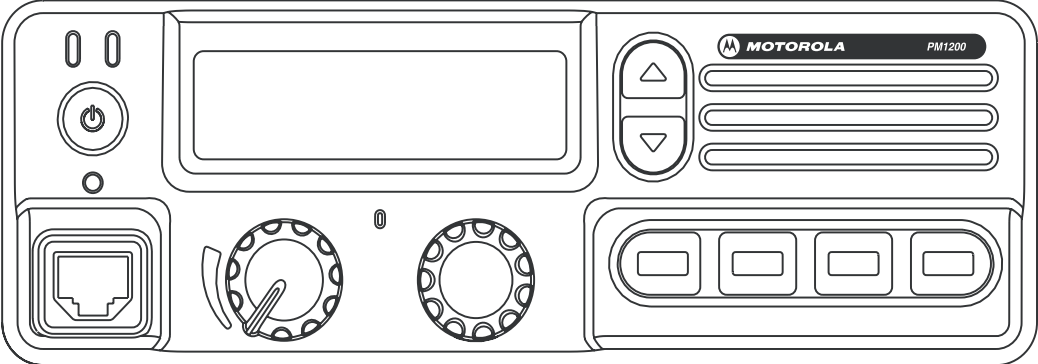


PM1200 Control Head



**PM1200 Mobile Radio
with Control Head
User's Guide**

6880309U08-A



Product Safety and RF Exposure Product Safety and RF Exposure Compliance



Before using this product, read the operating instructions for safe usage contained in the Product Safety and RF Exposure booklet enclosed with your radio.

ATTENTION!

This radio is restricted to occupational use only to satisfy FCC RF energy exposure requirements. Before using this product, read the RF energy awareness information and operating instructions below.

Product Safety and RF Energy Exposure Booklet for Mobile Two-Way Radios Installed in Vehicles or as Fixed Site Control Stations

ATTENTION!

BEFORE USING THIS RADIO, READ THIS BOOKLET WHICH CONTAINS IMPORTANT OPERATING INSTRUCTIONS FOR SAFE USAGE AND RF ENERGY AWARENESS AND CONTROL INFORMATION FOR COMPLIANCE WITH RF ENERGY EXPOSURE LIMITS IN APPLICABLE NATIONAL AND INTERNATIONAL STANDARDS.

The information provided in this document supersedes the general safety information contained in user guides published prior to February 2002.

RF Energy Exposure Awareness and Control Information, and Operational Instructions for FCC Occupational Use Requirements

NOTICE: This radio is intended for use in occupational/controlled conditions, where users have full knowledge of their exposure and can exercise control over their exposure to meet FCC limits. This radio device is NOT authorized for general population, consumer, or any other use.

This 2-way radio uses electromagnetic energy in the radio frequency (RF) spectrum to provide communications between two or more users over a distance. It uses radio frequency (RF) energy or radio waves to send and receive calls. RF energy is one form of electromagnetic energy. Other forms include, but are not limited to, sunlight and x-rays. RF energy, however, should not be confused with these other forms of electromagnetic energy, which when used improperly, can cause biological damage. Very high levels of x-rays, for example, can damage tissues and genetic material.

Experts in science, engineering, medicine, health, and industry work with organizations to develop standards for safe exposure to RF energy. These standards provide recommended levels of RF exposure for both workers and the general public. These recommended RF exposure levels include substantial margins of protection.

All Motorola 2-way radios are designed, manufactured, and tested to ensure they meet government-established RF exposure levels. In addition, manufacturers also recommend specific operating instructions to users of 2-way radios. These instructions are important because they inform users about RF energy exposure and provide simple procedures on how to control it.

Please refer to the following Web sites for more information on what RF energy exposure is and how to control your exposure to assure compliance with established RF exposure limits.

<http://www.fcc.gov/oet/rfsafety/rf-faqs.html>

<http://www.osha.gov/SLTC/radiofrequencyradiation/index.html>

Federal Communication Commission Regulations

The FCC rules require manufacturers to comply with the FCC RF energy exposure limits for mobile 2-way radios before they can be marketed in the U.S. When 2-way radios are used as a consequence of employment, the FCC requires users to be fully aware of and able to control their exposure to meet occupational requirements. Exposure awareness can be facilitated by the use of a label directing users to specific user awareness information. Your Motorola 2-way radio has a RF exposure product label. Also, your Motorola user manual, or separate safety booklet, includes information and operating instructions required to control your RF exposure and to satisfy compliance requirements.

Compliance with RF Exposure Standard

Your Motorola two-way radio is designed and tested to comply with a number of national and international standards and guidelines (listed below) regarding human exposure to radio frequency electromagnetic energy. This radio complies with the IEEE and ICNIRP exposure limits for occupational/controlled RF exposure environment at duty factors of up to 50% talk-50% listen and is authorized by the FCC for occupational use. In terms of measuring RF energy for compliance with the FCC exposure guidelines, your radio antenna radiates measurable RF energy only while it is transmitting (during talking), not when it is receiving (listening) or in standby mode.

Your Motorola two-way radio complies with the following RF energy exposure standards and guidelines:

- United States Federal Communications Commission, Code of Federal Regulations; 47CFR part 2 sub-part J
- American National Standards Institute (ANSI) / Institute of Electrical and Electronic Engineers (IEEE) C95. 1-1992
- Institute of Electrical and Electronic Engineers (IEEE) C95.1-2005 Edition
- International Commission on Non-Ionizing Radiation Protection (ICNIRP) 1998
- Ministry of Health (Canada) Safety Code 6. Limits of Human Exposure to Radio Frequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz, 1999
- Australian Communications Authority Radiocommunications (Electromagnetic Radiation - Human Exposure) Standard, 2003
- ANATEL, Brazil Regulatory Authority, Resolution 256 (April 11, 2001) "additional requirements for SMR, cellular, and PCS product certification."

RF Exposure Compliance and Control Guidelines and Operating Instructions

To control exposure to yourself and others and to ensure compliance with the RF exposure limits, always adhere to the following procedures.

Guidelines:

- User awareness instructions should accompany device when transferred to other users.
- Do not use this device if the operational requirements described herein are not met.

Instructions:

- **Transmit no more than the rated duty factor of 50% of the time.** To transmit (talk), push the Push-To-Talk (PTT) button or, for radios equipped with VOX, speak into the microphone. The red LED will illuminate when the radio is transmitting. To receive calls, release the PTT button, or, for radios equipped with VOX, stop talking. The red LED will extinguish when the radio stops transmitting. Transmitting 50% of the time, or less, is important because this radio generates measurable RF energy exposure only when transmitting (in terms of measuring for standards compliance).
- **Transmit only when people outside the vehicle are at least the recommended minimum lateral distance away, as shown in Table 1, from the body of a vehicle with a properly installed antenna.** This separation distance will ensure that there is sufficient distance from a properly installed (according to installation instructions) externally-mounted antenna to satisfy the RF exposure requirements in the standards listed above.

NOTE: Table 1 below lists the recommended lateral distance for people in an uncontrolled environment from the body of a vehicle with an approved, properly installed transmitting antenna (i.e., monopoles over a ground plane, or dipoles) at several different ranges of rated radio power for mobile radios installed in a vehicle.

Table 1. Rated Power of Vehicle-Installed Mobile Two-Way Radio and Recommended Minimum Lateral Distance from Vehicle Body

Mobile Radio Rated Power (see Note)	Minimum Lateral Distance from Vehicle Body
111 to 125 watts	5.0 feet

- When a mobile radio is used in conjunction with another co-located transmitter such as a Vehicular Repeater, it is the vehicle operator's responsibility to take appropriate steps to keep bystanders at the required separation distance from the vehicle to ensure compliance with the FCC's RF energy exposure limits for the general population. See the co-located transmitter's user manual for more details.

NOTE: If you are not sure of the rated power of your radio, contact your Motorola representative or dealer and supply the radio model number found on the radio model label. If you can not determine the rated power out, then assure 5.08-foot separation from the body of the vehicle. The maximum power shown on the FCC Grant may be higher than the rated power allowing for production variation.

Mobile Antenna Installation Guidelines

- These mobile antenna installation guidelines are limited to metal body motor vehicles or vehicles with appropriate ground planes.

-
- Antennas should be installed in the center area of the roof or the trunk lid taking into account exposure conditions of backseat passengers and according to the specific instructions and restrictions in the Radio Installation Manual along with the requirements of the antenna supplier.
 - Trunk lid installations are limited to vehicles with clearly defined flat trunk lids, and in some cases, to specific radio models and antennas. See the Radio Installation Manual for specific information on how and where to install specific types of approved antennas to facilitate recommended operating distances to all potentially exposed persons.
 - **Use only the Motorola-approved, supplied antenna or a Motorola-approved replacement antenna.** Unauthorized antennas, modifications, or attachments could damage the radio and may result in non-compliance with RF Safety Standards.

Approved Accessories

- This radio has been tested and meets RF Safety Standards when used with the Motorola accessories supplied or designated for this product. Use of other accessories may result in non-compliance with RF Safety Standards.
- For a list of Motorola-approved antennas, visit the following Web site, which lists approved accessories for your radio model:
<http://www.motorola.com/cgiss/index.shtml>.

Additional Information

For additional information on exposure requirements or other training information, visit <http://www.motorola.com/rfhealth>.

Compliance and Control Guidelines and Operating Instructions for Mobile Two-Way Radios Installed as Fixed Site Control Stations

If mobile radio equipment is installed at a fixed location and operated as a control station or as a fixed unit, the antenna installation must comply with the following requirements in order to ensure optimal performance and compliance with the RF energy exposure limits in the standards and guidelines listed on page iv:

- The antenna should be mounted outside the building on the roof or a tower if at all possible.
- As with all fixed site antenna installations, it is the responsibility of the licensee to manage the site in accordance with applicable regulatory requirements and may require additional compliance actions such as site survey measurements, signage, and site access restrictions in order to ensure that exposure limits are not exceeded.
- For additional installation information, see the guidelines for minimum separation distances provided above in the RF Exposure Compliance and Control Guidelines and Operating Instructions section of this document.

Electromagnetic Interference/Compatibility

NOTE: Nearly every electronic device is susceptible to electromagnetic interference (EMI) if inadequately shielded, designed, or otherwise configured for electromagnetic compatibility. It may be necessary to conduct compatibility testing to determine if any electronic equipment used in or around vehicles or near fixed site antenna is sensitive to external RF energy or if any procedures need to be followed to eliminate or mitigate the potential for interaction between the radio transmitter and the equipment or device.

Facilities

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.

Vehicles

To avoid possible interaction between the radio transmitter and any vehicle electronic control modules, such as ABS, engine, or transmission controls, the radio should be installed only by an experienced installer and the following precautions should be used when installing the radio:

1. Refer to the manufacturer's instructions or other technical bulletins for recommendations on radio installation.
2. Before installing the radio, determine the location of the electronic control modules and their harnesses in the vehicle.
3. Route all radio wiring, including the antenna transmission line, as far away as possible from the electronic control units and associated wiring.

Driver Safety

Check the laws and regulations on the use of radios in the area where you drive. Always obey them.

When using your radio while driving, please:

- Give full attention to driving and to the road.
- Pull off the road and park before making or answering a call if driving conditions so require.

Operational Warnings



Caution

For Vehicles with an Air Bag

Do not mount or place 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 radio is placed 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.

Potentially Explosive Atmospheres

Turn off your radio prior to entering 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.

The areas with potentially explosive atmospheres include fueling areas such as below decks on boats, fuel or chemical transfer or storage facilities, and areas where the air contains chemicals or particles such as grain, dust or metal powders. Areas with potentially explosive atmospheres are often, but not always, posted.



Blasting Caps and Blasting Areas

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.

For radios installed in vehicles fueled by liquefied petroleum gas, refer to the (U.S.) National Fire Protection Association standard, NFPA 58, for storage, handling, and/or container information. For a copy of the LP-gas standard, NFPA 58, contact the National Fire Protection Association, One Battery Park, Quincy, MA.

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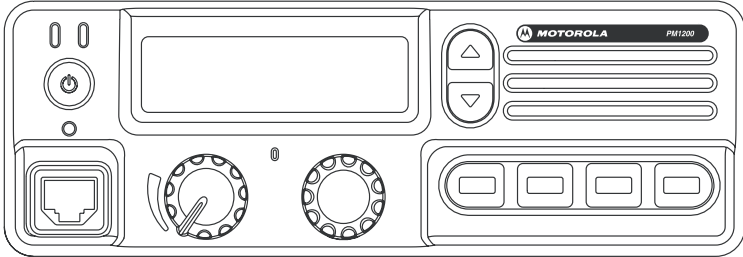
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Notes

PM1200 Operating Manual



PM1200 is a full featured FM transceiver, designed for flexible mobile and base station business communications in the VHF Low-Band frequency range (120/50 Watts: programmable). Each model is designed for reliable business communications in a wide variety of applications, with a wide range of operating capability provided by its leading-edge design.

The 250-channel memories can each be programmed with a 8-character channel name. Important channel frequency data is stored in EEPROM and flash memory on the CPU, and is easily programmable by dealers using a personal computer and the CPS Telco programming cable(AARKN4081B).

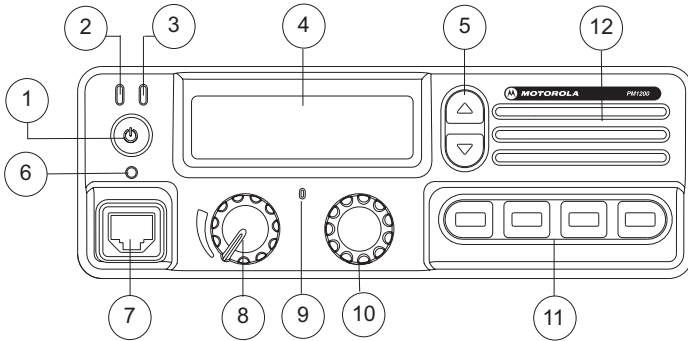
The following pages list the advanced features of PM1200 transceiver. You may wish to consult your Network Administrator regarding details of the configuration of this equipment for use in your application.

For North American Users Regarding 406 MHz Guard Band

The U.S. Coast Guard and National Oceanographic and Atmospheric Administration have requested the cooperation of the U.S. Federal Communications Commission in preserving the integrity of the protected frequency range 406.0 to 406.1 MHz, which is reserved for use by distress beacons. Do not attempt to program this apparatus, under any circumstances, for operation in the frequency range 406.0 - 406.1 MHz if the apparatus is to be used in or near North America.

Controls & Connectors

Front Panel



1. Power Button

Press the button to turn the transceiver ON and OFF.

2. TX Indicator

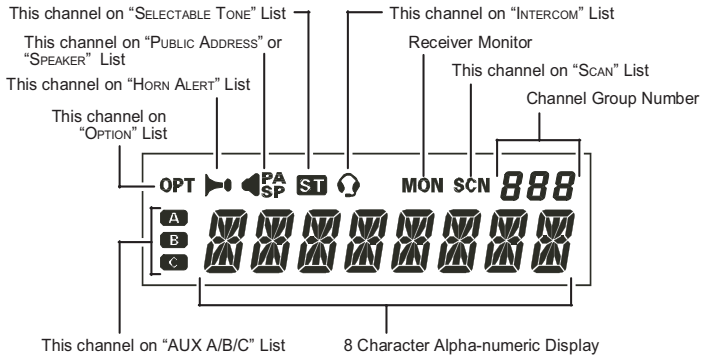
The LED lights up solid red when the radio is transmitting.

3. Busy Indicator

The LED lights up solid green when the channel is busy.

4. Liquid Crystal Display

The display includes an 8-character alpha-numeric section showing channel and group names, status and identity information, and error messages. Additional indicators on the display show priority channel assignments and scan include / exclude selection.



5. Channel Group Keys

Press up and down keys to change current group (and to display group number or name). Hold the button for more than 1/2 second to repeat the function.

6. DSC Indicator

When DSC feature is enabled, the DSC indicator blinks orange when the position of volume selector knob and/or channel selector knob are different than the pre-set position. The DSC indicator stops blinking when you successfully set the desired position.

7. Telco Connector for Microphone

Connect the microphone connector to this jack.

8. Volume Selector Knob

Used to set the volume of the receiver.

9. Emergency Microphone

Emergency microphone is enabled when the Emergency feature is activated.

10. Channel Selector Knob

Used to select the operating channel.

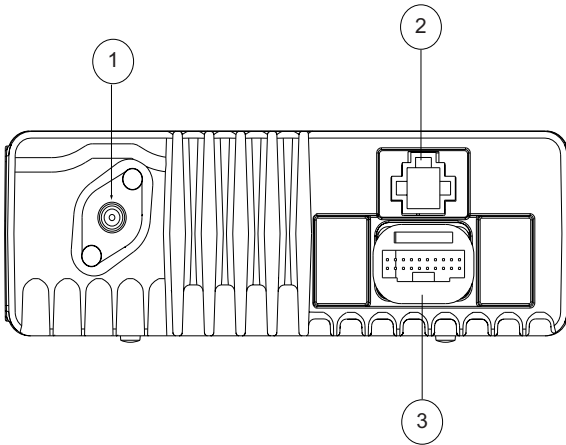
11. Programmable Function Buttons (PF button)

These buttons can be programmed to special functions, such as Toggle High/Low Power Selection, Monitor, Dimmer, Talkaround, Toggle Scan On/Off, Dual Watch, Squelch Level, Emergency, Speaker Change, Public Address, Revert Memory Channel 1, Revert Memory Channel 2, Selectable Tone, Alpha Numeric, Intercom, Horn Alert, Home Channel, Noise Blanker, Scan List Select, Selected Channel Priority, Audio Volume Attenuation, Scan Select, Group Scan Select and Unassigned function, as determined by your network requirements and programmed by your MOTOROLA dealer.

12. Internal Speaker

The internal speaker allows audio to be heard when receiving a call. Internal speaker is enabled unless the external speaker is connected.

REAR (Heatsink)



1. Antenna Socket

The 50-ohm coaxial feedline to the antenna must be connected here, using a Mini-UHF connector.

2. 13.4-V DC Power Connector

The supplied DC power cable must be connected to this 4-pin connector. Use only the supplied fused cable (extended if necessary) for power connection.

3. 20-Pin Accessory Connector

Connect the accessory connector to this 20-Pin jack. This connector can be used to connect the external speaker, vehicular hands-free and other supported accessories.

Basic Operation of the Transceiver

Important! - Before turning on the radio for the first time, please ensure that the power connections are connected properly and that an antenna is connected to the antenna jack.

Switching Power ON/OFF

Push the power switch to turn on the radio. The display will illuminate. The radio will start up on the last channel used prior to shut-down during the previous operating session.

Turn the channel selector knob to choose the desired operating channel. A channel name will appear on the display. If you want to select the operating channel from a different group, press the ▲ or ▼ button to select the different group that you want before selecting the operating channel.

Setting the Volume

Turn the volume selector knob clockwise to increase the volume, and counterclockwise to decrease it. If no signal is present, press and hold the MON button for more than 1/2 second. Background noise will now be heard, and you may set the volume selector knob to the desired audio level. Press and hold the MON button more than 1/2 second to decrease the noise and resume normal (quiet) monitoring.

Transmitting

To transmit, wait until the "BUSY" indicator is off (the channel is not in use), and press the PTT (Push-To-Talk) button on the side of the microphone (the "TX" indicator will appear or the "TX" indicator will glow red). While holding in the PTT button, speak into the microphone clearly, and then release the PTT button to receive.

Selecting Groups and Channels

Press the ▲ or ▼ button (repeatedly, if necessary) to select different group of channels.

Turn the channel selector knob to select different channel within the current group.

Automatic Time-Out Timer

If the selected channel has been programmed for automatic time-out, you must limit the length of each transmission. During transmission, a beep will sound ten seconds before time-out. Another beep will sound just before the deadline. The "TX" indicator will disappear and transmission will cease soon thereafter. To resume transmission, release the PTT button and wait for the "penalty timer" to expire (if you press the PTT button before the timer expires, the timer restarts, and you will have to wait another "penalty" period)

Radio Firmware Features

1.0 Number of Channels/Groups

PM1200 HP mobile is capable of supporting up to 250-channels. The 250-channels memories can each be programmed with 8-characters channel name. The 250-channel capacity may be partitioned into as many as 250 memory groups, where the total number of channels should be 250 channels. The groups programmed in the programming data can be selected via the ▲ / ▼Button.

2.0 Frequency Band

The frequency range for PM1200 HP mobile is as follow:

Low Band (A) 29.7 - 37 MHz

Low Band (B) 37 - 50 MHz

3.0 Power Level

PM1200 HP mobile has two power levels; High Power (Hi) and Low Power(Low). The power levels can be set via the CPS and must be set for each channel. The Hi/Low power can also be toggle using one of the four PF buttons on the front of the radio. Low power level is set to 50W and High power level is set to 120W. Default factory setting is 120W.

4.0 LED Indications

The following table describes the LED indications of the radio:

Table 1: LED Indications

Radio Status	Tx LED color	Busy LED color	DSC LED color
Transmitting	Solid Red		
Receiving signal with TPL/DPL enabled		Solid Green	
Receiving signal with TPL/DPL disabled		Solid Green	
Scan landed on Rx Channel with TPL/DPL enabled		Solid Green	
Scan landed on Rx Channel with TPL/DPL disabled		Solid Green	
Incorrect setting of the volume selector knob & channel selector knob			Blinking Orange

5.0 Self Test

When the radio is on, it performs a routine check to initialize and to check for any possible hardware error before actual usage.

An error code appears when there is an error during the self test. Description of the error codes is as follow:

Error1: General communication data error.

Most likely caused by one of the listed conditions in the Programming Problems section.

Error2: Incompatible administrative data.

Overhead programming data (which is not displayed by the programming software) is incompatible with the radio. This also occurs occasionally during radio-to-radio cloning.

6.0 Radio Configuration

The features described below are set as radio wide setting.

6.1 Time-Out Timer

Time-Out Timer (TOT) is the maximum amount of communication time allowed per transmission, while operating the radio. Once this time expires, the transmission is automatically terminated. TOT is set through the CPS.

The transmit time-out timer can be set between 0.5 minute to 7.5 minute in increment of 0.5 minute or "unlimited". When a call is initiated, the radio starts the transmit time-out timer. During transmission, the radio generates a time-out timer warning tone ten seconds before time-out, indicating that the radio is about to stop transmitting. Another beep will sound just before the deadline. To resume transmission, release the PTT button and wait for the penalty timer to expire. If you press the PTT button before penalty timer expires, the timer will restart, and you will have to wait another "penalty" period.

6.2 Default Status Check (DSC)

You can pre-set the volume selector knob to a desired volume level (0 to 10). You can also pre-set the channel selector knob to a desired channel via the CPS. When DSC feature is enabled, the DSC indicator (located beneath the power button) blinks orange when the position of volume selector knob and/or channel selector knob are different than the pre-set position (desired position). The DSC indicator will stop blinking when you successfully sets this to the programmed position.

7.0 Scan Feature

Scan feature allows you to listen for activity on more than one conventional channel. The lists of channels that the radio scans and other parameters associated with scan are specified by a Scan List.

When you press the 'Scan' PF button, the radio rapidly moves through the members of the Scan List looking for activity that would normally cause the speaker to unmute. The radio unmutes when such activity are detected. When both Tx and Rx activity has ceased for the time, the radio will return to the active scan state.

The scan mode can be stop by pressing the assigned 'Scan' PF button again if the Group Scan feature is disabled.

7.1 Dual Watch

This feature is similar to the Scan feature, but Dual Watch only monitors the current Operating Channel and the Priority Channel. The radio will scan the two channels when you press the assigned 'Dual Watch' PF button. It pauses each time it finds a channel on which someone is speaking. You can stop the Dual Watch feature by pressing the assigned PF button again. The operation will revert to the channel to which the channel selector knob is set.

7.2 Talkback Scan

Talkback Scan allows you to transmit during scanning pause. This feature can be enabled and disabled via the CPS. If talkback is enabled and the radio is in scanning pause on the landed channel, press the PTT button and the radio will transmit on landed channel. If the talkback is disabled, then the radio should not be able to transmit on the landed channel when the PTT button is pressed. Instead it will transmit on the selected channel.

8.0 Conventional Personality

This section describes the individual function of the conventional personality. The features described below takes effect on a per channel basis. It will only affect the particular channel parameter settings and allows each channel to have their own configuration. These individual channel personalities can also be grouped together.

8.1 Busy Channel Lockout (BCLO)

Busy Channel Lockout (BCLO) is the channel lockout rules while operating on the current channel.

When BCLO is disabled via the CPS, you can transmit even if the radio is actively receiving. Press the PTT button to unmute the speaker.

When BCLO (on carrier) is enabled via the CPS, you are not allowed to transmit when the radio is actively receiving. Press the PTT button to unmute the speaker.

BCLO (on wrong PL) will not allow transmission when the radio is actively receiving (carrier is present) or when an invalid tone is present.

8.2 Scan List

The list of channels that the radio scans and other parameters associated with scan members are specified in scan list. Each scan list can be configured in the CPS. Scan List has a collection of groups and each group consists of User Scan Lists, Dealer Scan List, Priority Scan Channel and Multiple Group Selection.

9.0 Standard Conventional Operation

Conventional operations of the radio are Carrier Squelch operation, TPL, DPL and Invert DPL

Different groups of radio users share the same frequency or channel (community repeater). Without the use of Private Line (PL) tones/codes, each individual group would constantly listen to the transmissions of all groups; this is known as Carrier Squelch operation. Private Line operation is done by outfitting members of each group with radios containing a unique PL tone/code. Their radios will then only unmute to transmissions made by other members of their group. If radios are set to only unmute when a transmission includes their own PL tone/code, then they are not disturbed by conversations of other groups. The sub-audible code that is added to the voice unmutes only those radios with an identical PL tone/code. There are two forms of PL available: Tone Private Line (TPL) and Digital Private Line (DPL).

TPL signaling consists of a sub-audible tone that is continuously modulated onto the carrier. The receiving radio will continuously monitor the carrier, and if the correct sub-audible tone is present, the speaker will unmute to the recovered audio. TPL tones are summed together with the voice information during encoding. There are 39 standard sub-audible Telecommunications Industry Associate (TIA)/ Electronic Industry Association (EIA) tones between 67.0 Hz and 250.3 Hz, inclusively. The radio will follow the standard for sub-audible Continuous Tone Controlled Squelch System (CTCSS) that is covered in TIA/EIA-603.

DPL signaling consists of a continuous sub-audible digital signal transmitted simultaneously with a voice message. DPL is similar to TPL except that a digital pattern is transmitted rather than a tone. The radio will follow the standard for sub-audible Continuous Digital Controlled Squelch System (CDCSS) that is covered in TIA/EIA-603.

Carrier Squelch operation does not require that a sub-audible signal be decoded in order to unmute the radio's speaker. Likewise, it does not produce a sub-audible signal during transmission.

9.1 Carrier Squelch Operation (CSQ)

The radio unmutes when the carrier energy exceeds the radio-designated carrier energy threshold.

When the energy is below the Squelch Threshold, carrier squelch detection is not achieved and radio will remain mute.

If a conventional personality is configured via the CPS to transmit CSQ only, no PL tones/codes will be transmitted.

If a conventional personality is configured via the CPS to receive CSQ, no PL tones/codes will be checked. The radio will unmute upon detection of carrier squelch.

9.2 PL Operation

PL is a Motorola term for CTCSS. PL is a sub-audible tone/code used to create unique/private communication groups. There are two types of PL, which in generic terms known as Tone Private Line (TPL) and Digital Private Line (DPL).

9.2.1 Tone Private Line (TPL)

You can select TPL from the CPS for individual personality. Each personality have different Squelch type for transmit and receive.

9.2.1.1 TPL Encode

Conventional channels in the radio with activated Tone Private Line settings transmit with the selected Tone Private Line code (transmit TPL).

If TPL is selected, the radio will transmit the TPL code on the selected conventional personality.

The TPL code determines which code the conventional personality will transmit.

9.2.1.2 TPL Decode

Receive TPL is used upon detection of a sub-audible tone that is used in the unmuting rules of the radio. When the radio decodes the correct TPL sub-audible tone that is being continuously modulated onto the carrier, the radio uses this information in determining if the speaker should be unmuted.

The Rx TPL code determines which code the conventional personality will attempt to decode & unmute the radio.

9.2.2 Digital Private Line (DPL)

DPL is a Motorola term for CDCSS. DPL is a digital format transmitted along with the carrier. DPL gives more use and privacy on a frequency.

DPL is selectable from the CPS for individual personality. Each personality can have different Squelch type for transmit and receive.

9.2.2.1 DPL Encode

Transmit DPL is the modulation of a sub-audible code on a carrier frequency. The sub-audible code is summed with microphone audio prior to modulation.

If DPL is selected, the radio will transmit DPL code on the selected conventional personality.

The DPL code determines which code the conventional personality will transmit.

9.2.2.2 DPL Decode

Receive DPL is used in detection of a sub-audible code that is used in the unmuting rules of the radio.

If DPL is selected, the radio will receive digital private line code on the selected conventional personality. The DPL code determines which code the conventional personality will attempt to decode.

9.2.3 Inverted DPL

Inverted DPL inverts Digital Private Line (DPL) signals when they are received by the radio. Inverted coding allows more traffic/usage on frequencies.

If DPL Invert is enabled on the transmit radio but not on the receive radio, then the receive radio will not un-mute.

If DPL Invert is enabled on the receive radio but not on the transmit radio, then the receive radio will not un-mute.

If DPL Invert is enabled on both the receive radio and the transmit radio, then the receive radio will un-mute.

The encode and decode operation of this Inverted DPL should be similar to DPL except all the bits in the DPL code are inverted in the DPL operating process.

9.3 TPL Reverse Burst

This feature is used to transmit a Tone Private Line (TPL) code at the end of a transmission - once the PTT button is released, and while operating on the current Conventional Personality. This sub-audible tone causes the receiving radio to mute its speaker before loss of a carrier is detected. Muting the speaker eliminates unwanted noise (squench tail) during loss of carrier detection.

If the TPL Reverse Burst is programmed to standard or non-standard via the CPS, a Tone Private Line (TPL) shut-off code will be transmitted at the end of a transmission once the PTT button is released, on the current Conventional Personality.

The receiving radio will mute its speaker before loss of a carrier is detected, upon receiving the TPL reverse burst.

If the TPL Reverse Burst is programmed to None (disabled) via the CPS, then the TPL reverse burst will not be transmitted at the end, upon the PTT button release. If the TPL shut-off code is not transmitted, then the receiving radio will not mute its speaker before loss of a carrier is detected, unwanted noise (squelch tail) during loss of carrier detection will be heard.

Table 2 shows the result of squelch tail elimination on the receiving radio based on the TPL reverse burst setting on transmit and receive radio.

Table 2: Squelch Tail Elimination Results

TPL Tx Reverse Burst Setting		Squelch Tail Elimination
TPL Tx Reverse Burst on Transmitting Radio	TPL Tx Reverse Burst on Receiving Radio	
Standard		Yes
Non-Standard	Non-Standard°	Yes
	Standard	No

When Reverse Burst is enabled in the CPS, the TPL Reverse Burst that is transmitted at the end of the transmission changes the phase prior to the removal of the carrier to eliminate the squelch tail.

There are 2 formats in use:

- Advances the phase of the tone forward 240 degree
- Advances the phase of the tone forward 180 degree

This setting is programmable in the CPS.

10.0 Programmable Function Button

There are four Programmable Function (PF) buttons available. Each button has two assigned features when the radio is turned on. One feature is for short press and the other feature is long press.

The features that can be assigned to the PF buttons are:

1. Toggle High/Low Power
2. Monitor
3. Toggle Scan On/Off
4. Dual Watch
5. Talkaround
6. Squelch Level
7. Dimmer
8. Emergency
9. Speaker Change
10. Public Address
11. Revert Memory Channel 1
12. Revert Memory Channel 2
13. Selectable Tone
14. Alpha Numeric
15. Intercom
16. Horn Alert
17. Home Channel
18. Unassigned
19. Noise Blanker - To reduce the car noise
20. Scan List Select
21. Selected Channel Priority

22. Audio Volume Attenuation

23. Scan Select

24. Group Scan Select

10.1 Toggle High/Low Power

Refer to “Power Level” on page 9.

10.2 Monitor

Monitor feature allows you to listen to current channels of Conventional dispatch type. Monitor mode places receiver in Carrier Squelch, overriding receive PL (or CTCSS) signaling. This is a press and hold feature, which is assigned to a PF Button. The "MON" icon appears on the LCD when you press the assigned ‘Monitor’ PF button.

The ‘Monitor’ PF Button automatically sets the short press as quiet monitoring and the long press as noise monitoring.

Both presses will override PL or Open, depending on setting.

10.3 Toggle Scan On/Off

The assigned button toggles between Scan On and Scan Off when you press the assigned ‘Toggle’ PF button. The radio will sound and “SCAN” is displayed on LCD. Press the assigned ‘Toggle’ PF Button again to enter Group Scan. “G SCAN” will be displayed on the LCD, provided the radio is in the group which has been selected as Group Scan member and there are more than two group scan members programmed in this radio.

10.4 Dual Watch

This feature is similar to the Scan feature, except that only two channels are monitored: the current operating channel and the Priority channel. The radio will search the two channels when you press the assigned 'Dual Watch' PF button. It will pause each time it finds a channel on which someone is speaking. Dual Watch feature can be stopped by pressing the assigned 'Dual Watch' PF button again. The operation will revert to the channel to which the channel selector knob is set.

10.5 Talkaround

You can assign any PF button to Repeater/Talkaround feature via programming data. The PF button allows you to toggle between Repeater mode operation and Talkaround mode operation.

The Repeater/Talkaround feature allows you to change the operational mode from Repeater, which requires the radio to transmit on the receive frequency of its associated repeater and receive on the Repeater's transmit frequency, to Talkaround mode operation which allows a radio to bypass the repeater and talk directly to another radio by transmitting on the radio's programmed receive frequency.

This features has no effect on simplex channels. After pressing the button, "-TAKARD-" is displayed on the LCD.

Talkaround must follow decode data setting.

10.6 Squelch Level

When the assigned 'SQL' PF button is pressed, a tone sounds and SQL appears on the display with the current Squelch Level. You can then select the desired level by rotating the channel selector knob. After the selection, press the assigned PF button. A tone sounds and the display returns to the normal channel.

10.7 Dimmer

The assigned PF Button adjusts the brightness of the display and key backlight through three levels of brightness and the fourth level completely turns off the backlight.

10.8 Emergency

When the assigned 'Emergency' PF Button is pressed, an Emergency call will be initiated (MDC-1200 requires ANI board). If the Emergency LCD and Emergency LED are disabled in the CPS, the transmitting radio produces no audio or visual indications when an Emergency call is made. If the Emergency LCD is enabled in the CPS, the LCD backlight illuminates when the Emergency call is initiated. If the Emergency LED is enabled in the CPS, the Tx LED will change to solid red when an Emergency call is initiated. To end an Emergency call, either press and hold EMG button during receive condition, or turn off the transceiver.

10.9 Speaker Change

The assigned 'Speaker Change' PF button allows you to select between "Front Panel", "Front Panel & Body", or "Body" speakers. When "Body" is selected, a tone sounds and the speaker icon appears on the display. This function can be used while receiving a call.

10.10 Public Address

The assigned 'Public Address' PF button allows you to toggle the PA amplifier ON and OFF. When this feature is ON, a tone sounds and the PA icon appears on the display. The Public Address feature can be used while receiving a call.

10.11 Revert Memory Channel 1

The assigned 'Memory Channel 1' PF button allows you to immediately change to the associated programmed channel.

10.12 Revert Memory Channel 2

The assigned 'Memory Channel 2' PF button allows you to immediately change to the associated programmed channel.


10.13 Selectable Tone

The assigned 'Selectable Tone' PF button allows you to use the channel selector knob to select a PL Tone.


10.14 Alpha Numeric

This feature allows you to switch the display between Group/Channel Number, and Group/Channel name (Alpha Numeric) by pressing the assigned 'Alpha Numeric' PF button. A tone will sound each time you switch between numerical and alpha numerical display.

10.15 Intercom

This feature requires dual control head configuration. Press the assigned 'IC' PF button to turn the Intercom feature ON or OFF. While ON, you can press the PTT button to communicate to another control head operator without transmitting over the air. When this PF button is pressed, a tone sounds and  appears on the display. The Intercom can also be used while receiving a call.

10.16 Horn Alert

You can toggle the Horn Alert function ON or OFF by pressing the assigned 'HA' PF button. If this feature is set to ON, the Horn Alert will activate when a call is received from the base station. When HA is ON, a tone sounds and  appears on the display.

10.17 Home Channel

You can press the assigned 'Home' PF button in order to select the preprogrammed Home Channel.

10.18 Unassigned

This option will not assign any function to the programmable button.

10.19 Noise Blanker - To reduce the car noise

The Noise Blanker feature in the radio helps to eliminate local noises which can be particularly troublesome in VHF Low-Band frequency spectrum. This feature can be toggled ON or OFF by pressing the assigned 'Noise Blanker' PF Button for an appropriate length of time.

10.20 Scan List Select

You can select the scan list between "USER" and "DEALER" by pressing the assigned 'Scan List SEL' PF button.

10.21 Selected Channel Priority

This feature checks user-assigned Priority Channel as you scan the other channels. When you press the assigned 'Selected Channel Priority' PF button, the current channel sets to the channel selector knob is converted to Priority Channel and the radio enters scan mode.

10.22 Audio Volume Attenuation

To set the audio output to the associated programmed level, press the 'Audio Volume Attenuation' PF button. Audio output will remain at this level even if you attempt to change the volume level with the volume control knob. The "normal" audio output level will resume when the 'Audio Volume Attenuation' PF button is pressed again. This feature applies to the external speaker only.

10.23 Scan Select

Pressing the 'Scan Select' PF button allows the currently selected channel to be included in or excluded from the scan list. When the channel is included, "SCN" appears on the LCD. Scan Select can only be assigned as a "long press PF button."

10.24 Group Scan Select

Pressing the assigned 'Group Scan Select' PF button allows the group currently selected to be included or excluded as a Group Scan member. When the group is included, "STOP_" is displayed on the LCD. When the 'Group Scan Select' PF button is pressed again, the current group is removed from the scan list and "SKIP_" is displayed on the LCD. Group Scan Select can only be assigned as a "long press PF button."

11.0 Entering Programming Mode

Connect the TELCO programming cable from the personal computer to the PM1200 mobile. To enter programming mode, press and hold the power button and PF3 button simultaneously for a few seconds. The control head will display "PC CLONE". Then programming can be done via the personal computer.

11.1 Radio-CPS-Radio Cloning

This feature allows cloning of the CPS configurable radio programming data and personalities information between two radios via the CPS. Cloning can be done only if the Target and the Source radios are of the same model type and firmware version.

When the radio enters cloning mode, a momentary tone sounds and "PC CLONE" appears on the display.

Cloning process will be aborted off both the Target and the Source radios are of different model.

During cloning, only the CPS configurable data will be cloned. Model number, Serial Number & Tuning Parameters will not be cloned.

12.0 The Option Board Features

The PM1200 Digital ANI ENCODER (MDC1200 & DTMF Identification Encoder) and the PM1200 Quik-Call II Decoder are available for PM1200 HP mobile.

12.1 PM1200 Digital ANI Encoder

PM1200 Digital ANI Encoder is the option board capable of PTT ANI (PTT ID) and Emergency ANI in MDC1200 or DTMF signaling. The unit provides Automatic Numeric Identification of a specific radio transmitter each time the microphone PTT button is pressed. Emergency messages are sent by pressing the assigned 'Emergency' PF button.

Manual DTMF generation is available as well as automatic ANI.

MDC-1200 is a 1200 baud pre-coded MSK signaling system intended for use in both limited and full function terminals for both voice-shared and dedicated channel data applications. A logical "1" is represented by 1800Hz, and a logical "0" by 1200Hz. It is used to enhance basic voice communications by adding digital data communication to the system. MDC is reliable and high-speed signaling on standard voice grade communication equipment.

12.1.1 PM1200 Digital ANI Encoder Option Board Features

This option board has the features as shown following:

- o ANI sent at beginning, end or both.
- o "Go-ahead" beep sounds when ready for voice transmission.
- o Courtesy beep transmitted when radio is unkeyed.
- o Emergency message sent with Emergency button pressed.
- o DTMF ANI
- o Emergency message open microphone monitor.

12.2 PM1200 Quik-Call II Decoder Option Board Features

Quik-Call II decoder decodes either single tone or a sequence of two tones. The Quik-Call II tones are normally located within the audible frequency range. The software shall support for the Quik-Call II Decode for the following radio features: Call Alert with Voice and Selective Call. The Quik-Call II features supported are: the Quik-Call Individual Call and the Quik-Call Group Call. The PM1200 Quik-Call Decoder only supports Tone A and Tone B.

13.0 Ignition Sense

The purpose of the ignition sense is to avoid drainage of the car battery while the car is off. To activate ignition sense, press power button and PF2 button simultaneously and the display will show "ING_ON". To disable the function, press the power button and PF2 button again simultaneously and the display will show "ING OFF". Please refer to the PM1200 installation manual before installation.

Accessories

Motorola provides the following approved accessories to improve the productivity of your PM1200 mobile two-way radio.

For a list of Motorola-approved antennas, batteries, and other accessories, visit the following web site:

<http://www.motorola.com/governmentandenterprise>

Speakers

Part No.	Description
HSN8145A	7.5Watt External Speaker
RSN4001A	13W External Speaker

Microphones

Part No.	Description
RMN5068A	Desktop Microphone
AARMN4025B	Microphone
AARMN4027A	Visor Mounted Microphone
AARMN4038A	Heavy Duty Microphone

Switches

Part No.	Description
RLN4836A	Emergency Footswitch
RLN4856A	Footswitch with remote PTT
RLN4857A	Pushbutton with remote PTT
RLN4858A	Gooseneck with Remote PTT

Miscellaneous

Part No.	Description
AAREX4617A	Telephone Style Handset Kit
HKLN4339A	Spare Fuse Kit
GKN6272A	External Alarm Relay & Cable

Antenna

Part No.	Description
RAB4002ARB	Low Band Antenna 29.7-36MHz
RAB4003ARB	Low Band Antenna 36-42MHz
RAB4004ARB	Low band Antenna 42-50MHz

Signaling Boards

Part No.	Description
HKLN4345A	PM1200 Interface Board for Option Boards
HKLN4346A	PM1200 Quik-Call II Decoder Option Board
HKLN4347A	PM1200 Digital ANI Encoder Option Board

Cables

Part No.	Description
AARKN4081B	Telco Programming Cable
HKKN4019A	Power Cable 33 ft.
HKLN4340A	Power Cable 20ft
HKKN1017A	Remote Mount Cable 8 ft
HKKN4018A	Remote Mount Cable 33 ft.
HKLN4341A	Remote Mount Cable 17ft
HKN9327BR	PM1200 Ignition Switch Cable

Notes

Glossary

Call Alert	A one-way alert, with audio and/or display messages.
Channel	A group of characteristics, such as transmit/receive frequency pairs, radio parameters, and encryption encoding.
Coded Squelch	Tone Private-Line™ or Digital Private-Line. Used on conventional channels to make sure you hear only the communication meant for you.
Conventional	Typically refers to radio-to-radio communications, sometimes through a repeater. You share a frequency, or frequencies, with other users without the aid of a central controller to assign communication channels. Therefore, you should monitor each channel before transmitting to avoid interfering with another user who may be transmitting.
Digital Private-Line (DPL) Coded Squelch	A continuous, sub-audible data signal, transmitted with the carrier.
FCC	Federal Communications Commission.
LCD	Liquid-Crystal Display.
Mode	A programmed combination of operating parameters; for example, a channel or talkgroup.

Monitoring (Conventional Operation)	Press a programmed 'Monitor' button to listen to another user active on the channel. This way, you may be prevented from talking over someone else's conversation.
Push-To-Talk (PTT) button	The PTT button engages the transmitter and puts the radio in transmit (send) operation when pressed. Press this button to transmit; release it to receive.
Repeater	A conventional radio feature, in which you talk through a receive/transmit facility (repeater) that re-transmits received signals in order to improve communications range and coverage.
RF	Radio Frequency. A part of the general frequency spectrum between the audio and infrared light regions (about 10 kHz to 10,000,000 MHz).
Squelch	The muting of audio circuits when received signal levels fall below a pre-determined threshold. With carrier squelch, you hear all channel activity which exceeds the radio's pre-set Squelch Level.
Talkgroup	An organization (or group) of radio users who communicate with each other, using the same communication path.
Tone Private-Line (PL) Coded Squelch	A continuous sub-audible tone transmitted with the carrier.

Commercial Warranty and Service

Limited Warranty

MOTOROLA COMMUNICATION PRODUCTS

I. WHAT THIS WARRANTY COVERS AND FOR HOW LONG:

MOTOROLA INC. (“MOTOROLA”) warrants the MOTOROLA manufactured Communication Products listed below (“Product”) against defects in material and workmanship under normal use and service for a period of time from the date of purchase as scheduled below:

PM 1200 Mobile Units	Two (2) Year
Product Accessories	One (1) Year

Motorola, at its option, will at no charge either repair the Product (with new or reconditioned parts), replace it (with a new or reconditioned Product), or refund the purchase price of the Product during the warranty period provided it is returned in accordance with the terms of this warranty. Replaced parts or boards are warranted for the balance of the original applicable warranty period. All replaced parts of Product shall become the property of MOTOROLA.

This express limited warranty is extended by MOTOROLA to the original end user purchaser only and is not assignable or transferable to any other party. This is the complete warranty for the Product manufactured by MOTOROLA. MOTOROLA assumes no obligations or liability for additions or modifications to this warranty unless made in writing and signed by an officer of MOTOROLA. Unless made in a separate agreement between MOTOROLA and the original end user purchaser, MOTOROLA does not warrant the installation, maintenance or service of the Product.

MOTOROLA cannot be responsible in any way for any ancillary equipment not furnished by MOTOROLA which is attached to or used in connection with the Product, or for operation of the Product with any ancillary equipment, and all such equipment is expressly

excluded from this warranty. Because each system which may use the Product is unique, MOTOROLA disclaims liability for range, coverage, or operation of the system as a whole under this warranty.

II. GENERAL PROVISIONS:

This warranty sets forth the full extent of MOTOROLA'S responsibilities regarding the Product. Repair, replacement or refund of the purchase price, at MOTOROLA's option, is the exclusive remedy. THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER EXPRESS WARRANTIES. IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED TO THE DURATION OF THIS LIMITED WARRANTY. IN NO EVENT SHALL MOTOROLA BE LIABLE FOR DAMAGES IN EXCESS OF THE PURCHASE PRICE OF THE PRODUCT, FOR ANY LOSS OF USE, LOSS OF TIME, INCONVENIENCE, COMMERCIAL LOSS, LOST PROFITS OR SAVINGS OR OTHER INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE SUCH PRODUCT, TO THE FULL EXTENT SUCH MAY BE DISCLAIMED BY LAW.

III. STATE LAW RIGHTS:

SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LIMITATION ON HOW LONG AN IMPLIED WARRANTY LASTS, SO THE ABOVE LIMITATION OR EXCLUSIONS MAY NOT APPLY.

This warranty gives specific legal rights, and there may be other rights which may vary from state to state.

IV. HOW TO GET WARRANTY SERVICE:

You must provide proof of purchase (bearing the date of purchase and Product item serial number) in order to receive warranty service and, also, deliver or send the Product item, transportation and insurance prepaid, to an authorized warranty service location.

Warranty service will be provided by Motorola through one of its authorized warranty service locations. If you first contact the company

which sold you the Product, it can facilitate your obtaining warranty service. You can also call Motorola at 1-888-567-7347 US/Canada.

V. WHAT THIS WARRANTY DOES NOT COVER:

- A) Defects or damage resulting from use of the Product in other than its normal and customary manner.
- B) Defects or damage from misuse, accident, water, or neglect.
- C) Defects or damage from improper testing, operation, maintenance, installation, alteration, modification, or adjustment.
- D) Breakage or damage to antennas unless caused directly by defects in material workmanship.
- E) A Product subjected to unauthorized Product modifications, disassemblies or repairs (including, without limitation, the addition to the Product of non-Motorola supplied equipment) which adversely affect performance of the Product or interfere with Motorola's normal warranty inspection and testing of the Product to verify any warranty claim.
- F) Product which has had the serial number removed or made illegible.
- G) Rechargeable batteries if:
 - any of the seals on the battery enclosure of cells are broken or show evidence of tampering.
 - the damage or defect is caused by charging or using the battery in equipment or service other than the Product for which it is specified.
- H) Freight costs to the repair depot.
- I) A Product which, due to illegal or unauthorized alteration of the software/firmware in the Product, does not function in accordance with MOTOROLA's published specifications or the FCC type acceptance labeling in effect for the Product at

the time the Product was initially distributed from MOTOROLA.

- J) Scratches or other cosmetic damage to Product surfaces that does not affect the operation of the Product.
- K) Normal and customary wear and tear.

VI. PATENT AND SOFTWARE PROVISIONS:

MOTOROLA will defend, at its own expense, any suit brought against the end user purchaser to the extent that it is based on a claim that the Product or parts infringe a United States patent, and MOTOROLA will pay those costs and damages finally awarded against the end user purchaser in any such suit which are attributable to any such claim, but such defense and payments are conditioned on the following:

- A) that MOTOROLA will be notified promptly in writing by such purchaser of any notice of such claim;
- B) that MOTOROLA will have sole control of the defense of such suit and all negotiations for its settlement or compromise; and
- C) should the Product or parts become, or in MOTOROLA's opinion be likely to become, the subject of a claim of infringement of a United States patent, that such purchaser will permit MOTOROLA, at its option and expense, either to procure for such purchaser the right to continue using the Product or parts or to replace or modify the same so that it becomes non-infringing or to grant such purchaser a credit for the Product or parts as depreciated and accept its return. The depreciation will be an equal amount per year over the lifetime of the Product or parts as established by MOTOROLA.

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VII. GOVERNING LAW:

This Warranty is governed by the laws of the State of Illinois, USA.

Service

Proper repair and maintenance procedures will assure efficient operation and long life for this product. A Motorola maintenance agreement will provide expert service to keep this and all other communication equipment in perfect operating condition. A nationwide service organization is provided by Motorola to support maintenance services. Through its maintenance and installation program, Motorola makes available the finest service to those desiring reliable, continuous communications on a contract basis. For a contract service agreement, please contact your nearest Motorola service or sales representative, or an authorized Motorola dealer.

Express Service Plus (ESP) is an optional extended service coverage plan, which provides for the repair of this product for a period of three years from the date of shipment from the factory, or the date of delivery if purchased from an authorized Motorola two-way radio dealer. For more information about ESP, contact the Motorola Radio Support Center, 2204 Galvin Drive, Elgin, IL 60123, 1-800-227-6772.