Operator's Manual
MM23016
Rev. K, Apr/11

M7200 Mobile Radio
with CH-721 Control Head

MANUAL REVISION HISTORY

REV	DATE	REASON FOR CHANGE
-	Nov/06	Initial release.
A	Jun/07	Included EDACS, Conventional, and P25 operation and updated OpenSky operation.
B	Sep/07	Included MPE information for motorcycle installations and added antennas.
C	Apr/08	Updated OpenSky operation information. Added P25 Trunking.
D	Jul/08	Updated OpenSky operation; included CH-721 keymaps, lock/unlock keypad, added Client Mode, included error messages.
E	Aug/08	Added quick buttons, updated Stealth Mode info.
F	Sep/08	Minor corrections and added System All Call to OpenSky.
G	Mar/09	Updated Table 8-2 and updated CH-721 graphic.
H	Jul/09	Conversion to Harris format.
J	Sep/10	Added antenna part numbers and the respective MPE information. Added keypad lock/unlock instructions for ECP mode, added BND SCAN and REGISTER, and updated warranty.
K	Apr/11	Updated for OTP R17; consolidated EDACS, P25, and Conventional operation into one section.

ACKNOWLEDGEMENT

This device is made under license under one or more of the following US patents: 4,590,473; 4,636,791; 5,148,482; 5,185,796; 5,271,017; 5,377,229; 4,716,407; 4,972,460; 5,502,767; 5,146,497; 5,164,986; 5,185,795; 5,226,084; 5,247,579; ; 5,491,772; 5,517,511; 5,630,011; 5,649,050; 5,701,390; 5,715,365; 5,754,974; 5,826,222; 5,870,405; 6,161,089; and 6,199,037 B1. DVSI claims certain rights, including patent rights under aforementioned U.S. patents, and under other U.S. and foreign patents and patents pending. Any use of this software or technology requires a separate written license from DVSI.

CREDITS

EDACS, OpenSky, Harris, and assuredcommunications are registered trademarks of Harris Corporation. All other brand and product names are trademarks, registered trademarks, or service marks of their respective holders.
AMBE is a registered trademark and IMBE, AMBE+, and AMBE+2 are trademarks of Digital Voice Systems, Inc.

NOTICE!

The material contained herein is subject to U.S. export approval. No export or re-export is permitted without written approval from the U.S. Government. Rated: EAR99 in accordance with U.S. Dept. of Commerce regulations 15CFR774, Export Administration Regulations.

Information and descriptions contained herein are the property of Harris Corporation. Such information and descriptions may not be copied or reproduced by any means, or disseminated or distributed without the express prior written permission of Harris Corporation, PSPC Business, 221 Jefferson Ridge Parkway, Lynchburg, VA 24501.

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

This product conforms to the European Union WEEE Directive 2002/96/EC. Do not dispose of this product in a public landfill. Take it to a recycling center at the end of its life.

This manual is published by **Harris Corporation** without any warranty. Improvements and changes to this manual necessitated by typographical errors, inaccuracies of current information, or improvements to programs and/or equipment, may be made by **Harris Corporation** at any time and without notice. Such changes will be incorporated into new editions of this manual. No part of this manual may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, for any purpose, without the express written permission of **Harris Corporation.**

Copyright © 2006 — 2011, Harris Corporation

TABLE OF CONTENTS

Page

1 SAFETY SYMBOL CONVENTION 8

2 RF ENERGY EXPOSURE INFORMATION 9
2.1 RF ENERGY EXPOSURE AWARENESS, CONTROL INFORMATION, AND OPERATION INSTRUCTIONS FOR FCC OCCUPATIONAL USE REQUIREMENTS 9
2.1.1 Federal Communications Commission Regulations 9
2.2 COMPLIANCE WITH RF EXPOSURE STANDARDS 10
2.2.1 Mobile Antennas for Standard Vehicle Installations 10
2.2.2 Mobile Antennas for Motorcycle Installations 14
2.2.3 Approved Accessories 14
2.2.4 Contact Information 14

3 OPERATION SAFETY RECOMMENDATIONS 15
3.1 TRANSMITTER HAZARDS 15
3.2 SAFE DRIVING RECOMMENDATIONS 15

4 OPERATING RULES AND REGULATIONS 16
4.1 OPERATING TIPS 16

5 PRODUCT DESCRIPTION 17

6 CHANGE OPERATING MODE 18
6.1 CHANGE FROM OTP MODE 18
6.2 CHANGE TO OTP MODE 18

7 OPENSKY OPERATION 19
7.1 CH-721 FRONT PANEL COMPONENTS 19
7.2 POWER UP AND VOLUME CONTROL 21
7.2.1 Power Up 21
7.2.2 Volume Control 21
7.3 SELF-TEST 21
7.4 LOGIN TO THE NETWORK 21
7.5 LOG OFF THE NETWORK 22
7.6 TURN THE RADIO OFF 22
7.7 MENU DISPLAY AND CONTROL AREA 22
7.8 RADIO STATUS ICONS 23
7.9 DWELL DISPLAY 23
7.10 ERROR MESSAGES 23
7.11 PERSONALITY 25
7.11.1 Profiles 25
7.11.2 Talk Groups 26
7.12 ALERT TONES 27
7.13 BASIC MENU STRUCTURE 28
7.14 DUAL-TONE MULTI-FREQUENCY 30
7.15 KEYPAD 30
7.15.1 Keypad Commands (System Model Control Head) 30
7.15.2 Quick Buttons (System Model Only) 31
7.15.3 Keypad Lock/Unlock 31
7.15.4 Password Entry 31
7.15.5 DTMF Overdial 31
7.16 CHANGE THE ACTIVE PROFILE 32

TABLE OF CONTENTS

Page

7.17 ENABLE/DISABLE VOLUME SIDE TONE 32
7.18 CHECK OR CHANGE THE SELECTED TALK GROUP 32
7.19 ADJUST DISPLAY AND BUTTON BACKLIGHT BRIGHTNESS 32
7.20 STEALTH MODE 33
7.20.1 Enable Stealth Mode 33
7.20.2 Disable Stealth Mode 33
7.21 ADJUST SIDE TONE AUDIO LEVEL 33
7.22 CHANGE OPERATING MODE 34
7.23 RECEIVE AND TRANSMIT VOICE CALLS 34
7.23.1 Receive a Voice Call 34
7.23.2 Transmit a Voice Call 34
7.24 ADJUST AUDIO TREBLE LEVEL 35
7.25 INTERCOM MODE 35
7.26 TALK GROUP LOCK OUT 36
7.26.1 Lock Out a Talk Group 36
7.26.2 Unlock a Talk Group 36
7.27 SCANNING 37
7.27.1 Check or Change Active Scan Mode 37
7.27.2 Scan Priority 38
7.27.3 Change Priotiy1 and Priority2 Talk Groups 38
7.28 MAKE SELECTIVE CALLS 38
7.28.1 Manually Dial a Selective Call (System Model Control Head) 39
7.28.2 Speed Dial a Selective Call 39
7.28.3 Receive a Selective Call 40
7.28.4 Terminate a Selective Call 40
7.29 SELECTIVE ALERT 40
7.29.1 Send Selective Alert Messages 40
7.29.2 Receive Messages 41
7.29.3 Define Pre-Programmed Messages 42
7.30 TELEPHONE INTERCONNECT CALLS (SYSTEM MODEL CONTROL HEAD) 42
7.30.1 Place an Interconnect Call 42
7.30.2 Receive an Interconnect Call 42
7.31 EMERGENCY COMMUNICATIONS 42
7.31.1 Declare an Emergency Call or Alert 43
7.31.2 Silent Emergency 43
7.31.3 Clear an Emergency Call or Alert 44
7.31.4 Receive an Emergency Call 44
7.31.5 Dismiss an Emergency Call 45
7.32 ENCRYPTION 45
7.32.1 Automatic Encryption 45
7.32.2 Manual Encryption (System Model) 46
7.33 PRESET BUTTONS 46
7.34 STATUS MESSAGES 47
7.34.1 Send Status Message via the Keypad (System Model Only) 47
7.34.2 Send Status Message via the Menu 47
7.35 REQUEST TO TALK (RTT) MESSAGES 47
7.35.1 Send RTT Message via the Keypad (System Model Radios Only) 48
7.35.2 Send RTT Message via the Menu 48

TABLE OF CONTENTS

Page
7.36 DYNAMIC REGROUPING 48
7.37 GPS COORDINATES 48
7.38 SCENE-OF-INCIDENT MODE 49

8 EDACS/CONVENTIONAL/P25 (ECP) OPERATION 50
8.1 TURN THE RADIO ON 50
8.2 CH721 FRONT PANEL COMPONENTS 50
8.3 KEYPAD LOCK/UNLOCK 51
8.4 RADIO STATUS ICONS 52
8.5 MESSAGES 52
8.6 ALERT TONES 55
8.7 MENU 56
8.8 FEATURE ENCRYPTION DISPLAY 57
8.8.1 Serial Number ROM (12 Hex Digits) 58
8.8.2 Feature Encryption Data Stream 58
8.8.3 Features Enabled 59
8.9 SYSTEM/GROUP/CHANNEL SELECTION 60
8.9.1 System Selection 60
8.9.2 Group and Channel Selection 60
8.10 LAST SYSTEM/GROUP/CHANNEL RECALL 60
8.11 ENCRYPTION 61
8.11.1 Displaying the Currently Used Cryptographic Key Number 61
8.11.2 Key Zero 61
8.11.3 Receive an Encrypted Call 61
8.11.4 Transmit an Encrypted Call 62
8.12 MACRO KEY OPERATION 62
8.13 RECEIVE A CALL 62
8.14 TRANSMIT A CALL 62
8.15 CONVENTIONAL FAILSOFT (EDACS) 63
8.16 EMERGENCY OPERATION 63
8.16.1 Receive an Emergency Call 63
8.16.2 Declare an Emergency 63
8.17 SYSTEM SCAN OPERATION (EDACS AND P25 TRUNKED) 64
8.17.1 Wide Area System Scan (WA Scan) 64
8.17.2 ProScan™ 64
8.17.3 Priority System Scan 64
8.17.4 When Wide Area System Scan is Enabled 64
8.17.5 When ProScan Is Enabled 65
8.17.6 Menu Selection 65
8.17.7 Pre-Programmed Keypad Key 65
8.18 SCAN OPERATION 65
8.18.1 Add Groups or Channels to a Scan List 65
8.18.2 Delete Groups or Channels from a Scan List 66
8.18.3 Nuisance Delete 66
8.18.4 Turn Scan On 66
8.18.5 Priority Group/Channel Scanning 66
8.18.6 Turn Scan Off 67
8.19 INDIVIDUAL CALLS (EDACS AND P25 MODES) 67
8.19.1 Receive and Respond to an Individual Call 67

TABLE OF CONTENTS

Page

8.19.2 Call Storage Lists 68
8.19.3 Send an Individual Call 68
8.20 SCAT™ OPERATION 69
8.21 TELEPHONE INTERCONNECT CALLS (EDACS AND P25) 69
8.21.1 Receive a Telephone Interconnect Call 69
8.21.2 Send a Telephone Interconnect Call 69
8.21.3 DTMF Overdial/Conventional Mode Telephone Interconnect 70
8.21.4 Programmable Entries 70
8.22 MOBILE DATA (EDACS AND P25 TRUNKED) 71
8.22.1 Displays 71
8.22.2 DATA OFF Operation 71
8.22.3 DATA ON Operation 71
8.22.4 Exiting Data Calls 72
8.22.5 Scan Lockout Mode 72
8.22.6 Data Lockout Mode 72
8.23 STATUS/MESSAGE OPERATION (EDACS AND P25 TRUNKED) 73
8.23.1 Status Operation 73
8.23.2 Message Operation 73
8.24 EDACS CONVENTIONAL P1 SCAN 74
8.25 DYNAMIC REGROUP OPERATION (EDACS) 74
8.26 PAGE (P25 TRUNKED ONLY) 74
8.27 SQUELCH ADJUST (CONVENTIONAL) 74
8.27.1 Menu Selection 75
8.27.2 Pre-Programmed Keypad Key 75
8.28 TYPE 99 DECODE (ANALOG CONVENTIONAL) 75
8.28.1 Menu Selection 76
8.28.2 Pre-Programmed Keypad Key 76
8.29 TALK-AROUND (ANALOG CONVENTIONAL) 76

9 BASIC TROUBLESHOOTING 77

10 CUSTOMER SERVICE 79
10.1 CUSTOMER CARE 79
10.2 TECHNICAL ASSISTANCE 79

11 KEYPAD REMAPPING 80

12 RADIO SETUP 81

FIGURES

Figure 7-1: System Model 19
Figure 7-2: Scan Model 19
Figure 7-3: Typical Display 23
Figure 7-4: Personality Structure Example 26
Figure 8-1: System Model 50
Figure 8-2: Scan Model 50
Figure 8-3: Typical Display 52

TABLE OF CONTENTS

Page

TABLES

Table 2-1: Recommended Minimum Safe Lateral Distances for Standard Vehicle Application 11
Table 2-2: Rated Power and Recommended Minimum Safe Lateral Distances for Motorcycle Application 14
Table 7-1: Front Panel Default Controls and Functions 20
Table 7-2: Icons and Descriptions 23
Table 7-3: M7200 OpenSky Mode Alert Tones 27
Table 7-4: Basic Menu Structure 28
Table 7-5: Keypad Function Commands 30
Table 7-6: Quick Button Functions 31
Table 7-7: Scan Modes 37
Table 7-8: Status of Selective Call 39
Table 7-9: Status of Selective Alert 41
Table 8-1: Front Panel Default Controls and Functions 51
Table 8-2: Icons and Descriptions 52
Table 8-3: Radio Messages 53
Table 8-4: Alert Tones 55
Table 8-5: Menu Item Information 56
Table 8-6: Available Feature Numbers 59
Table 8-7: Current Cryptographic Key Display 61
Table 9-1: Basic Troubleshooting 77

Harris Corporation, Public Safety and Professional Communications (PSPC) Business continually evaluates its technical publications for completeness, technical accuracy, and organization. You can assist in this process by submitting your comments and suggestions to the following:

Harris Corporation
PSPC Business
Technical Publications
221 Jefferson Ridge Parkway
Lynchburg, VA 24501

fax your comments to: 1-434-455-6851
or
e-mail us at: PSPC_TechPubs@harris.com

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. Harris Corporation assumes no liability for the customer's failure to comply with these standards.

WARNING

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.

CAUTION

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.

NOTE

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 Harris Corporation 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 Harris 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 Harris 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 Harris 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 Harris 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.

CAUTION

For standard vehicle applications, Table 2-1 which begins on page 11 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). This data is based upon the radio's rated radio power of 15 watts with the radio installed in a standard vehicle. Transmit only when unaware bystanders are at least the uncontrolled recommended minimum lateral distance away from the transmitting antenna.

For motorcycle applications, Table 2-2 on page 14 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). This data is based upon the radio's rated radio power of 15 watts with the radio mounted to a motorcycle. Transmit only when unaware bystanders are at least the uncontrolled recommended minimum lateral distance away from the transmitting antenna.

2.2.1 Mobile Antennas for Standard Vehicle Installations

Install the radio's antenna in the center of the vehicle's roof. Refer to Table 2-1 for applicable antenna part numbers. 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:

- The requirements of the antenna manufacturer/supplier included with the antenna.
- Instructions in the M7200 Radio Installation Manual, including minimum antenna cable lengths.
- 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 Harris Corporation approved/supplied antenna(s) or approved replacement antenna. Unauthorized antennas, modifications, or attachments could damage the radio and may violate FCC regulations.

Table 2-1: Recommended Minimum Safe Lateral Distances for Standard Vehicle Application

ANTENNA PART NUMBER	ANTENNA DESCRIPTION	RECOMMENDED MINIMUM LATERAL HUMAN BODY DISTANCE FROM TRANSMITTING ANTENNA	
		CONTROLLED ENVIRONMENT	UNCONTROLLED ENVIRONMENT
AN-125001-002 (mount) with AN-225001-001 (element)	700/800 MHz Standard Rooftop-Mount; 3 dBd Gain	15.7 Inches (40 Centimeters)	34.6 Inches (88 Centimeters)
AN-125001-002 (mount) with AN-225001-002 (element)	700/800 MHz Standard Rooftop-Mount; Elevated-Feed 3 dBd Gain		
AN-125001-002 (mount) with AN-225001-003 (element)	700/800 MHz Standard Rooftop-Mount; Elevated-Feed, No Ground Plane 3 dBd Gain		
AN-125001-002 (mount) with AN-225001-004 (element)	700/800 MHz Standard Rooftop-Mount; Low-Profile 2 dBd Gain		
AN-125001-002 (mount) with AN-225001-005 (element)	700/800 MHz Standard Rooftop-Mount; 5 dBd Gain	19.7 Inches (50 Centimeters)	43.3 Inches (110 Centimeters)
AN-125001-004 (mount) with AN-225001-001 (element)	700/800 MHz Thick Rooftop-Mount; 3 dBd Gain	15.7 Inches (40 Centimeters)	34.6 Inches (88 Centimeters)
AN-125001-004 (mount) with AN-225001-002 (element)	700/800 MHz Thick Rooftop-Mount; Elevated-Feed 3 dBd Gain		
AN-125001-004 (mount) with AN-225001-003 (element)	700/800 MHz Thick Rooftop-Mount; Elevated-Feed, No Ground Plane 3 dBd Gain		
AN-125001-004 (mount) with AN-225001-004 (element)	700/800 MHz Thick Rooftop-Mount; Low-Profile 2 dBd Gain		
AN-125001-004 (mount) with AN-225001-005 (element)	700/800 MHz Thick Rooftop-Mount; 5 dBd Gain	19.7 Inches (50 Centimeters)	43.3 Inches (110 Centimeters)

(Table Continued on Next Page)

Table 2-1: Recommended Minimum Safe Lateral Distances for Standard Vehicle Application

ANTENNA PART NUMBER	ANTENNA DESCRIPTION	RECOMMENDED MINIMUM LATERAL HUMAN BODY DISTANCE FROM TRANSMITTING ANTENNA	
		CONTROLLED ENVIRONMENT	UNCONTROLLED ENVIRONMENT
AN-125001-006 (mount) with AN-225001-001 (element)	700/800 MHz GPS Combo Rooftop-Mount; 3 dBd Gain	15.7 Inches (40 Centimeters)	34.6 Inches (88 Centimeters)
AN-125001-006 (mount) with AN-225001-002 (element)	700/800 MHz GPS Combo Rooftop-Mount; Elevated-Feed 3 dBd Gain		
AN-125001-006 (mount) with AN-225001-003 (element)	700/800 MHz GPS Combo Rooftop-Mount; Elevated-Feed, No Ground Plane 3 dBd Gain		
AN-125001-006 (mount) with AN-225001-004 (element)	700/800 MHz GPS Combo Rooftop-Mount; Low-Profile 2 dBd Gain		
AN-125001-006 (mount) with AN-225001-005 (element)	700/800 MHz GPS Combo Rooftop-Mount; 5 dBd Gain	19.7 Inches (50 Centimeters)	43.3 Inches (110 Centimeters)
AN-125001-008 (mount) with AN-225001-001 (element)	700/800 MHz Magnetic-Mount; 3 dBd Gain	15.7 Inches (40 Centimeters)	34.6 Inches (88 Centimeters)
AN-125001-008 (mount) with AN-225001-002 (element)	700/800 MHz Magnetic-Mount; Elevated-Feed 3 dBd Gain		
AN-125001-008 (mount) with AN-225001-003 (element)	700/800 MHz Magnetic-Mount; Elevated-Feed, No Ground Plane 3 dBd Gain		
AN-125001-008 (mount) with AN-225001-004 (element)	700/800 MHz Magnetic-Mount; Low-Profile 2 dBd Gain		
AN-125001-008 (mount) with AN-225001-005 (element)	700/800 MHz Magnetic-Mount; 5 dBd Gain	19.7 Inches (50 Centimeters)	43.3 Inches (110 Centimeters)

(Table Continued on Next Page)

Table 2-1: Recommended Minimum Safe Lateral Distances for Standard Vehicle Application

ANTENNA PART NUMBER	ANTENNA DESCRIPTION	RECOMMENDED MINIMUM LATERAL HUMAN BODY DISTANCE FROM TRANSMITTING ANTENNA	
		CONTROLLED ENVIRONMENT	UNCONTROLLED ENVIRONMENT
AN102800V1	136 to 941 MHz, ¼-Wavelength**, Standard Rooftop-Mount; 0 dBd Gain	15.7 Inches (40 Centimeters)	34.6 Inches (88 Centimeters)
AN102800V2	136 to 941 MHz, ¼-Wavelength**, Thick Rooftop-Mount; 0 dBd Gain		
AN-025167-001 (Discontinued)	700/800 MHz Standard Rooftop-Mount; 3 dBd Gain	12.6 inches (32 centimeters)	27.6 inches (70 centimeters)
AN-025167-002 (Discontinued)	700/800 MHz Elevated-Feed Rooftop-Mount; 3 dBd Gain		
AN-025167-004 (Discontinued)	700/800 MHz GPS Combo Rooftop-Mount; 3 dBd Gain		
AN-025167-005 (Discontinued)	700/800 MHz GPS Combo Elevated-Feed Rooftop-Mount; 3 dBd Gain		
AN-025167-006 (Discontinued)	700/800 MHz Magnetic-Mount; 3 dBd Gain		
AN-025167-010 (Discontinued)	700/800 MHz Low-Profile Rooftop-Mount; 2 dBd Gain		
AN-025167-011 (Discontinued)	700/800 MHz GPS Combo Low-Profile Rooftop-Mount; 2 dBd Gain		
AN-025167-014 (Discontinued)	700/800 MHz Standard Rooftop-Mount; 5 dBd Gain	7.9 inches (20 centimeters)	26.4 inches (67 centimeters)
AN-025167-015 (Discontinued)	700/800 MHz GPS Combo Rooftop-Mount; 5 dBd Gain		

2.2.2 Mobile Antennas for Motorcycle Installations

NOTE

This device must not be co-located or operated in conjunction with any other antenna or transmitter.

Table 2-2: Rated Power and Recommended Minimum Safe Lateral Distances for Motorcycle Application

ANTENNA PART NUMBER	ANTENNA DESCRIPTION	RECOMMENDED SAFE MINIMUM LATERAL DISTANCE FROM TRANSMITTING ANTENNA	
		CONTROLLED	UNCONTROLLED
LE-OM806HDBKTNCDS	800 MHz; 3.5 dBd Gain	7.9 Inches (20 Centimeters)	16.1 Inches (41 Centimeters)

Install the radio's antenna on the end of the motorcycle case farthest away from the driver. Refer to Table 2-2 for frequencies and corresponding part numbers of recommended antennas. These mobile antenna installation guidelines are limited to motorcycles fit with the motorcycle radio case with integral antenna grounding plane. The antenna installation should additionally be in accordance with the following.

- The requirements of the antenna manufacturer/supplier included with the antenna.
- Instructions in the M7200 Radio and Control Unit Motorcycle Installation Manual, including minimum antenna cable lengths.
- 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 Harris Corporation approved/supplied antenna(s) or approved replacement antenna(s).

Unauthorized antennas, modifications, or attachments could damage the radio and may violate FCC regulations.

2.2.3 Approved Accessories

This radio has been tested and meets the FCC RF guidelines when used with the Harris 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 Harris approved accessories, refer to the product manuals, the Products and Services Catalog, or contact Harris Corporation at 1-800-368-3277.

2.2.4 Contact Information

For additional information on exposure requirements or other information, contact Harris Corporation at 1-800-528-7711 or at www.pspc.harris.com.

3 OPERATION SAFETY RECOMMENDATIONS

3.1 TRANSMITTER HAZARDS

WARNING

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.

NOTE

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.

For remote mount installations configured with a CH-721 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. Two control units may be attached to a 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 an additional remote control head, 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. The other connected control head hears 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. Either control head can override the radio settings of other connected control head.
- Comfort settings, such as volume and display brightness that are applicable to the individual control head can be adjusted and cannot be overridden by the other control head.
- An optional intercom function is available between control units. Audio is broadcast to ALL connected control heads.

6 CHANGE OPERATING MODE

6.1 CHANGE FROM OTP MODE

To change from OTP operating mode to P25, EDACS, or Conventional:

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

Or

Preset button C can be configured via programming to reboot the radio into a particular application mode.

Or

Quick Button command 1# transitions the radio to ECP mode. If ECP mode is not loaded in the radio, the radio displays “No App.”

6.2 CHANGE TO OTP MODE

1. Use to scroll through available systems until OpenSky is displayed.
2. The radio transitions to OTP mode.

7 OPENSKY OPERATION

NOTE

Refer to MM-011553-001 for M7200 V-TAC operating instructions.

7.1 CH-721 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 On-Off/Volume Control knob, and a microphone connector. In addition, the system model control head features a DTMF keypad.

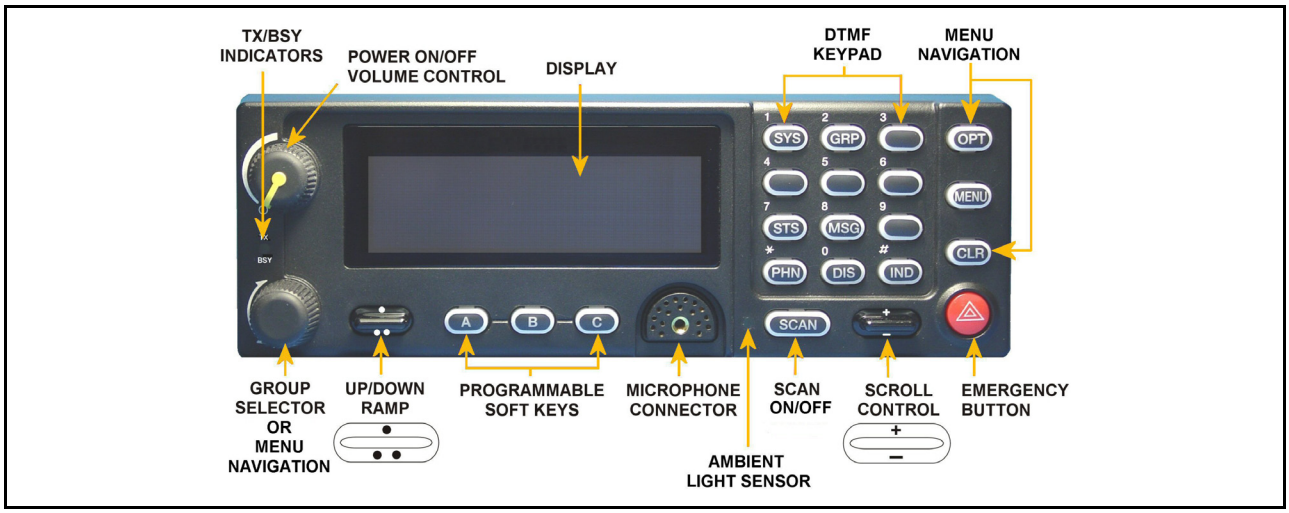


Figure 7-1: System Model

Figure 7-2: 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 radio programming. Table 7-1 describes the default configuration.

Table 7-1: Front Panel Default Controls and Functions

PART	FUNCTION
Power On-Off/Volume Control 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.
	If enabled through programming, the emergency button sends an emergency and opens voice communication on the currently selected talk group or the default emergency talk group (depending upon how the system is defined).
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.).
	IF ENABLED VIA PROGRAMMING, while in the dwell display, scrolls through available talk group. Scrolls through selections within the active menu (available talk groups, pre-programmed speed dial numbers, canned alert messages, etc.). Or Increases and decreases the display brightness.
	IF ENABLED VIA PROGRAMMING, scrolls through available menu items.
OPT/OPTION **CLR/CLEAR**	Scrolls through available menu items.
MENU	Press to activate the current selection. In some cases, this is not necessary as the last selection automatically activates after a short period. Also exits Stealth Mode.
Display Area	Menu selections and messages. Network Connectivity icon. Current Volume Level icon. Volume represented numerically within the display (0 = Muted, 40 = Loudest). User may select which one of several dwell displays the radio uses.
Pre-Set Buttons **A**, **B**, & **C**	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. Preset button C can be configured via programming to reboot the radio into a particular application mode. Contact your system administrator to determine if this feature is enabled in your radio.

PART	FUNCTION
SCAN	Toggles the Scan Mode ON/OFF. • If the Scan Mode is Normal and the Scan Mode is toggled Off, when the Scan Mode is toggled On the Scan Mode is set to Normal. • If the Scan Mode is Fixed and the Scan Mode is toggled Off when the Scan Mode is toggled On the Scan Mode is set to Fixed . • If the Scan Mode is Off when the radio boots up when the Scan Mode is toggled On the Scan Mode is set to Normal.

7.2 POWER UP AND VOLUME CONTROL

7.2.1 Power Up

1. Rotate the Power On-Off/Volume Control knob clockwise to power on the radio. The display illuminates 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 displays the Dwell Display.

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

7.2.2 Volume Control

Turn the Power On-Off/Volume Control knob clockwise to increase the volume and counter-clockwise to decrease the volume. The radio sounds a tone to indicate the current volume level.

7.3 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.

7.4 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 7.32), requires the user to enter a User ID and password.

If encryption is enabled and authorized on the radio, the user is 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.

- 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 does **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 login. (Refer to Section 7.5 for further details regarding log off commands.) The password is established before the radio is put into operation. Contact the local OpenSky network administrator for more information.

NOTE

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

7.5 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 login. Manually log off by pressing *0## (requires System Model).

7.6 TURN THE RADIO OFF

To turn the radio off, rotate the **Power On-Off/Volume Control knob** counter-clockwise. In multiple control head installations, turning off the last powered-up control head also automatically turns off the radio.

If enabled via programming, 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 automatically restore, along with the network personality settings. In multiple control head installations, settings are maintained for each control head position.

NOTE

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 are lost. This can extend the time required for the radio to register with the network upon the subsequent power-up.

7.7 MENU DISPLAY AND CONTROL AREA

Following power-up, the radio display shows the default talk group (Figure 7-3). , **OPT/OPTION,** or **CLR/CLEAR** 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 unless the menu up/down buttons are pressed.

When the dwell display is active, it changes to reflect the current profile, received talk group/caller ID (when available), or channel. The second line of dwell menu changes when the user presses the MENU button.

The radio's display is highly interactive. It responds in the top and bottom text lines as the user presses the menu buttons to scroll through the menu loop and the entries for each menu.

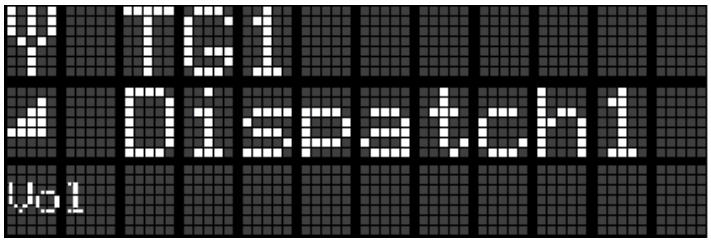


Figure 7-3: Typical Display

7.8 RADIO STATUS ICONS

Status Icons indicate the various operating characteristics of the radio. The icons show operating modes and conditions (see Table 7-2). The location of icons on the display may vary depending on configuration.

Table 7-2: Icons and Descriptions

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

7.9 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 displays the currently selected profile, caller ID/alias[1], received talk group, and current channel name. Press the **MENU** button to scroll through and view one of these second line options.

7.10 ERROR MESSAGES

This section lists and describes the error messages that may be displayed by the M7200 during OpenSky operation.

MESSAGE	DESCRIPTION
NOAUT01	Unspecified MDIS error. If condition persists in strong signal conditions, contact your system administrator.
MDENIED	Unspecified MDIS error. If condition persists in strong signal conditions, contact your system administrator.
UNAUTH3	Unauthorized IP. The radio network ID has not been added to network.
UNAUTH4	Bad authentication. If condition persists in strong signal conditions, contact your system administrator.
UNAUTH5	Unsupported authentication. If condition persists in strong signal conditions, contact your system administrator.

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

MESSAGE	DESCRIPTION
MDISBSY	The MDIS is busy. If condition persists in strong signal conditions, contact your system administrator.
DUP IP	Duplicate IP.
BADIKEY	Invalid infrastructure public key sequence number (IPKSN).
BADEKEY	Invalid end-system public key sequence number (EPKSN).
UNK MES	Unknown mobile end system (MES). If condition persists in strong signal conditions, contact your system administrator.
NOAUT05	MDIS failed mutual authentication. If condition persists in strong signal conditions, contact your system administrator.
BADMDIS	MDIS failed mutual authentication. If condition persists in strong signal conditions, contact your system administrator.
MDS BSY	MDIS busy – retry.
UNK DOM	Unknown home domain. If condition persists in strong signal conditions, contact your system administrator.
KEYSYNC	Mismatched key sequence number.
UNK ALG	Unknown/unsupported encryption algorithm.
BADSIZE	Unsupported MDIS key size.
NOAUT11	MES failed data mutual authentication. If condition persists in strong signal conditions, contact your system administrator.
NOAUT12	No response from MDIS. If condition persists in strong signal conditions, contact your system administrator.
NOREPLY	No SME response from MDIS. If condition persists in strong signal conditions, contact your system administrator.
VDENIED	Unspecified VNIC error. If condition persists in strong signal conditions, contact your system administrator.
BAD VID	Invalid voice user ID. Check User ID. If correct, contact your system administrator.
HOM DWN	The Home VNIC is down. Retry. If error continues, contact your system administrator.
SRV BSY	The serving VNIC is busy (congested).
MAX USR	The maximum number of users are already registered with the specified user ID. OpenSky allows one User ID to log onto the network using up to three different radios. Use *0## command or power down one of the other radios to de-register the radio.
NAS BSY	The system cannot provision MES because of an administrative process.
NOAUTHM	The MES failed voice mutual authentication. If a valid radio displays this error, contact TAC (see Section 10.2).
NOSUPRT	The MES cannot support the required provision. If condition persists in strong signal conditions, contact your system administrator.

MESSAGE	DESCRIPTION
NOAUTHV	VNIC does not support or failed mutual authentication. If condition persists in strong signal conditions, contact your system administrator.
PLS LOGIN	If enabled and authorized for encryption, the radio requires the user to enter a User ID and password. Login with keypad.
BAD PWD	An invalid password has been entered. Verify the password and re-enter.
OVER_TEMP	The radio may be too hot. The radio ceases transmitting if it exceeds an operational temperature threshold. Let the radio cool before attempting to transmit. Report this failure to authorized technician.
No App	ECP mode is unavailable (not programmed).
NO PRIV	Missing required privilege.
NO SYNC	No forward-channel sync (weak or no coverage). If condition persists in strong signal conditions, contact your system administrator.
No Access	Incoming encrypted voice cannot be decrypted. If condition persists in strong signal conditions, contact your system administrator.
NO REG	Not registered with MDIS, VNIC, or both.
Locked Out	Another control head is actively using the user interface.
DISABLED	Function disabled (e.g., function invalid in current context).

7.11 PERSONALITY

As illustrated in Figure 7-4, 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.

7.11.1 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.

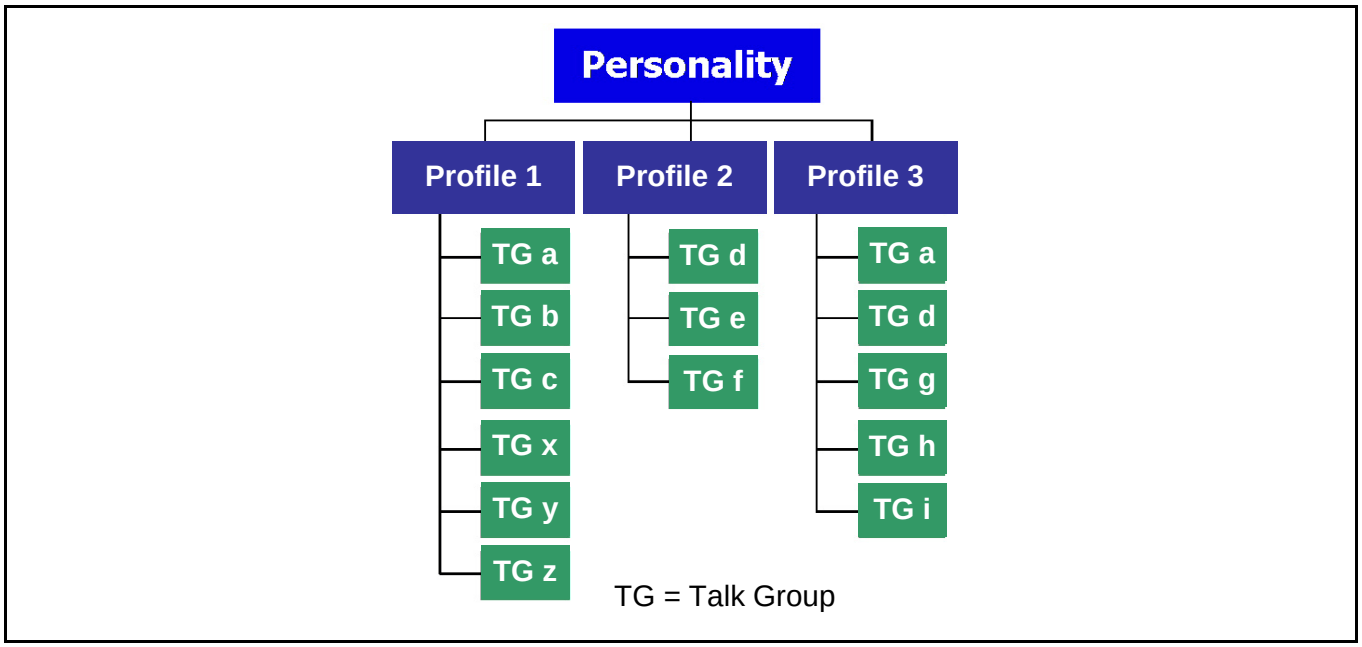


Figure 7-4: Personality Structure Example

NOTE

If Global Profile is enabled by the system administrator, the number of available talk groups to scan doubles.

7.11.2 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.

7.12 ALERT TONES

The M7200 radio also provides audible Alert Tones or "beeps" to indicate the various operating conditions (see Table 7-3).

Table 7-3: M7200 OpenSky Mode Alert Tones

NAME	TONE	DESCRIPTION
Call Queued	1 low tone/2 high tones	Call queued for processing.
Call Denied	3 short beeps	Radio is out of coverage area or requested talk group is active.
Grant (or Go-Ahead)	1 short beep	Sounds when resources become available for a call request placed in the queue (if enabled) upon channel access. If the radio roams to another site while transmitting, then it auto rekeys and begins transmitting on that tower. It gives a second grant tone to let the user know they have roamed.
Priority Bump	1 short tone	Stopped current incoming call in favor of higher-priority incoming call.
Call Removed	1 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	1 short tone, 2 short beeps, 1 short tone	Only played once to indicate a selective alert has been received.
Emergency Tone	3 long tones	Sounds when an emergency is declared.
Emergency Cleared	1 long low-pitched tone	Sounds when an emergency is cleared.
Volume	1 short tone	Reflects current volume level.
Selective Call Ring	A ringing tone similar to a telephone	Ringing is repeated every four seconds until the call is accepted or rejected by the radio being called or until the network drops the call if unanswered after one minute.
PSTN Ring	1 medium-pitch repeating 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.
Roam	2 short tones, 1 high-pitched and 1 low-pitched	Sounds when the radio transitions from one radio base station site to another.
Out of Range	Tri-tone beep	If enabled via programming, sounds when the radio is not within operational range with base station.

7.13 BASIC MENU STRUCTURE

Table 7-4 illustrates the basic M7200 OpenSky menu structure. Menu items 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 7-4: Basic Menu Structure

MENU NAME	RADIO DISPLAYS	USAGE NOTES
To/From Dwell Display		
, **CLR**, or **OPT**		
Engineering Display	bit-error rates and RSSI data	Displays radio system connection data. For engineering use.
, **CLR**, or **OPT**		
Silent Emergency	"**SilentEmerg**"	Use + – to toggle Silent Emergency "On" or "Off."
, **CLR**, or **OPT**		
Operating Mode	"**App Mode**"	Use + – to choose an available mode (OTP, ECP, or OCF). Press **MENU** and confirm (Y/N) with + – and press **MENU** again.
, **CLR**, or **OPT**		
GPS Fix	"**GPS Fix**"	Radio's current GPS latitude and longitude position scrolls across top line of the display. Applies to GPS-equipped radios only.
, **CLR**, or **OPT**		
User ID	"**User ID**"	User's identification/name scrolls across top line of the display (if programmed).
, **CLR**, or **OPT**		
IP Address	"**IP Address**"	Radio's Internet Protocol (IP) address scrolls across top line of the display.
, **CLR**, or **OPT**		
Station Identification	"**Station ID**"	Station's identification/name scrolls across top line of the display (if programmed).
, **CLR**, or **OPT**		
Stealth Mode	"**StealthMenu**"	Use + – to turn Stealth Mode "On."
, **CLR**, or **OPT**		
Treble Level	"**Treble Menu**"	Use + – to choose speaker/headset treble level (LOW, MEDIUM, MEDHIGH, or HIGH). Press **Select** to return to dwell display.
, **CLR**, or **OPT**		
Display Brightness	"**Bright Menu**"	Use + – to dim or brighten. Press **MENU** to return to dwell display.
, **CLR**, or **OPT**		
Side Tone Level	"**Side Menu**"	Use + – to choose side tone level (Off, Low, Med, or High). Press **MENU** to return to dwell display.
, **CLR**, or **OPT**		
Intercom	"**INTERCOM**"	Use + – to turn intercom "On" or "Off." Press **MENU** to return to dwell display.
, **CLR**, or **OPT**		
See Next Page		

MENU NAME	RADIO DISPLAYS	USAGE NOTES
See Previous Page		
Selected Channel	"**ChannelMenu**"	Allows the user to display and change the current channel. Press **MENU** to return to dwell display.
CLR, or **OPT**		
Scan Mode	"**ScnModeMenu**"	Use to select Scan Mode (Normal, No Scan, or Fixed). Press **MENU** to return to dwell display.
CLR, or **OPT**		
Talk group Lock Out	"**LockOutMenu**"	Use to choose a talk group for locking/unlocking. Press **MENU** to toggle "<" on (locked out) and off.
CLR, or **OPT**		
Priority 1 Talk group	"**Priority1**"	Use to choose new priority talk group. Press **MENU** to return to dwell display.
CLR, or **OPT**		
Priority 2 Talk group	"**Priority2**"	Use to choose new priority talk group. Press **MENU** to return to dwell display.
CLR, or **OPT**		
Emergency Dismiss	"**EmgDismiss**"	Use to choose emergency talk group. Press **MENU** to dismiss.
CLR, or **OPT**		
Alerts Received	"**AlertsRcvd**" or oldest message	"No alerts" or alert message text scrolls in display. Use to view messages.
CLR, or **OPT**		
Alert Destination	"**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.
CLR, or **OPT**		
Status LED	"**Status LED**"	Press **MENU**, then use to turn the TX/RX LED "On" or "Off."
CLR, or **OPT**		
Client Mode	"**Client Mode**"	Use to choose Client Mode (Network or SOI).
CLR, or **OPT**		
Speed Dial	"**SpeedDial**"	Use to choose a speed-dial number. Press **MENU**, then use to select canned message.
CLR, or **OPT**		
Profile Selection	"**ProfileMenu**"	Use to choose an available profile. Press **MENU** to return to dwell display.
CLR, or **OPT**		
Request to Talk Message	**"RTT Msg"**	Use to scroll through available messages.
CLR, or **OPT**		
Status Message	**"Status Msg"**	Use to scroll through available messages.
CLR, or **OPT**		
Talk group Selection	"**TalkGrpMenu**"	Use to choose a talk group in current profile. Press **MENU** to return to dwell display.
Use , **CLR**, or **OPT** to scroll through menus.		

NOTE

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

7.14 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 7-1). 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, the DTMF tone is played through the radio's speaker.

7.15 KEYPAD

7.15.1 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:

Table 7-5: Keypad Function Commands

KEYPAD COMMAND	FUNCTION
***0**	**Log off command:** **0##* (logs the user off the system). See page 22 for additional information.
***1**	**Login command:** **1<User ID> # <Password> #* (required for encryption). See page 21 for additional information.
***2**	**Status Message:** **2 <0...9> #.*
***4**	**Enter Scene of Incident Mode (SOI) on specified channel and band:** *4#<*ccc*>#<bb># where *ccc* is the SOI channel number and *bb* is the number assigned to each frequency band. **Press *40# to exit SOI mode.**
***5**	**RTT Message:** **5 <0...9> #.*
***7**	**Initiate Selective Alert command:** **7<Target ID>#[Choose Message]#*. See page 40 for additional information.
***8**	**Radio-to-Radio Call command:** **8<Selective call number># (PTT to dial)*.
***9**	**Public Switched Telephone Network (PSTN) Call command:** **9 <telephone number># (PTT to dial).* See page 42 for additional information.
***32**	**Begin Manual Encryption command:** **32<Pre-Determined Encryption Key >#* 1 – 16 digit encryption key for 128 bit encryption; 17 – 32 digit encryption key for 256 bit encryption. See page 45 for additional information.
***33**	**End Manual Encryption command**: **33#*

7.15.2 Quick Buttons (System Model Only)

Quick Keys are a two-button sequence that gives the radio user quick access to certain menu items. Quick keys act as a toggle function.

Table 7-6: Quick Button Functions

QUICK KEYS	FUNCTION
1#	**Transition to ECP mode.** If ECP is not loaded in the radio, the radio displays “No App.”
2#	**Stealth Mode On/Off.**
3#	**Scan Mode On/Off.** • If the Scan Mode is Normal when the Scan Mode is toggled Off, the Scan Mode is Normal when toggled On again. • If the Scan Mode is Fixed when the Scan Mode is toggled Off, the Scan Mode is Fixed when Scan Mode is toggled On again. • If the Scan Mode is Off when the radio boots up, the Scan Mode is Normal when Scan Mode is toggled On.
4#	**Lights/Tones On/Off.** This turns the TX/RX LEDs and Side Tones On/Off. If the radio is in Stealth mode, this quick button is disabled since the user is not able to turn on the light/tones in Stealth Mode.

7.15.3 Keypad Lock/Unlock

To lock or unlock the keypad:

1. Press the **MENU** button.
2. While the **MENU** button is pressed, within one second press the **OPTION** button.
3. A brief message is displayed on the 2nd line of the display (Kypd Lck, Kypd Unlck).

7.15.4 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 appears in the display as they are scrolled through, for example: '-' and '+'. Press the # key twice to complete the entry process.

NOTE

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

7.15.5 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.

7.16 CHANGE 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. Scroll through the menu until “ProfileMenu” is displayed.
2. Use + – to scroll through the list of available profiles.
3. Profile becomes active when selected for longer than two (2) seconds, when the **MENU** is pressed, or when the menu is changed.

7.17 ENABLE/DISABLE VOLUME SIDE TONE

The Volume Side Tone sounds when adjusting the volume control.

To enable or disable this tone,

1. Power off the radio.
2. Press and hold the B button while turning the radio on.

7.18 CHECK OR CHANGE 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. 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.

7.19 ADJUST DISPLAY AND 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. Scroll through the menu until “Bright Menu” appears.
2. Use + – to increase or decrease brightness. Display and button backlight brightness immediately dims or brightens.

Or

If enabled via programming, the + – control increases/decreases brightness.

7.20 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. All buttons are disabled except for PTT, Emergency, 2# and **MENU**. Since the screen is blank the user cannot see the result of other button presses.

7.20.1 Enable Stealth Mode

1. Scroll through the menu until "StealthMenu" appears.
2. To immediately turn Stealth Mode on, press (**+**) or (**-**) with .

Or

Press quick button command 2# on the System Model control head.

7.20.2 Disable Stealth Mode

To turn Stealth Mode off, press quick button command 2# or the **MENU** button on the radio's front panel.

7.21 ADJUST 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 to set side tone level:

1. Scroll 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.

7.22 CHANGE OPERATING MODE

1. Scroll through the menu until “App Mode” appears in the bottom line of the display.
2. Use to choose an available mode. Press **MENU** and confirm (Y/N) with and press **MENU** again.

Or

Preset button C can be configured via programming to reboot the radio into a particular application mode.

Or

Quick Button command 1# transitions the radio to ECP mode. If ECP mode is not loaded in the radio, the radio displays “No App.”

7.23 RECEIVE AND TRANSMIT VOICE CALLS

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

7.23.1 Receive a Voice Call

NOTE

The Alias/User ID/Talk Group name are only displayed if that dwell display option is selected using the **MENU** button. For example if the user sets the dwell display option to profile, the profile continues to be displayed when a call is received.

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

- When the dwell display is set to received talk group, the Scan Mode is Normal or Fixed, :
  a. If the received talk group matches the selected talk group, then the alias (if available) or user ID of the incoming caller is displayed.
  b. If the received talk group does not match the selected talk group, then the received talk group name is displayed
- When the dwell display is set to received talk group and the Scan Mode is None, the radio only receives voice on its selected talk group. When the call is received, the alias (if available) or the user ID of the incoming caller is displayed.
- When the dwell display is not set to received talk group, then there is no display indication of an incoming call.

NOTE

A radio receiving a System All Call displays “All Call” instead of the alias. A radio not transmitting on a talk group in emergency status drops all other calls to scan into an All Call.

Refer to Section 7.27 for detailed information on talk group scanning. Refer to Section 7.32 for detailed information regarding sending and receiving encrypted calls.

7.23.2 Transmit a Voice Call

Transmit a voice call as follows:

1. Turn the radio on.

2. If required, login to the network using a user ID and password (see Section 7.4).
3. Select the desired talk group for transmitting on.
4. Press 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 7.32 for detailed information regarding sending and receiving encrypted calls.

7.24 ADJUST AUDIO TREBLE LEVEL

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

1. 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.

7.25 INTERCOM MODE

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

1. Scroll 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 override intercom communications for the duration of the voice call. The radio and associated control heads remain in intercom mode and intercom communications 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.

CAUTION

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 does **NOT** send microphone audio anywhere.

7.26 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.

NOTE

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.

NOTE

P1 and P2 talk groups cannot be locked out.

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 is automatically 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.

7.26.1 Lock Out a Talk Group

1. 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 appears 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 re-appears 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.

7.26.2 Unlock a Talk Group

1. 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 appears 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.

NOTE

- Changing the active profile removes any lockouts you have made.
- Turning off the radio removes any lockouts you have made.

7.27 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 7-7, 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 7-7: 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)	The user can scan all talk groups in the active profile that are not locked out as long as there is demand on the site. Priority (P1 and P2) groups are user selectable. Receive calls from more than one talk group, if available from the current site. Allows dragging of the selected talk group, P1, P2, and default emergency 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 are not be actively dragged.) The default emergency talk group, as well as any emergency-enabled talk groups, is only dragged if it is in emergency mode.
Fixed	Functions the same as Normal Scan Mode, except 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.

7.27.1 Check or Change 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. Scroll through the menu until "ScnModeMenu" appears in the display.
2. Use to scroll through the scan options until the desired mode appears. See Table 7-7.

Or

Use the quick button option 3#.

7.27.2 Scan Priority

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

- System All Call
- Selected talk group in emergency state
- Default emergency group in emergency state
- Selected talk group
- Emergency capable group in emergency state
- Priority 1 talk group
- Priority 2 talk group
- Other (non-priority)

7.27.3 Change Priotiy1 and Priority2 Talk Groups

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

1. Scroll through the menu until “Priority1” or “Priority2” appears in the bottom line of the display (Priority1 group has higher priority than the Priority2 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.

7.28 MAKE 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 7-1). See Section 7.14 for more detail.

NOTE

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

Table 7-8 lists and defines the messages that may be displayed by the radio during a Selective Call.

Table 7-8: Status of Selective Call

STATUS MESSAGE	DEFINITION
Busy	Peer is involved in another selective/PSTN call.
Disconnect	Selective/PSTN call was terminated for unknown reason.
Network Err	Selective/PSTN call cannot continue because of an unspecified network error.
Reject	Peer or this user declined request to establish selective/PSTN call.
Unavailable	Peer cannot be reached for selective/PSTN call.
Calling	Calling peer (i.e., for selective or PSTN calls).
Connecting	Establishing selective/PSTN call with peer.
Hangup	Peer or this user terminated selective/PSTN call.
Lim 10 min	Selective/PSTN call limited to 10 minutes.
Timing Out	Selective/PSTN call has 10 seconds remaining before limit is reached (shown for 5 seconds).
Sel Call	Selective call is active.

7.28.1 Manually Dial 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.

7.28.2 Speed Dial 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 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 appears in the 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 # button or (-) using .

7.28.3 Receive a Selective Call

When someone calls in from another radio using the Selective Call function, a ring sounds in the speaker and/or headset. Press up or down using or any number key to accept an incoming Selective Call. Press the microphone's PTT button when speaking (transmitting) to the caller.

Press the # button or (-) using to reject an incoming Selective Call.

A Selective Call is interrupted if an emergency is declared on a monitored talk group.

7.28.4 Terminate a Selective Call

Press the # button or (-) using to terminate an incoming Selective Call.

7.29 SELECTIVE ALERT

Selective alert messaging is an OTP feature allowing one of up to eight (8) pre-programmed text messages (refer to Section 7.29.3) 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 7-9 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 until deleted or until the radio is power cycled.

7.29.1 Send 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. 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 7.14.

3. Press the # key to enter the number.

Choose and Send the Message

After specifying the destination radio's User ID (Section 7.29.1), 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 press 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 is momentarily displayed (Table 7-9).

Table 7-9: Status of Selective Alert

STATUS MESSAGE	DEFINITION
Alert Sent	Alert message successfully sent to target.
Delivered	Alert message passed to network.
Delivering	Delivering alert message to target.
New alert	New alert message received.
No alerts	No alerts are available.
Busy	VNIC congested and cannot deliver message at the current time.
Dest Down	Destination home VNIC down.
Ignored	Destination is either non-responsive or does not care to respond.
Inv Option	Distribution option is invalid.
Not Reg	Destination is not registered.
Partial	Not all destination ESN instances reachable.
Unauth Alrt	Unauthorized service function; initiator is not authorized to send the selected service message.
Unknown Msg	Unknown status received from VNIC.
Unreachable	Alert destination cannot be reached.

7.29.2 Receive Messages

When a selective alert message is received by a radio, a four-beep tone (one low, two high, and one low) is heard and "New alert" 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.

Display Received Messages

1. 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.

Delete 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.

7.29.3 Define 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, can include up to 99 text characters.

7.30 TELEPHONE INTERCONNECT CALLS (SYSTEM MODEL CONTROL HEAD)

7.30.1 Place an Interconnect Call

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, another ring tone sounds.
5. When the caller answers, press the PTT button when speaking and release it to listen to the caller.
6. To hang-up, press the # button or (-) using .

7.30.2 Receive an Interconnect Call

When receiving an Interconnect Call, a ring sounds in the speaker and/or headset. Press up or down using or any number key to accept an incoming Interconnect Call. Press the microphone's PTT button when speaking (transmitting) to the caller.

Press the # button or (-) using to reject an incoming Interconnect Call.

7.31 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 pressed. 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.

7.31.1 Declare an Emergency Call or Alert

1. Press the red emergency button on the radio to enter emergency mode. The emergency is raised after the emergency raise delay [default is one (1) second].
   - If the active profile of the unit initiating the emergency is configured for Emergency Alert, the emergency alert signal is sent to registered alert servers, such as the dispatcher console.
   - If the active profile of the unit initiating the emergency is configured for Emergency Call, the talkgroup is placed into emergency status notifying other radios and the emergency alert signal is sent to the dispatcher console.
   - If the emergency behavior of the active profile is Current, the active, selected voice group becomes the default emergency voice group.
   - If the emergency behavior of the active profile is Default, the radio moves to the default emergency voice group of the profile and this talk group becomes the select talk group.
2. The display alternates between "Emergency" and whatever option is selected for the 2nd line of the dwell display.

If the attempt is unsuccessful, "E-PEND" flashes periodically and a retry is queued for 10 seconds. If unsuccessful because of lost sync, retry occurs immediately upon reacquiring sync. On each retry attempt, radio temporarily displays "E-RETRY." This process repeats until the emergency is successfully declared.

7.31.2 Silent Emergency

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

NOTE

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

7.31.3 Clear an Emergency Call or Alert

NOTE

Check with the system administrator to ensure that the radio is programmed to allow an emergency to be cleared.

If enabled via programming, clear an emergency by:

1. Pressing and holding the **CLR/CLEAR** button and simultaneously pressing the emergency button.
2. After the Emergency Cleared Tone sounds, release both buttons.

NOTE

If the radio is in Stealth Mode, clearing the emergency takes the radio out of Stealth Mode.

7.31.4 Receive 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 receiving voice in an active emergency, the flashing "EMERGENCY" is inhibited so that the alias of the sender can be seen.
- On receiving radios with the emergency talk group selected, the alias of the sending party is displayed for 5 seconds during the open-mic period, then the word "Emergency" flashes on the second line of the display and continues until the emergency state ends.
- 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 37 for additional information on "No Scan" operation.
- 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.

NOTE

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.

7.31.5 Dismiss an Emergency Call

NOTE

An emergency is dismissed for a configurable amount of time only (default = 5 minutes).

To ignore an emergency call declared by another radio user:

1. Scroll through the menu 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.

NOTE

The emergency dismiss timer is cleared when the emergency is cleared.

7.32 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 Unified Administration Server (UAS) 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.

7.32.1 Automatic Encryption

For automatic encryption, a network administrator selects the talk group to be encrypted at the interface to the UAS. 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” appears 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 alternates between “No Access” and the alias of the radio that is currently engaged in the secure call.

NOTE

Radios can also be programmed to automatically login and enable encryption.

7.32.2 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 and is entered into the radio using the keypad. For 128 bit encryption, this key is between 1 and 16 digits. For 256 bit encryption, this key is between 17 and 32 digits.

If two communicating radios have different (manually-defined) keys, receive audio at each radio sounds 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 sounds a deny tone and “No Access” appears 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 (1 – 16 digits for 128 bit encryption; 17 – 32 digits for 256 bit encryption).
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 sees “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 alternates 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.

7.33 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 Priority 1 and Priority 2 talk groups
- 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) clears the presets since they are stored on a per-user basis. Changing control heads does not recall presets for the previous control head.

NOTE

Preset button C can be configured via programming to reboot the radio into a particular application mode. Contact your system administrator to determine if this feature is enabled in your radio.

7.34 STATUS MESSAGES

If enabled via programming, the radio can transmit a pre-programmed status message. Section 8.30.1 describes how to send a status message via the keypad and Section 8.30.2 describes how to send a status message via the menu.

7.34.1 Send Status Message via the Keypad (System Model Only)

1. Press *2 <0…9> # on the keypad.
2. A Status message can be associated with each key (0 – 9). This text is displayed on the first line of the display when the key is pressed until another key is pressed.
   - If no messages have been configured, “No Messages” is displayed.
   - If a message is not assigned to a key, “No Entry” is displayed for the keypad sequence.
   - You can press multiple keys to select the desired Status message.
3. The # key terminates the keypad sequence and sends the currently selected status message. If no messages have been configured or no message is associated with the key, no message is sent and an error tone is played.

Press the * key to cancel the keypad sequence.

7.34.2 Send Status Message via the Menu

1. Scroll through the menu until “Status Msg” appears and press **MENU**. If no messages have been configured, “No Messages” is displayed.
2. Scroll through the available messages using . The configured Status message is displayed on the 1st line of the display.
3. Press the **MENU** button to send the currently selected message. If no messages have been configured, no message is sent and an error tone sounds.

Press up or down with to cancel status message selection.

7.35 REQUEST TO TALK (RTT) MESSAGES

If enabled via programming, the RTT message feature allows you to send either a short service message to the VNIC. Section 7.35.1 describes how to send an RTT message via the keypad and Section 7.35.2 describes how to send an RTT message via the menu. Note that only one RTT message can be programmed into the radio.

7.35.1 Send RTT Message via the Keypad (System Model Radios Only)

1. Press *5 <0…9> # on the keypad. The key associated with the RTT message (0-9) is configured via programming.
2. This message is displayed on the first line of the display when the key is pressed until another key is pressed.
   - If no message has been configured, “No Message” is displayed.
   - If a message is not assigned to the key, “No Entry” is displayed for the keypad sequence.
3. The # key terminates the keypad sequence and sends the currently selected RTT message. If no message has been configured or no message is associated with the key, no message is sent and an error tone is played.

Press the * key to cancel the keypad sequence.

7.35.2 Send RTT Message via the Menu

1. Scroll through the menu until “RTT Msg” appears and press **MENU**. If no message has been configured, “No Messages” is displayed.
2. Use to select message. The configured RTT message is displayed on the 1st line of the display.
3. Press the **MENU** button to send the currently selected message. If no message has been configured, no message is sent and an error tone sounds.

Press to cancel RTT message selection.

7.36 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 edits the personalities of the affected radios to include an emergency profile and then pages 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 defaults to the emergency profile selected by the administrator.

7.37 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. Scroll through the menu 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.

NOTE

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 also indicates if the data is aged (2 minutes or more) [GPS (Aged) is displayed].

7.38 SCENE-OF-INCIDENT MODE

The Scene-of-Incident mode (SOI) is user-selectable. The SOI mode provides a local repeater function (V-TAC) with no network connection

CAUTION

When operating in the SOI mode, the radio is disconnected from the OpenSky network. Therefore, communications with radios and dispatch personnel on the network is not possible.

Enter SOI Mode Manually Entering the Channel:

1. Scroll through the menu until the Client Mode menu appears.
2. Using +/–, scroll until SOI is displayed.
3. Press the **MENU** button to confirm mode selection.
4. Using +/–, scroll until “Manual Select Chan” is displayed and press **MENU**.
5. Using +/–, scroll to edit the right-most digit and press **MENU** to advance to the next digit. Repeat until the desired channel is entered.
6. The radio then prompts the user to edit the band. Use +/– to edit the number assigned to the frequency band and press **MENU** to confirm and enter the SOI mode.

Use the Client Mode menu to return to normal operation (Network Mode). The personality and profile in use at the time the radio entered SOI mode is restored.

Enter SOI Mode Selecting Pre-Programmed Channel:

1. Scroll through the menu until the Client Mode menu appears.
2. Using +/–, scroll until SOI is displayed.
3. Press **MENU** to confirm mode selection.
4. Using +/–, scroll through a list of pre-programmed channels.
5. Press **MENU** to confirm channel and enter SOI mode.

Use the Client Mode menu to return to normal operation (Network Mode). The personality and profile in use at the time the radio entered SOI mode is restored.

Enter SOI Mode (System Model Only):

1. Press *4#.
2. The radio prompts for the channel. Enter the channel number and press # to confirm channel.
3. The radio prompts for the band. Enter the number assigned for the desired frequency band and press # to confirm.
4. The radio reverts to the dwell display.

   If accepted, you are switched off the network and communicate locally through the V-TAC.

Press *40# or use the Client Mode menu to return to normal operation (Network Mode). The personality and profile in use at the time the radio entered SOI mode is restored.

8 EDACS/CONVENTIONAL/P25 (ECP) OPERATION

8.1 TURN THE RADIO ON

Rotate the **POWER ON/OFF/VOLUME** knob clockwise, out of detent to turn the radio on. A short beep (if enabled through programming) indicates the radio is ready for operation. The display indicates, if programmed, the last selected system name on line one and the last selected group or channel name on line two.

8.2 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 On/Off/Volume Control knob, and a microphone connector. In addition, the system model control head features a DTMF keypad.

Table 8-1 lists all default front panel controls and their functions. All functions and controls of the Scan radio operate the same as the corresponding functions and controls on the System radio.

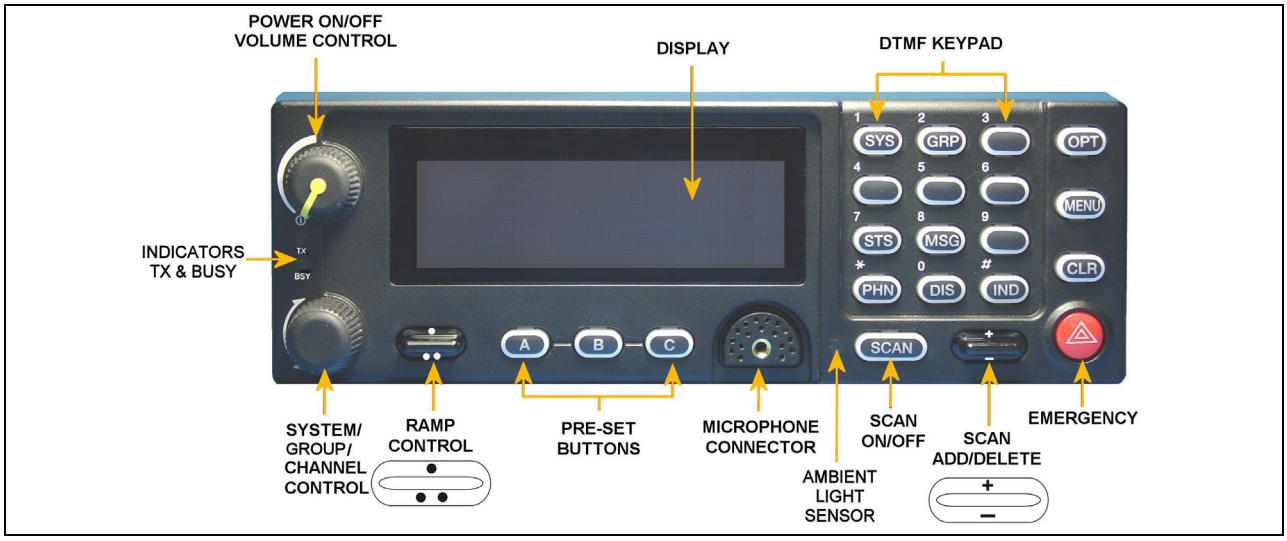


Figure 8-1: System Model

Figure 8-2: Scan Model

NOTE

Button function may vary depending upon radio programming. Complete the table in Section 10 if the keys have been remapped to provide new functions.

Table 8-1: Front Panel Default Controls and Functions

PART	FUNCTION
Power On-Off/Volume Control 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.
	The Emergency button declares an emergency if enabled through programming.
Ambient Light Sensor	Radio automatically adjusts the display and button backlight brightness level based on ambient light. Do not block this sensor.
	This rotary switch selects the systems or groups/channels, depending upon programming.
+ −	This rocker type button is used to display the current SCAN status for a group/channel and then add or delete the group/channel from the system scan list.
	The primary function of this rocker type button is to scroll through the System list or the Group/Channel list depending upon programming. The secondary function is to increment or decrement items within a list (phone list for example).
OPT/OPTION	Toggle a PC programmable feature ON and OFF.
CLR/CLEAR	Exits the current operation or entry mode. In Conventional mode, pressing this button unmutes the receiver so activity on the selected channel can be monitored.
MENU	Primary function - access the menu list. This is a list of additional features that are not available directly from the keypad. Secondary function - activate a selected item within a list, similar to an enter key.
SCAN	Toggles scan operation ON and OFF.
Pre-Set buttons **A**, **B**, **C**	Used to store and recall user-selectable parameters.
SYS	Used to enter the System select mode.
GRP	Used to enter the Group select mode.
STS	Permits the transmission of a pre-programmed status message to an EDACS or P25 Trunked site.
MSG	Permits the transmission of a pre-programmed message to an EDACS or P25 Trunked site.
PHN	Used to place telephone calls through the radio by selecting the interconnect special call function.
DIS	Used to show the key ID and whether or not it is valid or available.
IND	Used to call an individual or make an all-call by selecting the individual call function.

8.3 KEYPAD LOCK/UNLOCK

1. Scroll through the menu until “KEY LOCK” is displayed.
2. Press **MENU**.

Press **MENU** and **OPTION** to unlock the keypad.

8.4 RADIO STATUS ICONS

Status icons are indicators that show the various operating characteristics of the radio.

Figure 8-3: Typical Display

Table 8-2: Icons and Descriptions

ICON	DESCRIPTION
	Indicates the EDACS system is in Failsoft™ mode (if enabled through programming).
	Indicates selected group or channel is in scan list.
	Indicates selected group or channel is programmed as Priority 1 in scan list.
	Indicates selected group or channel is programmed as Priority 2 in scan list.
	Indicates Scan Mode enabled.
	Volume bars – indicates relative volume level.
	Indicates the current channel is set up as an analog channel.
	Indicates the current channel is set up as a ProVoice channel.
	Indicates the current channel is set up as a Project 25 (P25) channel.
	Indicates receiving or transmitting Encrypted Calls.
	Indicates a conventional channel enabled with Channel Guard Function.

8.5 MESSAGES

During radio operation, various messages are displayed on either line 1 or line 2. Typical messages include control channel status information, such as system busy or call denied, or messages associated with the radio's operation, (i.e., volume adjust). These messages are described as follows:

Table 8-3: Radio Messages

MESSAGE	NAME	DESCRIPTION
QUEUED	Call Queued	Indicates the system has placed the call in a request queue.
SYS BUSY	System Busy	Indicates the system is busy, no channels are currently available, the queue is full or an individual call is being attempted to a radio that is currently transmitting.
DENIED	Call Denied	Indicates the radio is not authorized to operate on the selected system.
CC SCAN	Control Channel Scan	Indicates the control channel is lost and the radio has entered the Control Channel Scan mode to search for the control channel.
WA SCAN	Wide Area Scan	Indicates the control channel is lost and the radio has entered the Wide Area Scan mode to search for a new system (if enabled through programming).
T99 ON	Type 99 Decode ON	Indicates the Type 99 Decode feature is enabled.
T99 OFF	Type 99 Decode OFF	Indicates the Type 99 Decode feature is disabled.
RXEMER	Receive Emergency	Indicates an emergency call is being received. This message is flashing on line 2.
TXEMER	Transmit Emergency	Indicates an emergency call has been transmitted. This message is flashing on line 2.
VOL=31	Volume Level	Indicates the current volume level. The volume level display ranges from OFF (silent) to 31 (loudest).
UNKNOWN	Caller's ID Not Received	Indicates that an individual call is being received, but the caller's ID was not received.
TX DATA	Transmit Data	Indicates the radio is transmitting a data call.
RX DATA	Receive Data	Indicates the radio is receiving a data call. Displayed on line 2.
DATA OFF	Data OFF	Indicates the radio is in the data disabled state. Displayed on line 1.
DATA ON	Data ON	Indicates the radio has been toggled to the data enable state. Displayed for two seconds on line 1 when toggled to enable state.
SYSC ON	System Scan Features ON	Indicates the System Scan features are enabled.
SYSC OFF	System Scan Features OFF	Indicates the System Scan features are disabled.
PA ON	Public Address ON	Indicates that the public address function of the radio is enabled.
PA OFF	Public Address OFF	Momentary (2 seconds) - indicates that public address function of the radio was disabled.
ALRM ON	External Alarm Enabled	Indicates that the external alarm function of the radio is enabled.
ALRM OFF	External Alarm Disabled	Momentary (2 seconds) - indicates that the external alarm function of the radio was disabled.
PVT DIS	Private Mode Disabled	Indicates that private mode is disabled or no encryption key has been programmed for the selected group/channel or special call.
FRCD PVT	Forced Private Operation	Indicates that forced private operation has been pre-programmed into radio.
NO KEY #	Encryption Key Missing	Flashing - indicates that no encryption key or an incorrect encryption key is programmed into the radio.
BCKL=1-6	Backlight	Indicates the display intensity and keypad backlight level.
GR	Group ID	Indicates that the call is a group call and is followed by the GID of the caller.
ID	Individual ID	Indicates the call is an individual call and the ID number of the caller, example "ID 2725."
WHC=1	Who Has Called	This display indicates the number from the *Who Has Called* list. Individual calls received but not responded to are stored in a *Who Has Called* list. This list is accessible by pressing the # key and then the INDV key after the Individual call has timed out or the Clear button is pressed. This display is on line 2 and the LID of the caller is displayed on the top line. Currently the list is not implemented and the display is always WHC=1.
PHONE	Phone Call	Displayed when a phone call is received from the site. It is displayed in line 1 of the display. Line 2 of the display contains the display *INDV* when line 1 contains this message. The radio interprets a received phone call as an individual call.

MESSAGE	NAME	DESCRIPTION
CONV FS	Conventional Failsoft	Displayed when a failure of the EDACS system occurs. All communication is in conventional mode.
MENU		Displayed when the menu key is pressed and remains displayed in line 1 until a menu item is selected.
SYS=1-64	System = 1 - 64	The system number for the current base station of the system displayed in line 1. It is displayed in line 2 of the display. Press the system key to obtain this display.
GRP=1-64	Group = 1 - 64	The group number of the group displayed in line 2 of display. It is displayed in line 1 of the display. Press the group key to obtain this display. There are up to 48 groups available (i.e., 3 banks of 16). The maximum number of groups programmed in a radio is determined by the personality.
INDV=1-99	Individual = 1 - 99	Indicates which item in the individual call list is being displayed. It is displayed in line 2 of the display. The name or ID of the item in the list is displayed in line 1 of the display.
PHN=1-99	Phone = 1 - 99	Indicates which item in the phone list is being displayed. It is displayed in line 2 of the display. Line 1 of the display is the last 3 characters of the list item contents.
SEL PHN	Select Phone	After pressing the PHN key, selecting an entry from the phone list by typing the entry number displays this message on Line 1.
SEL INDV	Select Individual ID	Displayed on line 1 when an entry from the individual ID list is selected after pressing the INDV key. The entry is a number between 1 and 32 inclusive.
SYS ALL	System All Call	Displayed on line 1 to indicate a system all-call has been received.
Ggg-v.vv	Code Group and Revision Number	This is code group and revision number that is displayed in line 2 when the menu item “REVISION” is selected. The ‘gg’ is the group number of the software. The first ‘v’ is the hardware version and ‘vv’ is the revision of the software.
PHONE	Phone Call	Displayed when an initiated phone call is in progress. This is displayed on line 2 of the display.
NO ENTRY		Indicates that there is no data stored in one of the programmable items in either the phone list or individual call list. The user programmable items are items 1 through 10 in each list.
INV SYS	Invalid System	Displayed when the current system is an invalid type.
CHN=1-99	Channel = 1 - 99	Displayed on line 1 of the display. This is a conventional channel index displayed when the group key is pressed.
FIX LIST	Fixed List	The Priority scan list is fixed and cannot be changed using the add or delete keys.
FIXED P1	Fixed Priority 1	The Priority 1 scan channel is fixed and cannot be changed using the add or delete keys.
EM	Emergency	Indicates an emergency has been declared by the LID that follows the display, “EM.” An example of this is “EM 01201.”
INDV	Individual Call	Displayed in line 2 of the display when an individual call is in progress (trunked and T99 modes only).
GROUP	Group Call	Indicates a group call is in progress and is displayed on line 1 of the display (trunked and T99 modes only).
SPKR ON	External Speaker ON	Displayed when the external speaker is enabled.
SPKR OFF	External Speaker OFF	Displayed when the external speaker is disabled.
BANK=1-8		The bank of keys that are going to be loaded when the keyloader loads encryption keys. This is only valid for radios that support VGS, VGE, or DES encryption. It is displayed on line 2 of the display when the encryption keyloader is connected.
REGR_0x	Dynamic Regroup	Indicates which group in the dynamic regroup operation has been enabled, where “x” is a digit of 1 to 8.
KEY LOAD		Displayed on line 1 of the display when the encryption keyloader is connected.
KEY ZERO		Displayed on line 2 of the display when the reset and option buttons are pressed simultaneously for approximately two seconds. The encryption keys are zeroed.
SYS KEY	System Key	Displayed on line 1 of the display in the display key mode of the menu. It is followed in the second line with a key number “KEY = <1..7>.”

MESSAGE	NAME	DESCRIPTION
GRP KEY	Group Key	Displayed on line 1 of the display in the display key mode of the menu for trunked systems only. It is followed in the second line with a key number “KEY = <1..7>.”
KEY=1-7		Displayed on line 2 of the display in the display key mode of the menu for conventional systems when the “SYS KEY” or “CHN KEY” is displayed in line 1 and for trunked systems when the “SYS KEY” or “GRP KEY” is displayed in line 1.
PRIMARY		Displayed on line 1 of the display when the primary keys are enabled.
PRS NAME	Personality Name	Displayed on line 1 of the display under the revision selection of the menu. The personality name is displayed on line 2 at the same time.
BND SCAN	Band Scan	**Only displayed if the P25T system is configured for "EnhancedCC" mode of operation.** When the radio cannot find a Control Channel in either the trunked frequency set or the list of discovered adjacencies, the radio is able to perform a full spectrum frequency scan to find a new Control Channel.
REGISTER		Displayed when the radio is performing a registration/affiliation on a P25 trunking site.

8.6 ALERT TONES

The M7200 series mobile radio also provides audible alert tones or “beeps” to indicate the various operating conditions. These alert tones can be enabled or disabled through programming.

Table 8-4: Alert Tones

NAME	TONE	DESCRIPTION
Call Originate	A short mid-pitched tone.	Sounds after keying the radio (Push-To-Talk button is pressed). Indicates the radio has been assigned a working channel.
Autokey	A mid-pitched tone.	After being placed in a queue or releasing the PTT button prior to a working channel assignment, the site calls the radio when a channel becomes available. At this point, the radio automatically keys the transmitter (autokey) for a short period to hold the channel. The radio sounds a mid-pitched tone when it is clear to talk. Immediately press the PTT button to keep the assigned channel.
Call Queued	A high-pitched tone.	Sounds after pressing the PTT button indicating the system has placed the call request in the queue. The receiving unit(s) also sound(s) the tone to indicate they will receive a call shortly.
System Busy	Three low-pitched tones.	Sounds if the radio is keyed when the system is busy, if no channels are available for sending the message, if the call queue is full, or if an individual call is being attempted to a radio that is transmitting.
Call Denied	A low-pitched tone.	Indicates the radio is not authorized on the system that has been selected.
Carrier Control Timer	Five short high-pitched warning tones followed by a long low-pitched tone.	Sounds if the programmed time for continuous transmission is exceeded. The transmitter shuts down shortly after the alert, interrupting communications. Release and re-key the PTT button to maintain communications. This resets the carrier control timer and turns the transmitter back on.
Key Press Alert	A short tone.	Indicates a key has been pressed. A short low-pitched tone indicates no action was taken because the key is not active in the current mode.
Page (P25T Only)	Three high-pitched tones.	In P25 trunked mode, if the receiving radio accepts a page, both the receiving and transmitting radios emit three high-pitched tones.
Out of Range	One low pitched tone.	Indicates the radio is in Wide Area Scan. The radio periodically beeps when in Wide Area Scan.

8.7 MENU

NOTE

To directly access a menu, press the corresponding button on the control head. For example, press the **SYS** button to enter the System select mode. Button configuration may vary depending on radio programming.

The order and specific number of menu items available is configurable through programming. Upon radio power up, the menu item at the beginning of the menu list is always displayed first. Subsequent access to the menu function returns the last menu item shown in the display. To enter the menu mode, press **MENU**. and **CLR** are used during the selection process. The radio continues to receive and transmit normally while in the menu function.

A new item is displayed by using the ramp control to scroll through the list in increasing and decreasing order. The displayed menu item is made active by pressing **MENU**.

After entering the menu, the following generic display format appears.

M E N U
Y Y Y Y Y Y Y Y

Line 1 indicates the radio is in the menu. Line 2 indicates the menu item (YYYYYYYY) that is to be viewed or changed (some menu items provide radio information and do not have changeable parameters).

An example of the menu item selection process and menu item parameter change is detailed below for the brightness menu item.

1. Press **MENU** to enter the menu mode.
2. Press the ramp control until the display shows:

M E N U
BACKLGHT

3. Press **MENU.**
4. Use the ramp control to increase or decrease backlight brightness. Once the desired setting is reached, press **MENU** to store the value and return to the normal display.
5. For menu items that display radio information, use to scroll through a list of informational displays.

The menu items are listed in Table 8-5.

Table 8-5: Menu Item Information

FEATURE	DISPLAY	PARAMETER SETTINGS	COMMENT
Backlight Adjust	Menu Item: **BACKLGHT**		Sets the backlight level.
Radio Revision Information	Menu item: **REVISION**	Informational displays only; no user selectable settings.	Selects the information display to view.
Phone Call	Menu item: **PHONE**		Allows access to the Phone Call Feature.
Individual Call	Menu Item: **INDV**		Allows access to the Individual Call Feature.
External Alarm	Menu Item: **EXTALARM**	ON, OFF	EXTALARM replaces the system name on the display as long as the external alarm feature is enabled.

FEATURE	DISPLAY	PARAMETER SETTINGS	COMMENT
Public Address	Menu item: **PUB ADDR**	ON, OFF	Public Address is toggled ON and OFF.
External Speaker	Menu item: **EXT SPKR**	ON, OFF	External Speaker is toggled ON and OFF.
Encryption Key Loading	Menu item: **KEYLOAD**	Up to 8 banks of 7 keys	Enables the radio to accept the loading of encryption keys.
Display Current Encryption Key(s)	Menu item: **DISP KEY**		Displays current encryption key number.
Scan	Menu item: **SCAN**	ON, OFF	Toggles scan function ON or OFF.
Private Mode	Menu Item: **PRIVATE**	ON, OFF	Toggles private function ON or OFF.
Scan Add	Menu item: **SCAN ADD**	S, 2 or 1	Adds group or channel to scan list.
Scan Delete	Menu item: **SCAN DEL**		Deletes group or channel from scan list.
Scan Add/Delete	Menu item: **SCAN A/D**	Toggle sequence S, 2, 1	Changes present group or channel to next scan choice in scan list.
Last Scanned Channel Recall	Menu Item: **SCAN ADD**		Changes the selected channel to the last scanned channel.
Home group or channel selection	Menu item: **HOME**		Changes to the group or channel defined for Home function.
System select	Menu item: **SYS**		Displays the system selected.
System and group selection	Menu item: **S/G 1 – S/G 16**		Changes to the System & Group/Channel programmed for SYSGRP 1-16.
Mute	Menu item: **MUTE**	ON, OFF	Toggles the mute function ON or OFF to control the audio output from the selected radio.
No Data	Menu item: **NO DATA**	ON, OFF	Toggles data feature ON or OFF.
EDACS Conventional Priority 1 Scan	Menu item: **ECP1 SCN**	ON, OFF	Toggles this feature ON or OFF.
Group selection	Menu item: **GRP**		Displays the group selected.
Status Condition	Menu item: **STATUS**	0-9 = (n)umber of pre-programmed status	Transmits the pre-programmed status message.
Message Condition	Menu item: **MESSAGE**	0-9 = (n)umber of pre-programmed messages	Transmits the pre-programmed message.
Feature Encryption Display	Menu Item: **FEATURES**	Informational displays only; no user selectable settings	Indicates current features programmed into the radio as well as certain information required to add features to the radio.
System Scan Enable	Menu Item: **SYS SCAN**	ON, OFF	System Scan features like ProScan are toggled ON and OFF.
Talkaround feature	Menu item: **TALK**	ON, OFF	Toggles Talkaround ON or OFF (transmit frequency changed to receive frequency).
Type 99 Decode Enable	Menu Item: **T99 EN**	ON, OFF	Type 99 Decode is toggled ON and OFF.

8.8 FEATURE ENCRYPTION DISPLAY

Feature Encryption Display is available through the menu function and, if programmed, appears in the menu as "**FEATURES**." This data indicates current features programmed into the radio as well as information required to add features to the radio.

Once the feature has been accessed, all normal menu functions work. The user can scroll up or down through all of the entries.

Feature Encryption Display provides the ability to view, in the order displayed, the following:

- Serial number ROM data - serial number of the ROM
- Feature encryption data stream - used to enable features

- Number Fields - defines limits
- Features enabled - displays bit fields of enabled features

8.8.1 Serial Number ROM (12 Hex Digits)

Example:

To enable a feature in a radio, call Harris Corporation and they will ask for the ROM serial number. The serial number shown here is for example only.

8.8.2 Feature Encryption Data Stream

Example:

These data streams define the features the user has enabled in his radio and are required by Harris to enable other features. The data streams shown here are for example only. ***Note:*** There are three displays: FD1, FD2, and FD3. All three are required.

Number Fields

Example:

These number fields show the set limits of the of the user's radio as:

- SG# XXX - Maximum number of system/groups combination available
- SY# XXX - Maximum trunked system limit
- CH# XXX - Maximum number of conventional channels available

The user needs to know the limits of his radio before attempting to enable other features. The numbers shown here are for example only.

8.8.3 Features Enabled

These numbers indicate which features are enabled.

Example:

Table 8-6 lists possible features available in the user's radio.

Table 8-6: Available Feature Numbers

FEATURE NUMBER	POSSIBLE FEATURES	STANDARD OR OPTIONAL
01	Conventional Priority Scan	Standard
04	Group Scan (EDACS and P25 Trunked)	Standard
05	Priority System Scan (EDACS and P25 Trunked)	Optional
06	WAscan/ProScan (EDACS and P25 Trunked)	Optional
07	Dynamic Regroup	Standard
08	EDACS Emergency	Standard
09	Type 99 Encode	Standard
10	Conventional Emergency	Standard
14	DES Encryption	Optional
16	Mobile Data	Optional
17	Status/Message (EDACS and P25 Trunked)	Optional
21	EDACS Security Key (ESK)	Optional
22	ProFile™ (EDACS and P25 Trunked)	Optional
23	Narrowband	Standard
29	ProVoice™	Optional
32	FIPS-140-2	Optional
33	P25 Common Air Interface	Optional
34	Direct Frequency Entry	Optional
38	Radio TextLink	Optional

8.9 SYSTEM/GROUP/CHANNEL SELECTION

The M7200 **SYSTEM/GROUP/CHANNEL** knob and the ramp control are programmable for maximum flexibility. If the SYSTEM/GROUP/CHANNEL knob is assigned to select groups or channels, then the ramp control is assigned to select systems. If the SYSTEM/GROUP/CHANNEL knob is assigned to select systems, then the ramp control is assigned to select groups or channels. System, group, and channel selection is the primary function for these controls.

Systems or groups can also be selected by pressing **SYS** or **GRP** and using the ramp control to scroll through available options.

8.9.1 System Selection

Several methods, some of which depend on programming, can be used to select a new system. These procedures are presumed to be starting from the normal receive display.

METHOD 1: If system selection is programmed to the SYSTEM/GROUP/CHANNEL knob, select a system by turning the SYSTEM/GROUP/CHANNEL knob to the desired system position. The display registers the new system name on line 1. If the wrap option is OFF and the knob is moved to a position greater than the number of programmed systems, the highest programmed system remains selected.

METHOD 2: If system selection is programmed as the primary function of the ramp control, select a system by pressing up or down to scroll through the system list. The display registers the new system name on line 1.

METHOD 3: Press **SYS** to enter the system select mode and use the ramp control to scroll through the systems.

8.9.2 Group and Channel Selection

Several methods, some of which depend on programming, can be used to select a new group or channel. These procedures assume starting from the normal receive display.

METHOD 1: If group selection is programmed to the SYSTEM/GROUP/CHANNEL knob, select a group by turning the SYSTEM/GROUP/CHANNEL knob to the desired group. The display registers the new group name on line 2. If the wrap option is OFF and the knob is moved to a position greater than the number of programmed groups, the highest programmed group remains selected.

METHOD 2: If group selection is programmed as the primary function of the ramp control, select a group by pressing up or down, to scroll through the group list. The display registers the new group name on line 2.

METHOD 3: Press **GRP** to enter the group select mode and use the ramp control to scroll through different groups.

8.10 LAST SYSTEM/GROUP/CHANNEL RECALL

This feature, enabled through programming, allows the user to recall the last selected system/group after an emergency or home function or system/group key function. For example, if the Home button (pre-programmed) is pressed, the radio goes to the designated Home system/group or channel. If the Home button is pressed again, the radio returns to the previous system/group or channel. At this time, the user can toggle between the Home system/group or channel and the previous system/group or channel. The operation is the same for the SG1-SG16 buttons.

8.11 ENCRYPTION

The M7200 mobile radio supports AES and DES encryption. When operating on a group or channel programmed for encryption, all transmissions are private and the radio receives clear and private signals. is displayed when the encryption is enabled. If the selected group or channel is programmed for auto-select capability, the mode may be toggled between encrypted and unencrypted by pressing the **MENU** key, and then selecting the **PRIVATE** menu option. Radios programmed for forced encryption do not allow a change of the transmit mode.

8.11.1 Displaying the Currently Used Cryptographic Key Number

To display the cryptographic key currently in use for either the system encryption key (for special call such as individual, phone, all, agency or fleet) or the group/channel key (for group or conventional calls), perform the following procedure (Not Available on Conventional radios):

1. Press the **MENU** button.
2. Use to select **DISP KEY**. Then press the **MENU** button.
3. Then use to toggle between displaying the system key or the group/channel key.

Table 8-7: Current Cryptographic Key Display

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

8.11.2 Key Zero

All cryptographic keys can be zeroed (erased from radio memory) by pressing and holding the **CLR/CLEAR** button, and while still pressing this button, press and hold the **OPT/OPTION** button. Press both buttons for 2 seconds. A series of warning beeps begins at the start of this 2-second period and then switches to a solid tone after the keys have been zeroed. The display indicates **KEY ZERO**.

If the cryptographic key(s) are zeroed, one or more keys must be transferred from the Key Loader into the radio before private communications can continue. Refer to Key Manager TQS3416 Administration and Software Release Notes for further information.

8.11.3 Receive an Encrypted Call

When receiving, the radio automatically switches between clear or encrypted operation. If the transmission being received is an encrypted transmission, it is decrypted, the receiver unsquelches, and the message is heard in the speaker. The selected group or channel must be programmed for encryption and the correct cryptographic key must be loaded into the radio for this to occur.

8.11.4 Transmit an Encrypted Call

1. Select the desired group or channel.
2. Enable encryption by pressing the **MENU** button and then selecting the **PRIVATE** menu option, or press the button on the control head that has been programmed for **PRIVATE**.
   - If the last state of the radio was encryption enabled, then encryption is enabled on power up. In addition, encryption is enabled if forced operation has been programmed in the radio
   - If a group or channel is not programmed for encryption, **PVT DIS** is displayed if an attempt is made to enable encryption. It is not possible to operate on this group/channel in encrypted mode.
   - If the radio is programmed for forced encryption mode, **FRCD PVT** is displayed if an attempt is made to disable encryption. It is not possible to transmit on this group/channel in clear mode.
   - If the radio does not have the correct encryption key loaded, **NO KEY #** is displayed and the call does not transmit.
3. Continue with standard transmission procedures. An access tone is heard when the PTT button is pressed.

8.12 MACRO KEY OPERATION

Macro key operation permits the user to accomplish a series of keystrokes with a single "macro" keystroke. Up to ten (10) macro keys can be defined, each capable of executing up to twenty (20) keystrokes, to any pushbutton input (i.e., keypad keys, buttons, etc.). Each macro key can be pre-programmed to activate when pressed or when released. A macro key can also be pre-programmed to change the keystroke sequence the next time the macro key is activated. For detail operation and assignment of macro keys, contact your system administrator.

8.13 RECEIVE A CALL

1. Turn the radio on by rotating the POWER ON-OFF/VOLUME knob clockwise (out of detent). A short alert signal (if enabled through programming) indicates the radio is ready to use.
2. The display shows the last selected or the power up (depending on programming) system and group/channel names. If the radio is unable to obtain a control channel, line 2 shows **CC SCAN**.
3. Adjust the volume to the desired level.
4. Select the desired system and group/channel.
5. The radio is now ready to receive calls.
6. When the radio receives a call, it unmutes on the assigned working channel and the **BSY** indicator comes on. Line 1 shows **GR** followed by the logical ID number (if received) of the unit sending the message, or the associated name if the ID number is found in the individual call list.

8.14 TRANSMIT A CALL

1. Turn the radio on and set the POWER ON-OFF/VOLUME knob to the desired volume level. Select the desired system and group/channel.
2. Ensure that conventional channels are not busy by pressing the **CLR** button to briefly disable any channel decoding and unmute the receiver, or observe the unlit **BSY** indicator. If the Channel Busy Lockout feature is programmed for the selected channel, the radio does not transmit when the channel is busy.

3. Press and hold the PTT button.
4. When the working channel is assigned, **TX** and **BSY** indicators are turned ON and a short beep is sounded indicating communication can begin.

NOTE

If two or more tones, or a high-pitched tone is heard, the system may be busy and the call request has been placed in queue or the request has been denied for some reason. Refer to the Section 8.6 for more details.

5. Hold the microphone approximately 2 inches from the mouth and speak in a normal voice.
6. Release the PTT button when the transmission is complete and listen for a reply.

8.15 CONVENTIONAL FAILSOFT (EDACS)

In the unlikely event of a failure of the EDACS system, communications can take place in conventional failsoft mode. The radio is automatically directed to a communications channel set up for this purpose. During this mode of operation, the control unit displays **CONV FS** in the alphanumeric display. An increase in activity on the channel during conventional failsoft operation may be noticed, so be careful not to transmit until the channel is clear.

Operation during conventional failsoft is the same as operation on a conventional system, except that it is not possible to select a communications channel, or use emergency and special call. When trunking is restored, the radio is automatically returned to normal operation.

NOTE

Emergency and Special Call are not operational during conventional failsoft. In addition, the **GRP** control does not operate.

8.16 EMERGENCY OPERATION

The radio's ability to declare an emergency, clear an emergency, remain locked on an emergency and group, and the emergency audio and display freeze is enabled or disabled through programming. When an emergency is declared, scanning stops and only restarts after the emergency is cleared.

8.16.1 Receive an Emergency Call

When receiving an emergency call from the selected group and system, an alert beep sounds and the **BSY** indicator illuminates. The message ***RXEMER*** flashes in the display on line 2 until the emergency condition is cleared. Follow standard emergency procedures.

8.16.2 Declare an Emergency

To send an emergency call to the selected system and group (or on an optionally pre-programmed emergency group), proceed as follows:

1. Press and hold the red emergency button for approximately one second. (This time is programmable and therefore could be longer or shorter. Check with the system administrator.) The radio transmits an emergency call request with the radio ID until an emergency channel assignment is received.
2. When the working channel assignment is received, the radio sounds a single beep (Autokey alert tone) indicating it is ready for voice transmission. *TXEMER* flashes on line 2 in the display until the emergency is cleared.
3. Press PTT and speak into the microphone in a normal voice.

4. Release PTT when the transmission is complete and listen for a reply.
5. The emergency can be cleared by pressing and holding the **CLR** button followed by pressing the red emergency button then releasing both buttons.

8.17 SYSTEM SCAN OPERATION (EDACS AND P25 TRUNKED)

The radio can be programmed with the following System Scan features. These features are automatically enabled upon radio power up. A key or menu option is also defined to allow the System Scan features to be toggled during radio operation. This is covered in the Menu Selection and Pre-Programmed Keypad Key sections. The System Scan state is maintained through system changes but defaults to ON at power up.

8.17.1 Wide Area System Scan (WA Scan)

The M7200 Series mobile radio can be programmed for wide area system scan operation for multi-site applications. Upon the loss of the currently selected system's control channel, radios can be programmed to automatically scan the control channels of other systems. If a new control channel is found, the radio switches to the new system and sounds an alert tone.

8.17.2 ProScan™

The radio can be programmed for ProScan™ system scan operation for multi-site applications depending on the version of radio flash code. ProScan provides the radio with the ability to select a new system for the radio to communicate on, when the selected system drops below a predefined level. This is accomplished by enabling each radio to analyze the signal quality of its current control channel and compare it with the signal quality of the control channel for each site in its adjacency scan list. The signal quality metric used for the ProScan algorithm is based on a combination of both Received Signal Strength Indicator [RSSI] and Control Channel Verification [CCV] measurements. When the selected system’s signal quality level degrades below a pre-programmed level, the radio begins to look for a better control channel. Once a control channel that exceeds the pre-programmed parameters is found, the radio changes to the new system and emits a tone. If the control channel is completely lost, the radio enters Wide Area System Scanning and searches the programmed adjacent systems until a suitable control channel is found.

8.17.3 Priority System Scan

The radio can also be programmed for Priority System Scan. (To ensure that this feature operates correctly, the control channel of the priority system must be located on channel one unless you are using the ProScan algorithm.) The priority system is the desired or preferred system. While receiving the control channel of the selected system, the radio periodically leaves the selected system and searches for the control channel of the priority system at a programmable rate. The programmable rate is defined by the value in the Priority Scan Time control, (unless the ProScan algorithm is enabled as explained below). This priority scan timer is reset each time the PTT button is pressed or when a call is received. If the priority system control channel is found, or meets the predefined ProScan criteria, the radio automatically switches to the priority system.

8.17.4 When Wide Area System Scan is Enabled

If the radio cannot find the control channel of the selected system and begins Wide Area System Scan, the radio only scans for the priority system control channel if the priority system is in the WA Scan list.

8.17.5 When ProScan Is Enabled

The radio monitors the priority system and switches to the priority system if the priority system meets the criteria defined in the “ProScan Options” dialog box. If ProScan is enabled, the rate at which the radio scans for the priority system is defined by the System Sample Time control.

8.17.6 Menu Selection

Press **MENU** and then use the ramp control to scroll through the selections until **SYS SCAN** is displayed. Then press **MENU** to toggle the System Scan state. The **SYSC ON** or **SYSC OFF** display message is displayed for two seconds to show the new state.

8.17.7 Pre-Programmed Keypad Key

Press the pre-programmed key and the **SYSC ON** or **SYSC OFF** display message is displayed for two seconds to show the new state.

8.18 SCAN OPERATION

Only groups or channels that are part of the radio's scan list are scanned. Groups/channels are added to the scan list on a per system basis through programming, the radio keypad, or both, dependent upon programming. This scan list can be changed by the user from the keypad, unless programmed otherwise. Each system's scan list is retained in memory when the radio is turned off. The M7200 Series mobile radio can also be programmed to provide Trunked Priority Group Scan capability, which operates similar to priority scan in Conventional mode.

The following is a description of programmable scan features that should be helpful in understanding the scan operation of the radio:

Scan Hang Time - the delay time the radio waits before resuming scan after the push-to-talk is released or after the carrier has dropped a channel.

TX Select - the group the radio transmits on while scanning. The radio is programmed to transmit on either the scanned group or the selected group.

Scan List (privileges) - this feature allows or prohibits scan list changes by the user.

P1 Programming - priority group programming is accomplished by one (and only one) of three methods:

- From the keypad, where the Priority programming is not fixed and does not follow the selected channel,
- Priority 1 group programming follows the selected channel, or
- Priority 1 group programming is fixed during PC programming and cannot be changed by the user.

P1 Always Scan - determines if the Priority 1 Group is always scanned, regardless of the scan state set by the user.

8.18.1 Add Groups or Channels to a Scan List

1. With scan operation turned off, select the desired group channel to add to the selected scan list.
2. Press (**+**) or (**-**) with to display the current priority status of the group on line 1 for a time-out period.

3. While the status is displayed, press (**+**) with to add the group/channel to the scan list. is displayed.

4. Press (**+**) with a second time to set the group/channel to Priority 2. is displayed.

5. Press (**+**) with a third time to set the group/channel to Priority 1. is displayed in column 1, line 1. The priority level selection sequence only advances the group to the next higher priority level and stops at priority level 1. To select a lower priority level, the group/channel must be deleted from the scan list and then added back to the scan list. Each new group/channel added to the scan list starts at the lowest priority. If the Priority 1 and Priority 2 group/channel are already set and a new group/channel is assigned as Priority 1 or Priority 2, the previously assigned group/channel changes to non-priority scanning.

8.18.2 Delete Groups or Channels from a Scan List

1. With scan operation turned off, select the desired group/channel to delete from the selected scan list.

2. Press (**+**) or (**-**) with . The current scan status of the group/channel is displayed for a time-out period.

3. Press (**-**) with to delete the group from the scan list. , or turns off. Any group/channel that is not in a scan list shows a "**blank**" when it is the selected group/channel.

8.18.3 Nuisance Delete

A group/channel can also be deleted from the scan list, if it is not the currently selected group/channel, by pressing (**-**) with during scan operation while the radio is displaying the unwanted group/channel. The group/channel is deleted from the scan list in the same manner as if using the steps above. Deletions performed in this manner do not remain deleted if the radio is turned off and back on.

8.18.4 Turn Scan On

1. Toggle scan operation by pressing **SCAN**. The SCAN indicator turns on when the radio is scanning.

NOTE

Scanning stops while the microphone is off-hook if the hookswitch feature is enabled through programming.

2. When a group on the scan list receives a channel assignment, the radio unmutes on the assigned channel, the **BSY** indicator comes on and the received scan group is displayed.
   - The radio continues scanning if a new group/channel is selected when scan is on.
   - Pressing the PTT button when scan is on causes the radio to transmit on the displayed group/channel or on the currently selected group depending on programming.
   - Pressing up with when scan is on causes the radio to recall the scanned group/channel that was last received. This group/channel is recalled for a period equal to the scan hang time.

8.18.5 Priority Group/Channel Scanning

When scan is enabled and the Priority 1 and Priority 2 groups/channels have been identified, the radio listens to calls on those groups/channels and the selected group/channel. While receiving a scanned call,

the radio continues to monitor the selected Priority 1 and Priority 2 group/channel and drops the call if the selected group/channel or other higher priority call becomes active. During a Priority 2 call, the radio continues to monitor for a Priority 1 group call.

The radio monitors for Agency and Fleet calls that correspond to the Agency and Fleet associated with the Priority 1 and Priority 2 groups. Priority Agency and Fleet calls are indicated by displaying **AGENCY** or **FLEET** on the System line of the display and associated Priority 1 or 2 group on the Group line of the display.

8.18.6 Turn Scan Off

Turn scan operation off by pressing **SCAN**. The radio resumes operation on the selected group/channel.

8.19 INDIVIDUAL CALLS (EDACS AND P25 MODES)

8.19.1 Receive and Respond to an Individual Call

When the radio receives an individual call, it unmutes on the assigned working channel and turns on the **BSY** indicator. Line 1 shows “ID” followed by the logical ID number of the radio sending the message, or the associated name if the ID number is found in the individual call list. The individual call indicator displays ***INDV*** on line 2. The radio can be programmed to ring when an individual call is received. If enabled, the ring begins five seconds after the caller unkeys and continues until the PTT button, the **CLR** button, or **IND** is pressed.

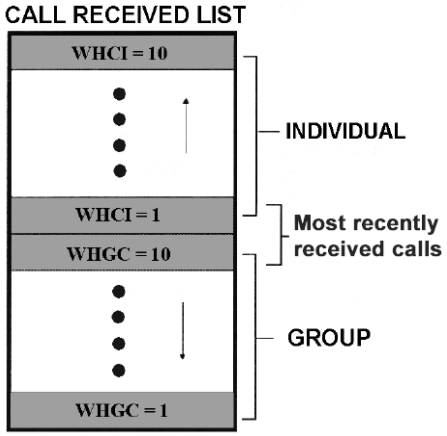
NOTE

Hookswitch functions the same as **CLR** key in I-CALL, phone call, and menu modes.

If a response is made to the call prior to the programmed call-back time-out, the call is directed to the originating unit. If a response is not made before the call-back time-out, the radio returns to normal receive mode, but *** WHC *** is displayed. If the caller's ID is not received, **UNKNOWN** displays for the duration of the call and there is no call-back hang time.

To respond after the call-back time-out, press the **IND** key. The radio's display shows the callers ID on the first line and **WHCI=1** on the second line. Pressing the PTT button at this point initiates an individual call back to the original caller. (If the last call was a group call, the display shows **WHCG=1**. Pressing the PTT button places the call as an individual call.)

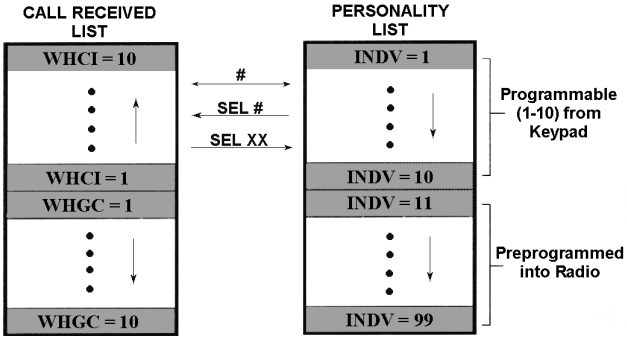
The radio stores the IDs of the last 10 callers in the Calls Received List as shown. Individual calls are stored in the top half of the list (1-10) and group calls are stored in the bottom half of the list (1-10). The most recent call is stored in position 1, the second most recent call is stored in position 2, etc.



To access the list, press the **IND** key twice. Use to scroll through the list. Press the **MENU** key to display the time elapsed since the call was received.

8.19.2 Call Storage Lists

There are two lists available for call storage in the radio, the calls received list (1-10) and the personality list (1-99 as defined by the user). When the individual call mode is entered by pressing **IND**, the calls received list is available. The user can toggle to the personality list by selecting any key other than **DIS** or toggle between the two lists by pressing the **IND** key. If wrap is enabled, the calls received list wraps on itself and not into the other list.



The saved call list shows all ten storage locations. If no calls have been received, the saved call list is empty and the pre-stored list is available upon entering the individual call mode.

When in the saved call list, pressing **MENU** toggles the time stamp ON and OFF. The time stamp indicates how long ago the call was received. The display indicates this information as HH:MM:SS where HH = hours, MM = minutes and SS = seconds.

When in the pre-stored list, pressing **MENU** toggles the **L**ogical **ID**entification (LID) ON and OFF.

8.19.3 Send an Individual Call

The following procedures describe how to initiate and complete an individual call.

1. To select a previously stored individual, select the I-Call mode from the menu or press **IND** followed by the ramp control to scroll through the list of stored individuals. While in the individual call list, the **MENU** key toggles the display between the call name and the unit ID number. If the individual is not stored in this list but the individual's unit ID is known, it can be entered directly from the keypad.

2. Press the PTT button. The radio performs the necessary signaling to obtain a communication channel. When the signaling is complete and the radio is clear to transmit, the **TX** indicator turns ON and the channel access tone sounds. Line 1 shows the called individual's name if found in the list of stored individuals or ID followed by the logical ID number of the unit being called. The message ***INDV*** displays on line 2. Proceed with the message.

8.20 SCAT™ OPERATION

A SCAT (Single Channel Autonomous Trunking) System operates with the same set of features as a standard EDACS system. The only significant user change relates to the **BSY** indicator. Since only one channel, operating as both control and working channel, exists in a SCAT System, the **BSY** indicator is ON when the SCAT channel is in the working channel mode. When the transmission on the channel is completed, the indicator turns OFF and indicates the return of SCAT control channel signaling.

8.21 TELEPHONE INTERCONNECT CALLS (EDACS AND P25)

8.21.1 Receive a Telephone Interconnect Call

Receiving a telephone interconnect call is identical to receiving an individual call. See the DTMF Overdial Operation section if access to services requiring "over-dial" is needed. Overdial operations are available for any special call whether it is an individual call or a telephone interconnect call.

8.21.2 Send a Telephone Interconnect Call

Use the following procedures to initiate and complete a Telephone Interconnect call:

1. To select a previously stored phone number, select phone call mode from the menu, press **PHN** and use the ramp control to scroll through the list of stored phone numbers. While in the phone call list, the **MENU** key toggles the display between the phone call name and the phone call number. If the phone number is not stored in this list but the phone number is known, it can be entered directly from the keypad. If necessary, a pause can be entered by pressing and holding **0**-**9**, **(*)**, or **(#)** until an underscore appears in the display.
2. Press and release the PTT button; the radio performs the necessary signaling to obtain a communication channel. When the signaling is complete and the radio is clear to transmit, **TX** indicator turns on and the channel access tone sounds. Line 1 shows the accompanying name if selected from the list of stored numbers or the phone number if entered directly. The message ***PHONE*** is displayed on line 2. The radio then automatically transmits the programmed number stored in the special call queue.
3. Telephone ringing is heard. When someone answers the phone, press the PTT button and speak into the microphone. Release the PTT button to listen to the caller. Unsuccessful interconnect signaling returns the radio to the normal receive mode and the number remains displayed until the special call is cleared by pressing the **CLR** button or the time-out expires or another group or system is selected.
4. To terminate the call, momentarily press the **CLR** button.

NOTE

The M7200 Series mobile radio is capable of half-duplex conversation only. The caller’s message can only be sent if the PTT button is pressed (the radio is transmitting) and the caller can only be heard by the person being called when the PTT is released (the radio is receiving).

8.21.3 DTMF Overdial/Conventional Mode Telephone Interconnect

Once the radio has established a connection to the public telephone system, it may be necessary to "over-dial" more digits to access banking services, answering machines, credit card calls or other types of systems that require DTMF (Dual-Tone Multi-Frequency) access digits. Overdial operation can also be used to initiate a telephone interconnect call via DTMF signaling if a dial tone has already been accessed on the system. This is the method that is used for making a telephone interconnect call while operating in the conventional mode but also functions in trunked mode if a dial tone is directly accessible. Telephone numbers and other number sequences for overdialing can be stored in the phone list when programming the radio or stored by the operator in the first ten phone list entries. These numbers are accessed by pressing **PHN**.

The following steps are required to dial these numbers:

1. Follow the procedure in Section 8.21.2 to establish a connection to the telephone system or consult the system administrator for the procedure to access a dial tone on the trunked or conventional system.
2. Overdial numbers are transmitted using either method as follows:

   METHOD 1: Press and hold PTT while entering the overdial number sequence from the keypad. This method sends DTMF tones during individual, telephone interconnect, trunked group, or conventional channel calls. Anytime the PTT button is pressed and held, the keypad is enabled for DTMF entry.

   METHOD 2: Press **PHN** to access a stored number from the phone list or to directly enter the overdial digits. Press PTT to send the overdial sequence once. If the number needs to be transmitted again it must be selected or entered again (this prevents unwanted numbers from being sent the next time the PTT button is pressed during the call).

This overdial select/entry mode remains active until the call is dropped, cleared, or **MENU** is pressed. The overdial select/entry mode can be re-entered if the call is still active by pressing **PHN**.

8.21.4 Programmable Entries

Individual call ID numbers, telephone numbers and other number sequences for overdialing are stored in the special call lists when programming the radio. The first ten entry locations of these lists can be changed by the radio operator. The keypad is used when adding, changing and storing numbers in these entry locations.

Use the following procedure to store a number in one of the first ten entries of a special call list:

1. Press **IND** or **PHN** to enter the individual call list or the phone call list.
2. Scroll through the list using the ramp control until one of the first ten entries is reached. **NO ENTRY** is displayed if the location is empty.
3. Enter the desired number. If necessary, a pause can be entered by pressing and holding **0-9**, (*****), or (**#**) until an underscore appears in the display. The individual call list entries accept up to 5 digits. The phone call list entries accept a combination of up to 31 digits and pauses.
4. Press and hold **MENU** until the display changes indicating that the number has been stored.
5. Repeat the steps above if the number stored in an entry location needs to be changed.

8.22 MOBILE DATA (EDACS AND P25 TRUNKED)

The M7200 Series mobile radios, when operating in the EDACS or P25 Trunked configuration, permit either voice or data calls to be transmitted or received. The radio can handle only one type of call at a time; however, selection of either data or voice is selected transparently by the operator through normal usage of the radio. Data communications is not supported in the conventional mode.

The mobile radios can be connected to Mobile Data Terminals (MDT) or to a host computer. Any RS-232 compatible device that supports the Radio Data Interface (RDI) protocol (Version 1.91 or greater) can be connected to the mobile radio. Support for MDTs or host computers is a programmable option per radio. Additionally, radios programmed for host computers can also be programmed for data only operation (no voice calls transmitted or received).

NOTE

Turn power to the radio OFF before connecting or disconnecting any cables, including the data cable. Also, turn power to the radio OFF when docking or undocking a connected laptop computer. Failure to turn the power OFF can damage the radio, requiring service by a Harris Corporation approved service center.

8.22.1 Displays

The following is displayed on the control unit during the various states of data mode of operation.

TX DATA Displayed on bottom line of display when the radio is transmitting a data call.

RX DATA Displayed on bottom line of display when the radio is receiving a data call.

DATA OFF Displayed on top line of display when the radio is in the data disabled state.

DATA ON Displayed for two seconds on top line of display when the radio is toggled to the data enabled state.

8.22.2 DATA OFF Operation

The radio can be placed in the data disabled state by any of the following methods. When the data state is disabled, the control unit displays **"DATA OFF"** on the top line. An ongoing data call is allowed to complete except when an emergency is declared.

- Removing the microphone from the hookswitch (hookswitch option must be enabled by pre-programming).
- Declaring an emergency (not to be used unless an actual emergency condition exists). Alert tone sounds.
- Pressing the **OPT** button (System Model) or **OPTION** (Scan Model) (pre-programmed). Alert tone sounds.
- Selecting the function using the **MENU** button (pre-programmed).

8.22.3 DATA ON Operation

The data state is enabled by one of the following (depending on how it was disabled). **“DATA ON”** is displayed top line of display for 2 seconds then the display returns to normal.

- Replacing the microphone into the hookswitch (going on-hook). Only valid if the **“DATA OFF”** operation was entered by removing the microphone from the hookswitch (going off-hook).
- Clearing an emergency, but valid only if an emergency caused **“DATA OFF”** operation.

8.22.4 Exiting Data Calls

Under normal conditions, the radio enters the scan lockout mode and returns to the control channel after completion of a data call (transmit or receive). If, during a data call, one of the following conditions occurs, the data call is immediately terminated and the radio performs the desired function:

- The PTT is activated.
- The PTT is in Public Address Mode.
- An emergency is declared by pressing the pre-programmed emergency button.
- A group or system change is made.

8.22.5 Scan Lockout Mode

Following the transmission or reception of a data call, if scan is enabled, scanning stops temporarily (duration pre-programmed). During this time the scan LED flashes to indicate that scan is enabled but temporarily suspended. This mode is normally exited when the pre-programmed time expires; however, the following actions terminate the scan lockout mode before the timeout is completed.

- The **CLR** (System Model) or **CLEAR** (Scan Model) button is pressed.
- The PTT is pressed.
- A group or system change is made.
- Enter phone call mode.
- Enter individual call mode.
- A new emergency assignment has been received.
- The PTT is pressed in Public Address Mode.
- An emergency is declared or cleared.
- Microphone is removed from hookswitch (off-hook).
- Receiving an individual or phone call.
- Receiving an Agency, Fleet or System All Call.
- Pressing the **SCAN** button to turn scan ON or OFF.

8.22.6 Data Lockout Mode

The data lockout mode is a pre-programmed mode when the radio does not respond to any data channel assignments and prevents receive data calls from interrupting voice calls. Transmit data calls are still initiated when needed by the operator. After a pre-programmed time, the radio responds to receive data calls; however, the following conditions clear the data lockout mode:

- The **CLR** (System Model) or **CLEAR** (Scan Model) button is pressed.
- Transmitting a data call.
- Changing a system.
- An emergency is declared.
- Pressing the PTT while in Public Address Mode.
- Turning scan ON with the SCAN button.

8.23 STATUS/MESSAGE OPERATION (EDACS AND P25 TRUNKED)

Status and message operation is possible with either the Scan or System version of the M7200 Series mobile radio unit. The following procedure is applicable for the System version. For operation with the Scan version, the four primary keycaps must be reconfigured and pre-programmed for status/message operation.

8.23.1 Status Operation

Status operation permits the transmission of a pre-programmed status condition to the EDACS or P25 Trunked site.

To send a status condition, press the **STS** button and then press one of the number buttons (**0-9**) to select the pre-programmed status. If no status has been programmed for the selected number button, the radio displays **NO ENTRY** and the radio sounds a low tone. A valid selection permits the status text to appear in the display for a pre-programmed time. After the time-out expires or the **MENU** button has been pressed (the **MENU** button overrides the time-out period), the status is selected and is transmitted to the site or stored in the radio memory where it can be polled by the site at a future time. If the site receives the status properly, when transmitted or polled by the site, a high-pitched tone sounds and the keylight associated with that status remains lit. If the site does not receive the status properly, a low-pitched tone sounds and the keylight associated with the status blinks.

If an incorrect status is selected or the incorrect number button is pressed, the status can be changed during the pre-programmed time-out period by pressing another number button. The status selection can also be cancelled by pressing the **CLR** button prior to the time-out period.

To view the currently selected status after it has been transmitted, press the **STS** button. If the status was not sent successfully to the site, the text associated with the status flashes in the display.

The radio can also be pre-programmed to re-designate the keypad buttons for **ST0** thru **ST9** to send status condition. In this configuration the radio status operation operates as previously described except the **STS** button is not required. The keylight associated with **ST0** thru **ST9** indicates which status is selected.

8.23.2 Message Operation

Message operation permits the transmission of a pre-programmed message text to an EDACS or P25 Trunked site.

To send a message, press the **MSG** button and then press one of the number buttons (**0-9**) to select the pre-programmed message text. If no message text has been programmed for the selected number button, the radio displays **NO ENTRY** and a low-pitched tone sounds. A valid selection permits the message text to appear in the display for a pre-programmed time. After the time-out expires or the **MENU** button has been pressed (the **MENU** button overrides the time-out period), the message text is selected and is transmitted to the site. If the site receives the message properly when transmitted, a high pitched tone sounds and the **MSG** keylight remains lit. If the site does not receive the message properly, a low-pitched tone sounds and the **MSG** keylight blinks.

If an incorrect message text is selected or the incorrect number button is pressed, the message text can be changed during the pre-programmed time-out period by pressing another number button. The message text selection can also be cancelled by pressing the **CLR** button prior to the time-out period.

To view the currently selected message text after it has been transmitted, press the **MSG** button and then the **CLR** button prior to the time-out period. If the message text was not sent successfully to the site, the text associated with the message flashes in the display.

8.24 EDACS CONVENTIONAL P1 SCAN

This feature permits the radio user to scan a pre-programmed conventional system and channel as a Priority 1 (P1) channel while the radio is selected for EDACS trunked system. If activity is detected on the conventional P1 channel, the radio unmutes and remains on this conventional channel for the programmable hang time. The radio must be pre-programmed to designate a button for scan ON/OFF operation.

8.25 DYNAMIC REGROUP OPERATION (EDACS)

Dynamic regroup operation permits multiple talk groups (up to eight) to be added to a radio via the Communications Systems Director (CSD). The radio must be pre-programmed to respond to regrouping. Dynamic regrouping is not activated in a radio until an activation message is sent by the system manager. Each radio that receives and acknowledges regrouping instructions is successfully regrouped.

Pressing and holding **CLEAR**/**CLR** for 2.5 seconds toggles the user into and out of the dynamic regroup group set. A double beep sounds for entry or exit. The display indicates **REGR_0x** where "x" is a digit of 1 to 8 indicating the group when dynamic regroup has been enabled by the user. If the radio is in dynamic regroup and the user selects a group that has not been regrouped, the display shows **NO ENTRY**. The radio is prevented from transmitting and receiving calls in this condition except for scanned groups.

If the pre-programmed group set on the currently selected system contains an EMER/HOME group and the radio is in dynamic regroup, the radio exits dynamic regroup and declares the emergency on the HOME group. If no EMER/HOME group is present, the radio declares the emergency on the currently selected dynamic regroup group.

8.26 PAGE (P25 TRUNKED ONLY)

Page sends a PING message to a radio and functions similar to Individual Call. The following procedures describe how to initiate and complete a Page.

1. To select a previously stored individual, select **PAGE** from the menu followed by the ramp control to scroll through the list of stored individuals. While in the individual call list, the **MENU** key toggles the display between the call name and the unit ID number. On System model radios, the individual’s unit ID can also be entered directly from the keypad.
2. Press the PTT button; the radio performs the necessary signaling on the control channel. On the calling radio, line 1 shows the called individual's name if found in the list of stored individuals or ID followed by the logical ID number of the unit being called. If the receiving radio receives the Page and responds, both radios emits three high-pitched tones. The receiving radio also displays PAGE and the ID of the calling radio.

8.27 SQUELCH ADJUST (CONVENTIONAL)

In the conventional mode of operation, the squelch can be re-adjusted in the MENU or from a front panel key on the keypad that has been pre-programmed. A default value of 9, or any user level between 1 and 16, can be selected using programming software. The user can change this setting either of two ways from the front panel keys.

NOTE

A value of 16 requires a strong signal to open squelch, a value of 2 requires a very weak signal to open squelch, and a value of 1 is open squelch.

NOTE

When the squelch adjust feature is activated, Channel Guard, T99 decode, and Scan are disabled. When the squelch adjust feature is exited, Channel Guard, T99 decode, and Scan are restored to their previous states.

8.27.1 Menu Selection

1. Press the **MENU** key and then use the ramp control to scroll through the selections until **SQUELCH** is displayed. Then press **MENU** (select) again.
2. The display shows **SQLCH=xx**, where "xx" is the value between 1 and 16.
3. Use the ramp control to scroll through the values. Then press the **MENU** (select) key to save the new value after the display time-out (2 seconds). The displayed value is selected and saved.
4. If the **MENU** or **CLR** key is pressed before the time-out, the menu feature exits and the squelch level is not updated. The original value is restored.

8.27.2 Pre-Programmed Keypad Key

1. Press the pre-programmed key and the display indicates **SQLCH=xx**, where "xx" is the value between 1 and 16.
2. Use the ramp control to scroll through the values. Then press **MENU** to save the new value or wait for the display time-out (2 seconds). The displayed value is selected and saved.
3. If the **CLR** key is pressed before the time-out, the squelch level is not updated and the original value is restored.

8.28 TYPE 99 DECODE (ANALOG CONVENTIONAL)

If the Type 99 Decode Option has been pre-programmed, individual Selective Calling is possible. The radio can now decode individual, group, or supergroup paging calls. Two sets of Type 99 paging codes must be pre-programmed into the radio. When the radio decodes an appropriate Type 99 code sequence, an alert tone and visual indicator is provided to the user. The receiver then operates as a noise squelched unit until Type 99 is reset. Type 99 decode continues to operate during this noise squelched period. The appropriate Type 99 alert tone sounds again if it detects a valid two-tone sequence.

Type 99 operation can be reset manually or automatically (pre-programmed). Manual reset is achieved by briefly pressing **CLR**, if programmed. Automatic reset, if enabled, occurs after a 30 second interval following the most recent decode of a Type 99 tone sequence. Hookswitch (pre-programmed) can also enable or disable Type 99 decode. The pre-programmed key light blinks when Type 99 is disabled by the hookswitch.

Type 99 decode continues to be active while the radio's **CLR** button is pressed. This allows the user to monitor calls and still be alerted when a call is directed to the user. While the user continues to press **CLR**, the user hears both calls and all Type 99 tone signals. If **CLR** is pressed for longer than two (2) seconds, Type 99 decode is either disabled or re-enabled depending upon its present state.

To check the Type 99 enable status, press the Scan Add/Delete ramp control. The current status of Type 99 decode is displayed for a time-out period.

If a Horn Alert Option is installed and enabled with the Type 99 Decode Option, the radio can beep the vehicle horn when a Type 99 call is received. This option permits alerting persons out of the vehicle when a call is received.

NOTE

Type 99 is automatically disabled when Scan is enabled.

8.28.1 Menu Selection

Press **MENU** and then use the ramp control to scroll through the selections until **T99 ENAB** is displayed. Then press **MENU** to toggle the Type 99 decode state. The **T99 ON** or **T99 OFF** display message is displayed for two seconds to show the new state.

8.28.2 Pre-Programmed Keypad Key

Press the pre-programmed key and the **T99 ON** or **T99 OFF** display message is displayed for two seconds to show the new state.

8.29 TALK-AROUND (ANALOG CONVENTIONAL)

Talk-around provides short range, line of sight communications.

1. Make sure the radio is ON and then select the desired conventional system and channel.
2. Press the pre-programmed button to toggle the talk-around function ON.
3. Ensure that the channel is not busy by pressing **CLR**/**CLEAR** to briefly disable any channel decoding and unmute the receiver or observe the unlit **BSY** indicator. If the Channel Busy Lockout feature is programmed for the selected channel, the radio does not transmit when the channel is busy.
4. Press and hold the PTT button. The **TX** indicator illuminates and a short beep sounds (if pre-programmed) indicating that communication can begin.
5. Release the PTT button when the transmission is complete and listen for a reply.
6. When the communication is completed, press the pre-programmed button to toggle the talk-around function OFF.

Or

1. Make sure the radio is ON and then select the desired conventional system and channel.
2. Select **TALKARND** from the menu to toggle talk-around on and off.

9 BASIC TROUBLESHOOTING

If the radio is not operating properly, check Table 9-1 for likely causes. For additional assistance, contact a qualified service technician.

Table 9-1: 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 log in credentials.	Check log in 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.
“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.
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.
Screen displays: UNAUTH3	The radio network ID has not been added to the network.	Contact system administrator.

SYMPTOM	CAUSE	SOLUTION
Screen displays: NOAUTHV	Radio authentication of the VNIC failed.	Contact system administrator.
Screen displays: NOAUTHM	VNIC authentication of the radio failed.	Contact system administrator.
Screen displays: NOSUPRT	The voice authentication security policy is set to only allow authenticated users.	Contact system administrator.
Encrypted calls cannot be made.	User not logged in.	Log in (refer to Section 7.15.2).

10 CUSTOMER SERVICE

10.1 CUSTOMER CARE

If any part of the system equipment is damaged on arrival, contact the shipper to conduct an inspection and prepare a damage report. Save the shipping container and all packing materials until the inspection and the damage report are completed. In addition, contact the Customer Care center to make arrangements for replacement equipment. Do not return any part of the shipment until you receive detailed instructions from a Harris representative.

Contact the Customer Care center at http://www.pspc.harris.com/CustomerService or:

North America:

Phone Number: 1-800-368-3277

Fax Number: 1-321-409-4393

E-mail: PSPC_CustomerFocus@harris.com

International:

Phone Number: 1-434-455-6403

Fax Number: 1-321-409-4394

E-mail: PSPC_InternationalCustomerFocus@harris.com

10.2 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 America) 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: PSPC_tac@harris.com

11 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		#	

12 RADIO SETUP

RADIO TYPE:

FREQUENCY BAND:

OPERATOR'S NAME:

EMERGENCY GROUP:

SYSTEM NUMBER	SYSTEM NAME	TRK/CNV	GRP/CHN NUMBER	GRP/CHN NAME	USE

SYSTEM NUMBER	SYSTEM NAME	TRK/CNV	GRP/CHN NUMBER	GRP/CHN NAME	USE

SYSTEM NUMBER	SYSTEM NAME	TRK/CNV	GRP/CHN NUMBER	GRP/CHN NAME	USE

SYSTEM NUMBER	SYSTEM NAME	TRK/CNV	GRP/CHN NUMBER	GRP/CHN NAME	USE

WARRANTY

Please register this product within 10 days of purchase. Registration validates the warranty coverage, and enables Harris to contact you in case of any safety notifications issued for this product.

Registration can be made on-line at www.pspc.harris.com/CustomerService or by contacting Harris Warranty Administration at the following:

U.S. & Canada:
Phone Number: 1-800-368-3277, Option 4 (toll free)
Fax Number: 1-434-455-6821
E-mail: mailto:WarrantyClaims@Harris.com

International:
Phone Number: 1-434-455-6403
Fax Number: 1-434-455-6676
E-mail: mailto:WarrantyClaims@Harris.com

A. Harris Corporation, a Delaware Corporation, through its RF Communications Division (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-Seller 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), ninety (90) days.
3. for P7300, P7200, P7100^{IP}, P5400, P5300, P5200, P5100, P3300, M7300, M7200 (including V-TAC), M7100^{IP}, M5300 and M3300 radios, two (2) years, effective 10/01/2007.
4. for Unity® XG-100P, three (3) years.
5. 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 Seller's 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.

Harris Corporation
RF Communications Division
221 Jefferson Ridge Parkway
Lynchburg, VA 24501
1-800-528-7711

Harris Corporation
RF Communications Division
1680 University Avenue
Rochester, NY 14610
1-585-244-5830

ECR-7047L

Public Safety and Professional Communications | www.pspc.harris.com
221 Jefferson Ridge Parkway | Lynchburg, VA USA 24501 | 1-800-528-7711