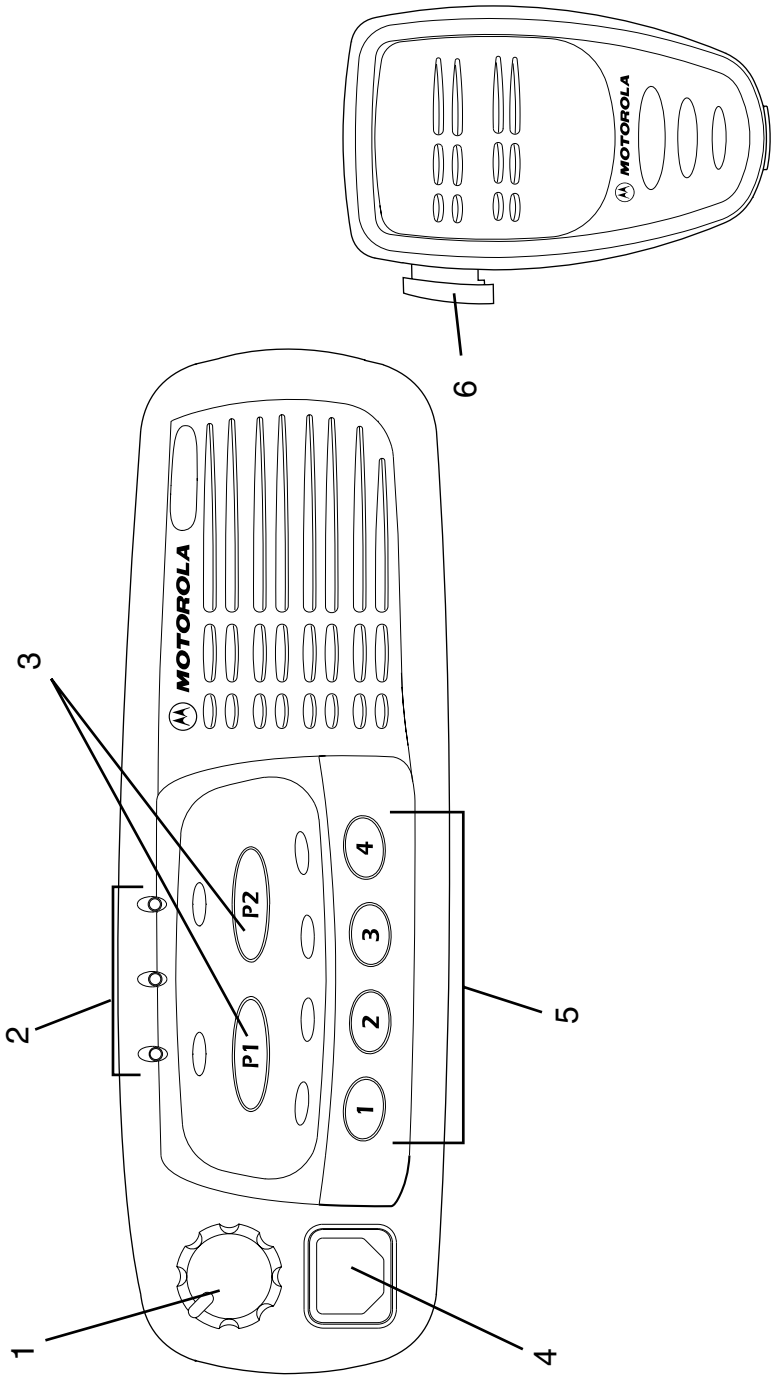
Professional Radio

GM640

User Guide

68P64110B91

Issue: July 2000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CONTENTS

Radio Overview 3

Radio Controls 3
Programmable Buttons 3
Audio Signal Tones 5

Getting Started 7

Turning the Radio On-Off 7
Adjusting the Radio's Volume 7
Radio Registration 8

Radio Calls 9

Making a Call 9
Dedicated Calls 9
User Absent 10
Ending a Call 11
Cancelling a Call 11
Receiving a Call 12
Receiving a Call on a OACSU System . . 12
Receiving a Call on a FOACSU System . 12
Missed Calls 13
Emergency Calls 14

Personality 15

MPT 15
Talkgroup 16
Fixed and Dynamic Groups 16
Conventional Mode 17
Personality Selection 18

Features 19

Voice Recorder 19

Settings 21

Car Radio Mute 21
External Alarm 22

Safety Information 23
Safe and Efficient Operation 23
Exposure to Radio Frequency Energy . . . 23
Electromagnetic Interference/
Compatibility. 24
Operational Warnings 24
Potentially Explosive Atmospheres . . . 24
Blasting Caps and Areas. 24
Radio Operation and EME Exposure 25
Mobile Antenna Installation 25
Control Station Operation. 25
General Radio Care 26
Notes 26

Computer Software Copyright

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RADIO OVERVIEW

This user guide covers the operation of the GM640 Professional Mobile Radio.

Please read pages 23 to 26 **before** using this radio

RADIO CONTROLS

The numbers below refer to the illustrations on the inside front cover.

1. **On-Off / Volume Knob**
   Used to turn the radio on or off, and to adjust the radio's volume.

2. **LED Indicators**
   Indicate current radio operation.
   Green: Flashes to indicate NO SERVICE.
   Red: On when radio is transmitting.
   Red Flashing: When transmitting - battery low.
   Green: On to indicate monitor mode active (Conventional Mode).
   Red Flashing: When receiving - channel busy (Conventional Mode).
   Single Yellow Flash: Personality 1 selected.
   2 Yellow Flashes:Personality 2 selected.

3. **Programmable Buttons** (P1) (P2)
   P1 always used as Call Clear/Monitor/Delete.

4. **Mic Jack**

5. **Programmable Buttons** (1) (2) (3) (4)
   Relate to channels 1-4 in conventional mode, LEDs above buttons used in conventional mode only .

6. **Push-to-talk (PTT)**
   Press and hold down this button to talk; release it to listen.

PROGRAMMABLE BUTTONS

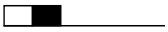
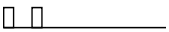
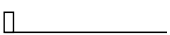
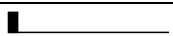
Several of your radio buttons can be programmed (by Customer Programming Software CPS) to activate the radio features. The following table shows the features that can be assigned to the P2 button and the 1-4 buttons.

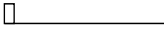
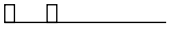
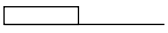
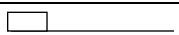
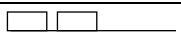
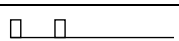
-

Feature	Description
Dedicated Call/Emergency	To make a call to a pre-determined number. This can be an emergency number, effectively activating an Emergency Call.
Personality	To select one of two radio personalities, (e.g. MPT trunking system or conventional system).
Missed Calls	To select the Missed Calls list. This is a list of calls received and stored by the radio when you were unable to take the call.
External Alarm	To switch the External Alarm feature On and Off.
Car Radio Mute	To switch the Car Radio Mute feature On and Off.
Record/Play-back (Voice Recorder)	To record/play-back incoming calls or memo using voice recorder feature.

Audio Signal Tones (Standard)

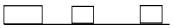
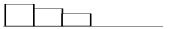
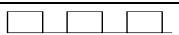
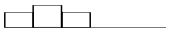
High pitched tone □ Low pitched tone ■

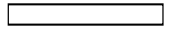
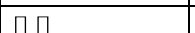
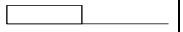
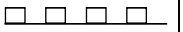
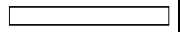
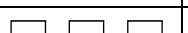
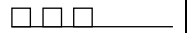
Tone	Signal	Description
Self test		Power up.
Tone A		Call clear indication.
Tone B		Traffic channel allocated or PTT/ Mic/ Loudspeaker enabled.
Tone C1		System busy.
Tone C2		Unavailable.
Tone C3		Called party busy.
Tone C4		Invalid number.
Tone D		Call set up in progress, wait for further indications.
Tone F		Transaction confirmed, called unit will call back.
Tone G		Look at display for call set up or System information.
Tone H		Invalid entry.

Tone	Signal	Description
Key click		Confidence tone when any key pressed or Speech limitation alert.
Fail tone		Hardware error or Call timed out (conventional mode).
Tone I		Low battery warning.
Tone K1		Voice Storage recording.
Tone K2		Voice Storage warning.
Tone K3		Voice Storage full.
Tone L1		1st Personality.
Tone L2		2nd Personality.
Tone M1		Talkgroup Confirmation.
Tone M2		Talkgroup unavailable.
Tone N1		Out of range alert.
Ring tones	Standard/ English/French/ General	Incoming call, press PTT, then wait for further indications.

Audio Signal Tones (Alternative)

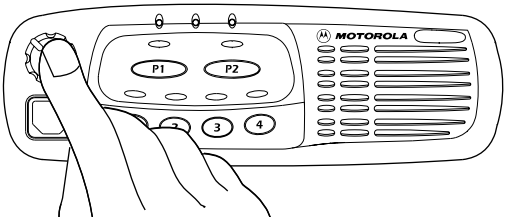
High to Low pitched tones

Tone	Signal	Description
Self test		Power up.
Tone A		Call clear indication.
Tone B		Traffic channel allocated or PTT/ Mic/ Loudspeaker enabled.
Tone C1		System busy.
Tone C2		Unavailable.
Tone C3		Called party busy.
Tone C4		Invalid number.
Tone D		Call set up in progress, wait for further indications.
Tone F		Transaction confirmed, called unit will call back.
Tone G		Look at display for call set up or System information.

Tone	Signal	Description
Tone H		Invalid entry.
Key click		Confidence tone when any key pressed or Speech limitation alert.
Fail tone		Hardware error or Call timed out (conventional mode).
Tone I		Low battery warning.
Tone K1		Voice Storage recording.
Tone K2		Voice Storage warning.
Tone K3		Voice Storage full.
Tone L1		1st Personality.
Tone L2		2nd Personality.
Tone M1		Talkgroup Confirmation.
Tone M2		Talkgroup unavailable.
Tone N1		Out of range alert.
Ring tones	Standard/ English/French/ General	Incoming call, press PTT, then wait for further indications.

GETTING STARTED

TURNING THE RADIO ON OR OFF



ON	OFF
Push the **On/Off/ Volume Control** knob until you hear a click.	Push and hold the **On/ Off/Volume Control** knob for 2 seconds.

ADJUSTING THE VOLUME

Turn the **On/Off/Volume Control** knob clockwise to increase the volume, or counterclockwise to decrease the volume.

RADIO REGISTRATION

When turned on, the radio enters a self test routine, the self test tone will sound and the LED will light green. If the radio fails the self test a continuous low tone will sound until the radio is turned off .

Note: If the radio fails the self test routine, consult your dealer.

When the self test is complete the radio will scan for system access with the LED on the radio flashing GREEN.

The radio personality will be the one last used prior to the radio being switched off. To check the radio personality or select a new personality refer to PERSONALITY - **Personality Selection**.

When a system is acquired, the green LED will go off.

RADIO CALLS

Making a Call

The radio is capable of making a variety of calls, including calls to individual radios, groups of radios and calls to private and public telephone systems.

Before you can make a call the radio must be in the IDLE STATE, i.e. a personality has been selected and no call is in progress.

The radio can make calls by using **Dedicated Calls** only.

Dedicated Calls

Dedicated calls can be made from a pre-programmed Dedicated Call button. Press the Dedicated Call button to make a call to a commonly used pre-programmed number. The call may also be programmed as an Emergency call or Priority call.

User Absent

User Absent may be permanently enabled in your radio via programming. With this feature enabled, entry into the user absent mode is automatic and any calls received when you are away from your radio will be put into the Missed Calls list automatically and the message “Will call back” sent to the caller.

When you return to your radio, check whether tone G sounds every 10 seconds which indicates that your radio is in user absent mode. Press any button to exit user absent mode and return the radio to the idle state for normal operation.

Ending a Call

Always end a call by:

1	CLEAR BUTTON	Tone A sounds

Cancelling a Call

At any time while setting up a call it may be cancelled by:

1	CLEAR BUTTON	Tone D or G sounds

Receiving A Call

There are two types of systems on which the radio may be used, Off Air Call Set Up (OACSU) and Full Off Air Call Set Up (FOACSU).

If you are in doubt about which system you are operating on, please consult your dealer.

Receiving a call on an OACSU system

When the radio is called:

1	Tone D sounds	LED flashes red. Call is being set up.
2	Tone B sounds	LED extingushed.

Receiving a call on an FOACSU system

When the radio is called:

1	Ringing tone sounds	Led flashes red.
2	PTT button to accept call. (Unless in talkgroup personality, when the radio unmutes automatically for dynamic and fixed group calls.)	
3	Tone D sounds	LED flashes red. Call is being set up.
4	Tone B sounds (when conversation is permitted)	LED extinguished.

Note: The system may have a limited call time, and the call may be terminated automatically if this call time is exceeded.

Missed Calls

If a call remains unanswered, the call will be stored by the radio, provided that missed calls has been programmed into your radio.

Only one call can be stored. If the same radio calls more than once the call is only stored once. When the call have been stored by the radio, any further calls received overwrite the stored call.

When a call has been stored by the radio, tone G will sound every ten seconds.

The Missed Call List is entered directly by pressing the Missed Call button when the radio is in the IDLE STATE.

You can call back to the number in the Missed Call list by:

1 PTT button to make the call.
The radio sends out its ID and sounds a tone.

2 After the call is set-up, press PTT button and talk with your mouth 2.5-5 cm from micro-phone. Release PTT to listen.

3 CLEAR BUTTON Tone A sounds

On a successful call set- up, the entry is automatically deleted from the list and the radio returns to the IDLE STATE.

An unanswered call may be deleted from the Missed Call list at any time by:

1 Press MISSED CALL button to enter list

2 Press CLEAR button to delete entry in list

Radio returns to IDLE STATE

Note: The calls in the Missed Call list are not deleted when the radio is turned off. It is not possible to call back status calls.

Emergency Calls

An emergency call allows you the highest form of priority calling and normally takes precedence over all other calls.

Your radio can be programmed to give you a one-button quick access to call a particular radio or centre (predefined by your dealer) in emergency situations.

To initiate an emergency call:

1 Press the **Emergency** button
or

2 Press the **Footswitch** (if programmed as emergency button)
With radio OFF
a. Press footswitch to turn radio ON
b. Press footswitch again to send emergency call.
With radio ON
a. Press footswitch once to send emergency call.

Emergency can be stopped by one of the following:

1. Switching the radio **Off** and **On** again.

2. Pressing the CLEAR button.

3. The emergency time duration is reached.

Note: The emergency time duration is programmed into your radio by your dealer.

Your radio may receive an emergency call when:

Tone D or Ringing Tone will sound depending on your system.

PERSONALITY

The personalities described below are programmed into your radio by your dealer and are accessible either via the personality button.

A radio personality contains data such as frequencies, alert tones, permitted calls etc. which determines the mode of operation of your radio. Your radio may be programmed with up to 2 different personalities, selected from MPT, Talkgroup and Conventional.

MPT

This personality permits the radio to operate in a trunked mode. Incoming and outgoing calls are set up using a defined set of rules or protocol between your radio and a controller in a similar manner to your home telephone. Your radio 'registers' onto an MPT trunked system as described in GETTING STARTED - **Radio Registration**.

Talkgroup

Talkgroup is an MPT personality following the same rules or protocol, but is primarily for talkgroup calls. On selection of a talkgroup, you may send and receive calls as described below.

Fixed and Dynamic Groups

These groups form part of the **Talkgroup Personality**, such that when this personality is selected your talkgroup list shows only these groups.

A **fixed** group is a group of users, the address (number/alias) of which is preprogrammed into your radio by your dealer.

A **dynamic** group is a group of users, the address (number) of which is sent to your radio ‘over air’ at any time via the system controller.

Therefore at any time you may become a member of a dynamic group, able to receive calls and (depending on how your radio is programmed) send calls to that group.

Incoming calls to fixed and dynamic group numbers are detailed in **Receiving a Call**.

To make an outgoing call to a selected talkgroup, press the PTT and speak after the confidence tone.

Calls are cleared in the normal manner.

If the system is busy an engaged tone will be heard, release the PTT and wait for the confidence tone. You may then proceed with the call by pressing the PTT.

Conventional Mode

In the conventional mode your radio operates as a standard two-way radio.

Select the personality “Conventional” as described in **Personality Selection**.

Prior to transmission always make sure that the channel is free (red LED not flashing). Press the PTT to transmit, release to listen. The red LED lights while the radio transmits and flashes if the channel is busy.

Some channels may be monitored for activity by pressing the clear button.

In the conventional mode, the radio is equipped with a time out timer. A speech limitation alert tone will sound a few seconds before the transmitter in your radio is switched off. The call timed out tone will sound and continue until the PTT is released.

Personality Selection

Your radio may be programmed with two different personalities, known as Personality 1 and Personality 2.

The personalities programmed may be any of MPT, Talkgroup or Conventional.

Check with your system manager or dealer for the personalities in your radio.

To check the current personality:

1 Ensure radio is in IDLE STATE.

2 Press Personality button

3 If Personality 1: Tone L1 sounds.

4 If Personality 2: Tone L2 sounds.

To change the personality:

1 Ensure radio is in IDLE STATE.

2 Press Personality button for longer than 3 seconds

3 If the current personality is Personality 1: Tone L1 sounds.

4 At the end of the 3 second button press: Tone L2 sounds indicating that the personality has changed to Personality 2.

5 Repeat procedure to revert to Personality 1.

FEATURES

Voice Recorder

You can record and playback incoming calls or make a memo using the voice recorder feature, which allows up to 2 minutes of recording.

To **record** an incoming call:

1. Press and hold the Record/Playback button, the Voice Storage Recording alert sounds momentarily.
2. Record the call or part of the call.
3. The Voice Storage Warning alert sounds when the memory is nearly full.
4. The Voice Storage Full alert sounds when the memory is full and recording ceases.
5. Release the Record/Playback button at any time to stop recording.

To **record** a memo:

1. Ensure radio is in IDLE STATE.
2. Press and hold the Record/Playback button, the Voice Storage Recording alert sounds momentarily.
3. Speak clearly into the radio microphone to record your memo.
4. The Voice Storage Warning alert sounds when the memory is nearly full.
5. The Voice Storage Full alert sounds when the memory is full and recording ceases.
6. Release the Record/Playback button at any time to stop recording.

Note: Recorded messages are deleted on change of personality.

To **playback** a recorded call or memo:

1. Ensure radio is in IDLE STATE.
2. Press the Record/Playback button to playback the first recorded call or memo.
3. Press the Record/Playback button again to skip to the next message to be played back.

To **delete** a recorded call or memo:

1. Playback message as described in above procedure.
2. Press the Clear button to delete the message currently being played back.

SETTINGS

The settings described below are programmed into your radio by your dealer and are accessible via a programmable button.

CAR RADIO MUTE

This feature allows you to switch on and off the car radio mute feature. The Car Radio Mute automatically mutes your in-car audio entertainment system to allow you to hear incoming calls or to stop audio interference when you are making a call.

Note: This feature will not operate when in a conventional personality.

You can switch **On** or **Off** the Car Radio Mute by using a pre-programmed **Car Radio Mute** button when the radio is in the IDLE STATE.

Using the Car Radio Mute Button

1. Press the **Car Radio Mute** button to switch **on** Car Radio Mute, when the feature enable alert will sound.
2. Press the **Car Radio Mute** button again to switch **off** Car Radio Mute when the feature disable alert will sound.

EXTERNAL ALARM

The external alarm feature activates the vehicle horn and/or lights to inform you of an incoming call when you are away from your vehicle.

Note: This feature will not operate when in a conventional personality.

When the alarm is activated it can be cancelled by:

1. Answering the call.
2. Calling party terminates the call.
3. The call is placed in the Missed Calls list.
4. The call times out.

You can switch **On** or **Off** the External Alarm by using a pre-programmed **External Alarm** button when the radio is in the IDLE STATE.

Using the External Alarm Button

1. Press the **External Alarm** button to switch **on** External Alarm, when the feature enable alert will sound.
2. Press the **External Alarm** button again to switch **off** External Alarm when the feature disable alert will sound.

SAFETY INFORMATION

Safe and Efficient Operation of Motorola Two-Way Radios

This section provides information and instructions for the safe and efficient operation of Motorola Mobile Two-Way Radios.

For information regarding radio use in hazardous areas, please refer to the Factory Mutual (FM) approval manual supplement or Instruction Card which is included with radio models that offer this capability.

Exposure To Radio Frequency Energy

National and International Standards and Guidelines

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:

- Federal Communications Commission Report and Order No. FCC 96-326 (August 1996)
- American National Standards Institute (C95.1 - 1992)
- National Council on Radiation Protection and Measurements (NCRP - 1986)
- International Commission on Non-Ionizing Radiation Protection (ICNRP - 1986)
- European Committee for Electrotechnical Standardisation (CENELEC):
  - ENV. 50166-1 1995 E — Human Exposure to Electromagnetic Fields Low Frequency (0Hz to 10kHz)
  - ENV. 50166-2 1995 E — Human Exposure to Electromagnetic Fields High Frequency (10kHz to 300GHz)
  - Proceedings of SC211/8 1996 — Safety Considerations for Human Exposure to E.M.F.s from Mobile Telecommunications Equipment (M.T.E.) in the Frequency Range 30MHz - 6 GHz (E.M.F. - Electromagnetic Fields)

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

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.

When instructed to do so, turn off your radio when on board an aircraft. Any use of a radio must be in accordance with airline regulations or crew instructions.

Operational Warnings

Vehicles Equipped with Airbags

WARNING

An airbag inflates with great force.
DO NOT place objects, including communication equipment, in the area over the airbag or in the airbag deployment area. If the communication equipment is improperly placed and the airbag inflates, this could cause serious injury.

Potentially Explosive Atmospheres

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

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.

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 inside and outside the vehicle are at least the minimum distance away from a properly installed, externally mounted antenna.

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

Table 1: Radiated Power and Distance

Radiated Power of Vehicle-installed Mobile Two-way Radio	Minimum Distance From Transmitting Antenna
7 to 15 Watts	30.5 cm(1 Foot)
16 to 50 Watts	61 cm (2 Feet)
More than 50 Watts	91.5 cm (3 Feet)

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

Control Station Operation

When radio equipment is used to operate as a control station, it is important that the antenna be installed outside the building and away from places where people may be in close proximity.

Refer to Table 1 for rated power and minimum distant values for transmitting antennas.

General Radio Care

Caution

- The use of chemicals such as detergents, alcohol, aerosol sprays, and/or petroleum products may be harmful to and damage the radio housing.
- Avoid physical abuse of the radio.
- Clean the radio exterior using a cloth moistened with clean water and a mild dishwashing liquid.
- The use of non-approved radio accessories may damage the radio and invalidate warranty.

NOTES