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Appendix F: User Manual

Please refer to the following pages.

Operator's Manual

MM-011709-001

Feb/07

OpenSky®



CS-7200 with SP-103
Control Station with Deskset

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1 SAFETY INFORMATION

1.1 IMPORTANT SAFETY INSTRUCTIONS



NOTE

The user is responsible at all times for the proper operation and maintenance of the equipment.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.



13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. Warning: The lightning bolt signifies an alert to the user of the presence of un-insulated "dangerous voltage" within the product's enclosure that may be of significant magnitude to constitute a risk of electric shock to persons.



16. Warning: The exclamation point alerts the user to the presence of important operation and maintenance (service) instructions in the literature accompanying the product.
17. Outdoor Use Warning: To reduce the risk of Fire or Electric Shock, Do Not Expose This Apparatus to Rain or Moisture.
18. Wet Location Warning: Apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on the apparatus.

1.2 FCC REGULATIONS

Use, installation and service of this equipment as summarized within this Manual will ensure the safe performance of this equipment and will result in user exposure substantially below FCC recommended limits for human exposure to Radio Frequency electromagnetic energy.

These devices comply with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) the device may not cause harmful interference; and (2) the device must accept any interference received, including interference that may cause undesired operation.

These devices are not required to comply with the FCC RF exposure limits for Uncontrolled Exposure (General Population) and Occupational Exposure, because it is assumed that neither uncontrolled nor occupational exposure is applicable in the general installation configuration. The CS-7200 must be disabled before maintenance to the antenna is attempted.

The Federal Communications Commission (FCC) requires the user to obtain a station license for this radio equipment before operation.

FCC regulations state that the frequency, deviation, and power of the radio transmitter must be maintained within specific limits. It is recommended, therefore, that these three parameters be checked prior to placing the station in service.

1.2.1 Antennas

The CS-7200 and antenna must be professionally installed by an experienced antenna installation professional. During the installation of directional antennas, the installer must not point the main beam of the antenna at locations occupied by persons within the distance of maximum permissible exposure limits specified in Part 2 of the FCC regulations. Failure to follow these instructions will void the product warranty and may expose the end user and others to excessive Radio Frequency hazard. All antennas are intended to be installed outdoors and at distances from personnel well beyond the minimum allowable distance.

2 PRODUCT DESCRIPTION

2.1 CS-7200 CONTROL STATION

The CS-7200 Control Station is a component of the OpenSky® network, an integrated voice and data communications system that delivers end-to-end digital transmissions over a single wireless network to various subscriber units.

The CS-7200 is used typically for dispatch purposes and operates over both the Specialized Mobile Radio (SMR) and National Public Safety Planning Advisory Committee (NPSPAC) frequency bands. These bands provide a total of over 830 possible channels spread over the 806-824 MHz transmission and 851-869 MHz reception bands. The CS-7200 operates half-duplex voice, full duplex data, with a 15 W (typical) transmit output power.

The CS-7200 uses Time Division Multiple Access (TDMA) technology to allow multiple users to share a single RF channel. In addition, a single 20 kHz RF channel can support simultaneous digital voice and data communications. The radio supports the OpenSky Trunked Protocol (OTP).

The CS-7200 provides voice and data services in a dispatch operation. Voice operation is provided using the SP-103 Deskset or third-party Tone Remote Desk Sets via the TRCM-103. For data transfers, the CS-7200 and the SP-103 are equipped with an industry standard TIA/EIA-232 interface serial port for connecting optional equipment such as a laptop PC or third-party display or key-entry device. OpenSky works seamlessly with equipment from popular manufacturers and off-the-shelf applications through a standard UDP/IP Protocol, providing simple “plug and play” connectivity.

The CS-7200 is a “soft” radio. Its functions are determined by whatever release of OpenSky software applications are installed. Refer to Figure 2-1 for a picture of the CS-7200.

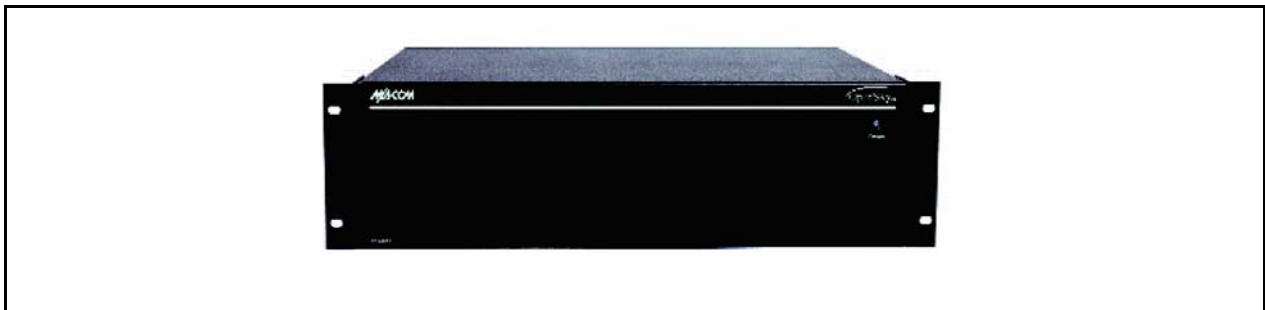


Figure 2-1: CS-7200

2.2 MODES OF OPERATION

2.2.1 VOICE OPERATION

The voice path operates like a traditional dispatch radio, with a microphone to transmit (push-to-talk) and a speaker to receive. In OpenSky Trunked Protocol (OTP), there is no separate voice and data path – all transmitted information is digital.

2.2.2 DATA OPERATION

Data operation requires the connection of a laptop PC. OpenSky works through standard IP protocols such as UDP/IP. The data path operates similarly to the voice path, with a few differences. All external data information in and out of the radio uses the TIA/EIA-232 serial port connection.

2.2.3 INTERCOM OPERATION

The intercom option, a licensed option, allows the CS-7200 radio to pass audio locally between multiple SP-103 units, not over the network. It gives users at multiple SP-103 units, connected to the same CS-7200, the ability to communicate with each other without transmitting over-the-air. When activated, incoming network radio calls are still scanned and broadcast at each SP-103 units.

2.3 SP-103 DESKSET

The SP-103 Deskset is part of the OpenSky suite of radio products delivering high capacity, end-to-end, digital communication and providing remote access for voice, data, and control of the CS-7200 Control Station.

The SP-103 supports voice access via PTT microphones or headset microphones/speaker devices. The SP-103 also provides an interface for a footswitch PTT in order to support microphones/headsets that do not contain integral PTT switches. The SP-103 has an integral 3x4 DTMF keypad for log-on and selective calling. The SP-103 contains an integral 10-Watt speaker and provides the interface to connect to an external 10-Watt speaker. The serial port can be used for data operation. Refer to Figure 2-2 for a picture of the SP-103.



Figure 2-2: SP-103 Deskset



NOTE

Refer to Installation Manual MM-011712-001 when configuring the SP-103.

2.4 TRCM-103 TONE REMOTE CONTROL MODULE

The TRCM-103 operates within the OpenSky network as part of a Dispatch Center in conjunction with a third-party Tone Remote Desk Set and CS-7200 Control Station. It provides remote voice and control communication paths to the CS-7200. The TRCM-103 is a depot or field installed option that mounts on the back of the CS-7200. The TRCM-103 automatically detects one of five alert tones and sixteen function tones with a 26 dB dynamic range. The TRCM-103 audio interface utilizes a standard RJ-11 port and is configurable for 2-wire half-duplex or 4-wire full-duplex operation. The TRCM-103 audio termination is selectable for either 600 or 6k ohms. These features allow for easy integration with existing Tone Remote Desk Sets. Please see the installation manual for details on configuring the device.

2.5 PERSONALITY

As illustrated in Figure 2-3, a personality defines the profiles and talk groups available to the user. It is the structuring of a collection of profiles and privileges established by the OpenSky network administrator to provide the user with a comprehensive set of profiles to communicate effectively with the necessary talk groups or individuals.

Personalities are stored on the network and downloaded over-the-air to the CS-7200. This process is called “provisioning.” Provisioning occurs at 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.

2.5.1 Profiles

As stated above, each profile can contain up to sixteen (16) talk groups. A profile also defines 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.

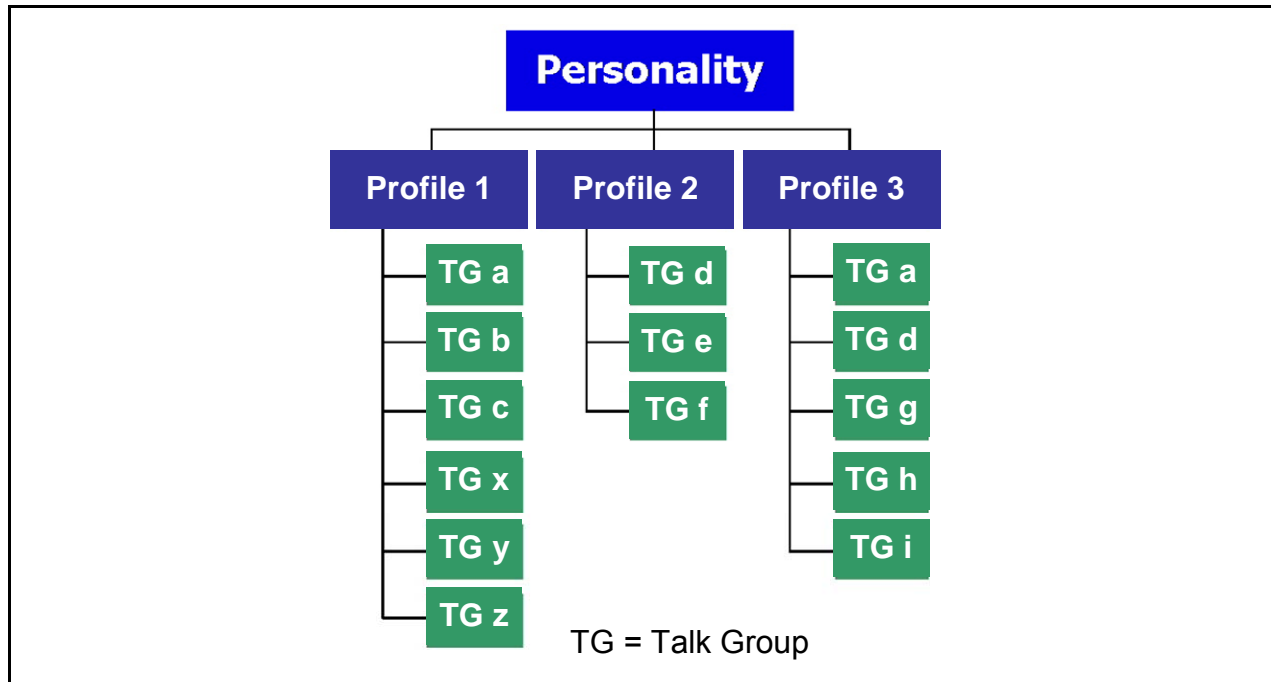


Figure 2-3: Personality Structure Example

2.5.2 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.

3 CS-7200/SP-103 OPERATION

3.1 CONTROLS AND INDICATORS

3.1.1 CS-7200 Front Panel

The CS-7200 front panel contains the mounting flanges, which allow for mounting into a standard 19" rack. The power indicator light is located on the top right-hand side of the panel.



Figure 3-1: CS-7200 Front Panel

3.1.2 CS-7200 Rear Panel

The CS-7200 rear panel contains most of the cabling connections. The I/O connector contains radio-specific functions. A serial port is provided for connection to a standard TIA/EIA-232 (DTE) device. Connection to a Controller Area Network (CAN) device, such as the SP-103 Deskset, or TRCM-103, is made through the 3-pin CAN connector. The CS-7200 is a CAN termination end-point.

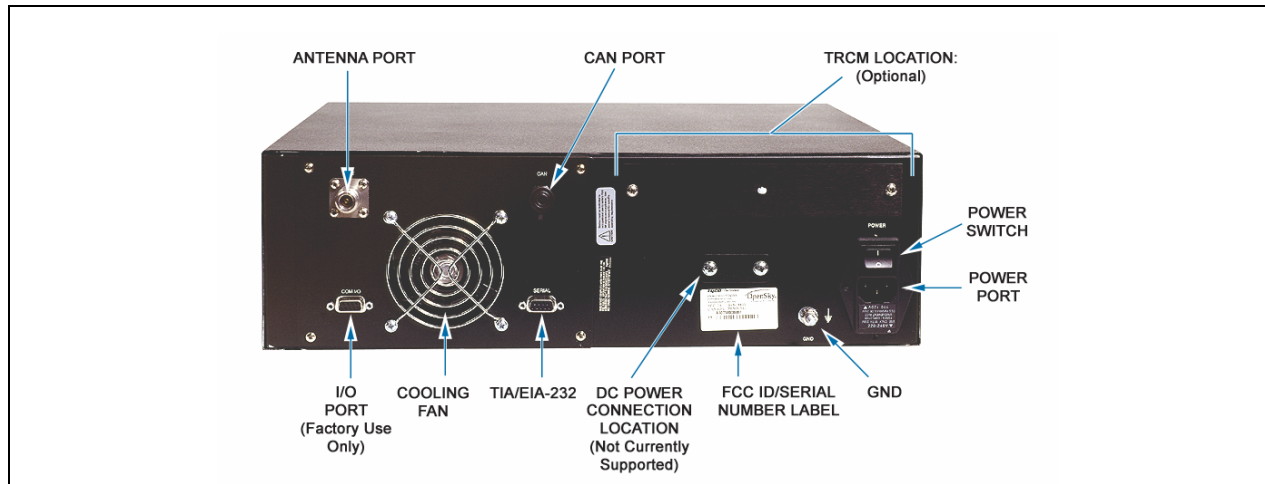


Figure 3-2: CS-7200 Rear Panel

3.1.2.1 TRCM-103

Installation of the TRCM-103 option allows the user to connect to off-the-shelf Tone Remote Desk Sets. See Section 4 for TRCM-103 Operating Instructions.

3.1.3 SP-103 Front Panel

The SP-103 front panel provides the CS-7200 user interface, which includes a 19-digit (8 over 11) alphanumeric display panel, a menu and selector keypad, three pre-set buttons, a rotary volume control, a microphone connector, emergency button, and 12-position DTMF keypad. In addition, the front panel contains a photo-detector to sample ambient light level (used to automatically adjust display and button backlighting brightness). See Table 3-1 for Controls and Functions overview.

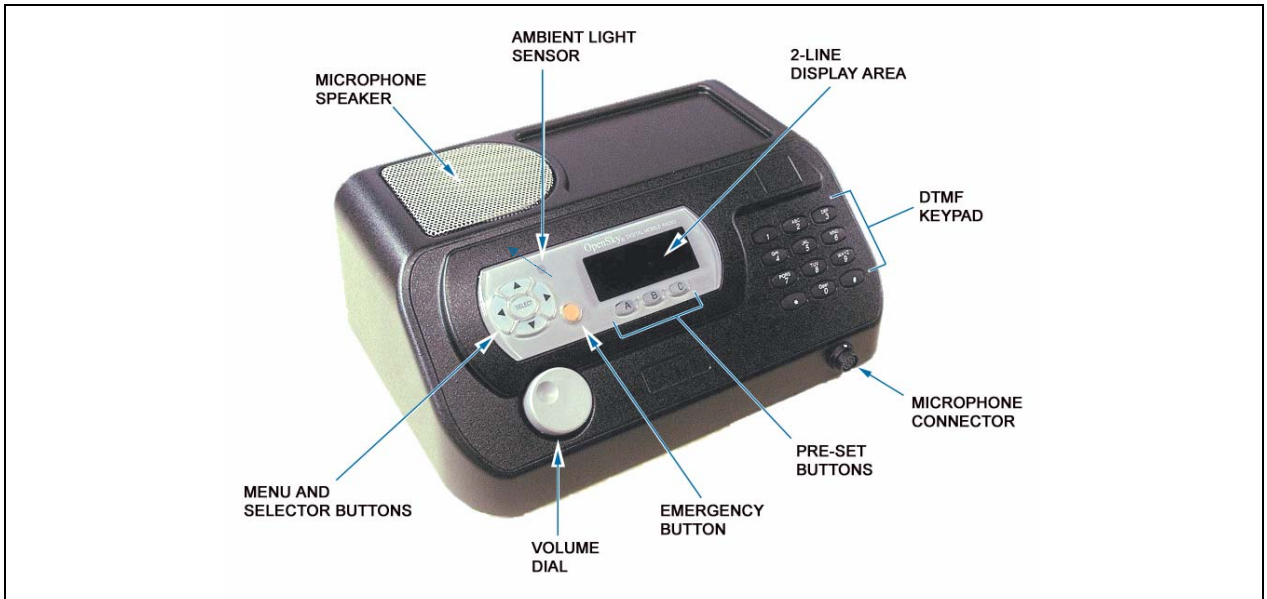


Figure 3-3: SP-103 Front Panel

3.1.4 SP-103 Rear Panel

The SP-103 rear panel contains the interface connections necessary between the Deskset and the CS-7200.

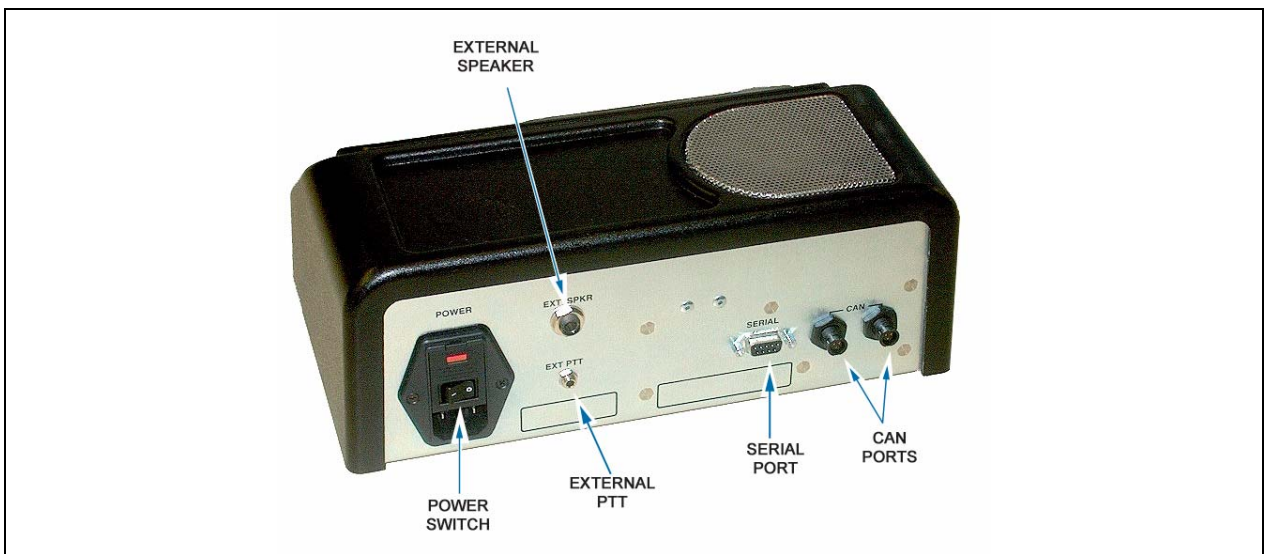


Figure 3-4: SP-103 Rear Panel

Table 3-1: SP-103 Front Panel Controls and Functions

CONTROL	FUNCTION
Volume dial	Twist clockwise to increase speaker volume. Twist counter-clockwise to decrease speaker volume.
MIC connection	Attach hand-held/hand-free microphone or headset.
Emergency button	Pressing this button, if enabled through programming, will send an emergency alert and will open voice communication on the currently selected talk group or the radio's default emergency talk group (depending upon how the system is defined).
Ambient light sensor	Automatically adjusts the display and button backlight brightness level based on ambient light. Do not block this sensor.
Menu and Selector buttons	Cycle through the menu loop with UP ▲ and DOWN ▼ buttons. Scroll through selections with LEFT ◀ and RIGHT ▶ buttons. Press SELECT button to activate the final selection.
Display area	Menu selections appear here, along with Network Connectivity and Volume level indicators. User may select which of several Dwell displays the SP-103 will display. Refer to Table 3-4
Preset buttons	These buttons are used to store and recall user-selectable parameters such as scan mode, selected profile, selected talk group, and priority talk group.
DTMF keypad	Allows for specific tasks such as entering a User ID and password, or selective calling.

Table 3-2: SP-103 Rear Panel Connections and Functions

CONNECTIONS	FUNCTION
Power switch	Press to Power Up/Down
Serial port	Allows for transfer of data to and from a PC. Note that only one PC or data device can be connected to the CS-7200 system at any given point in time.
CAN ports	The two 3-pin CAN connectors are used to connect the SP-103 (a CAN device) to the CS-7200 or to terminate the bus.
External PTT	Provides interface for a footswitch PTT.
External Speaker	Provides interface for connection to an external 10-Watt speaker. When an external speaker is connected, the internal speaker is automatically muted.



Both conductors of the external speaker port are active and should not be grounded. Connectors with exposed metal covers should not be used.

3.2 DISPLAY OVERVIEW

The display shows the radio status (Table 3-4). Network connectivity and volume icons appear on the right. The volume level is also represented numerically within the display with zero (0 or muted) being the lowest volume level and forty (40) being the highest/loudest level. “Mute” displays when the speaker is muted. The rest of the display consists of two text lines that change in response to user interaction with the menu buttons. A sample display is shown in Figure 3-5.



Figure 3-5: Sample Display (Talk Group Menu Session)

3.2.1 Network Connectivity Icon

The illuminated network connectivity icon (refer to Table 3-4) indicates network connectivity has been achieved. This icon will always be illuminated when connected to the “network.”



NOTE

Transmitting voice communications may be possible even if the Network Connectivity icon is not illuminated. However, reception of voice calls, as well as transmitted audio to users on other radio sites, is not guaranteed while in this state.

3.2.2 Volume Level Icon

As shown in Figure 3-5, the volume level icon indicates the current speaker/headset volume setting. Turn the volume dial to change the setting.



NOTE

In addition to the volume level icon at the right of the display, volume level is also presented numerically within the display. This numeric representation only appears during, and briefly after, the volume adjustment is made.

3.2.3 Display’s Top Line

The display’s top line of text changes as the ◀ and ▶ menu buttons are pressed to scroll through the selections in the active menu. When the dwell display is present, press the ◀ and ▶ buttons to scroll through available talk groups. The top line of the display also indicates other information such as the selected talk group when the dwell display is active, and alert messages.

3.2.4 Display’s Bottom Line

The display’s bottom line of text changes as the ▲ and ▼ menu buttons are pressed to scroll through the menus. The menu structure is shown in Table 3-3. The bottom line of the display also indicates other information such as a login prompt, emergency status, and dwell display messages as described in the following section.

Table 3-3: Basic Menu Structure

Menu Name	Radio Displays (first and second lines)	Usage Notes
	To/From Dwell Display ▲ ▼	
Engineering Display (Menu may not be available per programming.)	▲ ▼ registration, RF sync and transceiver status codes bit-error rates and RSSI data	Displays radio system connection data. For engineering use.
Silent Emergency	▲ ▼ OFF/ON "SilentEmerg"	Use ◀ or ▶ to toggle between OFF/ON. Press Select to enable.
Operating Mode (e.g., OTP, OCF)	▲ ▼ available modes "Mode Menu"	Use ◀ or ▶ to turn choose an available mode. Press Select and confirm (Y/N) with ◀ or ▶ and Select again.
GPS Fix	▲ ▼ current latitude and longitude (degrees:minutes:seconds) "GPS Fix"	GPS latitude and longitude position of currently tuned-to base station ["GPS (Site)"] scrolls across top line of the display.
User ID	▲ ▼ User ID # of user currently logged in "User ID"	User's identification/name scrolls across top line of the display (if programmed).
IP Address	▲ ▼ Radio's IP address "IP Address"	Radio's Internet Protocol (IP) address scrolls across top line of the display.
Station Identification	▲ ▼ station's call sign "Station ID"	Station's identification/name scrolls across top line of the display (if programmed).
Stealth Mode (display backlight is disabled)	▲ ▼ "OFF" "StealthMenu"	Use ◀ or ▶ to turn on. Press any button to turn it off.
Treble Level	▲ ▼ "LOW", "MEDIUM", "MEDHIGH", "HIGH" "Treble Menu"	Use ◀ or ▶ to choose speaker treble level. Press Select to return to dwell display.
Display Brightness	▲ ▼ "<< >>" "Bright Menu"	Use ◀ or ▶ to brighten or dim backlighting. Press Select to return to dwell display.
Side Tone Level	▲ ▼ "OFF", "LOW", "MED", HIGH" "Side Menu"	Use ◀ or ▶ to choose side tone level. Press Select to return to dwell display.
	▲ ▼ See Next Page	

Menu Name	Radio Displays (first and second lines)	Usage Notes
	See Previous Page	
	▲ ▼	
Selected Channel (Menu may not be available per radio programming)	selected channel "ChannelMenu"	Displays the current channel. Press Select to return to dwell display.
	▲ ▼	
Scan Mode (e.g. Normal, No Scan, Fixed)	current scan mode "ScnModeMenu"	Use ◀ or ▶ to turn scan on and off. Press Select to return to dwell display.
	▲ ▼	
Talk group Lock Out	talk group "<" "LockOutMenu"	Use ◀ or ▶ to choose a talk group for locking/unlocking. Press Select to toggle "<" on (locked out) and off.
	▲ ▼	
Priority 2 Talk group	current priority talk group "Priority2"	Use ◀ or ▶ to choose Priority 2 talk group. Press Select to return to dwell display.
	▲ ▼	
Priority 1 Talk group	current priority talk group "Priority1"	Use ◀ or ▶ to choose Priority 1 talk group. Press Select to return to dwell display.
	▲ ▼	
Alerts Received	time/sender's name/ alias/message text "AlertsRcvd" or oldest message	"No alerts" or alert message text scrolls in display. Use ◀ or ▶ to view all messages.
	▲ ▼	
Alert Destination	current speed dial # "AlertDest"	Use ◀ or ▶ to choose a speed-dial number. Press Select to go to the "Alert Msg" menu. Use ◀ or ▶ to scroll through "canned messages." Press Select to send message and return to dwell display.
	▲ ▼	
Speed Dial	current speed dial # "SpeedDial"	Use ◀ or ▶ to choose a speed-dial number and press PTT to place call.
	▲ ▼	
Profile Selection	currently active profile "ProfileMenu"	Use ◀ or ▶ to choose an available profile. Press Select to return to dwell display.
	▲ ▼	
Talk group Selection	selected talk group "TalkGrpMenu"	Use ◀ or ▶ to choose a talk group in current profile.
	▲ ▼	
Emergency Dismiss	alert received "EmgDismiss"	Use ◀ or ▶ to choose emergency talk group. Press Select to toggle "<" on (dismiss) and off.
	▲ ▼	
Dwell Display	selected talk group (bottom line option)	Use ◀ or ▶ to scroll top line through talk groups. Press Select to change bottom line option.

Use ▲ and ▼ to scroll through menus.





Menus will vary depending upon system programming, radio hardware, and optional configurations. All menus except the dwell display menu can be turned off by network administration personnel.

3.2.5 Dwell Display

When not engaged in menu selection, the 2-line display defaults to the user-defined default display, known as the “dwell display.” The top line indicates the currently selected talk group. The bottom line indicates the currently selected profile, received talk group/caller ID/alias¹ or radio channel. To set one of these bottom line options, press the **Select** button from the dwell display.

Table 3-4: Display Parts and Functions

COMPONENT	FUNCTION
Network Connectivity Icon 	When the network connectivity icon is illuminated, there is a network connection and not illuminated when there is no network connection.
Volume Icon 	Shows current speaker volume setting chosen by the user. Note that a momentary numerical representation will also be shown within the display while the volume is being adjusted.
TWO TEXT LINES	<p>During a menu session, the display’s bottom line responds to ▲ (up arrow) and ▼ (down arrow) buttons. It indicates the current menu. For example, the Talk group Menu is selected in Figure 3-6.</p> <p>The display’s top line responds to the ◀ (left arrow) and ▶ (right arrow) buttons. It indicates the options within the current menu. For example, “Police1” is the currently selected talk group in Figure 3-6.</p>

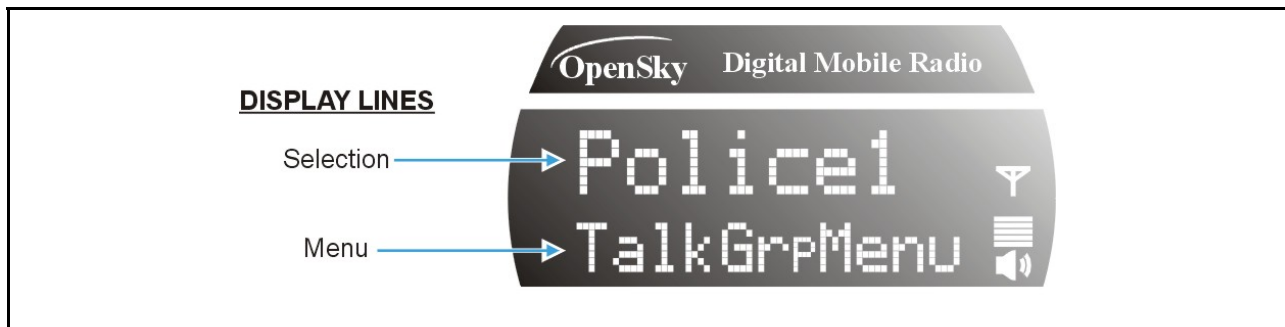


Figure 3-6: Top and Bottom Display Lines

3.2.6 Menu Display and Control Area

Following power-up, the display shows the default talk group. Pressing the ▲ and ▼ buttons change the display to the next available menu. Refer to Table 3-3. In many cases, the dwell display automatically reappears after no menu buttons are pressed for a short period of time (between 10 and 30 seconds). For some menus such as the User ID menus, this does not occur until the user presses a front panel button.

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

The display is highly interactive. It responds in the top and bottom text lines as the user presses the menu buttons (▲, ▼, ◀, ▶ and **Select**) to scroll through the menu loop and the entries for each menu.

¹ Alias is a logical ID name such as “J_Smith.” The name corresponds to a user ID such as 003-542-0001. Alias is limited to eight (8) characters.



Although the display supports eight (8) characters on the top line, systems currently limit talk group names to seven (7).

3.2.7 Dwell Display User-Selectable

The top line of the dwell display for OpenSky trunked mode operation is always the selected talk group for the profile of the particular radio. What appears in the bottom line depends on the choice made as a dwell display option. From dwell display, press **Select** to change the bottom line display option by cycling through available options.

Whatever the preference, the radio will respond dynamically to changes in status, always displaying the current information about the current network connection. The bottom line indicates the currently selected profile, received talk group/caller ID/alias or radio channel. To set one of these bottom line options, press the **Select** button from the dwell display. If a menu is not enabled it is not available for display in the bottom line of the dwell display.

Table 3-3 shows the Basic Menu Structure and some options available. Available profiles, talk groups, and channels vary widely from network to network depending on system hardware, and option configuration.



Visible menu items will vary depending on the system, hardware, and option configuration.

3.3 BASIC RADIO OPERATION

3.3.1 POWER UP

1. Press the power switch on the CS-7200 rear panel. The front panel LED will illuminate.
2. Press the power switch on the rear panel of the SP-103. The display will show, “Booting. Please wait.”
3. Wait through the startup sequence, which lasts approximately 10 seconds.



If the startup sequence lasts longer than 10 seconds or if “No MRU” appears on the SP-103 display, the Control Station has not powered up correctly or no CAN connection is present. See section 3.1.4.

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 Network Administrator.

4. When provisioning is complete, the dwell display will appear on the SP-103 display and the Volume icon will indicate the current speaker volume setting.



Figure 3-7: Dwell Display and Speaker Volume Icon

3.3.2 Self-Test

After power-up, the CS-7200 undergoes a multi-function automatic registration procedure and self test. As many as sixteen (16) possible radio profiles are downloaded from the network in response to the User's ID.

3.3.3 Logging In to the Network

Login occurs either automatically (auto registration) if the radio has a valid registration or, if enabled and authorized for encryption (section 3.12), requires the user to enter a User ID and password.

If encryption is enabled and authorized, the user will be prompted to "Pls Login" with the *1 login command, a User ID, and password.

1. Press *1 (Login command).
2. Enter the full 10-digit User ID.
3. Press the # key.
4. Enter the password.
5. Press the # key twice.

The User ID may be remembered from the previous log-in. (Refer to Section 3.3.4 for further details regarding log-off commands.) The password will be established before the radio is put into operation. Contact the local OpenSky network administrator for more information.



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

3.3.4 Logging off the Network

The *0## command un-registers the radio. Typically, it is automatically performed when powering down the radio using SP-103 Power Button. The User ID is remembered by the radio so only the password is needed at next log-in.

3.3.5 POWER DOWN

Press the A/C power switches on the SP-103 (Figure 3-3) and CS-7200 rear panel (Figure 3-2) to power down.



The CS-7200 configuration will not be saved if power is removed prior to saving.

3.3.6 Receiving and Transmitting Voice Calls

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

3.3.6.1 Receiving a Voice Call

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

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

Refer to section 3.6 for detailed information on talk group scanning. Refer to section 3.12 for detailed information regarding sending and receiving encrypted calls.

3.3.6.2 Transmitting a Voice Call

Transmit a voice call as follows:

1. Ensure power is supplied to the CS-7200. See section 3.3.1.
2. If required, log-in to the network using a user ID and password. See section 3.3.3.
3. Select the desired talk group for transmitting on.
4. Depress and hold the **Push-to-Talk (PTT)** button on the 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.



NOTE

The PTT button is located on either the SP-103 Deskset stand mic, the side of the hand-held mic or on the foot switch.

5. Release the PTT button when finished speaking.

Refer to section 3.12 for detailed information regarding sending and receiving encrypted calls.

3.3.7 Tones

In addition to the volume level tones (sounded momentarily only when volume level is adjusted) and confirming tones (sounded momentarily when a menu or option is selected), the radio provides the tones described in Table 3-5.

Table 3-5: Alert Tones

NAME	STONE	DESCRIPTION
Call Queued	one low tone/two high tones	Call queued for processing.
Call Denied	3 short	Radio is out of coverage area or requested talk group is active.
Grant (or Go-Ahead)	single short beep	Sounded when resources become available for a call request placed in the queue (if enabled) upon channel access
Call Removed	single long low-pitched tone	Notifies the user access to the channel has been lost (out of coverage area or preempted by higher-priority call)

NAME	STONE	DESCRIPTION
Selective Alert Received	4 short tones	Only played once to indicate a selective alert has been receive
Emergency Alert Tone	3 short beeps	Sounds when an emergency alert is declared
Emergency Cleared Tone	one long low-pitched tone	Sounds when and emergency is cleared
Selective Call Ring Tone	a ringing tone similar to a telephone	Ringng is repeated every 4 seconds until the call is accepted or rejected by the radio being called or until the network drops the call if unanswered after 1 minute
PSTN Ring Tones	single medium-pitch reiterative tone	Two ring tone - one generated by the radio when there is an incoming telephone call or an outgoing telephone call attempt is waiting for the telephone interconnect gateway equipment to dial the Public Switched Telephone Network (PSTN). The second ring tone sounds when the gateway equipment has dialed the number.
Roam Tone	a quick high-low beep sequence	Sounds when the radio transitions from one radio base station site to another. If this tone sounds just after pressing the PTT button, keep the PTT button depressed and begin speaking into the microphone <u>after</u> the grant tone sounds.

3.3.8 Adjusting Side Tone Audio Level

The SP-103 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.”

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

Use the following procedure set side tone level:

1. Use the ▲ and ▼ buttons to cycle through the menu until the “Side Menu” appears in the bottom line of the display.
2. Use the ◀ or ▶ buttons to change to the desired level (Off, Low, Medium, or High). To turn side tones completely off, use the “Off” setting.
3. Press the **Select** button to confirm and begin using the side tone level setting. The dwell display will appear when the radio begins using the new setting.

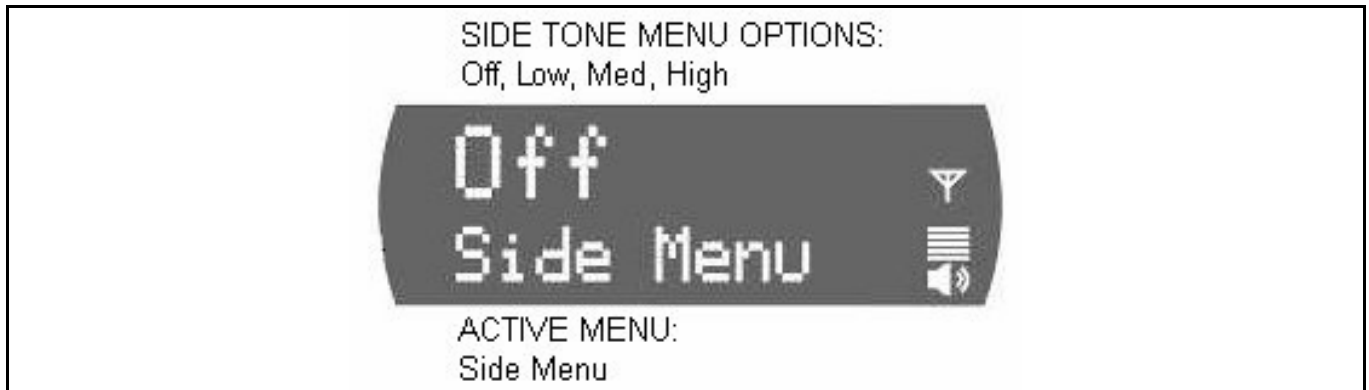


Figure 3-8: Side Tones Menu

3.3.9 Adjusting Display & Button Backlight Brightness

The SP-103 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. Use the ▲ or ▼ button to scroll through the menu until “Bright Menu” appears. A “<< >>” symbol appears in the top line of the display.
2. Use the ◀ button to reduce the brightness or the ▶ button to increase the brightness. Display and button backlight brightness will immediately dim or brighten.

3.3.10 Adjusting Speaker/Headset Audio Treble Level

The tone of received signals heard in the speaker and headset can be adjusted using the radio’s “Treble Menu” as follows:

1. Use the ▲ or ▼ button to scroll through the menu until “Treble Menu” appears. The current treble level setting indicates in the top line of the display. There are four (4) levels available: low, medium, medium-high and high.
2. Use the ◀ button to reduce the treble level setting or the ▶ button to increase it.
3. Press the **Select** button to return to the Dwell Display.

3.3.11 Checking or Changing the Active Profile

The radio can store up to sixteen (16) standard profiles within its personality, one of which is always set as the currently active profile. Each profile can contain up to sixteen (16) talk groups. Each profile is typically configured to contain those talk groups specific to certain communication activities, such as police patrol.

If the dwell display is set to “profile,” the currently active profile’s name appears in the bottom line of the display. Otherwise, to determine which profile is currently active, use the menu buttons to access the Profile Menu. The active profile’s name will appear in the top line of the display. To switch to/activate a different profile:

1. Press the ▲ or ▼ button until “ProfileMenu” appears in the bottom line of the display. The name of the currently active profile appears in the top line. For example, “TacNet” as shown in Figure 3-9.

2. Press the ◀ or ▶ buttons to choose the desired profile stored in the radio as established by the OpenSky network administrator.
3. Press the **Select** button to activate the newly chosen profile. After a short time (a few seconds), the newly chosen profile activates and the dwell display re-appears.



Figure 3-9: Profile Menu

3.3.12 Checking or Changing the Selected Talk Group

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

First Method:

1. Use the ▲ and ▼ buttons to scroll through the menu until “TalkGrpMenu” appears on the bottom line of the display. The currently selected talk group appears in the top line of the display. For example, “Police1” as shown in Figure 3-10.
2. Use the ◀ or ▶ buttons to scroll through the available list of talk groups in the active profile. This list is determined by the OpenSky network administrator.

OR

Second Method:

From the dwell display, press the ◀ or ▶ buttons to scroll through the available list of talk groups in the active profile.



Figure 3-10: Talk Group Menu

3.4 INTERCOM MODE

Intercom mode menu option is available when the CS-7200 detects multiple Desksets at power-up. Intercom mode allows multiple desksets on the same CS-7200 to communicate with one another, without transmitting over the air. INTERCOM will appear in the top line of the display panel and “On” or “Off” will appear in the bottom line.

Incoming voice calls will override intercom communications for the duration of the voice call. The Control Station will still be in Intercom mode and intercom communications will resume when the voice call ends.

Use the following procedure to change Intercom mode settings:

1. Use ◀ or ▶ to turn Intercom mode ‘On’ or ‘Off.’
2. Press **Select** to confirm choice.

When intercom mode is turned on:

- Incoming voice calls will override intercom communications for the duration of the voice call. The desksets remain in intercom mode and intercom communications will resume when the voice call ends.
- “TG: INTERCOM” appears in the 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.
- If a call exists on the currently selected talk group when a PTT button is pressed at one of the desk sets, “TG: in use” appears in the display to indicate intercom mic audio cannot preempt the call on the talk group.



A user at a CS-7200 with only one SP-103 can turn intercom mode on. In this case, pressing the microphone’s PTT button will not send microphone audio anywhere.

3.5 TALK GROUP LOCK OUT

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

1. **No Scan.** By turning scan off (selecting “No Scan” via the “ScnModeMenu”), only the selected talk group is audible.

2. **Lock Out.** By locking out selected talk groups, the “chatter” of the locked-out talk groups cannot be heard. This focuses the user’s scanning resources to calls only on desired talk groups.

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



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

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



If the Scan Mode is “Fixed,” P1 and P2 groups CANNOT be locked out. See Section 3.6 for more information.

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

3.5.1 Locking Out a Talk Group

1. Use the ▲ or ▼ button to scroll through the menu until “LockOutMenu” appears in the bottom line of the display. The name of a talk group in the currently active profile will appear in the top line. See Figure 3-11.
2. Use the ◀ or ▶ buttons 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 **Select** button to lockout the displayed talk group. A less than symbol (<) appears next to the talk group’s name.
4. Repeat steps 3 and 4, as needed, to lockout additional talk groups.

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

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

3.5.2 Unlocking a Talk Group

1. Use the ▲ or ▼ button to scroll through the menu until “LockOutMenu” appears in the bottom line of the display. The name of a talk group in the currently active profile will appear in the top line. See Figure 3-11.
2. Use the ◀ or ▶ buttons 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.



Figure 3-11: Lock Out Menu

3. Press the **Select** 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.

3.6 SCAN MODE

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

As described in Table 3-6, the choice of scanning mode broadens or narrows the span of communications with all the talk groups in the radio’s profiles, but does not affect interaction with the talk groups.

Table 3-6: Scan Modes

SCAN MODE	EXPLANATION
No Scan	<p>Eliminates distractions.</p> <p>Full communications (transmit and receive) on selected talk group.</p> <p>No calls received from other talk groups.</p>
Normal (Default)	<p>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.</p> <p>Priority (P1 and P2) groups are user selectable.</p> <p>Receive calls from more than one talk group, if available from the current site.</p> <p>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 will not be actively dragged.)</p> <p>The default emergency talk group, as well as any emergency-enabled talk groups, is only dragged if it is in emergency mode.</p>
Fixed	<p>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.</p> <p>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.</p> <p>Allows dragging of the P1, P2, and selected talk group to the site on which the radio is registered. If other calls are available at the site, they can also be heard, but they will not be actively dragged.</p> <p>The default emergency talk group, as well as any emergency-enabled talk groups, is only dragged if in emergency mode.</p>

3.6.1 Checking or Changing Active Scan Mode

The currently active scan mode does not appear in the dwell display. To check it, access “ScnModeMenu” and observe it in the top line of the display. To change the active scan mode, access “ScnModeMenu” and select the other mode as described in the following section.

3.6.1.1 Changing Scan Mode

1. Use the ▲ and ▼ buttons to scroll through the menus until “ScnModeMenu” appears in the display.
2. Use the ◀ or ▶ buttons to scroll through the scan options until the desired mode appears. See Table 3-6.

3.6.2 Scanning Priority

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

- 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)

3.6.2.1 Set Talk Group Priority

Follow this procedure to make talk groups in the current profile the Priority 1 or Priority 2 talk group.

1. Use ▲ or ▼ to 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 ◀ or ▶ to select a new priority talk group.
3. Press the **Select** button to set the newly selected talk group as the priority talk group.

3.7 SELECTIVE CALL

Selective calling is a feature that allows two radio units, a CS-7200 and a mobile radio for example, 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.



NOTE

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

3.7.1 Making a Selective Call

1. If using the DTMF keypad:
 - A. Press *8 on the keypad.
 - B. Enter the number of the radio to be called (e.g., 027-001-0006). Like dialing a telephone number, ignore/do not enter dashes. 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.
 - C. Press and release the # key.
 - D. Wait approximately two (2) seconds.
 - E. 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.
 - F. Selective calls are limited to a maximum duration of ten minutes.

Using Speed Dial:

- A. Scroll through the Menu options using the ▲ and ▼ buttons until “SpeedDial” appears in the bottom line of the display.

**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.

- B. Using the ◀ and ▶ buttons, scroll through the pre-programmed speed-dial numbers until the desired number appears in the display.
2. Continue by pressing the PTT button when speaking (transmitting) to the caller.
 3. To end the call, press the **Select** button.

3.7.2 Receiving a Selective Call

When someone calls in from another radio using the selective call function a ring will sound in the speaker and/or headset. Press the ▶ button to answer the call and press the microphone’s PTT button when speaking (transmitting) to the caller. Press the **Select** button to end the call.

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

3.8 SELECTIVE ALERT

Selective alert messaging is an OTP feature allowing one of up to eight (8) pre-programmed text messages (refer to section 3.8.3) 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 3-7 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 it is power cycled.

3.8.1 Sending Selective Alert Messages

3.8.1.1 Specifying the Destination

The destination radio’s User ID can be selected via the menu buttons on the radio’s front panel or via the keypad.

Menu Button Method

1. Using the ▲ or ▼ button, 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.
4. Press the ◀ or ▶ button to change to a different speed-dial number. Pause between each arrow button depress to observe the entire number as it scrolls across the top line of the display.
5. When the desired speed-dial number appears, press the **Select** button to activate the selection.
6. Continue with section 3.8.1.2.

Keypad Method

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. Like dialing a telephone number, ignore/do not enter dashes. 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 3.11.
3. Press the # key to enter the number.

3.8.1.2 Choosing and Sending the Message

After specifying the destination radio’s User ID (section 3.8.1), 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 ◀ or ▶ button. The next available message in the list is displayed. Pause between each arrow button depress to observe the entire message as it scrolls across the top line of the display.

If the destination radio’s User ID was chosen via the keypad, the keypad’s 4 and 6 buttons can also be used to scroll through the available messages.

2. To select and send the displayed message, press the **Select** button, or press the # button on the keypad.
3. The status of the sent message will be momentarily displayed. Possible status Selective Alert status messages and their meanings are listed in Table 3-7.

Table 3-7: Possible Status of Selective Alert

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

3.8.2 Receiving Selective Alert Messages

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

3.8.2.1 Displaying Messages Received

1. Using the ▲ or ▼ button, 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 the ◀ and ▶ buttons. Use ◀ to view older messages and ▶ to view newer messages.

3. To delete the message currently being viewed, press the **Select** button.

3.8.2.2 Deleting Received Messages

To delete a received message:

1. Display the message (refer to Section 3.8.2.1).
2. Delete the message by pressing the **Select** button.
3. Confirm the deletion by pressing the **Select** button again.

3.8.3 Defining Pre-Programmed Messages

All selective alert messages are pre-defined by the radio system's maintenance personnel. These messages are sometimes referred to as "canned" messages. Custom selective alert messages cannot be created by the radio user. The entire selective alert message, including the abbreviation, can include up to two hundred (200) text characters.

3.9 TELEPHONE INTERCONNECT CALLS

If the radio system is equipped with Public Switched Telephone Network (PSTN) interconnect equipment, telephone calls can be made 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 PTT button to initiate the call. An initial ring tone plays indicating call initiation. Once the gateway picks up the call, the ring tone changes.
5. When the caller answers, depress the PTT button when speaking and release it to listen to the caller.
6. To hang-up, press the **Select** button on the front panel.

3.10 EMERGENCY COMMUNICATIONS

The 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 PTT button is not depressed. An emergency talk group is provided greater priority and infinite hang-time by the radio system's infrastructure. Hang-time is the maximum duration of quiet time between transmissions on the talk group before the infrastructure assets are automatically taken away. Because an emergency call is handled on a talk group, it is received by all radios and consoles monitoring the talk group.

An emergency alert is a data message sent by a 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.

3.10.1 Declaring an Emergency Call or Alert

To declare an emergency call or emergency alert, press and release the orange **Emergency** button on the SP-103 or the function button on the Tone Remote Desk Set that has been configured as the Emergency set button. (On the SP-103, the Emergency button is located just to the right of the 5-button Menu and Selector keypad.)

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

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

3.10.2 Clearing an Emergency Call or Alert

To clear an emergency, press and hold the **Emergency** button for at least three (3) seconds. However, this can only be accomplished at the radio where the emergency was originally declared (the initiating radio), by a dispatcher at a console, at a supervisory radio, or by the network administrator. When the emergency is successfully cleared, the remove tone will sound at the initiating radio. Also, for an emergency call, the asterisk (*) will clear from the display.

3.10.3 Silent Emergency

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



NOTE

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

3.10.4 Receiving an Emergency Call

Upon receiving an emergency call declared by another radio:

- An emergency tone sounds in the radio's speaker (three short high-pitched beeps).
- "EMERGENCY" flashes in the display.
- When the emergency talk group is selected, an asterisk (*) follows its name in the top line of the display. The asterisk identifies the selected talk group is in an emergency state. Some radios may be programmed by the system or network administration personnel to flash the **Emergency** button (red) when an emergency call is received.
- 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 section 3.6 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.

3.10.5 Dismissing an Emergency Call

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

1. Press the ▲ or ▼ button until "EmgDismiss" appears in the display.
2. Press the ◀ or ▶ buttons until the talk group in the emergency state appears, as indicated by an asterisk (*) following the talk group's name.
3. Press the **Select** button.

3.11 DUAL-TONE MULTI-FREQUENCY KEYPAD

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. This allows for specific tasks such as entering a user ID and password, or selective calling.

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

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

- *0 Log-off command:** *0## (logs the user off the system). See page 20 for additional information.
- *1 Log-in command:** *1<User ID> # <Password> ## (required for encryption). See page 20 for additional information.
- *5 Single Site Channel command:** *5<SMR/NPSPAC channel>#
- *6 Load Default Personality command:** *6#. This command applies only if the radio is not voice-registered on the network.
- *7 Initiate Selective Alert command:** *7<Target ID>#[Choose Message]#. See page 30 for additional information.
- *8 Radio-to-Radio Call command:** Selective call number # (PTT to dial). See page 29 for additional information.
- *9 Public Switched Telephone Network (PSTN) Call command:** See page 32 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 36 for additional information.
- *33 End Manual Encryption command:** *33#.

3.11.1 Password Entry

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



NOTE

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

3.11.2 Overdial

In order to send DTMF tones over the radio link, hold the PTT key when pressing the DTMF keys.

3.12 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). This form of encryption provides air-link security.

Voice encryption is handled either automatically or manually. Automatic encryption is initiated through the Unified Administration System (UAS) for a specific talk group and requires nothing from the user. Manual encryption is initiated by two or more radio users and requires DTMF keypads. Both methods of encryption are discussed in the following sections.

3.12.1 Automatic Encryption

For automatic encryption, a network administrator will select 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 DTMF keypad to enter User ID and Password.

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

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

3.12.2 Manual Encryption

Two or more users can manually encrypt a call, if enabled, without an established encrypted talk group. A pre-determined key and a DTMF keypad are 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 will sound garbled.

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



CAUTION

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

Perform the following to transmit or receive manually encrypted calls:

1. Press *32 on the DTMF 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 will see “Secure Call” on the bottom of the dwell display.

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

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

3.13 PRESET BUTTONS

The SP-103 front panel contains three buttons labeled A, B, and C. By holding one of these buttons down for approximately three (3) seconds, the following current information is saved to the function of that button:

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

When information has been saved to a preset, the button will be illuminated green. If the button is not designated as a preset, it will be illuminated red.

Presets are saved and restored to/from non-volatile memory. Changing the User ID (login in as a different user) will clear the presets, as they are stored on a per-user basis.

3.14 DYNAMIC REGROUPING

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

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

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

3.15 ENGINEERING DISPLAY

Some radios may have access to an engineering display that presents various data related to the radio system. An example display is shown in the following figure. Typically, this display is accessed by pressing the ▼ button once from the dwell display.

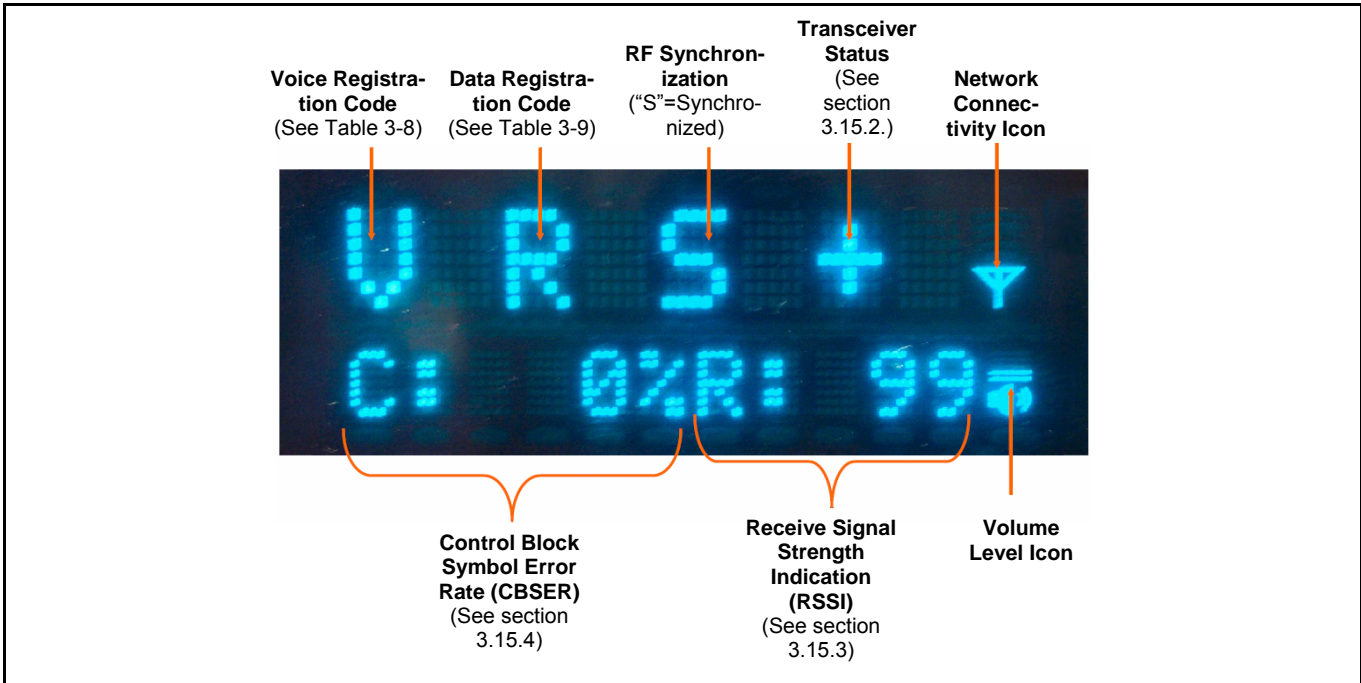


Figure 3-12: Example Engineering Display

3.15.1 Voice and Data Registration Codes

The engineering display’s voice and data registration codes identify the current registered operational status of the radio on the OpenSky network. Voice registration is granted by the VNIC (Voice Network Interface Controller) computer and data registration is granted by the MDIS (Mobile Data Intermediate System) computer. See Table 3-8 and Table 3-9 respectively.

3.15.2 Transceiver Status

The engineering display’s transceiver status is a plus (“+”) symbol during normal operations.

Table 3-8: Voice Registration Codes

DISPLAYED CODE	LOWER DISPLAY	RETRY	MEANING
(none)	(none)	No	Off network.
a	VDENIED	No	Voice denied: Unknown reason.
b	BAD VID	No	Voice denied: Unknown MES ID. (Check User ID.)
c	(none)	No	Voice denied: Duplicate MES ID.
d	(none)	No	Voice denied: IP address denied.
e	(none)	No	Voice denied: Duplicate IP address.
f	BAD PWD	No	Voice denied: Missing password.
g	BAD PWD	No	Voice denied: Invalid password.

DISPLAYED CODE	LOWER DISPLAY	RETRY	MEANING
h	HOM DWN	Yes	Voice denied: Home VNIC down.
i	SRV BSY	Yes	Voice denied: Serving VNIC congested.
j	(none)	Yes	Voice denied: Aged reg. seq. number.
k	MAX USR	Yes	Voice denied: Too many login instances.
l	UAS BSY	Yes	Voice denied: UAS changing talk group.
V	(none)	No	Voice registered.
v	(none)	No	Voice registration pending.
R	(none)	No	Data registered only.

Table 3-9: Data Registration Codes

DISPLAYED CODE	LOWER DISPLAY	RETRY	Meaning
R	(none)	No	Data registered.
1	(none)	No	Network access denied. Unknown reason.
2	(none)	No	Network ID unsupported.
3	UNAUTH3	No	Network ID not authorized. (Check IP.)
4	UNAUTH4	No	Bad authentication.
5	UNAUTH5	No	Unsupported authentication.
6	MDS BSY	Yes	MDIS fully loaded.
7	DUP IP	No	Service denied: Duplicated IP address.
p	(none)	No	Data registration pending.
d	(none)	No	Data deregistration pending.

3.15.3 Receive Signal Strength Indication (RSSI)

The engineering display's RSSI number represents, in absolute value, the dBm level of the signal received from the OpenSky's base station transmitter. It represents a negative unit of measure, but a negative/minus sign does not precede the number in the display. Because the displayed number represents a negative value, higher/increasing numbers represent lower/decreasing received signal strengths.

Values lower than -110 (125 for example) indicate a possible antenna problem, or operation in a fringe or no-coverage area.

Higher RSSI values, -85 for example (displayed 85), with CBSER values greater than zero (0) generally indicate RF interference is being induced into the antenna system along with the received signal.

It is not uncommon for an OpenSky signal with low RSSI and degraded CBSER to be decoded by the radio and heard at the speaker without any problem.

3.15.4 Control Block Symbol Error Rate (CBSER)

The engineering display's CBSER value indicates data distortion or interference. Zero (0) represents no errors. When operating in RF fringe areas, this number may increase as interference in the received data signals increases.

4 CS-7200/TRCM-103 OPERATION

Ensure the TRCM-103 has been installed and calibrated in accordance with the Installation Manual.

4.1 POWER UP

1. Press the power switch on the CS-7200 rear panel. The front panel LED will illuminate.
2. Power up the Tone Remote Desk Set as directed by the third-party Desk Set user manual.
3. Wait through the startup sequence, which lasts approximately 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 Network Administrator.

4.2 NETWORK LOG ON

Network log on is either automatic or directed via a PC. Contact your local administrator for procedures on how to log on to the network.

4.3 SELF-TEST

After power up, the CS-7200 undergoes a multi-function automatic registration procedure and self-test. It is "provisioned" with the user personality: as many as 16 possible user profiles are downloaded to the equipment from the network in response to the User's ID. Emergency behavior is provisioned along with each profile.

4.4 CONTROLS AND INDICATORS

See the third-party Desk Set's user manual to ensure familiarity with the equipment's Controls and Indicators.

4.5 VOICE CALLS

As soon as the startup/log on/provision/self-test sequence and network registration is complete, voice calls from the talk groups in the active profile will be audible, if they are available.

4.5.1 Receiving a Voice Call

No action is required to receive a voice call, since the incoming call will be forwarded as clear audio to the third-party Tone Remote Desk Set.

4.5.2 How to Make a Voice Call

The steps for making a voice call are similar to those for a conventional radio.

1. First, ensure power is supplied to the CS-7200 (see Section 4.1).
2. Select the proper function button on the third-party Tone Remote Desk Set that corresponds to the talk group. See your system administrator for the mapping of function buttons.
3. Depress and hold the transmit button on the third-party Tone Remote Desk Set
4. Release the transmit button when finished speaking.

4.6 RADIO TONES

See section 3.3.7.

4.7 POWER DOWN

Press the power switch on the CS-7200 rear panel. Saved settings will survive the power down procedure. At the next power up, these settings will automatically default, along with network personality settings.

5 BASIC TROUBLESHOOTING

If Control Station is not operating properly, check Table 5-1 for likely causes. For additional assistance, contact a qualified service technician.

Table 5-1: Basic Troubleshooting

SYMPTOM	CAUSE	SOLUTION
Station/Deskset will not turn on	No power.	Check connections to wall outlet and the CS-7200/SP-103 to make sure equipment is properly plugged in.
SP-103 Deskset displays "No MRU"	Start-up sequence may have not completed correctly.	Check for loose/bad CAN cable, then power down and power up.
Start-up sequence takes longer than 10-15 seconds.	Start-up sequence may have not completed correctly.	Check for loose/bad CAN cable, then power down and power up.
Station/Deskset will not turn off	One of the attached SP-103 units is still powered up.	Power off all SP-103 units.
Station/Deskset will not register or does not receive provisioning data.	Bad logon credentials	Check logon and password
No audio	Speaker volume is muted.	Increase the volume level.
Poor SP-103 display visibility	Ambient light sensor is obstructed.	Clear the obstruction and give the sensor a clear path to ambient light.
Station/Deskset will not transmit	Station/Deskset may be overheated.	If overheated, let Station/Deskset cool before retrying transmission. Report this failure to an authorized technician.
Station/Deskset will not transmit (transmit indicator on SP-103 does not flash)	Station/Deskset may be experiencing low voltage.	Check connections to wall outlet and the CS-7200/SP-103 to make sure equipment is properly plugged in.
Equipment powers off for no apparent reason	Equipment may be experiencing very low voltage.	Check connections to wall outlet and the CS-7200/SP-103 to make sure equipment is properly plugged in.

6 WARRANTY

- A. M/A-COM, Inc. (hereinafter "Seller") warrants to the original purchaser for use (hereinafter "Buyer") that Equipment manufactured by or for the Seller shall be free from defects in material and workmanship, and shall conform to its published specifications. With respect to all non-M/A-COM Equipment, Seller gives no warranty, and only the warranty, if any, given by the manufacturer shall apply. Rechargeable batteries are excluded from this warranty but are warranted under a separate Rechargeable Battery Warranty (ECR-7048).
- B. Seller's obligations set forth in Paragraph C below shall apply only to failures to meet the above warranties occurring within the following periods of time from date of sale to the Buyer and are conditioned on Buyer's giving written notice to Seller within thirty (30) days of such occurrence:
1. for fuses and non-rechargeable batteries, operable on arrival only.
 2. for parts and accessories (except as noted in B.1) sold by Seller's Service Parts Operation, ninety (90) days.
 3. for PANTHER™ Series handportable and mobile radios, two (2) years.
 4. for all other equipment of Seller's manufacture, one (1) year.
- C. If any Equipment fails to meet the foregoing warranties, Seller shall correct the failure at its option (i) by repairing any defective or damaged part or parts thereof, (ii) by making available at Seller's factory any necessary repaired or replacement parts, or (iii) by replacing the failed Equipment with equivalent new or refurbished Equipment. Any repaired or replacement part furnished hereunder shall be warranted for the remainder of the warranty period of the Equipment in which it is installed. Where such failure cannot be corrected by Seller's reasonable efforts, the parties will negotiate an equitable adjustment in price. Labor to perform warranty service will be provided at no charge during the warranty period only for the Equipment covered under Paragraph B.3 and B.4. To be eligible for no-charge labor, service must be performed at a M/A-COM factory, by an Authorized Service Center (ASC) or other Servicer approved for these purposes either at its place of business during normal business hours, for mobile or personal equipment, or at the Buyer's location, for fixed location equipment. Service on fixed location equipment more than thirty (30) miles from the Service Center or other approved Servicer's place of business will include a charge for transportation.
- D. Seller's obligations under Paragraph C shall not apply to any Equipment, or part thereof, which (i) has been modified or otherwise altered other than pursuant to Seller's written instructions or written approval or, (ii) is normally consumed in operation or, (iii) has a normal life inherently shorter than the warranty periods specified in Paragraph B, or (iv) is not properly stored, installed, used, maintained or repaired, or, (v) has been subjected to any other kind of misuse or detrimental exposure, or has been involved in an accident.
- E. The preceding paragraphs set forth the exclusive remedies for claims based upon defects in or nonconformity of the Equipment, whether the claim is in contract, warranty, tort (including negligence), strict liability or otherwise, and however instituted. Upon the expiration of the warranty period, all such liability shall terminate. The foregoing warranties are exclusive and in lieu of all other warranties, whether oral, written, expressed, implied or statutory. NO IMPLIED OR STATUTORY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE SHALL APPLY. IN NO EVENT SHALL THE SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL, SPECIAL, INDIRECT OR EXEMPLARY DAMAGES.

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