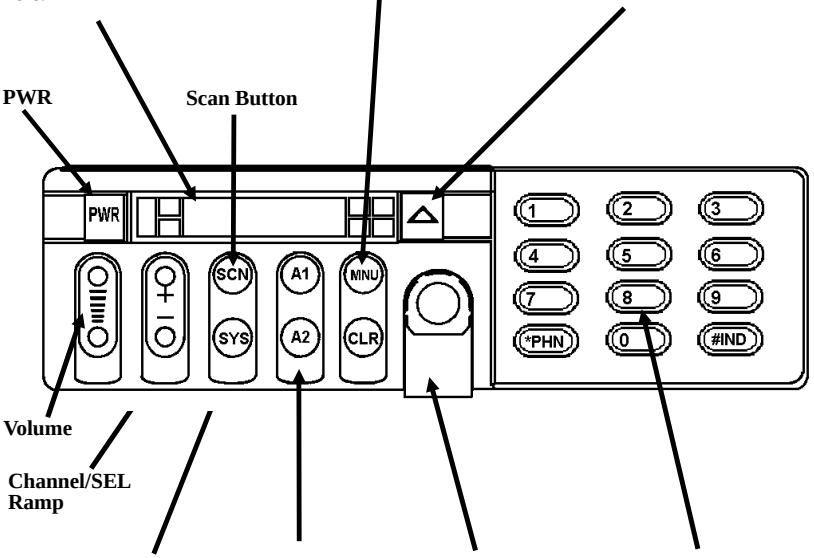
SCAN ADD/DELETE: Press the **MENU** button until "SCAN A/D" appears in the display. Use the **CHANNEL/SEL-** button to step through the group selections for the current system. Use the **CHANNEL/SEL +** button to change the scan state. An "S" is illuminated to the right of the display if the group/channel has SCAN enabled.

CONTROLS, INDICATORS, AND DISPLAYS

8-Character Alphanumeric Dot Matrix LED allows you to identify channel selections by descriptive names. Menu options, and status information are displayed here.

MENU button allows access to functions and options, including scan add/delete for modifying the radio's scan list and alarm on/off for the external alarm option that uses your horn or head lights to signal an incoming call.

Emergency ID/ Alarm (optional) sends an emergency alert and identifying code to the dispatcher. If no emergency function is required, this can be programmed as a "HOME" switch.



System Switch scrolls through the names of the systems and/or channels programmed into the radio, displaying them on the Dot Matrix display.

Two Flex Keys give you one-touch access to the menu or optional features. Optional keycaps are available to identify the functions of pre-programmed buttons, including Scan Add/ Delete, Public Address, Home, Private, External Alarm, and display brightness.

Front-Mounted Microphone Connector provides easy access to the microphone and programming capabilities.

System Keypad 10-watt external speaker must be used with the System model.

Figure 2 - MDX System Radio

CONTROLS (CONT'D)

MENU - Cont.	**ALARM ON/OFF:** Press the **MENU** button until "ALM ON" or "ALM OFF" appears in the display. Press the **CHANNEL/SEL +** or **-** buttons until the desired state is selected. (Note: This enables or disables the external alarm, e.g. horn or lights.)
SQUELCH	Press and hold "Scan" button, use "volume" up to loosen squelch and down to tighten squelch.
SYS	Momentary switch. The **SYS** (SYSTEM) button is used to select system changes. System may be incremented by pressing and releasing the **SYS** button. Alternately, when the display shows the System name, the CHANNEL/SEL buttons may be used to increment or decrement the system selections. (NOTE: The radio may be programmed with wrap around on the system selection; this would allow the radio to switch from the highest to lowest system with one change instead of ramping all the way through the list.)
CHANNEL/SEL	Ramp Switch. The **CHANNEL/SEL** button is used to increment or decrement the current channel selection. It is also used as described above to increment/decrement the System. In conventional mode, these buttons change the channel selection.
CLR	Momentary switch. The **CLR** button is used to exit from the menu operation, monitor a conventional channel or end a special/individual call.
HOME/ EMERGENCY	Momentary switch. The **HOME** or **EMERGENCY** button is used to select a home system, or channel. The radio may be programmed to revert to a particular system or channel within the selected or home system. It may also be programmed to send an emergency message (GESTAR) when pressed and held for approximately one second (either on the selected system or on the Home system).
FLEX KEYS A1, A2	The auxiliary buttons are used to access frequently used menu selections quickly. They can also be programmed as a HOME, External Alarm, Public Address, T99 decode, Private, and Scan add/delete.

NUMERIC KEYS 1-9, 0, *, #	On system radio, the twelve button keypad permits transmission of DTMF digits.

DISPLAY INDICATORS

The radio's display is shown in Figure 3. The character line is used to display system or area and group or channel names and also operational messages to the user. The line contains eight Dot Matrix LED characters. The 7 status indicators are used to show the various operating conditions of the radio.

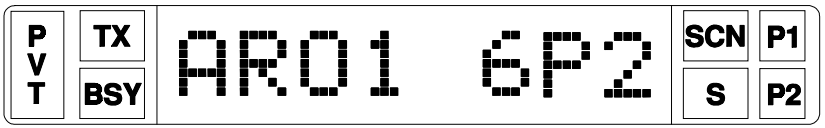


Figure 3 - Sample MDX Display

TX	On indicates the radio is transmitting.
BSY	Lights when a channel is busy (RF carrier present).
SCN	ON indicates scan is enabled.
S	ON indicates channel in scan list.
P1	ON indicates selected channel is a priority 1 channel.
P2	ON indicates selected channel is a priority 2 channel.
PVT	ON indicates selected channel has been pre-programmed for AEGIS operation. Flashes indicates receiving an encrypted digital voice call.

DISPLAY ALPHA INDICATORS

The radio is capable of displaying status indicators in the alpha display. Some of these messages will use the entire display while others use only two or three characters. When the short message is displayed, it may be on the right or left of the display (PC programmable). It is separated from the normal information with an indicator such as an asterisk ("*").

T99	T99 call received alternates with current channel display.
T99 On	Menu display indicating T99 option is enabled.

DISPLAY ALPHA INDICATORS - Cont.

T99 Off	Menu display indicating T99 option is disabled.
Pub Addr	Public address option enabled.

ALERT TONES

The MDX Conventional mobile radio generates a set of unique alert tones to indicate operating status. The following section identifies and describes the alert tones used in the MDX radio.

SELF CHECK TEST ALERT	One beep is sounded after the radio is turned on to indicate that the radio has passed the self diagnostic test. Optional in PC programmer.
CALL DISABLED ALERT	You will hear a continuous low pitched tone when your radio is set to a receive (decode) only channel and you press PTT on the microphone. This tone indicates that you are not allowed to place a call on this setting.
CARRIER CONTROL TIMER	The Carrier Control Timer alert is a pulsing pitched tone you will hear whenever you have kept the PTT button continuously pressed for a preprogrammed length of time. The transmitter shuts down when the pulsing low pitched tone starts, interrupting communications. To maintain communications, release and re-key the microphone. This resets the timer and turns the transmitter back on. The CCT is a built in precaution against extended use of the system.
T99 CALL RECEIVED	After decoding a T99 call, the received signalling 2-tone is sounded to alert you of the incoming call.

OPERATING THE RADIO

TURNING THE RADIO ON

1. Push the POWER switch. The display shows the channel alpha name once power up is complete. When powering up, the last selected Channel should be displayed unless the radio is programmed for a preprogrammed power up. The radio optionally generates a beep once the power up sequence is complete.

2. Set the volume using the VOLUME RAMP button. A short beep sounds each time the VOLUME button is pressed. The beeps will not sound if a call is being received.

SELECT

To select a different channel when you have selected a conventional system:

1. Press the **CHANNEL/SEL** + or - ramp button until the desired channel name appears in the alphanumeric display. A tone sounds each time the channel name changes unless the **BSY** indicator is on.

FRONT PANEL SQUELCH ADJUSTMENT

The squelch setting of the radio can be adjusted by the user through the front panel controls. There are a total of 256 steps used internally to the radio for the squelch level adjustment. The front panel allows adjustment through a portion of that range.

With the radio on a conventional channel, press and hold the SCN button. Then use the VOLUME ramp button to open and close the squelch. After setting the squelch to the desired setting, release the SCN button to return the radio to normal operation.

RECEIVING A CALL

1. Make sure that the radio is turned ON, and the proper channel is selected using the **CHANNEL/SEL** + or - ramp button and the **SYS** button.

2. Press the **CLR** button to monitor the channel. Noise will be heard if there is no activity on the channel. This function is also useful for setting the desired volume level.

3. You will hear the voice message automatically if a valid message is received by your radio.

SENDING A MESSAGE

1. Make sure the radio is turned ON, and the proper Channel and System have been selected.

2. Press and hold the CLR switch and then adjust the VOLUME controls for the desired listening level. Release CLR switch.

3. Decide what you want to say. If you intend a lengthy message (or several messages), the vehicle engine should be running to maintain the battery charge.

4. Observe the BSY indicator and then press CLR the switch to assure that the channel is not in use.

5. Remove microphone from the hanger, press the PTT switch and identify yourself. The **TX** indicator will be shown each time the PTT switch is pressed.

6. Release the PTT switch and wait for an answer to your call. Then complete your message.

7. When the PTT switch is pressed continuously for a pre-programmed time (default of 30 seconds), the carrier control timer (if enabled) will sound a pulsed alert tone and unkey the transmitter. Release and press the PTT switch again to reset the timer and resume conversation.

NOTE

Always speak in a normal tone of voice. Hold the microphone cupped in your hand and touching your cheek lightly. Speak across the face of your microphone, not directly into it. Shouting will degrade your transmission, so do not speak any louder than normal.

SCAN OPERATION

SCAN SETUP

You may program your radio to scan a number of Channels for activity on the selected system.

Starting Or Stopping SCAN

Press the SCAN button to alternate between Scan on (SCN indicator illuminated) and Scan off (indicator dark).

Adding/Deleting To/From SCAN

SCAN should be off before changing the SCAN list.

1. Press the menu button until SCAN A/D is displayed.

2. Press the CHANNEL/SEL (-) button until the CHANNEL name is displayed.

3. Press the CHANNEL/SEL (+) button until the desired priority level is displayed by the scan priority indicators on the right side of the display; the choices are S, P2; P1 or all off (all off removes the channel from the SCAN list).

4. Press the CLR button when completed to return to normal operation.

If your radio has one of the auxiliary keys preprogrammed to edit the SCAN list, the list may be changed by using the CHANNEL/SEL buttons to display the CHANNEL name, and then pressing the auxiliary key until the desired level is displayed.

NOTES

1. The radio will remember the scan state through a power cycle unless programmed with a predefined power up state.

2. The radio may be programmed to stop scanning when the microphone is removed from the hookswitch.

3. When the radio is programmed, a FIXED SCAN list can be specified. If this is done, the SCAN list cannot be changed.

4. A previous channel with priority will become a non-priority scan channel when a new priority channel is programmed.

The SCAN function allows monitoring of up to 16 receive channels on the selected system. The scanned channels may be any frequency within the frequency band limits of the radio and may be Channel Guard protected. All scan functions are retained in memory, even if the 12 Volt vehicle battery is disconnected.

Any channel may be scanned with or without a priority level. One channel may be programmed for Priority 1 (P1) and another for Priority 2 (P2) with any or all remaining channels programmed as non-priorities.

RECEIVER SCAN RATE

The scan rate for the radio will vary depending upon the number of channels programmed into the scan list and whether or not Channel Guard is programmed. The scan rate will be faster when fewer channels are programmed into scan memory.

Scan operation will be determined by the following conditions:

- PRIORITY 1, PRIORITY 2 and NON-PRIORITY PROGRAMMED
  The Priority 1, Priority 2 and up to 14 remaining channels will be scanned. Once a carrier is detected (and if programmed, the correct Channel Guard is decoded), the display will indicate that channel. Sampling of the Priority 1 and Priority 2 channels continues while receiving a message. Should a Priority 1 or 2 channel carrier (and correct Channel Guard) be detected while a non-priority channel is being received, the applicable indicator, P1 or P2 lights, and the channel is switched to the Priority 1 or 2 channel regardless of what is being received on the non-priority channel.

- NON-PRIORITY PROGRAMMED
  Up to 16 non-priority channels may be scanned. Once a carrier is detected (or correct Channel Guard is decoded) the digital display will indicate that channel. Scanning will stop and remain on the channel until the carrier disappears; after a few seconds scanning resumes. The channels are scanned in descending order.

USING THE RADIO WITH SCAN

The Selected Channel

The SELECTED channel is the channel in the display when scan is turned on by pushing the SCAN switch. When a signal is not being received, the radio reverts to this channel for transmitting. When a signal is being received, the radio can be PC programmed to either revert to the SELECTED channel or remain on the received channel for transmission.

The SELECTED channel does not necessarily have to be a channel in the scan list. The SELECTED channel will be temporarily entered into the scan list and scanned until the SELECTED channel is changed.

When scan is turned off by pushing the SCAN switch, the radio will return to the SELECTED channel.

Display

Channel indicator

While no signal is being received, the channel indicator will always show the SELECTED channel. When an active channel is received, the channel indicator will show the received channel.

SCN indicator

When the SCAN button is pushed, the radio will light the SCN indicator and begin scanning. The SCN indicator will flash when the microphone is placed off-hook to show the radio is no longer scanning (only if the radio is PC programmed not to scan off-hook).

Transmitting While In Scan:

Transmitter operation in scan is determined by the PC programming of the radio's personality. A flow chart is provided in this section to summarize the scan operation described below.

- Off-hook scan not enabled (default):

  With off-hook scan not enabled (normal default condition), all scanning will stop when the microphone is placed off-hook. The SCN indicator will flash to show all scanning has stopped. If a signal is not being received when the mic is placed off-hook, the radio will transmit on the SELECTED channel. If a signal is being received when the mic is placed off-hook, the radio can be PC programmed (using the "scan transmit option") to either stay on the receive channel or revert to the SELECTED channel. When the mic is placed back on-hook, the radio will immediately start scanning, even if the received channel was still active.

- Off-hook scan enabled:

  With off-hook scan enabled, moving the microphone off-hook will not affect scan operation. The radio will continue scanning. If a signal is not being received, the radio will transmit on the SELECTED channel. If a signal is being received, the radio can be PC programmed (using the "scan transmit channel" option) to either stay on the receive channel or revert to the SELECTED channel when the mic PTT is keyed.

- On-hook

  When the microphone is on-hook (in the microphone hanger) and the radio is not receiving a channel, the radio always transmits on the SELECTED channel.

  When the radio is receiving a channel the radio's personality can be programmed to transmit either on the received channel or the SELECTED channel. If the radio was programmed for the SELECTED channel, the display changes to the SELECTED channel when the transmitter is keyed.

Monitor (CLR) Switch Operation In Scan

The CLR switch does not operate while scanning inactive channels. When a channel becomes active, the CLR switch operates only during the scan hang time after the channel activity disappears.

Channel Changes In Scan

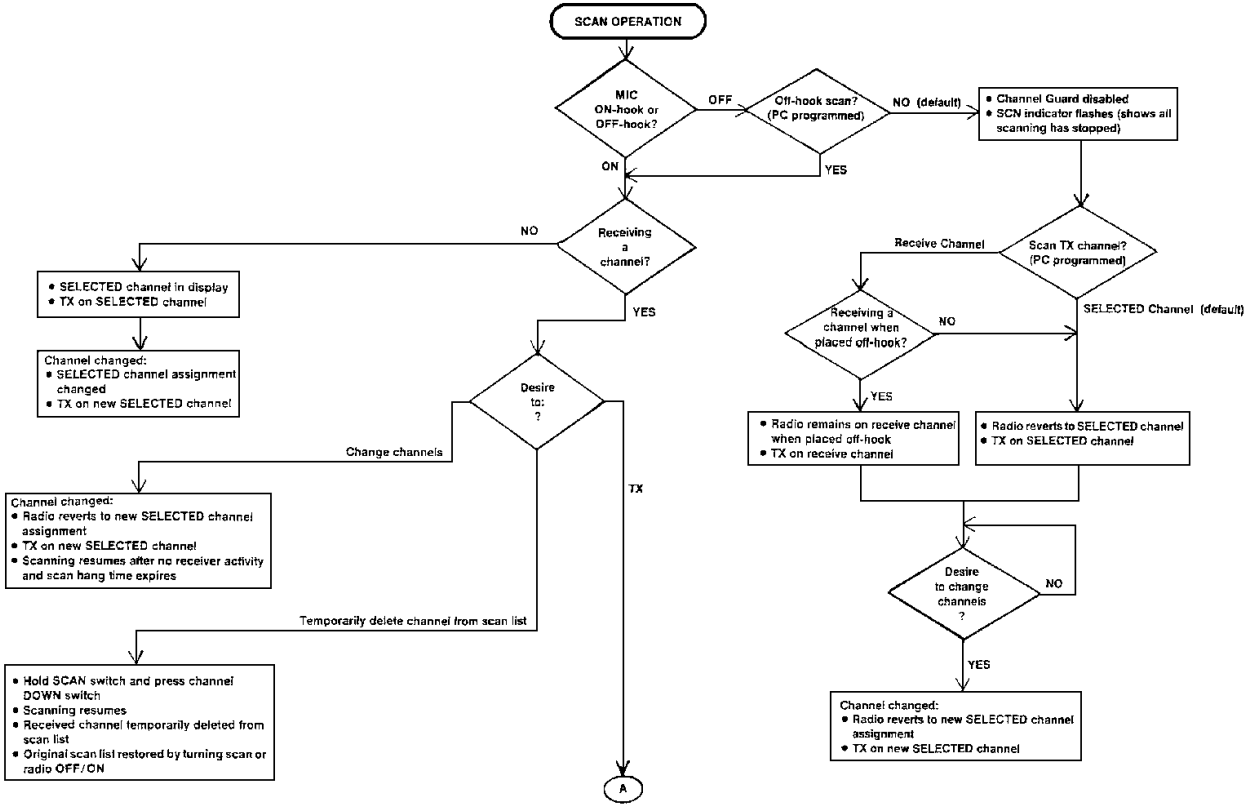
Pushing the channel switches (UP or DOWN) while scan is turned on will change the SELECTED channel assignment. If a signal is being received and the channel switches are pushed, the radio will revert to the new SELECTED channel assignment. After 2 seconds, if no activity appears on the new SELECTED channel, scanning will resume. If the SELECTED channel is changed to a channel not in the scan list, the new channel will be temporarily added to the scan list until the SELECTED channel is changed again.

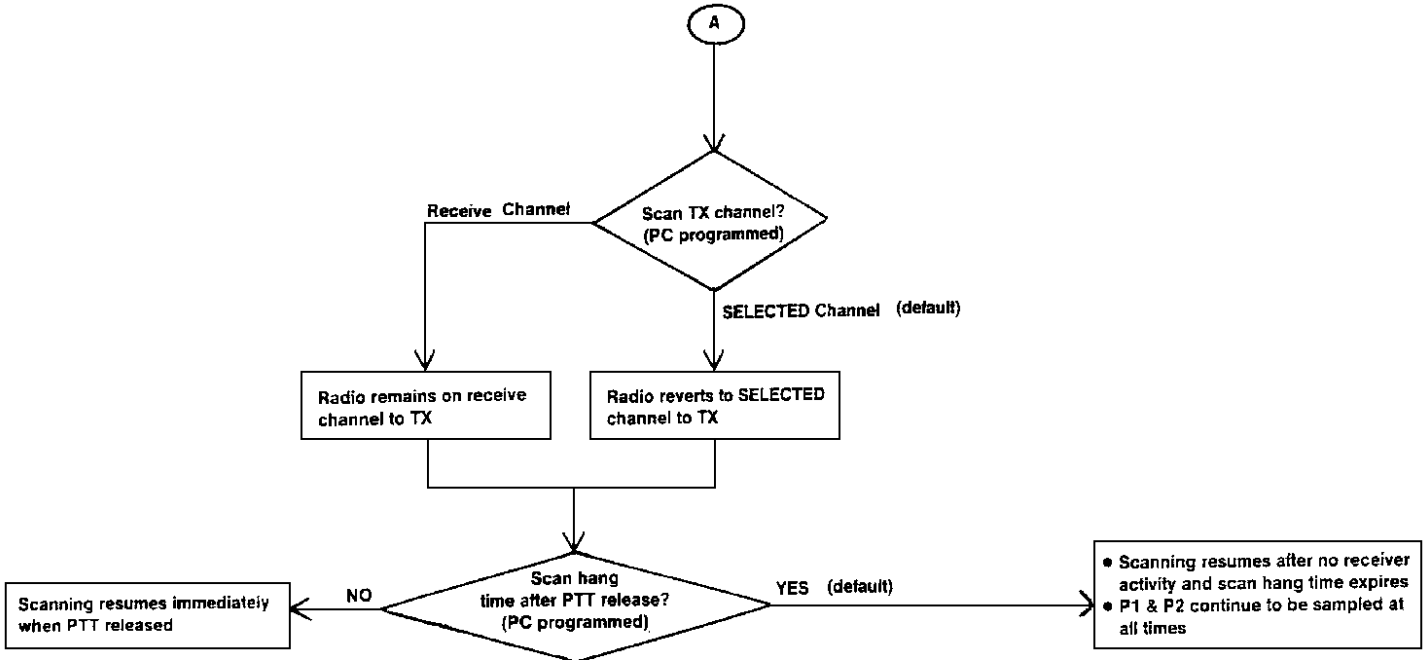
- Temporary channel deletions

  The SCAN function must be turned off to make any permanent changes (additions, deletions, re-priorizations) to the scan list. While in scan, temporary channel deletions may be made to the scan list. The original scan list will be back in effect by either turning scan off (by pushing the SCAN switch) or by turning the radio power off and back on.

  When the radio stops scanning on an active channel, the channel may be temporarily deleted by holding the SCAN switch and then pressing the CHANNEL/SEL (–) switch. The radio will immediately resume scanning while skipping over the temporarily deleted channel.

  Temporary deletions cannot be made until the radio stops on an active channel. P1 and P2 channels cannot be temporarily deleted.


SCAN OPERATION
MIC ON-hook or OFF-hook?
OFF
Off-hook scan? (PC programmed)
NO (default)
• Channel Guard disabled
• SCN indicator flashes (shows all scanning has stopped)
YES
ON
Receiving a channel?
NO
• SELECTED channel in display
• TX on SELECTED channel
Channel changed:
• SELECTED channel assignment changed
• TX on new SELECTED channel
YES
Desire to: ?
Change channels
Channel changed:
• Radio reverts to new SELECTED channel assignment
• TX on new SELECTED channel
• Scanning resumes after no receiver activity and scan hang time expires
Temporarily delete channel from scan list
• Hold SCAN switch and press channel DOWN switch
• Scanning resumes
• Received channel temporarily deleted from scan list
• Original scan list restored by turning scan or radio OFF/ON
TX
A
Receive Channel
Scan TX channel? (PC programmed)
SELECTED Channel (default)
Receiving a channel when placed off-hook?
NO
YES
• Radio remains on receive channel when placed off-hook
• TX on receive channel
• Radio reverts to SELECTED channel
• TX on SELECTED channel
Desire to change channels ?
NO
YES
Channel changed:
• Radio reverts to new SELECTED channel assignment
• TX on new SELECTED channel


A
Scan TX channel?
(PC programmed)
Receive Channel
SELECTED Channel (default)
Radio remains on receive channel to TX
Radio reverts to SELECTED channel to TX
Scan hang time after PTT release?
(PC programmed)
NO
YES (default)
Scanning resumes immediateiy when PTT released
• Scanning resumes after no receiver activity and scan hang time expires
• P1 & P2 continue to be sampled at all times

NOTES

Each channel can be programmed for ANALOG Voice, Aegis Digital Voice, or Aegis VGE Encrypted Digital Voice mode of operation by programming the "KEY" variable.

When programmed "DIS", a channel will only operate in the ANALOG mode. ANALOG voice calls can be easily monitored by unauthorized persons.

When programmed "DIG", a channel will only transmit Aegis Digital Voice. Aegis Digital Voice and ANALOG Voice calls can be received.

When programmed "1-6", a channel will transmit Aegis VGE Encrypted Digital Voice. Valid cryptographic keys must be loaded into the MDX using the Universal Key Loader. The "PVT" icon (indicating encrypted mode is on) can be turned on and off using one of the AUX keys or by chosing "FORCED" as the mode of operation in the programmer.

VOICE MODES

Each system in the radio can be programmed for Aegis communications. Aegis programmed systems have two (2) different voice modes: clear (analog) and digital. The voice modes are programmmed 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 mode.

TRANSMIT/RECEIVE MODE COMPATIBILITY FOR AEGIS OPERATION

CHANNEL PROGRAMMING (TRANSMIT)	CLEAR RECEIVE	DIGITAL RECEIVE
CLEAR	YES	NO
DIGITAL	YES	YES

NOTE

Conventional Aegis requires Channel Guard on the channel to operate correctly.

CLEAR MODES

In clear mode the radio transmits and receives only analog voice signals. These analog signals are non-digitized and non-encrypted. Clear mode transmissions can be easily monitored by unauthorized persons. Channels programmed for clear operation cannot transmit or receive Aegis digital 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. Channels programmed for Aegis digital operation transmit only digital signals.

Phone and emergency calls will be transmitted clear if digital mode is disabled or inoperative.

DTMF

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

AEGIS VGE DIGITAL MODES

The Aegis VGE digital mode allows the radio to transmit encrypted messages and receive clear or digital transmissions. The radio will transmit digital if the channel is programmed for digital operation and forced operation is pre-programmed. If autoselect operation was pre- programmed and the radio is in digital 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 digital.

AEGIS transmissions cannot be received by a radio set to receive VGE digital transmission. Accordingly, a VGE digital transmission cannot be received by a radio set to receive a AEGIS transmission.

Cryptographic keys are transferred to the radio using a cryptographic Keyloader. Up to six (6) different cryptographic keys, numbered 1-6, can be transferred from a Keyloader and stored in the radio. An individual key is automatically selected on a per-channel basis according to the radio's programming. Channels within AEGIS systems can be programmed for keys 1-6. Channels within VGE digital systems can be programmed for keys 1-6.

VGE digital radios require a VGE Keyloader (Option 4028 with software version 2.n or later).

When operating on a channel programmed for digital mode, all transmissions will be digital transmissions and the radio will receive clear and digital signals. The PVT light turns on when the private mode is enabled. If the selected channel is programmed for autoselect capability, the mode may be toggled between digital and clear with the flex keys (A1, A2). Radios programmed for forced operation do not allow a change of the transmit mode; therefore, the flex keys would have 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 microphone connector on the radio unit.

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 (MNU) button to access the menu options, then press the (MNU) button repeatedly 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 microphone connector. Press the (CLR) button to exit the keyload operation. The radio will change to the selected channel as indicated in the display.

DISPLAYING THE CURRENTLY USED CRYPTOGRAPHIC KEY NUMBER

To display the cryptographic key currently in use for the channnel, perform the following procedure:

1. Press the (MNU) button.

2. Use the (MNU) button to select **DISP KEY**.

3. Then use the CHANNEL/SEL button to toggle between displaying the system key or the channel key.

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

KEY ZERO

All cryptographic keys can be zeroed (erased from radio memory) by pressing the (CLR) button and while still pressing this button, press and hold the OPT button. 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 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 VGE digital communications may continue.

VGE DIGITAL OPERATION

RECEIVING AN ENCRYPTED CALL

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

TRANSMITTING AN ENCRYPTED CALL

1. Select the desired channel.

2. Place the radio in digital mode by pressing the PVT button (flex key (A1), (A2)). When digital mode is enabled, the PVT light will be on.

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

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

If the radio is programmed for digital mode operation, **FRCD PVT** will be displayed if an attempt is made to disable digital transmit mode. It is not possible to transmit on this 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 digital mode access tone will be heard when the PTT button is pressed.

Outside Address

The same outside address (works with similar to Channel Guard operation) must be programmed in the transmitting and receiving radios when Aegis digital 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 digital 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.

OPTIONS

Type 99 Option

If the Type 99 Option is present, individual selective calling is possible. Press the programmed Flex key or use the menu and CHANNEL/SEL keys to enable the decoder option (Scan must be off). The LED display will show the option status: "T99 ON" or "T99 OFF". Press the button a second time to toggle the option status. The display will revert to normal channel display after 5 seconds. When a call is received, an alert tone will be heard and the display will flash, alternately "T99" and the channel selected. After receiving the call, press the CLR button to reset the decoder for the next call. The display will stop flashing.

If a call was received and the display is flashing, the CLR button must first be pushed before the T99 option may be disabled.

If the Horn Alert option is present with the Type 99 option, the radio can beep the vehicle horn when a Type 99 call is received. This option permits alerting persons out of the vehicle when a call is received. The Horn ON/OFF switch which is mounted on or near the radio is used to turn off the horn beep relay.

Public Address Option

If the Public Address Option is present, the radio may be used as a public address amplifier. Press the programmed Flex key (or use the menu) to enable the option (Scan must be off). The display will show "PUB ADDR". When the microphone PTT switch is keyed, the radio no longer transmits, but allows the microphone audio to feed the speaker. Adjust the VOLUME for desired level. Press the Flex key or use the CHANNEL/SEL a second time to disable the option. The display will revert to normal channel display. Changing channels or turning scan on will also turn the option off.

The public address microphone audio normally feeds an external speaker. An ON/OFF switch, which is mounted on or near the radio, allows selecting either the internal or external speaker for the receiver audio. The ON/OFF switch turns the receiver audio on or off to the external speaker. This switch still functions for the receiver audio with the PA option disabled.

1. Make sure the radio is turned ON.
2. Press the **MNU** button until **PUB ADDR** appears in the display. Press the PTT switch to transmit the microphone audio to the external speaker.
3. When the PA operation is completed, press the **CLR** button to return to normal operation.

OR

1. Make sure the radio is turned ON.

2. Press the **A1** or **A2** button (pre-programmed). When **PUB ADDR** appears in the display press the PTT switch to transmit the microphone audio to the external speaker.

3. After the PA operation is completed, press the **A1** or **A2** button to return to normal operation.

INTERNAL/EXTERNAL SPEAKER

When the Internal/External Speaker Option PMSU5A has been installed along with an external speaker, the operator can select either speaker one of two ways.

1. Set the ON/OFF switch on the option box to the ON position to select the external speaker and disable the internal speaker. Place in OFF position to select the internal speaker only.

OR

1. Press the **A1** or **A2** button (pre-programmed) to select the external speaker and disable the internal speaker. Press the **A1** or **A2** button again to select the internal speaker only.

AVAILABLE OPTIONS

The following equipment options are available for the MDX radio. Refer to your local radio supplier for ordering information.

MDX Conventional Optional Accessories

Option	Description	Part Number
PMAN1R	VHF/UHF roof mount antenna with TNC connector	19B209568P6
PMCC9M	External speaker cable, 18 inches	19A149590P10
PMCD1W	External speaker cable, 16 feet, requires option PMZM1K	19A149590P10
PMCD7W	9’ Power Cable	19B801358P18
PMCD7Z	External option cable, 2 feet	19C851585P14
PMCD9A	Power Cable, 18 feet	19B801358P17
PMLS1F	Speaker, MIL-STD-810C & D, 5" x 5", requires options PMCD7Z & PMCC9M	19A149590P1
PMMA1L	Desk mounting wedge for station use.	19C851086P14
PMMA1M	Spare mounting bracket	19A138051G11
PMMC3X	Desk microphone for station use.	19C851086P14
PMMC5K	DTMF microphone	344A4611P1
PMMK3D	Round pushbutton kit with commonly used legends. Includes button extraction tool.	344A4254G2
PMPD1A	Noise suppression kit	19A148539G1
PMPS1K	Power supply, 120/240V, 50/60 Hz, 13A. For station use.	19A704647P12
PMSU1C	Alarm (horn) relay kit, requires option PMCD7Z	19A705499P1
PMZM1K	External speaker kit, requires option PMCD7Z, includes options PMLS1F and PMCC9M	
	PROGRAMMING OPTIONS	
TQ3370	Programming Interface Module Kit	
TQ3372	Programming Cable	
TQ3346	PC Radio Programmer	

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 change 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.

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.
1-800-528-7711 (Outside USA, 804-528-7711).

NOTES

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.

Obstructions such as mountains or buildings between the vehicle sending and the system/person receiving the message.

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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