



GTX[™]

Mobile Radio for LTR[®] Systems

Trunked Mobile Radio User Guide



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GENERAL INFORMATION

Thank you for purchasing the Motorola GTX LTR[®] mobile radio. The GTX mobile radio offers ten (10) trunked modes with eight (8) talkgroups per trunked mode, and ten (10) conventional channels. The GTX mobile radio is available in the 800 MHz and 900 MHz frequency ranges. Intelligent and flexible software increases the radio's capability and permits many of the radios' features to be customized for you.



WARNING: When installing or removing the mobile radio from the vehicle, the radio must be turned off.

WARNINGS, CAUTIONS, AND NOTES

Throughout the text in this publication, you will notice the use of **Warnings**, **Cautions**, and **Notes**. These notations are used to emphasize that safety hazards exist, and care must be taken or observed.



WARNING: An operational procedure, practice, or condition, etc., which may result in injury or death if not carefully observed.



CAUTION: An operational procedure, practice, or condition, etc., which may result in damage to the equipment if not carefully observed.

NOTE: An operational procedure, practice, or condition, etc., which is essential to emphasize.

MULTIPLE SELECTION

Each trunked mode may have its own unique set of talkgroups, Call Alert paging, and Private Conversation calls. After a trunked mode has been selected, there is a delay of approximately one second before the radio can receive or transmit calls.

TALKGROUP SELECTION

A trunked system can be divided into different talkgroups. This enables the system owner to organize the talkgroups into communication groups according to function. Members of a specific talkgroup hear only messages intended for their talkgroup. For example, if talkgroup B is selected, you will not receive messages for talkgroup E.

FEATURES AND ADVANTAGES OF TRUNKING

The GTX mobile radio can operate on both trunked and conventional radio systems. Conventional typically refers to radio-to-radio communication, sometimes through a repeater.

A trunked radio system allows a large number of users to share a relatively small number of frequencies without interfering with each other.

The air time of all the repeaters in the trunked system is pooled, which maximizes the amount of air time available to any one radio, and minimizes channel congestion.










Some of the overall key benefits of an LTR Trunked Radio System are:

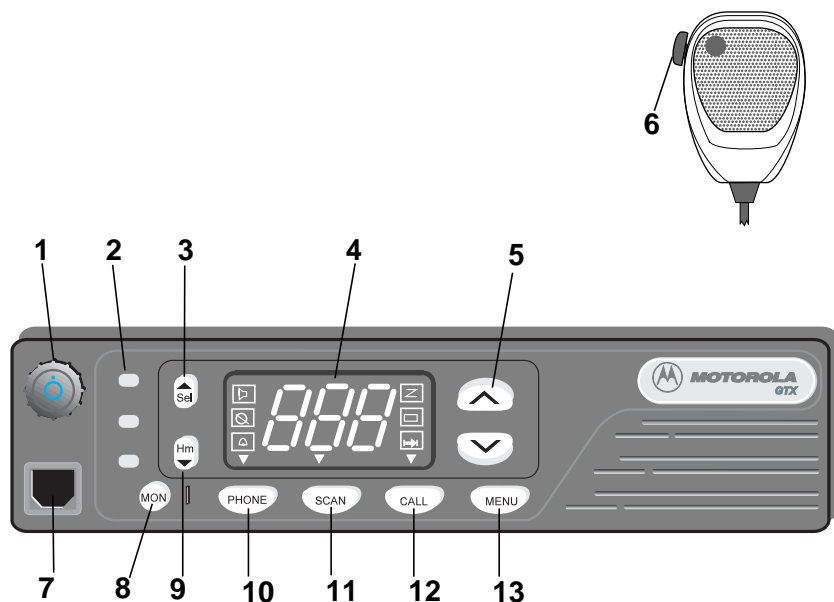
- No channel monitoring required prior to transmission.
- Improved system access.
- Automatic channel selection.
- Increased privacy among members of the same group.

When an LTR trunked radio user wants to communicate with another radio, the user's radio sends a "channel request" to the home repeater. The system then sends back a "channel grant" to the user's radio. The channel grant message contains the number of a "go to" repeater to tell the radio which repeater to use. This "go to" repeater can be the same as the radio's home repeater or another repeater in the system.

The radio uses the "go to" repeater for transmission. Once the transmission has ended, this repeater is available for other users.







CONTROLS, BUTTONS, INDICATORS, AND CONNECTORS

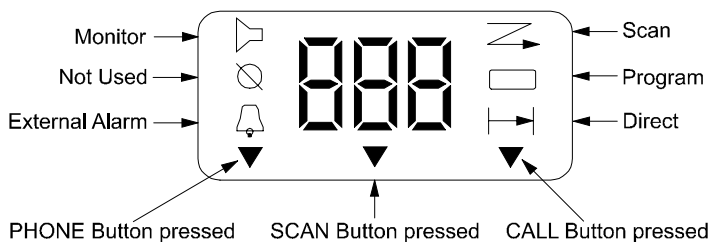
1. Radio ON/OFF Volume Control Knob
2. LED (Light Emitting Diode) Indicators
 - RED: lights continuously when the radio is transmitting.
 - YELLOW: lights continuously when the radio is receiving.
 - Not used
3. Select Button  : Press to:
 - select a displayed feature
 - select a trunked mode or conventional channel
4. 3-Character Display
5. Talkgroup Select Buttons   : Press to select a talkgroup
6. Push-to-Talk (PTT) Button
7. Microphone Jack
8. Monitor Button  : Press to monitor a channel
9. Home Button  : Press to:
 - exit a feature
 - exit a system or menu
 - select a trunked mode or conventional channel
10. Phone Button  : Press to answer or make a telephone call
11. Scan Button  : Press to turn scan on or off
12. Call Button  : Press to activate Horn & Lights
13. Menu Button  : Press to display the menu features



DISPLAY ICONS

The display icons which appear on the display are:

-  External Alarm Selected
-  Scanning
-  Not in Use
-  Programming
-  Monitor
-  Direct



DISPLAY CHARACTER SUMMARY

The GTX LTR radio has a 3-character display.

- Trunked modes appear on the left side of the display. This can be any digit between 0 and 9 (0=mode 10).
- Talkgroups appear on the right side of the display. This can be any letter between A and P.
- Conventional Channels sequentially follow the last trunked mode and appear as 2-digit numbers on the right side of the display. The indication that the radio is on a conventional channel is seen when the display does not indicate a letter or special character.

Self test

When the radio is turned on, this display appears while the self test is in process.



Telephone Interconnect

This display indicates you have received an in-coming phone call.



ALERT TONE INDICATORS

The GTX radio generates a number of audible tones to indicate radio operating conditions:

Tone	Indication	Description
Very short, high-pitch tone when radio is first turned on	Successful Power-Up	Indicates that the radio passed its power-up self test and is ready for use.
Continuous, low-pitched tone when radio is first turned on	Unsuccessful Power-Up	Indicates that the radio failed its power-up self test and is not ready for use. Contact your nearest Motorola Service Representative.
Two, medium-pitched tones and one, high-pitched tone	Talk Permit	Indicates you have access to transmit. The radio holds access for about three seconds. Press the PTT and begin your transmission.
Continuous, low-pitched tone when PTT is pressed.	Talk Prohibit	An unsuccessful attempt to access the system. Try again later when in a better location.
Short, high-pitched tone	Valid (Good) Key Press	Indicates that the key instruction was accepted.
Short, low-pitch tone	Invalid (Bad) Key Press	Indicates that the key instruction was rejected.
Continuous, low-pitched tone when PTT is pressed	Time-Out Timer Warning	Your radio's time-out timer limits the duration of your transmission time. When you first hear this tone, you have four seconds before the allotted time will expire.
15-20 second high-pitched tone	Telephone Time-Out Timer Warning	Indicates that you have 15 to 20 seconds to complete your conversation before the telephone call is disconnected.
Continuous, low-pitched tone	Invalid Mode	Indicates that an invalid or unprogrammed operation was performed on the radio.
Continuous, medium-pitched tone when PTT is pressed	Out of Range Tone	Indicates that the radio is out of range from the selected Trunking site.
Continuous, low-pitched tone	Disconnect Mode Warning	Reminder to exit Phone mode. You may be missing other types of calls. Press the Phone or Call buttons to exit the mode.
Repeated, short, low-pitched tones when PTT is pressed.	Trunked System Busy (Trunked Systems only)	Indicates that all available trunked modes are busy. Release the PTT button and listen for the call back tone to transmit.





TURNING THE RADIO ON / OFF

1. Turn on the radio by turning the ON/OFF volume control knob clockwise.
 - The radio will go through a power-up self test. A good power-up, high-pitched tone will sound to indicate that the radio has passed the self-test.
 - The last trunked mode and talkgroup or conventional channel will appear on the display.
2. Adjust the volume to a comfortable listening level by turning the knob clockwise or counterclockwise as required.
3. Turn off the radio by turning the ON/OFF volume control knob counterclockwise.

TRUNKED MODES

Up to ten (10) trunked modes with eight (8) talkgroups in each trunked mode can be programmed into the radio.

Selecting a Trunked Mode

1. Press the  **Select** button or  **Home** button until the desired trunked mode is displayed.
2. Press the Talkgroup Select  or  buttons until the desired talkgroup is displayed.
 - A trunked mode/talkgroup is indicated by a digit and a letter.

Your radio is now set to receive and transmit calls on the selected trunked mode.

Receiving a Call (Trunked Modes)

1. Turn on the radio and select the desired trunked mode and talk-group.
2. Listen until you hear activity, then adjust the volume control for a comfortable listening level. Your radio is now set to receive calls on the selected trunked mode.
 - The YELLOW receive LED will light continuously while the radio is receiving.

Transmitting on a Trunked Mode

1. Turn on the radio and select the desired trunked mode and talk-group.
2. Hold the microphone in a vertical position at a distance of about 1 to 2 inches (2.5 to 5 cm) from your mouth.
3. Press and hold the PTT button and speak slowly and clearly into the microphone.
 - If access to the trunked system was successful, you will hear a short, high-pitched tone (the “talk permit” tone).
 - The RED transmit LED will light continuously while the radio is transmitting.
4. When your transmission is complete, release the PTT to listen.

CONVENTIONAL CHANNELS

Up to ten (10) conventional channels can be programmed into the radio.

Selecting a Conventional Channel

1. Press the  **Select** button or  **Home** button until the desired conventional channel is displayed.

- A conventional channel is indicated by digits only.

Your radio is now set to receive and transmit calls on the selected conventional channel.

Receiving a Call (Conventional Channels)

1. Turn on the radio and select the desired conventional channel.
2. Listen until you hear activity, then adjust the volume control for a comfortable listening level.

NOTE: The squelch opening level setting may be reprogrammed at an authorized service facility.

- The YELLOW receive LED will light continuously while the radio is receiving.




Your radio is now set to receive calls on the selected conventional channel.

Transmitting on a Conventional Channel

1. Turn on the radio and select the desired conventional channel.
2. If the conventional channel on which you are transmitting is programmed to receive PL (Private-Line) or DPL (Digital Private-Line), ensure that the channel is not in use by listening for activity. You can do this by monitoring a channel. Refer to the Monitoring instructions on page 13.
 - The YELLOW indicator LED will light if the channel is in use. Do not transmit if someone else is using the channel.
3. If Smart PTT is enabled, you do not need to listen for channel activity before transmitting. Any attempt to transmit on a busy channel will cause an invalid-mode tone to sound until the PTT button is released.
4. When the channel is available, hold the microphone in a vertical position at a distance of about 1 to 2 inches (2.5 to 5 cm) from your mouth.
5. Press and hold the PTT button and speak slowly and clearly into the microphone.
 - The RED Transmit LED will light continuously while the radio is transmitting.
6. When your transmission is complete, release the PTT to listen.

Monitoring

Monitor allows you to monitor the conventional channel for activity when PL or DPL is activated (same as taking the microphone off hook)


1. To turn Monitor ON, press the  **Monitor** button or take the microphone off hook.
 - The  monitor icon will display.
2. To turn Monitor OFF, press the  **Monitor** button again or place the microphone on-hook.

NOTE: The monitoring feature is available only when the radio is in conventional mode and Coded Squelch PL or DPL is preprogrammed for the receiver frequency.

INTRODUCTION



Your radio is equipped with a telephone interconnect option that allows you to call land line telephones through the trunked system. Calls made through the central controller are half-duplex operation (speak or listen).


MAKING A TELEPHONE CALL (FULL INTERCONNECT CAPABILITY)

1. Press the  **Phone** button. The display will momentarily indicate:

ALL



 - If a free channel is available, the display will indicate:

▼ PHn
2. Select a phone number from the list by using the Talkgroup Select \wedge or \vee buttons. **Or**, if you have a DTMF microphone, you can enter the phone number manually using the keypad.
3. Press the PTT button to send the phone number.
 - If phone access is successful, you will hear a dial tone, followed by the phone number tones as they are being sent to the repeater.
4. If you get a busy tone, hang-up by pressing the  **Phone** button and try again.
 - If an illegal medium-pitched tone sounds when the  **Phone** button is pressed, it indicates that the telephone interconnect option has not been enabled and the telephone call cannot be made.

5. After the called party answers, inform him or her that you are using a radio and that he or she must wait for you to finish speaking (indicated by a soft beep) before replying. Proceed in a normal push-to-talk manner by pushing the PTT button to talk and release to listen.
 - The maximum time period allowed for a telephone call is programmable by your authorized Motorola dealer. If a high-pitched tone sounds, it alerts you that you have 15-20 seconds to complete your conversation before the call is disconnected.
6. To disconnect the call, press the  **Phone** button.
 - If the call is not disconnected, a continuous low-pitched tone will sound. Until the call is disconnected, you will not be able to receive calls of any type.

ANSWERING A TELEPHONE CALL

Standard telephone interconnect receive features are as follows:

- When a telephone call is received, a ringing tone will sound, alerting your to answer the call. The display will indicate:
1. To answer the call, take the microphone off the hook and press the  **Phone** button. The radio will be removed from dispatch operation and the display will indicate:
 2. Press the PTT button to speak and release to listen.
 3. To terminate the call, press the  **Phone** button.








NOTE: If a mobile unit is equipped with the Horn/Lights feature, engage it before you leave the vehicle. When a call is received, the vehicle's horn will sound or the lights will flash for six seconds.

INTRODUCTION

The scan feature allows you to monitor activity on different trunked modes and conventional channels by scanning a list of up to eight (8) members.

TURNING SCAN ON/OFF

1. To turn Scan ON, press the  **Menu** button until the display indicates the type of scan you desire.
2. Press the  **Select** button to select the type of scan.
3. Press the  **Scan** button to turn ON.
 - The () scan icon will be displayed, indicating scan is active. The radio will scan for activity in the trunked modes/talkgroups or conventional channels that are defined in the scan list.
4. To turn Scan OFF, press the  **Scan** button again.

NOTE: To initiate a call properly during scan mode, press the PTT button for a few seconds before speaking into the microphone.

TYPES OF SCAN

All Group Scan

Scans all talkgroups within a selected trunk mode as programmed by your authorized Motorola dealer.



System Scan

Scans all trunked modes/talkgroups and conventional channels as programmed by your authorized Motorola dealer.













NOTE: Every system has its own scan list. It can be enabled or disabled by your authorized Motorola dealer.

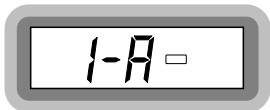
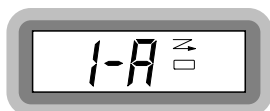
User Scan

Scans all trunked modes/talkgroups and conventional channels as determined by the user programmable scan list.




PROGRAMMING / VIEWING A SCAN LIST

1. Press the  **Menu** button until the display indicates:
2. Press the  **Select** button to select "Scan Programming/Viewing mode".
 - The radio will sound four quick tones and the display will indicate:
3. Use the Talkgroup Select  or  buttons to scroll through all trunked modes/talkgroups and conventional channels.
 - Trunked modes/talkgroups and conventional channels currently in the scan list will be indicated by the () scan icon.
4. To add a trunked mode/talkgroup or conventional channel into the scan list, press the  **Select** button when the desired trunked mode/talkgroup or conventional channel is displayed. The display will indicate:
 - The () scan icon will appear.
5. To remove from the scan list, press the  **Select** button again. The display will indicate:
 - The () scan icon will disappear.
6. To exit the scan programming feature, press the  **Home** button. The display will indicate the home display.




NOTE: The scan list is limited to eight (8) members. An alert tone sounds if you attempt to add more than eight members.

NUISANCE DELETE

1. When in scan mode, if you wish to **temporarily** delete an annoying trunked mode/talkgroup or conventional channel from the scan list, press the  **Menu** button until the display indicates:



2. Press the  **Select** button to enable Nuisance Delete.
3. To resume scanning of the temporarily deleted trunked mode/talkgroup or conventional channel, you must exit and re-enter scan mode.

TALKBACK DELAY

You may talkback during a detected activity for a pre-programmed amount of time after the activity ends. After this time period, the radio will resume scanning. This feature is programmable by your authorized Motorola dealer.

OFF-HOOK SUSPEND SCAN

If this feature is enabled, the radio will stop scanning when the radio is off-hook. Scan will be resumed when the microphone is replaced on-hook. This feature is programmable by your authorized Motorola dealer.

HORN / LIGHTS

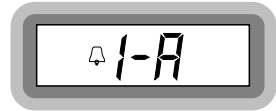
When you are outside the vehicle, the radio's horn/lights feature will activate the vehicle's horn/lights (if enabled) upon receiving an incoming Call Alert or land to mobile telephone call.

1. To activate "horn & lights" press the



Call button.

- The display indicates the **Home** display with the horn & lights (bell) icon:



2. To disable - press any button.

DATA CAPABILITY

Your GTX mobile two-way radio supports standard data capability using an external modem. Please contact your authorized Motorola dealer for more information.

Motorola offers a number of accessories to enhance the productivity of your GTX mobile two-way radio. Many of the available accessories are listed below. For a complete list, please contact your authorized Motorola dealer.

Audio:

HMN3413	Compact Microphone
HMN1035	Heavy Duty Palm Microphone
HMN3013	DTMF Keypad Microphone
AAREX4617	Handset with Hang-up Clip
HLN9073	Hang-up Clip

Antennas for 800 MHz Radio Models:

HAF4002	806-870 MHz, 1/4 Wave Roof Mount
RRA4983	800 MHz, 3 dB Gain Roof Mount w/Teflon Cable
RRA4914	800 MHz, 3 dB Gain Roof Mount

Antennas for 900 MHz Radio Models:

RRA4935	900 MHz, 3 dB Gain w/14 ft. Cable
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Control Stations:

12 W / 15 W Models	30 W / 35 W Models	
HLN3067	RLN4834	Control Station Package
HMN3000	HMN3000	Desk Microphone
GLN7318	GLN7318	Base Station Tray
HPN4002	HPN4001	Power Supply and Cable (25-60 W)
HKN9088	HKN9088	Mobile Mini-U Antenna Adapter

General Accessories:

12 W / 15 W Models	30 W / 35 W Models	
GLN7317	HLN9640	Non-Locking Mounting Bracket
FSN5510	FSN5510	7.5 W External Speaker
GKN6272	GKN6272	External Alarm Relay and Cable
GKN6270	HKN4191	Power Cable
GKN6271	GKN6271	Ignition Switch Cable

RESTRICTIONS

Because this radio contains a transmitter, federal law prohibits unauthorized, non-licensed personnel from adjusting or maintaining it. If any operational difficulties should arise while using this product, report them to authorized service personnel as soon as possible.



WARNING: Do not attempt any unauthorized modification to the radio or accessories.

Read This Information Before Using Your Radio

OPERATIONAL WARNINGS

For Vehicles with an Air Bag



WARNING: Do not install a mobile radio in the area over an air bag or in the air bag deployment area. Air bags inflate with great force. If a mobile radio is installed in the air bag deployment area and the air bag inflates, the radio may be propelled with great force and cause serious injury to occupants of the vehicle.

Installation of vehicle communication equipment should be performed by a professional installer/technician qualified in the requirements for such installations. An air bag's size, shape and deployment area can vary by vehicle make, model and front compartment configuration (e.g., bench seat vs. bucket seats).

Contact the vehicle manufacturer's corporate headquarters, if necessary, for specific air bag information for the vehicle make, model and front compartment configuration involved in your communication equipment installation.

Potentially Explosive Atmospheres



WARNING: Turn off your two-way radio when you are in any area with a potentially explosive atmosphere. Sparks in a potentially explosive atmosphere can cause an explosion or fire resulting in bodily injury or even death.

Blasting Caps and Areas



WARNING: To avoid possible interference with blasting operations, turn off your radio when you are near electrical blasting caps, in a blasting area, or in areas posted: "Turn off two-way radio". Obey all signs and instructions.

NOTE: The areas with potentially explosive atmospheres referred to above include fueling areas such as: below decks on boats; fuel or chemical transfer or storage facilities; areas where the air contains chemicals or particles, such as grain, dust or metal powders; and any other area where you would normally be advised to turn off your vehicle engine. Areas with potentially explosive atmospheres are often but not always posted.

EXPOSURE TO RADIO FREQUENCY ENERGY

Your Motorola two-way radio, which generates and radiates radio frequency (RF) electromagnetic energy (EME), is designed to comply with the following National and International Standards and Guidelines regarding exposure of human beings to radio frequency electromagnetic energy:

- United States Federal Communications Commission, Code of Federal Regulations; 47 CFR part 2 sub-part J
- American National Standards Institute (ANSI) / Institute of Electrical and Electrical Engineers (IEEE) C95.1 - 1992
- Institute of Electrical and Electronic Engineers (IEEE) C95.1-1999 Edition
- National Council on Radiation Protection and Measurements (NCRP) of the United States. Report 86, 1986
- International Commission on Non-Ionizing Radiation Protection (ICNRP) 1998
- National Radiological Protection Board of the United Kingdom 1995
- Ministry of Health (Canada) Safety Code 6. Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz, 1999
- Australian Communications Authority Radiocommunications (Electromagnetic Radiation - Human Exposure) Standard 1999 (applicable to wireless phones only)

To assure optimal radio performance and to ensure that your exposure to radio frequency electromagnetic energy is within the guidelines in the above standards, always adhere to the following procedures:

Mobile Radio Operation and EME Exposure

To assure optimal radio performance and that human exposure to radio frequency electromagnetic energy is within the guidelines referenced earlier in this document, transmit **only** when people outside the vehicle are at least the minimum distance away from a properly installed, externally-mounting antenna.

Table 1 lists the minimum distance for several different ranges of rated radio power.

Table 1. Rated Power and Distance

Rated Power of Vehicle-installed Mobile Two-Way Radios	Minimum Distance from Transmitting Antenna
7 to 15 Watts	1 Foot (30.5cm)
16 to 50 Watts	2 Feet (61cm)
More than 50 Watts	3 Feet (91.5cm)

Mobile Antenna Installation

Install the vehicle antenna **external** to the vehicle and in accordance with:

- The requirements of the antenna manufacturer/supplier
- Instructions in the Radio Installation Manual.

ELECTROMAGNETIC INTERFERENCE/COMPATIBILITY

NOTE: Nearly every electronic device is susceptible to electromagnetic interference (EMI) if inadequately shielded, designed or otherwise configured for electromagnetic compatibility.

- To avoid electromagnetic interference and/or compatibility conflicts, turn off your radio in any facility where posted notices instruct you to do so. Hospitals or health care facilities may be using equipment that is sensitive to external RF energy.

GENERAL SAFETY INFORMATION

Driving

Check the laws and regulations on the use of communication devices in the areas where you drive. Always obey them. Also, when using your radio while driving, please:

- Give full attention to driving
- Use hands-free operation of the communication device, if available
- Pull off the road and park before making or answering a call if driving conditions so require.

Children

Do not allow children to play with your radio. It is not a toy. Children could hurt themselves or others (by poking themselves or others in the eye with the antenna, for example). Children also could damage the radio.

TROUBLESHOOTING

If you cannot communicate with your two-way radio, try the following steps:

1. Checking the radio
 - Be sure the radio is turned on and the mode selector is in the proper position.
2. Check the accessories
 - Check that the radio problem is not caused by accessories improperly connected.
3. Review the user guide
 - Review your user guide to ensure proper radio use.
4. Additional troubleshooting
 - After following the above steps, if your radio still exhibits a problem, review your service agreement and call the applicable Motorola service representative. Be prepared to provide the product model number and the unit's serial number.

Self Test Failure

- In case of self test failure, the invalid continuous tone is sounded. If the radio still does not pass the self check, a problem may exist in the radio. Contact the nearest Motorola service representative.

NOTE: The power-up self check verifies that the radio's microprocessor-based systems are working, but it does not check all the RF components, nor does it check the operation of all customer-specific features. Motorola recommends that the functioning of the radio be checked periodically by an authorized Motorola service representative.

PARTS INFORMATION

7:00 A.M. - 7:00 P.M. (Central Standard Time)
Monday through Friday (Chicago, U.S.A.)

To order parts:
1-800-422-4210

Accessories and Aftermarket Division
Attention: Order Processing
1313 E. Algonquin Road
Schaumburg, IL 60196

No International weekend service is available.

COMPUTER SOFTWARE COPYRIGHTS

The Motorola equipment described in this manual may include copyrighted Motorola computer programs stored in semiconductor memories or other media. Laws in the United States and other countries preserve for Motorola certain exclusive rights for copyrighted computer programs, including the exclusive right to copy or reproduce in any form the copyrighted computer program. Accordingly, any copyrighted Motorola computer programs contained in the Motorola equipment described in this manual may not be copied or reproduced in any manner without the express permission of Motorola. Furthermore, the purchase of Motorola equipment shall not be deemed to grant either directly or by implication, estoppel, or otherwise, any license under the copyrights, patents or patent applications of Motorola, except for the normal nonexclusive, royalty free license to use that arises by operation of law in the sales of a product.