Operator's Manual

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M7200 Series

Digital Mobile Radio

tyco Electronics

MACOM

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1 SAFETY SYMBOL CONVENTION

The following conventions are used throughout this manual to alert the user to general safety precautions that must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the product. M/A-COM, Inc. assumes no liability for the customer's failure to comply with these standards.

The WARNING symbol calls attention to a procedure, practice, or the like, which, if not correctly performed or adhered to, could result in personal injury. Do not proceed beyond a WARNING symbol until the conditions identified are fully understood or met.

The **CAUTION** symbol calls attention to an operating procedure, practice, or the like, which, if not performed correctly or adhered to, could result in a risk of danger, damage to the equipment, or severely degrade the equipment performance.

The **NOTE** symbol calls attention to supplemental information, which may improve system performance or clarify a process or procedure.

The **ESD** symbol calls attention to procedures, practices, or the like, which could expose equipment to the effects of **E**lectro-**S**tatic **D**ischarge. Proper precautions must be taken to prevent ESD when handling circuit modules.

2 RF ENERGY EXPOSURE INFORMATION

2.1 RF ENERGY EXPOSURE AWARENESS, CONTROL INFORMATION, AND OPERATION INSTRUCTIONS FOR FCC OCCUPATIONAL USE REQUIREMENTS

Before using your mobile two-way radio, read this important RF energy awareness and control information and operational instructions to ensure compliance with the FCC's RF exposure guidelines.

NOTE

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.

CAUTION

Changes or modifications not expressly approved by M/A-COM, Inc. could void the user's authority to operate the equipment.

This two-way radio uses electromagnetic energy in the radio frequency (RF) spectrum to provide communications between two or more users over a distance. It uses 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, electric power, 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 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 two-way radios marketed in North America 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 two-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 websites 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

2.1.1 Federal Communications Commission Regulations

Your M/A COM, Inc. M7200 mobile two-way radio is designed and tested to comply with the FCC RF energy exposure limits for mobile two-way radios before it can be marketed in the United States. When two-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 M/A COM, Inc. M7200 two-way radio has an RF exposure product label. Also, your M7200 Installation and Operator's Manuals include information and operating instructions required to control your RF exposure and to satisfy compliance requirements.

2.2 COMPLIANCE WITH RF EXPOSURE STANDARDS

Your MA/COM, Inc. M7200 mobile 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 RF 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 (talking), not when it is receiving (listening) or in standby mode.

Your M/A COM, Inc. M7200 mobile two-way radio complies with the following RF energy exposure standards and guidelines:

- United States Federal Communications Commission (FCC), Code of Federal Regulations; 47 CFR §§ 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) C95.1-1999.

Table 2-1 lists the recommended minimum lateral distance for a controlled environment and for unaware bystanders in an uncontrolled environment, from transmitting types of antennas (i.e., monopoles over a ground plane, or dipoles) at rated radio power for mobile radios installed in a vehicle. Transmit only when unaware bystanders are at least the uncontrolled recommended minimum lateral distance away from the transmitting antenna.

Table 2-1: Rated Power and Recommended Minimum Safe Lateral Distance

MOBILE RADIO FREQUENCY SPLIT	ANTENNA P/N	RATED POWER OF VEHICLE-INSTALLED MOBILE TWO-WAY RADIO	RECOMMENDED SAFE MINIMUM LATERAL DISTANCE FROM TRANSMITTING ANTENNA	
			CONTROLLED	UNCONTROLLED
760 -870 MHz	MAMV-AN3J	15W	32 cm	70cm
	MAMV-AN3K			
	MAMV-AN3V			

2.2.1 Mobile Antennas

Install the radio's antenna (refer to Table 2-1 for applicable antenna part numbers) in the center of the vehicle's roof. These mobile antenna installation guidelines are limited to metal body motor vehicles or vehicles with appropriate ground planes. The antenna installation should additionally be in accordance with the following.

1. The requirements of the antenna manufacturer/supplier included with the antenna.
2. Instructions in the M7200 Radio Installation Manual, including minimum antenna cable lengths.
3. The installation manual providing specific information of how to install the antennas to facilitate recommended operating distances to all potentially exposed persons.

Use only the M/A-COM approved/supplied antenna(s) or approved replacement antenna. Unauthorized antennas, modifications, or attachments could damage the radio and may violate FCC regulations.

2.2.2 Approved Accessories

This radio has been tested and meets the FCC RF guidelines when used with the M/A-COM accessories supplied or designated for use with this product. Use of other accessories may not ensure compliance with the FCC's RF exposure guidelines, and may violate FCC regulations.

For a list of M/A-COM approved accessories refer to the product manuals, M/A-COM's Products and Services Catalog, or contact M/A-COM at 1-800-368-3277.

2.2.3 Contact Information

For additional information on exposure requirements or other information, contact M/A-COM, Inc. at 1-800-528-7711 or at http://www.macom-wireless.com.

3 OPERATION SAFETY RECOMMENDATIONS

3.1 TRANSMITTER HAZARDS

The operator of any mobile radio should be aware of certain hazards common to the operation of vehicular radio transmitters. A list of several possible hazards is given:

- **Explosive Atmospheres –** Just as it is dangerous to fuel a vehicle with the motor running, similar hazards exist when operating a mobile radio. Be sure to turn the radio off while fueling a vehicle. Do not carry containers of fuel in the trunk of a vehicle if the radio is mounted in the trunk.

  Areas with potentially explosive atmosphere are often, but not always, clearly marked. Turn OFF your radio when in any area with a potentially explosive atmosphere. It is rare, but not impossible that the radio or its accessories could generate sparks.

- **Interference to Vehicular Electronics Systems –** Electronic fuel injection systems, electronic anti-skid braking systems, electronic cruise control systems, etc., are typical electronic systems that can malfunction due to the lack of protection from radio frequency energy present when transmitting. If the vehicle contains such equipment, consult the dealer and enlist their aid in determining the expected performance of electronic circuits when the radio is transmitting.

- **Electric Blasting Caps –** To prevent accidental detonation of electric blasting caps, **DO NOT** use two-way radios within 1000 feet of blasting operations. Always obey the "**Turn off Two-Way Radios**" signs posted where electric blasting caps are being used. (OSHA Standard: 1926-900)

- **Liquefied Petroleum (LP) Gas Powered Vehicles –** Mobile radio installations in vehicles powered by liquefied petroleum gas with the LP gas container in the trunk or other sealed-off space within the interior of the vehicle must conform to the **N**ational **F**ire **P**rotection **A**ssociation standard **NFPA 58** requiring:
  - The LP gas container and its fittings.
  - Outside filling connections shall be used for the LP gas container.
  - The LP gas container shall be vented to the outside of the vehicle.

3.2 SAFE DRIVING RECOMMENDATIONS

(Recommended by AAA)

- Read the literature on the safe operation of the radio.
- Keep both hands on the steering wheel and the microphone in its hanger whenever the vehicle is in motion.
- Place calls only when the vehicle is stopped.
- When talking from a moving vehicle is unavoidable, drive in the slower lane. Keep conversations brief.
- If a conversation requires taking notes or complex thought, stop the vehicle in a safe place and continue the call.
- Whenever using a mobile radio, exercise caution.

4 OPERATING RULES AND REGULATIONS

Two-way FM radio systems must be operated in accordance with the rules and regulations of the local, regional, or national government.

In the United States, the M7200 mobile radio must be operated in accordance with the rules and regulations of the Federal Communications Commission (FCC). As an operator of two-way radio equipment, you must be thoroughly familiar with the rules that apply to your particular type of radio operation. Following these rules helps eliminate confusion, assures the most efficient use of the existing radio channels, and results in a smoothly functioning radio network.

When using your two-way radio, remember these rules:

- It is a violation of FCC rules to interrupt any distress or emergency message. As your radio operates in much the same way as a telephone "**party line**," always listen to make sure that the channel is clear before transmitting. Emergency calls have priority over all other messages. If someone is sending an emergency message – such as reporting a fire or asking for help in an accident – ***KEEP OFF THE AIR!***
- The use of profane or obscene language is prohibited by Federal law.
- It is against the law to send false call letters or false distress or emergency messages. The FCC requires that you keep conversations brief and confine them to business. To save time, use coded messages whenever possible.
- Using your radio to send personal messages (except in an emergency) is a violation of FCC rules. You may send only those messages that are essential for the operation of your business.
- It is against Federal law to repeat or otherwise make known anything you overhear on your radio. Conversations between others sharing your channel must be regarded as confidential.
- The FCC requires that you identify yourself at certain specific times by means of your call letters. Refer to the rules that apply to your particular type of operation for the proper procedure.
- No changes or adjustments shall be made to the equipment except by an authorized or certified electronics technician.

Under U.S. law, operation of an unlicensed radio transmitter within the jurisdiction of the United States may be punishable by a fine of up to $10,000, imprisonment for up to two (2) years, or both.

4.1 OPERATING TIPS

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

- Operating the radio in areas of low terrain, or while under power lines or bridges.
- Obstructions such as mountains and buildings.
- In areas where transmission or reception is poor, some improvement can be obtained by moving a few yards in another direction or moving to a higher elevation.

5 PRODUCT DESCRIPTION

The M7200 mobile is a state-of-the-art radio that operates seamlessly between the 800 MHz frequency band and the 700 MHz frequency band. The M7200 is designed to meet the critical communications demands of public service users and complies with MIL-STD-810F specifications.

The M7200 is capable of supporting multiple operating modes, including OpenSky digital operation, EDACS or ProVoice trunked modes, P25 digital trunked mode, P25 digital conventional mode, and conventional analog mode.

The M7200 uses Time Division Multiple Access (TDMA) technology in the OpenSky mode to allow multiple users to share a single RF channel. In addition, a single RF channel can support simultaneous digital voice and data communications.

The M7200 provides integrated voice and data services. Voice operation is provided using a microphone and speaker included in the radio installation kit. For data transfers, the M7200 is constructed with an industry-standard RS-232 interface serial port for connecting an optional laptop PC.

A PC, not included with the M7200, provides network connectivity through the standard serial (DCE-type) interface.

The M7200 has an integrated Global Positioning System (GPS) receiver. This allows the M7200 to fully support the Automatic Vehicular Locator (AVL) for fleet management and dispatch applications.

The OpenSky M7200 benefits from a flexible, software-based digital radio design. Features and user profiles are software-defined and can be reprogrammed over the air. The optional over-the-air programming feature allows communication protocols to be changed easily and added at any time.

5.1 REMOTE CONTROL HEAD OPERATION

For remote mount installations configured with a CH721 control head, all normal radio operations and interfaces can be handled via the control head connected to the radio unit by a single twisted-pair connection routed through a vehicle. Up to six control units may be attached to a trunk mount radio. Each control head provides a serial access point for data and any one (only one at a time) can be connected to a data device such as a personal computer.

Where multiple control heads are connected or where a dash-mount radio is installed with additional remote control heads, the following features are available from each position:

- Outgoing voice calls can be initiated. (Any control head can initiate a call but only one can talk at a time. All other connected control heads will hear both sides of the conversation.)
- Incoming and outgoing audio can be heard. (Outgoing audio is not broadcast at the source position.)
- Independent audio control is available.
- Radio settings such as talk group, scan mode etc., can be controlled. (Any connected control head can override the radio settings of other connected control heads.)
- Comfort settings, such as volume and display brightness that are applicable to the individual control head can be adjusted and cannot be overridden by other control heads.
- An optional intercom function is available between control units. (Audio will be broadcast to ALL connected control heads.)

5.2 INTERCOM OPERATION

The intercom option, a licensed option, allows the M7200 radio to pass audio locally between control heads and not over the network. It gives users at multiple control heads connected to the same radio the ability communicate with each other without transmitting over-the-air. When activated, incoming network radio calls are still scanned and broadcast at each control head.

6 OPENSKY OPERATION

6.1 CH721 FRONT PANEL COMPONENTS

The front panel of the control head includes a dot matrix display, controls for menu navigation, an emergency button, three pre-set buttons, a power button/rotary volume dial, and a microphone connector. In addition, the system model control head features a DTMF keypad. Table 6-1 lists all default front panel controls and their functions.

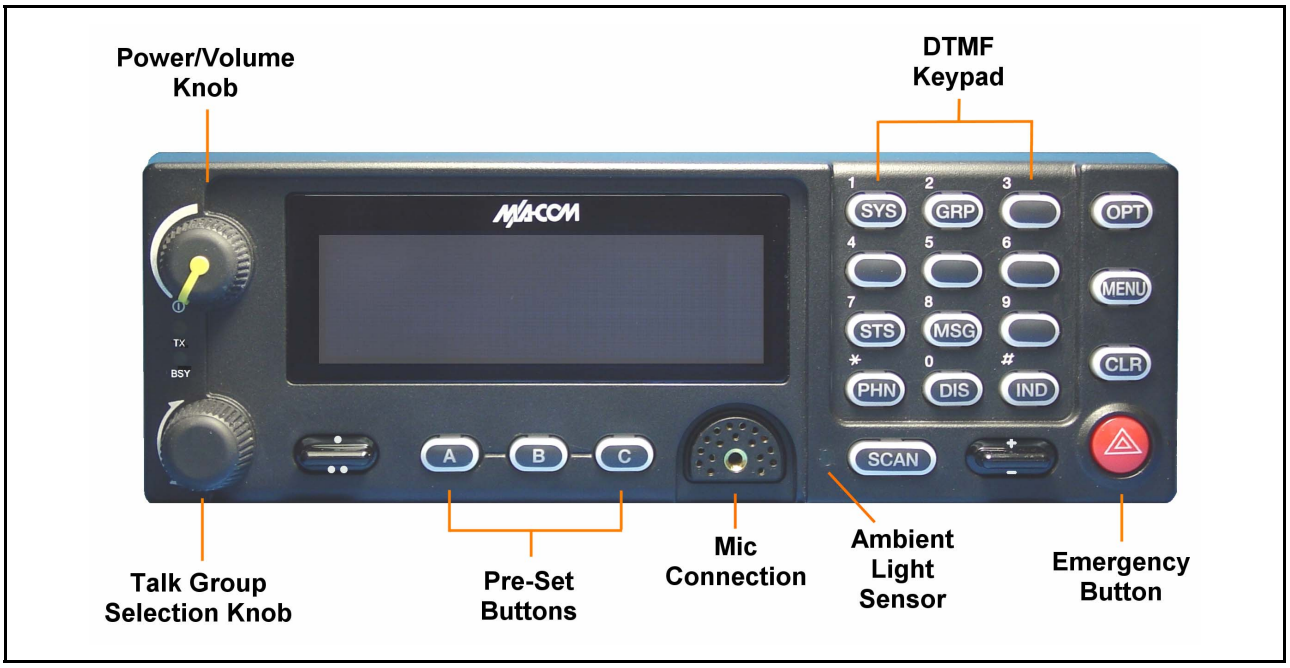


Figure 6-1: System Model

Figure 6-2: Scan Model

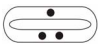
The buttons on the front panel are backlit for operation in a low ambient light level such as nighttime operation. Some buttons also flash to provide feedback of various operating conditions.

In addition, the front panel contains a light-level sensor that samples ambient light levels for automatic display and button backlight brightness adjustments. In other words, it automatically brightens the display and backlights when higher external light levels exist and it automatically dims the display and backlights during lower external light levels.

NOTE

Button function may vary depending upon system programming, radio hardware, and optional configurations. Complete the table in APPENDIX A if the keys have been remapped to provide new functions.

Table 6-1: Front Panel Default Controls and Functions

PART	FUNCTION
Power/Volume Knob	Turn knob clockwise to power on the radio and increase volume. Turn counter-clockwise to decrease volume and power off the radio.
Mic Connection	Connection for hand-held, hands-free, speaker-mic, or headset.
Emergency Button	If enabled through programming, the emergency button sends an emergency alert and opens voice communication on the currently selected talk group or the default emergency talk group (depending upon how the system is defined). To end an emergency call, press and hold the emergency button for approximately four seconds.
Ambient Light Sensor	Radio automatically adjusts the display and button backlight brightness level based on ambient light. Do not block this sensor.
	While in the dwell display, scrolls through available talk groups. Scrolls through selections within the active menu (available talk groups, pre-programmed speed dial numbers, canned alert messages, etc.).
	Scrolls through available menu items.
OPT/OPTION	
CLR/CLEAR	
MENU	Press to activate the current selection. In some cases, this is not necessary as the last selection will automatically activate after a short period.
Display area	Menu selections and messages. Network Connectivity icon. Current Volume Level icon. Volume numeric representation within the display (0 = Muted, 40 = Loudest). User may select which one of several dwell displays the radio uses.
Pre-Set buttons	These buttons are used to store and recall user-selectable parameters such as scan mode, selected profile, selected talk group, and priority talk group. Different parameters can be stored at each of the three different pre-set buttons.

6.2 POWER UP AND VOLUME CONTROL

6.2.1 Power Up

1. Rotate the Power/Volume Control knob clockwise to power on the radio. The display will illuminate when the radio powers up.

2. Wait for the power-up sequence to complete, which takes approximately ten (10) seconds.

   During this time, if enabled for auto registration, the radio is provisioned with a customized user personality designed for the user's specific needs by the OpenSky network administrator.

   If this personality contains encrypted talk groups or if the user is authorized for, and intends to use, manual encryption, User Login must be performed. This requires a system model control head so that the User ID and password can be entered.

3. When provisioning is complete, the radio will display the Dwell Display.

   *If User Login is required, the bottom line of the Dwell Display will flash the message "**Pls Login**."*

6.2.2 Volume Control

Turn the Power/Volume Control knob clockwise to increase the volume and counter-clockwise to decrease the volume.

6.3 SELF-TEST

After power-up, the M7200 radio undergoes a multi-function automatic registration procedure. As many as sixteen (16) possible radio profiles are downloaded to the radio from the network in response to the User's ID.

6.4 LOGIN TO THE NETWORK

Login occurs either automatically (auto registration) if the radio has a valid registration or, if enabled and authorized for encryption (section 6.30), requires the user to enter a User ID and password.

If encryption is enabled and authorized on the radio, the user will be prompted to "Pls Login" with the *1 login command, a User ID, and password [System Model Control Head required].

1. Press *1 (Login command).
2. Enter the full 10-digit User ID.
3. Press the # key.
4. Enter the password. See the following NOTE.
   - If the radio is configured for alpha-numeric passwords and the password has consecutive duplicate numbers ("MES**33**" for example), enter # between the consecutive duplicate numbers so the radio will **not** interpret the entry as a letter ("D" in this example).
   - If the radio is configured for numeric-only passwords, do not enter # between duplicated numbers.
5. Press the # key twice.

The User ID may be remembered from the previous log-in. (Refer to Section 6.5 for further details regarding log-off commands.) The password will be established before the radio is put into operation. Contact the local OpenSky network administrator for more information.

If necessary, contact radio system administration personnel for log-in assistance and/or radio-specific log-in instructions.

6.5 LOG OFF THE NETWORK

The *0## command de-registers the radio. Typically, this is automatically performed when powering down the radio. Using this method, the User ID is remembered by the radio so only the password is needed at next log-in. Manually log-off by pressing *0## (requires System Model).

If a user is logged in using encryption features, it is necessary to log-off when encryption is no longer required.

6.6 TURNING THE RADIO OFF

To turn the radio off, rotate the **Power Button/Volume Dial** counter-clockwise. In multiple control head installations, turning off the last powered-up control head will also automatically turn off the radio.

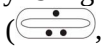
Several user-selected radio settings (i.e., scan mode, pre-set buttons, and side tone levels) are maintained for the next operational session. At the next radio power-up, maintained settings will automatically restore, along with the network personality settings. In multiple control head installations, settings are maintained for each control head position.

If power is abruptly disconnected from the radio prior to executing the correct turn-off procedure, user-selected radio settings and last-tuned channel information will be lost. This can extend the time required for the radio to register with the network upon the subsequent power-up.

6.7 MENU DISPLAY AND CONTROL AREA

Following power-up, the radio display shows the default talk group. Pressing up or down with  changes the display to the next available menu. In many cases, the dwell display automatically re-appears after no menu buttons are pressed for a short period of time (between 10 and 30 seconds). For some menus such as the GPS and User ID menus, this does not occur until the user presses a front panel button.

When the dwell display is active, it will change dynamically to reflect the current profile, received talk group/caller ID (when available), or channel (when enabled).

The radio's display is highly interactive. It responds in the top and bottom text lines as the user presses the menu buttons ( ,  and **MENU**) to scroll through the menu loop and the entries for each menu. Table 6-4 outlines the basic menu structure.

6.8 RADIO STATUS ICONS

Status Icons indicate the various operating characteristics of the radio. The icons show operating modes and conditions (see Table 6-2). The location of icons on the display may vary depending on configuration.

Table 6-2: ICONS and Descriptions

ICON	DESCRIPTION
	Indicates data registration.
	Volume bars – indicates relative volume level.

6.9 DWELL DISPLAY

When not engaged in menu selection, the first two lines of the display default to the user-defined display, known as the "dwell display." The top line indicates the currently selected talk group. The second line will display the currently selected profile, caller ID/alias[1], received talk group, and current channel name. Press the Ⓜ button repeatedly to scroll through and view one of these second line options.

6.10 PERSONALITY

As illustrated in Figure 6-3, a personality defines the profiles and talk groups available to the user. It is the structuring of a collection of profiles and privileges established by the OpenSky network administrator to provide the user with a comprehensive set of profiles to communicate effectively with the necessary talk groups or individuals.

Personalities are stored on the network and downloaded over-the-air to the radio. This process is called "provisioning." Provisioning occurs at radio power-up and at user log-in. Each personality can contain up to sixteen (16) profiles and each profile can contain up to sixteen talk groups.

6.10.1 Profiles

As stated above, each profile can contain up to sixteen (16) talk groups. A profile also defines the radio's emergency behavior. All transmissions are made on the selected talk group (displayed on the top line of the dwell display). The user can change the selected talk group to any of the other talk groups within the profile.

[1] Alias is a logical ID name such as "J_Smith." The name corresponds to a user ID such as 003-542-0001.

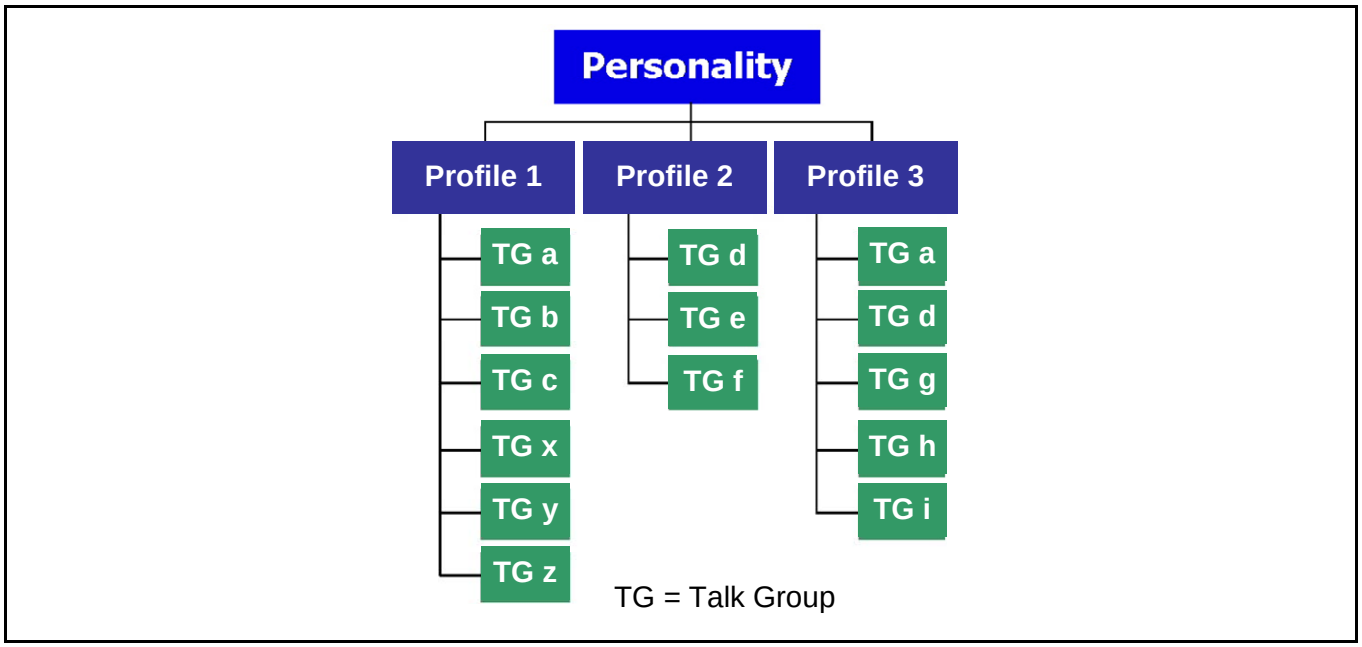


Figure 6-3: Personality Structure Example

6.10.2 Talk Groups

A talk group represents a set of users that regularly need to communicate with one another. There can be any number of authorized users assigned to a talk group. Talk groups are established and organized by the OpenSky network administrator. An OpenSky talk group is similar to a channel within a conventional FM radio system.

6.11 ALERT TONES

The M7200 radio also provides audible Alert Tones or "beeps" to indicate the various operating conditions (see Table 6-3).

Table 6-3: M7200 Alert Tones

NAME	TONE	DESCRIPTION
Call Queued	one low tone/two high tones	Call queued for processing
Call Denied	three short	Radio is out of coverage area or requested talk group is active.
Grant (or Go-Ahead)	single short beep	Sounded when resources become available for a call request placed in the queue (if enabled) upon channel access
Call Removed	single long low-pitched tone	Notifies the user access to the channel has been lost (out of coverage area or pre-empted by higher-priority call)
Selective Alert Received	four short tones	Only played once to indicate a selective alert has been receive
Emergency Alert Tone	three (3) short beeps	Sounds when an emergency alert is declared

NAME	TONE	DESCRIPTION
Emergency Cleared Tone	one long low-pitched tone	Sounds when and emergency is cleared
Selective Call Ring Tone	a ringing tone similar to a telephone	Ringing is repeated every four (4) seconds until the call is accepted or rejected by the radio being called or until the network drops the call if unanswered after one (1) minute
PSTN Ring Tones	a single medium-pitch reiterative tone.	Two ring tone - one generated by the radio when there is an incoming telephone call or an outgoing telephone call attempt is waiting for the telephone interconnect gateway equipment to dial the Public Switched Telephone Network (PSTN). The second ring tone sounds when the gateway equipment has dialed the number.

6.12 BASIC MENU STRUCTURE

Table 6-4 illustrates the basic M7200 OpenSky menu structure. Menu items will vary depending upon system programming, radio hardware, and optional configurations. All menus except the dwell display menu can be turned off by network administration personnel.

Table 6-4: Basic Menu Structure

Menu Name	Radio Displays (top and bottom lines)	Usage Notes
	To/From Dwell Display	
	⋮	
Engineering Display (Menu may not be available per programming.)	registration, RF sync and transceiver status codes / bit-error rates and RSSI data	Displays radio system connection data. For engineering use.
	⋮	
Silent Emergency	OFF/ON / "**SilentEmerg**"	Use + – to toggle OFF/ON.
	⋮	
Operating Mode (e.g., OTP, OCF)	available modes / "**Mode Menu**"	Use + – to choose an available mode. Press **MENU** and confirm (Y/N) with + – and **MENU** again.
	⋮	
GPS Fix	current latitude and longitude / "**GPS Fix**"	Radio's current GPS latitude and longitude position scrolls across top line of the display. Applies to GPS-equipped radios only.
	⋮	
User ID	User ID # of user currently logged in / "**User ID**"	User's identification/name scrolls across top line of the display (if programmed).
	⋮	
IP Address	Radio's IP address / "**IP Address**"	Radio's Internet Protocol (IP) address scrolls across top line of the display.
	⋮	
Station Identification	station's call sign / "**Station ID**"	Station's identification/name scrolls across top line of the display (if programmed).
	⋮	
Stealth Mode	"OFF" / "**StealthMenu**"	Use + – to turn on. Press any button to turn it off.
	⋮	
Treble Level	"LOW", "MEDIUM", "MEDHIGH", "HIGH" / "**Treble Menu**"	Use + – to choose speaker/headset treble level. Press **Select** to return to dwell display.
	⋮	
Display Brightness	"<< >>" / "**Bright Menu**"	Use + – to dim or brighten backlighting. Press **MENU** to return to dwell display.
	⋮	
Side Tone Level	"OFF", "LOW", "MED", "HIGH" / "**Side Menu**"	Use + – to choose side tone level. Press **MENU** to return to dwell display.
	⋮	
Intercom	"ON" or "OFF" / "**INTERCOM**"	Use + – to turn intercom on and off. Press **MENU** to return to dwell display.
	⋮	
Selected Channel (Menu may not be available per radio programming)	selected channel / "**ChannelMenu**"	Displays the current channel. Press **MENU** to return to dwell display.

See Next Page

Menu Name	Radio Displays (top and bottom lines)	Usage Notes
	To/From Dwell Display	
	See Previous Page	
Scan Mode	current scan mode "**ScnModeMenu**"	Use + – to turn scan on and off. Press **MENU** to return to dwell display.
Talk group Lock Out	talk group "<" "**LockOutMenu**"	Use + – to choose a talk group for locking/unlocking. Press **MENU** to toggle "<" on (locked out) and off.
Priority 1 Talk group	current priority talk group "**Priority2**"	Use + – to choose new priority talk group. Press **MENU** to return to dwell display.
Priority 2 Talk group	current priority talk group "**Priority1**"	Use + – to choose new priority talk group. Press **MENU** to return to dwell display.
Emergency Dismiss	alert received "**EmgDismiss**"	Use + – to choose emergency talk group. Press **MENU** to dismiss.
Alerts Received	time/sender's name/ alias/message text "**AlertsRcvd**" or oldest message	"No alerts" or alert message text scrolls in display. Use + – to view messages.
Alert Destination	current speed dial # "**AlertDest**"	Use + – to choose a speed-dial number. Press **MENU** to go to "AlertMsg" menu. Scroll through canned messages with + –. Press **MENU** to send message and return to dwell display.
Speed Dial	current speed dial # "**SpeedDial**"	Use + – to choose a speed-dial number. Press **MENU**, then use + – to select canned message.
Profile Selection	currently active profile "**ProfileMenu**"	Use + – to choose an available profile. Press **MENU** to return to dwell display.
Talk group Selection	selected talk group "**TalkGrpMenu**"	Use + – to choose a talk group in current profile. Press **MENU** to return to dwell display.
Dwell Display	Selected talk group (bottom line option)	Use + – to scroll top line through talk groups. Press **MENU** to change bottom line option.
	Use ••, **CLR**, or **OPT** to scroll through menus.	

NOTE

Menus and button function will vary depending upon system programming, radio hardware, and optional configurations.

6.13 DUAL-TONE MULTI-FREQUENCY

Dual-Tone Multi-Frequency (DTMF) is the system used by touch-tone telephones. DTMF assigns a specific tone frequency to each key so a microprocessor can easily identify its activation. The radio supports DTMF with a system model control head (Figure 6-1). This allows for specific tasks such as entering a user ID and password, or selective calling.

When a key on the DTMF keypad is pressed, a single low-pitched tone will be heard from the microphone. The key tones are not adjustable.

6.14 KEYPAD COMMANDS (SYSTEM MODEL CONTROL HEAD)

To perform a command from the keypad, press the ***** key followed by one of the pre-set function keys as follows:

***0** **Log-off command:** *0## (logs the user off the system). See page 17 for additional information.

***1** **Log-in command:** *1<User ID> # <Password> ## (required for encryption). See page 16 for additional information.

***4** **Enter Scene of Incident Mode (SOI) on specified channel.**

***7** **Initiate Selective Alert command:** *7<Target ID>#[Choose Message]#. See page 31 for additional information.

***8** **Radio-to-Radio Call command:** Selective call number # (PTT to dial).

***9** **Public Switched Telephone Network (PSTN) Call command:** See page 33 for additional information.

***32** **Begin Manual Encryption command:** *32<Pre-Determined Encryption Key of Up To 16 Digits># See page 36 for additional information.

***33** **End Manual Encryption command**.

6.14.1 Password Entry

Password entry requires a system model control head. Password characters are encrypted on the display using symbols to indicate the entry. The encryption symbols for each entry will appear in the display as they are scrolled through, for example: '-' and '+'. Press the # key twice to complete the entry process.

If the password is wrong, the radio will not successfully register with the network for wide area voice reception. The radio can still be used in single-site mode.

6.14.2 DTMF Overdial

Using the keypad on a System Model, the radio can transmit DTMF tones corresponding to numbers/characters 0 — 9, * and # on the keypad. To overdial numbers/characters, transmit by pressing and holding the PTT button and then, press the corresponding keys (one at a time) on the keypad.

6.15 CHANGING THE ACTIVE PROFILE

The radio can store up to sixteen (16) standard profiles, one of which is the currently active profile. To change the currently active profile:

1. Press up or down using  until "ProfileMenu" is displayed.
2. Use  to scroll through the list of available profiles.
3. Profile becomes active when selected for longer than 2 seconds, when the **MENU** is pressed, or when the menu is changed using  .

6.16 CHECKING OR CHANGING THE SELECTED TALK GROUP

Each profile stored in the radio can have up to sixteen (16) talk groups. One talk group within the currently active profile is set as the "selected talk group." For the radio user, the selected talk group is typically the focus of most voice transmissions and receptions. There are two ways to change the selected talk group:

First Method:

1. Use  to scroll through the menu until "TalkGrpMenu" appears on the bottom line of the display. The currently selected talk group appears in the top line of the display.
2. Use  to scroll through the available list of talk groups in the active profile. This list is determined by the OpenSky network administrator.

Second Method:

From the dwell display, use the talk group selection knob or  to scroll through the available list of talk groups in the active profile.

6.17 ADJUSTING DISPLAY & BUTTON BACKLIGHT BRIGHTNESS

The radio uses a light sensor on the front panel to automatically adjust display brightness and button backlight brightness to ambient light conditions. The display and backlights automatically brighten at higher external light levels and automatically dim at lower external light levels. However, the "Bright Menu" gives the user some manual brightness control as follows:

1. Using  , scroll through the menu until "Bright Menu" appears.
2. Use  to increase or decrease brightness. Display and button backlight brightness will immediately dim or brighten.

6.18 STEALTH MODE

For some users, it is important to be able to turn off the radio's display lights, button backlighting, volume and side tones, but not the radio traffic. For example, in covert operations, lights and sounds could inadvertently expose an otherwise unobservable radio user. For this purpose, the radio has a Stealth feature that disables the radio display light, indicator light and audible side tones.

When stealth mode is on, the radio continues to scan the programmed list of talk groups and the user can key-up on the selected talk group.

6.18.1 Enabling Stealth Mode

1. Using  , scroll through the menu until "StealthMenu" appears.
2. To immediately turn stealth mode on, press up or down with  .
3. To turn stealth mode off, press any button on the radio's front panel.

6.18.2 Disabling Stealth Mode

Pressing any radio button other than the mic's PTT button or the emergency button on front panel will immediately turn stealth mode off. For example, pressing the **MENU** button on the front panel will turn stealth mode off.

With stealth mode on, pressing any radio button (other than the mic's PTT button or the emergency button) on front panel will immediately turn stealth mode off. For example, pressing the ⊙ button on the front panel will turn stealth mode off.

6.19 ADJUSTING SIDE TONE AUDIO LEVEL

The radio sounds confirming tones called "side tones" when its buttons are pressed. Most users find this audible confirmation helpful when navigating the menus. Side tone audio level can be adjusted or turned completely off using the "Side Menu."

For covert operations, it may be necessary to turn off side tones. For safety's sake, turning off the radio during covert operations is not recommended.

To temporarily disable the side tones that could expose the user's presence and position, use the menu buttons to access the "Side Menu" and select "Off" from the menu choices.

If the radio is operating properly but side tones are not heard when the menu buttons are pressed, the side tones are probably turned off. To turn them back on, access the "Side Tone" menu and select a setting other than "off."

Use the following procedure set side tone level:

1. Use  to cycle through the menu until the "Side Menu" appears in the bottom line of the display.
2. Use  to change to the desired level (Off, Low, Medium, and High). To turn side tones completely off, use the "Off" setting.

6.20 CHANGE OPERATING MODE

1. Use  to cycle through the menu until the "Mode Menu" appears in the bottom line of the display.
2. Use  to choose an available mode. Press **MENU** and confirm (Y/N) with  and **MENU** again.
3. Press the **MENU** button to confirm.

6.21 RECEIVING AND TRANSMITTING VOICE CALLS

As soon as the radio completes the startup/log-on/provision/self-test sequence and registers on the OpenSky network, voice calls from talk groups in the active profile will be audible.

6.21.1 Receiving a Voice Call

No action is required to receive a voice call. The display responds to incoming voice calls as follows:

- If the dwell display is set to received talk group/caller ID/alias, the display indicates either the User ID of the incoming caller, if available, or the talk group's name. If the selected talk group matches the receive talk group, caller ID/alias is displayed. Otherwise, the talk group (name) is displayed.
- If the dwell display is not set to received talk group, the display indicates the data appropriate to those displays, but provides no indication as to the identity of the incoming caller.

Refer to section 6.25 for detailed information on talk group scanning. Refer to section 6.30 for detailed information regarding sending and receiving encrypted calls.

6.21.2 Transmitting a Voice Call

Transmit a voice call as follows:

1. Turn the radio on.
2. If required, log-in to the network using a user ID and password. See section 6.4 beginning on page 16 as necessary.
3. Select the desired talk group for transmitting on.
4. Depress and hold the **Push-to-Talk (PTT)** button on the hand-held microphone, pause for a moment, and then speak normally. For maximum clarity, hold the microphone approximately 1 ½ inches from the mouth and do not shout or whisper into it. If the call is queued by the network, wait for the grant tone to sound before speaking.
5. Release the PTT button when finished speaking.

Refer to section 6.30 for detailed information regarding sending and receiving encrypted calls.

6.22 ADJUSTING AUDIO TREBLE LEVEL

The tone of received signals can be adjusted using the radio's "Treble Menu" as follows:

1. Use  to scroll through the menu until "Treble Menu" appears. The radio's current treble level setting indicates in the top line of the display. There are four levels available: low, medium, medium-high and high.
2. Use  to increase or decrease.
3. Press the **MENU** button or wait a few seconds to return to the Dwell Display.

6.23 INTERCOM MODE

The optional intercom mode gives users at multiple control heads connected to the same radio the ability communicate with each other without transmitting over-the-air. Turn intercom mode on and off using the "INTERCOM" menu as follows:

1. Use  to cycle through the available menu items until "INTERCOM" appears in the display.

2. Use  to toggle between “On” and “Off.”

When intercom mode is turned on:

- Incoming voice calls will override intercom communications for the duration of the voice call. The radio and associated control heads will remain in intercom mode and intercom communications will resume when the voice call ends.
- “TG: INTERCOM” appears in the control head’s display when talking on the intercom. This indicates microphone audio is not sent out on the selected talk group; rather, it remains localized between the radio control positions (i.e., the control heads connected to the mobile radio).
- If a call exists on the currently selected talk group when a PTT button is pressed at one of the control heads, “TG: in use” appears in the display to indicate intercom mic audio cannot preempt the call on the talk group.

A user at a radio with only one control head/front panel can turn intercom mode on. In this case, pressing the microphone’s PTT button will not send microphone audio anywhere.

6.24 TALK GROUP LOCK OUT

There are two ways of focusing voice communications by suppressing calls from talk groups in the currently active profile:

1. **No Scan.** By turning scan off (selecting “No Scan” via the “ScnModeMenu”), only the selected talk group is audible.
2. **Lock Out.** By locking out selected talk groups, the “chatter” of the locked-out talk groups cannot be heard. This focuses the user’s scanning resources to calls only on desired talk groups.

Talk group lock out is a scan-related feature. With lock out, one or more talk groups in the active profile can be temporarily disabled from being scanned. Calls are not received on locked-out talk groups. Lock out settings are not retained between profile changes or when the radio is power cycled.

Lock out is a listening (receive) function and only blocks received calls on locked out talk groups. Lock out does not affect transmit capability. The above methods do not apply to recent emergency lock outs.

Only talk groups in the active profile can be locked out, since they are the only talk groups whose voice calls can be heard on the radio.

If the Scan Mode is “Fixed,” P1 and P2 groups CANNOT be locked out. See Section 6.25 for more information.

The default emergency and emergency-capable talk groups can be locked out if they are NOT in an emergency state. If a talk group is locked out and is subsequently changed to the currently selected talk group, it will automatically be unlocked by the radio so the user can hear calls on the talk group. The radio may be configured so all talk groups are automatically locked out by default. In this case, they must be manually unlocked, if desired.

6.24.1 Lock Out a Talk Group

1. Use  to scroll through the menu until "LockOutMenu" appears in the bottom line of the display. The name of a talk group in the currently active profile will appear in the top line.
2. Use  to scroll through the list of talk groups, if any, until the desired talk group for lock out appears in the top line of the display.
3. Press the **MENU** button to lockout the displayed talk group. A less than symbol (<) appears next to the talk group's name.
4. Repeat steps 2 and 3, as needed, to lockout additional talk groups.

The dwell display will re-appear a few seconds after button presses end.

While scrolling through talk groups in the active profile, the only talk groups that appear in the "LockOutMenu" are those in the active profile.

6.24.2 Unlock a Talk Group

1. Use  to scroll through the menu until "LockOutMenu" appears in the bottom line of the display. The name of a talk group in the currently active profile will appear in the top line.
2. Use  to scroll through the list of talk groups, if any, until the talk group desired for unlocking appears in the top line of the display. A less-than symbol ("<") appears next to the name of a talk group that is currently locked out.
3. Press the **MENU** button to unlock the talk group. The less-than symbol ("<") next to the name of the talk group disappears. The dwell display appears as soon as the radio acknowledges the selection.

6.24.3 Caution Regarding Profile Changes

A talk group's lock out status does not survive a change of profile. If after locking out talk groups in the current profile and then selecting a new profile, all talk groups that were previously locked are automatically unlocked.

Compare options before changing to another profile. If the user's goal can be achieved by temporarily assigning priority talk group status to a talk group, it could be possible to avoid having to lock out the same talk groups again in a new profile.

6.25 SCANNING

Three scanning modes are available for the radio, but only one can be active at any time. Changing the scanning mode changes the way the radio scans voice calls for all of profiles in the radio personality, no matter which profile is or becomes active.

As described in Table 6-5, the choice of scanning mode changes the span of communications with all the talk groups in the radio's profiles, but does not affect interaction with the talk groups.

Table 6-5: Scan Modes

SCAN MODE	EXPLANATION
No Scan	**Eliminates distractions**. Full communications (transmit and receive) on selected talk group. No calls received from other talk groups.
Normal (Default)	Full communications (transmit and receive) on the selected talk group. Scans all talk groups in the active profile that are not locked out. Receive calls from more than one talk group, if available from the current site. Allows dragging of the selected, default emergency, P1, and P2 talk groups to the site on which the radio is registered. (If other calls are available at the site, they also can be heard but they will not be actively dragged.) An emergency-enabled talk group is only dragged if it is in emergency mode.
Fixed	The priority groups are fixed to the selected profile's pre-defined P1 and P2 groups (configured via the UAS). In this mode, P1 and P2 groups CANNOT be locked out.

6.25.1 Checking or Changing Active Scan Mode

The currently active scan mode does not appear in the dwell display. To check it, access "ScnModeMenu" and observe it in the top line of the display. To change the active scan mode:

1. Use  to scroll through the menus until "ScnModeMenu" appears in the display.
2. Use  to scroll through the scan options until the desired mode appears. See Table 6-5.

6.25.2 Scanning Priority

The following lists the scanning priority order (from highest to lowest):

1. Selected talk group in emergency state.
2. Default emergency group in emergency state.
3. Selected talk group.
4. Emergency capable group in emergency state
5. Priority 1 talk group.
6. Priority 2 talk group.
7. Other (non-priority)

6.25.2.1 Changing Scanning Priority

Follow this procedure to set talk groups in the current profile as the Priority 1 or Priority 2 talk group:

1. Use  to scroll through the menu until "Priority1" or "Priority2" appears in the bottom line of the display (Priority1 group has higher priority than the Priorty2 group. The talk group currently set as the priority talk group appears in the top line of the display.
2. Use  to select a new priority talk group.

3. Press the **MENU** button to set the newly selected talk group as the priority talk group.

6.26 MAKING SELECTIVE CALLS

Selective calling is a feature that allows two radio units to obtain and utilize an independent voice path for a private call. Radios can be configured to both initiate and receive selective calls or to only receive selective calls.

In the OpenSky system, a source radio can be configured to initiate selective calls through a pre-programmed list in memory. This method uses the "speed dial list" set up by the OpenSky network administrator and provisioned as part of the registration process.

In addition, a properly equipped source radio can initiate a selective call to any radio in the system by entering the ten-digit voice user ID (which looks like a telephone number) of the target device. Entering a selective call number without using the speed dial feature requires a system model control head (Figure 6-1). See section 6.13 for more detail.

NOTE

Selective calls are terminated if an emergency is declared. The network limits selective calls to ten (10) minutes maximum.

6.26.1 Manually Dialing a Selective Call (System Model Control Head)

1. Press *8 on the keypad.
2. Enter the number of the radio to be called (e.g., 027-001-0006). If the region number (first 3 digits; 027 in this example) is the same as this radio's region number, these digits do not need to be entered. Likewise, if the region and agency numbers (first 6 digits; 027-001 in this example) are the same as this radio's numbers, these digits do not need to be entered. Leading zeros can also be ignored.
3. Press and release the # key.
4. Wait approximately two (2) seconds.
5. Press and release the PTT button to initiate the selective call request. When the called party accepts the call, press the PTT again and begin speaking.

6.26.2 Speed Dialing a Selective Call

NOTE

Speed dial numbers are defined and provisioned by the OpenSky network administrator and cannot be manually entered into the radio by the user. Contact the administrator if changes to the speed dial list are required.

1. Scroll through the Menu options using  until "SpeedDial" appears in the bottom line of the display.
2. Using  , scroll through the pre-programmed speed-dial numbers until the desired number appears in the display.
3. Press and release the PTT button to ring the other user.
   a. The ring tone is sounded.

b. If the other user accepts the call, the called user's alias will appear in initiating caller's display. The two are now in a private call until one ends the call, the call is terminated due to an initiated emergency, or the maximum time limit of ten (10) minutes is reached.

4. To end the call, press the **MENU** button.

6.26.3 Receiving a Selective Call

When someone calls in from another radio using the selective call function, a ring will sound in the speaker and/or headset. Use the + ramp control to answer the call and press the microphone's PTT button when speaking (transmitting) to the caller. Press the **MENU** button to end the call.

A selective call will be interrupted if an emergency is declared on a monitored talk group.

6.27 SELECTIVE ALERT

Selective alert messaging is an OTP feature allowing one of up to eight (8) pre-programmed text messages (refer to section 6.27.3) to be sent from one radio to another. The user specifies a destination radio's User ID, selects one of the pre-programmed text messages, and then transmits it to the destination radio. The message delivery system adds time-of-day information and forwards the message to the destination (receiving) radio. The sending radio receives a brief message noting the status of the transmission. Refer to Table 6-6 for a list of possible status messages.

The first few characters of a message are part of the message text entered when the message is programmed. This programming is performed by the system or network administration personnel.

Messages successfully received by the destination radio are stored in it until read or until it is power cycled.

6.27.1 Sending Selective Alert Messages

The destination radio's User ID can be selected via the menu or via the keypad on the system model control head.

Menu Button Method:

1. Using  , scroll through the menu until "AlertDest" (Alert Destination) appears in the bottom line of the display. The current speed dial number scrolls on the top line.
2. Use  to change to a different speed-dial number.
3. When the desired speed-dial number appears, press the **MENU** button to activate the selection.
4. Choose and send the message.

Keypad Method (System Model Control Head):

To select the destination radio's User ID using the keypad, perform the following:

1. Press *7 on the keypad. "AlertDest" appears in the display.
2. Enter the number of the destination radio (e.g., 027-001-0006) using the DTMF keypad. If the region number (first 3 digits; 027 in this example) is the same as this radio's region number, these digits do not need to be entered. Likewise, if the region and agency numbers (first 6 digits; 027-001 in this example) are the same as this radio's numbers, these digits do not need to be entered. Leading zeros can also be ignored. Refer to Section 6.13.
3. Press the # key to enter the number.

Choosing and Sending the Message

After specifying the destination radio's User ID (Section 6.27.1), the radio automatically allows you to choose a message. The current message scrolls across the top line of the display. To choose a message:

1. Scroll through the message list using  . The next available message in the list is displayed. Pause between each arrow button depress to observe the entire message as it scrolls across the top line of the display.
2. To select and send the displayed message, press the **Select** button, or press the # button on the keypad.
3. The status of the sent message will be momentarily displayed (Table 6-6).

Table 6-6: Status of Selective Alert

STATUS MESSAGE	DEFINITION
Delivering	Select Alert message transmit attempt
Busy	Too busy – Try again
Dest Down	Receiving radio not logged on – Not registered
Not Reg	Transmitting radio not logged on – Not registered
Delivered	Transmission complete
Unreachable	No response
Partial	Transmission interrupted

6.27.2 Receiving Messages

When a selective alert message is received by a radio, a four-beep tone is heard and "NewAlert" flashes until the new message is read. Up to eight (8) received messages are stored. If another message is received, the first (oldest) message is automatically deleted to make room for new incoming messages.

Displaying Received Messages

1. Using  , scroll through the menu until "AlertsRecvd" (Alerts Received) appears in the bottom line of the display. "No alerts" or the last received (newest) message appears in the display. It is preceded by the time the message was received, and the sender's name/alias.
2. View other received messages using  .
3. To delete the message currently being viewed, press the **MENU** button.

Deleting Received Messages

To delete a received message:

1. Display the message.
2. Delete the message by pressing the **MENU** button.
3. Confirm the deletion by pressing the **MENU** button again.

6.27.3 Defining Pre-Programmed Messages

All selective alert messages are pre-defined by the radio system's maintenance personnel. These messages are sometimes referred to as "canned" messages. Custom selective alert messages cannot be created by

the radio user. The entire selective alert message, including the abbreviation, can include up to two hundred (200) text characters.

6.28 TELEPHONE INTERCONNECT CALLS (SYSTEM MODEL CONTROL HEAD)

If the radio system is equipped with Public Switched Telephone Network (PSTN) interconnect equipment, telephone calls can be made from the M7200 using this procedure:

1. Press the *9 keys.
2. Enter the telephone number. (Ignore dashes/spaces, and precede the number with any required access digits such as a 1 for long distance.)
3. Press the # key.
4. Wait a few seconds and then press and release the mic's PTT button to initiate the call. An initial ring tone plays indicating call initiation. Once the gateway picks up the call, the ring tone changes.
5. When the caller answers, depress the PTT button when speaking and release it to listen to the caller.
6. To hang-up, press the **MENU** button on the front panel.

6.29 EMERGENCY COMMUNICATIONS

The M7200 mobile radio can transmit both emergency voice calls and emergency alerts over the entire network. OpenSky handles emergency calls and alerts with the highest priority.

For critical voice communications, an emergency call can be raised on the default talk group or the currently selected talk group by "declaring" an emergency on the talk group. The exact talk group is determined by the currently active profile. After successfully declaring an emergency on a talk group, the declaring radio's microphone remains "hot" for a predetermined amount of time. In other words, the radio transmits audio for a period of time even when the microphone's PTT button is not depressed. An emergency talk group is provided greater priority and infinite hang-time by the radio system's infrastructure. Hang-time is the maximum duration of quiet time between transmissions on the talk group before the infrastructure assets are automatically taken away. Because an emergency call is handled on a talk group, it is received by all radios and consoles monitoring the talk group.

An emergency alert is a data message sent by the radio to the MIS console (or any console capable of receiving it). It identifies the radio declaring the emergency, and the radio's location (if the radio is equipped with a GPS receiver). Voice audio is not automatically transmitted during the emergency if the administrator configures the radio for alert notification only.

6.29.1 Declaring an Emergency Call or Alert

To declare an emergency call or emergency alert, press and release the orange Emergency button. This button is located just to the right of the 5-button Menu and Select keypad; see Figure 6-1 on page 14. Note the following:

- The OpenSky network administrator determines if the Emergency button is used to declare an emergency call or if it is used to declare an emergency alert. This is based upon the radio's currently active profile.

- The OpenSky network administrator also determines if the emergency is declared on the currently selected talk group or a "default" emergency talk group. Again, this is based upon the radio's currently active profile. A talk group upon which an emergency is declared on is considered an "emergency talk group."
- Upon successful emergency declaration:
  - An emergency tone will sound in the radio's speaker/headset if the radio is not in stealth mode.
  - At the declaring radio, the Emergency button flashes red if the radio is not in stealth mode. The administrator can configure the radio to automatically transmit upon successful emergency declaration, at which point the **MENU** button will flash red. However, the **MENU** button flashing red is not a requirement for successful emergency declaration.
  - For an emergency call declaration, "EMERGENCY" indicates in the bottom line of the display. In addition, the emergency talk group's name appears in the top line of the display, followed by an asterisk (*). The emergency talk group can be forwarded across the OpenSky network for emergency communications.
  - For an emergency alert declaration, "EMERG ALERT" indicates in the bottom line of the display.
  - For an emergency call declaration, other radio users and/or dispatchers at consoles will hear the emergency signal, a distinctive 3-tone burst. They will also hear audio from the declaring radio's "hot" microphone, if any.
  - For an emergency alert declaration, only dispatchers at consoles will hear the emergency signal and, if any, audio from the declaring radio's "hot" microphone.
  - For an emergency call the declaring radio's microphone remains "hot" for a predetermined amount of time. In other words, the radio transmits audio for a period of time even when the microphone's PTT button is not depressed. Audio is transmitted over the emergency talk group. When the microphone is "hot" for this initial period (typically ten seconds), simply speak into it for voice transmission.

If an emergency declaration is not successful, the radio will periodically re-attempt until it is successful. During this retry period, the radio will flash "EMERG PEND" on the bottom line of the display. It will display "EMERG RETRY" for each attempt.

6.29.2 Silent Emergency

When this feature is enabled and an emergency call or alert is declared by pressing the emergency button, the radio will not play a tone and will display an abbreviated emergency message (default is EBA). This feature is enabled or disabled via programming or via the menu.

If the Silent Emergency feature is enabled or disabled via programming, the setting will survive power cycle. Enable/Disable selection via the menu will NOT survive power cycle and the enable/disable state will revert to the programmed setting at power up.

6.29.3 Clearing an Emergency Call or Alert

To clear an emergency, press and hold the Emergency button for at least three seconds. However, this can only be accomplished at the radio where the emergency was originally declared (the initiating radio), by a dispatcher at a console, at a supervisory radio, or by the network administrator. When the emergency is

successfully cleared, the remove tone will sound at the initiating radio. Also, for an emergency call, the asterisk (*) will clear from the display.

6.29.4 Receiving an Emergency Call

Upon receiving an emergency call declared by another radio:

- An emergency tone sounds in the radio's speaker/headset (three short high-pitched beeps).
- "EMERGENCY" flashes in the display if the radio is not in stealth mode.
- When the emergency talk group is selected, an asterisk (*) follows its name in the top line of the display. The asterisk identifies the selected talk group is in an emergency state. Some radios may be programmed by the system or network administration personnel to flash the **Emergency** button (red) when an emergency call is received. This occurs only if the radio is not in stealth mode.
- If scan mode is set to "No Scan" and the emergency was declared on the selected talk group, audio on the emergency talk group is heard in the speaker/headset. See page 28 for additional information on "No Scan" operation. Also see the following NOTE.
- If scan mode is set to "No Scan" and the emergency was declared on a talk group **other than** the selected talk group, the emergency talk group (identified by an "*") must be selected before audio on it is heard in the speaker/headset.
- If scan mode is set to "Normal" and the emergency was declared on the selected talk group, the selected/emergency talk group's name remains in the top line of the display. Audio on the emergency talk group is heard in the speaker/headset.
- If scan mode is set to "Normal" and the emergency was declared on a talk group **other than** the selected talk group, the emergency talk group's name appears in the bottom line of the display. Audio on the emergency talk group is heard in the speaker/headset.
- The declaring radio's alias appears in the bottom line of the display when the emergency talk group is selected.
- An emergency call can be dismissed as described in the following section.

A radio declaring an emergency on a talk group has a "hot" mic time period of typically ten (10) seconds just after it declares the emergency. This time period may be adjusted by system or network administration personnel on a per radio basis.

6.29.5 Dismissing an Emergency Call

To ignore an emergency call declared by another radio user, dismiss it as follows:

1. Press  until "EmgDismiss" appears in the display.
2. Press  until the talk group in the emergency state appears, as indicated by an asterisk (*) following the talk group's name.
3. Press the **MENU** button.

6.30 ENCRYPTION

In the OpenSky network, both data and voice use a 128-bit or 256-bit key encryption standard published by the Federal Information Processing Service (FIPS), called Advanced Encryption Standard (AES). AES is approved by the U.S. Department of Commerce for encryption of classified materials.

When encryption is enabled on the network, data is encrypted from the MDIS to the Mobile End System (MES) (e.g., M7200 mobile radio). This form of encryption provides air-link security.

Voice encryption is handled either automatically or manually. Automatic encryption is initiated through the Network Administration Server (NAS) for a specific talk group and requires nothing from the user. Manual encryption is initiated by two or more radio users and requires system model control heads. Both methods of encryption are discussed in the following sections.

6.30.1 Automatic Encryption

For automatic encryption, a network administrator will select the talk group to be encrypted at the interface to the NAS. Once the talk groups have been selected and identified as secure, credentials for key generation are generated automatically by the system and provisioned to authorized users. This process requires that authorized users login to the network and be authenticated. Encryption keys require no manual handling and are never sent "in the clear" over any network interface or air-link.

1. "Pls Login" appears displayed in the bottom line of the dwell display.
2. Login normally using the keypad on a system model control head to enter User ID and Password.

If a user is engaged in a call on a talk group encrypted at the network administrator level, "Secure Call" will appear in the bottom line of the dwell display if the user is logged in to that talk group.

If a secure call is in progress elsewhere and the user has not logged in, the bottom of the dwell display will alternate between "No Access" and the alias of the radio that is currently engaged in the secure call.

6.30.2 Manual Encryption (System Model)

Two or more users can manually encrypt a call, if enabled, without an established encrypted talk group. A pre-determined key is required at each radio.

NOTE

The key must be pre-determined by the users prior to making a manually encrypted call on a talk group. It can be between one and sixteen (1 - 16) digits and it is entered into the radio using the keypad.

If two communicating radios have different (manually-defined) keys, receive audio at each radio will sound garbled.

With manual encryption enabled, unencrypted radio users on the talk group can still make standard voice (unencrypted) calls on the talk group. However, if an unencrypted user attempts to transmit on the talk group when one of the encrypted users is already transmitting on the talk group, the unencrypted radio will sound a deny tone and "No Access" will appear in the display. Also, the encrypted user can hear standard unencrypted calls, but cannot respond while still manually encrypted.

CAUTION

Do *not* set a talk group for manual encryption if it has been set for encryption by the network administration personnel.

Perform the following to transmit or receive manually encrypted calls:

1. Press *32 on the keypad.
2. Enter the key (up to 16 digits).
3. Press the # key.
4. To end manual encryption, press *33#.

If a user is engaged in a call on a talk group that has been manually encrypted at the radio level, the user will see “Secure Call” on the bottom of the dwell display.

If a secure (encrypted) call is in progress, and the user has not entered the key, the bottom of the dwell display will alternate between “No Access” and the alias of the radio that is currently engaged in the secure call.

Once the user has terminated manual encryption, “UnSecure” appears temporarily in the bottom line of the dwell display.

6.31 PRESET BUTTONS

The front panel contains three buttons labeled A, B, and C. By holding one of these buttons down for approximately three (3) seconds, the following current information is saved to the function of that button:

- Selected talk group
- Selected profile
- Selected priority talk group
- Lockouts
- Scan mode
- Intercom mode

Presets are saved and restored to/from non-volatile memory. Changing the User ID (login in as a different user) will clear the presets since they are stored on a per-user basis. Changing control heads will not recall presets for the previous control head.

6.32 DYNAMIC REGROUPING

Dynamic regrouping requires that the network administrator determine which radio users should be formed into an impromptu talk group to respond to particular emergency conditions.

The administrator will edit the personalities of the affected radios to include an emergency profile and then page the affected radios to re-register with the network to receive their edited personalities.

In response, affected radios automatically re-register to receive their edited personalities. During re-registration, subscriber equipment will default to the emergency profile selected by the administrator.

6.33 GPS COORDINATES

The radio’s current latitude and longitude coordinates may be displayed using the “GPS” menu. The following procedure assumes a GPS antenna is connected to the radio and it is receiving adequate signals from GPS satellites:

1. Press  until the “GPS” menu appears in the bottom line of the display. Current GPS coordinate latitude and longitude data continuously scrolls in the top line of the display in a degrees:minutes:seconds format.
2. Use  to change to another menu.

If the internal GPS receiver’s data is expired (30 minutes or more) or unavailable, the radio uses the serving base station’s coordinates [GPS (Site) is displayed]. The GPS Menu will also indicate if the data is aged (2 minutes or more) [GPS (Aged) is displayed]

7 BASIC TROUBLESHOOTING

If the radio is not operating properly, check Table 7-1 for likely causes. For additional assistance, contact a qualified service technician.

Table 7-1: Basic Troubleshooting

SYMPTOM	CAUSE	SOLUTION
Radio will not turn on.	No power.	Test the connection to the vehicle power supply.
Radio will not turn off.	If in multiple control head configuration, one of the attached control heads is still powered up.	Power off all control heads.
Radio will not register or does not receive provisioning data.	Bad logon credentials.	Check logon and password.
No audio.	Speaker volume is muted.	Increase the volume level.
Poor audio.	Transmitting or receiving in a poor coverage area or subject to interference.	Check network connectivity and move to a better coverage area if possible. Report the area without coverage to an authorized network technician.
Poor display visibility.	Ambient Light Sensor is obstructed.	Clear the obstruction and give the sensor a clear path to ambient light.
No network connectivity icon in display.	Radio is out-of-range or cannot connect with the OpenSky network. Base station network connection has failed.	Return to coverage area if possible and wait for condition to clear. Use single-site trunking or switch to an alternate channel.
Radio will not transmit.	Radio may be out of coverage area or may be overheated.	Return to coverage area if possible. If overheated, let radio cool before retrying transmission. Report this failure to an authorized technician.
Radio will not transmit (transmit indicator does not flash).	Radio may be experiencing low voltage.	The M7200 will cease to transmit if the voltage drops below 8.5 volts. Have the battery checked by an authorized technician.
Radio powers off for no apparent reason.	Radio may be experiencing very low voltage.	The M7200 automatically powers down when voltage drops below +5.0 volts. Have the battery checked by an authorized technician.
“Warning: No MRU” Message.	Radio control head is unable to communicate with mobile radio unit (radio transceiver).	Have the radio connections checked by an authorized technician.

SYMPTOM	CAUSE	SOLUTION
Control head randomly changes display.	In multiple control head configurations, another user is operating the radio from another control head.	None
Encrypted calls cannot be made.	Not authorized to use.	Contact system administrator to request encryption privileges.
Encrypted calls cannot be made.	User not logged in.	Log in (refer to Section 6.14.1).

8 TECHNICAL ASSISTANCE

The Technical Assistance Center's (TAC) resources are available to help with overall system operation, maintenance, upgrades and product support. TAC is the point of contact when answers are needed to technical questions.

Product specialists, with detailed knowledge of product operation, maintenance and repair provide technical support via a toll-free (in North American) telephone number. Support is also available through mail, fax and e-mail.

For more information about technical assistance services, contact your sales representative, or call the Technical Assistance Center at:

North America:	1-800-528-7711
International:	1-434-385-2400
Fax:	1-434-455-6712
E-mail:	tac@tycoelectronics.com

9 WARRANTY

A. M/A-COM, Inc. (hereinafter "Seller") warrants to the original purchaser for use (hereinafter "Buyer") that Equipment manufactured by or for the Seller shall be free from defects in material and workmanship, and shall conform to its published specifications. With respect to all non-M/A-COM Equipment, Seller gives no warranty, and only the warranty, if any, given by the manufacturer shall apply. Rechargeable batteries are excluded from this warranty but are warranted under a separate Rechargeable Battery Warranty (ECR-7048).

B. Seller's obligations set forth in Paragraph C below shall apply only to failures to meet the above warranties occurring within the following periods of time from date of sale to the Buyer and are conditioned on Buyer's giving written notice to Seller within thirty (30) days of such occurrence:

1. for fuses and non-rechargeable batteries, operable on arrival only.
2. for parts and accessories (except as noted in B.1) sold by Seller's Service Parts Operation, ninety (90) days.
3. for PANTHER™ Series hand portable and mobile radios, two (2) years.
4. for all other equipment of Seller's manufacture, one (1) year.

C. If any Equipment fails to meet the foregoing warranties, Seller shall correct the failure at its option (i) by repairing any defective or damaged part or parts thereof, (ii) by making available at Seller's factory any necessary repaired or replacement parts, or (iii) by replacing the failed Equipment with equivalent new or refurbished Equipment. Any repaired or replacement part furnished hereunder shall be warranted for the remainder of the warranty period of the Equipment in which it is installed. Where such failure cannot be corrected by Seller's reasonable efforts, the parties will negotiate an equitable adjustment in price. Labor to perform warranty service will be provided at no charge during the warranty period only for the Equipment covered under Paragraph B.3 and B.4. To be eligible for no-charge labor, service must be performed at a M/A-COM factory, by an Authorized Service Center (ASC) or other Servicer approved for these purposes either at its place of business during normal business hours, for mobile or personal equipment, or at the Buyer's location, for fixed location equipment. Service on fixed location equipment more than thirty (30) miles from the Service Center or other approved Servicer's place of business will include a charge for transportation.

D. Seller's obligations under Paragraph C shall not apply to any Equipment, or part thereof, which (i) has been modified or otherwise altered other than pursuant to Seller's written instructions or written approval or, (ii) is normally consumed in operation or, (iii) has a normal life inherently shorter than the warranty periods specified in Paragraph B, or (iv) is not properly stored, installed, used, maintained or repaired, or, (v) has been subjected to any other kind of misuse or detrimental exposure, or has been involved in an accident.

E. The preceding paragraphs set forth the exclusive remedies for claims based upon defects in or nonconformity of the Equipment, whether the claim is in contract, warranty, tort (including negligence), strict liability or otherwise, and however instituted. Upon the expiration of the warranty period, all such liability shall terminate. The foregoing warranties are exclusive and in lieu of all other warranties, whether oral, written, expressed, implied or statutory. NO IMPLIED OR STATUTORY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE SHALL APPLY. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, SPECIAL, INDIRECT OR EXEMPLARY DAMAGES.

This warranty applies only within the United States.

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APPENDIX A KEYPAD REMAPPING

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

Button	Function	Button	Function
Emergency		1	
Preset A		2	
Preset B		3	
Preset C		4	
Rocker •		5	
Rocker ••		6	
Rocker +		7	
Rocker -		8	
MENU		9	
OPT/OPTION		*	
CLR/CLEAR		0	
SCAN		#	

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