



PC ConfigureTM Programming Manual

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Information in this manual covers PC Configure version 2.12.6 and higher. 5100/5300 Series ES radios with 6.8.x firmware or higher and earlier radios updated to 5.10 file format are supported.

PC Configure Programming Manual

April 2009



PC Configure™ Software Programming Manual

(Programming Software 2.12.x)

April 2009

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List of Fields

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Introduction

PC Configure™ Programming Software is used to configure EFJohnson's portable and mobile radios.



PC Configure 2.12.x supports 51xx/53xx/Ascend radios with software 4.14.x or later and with Series ES radios with software 6.8.x. Earlier model EFJohnson radios that have been updated to 5.10 file format are also supported.

1.1 Computer Requirements

The computer used to run PC Configure must meet the following minimum requirements:

- Microsoft Windows® XP or Vista
- Intel Pentium® processor or equivalent
- A hard disk drive with at least 20 MB of free space
- A CD-ROM drive
- An available USB or serial port

1.2 Programming Setup

To program the radios, you need:

- Windows®-based computer
- PC Configure
- The items listed in Sections 1.2.1 and 1.2.2.

1.2.1 51xx Portable

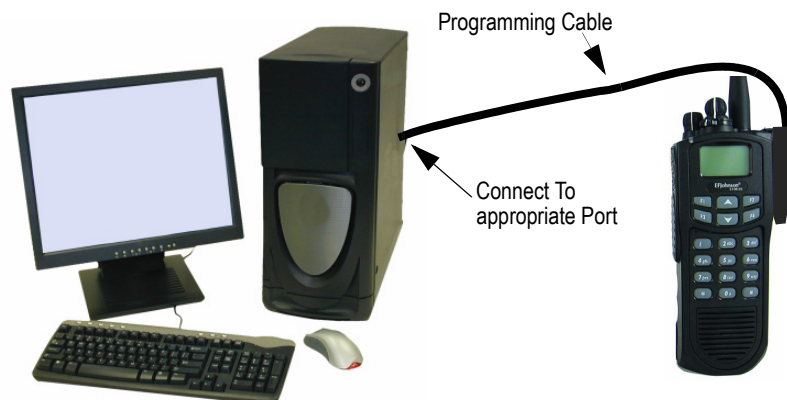
Programming cable from computer to radio (serial connection), Part No. 023-5100-920.
or

Radio programming cable, Part No. 023-5100-970. This cable has a USB connector for connection to a USB port on your workstation and can be used with PC Configure 2.8.2 or later.

Note *PC Configure Kit No. 250-5100-104 contains the USB programming cable and a CD with the PCC software and manual. PC Configure Kit No. 250-5100-004 contains the serial cable and a CD with the PCC software and manual.*

Figure 1.1 shows the connections you must make to program a portable radio.

Figure 1.1 Portable Radio Programming Connections



1.2.1.1 Connecting Portable Radios To Computer

51xx Series - No RPI is required because the radio contains the interface circuitry.

Figure 1.2 5100 Portable Programming Cables, Part No. 023-5100-920 and 023-5100-970



Note *Although they may look the same, the 5000 portable programming cable cannot be used to program a 5100 portable and vice versa.*

1.2.2 53xx Mobile

- Programming cable from RPI to radio, Part No. 023-5300-005.
or
Radio programming cable, Part No. 023-5300-980 (USB connector). A Remote Programming Interface box is not needed with this USB cable.
- Remote Programming Interface (RPI), Part No. 023-5300-001 can be used only in the 5300/53SL, and Ascend transceivers.

Note *The -005 cable, 5300-000 RPI, 023-9998-527 programming software, and the PDF file for this manual are included in 5300 Programming Kit, Part No. 250-5300-004. The 250-5300-104 kit includes the USB programming cable and a CD with the PCC software and manual.*

Figure 1.3 shows the connections you must make to program a mobile radio.

Figure 1.3 Mobile Radio Programming Serial Connections (RPI box connection)

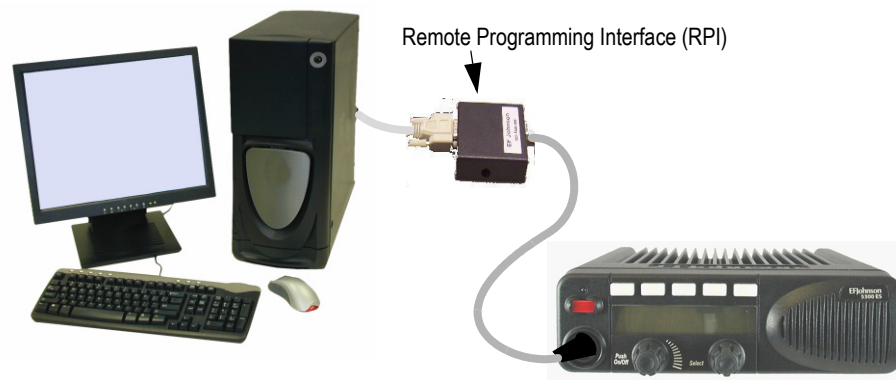
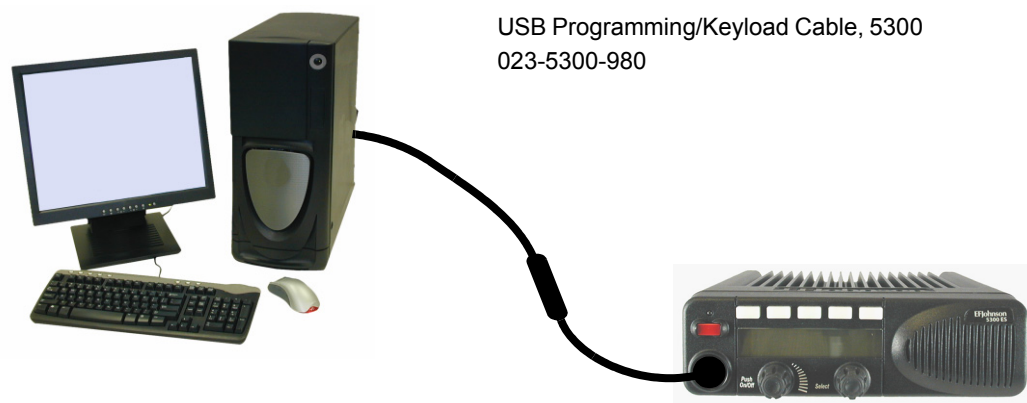
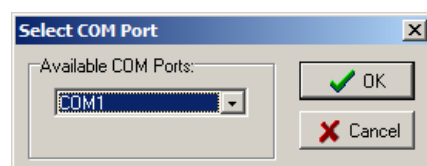


Figure 1.4 Mobile Radio Programming - USB connection



Customers upgrading software to this version (2.10.x) and using RPI Box part number 023-5300-000 should check the box for “Use RS485 Mode (for RPI Box 023-5300-000)” when selecting COM Port. Customers using RPI Box 023-5300-001 need to update their applications and ensure the checkbox is unchecked. Access the **Select COM Port** dialog by **Transfer → Comports**.

Figure 1.5 Select COM Port



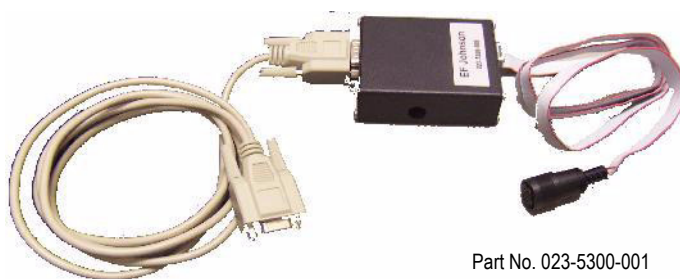
1.2.2.1 Connecting Mobile Radios To Computer (Serial Connection)

The Radio Programming Interface (RPI) provides the required logic interface between the computer and radio. The cable from the RPI to computer is not included with the RPI or in the programming kit. The serial RPIs have a female DB9 connector, and most computer serial ports have a male DB9 or DB25 connector. Therefore, a male DB9 to female DB9 or DB25 cable is usually required. This standard cable is available at most computer supply stores or EFJohnson offers a six-foot DB9M to DB9F cable, Part No. 597-5900-002.

Note *With 53xx radios, RPI, Part No. 023-5300-001, can be used. Other RPIs such as 023-9800-000 and 023-9750-000 are not compatible with this radio.*

If using an USB programming cable Part No. 023-5300-980, the RPI box is not needed. (That functionality is built into the cable itself.)

Figure 1.6 Radio Programming Interface (RPI) for 5300 Mobile Radios



Part No. 023-5300-001



Part No. 023-5300-980

The cable from the RPI to the radio is not included with the RPI, but it is included in the mobile PC Configure Programming Kit, Part No. 250-5000-004 (for PC Configure 1.x.x) or 250-5300-004 (for PC Configure 2.x.x), or can be ordered separately as previously described.

This cable plugs into the microphone jack of standard front or remote mount radios. With 53xx radios using the Handheld Control Unit (HHC), the connection point is the 10-pin programming jack on the HHC junction box through a special adapter plug (Part No. 023-5300-140).

Note *The RPI receives its power from the radio, not from the computer.*

1.3 Operating and Service Manuals

This manual includes brief descriptions of the various programmable parameters. For detailed radio operating information, refer to the applicable radio operating or service manuals.

1.4 Software Installation

Note *Before you remove an old version of PC Configure, be sure to copy the files in the Data and Keys folders to those folders of the new version. However, you do not have to uninstall older versions of PC Configure.*

- 1 Ensure there are no other applications open during this installation procedure. Also, ensure the computer meets the minimum requirements listed in [Section 1.1, “Computer Requirements”](#).
- 2 Insert the PC Configure CD-ROM in the CD drive of your computer. Double-click on the PC Configure Application File.

or

In the lower left corner of the screen, select **Start → Run**, then click the **Browse** button. Select the CD-ROM drive and the file *PCConfigure_x_x.exe* (*x_x* is the PC Configure version number). Click the **Open** button and then from the **Run** window, click **OK** and the installation process begins.

- 3 Follow the on-screen instructions. The default directory for the program is *\Program Files\EF Johnson\PCConfigure*. During installation, you can specify a different directory to install the program in if you wish to do so.
- 4 At the Sentinel Protection Installer, select **Next**. Please read and accept the license agreement. Click **Next** and the Set Up screen is displayed. Select **Complete** to finish your installation procedure.

1.4.1 Online Registration

EFJohnson offers greater convenience for our customers via our online warranty registration for our products and allows customers to receive field service notices more quickly.

Visit our public website www.EFJohnson.com. Follow the link that says “Register your EFJohnson products online” or go to <http://www.efjohnson.com/WarrantyRegistration.asp>. Then, follow the instructions to register your products.

Using PC Configure while connected to the internet, select **Tools → Register Radio** to access the Warranty Registration form.

1.5 Starting and Exiting

To start the PC Configure program from Windows, select **Start → Programs → EFJohnson → PCConfigure_2.10.xx**.

To exit the PC Configure program, select **File → Exit** or click the red **X** in the upper right corner of the screen.

1.6 Programming File Types

Programming data is stored in a disk file that can be saved, read, copied, and deleted. Refer to [Section 3.1, “File Menu”](#). This file automatically receives the extension *.rcf*.

1.7 Help Files

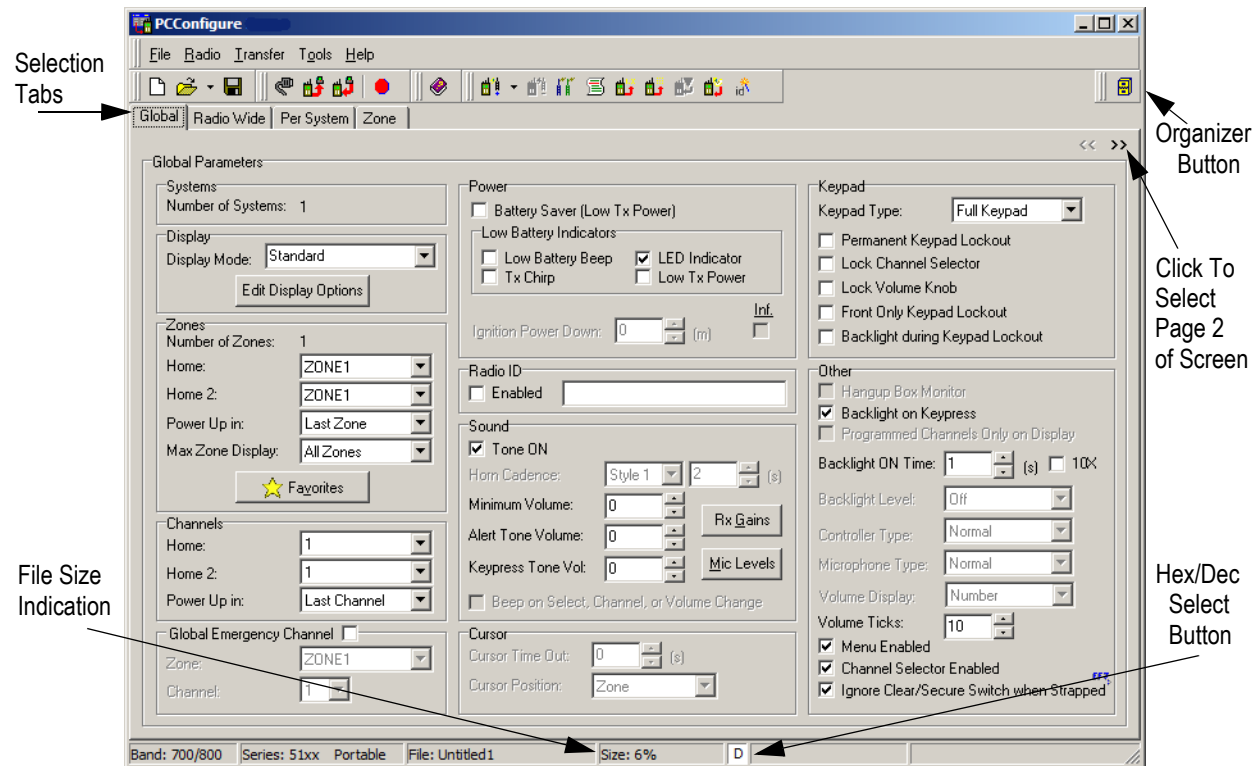
To display Help information on the current screen, click **Help** in the menu bar.

Note *For a list of changes made with the various releases of this software, refer to the ReleaseNotes.txt file in the PC Configure program files folder found on the Installation CD.*

1.8 Main Folders

From the tabs at the top of the main screen (see Figure 1.7), you can access four different folders: Global, Radio Wide, Per System, and Zone.

Figure 1.7 Main Screen (Global Screen shown)



The functions of these folders are as follows:

Global - This screen programs parameters that are the same for all Conventional, Project 25 Trunked, SMARTNET™, SmartZone®, and Multi-Net systems. Refer to [Section 4, “Global Screen”](#) for more information on parameters in this screen.

Radio Wide - This screen programs the parameters that are the same for all programmed Conventional (Project 25 and analog), Project 25 trunked, SMARTNET/SmartZone, and Multi-Net systems (a different screen is displayed for each). The screen’s system type is selected in the **System Specific** pane. Refer to [Section 5.1, “Radio Wide Screen”](#) (Conventional systems), [Section 6.1, “Radio Wide Screen”](#) (SMARTNET/SmartZone), [Section 7.1, “Radio Wide Screen”](#) (Project 25 trunked), or [Section 8.1, “Radio Wide Screen”](#) (Multi-Net) for more information on parameters in this screen.

Per System - This screen programs the parameters that are unique to each programmed system. Select the system you want to edit by clicking it in the **Systems** box. Refer to [Sections 5.2, 6.2, 7.2 or 8.2](#) for more information on parameters in this screen.

Zone - This screen programs the channels and zones. Unique channel parameters include system number and type, frequency, and talk group. Refer to [Section 5.3, “Setting Up Zones and Channels”](#), [Section 6.3, “Setting Up Zones and Channels”](#), [Section 7.3, “Setting Up Zones and Channels”](#) or [Section 8.3, “Setting Up Zones and Channels”](#) for more information on parameters in this screen.

1.9 Other Screen Information

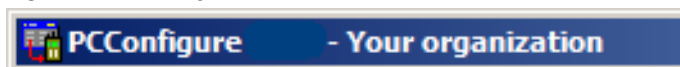
This section describes the items that appear on the PC Configure main screen:

- Programmable title and logo
- Organizer
- Band, radio and file name
- File size indication
- Decimal/Hexadecimal select


1.9.1 Programmable Title and Logo

You can enter text to customize the title that is displayed at the top of the screen. Refer to [Figure 1.8](#). Use the **Tools → Organization Identity** menu item to program the title. For example, use this to display a company name on the top line. In addition, you can customize the logo that is displayed on the right end of the menu bar. Refer to [Section 3.4, “Tools Menu”](#) for more information.

Figure 1.8 Programmable Title Bar



1.9.2 Organizer

Click the organizer button  on the right end of the toolbar to display the screen used to organize various programming files into groups and subgroups. The Organizer makes it easier to administer the programming files of a large organization. Refer to [Section 3.8, “Organizer”](#) for more information.

1.9.3 Bands, Radios and File Boxes

Know the frequency band of the radios for which you are programming. The following band frequencies are supported.

- VHF (136-174 MHz)
- UHF 380 (380-470 MHz)
- UHF Low (403-470 MHz)
- UHF High (450-512 MHz)
- 700/800 MHz (762-870 MHz)
- 800 MHz (806-870 MHz)
- 900 MHz (896-940)

When installing a radio select “5100 Portable” for either the 5100 Series or the ES Series Portable radios, and select “5300 Mobile” for either the 5300 Series or the ES Series Mobile radios.

1.9.4 File Size Indication

The maximum number of channels you can program may be limited by the available memory space in the radio. Figure 1.7 shows the **Size:** box in the status bar on the bottom of the screen that displays a running indication of the amount of memory used by the current data if it was downloaded to the radio. The **Size:** box displays this as a percentage. Please watch this percentage during the programming. When the percentage reaches 95%, you may have to delete some channels, scan lists or unused talkgroups if more information remains to be programmed. When this percentage reaches 100%, the available memory is full.

1.9.5 Decimal / Hexadecimal Select

On some screens, such as the SMARTNET Talk Group, you can enter numbers using either a decimal or hexadecimal format. The format effects all settings. This means that when you select a decimal/hexadecimal format, that format effects all applicable numbers on all screens (except System ID /WACN ID which are fixed as hexadecimal numbers). Decimal or hexadecimal format may be changed during programming.

Note *Decimal mode is preferred for Ascend radio programming. Hexadecimal mode entry is allowed for site list channels and group ID values.*

The currently selected format is indicated in the status bar on the bottom of the screen in the box next to the file size indication. Refer to Figure 1.7. A “D” indicates the decimal format is selected, and an “H” indicates the hexadecimal format is selected. The background color indicates the number type. The color is ivory for hexadecimal numbers, and white for decimal and other entries.



To toggle between the decimal and hexadecimal formats, right click the **H/D** box and click “Yes” in the confirmation box that appears. This mode can also be toggled using the **Tools → Preferences** screen described in [Section 3.4, “Tools Menu”](#). (Please note that you cannot change with a List window open.)

1.10 Creating Systems

A system as used with these radios is a collection of channels or talk groups typically assigned to use the same infrastructure (conventional repeaters or trunking site/sites). The **Per System** screen shows unique system parameters, including the scan list, various timers, and talk groups. You can create up to sixteen systems of any type.

Note *To view the current and added systems, select the **Per System** tab and all programmed systems appear in the **Systems** pane on the left side.*

To create a new Conventional, SMARTNET, SmartZone, Project 25 Trunked, or Multi-Net system, select **Radio → Add Systems** in the menu bar and then select the desired system type. Refer to [Section 3.2, “Radio Menu”](#).

Another way to create a system is to click  in the toolbar and select the desired system type from the drop-down list. To delete a system, select it in the **Systems** box and then select the **Radio → Delete System** in the menu bar or  in the toolbar.

1.11 Safeguards to Prevent Downloading Wrong Code Version

Note *The following applies only to downloading application code (firmware), not to downloading standard personality information.*

PC Configure software, Version 2.10.x includes safeguards to prevent downloading an incorrect firmware version. PC Configure 2.10.x supports 51xx/53xx radios with software 4.14.x or later, ES Series radios (software 6.8.x), and earlier radios that have been updated to 5.10 file format.

1.12 Features / Functions Added or Modified for 2.12.x

The following features have been added to PC Configure 2.12.x:

- Increased Conventional Analog DTMF Digits to 16
- Added Emergency Alarm Retries to Conventional Analog Signaling
- Added P25 Conventional Out of Range Indication (EFJ conventional infrastructure)
- Added P25 Conventional Talkgroup Scan (Priority Scan List)
- Added P25 Conventional Automatic Registration (EFJ conventional infrastructure)
- Added SMARTNET/Smart Zone Programmable Failsoft Connect Tone
- 5100x/ES Discover™ GPS Speaker Microphone Support added
- P25 Trunking and SmartZone - Added Site Lock Indicator
- 5100x/ES Side Port Settings added for portable accessories (including the GPS Speaker microphone)
- 5100x/ES Backlight Button enhanced
- 54 Channel/16 Zone Channel Configuration added
- 5300x/ES - Added Baud Rate Setting to External Serial Port
- Added support for different 5300 Mic Configurations
- P25 Trunking and Conventional (OTAR and Data Settings) Packet Data PPP Interface Improved
- 5100x/ES Function Recall added to button and menu assignments
- Display option: Received Key ID added
- P25 Trunking - Initialize System Info on PCC System changed
- P25 Trunking Individual Talkgroup Security Settings modified
- P25 Trunking OTAP (uploads and downloads, similar to Conventional OTAP)
- 5300x/ES Lock Channel Indicator added
- Disable Soft System Key Option added
- Conventional Call Guard Disable Feature can be programmed to a function button or added to menu.
- Increased the number of Keys on Enhanced System Key
- Support for Lightning Control Head

Programming Procedure

This section describes the general procedure you follow to program a radio.

- [Getting Started](#)
- [Creating Systems](#)
- [Entering Global Parameters](#)
- [Entering Radio Wide Parameters](#)
- [Setting Up Zones and Channels](#)
- [Entering Conventional System and Channel Parameters](#)
- [Entering SMARTNET / SmartZone System and Channel Parameters](#)
- [Entering Project 25 Trunked System and Channel Parameters](#)
- [Entering Multi-Net System and Channel Parameters](#)
- [54 Channel / 16 Zone Configuration](#)
- [Programming the Radio \(Writing the File\)](#)

2.1 Getting Started

Select a programming file as follows:

Create a New File

- 1 In PC Configure, please check the **Tools → Preferences** screen. If the “On New, Always” checkbox is checked, the parameters of the new file is determined by the selected default settings.

2 To start with a new file containing default parameters, select **File → New**.

3 When the dialog box appears, select the frequency band of the radio:


VHF (136-174 MHz)
UHF 380 (380-470 MHz)
UHF Low (403-470 MHz)
UHF High (450-512 MHz)
700/800 MHz (762-870 MHz)
800 MHz (806-870 MHz)
900 MHz (896-940)

Note *Multi-Net operation is available with 800 MHz, 700/800 Hz and 900 MHz models.*


Open An Existing File - To open an existing file stored on disk, select **File → Open** and the name of the file that you want to open. PC Configure has the ability to read both radio configuration (.rcf) and option (.opt) files.

Read a File From a Radio

1 To transfer a file from a radio to the computer for editing or use as a basis to program another radio, connect the radio to the computer as described in [Section 1.2](#), “Programming Setup”.

2 Turn the radio on and select **Transfer → Read Parameters From Radio** in the menu bar or select the  icon from the Transfer Options in the Toolbar. Refer to [Section 3.3](#), “Transfer Menu” for more information.

2.2 Creating Systems

When you create a new programming file, PC Configure automatically sets up a conventional system. With the **Radio Wide** or **Per System** folder open, select **Radio → Add System** or click the  icon in the toolbar to create the desired number and type of Conventional, SMARTNET, SmartZone, Project 25 Trunked and/or Multi-Net systems. Refer to [Section 1.10](#), “Creating Systems” for more information.

Note *Systems can be added regardless of which folder you are viewing. However, the **Radio Wide** or **Per System** folder must be selected to view the current systems. If you add more than one new system while in the **Radio Wide** folder, you will not see them listed in the Systems List until you open the **Per System** folder.*

2.3 Entering Global Parameters

- 1 Click the **Global** tab at the top of the screen to display the **Global** Parameter screen.
- 2 Program the applicable parameters in this screen. Parameters that do not apply to the selected radio series are grayed out. See [Section 4, “Global Screen”](#) for additional information on these parameters.

When a screen has a secondary page, use the double arrows, **<< >>**, on the right side of the screen to navigate between the initial screen and the second screen.

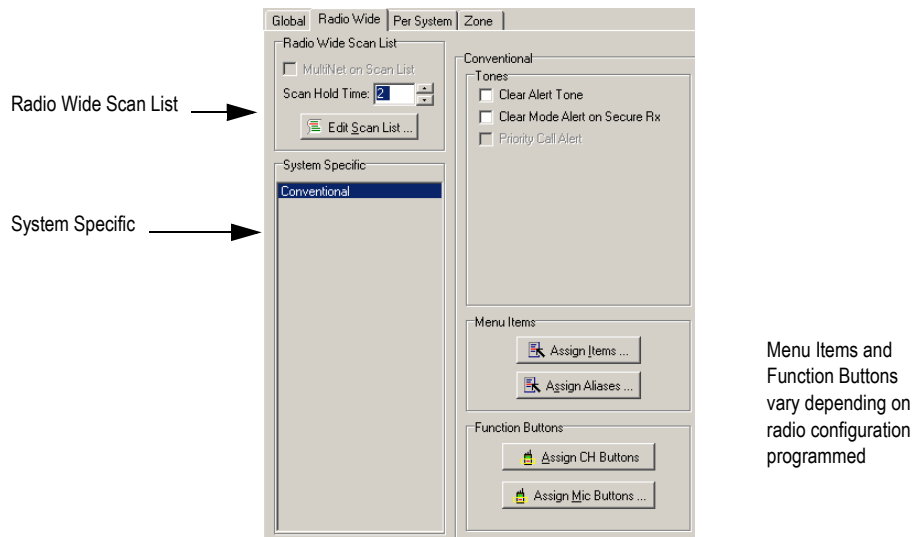
Note *The Global Parameters screen is applicable to all protocols. The **Radio Wide**, **Per System**, and **Zone/Channels** screens are system-specific screens. Please note that the terms “protocol” and “system” mean Conventional, SmartNet/SmartZone, P25 Trunking, and Multi-Net.*

2.4 Entering Radio Wide Parameters

- 1 Display the **Radio Wide** screen by clicking the **Radio Wide** tab at the top of the screen. The **Radio Wide** screen contains certain areas that appear regardless of which type of system you program. If the Menu feature is enabled on the **Global** page, the Menu Items button is displayed.

Figure 2.1 Radio Wide Screen Common Fields

Partial Radio Wide screen for Conventional mobile radio with Lightning controller shown






- 1 When you click any of the buttons, PC Configure opens a screen that enables you to program a corresponding set of parameters. Select the protocol (or system) that you wish to program in the left pane, labeled System Specific. The protocols listed in the System Specific screen are those systems that have been added (refer to [Section 1.10, “Creating Systems”](#)). A screen with parameters to be programmed for the specified system/protocol is displayed.
- 2 Program the applicable parameters for all Conventional, SMARTNET/SmartZone, Project 25 Trunked and/or Multi-Net systems as described in the section for each respective system.

2.4.1 Radio Wide Scan List Programming

Note *You cannot program the Radio Wide Scan List until the channels are set up as described in Section 2.5, “Setting Up Zones and Channels”. Please refer to Section 9, “Programming Scanning” for additional information.*

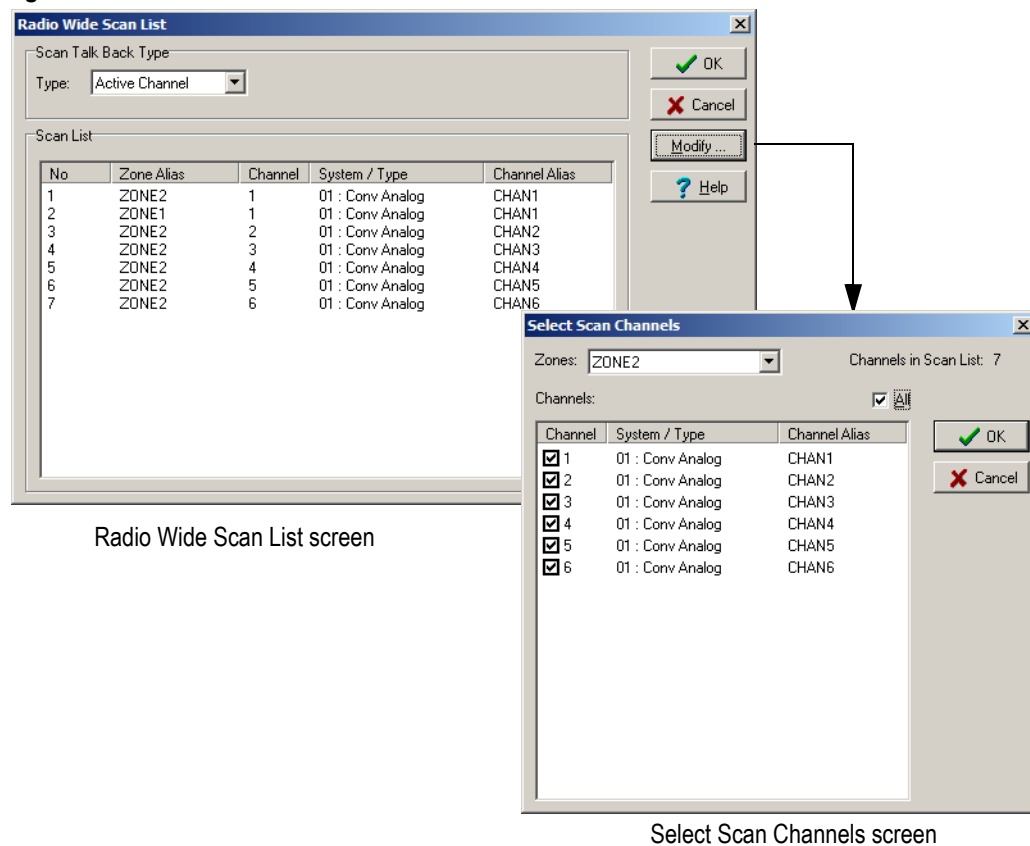
Scan Hold Time - When the radio performs Radio Wide scanning, this programs the delay that occurs after the radio stops receiving or transmitting messages and before Radio Wide Scan resumes. You can program times of 2 - 7.5 seconds.

Edit Scan List - You cannot program the radio wide scan list until you have set up all channels to be included in it in the Zone screens, as described in the *Setting Up Zones* section for each system. The **Radio Wide Scan List** is the same for all system types and can include up to sixteen channels from any system. You program this scan list by clicking the  Edit Scan List ... button on this screen or  in the toolbar. When you click either of these buttons, PC Configure displays the screens shown in Figure 2.2. To select the channels that are in the radio wide scan list, click the  Modify ... button to display the **Select Scan Channels** screen. Select the desired zones from the drop-down list and then check the channels that you want to include from each zone in the list.




Limiting the number of systems is recommended.

Figure 2.2 Radio Wide Scan List Screens

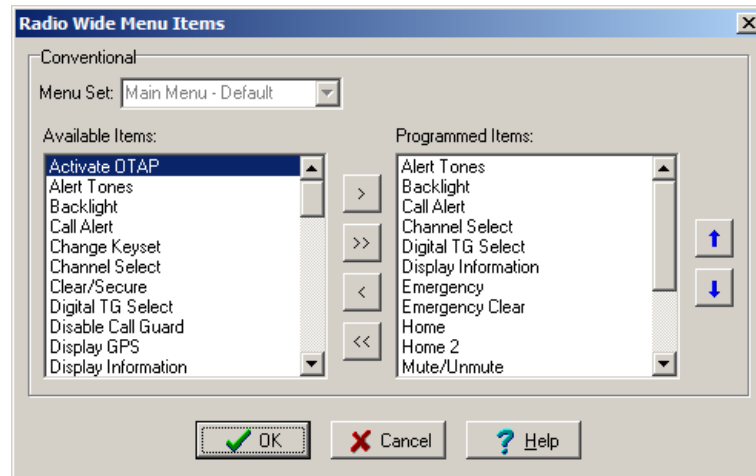


2.4.2 Menu Items Programming

You can assign menu items when you program 5100/5300 radios. To allow the radio user to use the menu mode, you must select the “Menu Enabled” box on the **Global** screen. Clicking the  **Assign Items ...** button on the Radio Wide screen displays the Radio Wide Menu Items shown in Figure 2.3. From this screen, choose the functions the radio user can select in the menu mode. To move any item from the **Available Items:** list to the **Programmed Items:** list--or *vice versa*--double-click the item or select it and click right single arrow buttons to add an item or click the left single arrow button to remove item. Clicking a double arrow button moves all items in one list to the other list.

Menu Items are presented to the user in the order listed in the Programmed Items window. To change the order of the listed menu items in the Programmed Items window, highlight the desired item and then move it up or down using the navigation arrows at the right of the display window.

Figure 2.3 Radio Wide Menu Items Screen






You can program a separate set of menu parameters for each system type using a process similar to the one described for function buttons in [Section 2.4.3, “Function Button Programming”](#). Select the system type that you want to program in the **Radio Wide** screen’s “System Specific” box. The radio user can control functions by both the menu and a function button. Table 2.1 shows the available menu functions.

Note *The parameters that are occasional changes or are definite changes (such as power level, scan edit, etc.) should be programmed as Menu Items. Buttons are daily changes or toggle changes (scan, backlight, etc.)*

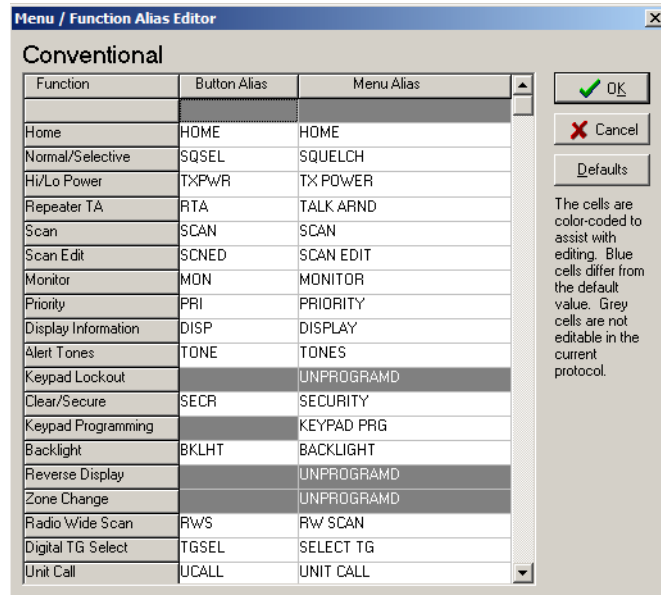
2.4.2.1 To Program Aliases

Note *This feature is applicable for the 5300 Lightning Control Head only. Please ensure that Controller Type (page 1 of the **Global** screen) is set to “Lightning”.*

- 1 Click the  **Assign Aliases...** button under Menu Items on the **Radio Wide** screen to display the Menu / Function Alias Editor screen. This enables you to set custom aliases for menu items and button names for the 5300 Lightning Control Head.
- 2 Assign the menu/button items on the Radio Wide Menu Items screen. Select the Menu to program. The main menu may have up to 100 items. Menus 1 - 5 may have up to 25 items. The arrows ( and ) may be used to select the menu. The arrows next to the Programmed Items frame may be used to move the highlighted item up or down in the list.

- 3 On the **Menu / Function Alias Editor** screen, the aliases in the “Button Alias” or “Menu Alias” columns apply to the items in the advanced menus. Soft key labels are also editable using the “Button Alias” column. Choose the function you wish to rename and in the cell for that function under Menu Alias, enter up to ten digits (upper and lower case) for the new identifier.



Figure 2.4 Menu/Function Alias Editor



- 4 Click **OK** to save your settings.

2.4.3 Function Button Programming

Function buttons are programmed per protocol and may have different functions depending on the protocol.

- 1 Select a protocol in the System Specific pane of the **Radio Wide** screen.
- 2 Click the  **Assign Buttons** (5100 portable radios) or  **Assign CH Buttons** (5300 mobile radios) icon in the lower left of the **Radio Wide** screen to display a screen similar to the one shown in Figure 2.5. Use this screen to program the function buttons for the radio series you chose in **Radio → Series**.

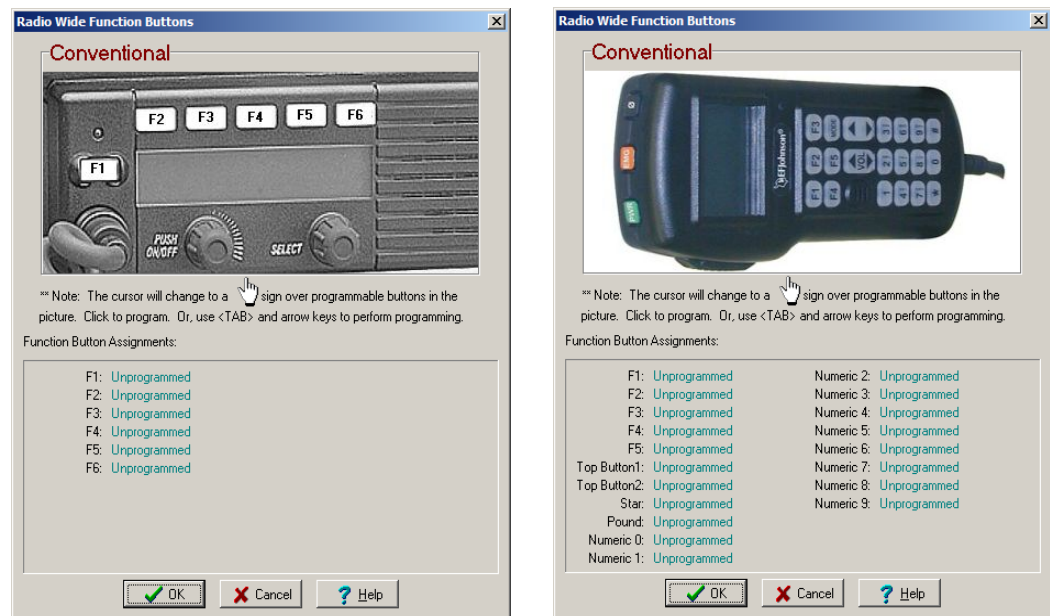
If programming a portable radio, the "Keypad Type" drop-down menu on the "5100 Global" page controls which radio model (Model I/II/III) is pictured and the function buttons which can be assigned. For example, the Model III radio is shown in Figure 2.5.

Figure 2.5 Radio Wide Function Buttons (for 5100 ES Model III Portable Conventional)



If you are configuring a mobile radio, the Controller Type on the "5300 Global" page determines which model (Standard, Hand held, or Lightning) mobile picture is displayed for function button selection.

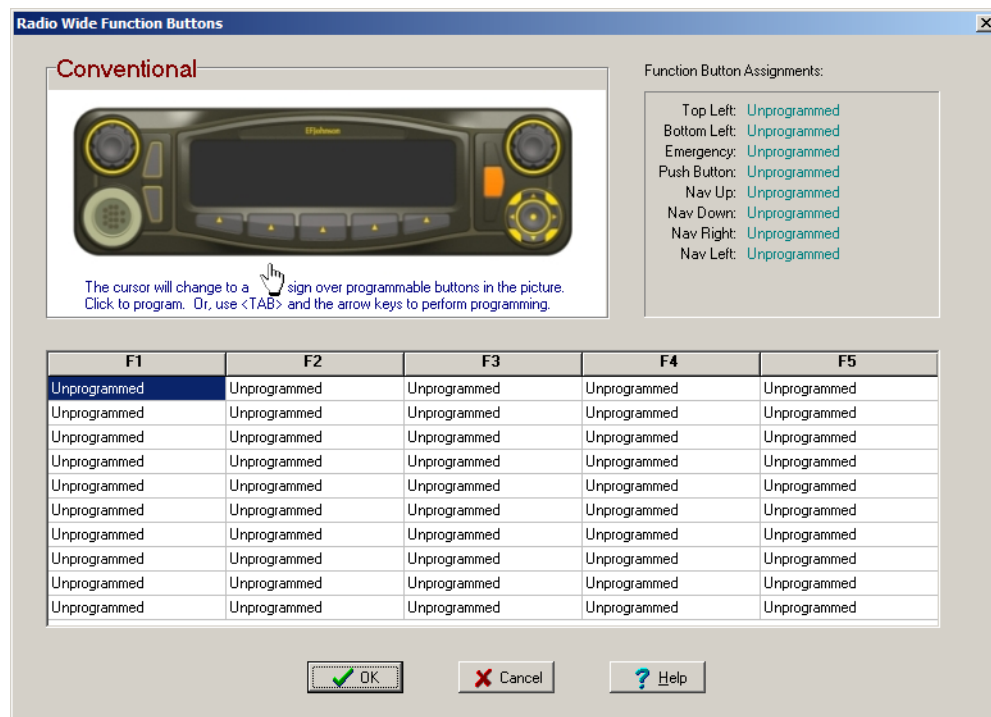
Figure 2.6 Radio Wide Function Buttons (for 5300 ES Mobile Conventional)



5300 ES Series (Normal Controller)

5300 and 5300 ES Series (Handheld Controller)

Figure 2.7 Radio Wide Function Buttons (for 5300 ES Mobile Lightning Control Head)



Available Menu and Options Buttons selections are listed in Table 2.1.

To view the functions programmed for each button in the various modes, select **Radio → View Programmed Radio Wide Functions**. Refer to [Section 3.2, “Radio Menu”](#).

Table 2.1 51xx/53xx Programmable Option Button and Menu Mode Functions

Function	X = Available in Mode:					Menu Display
	Conventional	Project 25 Trunking	SMARTNET	SmartZone	Multi-Net	
Activate OTAP	X					
Alert tones On-Off	X	X	X	X	X	Tones
Auto Site Search		X	X	X		
Backlight On-Off (51xx), Hi/Med/Off (53xx)	X	X	X	X	X	Backlight
Call Alert Select (Paging)	X	X	X	X		Call Alert
Call Response Select		X	X	X	X	Call Rsp
Cancel Dynamic Regroup		X	X	X		Cancel DR
Change Keypset (OTAR)	X	X	X	X	X	Chg Keypset
Channel Select	X	X	X	X	X	Chan Selct
Clear/Secure Encryption Select	X	X	X	X		Security
Clone Programming Select (51xx menu only)	X	X	X	X		Clone
Shaded features support the secondary press and hold function.on the portable radios						

Table 2.1 51xx/53xx Programmable Option Button and Menu Mode Functions (continued)

Function	X = Available in Mode:					Menu Display
	Conventional	Project 25 Trunking	SMARTNET	SmartZone	Multi-Net	
Contrast (51xx only)	X	X	X	X	X	Contrast
Data Modes		X				
Digital (Project 25) Talk Group Select	X					Select TG
Disable Call Guard	X	X	X	X	X	
Display GPS	X	X	X	X	X	-
Display Information Select (frequency or channel display)	X					Display
Emergency Mode Select	X	X	X	X	X	Emergency
Emergency Clear	X					
Erase Keys, OTAR (menu only with 51xx/53xx)	X	X	X	X	X	Erase Keys
External Public Address (53xx only)	X	X	X	X	X	
Favorite Channels	X	X	X	X	X	
Function Recall	X	X	X	X	X	
Group Scan					X	
High/Low Power Select	X	X	X	X	X	Tx Power
Home	X	X	X	X	X	Home Zone
Home 2	X	X	X	X	X	
Horn Honk Select (53xx only)	X	X	X	X	X	
Key Select, OTAR	X	X				Key Select
Keypad Lock Select (51xx only)	X	X	X	X	X	(Opt sw only)
Keypad Programming Select	X					Keypad Prg
Messaging Select	X		X	X	X	Message
Monitor Mode Select	X					Monitor
Mute/Unmute	X	X	X	X	X	
Normal/Selective Squelch Select	X					Squelch
P25 Packet Data	X	X				Data Modes
Phone Call Select	X	X	X	X	X	Phone
Priority Channel Select	X					Priority
Private Call Select		X	X	X		Priv Call
Radio Information	X	X	X	X	X	
Radio Wide Scan Select	X	X	X	X	X	RW Scan
Rekey Request	X					Rekey Request
Remote Access (Pyramid Repeater) (53xx only)	X	X	X	X	X	
Repeater Talk-Around Select	X					Talk Arnd
Shaded features support the secondary press and hold function on the portable radios						

Table 2.1 51xx/53xx Programmable Option Button and Menu Mode Functions (continued)

Function	X = Available in Mode:					Menu Display
	Conventional	Project 25 Trunking	SMARTNET	SmartZone	Multi-Net	
Request to Talk	X					
RWS List Edit	X	X	X	X	X	RWS Edit
Scan Mode Select	X	X	X	X	X	Scan
Scan List Edit Select	X	X	X	X	X	Scan Edit
Scan List Select	X (5100 only)	X	X	X	X	Scan Selct
Set User Password	X	X	X	X	X	Set Paswd
Single Tone Encoder (51xx only)	X					Tone Encdr
Site Lock Select		X		X	X	Site Lock
Site Search Select		X		X	X	Site Srch
Squelch (Code) Select List	X					Sqch Code
Status Select	X	X	X	X	X	Status
Surveillance Mode Select	X	X	X	X	X	Surv Mode
Text Messaging	X					
Tone Volume Edit - Alert	X	X	X	X	X	numbers that can be adjusted
Tone Volume Edit - Keypad	X	X	X	X	X	numbers that can be adjusted
Transmit Power	X	X	X	X	X	
Unit Call Select	X	X	?	?	X	Unit Call
Unprogrammed (Note The button is not used.)	X	X	X	X	X	
Volume Down (51xx only)	X	X	X	X	X	(Opt sw only)
Volume Up (51xx only)	X	X	X	X	X	(Opt sw only)
Zone Select	X	X	X	X	X	Zone Selct
Shaded features support the secondary press and hold function.on the portable radios						

The following table lists the current keycap set for standard 5300 mobile radios.


Table 2.2 Current Keycap Set for 5300 Mobiles

C/S	TG SEL	TX PWR	CALL	MON	RWS
PRI ED	ALERT	RESP	MSG	RTA	PHONE
STATUS	HOME	SCN ED	PROG	SEARCH	LOCK
F1	F2	OTAR	KY CHG	KY CLR	PUB AD
HORN	KY SEL	DATA	SN LST	SQ LST	SURVLC
TN VOL	CH SEL	PW CHG	RWS ED		

Program the function buttons as follows:

- 1 Click the option button (<F_x>, side buttons, ABC switch, etc.) that you want to program in the photo. A drop-down menu displays that shows the functions you can assign.

Tip You can program almost all the 51xx portable's buttons.

- 2 To select a function, double click it in the drop-down list. The functions assigned to each button appear in the bottom part of the screen.
- 3 Repeat Steps 1 and 2 for all function buttons that you want to program. Next, click **OK** to exit and save the changes or **Cancel** to exit without saving the changes.
- 4 You may want the function buttons to perform different functions when the radio operates in other modes. To accomplish this, do the following:
 - a Select one of the other modes in the **Radio Wide → System Specific** box.
 - b Click  **Assign Buttons** in the **Radio Wide** screen to display a screen similar to the one shown in Figure 2.5.
 - c Repeat Steps 1 through 3 for each mode that you want to assign unique function buttons to.

Note The process of assigning a button, i.e. selecting the button, then double-clicking the option to assign the option, guarantees no accidental programming of a button.

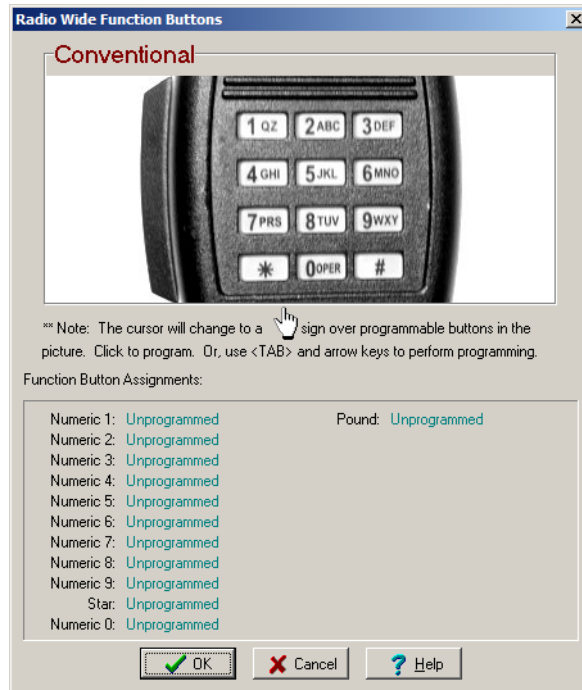
2.4.3.1 To Program Microphone Buttons

This function is applicable for the 5300 mobile radios equipped with external microphones. Select “Digital Keypad” in the **Microphone Type** field on the first page of the **Global** screen to enable this feature.

- 1 Function buttons are programmed for each protocol and may have different functions depending on the protocol. Select a protocol in the System Specific pane of the **Radio Wide** screen.

- 2 Click  **Assign Mic Buttons ...** under **Function Buttons** on the **Radio Wide** screen to program microphone buttons.

Figure 2.8 Radio Wide Microphone Function Buttons (for 5300 ES Conventional)



2.5 Setting Up Zones and Channels

- 1 Display the **Zone** screen by clicking the **Zone** tab at the top of the screen.
- 2 Set up Zones and Channels as described in the “Setting Up Zones and Channels” discussions in Sections 5.3, 6.3 and 7.3. If the 864 Option is enabled and radio memory allows, up to 54 zones can be programmed. Zones can include up to 16 channels of any type from any system.

2.6 Entering Conventional System and Channel Parameters

Note *If no conventional channels are programmed, proceed to [Section 2.7, “Entering SMARTNET / SmartZone System and Channel Parameters”](#).*

- 1 Display the system programming screen by clicking the **Per System** tab at the top of the screen.

- 2 Select the protocol in the left pane and program the applicable parameters for each Conventional system as described in [Section 5.2.1, “Conventional System Parameters”](#).

Note *You may have to define the channels further as described in the next steps before programming the standard scan lists.*

- 3 Display the **Zone** screen by clicking the **Zone** tab at the top of the screen. Program the individual channel information of each Conventional channel in each zone as described in [Section 5.3.3, “Programming Conventional Channel Parameters”](#).
- 4 After you have programmed all channel information, program the priority scan lists in each system (preceding Step 2), if necessary program the Radio Wide scan list in the **Radio Wide** screen. Refer to [Section 2.4, “Entering Radio Wide Parameters”](#).

2.7 Entering SMARTNET / SmartZone System and Channel Parameters

Note *If no SMARTNET or SmartZone channels are programmed, proceed to [Section 2.8, “Entering Project 25 Trunked System and Channel Parameters”](#).*

- 1 Display the system programming screen by clicking the **Per System** tab at the top of the screen. Make sure the correct System Key is selected as described in [Section 13, “System Keys”](#).
- 2 Select the system in the left pane and program the applicable parameters for each SMARTNET and SmartZone system as described in [Section 6.2.1, “System Parameters: Primary Screen”](#).

Note *You may have to define the channels further as described in the next steps before programming the various system lists.*

- 3 Display the **Zone** screen by clicking the **Zone** tab at the top of the screen. Program the individual channel information of each SMARTNET and SmartZone channel in each zone as described in [Section 6.3.3, “SMARTNET / SmartZone Channel Parameters”](#).
- 4 After you have programmed all channel information, program the priority scan lists in each system (preceding Step 2), if necessary program the Radio Wide scan list in the **Radio Wide** screen. Refer to [Section 2.4, “Entering Radio Wide Parameters”](#).

2.8 Entering Project 25 Trunked System and Channel Parameters

Note *If no Project 25 Trunked channels are programmed, proceed to [Section 2.11](#), “Programming the Radio (Writing the File)”.*

- 1 Display the system programming screen by clicking the **Per System** tab at the top of the screen. Make sure the correct system key is selected as described in [Section 13](#), “System Keys”.
- 2 Select the system in the left pane and program the applicable parameters for each Project 25 Trunked system as described in [Section 7.2.1](#), “Project 25 Trunked System Parameters: Primary Screen”.

Note *You may have to define the channels further as described in the next steps before programming the priority scan lists.*

- 3 Display the **Zone** screen by clicking the **Zone** tab at the top of the screen. Program the individual channel information of each Project 25 Trunked channel in each zone as described in [Section 7.3.3](#), “Project 25 Trunked Channel Parameters”.
- 4 After you have programmed all channel information, program the priority scan lists in each system (preceding Step 2), if necessary program the Radio Wide scan list in the **Radio Wide** screen. Refer to [Section 2.4](#), “Entering Radio Wide Parameters”.

2.9 Entering Multi-Net System and Channel Parameters

- 1 Display the system programming screen by clicking the **Per System** tab at the top of the screen.
- 2 Select the system in the left pane and program the applicable parameters and site lists for each Multi-Net system as described in [Section 8.2.1](#), “Multi-Net System Parameters”.

Note *It may be necessary to further define the channels as described in the next steps before programming the group scan lists.*

- 3 Display the **Zone** screen by clicking the **Zone** tab at the top of the screen. Program the individual channel information of each Multi-Net channel in each zone as described in [Section 8.3.3](#), “Multi-Net Channel Parameters”.

- 4 If necessary, program the group scan lists and Wide Area Talk Group lists in each system (see preceding step 2). After all channel information is programmed, program the Radio Wide scan list in the **Radio Wide** screen (see [Section 2.4, “Entering Radio Wide Parameters”](#)).

2.10 54 Channel / 16 Zone Configuration

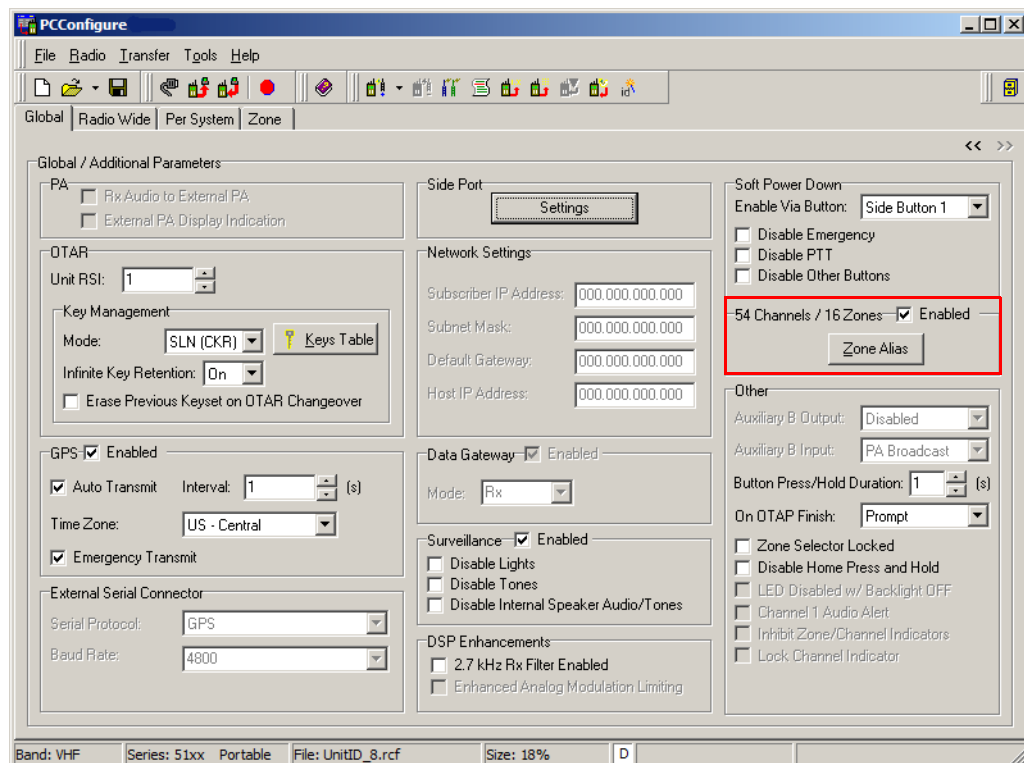
Note *The 54 Channel/16 Zone Feature must also be enabled in radio options (To determine the options enabled, use the **Transfer > Read Options from Radio** function.) Please ensure that the 864 Talkgroups/Channels and the 54 Channel/16 Zone options are checked.*

If the option is enabled, PC Configure can be programmed to use the 54 Channel/16 Zone configuration feature. This is setup on two screens:

- the [Global Additional Parameters](#) screen
- the **Zone** screen for your system

On the second page of the **Global** screen, check the **Enabled** box for **54 Channels / 16 Zones** and click the [Zone Alias](#) button to edit zone aliases.

Figure 2.9 Global Additional parameters screen



The **54 Channels / 16 Zones - Titles** screen is displayed. If the 54 channels/16 zones feature is enabled, these zone aliases will be used by the radio instead of what is programmed on the zone page.

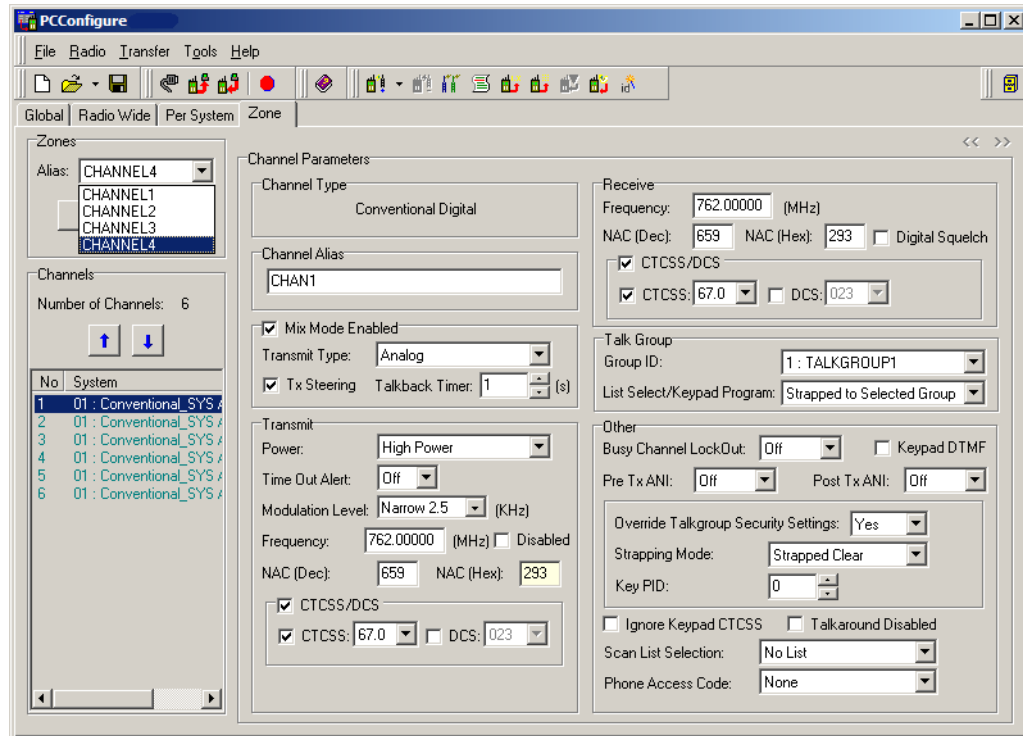
Figure 2.10 54 Channels / 16 Zones - Titles

Zone	Title
Zone 1	CONV
Zone 2	DIGITAL
Zone 3	SMARTNET
Zone 4	SMARTZONE
Zone 5	P25
Zone 6	
Zone 7	
Zone 8	
Zone 9	
Zone 10	
Zone 11	
Zone 12	
Zone 13	
Zone 14	
Zone 15	
Zone 16	

Enter up to ten digits for an identifier or alias for each zone. If the 54 channels/16 zones feature is enabled, these zone aliases are used by the radio instead of what is programmed on the zone page. If no alias is programmed in the table, the radio will display “Zone x” [portable radios] or “ZONE x” [mobile radios]. For example, if the user selects zone 6 on a subscriber programmed with the zone aliases set as on the 54 Channels / 16 Zones - Titles screen, portable radios will display “Zone 6” and mobile radios will display “ZONE 6.”

On the **Zone** page, the zones should be named as “CHANNEL 1” through “CHANNEL x,” where x is the last channel number programmed for the codeplug. To minimize changes to use other Channel/Zone configuration, anywhere PC Configure says “zone,” replace this with “channel.” Likewise, replace the term “channel” with “zone.”

Figure 2.11 Zone screen for 54 channel/16 zone configuration

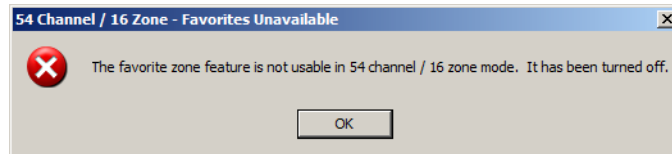


For example, when using the global emergency feature, the programmed zone will actually become the channel and the programmed channel will actually become the zone of the global emergency channel. The only exception to this rule is the zone select and channel select function buttons/menu items. The zone select function will still switch zones, and the channel select function will still switch channels. For zone select, the user may enter 1 through 16 as valid zones; all others will be denied as invalid. For channel select, the only difference to the user will be the matrix used to enter channels. For example, zone 2, channel 1 using the old 54 zone/16 channel configuration was denoted as channel 17 in the matrix. Using the 16 zone/54 channel configuration, zone 2, channel 1 will be denoted as channel 2 in the matrix.

Note *The favorite zone feature cannot be enabled when using the 54 channel/16 zone feature. If the user selects the 54 channel/16 zone feature enable checkbox in PCConfigure after enabling the favorites zone feature, a popup warning is displayed, and the favorites button will be grayed out until the 54 channel/16 zone feature enable checkbox is unchecked.*

However, any information stored in the favorite zone table will be retained in the event of the user accidentally selecting the 54 channel/16 zone feature.

Figure 2.12 Warning (Favorites unavailable when using 54 channel/16 zone configuration)



When the 54 channel/16 zone feature is enabled in a portable codeplug, the zone and channel controls will be swapped on the radio. The channel select knob will select the zones, and the up/down buttons will select the channels. Because of this, the zone lock function (if programmed) will function as a channel lock function.


On mobile radios, the channels will be displayed by the left most number indicator and the zones will be displayed by the right most number indicator.

2.11 Programming the Radio (Writing the File)

After you enter all the required programming information in the various programming screens, you can write the information to the radio: This step is also called “downloading”. When writing a file, ensure that you have done the following:

- Secured all connections between the computer and radio
- Turned the radio on
- Selected the proper serial port (Refer to [Section 3.3, “Transfer Menu”](#).)

Then proceed as follows:

- 1 Select **Transfer → Write Parameters To Radio** from the menu bar or select the  icon from the Transfer Options in the Toolbar.
- 2 If no file is currently loaded, a dialog box appears to select the desired file. Otherwise, the current file is transferred to the radio.

2.11.1 Over the Air Programming

OTAP is an “Over the Air” programming feature for the subscriber parameter (code plug) files. Using the OTAP feature, parameter files can be updated and changed in the field, eliminating the need to take the radio out of service to perform updates. The OTAP option should be active. To verify that this option has been activated, please select **Transfer → Read Options from Radio** from the menu bar. An EFJohnson Data Router must also be installed. Please refer to the Key Management Facility Technical Manual for instruction for the router installation.

Note *Conventional Over the Air Programming (OTAP) requires firmware version 4.12.x (x-platform) or 6.6.x (ES) or later. P25 OTAP requires version 6.10 for both x-platform and ES radios.*

2.11.1.1 Setting Up the Radio

- 1 The current profile in the radio controls how an OTAP download is handled. On the second **Global** screen, in the **Other** group box, the **On OTAP Finish** field provides a drop-down box with the possible actions the radio should take: “Prompt”, “Activate”, and “Off-line”.
 - Prompt - the radio displays the message “Activate?” after a successful OTAP download, prompting the radio user to respond. On portable subscriber units, the user should press the <F2> button to indicate an affirmative answer or the <F1> button to indicate a negative answer. On mobile subscriber units, the user should press the Select button to indicate an affirmative answer or the <F6> button to indicate a negative answer. The radio user has 30 seconds to answer. An affirmative answer stores the parameters in the EEPROM and resets the radio; a negative answer or no answer results in the parameters remaining in the Flash memory for activation at a later time, but also resets the radio.
 - Activate - the new parameters are automatically written to the EEPROM upon a successful download. The user sees a display of “Activating” followed by a reset of the radio.
 - Off-line - the parameters are stored in Flash memory until activated with PC Configure or by the radio user. The PC Configure activation method is described in Section 2.11.1.2. The activation method for the radio requires having either a menu item or a button assigned to the “Activate OTAP” function. If the radio has undergone a successful download, by selecting the menu item or pressing the button, the radio displays the message “Activating” followed by a reset of the radio.

Note *The radio will reset after a successful download in this mode, but the previous radio profile will remain in use until the radio user or PC Configure operator activates the OTAP parameter.*

- 2 Using the Radio Wide tab, program either a button or menu item.

- 3 The download completion action of any buttons/menu items must be programmed prior to beginning an OTAP session if an action other than the “Activate” mode is desired. The radio must also be registered with the data router for OTAP to take place. The recommended data settings should be programmed with PC Configure as shown in Figure 2.13.

Figure 2.13 Recommended Data Settings

OTAR and Data Settings

OTAR

OTAR Enabled: (s)

Rekey Request Time Out: (s)

Rx Security Level:

Tx Security Level:

Reverse Warm-Start Enabled:

Registration Inactivity Timer: (hr)

Originating Response Kind:

Registration Number of Attempts:

Registration Time between Attempts: (s)

Deregistration Enabled:

KMF IP Address:

KMF UDP Port:

Subscriber OTAR UDP Port:

Packet Data

☐ SNMP Traps

☐ ICMP Echo

CAI IP Address:

Connection Type:

ARP Cache Depth: (entries)

ARP Cache Expiration: (hr)

Data / SNNDCP

Data Registration Enabled:

Data Registration Type:

CAI Data Max Tx Attempts:

Response Timer: (ms)

SNNDCP Activation Wait Timer: (s)

SNNDCP Dwell Timer: (s)

☐ Rx/Voice Interrupts Data

Subscriber IP Address:

Mobile Computer IP Address:

Tx Limited Patience

Tx Limited Patience: (s) ☒

Min Response Timer: (ms)

Frame Sync Seek Period: (ms)

Tx Short Random Range: (ms)

Tx Long Random Range: (ms)

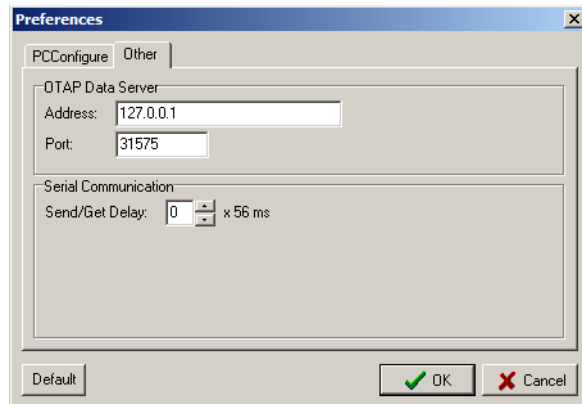
Tx Response Random Range: (ms)

2.11.1.2 Setting Up PC Configure

- 1 Open PC Configure once the Data Router is active. Verify that the OTAP Data Server settings are correct by clicking the **Tools → Preferences** menu item and then selecting

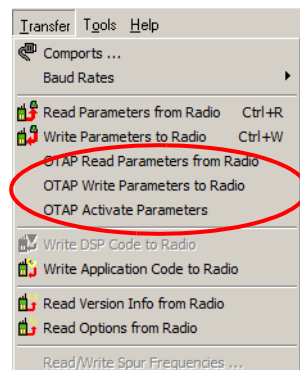
the **Other** tab. Refer to Figure 2.14. These settings may be obtained from your system administrator.

Figure 2.14 Preferences Dialog



- 2 An OTAP procedure can now begin. To upload the parameters of a specific radio, select **Transfer → OTAP Read Parameters from Radio**. See Figure 2.15 for a screenshot of the new menu items.

Figure 2.15 OTAP menu items



- 3 A dialog box asking for the unit ID of the target radio is displayed. This dialog box is shown in Figure 2.16.

Figure 2.16 OTAP Target Unit ID Dialog



Enter the ID, and click **OK**. To perform an OTAP download, complete the PC Configure file as if it were to be downloaded via a serial connection.

- 4 When ready to download, select **Transfer → OTAP Write Parameters to Radio**. The OTAP Target Unit ID dialog box shown in Figure 2.16 is displayed. Enter the ID, and click **OK**.

The appearance of PC Configure during an OTAP upload/download is the same as its look during a wired upload/download. If the progress bar in the lower right corner increments and no error message is displayed, the OTAP procedure was successful.

After a successful download, if the radio is programmed to store the parameters but not activate them (i.e. Off-line), the PC Configure operator may activate the parameters any time the radio is registered on the data server. By selecting **Transfer → OTAP Activate Parameters** from the menu, the dialog shown in Figure 2.16 is displayed. After clicking **OK**, PC Configure will send a command over the air to the target radio telling it to activate its OTAP parameters. The radio sends an acknowledgement if it receives the request and PC Configure displays a dialog box indicating the activation was successful. If PC Configure does not receive the acknowledgement after one minute, a different dialog is displayed indicating the activation request failed.

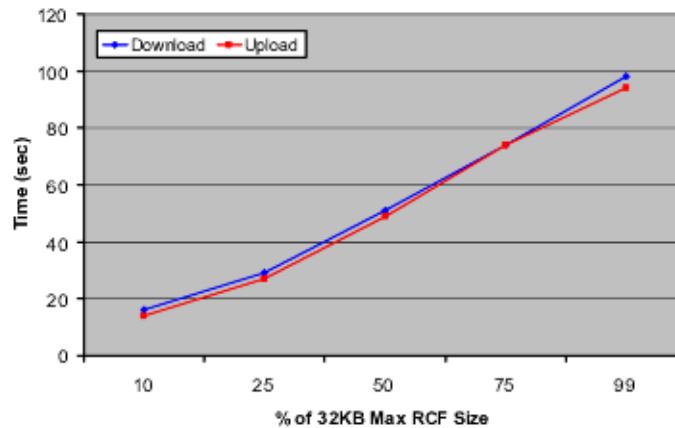
2.11.1.3 OTAP Procedures

After clicking OK in the OTAP Target Unit ID dialog box shown in Figure 2.16, the OTAP procedure will begin if the radio has undergone a successful data registration procedure. The exchange of the radio's configuration file does not begin immediately. PC Configure reads the following information from the radio (in no particular order):

- bootloader software version
- firmware version
- DSP software version
- file format version
- hardware revision
- SEM version
- CPLD version (mobile ES radios only)

After this information exchange, the transfer of the parameters block begins. The time the procedure takes versus the size of the file is show in Figure 2.17. The times were recorded under good signal strength with minimal data traffic. Actual times may be longer or shorter depending on conditions.

Figure 2.17 OTAP Transfer Times



Larger files tie up the radio for a long time. Therefore, any user interface event, such as a channel change, zone change, button press or toggle switch position change (portable radios only) stops the OTAP procedure and returns the radio to normal operating mode. For button presses/toggle switch position changes, the radio exits OTAP mode only if a function is programmed for the button/toggle switch; otherwise, the bad tone sounds.

Low signal conditions may also cause the radio to exit OTAP. If the radio does not receive a response from PC Configure one minute after receiving its last data packet, the radio stops the OTAP procedure and returns to normal operating mode.

PC Configure also notifies the user if the OTAP procedure was unsuccessful. A dialog box will display if PC Configure cannot communicate with the radio.

Menus and Tools

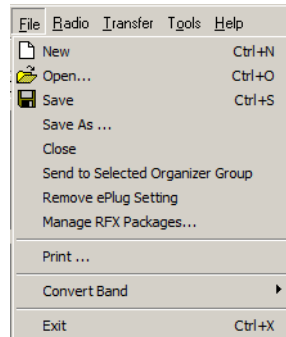
This section describes the controls you find in the following PC Configure navigation tools:

- [File Menu](#)
- [Radio Menu](#)
- [Transfer Menu](#)
- [Tools Menu](#)
- [Help Menu](#)
- [Toolbar](#)
- [Status Bar](#)
- [Organizer](#)

3.1 File Menu

Figure 3.1 shows the **File** menu.

Figure 3.1 File Menu



New - Creates a new programming file named *untitled.rcf* containing default parameters. Also displays a dialog box for selecting the frequency range unless the Always box is checked on the **Tools** → **Preference** screen.

Open - Opens a programming/options file that was previously saved to disk. If a modified file is open, PC Configure asks you if you want to save that file before the new file is opened.

Save - Saves the current file to disk using the current file name. If it is the first time a new file is being saved, the following **Save As** screen displays to specify the file name and destination.

Note *You cannot save any type of new programming file to disk without a radio connected because an ESN is required to save this file. Refer to [Section 15.1, “Saving a New File/ePlug Functionality”](#) for more information.*

Save As - Saves the current file to disk and displays a screen for selecting a file name and destination if desired. The option of entering a name or browsing to a new directory before it is saved is offered. The default file name is the Project 25 Unit ID in the format *UnitID_xx*.

Close - Closes the current file without exiting the program so you can open or create another file. If you modified the current file but did not save your changes, PC Configure asks you if you want to save your changes before closing.

Send to Selected Organizer Group - Adds the current file to the group that you select in the organizer. Refer to [Section 3.8, “Organizer”](#) for more information.

Remove ePlug Setting - This function allows the user to remove prior ePlug settings from active or archived trunking files. The user must have access to the system key to make these changes.

Manage RFX Packages - Allows the user to gather code plugs and option files from multiple radios and store them in a virtual container as well as transport the plugs and files between the non-programming users and a central programming/technical authority.

Print - Prints the information in the current file. A screen displays to select if **Global**, **Radio Wide**, **Per System**, or **Zone** information is printed.

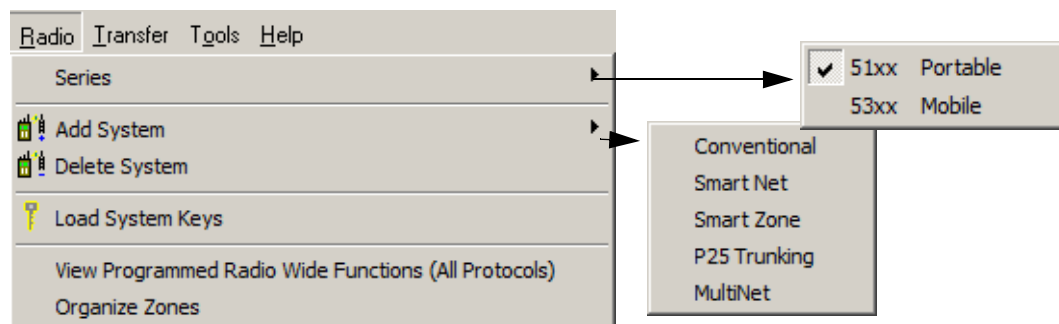
Convert Band - If the current file type is UHF 380 (selected when you create it by **File → New**), you can use this to change it to UHF LO type and *vice versa*. Also, you can use this command to convert an 800 MHz file to 700/800 MHz and *vice versa*. If some frequencies are out of the new band, the conversion will not be completed. A text box opens and displays the out-of-range channels in a zone/channel list.

Exit - Closes the PC Configure program. If you modified the current file but did not save your changes, PC Configure asks you if you want to save your changes before closing.

3.2 Radio Menu

Figure 3.2 shows the **Radio** menu.

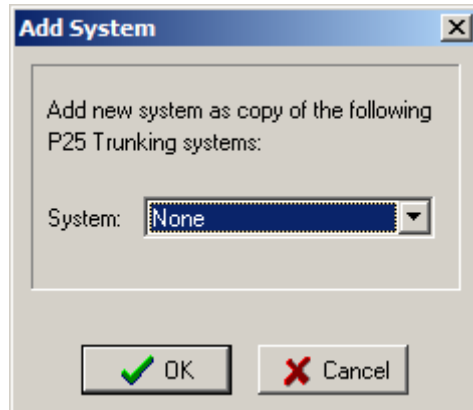
Figure 3.2 Radio Menu



Series - Selects the specific type of radio to program. You can then select only parameters that apply to that radio. Other parameters are grayed-out.

Add System - Adds a new Conventional, SMARTNET, SmartZone, or Project 25 Trunking system as described in [Section 1.10, “Creating Systems”](#). Multi-Net is available with Ascend Mobile and Portable models. Select the system you wish to add. A pop-up menu is displayed allowing you to select a system on which to model the new or to copy.

Figure 3.3 Add System Screen

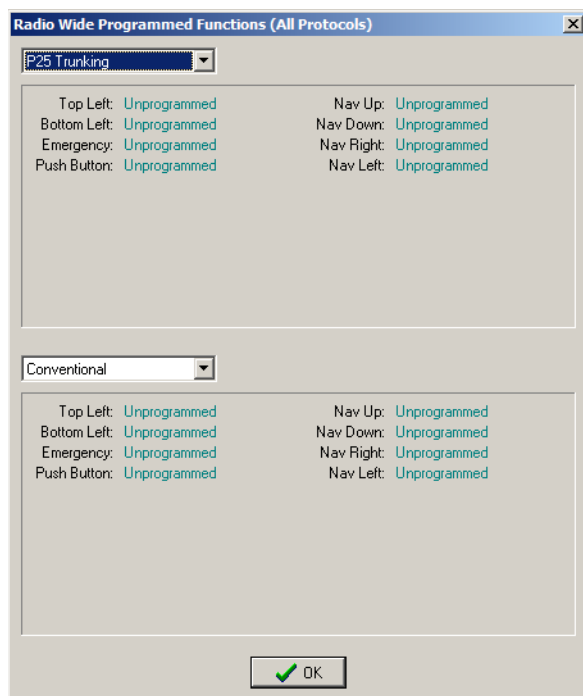


Delete System - When you set-up two or more systems, this function deletes the system selected in the **Per System** screen.

Load System Keys - Allows the system keys to be loaded from a folder other than the default *Keys* folder, a jump drive, CD or other media on which the key is stored. A dialog box displays to let you select the desired folder. Refer to [Section 13, “System Keys”](#) and “Preferences” in [Section 3.4, “Tools Menu”](#) for more information. After you have loaded the key from the Keys folder, proceed to the **Per System** tab and select the desired system. In the IDs System drop-down box, select the *.key* file. (Please refer to the **Per System** Initial screen in Sections 6 and 7.)

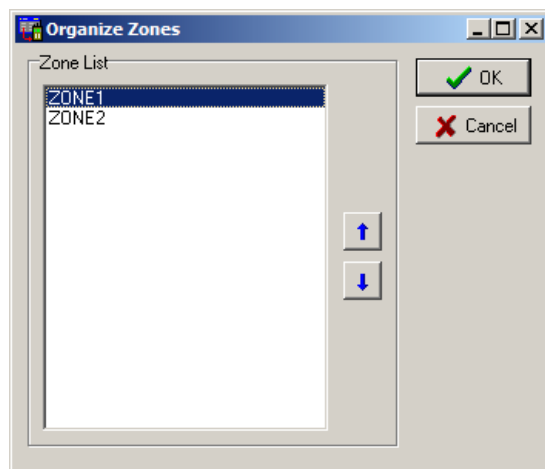
View Programmed Radio Wide Functions (All Protocols) - Displays the screen shown below that indicates the functions you assigned to the programmable option buttons on the **Radio Wide** screen. Refer to [Section 2.4.3, “Function Button Programming”](#). You can program these buttons for a different function in each protocol (conventional, SMARTNET, SmartZone, Project 25 Trunked, Multi-Net). The screen displays a maximum of two modes selected by the drop-down lists.

Figure 3.4 Radio Wide Programmed Functions Screen



Organize Zones - The position of the zones in the list can be changed by highlighting the zone and clicking the up/down arrows beside the list.

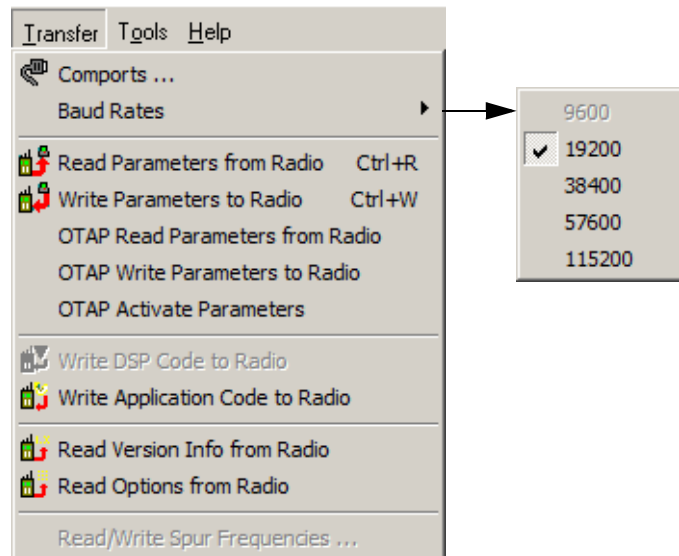
Figure 3.5 Organize Zones screen




3.3 Transfer Menu

Figure 3.6 shows the **Transfer** menu.

Figure 3.6 Transfer Menu



Note To stop a data transfer in progress, click  in the toolbar. Refer to [Section 3.6, “Toolbar”](#).

Comports... - Displays a dialog box in which you can select the communication port used to program the radio. Refer to [Section 1.2, “Programming Setup”](#). The default is COM1. PC Configure saves the last selected port, then automatically selects it again whenever someone starts the program. At startup, PC Configure looks at the available communication ports and highlights the available ports from which you may select your comport. Refer to “Preferences” in [Section 3.4, “Tools Menu”](#) for more information.

Baud Rates - Select the following baud rates for the specific download procedure desired.

RCF download and upload = 19200

Application download = 115200

Note *PC Configure 2.10.x does not support radios using 9600 baud. 9600 Baud rate should never be used with newer radios.*

Read Parameters from Radio - Transfers the information programmed in the radio connected to the computer into a new programming file. If you have not saved the current file when you select this function, PC Configure displays a dialog box that asks whether you want to save it. You can view, edit, or save the transferred data to a disk file. You may have to enter an upload password. Refer to [Section 10, “Password Description”](#) for more information.

Write Parameters to Radio - Programs the radio connected to the computer with the data in the current programming file. You may have to enter a password. Refer to [Section 10, “Password Description”](#) for more information.

OTAP Read Parameters from Radio - Prompts the target radio to upload its current .rcf file to PC Configure via OTAP.

OTAP Write Parameters to Radio - Downloads the currently-open .rcf file to the target radio via OTAP.

OTAP Activate Parameters - If the radio is programmed to store, but not to activate parameters, select this option to activate the parameters after the radio is registered on the data server.

Write Application Code to Radio - Used to program application code upgrades to 5100/5300 radios.

Proceed as follows:

- 1 Obtain from EFJohnson a special computer file containing the new application code. The application code has a .hex extension. Copy the 5100 specific .hex file to the PPC/5100 subfolder under the main PC Configure folder. Copy the 53xx specific .hex file to the PPC/5300 subfolder under the main PC Configure folder. These are default locations for storing application upgrade files.

- 2 Put the radio in the firmware programming mode as follows.

53xx/Ascend - Turn power on with the special Flash Mode Select Plug, Part No. 023-5300-010, plugged into the microphone jack. Another way to do this is to short Pin 3 to Pin 7. With the HHC, plug it into the programming adapter plug (023-5300-140) that is plugged into the junction box programming connector. The 5300 radio will display Control Head version number when programming mode has been entered (for example: “3.17.x”).

51xx/Ascend - Turn power on with the “3rd” side button depressed. The radio will display “Bootload Waiting for serial bus command” when programming mode has been entered.

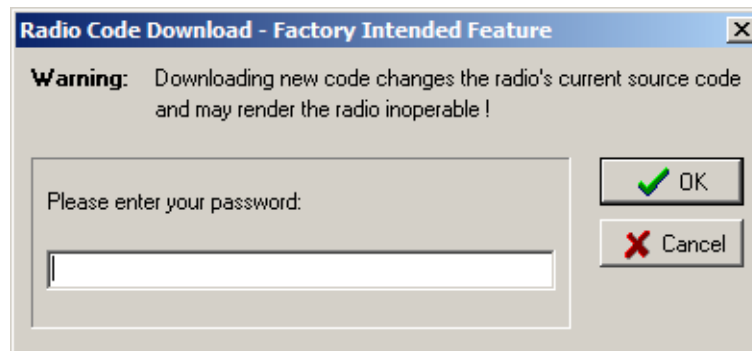
- 3 Ensure that the baud rate for the “flash” or “application” download is set to 115200.
- 4 Ensure the radio is connected to the computer, then select this function. Enter the password (obtained from EFJohnson) in the screen that displays and click the **OK** button.

Note *An error box will alert you if a radio contains a Flash Code that is not supported by this version of PC Configure. You may need to update the boot loader code as well as the application code. Update the boot code first. You select the Boot Loader utility by one password and the application utility by another.*

- 5 The Write Application uses the password “huskers” (without quotation marks) for flash upgrade and “wildcats” (without quotation marks) for boot upgrade.

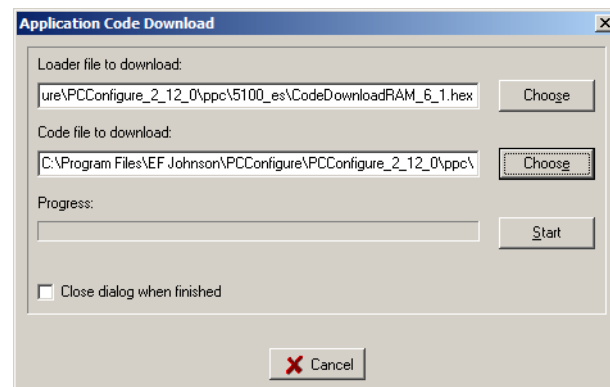
- 6 The Radio Code Download screen is displayed. Enter your password and press **OK**.

Figure 3.7 Radio Code Download Screen



The following screen is displayed. PC Configure reads the radio's version and selects the correct loader file. Select the correct .hex file for the application download. Click the **Choose** button to select. The PC Configure software includes the loader file. If communication difficulties exist, the default legacy loader file is loaded.

Figure 3.8 Code Download Screen

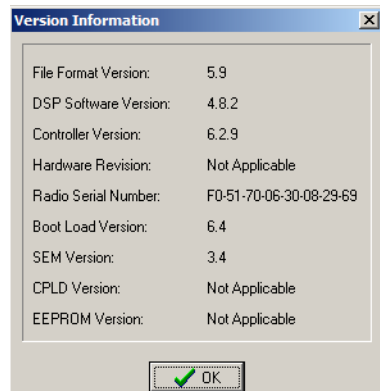


- 7 Click the **Start** button to begin code download process. If a communication failure occurs, verify that the proper Application Code and Loader Code were selected (Figure 3.8). Re-initialize the radio's programming mode and click **Start** again. The Application Download Process requires approximately 15 - 25 minutes to complete.

Note *After downloading is complete, perform **Read Parameters from Radio** and then **Write Parameters to Radio** to ensure the file format is correct. The radio must be connected when performing these tasks.*

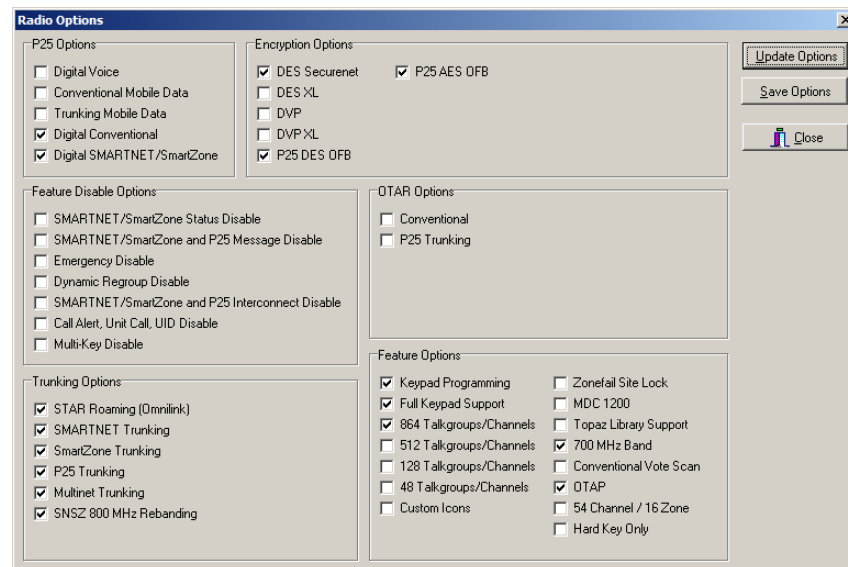
Read Version Info from Radio - Transfers version information on the software the radio contains and then displays it as shown below. The SEM version will be Not Available if there are no Encryption options enabled in the radio.

Figure 3.9 Version Information Screen



Read Options from Radio - Displays information about the options enabled in the radio (Figure 3.10). The check boxes indicate which options are enabled. They are for informational purposes only and cannot be edited.

Figure 3.10 Transfer > Read Options Screen

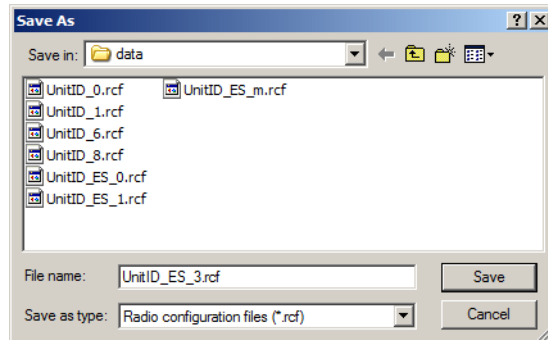


Use the **Update Options** button to add additional options that were purchased for the radio. A data file keyed to the radio's Electronic Serial Number (ESN) unlocks these options. This file has an .opt extension. When you click this button, PC Configure displays a screen that lets you select and download this data file.

Note *To enable additional options, please contact EFJohnson Customer Service. A file from the factory is required to enable additional options.*

Use the **Save Options** button to save your .opt file. The Save screen shown below is displayed. Enter the file name for your options file and click **Save**.

Figure 3.11 Save Options

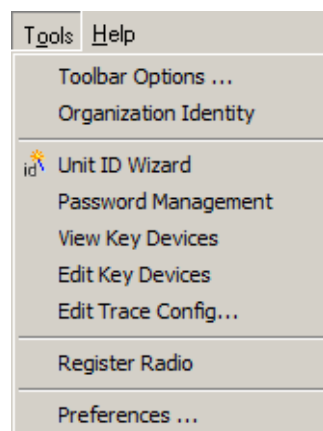


Note *Appendix A describes how to copy an RCF file from an older radio using Flash Code 4.4.x or earlier to a newer radio using Flash Code 4.6.x or later.*

3.4 Tools Menu

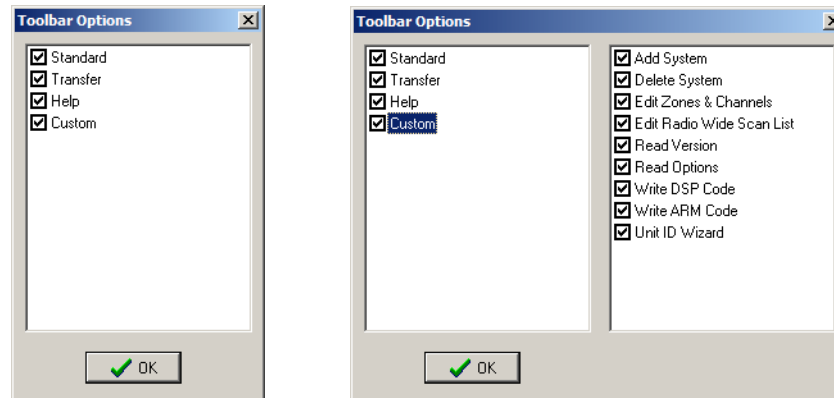
Figure 3.12 shows the **Tools** menu.

Figure 3.12 Tools Menu



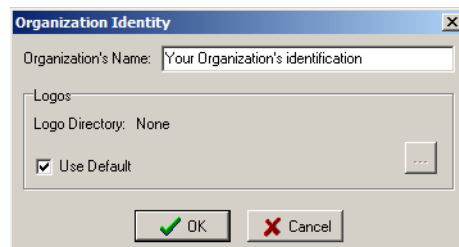
Toolbar Options - Displays the following dialog box from which you select the icons that the toolbar displays. When you check and highlight the **Custom** box, the additional window is displayed to allow you to select which icons to display. PC Configure saves the last selected configuration, then automatically reselects that configuration when you restart the program.

Figure 3.13 Toolbar options Screen



Organization Identity - Displays the following screen in which you can designate a unique company title and logo to display on the programmer screen.

Figure 3.14 Organization Identity Screen



To display a unique company name, enter the desired name in the **Organization's Name** box in this screen. It then displays after **Radio Configuration** - at the top of the screen. Refer to Figure 1.7.

A logo displays on the right end of the toolbar. When the radio performs a read or write operation, this logo changes. To display the default logo, check the **Use Default** box. To display a custom logo, create a bitmap file of the desired graphic that meets the following requirements. You can use a photo editing program to create the bitmap.

- 53 W x 22 H pixels
- .bmp file format
- 256 colors or higher recommended

- You can create a maximum of 30 files. You can name them *Logo1.bmp*, *Logo2. bmp*, and so on up to *Logo30.bmp*. These graphics are then displayed in rapid succession during a radio read or write operation.


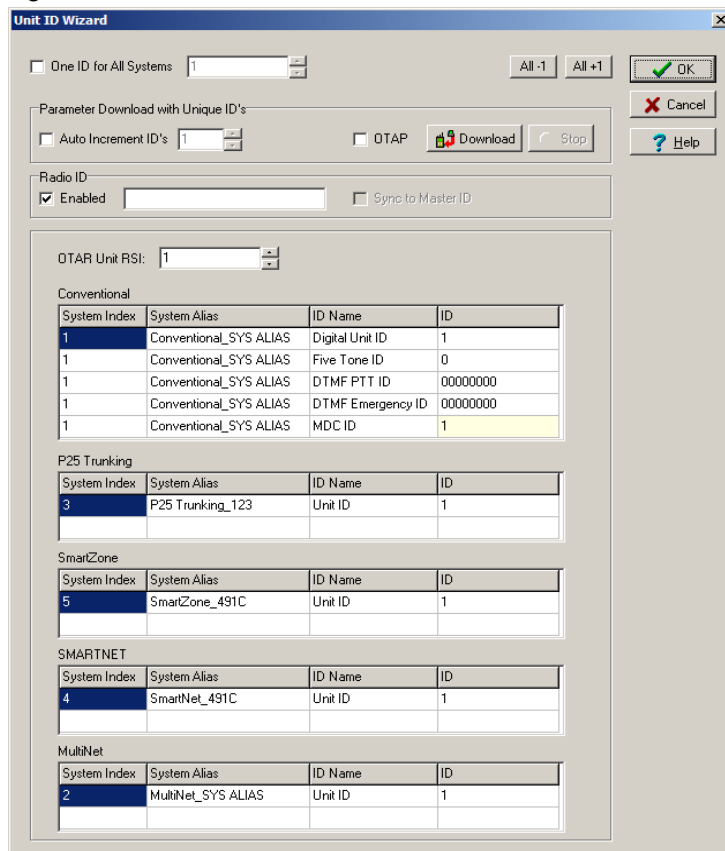
Unit ID Wizard - Displays the Unit ID Wizard screen shown in Figure 3.15. This feature is accessed either through the menu or by pressing the Unit ID Wizard button, . The button will launch the Unit ID Wizard screen. This tool assists users in programming radios when the only item that changes is the Unit ID.

Figure 3.15 Unit ID Wizard screen



The Unit ID Wizard screen includes the following sections:

- One ID for All Systems:** A checkbox and a numeric field (set to 1). Buttons: All -1, All +1, OK, Cancel, Help.
- Parameter Download with Unique ID's:**
 - Auto Increment ID's:** A checkbox and a numeric field (set to 1). Buttons: Download, Stop.
 - OTAP:** A checkbox.
- Radio ID:**
 - Enabled:** A checked checkbox and a numeric field.
 - Sync to Master ID:** A checkbox.
- OTAR Unit RSI:** A numeric field (set to 1).
- Conventional:** A table with 4 columns: System Index, System Alias, ID Name, ID.

System Index	System Alias	ID Name	ID
1	Conventional_SYS ALIAS	Digital Unit ID	1
1	Conventional_SYS ALIAS	Five Tone ID	0
1	Conventional_SYS ALIAS	DTMF PTT ID	00000000
1	Conventional_SYS ALIAS	DTMF Emergency ID	00000000
1	Conventional_SYS ALIAS	MDC ID	1
- P25 Trunking:** A table with 4 columns: System Index, System Alias, ID Name, ID.

System Index	System Alias	ID Name	ID
3	P25 Trunking_123	Unit ID	1
- SmartZone:** A table with 4 columns: System Index, System Alias, ID Name, ID.

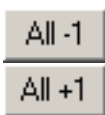
System Index	System Alias	ID Name	ID
5	SmartZone_491C	Unit ID	1
- SMARTNET:** A table with 4 columns: System Index, System Alias, ID Name, ID.

System Index	System Alias	ID Name	ID
4	SmartNet_491C	Unit ID	1
- MultiNet:** A table with 4 columns: System Index, System Alias, ID Name, ID.

System Index	System Alias	ID Name	ID
2	MultiNet_SYS ALIAS	Unit ID	1

The Unit ID Wizard contains all the IDs for the programmed systems.

One ID for All Sub Systems – Check this box to change all IDs at once. Up to ten digits may be entered for the ID.





– The All -1 button decrements all IDs by one.


– The All +1 button increments all IDs by one.

Auto Increment ID's – Check this box to increment all unit IDs after each download by the amount specified.

OTAP – Check this box to enable OTAP downloads.

Click the  Download to initiate parameter downloads. Press  Stop to halt the Download process.

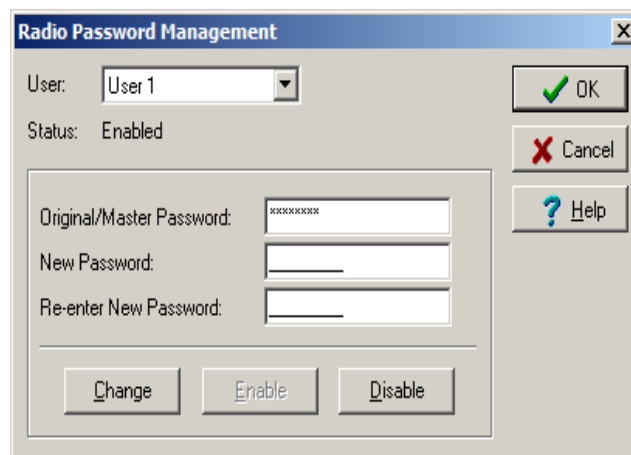
OTAR Unit RSI – OTAR Radio Set Identifier that is located on the 2nd page of the Global's Tab.

To increment/decrement a particular ID, click in the ID box and using the  up/down arrows, increase or decrease that ID individually.

Password Management - Displays the following screen in which you can enable, disable, and change radio passwords. You must connect a radio to the computer to display this screen. Actual passwords never display in this screen. PC Configure always represents passwords as eight asterisks (*****), regardless how long the passwords really are.

Note *When this mode is entered, changes are actually being made to the radio, and when this mode is exited, the changes are active.*

Figure 3.16 Radio Password Management Screen



User - This drop-down list selects the particular password that you want to change as follows:

User 1, User 2, User 3, User 4 - You can program up to four different power-on passwords. The same user features are available with each.

Upload, Download - The radio user must enter these passwords to Upload (read) or Download (write) programming parameters. The radio user does not need a **User** password to upload or download parameters.

Master - This password overrides all the other passwords. A system administrator can use it if any of the preceding passwords are lost.

Selected User - This box indicates status of the selected password (Enabled or Disabled). The **Password** box always indicates eight asterisks, and you cannot edit it.

Proceed as follows to set up or change a password. Passwords must be 1-8 characters long and consist of numbers 0-9. Zeros are valid characters in any location, even as leading characters.

To change a Password:

Note *To enter a password, click the first asterisk or select all eight asterisks. If you enter an incorrect password, a red “!” exclamation point displays to the right of the box. You must then reenter the password.*

- 1 Select the password in the drop-down menu.
- 2 If the password was previously set up, enter the current password in the **Original/Master Password** box. If this is the first time the password is used, it initially consists of null (deleted) characters. In this case, do not enter anything in this box.
- 3 If you are enabling or disabling the password, click the appropriate **Enable** or **Disable** button. Proceed to Step 6.
- 4 If you are changing or initially setting-up the password, enter the new password in the **New Password** box, then reenter it in the **Re-enter New Password** box to confirm it. Click the **Change** button.
- 5 Repeat for other passwords as required.
- 6 To exit without sending the change to the radio, click the **Cancel** button. To exit and send the change to the radio, click the **OK** button.

View Key Device - This field is used to view the Enhanced System Key (USB) file. (For 5100 and 5300 radios only.) Refer to Figure 3.17.

Figure 3.17 System Key Devices

The screenshot shows the 'Key Devices' window with two main sections: 'Master Key Device' and 'Slave Key Device'.

Master Key Device:

- Serial #: 1
- System IDs: A list with items 1 through 6. Item 1 is selected.
- Type: P25 Trunking
- WACN ID: 1
- Buttons: >, >>, <, <<
- Read button

Slave Key Device:

- Serial #: 0
- Exp. Date: 2/10/2009
- Creator Serial #: 0
- Created By: N/A
- System IDs: A list (empty)
- Type: P25 Trunking
- WACN ID: 1
- Unit ID Ranges [0 .. 16777215]:

	Lower	Upper
1	0	0
2	0	0
3	0	0
- Group ID Ranges [0 .. 65534]:

	Lower	Upper
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
- Buttons: Read As Master, Write, Read
- Close button

Edit Key Device - This field is used to define/edit the preferences that can be modified using the Enhanced System Key (dongle) file.

Edit Trace Configuration - This feature is used in conjunction with field data collection and should not be used unless directed by EFJohnson personnel, on a case-by-case basis.

Figure 3.18 Trace Configuration

The screenshot shows a Windows-style dialog box titled "Trace Configuration". It contains several sections for configuring radio buffers and logging options.

Radio Buffer Configuration:

- Total Bytes: 0
- Used Bytes: 0
- Available Bytes: 0

Level 1 Buffers:

- Number of Buffers: 5 (spin box)
- Size: 2000 (dropdown menu)
- Extra Data Bytes: 0 (spin box)

Level 2 Buffer:

- Size: 2000 (dropdown menu)
- Extra Data Bytes: 0 (spin box)

Level 3 Buffer:

- Size: 2000 (dropdown menu)
- Extra Data Bytes: 0 (spin box)

At the bottom of the buffer sections are two buttons: "Read Config" and "Download Config".

Radio Trace Logging Options:

- ☐ Log OSWs/DSPs
- Download (button)

Register Radio - To register your radio, select this option. The Warranty Registration form at www.EFJohnson.com is displayed.

Figure 3.19 Online Registration

The screenshot shows the EFJohnson.com website's 'Product Registration' page. The page layout includes a top navigation bar with links for Training, Service & Support, Contact Us, Sales, and Careers. Below this is a secondary navigation bar with links for ABOUT EFJOHNSON, PRODUCTS, APPLICATIONS, and NEWSROOM. The left sidebar contains links for CONTACT TECH SUPPORT, FAQ, FIELD SERVICE BULLETINS, WHITE PAPERS, DOWNLOAD MANUALS, ENCRYPTION APPLICATION NOTES LIST, and a highlighted 'PRODUCT REGISTRATION' link. Below these links is a 'TRAINING' section and a 'Download our Product Catalog' link. A 'FEATURED PRODUCT' section highlights the 'Discover™ GPS Speaker Microphone' with a 'LEARN MORE' link. The main content area is titled 'Product Registration' and contains the instruction 'Please enter your product information below.' It features two tabs: 'Step 1 Product Registration' (active) and 'Step 2 Review/Submit'. The 'Submitter Information' section includes the following fields:

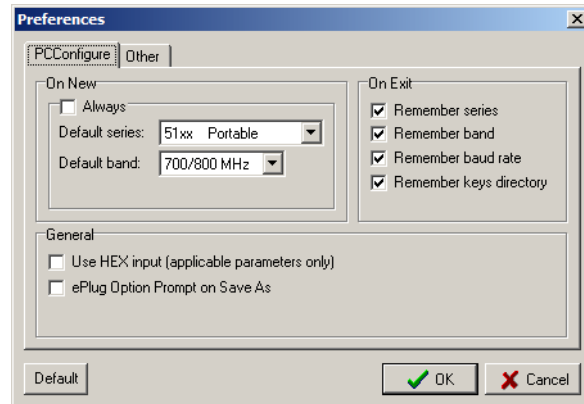
- *Name (First and Last)
- *Title and *Company
- *E-Mail
- *Phone Number and *Fax Number
- *Address (Address Line 1 and Address Line 2)
- *City, *State/Region (dropdown menu), and *Zip/Postal Code
- *Country (dropdown menu, currently set to United States)
- *Product Lines (radio buttons):
 - *Project 25 Compliant Radios
 - *Project 25 Systems
 - *Base Stations & Repeaters
 - *Broadband Hardware Products
 - *Broadband Software Products


A 'Next >>' button is located at the bottom of the form.

Complete the fields as instructed and click **Submit**. You will receive an E-mail confirmation upon receipt of your registration form.


Preferences - Displays the following screens from which you can set several program preferences.


Figure 3.20 Preferences: PC Configure Screen



On New - When you check **Always**, PC Configure automatically creates a programming file with the radio series and band selected by the drop-down menus. This happens when **File → New** is selected or the  button clicked. However, you cannot change the band of the file, so you can only create files with the selected band. If you do not check this, select the band in a separate step before you create the file as described below.

On Exit - When you check one of the parameters in this box, PC Configure restores that parameter to the current condition when you restart the program. Otherwise, the default is selected. Note that if you check **On New → Always**, it overrides the first two parameters.

Remember series - When you create a new file by selecting **File → New** or clicking the  button, PC Configure automatically selects the current radio series. If you do not select this, “5300” is the default.

Remember band - When you create a new file by selecting **File → New** or clicking the  button, PC Configure highlights the current frequency band when the band select screen displays. You can also change the frequency band if you wish. If you do not select this, “VHF” is the default.

Remember baud rate - PC Configure automatically reselects the current baud rate. Refer to [Section 3.3, “Transfer Menu”](#). If you do not select this, “19200” is the default.

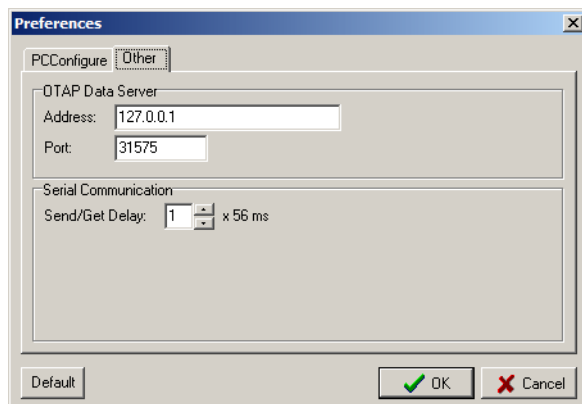
Remember keys directory - PC Configure automatically reselects the current key directory. If you do not select this, the “Keys” folder is the default. Refer to “Load System Keys” in [Section 3.2, “Radio Menu”](#).

Use Hex input (applicable parameters only) - When selected, you must enter all applicable numbers in hexadecimal format instead of decimal format. All hexadecimal numbers are indicated by an ivory-colored background. Refer to [Section 1.9.5, “Decimal / Hexadecimal Select”](#) for more information.

ePlug Option Prompt on Save As - Select this option to enable the ePlug functionality. If enabled, the ePlug ESN Input screen, Figure 13.5, is displayed.

The Preferences: Other screen, Figure 3.21, is shown below:

Figure 3.21 Preferences: Other Screen



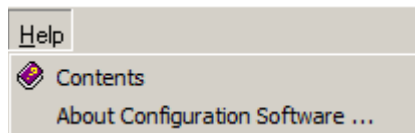
Serial Communication

Send/Get Delay - Allows you to program a serial port delay of 0-18 (x 56 ms). You may need to program this delay if you use computers that are slow to respond to serial port signals. If the software times-out during read/write operations, try increasing this delay. Usually, select the default level of “0” (no delay).

3.5 Help Menu

Figure 3.22 shows the **Help** menu.

Figure 3.22 Help Menu



Contents - Displays the help system table of contents.

Note *Compatibility issues have been found when using the PC Configure Help option on a machine running Microsoft's Windows Vista®. Microsoft's website offers a patch for download that allows the current version of Help to run on Windows Vista. Alternatively, the pdf of the reference manual distributed with PC Configure may be used.*

About Configuration Software - Displays the PC Configure version number and company information.

3.6 Toolbar

The tools in the toolbar provide quick access to many menu functions. To display the tools, select the **Tools → Toolbar Options** menu described in [Section 3.4, “Tools Menu”](#). You can use this menu to turn on and turn off the **Standard**, **Transfer**, **Help**, and **Custom** tools.

3.6.1 Standard Tools

Refer to [Section 3.1, “File Menu”](#) for more information on these functions.



New - Opens a new programming file containing default parameters.



Open - Loads a file from disk. Clicking the down arrow displays a drop-down list of recently loaded files.



Save - Saves the current file to disk.

3.6.2 Transfer Tools

Refer to [Section 3.3, “Transfer Menu”](#) for more information on these functions.



COM Port - Selects the serial port used to connect the radio to the computer.



Read Parameters From Radio - Transfers data from the radio to a new programming file.



Write Parameters To Radio - Programs the radio with the data in the current programming file.



Stop Data Transfer - Cancels the data transfer in progress.

3.6.3 Custom Tools



Add System - Adds a new system. Clicking the down arrow displays a drop-down list of the system types that can be added.



Delete System - When the Per System screen displays, clicking this button deletes the selected system.



Edit Zones and Channels - Displays the **Edit Zones and Channels** screen.



Edit Radio Wide Scan List - Displays the **Radio Wide Scan List** edit screen.



Read Version From Radio - Reads version information from the radio for the software it contains and then displays that information.



Read Options From Radio - Reads option information from the radio and then displays it.




Write Application Code To Radio - Programs the radio with new Application software.



Unit ID Wizard - Launches the Unit ID Wizard dialogue screen which assists in programming radios when the only item that changes is the Unit ID.

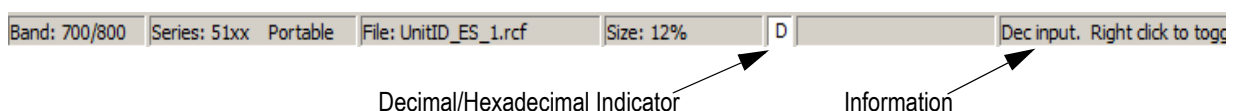
3.6.4 Organizer

The organizer button  on the right end of the toolbar toggles the preceding screen that you can use to organize many programming files into groups and subgroups. See [Section 3.8, “Organizer”](#), for more information.

3.7 Status Bar

Figure 3.23 shows the status bar.

Figure 3.23 Status Bar



Band - The frequency band of the file. You select this when you create a new file with the **File → New** function.

Series - The radio series of the file selected by the **Radio → Series** function.

File - The file name of the current programming file. You specify this name the first time you save the file with the **File → Save** function, or you can change it with the **File → Save As** function.

Size - Indicates the percent of the available memory that would use if you programmed the radio with the current file. Refer to [Section 1.9.4, “File Size Indication”](#).

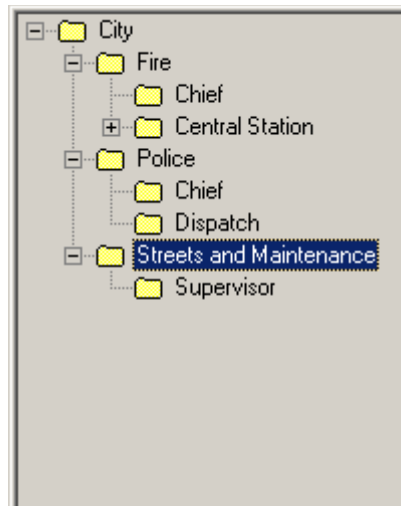
D/H Box - Indicates whether the decimal or hexadecimal number format is selected. Refer to [Section 1.9.5, “Decimal / Hexadecimal Select”](#).


Information - Displays a short description of tools in the toolbar when they are selected by the cursor.

3.8 Organizer






Figure 3.24 shows an example of the organizer screen.

Figure 3.24 Organizer Screen Example

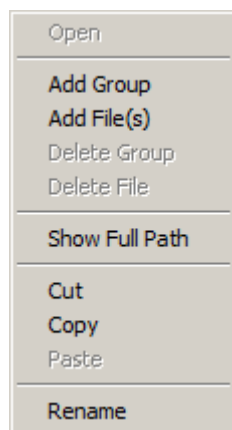


Clicking the organizer button  on the right end of the toolbar toggles the preceding screen that you can use to organize many programming files into groups and subgroups. This should make it easier for you to organize files if you administer a large organization.

Note *This organizer does not add, delete, or move programming files on the hard drive. It helps you organize those files into logical folders and subfolders.*

The folder symbol  represents groups. The  symbol represents programming files. A  symbol next to an item indicates that the branch is expanded, and clicking it collapses the branch. Likewise, a  symbol indicates that the branch is collapsed, and clicking it expands the branch. If a file in the organizer was deleted from the hard drive, it is indicated by a red “X” through the icon .

- 1 To add the current programming file to the Organizer, select the desired group in the organizer and then select the **File → Send to Selected Organizer Group** menu item. Refer to [Section 3.1, “File Menu”](#). To add other files, see Step 3.
- 2 To open a file listed in the organizer, simply double click it, drag it to the main programmer screen, or select **Open** as described in the next step.
- 3 To add, edit, delete, or move a group or file, right click the applicable group or file. The following window is displayed.



Open - Opens the selected file. If you have not saved the current file, PC Configure asks you if you would like to save it first.

Add Group - Adds a new group below the selected location.

Add File(s) - Displays a screen that you can use to select a file on the hard drive to add to the selected location.

Delete Group - Deletes the selected group from the organizer only. This option does not delete the actual files on the hard drive.

Delete File - Deletes the selected file from the organizer only. If you select **Delete File**, it does not delete the actual files on the hard drive.

Show Full Path - Displays the entire path name of the file on the hard drive.

Cut - Moves the selected group or file to the clipboard.

Copy - Copies the selected group or file to the clipboard.

Paste - Copies the current clipboard file to the selected location

Rename - Renames the selected group.

Note *You cannot rename files from the organizer.*

Tip *The Organizer settings are contained in the file "PCConfig.org" in the PCC install directory. Copy "PCConfig.org" from the old install directory to the new install directory to retain the Organizer settings across PCC versions. This capability will work across PC Configure's with different file formats.*

Global Screen

PC Configure global parameters are the same for all systems, channels, and zones. Two screens contain the interface at which you program these parameters. This section describes the parameters that you find on these screens.

4.1 Global Parameters: Primary Screen

The screen displays as active only those parameters that apply to the selected radio series. The other parameters are grayed out. Figure 4.1 shows the initial **Global** parameters for programming portable radios.

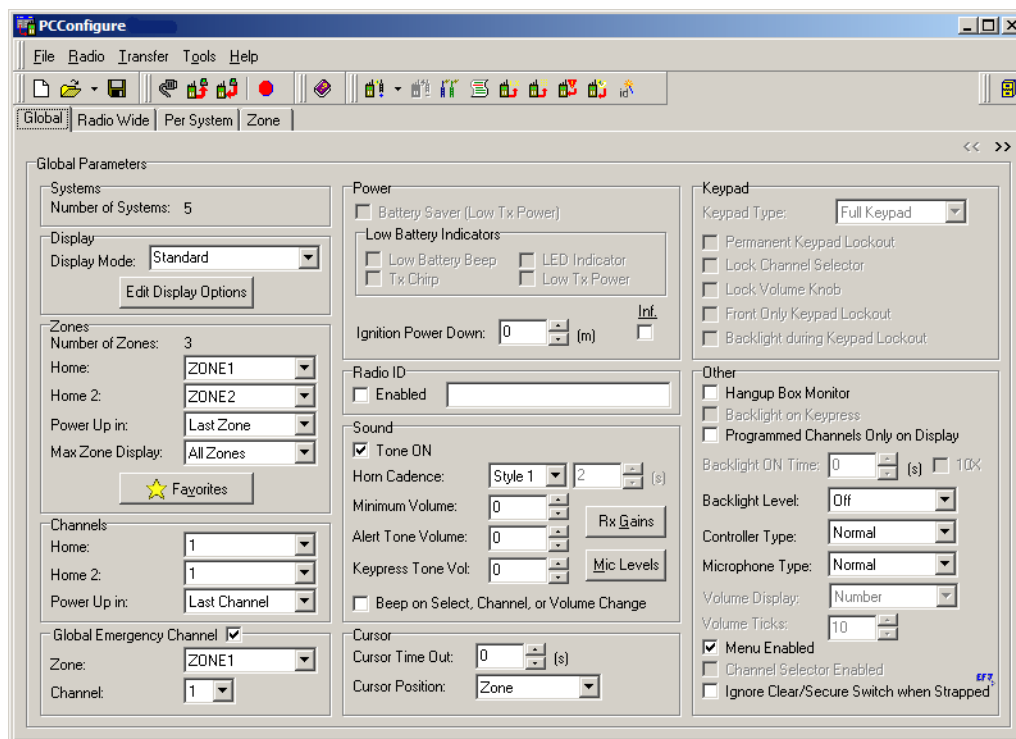
Figure 4.1 Primary Global Parameter Programming Screen (for 51xx Series)

The screenshot shows the PCConfigure software window with the following settings visible:

- Systems:** Number of Systems: 5
- Display:** Display Mode: Standard (with Edit Display Options button)
- Zones:** Number of Zones: 3; Home: ZONE1; Home 2: ZONE2; Power Up in: Last Zone; Max Zone Display: All Zones (with Favorites button)
- Channels:** Home: 1; Home 2: 1; Power Up in: Last Channel
- Global Emergency Channel:** Checked; Zone: ZONE1; Channel: 1
- Power:** Battery Saver (Low Tx Power): unchecked; Low Battery Indicators: Low Battery Beep, Tx Chirp, LED Indicator, Low Tx Power (all unchecked); Ignition Power Down: 0 (m) (with Inf. button)
- Radio ID:** Enabled: unchecked
- Sound:** Tone ON: checked; Horn Cadence: Style 1, 2 (s); Minimum Volume: 0; Alert Tone Volume: 0; Keypress Tone Vol: 0 (with Rx Gains and Mic Levels buttons); Beep on Select, Channel, or Volume Change: unchecked
- Cursor:** Cursor Time Out: 0 (s); Cursor Position: Zone
- Keypad:** Keypad Type: Full Keypad; Permanent Keypad Lockout, Lock Channel Selector, Lock Volume Knob, Front Only Keypad Lockout, Backlight during Keypad Lockout: all unchecked
- Other:** Hangup Box Monitor, Backlight on Keypress, Programmed Channels Only on Display: all unchecked; Backlight ON Time: 0 (s) (with 10X button); Backlight Level: Off; Controller Type: Normal; Microphone Type: Normal; Volume Display: Number; Volume Ticks: 10; Menu Enabled: checked; Channel Selector Enabled: unchecked; Ignore Clear/Secure Switch when Strapped: unchecked

Figure 4.2 shows the initial **Global** parameters for programming mobile radios.

Figure 4.2 Primary Global Parameter Programming Screen (for 53xx Series)



The parameters in this screen are as follows:

Systems

Number of Systems - Displays the number of systems that have been created as described in [Section 1.10, “Creating Systems”](#).

Display

Display Mode - Select the type of display for your radio. The current options are "Standard" or "Enhanced".

To program the settings for the display for the radio, select the **Edit Display Options** button.

Standard

Zone/Channel Combine - Check this box to combine channel and zone alias on radio display.

You may enter up to ten characters total if no space is used, or nine characters if you use a space, to identify the channel and zone.

Num Zone Characters - Enter the number of characters identifying the zone.

Space Between Zone and Channel - Check this box to place a space between the zone and channel identifiers.

Num Channel Characters - Enter the number of characters identifying the channel.

Zones - A zone is a programmed collection of a maximum of 16 channels of any type.

Number of Zones - The total number of zones currently set up. The maximum number allowed is 3, 16, 32 or 54, depending on the radio type and options enabled. Zones are created in the **Zone → Edit Zones** screen by clicking the **+** button. Refer to [Section 2.5, “Setting Up Zones and Channels”](#) for the system programmed.

Home - Selects the zone set for the Home Zone option function button (if programmed). This is the zone assigned to be selected if Power Up In is set to Home Zone.

Home 2 - Selects the channel set for a secondary Home Zone function button (if programmed).

Power Up in - Selects whether the radio powers up on the Home or Last Selected zone.

Max Zone Display - Select to display All Zones or this feature allows Voting Scan system users to show only a zone with the desired transmit channel locations for each grouping of sites within the vote scan system and hide additional receive channel locations that are included in the same system.


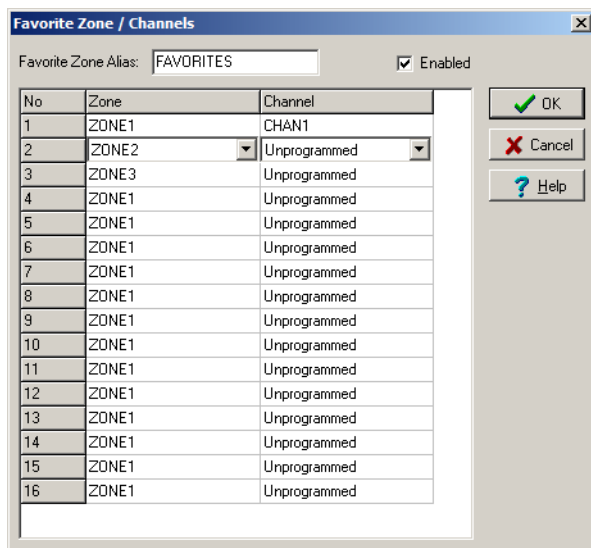
Favorites  **Favorites** - Allows you to create a dynamic zone where you create a shortcut to your most often used channels. By using Favorites you do not change anything with your existing zones or channels other than those you have created a shortcut to this channel.

Figure 4.3 Favorite Zone / Channels Screen



No	Zone	Channel
1	ZONE1	CHAN1
2	ZONE2	Unprogrammed
3	ZONE3	Unprogrammed
4	ZONE1	Unprogrammed
5	ZONE1	Unprogrammed
6	ZONE1	Unprogrammed
7	ZONE1	Unprogrammed
8	ZONE1	Unprogrammed
9	ZONE1	Unprogrammed
10	ZONE1	Unprogrammed
11	ZONE1	Unprogrammed
12	ZONE1	Unprogrammed
13	ZONE1	Unprogrammed
14	ZONE1	Unprogrammed
15	ZONE1	Unprogrammed
16	ZONE1	Unprogrammed

Once enabled, you can change the name of the Favorites Zone and the channel assignments. The default name is set to “FAVORITES”. You may set the 16 Favorite channels via drop-down menus that show all of the zones and channels programmed in the radio (Refer to [Section 2.5, “Setting Up Zones and Channels”](#)). If no Zone/Channels are selected, the channel is unprogrammed.

Channels

Home - Selects the channel set for the Home Channel function button (if programmed) when the radio powers up on the Home zone.

Home 2 - Selects the channel set for a secondary Home Channel function button (if programmed).

Power Up in - Selects if the Home or Last Selected channel is selected on power up. With the “Last Zone”/“Home Channel” power-up configuration, you select the programmed home channel number of the last active zone. If that channel number is not programmed in the active zone, “Unprogrammd” displays.

Global Emergency Channel - Selects the zone and channel on which you transmit all emergency calls and alarms, regardless of the channel type currently selected. For example, if the global emergency channel is a trunked channel and a conventional channel is selected when the emergency is initiated, it transmits on the trunked global emergency channel.

Zone - The zone on which all emergency calls and alarms are transmitted.

Channel - The channel on which all emergency calls and alarms are transmitted.

Power

Battery Saver (portables only) - If this is checked, 51xx and Ascend automatically switch to the low transmit power mode when the RSSI signal indicates the site is probably nearby. This occurs only when the radio operates in the SMARTNET/SmartZone or Project 25 trunked modes.

Note *Using the Battery Saver option is not recommended unless you have verified that at low power you can talk back to the site from every location including inside buildings and in basements.*

Low Battery Indicators (portables only)

Low Battery Beep - When checked, a short tone sounds every 30 seconds in the standby mode while the radio detects a low battery condition.

Tx Chirp - When checked, a double chirp sounds each time the radio user presses the PTT switch while the radio detects a low battery condition. For Trunking, if the Talk Permit Tone is enabled, the double beep will change to a double chirp.

LED Indicator - When checked, the LED on the top panel indicates a low battery condition. For example, 5100 ES Model I radios emits two medium pitched beeps and then flashes red every 30 seconds after that; other 5100 radios display the low battery indicator on the display.

Low Tx Power - When checked, the radio operates on low transmit power when it detects a low battery condition.

Ignition Power Down (mobiles only) - When the ignition switch controls radio power, this sets the delay that occurs between when the radio user turns the ignition switch off and when the radio power actually turns off. You can select times of 0-510 minutes or an infinite time (no turn-off).

Radio ID - This ID displays during the radio power up and identifies the personality file used to program the radio, the service area the radio is programmed for, or functional grouping the radio is programmed for.

Enabled - If the feature is enabled, the radio will display the Radio ID alias in place of the Self Test message during startup. The Radio ID alias display will be included with the Radio Info display items in both button/scroll and menu modes. If disabled, the Radio ID menu mode will display a blank line.

Sound

Tone ON - If you check this, all supervisory tones sound. If you do not check this, no tones sound. Default is checked or ON.

Horn Cadence (mobiles only) - Programs the following styles when the horn alert option switch enables the horn alert. This feature is enabled for Unit Calls and Interconnect Calls only and requires the Horn Honk button/menu option. Repeating does not occur with either style.

Style 1 - The horn is on for one second and off for 0.5 second for three cycles.

Style 2 - The horn sounds continuously for the programmed time (2-255 seconds).

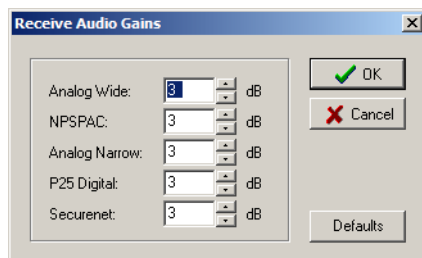
Minimum Volume - (ES mobiles with ES Series Remote Control Heads, 51xx, and Ascend portable) Sets the minimum volume level the volume control can select. You can use this to prevent missed messages caused by unintentionally turning the volume down too far. Relative levels of 0-255 can be set in steps of 1 ("0" sets the lowest minimum volume).

Note *The minimum volume setting has no effect on the volume of a pre-ES Series model remote control head using an internal speaker whether it is attached to a pre-ES Series or an ES Series mobile radio.*

Alert Tone Volume - This adjusts the alert tone volume level relative to the volume control setting. The radio user can also do this by a Tone Volume Edit option button if one is programmed. Changes made by this button permanently override this setting. You can set relative levels of -170 to +170 in steps of 1. "0" is the standard default setting. For example, if you have the volume knob set at a comfortable level of 120 and the Alert Tone Volume is set to 120, this combines for a Tone Volume of 240 or almost maximum volume.

Rx Gains - Increases or decreases the receive audio level for analog wideband, analog narrowband, analog MPSPAC, P25 or Securenet channels. The selectable range is 0 to 6 dB. The default value is 3 dB for all channel types. To reset to the default levels, click the “Defaults” button.

Figure 4.4 Receive Audio Gains Screen

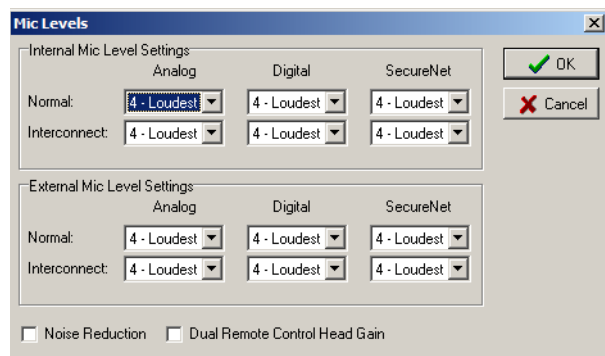


Keypress Tone Volume - Adjusts keypad button press tone levels. You can set relative levels of -170 to +170 in steps of 1. “0” is the standard default setting.

Mic Levels Mic Levels - Displays the following screen which sets the microphone sensitivity for various types of calls. You can set relative levels of 0 (least sensitive) to 4 (most sensitive), and AGC for analog and digital calls, with “4” the default. Automatic Gain Control (AGC) sets Mic audio to a constant level for radios receiving the call.

Note *Mic Levels apply to all protocols.*

Figure 4.5 MIC Levels Screen



Noise Reduction - Check the box to enable this feature. By enabling the feature, the radio will reduce the amount of white noise being transmitted from the subscriber.

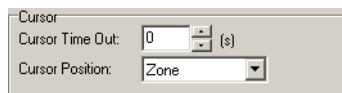
Note *This feature effects the transmitting radio. When checked, it is activated for all protocols (analog, digital, securenet).*

Dual Remote Control Head Gain - When using Dual Remote Control heads this check box should be enabled. This function will balance the Mic gain between the two control heads so that mic audio levels are consistent.

Beep on Select, Channel, or Volume Change - (Mobiles Only) If this feature is selected, the radio will beep

- when the Select Knob is pressed for both the Control Head and Hand Held Controller.
- if the channel is changed for both the Control head and Hand Held Controller.
- on Volume Change for the Hand Held Controller.

Cursor (Mobiles only)



Cursor
 Cursor Time Out: 0 [s]
 Cursor Position: Zone

Cursor Time Out - Programs the time delay that occurs before the cursor (zone or channel select indicator) returns to the default position programmed in the next parameter. You can program times of 0-255 seconds. "0" selects no return.

Cursor Position - Selects whether the Zone or Channel select mode is enabled when the radio user turns the power on and after the preceding time-out period expires.

Keypad (Portables Only)

Keypad Type - Changes the function button display picture (on the "Radio Wide" page) so that the proper model is displayed when assigning available function buttons.

Permanent Keypad Lockout - If this is checked, the front and side panel keys are disabled. The user cannot enable them again. If you select the Front Only Keypad Lockout parameter that follows, only the front panel keys are disabled. The radio user can still use the side panel keys.

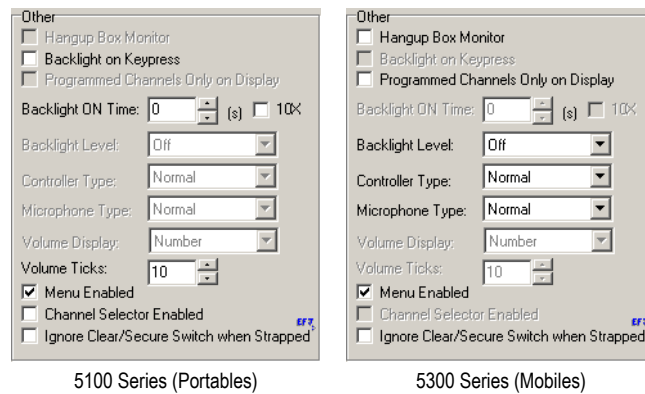
Lock Channel Selector - When checked, the Keypad Lockout function also temporarily locks the top panel channel selector switch. When not checked, it remains functional when the keypad is locked. To totally disable this control, do not select Channel Selector Enabled which follows.

Lock Volume Knob - When checked, the top panel volume control function (but not on-off) is also temporarily locked by the Keypad Lockout function. When not selected, it remains functional when the keypad is locked. To totally disable this control, program an Up/Down volume button. Refer to the following section on the Volume Ticks parameter.

Front Only Keypad Lockout - This controls the keys that are disabled by the preceding Permanent Keypad Lockout function and the Keypad Lockout option button if programmed. If neither of these functions is used, checking this parameter has no effect. If this box is checked, the front panel keys are disabled but the side panel keys remain active. If this box is not checked, both the front and side panel keys are disabled.

Backlight During Keypad Lockout - If you check this box, the backlight turns on normally when the user presses a key with the keypad locked (if Backlight on Keypress which follows is enabled). If you do not check this box, the backlight is also disabled when the keypad is disabled. Also, if a button is programmed for Backlight, this button is not locked by the Keypad Lock button.

Other



Hangup Box Monitor (mobiles only) - When checked, enables microphone off-hook detection. Taking the microphone off-hook then enables the monitor mode (conventional only) and disables scanning. The monitor mode unsquelches the receiver and monitors the channel if a carrier is detected.

Note *If microphone off-hook detection is enabled, monitor mode does not operate as described in the operation manual for monitor mode push button function.*

When Hangup Box Monitor is not checked, taking the microphone off-hook has no effect on these functions.

Backlight on Key Press (portables only) - If checked, the backlight turns on for the Backlight ON Time whenever the radio user presses a key.

Programmed Channels Only on Display (53xx only) - If you check this box, the radio only displays programmed channels. If you do not check this box, the radio displays all channels. When the radio user selects an unprogrammed channel, “UNPROGRAMD” displays and a tone sounds.

Backlight ON Time (portables only) - Programs the period of time in seconds the backlight stays on after it is enabled by pressing a button (except the PTT button) or key. Refer to the field, **Backlight on Key Press**. You can program times of 0-7.5 seconds in 0.5-second steps or 0-75 in 5 second intervals. When the radio user turns on the backlight by the option switch or menu parameter, the backlight stays on for the programmed time duration. Press and hold functionality now toggles the backlight on and off. A press of the backlight button only activates the back light for the time duration programmed.

10X - Check this box to enable the longer 0-75 **Backlight ON Time**.

Backlight Level (mobiles only) - Selects the backlight brightness as “Off,” “Mid,” or “High” at power up. The backlight option switch can override this setting if that switch is programmed.

Controller Type (53xx only) - Selects the type of control head being used. Select “Normal” for the standard front or remote mount control head. Select “Handheld” for the Handheld Control Unit. Select “Lightning” if using the Lightning Control Head.

Microphone Type (53xx only) - Selects the type of microphone being used. Select either "Normal" or "Digital Keypad".

Volume Ticks (51xx only) - When you program a Volume Up/Down button on the Radio Wide screen for a particular system type, the volume control is disabled when the radio user selects a channel programmed for that system type. This then selects the number of button presses ("ticks") required to change from minimum to maximum volume. You can program from 2 to 50 steps.

Menu Enabled

(51xx only) - Enables the menu mode with 51xx portables. The <F1> key becomes backup or exit button and <F2> becomes enter or select button instead of programmable option keys. If you do not select this parameter, the menu mode is not available and <F1> and <F2> remain as programmable option keys. The Up/Down Rocker switch scrolls through the menu.

(53xx only) - Enables the menu mode with 53xx mobiles. Use the press and hold activation of the Zone/Channel button on the control head to enter Menu mode. When the "Enable Menu Mode" check box on the Radio Wide page is checked, the user can program the contents of the Menu just as one does on the 5100 Menu page. The PowerPC code implements a timer to detect a press and hold situation on the Zone / Channel button, just like a "Menu" button press on the portable in all contexts.

Once you enter the Menu mode:

- o programmed buttons are deactivated just like in the 5100.
- o the <F6> button (far right looking at the control head) is the back up or exit button.
- o the Zone/Channel button press function Select knob.
- o the Zone/Channel rotation events become the Menu up/down function (5100 rocker switch equivalent).

Channel Selector Enabled (51xx only) - Enables the channel select knob in the top panel. If you do not check this, you permanently disable the channel select knob and the radio user can only select channels by the Channel Select option button or menu parameter. Defaults to checked. Refer to the preceding section on the Lock Channel Selector parameter.

Ignore Clear/Secure Switch when Strapped - When you select this, the mode selected by the switch (or menu parameter with the 51xx) is ignored and the transmission always occurs in the strapped mode. In addition, the error tone and "Sec Only" or "Clear Only" do not display when the switch selects a different mode than the one that is strapped.

Note *If all channels and talk groups are strapped Clear or Secure and no Clear or Secure option switch or menu parameter is used, you must always select this parameter. Refer to the following.*

Without the Clear/Secure switch or menu parameter, the radio is always in the last known state (usually Clear) and there is no way to change it. For example, if the last known state is Clear and you do not select this parameter, the radio user can never transmit a Secure message on a channel strapped Secure. When the user tries to do this, the following occurs:

- Transmitting is disabled
- An error tone sounds
- “Sec Only” displays

4.2 Global Additional Parameters

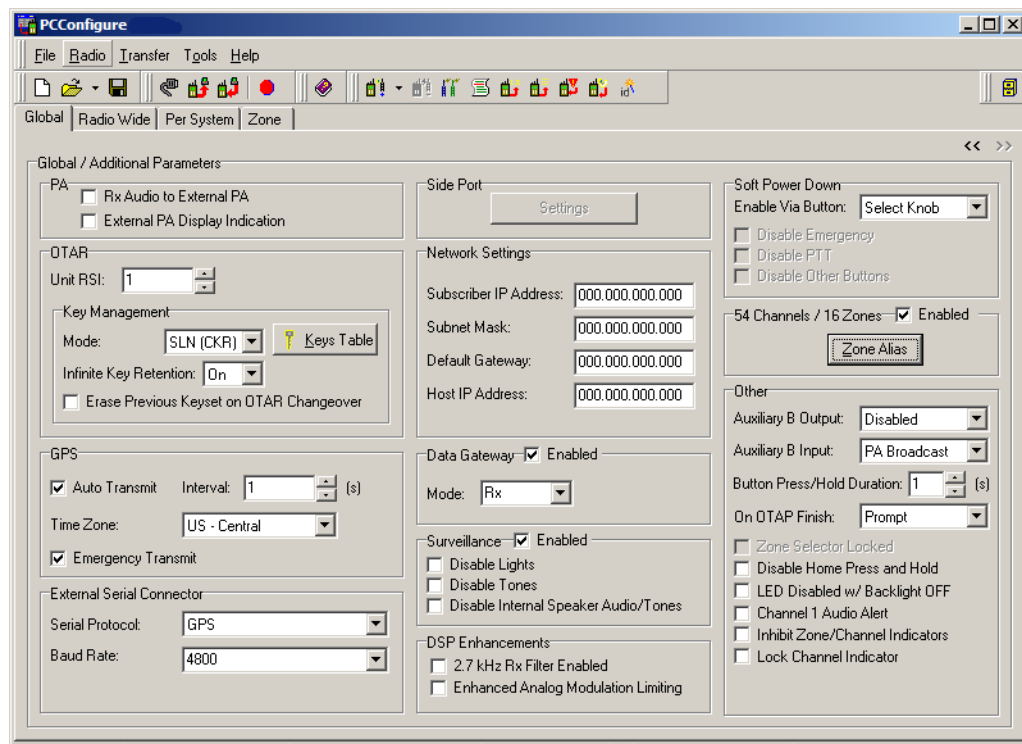
You open and close a second **Global** screen when you click the << >> buttons in the upper right corner of the screen. Figure 4.6 and 4.7 show this second screen.

Figure 4.6 Global Additional Parameters Programming Screen (for 5100 series)

The screenshot displays the 'PCConfigure' application window. The 'Global' tab is selected, showing the 'Global / Additional Parameters' configuration page. The interface is organized into multiple panels:

- PA:** Includes checkboxes for 'Rx Audio to External PA' and 'External PA Display Indication'.
- OTAR:** Features a 'Unit RSI' dropdown set to '1', a 'Key Management' section with 'Mode' set to 'SLN (CKR)' and a 'Keys Table' button, 'Infinite Key Retention' set to 'On', and an 'Erase Previous Keyset on OTAR Changeover' checkbox.
- GPS:** Has a 'GPS' checkbox checked and 'Enabled'. It includes 'Auto Transmit' (checked), 'Interval' set to '1' (s), 'Time Zone' set to 'US - Central', and 'Emergency Transmit' (checked).
- External Serial Connector:** Shows 'Serial Protocol' as 'GPS' and 'Baud Rate' as '4800'.
- Side Port:** Contains a 'Settings' button.
- Network Settings:** Includes input fields for 'Subscriber IP Address', 'Subnet Mask', 'Default Gateway', and 'Host IP Address', all set to '000.000.000.000'.
- Data Gateway:** Has a 'Data Gateway' checkbox checked and 'Enabled', with 'Mode' set to 'Rx'.
- Surveillance:** Includes a 'Surveillance' checkbox checked and 'Enabled', with options to 'Disable Lights', 'Disable Tones', and 'Disable Internal Speaker Audio/Tones'.
- DSP Enhancements:** Features checkboxes for '2.7 kHz Rx Filter Enabled' and 'Enhanced Analog Modulation Limiting'.
- Soft Power Down:** Includes 'Enable Via Button' (set to 'Side Button 1') and checkboxes for 'Disable Emergency', 'Disable PTT', and 'Disable Other Buttons'.
- 54 Channels / 16 Zones:** Has a checkbox checked and 'Enabled', with a 'Zone Alias' button.
- Other:** Includes 'Auxiliary B Output' (set to 'Disabled'), 'Auxiliary B Input' (set to 'PA Broadcast'), 'Button Press/Hold Duration' (set to '1' (s)), 'On OTAP Finish' (set to 'Prompt'), and several other checkboxes like 'Zone Selector Locked', 'Disable Home Press and Hold', 'LED Disabled w/ Backlight OFF', 'Channel 1 Audio Alert', 'Inhibit Zone/Channel Indicators', and 'Lock Channel Indicator'.

Figure 4.7 Global Additional Parameters Programming Screen (for 5300 series)



The secondary **Global** screen displays the following parameters:

PA (5300 only)

Rx Audio to External PA - Speaker audio always connects to the Ext PA line of the accessory cable. If you select this parameter, the receive audio signal also connects to this line. You need to assign and press the External PA button to activate this mode.

External PA Display Indication - If you select this, “Ext PA On” displays continuously when the Ext PA option button enables the external PA function. If you do not select it, “Ext PA On/Off” flashes in the display when the radio user presses a button.

Note *Setting the External PA Display Indication field is recommended if RX Audio to External PA is enabled.*

OTAR (Over-the-Air Rekeying)

Unit RSI - This sets the individual Radio Set Identifier of the OTAR radio. This is the ID used to register with the KMF and must be assigned if OTAR is enabled. You typically set this number to the Digital Unit ID, but you can also program other numbers if you wish to do so. The allowed Digital or Trunking Unit ID range is 1 - 9,999,999.

Key Management - Your key management mode determines the method you use to load and manage encryption keys. The Motorola keyloader has ASN and Astro 25 modes. You can use the ASN mode to load analog (DES) or digital (DES-OFB) keys. You can use the Astro 25 mode to load digital (DES-OFB or AES) channel keys. The SMA loads digital keys only.


Mode - Select the PID/ASN or SLN/CKR mode as follows. The keyloader function of the EFJohnson Subscriber Management Assistant (SMA) supports the SLN mode only. In the PID/ASN mode, use the Motorola keyloader in the ASN mode, and in the Astro 25 mode when you select “SLN/CKR”.

“PID/ASN Mode” - Select this mode to load analog channel keys directly into a Key PID (Physical ID) from 0-63. You can load digital channel keys in this mode.

“SLN/CKR Mode” - Select this mode to load keys from an SLN/CKR location 1 - 4095 from the Motorola keyloader or the SMA to Key PID location from 1-64.

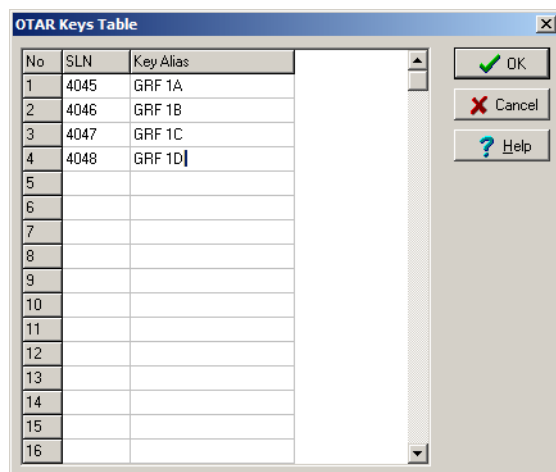
Note *You must select this mode to program the radio for OTAR.*

You can specify a maximum of 64 SLNs. The following key (alias) table links each SLN to a Key PID. Storage Location Number (SLN) and Common Key Reference (CKR) are equivalent terms.

Keys Table  **Keys Table** - Clicking this button displays the OTAR keys table screen shown in Figure 4.8. In this screen, associate Key PIDs 1-64 with the SLN/CKRs from 1-4095 specified when you load the key. You must program this table if you selected the SLN/CKR mode described above. The SLN/CKR number points to a specific key slot (of both keysets is using OTAR). The radio briefly displays the ten-character key alias when transmitting, changing channels, and switching between the clear and secure modes.

Note *If you do not cross reference SLNs to PIDs in this table, any keys loaded are inaccessible until this table is set up.*

Figure 4.8 OTAR Keys Table



No	SLN	Key Alias
1	4045	GRF 1A
2	4046	GRF 1B
3	4047	GRF 1C
4	4048	GRF 1D
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

Infinite Key Retention - If you select “On”, the radio stores keys in its memory and does not lose them when power is removed. If you select “Off”, the radio maintains the keys with power removed only until the storage capacitance discharges (approximately eight hours with a 53xx mobile and 30 seconds with a 51xx portable).

Erase Previous Keypad on OTAR Changeover - If this is selected, the keys in the original keypad are erased when the OTAR Changeover command. If this not selected, the keys in the original keypad are not erased when this occurs. Please note that this only erases keys on an OTAR changeover: It does not erase keys on a manual keypad changeover from either the menu or function button.

GPS -The Global Positioning System (GPS) feature can be used with a GPS receiver to determine the geographical location of the subscriber unit.

Enabled - (portable radio) Check this box to enable Global Positioning.

Auto Transmit - Check if you wish the location of the unit to be transmitted on the interval defined.

Note *Auto Transmit will only work for Digital Conventional channels on data enabled systems.*

Interval - If Auto Transmit selected, enter the time intervals for transmittal in one-second intervals.

Time Zone - Select your time zone or Greenwich time.

Emergency Transmit - Transmits GPS coordinates when an emergency is activated. This is only supported on the Conventional protocol.

Note *A GPS button or menu item can be defined on the Radio Wide page. If a button or menu item is not programmed, the user is not able to view or manually send GPS data.*

External Serial Connector (5300 only)

Serial Protocol - Select GPS if using an external device (such as a GPS receiver), or P25 Packet Data -SLIP or P25 Packet Data - PPP from the drop-down menu if using P25 Trunking data applications. SMU/UDDI is supported only on Multi-Net systems and provides the serial protocol supporting legacy Multi-Net UDDI data interfaces. Aux Output B is dedicated to handshake/CTS when SMU/UDDI is selected.

Baud Rate - Select the baud rate for the external device.

Side Port (5100 only)

Select the "Settings" button to set attributes for accessories for portable radios. A Side Port Settings popup window is displayed. The parameters that are programmed on this screen are:

Accessory - Select the accessory from the using the  button.

Baud Rate - Baud rate is currently used for GPS mic/accessories. The Otto GPS mic requires a baud rate setting of "4800". The Discover GPS mic has a programmable baud rate setting: program this field to match that setting.

Microphone Routing - Select the microphone routing option. Options available are:

“Follows PTT” - If the external microphone PTT is pressed, the external mic is active and the internal mic is ignored. If the radio PTT is pressed, the internal mic is active and the external mic is ignored.

“External Mic Only” - Regardless of whether the radio is PTT'd from the radio or from the external mic, only the external mic is active.

“Radio Only” - Regardless of whether the radio is PTT'd from the external mic or radio, only the internal mic is active.

External Emergency Switch - This feature controls both use of the man-down switch and the activation of an external microphone with an emergency button. If the radio remains in a horizontal position for the programmed time, the emergency mode selected by this feature functions the same as if the radio user pressed and held the Emergency button. To use the man-down feature, you must select it from the screen and a man-down device needs to be attached to the accessory port of the radio. The feature resets if the radio user moves the radio back to a vertical position. The radio user can cancel the Emergency mode by pressing the emergency button. When controlling the activation of an external microphone, the external microphone with an emergency button is used in the same manner as the orange emergency button on the top of the 5100.

Enable - Check this box to enable this feature.

Time Before Activation - 0 to 63 seconds. Time the radio can remain in a horizontal position before emergency signal is sent. This setting also sets the amount of time that you must press and hold the button to select the secondary function of any external microphone emergency button.

Network Settings - The radio IP address may be set one of two ways: Using the **Transfer → Read/Write IP Address** or setting the network settings on this screen. This is used for 5300 gateway for OTAR to other manufacturing infrastructure and it also makes use of the P25 data over IP, which you can send text or files using the P25 data protocol to various EFJ applications. Set static IP addresses for the following:

Subscriber IP Address

Subnet Mask

Default Gateway

Host IP Address

Data Gateway (5300 only) - Enables two 5300 radios to be networked for OTAR operations.

Enable - Check this box to enable this feature.

Mode - Set accordingly if radio can transmit or Receive OTAR operations.

Surveillance - Disables the transmit/receive LED indicator, display and keypad backlight, and all alert tones. When the Enable box is checked, the radio will power up in Surveillance mode with the selected options active. A function button can also be assigned which will activate and deactivate surveillance mode at the user's discretion. It overrides any other programming of these functions such as a Tone or Backlight option switch. A transmit icon in the display indicates the transmit mode when the LED indicator is disabled by this mode (51xx). This icon displays only in the Surveillance mode.

Disable Lights - Check this box to disable the lights.

Disable Tones - Check this box to disable the tones.

Disable Internal Speaker Audio - Check this box to disable the audio.

DSP Enhancements

2.7 kHz Rx Filter Enabled - Check this box to filter high frequencies above 2.7 Khz. This feature is applicable only to analog protocols.

Note *This feature effects the receiving radio.*

Enhanced Analog Modulation Limiting - Application specific. Please consult EFJohnson personnel before using this feature.

Soft Power Down (51xx and Ascend portable only) - The soft power down feature prevents the radio user from turning off the radio power accidentally by turning the top panel on-off/volume control. You can program any side option button for this function (in addition to the button's normal function). Then, to turn the power off, the radio user must press the programmed option button after power is turned off by the on-off/volume control.

Enable via Button - Turns on the soft power down feature and designates which button the feature is assigned too. This would require that the selected button be pressed to power off the radio once the on/off switch has been moved to the off position. Prevents accidental radio power down. Options for portable radios are: "Disabled" or select the side button to enable: "Side Button 1", "Side Button 2" and "Side Button 3". Options for mobile radios are: "Disabled", "Select Knob", "F2 Button" and "F6 Button".

The following three fields require the use of the soft power down feature and puts the radio to stand by if the on/off switch is turned to the off position.

Disable Emergency - Disables this function when the radio is in stand by mode. If Emergency is not selected here, pressing the button will cause the radio to come out of stand by mode and send the emergency.

Disable PTT - Disables this function when the radio is in stand by mode. If PTT is not selected here, pressing the button will cause the radio to come out of stand by mode and transmit the radio.

Disable Other Buttons - Disables other buttons when the radio is in stand by mode. If the "Disable Other Buttons" is selected, the only way to bring the radio out of stand by mode is to turn the on/off switch back on. The radio won't fully power down until the soft power down button is pressed.

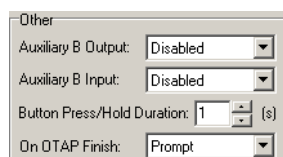
54 Channels / 16 Zones

For additional information about using this feature, refer to Section 2.10, “54 Channel / 16 Zone Configuration”.

Enabled - Check this box to enable this option in the codeplug.

Zone Alias - Click this button to edit the zone aliases. Up to sixteen zone aliases may be programmed. Each alias may contain up to ten digits. Please note that Channels should be named as zones, and zones as channels if using this feature. The exception to this rule is the Zone Select and Channel Select menu and function buttons are not switched when using the 54 channel/16 zone feature (Zone selects Zone and Channel selects Channel).

Other



The screenshot shows a configuration window titled 'Other'. It contains four settings:

- Auxiliary B Output: Disabled (dropdown menu)
- Auxiliary B Input: Disabled (dropdown menu)
- Button Press/Hold Duration: 1 (spin box) (s)
- On OTAP Finish: Prompt (dropdown menu)

Auxiliary B Output (53xx/ES) - Determines the function controlled by Pin 4 output of the accessory connector:

“Disabled” - The output is nonfunctional.

“Horn” - Controls an external horn alert.

“Backlight” - When you program the Siren option, the control head backlight also controls the Siren Controller backlight.

“Site Trunking” - Controls an external site trunking indication of some type with SmartZone and Project 25 trunked operation.

“Ext PA Mute” - Allows users to mute their own PA at the same time that the radio throws the external PA switch. If enabled, when the radio code toggles the external PA mute line, the auxiliary B output line will also be toggled.

Note *Auxiliary B Output is dedicated to handshake/CTS when SMU/UDDI is selected in the External Serial Connector field.*

Auxiliary B Input (53xx/Ascend Mobile Only) - Determines the function controlled by Pin 8 input of the accessory connector:

“PA Broadcast” - Selected with the Transit Bus PA option only to allow the radio user to select the public address function using an external switch.

“Ext Emergency” - Selected if the radio user can use an external emergency switch, such as a foot-activated type, to activate an emergency condition.

“Disabled” - The input is nonfunctional.

“Monitor” - Selected if the radio user can use an external monitor switch, such as a foot-activated type, to activate the monitor mode.

Note *If Monitor is programmed as Auxiliary B Input and the Aux B line is toggled from high to low, the monitor is turned on. If the Aux B line is toggled from low to high, the monitor is turned off.*

Button Press/Hold Duration - Some programs have a second function if you press and hold the button. This timer sets the amount of time that you must press and hold the button to select the second function: e.g., scan list select, nuisance delete, emergency cancel.

On OTAP Finish - Sets the actions the radio should take during Over the Air Programming (OTAP).

“Prompt” - The radio display prompts the user for a response after a successful OTAP download.

“Activate” - The new parameters are automatically written to the EEPROM upon a successful download.

“Off-Line” - The parameters are stored in Flash memory until activated with PC Configure or by the radio user.

Note *Refer to [Section 2.11.1](#), “Over the Air Programming” for more complete instructions for OTAP functionality.*

Zone Selector Locked (5100 only) - When the radio is turned on, the zone that comes up is the only one that can be used. Checking this box disables the user from changing zones and the radio stays in the Home Zone selected on the Primary Global page.

Disable Home Press and Hold - If this feature is enabled, the radio will go to the Home or Home 2 channel if the radio operator presses and holds the Home or Home 2 button. If not enabled, the radio stores the selected channel as the Home or Home 2 channel.

LED Disabled w/ Backlight OFF - (5300 Only) When you select this, the front panel transmit indicator is disabled whenever the display backlight is off. If you do not select it, this indicator operates normally regardless of the backlight state (except when you select the surveillance mode).

Channel 1 Audio Alert - (5300 Only) When rolling from channel 16 to channel one, an audio tone sounds to alert the user that you have rolled over to the beginning of the zone.

Inhibit Zone/Channel Indicators - (5300 Radios Only) Check this box to inhibit the zone/channel numeric display and the zone/channel select bars in all supported protocols and display operating modes.

Lock Channel Indicator - Check this box to always show the selected channel number on the right hand side of radio display. The alphanumeric portion of display shall show the active channel.

Conventional Systems

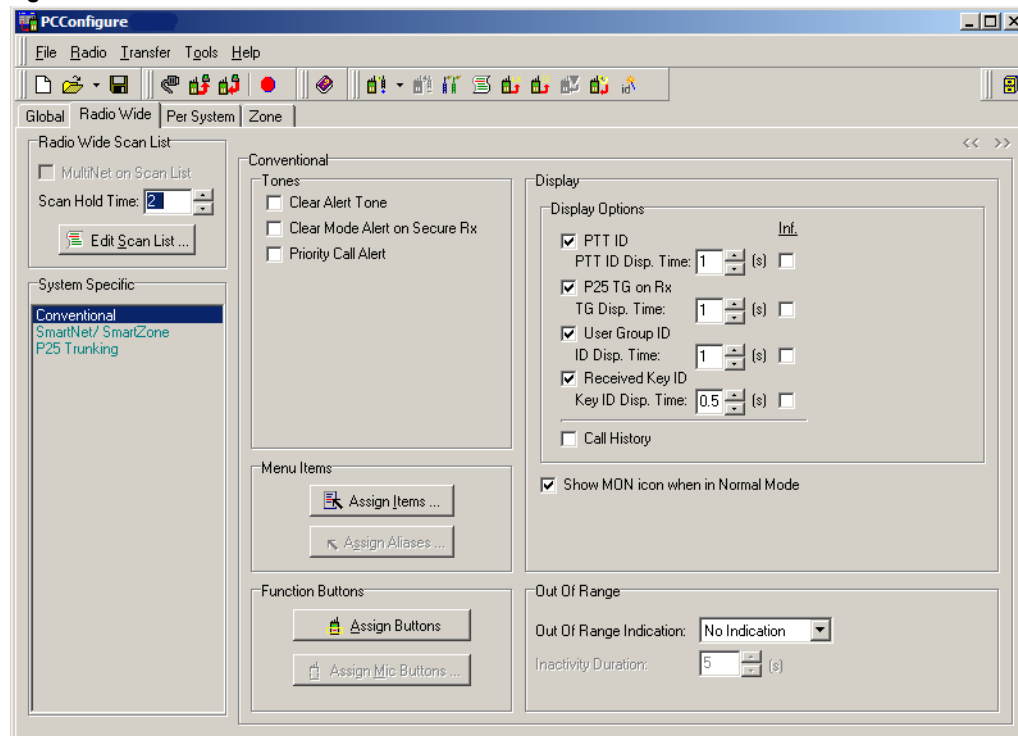
5.1 Radio Wide Screen

The **Radio Wide** screen programs parameters for all Conventional, Project 25 Trunked, SMARTNET/SmartZone, and Multi-Net systems. Areas of the screen common to all protocols are shown in Figure 2.1. A different screen displays for each system type. Figure 5.1 shows the Conventional screen. This section contains the instructions to program these parameters for Conventional systems.

5.1.1 Radio Wide Conventional Parameters

Select “Conventional” in the **System Specific** box to display the screen shown in Figure 5.1. This screen programs the functions for Conventional systems.

Figure 5.1 Radio Wide Conventional Screen



Radio Wide Scan List

Note Please refer to [Section 2.4.1, “Radio Wide Scan List Programming”](#) for additional information.

Scan Hold Time - When the radio performs Radio Wide scanning, this programs the delay that occurs after the radio stops receiving or transmitting messages and before Radio Wide Scan resumes. You can program times of 0 - 7.5 seconds.

Edit Scan List - You cannot program the radio wide scan list until you have set up all channels to be included in it in the *Zone* screens, as described in the *Setting Up Zones* section for each system. The Radio Wide Scan List is the same for all system types and can include up to sixteen channels from any system. You program this scan list by clicking the **Edit Scan List ...** button on this screen or in the toolbar. When you click either of these buttons, PC Configure displays the screens shown in Figure 2.2. To select the channels that are in the radio wide scan list, click the **Modify ...** button to display the Select Scan Channels screen. Select the desired zones from the drop-down list and then check the channels that you want to include from each zone in the list.

Tones

Clear Alert Tone - If checked, a short beep sounds to indicate that the radio user selected the clear (non-encrypted) mode.

Clear Mode Alert on Secure Rx - When you select this, a beep sounds whenever the radio receives a Secure (encrypted) call in the Clear mode on a conventional channel. If you do not select this, no beep sounds when this occurs.

Priority Call Alert - An audible tone tells the user he is receiving priority traffic and not just a standard scan channel. Although this feature is active for all systems, it is particularly applicable for the 5100 ES Model I radios.

Note *For information about assigning Menu Items and Function Buttons, please refer to [Section 2.4.2, “Menu Items Programming”](#) and [Section 2.4.3, “Function Button Programming”](#).*

Display

Display Options - Select whether anything displays before the selected channel alias.

PTT ID - The ID of the radio placing the call displays. You can program this ID to display for 0.5-7.0 seconds or “infinite”. When you select “infinite”, this ID displays for the entire call and none of the other parameters display.


P25 TG on Rx - The radio displays the number or alias of the talkgroup of the received call. You can program this to display for 0.5-7.0 seconds or “infinite” as just described.

User Group ID - If the ID of the received call is included in a User Group ID list as described in [Section 5.2.2.7, “User Group ID List \(Project 25 Only\)”](#), the alias of that group displays. You can program this to display for 0.5-7.0 seconds or “infinite” as just described.

Received Key ID - The radio displays the key used to decode received calls. You can program this to display for 0.5-7.0 seconds or infinite.

Call History - Check this box to enable the radio to store the last five IDs that it has received call alerts, talkgroup or unit calls from other radios.

After downloading parameters to the radio, the memory location where the last five Unit IDs are stored is cleared. Any digital conventional call, call alert, or unit call will store the transmitting unit's ID in one of the allocated memory slots. Up to five different IDs can be stored, with the most recent being stored first, second most recent stored second, etc. To use call history, select call alert or unit call list entry. The first entry should be the last unit that transmitted to the current radio. If the current radio is a portable, an “M” will appear in the upper left-hand corner, whereas a standard mobile radio will display its second triangle icon or a radio with the Lightning Control Head will display an “M”. The user can now scroll through these. Once the end of the memory locations or a non-valid ID is encountered (whichever happens first), the list entry will continue to the last unit ID, then to any programmed lists.

Show MON Icon When in Normal Mode - If checked, the monitor indication in the display ( with 5100, MON with 5300) turns on when you select the “Normal” mode by the Normal/Selective option button or menu parameter. If you do not check this, there is no continuous indication when the radio user selects this mode.

Out of Range

Out of Range Indication - Select the option to indicate to users that they are out of range of the current site. (Within EFJ conventional infrastructure only.) Indicator selections include:

- o No Indication (default)
- o Tone Only
- o Display Only
- o Tone & Display

Inactivity Duration - The interval that the out of range radio remains inactive without notifying user (by the Indication option above). May be set from 5 seconds to 1280 seconds (21+ minutes). Default is 30 seconds.

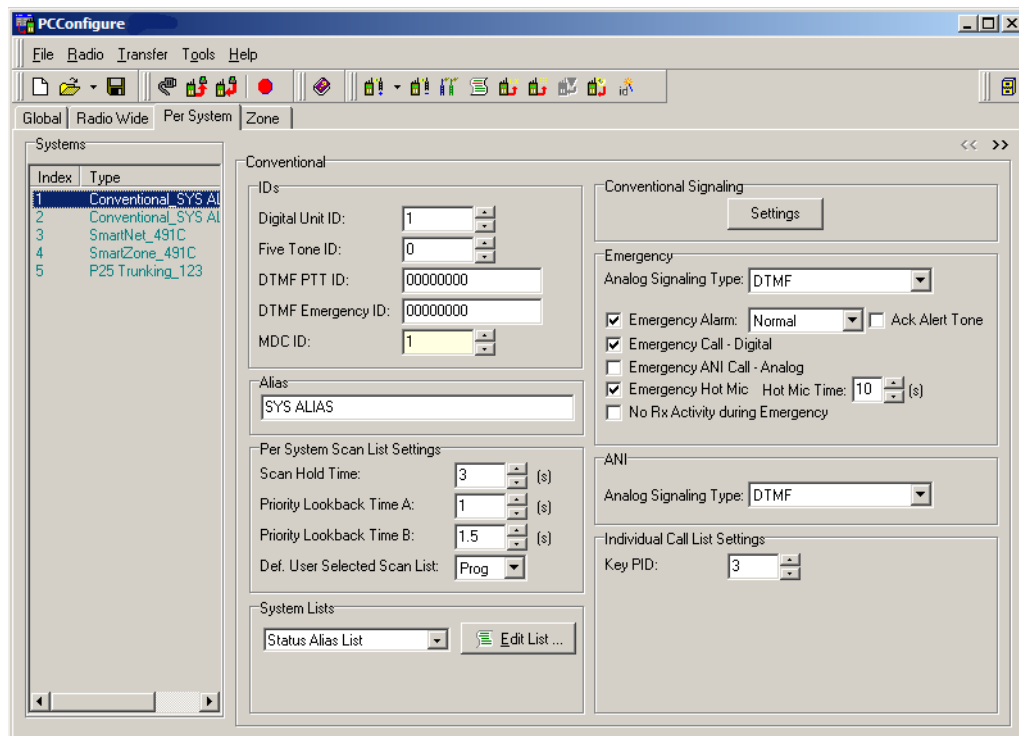
5.2 Per System Screens

This section contains descriptions of the parameters found on the **Per System** screens. Figures 5.2 and 5.4 show the **Per System** tab discussed in this section.

5.2.1 Conventional System Parameters

You can program Individual system parameters using the **Per System** screen shown in Figure 5.2. These parameters can be programmed after the desired systems have been set up as described in [Section 1.10, “Creating Systems”](#).

Figure 5.2 Conventional System Screen



Systems - Select the system for which you wish to set parameters. Radio-wide parameters are programmed by the **Radio Wide** screen as described in [Section 2.4.1, “Radio Wide Scan List Programming”](#). For information on programming individual SMARTNET/SmartZone and Project 25 Trunked system parameters, refer to Sections 6.2.1 and 7.2.1. The parameters in the individual Conventional System screen are as follows:

IDs

Digital Unit ID - This number identifies the radio when it operates on a Conventional Project 25 (digital) channel. It is recommended that each radio have a different ID, and the ID must be between 1 and 16,777,215.

Five Tone ID - Program for a RTT signaling or a pre and post ANI. Consisting of four digits from 0-9. Radio does not decode the five tone ID, only consoles will be able to decode the RTT or ANI signaling.

DTMF PTT ID - Channels programmed for pre- or post-transmit ANI use the PTT ID if the system is programmed for the DTMF analog signaling type. This ID consists of sixteen digits from 0-9. Program the ANI function on the channel screen as described in [Section 5.3.3, “Programming Conventional Channel Parameters”](#). For Legacy products, IDs ending in "00000000" should not be programmed, as only the first eight digits will be transmitted.

DTMF Emergency ID - This sets the ANI number that transmits if you selected the “Emergency ANI Call” or “Emergency Alarm” analog emergency features on the conventional **Per System** screen.

MDC ID - 5100 portable and 5300 mobile models support the ANI and Emergency Alert and Inhibit/Uninhibit features of the Motorola MDC1200 data protocol. Enter a hexadecimal value up to DEEE. This ID transmits if you select the MDC Analog Signal Type on the Conventional Per System screen, and if you program ANI or Emergency Alert. Emergency Alert and ANI parameters are programmed on the **Per System** screen, and ANI is programmed on the channel screen.

Alias - Programs the alias that is displayed for the system in the left pane after the system type. This alias is used as an identification aid when programming Zones and Channels and is not displayed by the radio.

Per System Scan List Settings - These parameters set various timers that control priority scanning when a channel assigned to the system is selected.

Scan Hold Time - Sets the delay that occurs before scanning resumes after a signal is no longer received. Times of 0 -7.5 seconds can be programmed.

Priority Lookback Time A - This time determines how often the priority channel is checked for activity. Times of 0.25-4.00 seconds in 0.25-second steps can be programmed.

Priority Lookback Time B - This time determines how often the priority channel is checked once an incorrect Call Guard (CTCSS/DCS) or NAC code is detected. Since it takes much longer to detect an incorrect Call Guard signal than a carrier, this time should be relatively long to prevent the interruptions from making a message difficult to understand. Times of 0.5-8.0 seconds can be programmed in 0.5-second steps.

Default User Selected Scan List - Selects the scan list that is normally always active on power up. A different scan list can be temporarily selected using the Scan List option switch or menu parameter. The Scan List Selection field on the conventional **Zone/Channel Parameters** screen can be programmed. To use the Scan List Selection field on the conventional Zone/Channel Parameters screen, the "Default User Selected Scan List" must be set to "Prog". This setting is overridden if a scan list is slaved to a particular zone on the **Zone/Channel** setup screen (see [Section 5.3, “Setting Up Zones and Channels”](#)). The press and hold function may be used to access the Scan List Select feature.

System Lists - Refer to [Section 5.2.2, “Conventional System Lists”](#) for information on these lists. The following system lists may be selected:

- [Status Alias List \(Project 25 Only\)](#)
- [Message Alias List \(Project 25 Only\)](#)
- [Call List \(Project 25 Only\)](#)
- [Talk Group List \(Project 25 Only\)](#)
- [Priority Scan List](#)
- [CTCSS / DCS / NAC List](#)
- [User Group ID List \(Project 25 Only\)](#)
- [Phone Access Code List \(Project 25 Only\)](#)
- [Phone List \(Project 25 Only\)](#)

Conventional Signaling - Select the [Settings](#) button to display the Conventional Signaling screen, Figure 5.3. This screen provides parameters and settings for Conventional digital (P25) and analog signaling.

Figure 5.3 Conventional Signaling Screen

Conventional Signaling

Digital Signaling

P25 Signaling

Retry Attempts: 4

Retry Response Timer: 3300 (ms)

Emergency Retry Attempts: 4

Emergency Response Timer: 3300 (ms)

RTT Message Number: 1

System Target Address: FFFFFFFE

Analog Signaling

Emergency Retry Attempts: 4

Single Tone Encoder

Initial Delay: 0 (ms)

Frequency: 1050 (Hz) Duration: 1.5 (s)

Modulation: 0.67

Side Tone: ☐

DTMF

Initial Delay: 0 (ms)

Digit Duration: 50 (ms)

Inter Digit Delay: 50 (ms)

Five Tone Encoder

Initial Delay: 0 (ms)

Inter Delay: 50 (ms)

Tone Duration: 50 (ms)

Modulation: 0.67

MDC

Initial Delay: 0 (ms)

OK

P25 Signaling

Retry Attempts - In the event that an RTT is not received by the system, the radio shall retransmit the RTT message until a successful ACK_RSP_FNE message is received or the maximum number of retransmissions is reached.

Retry Response Timer - If the radio does not receive the ACK_RSP_FNE message, this is the delay between the retry attempts.

Emergency Retry Attempts - In the event that an emergency alarm is not received by the system, the radio shall retransmit the emergency alarm message until a successful ACK_RSP_FNE message is received or the maximum number of retransmissions is reached.

Emergency Response Timer - If the radio does not receive the emergency alarm message, this is the delay between the retry attempts.

RTT Message Number - This message identifier is selected by the user to represent an RTT which is definable in the portable and mobile radio as well as the dispatch console system.

System Target Address - This address indicates that the message is not sent to a particular unit, but to the system infrastructure.

Analog Signaling

Emergency Retry Attempts - In the event that an Emergency alarm is not received by the system, the radio shall transmit the Emergency alarm message using the specified Emergency Analog Signaling Type until programmed number of retransmissions is reached. From zero to 15 may be entered. No Emergency ACK reply is received for retry attempts when using analog tone signaling, and when the programmed count is reached, a "No Ack" message is displayed and a beep sounds.

Single Tone Encoder

Initial Delay - This the delay before the actual signal is sent.

Frequency - The frequency of the tone being sent.

Duration - The amount of time the frequency is transmitted.

Modulation - An adjustable modulation value. Minimum is 0.5 and maximum is 0.8.

Side Tone - Enables a side tone when transmitting a single tone encoder.

Five Tone Encoder

Initial Delay - The delay before the actual signal is sent.

Inter Delay - The delay between each of the five tones being sent.

Tone Duration - The transmitted time duration of each tone.

Modulation - An adjustable modulation value. Minimum is 0.5 and maximum is 0.8.

DTMF

Initial Delay - The delay before the actual signal is sent.

Digit Duration - The duration of each of the tones being sent.

Inter Digit Delay - The delay between each of the tones being sent.

MDC

Initial Delay - The delay before the actual signal is sent.

Emergency Retry Attempts - In the event that an emergency alarm is not received by the system, the radio shall retransmit the emergency alarm message until a successful ACK_RSP_FNE message is received or the maximum number of retransmissions is reached.

The remainder of the fields from the **Per System** screen are:

Emergency

Analog Signaling Type - Selects the signaling type (Single Tone Encoder, Five Tone Encoder, DTMF or MDC) used for emergency calls and ANI on analog channels on the system. Refer to [Page 5-8](#) for more information about analog signaling types. Single Code Encoder allows the user to transmit a single tone. Five Tone Encoder allows a single transmission consists of five separate tones transmitted sequentially with an optional inter-tone pause between tones. MDC selects the MDC1200 Motorola signaling protocol. Analog Signaling Types are programmed on the **Conventional Signaling** screen, IDs, emergency and some ANI information is programmed on the **Per System** screen, and ANI is enabled on the analog channel screen (see [Section 5.3.3](#), “[Programming Conventional Channel Parameters](#)”).

Emergency Alarm - If this box is checked, emergency alarms are sent by pressing the Emergency option switch. In the Project 25 mode, an emergency alarm is a special Project 25 data transmission. In the analog mode, it is a DTMF or MDC Emergency ID that is sent (see preceding Analog Signaling Type). This ID is programmed on the Conventional **Per System** screen described in [Section 5.2.1](#), “[Conventional System Parameters](#)”.

“Normal/Silent” - When “Normal” is selected and an emergency alarm is sent, the red transmit indicator lights, an emergency tone sounds, and EMERGENCY flashes in the display. EMERGENCY continues to flash until power is cycled, the channel is changed, or the Emergency switch is pressed and held. If “Silent” is programmed, none of these indications occur.

Acknowledge Alert Tone - If selected, an alert tone sounds when the emergency alarm is acknowledged by the dispatcher (DTMF only).

Emergency Call - Digital - Enables Emergency Calls on conventional Project 25 channels. When the Emergency button and then the PTT switch are pressed, an emergency call is transmitted. To exit the emergency mode, cycle power or press and hold the Emergency switch.

Emergency ANI Call - Analog - Enables Emergency Calls on conventional analog channels. When the Emergency button and then the PTT switch are pressed, the Emergency DTMF code is sent every transmission (in place of the DTMF PTT ID if applicable). To exit the emergency mode, cycle power or press and hold the Emergency switch.

Emergency Hot Mic - When this box is checked and an emergency call is sent by pressing the Emergency switch, automatic transmitting occurs with the microphone audio unmuted (without user intervention) for the time specified by the following Emergency Hot Mic Time. If it is not checked or if an emergency call is not selected, automatic transmissions do not occur. This feature is initiated only by the first press of the Emergency switch. Subsequent presses do not trigger automatic transmissions. To reset this function, power must be cycled.

(Emergency) Hot Mic Time - Defines the period during which automatic transmissions occur. Times of 10-120 seconds in ten-second steps can be selected.

No Rx Activity during Emergency - When this box is checked, the following receive indications are disabled in the emergency mode: receive audio, receive LED, receive icons.

ANI

Analog Signaling Type - Selects the signaling type (DTMF, MDC, Single Tone Encoder, or Five Tone Encoder) used for ANI on analog channels on the system. MDC selects the MDC1200 Motorola signaling protocol. The DTMF and MDC IDs are programmed on the **Per System** Conventional screen (see [Section 5.2.1, “Conventional System Parameters”](#)), emergency and some ANI information is programmed on this screen, and ANI is enabled on the analog channel screen (see [Section 5.3.3.1, “Conventional Analog Channel Parameters”](#)).

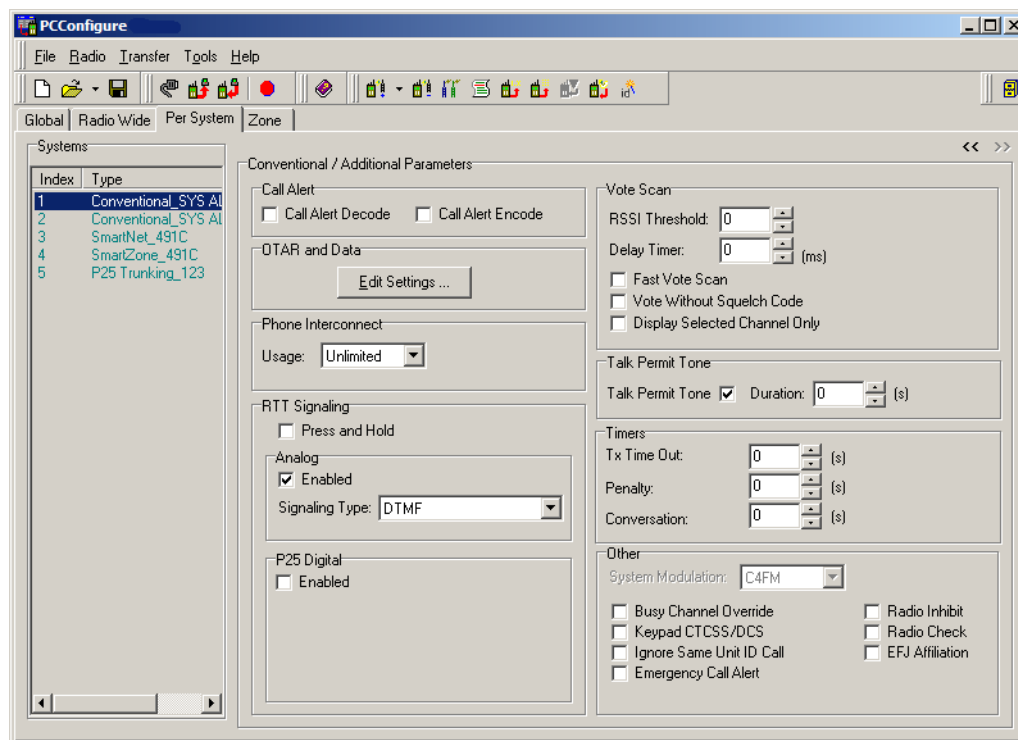
Note *The type of ANI (DTMF, MDC, Single Tone Encoder, Five Tone Encoder) is selected by the preceding Analog Signaling Type. DTMF PTT and MDC IDs are programmed on the **Radio Wide** Conventional screen, and pre and post ANI is enabled on the analog channel screen.*

Individual (Unit) Call List Settings (Project 25 Only)

Key PID - Selects the location from 0-63 (PID/ASN mode) or 1-64 (SLN/CKR mode) of the key used for secure individual calls on the system if applicable.

An additional conventional system screen is opened/closed by clicking the << >> buttons in the upper right corner of the screen. The following additional parameters are then displayed:

Figure 5.4 Conventional System Additional Parameters



Call Alert (Project 25 Only)

Call Alert Decode - If selected, enables call alert messages (pages) to be received.

Call Alert Encode - If selected, enables call alert messages (pages) to be sent.

OTAR and Data Settings

Tip You must select the *SLN (CKR)* key management mode on Page 2 of the **Global** screen to select the OTAR and Data parameters which follow.

Edit Settings - Clicking the **Edit Settings ...** button displays the following screen which programs various OTAR and Project 25 data parameters:

Figure 5.5 OTAR and Data Settings Screen

OTAR

OTAR Enabled - Select “On” to enable **Data Registration Enabled** for OTAR (Over-the-Air Rekeying) of encryption keys. Select “Off” to disable this feature.

Rekey Request Time Out - When rekeying is initiated by the radio (OTAR Rekey Request message sent), this setting determines how long the radio waits for a response from the Key Management Facility (KMF). Times of 20-180 seconds can be programmed. Default is 60 seconds.

Rx Security Level - When Enhanced is selected, only encrypted and authenticated Key Management Messages (KMMs) from the KMF are accepted (except for warm-start, which is authenticated only). If Basic (the default) is selected, any KMM is accepted that is in a format allowed by the OTAR standard.

Tx Security Level - When Enhanced is selected, all OTAR procedures originating from the radio are encrypted and authenticated. If they cannot be encrypted and authenticated, the KMM will not be sent. When Basic (the default) is selected, the radio always sends KMMs in the clear (if the OTAR standard allows them to be unencrypted and unauthenticated).

Note *Under Conventional OTAR and Data Settings, various fields are grayed out because they are not implemented in conventional mode.*

Originating Response Kind - Selects if a response is required from the KMF to outgoing messages. If “Kind 1-Unconfirmed” is selected, no response is requested, and if “Kind 3-Confirmed” (the default) is selected, and immediate response is requested.

Packet Data

SNMP Traps - Enables SNMP (Simple Network Management Protocol) indications and status updates to be sent to an application running on a mobile computer. The application is able to communicate with the radio using the SNMP protocol. The status updates include radio registration status and data service availability status. This value defaults to off.

ICMP Echo - Enables the radio to send back an ICMP response once an ICMP request has been received. This value defaults to off.

CAI IP Address - Assigns a fixed IPv4 Fixed IP Address to the radio for the Common Air interface.

Connection Type - Set the type of connection between the MDP and portable radio. For conventional IP Based data, set this to PPP.

ARP Cache Depth - Sets the Cache size used by the ARP (Address Resolution Protocol).

ARP Cache Expiration - Sets the Cache Expiration for the ARP (Address Resolution Protocol). This is the amount of time an IP/CAI address can stay in the cache.

Data/SNDCP (Subnetwork Dependent Convergence Protocol)

Data Registration Enabled- Select “On” to enable data registration. The radio then registers with the data system on a channel change (Project 25 channels only).

Data Registration Type - Dynamic allows the radio to automatically register with the KMF data base, while Static requires the KMF operator to manually enter the subscriber in the KMF data base. The default setting should be “Dynamic”.

CAI Data Max Tx Attempts - Selects the maximum number of times the radio attempts to send a Common Air Interface (CAI) data packet. Attempts to send the data packet continue until the radio receives an acknowledgement confirming the successful receipt of the packet, or until the selected amount of transmit attempts is reached. Default is 4.

Response Timer - Selects the amount of time the radio waits for an acknowledgement that a CAI transmission is successful before resending. Default is 3300 ms.

Under Conventional OTAR and Data Settings, the following are grayed out because SNDCP is not implemented in conventional mode:

SNDCP Activation Wait Timer - This controls the time that a radio waits for the KMF to respond to a SNDCP context activation request.

SNDCP Dwell Timer - Currently not implemented

Rx Interrupts Data. - When checked, a voice call can interrupt data.

Subscriber IP Address - The IP address assigned to the radio for a PPP connection.

Mobile Computer IP - IP address for the mobile computer for a PPP connection.

Tx Limited Patience - Selects the amount of time radio attempts to transmit a common air interface packet. Once time expires, radio ceases transmission. Times of 1 to 255 seconds or infinite, in increments of one second. The default is infinite.

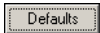
Min Response Timer - Selects the minimum amount of time that the radio waits for an acknowledgement of a successful CAI to be sent across the channel. Times of 50 to 2000 msec., in increments of 50 msec. The default is 700 msec.

Frame Sync Seek Period - Selects the amount of time the radio listens for a frame sync sequence before a packet is transmitted. Times of 0-5000 msec., in increments of 50 msec. The default is 750 msec.

Tx Short Random Range - Selects the maximum amount of time the radio waits to transmit once the first qualified FS is received indicating the channel is clear. Times of 50 to 500 msec., in increments of 50 msec. The default is 50 msec.

Tx Long Random Range - Selects the upper range of the random range. When the radio detects a busy, the radio uses a random time within this range (Back off delay) to determine when to retransmit the packet. Times of 50 to 5000 msec., in increments of 50 msec. The default is 2000 msec.

Tx Response Random Range - Selects amount of time radio waits before rechecking a channel's status once a busy channel status symbol has been received. Only applies to ACKs. Times of 50 to 1000 msec., in increments of 50 msec. Default is 1000 msec.

Select the  button to restore the system defaults to the above six fields.

Remaining fields on the second page of the **Per System** screen include:

Phone Interconnect (Project 25 Conventional Only)

Usage

“Disabled” - Phone calls cannot be placed or received.

“Answer Only” - Phone calls can be received but not placed.

“List Only” - Phone calls can be placed and received, and numbers can be recalled from a preprogrammed list only.

“Unlimited” - Phone calls can be placed and received, and numbers can be recalled from a preprogrammed list or dialed using a keypad. With 5300 radios, this mode is supported only when the HHC control unit is used. Standard 5300 front and remote models do not support number dialing. Press selects List only and press/hold selects direct entry.

RTT Signaling - Request to Talk (RTT) is used to alert the OCC operator that a unit is requesting to speak with the operator. In some cases Automatic Number Identification (ANI) is utilized to permit OCC operator identification of unit calling. Each base, mobile and portable radio transmits an encoded signal which is decoded into a unit identification and is displayed at the operator's console position. Priority capabilities permit a member to signal an emergency condition to the commenter by pushing one button.

Press and Hold - The time it takes to activate RTT Signaling.

Analog

Enabled - Enabled if a conventional analog channel.

Signaling Type - DTMF, MDC 1200, Single Tone Encoder, Five Tone Encoder.

P25 Digital

Enabled - Enabled if a digital channel.

Vote Scan - This option must be purchased. Scan based on received signal strength. Please refer to [Section 9.4, "Vote Scan Programming"](#) for instructions to program this feature.

RSSI Threshold - Sets the Receive Signal Strength Indicator (RSSI) levels that determine when searching for and switching to another site occurs.

Delay Timer - A delay that starts once a valid RF signal is received. After the delay timer has elapsed, an RSSI measurement is made.

Fast Vote Scan - A feature that is selected and if the signal strength level for the current repeater is above the RSSI Threshold setting, no additional voting will occur and the current repeater will be used.

Vote Without Squelch Code - If enabled, the CTSS/DCS setting will be ignored when determining which repeater to use.

Display Selected Channel Only - Selecting this field forces the radio to display the selected channel and to not display the repeater ID used once it is voted.

Talk Permit Tone - An audible tone alerting the user that it is OK to talk.

Duration - The amount of time before the talk permit tone sounds. From 0 to 3.1 seconds.

Timers

Tx Time Out - This timer limits the length of individual transmissions. Times up to three minutes, 45 seconds can be programmed in 15-second steps.

Penalty - This timer disables transmitting after the time-out timer disables the transmitter. Times up to three minutes, 45 seconds can be programmed in 15-second steps.

Conversation - This timer limits the total length of a conversation. Times up to 7.5 minutes can be programmed in 0.5-minute steps. This timer is reset if the dekey time between transmission exceeds the Penalty timer.

Other

System Modulation - Reserved for future use.

Busy Channel Override - If selected, the busy channel lockout feature can be overridden by quickly releasing and then pressing the PTT switch.

Keypad CTCSS/DCS (51xx Only) - If selected, a code for the selected channel can be directly selected from the programmed CTCSS/DCS/NAC list using the keypad. For example, pressing the “3” key selects code number 3 from the table. No other functions can then be assigned to the keys. If this is not selected, these codes can be selected only by the option button or menu parameter for that function.

Ignore Same Unit ID Call - This feature is part of the Mute/Unmute rules in place for subscriber products. If this box is checked, the radio will not unmute on traffic that is from a subscriber with the same digital unit ID. If not selected, the radio does not recognize the conventional “Digital Unit ID” when receiving traffic and will open for any traffic.

Emergency Call Alert - Notifies the user when an emergency call is being made on their selected P25 Conventional or P25 Trunking Talkgroup.

Radio Inhibit (Project 25 only) - If selected, the dispatcher can send a command which disables the radio.

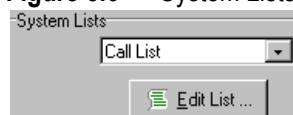
Radio Check (Project 25 only) - If selected, the dispatcher can send a message requesting a response from the radio (to check if it is in operation, for example). Radio responds with Zone number and Channel number the radio is currently selected to.

EFJ Affiliation - Check this box to enabled EFJohnson affiliation. The radio will transmit its unit ID, current talk group and mobile computer IP address to the system. (Within EFJ conventional infrastructure only.)

5.2.2 Conventional System Lists

To program the various conventional system lists select them in the **System Lists** drop-down list on the Conventional **Per System** screen shown Figure 5.2 and click the **Edit List** button. Descriptions of the various lists and the information they program follow. Figure 5.6 shows the drop-down **Systems List**.

Figure 5.6 System Lists Drop-down List



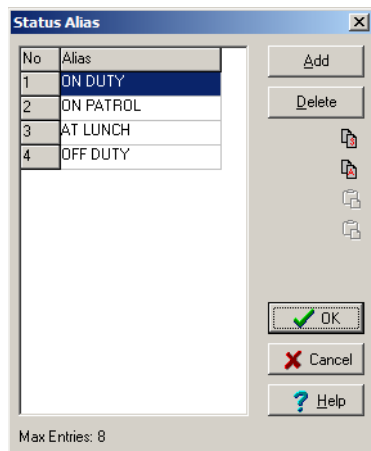
The following system lists may be selected:

- Status Alias List (Project 25 Only)
- Message Alias List (Project 25 Only)
- Call List (Project 25 Only)
- Talk Group List (Project 25 Only)
- Priority Scan List
- CTCSS / DCS / NAC List
- User Group ID List (Project 25 Only)
- Phone Access Code List (Project 25 Only)
- Phone List (Project 25 Only)

5.2.2.1 Status Alias List (Project 25 Only)

The Status Alias List screen which follows programs the alias for each of up to eight status conditions that can be sent. The meaning of each status number is defined by the system manager. The status number and meanings must be same between radio and console.





Figure 5.7 Status Alias Screen



To display this screen, on the Conventional **Per System** screen, select “Status Alias List” in the drop-down list and then click the  **Edit List ...** button.

To add an alias, click the Add button, and to delete an alias, select it and click the Delete button. To edit an alias, select it and change it as desired. Up to ten characters can be entered that identify the status. This identification is displayed when the user selects a status condition.

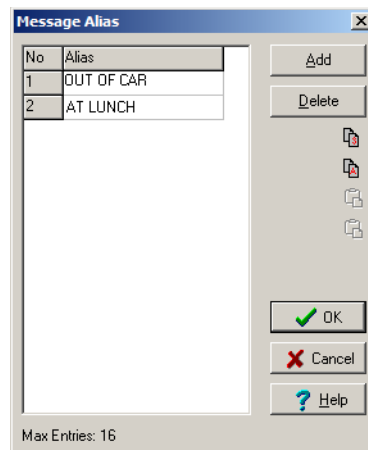
To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy CC frequencies to another system's CC list, etc.

- 1 Select the top  icon to copy the selected item or the second  icon to “copy all”, which copies every item active in the list.
- 2 Select the (third)  icon to paste the previously selected single item or the fourth  icon to “paste all”, which pastes the entire list captured previously. On “paste all”, it pastes over the current list. I.e., if the original list contains eight items and the pasted list contains six, two are deleted.

5.2.2.2 Message Alias List (Project 25 Only)

The Message Alias List screen shown in Figure 5.8 associates an alias (name) with each message number. Up to 16 messages may be programmed. The meaning of each message number is defined by the system manager.



Figure 5.8 Message Alias List Screen





To display this screen, on the Conventional **Per System** screen, select Message Alias List in the drop-down list and then click the  button.

To add an alias, click the Add button, and to delete an alias, simply select it and click the Delete button. To edit an alias, select it and change it as desired. Up to ten characters can be entered that identify the status. This identification is displayed when the user selects a message.

To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy CC frequencies to another system's CC list, etc.

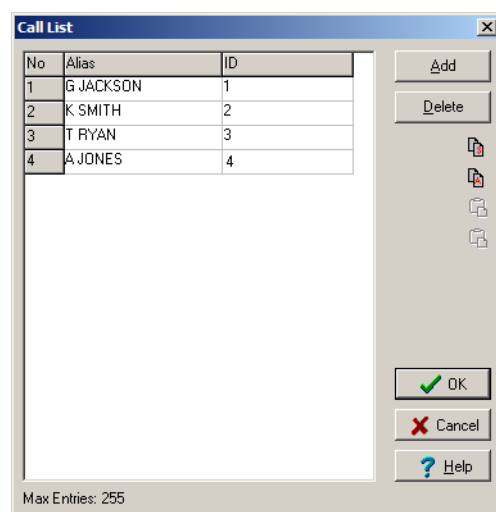
- 1 Select the top  icon to copy the selected item or the second  icon to “copy all”, which copies every item active in the list.

- 2 Select the (third)  icon to paste the previously selected single item or the fourth  icon to “paste all”, which pastes the entire list captured previously. On “paste all”, it pastes over the current list. I.e., if the original list contains eight items and the pasted list contains six, two are deleted.

5.2.2.3 Call List (Project 25 Only)

The Call List screen which follows sets up the IDs used to place individual calls on conventional digital (Project 25) channels. This list is also used when a call is received and the Display PTT ID is enabled. If the ID is defined in this list, the radio displays the alias, not the ID. This list is not used with conventional analog channels.

Figure 5.9 Call List Screen







To display this screen, on the Conventional **Per System** screen, select Call List in the drop-down list and click the  button.

To add a call, click the Add button, and to delete a call, simply select it and click the Delete button. To edit an Alias or ID, select it and enter the desired information as follows:

Alias - Up to ten characters can be entered to identify the user being called. This identification and the ID are alternately displayed when the call is selected by the user. Only uppercase letters can be entered, so lowercase letters are automatically converted to uppercase by the program.

ID - This is the ID of the radio being called. Valid entries are 0 - 16,777,216. When receiving a call from a unit with an ID entered on the list, the alias is displayed on the radio instead of the numeric ID.

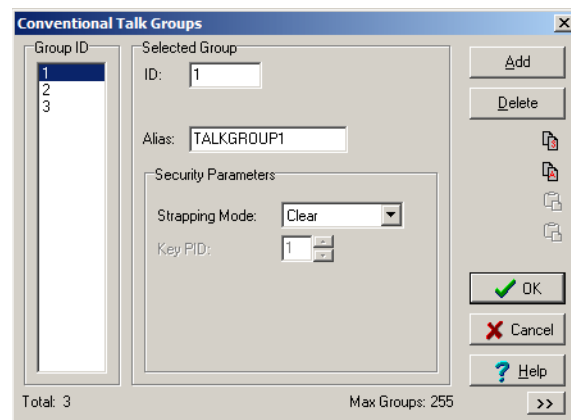
To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy CC frequencies to another system's CC list, etc.

- 1 Select the top  icon to copy the selected item or the second  icon to “copy all”, which copies every item active in the list.
- 2 Select the (third)  icon to paste the previously selected single item or the fourth  icon to “paste all”, which pastes the entire list captured previously. On “paste all”, it pastes over the current list. I.e., if the original list contains eight items and the pasted list contains six, two are deleted.

5.2.2.4 Talk Group List (Project 25 Only)

The Talk Group List screen shown in Figure 5.10 sets up the talkgroups used to place group calls on conventional digital (Project 25) channels. Talkgroups are not used with conventional analog channels. Talkgroups are assigned to channels on the channel programming screen described in [Section 7.3.3, “Project 25 Trunked Channel Parameters”](#).

Figure 5.10 Talk Group Screen



To display this screen, on the Conventional **Per System** screen, select Talk Group List in the drop-down list and then click the  button.

To add a talkgroup, click the Add button, and to delete an talk group, simply select it and click the Delete button. To edit an ID or Alias, select it and enter the desired information as follows:

ID - Group IDs can be any number from 0-65535. Group IDs can be entered as decimal or hexadecimal numbers depending on which mode is selected.

Alias - The alias is the identification that is displayed when the Talk Group is selected, and up to ten characters can be entered. This drop-down list selects the Talk Group to be edited if applicable.

Security Parameters

Strapping Mode

“Clear” - All transmissions on the group occur in the clear (unscrambled) mode.

“Secure” - All transmissions occur in the secure (scrambled) mode.

“Selectable” - The clear or secure status of the group is selected by the Clear/Secure option switch.

Encryption Key ID - Selects the location from 0-63 (PID/ASN mode) or 1-64 (SLN/CKR mode) of the key used for secure calls on the group if applicable.


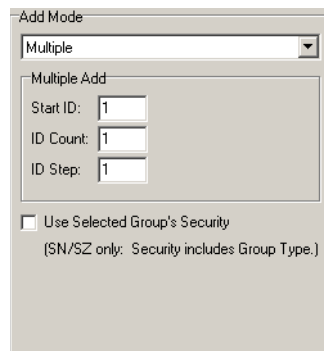
Add Mode - To add an entire block of talkgroup IDs or a specific ID, click the arrow button  in the lower right corner of the screen and the Talk Group screen is expanded and the following panel is displayed:

Figure 5.11 Add Mode Screen



Add Mode Drop-down List - “Single” adds the next available ID similar to the preceding “Add” button. “Multiple” adds a block of IDs as follows. To initiate the selected add operation, set up your parameters and click the preceding “Add” button. If the specified ID range results in duplicate IDs, an error message is displayed and no IDs are added.

Start ID - Specifies the starting ID of the block.





ID Count - Specifies the number of IDs to be added.

ID Step - Specifies if consecutive IDs are added or some other step rate is used.

For example, if Start ID = 10, ID Count = 5, and ID Step = 10, the IDs added are 10, 20, 30, 40 and 50.

Use Selected Group’s Security - When selected, the added groups are automatically programmed with the Strapping Mode and Encryption Key ID of the selected group.

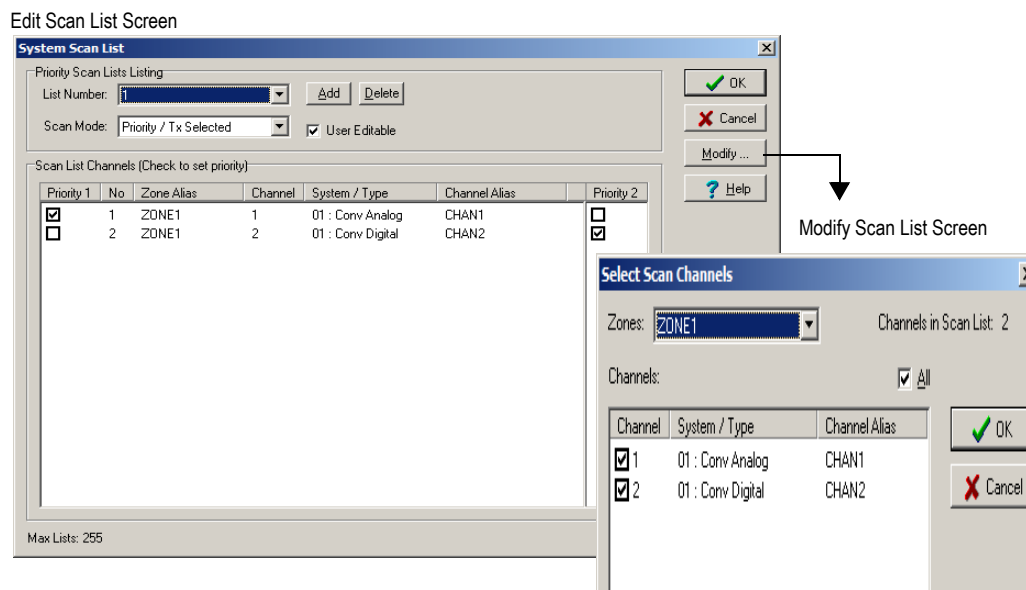
To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy CC frequencies to another system’s CC list, etc.

- 1 Select the top  icon to copy the selected item or the second  icon to “copy all”, which copies every item active in the list.
- 2 Select the (third)  icon to paste the previously selected single item or the fourth  icon to “paste all”, which pastes the entire list captured previously. On “paste all”, it pastes over the current list. I.e., if the original list contains eight items and the pasted list contains six, two are deleted.

5.2.2.5 Priority Scan List

Note *It may be necessary to define specific channel parameters before programming the conventional scan lists as follows (see Section 5.3.3.1).*

Figure 5.12 Priority (Standard) Scan List Programming Screens



This displays the Priority (Standard) Scan List screen (shown in Figure 5.12). This screen programs the priority scan lists that are selected on the system.

List Number - This drop-down list selects which of the scan lists to program. Click the “Add” button to add a scan list and “Delete” to delete a scan list.

User Editable - If this box is checked, user editing of the scan list is allowed. The Scan Edit function switch is then required. User editing can be enabled or disabled on each scan list.

Note *With the 5100 and 5300, Priority 1 and 2 channels can be programmed. The Priority 1 channel is sampled while listening to a call on the Priority 2 channel but not vice versa.*

Scan Mode - Sets the channel on which transmissions occur when the PTT switch is pressed while scanning. A different mode can be programmed for each scan list. In addition, it selects if priority sampling is used and also the type of priority channel. The following modes are available:

“No Priority” - Priority sampling does not occur (all channels are scanned in sequence). The radio transmits on the selected channel.

“Priority/Tx Selected” - Priority sampling occurs and the priority channel(s) are those programmed in the selected scan list. The radio transmits on the selected channel.

“Priority/Tx Priority (1)” - Priority sampling occurs and the priority channel(s) are programmed in the selected scan list. The radio transmits on the priority (1) channel.

“Priority (1) on Sel Chan” - The priority (1) channel is always the selected channel. The radio transmits on the selected channel.

“Talkback Scan” - No priority sampling occurs. The radio transmits on the channel of a call while scanning is halted. Then when scanning resumes, it transmits on the selected channel.

“Vote Scan” - Scan based on received signal strength. Please refer to [Section 9.4, “Vote Scan Programming”](#) for instructions to program this feature.

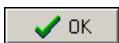
“TalkGroup on Active Scan” - Monitors a single digital conventional channel. When a call is received, the radio searches the scan list for a talkgroup that matches the received talkgroup. Returns calls on the received talkgroup if the user talks back during scan hold time.

“TalkGroup on Selected Scan” - Monitors a single digital conventional channel. When a call is received, the radio searches the scan list for a talkgroup that matches the received talkgroup. Always returns calls on the talkgroup from the selected channel.

If the “Priority/Tx Priority” or “Priority/Tx Selected” mode is programmed, you must choose the priority channel for the scan list. To do this, click the box next to the desired channel. Select the Priority 1 channel in the Priority 1 column and if a Priority 2 channel is also used, select it in the Priority 2 column.



(Modify) - To add or delete channels from a list, click this button to display the Modify Scan List screen shown in the preceding illustration. Select the channels from each zone that are to be included in the selected list (up to 255 channels maximum).



(OK) - Clicking this button closes the screen and saves the changes.



(Cancel) - Clicking this button closes the screen without saving any changes.

5.2.2.6 CTCSS / DCS / NAC List

Use Figure 5.13 to program the list of CTCSS/DCS (Call Guard) and NAC (Project 25) codes that can be selected if the Selective Squelch option switch is programmed or the Keypad CTCSS/DCS function which follows is programmed.

Figure 5.13 CTCSS/DCS/NAC List Screen

No	Tx CTCSS/DCS	Tx NAC	Rx CTCSS/DCS	Rx NAC
1	67.0 (CTCSS)	659 (D)/ 293 (H)	67.0 (CTCSS)	659 (D)/ 293 (H)
2	69.3 (CTCSS)	659 (D)/ 293 (H)	67.0 (CTCSS)	659 (D)/ 293 (H)

Total: 2 Max Entries: 64

Buttons: OK, Cancel, Add, Modify..., Delete, Help

To add a code to the list, click the Add button and an additional screen like the one shown in Figure 5.14 is displayed. Different codes can be programmed for the transmit and receive modes by selecting the mode in the drop-down list. In addition, carrier squelch can be programmed instead of a CTCSS/DCS code by unchecking the CTCSS/DCS box.

Figure 5.14 Add CTCSS/DCS/NAC

Values for: Tx

NAC (Dec): 659 NAC (Hex): 293

CTCSS/DCS: ☒ ☐

☒ CTCSS: 67.0 ☐ DCS: 023

Buttons: OK, Cancel

To change a code, select it and then click the Modify button. A maximum of 64 different codes can be programmed. A CTCSS/DCS code table is shown on [Page 16-1](#).

Figure 5.15 Edit CTCSS/DCS/NAC

Values for: Tx

NAC (Dec): 659 NAC (Hex): 293

CTCSS/DCS: ☒ ☐

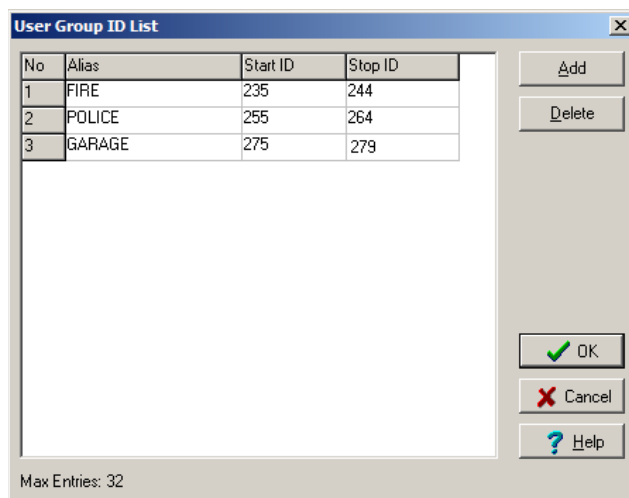
☒ CTCSS: 67.0 ☐ DCS: 023

Buttons: OK, Cancel

5.2.2.7 User Group ID List (Project 25 Only)

Use the User Group ID List screen shown in Figure 5.16 to program aliases that can be displayed if a call is received from a radio with an ID within the programmed block. For example, with the following screen, if a group call is received from radio within IDs 235-244, the alias “Fire” can be displayed. The display of this alias is controlled by the “User Group ID” parameter on the **Radio Wide** screen.

Figure 5.16 User Group ID List Screen



The screenshot shows a software window titled "User Group ID List". It contains a table with four columns: "No", "Alias", "Start ID", and "Stop ID". The table has three rows of data. To the right of the table are "Add" and "Delete" buttons. Below the table area are "OK", "Cancel", and "Help" buttons. At the bottom left, it says "Max Entries: 32".

No	Alias	Start ID	Stop ID
1	FIRE	235	244
2	POLICE	255	264
3	GARAGE	275	279

Max Entries: 32

5.2.2.8 Phone Access Code List (Project 25 Only)

Use the Phone Access Code List screen shown in Figure 5.17 to program sets of predefined DTMF access and de-access codes needed to make interconnect telephone calls on Project 25 channels. The code must be entered before the actual telephone number. They can be up to four digits in length, and the default code is *1P#. The access code is selected from this list on the conventional digital channel screen (see [Section 5.3.3.2, “Conventional Digital \(Project 25\) Channel Parameters”](#)).

Figure 5.17 Phone Access Code List Screen

The screenshot shows a window titled "Phone Access Codes" with a close button (X) in the top right corner. Inside the window is a table with three columns: "No", "Access Code", and "Deaccess Code". The first row contains the values "1", "*1P5", and "*1P5". To the right of the table are buttons for "Add", "Delete", and four copy icons. At the bottom right are buttons for "OK" (with a green checkmark), "Cancel" (with a red X), and "Help" (with a question mark). At the bottom left of the window, it says "Max Entries: 16".

No	Access Code	Deaccess Code
1	*1P5	*1P5

Max Entries: 16

5.2.2.9 Phone List (Project 25 Only)


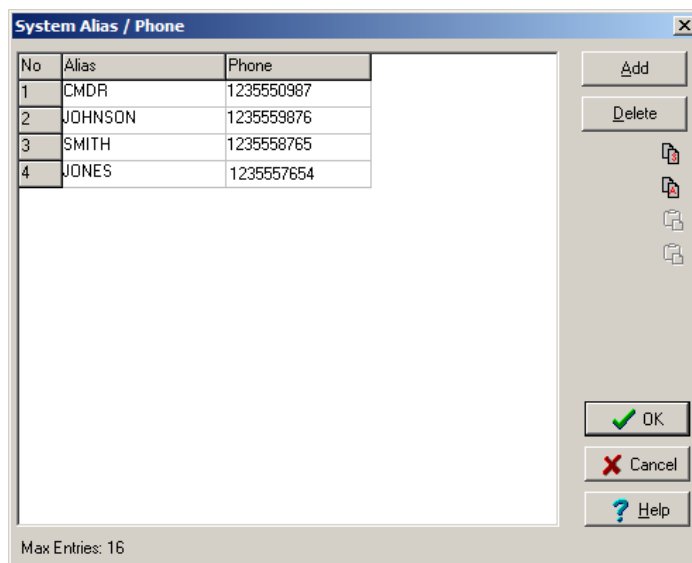
Use the Phone List screen shown in Figure 5.18 to program the telephone number list used for placing telephone calls if applicable. A maximum of 16 numbers can be programmed. To display this screen, on the Conventional **Per System** screen, select Phone List in the drop-down list and then click the  button.

Figure 5.18 Phone List Screen







To add a number, click the Add button, and to delete a number, simply select it and click the Delete button. To edit an alias or number, select it and enter the desired information as follows:

Alias - Up to ten characters can be entered to identify the number being called. This identification is displayed when the number to be called is selected by the user from the list. Only uppercase letters can be entered, so lowercase letters are automatically converted to uppercase by the program.

ID - This is the telephone number dialed when the location is selected. Numbers up to sixteen digits can be entered. A pause is entered by “p” or “P” and counts as one digit.

To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy CC frequencies to another system’s CC list, etc.

- 1 Select the top  icon to copy the selected item or the second  icon to “copy all”, which copies every item active in the list.
- 2 Select the (third)  icon to paste the previously selected single item or the fourth  icon to “paste all”, which pastes the entire list captured previously. On “paste all”, it pastes over the current list. I.e., if the original list contains eight items and the pasted list contains six, two are deleted.

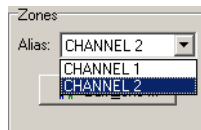
5.3 Setting Up Zones and Channels

5.3.1 Setting Up Zones

This section describes how to set-up zones and assign channels to each zone. A zone can include up to 16 channels of any type (conventional analog, Project 25 conventional, SMARTNET/SmartZone, Project 25 Trunked, or Multi-Net).

The 5100 portable/5300 mobile may be factory optioned to support up to 48, 256, 512, or 864 channels (3, 16, 32 or 54 zones respectively). To determine if one of these features is enabled, refer to the **Transfer → Read Options** Screen. Otherwise, a maximum of 16 zones (256 talkgroups) can be programmed.

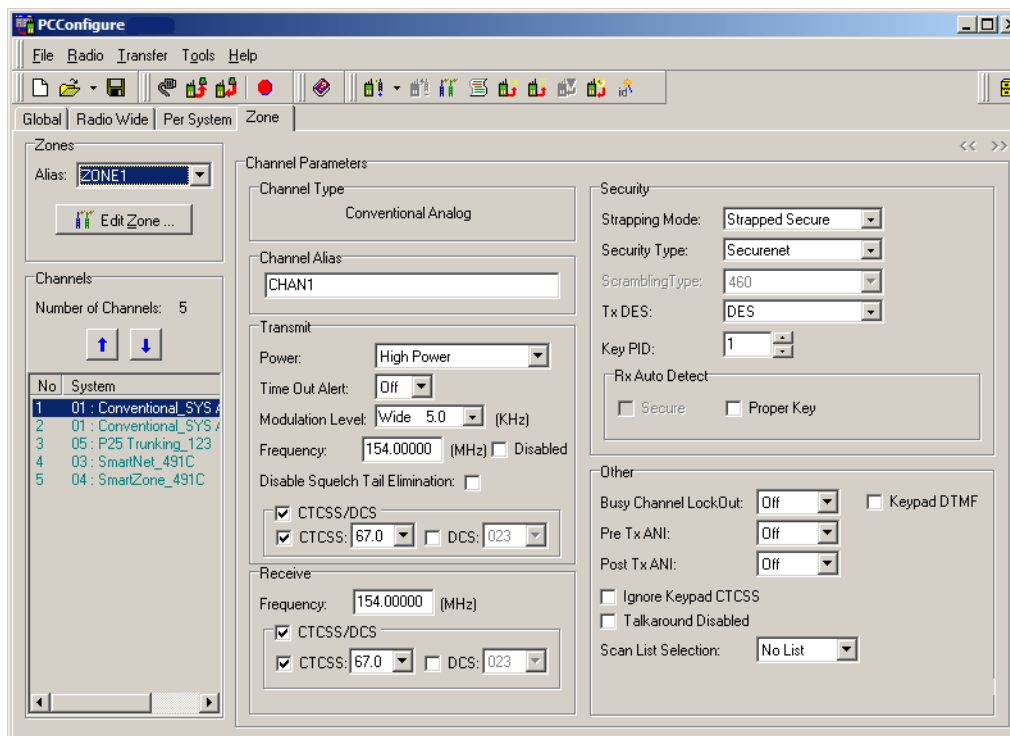
Note *If the 54 Channel / 16 Zone configuration option is enabled, Channels should be renamed as zones and zone as channels. Refer to [Section 2, “Programming Procedure”](#) for more information about this feature.*



Note *The maximum number of channels may be limited by available memory size.*

Setup Procedure:

- 1 Select the **Zone** tab to display the Zone screen. (This screen varies according to the type of system. Figure 5.19 shows a conventional analog Zone screen.)

Figure 5.19 Zone Screen



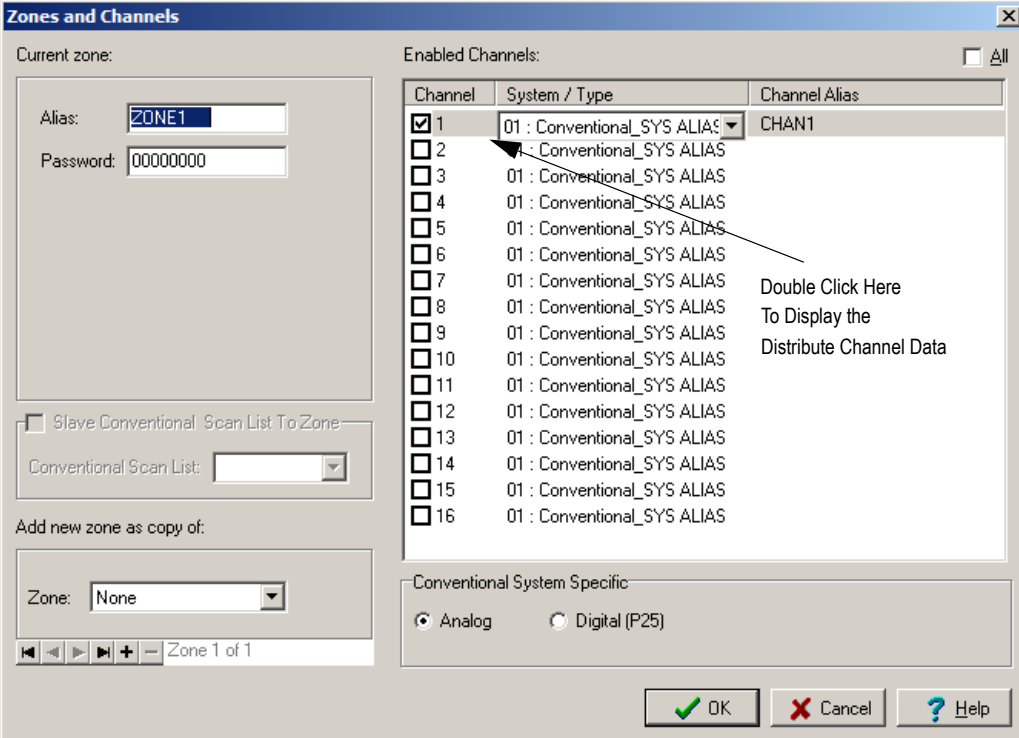






Click  in the upper left corner of the screen to display the **Zones and Channels** screen shown in Figure 5.20. Another way to do this is to click  in the toolbar.

Figure 5.20 Zones and Channels Screen



Channel	System / Type	Channel Alias
<input checked="" type="checkbox"/> 1	01 : Conventional_SYS ALIAS	CHAN1
<input type="checkbox"/> 2	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 3	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 4	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 5	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 6	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 7	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 8	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 9	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 10	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 11	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 12	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 13	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 14	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 15	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 16	01 : Conventional_SYS ALIAS	

- 1 To add a new blank zone, select “None” in the Zone drop-down list and then click the  button. To make a copy of a current zone, select the desired zone in the Zone drop-down list instead. To delete the current zone, click the  button.
- 2 To display the first zone, click ; the last zone ; the previous zone ; and the next zone, .
- 3 Program the alias (identification) that is displays briefly when you select the zone. To do this, enter a maximum of ten characters in the **Alias** box.
- 4 You can program a zone password that you must enter to perform keypad programming of the zone. Refer to [Section 11, “51xx Portable Keypad Programming”](#) and [Section 12, “53xx Mobile Keypad Programming”](#). To program this password, enter any eight numbers from 0-9. If you do not wish to program this password for the zone, simply leave this field all zeros.



5.3.1.1 Linking Conventional Scan Lists to Zones

You program conventional systems on the **Per System** screen with a default scan list that all channels in a given system can normally select. Refer to [Section 5.2.1, “Conventional System Parameters”](#). However, you can select the Slave Conventional Scan List to Zone feature to link a particular conventional scan list to the zone. This then becomes the default list for all conventional channels in that zone. It overrides the system default list programming. If a scan list is slaved to a zone, only channels within the slaved zone can be added to the slaved scan list.

5.3.2 Setting Up Channels

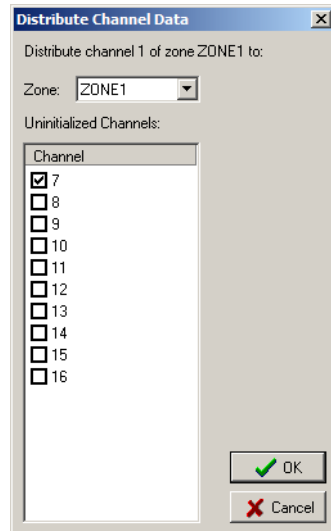
Note *When you assign a channel to a zone, you also select the system of the channel. Therefore, before assigning a channel to a zone, set up all necessary systems as described in [Section 1.10, “Creating Systems”](#).*

Set up channels by assigning them to a zone in the **Zones and Channels** screen shown in Figure 5.20. Proceed as follows to set up any type of channel.

- 1 Select the **Zone** screen (see Figure 5.19) and then click  to display the **Zones and Channels** screen shown in Figure 5.20. Another way to do this is to click  in the toolbar.
- 2 Select the desired zone as described in the preceding section.
- 3 To add a channel to the displayed zone, check the applicable box in the **Channel** column. To select or deselect all channels in the box, check or uncheck the **All** box.
- 4 To assign the channel to a system (if applicable), select the drop-down list in the **System/Type** column and select the desired system.
- 5 For Conventional channels, also select the channel type of each channel by clicking **Analog** or **Digital (Project 25)** in the **Conventional System Specific** box. This box is in the right pane at the bottom of the screen.

- 6 To copy an enabled channel to unprogrammed channel locations of the current zone or other zones, double click the shaded area of the channel as shown in Figure 5.20. The **Distribute Channel Data** screen then appears. Select the desired channels from this screen. This screen shows only disabled channels. (You need to select zone first then select channel to copy channel to.)

Figure 5.21 Distribute Channel Data



- 7 Repeat the preceding steps until the you have set up desired channels in each zone.
- 8 To program individual system and channel information, refer to [Section 5.3.3, “Programming Conventional Channel Parameters”](#).
- 9 To move a channel, select the channel you wish to move in the Channels list (on the left side of the Zone tab) and press the Up or Down arrow to move it to the desired location.

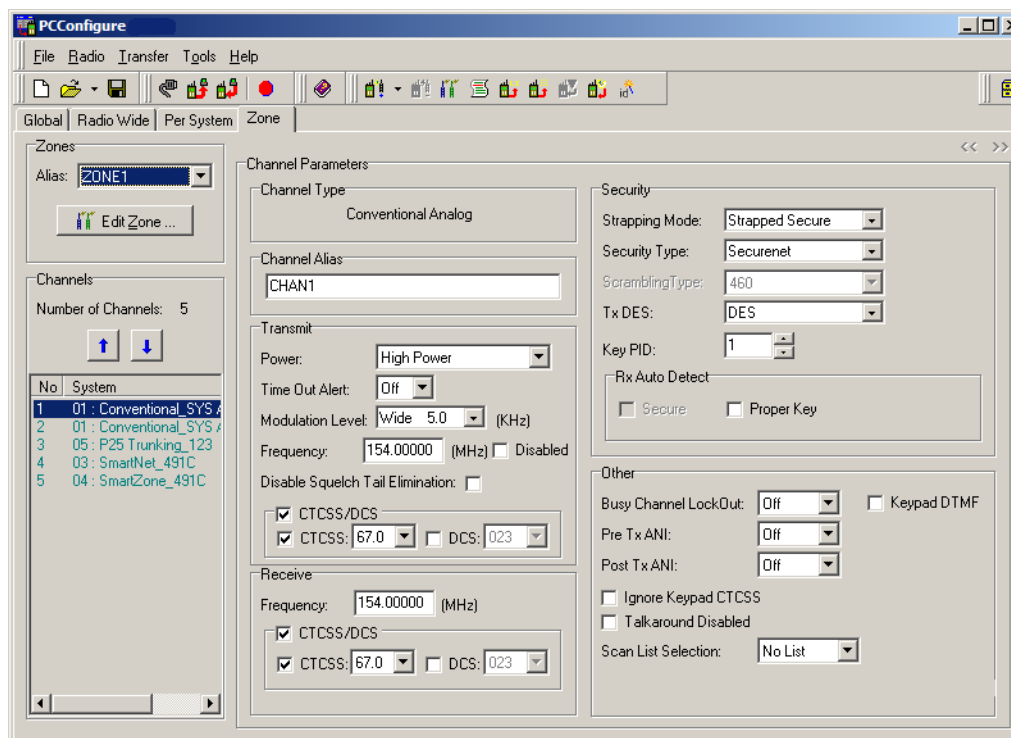
5.3.3 Programming Conventional Channel Parameters

After the desired channels have been set up as described in [Section 5.3.2, “Setting Up Channels”](#), you can program individual channel parameters. Select the **Zone** screen shown in Figure 5.22 and then select the desired Zone using the drop-down list in the “Zones” box. Screens which program individual channel parameters are selected by clicking the channel in the “Channels” box. See Figure 5.22 to set parameters for a Conventional Analog channel and Figure 5.23 to set parameters for a Conventional Digital channel.

5.3.3.1 Conventional Analog Channel Parameters

Select the system from the Channels section on the left side of the screen. The following screen is used to set channel parameters for a Conventional Analog system.

Figure 5.22 Conventional Analog Channel Screen



The parameters displayed when a Conventional Analog channel is selected are as follows.

Channel Type - Indicates the type of channel (Conventional Analog or Conventional Digital) that is currently selected in the “Channels” box.

Channel Alias - Programs the alias (identification) that is displayed when the channel is selected.

Transmit

Power - Fixes the transmit power on the channel for the high or low level or makes it selectable (the high/low power option switch is then required).

Time Out - Enables or disables the transmit time-out timer on the channel. The time-out timer time is programmed on the **Per System** programming screen (see [Section 5.2.1, “Conventional System Parameters”](#)).

Modulation Level - This selects if the channel modulation is wide band (5 kHz), narrowband (2.5 kHz), or NPSPAC (4 kHz). NPSPAC (public safety) modulation applies to 800 MHz models only.

Frequency - Programs the transmit frequency of the channel.

Disabled - Checking this box disables transmitting on the channel so that it is receive only.

Disable Squelch Tail Elimination - The 5100/5300 radios currently send a CTCSS reverse burst or CDCSS turn off code at the end of a transmission. This helps the repeater squelch sooner and eliminates the squelch tail often found in analog transmissions. Check this box to turn off the reverse burst feature so that the squelch tail is not eliminated.

CTCSS/DCS - Checking this box enables Call Guard (CTCSS/DCS) squelch control transmission on the channel. If this box is not checked, no code is transmitted and squelch is carrier controlled.

CTCSS - If this box is checked, tone Call Guard (CTCSS) squelch control is used and the desired tone is selected by the drop-down list.

Note *A CTCSS/DCS code table is shown on [Page 16-1, Section 16, "Call Guard \(CTCSS / DCS\) Tables"](#).*

DCS - If this box is checked, digital Call Guard (DCS) squelch control is used and the desired code is selected by the drop-down list.

Receive

Frequency - Programs the receive frequency of the channel.

CTCSS/DCS - Checking this box enables Call Guard (CTCSS/DCS) squelch control on the channel. If this box is not checked, no squelch control coding is used, and squelch is carrier controlled.

CTCSS - If this box is checked, tone Call Guard (CTCSS) squelch control is used and the desired tone is selected by the drop-down list.

DCS - If this box is checked, digital Call Guard (DCS) squelch control is used and the desired code is selected by the drop-down list.

Security

Note *Voice encryption is an optional feature that requires factory programming and possibly special hardware.*

Strapping Mode

"Strapped Clear" - All transmissions on the channel occur in the clear (unencrypted) mode.

"Strapped Secure" - All transmissions occur in the secure (encrypted) mode selected by Security Type.

"Switched" - The clear or secure status of the channel is selected by the Clear/Secure function switch.

Security Type

“Securenet” - Selects Motorola SecureNet™ DES type secure communication when either the Strapped Secure or Switched strapping modes are selected.

“Scrambling” - Selects Transcrypt 460 scrambling when either the Strapped Secure or Switched strapping modes are selected. (Not currently supported.)

Scrambling Type - (Not currently supported.) When the Transcrypt 460 scrambling type is selected, 460 scrambling is always enabled.

Tx DES - Enables DES type encryption mode.

Key PID - Selects the location from 0-63 (PID/ASN mode) or 1-64 (SLN/CKR mode) of the key used for secure calls on the channel if applicable.

Rx Auto Detect

Secure - [Rev 5 (ARM) only for 5300 mobiles] With the “Secure” check box enabled, if the radio receives analog DES (Securenet) encrypted traffic that does not match the PID key location programmed for the selected channel, squelch will open but no decoded voice traffic will be heard.

Proper Key - With the “Proper Key” check box enabled, if the radio receives an analog DES (Securenet) encrypted traffic, but the PID key location programmed for the active channel does not match the PID key being received, the radio will temporarily open squelch and then close squelch once the improper key is detected.

Other

Busy Channel LockOut

“Off” - Disables this feature.

“Noise” - Transmitting is disabled if a carrier is detected.

“Tone” - Transmitting is disabled if an incorrect Call Guard (CTCSS/DCS) tone or code is detected (one not programmed for current channel).

Keypad DTMF - If this box is checked, manual dialing of numbers using the DTMF keypad is allowed. Only true on a 53xx mobile while using the HHC controller.

Pre Tx ANI - If “Pre Tx” is selected, a DTMF-coded ID is sent at the beginning of each transmission. If this option is selected, Post TX ANI cannot be selected.

Post Tx ANI - If “Post Tx” is selected, a DTMF coded ID is sent at the end of each transmission. If this option is selected, Pre TX ANI cannot be selected.

Ignore Keypad CTCSS - If this is checked and a CTCSS/DCS code has been selected from the preprogrammed CTCSS/DCS table by the Selective Squelch Code Select feature, it is ignored and the programmed code for the channel is selected instead.

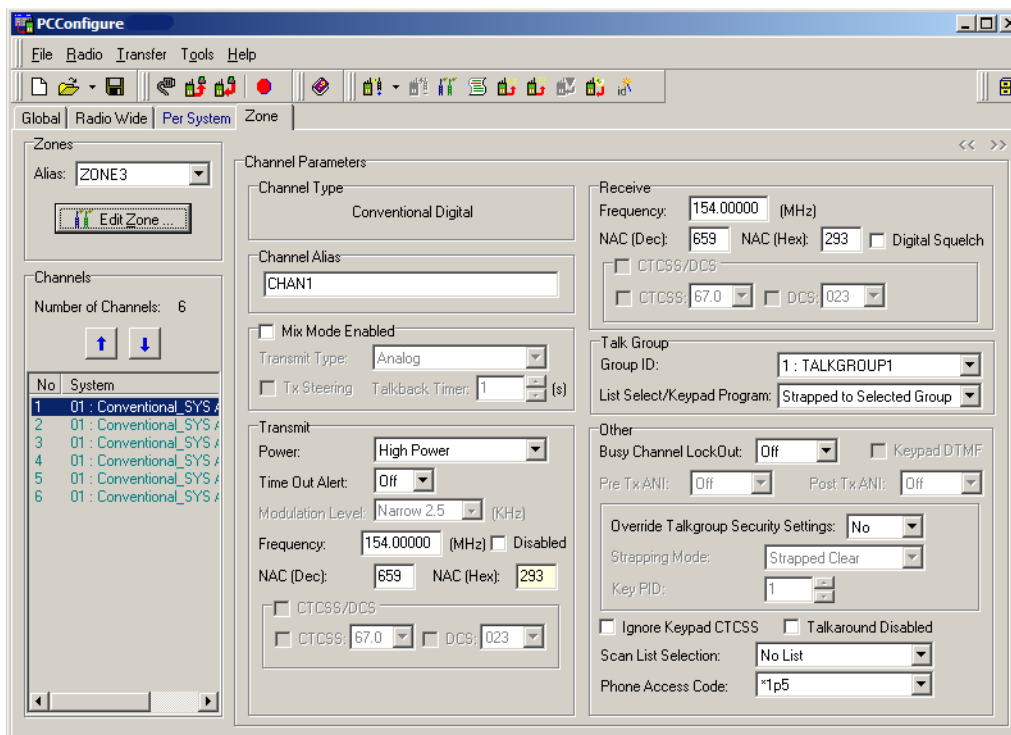
Talkaround Disabled - Set on a per-channel basis: the user has to use the infrastructure if disabled. (Radio to Radio communication is not allowed.)

Scan List Selection - Enter the number of the scan list set with the Vote Scan option.

5.3.3.2 Conventional Digital (Project 25) Channel Parameters

After the desired channels have been set up as described in [Section 5.3.2, “Setting Up Channels”](#), individual channel parameters can be programmed. Select the **Zone** screen shown in Figure 5.23 and select the desired Zone using the **Alias** drop-down list in the “Zones” box. Screens which program individual channel parameters are selected by clicking the channel in the **Channels** box.

Figure 5.23 Conventional Digital (Project 25) Channel Screen



The parameters displayed when a Conventional Digital channel is selected are as follows. Refer to [Section 5.3.3.1, “Conventional Analog Channel Parameters”](#) for information on Conventional Analog channels.

Channel Type - Indicates the type of channel (Conventional Analog or Conventional Digital) that is currently selected in the “Channels” box.

Channel Alias - Programs the alias (identification) that is displayed when the channel is selected. Up to ten characters can be programmed.

Mix Mode Enable - Checking this box selects both analog and digital operation on the current channel.

Mixed analog and digital (conventional Project 25) operation can be programmed for a channel location enabled as a digital channel (no mixed mode operation is available for a channel location enabled as analog). Mixed mode operation allows both types of calls to be received. The transmit mode is determined by either the “Transmit Type” selection or by enabling the “Tx Steering” feature. Analog transmission using either of these modes will require channel modulation, coded squelch and ANI signaling settings and analog receive will require coded squelch settings similar to that described in [Section 5.3.3.1, “Conventional Analog Channel Parameters”](#).

Transmit Type - When “Analog” is selected, CTCSS/DCS is transmitted, and when “Digital” is selected, NAC is transmitted.

Tx Steering - Allows the radio to reply to a mixed signal call received on the protocol other than the type indicated in Transmit Type. I.e., a digital reply to a digital received call on a channel marked for “analog”, or vice versa.

Talk-back Timer - Controls the duration allowed to talk back to the opposite protocol. Once the time expires, transmit occurs on the programmed Transmit Type.

Transmit

Power - Fixes the transmit power on the channel for the high or low level or makes it selectable (the high/low power function switch is then required).

Time Out Alert- Enables or disables the transmit time-out timer on the channel. The time-out timer time is programmed on the **Per System** programming screen (see [Section 5.2.1, “Conventional System Parameters”](#)).

Modulation Level - If the Mixed Mode and Transmit Type = Analog is selected, the modulation level is programmed. This selects if the channel modulation is wide band (5 kHz), narrowband (2.5 kHz), or NPSPAC (4 kHz).

Frequency - Programs the transmit frequency of the channel.

Disabled - Checking this box disables transmitting on the channel so that it is receive only.

NAC - Programs the transmit Network Access Code (NAC). These codes can be 0-4095, and either decimal or hexadecimal numbers can be entered. If this option is selected, narrowband is transmitted.

CTCSS/DCS - If the Mixed Mode and Transmit Type = Analog is selected, the transmit Call Guard (CTCSS/DCS) squelch coding can be programmed (see [Section 5.3.3.1, “Conventional Analog Channel Parameters”](#)). If this option is selected, wideband is transmitted.

CTCSS - Select the desired tone from the drop-down list.

Note *A CTCSS/DCS code table is shown in [Section 16, “Call Guard \(CTCSS / DCS\) Tables”](#).*

DCS - Select the desired code from the drop-down list.

Receive

Frequency - Programs the receive frequency of the channel.

NAC - Programs the receive NAC (Network Access Code). These codes can be 0-4095, and either decimal or hexadecimal numbers can be entered. NAC F7E (hex) is interpreted as a standard code.

Digital Squelch - When checked, carrier squelch is enabled which results in all digital traffic, regardless of NAC or talkgroup ID, being received. This does not program NAC F7E which is used the same as other NAC codes.

CTCSS/DCS - If the Mixed Mode is selected, the receive Call Guard (CTCSS/DCS) squelch coding can be programmed (see [Section 5.3.3.1, “Conventional Analog Channel Parameters”](#)). Both analog and digital (Project 25) calls can be received in the mixed mode.

CTCSS - Select the desired tone from the drop-down list.

Note A CTCSS/DCS code table is shown on [Section 16, “Call Guard \(CTCSS / DCS\) Tables”](#).

DCS - Select the desired code from the drop-down list.

Talk Group

Group ID - This selects the Project 25 talkgroup that is assigned to the channel. The talkgroup includes the Talk Group ID, talkgroup alias, secure strapping mode, and encryption key address. Talk Groups are programmed in the **Per System** screen ([Section 5.2.1, “Conventional System Parameters”](#)).

List Select/Keypad Program

“Strapped To Selected Group” - The talkgroup on the channel is always the programmed talkgroup and cannot be changed.

“List Selectable” - The talkgroup may be changed using the Digital TG Select function button.

Other

Busy Channel LockOut

“Off” - Disables this feature.

“Noise” - Transmitting is disabled if a carrier is detected.

“NAC” - Transmitting is disabled if an incorrect NAC code is detected (or CTCSS/DCS if mixed mode is enabled). An incorrect code is any code not programmed for the current channel.

Keypad DTMF - If this box is checked, manual dialing of numbers using the DTMF keypad is allowed. This is available in the mixed mode only. Only true on a 53xx mobile while using the HHC controller.

Pre Tx ANI - If “Pre Tx” is selected, a DTMF coded ID is sent at the beginning of each transmission if the transmit type is set to “analog” or if “Tx Steering” forces the radio to transmit back in analog mode.

Post Tx ANI - If “Post Tx” is selected, a DTMF coded ID is sent at the beginning of each transmission if the transmit type is set to “analog” or if “Tx Steering” forces the radio to transmit back in analog mode..

Override Talkgroup Security Settings - This allows the encryption strapping mode and key location to be set on a per channel basis instead of just on a per talkgroup basis. If “Yes” is selected in the drop-down menu, the selected strapping mode and key location overrides the talkgroup programming if applicable (conventional digital channels only).

Strapping Mode

“Strapped Clear” - All transmissions on the channel occur in the clear (unscrambled) mode.

“Strapped Secure” - All transmissions occur in the secure (scrambled) mode selected by Security Type.

“Switched” - The clear or secure status of the channel is selected by the Clear/Secure function switch.

Key PID - Selects the location from 0-63 (PID/ASN mode) or 1-64 (SLN/CKR mode) of the key used for secure calls on the channel if applicable.

Ignore Keypad CTCSS - If this is checked and a CTCSS/DCS code has been selected from the preprogrammed CTCSS/DCS table by the Selective Squelch Code Select feature, it is ignored and the programmed code for the channel is selected instead.

Talkaround Disabled - Set on a per-channel basis: the user has to use the infrastructure if disabled. (Radio to Radio communication is not allowed.)

Scan List Selection - Enter the number of the scan list set with the Vote Scan option.

Phone Access Code - Selects the Phone Access Code if telephone calls are placed on the channel. The access codes are programmed by the Phone Access Code system list on the **Per System** screen.

SMARTNET and SmartZone Systems

6.1 Radio Wide Screen

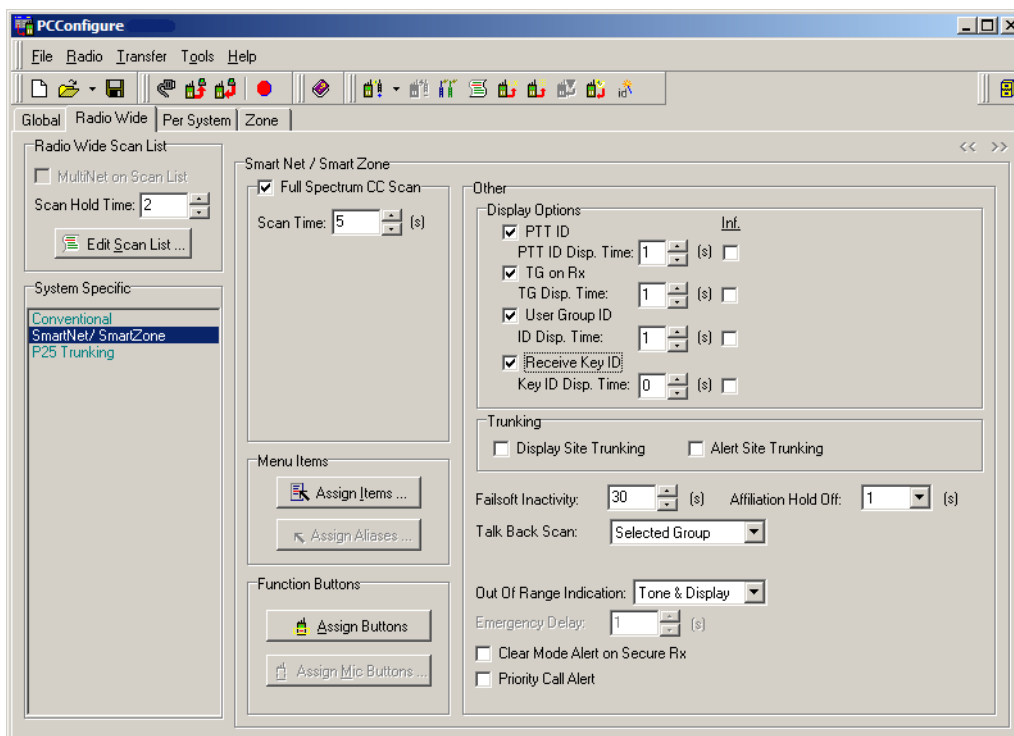
The **Radio Wide** screen programs parameters for all Conventional, Project 25 Trunked, SMARTNET™/SmartZone®, and Multi-Net systems. Areas of the screen common to all protocols are shown in Figure 2.1. A different screen is displayed for each system type. This section contains the instructions to program these parameters for SMARTNET/SmartZone systems.

Note SMARTNET™/SmartZone® are registered trademarks of Motorola, Inc.

6.1.1 Radio Wide Parameters

Select “SMARTNET/SmartZone” in the **System Specific** box to display the screen shown in Figure 6.1. This screen programs the functions that are the same for all SMARTNET and SmartZone systems.

Figure 6.1 Radio Wide SMARTNET/SmartZone Screen



Radio Wide Scan List

Note Please refer to [Section 2.4.1, “Radio Wide Scan List Programming”](#) for additional information.

Scan Hold Time - When the radio performs Radio Wide scanning, this programs the delay that occurs after the radio stops receiving or transmitting messages and before Radio Wide Scan resumes. You can program times of 2 - 7.5 seconds.

Edit Scan List - You cannot program the radio wide scan list until you have set up all channels to be included in it in the Zone screens, as described in the *Setting Up Zones* section for each system. The Radio Wide Scan List is the same for all system types and can include up to sixteen channels from any system. You program this scan list by clicking the button on this screen or in the toolbar. When you click either of these buttons, PC Configure displays the screens shown in Figure 2.2. To select the channels that are in the radio wide scan list, click the button to display the Select Scan Channels screen. Select the desired zones from the drop-down list and then check the channels that you want to include from each zone in the list.

Full Spectrum CC Scan - After the radio searches across the programmed range of potential control channel frequencies, the radio enters a channel-by-channel search across the full spectrum the radio covers. The timer sets the period of time the radio performs this scan before checking the programmed frequencies again. After the radio checks these frequencies, full spectrum scanning resumes from the previous point where scanning stopped. This cycle repeats until the radio finds a control channel. Checking the box enables full spectrum scan.

Scan Time - Sets the time that full spectrum scanning occurs as just described. The selectable range is 5-31 seconds. The default is five seconds.

Note *For information about assigning Menu Items and Function Buttons, please refer to [Section 2.4.2, “Menu Items Programming”](#) and [Section 2.4.3, “Function Button Programming”](#).*

Other

Display Options - Select whether anything displays before the selected channel alias. The order of the Display Options is TG, Unit (PTT) ID and then User Group alias if all are active.

TG on Rx - The radio displays the alias or number of the talk group on which the call is being received. You can program this to display for 0.5-7.0 seconds or “infinite” as just described.

PTT ID - The ID of the radio placing the call displays. You can program this ID to display for 0.5-7.0 seconds or “infinite”. When you select “infinite”, this ID displays for the entire call and none of the other parameters display.

User Group ID - If the ID of the call being received or the alias of that group is defined displays. You can program this to display for 0.5-7.0 seconds or “infinite” as just described.

Received Key ID - The radio displays the key used to decode received calls. You can program this to display for 0.5-7.0 seconds or infinite.

Trunking

Display Site Trunking - (Default setting.) If you select this, “Site Trunking” displays if the affiliated site loses communication with the zone controller and operates in the site trunking mode. This message displays until the zone controller returns to normal operation.

Alert Site Trunking - If you select this, an alert tone sounds when entering the site trunking mode previously described.

Failsoft Inactivity - Attempts to find a control channel in the programmed control channel list. If the radio remains inactive (no receive or transmit activity on the channel) while it operates in the failsoft mode for the programmed time, the radio momentarily leaves the failsoft mode and attempts to find a control channel. If you program “0”, the radio does not leave the failsoft mode.

Affiliation Hold Off - With SmartZone operation, this is the delay time that occurs after acquiring the control channel before it sends an affiliation inbound signaling word (ISW). This prevents all radios on the system from sending affiliation ISWs at the same time.

Talk Back Scan - When the radio receives a call while it is scanning, this setting determines the talk group of the radio's response during the scan hold time. You can program the radio to respond on the Selected talk group or the received talk group (Active) group if they are not the same. You program **Scan Hold Time** on the **Per System** screen.

Out Of Range Indication - Selects if the periodic tone sounds, "Out of Rng" (or "NO SYS") displays, or if both or neither of these indications occur when an out-of-range condition exists. "Display Only" is default.

Clear Mode Alert on Secure Rx - When you select this, a beep sounds when the radio receives a Secure (encrypted) call in the Clear mode on a SMARTNET/SmartZone channel. If you do not select it, no beep sounds when this occurs.

Priority Call Alert - An audible tone tells the user he is receiving priority traffic and not just a standard scan channel. Although this feature is active for all systems, it is particularly applicable for the 5100 ES Model I radios.

6.2 Per System Screens

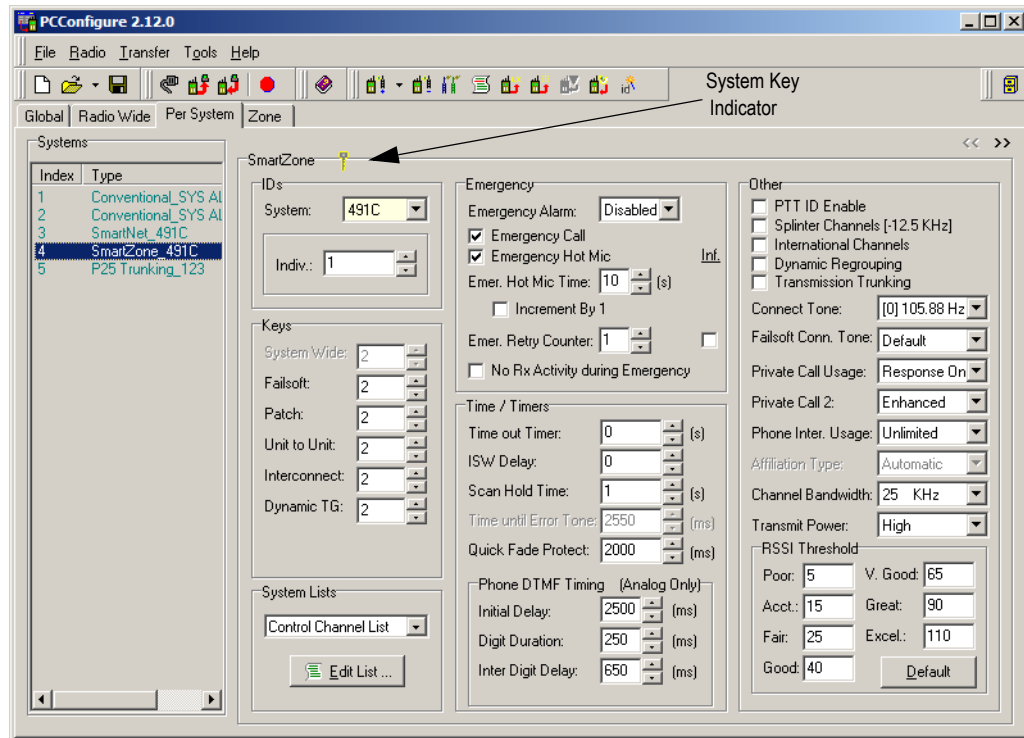
Two screens contain the interface where individual SMARTNET and SmartZone system parameters are programmed. This section contains descriptions of the parameters found on these screens. You can program these parameters after you set-up the desired systems as described in [Section 1.10, "Creating Systems"](#).

Note *Some SMARTNET and SmartZone parameters can be edited only if PC Configure detects the proper system key. PC Configure detects a key if a yellow key icon is indicated as shown in Figure 6.2. If there is a red "X" through this icon, PC Configure does not detect a key. Refer to [Section 13, "System Keys"](#), for more information.*

6.2.1 System Parameters: Primary Screen

Figure 6.2 shows the initial SMARTNET and SmartZone system programming screen.

Figure 6.2 SmartZone System Screen



Systems - Select the system for which you wish to set parameters.

IDs

System - After you have placed the system key into the designated *Keys* location, select the key from the drop-down box. (Refer to [Section 13.1, “Software System Key Location”](#).) System ID numbers can be 0001 through FFFF hex. If PC Configure does not detect a valid system system ID, you can only select the default ID of “0001”.

Note *Motorola assigns this System ID to the system when they install it. This is not assigned by EFJohnson.*

Indiv - Uniquely identifies the radio on a particular system. Each radio must have a different Unit ID. Valid Unit IDs are 1 through 65535. If you checked the Hex box, you can enter Indiv as a hexadecimal number instead of a decimal number.

Keys - Programs the following encryption key ID (hardware location) that is used for all except group calls.

System Wide - Key used for system-wide calls (typically originated by the dispatcher). The dispatcher usually originates these calls. (The System Wide key is not currently supported.)

Failsoft - Key used in failsoft conditions.

Patch - Key used in patch calls.

Unit to Unit - Key used for unit-to-unit (private) calls.

Interconnect - Key used for telephone interconnect calls.

Dynamic TG - The key used when the radio has been dynamically regrouped.
Defaulted value.

System Lists - Refer to [Section 6.2.3, “SMARTNET and SmartZone System Lists”](#) for descriptions of the following lists:

- [Control Channels List](#)
- [Status Alias List](#)
- [Message Alias List](#)
- [Call List](#)
- [Phone List](#)
- [Talk Group List](#)
- [Announcement Group List](#)
- [Priority Scan List](#)
- [Site List \(SmartZone Systems Only\)](#)
- [System Preferred Site List \(SmartZone Systems Only\)](#)
- [Other Band Trunking List \(VHF/UHF Only\)](#)
- [User Group ID List](#)
- [Rebanded Control Channels List](#)

Emergency

Emergency Alarm

“Disabled” - The radio sends no emergency signal when the user presses the Emergency option switch.

“Normal” - The radio sends an emergency alarm when the user presses the Emergency switch. The Emergency Alarm tone is heard and is only seen by the console, not by other users.

“Silent” - The radio sends an emergency alarm when the user presses the Emergency switch. Emergency Alarm tone is not heard and there are no visual indicators.

Emergency Call - When you check this box, if the radio user presses the Emergency option switch, an emergency group call transmits on the emergency group. The radio user cancels the emergency mode by cycling power or pressing and holding the emergency switch. (The press and hold time is determined by the timer on the **Global** secondary page.) If you disabled emergency calls, the alarm always occurs on the selected group. If you enabled emergency calls, it occurs—in order of preference—on the emergency group, selected group, and announcement group. When radio sends an emergency signal, the red transmit indicator lights, an emergency tone sounds, and “EMERGNCY” flashes in the display. “EMERGNCY” and the initiating ID continue to flash alternately until power is cycled, the channel is changed, or the radio user presses and holds the Emergency switch.

Emergency Hot Mic - When you check this box and the radio user sends an emergency call by pressing the Emergency switch, automatic transmitting occurs. The microphone audio is unmuted (without user intervention) for the time specified by the following **Emergency Hot Mic Time**. This field is grayed until the **Emergency Call** field is checked. This feature initiates only by the first press of the Emergency switch. Subsequent presses do not trigger automatic transmissions. This function resets if the radio user changes the channel.

Emergency Hot Mic Time - Specifies the time period during which transmissions occur. You can select time periods of 10 through 120 seconds in ten-second increments.

Increment by 1 - If the ten-second increment is not desired, check this box to increment by one second. Can be set from 1 to 12.

Emergency Retry Counter - If you check **Inf** (infinite), the radio system repeats emergency calls until they are acknowledged or canceled. If you do not check it, the radio repeats these calls only the specified number of times. Value can be set from 1-254. 255 automatically enables “Infinite”.

No Rx Activity during Emergency - When you check this box, the following radio receive indications do not display in the emergency mode: Receive audio, receive LED, and receive icons.

Time/Timers

Time out Timer - This timer determines the maximum time period of a continuous transmission. You can program it for 15 through 225 seconds in 15-second intervals, or you can disable it (0).

ISW Delay Time - Increasing or decreasing this value changes the transmission timing of inbound signaling words (ISWs) relative to the reception of outbound signaling words (OSWs).

Scan Hold Time - Specifies the delay that occurs after the radio no longer receives a message before scanning resumes. You can program times of zero through ten seconds. The default is three seconds.

Time until Error Tone - Not used.

Quick Fade Protect - Specifies the time the radio will stay on the control channel when synchronization is lost before returning to CC hunt. This setting allows the radio to ride through a short term loss of synchronization on the control channel and recover without having to enter CC hunt to recover the control channel.

Phone DTMF Timing

Initial Delay - Delay from 25 through 6375 in 25 milliseconds steps from the time the radio system grants a traffic channel for phone interconnect to the start of the dialing of the phone number. Default is 1500 milliseconds.

Digit Duration - Duration from 25 through 6375 in 25 milliseconds steps of each phone number digit. Default is 125 milliseconds.

Inter Digit Delay - Delay from 25 through 6375 in 25 milliseconds steps between each digit of a phone number. Default is 75 milliseconds.

Other

PTT ID Enable - When selected, the radio can key during the programmed hang time and continue the conversation on the active channel, similar to Message Trunking in that the unit id initiating the channel grant request is logged by the system. If a user keys during the hang time, re affiliation with the system occurs before the radio uses the voice channel. The radio then holds the voice channel while this re affiliation occurs. The call connects to the open voice channel. This results in all traffic being logged, even the traffic of the radios that transmit during the hang time.

If you do not select either PTT ID Enable or Transmission Trunking, Message Trunking operation is similar to that described above. However, re affiliation does not occur during the hang time. Therefore, radios that key up during the hang time do not affiliate and are not logged. The radio system logs only the call of the radio that initiates the call.

Splinter Channels - When you check this, the receive and transmit frequencies are 12.5 kHz lower than the normal frequencies. Splinter channels are used only as required in the U. S.-Mexico and U. S.-Canada border areas for frequencies between 806 and 820.975 MHz.

International Channels - Check this box to use the international band plan.

Note *The international band plan also supports splinter frequencies. If splinter is enabled, the control channels and failsoft frequencies are shifted down 12.5 kHz, and the radio will interpret the channel numbers received over the air as splinter channels.*

Dynamic Regrouping - When you check this, you can program a dynamic regrouping channel. This is a SMARTNET/SmartZone channel that the dispatcher dynamically sets the talk group for. You select it on the channel screen.

Note *The regrouped talkgroup must be defined in the system talkgroup table. (This is because the talkgroup can be both analog and digital and that information is not reported to the radio in the regroup command.) Refer to [Section 6.3.3, “SMARTNET / SmartZone Channel Parameters”](#).*

Transmission Trunking - The system does not use hang time. The radio affiliates and receives a new channel grant on every PTT. When a radio unkeys, the radio system makes the channel available for other users immediately, and the system logs all traffic. If you do not check this, refer to the PTT ID Enable description above.

Connect Tone - The tone expected by the controller on the traffic channel to confirm the presence of a subscriber transmission. Set this tone the same as it is in the controller.

Failsoft Conn. Tone - If a value other than "Default" is programmed, the radio will use this connect tone during failsoft operations. "Default" is the programmed connect tone.

Private Call Usage

“Disabled” - The radio user cannot place private calls or receive them.

“Response Only” - The radio user can receive private calls but cannot place them.

“List Only” - The radio user can place private calls and receive them. The user can recall numbers from a programmed list only.

“Unlimited” - The radio user can place private calls and receive them. The user can recall numbers from a programmed list or dial them from the keypad. 53xx radios support this mode only when they use the HHC control unit. Standard 53xx front and remote models do not support number dialing. A press enters programmed list and press/hold enters dial from keypad.

Private Call 2

“Standard” - Selects the standard Private Conversation mode in which the user does not receive any feedback when the called radio is not active in the system. The radio user receives only a “No Answer” if the called radio does not answer.

“Enhanced” - Selects the Enhanced Private Conversation™ mode. When the radio users places a call with this mode, the system tells the user if the called radio is currently active in the system and within range. The calling radio displays “No Ack” if the called radio is not active in the system and “No Answer” if it is active but does not answer.

Phone Inter. Usage - Programs operation of telephone calls same as “Private Call Usage” above.

Affiliation Type (SMARTNET only)

“Automatic” - The radio immediately affiliates with the central controller as soon as the radio operator turns it on. The radio automatically re-affiliates each time the talk group changes.

“On PTT” - Auto affiliation is disabled and the radio will affiliate upon the first PTT press. The radio affiliates with the central controller each time the radio user presses the PTT switch, even when pressed during the hang time. Also, when the radio user keys the radio during the hang time, the radio holds the active channel during the re-affiliation. The re-affiliated radio continues traffic on this channel.

Channel Bandwidth - Selects the channel bandwidth as 25, 20, or 12.5 kHz.

“25 kHz” - Transmit Modulation Limiting is 4 kHz for NPSPAC (821 or 806) channels, 5 kHz otherwise.

“20 kHz” - Transmit Modulation Limiting is 4 kHz for all frequencies.

“12.5 kHz” - Transmit Modulation Limiting is 2.5 kHz for all frequencies.

Transmit Power - Fixes the radio’s transmit power at the high or low level, or makes it selectable for each system. If it is selectable, the radio must have a high/low power function switch.

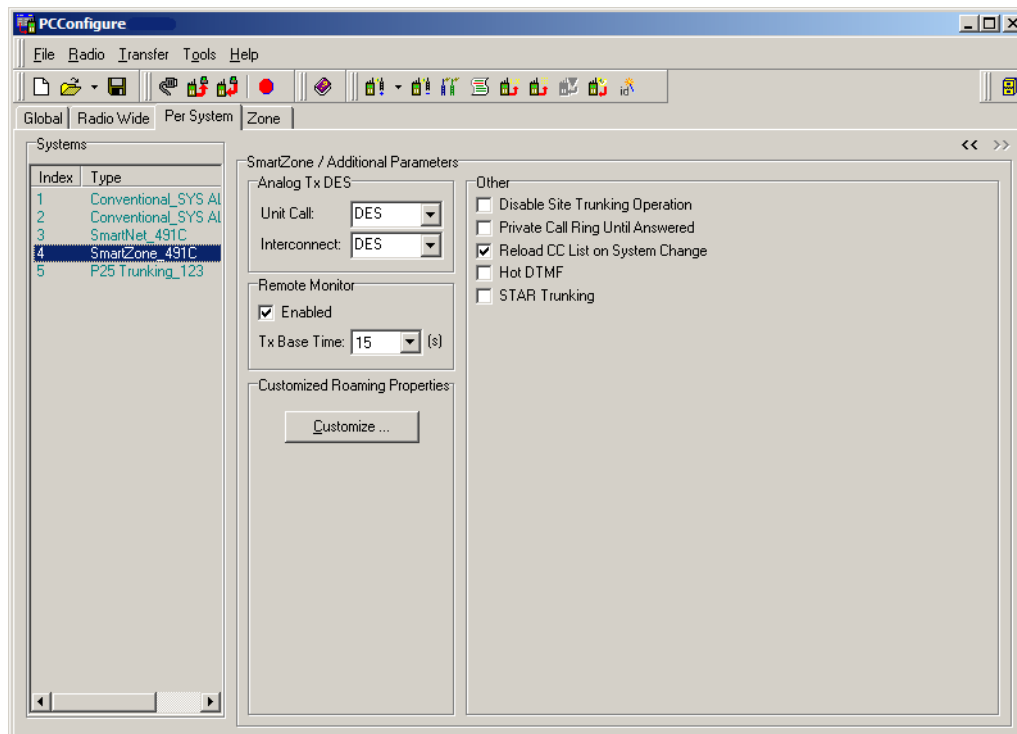
RSSI Threshold (SmartZone Only) - Sets the Receive Signal Strength Indicator (RSSI) levels that determine when searching for and switching to another site occurs.

Tip *Do not change the RSSI Threshold default levels unless you know how these settings effect operation. If you are converting an old file, Fair and Great values are needed, click the default button (so that default values are used.)*

6.2.2 SMARTNET and SmartZone Additional Parameters

To open and close the second SMARTNET and SmartZone system programming screen, click the << >> buttons in the upper right corner of the screen. The following additional parameters are displayed. Figure 6.3 shows the parameters displayed on this second screen.

Figure 6.3 SMARTNET and SmartZone Additional Parameters



Analog Transmit DES - Allows you to specify the type of encryption individually for Unit and Interconnect calls made in the analog mode.

Remote Monitor

Enabled - Used to remotely key up the radio for emergency situations. System sends a trace talkgroup to the radio. The radio receives the command and performs a hotmic on that talkgroup for period of time programmed (15, 30, 45, 60 seconds).

Transmit Base Time - Time programmed for Remote Monitor. From 15 to 60 seconds in 15-second intervals.

Customized Roaming Properties (SmartZone Only) - You can change SmartZone and Project 25 Trunked roaming properties by clicking the **Customize ...** button. The screen shown in Figure 6.4 is displayed. Information programmed in this screen is described in the Roaming Properties Notes window that is displayed. The RSSI Filter slider bar controls how quickly the radio reacts to dropouts in the RSSI level. The more aggressive the setting, the quicker site switching occurs.

Note *Default settings should not be changed with out consulting EFJ technical support.*

Figure 6.4 SmartZone Customized Roaming Properties Screen

Customized Roaming Properties

Customized Roaming Properties Enabled ☒

Property	Weight
<input checked="" type="checkbox"/> Valid Site:	1632
<input checked="" type="checkbox"/> RSSI Acceptable/Better:	864
<input checked="" type="checkbox"/> Control Channel Sync:	480
<input checked="" type="checkbox"/> Currently Adjacent:	288
<input checked="" type="checkbox"/> Next Site Requested:	96
<input checked="" type="checkbox"/> Retry To Completion:	96
<input checked="" type="checkbox"/> Wide Area Site:	24
<input checked="" type="checkbox"/> RSSI	
Untested:	1
Poor:	2
Acceptable:	3
Fair:	0
Good:	4
Very Good:	5
Great:	0
Excellent:	6
<input checked="" type="checkbox"/> Site Preference	
Least Preferred:	-2
No Preference:	0
Preferred:	8
Always Preferred:	228

Default

Customized RSSI Filter Enabled ☒

RSSI Filter Coefficient: (0 - Aggressive) (Passive - 99)

Default

Roaming Properties Notes

Roaming is accomplished by using the state of various site properties to determine the best site to operate on. Each of these properties is assigned a weight. The property weights are added together to get a site rank. The radio will always attempt to operate on the site with the highest rank. Which site properties are included in the site rank is programmable, as is the weight for each property. Below are descriptions of each property.

Valid Site: This property is true if the site is valid for roaming. Sites become invalid when they are no longer adjacent to the site the radio is operating on.

RSSI Acceptable/Better: This property is true if the site has an RSSI value that is higher than the programmed Acceptable threshold.

Control Channel Sync: This property is true if the radio is able to obtain synchronization on the site control channel.

Currently Adjacent: This property is true if the site is adjacent to the site the radio is currently operating on.

Next Site Requested: This property is true if the radio operator has

View [RSSI Filter Coefficient Notes](#)

OK Cancel Help

Other

Disable Site Trunking Operation - When you check this, you disable site trunking on the system. Radio will ignore any site not in "Wide Area" trunking mode.

Private Call Ring until Answered - This option allows a ring for private calls to sound until the timer expires.

Reload CC List on System Change - For Smartnet/Smartzone .rcf files (code plugs) with multiple systems using the same system ID. Enable this feature to reload control channels after a change from one system to another.

Hot DTMF - When you check this, the radio sends DTMF digits when the radio user presses numeric buttons while transmitting in the SMARTNET/SmartZone analog mode.

STAR Trunking (SmartZone Only) - Selects this feature, which is available with SmartZone systems. The system selected in the System: drop-down menu then becomes the home system. The radio system then requires no other system information to use this feature. You must enter the talk groups as with non-Omnalink systems. All other programming occurs on the infrastructure side. All required roaming information is received through adjacent site control channel data.

6.2.3 SMARTNET and SmartZone System Lists

Select the various SMARTNET and SmartZone lists by the **System Lists** drop-down menu on the initial SMARTNET and SmartZone **Per System** screen. After you select the desired list, edit it by clicking the  **Edit List ...** button.

This section contains descriptions of the following lists:

- [Control Channels List](#)
- [Status Alias List](#)
- [Message Alias List](#)
- [Call List](#)
- [Phone List](#)
- [Talk Group List](#)
- [Announcement Group List](#)
- [Priority Scan List](#)
- [Site List \(SmartZone Systems Only\)](#)
- [System Preferred Site List \(SmartZone Systems Only\)](#)
- [Other Band Trunking List \(VHF/UHF Only\)](#)
- [User Group ID List](#)
- [Rebanded Control Channels List](#)

Descriptions of the various lists and the information they program follow.

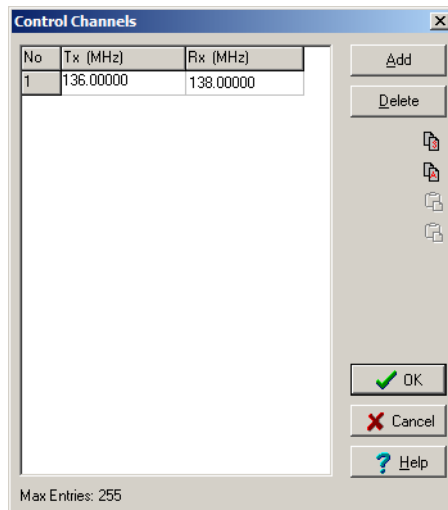
6.2.3.1 Control Channels List

The Control Channels List screen shown in Figure 6.5 allows the system manager to view and edit the control channels. Each SMARTNET system can have a maximum of four control channels. Each SmartZone system can have a maximum of 255 control channels.

Note *For VHF and UHF trunking systems, the "Other Band Trunking" (OBT) table must be programmed before Control Channel frequencies can be entered. This information is supplied by the system administrator. The OBT table is not required for 700/800Mhz trunking systems.*





To display this screen, on the SMARTNET/SmartZone **Per System** screen, select "Control Channel List" in the drop-down menu, then click the  button.

Figure 6.5 Control Channels List Screen



To add a channel, click the **Add** button. To delete a channel, select it and click the **Delete** button. To edit a channel, select the digits that you want to change and edit them as desired. For the 800 MHz band, you can change only the receive channel frequency. PC Configure automatically calculates the transmit frequency (45 MHz below the receive frequency). These are the subscriber frequencies, not the repeater frequencies. **Enter the subscriber frequencies which are the reverse of the repeater frequencies.**

To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy CC frequencies to another system's CC list, etc.

- 1 Select the top  icon to copy the selected item or the (second)  icon to "copy all", which copies every item active in the list.
- 2 Select the (third)  icon to paste the previously selected single item or the fourth  icon to "paste all", which pastes the entire list captured previously. On "paste all", it pastes over the current list. I.e., if the original list contains eight items and the pasted list contains six, two are deleted.

6.2.3.2 Status Alias List

The Status Alias List screen shown in Figure 6.6 is the interface where you program the alias for each of a maximum of eight status conditions. The system manager defines meaning of each status number. The status number and meanings must be same between radio and console.


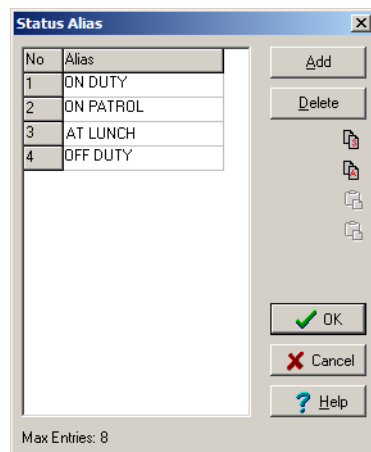




To display this screen, on the SMARTNET and SmartZone **Per System** screen, select “Status Alias List” in the drop-down menu, and click the  button.

Figure 6.6 Status Alias List Screen



To add an alias, click the **Add** button. To delete an alias, simply select it and click the **Delete** button. To edit an alias, select it and change it as desired. You can enter a maximum of ten characters. This identification displays when the user selects a status condition.

To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy CC frequencies to another system’s CC list, etc.

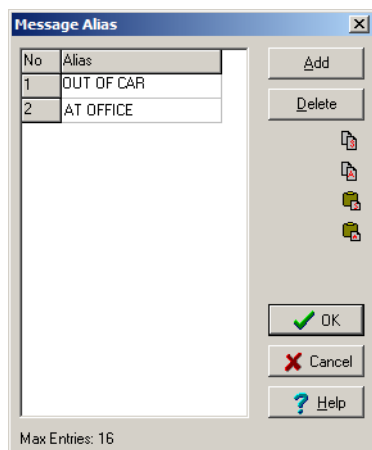
- 1 Select the top  icon to copy the selected item or the (second)  icon to “copy all”, which copies every item active in the list.
- 2 Select the (third)  icon to paste the previously selected single item or the fourth  icon to “paste all”, which pastes the entire list captured previously. On “paste all”, it pastes over the current list. I.e., if the original list contains six items and the pasted list contains four, two are deleted.

6.2.3.3 Message Alias List

The Message Alias List screen shown in Figure 6.7 associates an alias (name) with each message number. The system manager defines the meaning of each message number. The message number and meanings must be same between radio and console. (A maximum of 16 messages may be programmed.)





To display this screen, on the SMARTNET/SmartZone **Per System** screen, select “Message Alias List” in the drop-down menu, and click the  button.

Figure 6.7 Message Alias List Screen



To add an alias, click the **Add** button. To delete an alias, select it and click the **Delete** button. To edit an alias, select it and change it as desired. You can enter a maximum of ten characters. This identification displays when the user selects a status condition.

To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy CC frequencies to another system’s CC list, etc.

- 1 Select the top  icon to copy the selected item or the (second)  icon to “copy all”, which copies every item active in the list.
- 2 Select the (third)  icon to paste the previously selected single item or the fourth  icon to “paste all”, which pastes the entire list captured previously. On “paste all”, it pastes over the current list. I.e., if the original list contains eight items and the pasted list contains six, two are deleted.

6.2.3.4 Call List


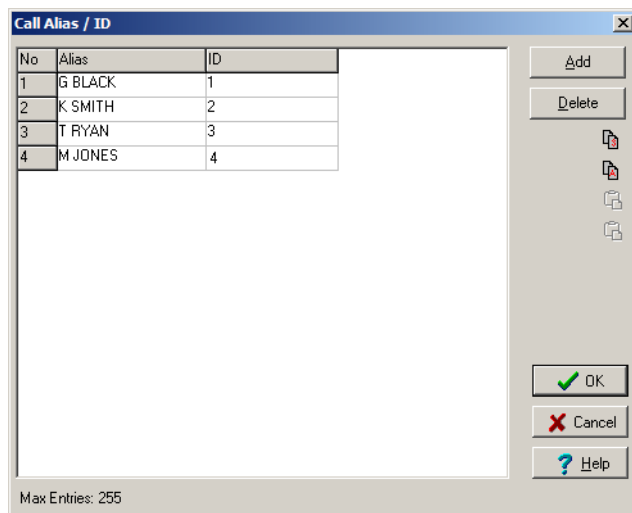
The Call List screen shown in Figure 6.8 programs the list of IDs used for private calls. You can program a maximum of 255 IDs. This list is also used when a call is received and the Display PTT ID is enabled; if the ID is defined in this list the alias is displayed, not the ID. To display this screen, on the SMARTNET/SmartZone **Per System** screen, select “Call List” in the drop-down menu, then click the  button.

Figure 6.8 Call List Screen







To add a call, click the **Add** button. To delete a call, select it and click the **Delete** button. To edit an alias or ID, select it and enter the desired information as follows:

Alias - You can enter a maximum of ten characters to identify the user being called. This identification displays when the user selects the radio ID to be called from the list. When the user receives a call from a unit in this list, the alias of the unit displays for the user instead of the calling unit’s ID number. You can enter only capital letters, so PC Configure automatically converts any lowercase letters that you enter to capital letters.

ID - This is the ID of the radio that the user is calling. Valid entries are 0 through 65535. PC Configure detects zero (“0”) as no entry.

To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy CC frequencies to another system’s CC list, etc.

- 1 Select the top  icon to copy the selected item or the (second)  icon to “copy all”, which copies every item active in the list.
- 2 Select the (third)  icon to paste the previously selected single item or the fourth  icon to “paste all”, which pastes the entire list captured previously. On “paste all”, it pastes over the current list. I.e., if the original list contains eight items and the pasted list contains six, two are deleted.

6.2.3.5 Phone List


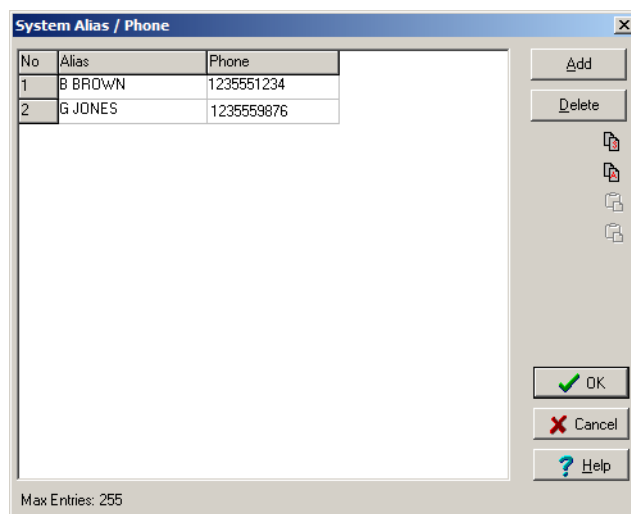
The Phone List screen shown in Figure 6.9 programs the telephone number list that the radio user may place telephone calls from (if you program the system to use this feature). You can program a maximum of 255 numbers. To display this screen, on the SMARTNET and SmartZone **Per System** screen, select “Phone List” in the drop-down menu, then click the  button.

Figure 6.9 Phone List Screen







To add a call, click the **Add** button. To delete a call, select it and click the **Delete** button. To edit an alias or number, select it and enter the desired information as follows

Alias - You can enter a maximum of 16 characters to identify the number being called. This identification displays when the user selects the number to be called from the list. You can enter only capital letters, so PC Configure automatically converts any lowercase letters that you enter to capital letters.

Phone - This is the telephone number that the radio dials when the radio user selects the location. Enter the three-digit area code and seven-digit telephone number (US calls) or up to 16 digits (for international calls) using the numbers 0 through 9.

To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy CC frequencies to another system’s CC list, etc.

- 1 Select the top  icon to copy the selected item or the (second)  icon to “copy all”, which copies every item active in the list.
- 2 Select the (third)  icon to paste the previously selected single item or the fourth  icon to “paste all”, which pastes the entire list captured previously. On “paste all”, it pastes over the current list. I.e., if the original list contains eight items and the pasted list contains six, two are deleted.

6.2.3.6 Talk Group List


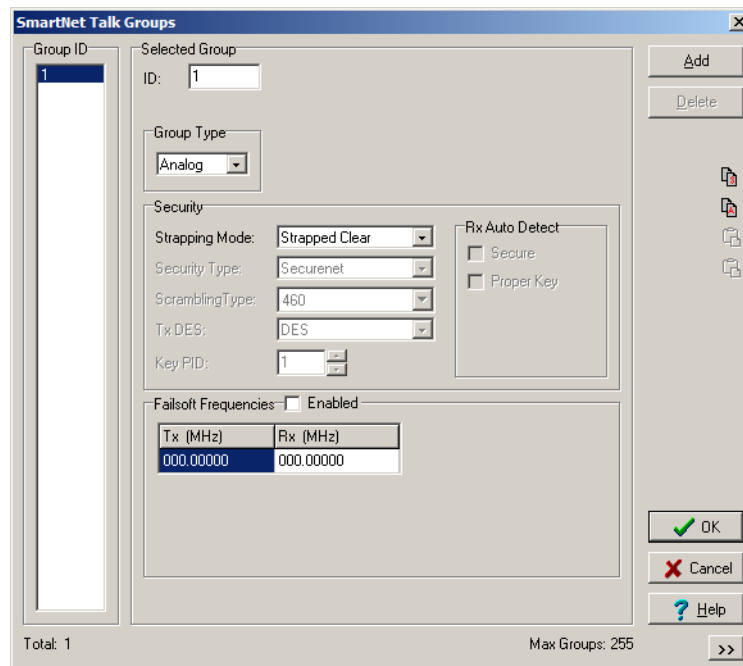
The Talk Group List screen shown in Figures 6.10 and 6.11 sets up SMARTNET and SmartZone talk groups and programs unique talk group information. To display this screen, on the SMARTNET and SmartZone **Per System** screen, select “Talk Group List” in the drop-down menu, and click the  button.

Figure 6.10 SMARTNET Talk Group List Screen



The dialog box is titled "SmartNet Talk Groups". It features a list on the left labeled "Group ID" with the number "1" selected. To the right of the list is a "Selected Group" section containing an "ID:" field with the value "1". Below this is a "Group Type" dropdown menu set to "Analog". A "Security" section follows, with fields for "Strapping Mode" (set to "Strapped Clear"), "Security Type" (set to "Securenet"), "Scrambling Type" (set to "460"), "Tx DES" (set to "DES"), and "Key PID" (set to "1"). To the right of these fields is a "Rx Auto Detect" section with two checkboxes: "Secure" and "Proper Key", both of which are unchecked. Below the security fields is a "Failsoft Frequencies" section with an "Enabled" checkbox that is unchecked. This section contains a table with two columns: "Tx (MHz)" and "Rx (MHz)". The table has one row with the value "000.00000" in both columns. On the right side of the dialog, there are buttons for "Add", "Delete", and a vertical stack of four document icons. At the bottom right are "OK", "Cancel", and "Help" buttons. The bottom status bar shows "Total: 1" on the left and "Max Groups: 255" on the right, with a right-pointing arrow button.

Tx (MHz)	Rx (MHz)
000.00000	000.00000

Figure 6.11 SmartZone Talk Groups Screen

The screenshot shows the 'SmartZone Talk Groups' configuration window. On the left, a 'Group ID' list contains the number '1'. The main area is for 'Selected Group' ID: 1. It includes fields for 'Group Type' (Analog), 'Use Sys Preferred Site List' (unchecked), 'List to Use' (List 1), 'Security' settings (Strapping Mode: Strapped Secure, Security Type: Securenet, Scrambling Type: 460, Tx DES: DES, Key PID: 1), 'Rx Auto Detect' (Secure and Proper Key unchecked), 'Failsoft Frequencies' (Enabled, with Tx and Rx frequencies at 136.00000 MHz), and 'Talk Group Specific Preferred Sites' (Preferred Site 1 checked, Site ID: 1, Preference: None). At the bottom, there is a 'Wide Area System Scan Preference' checkbox, 'Total: 1' groups, 'Max Groups: 255', and 'Add', 'Delete', 'OK', 'Cancel', and 'Help' buttons.

The parameters programmed in this screen are as follows:

ID - This list displays the talk group IDs contained in the Talk Group list. (1 - 4095/decimal and FFF/hexadecimal). To edit a talk group ID in this list, select it and then change it in the **Selected Group** box. This is the actual ID of the talk group. You assign talk groups to channels in the **Zone** screen. Refer to [Section 6.22, “SMARTNET/SmartZone Zone Screen”](#).

Note *You can enter this ID in either the decimal or hexadecimal format as described in [Section 1.9.5, “Decimal / Hexadecimal Select”](#).*

Add - Click this button to add the next available talk group ID to the list. You can program each SMARTNET and SmartZone system with a maximum of 255 talk groups.


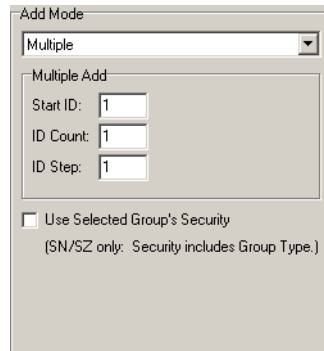
Add Mode - To add an entire block of talk group IDs or a specific ID, click the arrow button  in the lower right corner of the screen. The Talk Groups screen is expanded and the **Add Mode** panel, Figure 6.12, is displayed:

Figure 6.12 Add Mode Screen



Add Mode drop-down


Add Mode Drop-down List - “Single” adds the next available ID similar to the preceding “Add” button. “Multiple” adds a block of IDs as follows. To initiate the selected add operation, set up your parameters and click the preceding “Add” button. If the specified ID range results in duplicate IDs, an error message is displayed and no IDs are added.

Start ID - Specifies the starting ID of the block.

ID Count - Specifies the number of IDs to be added.

ID Step - Specifies if consecutive IDs are added or some other step rate is used. For example, if Start ID = 10, ID Count = 5, and ID Step = 10, the IDs added are 10, 20, 30, 40 and 50.

Use Selected Group’s Security - When selected, PC Configure automatically programs the added groups with the Strapping Mode and Encryption Key ID of the selected group.

 - Clicking this button deletes the selected talk group.

Group Type - Select either “Analog” or “Digital” signaling on the talk group.

Tip *If after programming when you select a channel (Talk Group) and you just hear channel rumble, you have a digital Talk Group set for analog*

Use System Preferred Site List (SmartZone Only) - Selects one of the preferred site lists for the talk group. Refer to the “System Preferred Site List” description which follows for more information.

Security

Strapping Mode

“Strapped Clear” - All transmissions on the talk group occur in the clear (unencrypted) mode.

“Strapped Secure” - All transmissions on the talk group occur in the secure (encrypted) mode selected as follows.

“Switched” - The clear or secure status of the talk group is selected by the Clear/Secure option switch.

Security Type - Select SecureNet. Scrambling is not supported.

Note *Voice encryption is an optional feature that requires factory programming and possibly special hardware.*

“SecureNet” - Selects the Motorola SecureNet DES type of secure communication when you select either the coded or switched strapping mode.

Tx DES

With analog channels, when you select “Securenet” secure communication, the DES type is selected.

On digital channels, you cannot select the type. Digital channels support both DES-OFB and AES encryption. The encryption key that the talk group selects determines the encryption type.

Key PID - Selects the location from 0-63 (PID/ASN mode) or 1-64 (SLN/CKR mode) of the key used for secure calls on the group if applicable.

Rx Auto Detect

Secure - [Rev 1 (ARM) only] With the “Secure” check box enabled, if the radio receives analog DES (Securenet) encrypted traffic that does not match the PID key location programmed for the selected channel, squelch will open but no decoded voice traffic will be heard.

Proper Key - The radio will search the list of loaded keys and if a match is found it will receive the call regardless of which key is assigned to the Transmit for this channel. If not selected, the radio will only receive a call on from a key that matches the key assigned to the Transmit for this channel.

Failsoft Frequencies

Enabled - If you check this box, you enable a failsoft channel on the talk group if a controller or other major failure occurs. If you do not check this box, the radio does not enter failsoft mode if a failure occurs.

Tx (MHz) - Programs the failsoft transmit frequency if you checked Enabled.

Rx (MHz) - Programs the failsoft receive frequency if you checked Enabled.

Rebanded (700/800 Mhz band only)

Tx (MHz) - Programs the failsoft transmit frequency if you checked Enabled.

Rx (MHz) - Programs the failsoft receive frequency if you checked Enabled.

Talk Group Specific Preferred Sites (SmartZone Only) - With SmartZone systems, you can associate a maximum of four preferred sites and/or a preferred site list with each talkgroup. Check the box of a preferred site to associate it with a talkgroup. This forces a call on the talkgroup to access the specified sites. You program the preference for each site as “Least”, “None”, “Preferred”, or “Always” as follows.

“Least” - This setting adds negative weighting to the roaming properties so that a “Least” preferred site will not be used unless all other adjacent sites have much lower RSSI values.

“None” - This setting adds no weighting (positive or negative) to the roaming properties so that no site has any additional preference over any other adjacent sites.

“Preferred” - This setting adds positive weighting to the roaming properties so that this site will be used unless its signal strength is much lower than the adjacent sites.

“Always” - This setting adds significant weighting to the roaming properties and will be used as long as its RSSI value remains above the “Acceptable” RSSI threshold. This setting ignores “Site Trunking” conditions on the site associated with this setting, which can cause loss of communications to Wide Area sites if this condition occurs.

Program the preferred site lists at the System Preferred Site Lists screen described on [Page 6-28](#). You can program a maximum of 16 lists. Each site can include up to 16 sites.

If both a preferred site list and one or more preferred sites (selected at bottom of screen) are associated with a talkgroup, the preferred sites at the bottom are searched first. The first entry found for a given site is used. If the same site is in both lists, the entry in the list at the bottom of the screen is used first.

Selected Site

Site ID - Designates a site that the talk group can roam to.

Preference - “Least”, “None” (no preference), “Preferred”, or “Always (preferred)” is a weighting for steering to different sites.

Wide Area System Scan Preference - The Wide Area System Scan functions as described: When returning to a previously used site:

- a The last valid site id and its Receive/Transmit channel numbers are loaded from the EEPROM.
- b The Dynamic Site List is checked to see if any newer Receive/Transmit channel information is available for the last used Site ID.
- c The best Receive/Transmit channel information is used and the radio checks to see if this control channel is available for use.

In this way, it takes less time for the radio to find a valid site on its first try and on average greatly reduces the access time to the system even with highly restricted access on a per talkgroup basis.

6.2.3.7 Announcement Group List


The Announcement Group List screen shown in Figure 6.14 sets up SMARTNET/SmartZone announcement groups that are used to communicate with several talk groups simultaneously. Each announcement group can have up to 16 talk groups.

Note *You cannot use the same ID number for a talk group and an announcement group: They cannot be duplicated.*

Figure 6.13 SMARTNET Announcement Group List Screen

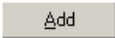
The screenshot shows the 'SmartNet Announcement Groups' configuration window. It features a 'Group ID' list on the left with '1' selected. The main configuration area, titled 'Selected Group', includes fields for 'ID' (1), 'Group Type' (Analog), and a 'Security' section with 'Strapping Mode' (Strapped Clear), 'Security Type' (Securenet), 'Scrambling Type' (460), 'Tx DES' (DES), and 'Key PID' (1). There is also an 'Rx Auto Detect' section with 'Secure' and 'Proper Key' options. On the right, a 'Talk Group List' shows '1' selected. The bottom left indicates 'Total: 1'. The right side contains buttons for 'Add', 'Delete', 'OK', 'Cancel', 'Help', and a '>>' button.

Figure 6.14 SmartZone Announcement Group List Screen

To display this screen, on the SMARTNET or SmartZone **Per System** screen, select the “Announcement Group List” in the drop-down list and then click the  button. The parameters programmed in this screen are as follows:

Group ID - This list displays the Announcement group IDs currently contained in the Announcement Group list. To edit an ID in this list, select and change it in the Selected Group box. This is the actual ID of the announcement group. Announcement groups are assigned to channels in the **Zone** screen (see Figure 6.22).

Note *You can enter this ID in either decimal or hexadecimal format as described in [Section 1.9.5, “Decimal / Hexadecimal Select”](#).*

 - Click this button to add the next available announcement group ID to the list. You can program each SMARTNET/SmartZone system with up to 255 announcement groups.


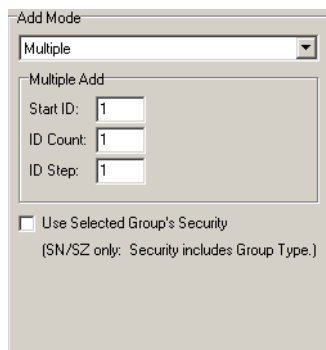

To add an entire block of announcement group IDs or a specific ID, click the arrow button  in the lower right corner of the screen. The Announcement Group List screen is expanded and the **Add Mode** panel is displayed. Refer to the preceding “Talk Group List” description for more information on this screen.

Figure 6.15 Add Mode Screen



 - Click this button to delete the announcement group that is currently selected in the list.

Group Type - Select either Analog or Digital signaling on the announcement group.

Use System Preferred Site List (SmartZone Only) - Select one of the preferred sites for the announcement group. Refer to the preceding Talk Group List description for more information.

Security

Strapping Mode

“Strapped Clear” - All transmissions on the talk group occur in the clear (unencrypted) mode.

“Strapped Secure” - All transmissions on the talk group occur in the secure (encrypted) mode selected as follows.

“Switched” - The clear or secure status of the talk group is selected by the Clear/Secure option switch.

Security Type - Select SecureNet. Scrambling is not supported.

Note *Voice encryption is an optional feature that requires factory programming and possibly special hardware.*

“SecureNet” - Selects the Motorola SecureNet DES type of secure communication when you select either the coded or switched strapping mode.

Tx DES

With analog channels, when you select “Securenet” secure communication, the DES type is selected.

On digital channels, you cannot select the type. Digital channels support both DES-OFB and AES encryption. The encryption key that the talk group selects determines the encryption type.

Key PID - Selects the location from 0-63 (PID/ASN mode) or 1-64 (SLN/CKR mode) of the key used for secure calls on the group if applicable.

Rx Auto Detect

Secure - [Rev 5 (ARM) only] With the “Secure” check box enabled, if the radio receives analog DES (Securenet) encrypted traffic that does not match the PID key location programmed for the selected channel, squelch will open but no decoded voice traffic will be heard.

Proper Key - The radio will search the list of loaded keys and if a match is found it will receive the call regardless of which key is assigned to the Transmit for this channel. If not selected, the radio will only receive a call on from a key that matches the key assigned to the Transmit for this channel.

Talk Group List - Select the talk groups that are included in each announcement group. You can enter this ID in either decimal or hexadecimal format as described in [Section 1.9.5, “Decimal / Hexadecimal Select”](#).

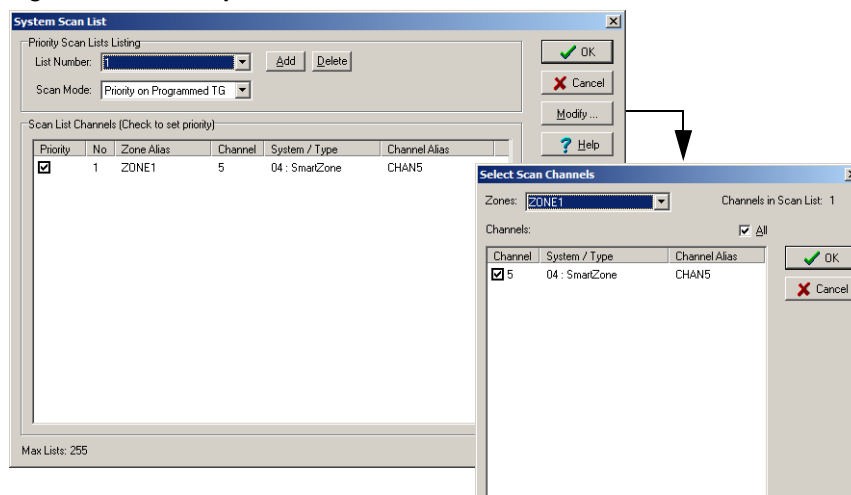
Announcement Group Specific Preferred Sites (SmartZone Only) - Program the preferred site information similar to talk groups described in the preceding “Talk Group List” description. You can associate up to four Preferred Sites and/or a Preferred Site List with each announcement group.

6.2.3.8 Priority Scan List

Note Before the priority monitor scan lists can be programmed as follows, you must set up the channels to be included in these lists in the **Zone** screen as described in [Section 6.3.3, “SMARTNET / SmartZone Channel Parameters”](#).

The Priority Scan List screen shown in Figure 6.16 sets up the Priority (Standard) Scan lists that can be programmed on each SMARTNET or SmartZone system. Each scan list can include up to 255 channels, one of which may be a priority channel. Memory limits the size and number of lists. These channels must be from the same SMARTNET or SmartZone system: Channels from other systems are not allowed.

Figure 6.16 Priority Scan List Screen



To display this screen, on the SMARTNET/SmartZone **Per System** screen, select “Priority Scan List” in the drop-down list and click the button.

List Number - This drop-down list allows you to select the scan list to edit. Click the **Add** button to add a scan list and **Delete** to delete a scan list.

- Click this button to display the screen shown on the right above which is used to edit the selected scan list. Check the channels in each zone to be included in the selected scan list. Repeat for the other scan lists if applicable.

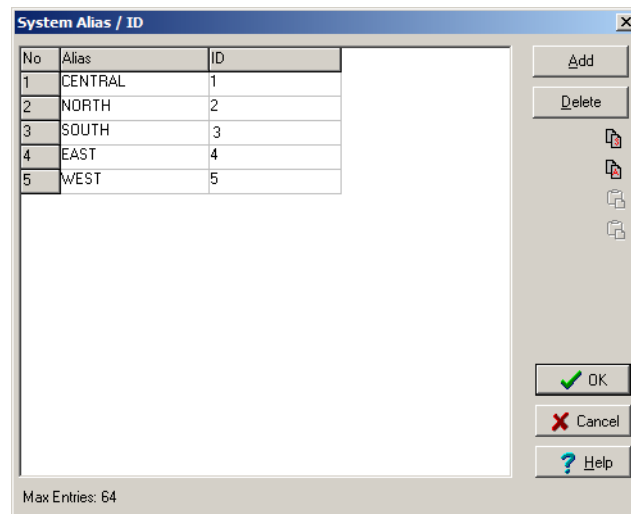
Scan Mode - If priority scan is used on a list, select “Priority on Selected” or “Priority on Programmed” from the drop-down list. If priority scanning is not used, select “Non Priority Scan”. If “Priority on Programmed” is selected, check the priority box of the desired priority channel.

Note Priority talk group scanning must also be supported at the system level for it to occur as programmed. Talk Groups programmed as “Priority” in PC Configure must also be designated as Priority Monitor Groups by the System Control software. If a call is coming from another Site a radio has to be affiliated on that talk group before the System will send this talk group to your site before the radio can receive this call in scan.

6.2.3.9 Site List (SmartZone Systems Only)

Sites in a SmartZone system are designated by a number. The System Alias/ID screen shown in Figure 6.17 allows you to program an alias for each site number that is displayed when using the Site Search feature.

Figure 6.17 System Alias / ID Screen



To display this screen, from the SmartZone **Per System** screen, select “Site List” in the drop-down list and then click the **Edit List ...** button. To add an alias, click the **Add** button. To delete an alias, select it and click the **Delete** button. To edit an alias or ID, select it and make the desired changes.

Alias - Programs up to ten alphanumeric characters that identify the site.

ID - Site ID from 1-64. A maximum of 64 entries are supported.

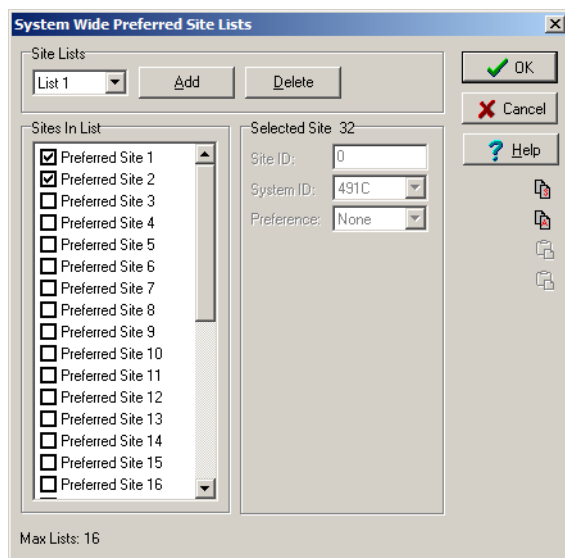
To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy CC frequencies to another system’s CC list, etc.

- 1 Select the top icon to copy the selected item or the (second) icon to “copy all”, which copies every item active in the list.
- 2 Select the (third) icon to paste the previously selected single item or the fourth icon to “paste all”, which pastes the entire list captured previously. On “paste all”, it pastes over the current list. I.e., if the original list contains eight items and the pasted list contains six, two are deleted.

6.2.3.10 System Preferred Site List (SmartZone Systems Only)

A maximum of 16 Preferred Site Lists can be programmed using the System Wide Preferred Site List screen shown in Figure 6.18. These lists can be associated with individual talkgroups on the Talk Group List screen described in [Section 6.2.3.6, “Talk Group List”](#). This forces calls on a talkgroup to access specific sites. The preference for each site in a list can be set for Least, None, Preferred, or Always.

Figure 6.18 System Wide Preferred Site List Screen



Each list can be programmed with up to 16 sites. Therefore, the use of Preferred Site Lists allows a maximum of 16 sites to be associated with a group instead of just four available on the Talk Group List screen. In addition, if several talkgroups are associated with the same sites, a list can be selected instead of manually entering roaming restrictions on each talk group.

Site Lists - This drop-down list selects the list to be edited. Sixteen lists are available. To add a new list, click the **Add** button. To delete the selected list, click the **Delete** button.

Sites In List - To add/delete a site from the list, click the checkbox.

Site ID - Enter the Site ID (1-64) the preference is to be applied to.

System ID - Select the System ID with which the Site is associated, (may differ if the system is Omni-link).

Preference - Select the site preference in the drop-down list. A default weighting is usually assigned to these preference levels which results in the most preference given to “Always” and the least preference to “Least” as follows:

“Least” - This setting adds negative weighting to the roaming properties so that a "Least" preferred site will not be used unless all other adjacent sites have much lower RSSI values.

“None” - This setting adds no weighting (positive or negative) to the roaming properties so that no site has any additional preference over any other adjacent sites.

“Preferred” - This setting adds positive weighting to the roaming properties so that this site will be used unless its signal strength is much lower than the adjacent sites.

“Always” - This setting adds significant weighting to the roaming properties and will be used as long as its RSSI value remains above the "Acceptable" RSSI threshold. This setting ignores "Site Trunking" conditions on the site associated with this setting, which can cause loss of communications to Wide Area sites if this condition occurs.

6.2.3.11 STAR List (Smart Zone Only)

The STAR List is not used.

6.2.3.12 Other Band Trunking List (VHF/UHF Only)

The Other Band Trunking screen shown in Figure 6.19 is displayed only when programming channels in the VHF and UHF frequency bands. It is used to define the relationship between transmit and receive channel frequencies in these bands. With 800 MHz systems, this is not required because the difference between transmit and receive frequency is always 45 MHz.

Figure 6.19 Other Band Trunking Screen

Other Band Trunking			
Split 1			
	Spacing (KHz)	Start Freq (MHz)	End Freq (MHz)
Transmit:	25	136.0000	145.4750
Receive:	25	136.0000	145.4750
Split 2 <input type="checkbox"/> Enable			
	Spacing (KHz)	Start Freq (MHz)	End Freq (MHz)
Transmit:		000.0000	000.0000
Receive:		000.0000	000.0000
Split 3 <input type="checkbox"/> Enable			
	Spacing (KHz)	Start Freq (MHz)	End Freq (MHz)
Transmit:		000.0000	000.0000
Receive:		000.0000	000.0000

To display this screen, on the SMARTNET/SmartZone **Per System** screen, select the “Other Band Trunking” in the drop-down list and click the  **Edit List ...** button.

This screen organizes the available frequency band in up to three sub-bands, called splits. Each split is defined by a start frequency, stop frequency, and channel spacing as follows. Frequencies outside the defined split cannot be accessed by the radio. These frequency splits must be defined the same way they are defined for the system infrastructure.

Tx and Rx Spacing - Spacing in kHz between each potential transmit and receive frequency.

Tx and Rx Start Frequency - Start in MHz of the band split for transmit and receive frequencies.

Tx and Rx Stop Frequency - Stop in MHz of the band split for transmit and receive frequencies.

6.2.3.13 User Group ID List

This User Group ID List screen shown in Figure 6.20 allows you to program aliases that can be displayed if a call is received from a radio with an ID within the programmed block. For example, with the preceding screen, if a group call is received from radio within group IDs 235-240, the alias “Fire” can be displayed. The display of this alias is controlled by the “User Group ID” parameter on the **Radio Wide** screen.

Figure 6.20 User Group ID List Screen

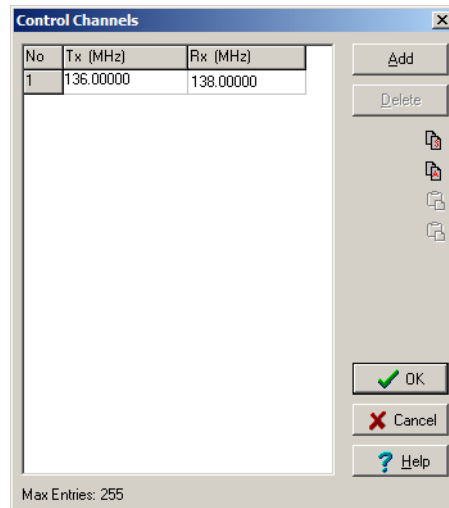
No	Alias	Start ID	Stop ID
1	FIRE	235	244
2	POLICE	255	264
3	GARAGE	275	279

Max Entries: 32





6.2.3.14 Rebanded Control Channels List

This Control Channels List is the control channels for sites that have been rebanded.

Figure 6.21 Control Channels (Rebanded System List) Screen



To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy CC frequencies to another system's CC list, etc.

- 1 Select the top  icon to copy the selected item or the (second)  icon to "copy all", which copies every item active in the list.
- 2 Select the (third)  icon to paste the previously selected single item or the fourth  icon to "paste all", which pastes the entire list captured previously. On "paste all", it pastes over the current list. I.e., if the original list contains eight items and the pasted list contains six, two are deleted.

6.3 Setting Up Zones and Channels

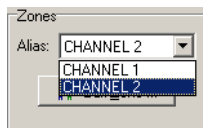
6.3.1 Setting Up Zones

This section describes how to set-up zones and assign channels to each zone. A zone can include up to 16 channels of any type (conventional analog, Project 25 conventional, SMARTNET/SmartZone, Project 25 Trunked, or Multi-Net).

The 51xx portable/53xx mobile may be factory optioned to support up to 48, 256, 512, or 864 channels (3, 16, 32 or 54 zones respectively). To determine if one of these features is enabled, refer to the **Transfer → Read Options** Screen.

Note *The maximum number of channels may be limited by available memory size.*

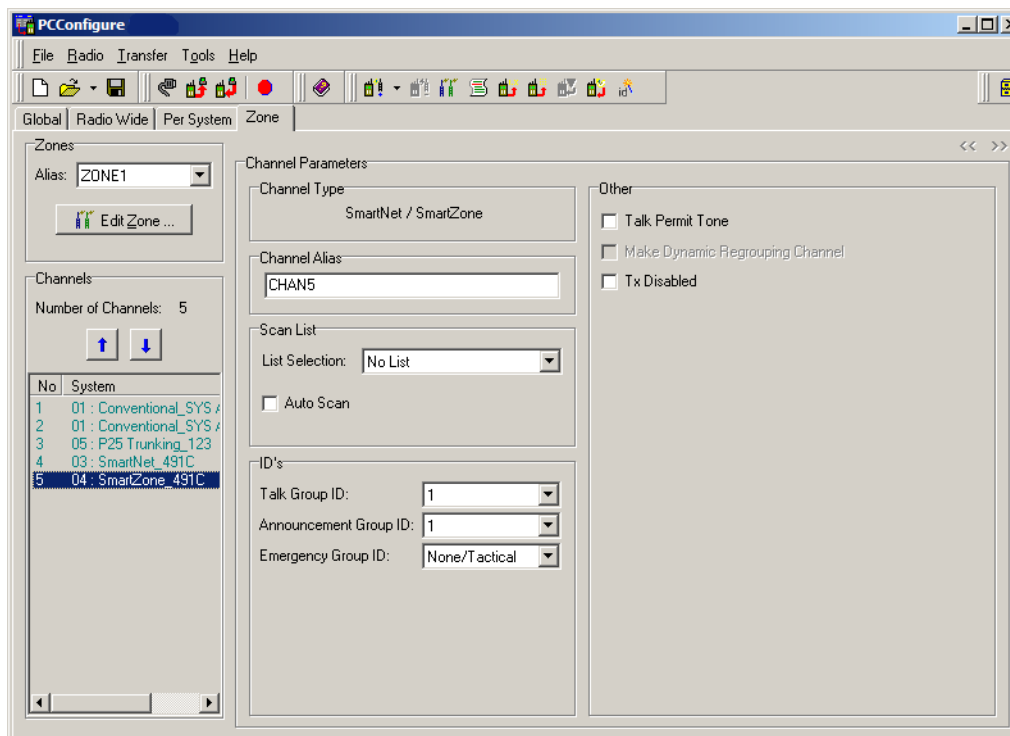
Note *If the 54 Channel / 16 Zone configuration option is enabled, channels should be renamed as zones and zone as channels.*



Setup Procedure

- 1 Select the **Zone** tab to display the Zone screen (See Figure 6.22.) This screen varies according to the type of system.

Figure 6.22 SMARTNET/SmartZone Zone Screen





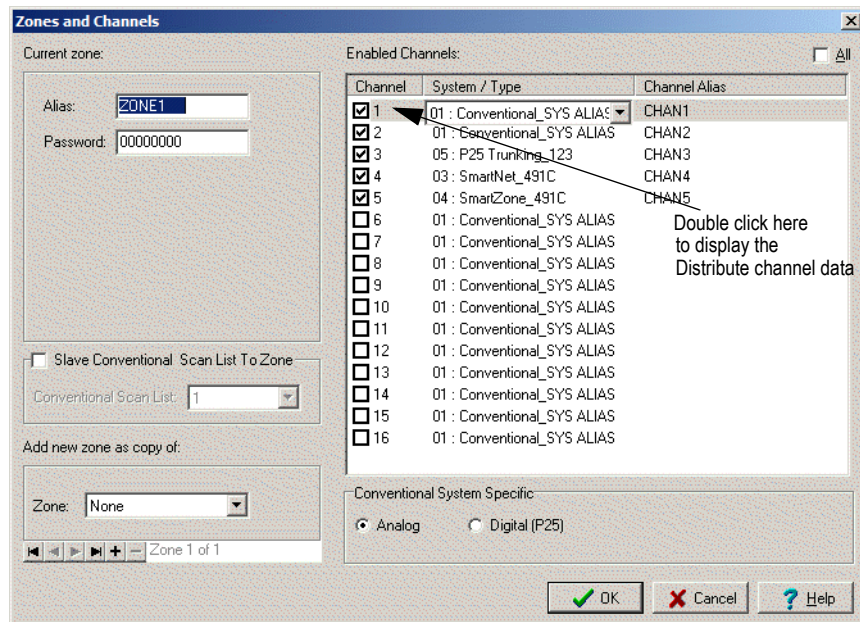






Click  in the upper left corner of the screen to display the **Zones and Channels** screen shown in Figure 6.23. Another way to do this is to click  in the toolbar.

Figure 6.23 Zones and Channels Screen



- To add a new blank zone, select “None” in the Zone drop-down list and then click the  button. To make a copy of a current zone, select the desired zone in the Zone drop-down list instead. To delete the current zone, click the  button.
- To display the first zone, click ; the last zone ; the previous zone ; and the next zone, .
- Program the alias (identification) that is displays briefly when you select the zone. To do this, enter a maximum of ten characters in the **Alias** box.
- You can program a zone password that you must enter to perform keypad programming of the zone. Refer to [Section 11, “51xx Portable Keypad Programming”](#). To program this password, enter any eight numbers from 0-9. If you do not wish to program this password for the zone, simply leave this field all zeros.

Note Zone password for keypad programming is a conventional only feature.

6.3.2 Setting Up Channels

Note When you assign a channel to a zone, you also select the system of the channel. Therefore, before assigning a channel to a zone, set up all necessary systems as described in [Section 1.10, “Creating Systems”](#).

Set up channels by assigning them to a zone in the **Zones and Channels** screen shown in Figure 6.23.



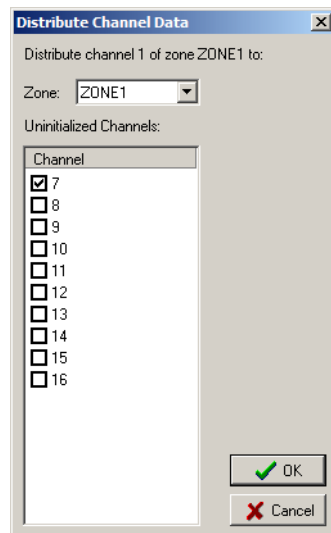
- 1 Select the **Zone** screen (see Figure 6.22) and then click  to display the **Zones and Channels** screen shown in Figure 6.23. Another way to do this is to click  in the toolbar.
- 2 Select the desired zone as described in the preceding section.
- 3 To add a channel to the displayed zone, check the applicable box in the **Channel** column. To select or deselect all channels in the box, check or uncheck the **All** box.
- 4 To assign the channel to a system (if applicable), select the drop-down list in the **System/Type** column and select the desired system.
- 5 To copy an enabled channel to unprogrammed channel locations of the current zone or other zones, double click the shaded area of the channel as shown in Figure 6.23. The **Distribute Channel Data** screen is displayed. Select the desired channels from this screen. This screen shows only disabled channels. (You need to add select zone first then select channel to copy channel to.)

Figure 6.24 Distribute Channel Data

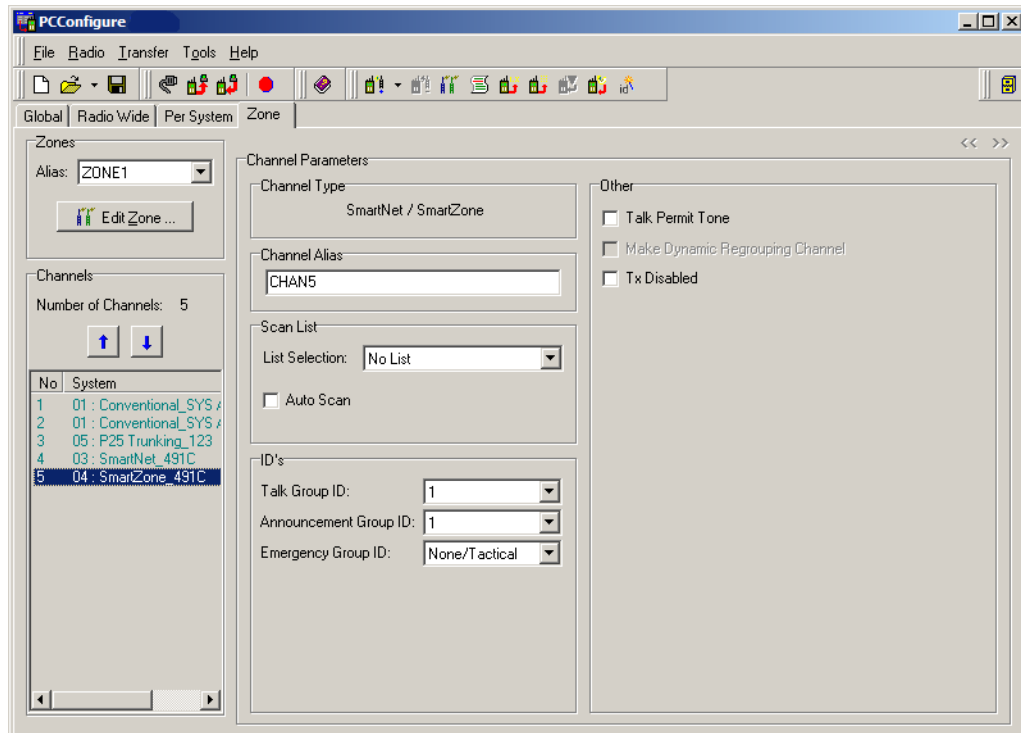


- 6 To move a channel, select the channel you wish to move in the Channels list (on the left side of the Zone tab) and press the Up or Down arrow to move it to the desired location.
- 7 Repeat the preceding steps until the you have set up desired channels in each zone.
- 8 To program individual system and channel information, refer to [Section 6.3.3, “SMARTNET / SmartZone Channel Parameters”](#).

6.3.3 SMARTNET / SmartZone Channel Parameters

After the desired channels have been set up as described in [Section 6.3.2, “Setting Up Channels”](#), you may program individual channel parameters. Select the **Zone** screen shown in Figure 6.25 and then select the desired Zone using the drop-down list in the **Alias** box. Select screens to program individual channel parameters by clicking the channel in the **Channels** box.

Figure 6.25 SmartZone Zone Screen



The parameters displayed when a SMARTNET/SmartZone channel is selected are as follows.

Channel Parameters

Channel Type - Indicates the type of channel that was defined on the Zone Edit screen.

Channel Alias - Programs the alias (identification) that is displayed when the channel is selected. Up to ten characters can be programmed.

Scan List

List Selector - Selects the priority (standard) scan list selected by the channel. If “No List” is selected, scanning is not selectable on that channel.

Auto Scan - When this is checked, the radio automatically begins scanning the scan list associated with the channel whenever the channel is selected. When it is not checked, scanning must be started manually by the Scan option switch.

IDs

Operation with the various combinations of Talk Groups (TG's) and Announcement Groups (AG's) is as follows:

Talk Group Only - Transmit on TG, receive on TG.

Announcement Group ID Only - Transmit on AG, receive on AG, receive on all TG's in AG.

Talk and Announcement Groups - Transmit on TG and receive on TG plus AG but not the TG's assigned to the AG.

Tip *You can enter these IDs in either decimal or hexadecimal format as described in [Section 1.9.5, "Decimal / Hexadecimal Select"](#).*

Talk Group ID - Defines the talk group selected by that channel. Program Talk Groups by selecting "Talk Group List" on the **Per System** screen (see [Section 6.2.3.6, "Talk Group List"](#) or [Section 7.2.3.6, "Talk Group List"](#)).

Announcement Group ID - Defines the announcement group selected by that channel. Program Announcement Groups by selecting "Announcement Group List" on the **Per System** screen (see [Section 6.2.3.7, "Announcement Group List"](#) or [Section 7.2.3.7, "Announcement Group List"](#)).

Emergency Group ID - Defines the talk group used for emergency calls on the channel. If no Emergency Group is selected, the emergency is transmitted on the selected (tactical) talk group.

Other

Talk Permit Tone - When this feature is checked, a short tone sounds after a request for a group call has been approved by the main controller. This indicates that speaking can begin. When not checked, no audio feedback is used to indicate when speaking can begin.

Make Dynamic Regrouping Channel - Checking this box designates the channel as the dynamic regrouping channel. The talk group is then programmed over the air, so the Talk Group ID and Announcement Group ID are not programmable.

Dynamic Regrouping must be enabled on the **Per System** screen to program a dynamic regrouping channel. The dynamic talk group does not need to be a programmed group.

A **Cancel Dynamic Regrouping** option button or menu parameter (51xx only) can now be programmed (see Sections 2.4.2 and 2.4.3). This allows the user to reselect the previous talk group if desired.

Transmit Disabled - When this feature is checked, transmitting is disabled on the channel, and it can be used for monitoring only.

Project 25 Trunked Systems

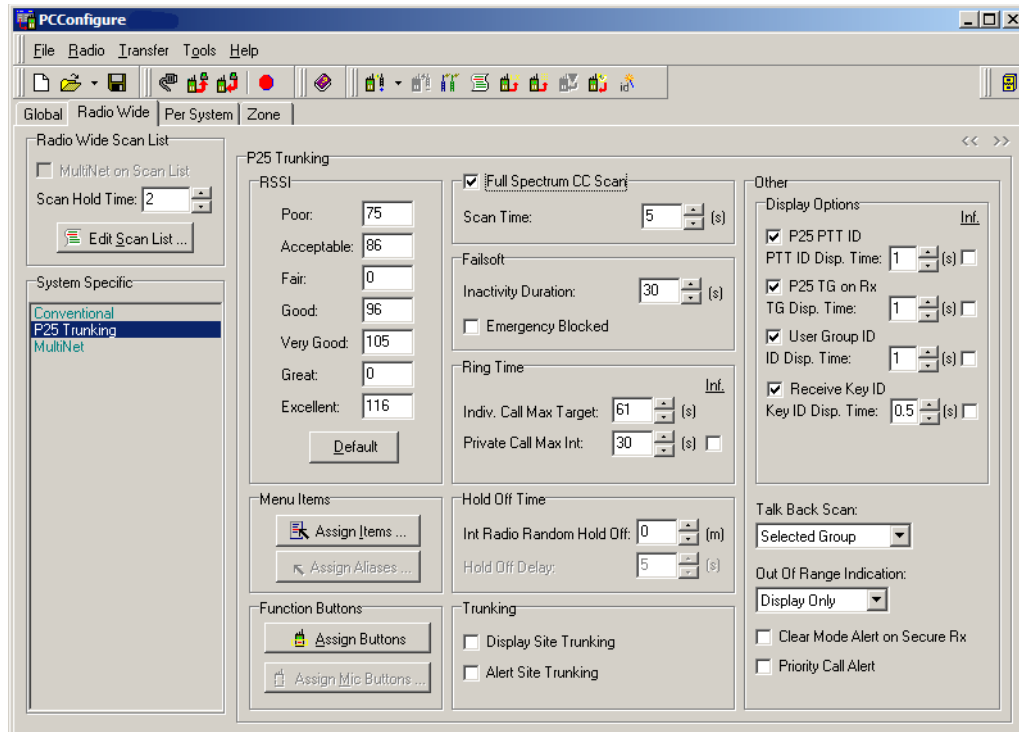
7.1 Radio Wide Screen

The **Radio Wide** screen programs parameters for all Conventional, Project 25 Trunked, SMARTNET/SmartZone, and Multi-Net systems. Areas of the screen common to all protocols are shown in Figure 2.1. A different screen displays for each system type. Figure 7.1 shows the Project 25 Trunked screen. This section contains the instructions to program these parameters for Project 25 Trunked Systems.

7.1.1 Radio Wide Parameters

Select “Project 25 Trunked” in the **System Specific** box to display the screen shown in Figure 7.1. This screen programs the functions that are the same for all Project 25 trunked systems.

Figure 7.1 Radio Wide Project 25 Trunked Screen



RSSI - This sets the Receive Signal Strength Indicator (RSSI) levels that determine when the radio tries to search for and switch to another site. Click the **Default** button to restore these levels to the default settings. If you check the **Hex** box, the RSSI levels display in as hexadecimal numbers instead of decimal numbers.

Note *Do not change the default RSSI levels unless you know how these levels affect radio operation. If you are converting an old file, Fair and Great values are needed, click the default button (so that default values are used.)*

Note *For information about assigning Menu Items and Function Buttons, please refer to [Section 2.4.2, “Menu Items Programming”](#) and [Section 2.4.3, “Function Button Programming”](#).*

Full Spectrum CC Scan - Checking the box enables full spectrum scan. After the radio searches all potential control channel frequencies, it enters a channel-by-channel search across the full spectrum the radio covers. The timer sets the period of time the radio performs this scan before it checks the expected frequencies again. After it checks these frequencies, full spectrum scanning resumes. This cycle repeats until the radio finds a control channel. When timer expires, it searches the CC List for control channels, then returns to the full spectrum scan.

For VHF and UHF, it enters a channel-by-channel search across “the frequencies outlined in the Channel Identifier Lists” not the full spectrum the radio covers. For 700/800, it searches every channel.

Scan Time - Sets the time that full spectrum scanning occurs. You can select time periods between 5 and 31 seconds. The default is five seconds.

Failsoft - These parameters program failsoft operation that occurs when there is a controller or other major system failure.

Inactivity Duration - Sets the time the radio must remain inactive (no receive or transmit activity on channel) in the failsoft mode before it tries to leave the failsoft mode and attempt to find a control channel. If you program “0”, the radio does not leave the failsoft mode.

Emergency Blocked - If you check this, the radio user cannot make *emergency calls when the radio is in the failsoft mode*.

Ring Time

Individual Call Max Target - Sets the maximum ring time of the target radio when it receives phone and unit-to-unit calls. When this time expires, the call automatically discontinues. You can program time periods between 61 and 120 seconds. The default is 61 seconds.

Private Call Max Int - Sets the maximum time the initiating radio rings when it places a unit call. This does not include phone calls. Ringing stops if the target radio answers before this timer expires. You can program time periods between 1 and 255 seconds. The default is 30 seconds. If you program “infinite”, ringing continues until the target mobile answers.

Hold Off Time

Int Radio Random Hold Off - When a failure occurs on a site, this sets the delay that occurs before a radio leaves that site and registers on another. It also sets the delay that occurs before a radio returns to a site that has returned to normal operation. A random time is calculated between 0 and the selected time. This timer starts only when the following Hold Off Delay expires. You can program time periods between 0 and 60 minutes. The default is 0 minutes.

Hold Off Delay - (Not supported.) Sets the delay in registration or affiliation that occurs before starting the preceding random hold off time. During this delay, the radio monitors for over-the-air packets. You can program time periods between 5 and 60 seconds.

Trunking

Display Site Trunking - (Default setting.) If you select this, “Site Trunking” displays if the affiliated site loses communication with the zone controller and begins to operate in the site trunking mode. This message displays until the zone controller returns to normal operation.

Alert Site Trunking - If you select this, an alert tone sounds when the radio enters the site trunking mode just described.

Other

Display Options - Select whether anything displays alternately with the selected channel alias or frequency when the radio receives Project 25 group calls. The order of the Display Options is TG, Unit (PTT) ID and then User Group alias if all are active.

P25 TG on Rx - The radio displays alias or number of the talk group on which the call is being received. You can program this to display for 0.5-7.0 seconds* or “infinite” as just described.

P25 PTT ID - The ID of the radio placing the call displays. You can program this ID to display for 0.5-7.0 seconds or “infinite”. When you select “infinite”, this ID displays for the entire call and none of the other parameters display.

User Group ID - If the ID of the call being received is included in a User Group ID list as described in [Section 5.2.2.7, “User Group ID List \(Project 25 Only\)”](#), the alias of that group is displayed. You can program this to display for 0.5-7.0 seconds or “infinite” as just described.

Received Key ID - The radio displays the key used to decode received calls. You can program this to display for 0.5-7.0 seconds or infinite.

Talk Back Scan - When the radio receives a call while it is scanning, this setting determines the talk group of the radio’s response during the scan hold time. You can program the radio to respond on the “Selected (talk) Group” or the received talk group (“Active Group”) if they are not the same. You program **Scan Hold Time** on the **Per System** screen.

Out Of Range Indication - Selects which of the following occur when an out-of-range condition exists:

“Tone Only” - The periodic tone sounds.

“Display Only” - Default setting. “Out of Rng” (or “NO SYS”) displays.

“Tone and Display” - Both 1 and 2 above.

“No Indication” - Neither 1 nor 2 above.

Clear Mode Alert on Secure Rx - When you select this, a beep sounds when the radio receives a Secure (encrypted) call in the Clear mode on a Project 25 trunked channel. If you do not select it, no beep sounds when this occurs.

Priority Call Alert - An audible tone tells the user he is receiving priority traffic and not just a standard scan channel. Although this feature is active for all systems, it is particularly applicable for the 5100 ES Model I radios.

7.2 Per System Screens

Two screens contain the interface where you program individual Project 25 trunked system parameters. This section contains descriptions of the parameters that you find on these screens. You can program these parameters after you set-up the desired systems as described in [Section 1.10, “Creating Systems”](#).

Note *Some Project 25 trunking parameters can be edited only if PC Configure detects the proper system key. PC Configure detects a key if a yellow key icon is indicated as shown in Figure 6.2. If there is a red “X” through this icon, PC Configure does not detect a key. Refer to [Section 13, “System Keys”](#) for more information.*

7.2.1 Project 25 Trunked System Parameters: Primary Screen

Figure 7.2 shows the initial Project 25 trunked system programming screen.

Figure 7.2 Initial Project 25 Trunked System Screen

The screenshot shows the PCConfigure application window with the 'Per System' tab selected. The 'Systems' list on the left contains three entries: 1 Conventional_SYS ALIAS, 2 MultiNet_SYS ALIAS, and 3 P25 Trunking_123. The 'P25 Trunking' section is active, showing the following settings:

- ID's:** System: 123, WACN: 1, Site: 1, RFSS: 1, Unit: 1.
- Emergency:** Emergency Alarm: Disabled, Emergency Call: checked, Emergency Hot Mic: checked, Emer. Hot Mic Time: 10 (s), Increment By 1: unchecked, Emer. Retry Counter: 4, No Rx Activity during Emergency: unchecked.
- Keys:** Failsafe: 0, Patch: 0, Private Call: 0, Interconnect: 0, Dynamic TG: 0.
- Time / Timers:** Time Out Timer: 0 (s), RFSS Response Time: 750 (ms), Force Unmute Time: 1200 (ms), PTT Warning Time: 4000 (ms), Busy Update Timer: 30 (s), Resp. Pending Timer: 6 (s), ISP Sequence Length: 5 (s), Quick Fade Protect: 1000 (ms), Scan Hold Time: 0 (s).
- Other:** Talk Permit Tone: checked, Radio Inhibit: unchecked, Radio Check: unchecked, SmartZone Coverage Type: unchecked, Conversation Type: PTT - ID, Status Aliasing: unchecked, Dynamic Regrouping: unchecked, Default RCM Addr.: FFFFFFFC, Private Call Usage: Disabled, Private Call Type: Enhanced, Phone Inter. Usage: Disabled, Call Alert Usage: Disabled, Transmit Power: High, RSSI Threshold: 100, System Modulation: C4FM, Disable Site Trunking Operation: unchecked, Inactivity Auto-Reaffiliation: checked, Auto-Reaffiliation Timer: 2 (h).

Systems - Select the system for which you wish to set parameters.

IDs

Note *These IDs are displayed in hexadecimal format as described in [Section 1.9.5, “Decimal / Hexadecimal Select”](#).*

System - This ID is determined and read from the system key. This ID comes from the system key in the *Keys* folder.

WACN - This ID, the home Wide Area Communications Network, is determined and read from the system key.

Site - Specifies the home site of the radio. If the Zone Fail Site Lock feature is enabled, this also determines the site the radio is restricted to if the zone controller goes down. (Zone Fail Site Lock is disabled by default in the subscriber units. The radio must be optioned to use this feature.)

RFSS - Specifies the default RF subsystem [RFSS (zone controller)], or the RFSS that the radio is restricted to if you enabled the SmartZone coverage option. One or more RF Subsystems make up a system. Valid IDs are 1 through 254.

Unit - Provides a unique identification of the radio on a system. Therefore, each radio must have a different Unit ID. Valid Unit IDs are 1 through 16,777,215 (000001 through FFFFFFFF hex). The decimal version of this ID is the private call ID of the radio.

Keys - Programs the following encryption key ID (hardware location) that the radio uses for all calls except group calls.

Failsoft - Key used in failsoft conditions.

Patch - Key used in patch calls.

Private Call - Key used for unit-to-unit (private) calls.

Interconnect - Key used for telephone calls.

Dynamic Talk Group - Key used for dynamic talk groups.

System Lists - Refer to [Section 7.2.3, “Project 25 Trunked System Lists”](#) for descriptions of the following lists:

- [Channel ID List](#)
- [Control Channels List](#)
- [Status Alias List](#)
- [Call List](#)
- [Phone List](#)
- [P25 Talk Group List](#)
- [P25 Announcement Group List](#)

- [Priority Scan List](#)
- [Site List](#)
- [System Preferred Site List](#)
- [User Group ID List](#)
- [Rebanded Control Channels List \(700/800Mhz band only\)](#)
- [NAT List](#)

Emergency

Emergency Alarm

“Disabled” - The radio sends no emergency signal when the user presses the Emergency option switch.

“Normal” - The radio sends an emergency alarm when the user presses the Emergency switch. The Emergency Alarm tone is heard and is only seen by the console, not by other users.

“Silent” - The radio sends an emergency alarm when the user presses the Emergency switch. Emergency Alarm tone is not heard and there are no visual indicators.

Emergency Call - When you check this box, if the radio user presses the Emergency option switch and then the PTT switch, an emergency group call transmits on the emergency group. The radio user cancels the emergency mode by cycling power or pressing and holding the emergency switch. (The press and hold time is determined by the timer on the **Global** secondary page.) If you disabled emergency calls, the alarm always occurs on the selected group. If you enabled emergency calls, it occurs—in order of preference—on the emergency group, selected group, and announcement group. When the radio sends an emergency signal, the red transmit indicator lights, an emergency tone sounds, and “EMERGNCY” flashes in the display. “EMERGNCY” and the initiating ID continue to flash alternately until power is cycled, or the radio user presses and holds the Emergency switch.

Emergency Hot Mic - When you check this box and the radio user sends an emergency call by pressing the Emergency switch, automatic transmitting occurs. The microphone audio is unmuted (without user intervention) for the time specified by the following **Emergency Hot Mic Time**. If you do not check this or if you do not select either emergency call, automatic transmissions do not occur. This feature initiates only by the first press of the Emergency switch. Subsequent presses do not trigger automatic transmissions. This function resets if the radio user changes the channel.

Emergency Hot Mic Time - Specifies the time period during which transmissions occur. You can select time periods of 10 through 120 seconds in ten-second increments if the **Increment by 1** box is unchecked.

Increment by 1 - Check this box to increment the Emergency Hot Mic Time for 1 to 12 seconds (in increments of 1).

Emergency Retry Counter - If you check **Inf** (infinite), the radio repeats emergency calls until they are acknowledged or canceled. If you do not check it, the radio repeats these calls only the specified number of times. Value can be set from 1-254. 255 automatically enables “Infinite”.

No Receive Activity during Emergency - When you check this box, the following radio receive indications do not display in the emergency mode: Receive audio, receive LED, and receive icons.

Time/Timers

Time Out Timer - This timer determines the maximum time period of a continuous transmission. You can program it for 15 through 225 seconds in 15-second intervals, or you can disable it (0).

RFSS Response Time - Specifies the time between attempts to affiliate on RFSS sites. You can program times of 50 ms to 6375 ms in 25 ms steps. The default is 750 ms.

Force Unmute Time - (Not Supported.) Specifies the maximum time the radio remains muted after transmitting because of probable system delay. If the radio determines that the incoming audio signal is from some other radio, the radio disregards this delay. You can program times of 25 to 6375 ms. The default is 1200 ms.

PTT Warning Time - Specifies the time the radio waits before sounding the PTT Prohibit tone. This tone warns the user that the PTT request is being processed and the user should release the PTT switch. You can program times of 500 through 6375 ms. The default is 4000 ms.

Busy Update Timer - Specifies the time the radio waits in a busy state for a reject, grant, or another busy update from the radio system. When this timer expires, the radio no longer expects a response from the system and the radio tries the transmission again. You can program times of 15 through 945 seconds. The default is 30 seconds.

Response Pending Timer - (Not Supported.) Specifies the time the radio waits when it expects a further response from the radio system to a request. This occurs when the system sends a response that indicates the request is being processed and a response is coming. When this timer expires, the radio no longer expects a response and the radio returns to the idle state. You can program times of 1 through 255 seconds or infinity. The default is six seconds.

ISP Sequence Length - Specifies the time the radio system allows each site for an ISP retry request. The radio retries until this timer expires. The radio makes at least five retries, regardless of this timer setting. You can program times of 1 through 255 seconds or infinity. The default is five seconds.

Quick Fade Protect - Specifies the time the radio will stay on the control channel when synchronization is lost before returning to CC hunt. This setting allows the radio to ride through a short term loss of synchronization on the control channel and recover without having to enter CC hunt to recover the control channel. You can program times of 200 through 6575 ms. The default is 1000 ms.

Scan Hold Time - Specifies the delay that occurs after the radio no longer receives a message before scanning resumes. You can program times of zero through eight seconds. The default is zero (0) seconds.

Other

Talk Permit Tone - If you check this, a short tone sounds after the main controller approves a request for a group call. This indicates that speaking can begin. If you do not check this, the radio user hears no audio signal to indicate when speaking can begin.

Radio Inhibit - If you check this, the dispatcher can disable or enable the radio. When the radio receives this command, the radio sends an acknowledgment to the dispatcher. Then, the radio is disabled as follows.

- Receive audio is muted and transmit audio is disabled.
- All radio controls are inoperative.
- Scanning is disabled on the selected mode (Project 25 trunking).
- The transmit indicator is disabled and the display is blanked.

The dispatcher can then enable the radio again. As an alternative, you can enable the radio again by reading and then rewriting the programming data using PC Configure.

Radio Check - If you check this, the radio will respond to a remote check command. The dispatcher can send this command to confirm that the radio is active and operational on the system. If you do not check this, this command is ignored.

SmartZone Coverage Type - If you check this, roaming can occur only within the selected RFSS controller. If you do not check this, roaming can occur across all available RFSS controllers in the WACN system.

Conversation Type

“Message Trunking” - Not available with Project 25 trunking.

“PTT - ID” - "Default" selection for Project 25 trunking. The radio can key during the programmed hang time and continue the conversation on the active channel. If a user keys during the hang time, reaffiliation with the system occurs before using the voice channel. The radio holds the voice channel while this reaffiliation occurs. The call then connects to the open voice channel. This results in all traffic being logged, even from the radios which transmit during the hang time.

“Transmission” - The radio does not use hang time. The radio affiliates and receives a new channel grant on every PTT. When a radio unkeys, the radio system makes the channel available for other users immediately, and the system logs all traffic. If you do not check this, refer to the **PTT ID Enable** description above.

Status Aliasing - Enables and disables status aliasing for the system. This function allows you to customize status numbers and allows you to assign an alias name to each number.

Dynamic Regrouping - If you check this, you can program a dynamic regrouping channel. This is a Project 25 trunked channel that has the talk group dynamically set by the dispatcher. Select it on the **Zone** screen. Refer to [Section 7.3.3, “Project 25 Trunked Channel Parameters”](#).

Default RCM Address - Specifies the Radio Control Manager used as the target address of Inbound Signaling Packet (ISP) transmissions such as status and message transmissions. You can program hexadecimal addresses from 000000 to FFFFFFFF. The default is FFFFFFFC.

Private Call Usage

“Disabled” - The radio user cannot place private calls or receive them.

“Response Only” - The radio user can receive private calls but cannot place them.

“List Only” - The radio user can place private calls and receive them. The user can recall numbers from a programmed list only.

“Unlimited” - The radio user can place private calls and receive them. The user can recall numbers from a programmed list or dial them from the keypad. 53xx radios support this mode only when they use the HHC control unit. Standard 53xx front and remote models do not support number dialing.

Private Call Type

“Standard” - Selects the standard Private Conversation mode in which the user does not receive any feedback when the called radio is not active in the system. The radio user receives only a “No Answer” if the called radio does not answer.

“Enhanced” - Selects the Enhanced Private Conversation™ mode. When the radio users places a call with this mode, the system tells the user if the called radio is currently active in the system and within range. The calling radio displays “No Ack” if the called radio is not active in the system and “No Answer” if it is active but does not answer.

Phone Interconnect Usage - Programs operation of telephone calls same as the preceding **Private Call Usage**.

Call Alert Usage - Programs operation of call alert calls (pages) the same as the preceding **Private Call Usage**.

Transmit Power - Fixes the radio’s transmit power at the high or low level, or makes it selectable for each system. If it is selectable, the radio must have a high/low power function switch.

RSSI Threshold (Project 25 Trunking Only) - When the above “Transmit Power” setting is selected to “Auto”, this threshold setting (default = 100 RSSI) will determine at what signal level the radio will switch to low power based on the RSSI reading of the site the radio is currently affiliated. As the RSSI value falls below the selected threshold setting, the radio will again transmit at high power.

System Modulation - Reserved for future use.

Disable Site Trunking Operation - The radio will go “Out of Range” if the site is in “Site Trunking”.

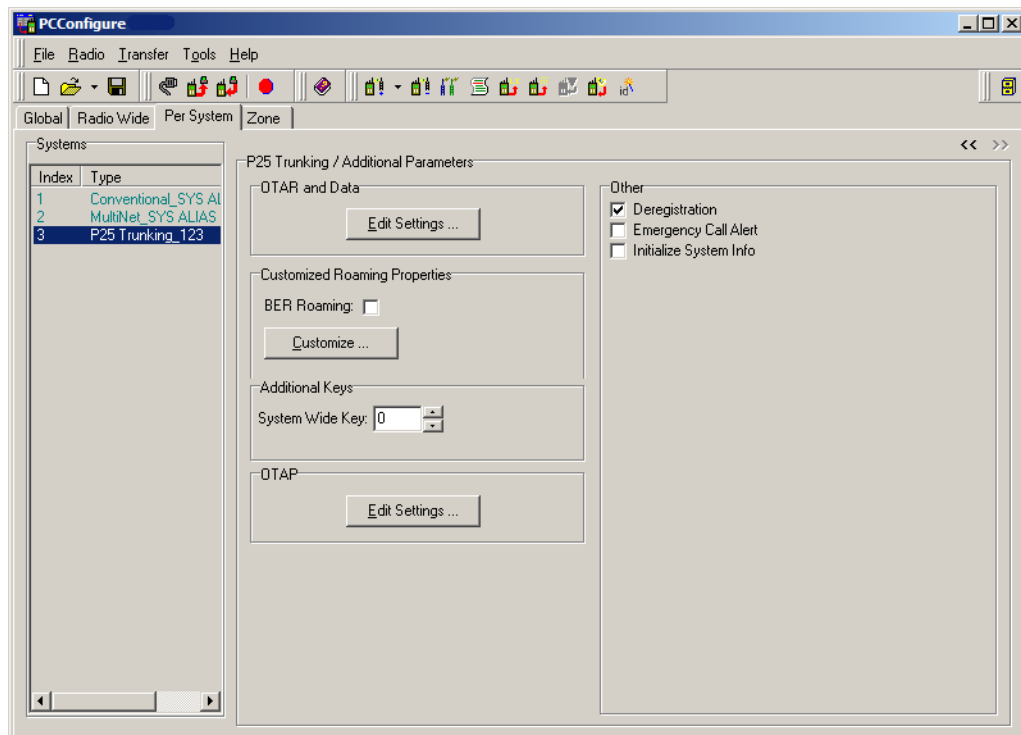
Inactivity Auto-Reaffiliation - If you check this, the radio attempts reaffiliation on the system if the radio has had no transmit activity for the time period programmed by the **Auto-Reaffiliation Timer**.

Auto-Reaffiliation Timer - This parameter specifies the time the radio waits with no transmit activity to attempt reaffiliation on the system.

7.2.2 Project 25 Trunked System Additional Parameters

You open and close a second Project 25 trunked system programming screen when you click the << >> buttons in the upper right corner of the screen. Figure 7.3 shows the parameters displayed on this second screen.

Figure 7.3 Second Project 25 Trunked System Screen



OTAR and Data Settings

Note To select OTAR and the data parameters that follow, you must select SLN/CKR Mode key management on the second Global screen. Refer to [Section 4.2, “Global Additional Parameters”](#).

Click the **Edit Settings ...** button to display the OTAR and Data Settings screen shown in Figure 7.4. This screen is the interface where you program various OTAR and Project 25 data parameters.

Figure 7.4 OTAR and Data Settings Screen.

OTAR

OTAR Enabled - Select “On” to enable OTAR. Select “Off” to disable this feature.

Rekey Request Time Out - When the radio initiates rekeying (that is, when it sends an OTAR rekey request message), this setting determines how long the radio waits for a response from the Key Management Facility (KMF). You can program times of 20 through 180 seconds.

Rx Security Level

“Enhanced: - The radio accepts only encrypted and authenticated KMMs from the KMF (except for warm-start, which is authenticated only).

“Basic” - The radio accepts any KMM that is in a format allowed by the OTAR standard.

Tx Security Level

“Enhanced” - All OTAR procedures originating from the radio are encrypted and authenticated. If they cannot be encrypted and authenticated, the radio does not send the KMM.

“Basic” - The radio always sends unencrypted KMMs if the OTAR standard allows them to be unencrypted and unauthenticated.

Note *Fields that are grayed out are not applicable to P25 Trunking.*

Registration Inactivity Timer - If the radio has not registered any OTAR activity within the time period set by this timer (in hours), the radio attempts to re-register with the KMF.

Originating Response Kind - Selects if a response is required from the KMF to outgoing messages.

“Kind 1-Unconfirmed” - Requests no response.

“Kind 3-Confirmed” - Requests immediate response.

Registration Number of Attempts - Specifies the maximum number of times that the radio tries to complete a successful OTAR registration.

Registration Time between Attempts - Specifies the time in seconds that the radio waits after an unsuccessful OTAR registration attempt before it tries to register again. This time period should be greater than the **Data/SNDCP → Response Timer** below.

KMF IP Address - The KMF’s IP address.

KMF UDP Port - The UDP port that the radio uses when it sends Key Management Messages (KMMs) to the KMF. The default value is 64414.

Subscriber OTAR UDP Port - The UDP port that the radio uses for OTAR. The default value is 64414.

Packet Data - Enables a laptop to connect to a mobile radio and send IP packet data to the system through the radio when it is in P25 trunking mode.

SNMP Traps - Enables SNMP (Simple Network Management Protocol) indications and status updates to be sent to an application running on a mobile computer. The application is able to communicate with the radio using the SNMP protocol. The status updates include radio registration status and data service availability status. This value defaults to off.

ICMP Echo - Enables the radio to send back an ICMP response once an ICMP request has been received. This value defaults to off.

CAI IP Address - Assigns a fixed IPv4 Fixed IP Address to the radio for the Common Air interface.

Connection Type - (5100 only) Sets the type of connection between the MDP and portable radio. For conventional IP Based data set this to PPP.

ARP Cache Depth - (Conventional OTAR only) Sets the Cache size used by the ARP (Address Resolution Protocol).

ARP Cache Expiration - (Conventional OTAR only) Sets the Cache Expiration for the ARP (Address Resolution Protocol). This is the amount of time an IP/CAI address can stay in the cache.

Data/SNDCP (Subnetwork Dependent Convergence Protocol)

Data Registration Enabled - Select On if OTAR is used. The radio then registers with the data system on a channel change (Project 25 channels only).

Data Registration Type - Dynamic allows the radio to automatically obtain its IP address from the KMF data base, while Static requires the KMF operator to manually enter the radio IP address in the KMF data base. The default setting should be "Dynamic".

CAI Data Max Tx Attempts - Selects the maximum number of times the radio attempts to send a CAI data packet. Attempts to send the data packet continue until the radio receives an acknowledgment confirming the successful receipt of the packet, or until the radio exceeds the selected amount of transmit attempts.

Response Timer - Selects the period of time the radio waits for an acknowledgment that a CAI transmission is successful before it tries the transmission again.

SNDCP Activation Wait Timer - Controls the time that a radio waits for the KMF to respond to a SNDCP context activation request.

SNDCP Dwell Timer - Specifies amount of time data can stay in SNDCP output queue. Currently not implemented.

Rx Voice Interrupts Data - When checked, a voice call can interrupt data.

Subscriber IP Address - The IP Address assigned to the subscriber. Currently not used.

Mobile Computer IP Address - IP address for the mobile computer. Currently not used.

Tx Limited Patience - Selects the amount of time radio attempts to transmit a common air interface packet. Once time expires, radio ceases transmission. Times are 1 to 255 seconds, infinite in increments of 1. The default is infinite.


Min Response Timer - Selects the minimum amount of time that the radio waits for an acknowledgement of a successful CAI to be sent across the channel. Times are 50 to 2000 msec., in increments of 50 msec. The default is 700 msec.

Frame Sync Seek Period - Selects the amount of time the radio listens for a frame sync sequence before a packet is transmitted. Times are 0 to 5000 msec., in increments of 50 msec. The default is 750 msec.


Tx Short Random Range - Selects the maximum amount of time the radio waits to transmit once the first qualified FS is received indicating the channel is clear. Times are 50 to 500 msec., in increments of 50. The default is 50 msec.

Tx Long Random Range - Selects the upper range of the random range. When the radio detects a busy, the radio uses a random time within this range (Back off delay) to determine when to retransmit the packet. Times are 50 to 5000 mSec., in increments of 50 msec. The default is 2000 msec.

Tx Response Random Range - Selects amount of time radio waits before rechecking a channel's status once a busy channel status symbol has been received. Only applies to ACKs. Times are 50 to 1000 msec., in increments of 50. The default is 1000 msec.

Select the  button to restore the system defaults to the above six fields.

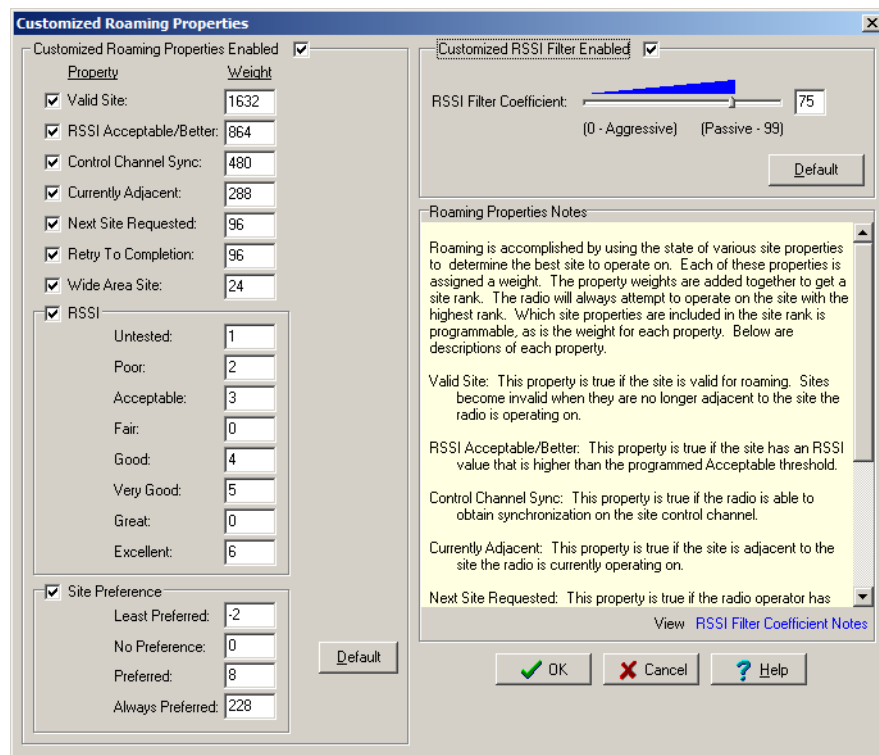
Remaining fields on the second page of the Project 25 **Per System** screen include:

Customized Roaming Properties (P25 Only) - You can customize SmartZone and Project 25 Trunked roaming properties by clicking the  button. The screen shown in Figure 7.5 is displayed. Information programmed in this screen is described in the **Roaming Properties Notes** window. The RSSI Filter slider bar controls how quickly the radio reacts to dropouts in the RSSI level. The more aggressive the setting, the quicker site switching occurs.

Note *Default settings should not be changed without consulting EFJ technical support.*

BER Roaming - Uses control channel “Bit Error Rates” to determine which sites the radio should also roam.

Figure 7.5 Customized Roaming Properties Screen




Customized Roaming Properties

Customized Roaming Properties Enabled ☒

Property	Weight
<input checked="" type="checkbox"/> Valid Site:	1632
<input checked="" type="checkbox"/> RSSI Acceptable/Better:	864
<input checked="" type="checkbox"/> Control Channel Sync:	480
<input checked="" type="checkbox"/> Currently Adjacent:	288
<input checked="" type="checkbox"/> Next Site Requested:	96
<input checked="" type="checkbox"/> Retry To Completion:	96
<input checked="" type="checkbox"/> Wide Area Site:	24
<input checked="" type="checkbox"/> RSSI	
Untested:	1
Poor:	2
Acceptable:	3
Fair:	0
Good:	4
Very Good:	5
Great:	0
Excellent:	6
<input checked="" type="checkbox"/> Site Preference	
Least Preferred:	-2
No Preference:	0
Preferred:	8
Always Preferred:	228

Default

Customized RSSI Filter Enabled ☒

RSSI Filter Coefficient:  75
(0 - Aggressive) (Passive - 99)

Default

Roaming Properties Notes

Roaming is accomplished by using the state of various site properties to determine the best site to operate on. Each of these properties is assigned a weight. The property weights are added together to get a site rank. The radio will always attempt to operate on the site with the highest rank. Which site properties are included in the site rank is programmable, as is the weight for each property. Below are descriptions of each property.

Valid Site: This property is true if the site is valid for roaming. Sites become invalid when they are no longer adjacent to the site the radio is operating on.

RSSI Acceptable/Better: This property is true if the site has an RSSI value that is higher than the programmed Acceptable threshold.

Control Channel Sync: This property is true if the radio is able to obtain synchronization on the site control channel.

Currently Adjacent: This property is true if the site is adjacent to the site the radio is currently operating on.


Next Site Requested: This property is true if the radio operator has

[View RSSI Filter Coefficient Notes](#)

OK Cancel Help

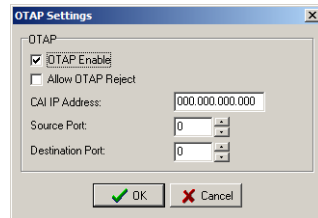
Additional Keys

System Wide Key - Use this setting to select the encryption key location to use for clear, encrypted system wide calls.

OTAP Settings - Select the  button.

Note *The radio must first be configured for data operations on the Trunked IV&D system to establish OTAP services, then it must be programmed for OTAP operation.*

Figure 7.6 OTAP Settings



OTAP Enable – Enables OTAP operation for mobile subscribers.

Allow OTAP Reject - Allows user to reject an incoming OTAP communications. This currently not implemented.

Destination IP Address – The destination IP Address assigned to the OTAP server attached to the P25 Trunking system network.

Source Port – The UDP port that the radio listens on when receiving OTAP messages from the OTAP server.

Destination Port - The UDP port that the radio uses for transmitting messages to the OTAP server.


Other

Deregistration - This selection forces the radio to de-register from the active system when powering down or when moving from one system to a different system (conventional or trunking).

Emergency Call Alert - Check this box to notify the user when an emergency call is being made on their selected P25 Conventional or P25 Trunking talk group.

Initialize System Info - Check this box to force the radio to initialize the system information when the radio moves from one system to another if the system ID/WACN match in duplicate PC Configure programmed system.

7.2.3 Project 25 Trunked System Lists

Select the various Project 25 trunking lists by the “System Lists” drop-down menu on the Project 25 Trunking **Per System** screen. After you select the desired list, you can edit it by clicking the  button.

This section contains descriptions of the following lists:

- [Channel ID List](#)
- [Control Channels List](#)
- [Status Alias List](#)
- [Call List](#)
- [Phone List](#)
- [P25 Talk Group List](#)
- [P25 Announcement Group List](#)
- [Priority Scan List](#)
- [Site List](#)
- [System Preferred Site List](#)
- [User Group ID List](#)
- [Rebanded Control Channels List \(700/800Mhz band only\)](#)
- [NAT List](#)

Descriptions of the various lists and the information they program follow.

7.2.3.1 Channel ID List

The Channel Identifiers List screen shown in Figure 7.7 displays only when programming channels in the VHF, UHF, and 700/800 MHz frequency bands (Other Band Trunking). Both Explicit and Implicit addressing is available.





Note *The system manager provides Channel ID and Control Channel information. This information must match the programming assigned to other subscriber units for it to function properly on the system. VHF/UHF entries should begin in the #3 location.*

Figure 7.7 Channel Identifiers List Screen

No	Bandwidth (KHz)	Tx Offset Sign (+/-)	Tx Offset (MHz)	Spacing (KHz)	Base Frequency (MHz)
1	12.5	-	045.00000	006.25000	851.00625
2	12.5	-	0	0	0
3	12.5	-	0	0	0
4	12.5	-	0	0	0
5	12.5	-	0	0	0
6	12.5	-	0	0	0
7	12.5	-	0	0	0
8	12.5	-	0	0	0
9	12.5	-	0	0	0
10	12.5	-	0	0	0
11	12.5	-	0	0	0
12	12.5	-	0	0	0
13	12.5	-	0	0	0
14	12.5	-	0	0	0
15	12.5	-	0	0	0
16	12.5	-	0	0	0

With Implicit Addressing, the control channel sends only the receive frequency. Information in this table determines the transmit frequency. With Explicit Addressing, the control channel sends both the receive and transmit frequencies. Both types reference information in this table. VHF, UHF, 700 MHz and 800 MHz all have settings in the Channel ID table that must be populated for the radio to operate properly. The 800MHz information is defaulted to this table.

To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy CC frequencies to another system's CC list, etc.

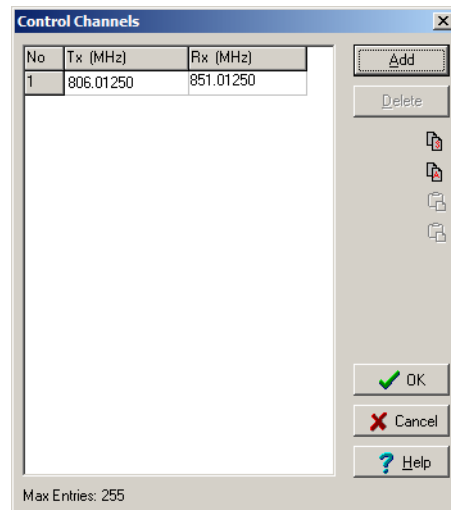
- 1 Select the top  icon to copy the selected item or the (second)  icon to "copy all", which copies every item active in the list.
- 2 Select the (third)  icon to paste the previously selected single item or the fourth  icon to "paste all", which pastes the entire list captured previously.

7.2.3.2 Control Channels List

The Control Channels List screen shown in Figure 7.8 allows the system manager to view and edit the control channels. Each Project 25 trunking system can have a maximum of 255 control channels. Only one control channel is active at a time.





To display this screen, on the Project 25 Trunking System screen, select “Control Channel List” in the drop-down menu, then click the  button.

Figure 7.8 Control Channels List Screen



To add a channel, click the **Add** button. To delete a channel, select it and click the **Delete** button. To edit a channel, select the digits that you want to change and edit them as desired. For the 800 MHz band, you can change only the receive channel frequency. PC Configure automatically calculates the transmit frequency (45 MHz below the receive frequency). These are the mobile frequencies, not the repeater frequencies. Only multiples of 5 kHz and 6.25 kHz are valid.

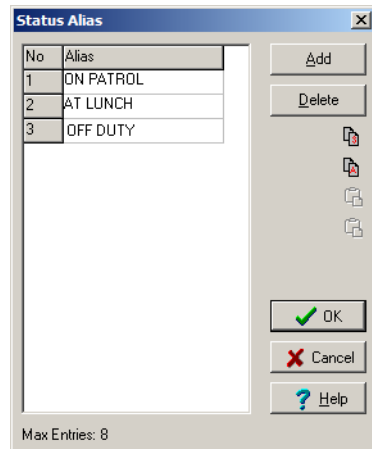
To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy CC frequencies to another system’s CC list, etc.

- 1 Select the top  icon to copy the selected item or the (second)  icon to “copy all”, which copies every item active in the list.
- 2 Select the (third)  icon to paste the previously selected single item or the fourth  icon to “paste all”, which pastes the entire list captured previously.

7.2.3.3 Status Alias List

The Status Alias List screen shown in Figure 7.9 is the interface where you program the alias for each of a maximum of eight status conditions. The system manager defines meaning of each status number.





Figure 7.9 Status Alias List Screen



To display this screen, on the Project 25 Trunking **Per System** screen, select “Status Alias List” in the drop-down menu, then click the  button.

To add an alias, click the **Add** button. To delete an alias, select it and click the **Delete** button. To edit an alias, select it and change as desired. You can enter a maximum of ten characters. This identification displays when the user selects a status condition.

To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy CC frequencies to another system’s CC list, etc.

- 1 Select the top  icon to copy the selected item or the (second)  icon to “copy all”, which copies every item active in the list.
- 2 Select the (third)  icon to paste the previously selected single item or the fourth  icon to “paste all”, which pastes the entire list captured previously.

7.2.3.4 Call List


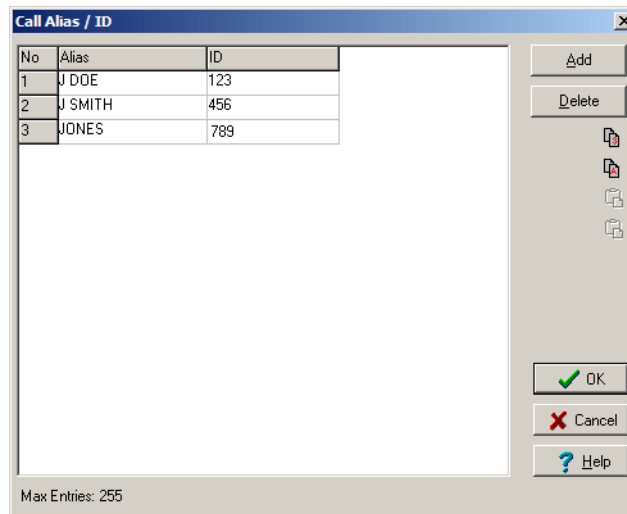
The Call Alias / ID List screen shown in Figure 7.10 is the interface where you program the list of IDs used for unit calls. You can program a maximum of 255 IDs. To display this screen, on the Project 25 Trunking **Per System** screen, select “Call List” in the drop-down menu, then click the  button.

Figure 7.10 Call Alias / ID List Screen







To add a call, click the **Add** button. To delete a call, select it and click the **Delete** button. To edit an Alias or ID, select it and enter the desired information as follows:

Alias - You can enter a maximum of ten characters to identify the user being called. This identification displays when the user selects the mobile radio to be called from the list. When the user receives a call from a unit in this list, the alias of the unit displays for the user instead of the calling unit’s ID number. You can enter only capital letters, so PC Configure automatically converts any lowercase letters that you enter to capital letters.

ID - This is the ID of the radio that the user is calling. Valid entries are 1 through 16,777,215. PC Configure detects zero (“0”) as no entry.

To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy CC frequencies to another system’s CC list, etc.

- 1 Select the top  icon to copy the selected item or the (second)  icon to “copy all”, which copies every item active in the list.
- 2 Select the (third)  icon to paste the previously selected single item or the fourth  icon to “paste all”, which pastes the entire list captured previously.

7.2.3.5 Phone List


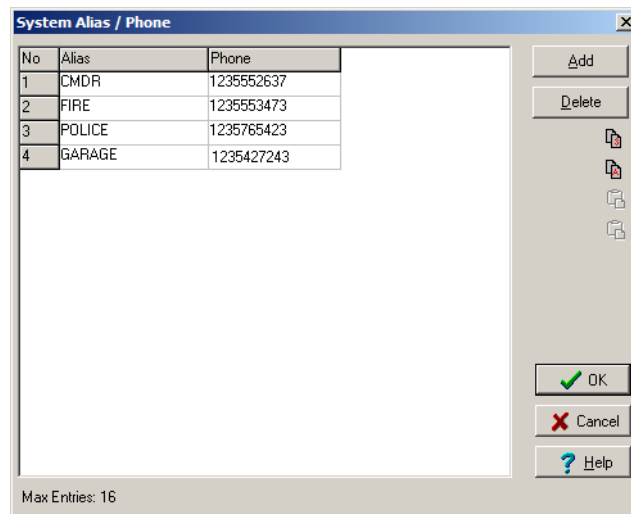
The Phone List screen shown in Figure 7.11 programs the telephone number list that the radio user may place telephone calls from (if you program the system to use this feature). You can program a maximum of 16 numbers. To display this screen, on the P25 Trunking screen, select “Phone List” in the drop-down menu, then click the  button.

Figure 7.11 Phone List Screen







To add a call, click the **Add** button. To delete a call, select it and click the **Delete** button. To edit an alias or number, select it and enter the desired information as follows:

Alias - You can enter a maximum of ten characters to identify the number being called. This identification displays when the user selects the number to be called from the list. You can enter only capital letters, so PC Configure automatically converts any lowercase letters entered to capital letters.

Phone - This is the telephone number that the radio dials when the radio user selects the location. Enter the three-digit area code and seven-digit telephone number using the numbers 0 through 9.

To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy CC frequencies to another system’s CC list, etc.

- 1 Select the top  icon to copy the selected item or the (second)  icon to “copy all”, which copies every item active in the list.
- 2 Select the (third)  icon to paste the previously selected single item or the fourth  icon to “paste all”, which pastes the entire list captured previously.

7.2.3.6 Talk Group List


The P25 Trunking Talk Groups screen shown in Figure 7.12 sets up Project 25 Trunking talk groups. It is the interface at which you program unique talk group information. To display this screen, on the Project 25 Trunking **Per System** screen, select the “Talk Group List” drop-down menu, then click the  button.

Figure 7.12 P25 Trunking Talk Group Screen

The parameters programmed in this screen are as follows:

ID - This list displays the talk group IDs contained in the Talk Group list. To edit a talk group ID in this list, select it and then change it in the **Selected Group** box. This is the actual ID of the talk group. You assign talk groups to channels in the **Zone** screen. Refer to Figure 7.25.

Note You can enter this ID (1-65535/decimal and FFFF/hexadecimal) in either format as described in [Section 1.9.5, “Decimal / Hexadecimal Select”](#).

Add - Click this button to add the next available talk group ID to the list. You can program each Project 25 trunking system with a maximum of 255 talk groups.


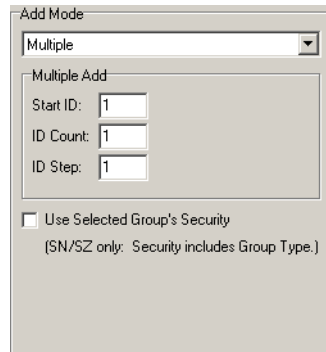
Add Mode - To add an entire block of talk group IDs or a specific ID, click the arrow button  in the lower right corner of the screen. The **P25 Trunking Talk Group** screen is expanded and the **Add Mode** panel, shown in Figure 7.13, is displayed:

Figure 7.13 Add Mode Panel



Add Mode Drop-down

Single - Adds the next available ID similar to the **Add** button.


Multiple - Adds a block of IDs as follows: To initiate the selected add operation, click the **Add** button. If the specified ID range results in duplicate IDs, an error message displays and PC Configure adds no IDs.

Start ID - Specifies the starting ID of the block.

ID Count - Specifies the number of IDs to be added.

ID Step - Specifies if consecutive IDs are added or some other step rate is used. For example, if Start ID = 10, ID Count = 5, and ID Step = 10, the IDs added are 10, 20, 30, 40 and 50.

Use Selected Group's Security - When selected, PC Configure automatically programs the added groups with the Strapping Mode and Encryption Key ID of the selected group.

 - Click this button to delete the selected talk group.

Security Parameters

Strapping Mode

“Clear” - All transmissions on the talk group occur in the clear (unencrypted) mode.

“Secure” - All transmissions on the talk group occur in the secure (encrypted) mode selected as follows.

“Selectable” - The radio user select the clear or secure status of the talk group is with the “Clear/Secure” option switch.

Encryption Key ID - Selects the location from 0 to 63 (PID/ASN mode) or 1 to 64 (SLN/CKR mode) of the key used for secure calls on the group if applicable.

Any Key - Enabled by default to correspond to previous radio behavior. When the option is enabled and the radio receives a secure call, it allows any key in the radio to be used to decrypt the traffic. If the option is disabled, the radio uses only the key assigned to the talkgroup/announcement group/channel to decrypt traffic. If the radio receives a call using another key than the specified key, the radio's display shows the call parameters that are programmed on the PCConfigure P25 Trunking radio wide page (PTTID, Talkgroup ID, etc.) but the LED will not illuminate nor will the speaker open.

Use System Preferred Site List - Selects one of the preferred sites for the talk group. Refer to the **Preferred Sites** description which follows for more information.

Failsoft Frequencies

Failsoft Enable - If you check this box, you enable a failsoft channel on the talk group if a controller or other major failure occurs. If you do not check this box, the radio does not enter the failsoft mode if a failure occurs.

Tx (MHz) - Programs the failsoft transmit frequency if you checked **Failsoft Enable**.

Rx (MHz) - Programs the failsoft receive frequency if you checked **Failsoft Enable**.

Rebanded

Tx (MHz) - Programs the failsoft transmit frequency if you checked Enabled.

Rx (MHz) - Programs the failsoft receive frequency if you checked Enabled.

Talk Group Specific Preferred Sites

With Project 25 trunked systems, you can associate a maximum of four preferred sites. You can also associate a preferred site list with each talk group. This forces a call on the talk group to access the specified sites. The system manager can then keep radios on specific sites even if you do not enable the Site Search feature. You can program the preference for each site as "Least", "None", "Preferred", "Always" or "Only" as follows.

"Least" - This setting adds negative weighting to the roaming properties so that a "Least" preferred site will not be used unless all other adjacent sites have much lower RSSI values.

"None" - This setting adds no weighting (positive or negative) to the roaming properties so that no site has any additional preference over any other adjacent sites.

"Preferred" - This setting adds positive weighting to the roaming properties so that this site will be used unless its signal strength is much lower than the adjacent sites.

"Always" - This setting adds significant weighting to the roaming properties and will be used as long as its RSSI value remains above the "Acceptable" RSSI threshold. This setting ignores "Site Trunking" conditions on the site associated with this setting, which can cause loss of communications to Wide Area sites if this condition occurs.

“Only” - This setting will tie the selected talk group to one site only. The subscriber unit will then act as though site locked on the programmed site and display OOR when it is unable to connect to this site.

Selected Site

RFSS ID - Designates the zone controller with which the "site to be preferenced" is associated.

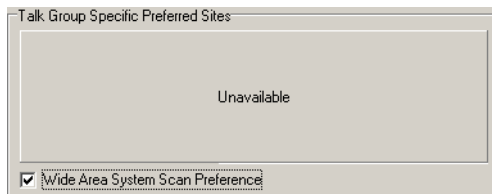
Site ID - Designates the site to which the preferences will be applied.

Preference - “Least”, “None” (no preference), “Preferred”, “Always (preferred) or “Only” is a weighting for steering to different sites.

Program the preferred site lists at the **System Wide Preferred Site List** screen described on [Section 7.2.3.10, “System Preferred Site List”](#). You can program a maximum of 64 lists. Each list can include a maximum of 32 sites.

If you associate a talk group with both a preferred site list and one or more preferred sites, the radio searches the preferred sites first. The first entry found for a given site is used. If the same site is in both lists, the entry in the list at the bottom of the screen is used first.

Wide Area System Scan Preference - Selecting this feature causes the radio to save the Site ID and Transmit/Receive channel frequencies for any particular site and uses these to speed system access when returning to a previously selected talk group. This portion of the screen changes as shown below:



To use system channel resources more efficiently, you may use system access permissions to steer certain talk groups to particular sites. For example, a police department may be allowed to use only Site 1, and a public works department may be allowed to use only Site 2. With this option enabled on a talk group, as the talk group affiliates with a site that site is saved if the mobile is changed to a new talk group. When the radio moves back to the Wide Area Scan talk group, it will attempt to affiliate on the saved site before looking for a new site.

Call Alert Interrupt - Check this box to allow the radio to interrupt a received call to process a call alert.

7.2.3.7 Announcement Group List

The P25 Trunking Announcement Group List screen shown in Figure 7.14 sets up Project 25 Trunking announcement groups that communicate with several talk groups simultaneously. Each announcement group can have a maximum of 255 talk groups.

Figure 7.14 P25 Trunking Announcement Groups Screen

To display this screen, on the Project 25 Trunking **Per System** screen, select the “Announcement Group List” in the drop-down menu, then click the button.

Group ID - This list displays the announcement group IDs contained in the announcement group list. To edit an ID in this list, select it and then change it in the Selected Group box. This is the actual ID of the announcement group. You assign announcement groups to channels in the **Zone** screen. Refer to [Section 7.3.3, “Project 25 Trunked Channel Parameters”](#).

Note *You can enter these IDs in either decimal or hexadecimal format as described in [Section 1.9.5, “Decimal / Hexadecimal Select”](#).*

- Clicking this button adds the next available announcement group ID to the list. You can program each Project 25 Trunked system with a maximum of 255 announcement groups.


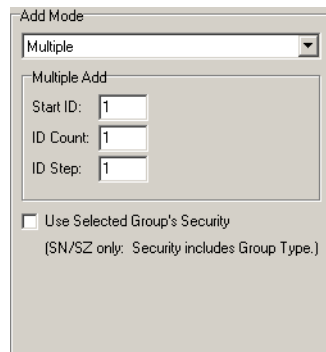
To add an entire block of announcement group IDs or a specific ID, click the arrow button  in the lower right corner of the screen. The **Add Mode** screen shown in Figure 7.15 then displays.

Figure 7.15 Add Mode Screen



Add Mode Drop-down list

Single - Adds the next available ID similar to the **Add** button.

Multiple - Adds a block of IDs as follows: To initiate the selected add operation, click the **Add** button. If the specified ID range results in duplicate IDs, an error message displays and PC Configure adds no IDs.

Start ID - Specifies the starting ID of the block.

ID Count - Specifies the number of IDs to be added.

ID Step - Specifies if consecutive IDs are added or some other step rate is used. For example, if Start ID = 10, ID Count = 5, and ID Step = 10, the IDs added are 10, 20, 30, 40 and 50.

Use Selected Group's Security - When selected, PC Configure automatically programs the added groups with the Strapping Mode and Encryption Key ID of the selected group.

 - Clicking this button deletes the selected announcement group.

Security Parameters

Strapping Mode

“Clear” - All transmissions on the talk group occur in the clear (unencrypted) mode.

“Secure” - All transmissions on the talk group occur in the secure (encrypted) mode selected as follows.

“Selectable” - The clear or secure status of the talk group is selected by the “Clear/Secure” option switch.

Key PID - Selects the location from 0 to 63 (PID/ASN mode) or 1 to 64 (SLN/CKR mode) of the key used for secure calls on the group if applicable.

Note *Voice encryption is an optional feature that requires factory programming and possibly special hardware.*

Note *AES encryption is not available with the 51SL or 53SL.*

Any Key - Enabled by default to correspond to previous radio behavior. When the option is enabled and the radio receives a secure call, it allows any key in the radio to be used to decrypt the traffic. If the option is disabled, the radio uses only the key assigned to the talkgroup/announcement group/channel to decrypt traffic. If the radio receives a call using another key than the specified key, the radio's display shows the call parameters that are programmed on the PC Configure P25 Trunking **Radio Wide** page (PTTID, Talkgroup ID, etc.) but the LED will not illuminate nor will the speaker open.

Announcement Group Specific Preferred Sites - Select one of the preferred sites for the announcement group. Please refer to the P25 Trunking Talk Group List for more details.

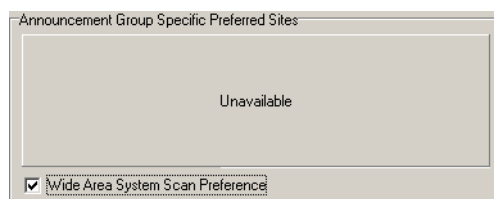
Selected Site

RFSS ID - Designates the zone controller with which the "site to be preferenced" is associated.

Site ID - Designates the site to which the preferences will be applied.

Preference - "Least", "None" (no preference), "Preferred", "Always" (preferred), or "Only" is a weighting for steering to different sites. The "Only" setting will tie the selected talk group to one site only. The subscriber unit will then act as though site locked on the programmed site and display OOR when it is unable to connect to this site.

Wide Area System Scan Preference - Selecting this feature causes the radio to save the Site ID and Transmit/Receive channel frequencies for any particular site and uses these to speed system access when returning to a previously selected announcement group. This portion of the screen changes as shown below:

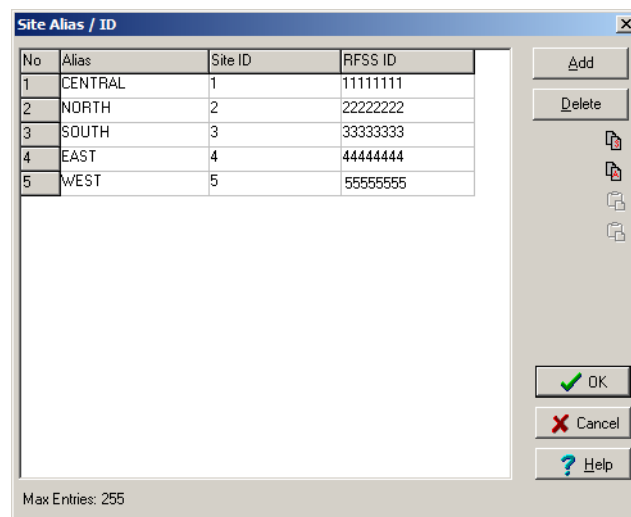


Talk Group List - Select the talk groups that are included in each announcement group. You can enter this ID in either decimal or hexadecimal format as described in [Section 1.9.5, "Decimal / Hexadecimal Select"](#).

7.2.3.8 Site List

Sites in a Project 25 Trunking system are designated by a site number and an RF subsystem (RFSS) number. The Site Alias / ID List screen shown in Figure 7.16 is the interface where an alias for each site that displays when using the Site Search feature is programmed.

Figure 7.16 Site Alias / ID Screen



To display the preceding screen, on the Project 25 Trunking **Per System** screen, select “Site List” in the drop-down list and then click the **Edit List ...** button. To add an alias, click the **Add** button to display the **Add Alias/ID** screen. To delete an alias, select it and click the **Delete** button. To edit an alias or ID, simply select it and make the desired changes.

Alias - Programs up to ten alphanumeric characters that identify the site.

Site ID - Values can be from 1 through 256.

RFSS ID - RF subsystem (RFSS) number associated with this site.

To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy CC frequencies to another system’s CC list, etc.

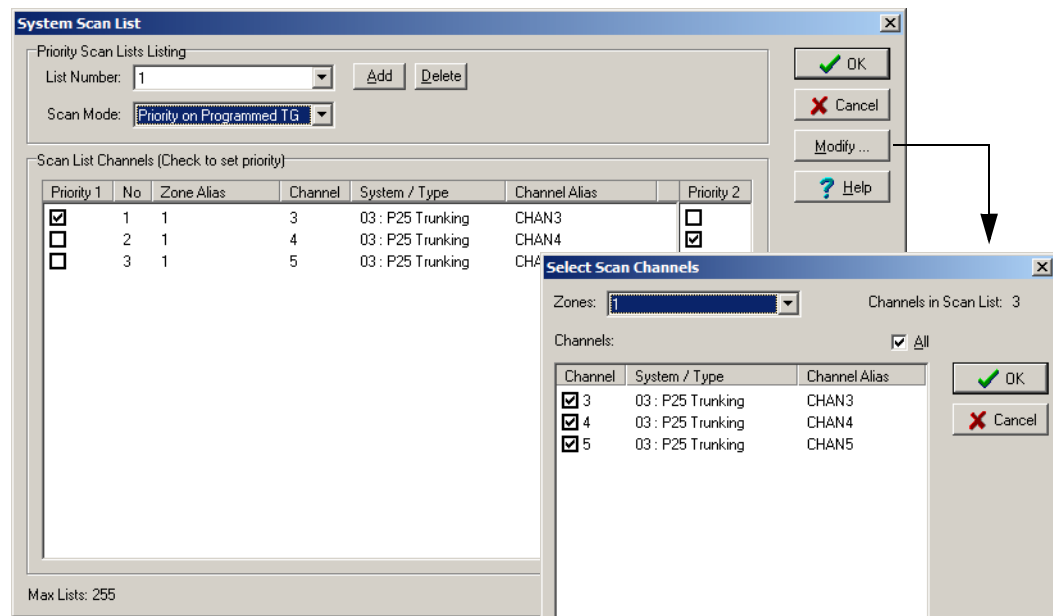
- 1 Select the top icon to copy the selected item or the (second) icon to “copy all”, which copies every item active in the list.
- 2 Select the (third) icon to paste the previously selected single item or the fourth icon to “paste all”, which pastes the entire list captured previously.


7.2.3.9 Priority Scan List

Note Before you can program the priority monitor scan lists, you must set up the channels that you want to include in these lists. You program them in the screen shown in Figure 7.25.


The Priority Scan List screen shown in Figure 7.17 sets up the Priority (Standard) Scan lists that you can program on each Project 25 Trunking system. Each scan list can include up to 255 channels, one of which may be a priority channel. These channels must be from the same Project 25 Trunking system. You cannot program channels from other systems. You can program as many lists as can be stored in the available memory.

Figure 7.17 Priority Scan List Screen



To display this screen, on the Project 25 Trunking **Per System** screen, select "Priority Scan List" in the drop-down menu and click the  **Edit List ...** button.

List Number - This drop-down menu is the interface where you select the scan list to edit. Click the **Add** button to add a scan list. Click the **Delete** button to delete a scan list.

 **Modify ...** - Click this button to display the screen shown in Figure 7.17. This screen is the interface where you edit the selected scan list. Check the channels in each zone that you want to include in the selected scan list. Repeat for the other scan lists if applicable.

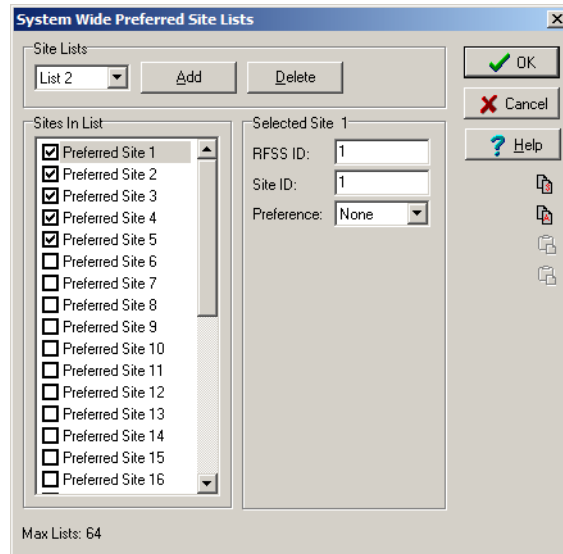
Scan Mode - To use priority scan on a list, select "Priority on Selected" or "Priority on Programmed" from the drop-down menu. If you select "Priority on Programmed", check the box of the desired priority channel. If you do not want to use priority scan, select "Non Priority Scan". Dual Priority Scan functionality is available.

Note To use Priority talk group scanning, your system must support it for it to occur as programmed. You must designate talk groups programmed as "Priority" as Priority Monitor Groups by the System Control software.

7.2.3.10 System Preferred Site List

The System Wide Preferred Site List screen shown in Figure 7.18 is the interface where preferred site lists are programmed. You can associate these lists with individual talk groups on the **P25 Trunking Talk Groups** list screen shown in Figure 7.12. This forces calls on a talk group to access specific sites. You set the preference for each site in a list as “Least”, “None”, “Preferred”, “Always”, or “Only”:

Figure 7.18 System Wide Preferred Site List Screen



You can program each list with a maximum of 32 sites. Therefore, using preferred site lists allows you to associate a group with a maximum of 32 sites, rather than just four sites as available through the **P25 Trunking Talk Groups** list screen. Also, if you associate several talk groups with the same sites, you can simply select a list instead of separate sites.

Site Lists - This drop-down menu is the interface where you select the list that you want to edit. To add a new list, click the **Add** button. To delete the selected list, click the **Delete** button.

Sites In List - To add or delete a site from the list, click its check box.





Selected Site

RFSS ID - Designates the zone controller with which the "site to be preferenced" is associated.

Site ID - Designates the site to which the preferences will be applied.

Preference - “Least”, “None” (no preference), “Preferred”, “Always” (preferred), or “Only” is a weighting for steering to different sites. The “Only” setting will tie the selected talk group to one site only. The subscriber unit will then act as though site locked on the programmed site and display OOR when it is unable to connect to this site.

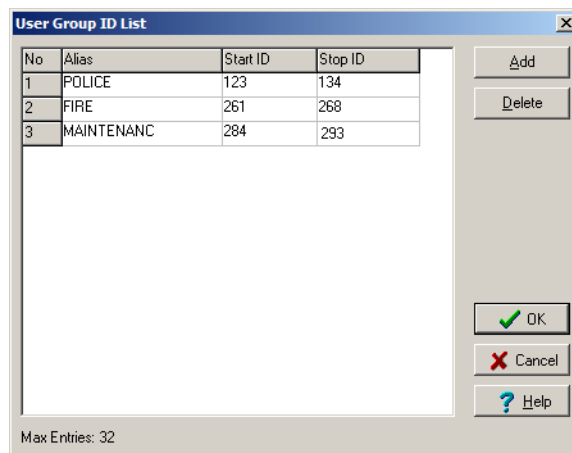
To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy CC frequencies to another system's CC list, etc.

- 1 Select the top  icon to copy the selected item or the (second)  icon to "copy all", which copies every item active in the list.
- 2 Select the (third)  icon to paste the previously selected single item or the fourth  icon to "paste all", which pastes the entire list captured previously.

7.2.3.11 User Group ID List

The User Group ID List screen shown in Figure 7.19 is the interface where you program aliases that display if a radio user receives a call from a radio with an ID within the programmed block. For example, in the screen shown, if a radio user receives a group call from Group IDs 245 through 254, the alias "Police" displays. The **User Group ID** parameter on the **Radio Wide** screen controls the display of this alias.

Figure 7.19 User Group ID List Screen



The screenshot shows a window titled "User Group ID List". It contains a table with four columns: "No", "Alias", "Start ID", and "Stop ID". The table has three rows of data. To the right of the table are buttons for "Add", "Delete", "OK", "Cancel", and "Help". At the bottom left of the window, it says "Max Entries: 32".

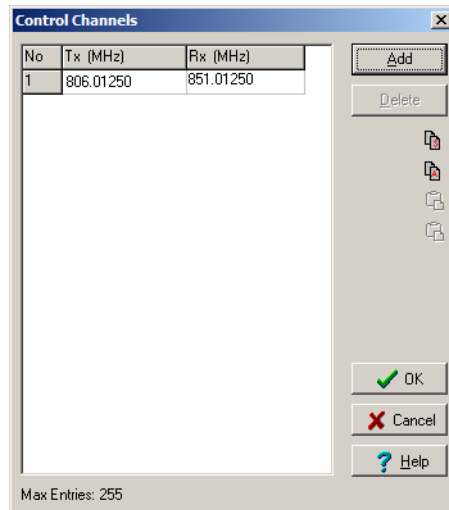
No	Alias	Start ID	Stop ID
1	POLICE	123	134
2	FIRE	261	268
3	MAINTENANC	284	293

Max Entries: 32





7.2.3.12 Rebanded Control Channels List (700/800Mhz band only)

The Control Channels List is the control channels for sites that have been rebanded.

Figure 7.20 Control Channels (Rebanded System List) Screen



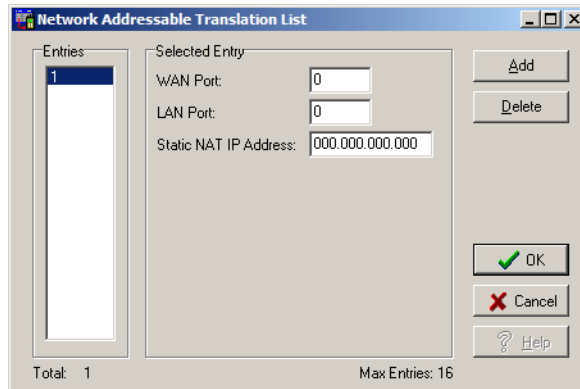
To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy CC frequencies to another system's CC list, etc.

- 1 Select the top  icon to copy the selected item or the (second)  icon to "copy all", which copies every item active in the list.
- 2 Select the (third)  icon to paste the previously selected single item or the fourth  icon to "paste all", which pastes the entire list captured previously.

7.2.3.13 NAT List

The Network Address Translation (NAT) List displays records and allows users to define records specifying source information (WAN and LAN ports and Static NAT IP Address) for each translation. Up to 16 entries may be recorded.

Figure 7.21 Network Address Translation (NAT) List



WAN Port - The wide area network port the radio uses for NAT transmissions.

LAN Port - The local area network port the radio uses for NAT transmissions.

Static NAT IP Address - The IP address for the mobile device.

7.3 Setting Up Zones and Channels

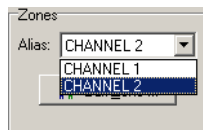
This section describes how to set-up zones and assign channels to each zone. A zone can include up to 16 channels of any type (conventional analog, Project 25 conventional, SMARTNET/SmartZone, Project 25 Trunked, or Multi-Net).

7.3.1 Setting Up Zones

The 5100 portable/5300 mobile may be factory optioned to support up to 48, 256, 512 or 864 channels (3, 16, 32 or 54 zones respectively). To determine if one of these features is enabled, refer to the **Transfer → Read Options** Screen.

Note *The maximum number of channels may be limited by available memory size.*

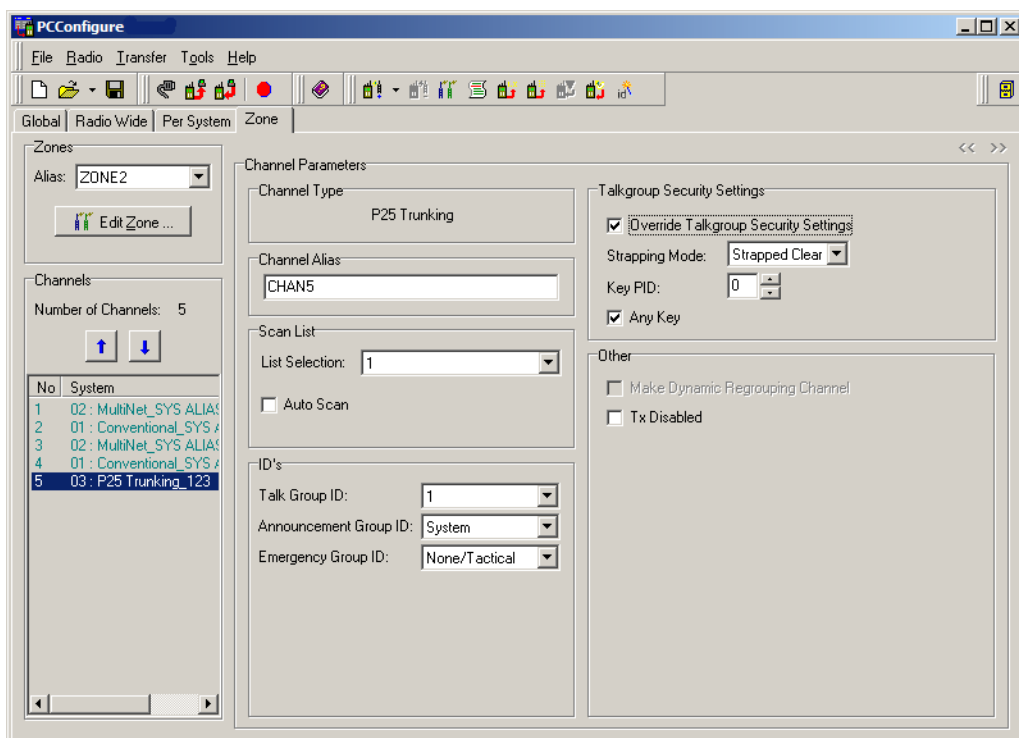
Note *If the 54 Channel / 16 Zone configuration option is enabled, channels should be renamed as zones and zone as channels.*



7.3.1.1 Setup Procedure

- 1 Select the **Zone** tab to display the Zone screen, Figure 7.22. (This screen varies according to the type of system.)

Figure 7.22 Project 25 Trunked Channel Zone Screen





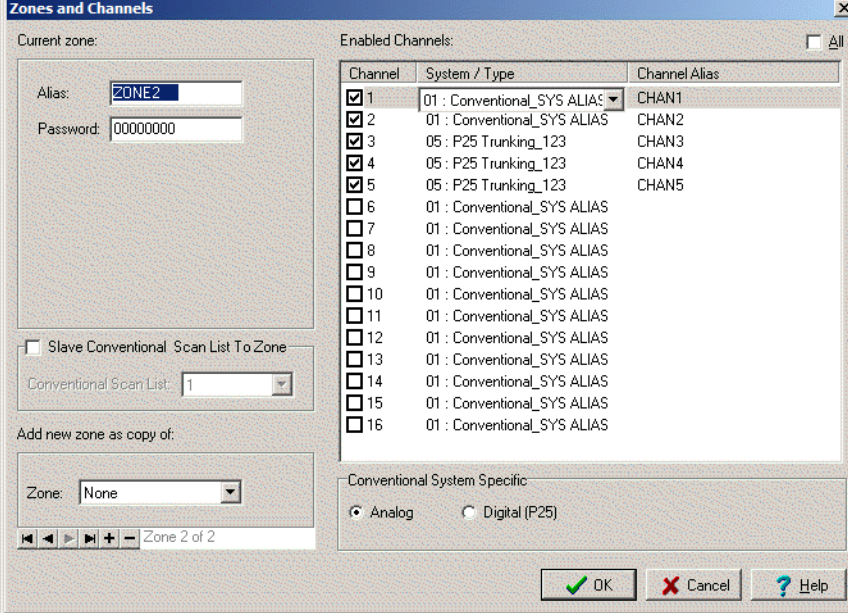






Click  in the upper left corner of the screen to display the **Zones and Channels** screen shown in Figure 7.23. Another way to do this is to click  in the toolbar.

Figure 7.23 Zones and Channels Screen



Channel	System / Type	Channel Alias
<input checked="" type="checkbox"/> 1	01 : Conventional_SYS ALIAS	CHAN1
<input checked="" type="checkbox"/> 2	01 : Conventional_SYS ALIAS	CHAN2
<input checked="" type="checkbox"/> 3	05 : P25 Trunking_123	CHAN3
<input checked="" type="checkbox"/> 4	05 : P25 Trunking_123	CHAN4
<input checked="" type="checkbox"/> 5	05 : P25 Trunking_123	CHAN5
<input type="checkbox"/> 6	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 7	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 8	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 9	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 10	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 11	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 12	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 13	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 14	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 15	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 16	01 : Conventional_SYS ALIAS	

- 2 To add a new blank zone, select “None” in the Zone drop-down list and then click the  button. To make a copy of a current zone, select the desired zone in the Zone drop-down list instead. To delete the current zone, click the  button.
- 3 To display the first zone, click ; the last zone ; the previous zone ; and the next zone, .
- 4 Program the alias (identification) that is displays briefly when you select the zone. To do this, enter a maximum of ten characters in the **Alias** box.
- 5 You can program a zone password that you must enter to perform keypad programming of the zone. Refer to [Section 11](#), “”. To program this password, enter any eight numbers from 0-9. If you do not wish to program this password for the zone, leave this field all zeros.

Note *Zone password for keypad programming is a conventional only feature.*

7.3.2 Setting Up Channels

Note *When you assign a channel to a zone, you also select the system of the channel. Therefore, before assigning a channel to a zone, set up all necessary systems as described in [Section 1.10](#), “Creating Systems”.*

Set up channels by assigning them to a zone in the **Zones and Channels** screen shown in Figure 7.23. Proceed as follows to set up any type of channel.



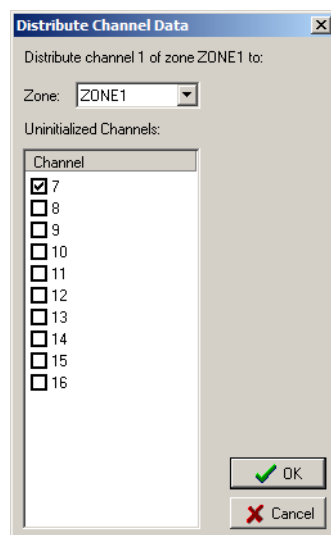
- 1 Select the **Zone** screen (see Figure 7.25) and then click  to display the **Zones and Channels** screen shown in Figure 7.23. Another way to do this is to click  in the toolbar.
- 2 Select the desired zone as described in the preceding section.
- 3 To add a channel to the displayed zone, check the applicable box in the **Channel** column. To select or deselect all channels in the box, check or uncheck the **All** box.
- 4 To assign the channel to a system (if applicable), select the drop-down list in the **System/Type** column and select the desired system.
- 5 To copy an enabled channel to unprogrammed channel locations of the current zone or other zones, double click the shaded area of the channel as shown in Figure 7.23. The **Distribute Channel Data** screen then appears. Select the desired channels from this screen.

Figure 7.24 Distribute Channel Data

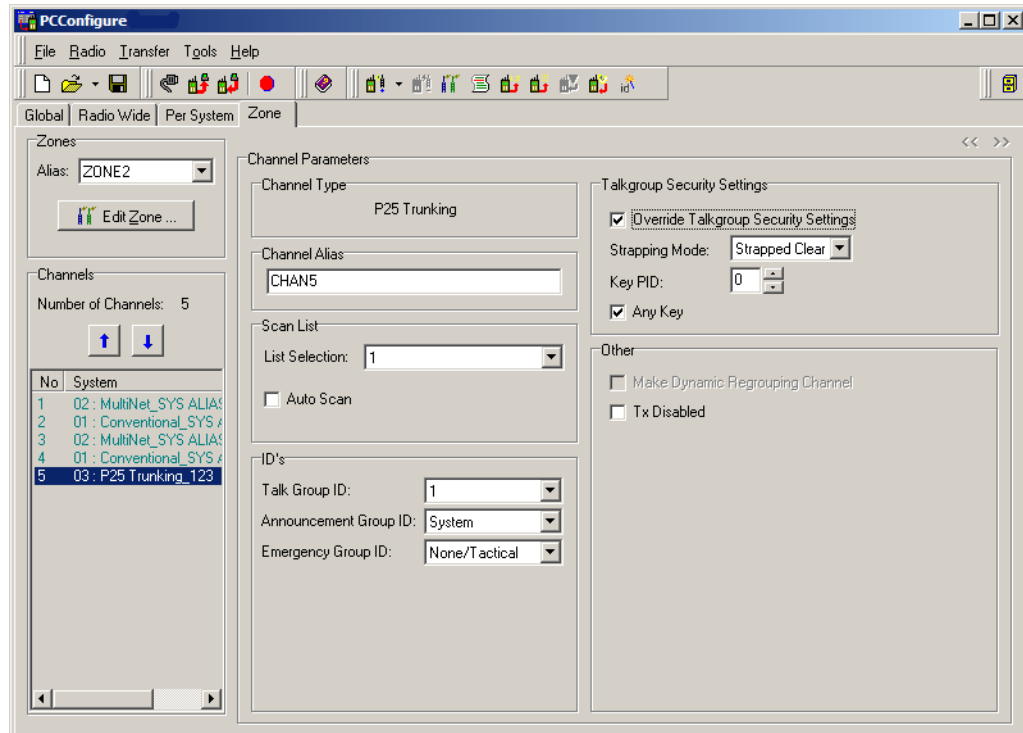


- 6 To move a channel, select the channel you wish to move in the Channels list (on the left side of the Zone tab) and press the Up or Down arrow to move it to the desired location.
- 7 Repeat the preceding steps until the you have set up desired channels in each zone.
- 8 To program individual system and channel information, refer to [Section 7.3.3, “Project 25 Trunked Channel Parameters”](#).

7.3.3 Project 25 Trunked Channel Parameters

After you set-up your desired channels as described in [Section 7.3.2, “Setting Up Channels”](#), you can program individual channel parameters. Select the **Zone** screen shown in Figure 7.25, then select the desired zone using the drop-down menu in the **Zones** box. Select screens that program individual channel parameters by clicking the desired channels in the **Channels** box.

Figure 7.25 Project 25 Trunked Zone Screen



The parameters displayed when you select a Project 25 Trunking channel are as follows.

Channel Type - Indicates the type of channel (Conventional Analog, Conventional Digital, SMARTNET/SmartZone, Project 25 Trunked) that was defined on the Edit Zone screen.

Channel Alias - Programs the alias (identification) that displays when the radio user selects the channel. You can program a maximum of ten characters.

Scan List

List Selection - Selects the priority (standard) scan list selected by the channel. If you select “No List”, the radio user cannot select scanning on that channel.

Auto Scan - When you check this, the radio automatically begins scanning the scan list associated with the channel whenever the radio user selects the channel. When it you do not check this, the radio user must start scanning manually with the Scan option switch.

ID's - The possible combinations of Talk Groups (TGs) and Announcement Groups (AGs) provide the following operation:

- Talk Group Only - Transmit on TG, receive on TG.
- Announcement Group Only - Transmit on AG, receive on all TGs in AG.
- Talk and Announcement Groups - Transmit on TG and receive on TG plus AG but not the TGs assigned to the AG.

Note *You can enter these IDs in either the decimal or hexadecimal format as described in [Section 1.9.5, "Decimal / Hexadecimal Select"](#).*

Talk Group ID - Defines the talk group selected by that channel. Program talk groups selecting "Talk Group List" on the **Per System** screen. Refer to [Section 7.2.3.6, "Talk Group List"](#).

Announcement Group ID - Defines the announcement group selected by that channel. Program announcement groups by selecting "Announcement Group List" on the **Per System** screen. Refer to [Section 7.2.3.7, "Announcement Group List"](#).

Emergency Group ID - Defines the talk group used for emergency calls on the channel. If you do not select an emergency group, the emergency signal transmits on the selected (tactical) talk group.

Talkgroup Security Settings

Override Talkgroup Security Settings - Enable this feature to set new security settings for the channels that will take precedence over the talkgroup security settings. Other talkgroup parameters, such as failsoft frequencies and preferred site information are retained.

Strapping Mode

"Clear" - All transmissions on the talk group occur in the clear (unencrypted) mode.

"Secure" - All transmissions on the talk group occur in the secure (encrypted) mode selected as follows.

"Selectable" - The radio user select the clear or secure status of the talk group is with the Clear/Secure option switch.

(Encryption) **Key ID** - Selects the location from 0 to 63 (PID/ASN mode) or 1 to 64 (SLN/CKR mode) of the key used for secure calls on the group if applicable.

Any Key - Enabled by default to correspond to previous radio behavior. When the option is enabled and the radio receives a secure call, it allows any key in the radio to be used to decrypt the traffic. If the option is disabled, the radio uses only the key assigned to the talkgroup/announcement group/channel to decrypt traffic. If the radio receives a call using another key than the specified key, the radio's display shows the call parameters that are programmed on the PCConfigure P25 Trunking radio wide page (PTTID, Talkgroup ID, etc.) but the LED will not illuminate nor will the speaker open.

Other

Make Dynamic Regrouping Channel - When you check this box, you designate the channel as the dynamic regrouping channel. The system then programs the talk group over the air, so the talk group ID and announcement group ID are not programmable.

You must enable **Dynamic Regrouping** on the **Per System** screen to program a dynamic regrouping channel. The dynamic talk group does not need to be a programmed group.

Tx Disabled - When you check this box, you disable transmitting on the channel. You can then use the channel for monitoring only.

Multi-Net Systems

This section provides information to program Ascend portable and mobile radios for Multi-Net operation.

A Multi-Net[®] system, as used with the Ascend radios, programs the parameters for site quality and all the sites into which a radio will roam. Unique system parameters include such things as home repeater number, emergency zone/channel, group scan list, individual (unique) ID, and fixed priority, transmit inhibit, interconnect and unit call permissions, and block decode IDs. Up to sixteen systems can be created.

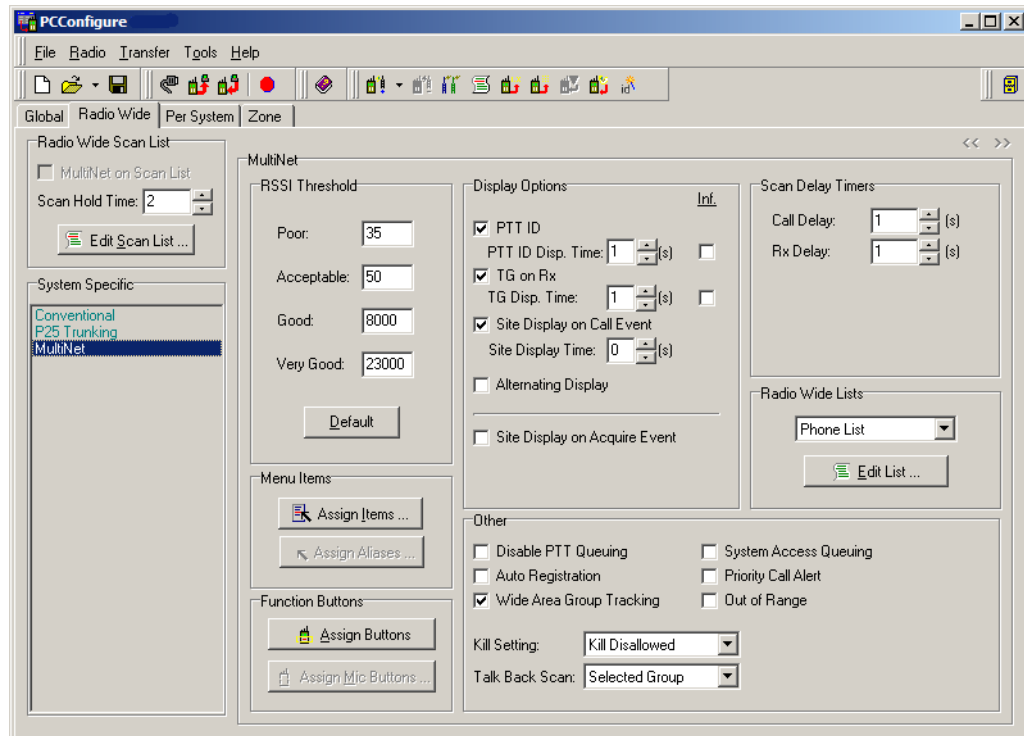
8.1 Radio Wide Screen

The **Radio Wide** screen programs parameters for all Conventional, Project 25 Trunked, SMARTNET[®]/SmartZone[®], and Multi-Net protocols. Areas of the screen common to all protocols are shown in Figure 2.1. A different screen displays for each system type. This section contains the instructions to program these parameters for the Multi-Net system.

8.1.1 Radio Wide Parameters

Select “Multi-Net” in the System Specific pane to display the screen shown in Figure 8.1. This screen programs the functions that are the same for all Multi-Net systems.

Figure 8.1 Multi-Net Radio Wide Screen



RSSI Threshold - This sets the RSSI (Receive Signal Strength Indicator) levels. The RSSI of a site must exceed Acceptable for it to be considered as a candidate for a new site by the site search procedure. A site falling below acceptable may start site search. Click the **Defaults** button to restore these levels to the default setting.

Ascend radios with software 4.6.x may use Poor, Acceptable and Good RSSI levels to determine an acceptable site. The Multi-Net Per System Site Lookback Time option and Site Select Option refer to these RSSI levels to determine site quality and when to begin site search.

If the “Hex” box is checked, the RSSI levels are displayed in the hexadecimal instead of decimal notation.

Note *The default RSSI levels should not be changed unless you are familiar with how these levels affect radio operation. Increasing the value of Acceptable requires a stronger signal to meet site criteria and decreases the effective coverage area.*

Radio Wide Lists - Refer to [Section 8.1.2, “Radio Wide Lists”](#) for more information for the following lists.

- [Phone List](#)

- [Unit Call List](#)
- [Status List](#)

Display Options - These functions select what is displayed when a group call is received. It does not affect the information displayed when a special call is received.

PTT ID - The individual (unique) ID of the mobile placing the call is displayed.

PTT Display Time - The time this ID is displayed is programmable for 0.5-7.0 seconds. When “infinite” is selected, this ID is displayed for the entire call and none of the other parameters are displayed. After time out, the channel (group) alias is then displayed continuously.

Talk Group on Receive - The group ID on which the call is received is displayed.

TG Display Time - The same times are programmable as with the preceding PTT ID.

Site Display on Call Event - allows the radio to display the current site alias when a call is received. This display, if enabled, is included in the alternating sequence.

Site Display Time - The same times are programmable as with the preceding PTT ID.

Alternating Display - The checked display options are shown in sequence for the indicated display time in each option followed by the channel alias while the call is active. The order of alternating display is fixed and follows the PCC option check boxes - PTT-ID, Talk Group ID, site alias, and channel alias. If alternating is checked the channel alias takes the timer value of the previous alternating display option. The Alternating cycle is terminated at the end of the call. For calls shorter than the selected display intervals, the selected Display Options will not complete before the call ends.

Site Display on Acquire Event - allows the radio to display the current site alias when a new site is acquired. The display is fixed at two seconds, is not reoccurring (not part of the alternating option), and does not require auto registration to be enabled. This feature would be useful for applications that have multiple sites (non-simulcast) allowing the radio user to know what site is servicing their call.

Scan Delay Timers - These timers program various setting for Multi-Net group scanning. Radio wide scan settings are programmed on the Radio Wide screen.

Call Delay - Programs the delay before scanning resumes after responding to a message.

Receive Delay - Programs the delay before scanning resume after receiving a message.

Other

Disable PTT Queuing (Camp-On) - When selected, the PTT switch cannot be held down while a message is being received in order to immediately access the system when it is finished.

System Access (Busy) Queuing - When selected, telephone and unit calls are placed in a queue if the radio system is busy when the PTT switch is pressed. An alert tone then sounds when the call can be placed. This feature is currently not implemented.

Auto Registration - When selected, auto-registration is enabled which causes the radio to automatically register on the current Multi-Net site with the strongest signal. If this is not selected, registration does not occur until the PTT switch is manually pressed.

Priority Call Alert - An audible tone tells the user he is receiving priority traffic and not just a standard scan channel. Although this feature is active for all systems, it is particularly applicable for the 5100 ES Model I radios.

Wide Area Group Tracking - Check this box to allow the selected channels to have multiple decode/encode group IDs depending on the active site.

Out of Range - When enabled, the Out of Range text is momentarily displayed and the Out of Range tone occurs at 10 - 45 second intervals indicating to the user when a persistent out-of-range condition exists.

Kill Setting - This selects if the radio can be disabled if it becomes lost or stolen. If disabling is allowed, the ability to interrogate the radio can also be enabled or disabled.

Talk Back Scan - When the PTT switch is pressed to respond to a message in the group scan mode, selects if the transmission always occurs on the Selected, Active, or Last Received group. When not scanning or if no message is being received, transmissions always occur on the selected group.

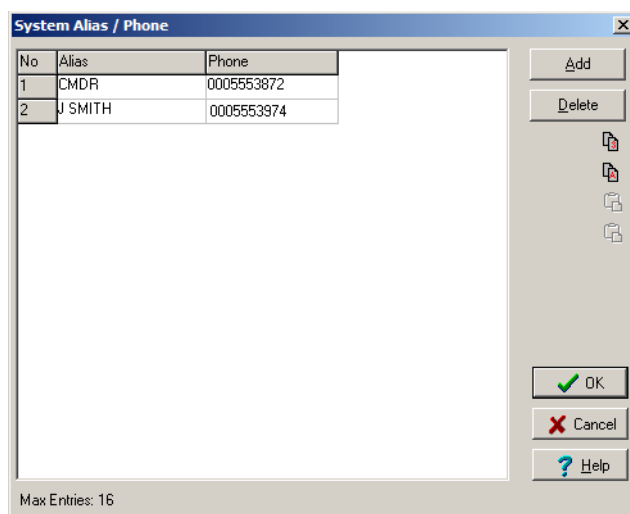
8.1.2 Radio Wide Lists

The various Multi-Net radio wide lists are programmed by selecting them in the **Radio Wide Lists** drop-down list shown in Figure 8.1 and then clicking the Edit List button. Descriptions of the various lists and the information they program follow.

8.1.2.1 Phone List





The Phone List screen shown in Figure 8.2 allows the user to program a list of phone numbers that can be recalled for Multi-Net telephone calls.

Figure 8.2 System Alias / Phone List Screen



Up to 16 numbers can be stored. Each number can be up to 16 digits. The * and # characters cannot be stored. To store a pause, enter a “p” or “P”. Numbers up to the pause are sent, a short delay occurs, and the remaining numbers (or the numbers to the next pause) are sent. A pause counts as one character. The alias can be up to ten alphanumeric characters.

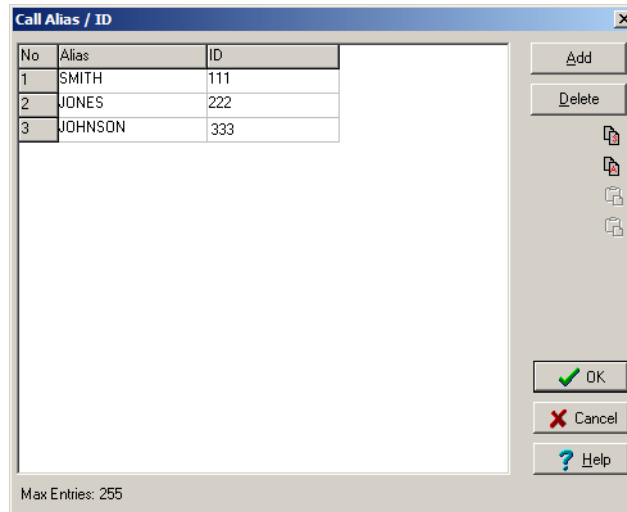
To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy CC frequencies to another system’s CC list, etc.

- 1 Select the top  icon to copy the selected item or the (second)  icon to “copy all”, which copies every item active in the list.
- 2 Select the (third)  icon to paste the previously selected single item or the fourth  icon to “paste all”, which pastes the entire list captured previously.

8.1.2.2 Unit Call List





The Unit Call List screen shown in Figure 8.3 allows the user to program the list of numbers that can be recalled for Multi-Net Unit/Unique ID and Directed Group calls.

Figure 8.3 Call Alias / ID List Screen



Up to 255 numbers can be stored. Individual (Unique) IDs for unit calls are four or seven digits in length, and Directed Group call numbers are five or eight digits in length. The longer number is required if the call is to another site and the three-digit site ID must be specified. The alias can be up to ten alphanumeric characters. Refer to the operating manual for more information on these numbers.

To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy items in this list to another system's list, etc.

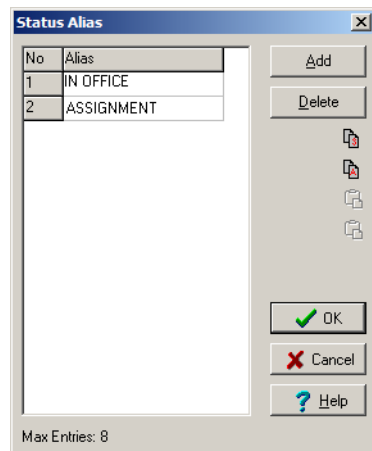
- 1 Select the top  icon to copy the selected item or the (second)  icon to "copy all", which copies every item active in the list.
- 2 Select the (third)  icon to paste the previously selected single item or the fourth  icon to "paste all", which pastes the entire list captured previously.

8.1.2.3 Status List





The Status List screen shown in Figure 8.4 allows the user to program up to eight status messages that can be selected. The message assigned to each number should be the same as that programmed in the dispatcher console. Each message can be up to ten alphanumeric characters.

Note *A button or menu option is required to allow the user to change the current status message.*

Figure 8.4 Status Alias List Screen



To copy and paste similar lists, use the buttons on the right side of the screen. You can only copy from and paste to similar lists: For example, you can only copy items in this list to another system's list, etc.

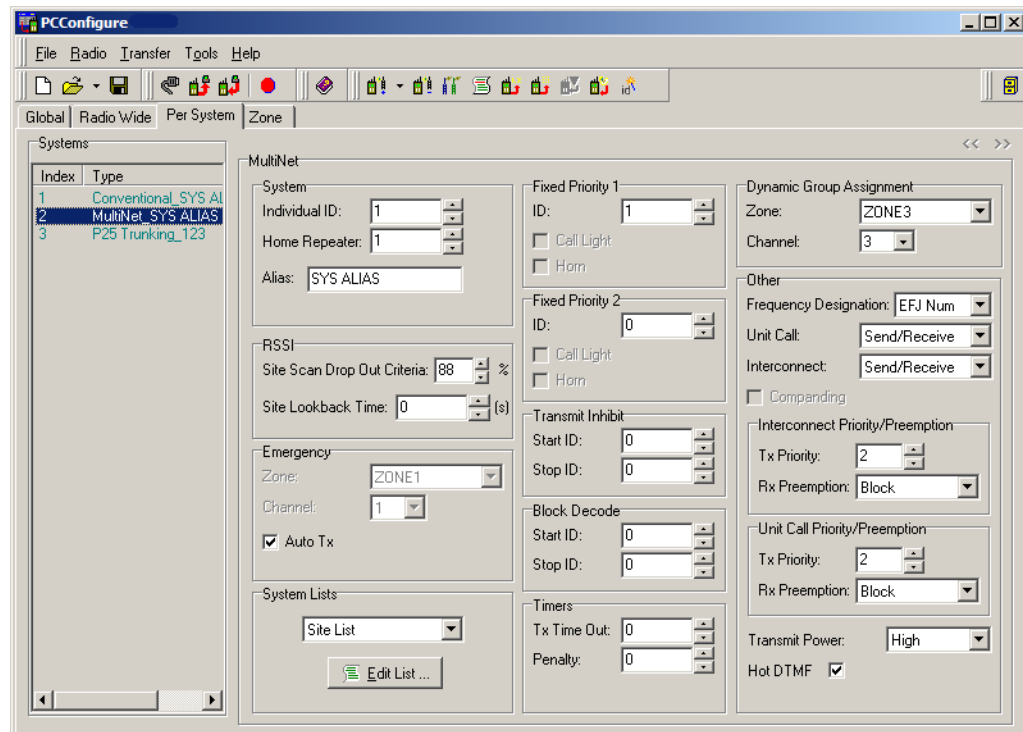
- 1 Select the top  icon to copy the selected item or the (second)  icon to "copy all", which copies every item active in the list.
- 2 Select the (third)  icon to paste the previously selected single item or the fourth  icon to "paste all", which pastes the entire list captured previously.

8.2 Per System Screen

8.2.1 Multi-Net System Parameters

You can program individual system parameters using the **Per System** screen shown in Figure 8.5. These parameters can be programmed after the desired systems have been set up as described in [Section 1.10, “Creating Systems”](#).

Figure 8.5 Multi-Net Per System Screen



The parameters on the Multi-Net **Per System** screen are as follows:

System

Individual (Unique) ID - Programs the individual ID of the radio when the system is accessed.

Home Repeater - Programs the home repeater number of the system. This number plus the channel group ID determine the mobile or group of mobiles that receive a group call.

Alias - Programs the alias of the system. This alias is used as an identification aid when programming Zones and Channels and is not displayed on the radio.

RSSI

Site Scan Drop Out Criteria - Programs the percentage of good data messages that must be received to stay on the site when roaming. The higher this setting, the sooner roaming occurs because fewer bad messages are permitted. Set 25 to 100% in 3 percent increments. The default is 25%.

Site Look Back Time - For Ascend radios, the response time controls the site sample option. Site sampling is performed at this interval (ten second minimum) while the RSSI is below Good but above Acceptable. Site sampling allows the Acceptable setting to be lower to extend the coverage area yet allowing a better site to be acquired if signal quality permits. Site sample is suspended if the radio is active with a call, during scan delay after a call, if only one site is programmed, during interconnect and unit calls, while emergency is active, or while radio wide scan is enabled. Set the Look back time to 0 to disable this feature.

Emergency - Sets the Zone and Channel selected when an emergency event is initiated.

Note *The Emergency Zone and Channel may be set on the Global page. In this case the Zone and Channel are not editable and only the Auto Transmit parameter for the current system is enabled for edit. A button, menu or I/O item must be programmed to access the emergency function.*

Zone - Select the Zone on which an emergency is transmitted when a channel linked to that system is selected.

Channel - Selects the Channel on which an emergency is transmitted when a channel linked to that system is selected. Any type of programmed channel can be selected and the emergency responds according to that channel type (such as Multi-Net, Conventional, SMARTNET).

Auto Tx - When selected, emergency messages are automatically transmitted, and when not selected, they must be manually transmitted. If the global or system emergency zone/channel is a Multi-Net channel assigned to the system, this option determines the auto/manual mode of that emergency zone/channel. Otherwise, this parameter is ignored.

System Lists - Refer to [Section 8.2.2, “System Lists”](#) for more information for the following lists.

- [Site List](#)
- [Group Scan List](#)
- [Wide Area Tracking List](#)

Fixed Priority 1 - Programs the fixed priority 1 Group ID that is received regardless of which of the system's channels are selected.

Note *The Fixed Priority 1 Group ID does not have to be included as a selectable channel. Enter 0 to disable this function.*

Fixed Priority 2 - Programs the fixed priority 2 Group ID that is received regardless of which of the system's channels are selected.

Note *The Fixed Priority 2 Group ID does not have to be included as a selectable channel. Enter 0 to disable this function.*

Transmit Inhibit - Programs the Transmit Inhibit ID block of IDs which can include up to all 225 IDs. When the selected channel Group ID is in this range and an ID within this block is detected up to five seconds before the PTT switch is pressed, the transmitter does not key. A valid receive ID that is in this range that opens the receive audio does not inhibit transmit. Enter "0" to disable this feature.

Start ID - Number at which to start the ID range.

Stop ID - Number at which to stop the ID range.

Block Decode - Programs a block of ID codes up to all 225 on which calls are received regardless of what system channel is selected. Enter "0" to disable this feature.

Start ID - Number at which to start the ID range.

Stop ID - Number at which to stop the ID range.

Timers

Transmit Time Out - Programs the time-out timer for 15-225 seconds. Programming "0" disables this timer.

Penalty - Programs the penalty timer for 15-225 seconds. Programming "0" disables this timer. This timer disables the transmitter for the programmed time after it is disabled by the time-out timer.

Dynamic Group Assignment - The Ascend radio allows the Dynamic Group Assignment to be any Zone and Channel assigned to the current Multi-Net system. The assigned channel becomes the "group 11" channel used in previous radios. With the Ascend radio, the System number transmitted by the dispatcher is the System Index number of the system from this screen. If an invalid zone and channel are selected, an alert indicator (a red triangle) appears next to the Dynamic Group Assignment line. A valid zone/channel combination must be selected before programming the radio.

Zone - Programs the Zone containing a Multi-Net channel that is reprogrammable over the air by the Dynamic Reassignment command.

Channel - The referenced Multi-Net Channel in the Zone previously programmed is reprogrammed over the air by the Dynamic Reassignment command. Any Multi-Net channel of the available 16 channels per zone can be selected.

Other

Frequency Designation - Selects if the Status and Home repeater channel numbers programmed in the Site List are entered as Channel Numbers from the Programming Channel List at the end of this manual or as the actual channel frequencies in megahertz. See Section 8.2.2.1, "Site List" for more information.

Unit Call - Programs the permission for placing and receiving unit calls on the system. These calls can be Disabled, Response Only, or Send/Receive. This also applies to placing Directed Group calls because they are placed as unit calls and received as Group calls. If unit calls are allowed a button or menu item must also be programmed to allow calls to be answered or placed.

Interconnect - Programs the permission for telephone calls similar to unit calls just described. If interconnect calls are allowed a button or menu item must also be programmed to allow calls to be answered or placed.

Interconnect Priority/Preemption

Tx Priority - Transmit Priority. Sets the access priority for interconnect (telephone) calls on the system for 2-5 ("2" programs the highest priority). Priority "1" is reserved for emergency calls.

Rx Preemption - Receive Preemption. Selects which active calls an interconnect call can interrupt. For example, if Group Scan is selected, only Group Scan and Block calls are interrupted, selected and fixed priority calls will not be interrupted.

1. Fixed Priority 2
2. Selected
3. Group Scan
4. Block

Unit Call Priority/Preemption - Sets the Transmit Priority and Preemptions for unit calls similar to interconnect calls just described.

Tx Priority - Transmit Priority. Sets the access priority for unit calls (unique ID calls) on the system for 2-5 ("2" programs the highest priority). Priority "1" is reserved for emergency calls.

Rx Preemption - Receive Preemption. Selects which calls unit calls can interrupt. Similar to interconnect Calls.

1. Fixed Priority 2
2. Selected
3. Group Scan
4. Block

Transmit Power - Fixes the transmit power for the system for the high or low level or makes it selectable (the High/Low Power switch is then required).

Hot DTMF - When selected, the radio allows interconnect and unit call attempts with no phone or unit call digits selected. This option supports Ascend mobiles with DTMF mics allowing the user to manually over-dial DTMF digits.

8.2.2 System Lists

Program the various Multi-Net system lists by selecting them in the **System Lists** drop-down list shown in Figure 8.5 and then clicking the **Edit List** button. Descriptions of the various lists and the information they program follow.

8.2.2.1 Site List


The Site List screen shown in Figure 8.6 allows the user to program the sites that are linked to the system. Up to 32 sites can be linked to each Multi-Net system. To display this screen, on the Multi-Net **Per System** screen, select “Site List” in the drop-down list and then click the  button.

Figure 8.6 Multi-Net Sites Screen

To add a site, click the **Add** button, and to delete a site, select it and click the **Delete** button. To edit a site, select it and change it as desired. The following site information is programmed:

Alias - Up to ten characters can be entered that identify the site. This identification is displayed when the site is selected or displayed using the Site Search feature.

Key - If a password protected codeplug is uploaded to PCC, after entering the valid Upload password, then the Key box on the site list menu of the Multinet per system screen displays the numeric system key information rather than asterisks. The system key information also prints if the codeplug is printed. If a non-password protected codeplug is uploaded to PCC, the Key box on the site list menu of the Multinet per system screen displays asterisks. If the codeplug is printed, the system key information is printed as asterisks.

NPSPAC Banding Scheme - Selects how the NPSPAC channels are calculated. When set to High, the NPSPAC channels begin at 866.000/821.0000 MHz (EFJ channel numbers 601 and higher). When set Low, the NPSPAC channels begin at 851.0125/806.0125 (EFJ channel numbers 1-879). EFJ channel numbers 1 - 559 comply with the 2005 FCC rebanding scheme, however EFJ numbers 560-879 are above the FCC rebanding scheme.

Splinter Channels - Selects if channels are offset 12.5 kHz on the low side. This channel offset may be required for non-NPSPAC 800 MHz channels in some border areas.

Status

Tx Channel Number - Transmit Channel Number. Programs the transmit channel number or frequency of the status repeater for the site. The system Channel Designation parameter determines if this is entered as a frequency or EFJ Channel number (see **Note** below).

Rx Channel Number - Receive Channel Number. Programs the receive channel number or frequency of the status repeater for the site. The system Channel Designation parameter determines if this is entered as a frequency or EFJ Channel number (see **Note** below).

Note *If EFJ channel numbers are used, be sure to use the EFJ Programming Channel Number, not the FCC Channel Number. The FCC channel numbering scheme skips some channels in the NPSPAC portion of the band, so a different scheme must be used. The 800 MHz EFJ Programming Channels are listed in a table at the back of this manual.*

Home

Tx Channel Number - Transmit Channel Number. Programs the transmit channel number of the home repeater for the site similar to the status channel just described.

Rx Channel Number - Receive Channel Number. Programs the receive channel number of the home repeater for the site similar to the status channel just described.

8.2.2.2 Group Scan List


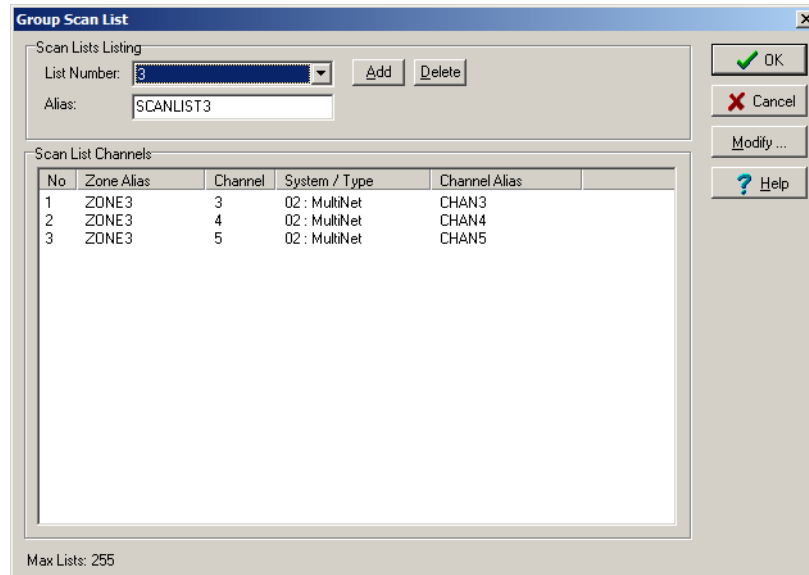

The Group Scan List screen shown in Figure 8.7 allows the user to program the channels in the group scan list for that system. Each Multi-Net system supports multiple group scan lists. Only Multi-Net channels linked to the system can be added. To display this screen, on the Multi-Net **Per System** screen, select “Group Scan List” in the drop-down list and click the  button. An option button or menu item must be programmed to allow the user to select the active list and to allow group scan enable.

Figure 8.7 Group Scan List Screen



No	Zone Alias	Channel	System / Type	Channel Alias
1	ZONE3	3	02 : MultiNet	CHAN3
2	ZONE3	4	02 : MultiNet	CHAN4
3	ZONE3	5	02 : MultiNet	CHAN5

Max Lists: 255

To edit this list, click the  button and Figure 8.8 is displayed. Select the applicable zone in the drop-down list. A list of the Multi-Net channels in that zone that are linked to the current system is displayed. Click the **All** box to select all displayed channels or click the box in the **Channel** column to select individual channels.

Ascend radios support multiple group scan lists. Each list may be programmed with an alias and up to 255 channels from the current system. A maximum of 255 lists may be programmed. With this option, add lists using the **Add** button, or select the desired list number in the drop-down list box and select **Modify** to edit the list. Channels must belong to the same Multi-Net system to be included in the group scan list.

Figure 8.8 Select Scan Channels

Group Scan List

Scan Lists Listing

List Number: 3 Add Delete

Alias: SCANLIST3

Scan List Channels

No	Zone Alias	Channel	System / Type	Channel Alias
1	ZONE3	3	02 : MultiNet	CHAN3
2	ZONE3	4	02 : MultiNet	CHAN4
3	ZONE3	5	02 : MultiNet	CHAN5

Max Lists: 255

OK Cancel Modify... Help

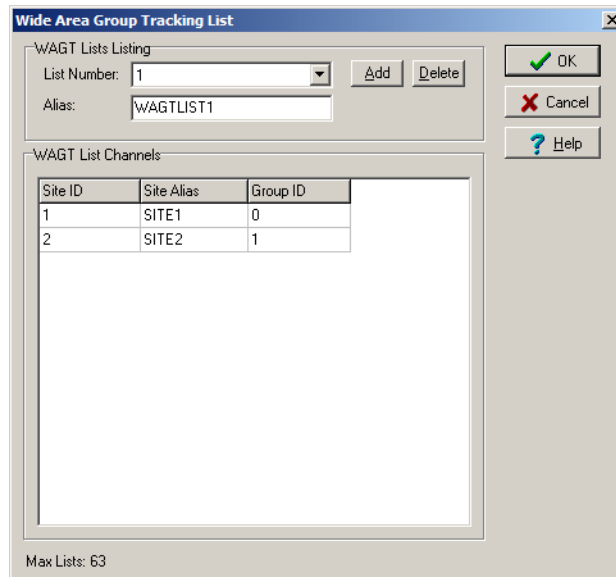
8.2.2.3 Wide Area Tracking List

Multi-Net channels may be programmed with a Wide Area Group Tracking (WAGT) list that allows the selected channel to have multiple decode/encode group IDs depending on the active site.

Note *This feature is only available if more than one site is programmed in the system and if enabled on the Multi-Net **Radio Wide** screen (**Wide Area Group Tracking** field).*

To display this screen, on the Multi-Net **Per System** screen, select “Wide Area Group Tracking” in the drop-down list and click the  button.

Figure 8.9 Wide Area Group Tracking



The dialog box titled "Wide Area Group Tracking List" contains the following elements:

- WAGT Lists Listing:**
 - List Number: 1 (dropdown menu)
 - Alias: WAGTLIST1 (text field)
 - Buttons: Add, Delete, OK (green checkmark), Cancel (red X), Help (blue question mark).
- WAGT List Channels:**

Site ID	Site Alias	Group ID
1	SITE1	0
2	SITE2	1
- Max Lists: 63** (text at the bottom left)

Enter the desired decode/encode group ID used for the listed site. Enter ID to use the selected channel's ID on that site.

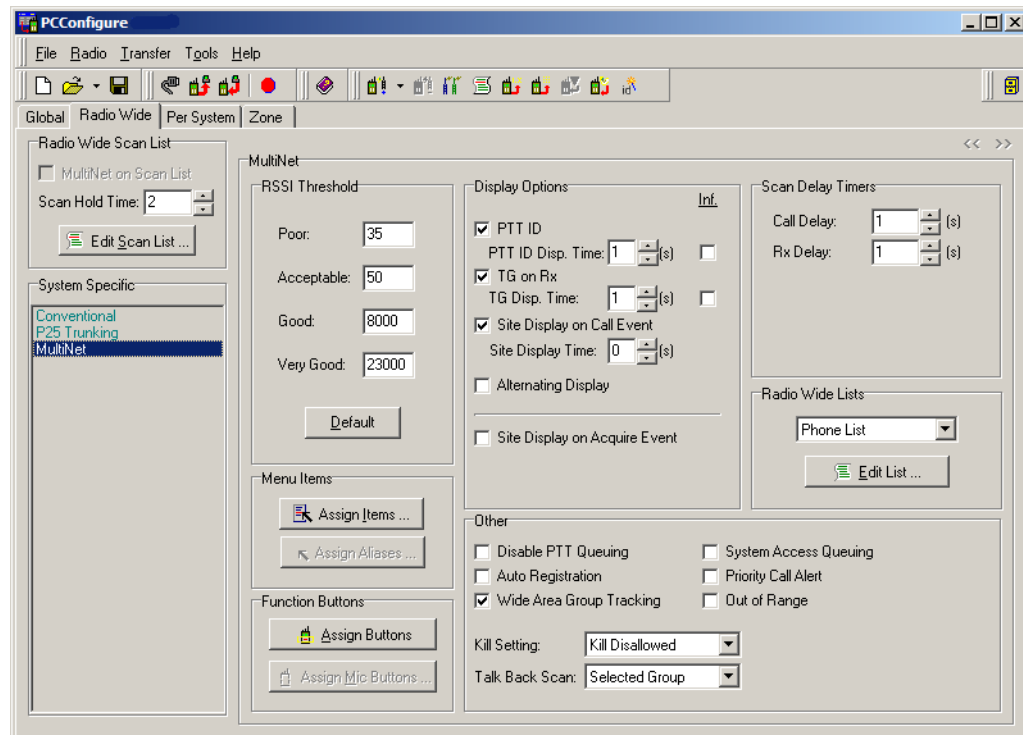
8.2.2.4 Multi-Net Preferred Site List / Scan List / Wide Area Group Tracking

Using the Multi-Net Preferred Site List, Scan List and Wide Area Group Tracking, the customers with multi-site configurations may tailor radio site options on a per-channel basis and not require additional systems or radio wide scan which preserves site search.

- 1 Radio Wide Site Alias Display. A user may prefer to be informed of the active site selected during roaming.

The Site Alias display is controlled with the Multi-Net Radio Wide Display Option settings (Figure 8.10).

Figure 8.10 Multi-Net Radio Wide Screen

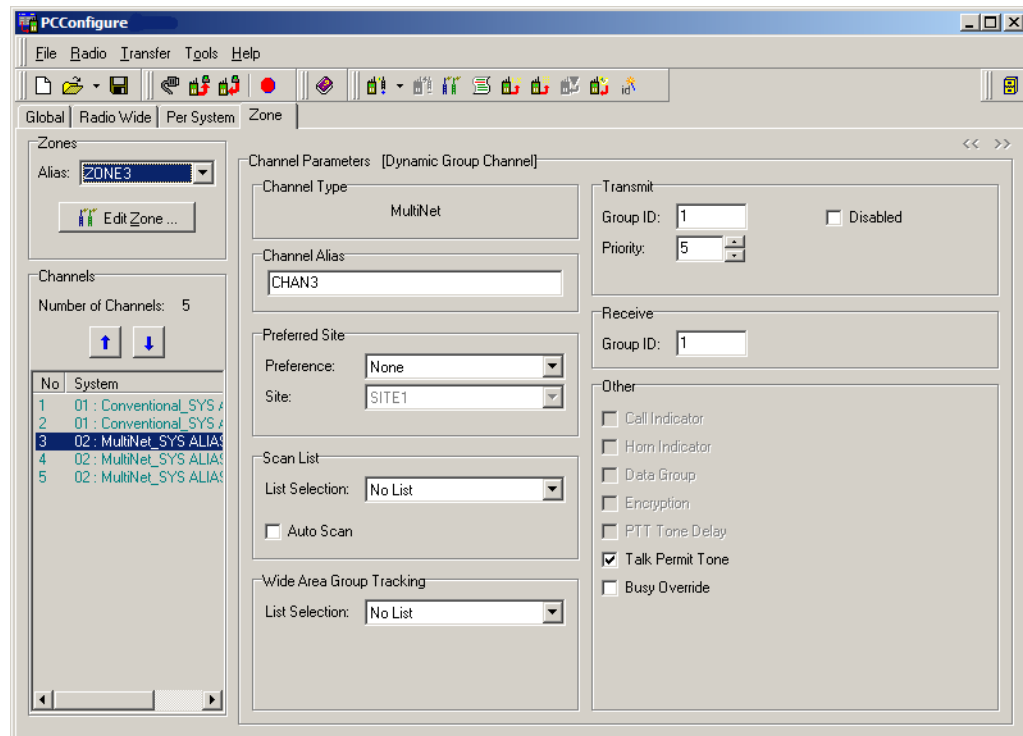


The site alias may be enabled to display on site acquisition and/or on call reception along with PTT-ID, Talk Group ID, and channel alias. To program this feature:

- a Check the Site Display on Acquire Event box to enable site alias display each time the radio determines a valid site was found. On Acquire displays the site alias for 2 seconds then restores the channel display.
- b Check the Site Display on Call Event box to enable site alias display each time a call is received. The display interval is programmable from 500 msec to 7.5 seconds. The site alias is included in the PTT-ID, TG-ID and channel display sequence.

- 2 Per-Channel Preferred Site. A customer may require a channel selection to prefer a specific site from the system site list. Multi-Net channels may be programmed with a Preferred Site and preference so that, on manual channel selection, the indicated site is made the active site.

Figure 8.11 Multi-Net Zone Screen



This feature is enabled on the Zone-Channel screen (Figure 8.16). The system programmer must select a Site Preference of “Preferred” or “Always” and then select a site from the list. Selecting “None” (the default) disables this feature and no site preference is enabled allowing any site in the system site list that has acceptable criteria or better. Site Preferences apply only to the selected channels and do not apply to channels received during scanning.

- Selecting Preferred – the indicated site is loaded on channel selection and site search/roam is inhibited while the site maintains acceptable or better criteria. A Preferred site will allow roaming if site criteria drops below acceptable. During roaming a preferred site will be acquired if criteria is above acceptable even if stronger sites are available.
- Selecting Always – the indicated site is loaded and site lock is active on channel selection and will not allow site search/roam. The user may manually select a site using the Site Search feature which overrides the programmed site preference.

- 3** Per-Channel Group Scan List. A customer may require a channel selection to use a specified scan list to provide communications with specific functional groups.

To enable this feature, select a scan list on the zone/channel page (Figure 8.11). Selecting “None” will disable this feature. If a scan list is selected and the user selectable scan list is set to “Programmed” the channel selection activates the indicated scan list during group scan. The channel selection may also enable group scan (Auto Scan Enable). This feature does not apply to non-selected channels received during scan. If the user selects a programmed scan list using the Scan List Select feature the per-channel list is ignored.

- Downloading a personality file to the radio does not change the last selected group scan list in a system. If a scan list is indicated the per-channel list is ignored.
- Scan List Select button or menu option may be required.
- The current scan list may be viewed using the Scan Select button or menu. To exit the list selection with out changing the current scan list use the <FI>/menu exit key.

- 4** Per-Channel Wide Area Group Tracking. The customer may have a multi-site configuration that incorporates group IDs specific to a particular site. Multi-Net channels may be programmed with a Wide Area Group Tracking (WAGT) list that allows the selected channel to have multiple decode/encode group IDs depending on the active site.

- a** Check the Wide Area Group Tracking box in the Multi-Net **Radio Wide** tab (Figure 8.10) to enable this feature.

- b Select and program a Wide Area Group Tracking list (Figure 8.12) from the per-system list edit box. Each WAGT list allows a group ID to be entered for each site programmed in the Site List screen. Enter 0 in the Group ID to allow the channel defined decode/encode IDs to be used, otherwise enter the site specific group ID associated with that site.

Figure 8.12 Wide Area Group Tracking

Site ID	Site Alias	Group ID
1	SITE1	0
2	SITE2	1

- c Select a WAGT list in the channel's Wide Area Group Tracking list selection (Figure 8.11) or select "No List" to disable this feature on that channel.

Note *Multiple WAGT lists are required if a site has more than one site specific group ID.*

8.3 Setting Up Zones and Channels

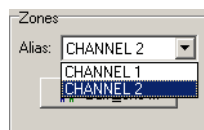
This section describes how to set-up zones and assign channels to each zone. A zone can include up to 16 channels of any type (conventional analog, Project 25 conventional, SMARTNET/SmartZone, Project 25 Trunked, or Multi-Net).

8.3.1 Setting Up Zones

The Ascend portable and mobile radios may be factory optioned to support up to 48, 256, 512, or 864 channels (3, 16, 32 or 54 zones respectively). To determine if one of these features is enabled, refer to the **Transfer → Read Options** Screen.

Note *The maximum number of channels may be limited by available memory size.*

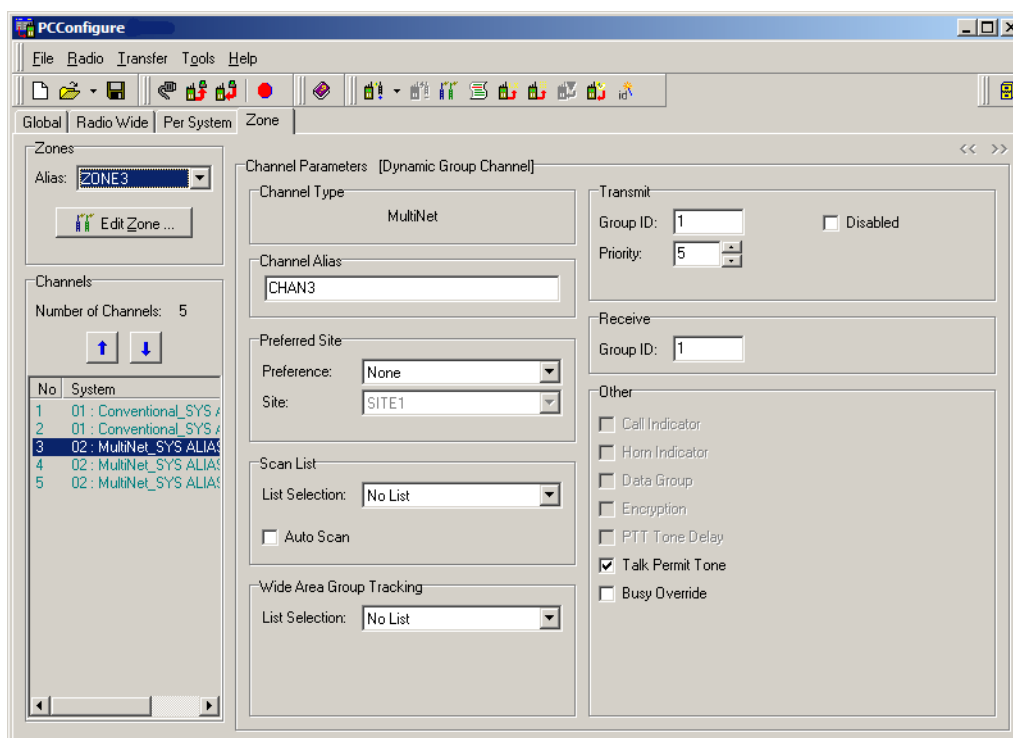
Note *If the 54 Channel / 16 Zone configuration option is enabled, channels should be renamed as zones and zone as channels.*



8.3.1.1 Setup Procedure

- 1 Select the **Zone** tab to display the Zone screen shown in Figure 8.13. (This screen varies according to the type of system the channel is associated with.)

Figure 8.13 Multi-Net Zone Screen





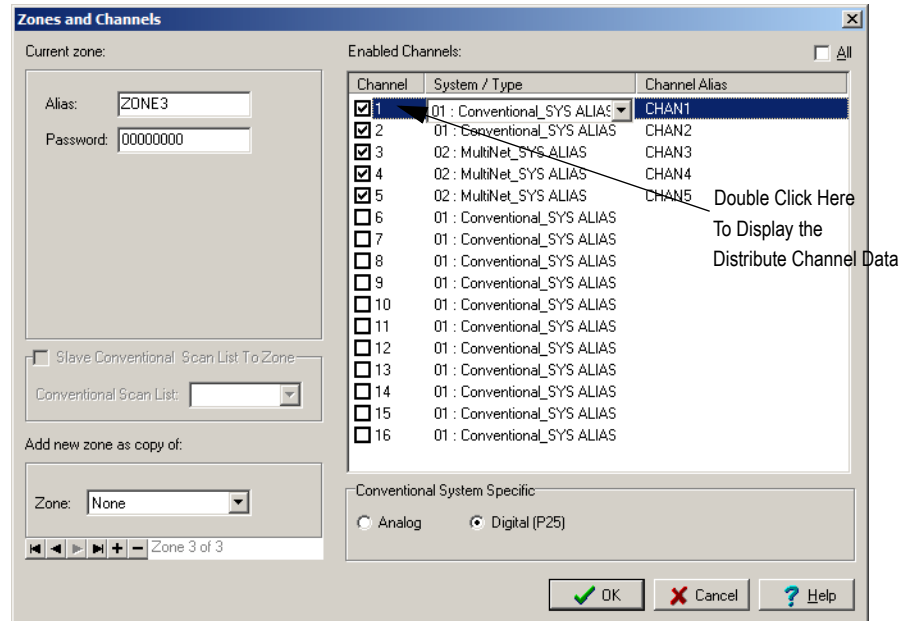






Click  **Edit Zone ...** in the upper left corner of the screen to display the **Zones and Channels** screen shown in Figure 8.14. Another way to do this is to click  in the toolbar.

Figure 8.14 Zones and Channels Screen



- 2 To add a new blank zone, select “None” in the Zone drop-down list and then click the  button. To make a copy of a current zone, select the desired zone in the Zone drop-down list instead. To delete the current zone, click the  button.
- 3 To display the first zone, click ; the last zone ; the previous zone ; and the next zone, .
- 4 Program the alias (identification) that is displayed briefly when you select the zone. To do this, enter a maximum of ten characters in the **Alias** box.
- 5 Keypad Programming and Zone Password are not implemented for Multi-Net.

Note *Zone password for keypad programming is a conventional only feature.*

8.3.2 Setting Up Channels

Note *When you assign a channel to a zone, you also select the system of the channel. Therefore, before assigning a channel to a zone, set up all necessary systems as described in [Section 1.10, “Creating Systems”](#).*

Set up channels by assigning them to a zone in the Zones and Channels screen shown in Figure 8.14. Proceed as follows to set up any type of channel.



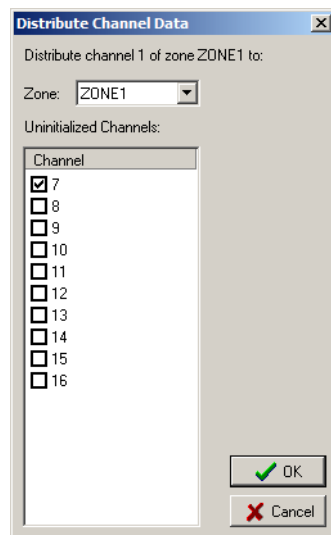
- 1 Select the **Zone** screen (see Figure 8.13) and then click  to display the **Zones and Channels** screen shown in Figure 8.14. Another way to do this is to click  in the toolbar.
- 2 Select the desired zone as described in the preceding section.
- 3 To add a channel to the displayed zone, check the applicable box in the **Channel** column. To select or deselect all channels in the box, check or uncheck the **All** box.
- 4 To assign the channel to a system (if applicable), select the drop-down list in the **System/Type** column and select the desired system. To assign multiple channels to a system, left click a channel and drag the cursor to highlight the desired channels. Then select the system from the drop-down list.
- 5 To copy an enabled channel to unprogrammed channel locations of the current zone or other zones, double click the shaded area of the channel as shown in Figure 8.14. The **Distribute Channel Data** screen shown in Figure 8.15 is displayed. Select the desired channels from this screen.

Figure 8.15 Distribute Channel Data

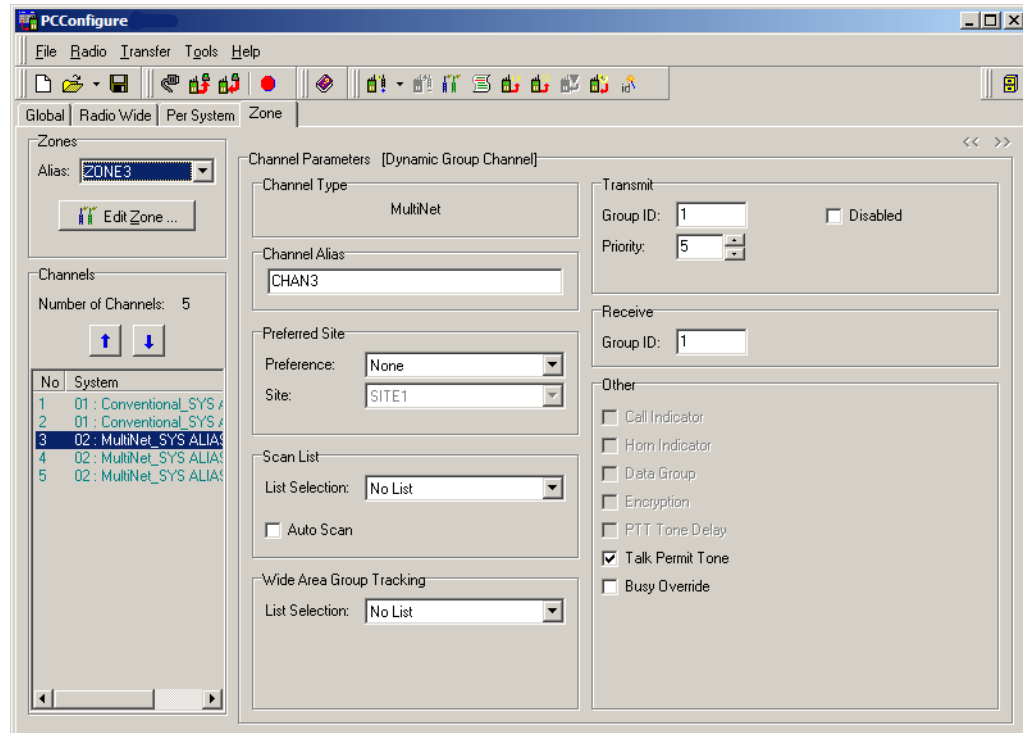


- 6 To move a channel, select the channel you wish to move in the Channels list (on the left side of the **Zone** tab) and press the Up or Down arrow to move it to the desired location.
- 7 Repeat the preceding steps until the you have set up desired channels in each zone.
- 8 To program individual system and channel information, refer to [Section 8.3.3, “Multi-Net Channel Parameters”](#).

8.3.3 Multi-Net Channel Parameters

After you set-up your desired channels as described in [Section 8.3.2, “Setting Up Channels”](#), you can program individual channel parameters. Select the **Zone** screen shown in Figure 8.13, then select the desired zone using the drop-down menu in the **Zones** box. Select screens that program individual channel parameters by clicking the desired channels in the **Channels** box.

Figure 8.16 Multi-Net Zone Screen



Channel Type - Indicates the type of channel (Multi-Net) that is currently selected in the **Channels** box.

Channel Alias - Programs the alias (identification) that is displayed when the channel is selected. A maximum of ten alphanumeric characters can be entered.

Preferred Site

Preference - select a Site Preference of “Preferred” or “Always” and then select a site from the list. Select “None” (the default) to disable this feature and no site preference is enabled allowing any site in the system site list that has acceptable criteria or better. This feature does not apply to channels received during scanning. The user may manually select a site using the Site Search feature which overrides the programmed site preference.

“Preferred” – the indicated site is loaded on channel selection and site search/roam is inhibited while the site maintains acceptable or better criteria. A Preferred site will allow roaming if site criteria drops below acceptable. During roaming a preferred site will be acquired if criteria is above acceptable even if stronger sites are available.

“Always” – the indicated site is loaded and site lock is active on channel selection and will not allow site search/roam. This feature does not apply to channels received during scanning. The user may manually select a site using the Site Search feature which overrides the programmed site preference.

Site - Select the site number from the listed sites.

Scan List

List Selection - A customer may require a channel selection to use a specified scan list to provide communications with specific functional groups. To enable this feature, select a scan list on the zone/channel page. Select “None” to disable this feature. If a scan list is selected and the user selectable scan list is set to “Programmed”, the channel selection activates the indicated scan list during group scan. The channel selection may also enable group scan (Auto Scan Enable).

Auto Scan - When this is checked, the radio automatically begins scanning the scan list associated with the channel whenever the channel is selected. When it is not checked, scanning must be started manually by the Scan option switch.

Wide Area Group Tracking

List Selection - Select the desired Wide Area Group Track list or No List (default) to disable this feature.

Transmit

Group ID - Programs the encode ID from 1-225.

Disabled - When selected, transmitting is disabled on the group so it is monitor only.

Priority - Selects the access priority of the group from 2-5 (“2” is the highest priority). Priority “1” is reserved for emergency calls.

Receive

Group ID - Programs the decode ID from 1-225. The receive and transmit IDs can be different if desired.

Other

Call Indicator - The Call Indicator feature is not implemented.

Horn Indicator - (Not available on a per channel basis.) When selected, the Horn alert feature activates when a call is received on the channel.

Data Group - (Ascend Mobile Only) A channel enabled for Data Group disables Receive audio to the speaker preventing the user from hearing in-band data transmissions. Receive and transmit audio for this channel is provided over the universal interface cable.

Encryption - Analog encryption for Multi-Net channels is not supported.

PTT Tone Delay - Not implemented.

Talk Permit Tone - When selected, the Talk Permit Tone sounds when the radio system is successfully accessed and speaking can begin. If this is not selected, no tone sounds when this occurs.

Busy Override - When selected, this feature allows the user to key the radio while receiving if Talkback and site priority allow.

Programming Scanning

The types of scanning that can be programmed are Radio Wide, Priority (Standard), Group Scan (Multi-Net) and Vote Scan.

Radio Wide Scan - Use this type when two or more types of channels must be scanned at the same time such as conventional and Project 25 trunked. If this is not a requirement, use the more efficient Priority Scan (or Group Scan for Multi-Net) which follows for faster scanning and expanded scan functionality.

Priority Scan (Standard) - Use this type to monitor only channels that are the same type as the selected channel. For example, if a conventional channel is selected, only conventional channels can be scanned. Trunked channels must also belong to the system of the selected channel.

Group Scan (Standard for Multi-Net) - The Multi-Net group scan feature is used to receive multiple Multi-Net channel/group IDs linked to a single system. This list can include up to 225 channels/group IDs per system. Only channels linked to the same system are included in a scan list.

Vote Scan - Vote scan uses conventional repeater RSSI levels to determine (vote) which repeater the call will be assigned to.

9.1 Programming the Radio Wide Scan Mode

- 1 On the **Radio Wide** screen, Radio Wide Scan List section, select the Radio Wide scan hold time. To edit the Radio Wide scan list, click the **Edit Scan List** button to program the Radio Wide Scan List channels and select the Scan Talk Back Type. Note that the Scan Hold Time and Scan talk back type selected here apply only to Radio Wide Scan. One radio wide scan list with up to 16 channels from any programmed zone/channel may be added. You must set up the channels that you want to include in the scan list as described in the *Setting Up Zones and Channels* section for system.

Note *The Radio Wide Scan List should only be used if scanning channels from different protocols.*

- 2 Program a **Radio Wide Scan** option button for each system type from which you wish to activate this option. Do this by clicking the **Assign Buttons** button on the **Radio Wide** screen as described in [Section 2.4.3, “Function Button Programming”](#). A Radio Wide Scan menu parameter can also be programmed as described in [Section 2.4.2, “Menu Items Programming”](#).

9.2 Programming the Priority Scan Mode

You set up Priority scan on the **Per System** screen because it is unique for each system type. Proceed as follows:

- 1 On the **Per System** screen, select the desired system in the left pane.
- 2 In the System Lists drop-down list near the bottom of the screen, select **Priority Scan List**. Then click the **Edit List** button and program the scan list as described in [Section 5.2, “Per System Screens”](#), [6.2, “Per System Screens”](#), and [7.2, “Per System Screens”](#). You must set up the channels that you want to include in the scan list as described in the *Setting Up Zones and Channels* section for each system.
- 3 With conventional channels, program the per system scan list settings on the **Per System** screen. There is also the option to link a particular scan list to a zone. Refer to [Section 5.2.2, “Conventional System Lists”](#) for more information.
- 4 Repeat the preceding steps for each system that will have Priority Scan function.
- 5 With trunked channels (SMARTNET/SmartZone/Project 25), you may need to program each channel to select a scan list and auto scan. Select the **Zone** screen and program this information for each channel if required (Sections 8.3 and 9.3).
- 6 Program the Scan option button by clicking the **Assign Buttons** button on the **Radio Wide** screen as described in [Section 2.4.3, “Function Button Programming”](#). A **Scan** menu parameter can also be programmed as described in [Section 2.4.2, “Menu Items Programming”](#).

9.3 Programming the Group Scan Mode

Group scan is set up on the **Per System** and **Radio Wide** screens for Multi-Net systems. Each Multi-Net system may be programmed with multiple named group scan lists. Proceed as follows:

- 1 On the **Per System** screen, select the desired system in the left pane.
- 2 In the System Lists drop-down list near the bottom of the screen, select “Group Scan List”. Then click the **Edit List** button and program the scan list as described in [Section 8.2.2.2, “Group Scan List”](#). The channels (groups) to be included in the scan list must have been set up as described in [Section 8.3.3, “Multi-Net Channel Parameters”](#).
- 3 Repeat the preceding step for each system that will have the Group Scan function.
- 4 On the **Radio Wide** screen, select “Multi-Net” in the left pane and program the Scan Delay Timers and Talk Back Scan option as described in [Section 8.1.1, “Radio Wide Parameters”](#).
- 5 Also on the **Radio Wide** screen, program the Group Scan option button by clicking the **Assign Buttons** button. A Group Scan menu parameter can also be programmed. Refer to [Section 8.1.1, “Radio Wide Parameters”](#) for more information.

9.4 Vote Scan Programming

This section describes how to program the Vote Scan option for a conventional system. System requirements for this option include:

- PC Configure version 2.1.0 or higher.
- Conventional Vote Scan system information (frequency pairs, etc.)

The steps to program Vote Scan in PC Configure are:

- 1 Open a current or new PCC file for the desired subscriber type (5100/5300) and desired frequency band.

- 2 From the **Zone** tab, select the **Edit Zone** button. Figure 9.1 is displayed.

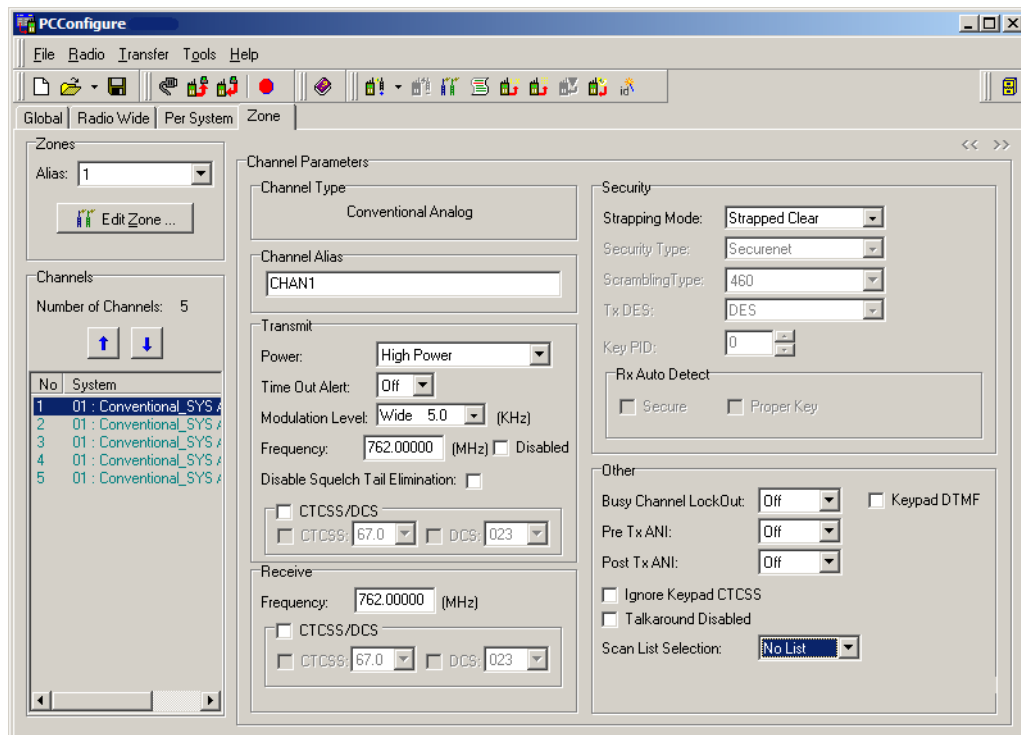
Figure 9.1 Zones and Channels Screen

Channel	System / Type	Channel Alias
<input checked="" type="checkbox"/> 1	01 : Conventional_SYS ALIAS	CHAN1
<input checked="" type="checkbox"/> 2	01 : Conventional_SYS ALIAS	CHAN2
<input checked="" type="checkbox"/> 3	01 : Conventional_SYS ALIAS	CHAN3
<input checked="" type="checkbox"/> 4	01 : Conventional_SYS ALIAS	CHAN4
<input checked="" type="checkbox"/> 5	01 : Conventional_SYS ALIAS	CHAN5
<input type="checkbox"/> 6	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 7	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 8	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 9	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 10	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 11	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 12	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 13	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 14	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 15	01 : Conventional_SYS ALIAS	
<input type="checkbox"/> 16	01 : Conventional_SYS ALIAS	

- 3 Enable the desired number of channels supported by the Vote Scan system. A five-channel vote system is shown in this example (Figure 9.1).
- 4 Select the check box for each channel location. Highlight each channel and designate that channel as either Analog or Digital.
- 5 Select **OK** after all desired channel locations have been selected.

6 The **Zone** page is now populated with the selected channels. (See Figure 9.2.)

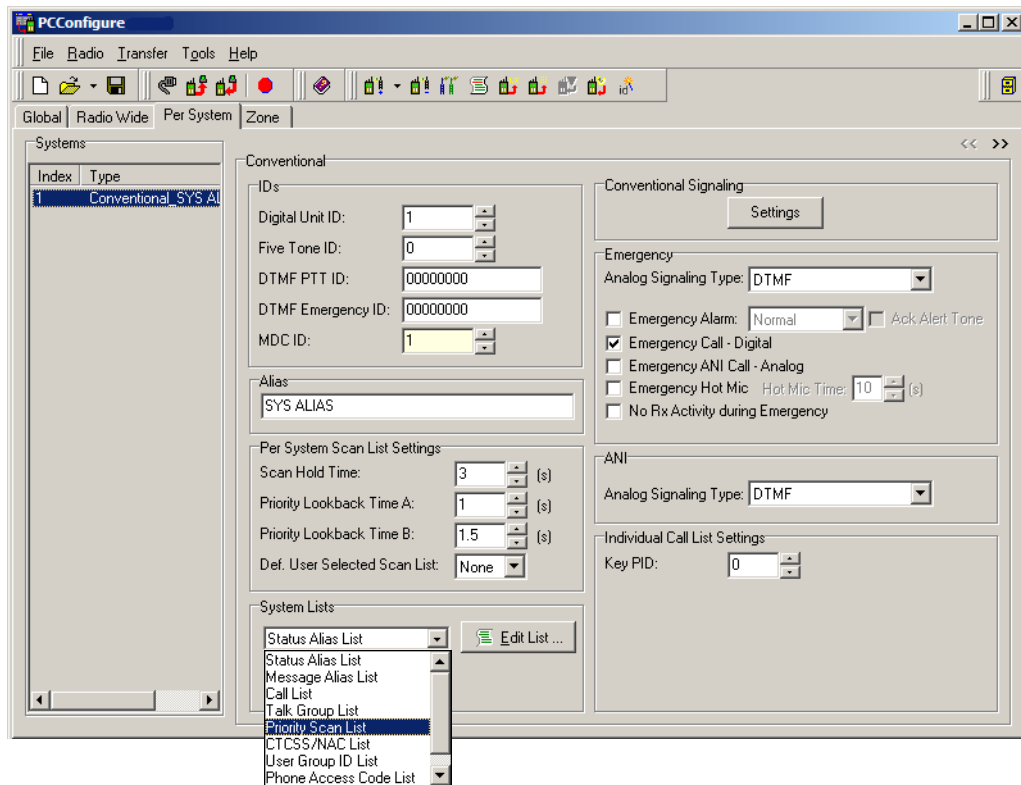
Figure 9.2 Zone Screen with Channels Selected



7 Highlight each channel location in the left hand column and populate each location with the repeater pair frequencies and settings for all station's part of the Vote Scan system.

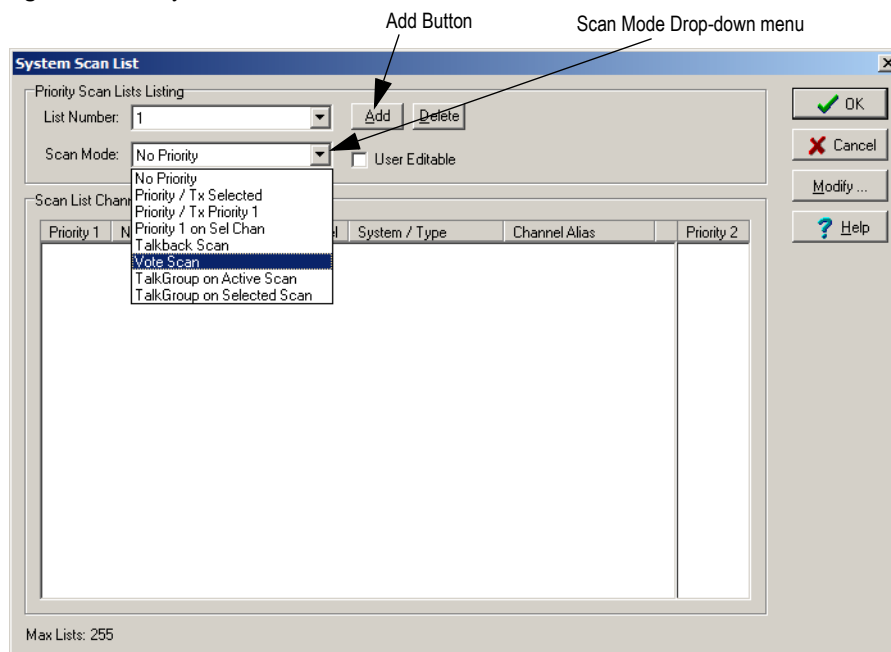
8 From the **Per System** tab, in the **System Lists**, select “Priority Scan List”.

Figure 9.3 Per System: System Lists Drop-down Menu



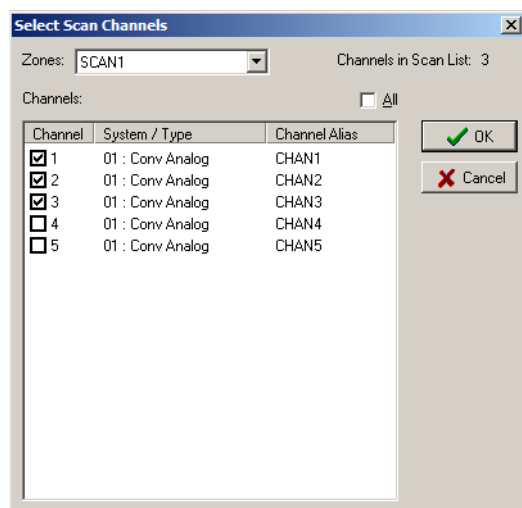
- 9 The following screen is displayed. Select the **Add** button to enable a scan list. For this example, only one scan list will be enabled.

Figure 9.4 System Scan List



- 10 Under the **Scan Mode** drop-down window on the **System Scan List** screen, select **Vote Scan**. See Figure 9.4.
- 11 Select the **Modify** button to populate the scan list. The **Select Scan Channels** screen is displayed.

Figure 9.5 Select Scan Channels



- 12 Select each channel location programmed with the Vote Scan station repeater pair frequencies. (See Figure 9.5.)

- 13 Select the **OK** button to save the selected channels to the scan list. The scan list is now populated with the desired channels. (See Figure 9.6.)

Figure 9.6 Populated System Scan

System Scan List

Priority Scan Lists Listing

List Number: 1

Scan Mode: Vote Scan ☒ User Editable

Scan List Channels (Check to set priority)

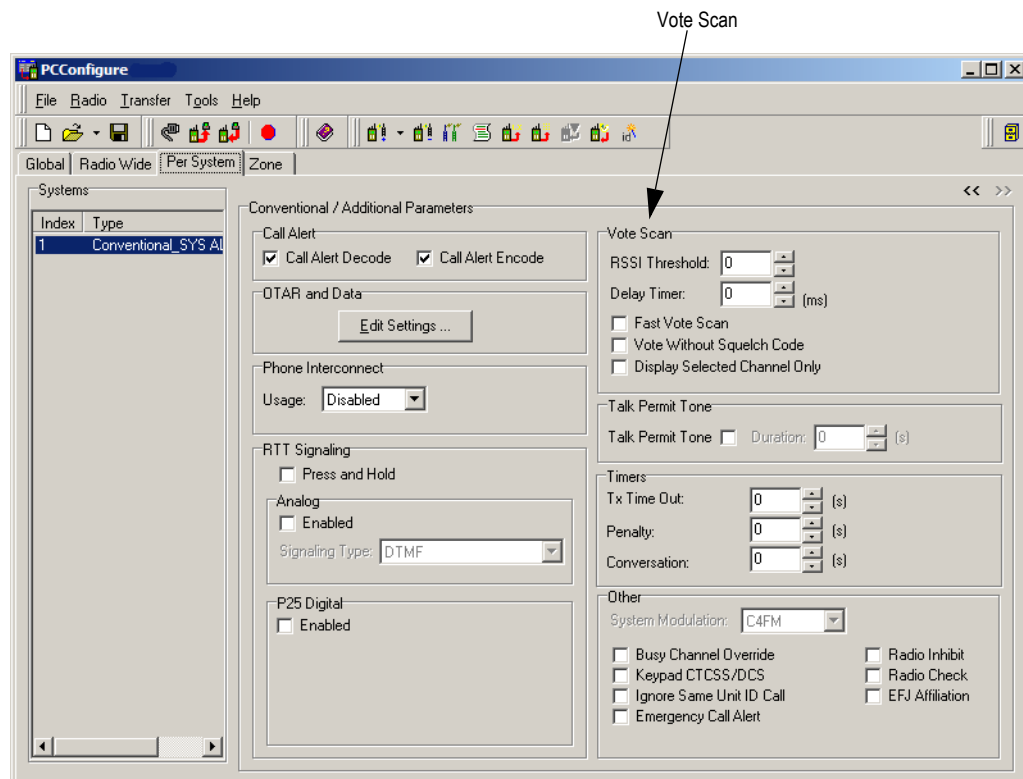
Priority 1	No	Zone Alias	Channel	System / Type	Channel Alias	Priority 2
<input type="checkbox"/>	1	SCAN1	1	01 : Conv Analog	CHAN1	<input type="checkbox"/>
<input type="checkbox"/>	2	SCAN1	2	01 : Conv Analog	CHAN2	<input type="checkbox"/>
<input type="checkbox"/>	3	SCAN1	3	01 : Conv Analog	CHAN3	<input type="checkbox"/>

Max Lists: 255

- 14 Select the **OK** button to save the scan list.

- 15 In the upper right corner of the **Per System** screen, click on the double arrows to show Page 2 of the **Per System** screen. (See Figure 9.7.)

Figure 9.7 Per System Additional Parameters



- 16 Set the **Vote Scan** settings as desired. (Cross reference with current system settings, descriptions below).

RSSI Threshold - The signal strength threshold the radio will use to determine whether to switch or stay on the current repeater.

Delay Timer - Delay setting to allow the carrier to come up on all repeaters so that voting on signal strength can occur.

Fast Vote Scan - If this feature is selected and the signal strength level for the current repeater is above the RSSI threshold setting, no additional voting will occur and the current repeater will be used.

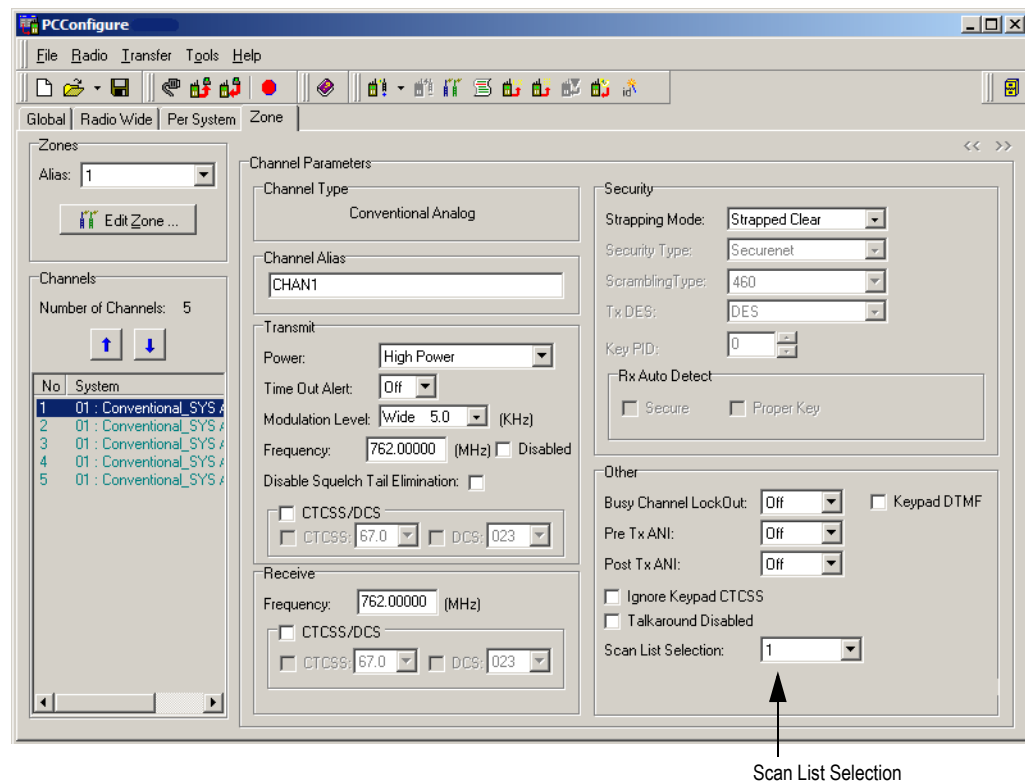
Vote Without Squelch Code - CTCSS/DCS setting will be ignored when determining which repeater to use.

Display Selected Channel Only - Selecting this field forces the radio to display the selected channel and to not display the repeater ID used once it is voted.

- 17 Select the **Zone** tab once again.

18 Highlight the first channel in the left column. (See Figure 9.8.)

Figure 9.8 Zone Screen



19 Go to the **Scan List Selection** drop-down menu in the lower right corner of the page. Select “Scan list 1”. (Only selection possible for this example.)

20 Duplicate this setting on the additional channel locations tied to the Vote Scan system.

21 After other programming settings are made (Global, Radio Wide or Per System settings), save the file and download to the appropriate EFJ subscribers.

Note *The **Scan List Select** function button/menu item cannot be programmed or used without a Vote Scan configuration file.*

SECTION 10

Password Description

This section contains the following information about passwords:

- Password enhancements
- Programming passwords
- Password description
- Zone password

10.1 Password Enhancements

51xx/Ascend portables and 53xx/Ascend mobiles have an enhanced password feature including multiple user passwords and protection for radio configuration transfers. Note that the user password feature is not available on 51xx/Ascend Model 1 portable radios without a display. The following passwords replace the single Power-On password:

- Four power-on (User x) passwords
- Download and upload passwords
- Master password

10.2 Programming Passwords

With the latest versions of PC Configure, the **Password at Power Up** parameter is removed from the **Global** screen as described in [Section 10.1, “Password Enhancements”](#). You program passwords using a password management screen displayed by the **Tools → Password Management** menu. Refer to [Section 3.4, “Tools Menu”](#). You must power-up the radio and connect the radio to the computer to display this screen.

PC Configure transfers password data and stores it in an encrypted format for security purposes. In addition, PC Configure never displays actual passwords. They are always indicated by eight asterisks (*****). Therefore, you cannot use PC Configure to determine what passwords are in a radio.

Passwords must be 1-8 characters in length and consist of the numbers 0-9. Zeros are valid characters in any location, even as leading characters. Initially, all passwords are null (deleted) characters. Therefore, when you first program a password, you do not need to make an entry in the **Original/Master Password** box.

10.2.1 Lost Passwords

If you lose a password, you can change it using PC Configure by entering the master password, as [Section 10.3.3, “Master Password”](#) describes. If the master password is lost or was not used, you can erase all passwords using the PCTune software as follows:

- 1 With PCTune 3.x.x or later, select **Radio → Reset Passwords**. Only password information is erased.
- 2 With earlier versions of PCTune, after starting the PCTune program, press <Shift> <Ctrl> <E> to toggle the following **Erase EEPROM** function. Otherwise, it is grayed and you cannot select it. Then select **Tools → Other Tools**. Displayed is a password protected area where the erase eeprom functionality is placed. This erases all password and personality information, so you must then reprogram the radio.



Do **NOT** select “COMPLETE” because that erases all information. Then, you must send the radio back to the factory to make it usable again.

10.2.2 Changing Password

A user can change an assigned password only if the **Set User Password** option button or menu parameter is programmed on the radio. Selecting this function displays prompts for entering and confirming a new password.

Note *With the 51xx/Ascend portable and 53xx/Ascend Handheld Control Unit (HHC), you should not use a number key for this function. This is because you exit the password mode if you press the assigned key when you enter a number.*

10.2.3 Password Entry Procedure

When the radio prompts you to enter a password, perform the following procedure to enter it:

51xx Portable - With DTMF keypad models, enter each number using the keypad and press the <F2> key after you enter the last digit. With limited keypad models, enter each number by pressing the Up/Down switch and press the <F2> key after each digit.

53xx Mobile - Rotate and press the **Select** switch.

10.3 Password Description

This section contains descriptions of the following types of passwords:

- User (power-on) passwords
- Download/Upload passwords
- Master password

10.3.1 User (Power-On) Passwords

When you enable a user password, you must enter it each time you turn on the radio's power. You can program a maximum of four different user passwords (User 1/User 2/User 3/User 4). The same radio features are enabled for each. When you enter any user password at power up, you enable normal radio operation.

10.3.2 Download / Upload Passwords

You can program separate download (write) and upload (read) passwords to prevent unauthorized downloading or uploading of radio programming parameters. Refer to [Section 3.3, "Transfer Menu"](#). When you use either of these passwords, you must enter the proper password to perform the desired operation. You do not need a user password to upload or download parameters if you did not use the password option.

10.3.3 Master Password

The master password overrides all the preceding passwords. The system administrator can use it as a “pass key” to a password-controlled function or to change a lost or unintentionally-changed password. Master passwords are set up and changed the same as the other passwords. It does not override the zone password described in [Section 10.4](#), “Zone Password”.

10.4 Zone Password

Note *The programming and use of the zone password is independent of the preceding passwords. Program it in the **Zone → Edit Zones and Channels** screen. Zone Password Programming is a "conventional only" feature.*

You can program a zone password for the 53xx mobile and 51xx portable. It prevents unauthorized reprogramming of zones by keypad programming. When you use this password, you must enter it before you can change system or channel parameters in that zone. You program the zone password in the **Edit Zones and Channels** screen. To display this screen, click the **Edit Zone** button on the **Zone** screen. Refer to the section, Setting Up Zones, for the programmed system.


You can program a different password for each zone. When you select a password-protected zone, “PASSWORD” flashes the first time you try to select a system or channel parameter in that zone. You then enter each digit of the password as previously described. The password is always eight digits long. After you enter the eighth digit, you can program system and channel parameters for that zone normally.

SECTION 11

51xx Portable Keypad Programming

Note *Keypad programming is permitted for United States federal government users only. It is not permitted for any user regulated by the United States Federal Communications Commission (FCC).*

Since only United States federal government users are permitted to use keypad programming, you can only program United States federal government models of this radio with this feature.

You can only use keypad programming on existing conventional channels if it has been enabled by factory programming and a conventional mode option switch or menu parameter is programmed for the **Keypad Programming** function. You then select it by simply pressing that switch or selecting that menu parameter. The keypad programming mode is indicated by “CHNG ZONE” and  in the display. Please note that you cannot add or program an unprogrammed channel using this feature.

Keypad programming allows the user to change conventional channel parameters such as the transmit and receive frequency, Call Guard squelch code, and encryption code. In addition, several conventional mode timers can be changed. You cannot use it to reprogram disabled channels or any Project 25 Trunked, SMARTNET/SmartZone, and Multi-Net information.

This section covers the following aspects of 51xx portable keypad programming:

- Menu description
- Zone change parameter
- Channel change parameter
- System parameters
- Channel parameters

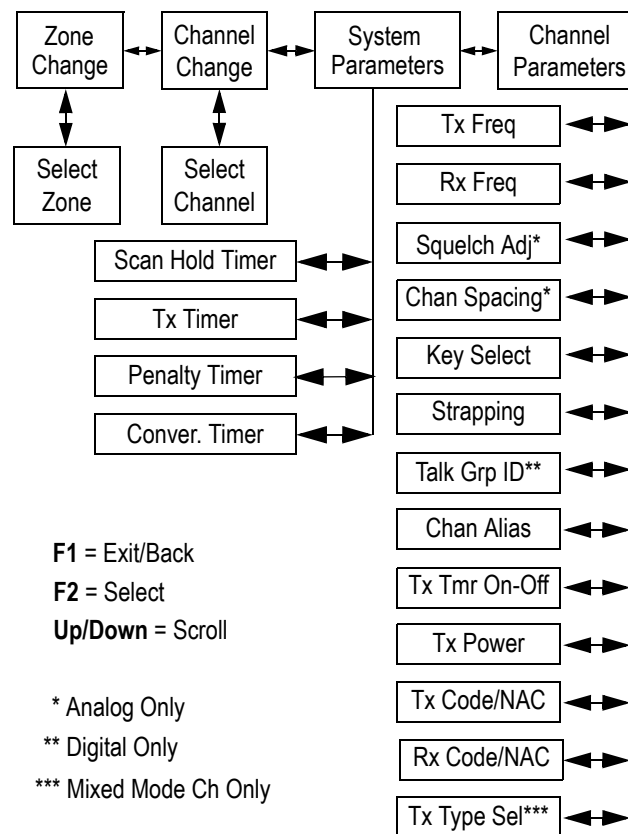
11.1 Menu Description

51xx portable keypad programming uses a menu system to let you select the parameters you want to change in the keypad programming mode. Figure 11.1 is a flowchart that shows the keypad programming mode menu structure. When you select the keypad programming mode by the **Keypad Programming** option button or menu parameter, the first menu parameter “CHNG ZONE” displays as just described. Press the Up/Down switch to scroll through the following parameters:

- CHNG ZONE ([Section 11.2](#))
- CHNG CHAN ([Section 11.3](#))
- SYS PARMS ([Section 11.4](#))
- CHAN PARMS ([Section 11.5](#))

Press the <F2> (Select) key to select a highlighted parameter, and press the <F1> key from one of the main menus to exit keypad programming. When you press the <F1> key in the other menus, you return to the previous menu. You also use the Up/Down switch in several menus to scroll through available selections. The following sections describe these parameters.

Figure 11.1 51xx Keypad Programming Menu Flowchart



11.2 Zone Change Parameter

The “CHNG ZONE” menu parameter selects the zone containing the conventional channel that you want to reprogram. It does not change the zone selected for normal operation.

Press the <F2> key to select the “ZONE CHG” parameter and then scroll through the programmed zones by pressing the Up/Down switch. When the desired zone displays, select it by pressing the <F2> key.

11.3 Channel Change Parameter

The “CHNG CHAN” menu parameter selects the conventional channel to be reprogrammed. You cannot select disabled channels or Project 25 Trunked/SMARTNET/SmartZone channels. This does not change the channel selected for normal operation.

Press the Select switch to select the “CHNG CHAN” parameter and then scroll through the programmed channels by pressing the Up/Down switch. When the desired channel appears, select it by pressing <F2> key.

11.4 System Parameters

Note *If “PASSWORD” displays briefly when you try to select one of the following parameters, you must enter the zone password before you can make any changes. Refer to [Section 10.4](#) for more information.*

The “SYS PARMS” menu parameter lets you select the conventional mode timer that you want to reprogram from among the following. Press the <F2> key to select the “SYS PARMS” parameter, then press the Up/Down switch to display the desired parameter. Press the <F2> key again to select it.

SCAN TIMER - Selects the Scan Hold timer. Press the Up/Down switch to decrement or increment the timer in 0.5-second steps from 0-7.5 or disable it by selecting 0 seconds. When the desired value appears, store it by pressing the <F2> key.

TX TIMER - Selects the transmit time-out timer. Press the Up/Down switch to decrement or increment the timer in 15-second steps from 0-225 or disable it by selecting 0 seconds. When the desired value appears, store it by pressing the <F2> key.

PEN TIMER - Selects the penalty timer. Press the Up/Down switch to decrement or increment the timer in 15-second steps from 0-225 or disable it by selecting 0 seconds. When the desired value appears, store it by pressing the <F2> key.

CONV TIMER - Selects the conversation timer. Press the Up/Down switch to decrement or increment the timer in 30-second steps from 0-450 or disable it by selecting 0 seconds. When the desired value appears, store it by pressing the <F2> key.

11.5 Channel Parameters

Note *If “PASSWORD” displays briefly when you try to select one of the following parameters, you must enter the zone password before you can make any changes. Refer to [Section 10.4](#) for more information.*

The “CHAN PARMS” menu parameter selects the following conventional channel parameters that you can reprogram. Press the <F2> key to select the “CHAN PARMS” parameter, then press the Up/Down switch to display the desired parameter. Next, press the <F2> key to select it. The squelch control parameters are unique to the type of conventional channel selected (analog or Project 25).

Note If you select a mixed-mode channel, you can program both the **RX CODE** (analog) and **RX NAC** (Project 25) parameters that are described below. Also, if the **Transmit Type** is analog, a **TX CODE** is programmed. If the **Transmit Type** is Digital (Project 25), a **TX NAC** is programmed.

TX FREQ - Programs the transmit channel frequency. The digits that you change begin to flash. Press the Up/Down switch to select the desired number for that digit. Then, press the <F2> key to move to the next digit. If you try to enter an invalid frequency, a beep sounds, “INVALID” displays briefly, and you must reenter the number.

RX FREQ - Programs the Receive frequency the same as **TX FREQ** above.

SQ ADJ (analog only) - Changes the preset squelch setting on that channel. “0” is the default setting. You can select values from –7 to +7. Increasing this setting toward +7 causes the squelch to open sooner so you can receive weaker signals. Decreasing it toward –7 causes the opposite to occur.

Note *The channel spacing is selectable on a P25 conventional digital channel if it is set to “Mixed Mode”. The channel spacing selections are the same as the analog channel spacing under this situation. You cannot change the squelch because the setting is critical for proper receiver operation.*

CHAN SPC - Selects either wide or narrow band channel spacing on analog channels only. Press the Up/Down switch to select “WIDE” or “NARROW”. When the desired setting displays, store it by pressing the <F2> key.

Note *Program the next two parameters only if the radio is programmed for encryption.*

Key Select - Selects the encryption key for the channel if applicable. The key storage location of 0-63 (PID) or 1-64 (SLN) is selected. Refer to [Section 4.2](#). If no keys are programmed, “No Keys” appears.

Strapping - Selects the encryption strapping mode for the channel as “Clear”, “Secure”, or “Switched”.

TG ID (Project 25 Only) - Selects the talk group for the selected channel. Press the <F2> key to display the current talk group ID, then press the <F2> key again to enter a different ID from 1-65,535. You must enter this number directly using the DTMF keypad.

Channel Alias - Programs the alias for the channel (DTMF keypad models only). You can enter a maximum of ten characters. Press the <F2> key once to display the current alias, then press it again to program a new alias. You program alphanumeric characters using the 0-9 keys. Pressing a key once enters the first letter on the key, then pressing it successive times enters the letters and the number on the key. For example, press the <2> key twice to enter “B”. Press the <F2> key to move to the next position or press it twice to enter a space.

TX TIMER - Enables or disables the time-out timer on the current channel. Press the Up/Down switch to select the on and off mode. When the desired setting displays, store it by pressing the <F2> key.

TX POWER - Selects the desired power output level. Press the Up/Down switch to scroll through the following choices. When the desired setting displays, store it by pressing the <F2> key.

- Power High - High transmit power
- Power Low - Low transmit power
- Power SW - Switchable power selectable by the High/Low power switch. You cannot choose this if that switch is not programmed.

CTCSS/DCS Squelch Control (analog channel)

TX CODE - Programs the transmit Call Guard (CTCSS/DCS) code. The currently selected code displays. Press the Up/Down switch to select the desired code type (CTCSS analog or DCS digital). Then press the <F2> key to select it and enter the code number. This process is similar to programming a channel frequency as just described.

RX CODE - Selects the receive codes the same as **TX CODE** above.

NAC Squelch Control (Project 25 Channel)

TX NAC - Programs the transmit Network Access Code (NAC) which can be any number from 0-4095. With later models, this number appears in hexadecimal from 000-FFF. The procedure is similar to programming a **TX FREQ** as just described. If you enter an invalid code, a beep sounds, “INVALID” appears briefly, and you must reenter the code.

RX NAC - Selects the receive NAC through a similar process as described for **TX NAC** above.

Transmit Type (Project 25 mixed mode only) - If the selected channel is a mixed mode, analog and Project 25 channel, this selects the transmit type. You can select either analog or digital (Project 25). This then determines if a TX CODE or TX NAC is programmed above.

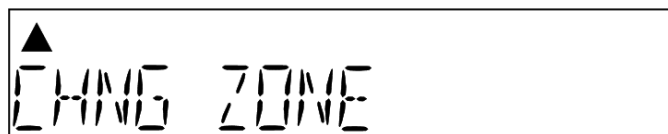
SECTION 12

53xx Mobile Keypad Programming

Note *Keypad programming is permitted for United States federal government users only. It is not permitted for any user regulated by the United States Federal Communications Commission (FCC).*

Since only United States federal government users are permitted to use keypad programming, you can only program United States federal government models of this radio with this feature.

You can only use keypad programming if it has been enabled by factory programming and a conventional mode option switch or menu parameter is programmed for the **Keypad Programming** function. You then select it by simply pressing that switch. You do not need to enter a password to use it. The text “CHNG ZONE” and a triangle in the display indicate keypad programming mode as follows:



Keypad programming allows you to change conventional channel parameters such as the transmit and receive frequencies, Call Guard squelch code, and encryption key. You can use it to change several conventional mode timers. You cannot use it to reprogram disabled channels or any Project 25 Trunked, SMARTNET/SmartZone, and Multi-Net information.

This section covers the following aspects of 53xx mobile keypad programming:

- Menu description
- Zone change parameter
- Channel change parameter
- System parameters
- Channel parameters

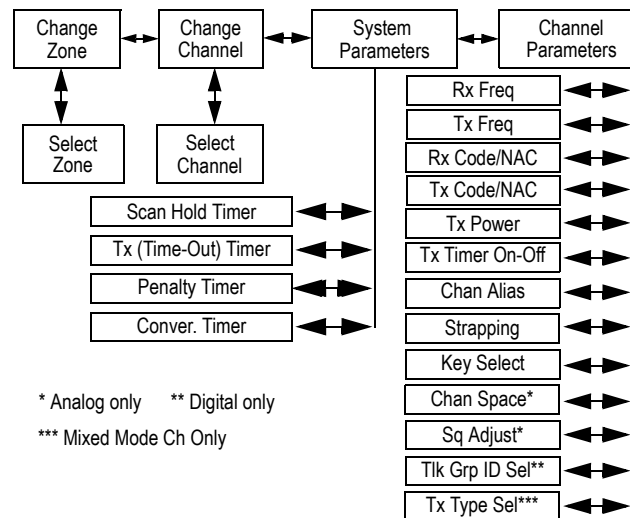
12.1 Menu Description

53xx mobile keypad programming uses a menu system to let you select the parameters you want to change in the keypad programming mode. Rotate and press the **Select** switch to scroll through and select the available parameters. The available parameters and the section in which each is described are as follows:

- CHNG ZONE (Section 12.2)
- CHNG CHAN (Section 12.3)
- SYS PARMS (Section 12.4)
- CHAN PARMS (Section 12.5)

Press the **Select** switch to select the displayed parameter. Press the **Keypad Programming** option switch from one of the main menus to exit keypad programming, or from other menus to exit back one level. Figure 12.1 shows the keypad programming mode menu structure.

Figure 12.1 53xx Keypad Programming Menu Flowchart



12.2 Zone Change Parameter

The “CHNG ZONE” menu parameter selects the zone containing the conventional channel that you want to reprogram. It does not change the zone selected for normal operation.

Press the **Select** switch to select the “CHNG ZONE” parameter, then scroll through the programmed zones by rotating that switch. When the desired zone displays, select it by pressing the **Select** switch.

12.3 Channel Change Parameter

The “CHNG CHAN” menu parameter selects the conventional channel that you want to reprogram. You cannot select disabled or Project 25 Trunked/SMARTNET/SmartZone channels. This does not change the channel selected for normal operation.

Press the **Select** switch to display “CHNG CHAN” and then rotate that switch to scroll through the programmed channels. When the desired channel displays, select it by pressing the **Select** switch.

12.4 System Parameters

Note *If “ENTER PSWD” displays briefly when you try to select one of the following parameters, you must enter the zone password before you can make any changes. Refer to [Section 10.4](#) for more information.*

The “SYS PARMS” menu parameter selects the conventional mode timer that you want to reprogram. Press the **Select** switch to select the “SYS PARMS” parameter and then rotate that switch to display the desired parameter. Then press the **Select** switch again to select it.

SCAN TIMER - Selects the Scan Hold timer. Rotate the **Select** switch to decrement or increment the timer in 0.5-second steps from 0-7.5 or set it to 0 seconds to disabled it. When the desired value displays, store it by pressing the **Select** switch.

TX TIMER - Selects the transmit time-out timer. Rotate the **Select** switch to decrement or increment the timer in 15-second steps from 0-225 or disable it by selecting 0 seconds. When the desired value displays, store it by pressing the **Select** switch.

PEN TIMER - Selects the penalty timer. Rotate the **Select** switch to decrement or increment the timer in 15-second steps from 0-225 or disable it by selecting 0 seconds. When the desired value displays, store it by pressing the **Select** switch.

CONV TIMER - Selects the conversation timer. Rotate the **Select** switch to decrement or increment the timer in 30-second steps from 0-450 or disable it by selecting 0 seconds. When the desired value displays, store it by pressing the **Select** switch.

12.5 Channel Parameters

Note *If “ENTER PSWD” displays briefly when you try to select one of the following parameters, you must enter the zone password before you can make any changes. Refer to [Section 10.4](#) for more information.*

The “CHAN PARMS” menu parameter selects the following conventional channel parameters that can be reprogrammed. Press **Select** switch to select the “CHAN PARMS” parameter and then rotate that switch to display the desired parameter. Then press the **Select** switch again to select it. The squelch control parameters are unique to the type of conventional channel selected (analog or Project 25).

Note If you select a mixed mode channel, you can program either the Rx Code (analog) and Rx NAC (Project 25) which follow. Also, if the Tx Type is Analog, a Tx Code is programmed, and if it is Digital (Project 25), a Tx NAC is programmed.

RX FREQ - Sets the receive channel frequency. To select the digit to change or move the cursor to the right, press the **Select** switch. Then to display the desired digit, rotate the **Select** switch. The frequency is stored after programming the last digit. If you enter an invalid frequency, a beep sounds, “INVALID” is displays briefly, and the frequency editing mode continues to be selected.

TX FREQ - Selects the transmit frequency the same as RX FREQ above.

CTCSS/DCS Squelch Control (Analog Channel)

RX CODE - Sets the receive Call Guard (CTCSS/DCS) code. The currently selected code is initially displayed. If required, rotate and press the **Select** switch to select the desired type (CTCSS analog or DCS digital). Then enter the desired code similar to programming a receive frequency as just described. If an invalid code is entered, a beep sounds, “INVALID” is briefly displayed, and the editing mode continues to be selected.

TX CODE - Selects the transmit codes the same as RX CODE above.

NAC Squelch Control (Project 25 Channel)

RX NAC - Selects the receive Network Access Code (NAC) which can be any number from 0-4095. With later models, this number displays in hexadecimal from 000-FFF. Rotate and press the **Select** switch to enter the desired code. The displayed code is stored after the last digit is programmed. If you enter an invalid code, a beep sounds, “INVALID” is displays briefly, and the NAC editing mode continues to be selected.

TX NAC - Selects the transmit NAC the same as RX NAC above.

TX POWER - Selects the desired power output level. Rotate the **Select** switch to scroll through the following choices. When the desired setting displays, store it by pressing the **Select** switch.

- **POWER HIGH** - High transmit power
- **POWER LOW** - Low transmit power

- **POWER SW** - Switchable power selectable by the High/Low power switch. This choice is not available if that switch is not programmed.

TX TIMER - Enables or disables the time-out timer on the current channel. Rotate the **Select** switch to toggle between the on and off mode, and when the desired setting displays, store it by pressing the **Select** switch.

Channel Alias - Programs the alias for the channel. Up to ten characters from A-Z and 0-9 and spaces can be entered. Press **Select** switch once to display the current alias and then press it again or rotate it to program a new alias. Rotate the **Select** switch to display the desired character and then press it to move to the next position. The number is stored after the **Select** switch is pressed with the last position selected.

Note *The next two parameters are programmed only if the radio is programmed for encryption.*

Strapping - Selects the encryption strapping mode for the channel as Clear, Secure, or Switched.

Key Select - Selects the encryption key for the channel if applicable. The key storage location of 0-63 (PID) or 1-64 (SLN) is selected. Refer to [Section 4.2](#). If no keys are programmed, “No Keys” displays.

Note *Channel spacing is selectable on a P25 conventional digital channel if it is set to “Mixed Mode”. The channel spacing selections are the same as the analog channel spacing under this situation. You cannot change the squelch because the setting is critical for proper receiver operation.*

CHAN SPACE - Selects either wide or narrow band channel spacing on analog channels only. Rotate the **Select** switch to toggle between “WIDE” and “NARROW”, and when the desired setting displays, store it by pressing the **Select** switch.

SQ ADJUST (analog only) - Changes the preset squelch setting on that channel. The default setting is “0” and values of –7 to +7 can be selected. Increasing this setting toward +7 causes the squelch to open sooner so the radio can receive weaker signals, and decreasing it toward –7 causes the opposite to occur.

TG ID (Project 25 only) - Selects the talk group for the selected channel. Rotate the **Select** switch to display the alias of each preprogrammed talk group and then press it to store the desired talk group.

Transmit Type (Project 25 mixed mode only) - If the selected channel is a mixed mode, analog and Project 25 channel, this selects the transmit type. You can select either analog or digital (Project 25). This then determines if a Tx Code or Tx NAC is programmed above.

SECTION 13

System Keys

To program certain SMARTNET/SmartZone and Project 25 Trunking parameters, PC Configure must detect the proper system key. EFJohnson provides the software system key or Enhanced System Key (MSK/SSK) functionality to *authorized users*. It is not the same as the encryption (hardware) key. You do not need it to program conventional analog and conventional Project 25 parameters.

The following sections describe the parameters that are available only with the system key. Other parameters associated with trunking, such as zones and channels, continue to be editable. If a system key has no trunking parameters enabled, a default trunking system of “One” is assigned and disabled parameters are unavailable for assignment to this system even though the radio can operate in trunking mode.

This section describes the following aspects of the system key:

- Location
- Disabled SMARTNET/SmartZone parameters
- Disabled Project 25 trunking parameters

13.1 Software System Key Location

Copy the software system key to the *Keys* folder of the directory. This folder is automatically created when you install. The default directory in which is installed is as follows; some other location may also have been selected:

Program Files\EF Johnson\PCConfigure2_x_x.

You can also load the system key from other folders using the **Radio → Load System Keys** function. A dialog box appears that allows you to select the folder. Once you designate the folder, the keys are available. Either the *Keys* folder or a previously designated folder is selected, depending on the **Tools → Preferences** programming. Refer to [Section 3.4](#). You can select the key using the pull-down box beside the System Key box.



- The key icon on the system screen (Figure 6.2) indicates that a system key is present in this folder. If a system key is not present, this yellow key icon has a red “X” over it as shown above and you cannot program any of the following parameters. In addition, be sure to select the proper system ID contained in the key in the **IDs → System** drop-down list on the **Per System** screen.

13.2 Using the Enhanced System Key

Note *If the **Hard Key Only** is enabled (**Transfer > Read Options From Radio**) PC Configure will ignore any soft system keys present. Only enhanced System Keys (USB) will be usable.*

PC Configure uses a system key to protect system parameters from being edited by unauthorized personnel. Refer to [Section 6.2](#) for the items protected in SMARTNET/SmartZone and [Section 7.2](#) for items protected in P25 Trunking Systems. A radio programmer can edit/customize the alias, group scan list and function buttons, etc. without the need for a system key, but is prohibited from editing protected fields without the system key. PC Configure supports the use of a “hard” system key file and the Enhanced Key functionality which allows a user with a Master System key to enable Slave keys, tied to specific parameters that will let a secondary user program the designated system fields.

Figure 13.1 Enhanced System Key



Each Master System Key (MSK) can be programmed for up to four system keys with full access to all PC Configure features. With the MSK, the system administrator can generate and track Slave Keys (SSK) issued. The SSK offers authorized organizations limited access to PC Configure programming. For each System Key, the Slave Key can be programmed for access to a limited range for both Unit IDs (a maximum three ranges) and talk groups (maximum five ranges).

To create a Slave System Key using a Master System Key:

Note *This procedure assumes possession of a formatted Slave System key, and a finished Master System Key to be used as a source Key. System Master keys and blank formatted Slave keys are available from EF Johnson.*

- a Insert the Master System Key and the Slave System Key to be programmed into USB ports.

Note *EFJohnson USB master keys are Part No. 250-5000-971. Your organization may also distribute them on slave keys (Part No. 250-5000-973).*

- b Under PC Configure, open the **Tools** menu and select **Edit Key Devices**.

Figure 13.2 Key Devices Screen

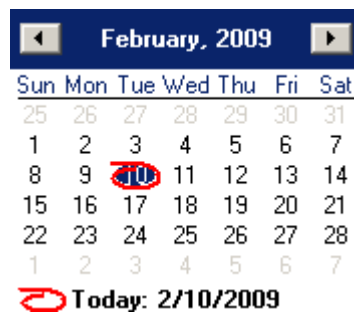
The screenshot shows the 'Key Devices' window with two main sections: 'Master Key Device' on the left and 'Slave Key Device' on the right. The 'Master Key Device' section shows a 'Serial #' of 1, a 'Type' of 'P25 Trunking', and a 'WACN ID' of 1. It also has a 'System IDs' list with values 1 through 6. The 'Slave Key Device' section shows a 'Serial #' of 0, an 'Exp. Date' of 2/10/2009, and a 'Created By' of N/A. It also has a 'Type' of 'P25 Trunking' and a 'WACN ID' of 1. Below these are two tables: 'Unit ID Ranges [0 .. 16777215]' and 'Group ID Ranges [0 .. 65534]'. Both tables have columns for 'Lower' and 'Upper' values. The 'Unit ID Ranges' table has rows 1, 2, and 3, all with 0 in both columns. The 'Group ID Ranges' table has rows 1 through 5, all with 0 in both columns. At the bottom of the window are buttons for 'Read', 'Read As Master', 'Write', and 'Read'. A 'Close' button is in the bottom right corner.

The Key Devices screen shows the System IDs that are programmed on the Master System Key. These are located on the left side of the window. The Key icon in the upper portion of both the Master Key device and the Slave Key device indicates the present of the respective key: The screen above shows the presence of a Master Key device (note the yellow key icon near the top of the left side of the screen), but not a Slave Key device (note a red “X” through the yellow key icon on the right side of the screen. The presence of the red X indicates that PC Configure does not detect a System ID within the Slave Key.) To continue, ensure that both a Master Key and Slave Key device are detected.

- c Select the System IDs to be sent to the Slave System Key by highlighting each ID, one at a time, and clicking the > button between the Master and Slave sides of the window. If you wish to include all available system IDs, this can be done by clicking the >> button.
- d Once all desired System IDs have been sent to the Slave side of the window, select the first System ID on the Slave side list, and enter at least one range of Unit IDs and one range of Group IDs.

Note *Unit and Group IDs can be entered in Hexidecimal/Decimal format.*

- e After entering Unit ID and Group ID ranges, select the next System ID on the Slave list, (if entering more than one) and repeat the process. Do this for each System ID being programmed.
- f If you wish to assign an expiration date to the Slave System Key, uncheck the **None** box in the expiration date section of the Slave side of the window. This allows you to enter an expiration date. Click the down arrow next to the **Exp. Date** field to display a calendar.



If you do *not* wish to assign an expiration date to the Slave System Key, leave the **None** box checked.

- g Assign a serial number to the Slave System Key (any number from 1 to 32767).

Figure 13.3 Key Devices Screen (with Activated Slave Key)

The screenshot shows the 'Key Devices' window with two main sections: 'Master Key Device' and 'Slave Key Device'.

Master Key Device:

- Serial #: 1
- System IDs: A list with items 1 through 6. Item 1 is selected.
- Type: P25 Trunking
- WACN ID: 1
- Buttons: >, >>, <, <<
- Read button at the bottom.

Slave Key Device:

- Serial #: 1
- Exp. Date: 2/10/2009
- Created By: Master
- System IDs: A list with items 1 through 6. Item 1 is selected.
- Type: P25 Trunking
- WACN ID: 1
- Unit ID Ranges [0 .. 16777215]:

	Lower	Upper
1	1	9
2	10	19
3	20	29
- Group ID Ranges [0 .. 65534]:

	Lower	Upper
1	1	9
2	10	19
3	20	29
4	30	39
5	40	49
- Buttons: Read As Master, Write, Read
- Close button at the bottom right.

- h Click the **Write** button on the Slave key side of the window, and the new Slave System Key is created.

13.3 ePlug Functionality

The ePlug functionality allows you to assign ESNs to specific files for downloading to the radio with the matching ESN without a system key. Please refer to [Section 2](#) in for more information about the ePlug functionality.

When setting up or reprogramming an individual radio, an EFJohnson standard trunking code plug with the addition of an EFJohnson Electronic Serial Number (ESN) may be used. ePlug features include:

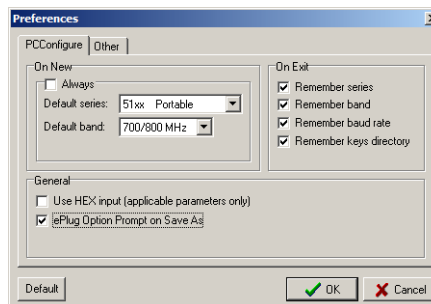
- Using PC Configure, the System Programmer has the ability to enter/edit an EFJ ESN number to the standard programming template (code plug). *For Trunking files, a valid system key must be present (either soft or Enhanced System Key) to enter or edit an EFJ ESN.*

- Using PC Configure, a radio programmer can load an ePlug into a radio with the matching ESN without the need for a system key.
- The radio programmer can edit any of the non-prohibited fields of the ePlug to customize the alias, group scan list, and function buttons etc.
- The radio programmer is prohibited from editing any of the protected fields of the ePlug unless a system key is present.

To implement in PC Configure:

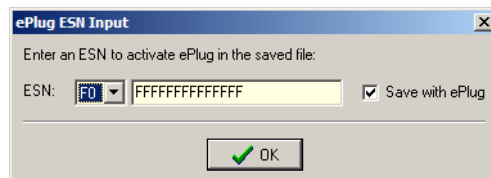
- 1 In PC Configure, select the **ePlug Option Prompt on Save As** field on the **Tools → Preferences → PCConfigure** screen.

Figure 13.4 Preferences Screen



- 2 Change the Unit ID to the radio into which this file will be going.
- 3 Save the file, performing a “Save As”. Enter the file name as you want it to be saved.
The following dialog box is displayed.

Figure 13.5 ESN Input



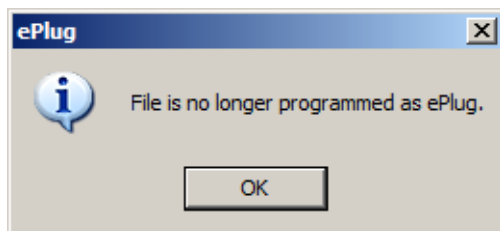
- 4 Press **OK** to save the file using the ESN of the connected radio.
A current or archived file can be saved by entering the ESN of the radio for which the file is being saved, and clicking **OK**. This can be found in PC Configure under **Transfer → Read Version Info from Radio**.
- 5 Use the **Radio → Series** menu to select the correct radio type (for example, 53xx mobile or 51xx portable). Refer to [Section 3.2](#).
- 6 Connect the radio to which this file will be transferred.
- 7 Open PC Configure and select the file that was saved.

- 8 Download to the different radio without the system key present.

*Some operating protocols and options may not be available with your radio. To display the options that have been factory-enabled for your radio, select **Transfer → Read Options From Radio**. Refer to [Section 3.3](#).*

To remove the ePlug setting:

- 1 In PC Configure, select the **Remove ePlug Setting** field on the **File** menu. The following window is displayed.



- 2 Click **OK**.

13.4 System Key Rules

When saving a file containing a trunking system, a system key is not required. These rules apply when using a cable or over-the-air programming (OTAP) beginning with PC Configure 2.10.x. The upload and download rules also apply to the Radio File Exchange (RFX) software.

Table 13.1 System Key Rules

Operation	Without System Key(s) ¹	With System Key(s) ²
Upload File	Allowed – There are no restrictions on file uploads. The ESN from the connected radio is attached to the RCF.	Allowed – There are no restrictions on file uploads. The ESN from the connected radio is attached to the RCF.
Download File	Conditionally Allowed – The ESN of the File must match the ESN of the radio.	Allowed.
Save File	Conditionally Allowed - If the RCF doesn't already have a valid ESN, PCC will require an ESN from a connected radio.	Conditionally Allowed - If the RCF doesn't already have a valid ESN, PCC will require an ESN from a connected radio or from the ePlug dialog.
Edit File	Conditionally Allowed – Some settings may not be edited.	Allowed – All settings may be edited.

¹ Without System Key(s): at least one of the programmed trunking systems does not have a valid system key.

² With System Key(s): all of the programmed trunking systems have valid systems keys.

13.5 Disabled SMARTNET / SmartZone Parameters

You cannot add or delete the following SMARTNET/SmartZone parameters without the proper system key:

- System ID - You can only select the system IDs from available keys
- Individual ID
- Control channels
- Talk groups
- Announcement groups
- Emergency groups
- Connect tone
- Splinter channel option

13.6 Disabled Project 25 Trunking Parameters

The following Project 25 Trunked parameters cannot be added or deleted without the proper system key. You can still edit conventional analog and Project 25 parameters

- WACN ID
- Home system ID
- Site ID
- RFSS ID
- Individual ID
- Control channels
- Talk groups
- Announcement groups
- Channel ID table
- Emergency Groups

SECTION 14

51xx Cloning Procedure

After an introduction to 51xx Series cloning, this section describes PC Configure's wireless cloning feature and tells how to perform cloning.

The cloning feature enables one radio to program another with identical information. You do not need PC Configure programming software to do this. This feature is available with 51xx portables only. Other requirements are as follows:

- You must enable the Clone menu parameter in the master (sending) radio. The slave (receiving) radio does not need this parameter.
- The master and slave radios must be identical models (same frequency range and options).

You can only transfer zones with conventional analog and Project 25 channels using this function. This function will not transfer any SMARTNET/SmartZone or Project 25 trunked information. Also, this function does not transfer Project 25 Unit ID, encryption keys, or the RSI ID or other OTAR information. The slave radio indicates cloned zones by an asterisk in the first character position of the zone alias. The first character is replaced by this asterisk.

14.1 Wireless Cloning

A wireless cloning feature is available that allows one radio to program another using an RF link instead of having to be connected by a cloning cable.

The wireless cloning feature uses the Project 25 data functionality of the radio. Therefore, you must program a conventional Project 25 channel in both radios. You must program the slave radio with a Project 25 Unit ID. You must also enable Data Registration on Page 2 of the **Per System** screen. If it is not enabled, “Disabled” is displayed. Radios with wireless cloning capability have a selection in the cloning menu to select either **Clone N** (Normal) or **Clone W** (Wireless). If you select “Wireless,” an additional menu appears. In this menu, you enter the Project 25 Unit ID of the slave radio. You then select the Zone/Complete mode.

14.2 Cloning Procedure

- 1 With normal (non-wireless) cloning, connect the master radio to the slave radio using Cloning Cable, Part No. 023-5100-930.
- 2 On the master radio, select the **Clone** menu parameter and press the <F2> key. If applicable, select either **Clone W** (Wireless) or **Clone N** (Normal). If you select normal cloning or if you cannot select either, proceed to Step 4.
- 3 With wireless cloning, a screen appears for entering the Project 25 Unit ID of the slave radio. Enter this ID using the keypad (or the Up/Down keys) and the <F2> key.
- 4 Select the **Zone** or **Complete** clone mode as desired. Operation in these modes is as follows:

Zone - This mode allows you to transfer only channel information for the selected zone. Information programmed on the **Global**, **Radio Wide**, and **By System** screens does not change. A list of the current conventional zones appears. Select the desired zone by highlighting it and pressing the <F2> key. A selected zone is indicated by an asterisk (*). Scroll to **OK** and press the <F2> key to begin the data transfer. This overwrites the selected zone in the slave radio. Previously, you could select multiple zones. They were appended to those in the slave radio.

Complete - This mode transfers all conventional programming information. This includes information on the **Global**, **Radio Wide**, and **By System** screens. Simply highlight **Complete** and press the <F2> key to begin the data transfer. This mode overwrites all this information currently in the slave radio. The radio does not retain any of the previous information except for the IDs as described in this section.

SECTION 15

Anti-Cloning Features

Note *The following information refers to copying parameters from one radio to another using the PC Configure software. It does not refer to cloning using two radios described in [Section 14](#).*

The 51xx and 53xx radios and PC Configure software include safeguards to prevent unauthorized cloning of radios programmed for trunked operation using the PC Configure software. The trunked operating modes are SMARTNET, SmartZone, and Project 25 Trunking.

Many trunking parameters are restricted. You can program and edit them only with the correct system key as described in [Section 13](#). These new safeguards prevent anyone from cloning another radio with restricted trunking information unless they have the correct system key.

15.1 Saving a New File/ePlug Functionality

If you save any file to disk, you must associate it with a specific radio. Therefore, when you save a new file for the first time, you must connect the radio to the computer so the ESN and other information can be read and stored with the file. However, you can open and edit a previously-saved disk file and then save it to disk again without a radio connected or without a system key.

The ePlug functionality allows you to assign ESNs to specific files for downloading to the radio with the matching ESN without a system key. Please refer to [Section 13.3](#) for more information about the ePlug functionality.

15.2 Writing a File To Radios

Correct System Key Available - If you have a system key, you can edit a file with trunking parameters and write it to any radio.

Correct System Key Not Available - If you do not have a system key, you cannot change restricted trunking parameters. Refer to [Section 13](#). However, you can still change non-restricted trunking and conventional parameters. You can only write the revised file to the radio with the matching ESN. If you try to write it to a different radio, an error message is displayed and download is halted.

File Containing Only Conventional Parameters (Project 25 or Analog) - There are no editing restrictions. You can write data files to any radio.

SECTION 16

Call Guard (CTCSS / DCS) Tables

Table 16.1 lists tone-based Call Guard tones and their associated frequencies. Table 16.2 lists digital Call Guard codes.

Table 16.1 Recommended Tone Call Guard Codes

Code	Frequency	Code	Frequency	Code	Frequency	Code	Frequency	Code	Frequency
		09	91.5	18	123.0	27	167.9	36*	233.6
01	67.0	10	94.8	19	127.3	28	173.8	37*	241.8
02	71.9	11**	97.4	20	131.8	29	179.9	38*	250.3
03	74.4	12	100.0	21	136.5	30	186.2	39**	69.3
04	77.0	13	103.5	22	141.3	31	192.8	40**	206.5
05	79.7	14	107.2	23	146.2	32	203.5	41**	229.1
06	82.5	15	110.9	24	151.4	33	210.7	42**	254.1
07	85.4	16	114.8	25	156.7	34*	218.1		
08	88.5	17	118.8	26	162.2	35*	225.7		
* These tones normally are not used because of their close proximity to the voice frequencies.									
** These tones normally are not used because they may cause interference with adjacent tones.									

Table 16.2 Recommended Digital Call Guard Codes

023	065	131	172	261	346	431	532	654	743
025	071	132	174	263	351	432	546	662	754
026	072	134	205	265	364	445	565	664	
031	073	143	223	271	365	464	606	703	
032	074	152	226	306	371	465	612	712	
043	114	155	243	311	411	466	624	723	
047	115	156	244	315	412	503	627	731	
051	116	162	245	331	413	506	631	732	
054	125	165	251	343	423	516	632	734	

SECTION 17

Project 25 Packet Data Mode

Project 25 packet data transmissions are available with 5100 portable and 5300 mobile radios. A Project 25 Packet Data option button or menu parameter (5100 only) toggles the data mode.

The Project 25 packet data mode allows a radio to act as a packet data modem for a remote application connected to the subscriber unit through an RS-232 or Serial Line Internet Protocol (SLIP) connection. The SLIP connection requires an Ethernet port which is available with the 5300 mobile radio.

17.1 Hardware Required

The 5100 Series portable radio connects to the external data equipment with the standard PC Configure programming cable through the RS-232 port (female DB9 connector).

The 5300 Series mobile radio must have a special data pigtail cable installed in it. Two types of cable are available. The RS-232 cable (Part No. 597-2002-282) has a female DB9 connector for connecting the external equipment. An Ethernet data cable (part number to be assigned) is also available.

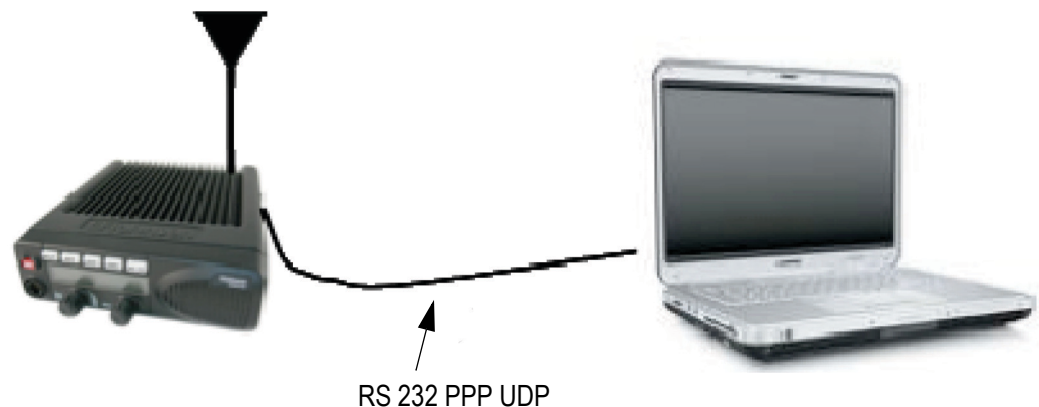
17.2 P25 Trunking Integrated Voice and Data System

This section provides information on how to establish data service on a P25 Trunking system using an EFJohnson radio and a mobile computer. The P25 Mobile Data Peripheral (MDP) Interface defines the data link between the mobile radio and a mobile computer. The P25 MDP Interface uses a RS 232 hardware interface at 9600 bits/s. The following protocols are supported across the interface:

- Point To Point Protocol (PPP)
- Internet Protocol (IP)
- Universal Datagram Protocol (UDP)

On EFJ mobile radios, the P25 MDP interface is located in the back of the unit. On the EFJ portable radios, the P25 MDP interface is the side interface. [Figure 17.1](#) illustrates the P25 MDP Interface.

Figure 17.1 P25 MDP Interface



17.2.1 Subscriber Radio Programming

The Integrated Voice and Data (IV&D) mobile radio must be configured for data operations on the Trunked IV&D system. The following screens from PC Configure application pertain to data operation on the Trunked IV&D system.

17.2.1.1 Trunking System Parameters – OTAR and Data Settings

Figure 17.2 OTAR and Data Configuration Screen

The following parameters can be programmed on the OTAR and Data Settings screen.

SNMP Traps - Enables SNMP (Simple Network Management Protocol) indications and status updates to be sent to an application running on a mobile computer. The application is able to communicate with the radio using the SNMP protocol. The status updates include radio registration status and data service availability status. This value defaults to “Off”. Currently not implemented.

ICMP Echo - Enables the radio to send back an ICMP response once an ICMP request has been received. This value defaults to “Off”.

CAI IP Address - Assigns a fixed IPv4 Fixed IP Address to the radio for the Common Air interface.

Connection Type - (5100 only) Sets the type of connection between the MDP and portable radio. For conventional IP Based data, set this to PPP.

Data Registration Enabled - Select “On” if OTAR is used. The radio then registers with the data system on a channel change (Project 25 channels only).

Data Registration Type - Dynamic allows the radio to automatically obtain its IP address from the KMF data base, while Static requires the KMF operator to manually enter the radio IP address in the KMF data base. The default setting should be “Dynamic”.

CAI Data Max Tx Attempts - Selects the maximum number of times the radio attempts to send a CAI data packet. Attempts to send the data packet continue until the radio receives an acknowledgment confirming the successful receipt of the packet, or until the radio exceeds the selected amount of transmit attempts.

Response Timer - Selects the period of time the radio waits for an acknowledgment that a CAI transmission is successful before it tries the transmission again.

SNDCP Activation Wait Timer - Controls the time that a radio waits for the KMF to respond to a SNDCP context activation request.

SNDCP Dwell Timer - Specifies amount of time data can stay in SNDCP output queue. Currently not implemented.

Rx Voice Interrupts Data - When checked, a voice call can interrupt data.

Subscriber IP Address - The IP Address assigned to the subscriber for a PPP connection.

Mobile Computer IP Address - IP address assigned to the mobile computer for a PPP connection.

Tx Limited Patience - Selects the amount of time radio attempts to transmit a common air interface packet. Once time expires, radio ceases transmission. Times are 1 to 255 seconds, infinite in increments of 1. The default is infinite.

Min Response Timer - Selects the minimum amount of time that the radio waits for an acknowledgement of a successful CAI to be sent across the channel. Times are 50 to 2000 milliseconds, in increments of 50 msec. The default is 700 msec.

Frame Sync Seek Period - Selects the amount of time the radio listens for a frame sync sequence before a packet is transmitted. Times are 0 to 5000 milliseconds, in increments of 50 msec. The default is 750 msec.

Tx Short Random Range - Selects the maximum amount of time the radio waits to transmit once the first qualified FS is received indicating the channel is clear. Times are 50 to 500 milliseconds, in increments of 50. The default is 50 msec.

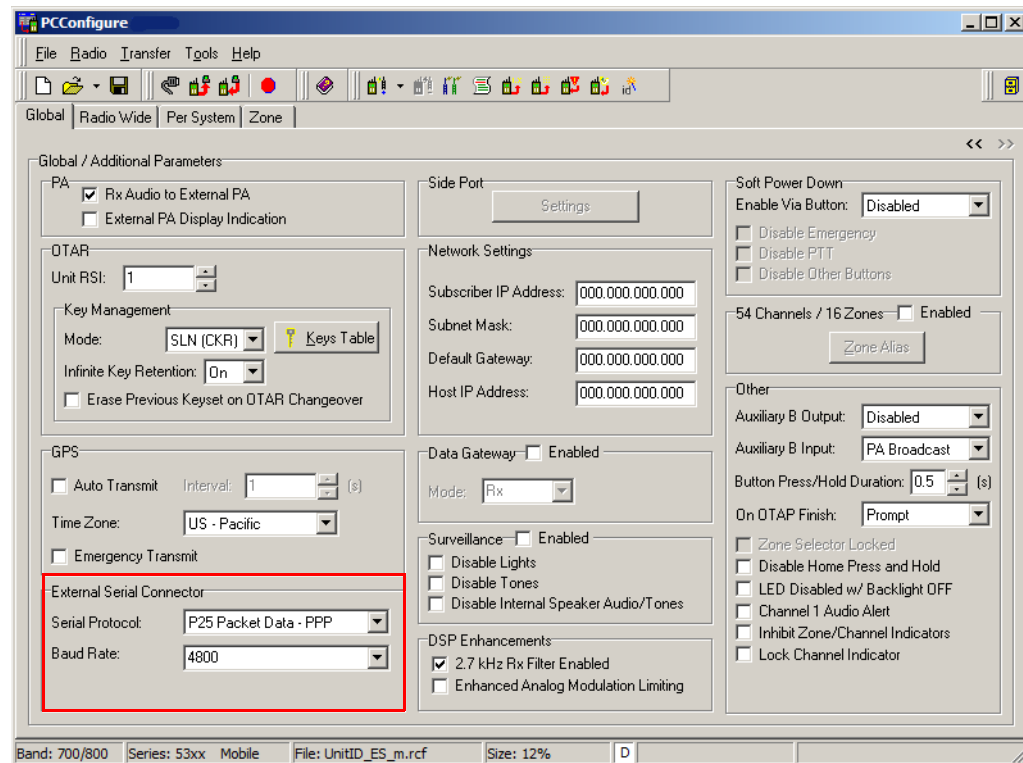
Tx Long Random Range - Selects the upper range of the random range. When the radio detects a busy, the radio uses a random time within this range (Back off delay) to determine when to retransmit the packet. Times are 50 to 5000 milliseconds, in increments of 50 msec. The default is 2000 msec.

Tx Response Random Range - Selects amount of time radio waits before rechecking a channel's status once a busy channel status symbol has been received. Only applies to ACKs. Times are 50 to 1000 milliseconds, in increments of 50. The default is 1000 msec.

17.2.1.2 Global Page – 5300 / 5300 ES Only

The 5300/5300ES have an additional parameter to program. The protocol used by the P25 MDP Interface in the back of the radio must be set. For P25 Trunking Data, set “P25 Packet Data – PPP” as the Serial Protocol on the second **Global** page.

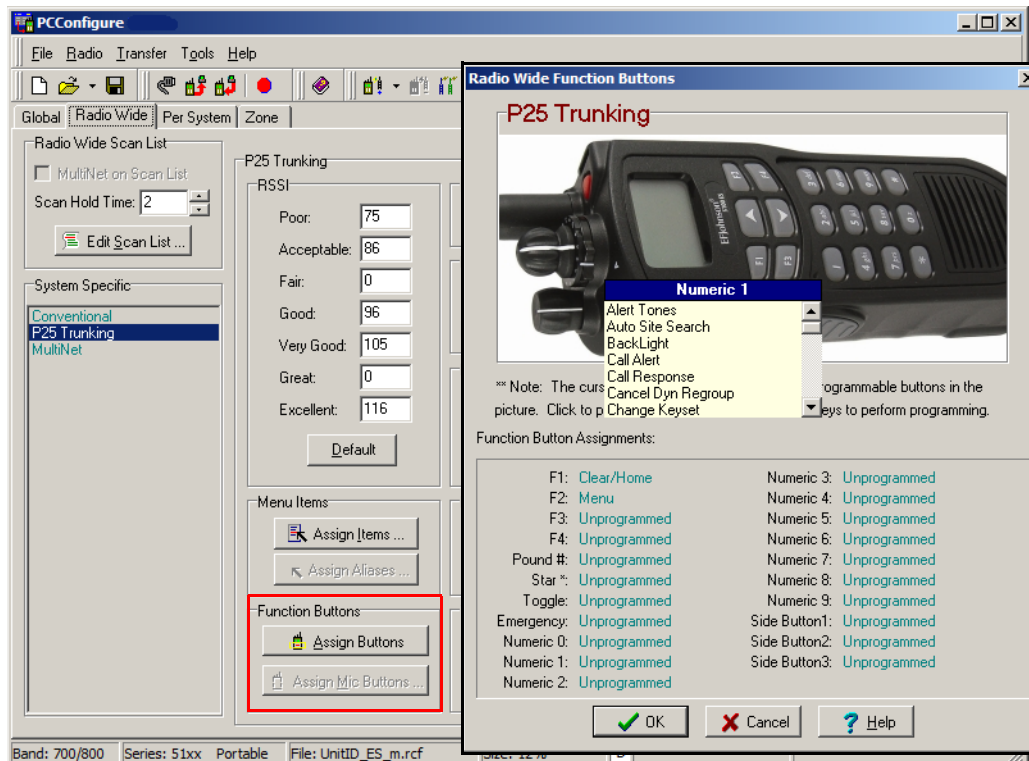
Figure 17.3 Global Configuration Screen



17.2.1.3 P25 Trunking Radio Wide – 5100 / 5100ES only

Since the 5100x/5100ES series uses the side port for the P25 MDP interface, the user must program a “Data Modes” button to enable PPP. This is found on the PC Configure P25 Trunking **Radio Wide** page.

Figure 17.4 P25 Trunking Radio Wide Screen



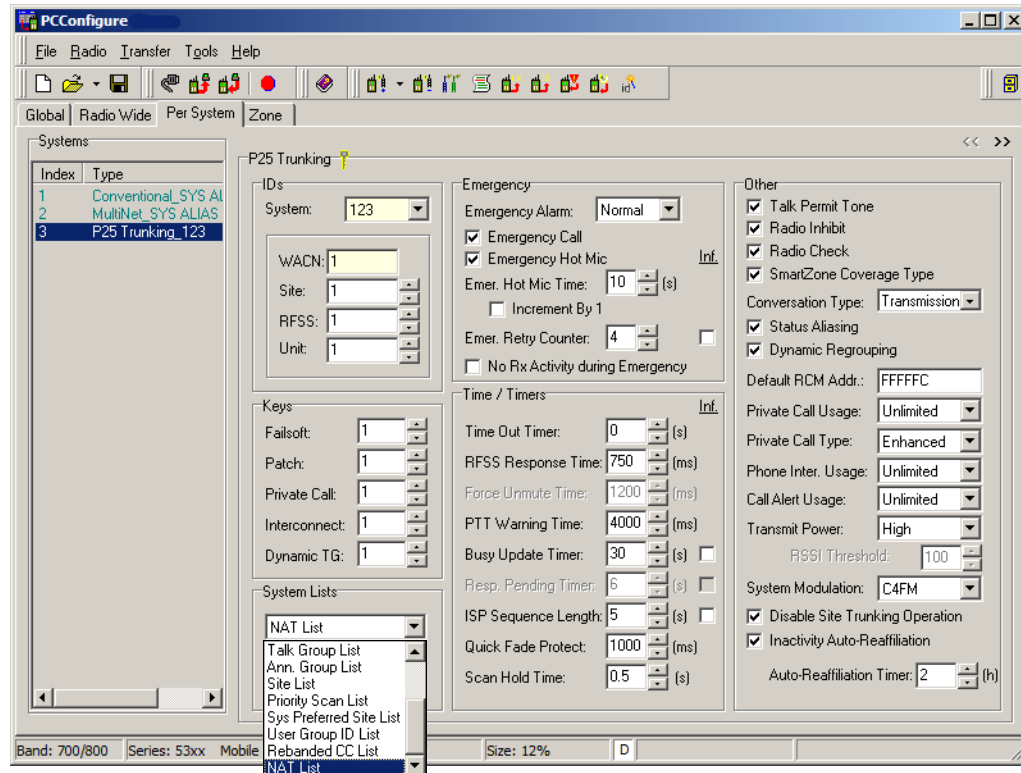
Once a button is programmed, the user only needs to press the button to enable the P25 MDP interface. The radio front panel display should display “Data On” for about one second. This enables the P25 MDP interface. The user will no longer be able to upload or download file from PC Configure. To disable the P25 MDP interface, the user should press the “Data Modes” button. The radio front panel display should display “Data Off”.

17.2.1.4 Trunking System List – NAT Table

It may be necessary for applications running on the mobile computer to use a specific source IP address and/or port number. If it is not feasible to change the source IP address and/or port number within the application itself, the NAT List can be used to allocate an IP address and port number to the mobile computer so that it can route IP datagrams to and from the radio and be agnostic to the IP address allocated to the radio in the rest of the system.

- 1 Select the NAT List from the System Lists section of the P25 Trunking **Per System** screen.

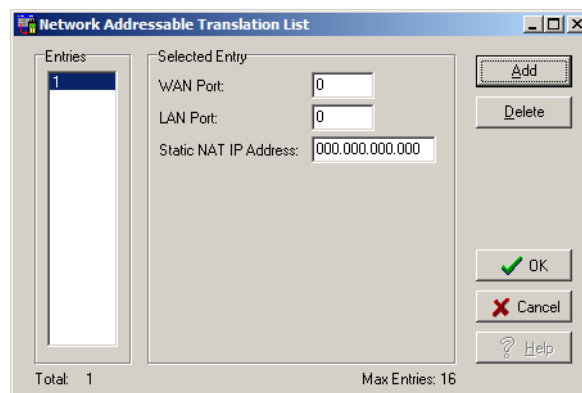
Figure 17.5 P25 Per System screen



The Network Addressable Translation List is displayed.

- 2 Select “Add” to add a entry to the list.

Figure 17.6 Network Addressable Translation List



- 3 Enter values into the fields as defined below.

WAN Port - This port is used to associate the application specific datagrams with data transmitted or received from the trunked system.

LAN Port - Enter the specific port address used by the application.

Static NAT IP Address - Enter the specific IP address that needs to be translated.

SECTION 18

FCC Channel Tables

This section provides tables listing the U. S. Federal Communications Commission's (FCC's) channel numbers, the EFJohnson Program channel numbers and the receive and transmit frequencies for both 800MHz and 900MHz channels. Table 18.1 lists the FCC's 800 MHz channels and each channel's associated receive frequency (RX Freq) and transmit frequency (TX Freq). Table 18.2 lists the FCC's 900 MHz channels and each channel's associated receive frequency (RX Freq) and transmit frequency (TX Freq). 900 MHz channel information is only supported in Multi-Net[®] Ascend subscriber radios optioned and configured for the 900 MHz band.

It is important when programming Ascend subscriber radios, to ensure that the EFJohnson program number is used, rather than the corresponding FCC channel number, as they are not identical for all frequencies.

When programming 800 MHz Multi-Net channels, it is critical that the program numbers used in the subscriber radios matches the program numbers used in the system infrastructure. If the Multi-Net infrastructure has been programmed with the pre-rebanding FCC channel numbers, use the information under "NPSPAC Banding Scheme "High" in Table 18.1 to obtain program numbers. If the Multi-Net infrastructure has been programmed with the post-rebanding FCC channel numbers, use the information under "NPSPAC Banding Scheme "Low" in Table 18.1 to obtain program numbers. For all trunking protocols, the rebanding scheme selected must be consistent across all trunking repeaters connected as a trunking site.

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
851.0125	806.0125	1	1	1	1
851.0250	806.0250			2	
851.0375	806.0375	2	2	3	2
851.0500	806.0500			4	3
851.0625	806.0625	3	3	5	4
851.0750	806.0750			6	5
851.0875	806.0875	4	4	7	6
851.1000	806.1000			8	7
851.1125	806.1125	5	5	9	8
851.1250	806.1250			10	9
851.1375	806.1375	6	6	11	10
851.1500	806.1500			12	11
851.1625	806.1625	7	7	13	12
851.1750	806.1750			14	13
851.1875	806.1875	8	8	15	14
851.2000	806.2000			16	15
851.2125	806.2125	9	9	17	16
851.2250	806.2250			18	17
851.2375	806.2375	10	10	19	18
851.2500	806.2500			20	19
851.2625	806.2625	11	11	21	20
851.2750	806.2750			22	21
851.2875	806.2875	12	12	23	22
851.3000	806.3000			24	23
851.3125	806.3125	13	13	25	24
851.3250	806.3250			26	25
851.3375	806.3375	14	14	27	26
851.3500	806.3500			28	27
851.3625	806.3625	15	15	29	28
851.3750	806.3750			30	29
851.3875	806.3875	16	16	31	30
851.4000	806.4000			32	31
851.4125	806.4125	17	17	33	32
851.4250	806.4250			34	33
851.4375	806.4375	18	18	35	34
851.4500	806.4500			36	35
851.4625	806.4625	19	19	37	36
851.4750	806.4750			38	37

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
851.4875	806.4875	20	20	39	38
851.5000	806.5000			40	
851.5125	806.5125	21	21	41	39
851.5250	806.5250			42	
851.5375	806.5375	22	22	43	40
851.5500	806.5500			44	41
851.5625	806.5625	23	23	45	42
851.5750	806.5750			46	43
851.5875	806.5875	24	24	47	44
851.6000	806.6000			48	45
851.6125	806.6125	25	25	49	46
851.6250	806.6250			50	47
851.6375	806.6375	26	26	51	48
851.6500	806.6500			52	49
851.6625	806.6625	27	27	53	50
851.6750	806.6750			54	51
851.6875	806.6875	28	28	55	52
851.7000	806.7000			56	53
851.7125	806.7125	29	29	57	54
851.7250	806.7250			58	55
851.7375	806.7375	30	30	59	56
851.7500	806.7500			60	57
851.7625	806.7625	31	31	61	58
851.7750	806.7750			62	59
851.7875	806.7875	32	32	63	60
851.8000	806.8000			64	61
851.8125	806.8125	33	33	65	62
851.8250	806.8250			66	63
851.8375	806.8375	34	34	67	64
851.8500	806.8500			68	65
851.8625	806.8625	35	35	69	66
851.8750	806.8750			70	67
851.8875	806.8875	36	36	71	68
851.9000	806.9000			72	69
851.9125	806.9125	37	37	73	70
851.9250	806.9250			74	71
851.9375	806.9375	38	38	75	72
851.9500	806.9500			76	73

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
851.9625	806.9625	39	39	77	74
851.9750	806.9750			78	75
851.9875	806.9875	40	40	79	76
852.0000	807.0000			80	
852.0125	807.0125	41	41	81	77
852.0250	807.0250			82	
852.0375	807.0375	42	42	83	78
852.0500	807.0500			84	79
852.0625	807.0625	43	43	85	80
852.0750	807.0750			86	81
852.0875	807.0875	44	44	87	82
852.1000	807.1000			88	83
852.1125	807.1125	45	45	89	84
852.1250	807.1250			90	85
852.1375	807.1375	46	46	91	86
852.1500	807.1500			92	87
852.1625	807.1625	47	47	93	88
852.1750	807.1750			94	89
852.1875	807.1875	48	48	95	90
852.2000	807.2000			96	91
852.2125	807.2125	49	49	97	92
852.2250	807.2250			98	93
852.2375	807.2375	50	50	99	94
852.2500	807.2500			100	95
852.2625	807.2625	51	51	101	96
852.2750	807.2750			102	97
852.2875	807.2875	52	52	103	98
852.3000	807.3000			104	99
852.3125	807.3125	53	53	105	100
852.3250	807.3250			106	101
852.3375	807.3375	54	54	107	102
852.3500	807.3500			108	103
852.3625	807.3625	55	55	109	104
852.3750	807.3750			110	105
852.3875	807.3875	56	56	111	106
852.4000	807.4000			112	107
852.4125	807.4125	57	57	113	108
852.4250	807.4250			114	109

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
852.4375	807.4375	58	58	115	110
852.4500	807.4500			116	111
852.4625	807.4625	59	59	117	112
852.4750	807.4750			118	113
852.4875	807.4875	60	60	119	114
852.5000	807.5000			120	
852.5125	807.5125	61	61	121	115
852.5250	807.5250			122	
852.5375	807.5375	62	62	123	116
852.5500	807.5500			124	117
852.5625	807.5625	63	63	125	118
852.5750	807.5750			126	119
852.5875	807.5875	64	64	127	120
852.6000	807.6000			128	121
852.6125	807.6125	65	65	129	122
852.6250	807.6250			130	123
852.6375	807.6375	66	66	131	124
852.6500	807.6500			132	125
852.6625	807.6625	67	67	133	126
852.6750	807.6750			134	127
852.6875	807.6875	68	68	135	128
852.7000	807.7000			136	129
852.7125	807.7125	69	69	137	130
852.7250	807.7250			138	131
852.7375	807.7375	70	70	139	132
852.7500	807.7500			140	133
852.7625	807.7625	71	71	141	134
852.7750	807.7750			142	135
852.7875	807.7875	72	72	143	136
852.8000	807.8000			144	137
852.8125	807.8125	73	73	145	138
852.8250	807.8250			146	139
852.8375	807.8375	74	74	147	140
852.8500	807.8500			148	141
852.8625	807.8625	75	75	149	142
852.8750	807.8750			150	143
852.8875	807.8875	76	76	151	144
852.9000	807.9000			152	145

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
852.9125	807.9125	77	77	153	146
852.9250	807.9250			154	147
852.9375	807.9375	78	78	155	148
852.9500	807.9500			156	149
852.9625	807.9625	79	79	157	150
852.9750	807.9750			158	151
852.9875	807.9875	80	80	159	152
853.0000	808.0000			160	
853.0125	808.0125	81	81	161	153
853.0250	808.0250			162	
853.0375	808.0375	82	82	163	154
853.0500	808.0500			164	155
853.0625	808.0625	83	83	165	156
853.0750	808.0750			166	157
853.0875	808.0875	84	84	167	158
853.1000	808.1000			168	159
853.1125	808.1125	85	85	169	160
853.1250	808.1250			170	161
853.1375	808.1375	86	86	171	162
853.1500	808.1500			172	163
853.1625	808.1625	87	87	173	164
853.1750	808.1750			174	165
853.1875	808.1875	88	88	175	166
853.2000	808.2000			176	167
853.2125	808.2125	89	89	177	168
853.2250	808.2250			178	169
853.2375	808.2375	90	90	179	170
853.2500	808.2500			180	171
853.2625	808.2625	91	91	181	172
853.2750	808.2750			182	173
853.2875	808.2875	92	92	183	174
853.3000	808.3000			184	175
853.3125	808.3125	93	93	185	176
853.3250	808.3250			186	177
853.3375	808.3375	94	94	187	178
853.3500	808.3500			188	179
853.3625	808.3625	95	95	189	180
853.3750	808.3750			190	181

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
853.3875	808.3875	96	96	191	182
853.4000	808.4000			192	183
853.4125	808.4125	97	97	193	184
853.4250	808.4250			194	185
853.4375	808.4375	98	98	195	186
853.4500	808.4500			196	187
853.4625	808.4625	99	99	197	188
853.4750	808.4750			198	189
853.4875	808.4875	100	100	199	190
853.5000	808.5000			200	191
853.5125	808.5125	101	101	201	192
853.5250	808.5250			202	193
853.5375	808.5375	102	102	203	194
853.5500	808.5500			204	195
853.5625	808.5625	103	103	205	196
853.5750	808.5750			206	197
853.5875	808.5875	104	104	207	198
853.6000	808.6000			208	199
853.6125	808.6125	105	105	209	200
853.6250	808.6250			210	201
853.6375	808.6375	106	106	211	202
853.6500	808.6500			212	203
853.6625	808.6625	107	107	213	204
853.6750	808.6750			214	205
853.6875	808.6875	108	108	215	206
853.7000	808.7000			216	207
853.7125	808.7125	109	109	217	208
853.7250	808.7250			218	209
853.7375	808.7375	110	110	219	210
853.7500	808.7500			220	211
853.7625	808.7625	111	111	221	212
853.7750	808.7750			222	213
853.7875	808.7875	112	112	223	214
853.8000	808.8000			224	215
853.8125	808.8125	113	113	225	216
853.8250	808.8250			226	217
853.8375	808.8375	114	114	227	218
853.8500	808.8500			228	219

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
853.8625	808.8625	115	115	229	220
853.8750	808.8750			230	221
853.8875	808.8875	116	116	231	222
853.9000	808.9000			232	223
853.9125	808.9125	117	117	233	224
853.9250	808.9250			234	225
853.9375	808.9375	118	118	235	226
853.9500	808.9500			236	227
853.9625	808.9625	119	119	237	228
853.9750	808.9750			238	229
853.9875	808.9875	120	120	239	230
854.0125	809.0125	121	121	240	231
854.0375	809.0375	122	122	241	232
854.0625	809.0625	123	123	242	233
854.0875	809.0875	124	124	243	234
854.1125	809.1125	125	125	244	235
854.1375	809.1375	126	126	245	236
854.1625	809.1625	127	127	246	237
854.1875	809.1875	128	128	247	238
854.2125	809.2125	129	129	248	239
854.2375	809.2375	130	130	249	240
854.2625	809.2625	131	131	250	241
854.2875	809.2875	132	132	251	242
854.3125	809.3125	133	133	252	243
854.3375	809.3375	134	134	253	244
854.3625	809.3625	135	135	254	245
854.3875	809.3875	136	136	255	246
854.4125	809.4125	137	137	256	247
854.4375	809.4375	138	138	257	248
854.4625	809.4625	139	139	258	249
854.4875	809.4875	140	140	259	250
854.5125	809.5125	141	141	260	251
854.5375	809.5375	142	142	261	252
854.5625	809.5625	143	143	262	253
854.5875	809.5875	144	144	263	254
854.6125	809.6125	145	145	264	255
854.6375	809.6375	146	146	265	256
854.6625	809.6625	147	147	266	257

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
854.6875	809.6875	148	148	267	258
854.7125	809.7125	149	149	268	259
854.7375	809.7375	150	150	269	260
854.7625	809.7625	151	151	270	261
854.7875	809.7875	152	152	271	262
854.8125	809.8125	153	153	272	263
854.8375	809.8375	154	154	273	264
854.8625	809.8625	155	155	274	265
854.8875	809.8875	156	156	275	266
854.9125	809.9125	157	157	276	267
854.9375	809.9375	158	158	277	268
854.9625	809.9625	159	159	278	269
854.9875	809.9875	160	160	279	270
855.0125	810.0125	161	161	280	271
855.0375	810.0375	162	162	281	272
855.0625	810.0625	163	163	282	273
855.0875	810.0875	164	164	283	274
855.1125	810.1125	165	165	284	275
855.1375	810.1375	166	166	285	276
855.1625	810.1625	167	167	286	277
855.1875	810.1875	168	168	287	278
855.2125	810.2125	169	169	288	279
855.2375	810.2375	170	170	289	280
855.2625	810.2625	171	171	290	281
855.2875	810.2875	172	172	291	282
855.3125	810.3125	173	173	292	283
855.3375	810.3375	174	174	293	284
855.3625	810.3625	175	175	294	285
855.3875	810.3875	176	176	295	286
855.4125	810.4125	177	177	296	287
855.4375	810.4375	178	178	297	288
855.4625	810.4625	179	179	298	289
855.4875	810.4875	180	180	299	290
855.5125	810.5125	181	181	300	291
855.5375	810.5375	182	182	301	292
855.5625	810.5625	183	183	302	293
855.5875	810.5875	184	184	303	294
855.6125	810.6125	185	185	304	295

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
855.6375	810.6375	186	186	305	296
855.6625	810.6625	187	187	306	297
855.6875	810.6875	188	188	307	298
855.7125	810.7125	189	189	308	299
855.7375	810.7375	190	190	309	300
855.7625	810.7625	191	191	310	301
855.7875	810.7875	192	192	311	302
855.8125	810.8125	193	193	312	303
855.8375	810.8375	194	194	313	304
855.8625	810.8625	195	195	314	305
855.8875	810.8875	196	196	315	306
855.9125	810.9125	197	197	316	307
855.9375	810.9375	198	198	317	308
855.9625	810.9625	199	199	318	309
855.9875	810.9875	200	200	319	310
856.0125	811.0125	201	201	320	311
856.0375	811.0375	202	202	321	312
856.0625	811.0625	203	203	322	313
856.0875	811.0875	204	204	323	314
856.1125	811.1125	205	205	324	315
856.1375	811.1375	206	206	325	316
856.1625	811.1625	207	207	326	317
856.1875	811.1875	208	208	327	318
856.2125	811.2125	209	209	328	319
856.2375	811.2375	210	210	329	320
856.2625	811.2625	211	211	330	321
856.2875	811.2875	212	212	331	322
856.3125	811.3125	213	213	332	323
856.3375	811.3375	214	214	333	324
856.3625	811.3625	215	215	334	325
856.3875	811.3875	216	216	335	326
856.4125	811.4125	217	217	336	327
856.4375	811.4375	218	218	337	328
856.4625	811.4625	219	219	338	329
856.4875	811.4875	220	220	339	330
856.5125	811.5125	221	221	340	331
856.5375	811.5375	222	222	341	332
856.5625	811.5625	223	223	342	333

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
856.5875	811.5875	224	224	343	334
856.6125	811.6125	225	225	344	335
856.6375	811.6375	226	226	345	336
856.6625	811.6625	227	227	346	337
856.6875	811.6875	228	228	347	338
856.7125	811.7125	229	229	348	339
856.7375	811.7375	230	230	349	340
856.7625	811.7625	231	231	350	341
856.7875	811.7875	232	232	351	342
856.8125	811.8125	233	233	352	343
856.8375	811.8375	234	234	353	344
856.8625	811.8625	235	235	354	345
856.8875	811.8875	236	236	355	346
856.9125	811.9125	237	237	356	347
856.9375	811.9375	238	238	357	348
856.9625	811.9625	239	239	358	349
856.9875	811.9875	240	240	359	350
857.0125	812.0125	241	241	360	351
857.0375	812.0375	242	242	361	352
857.0625	812.0625	243	243	362	353
857.0875	812.0875	244	244	363	354
857.1125	812.1125	245	245	364	355
857.1375	812.1375	246	246	365	356
857.1625	812.1625	247	247	366	357
857.1875	812.1875	248	248	367	358
857.2125	812.2125	249	249	368	359
857.2375	812.2375	250	250	369	360
857.2625	812.2625	251	251	370	361
857.2875	812.2875	252	252	371	362
857.3125	812.3125	253	253	372	363
857.3375	812.3375	254	254	373	364
857.3625	812.3625	255	255	374	365
857.3875	812.3875	256	256	375	366
857.4125	812.4125	257	257	376	367
857.4375	812.4375	258	258	377	368
857.4625	812.4625	259	259	378	369
857.4875	812.4875	260	260	379	370
857.5125	812.5125	261	261	380	371

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
857.5375	812.5375	262	262	381	372
857.5625	812.5625	263	263	382	373
857.5875	812.5875	264	264	383	374
857.6125	812.6125	265	265	384	375
857.6375	812.6375	266	266	385	376
857.6625	812.6625	267	267	386	377
857.6875	812.6875	268	268	387	378
857.7125	812.7125	269	269	388	379
857.7375	812.7375	270	270	389	380
857.7625	812.7625	271	271	390	381
857.7875	812.7875	272	272	391	382
857.8125	812.8125	273	273	392	383
857.8375	812.8375	274	274	393	384
857.8625	812.8625	275	275	394	385
857.8875	812.8875	276	276	395	386
857.9125	812.9125	277	277	396	387
857.9375	812.9375	278	278	397	388
857.9625	812.9625	279	279	398	389
857.9875	812.9875	280	280	399	390
858.0125	813.0125	281	281	400	391
858.0375	813.0375	282	282	401	392
858.0625	813.0625	283	283	402	393
858.0875	813.0875	284	284	403	394
858.1125	813.1125	285	285	404	395
858.1375	813.1375	286	286	405	396
858.1625	813.1625	287	287	406	397
858.1875	813.1875	288	288	407	398
858.2125	813.2125	289	289	408	399
858.2375	813.2375	290	290	409	400
858.2625	813.2625	291	291	410	401
858.2875	813.2875	292	292	411	402
858.3125	813.3125	293	293	412	403
858.3375	813.3375	294	294	413	404
858.3625	813.3625	295	295	414	405
858.3875	813.3875	296	296	415	406
858.4125	813.4125	297	297	416	407
858.4375	813.4375	298	298	417	408
858.4625	813.4625	299	299	418	409

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
858.4875	813.4875	300	300	419	410
858.5125	813.5125	301	301	420	411
858.5375	813.5375	302	302	421	412
858.5625	813.5625	303	303	422	413
858.5875	813.5875	304	304	423	414
858.6125	813.6125	305	305	424	415
858.6375	813.6375	306	306	425	416
858.6625	813.6625	307	307	426	417
858.6875	813.6875	308	308	427	418
858.7125	813.7125	309	309	428	419
858.7375	813.7375	310	310	429	420
858.7625	813.7625	311	311	430	421
858.7875	813.7875	312	312	431	422
858.8125	813.8125	313	313	432	423
858.8375	813.8375	314	314	433	424
858.8625	813.8625	315	315	434	425
858.8875	813.8875	316	316	435	426
858.9125	813.9125	317	317	436	427
858.9375	813.9375	318	318	437	428
858.9625	813.9625	319	319	438	429
858.9875	813.9875	320	320	439	430
859.0125	814.0125	321	321	440	431
859.0375	814.0375	322	322	441	432
859.0625	814.0625	323	323	442	433
859.0875	814.0875	324	324	443	434
859.1125	814.1125	325	325	444	435
859.1375	814.1375	326	326	445	436
859.1625	814.1625	327	327	446	437
859.1875	814.1875	328	328	447	438
859.2125	814.2125	329	329	448	439
859.2375	814.2375	330	330	449	440
859.2625	814.2625	331	331	450	441
859.2875	814.2875	332	332	451	442
859.3125	814.3125	333	333	452	443
859.3375	814.3375	334	334	453	444
859.3625	814.3625	335	335	454	445
859.3875	814.3875	336	336	455	446
859.4125	814.4125	337	337	456	447

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
859.4375	814.4375	338	338	457	448
859.4625	814.4625	339	339	458	449
859.4875	814.4875	340	340	459	450
859.5125	814.5125	341	341	460	451
859.5375	814.5375	342	342	461	452
859.5625	814.5625	343	343	462	453
859.5875	814.5875	344	344	463	454
859.6125	814.6125	345	345	464	455
859.6375	814.6375	346	346	465	456
859.6625	814.6625	347	347	466	457
859.6875	814.6875	348	348	467	458
859.7125	814.7125	349	349	468	459
859.7375	814.7375	350	350	469	460
859.7625	814.7625	351	351	470	461
859.7875	814.7875	352	352	471	462
859.8125	814.8125	353	353	472	463
859.8375	814.8375	354	354	473	464
859.8625	814.8625	355	355	474	465
859.8875	814.8875	356	356	475	466
859.9125	814.9125	357	357	476	467
859.9375	814.9375	358	358	477	468
859.9625	814.9625	359	359	478	469
859.9875	814.9875	360	360	479	470
860.0125	815.0125	361	361	480	471
860.0375	815.0375	362	362	481	472
860.0625	815.0625	363	363	482	473
860.0875	815.0875	364	364	483	474
860.1125	815.1125	365	365	484	475
860.1375	815.1375	366	366	485	476
860.1625	815.1625	367	367	486	477
860.1875	815.1875	368	368	487	478
860.2125	815.2125	369	369	488	479
860.2375	815.2375	370	370	489	480
860.2625	815.2625	371	371	490	481
860.2875	815.2875	372	372	491	482
860.3125	815.3125	373	373	492	483
860.3375	815.3375	374	374	493	484
860.3625	815.3625	375	375	494	485

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
860.3875	815.3875	376	376	495	486
860.4125	815.4125	377	377	496	487
860.4375	815.4375	378	378	497	488
860.4625	815.4625	379	379	498	489
860.4875	815.4875	380	380	499	490
860.5125	815.5125	381	381	500	491
860.5375	815.5375	382	382	501	492
860.5625	815.5625	383	383	502	493
860.5875	815.5875	384	384	503	494
860.6125	815.6125	385	385	504	495
860.6375	815.6375	386	386	505	496
860.6625	815.6625	387	387	506	497
860.6875	815.6875	388	388	507	498
860.7125	815.7125	389	389	508	499
860.7375	815.7375	390	390	509	500
860.7625	815.7625	391	391	510	501
860.7875	815.7875	392	392	511	502
860.8125	815.8125	393	393	512	503
860.8375	815.8375	394	394	513	504
860.8625	815.8625	395	395	514	505
860.8875	815.8875	396	396	515	506
860.9125	815.9125	397	397	516	507
860.9375	815.9375	398	398	517	508
860.9625	815.9625	399	399	518	509
860.9875	815.9875	400	400	519	510
861.0125	816.0125	401	401	520	511
861.0375	816.0375	402	402	521	512
861.0625	816.0625	403	403	522	513
861.0875	816.0875	404	404	523	514
861.1125	816.1125	405	405	524	515
861.1375	816.1375	406	406	525	516
861.1625	816.1625	407	407	526	517
861.1875	816.1875	408	408	527	518
861.2125	816.2125	409	409	528	519
861.2375	816.2375	410	410	529	520
861.2625	816.2625	411	411	530	521
861.2875	816.2875	412	412	531	522
861.3125	816.3125	413	413	532	523

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
861.3375	816.3375	414	414	533	524
861.3625	816.3625	415	415	534	525
861.3875	816.3875	416	416	535	526
861.4125	816.4125	417	417	536	527
861.4375	816.4375	418	418	537	528
861.4625	816.4625	419	419	538	529
861.4875	816.4875	420	420	539	530
861.5125	816.5125	421	421	540	531
861.5375	816.5375	422	422	541	532
861.5625	816.5625	423	423	542	533
861.5875	816.5875	424	424	543	534
861.6125	816.6125	425	425	544	535
861.6375	816.6375	426	426	545	536
861.6625	816.6625	427	427	546	537
861.6875	816.6875	428	428	547	538
861.7125	816.7125	429	429	548	539
861.7375	816.7375	430	430	549	540
861.7625	816.7625	431	431	550	541
861.7875	816.7875	432	432	551	542
861.8125	816.8125	433	433	552	543
861.8375	816.8375	434	434	553	544
861.8625	816.8625	435	435	554	545
861.8875	816.8875	436	436	555	546
861.9125	816.9125	437	437	556	547
861.9375	816.9375	438	438	557	548
861.9625	816.9625	439	439	558	549
861.9875	816.9875	440	440	559	550
862.0125	817.0125	441	441	560	
862.0375	817.0375	442	442	561	
862.0625	817.0625	443	443	562	
862.0875	817.0875	444	444	563	
862.1125	817.1125	445	445	564	
862.1375	817.1375	446	446	565	
862.1625	817.1625	447	447	566	
862.1875	817.1875	448	448	567	
862.2125	817.2125	449	449	568	
862.2375	817.2375	450	450	569	
862.2625	817.2625	451	451	570	

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
862.2875	817.2875	452	452	571	
862.3125	817.3125	453	453	572	
862.3375	817.3375	454	454	573	
862.3625	817.3625	455	455	574	
862.3875	817.3875	456	456	575	
862.4125	817.4125	457	457	576	
862.4375	817.4375	458	458	577	
862.4625	817.4625	459	459	578	
862.4875	817.4875	460	460	579	
862.5125	817.5125	461	461	580	
862.5375	817.5375	462	462	581	
862.5625	817.5625	463	463	582	
862.5875	817.5875	464	464	583	
862.6125	817.6125	465	465	584	
862.6375	817.6375	466	466	585	
862.6625	817.6625	467	467	586	
862.6875	817.6875	468	468	587	
862.7125	817.7125	469	469	588	
862.7375	817.7375	470	470	589	
862.7625	817.7625	471	471	590	
862.7875	817.7875	472	472	591	
862.8125	817.8125	473	473	592	
862.8375	817.8375	474	474	593	
862.8625	817.8625	475	475	594	
862.8875	817.8875	476	476	595	
862.9125	817.9125	477	477	596	
862.9375	817.9375	478	478	597	
862.9625	817.9625	479	479	598	
862.9875	817.9875	480	480	599	
863.0125	818.0125	481	481	600	
863.0375	818.0375	482	482	601	
863.0625	818.0625	483	483	602	
863.0875	818.0875	484	484	603	
863.1125	818.1125	485	485	604	
863.1375	818.1375	486	486	605	
863.1625	818.1625	487	487	606	
863.1875	818.1875	488	488	607	
863.2125	818.2125	489	489	608	

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
863.2375	818.2375	490	490	609	
863.2625	818.2625	491	491	610	
863.2875	818.2875	492	492	611	
863.3125	818.3125	493	493	612	
863.3375	818.3375	494	494	613	
863.3625	818.3625	495	495	614	
863.3875	818.3875	496	496	615	
863.4125	818.4125	497	497	616	
863.4375	818.4375	498	498	617	
863.4625	818.4625	499	499	618	
863.4875	818.4875	500	500	619	
863.5125	818.5125	501	501	620	
863.5375	818.5375	502	502	621	
863.5625	818.5625	503	503	622	
863.5875	818.5875	504	504	623	
863.6125	818.6125	505	505	624	
863.6375	818.6375	506	506	625	
863.6625	818.6625	507	507	626	
863.6875	818.6875	508	508	627	
863.7125	818.7125	509	509	628	
863.7375	818.7375	510	510	629	
863.7625	818.7625	511	511	630	
863.7875	818.7875	512	512	631	
863.8125	818.8125	513	513	632	
863.8375	818.8375	514	514	633	
863.8625	818.8625	515	515	634	
863.8875	818.8875	516	516	635	
863.9125	818.9125	517	517	636	
863.9375	818.9375	518	518	637	
863.9625	818.9625	519	519	638	
863.9875	818.9875	520	520	639	
864.0125	819.0125	521	521	640	
864.0375	819.0375	522	522	641	
864.0625	819.0625	523	523	642	
864.0875	819.0875	524	524	643	
864.1125	819.1125	525	525	644	
864.1375	819.1375	526	526	645	
864.1625	819.1625	527	527	646	

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
864.1875	819.1875	528	528	647	
864.2125	819.2125	529	529	648	
864.2375	819.2375	530	530	649	
864.2625	819.2625	531	531	650	
864.2875	819.2875	532	532	651	
864.3125	819.3125	533	533	652	
864.3375	819.3375	534	534	653	
864.3625	819.3625	535	535	654	
864.3875	819.3875	536	536	655	
864.4125	819.4125	537	537	656	
864.4375	819.4375	538	538	657	
864.4625	819.4625	539	539	658	
864.4875	819.4875	540	540	659	
864.5125	819.5125	541	541	660	
864.5375	819.5375	542	542	661	
864.5625	819.5625	543	543	662	
864.5875	819.5875	544	544	663	
864.6125	819.6125	545	545	664	
864.6375	819.6375	546	546	665	
864.6625	819.6625	547	547	666	
864.6875	819.6875	548	548	667	
864.7125	819.7125	549	549	668	
864.7375	819.7375	550	550	669	
864.7625	819.7625	551	551	670	
864.7875	819.7875	552	552	671	
864.8125	819.8125	553	553	672	
864.8375	819.8375	554	554	673	
864.8625	819.8625	555	555	674	
864.8875	819.8875	556	556	675	
864.9125	819.9125	557	557	676	
864.9375	819.9375	558	558	677	
864.9625	819.9625	559	559	678	
864.9875	819.9875	560	560	679	
865.0125	820.0125	561	561	680	
865.0375	820.0375	562	562	681	
865.0625	820.0625	563	563	682	
865.0875	820.0875	564	564	683	
865.1125	820.1125	565	565	684	

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
865.1375	820.1375	566	566	685	
865.1625	820.1625	567	567	686	
865.1875	820.1875	568	568	687	
865.2125	820.2125	569	569	688	
865.2375	820.2375	570	570	689	
865.2625	820.2625	571	571	690	
865.2875	820.2875	572	572	691	
865.3125	820.3125	573	573	692	
865.3375	820.3375	574	574	693	
865.3625	820.3625	575	575	694	
865.3875	820.3875	576	576	695	
865.4125	820.4125	577	577	696	
865.4375	820.4375	578	578	697	
865.4625	820.4625	579	579	698	
865.4875	820.4875	580	580	699	
865.5125	820.5125	581	581	700	
865.5375	820.5375	582	582	701	
865.5625	820.5625	583	583	702	
865.5875	820.5875	584	584	703	
865.6125	820.6125	585	585	704	
865.6375	820.6375	586	586	705	
865.6625	820.6625	587	587	706	
865.6875	820.6875	588	588	707	
865.7125	820.7125	589	589	708	
865.7375	820.7375	590	590	709	
865.7625	820.7625	591	591	710	
865.7875	820.7875	592	592	711	
865.8125	820.8125	593	593	712	
865.8375	820.8375	594	594	713	
865.8625	820.8625	595	595	714	
865.8875	820.8875	596	596	715	
865.9125	820.9125	597	597	716	
865.9375	820.9375	598	598	717	
865.9625	820.9625	599	599	718	
865.9875	820.9875	600	600	719	
866.0000	821.0000	601			
866.0125	821.0125	602	601	720	
866.0250	821.0250	603			

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
866.0375	821.0375	604	602	721	
866.0500	821.0500	605	603		
866.0625	821.0625	606	604	722	
866.0750	821.0750	607	605		
866.0875	821.0875	608	606	723	
866.1000	821.1000	609	607		
866.1125	821.1125	610	608	724	
866.1250	821.1250	611	609		
866.1375	821.1375	612	610	725	
866.1500	821.1500	613	611		
866.1625	821.1625	614	612	726	
866.1750	821.1750	615	613		
866.1875	821.1875	616	614	727	
866.2000	821.2000	617	615		
866.2125	821.2125	618	616	728	
866.2250	821.2250	619	617		
866.2375	821.2375	620	618	729	
866.2500	821.2500	621	619		
866.2625	821.2625	622	620	730	
866.2750	821.2750	623	621		
866.2875	821.2875	624	622	731	
866.3000	821.3000	625	623		
866.3125	821.3125	626	624	732	
866.3250	821.3250	627	625		
866.3375	821.3375	628	626	733	
866.3500	821.3500	629	627		
866.3625	821.3625	630	628	734	
866.3750	821.3750	631	629		
866.3875	821.3875	632	630	735	
866.4000	821.4000	633	631		
866.4125	821.4125	634	632	736	
866.4250	821.4250	635	633		
866.4375	821.4375	636	634	737	
866.4500	821.4500	637	635		
866.4625	821.4625	638	636	738	
866.4750	821.4750	639	637		
866.4875	821.4875	640	638	739	
866.5000	821.5000	641			

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
866.5125	821.5125	642	639	740	
866.5250	821.5250	643			
866.5375	821.5375	644	640	741	
866.5500	821.5500	645	641		
866.5625	821.5625	646	642	742	
866.5750	821.5750	647	643		
866.5875	821.5875	648	644	743	
866.6000	821.6000	649	645		
866.6125	821.6125	650	646	744	
866.6250	821.6250	651	647		
866.6375	821.6375	652	648	745	
866.6500	821.6500	653	649		
866.6625	821.6625	654	650	746	
866.6750	821.6750	655	651		
866.6875	821.6875	656	652	747	
866.7000	821.7000	657	653		
866.7125	821.7125	658	654	748	
866.7250	821.7250	659	655		
866.7375	821.7375	660	656	749	
866.7500	821.7500	661	657		
866.7625	821.7625	662	658	750	
866.7750	821.7750	663	659		
866.7875	821.7875	664	660	751	
866.8000	821.8000	665	661		
866.8125	821.8125	666	662	752	
866.8250	821.8250	667	663		
866.8375	821.8375	668	664	753	
866.8500	821.8500	669	665		
866.8625	821.8625	670	666	754	
866.8750	821.8750	671	667		
866.8875	821.8875	672	668	755	
866.9000	821.9000	673	669		
866.9125	821.9125	674	670	756	
866.9250	821.9250	675	671		
866.9375	821.9375	676	672	757	
866.9500	821.9500	677	673		
866.9625	821.9625	678	674	758	
866.9750	821.9750	679	675		

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
866.9875	821.9875	680	676	759	
867.0000	822.0000	681			
867.0125	822.0125	682	677	760	
867.0250	822.0250	683			
867.0375	822.0375	684	678	761	
867.0500	822.0500	685	679		
867.0625	822.0625	686	680	762	
867.0750	822.0750	687	681		
867.0875	822.0875	688	682	763	
867.1000	822.1000	689	683		
867.1125	822.1125	690	684	764	
867.1250	822.1250	691	685		
867.1375	822.1375	692	686	765	
867.1500	822.1500	693	687		
867.1625	822.1625	694	688	766	
867.1750	822.1750	695	689		
867.1875	822.1875	696	690	767	
867.2000	822.2000	697	691		
867.2125	822.2125	698	692	768	
867.2250	822.2250	699	693		
867.2375	822.2375	700	694	769	
867.2500	822.2500	701	695		
867.2625	822.2625	702	696	770	
867.2750	822.2750	703	697		
867.2875	822.2875	704	698	771	
867.3000	822.3000	705	699		
867.3125	822.3125	706	700	772	
867.3250	822.3250	707	701		
867.3375	822.3375	708	702	773	
867.3500	822.3500	709	703		
867.3625	822.3625	710	704	774	
867.3750	822.3750	711	705		
867.3875	822.3875	712	706	775	
867.4000	822.4000	713	707		
867.4125	822.4125	714	708	776	
867.4250	822.4250	715	709		
867.4375	822.4375	716	710	777	
867.4500	822.4500	717	711		

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
867.4625	822.4625	718	712	778	
867.4750	822.4750	719	713		
867.4875	822.4875	720	714	779	
867.5000	822.5000	721			
867.5125	822.5125	722	715	780	
867.5250	822.5250	723			
867.5375	822.5375	724	716	781	
867.5500	822.5500	725	717		
867.5625	822.5625	726	718	782	
867.5750	822.5750	727	719		
867.5875	822.5875	728	720	783	
867.6000	822.6000	729	721		
867.6125	822.6125	730	722	784	
867.6250	822.6250	731	723		
867.6375	822.6375	732	724	785	
867.6500	822.6500	733	725		
867.6625	822.6625	734	726	786	
867.6750	822.6750	735	727		
867.6875	822.6875	736	728	787	
867.7000	822.7000	737	729		
867.7125	822.7125	738	730	788	
867.7250	822.7250	739	731		
867.7375	822.7375	740	732	789	
867.7500	822.7500	741	733		
867.7625	822.7625	742	734	790	
867.7750	822.7750	743	735		
867.7875	822.7875	744	736	791	
867.8000	822.8000	745	737		
867.8125	822.8125	746	738	792	
867.8250	822.8250	747	739		
867.8375	822.8375	748	740	793	
867.8500	822.8500	749	741		
867.8625	822.8625	750	742	794	
867.8750	822.8750	751	743		
867.8875	822.8875	752	744	795	
867.9000	822.9000	753	745		
867.9125	822.9125	754	746	796	
867.9250	822.9250	755	747		

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
867.9375	822.9375	756	748	797	
867.9500	822.9500	757	749		
867.9625	822.9625	758	750	798	
867.9750	822.9750	759	751		
867.9875	822.9875	760	752	799	
868.0000	823.0000	761			
868.0125	823.0125	762	753	800	
868.0250	823.0250	763			
868.0375	823.0375	764	754	801	
868.0500	823.0500	765	755		
868.0625	823.0625	766	756	802	
868.0750	823.0750	767	757		
868.0875	823.0875	768	758	803	
868.1000	823.1000	769	759		
868.1125	823.1125	770	760	804	
868.1250	823.1250	771	761		
868.1375	823.1375	772	762	805	
868.1500	823.1500	773	763		
868.1625	823.1625	774	764	806	
868.1750	823.1750	775	765		
868.1875	823.1875	776	766	807	
868.2000	823.2000	777	767		
868.2125	823.2125	778	768	808	
868.2250	823.2250	779	769		
868.2375	823.2375	780	770	809	
868.2500	823.2500	781	771		
868.2625	823.2625	782	772	810	
868.2750	823.2750	783	773		
868.2875	823.2875	784	774	811	
868.3000	823.3000	785	775		
868.3125	823.3125	786	776	812	
868.3250	823.3250	787	777		
868.3375	823.3375	788	778	813	
868.3500	823.3500	789	779		
868.3625	823.3625	790	780	814	
868.3750	823.3750	791	781		
868.3875	823.3875	792	782	815	
868.4000	823.4000	793	783		

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
868.4125	823.4125	794	784	816	
868.4250	823.4250	795	785		
868.4375	823.4375	796	786	817	
868.4500	823.4500	797	787		
868.4625	823.4625	798	788	818	
868.4750	823.4750	799	789		
868.4875	823.4875	800	790	819	
868.5000	823.5000	801	791		
868.5125	823.5125	802	792	820	
868.5250	823.5250	803	793		
868.5375	823.5375	804	794	821	
868.5500	823.5500	805	795		
868.5625	823.5625	806	796	822	
868.5750	823.5750	807	797		
868.5875	823.5875	808	798	823	
868.6000	823.6000	809	799		
868.6125	823.6125	810	800	824	
868.6250	823.6250	811	801		
868.6375	823.6375	812	802	825	
868.6500	823.6500	813	803		
868.6625	823.6625	814	804	826	
868.6750	823.6750	815	805		
868.6875	823.6875	816	806	827	
868.7000	823.7000	817	807		
868.7125	823.7125	818	808	828	
868.7250	823.7250	819	809		
868.7375	823.7375	820	810	829	
868.7500	823.7500	821	811		
868.7625	823.7625	822	812	830	
868.7750	823.7750	823	813		
868.7875	823.7875	824	814	831	
868.8000	823.8000	825	815		
868.8125	823.8125	826	816	832	
868.8250	823.8250	827	817		
868.8375	823.8375	828	818	833	
868.8500	823.8500	829	819		
868.8625	823.8625	830	820	834	
868.8750	823.8750	831	821		

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
868.8875	823.8875	832	822	835	
868.9000	823.9000	833	823		
868.9125	823.9125	834	824	836	
868.9250	823.9250	835	825		
868.9375	823.9375	836	826	837	
868.9500	823.9500	837	827		
868.9625	823.9625	838	828	838	
868.9750	823.9750	839	829		
868.9875	823.9875	840	830	839	
869.0000	824.0000	841			
869.0125	824.0125	842		840	
869.0250	824.0250	843			
869.0375	824.0375	844		841	
869.0500	824.0500	845			
869.0625	824.0625	846		842	
869.0750	824.0750	847			
869.0875	824.0875	848		843	
869.1000	824.1000	849			
869.1125	824.1125	850		844	
869.1250	824.1250	851			
869.1375	824.1375	852		845	
869.1500	824.1500	853			
869.1625	824.1625	854		846	
869.1750	824.1750	855			
869.1875	824.1875	856		847	
869.2000	824.2000	857			
869.2125	824.2125	858		848	
869.2250	824.2250	859			
869.2375	824.2375	860		849	
869.2500	824.2500	861			
869.2625	824.2625	862		850	
869.2750	824.2750	863			
869.2875	824.2875	864		851	
869.3000	824.3000	865			
869.3125	824.3125	866		852	
869.3250	824.3250	867			
869.3375	824.3375	868		853	
869.3500	824.3500	869			

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
869.3625	824.3625	870		854	
869.3750	824.3750	871			
869.3875	824.3875	872		855	
869.4000	824.4000	873			
869.4125	824.4125	874		856	
869.4250	824.4250	875			
869.4375	824.4375	876		857	
869.4500	824.4500	877			
869.4625	824.4625	878		858	
869.4750	824.4750	879			
869.4875	824.4875	880		859	
869.5000	824.5000	881			
869.5125	824.5125	882		860	
869.5250	824.5250	883			
869.5375	824.5375	884		861	
869.5500	824.5500	885			
869.5625	824.5625	886		862	
869.5750	824.5750	887			
869.5875	824.5875	888		863	
869.6000	824.6000	889			
869.6125	824.6125	890		864	
869.6250	824.6250	891			
869.6375	824.6375	892		865	
869.6500	824.6500	893			
869.6625	824.6625	894		866	
869.6750	824.6750	895			
869.6875	824.6875	896		867	
869.7000	824.7000	897			
869.7125	824.7125	898		868	
869.7250	824.7250	899			
869.7375	824.7375	900		869	
869.7500	824.7500	901			
869.7625	824.7625	902		870	
869.7750	824.7750	903			
869.7875	824.7875	904		871	
869.8000	824.8000	905			
869.8125	824.8125	906		872	
869.8250	824.8250	907			

Table 18.1 800 Mhz Channel Table - Transceiver Programming

		NPSPAC Banding Scheme			
		High		Low	
Mobile Rx Frequency	Mobile Tx Frequency	Program Channel Number	FCC Channel Number	Program Channel Number	FCC Channel Number
869.8375	824.8375	908		873	
869.8500	824.8500	909			
869.8625	824.8625	910		874	
869.8750	824.8750	911			
869.8875	824.8875	912		875	
869.9000	824.9000	913			
869.9125	824.9125	914		876	
869.9250	824.9250	915			
869.9375	824.9375	916		877	
869.9500	824.9500	917			
869.9625	824.9625	918		878	
869.9750	824.9750	919			
869.9875	824.9875	920		879	

Table 18.2 lists the FCC's 900 MHz channels and each channel's associated receive frequency and transmit frequency.

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Frequency	Tx Frequency
1	1	935.0125	896.0125
2	2	935.0250	896.0250
3	3	935.0375	896.0375
4	4	935.0500	896.0500
5	5	935.0625	896.0625
6	6	935.0750	896.0750
7	7	935.0875	896.0875
8	8	935.1000	896.1000
9	9	935.1125	896.1125
10	10	935.1250	896.1250
11	11	935.1375	896.1375
12	12	935.1500	896.1500
13	13	935.1625	896.1625
14	14	935.1750	896.1750
15	15	935.1875	896.1875
16	16	935.2000	896.2000
17	17	935.2125	896.2125
18	18	935.2250	896.2250
19	19	935.2375	896.2375
20	20	935.2500	896.2500
21	21	935.2625	896.2625
22	22	935.2750	896.2750
23	23	935.2875	896.2875
24	24	935.3000	896.3000
25	25	935.3125	896.3125
26	26	935.3250	896.3250
27	27	935.3375	896.3375
28	28	935.3500	896.3500
29	29	935.3625	896.3625
30	30	935.3750	896.3750
31	31	935.3875	896.3875
32	32	935.4000	896.4000
33	33	935.4125	896.4125
34	34	935.4250	896.4250
35	35	935.4375	896.4375
36	36	935.4500	896.4500
37	37	935.4625	896.4625
38	38	935.4750	896.4750
39	39	935.4875	896.4875
40	40	935.5000	896.5000
41	41	935.5125	896.5125

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Frequency	Tx Frequency
42	42	935.5250	896.5250
43	43	935.5375	896.5375
44	44	935.5500	896.5500
45	45	935.5625	896.5625
46	46	935.5750	896.5750
47	47	935.5875	896.5875
48	48	935.6000	896.6000
49	49	935.6125	896.6125
50	50	935.6250	896.6250
51	51	935.6375	896.6375
52	52	935.6500	896.6500
53	53	935.6625	896.6625
54	54	935.6750	896.6750
55	55	935.6875	896.6875
56	56	935.7000	896.7000
57	57	935.7125	896.7125
58	58	935.7250	896.7250
59	59	935.7375	896.7375
60	60	935.7500	896.7500
61	61	935.7625	896.7625
62	62	935.7750	896.7750
63	63	935.7875	896.7875
64	64	935.8000	896.8000
65	65	935.8125	896.8125
66	66	935.8250	896.8250
67	67	935.8375	896.8375
68	68	935.8500	896.8500
69	69	935.8625	896.8625
70	70	935.8750	896.8750
71	71	935.8875	896.8875
72	72	935.9000	896.9000
73	73	935.9125	896.9125
74	74	935.9250	896.9250
75	75	935.9375	896.9375
76	76	935.9500	896.9500
77	77	935.9625	896.9625
78	78	935.9750	896.9750
79	79	935.9875	896.9875
80	80	936.0000	897.0000
81	81	936.0125	897.0125
82	82	936.0250	897.0250

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Frequency	Tx Frequency
83	83	936.0375	897.0375
84	84	936.0500	897.0500
85	85	936.0625	897.0625
86	86	936.0750	897.0750
87	87	936.0875	897.0875
88	88	936.1000	897.1000
89	89	936.1125	897.1125
90	90	936.1250	897.1250
91	91	936.1375	897.1375
92	92	936.1500	897.1500
93	93	936.1625	897.1625
94	94	936.1750	897.1750
95	95	936.1875	897.1875
96	96	936.2000	897.2000
97	97	936.2125	897.2125
98	98	936.2250	897.2250
99	99	936.2375	897.2375
100	100	936.2500	897.2500
101	101	936.2625	897.2625
102	102	936.2750	897.2750
103	103	936.2875	897.2875
104	104	936.3000	897.3000
105	105	936.3125	897.3125
106	106	936.3250	897.3250
107	107	936.3375	897.3375
108	108	936.3500	897.3500
109	109	936.3625	897.3625
110	110	936.3750	897.3750
111	111	936.3875	897.3875
112	112	936.4000	897.4000
113	113	936.4125	897.4125
114	114	936.4250	897.4250
115	115	936.4375	897.4375
116	116	936.4500	897.4500
117	117	936.4625	897.4625
118	118	936.4750	897.4750
119	119	936.4875	897.4875
120	120	936.5000	897.5000
121	121	936.5125	897.5125
122	122	936.5250	897.5250
123	123	936.5375	897.5375

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Frequency	Tx Frequency
124	124	936.5500	897.5500
125	125	936.5625	897.5625
126	126	936.5750	897.5750
127	127	936.5875	897.5875
128	128	936.6000	897.6000
129	129	936.6125	897.6125
130	130	936.6250	897.6250
131	131	936.6375	897.6375
132	132	936.6500	897.6500
133	133	936.6625	897.6625
134	134	936.6750	897.6750
135	135	936.6875	897.6875
136	136	936.7000	897.7000
137	137	936.7125	897.7125
138	138	936.7250	897.7250
139	139	936.7375	897.7375
140	140	936.7500	897.7500
141	141	936.7625	897.7625
142	142	936.7750	897.7750
143	143	936.7875	897.7875
144	144	936.8000	897.8000
145	145	936.8125	897.8125
146	146	936.8250	897.8250
147	147	936.8375	897.8375
148	148	936.8500	897.8500
149	149	936.8625	897.8625
150	150	936.8750	897.8750
151	151	936.8875	897.8875
152	152	936.9000	897.9000
153	153	936.9125	897.9125
154	154	936.9250	897.9250
155	155	936.9375	897.9375
156	156	936.9500	897.9500
157	157	936.9625	897.9625
158	158	936.9750	897.9750
159	159	936.9875	897.9875
160	160	937.0000	898.0000
161	161	937.0125	898.0125
162	162	937.0250	898.0250
163	163	937.0375	898.0375
164	164	937.0500	898.0500

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Frequency	Tx Frequency
165	165	937.0625	898.0625
166	166	937.0750	898.0750
167	167	937.0875	898.0875
168	168	937.1000	898.1000
169	169	937.1125	898.1125
170	170	937.1250	898.1250
171	171	937.1375	898.1375
172	172	937.1500	898.1500
173	173	937.1625	898.1625
174	174	937.1750	898.1750
175	175	937.1875	898.1875
176	176	937.2000	898.2000
177	177	937.2125	898.2125
178	178	937.2250	898.2250
179	179	937.2375	898.2375
180	180	937.2500	898.2500
181	181	937.2625	898.2625
182	182	937.2750	898.2750
183	183	937.2875	898.2875
184	184	937.3000	898.3000
185	185	937.3125	898.3125
186	186	937.3250	898.3250
187	187	937.3375	898.3375
188	188	937.3500	898.3500
189	189	937.3625	898.3625
190	190	937.3750	898.3750
191	191	937.3875	898.3875
192	192	937.4000	898.4000
193	193	937.4125	898.4125
194	194	937.4250	898.4250
195	195	937.4375	898.4375
196	196	937.4500	898.4500
197	197	937.4625	898.4625
198	198	937.4750	898.4750
199	199	937.4875	898.4875
200	200	937.5000	898.5000
201	201	937.5125	898.5125
202	202	937.5250	898.5250
203	203	937.5375	898.5375
204	204	937.5500	898.5500
205	205	937.5625	898.5625

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Frequency	Tx Frequency
206	206	937.5750	898.5750
207	207	937.5875	898.5875
208	208	937.6000	898.6000
209	209	937.6125	898.6125
210	210	937.6250	898.6250
211	211	937.6375	898.6375
212	212	937.6500	898.6500
213	213	937.6625	898.6625
214	214	937.6750	898.6750
215	215	937.6875	898.6875
216	216	937.7000	898.7000
217	217	937.7125	898.7125
218	218	937.7250	898.7250
219	219	937.7375	898.7375
220	220	937.7500	898.7500
221	221	937.7625	898.7625
222	222	937.7750	898.7750
223	223	937.7875	898.7875
224	224	937.8000	898.8000
225	225	937.8125	898.8125
226	226	937.8250	898.8250
227	227	937.8375	898.8375
228	228	937.8500	898.8500
229	229	937.8625	898.8625
230	230	937.8750	898.8750
231	231	937.8875	898.8875
232	232	937.9000	898.9000
233	233	937.9125	898.9125
234	234	937.9250	898.9250
235	235	937.9375	898.9375
236	236	937.9500	898.9500
237	237	937.9625	898.9625
238	238	937.9750	898.9750
239	239	937.9875	898.9875
240	240	938.0000	899.0000
241	241	938.0125	899.0125
242	242	938.0250	899.0250
243	243	938.0375	899.0375
244	244	938.0500	899.0500
245	245	938.0625	899.0625
246	246	938.0750	899.0750

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Frequency	Tx Frequency
247	247	938.0875	899.0875
248	248	938.1000	899.1000
249	249	938.1125	899.1125
250	250	938.1250	899.1250
251	251	938.1375	899.1375
252	252	938.1500	899.1500
253	253	938.1625	899.1625
254	254	938.1750	899.1750
255	255	938.1875	899.1875
256	256	938.2000	899.2000
257	257	938.2125	899.2125
258	258	938.2250	899.2250
259	259	938.2375	899.2375
260	260	938.2500	899.2500
261	261	938.2625	899.2625
262	262	938.2750	899.2750
263	263	938.2875	899.2875
264	264	938.3000	899.3000
265	265	938.3125	899.3125
266	266	938.3250	899.3250
267	267	938.3375	899.3375
268	268	938.3500	899.3500
269	269	938.3625	899.3625
270	270	938.3750	899.3750
271	271	938.3875	899.3875
272	272	938.4000	899.4000
273	273	938.4125	899.4125
274	274	938.4250	899.4250
275	275	938.4375	899.4375
276	276	938.4500	899.4500
277	277	938.4625	899.4625
278	278	938.4750	899.4750
279	279	938.4875	899.4875
280	280	938.5000	899.5000
281	281	938.5125	899.5125
282	282	938.5250	899.5250
283	283	938.5375	899.5375
284	284	938.5500	899.5500
285	285	938.5625	899.5625
286	286	938.5750	899.5750
287	287	938.5875	899.5875

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Frequency	Tx Frequency
288	288	938.6000	899.6000
289	289	938.6125	899.6125
290	290	938.6250	899.6250
291	291	938.6375	899.6375
292	292	938.6500	899.6500
293	293	938.6625	899.6625
294	294	938.6750	899.6750
295	295	938.6875	899.6875
296	296	938.7000	899.7000
297	297	938.7125	899.7125
298	298	938.7250	899.7250
299	299	938.7375	899.7375
300	300	938.7500	899.7500
301	301	938.7625	899.7625
302	302	938.7750	899.7750
303	303	938.7875	899.7875
304	304	938.8000	899.8000
305	305	938.8125	899.8125
306	306	938.8250	899.8250
307	307	938.8375	899.8375
308	308	938.8500	899.8500
309	309	938.8625	899.8625
310	310	938.8750	899.8750
311	311	938.8875	899.8875
312	312	938.9000	899.9000
313	313	938.9125	899.9125
314	314	938.9250	899.9250
315	315	938.9375	899.9375
316	316	938.9500	899.9500
317	317	938.9625	899.9625
318	318	938.9750	899.9750
319	319	938.9875	899.9875
320	320	939.0000	900.0000
321	321	939.0125	900.0125
322	322	939.0250	900.0250
323	323	939.0375	900.0375
324	324	939.0500	900.0500
325	325	939.0625	900.0625
326	326	939.0750	900.0750
327	327	939.0875	900.0875
328	328	939.1000	900.1000

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Frequency	Tx Frequency
329	329	939.1125	900.1125
330	330	939.1250	900.1250
331	331	939.1375	900.1375
332	332	939.1500	900.1500
333	333	939.1625	900.1625
334	334	939.1750	900.1750
335	335	939.1875	900.1875
336	336	939.2000	900.2000
337	337	939.2125	900.2125
338	338	939.2250	900.2250
339	339	939.2375	900.2375
340	340	939.2500	900.2500
341	341	939.2625	900.2625
342	342	939.2750	900.2750
343	343	939.2875	900.2875
344	344	939.3000	900.3000
345	345	939.3125	900.3125
346	346	939.3250	900.3250
347	347	939.3375	900.3375
348	348	939.3500	900.3500
349	349	939.3625	900.3625
350	350	939.3750	900.3750
351	351	939.3875	900.3875
352	352	939.4000	900.4000
353	353	939.4125	900.4125
354	354	939.4250	900.4250
355	355	939.4375	900.4375
356	356	939.4500	900.4500
357	357	939.4625	900.4625
358	358	939.4750	900.4750
359	359	939.4875	900.4875
360	360	939.5000	900.5000
361	361	939.5125	900.5125
362	362	939.5250	900.5250
363	363	939.5375	900.5375
364	364	939.5500	900.5500
365	365	939.5625	900.5625
366	366	939.5750	900.5750
367	367	939.5875	900.5875
368	368	939.6000	900.6000
369	369	939.6125	900.6125

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Frequency	Tx Frequency
370	370	939.6250	900.6250
371	371	939.6375	900.6375
372	372	939.6500	900.6500
373	373	939.6625	900.6625
374	374	939.6750	900.6750
375	375	939.6875	900.6875
376	376	939.7000	900.7000
377	377	939.7125	900.7125
378	378	939.7250	900.7250
379	379	939.7375	900.7375
380	380	939.7500	900.7500
381	381	939.7625	900.7625
382	382	939.7750	900.7750
383	383	939.7875	900.7875
384	384	939.8000	900.8000
385	385	939.8125	900.8125
386	386	939.8250	900.8250
387	387	939.8375	900.8375
388	388	939.8500	900.8500
389	389	939.8625	900.8625
390	390	939.8750	900.8750
391	391	939.8875	900.8875
392	392	939.9000	900.9000
393	393	939.9125	900.9125
394	394	939.9250	900.9250
395	395	939.9375	900.9375
396	396	939.9500	900.9500
397	397	939.9625	900.9625
398	398	939.9750	900.9750
399	399	939.9875	900.9875
400	400	940.0000	901.0000
401	401	940.0125	901.0125
402	402	940.0250	901.0250
403	403	940.0375	901.0375
404	404	940.0500	901.0500
405	405	940.0625	901.0625
406	406	940.0750	901.0750
407	407	940.0875	901.0875
408	408	940.1000	901.1000
409	409	940.1125	901.1125
410	410	940.1250	901.1250

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Frequency	Tx Frequency
411	411	940.1375	901.1375
412	412	940.1500	901.1500
413	413	940.1625	901.1625
414	414	940.1750	901.1750
415	415	940.1875	901.1875
416	416	940.2000	901.2000
417	417	940.2125	901.2125
418	418	940.2250	901.2250
419	419	940.2375	901.2375
420	420	940.2500	901.2500
421	421	940.2625	901.2625
422	422	940.2750	901.2750
423	423	940.2875	901.2875
424	424	940.3000	901.3000
425	425	940.3125	901.3125
426	426	940.3250	901.3250
427	427	940.3375	901.3375
428	428	940.3500	901.3500
429	429	940.3625	901.3625
430	430	940.3750	901.3750
431	431	940.3875	901.3875
432	432	940.4000	901.4000
433	433	940.4125	901.4125
434	434	940.4250	901.4250
435	435	940.4375	901.4375
436	436	940.4500	901.4500
437	437	940.4625	901.4625
438	438	940.4750	901.4750
439	439	940.4875	901.4875
440	440	940.5000	901.5000
441	441	940.5125	901.5125
442	442	940.5250	901.5250
443	443	940.5375	901.5375
444	444	940.5500	901.5500
445	445	940.5625	901.5625
446	446	940.5750	901.5750
447	447	940.5875	901.5875
448	448	940.6000	901.6000
449	449	940.6125	901.6125
450	450	940.6250	901.6250
451	451	940.6375	901.6375

Table 18.2 900 MHz Channels

Program Channel	FCC Channel	Rx Frequency	Tx Frequency
452	452	940.6500	901.6500
453	453	940.6625	901.6625
454	454	940.6750	901.6750
455	455	940.6875	901.6875
456	456	940.7000	901.7000
457	457	940.7125	901.7125
458	458	940.7250	901.7250
459	459	940.7375	901.7375
460	460	940.7500	901.7500
461	461	940.7625	901.7625
462	462	940.7750	901.7750
463	463	940.7875	901.7875
464	464	940.8000	901.8000
465	465	940.8125	901.8125
466	466	940.8250	901.8250
467	467	940.8375	901.8375
468	468	940.8500	901.8500
469	469	940.8625	901.8625
470	470	940.8750	901.8750
471	471	940.8875	901.8875
472	472	940.9000	901.9000
473	473	940.9125	901.9125
474	474	940.9250	901.9250
475	475	940.9375	901.9375
476	476	940.9500	901.9500
477	477	940.9625	901.9625
478	478	940.9750	901.9750
479	479	940.9875	901.9875



Updating Your Radio

Programming data for Series 51xx portable radios and 53xx mobile radios is stored in a file that can be saved, read, copied, and deleted. This file automatically receives the extension *.rcf*. Refer to [Section 3.1](#).

A.1 Identifying the Type of Radio

**WARNING**

It is extremely crucial to know what type of radio is to be upgraded before starting the upgrade process.

There are two ways to check the radio type.

5100 Portable Radios

- 1 Turn on the radio and check the displayed version number at power up.
 - a Non-SEM version radios have a S/W version 1.xx.xx displayed.
 - b SEM version radios have S/W version 2.x.x displayed.
 - c UCM version radios have S/W version 3.x.x displayed.
 - d X Platform radios have S/W version 4.x.x displayed.
 - e ES Series radios have S/W version 6.x.x displayed.
- 2 Use PC Configure to read the version information.
 - a With radio programming cables attached and radio powered on, select **Transfer → Read Version Info**.

- b** In the Controller Version the software number is displayed.
 - o A 1.x.xx number indicates a NON-SEM version.
 - o A 2.x.x number indicates an SEM version.
 - o A 3.x.x number indicates a UCM version radio.
 - o 4.x.x indicates the X platform radios.
 - o 6.x.x indicates the ES Series radios.

53xx Mobiles Radios

- 1** Turn on the radio and check the displayed version number at power up.
 - a** ARM/DSP version radios have a S/W version 1.xx.xx displayed after the control head S/W version number (Usually a 3.xx.xx on newer control heads or EFJ*20x on older control heads.)
 - b** SEM version radios have S/W version 2.x.x displayed after the control head S/W version number (Usually a 3.xx.xx on newer control heads or EFJ*20x on older control heads.)
 - c** UCM version radios have S/W version 3.x.x displayed after the control head S/W version number (Usually a 3.xx.xx on newer control heads or EFJ*20x on older control heads.)
 - d** X Platform radios have S/W version 4.x.x displayed after the control head version number.
 - e** ES Series radios have S/W version 6.x.x displayed after the control head version number.
- 2** Use PC Configure to read the version information.
 - a** With radio programming cables attached and radio powered on, **Select Transfer → Read Version Info.**
 - b** In the Controller Version the software number is displayed.
 - o A 1.x.xx number indicates an ARM/DSP version.
 - o A 2.x.x number indicates an SEM version.
 - o A 3.x.x number indicates a UCM version radio.
 - o A 4.x.x indicates the X platform radios.
 - o A 6.x.x indicates the ES Series radios.

A.2 .rcf File Conversions

5100 and 5300 Flash Codes

- 5100 portables and 5300 mobiles with 4.6.x or later versions use PC Configure 2.1.0 or later.

A.2.1 Uploading RCF from 4.4.x Radio

The following process provides the steps to save a working RCF from a radio with a 05.2 build application code:

- 1 Open PC Configure.
- 2 Read (upload) RCF profile from radio.
- 3 Save RCF profile to your PC hard drive. Placing 05.2 in the file name is recommended.

A.2.2 Downloading RCF to 4.4.x Radio

The following process provides the steps to write a working RCF back to a radio with 05.2 build application code:

- 1 Open PC Configure.
- 2 Open RCF file compatible with 4.4.x application code. (Placing 05.2 in the file name is recommended.)
- 3 Write (download) the RCF to the radio.

A.2.3 Copying RCF from 4.4.x Radio to 4.6.x Radio

The following process provides the steps to write a working RCF from a 05.2 application code into a radio with 06.1 build application code radio:

- 1 Open PC Configure.
- 2 Open RCF file saved to hard drive with 05.2 file format.

Note Do **not** save over the saved file. Archive all .rcf files: for example, once a 4.4.x RCF file is saved/opened with 4.6.x PCC, it cannot be opened by a 4.4.x PCC.

- 3 Download file to radio with 4.6.x application code.

- 4 PCC reformats the file and the radio operates normally.

If radio software has been upgraded from 4.4.x to 4.6.x:

- 1 Download file to radio with 4.6.x application code.
- 2 PCC reformats the file and the radio operates normally.

A.2.4 Upgrading file format to 5.10 file format

The file format had to be modified to support several feature requests. Refer to the following for information about version history.

Table A.1 Version History

File Format	PC Configure	Application Code
5.9	2.2.x	4.6.x (5100, 5300)
5.9	2.4.x	4.8.x (5100, 5300) 6.2.x (ES Series radios)
5.10	2.6.x	4.10.x (5100, 5300) 6.4.x (ES Series radios)
	2.8.x	4.12.x (5100, 5300) 6.6.x (ES Series radios)
	2.10.x	4.14.x (5100, 5300) 6.8.x (ES Series radios)

The following process provides the steps to upgrade from a 5.9 file format into a radio with 5.10 file format.

- 1 Upgrade the firmware using PCC 2.6.x. When the radio first boots up following the firmware upgrade, the message “Bad File Format” is shown on the radio display.
- 2 To clear this message, read and then write the parameters using PCC 2.6.x.

A.2.4.1 New 5300 RPI Box Application

- 1 If you are using a version of PC Configure prior to 2.6.9, there is a 90-second delay after application/firmware code download where the new RPI box will not be able to communicate with the radio. The delay can be bypassed by disconnecting and then reconnecting the RPI box from the radio (resetting the RPI SW) after the download has been completed.

- 2 If you are using a version of PC Configure prior to 2.6.9, you must manually set the baud rate to 115.2k for the 5300 Series radios (the 5300 ES and 5100 Series radios automatically download at 115.2k). The download process was changed in PC Configure 2.6.9 so that it will also automatically download at 115.2k regardless of what the baud rate is set to. This applies to both the new and old RPI boxes.

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