MOTOROLA

GTX Radios
Radio Service Software
User's Guide

68P02948C70-B

COMPATIBILITY NOTICE

This version of the Radio Service Software (RSS) incorporates changes made to the GTX radio codeplug with regard to additions to the GTX radio “Basic” model family.

These changes are not backward compatible with previous versions of the GTX RSS. This version of the RSS will properly read all current codeplug archive files and radio codeplugs. However, codeplugs that are written with this version will not be readable by prior RSS versions.

The changes are transparent to the radio’s firmware. Therefore, the changes are compatible with all current/ prior radio firmware versions.

Use caution if you are distributing this version among several service locations to ensure that all locations begin use of this version at the same time.

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GTX/LTR Radios
Radio Service Software
User's Guide

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1.0 INTRODUCTION

1.1 APPLICATION

The GTX Radios contain a new generation of advanced integrated circuits, with all RF and signalling parameters controlled by the radio's microprocessor. This Radio Service Software package is required to perform all alignment adjustments. The GTX radios do not contain any internal adjustable components (i.e. coils, pots, etc.).

This software also permits programming of all conventional and some trunking features, viewing of all trunking controlled parameters, and contains some helpful service aids for troubleshooting purposes.

The Motorola GTX Radio Service Software (RSS) Privacy Plus/LTR currently supports these models:

10-Trunk Systems x 8-Groups/System (80 trunked modes, 10 conventional channels):

'Standard' full-featured models. Portables have keypad and display

GTX/Privacy Plus Mobile	M11UGD6CB1_N	800 MHz, 15 Watt
GTX/Privacy Plus Mobile	M11WGD4CB1_N	900 MHz, 12 Watt
GTX/Privacy Plus Portable	H11UCD6CB1_N	800 MHz, 3 Watt
GTX/Privacy Plus Portable	H11WCD4CB1_N	900 MHz, 3 Watt
GTX/LTR Mobile	M11UGD6CU1_N	800 MHz, 15 Watt
GTX/LTR Mobile	M11WGD4CU1_N	900 MHz, 12 Watt
GTX/LTR Portable	H11UCD6CU1_N	800 MHz, 3 Watt
GTX/LTR Portable	H11WCD4CU1_N	900 MHz, 3 Watt

4-Trunk Systems x 3-Groups/System (12 trunked modes, 4 conventional channels):

'Basic' models. Portables have no keypad or display

GTX/Privacy Plus Portable	H11UCC6DB1_N	800 MHz, 3 Watt
GTX/Privacy Plus Portable	H11WCC4DB1_N	900 MHz, 3 Watt
GTX/LTR Portable	H11UCC6DU1_N	800 MHz, 3 Watt
GTX/LTR Portable	H11WCC4DU1_N	900 MHz, 3 Watt

IMPORTANT

It is the responsibility of the user not to violate any FCC regulations or authorizations covering the operation of any Motorola product.

1.2 PROGRAMMING KIT

The programming kit consists of the application software and this manual. The software is available in 3 1/2-inch disk format:

	KIT NUMBER	Disk Format
RSS for GTX	RVN-4150E	3 1/2-inch diskettes

1.3 REQUIRED HARDWARE

In addition to the application software, the following hardware is required to communicate with the radio:

1 - IBM PC, AT Personal Computer, or IBM Personal System 2, Model 25/30/50/60/70/80 equipped with 640K byte available RAM (minimum), an RS-232 Asynchronous Serial Communications Adapter, and DOS 3.2 or higher. A computer with a hard disk is required to run the program.

		PART NUMBER
2 -	Radio Interface Box (RIB)	RLN-4008
3 -	RIB Power Supply	01-80357A57 (110v) 01-80358A56 (220v) 60-82728J01 (9v)
4 -	RIB to IBM PC/XT interface cable (25-pin) RIB to IBM AT interface cable (9-pin)	30-80369B71 30-80369B72
5 -	RIB to radio interface cable (mobile)	30-80070N01
6 -	Mobile radio power cable (10/15 Watt)	(20/25/35 Watt)GKN6270
7 -	Portable radio programmer assembly	HKN9857

2.0 GETTING STARTED

2.1 HOW THIS MANUAL IS ORGANIZED

This section, GETTING STARTED, describes how to connect the radio to your computer and how to install the software. It includes how to read the screens, how to use the keyboard, how the screens are organized, and how to configure the software for your computer. It also includes description of the main menu and its functions available via the main menu. The following three sections provide information on SERVICING THE RADIO, GETTING and SAVING radio codeplug data, CHANGING and VIEWING codeplug data, and PRINTING radio configurations. All Radio Service Software (RSS) screens are included in this manual with detailed descriptions of each data field. An APPENDIX includes description of error codes, database structure format, and summary of the program organization and the keyboard commands.

2.2 CONNECTING THE RADIO TO THE COMPUTER

The radio and the Radio Interface Box (RIB) should be connected to the computer as described below and shown in Figure 2-1.

1. Connect the RIB-to-IBM interface cable end marked “TO IBM” to one of the computer’s serial communications ports (either COM1 or COM2). Refer to your computer owner’s manual for the location of the serial ports. Next, connect the other end marked “TO RIB” to the 15-pin connector on the RIB.

2. Connect the RIB-to-Radio interface cable end marked “TO RIB” to the 25-pin connector on the RIB. Connect the telephone modular connector to the microphone jack of the radio.

Portable Models:

Connect radio to the HKN9857A programming cable. Connect 25-pin, D-type connector to the RIB. Connect dual banana connector of HKN9857 to a 7.5 VDC power supply (red to +, black to -).

Mobile Models:

Connect the radio power cable leads (black to the negative (-) terminal and red to the positive (+) terminal) to a power supply and connect the connector end of the power cable to the radio. The power supply should be set at a nominal voltage of 13.6 Vdc for mobile models, and 7.5V for portable models.

3. Take the RIB power supply and connect it to the RIB. Plug the RIB power supply transformer into an AC outlet. (NOTE: RIB power supply not required for RLN-4008).

4. The radio will be ready to communicate with the computer once power is applied and the application software is started.

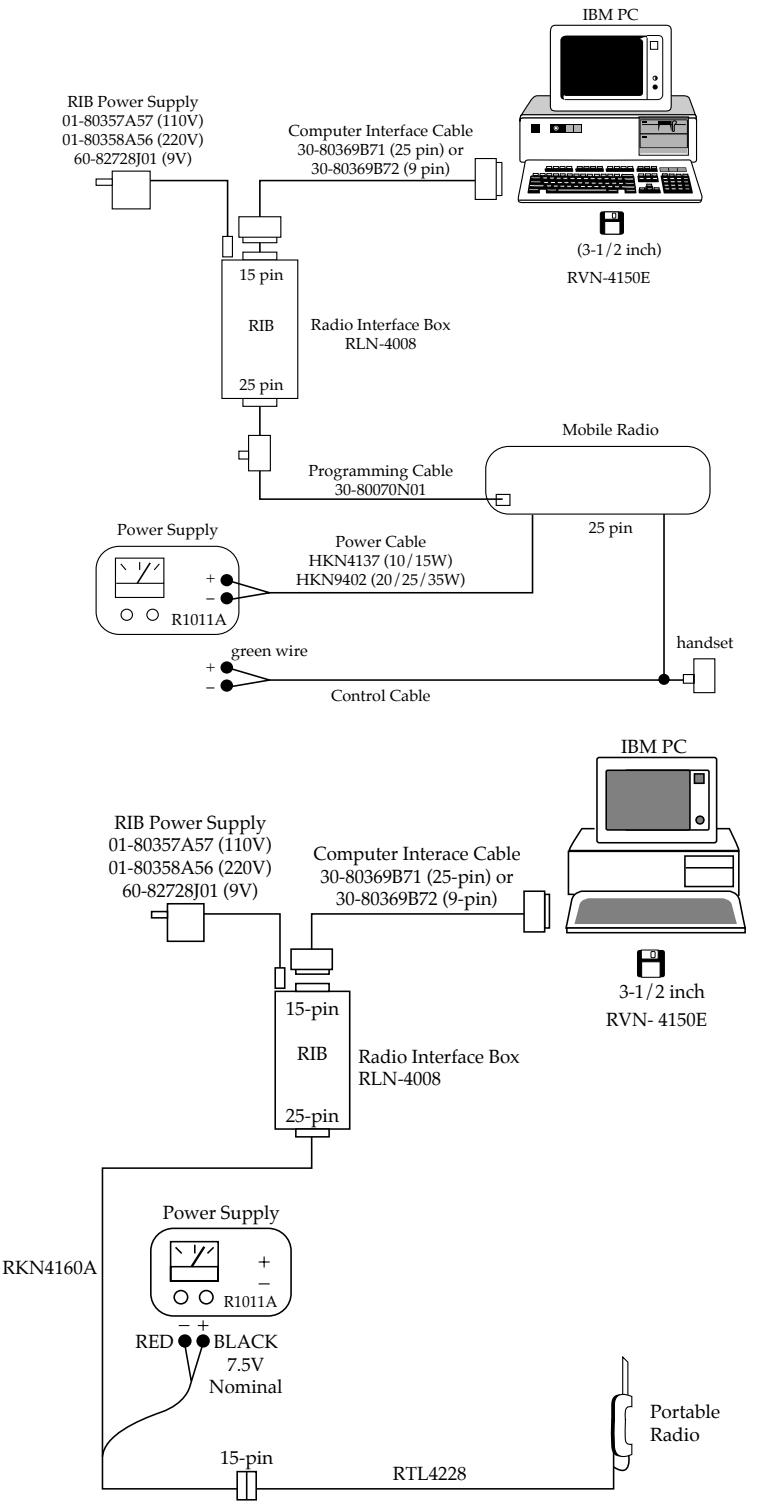

Figure 2-1. Radio-RIB-Computer Configuration

2.3 HOW TO READ THE SCREENS

Every action of the RSS is controlled through the use of formatted screen displays and the function keys on your keyboard. The function keys are the ten keys located on the left side or along the top of your keyboard marked F1 - F10.

Figure 2-2 illustrates the screen format used by the RSS. Each screen is divided into four sections. The upper left box (marked 1) always displays “MOTOROLA Radio Service Software” and the radio name. This box also displays the branch of the program tree (see paragraph 2.5) and the page number for multiple-page displays. For this example, the MAIN Menu is the top level of the program and no branch information is shown.

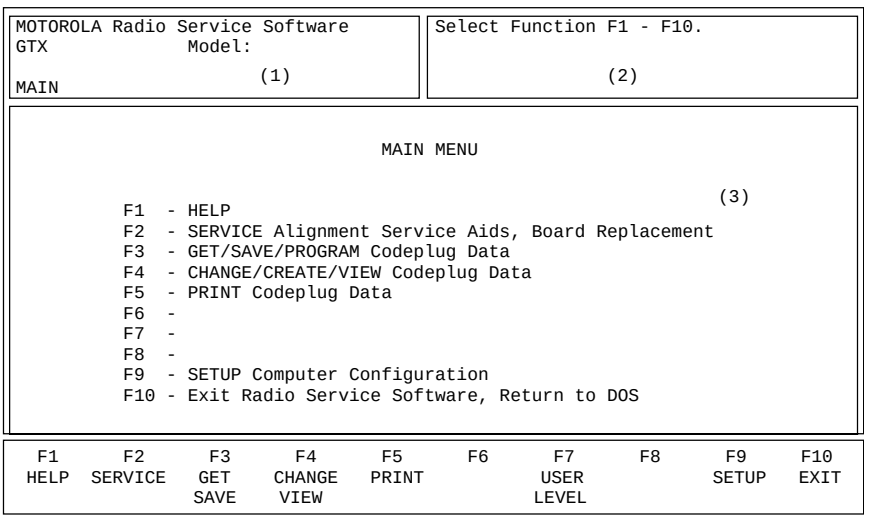

Figure 2-2. Sample Screen

The upper right box (marked 2) displays operating instructions. In this example, “Select Function Key F1 - 10.”, tells the operator that he or she must press one of the Function Keys to select an operation. Error messages and data entry errors are also displayed in this box.

The large center box (marked 3) will contain menu descriptions or data entry fields. In this example, the “MAIN MENU” is displayed, with detailed descriptions of the function keys. Menu screens may direct you to other menu screens or directly to data entry screens.

Data entry screens require you use the UP/DOWN arrow keys to make selections from a predetermined list or to enter data directly from the keyboard. The instruction message (box 2) always indicates what type of response is required. The current data entry field is always highlighted, since there are generally several data entry fields on a single screen. Press the ENTER (or TAB) key to move to the next data entry field. If you make a typing error, move the cursor under the error with the LEFT/RIGHT arrow keys and type over the error. All keyboard commands are summarized in the next section. The bottom box (marked 4) labels the function keys for each screen. For menu screens, such as this example, the capitalized text from box 3 corresponds directly to the function key labels. The F1 and F10 function keys perform the same functions for all RSS screens.

The F1 function key is used to access the HELP function. At any time, you may press F1 to get more information about the menu or data field being displayed. The F10 function key is used to EXIT the current screen and to return to the previous screen. If you attempt to exit a Service screen before you program the new data, you will be prompted “Are You Sure?” and can choose to Abort the Exit.

2.4 HOW TO USE THE KEYBOARD

All RSS keyboard commands are summarized in this section. The F1 HELP function also provides keyboard information. From any screen, you may view this list by pressing F1 (HELP) and then press F2 (KEYBOARD HELP).

F1:	Help Information
F1-F9:	Execute Labeled Function
F10:	Return to the PREVIOUS Menu
ESC:	Return to the MAIN Menu
TAB (or ENTER):	Advance Cursor to Next Data Field
Shift TAB:	Backup Cursor to Last Data Field
UP/ DOWN Arrow keys:	Increment / Decrement Value or Selection
LEFT / RIGHT Arrow:	Move Cursor Within Data Field
INSERT:	Insert Space at Current Cursor position
BACKSPACE:	Erase Data Within Field and Move Cursor Left
DELETE:	Erase Current Character
HOME:	Move Cursor To Upper Left Data Field
PAGE UP / PAGE DN:	Change Displayed Page

2.5 HOW THE SCREENS ARE ORGANIZED

The RSS screens are organized in a tree, as shown in Figure 2-3. You cannot randomly jump from one screen to another, but must move up and down the branches by using the menu screens and function keys. Refer to paragraph 2.8 for an explanation of the MAIN Menu functions.

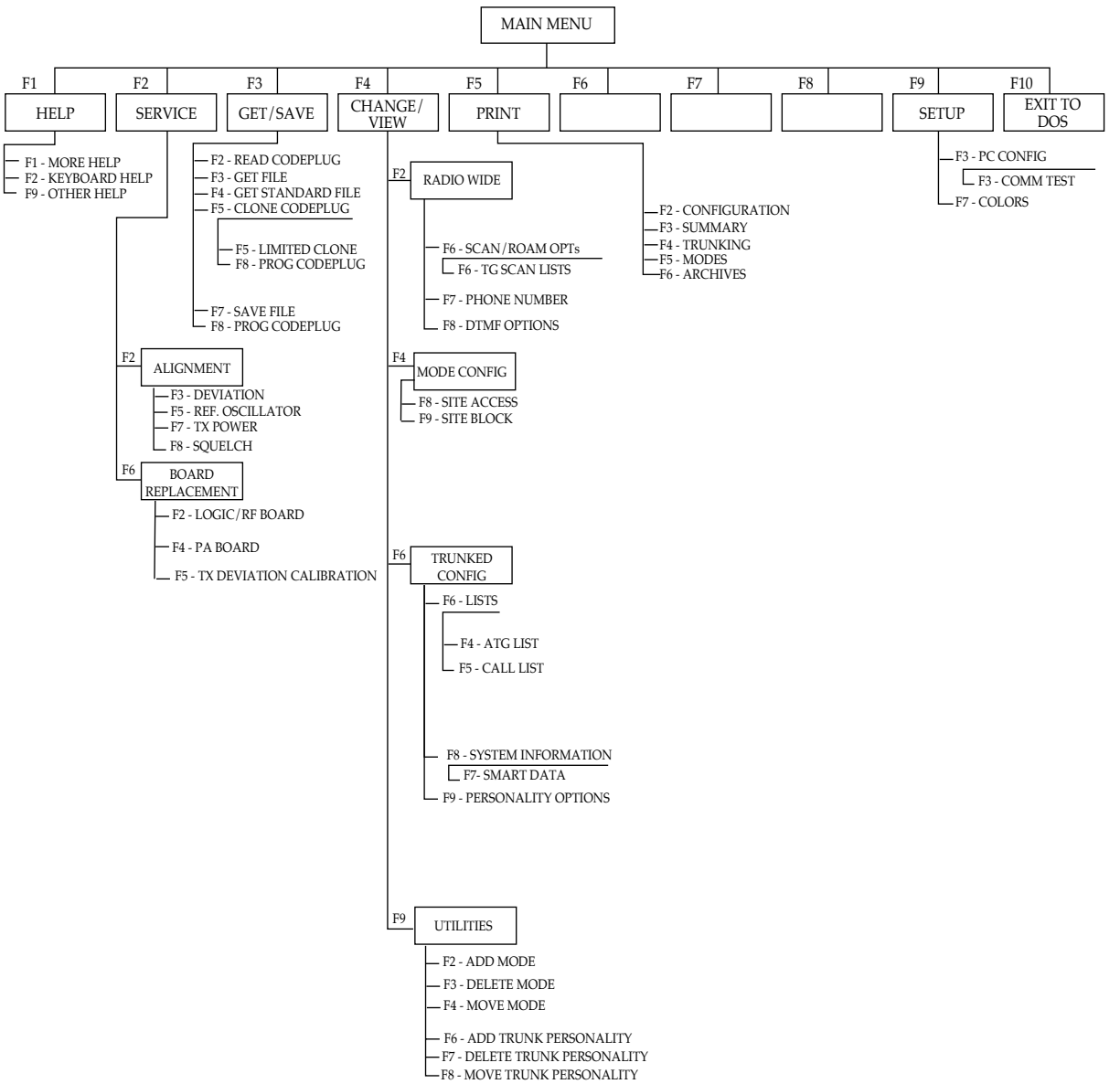

Figure 2-3. Radio Service Software Organization

Note:

This manual covers the Motorola and LTR (E.F.Johnson) Protocols. Therefore, depending on the model, the user must choose whether to program the codeplug with the Motorola or LTR Protocol.

2.6 HOW TO INSTALL THE SOFTWARE

A. HARD DISK INSTALLATION

To install the software on your hard disk, an installation program is included on PROGRAM DISK #1. The install program will ask which disk the RSS should be installed on, and will also ask for the directory in which it should be installed. For GTX, a default location of C:\MRSS\GTX will be offered. If you desire to install the RSS on a different disk or in a different directory than the default, enter the desired disk and directory when prompted. Once the install location has been chosen, the following files will be installed at that location:

For GTX:

1. GTX.MDF
2. GTX.EXE
3. GTX.HLP
4. README.TXT

To use the install program, place the PROGRAM DISK #1 into drive A: and log on to drive **A:**. To start the install program, type:

INSTALL: [Press Enter]

NOTE

The install routine uses a decompress algorithm and the install time is dependent upon the computer's speed.

After installing, the program displays that the installation has been successfully completed. Remove the supplied copy of the RSS and store it in a safe place. This will ensure that you will always have an uncorrupted copy available should anything happen to your hard disk.

The install routine automatically creates two sub-directories for storage of archive files: ARCHIVE and BACKUP. These files are created in the directory where you installed the RSS.

To create the System Key File path name, type:

MKDIR C:\MRSS\GTX\SYS_KEYS [Press Enter]

To complete the installation procedure for hard disk operation, you must start the program to configure it for your application (monitor type, serial port). To start the program, type:

GTX.exe [Press Enter]

2.7 HOW TO CONFIGURE THE SOFTWARE FOR YOUR COMPUTER

The first time the RSS is installed, the program may initially respond with a SERVICE SOFTWARE CONFIGURATION Menu as shown in Figure 2-4. The SERVICE SOFTWARE CONFIGURATION Menu has two active function keys, F3 and F7.

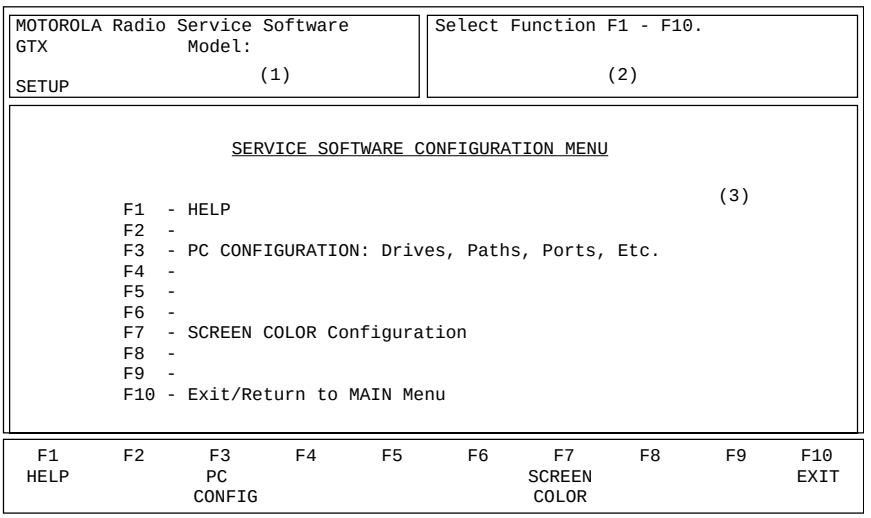

Figure 2-4. Service Software Configuration Menu

Press the F3 function key to access the CONFIGURE COMPUTER screen (Figure 2-5) to set default disk drive paths for Archive, Backup, System Key files. This is also used to select the communications port (COM 1 or COM 2) for the RIB connection.

Refer your computer owner's manual for a complete description of path names and asynchronous communication ports.

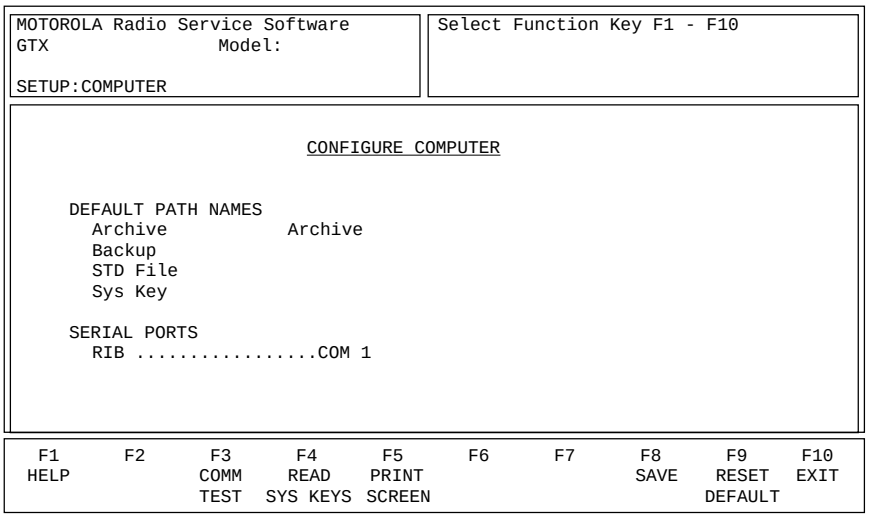

Figure 2-5. Configure Computer Screen

Use the following steps to configure your computer:

1. Enter the default disk drive where you plan to keep your archive files. If you have a hard disk system and want to save archive files on the hard disk, enter the Archive File path name which was created previously (see paragraph 2.6). Example:

   ARCHIVE

   For a floppy disk system, you should enter disk drive **A:** or **B:**.

2. Next, you must enter a default BACKUP disk drive for your archive files if you have chosen to store your archive files on your hard disk. Enter either **A:** or **B:**

   After archiving a codeplug file to a hard disk sub-directory, the RSS automatically prompts you to install a floppy disk in this drive to make a backup. If you have a dual floppy system, skip to step 3. Diskette backups for dual-floppy systems should be handled via standard DOS file copy procedures.

3. If you have been assigned System Keys, then it will be necessary to define the path name in which the System Key files reside. If you have a hard-disk system, enter the System Key file path name which you created previously.

   Example: C:\MRSS\SYS_KEYS

   Once the System Key path is defined, the user may load System Key files using the READ SYS KEYS (F4) function. If the System Key path name is stored (step 6) then during program start-up, the RSS will automatically load the System ID from every valid System Key found in the specified drive and path.

4. Use the UP/DOWN arrow keys to select to which Asynchronous Communications Port (COM 1 or COM 2) your RIB (Radio Interface Box) is connected.
   If you are not sure how your computer is configured or if you have two Asynchronous Communications Ports, the COMM TEST (F3) function may be used to verify that your computer is able to READ and PROGRAM a radio codeplug properly.

   The COMM TEST function will verify your system is functioning properly by sending commands to the radio and checking for the proper response. No codeplug changes will result from these commands. An OK response will be displayed in the Status Window if the system checks OK.

   After the computer and RIB are connected as given in paragraph 2.2, turn the radio on, and execute COMM TEST by pressing F3. If the communication test fails, select COM 2 and repeat COMM TEST. If the test fails the second time, check your setup as given in Paragraph 2.2.

5. To complete the computer configuration, press F8 to SAVE the configuration information to a file on the program disk. Every time you use the RSS, the configuration that you SAVED last will be used. At anytime the configuration may be changed and SAVED.

   All selections may be reset to the original values by pressing the F9 (RESET DEFAULT) function key. Note RESET DEFAULT does NOT save the configuration. If the default values are desired, you must save them by pressing F8 (SAVE).

6. Press F10 to return to the PROGRAMMER CONFIGURATION menu. If you have a color monitor, continue with step 8. Otherwise, this completes the software installation procedure. Press F10 again to move to the Banner screen and then press any key to continue to the MAIN Menu. The MAIN Menu is described in Section 2-8.

7. Press F7 function key to access the CONFIGURE SCREEN screen (Figure 2-6) to enable the color display option and configure your screen colors.

   A color monitor and color display interface card is required for proper color operation. Please refer to your computer owner's manual and/or ask your computer dealer if you have questions regarding the color capability of your computer.

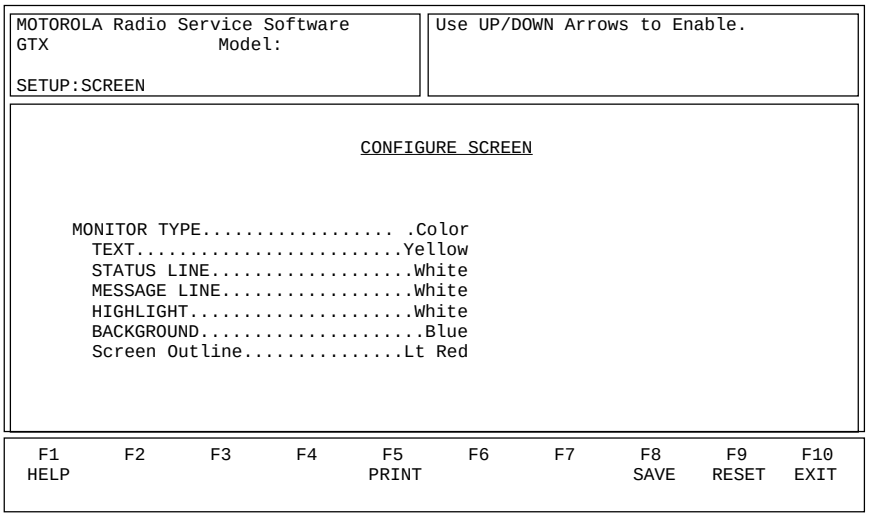

Figure 2-6. Configure Screen

8. Use the UP/DOWN arrow keys to select COLOR MONITOR TYPE. Once COLOR is enabled, you may change the colors of various sections of the display. Press the TAB or ENTER key to change fields and use the UP/DOWN arrow keys to change colors.

NOTE

For some portable or laptop computers with LCD displays, it may be necessary to configure the MONITOR TYPE as MONO in order to see the cursor during typical operation. Adjusting the color combinations while running in COLOR mode will also provide a method to improve cursor visibility. To save your selections, press the F8 function key. Pressing F9 will return the screen to the default settings.

This completes the software installation procedure. Press F10 twice to move to the Banner screen. Press any key to return to the MAIN Menu.

2.8 THE MAIN MENU

The MAIN Menu (Figure 2-7) is the top level of the program tree as shown in Figure 2-3. The RSS provides four basic functions which are selected from the MAIN Menu:

1. SERVICE
2 GETTING (or SAVING) Codeplug Data
3. CHANGING (or VIEWING) Codeplug Data
4. PRINTING Codeplug Data

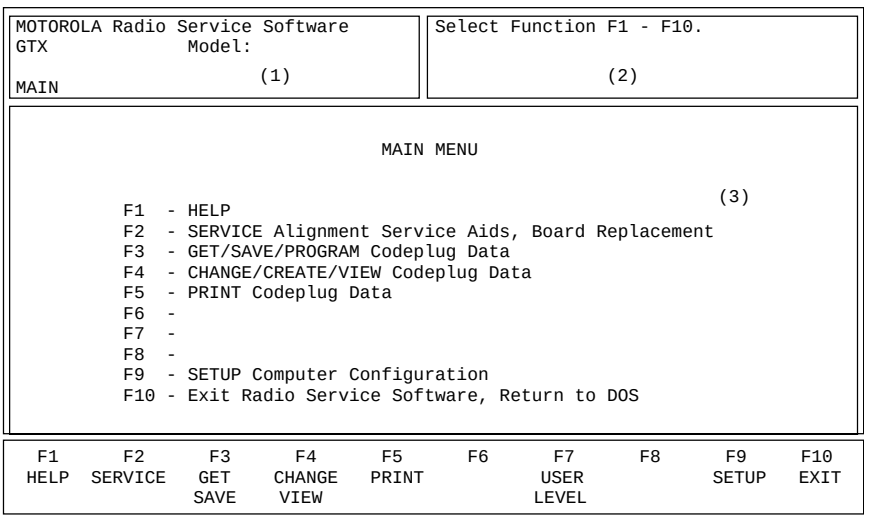

Figure 2-7. The MAIN Menu

After making a selection via the function keys, you will be directed to similar menus and/or data entry screens. From any point in the program, you may always return to the MAIN Menu by pressing the ESC (Escape) key.

Each programmer function is described in detail in the remainder of this section. F1 - The HELP function gives specific information regarding the current menu or highlighted data field. From the Help function, general information is available by pressing F1 again (MORE HELP).

In addition, the HELP function provides access to:

KEYBOARD HELP	(F3) - A summary of the keyboard commands
PRINT HELP	(F5) - Hard copy of the Help information
OTHER HELP	(F9) - Radio serial number, software version numbers, cable numbers, etc.

F2 - The SERVICE function is a multi-level menu that permits access to radio ALIGNMENT, UPDATE, and BOARD REPLACEMENT screens. The radio contains no internal alignment or tuning adjustments; all alignment is performed via the SERVICE screens.

A radio must be connected to your computer via the RIB before you will be permitted to access the SERVICE screens. All SERVICE screens access the codeplug directly; therefore, you do NOT have to read the codeplug data (via the GET/SAVE functions) before using the SERVICE screens.

All SERVICE functions are explained in Section 3.

F3 - The GET/SAVE function is used to READ codeplug data from a radio and/or GET an archived codeplug image from a diskette or hard disk for editing purposes (via the CHANGE/VIEW function). GET/SAVE is also used to PROGRAM modified codeplug data back into the radio, or SAVE an archive file on a diskette (or hard disk). Radio/Codeplug CLONING is also available via the GET/SAVE function.

All GET/SAVE functions are explained in Section 4.

F4 - The CHANGE/VIEW function is a multi-level menu that is used to change, view, or modify codeplug features and option configurations. The radio codeplug parameters are classified as RADIO-WIDE, MODE, and TRUNKED related. CHANGE/VIEW permits access to each of these categories.

Unlike the SERVICE function, a codeplug must be loaded into your computer's memory (via the GET/SAVE functions) before you can access the CHANGE/VIEW screens. You may CHANGE/VIEW an archive file without a radio connected.

All CHANGE/VIEW functions are explained in Section 5.

F5 - The PRINT function produces permanent records of codeplug configurations and/or RF alignment settings. A printer is required and should be connected to your computer per your instruction manual.

All PRINT functions are explained in Section 6.

F9 - The SETUP function, previously discussed in Section 2-7, is used to configure your Radio Service Software to your particular application. Default disk drives, communication ports, and even screen colors may be customized to your specific needs.

F10- The EXIT function is used to quit the program and return to DOS. Be sure all desired codeplug changes have been programmed back to the radio, and that an archive copy has been made. Otherwise all changes will be lost since returning to DOS erases this data from the computer's memory.

3.0 SERVICING THE RADIO

All radio alignment and board replacement procedures are accessed from the service menu. A radio must be connected to your computer via a Rib Interface Box (RIB) and cables and the radio turned on before you are permitted to access the service screens. Figure 3-2 illustrates how the service screens are organized.

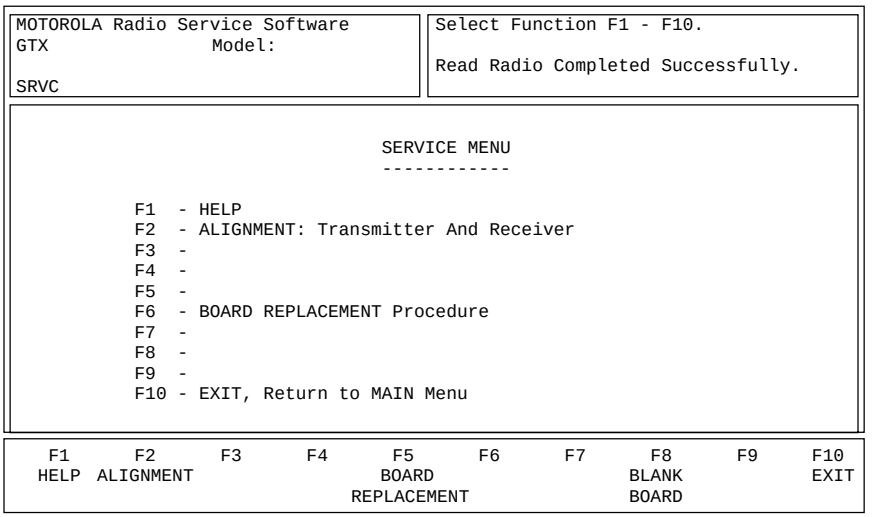

Figure 3-1. Service Menu

Function Key Descriptions:

F2 - Select ALIGNMENT to perform standard radio alignment procedures:

Transmitter VCO Deviation Adjustment Transmitter Power Set
Reference Oscillator Warp Adjustment Squelch Adjustment

F6- The BOARD REPLACEMENT function is used for servicing the radio when board repairs and/or replacement are required. Special initialization procedures and step-by-step instructions are given for all realignment procedures when replacing or servicing one or more of the following area:

Logic Board or RF Board
TX Deviation Calibration
Power Amplifier (PA) Board

All service screens read and program the radio codeplug directly; you do not have to use the GET/SAVE functions to use the service menus. You will be prompted at each service screen to save the new values before exiting the screen.

IMPORTANT

Do not switch off your radio in the middle of any service procedure. Always use the EXIT key to return to the MAIN menu screen before disconnecting the radio. Improper exits from the service screens may leave the radio in an improperly configured state and result in seriously degraded radio or system performance.

The service screens introduce the concept of a "softpot", an analog “Potentiometer” controlled by “Software”. As stated earlier, the radio does not contain any internally adjustable components. All RF and tuning adjustments are controlled by software.

Each service screen provides the capability to increase or decrease the 'softpot' setting with the keyboard UP/DOWN arrow keys respectively. A graphical scale is displayed indicating the minimum, maximum, and current value of the softpot setting.

When softpot value is adjusted, information is sent to the radio to increase (or decrease) a DC voltage in the corresponding circuit. For example, when on the Reference Oscillator Warp Adjustment screen, you press the UP arrow key to increase the frequency, which in turn provides instructions to the radio microprocessor to increase the voltage across a varactor in the reference oscillator.

In ALL cases, the softpot value is just a relative number, corresponding to a D/A (digital-to-analog) generated voltage in the radio. All standard measurement procedures and test equipment are applicable and are NOT affected in any way.

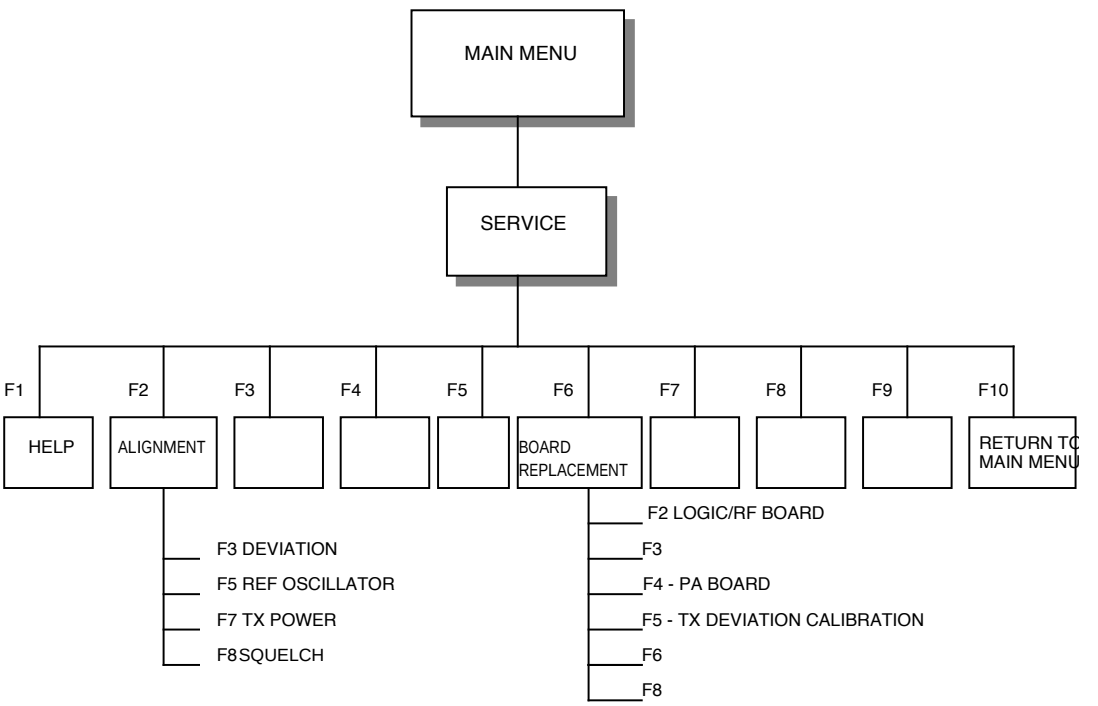

Figure 3-2. Service Screens Organization

3.1 ALIGNMENT

Standard periodic alignment procedures are performed from the ALIGNMENT Menu. These include:

1. Transmitter VCO Deviation Adjustment
2. Reference Oscillator Warp Adjustment
3. Transmitter Power Set
4. Squelch Adjustment

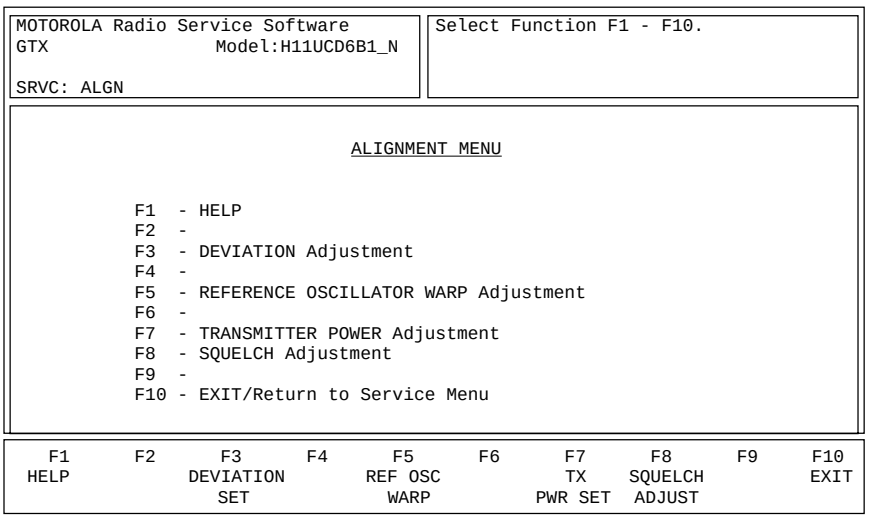

Figure 3-3. Alignment Menu

3.1.1 TRANSMITTER DEVIATION

Refer to your service manual for the DEVIATION ALIGNMENT procedure. Deviation must be checked when the radio is serviced, and must be readjusted after any Compensation adjustments are made. Motorola Radio Service Software (RSS) uses UP/DOWN arrows to adjust value.

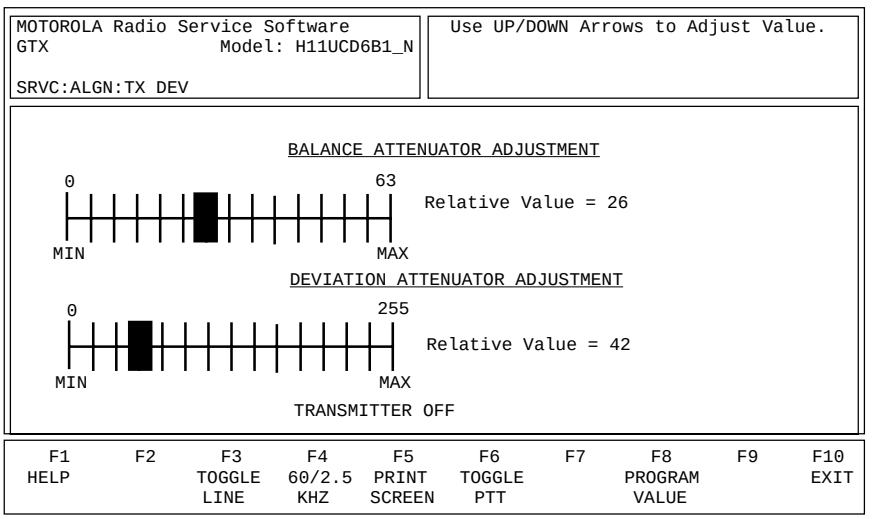

Figure 3-4. Transmitter Deviation Adjustment

The Radio has two adjustments for Transmit Deviation. Use Balance ATTENUATOR ADJUST meter to balance the deviation between high and low frequency. Use deviation ATTENUATOR meter to adjust the deviation level. Use the F3 “Toggle Line” function key to switch between the two adjustments.

3.1.2 REFERENCE OSCILLATOR WARP

Refer to your service manual for the REFERENCE OSCILLATOR ALIGNMENT procedure.

NOTE

The radio internal circuitry must be at room temperature (25 +/- 3 degree C; 77 +/- 5 degree F) to properly center the adjustment. Additionally, the radio should not be heated by transmitting or operating at a loud audio setting for a long period of time. Turn the radio off and let the radio cool thoroughly to room temperature before setting the Reference Oscillator.

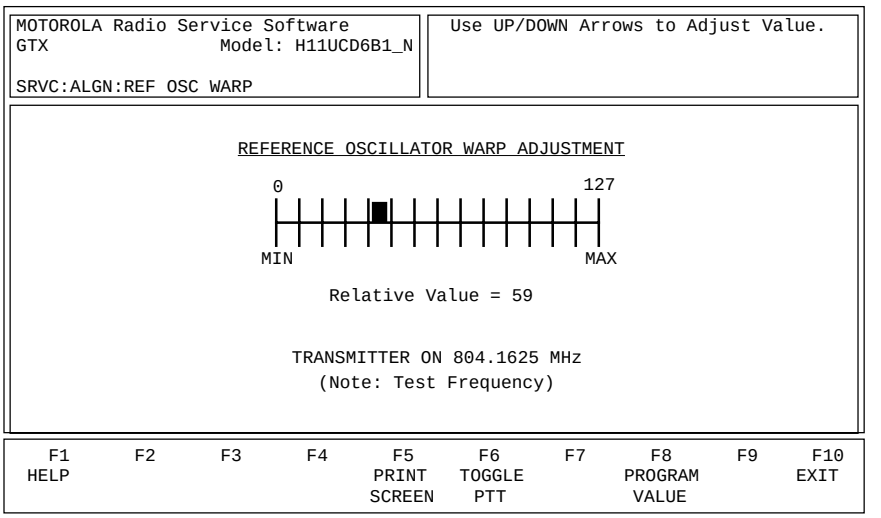

Figure 3-5. Reference Oscillator Warp Adjustment

Before warping, connect the radio antenna output to some frequency measuring equipment like the R 2000.

The reference oscillator is warped by first keying the radio via F6, and then by pressing the UP/DOWN arrow keys respectively. A relative warp value is displayed, but the actual transmitter frequency must be determined from your frequency counter or service monitor. A three minute time-out-timer is enabled when the radio is keyed via the F6 key.

Using the UP/DOWN arrow keys, adjust the Reference Oscillator Warp to the frequency displayed on the screen. Press F6 again to de-key the radio, and then press F8 to program the value to the radio.

3.1.3 TRANSMITTER POWER

Refer to your service manual for the TRANSMITTER POWER ALIGNMENT procedure.

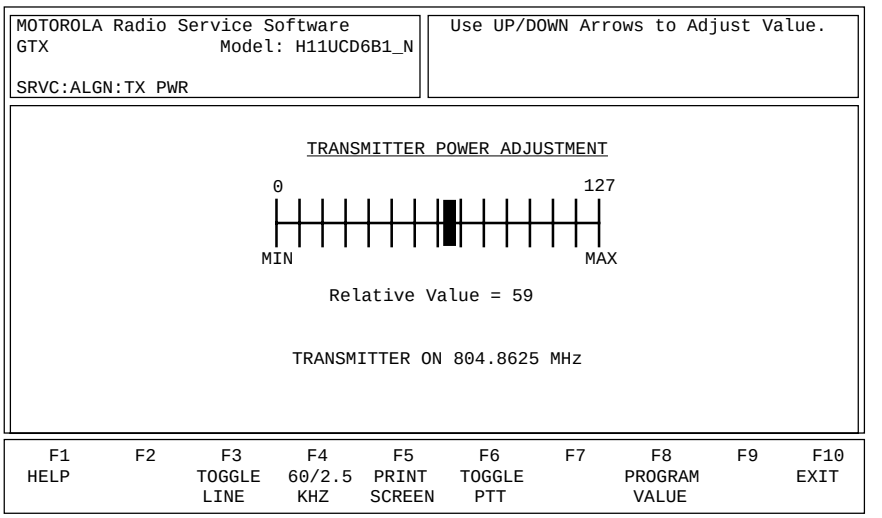

Figure 3-6. Transmitter Power Adjustment

Transmitter Power is adjusted by first keying the radio via F6, and then by pressing the UP/DOWN arrow keys to increase or decrease power respectively. A relative Tx Power value (NOT WATTS!) is displayed, but the actual transmitter power output must be determined from your service monitor.

The radio will transmit on the frequency displayed on the screen and should be terminated into a 50 ohm load or service monitor. A three minute time-out-timer is enabled when the radio is keyed via the F6 key.

Using the UP/DOWN arrow keys, adjust the Transmitter Power per your service manual. Press F6 again to de-key the radio, and then press F8 to program the value to the radio.

3.1.4 SQUELCH

Refer to your service manual for the SQUELCH procedure.

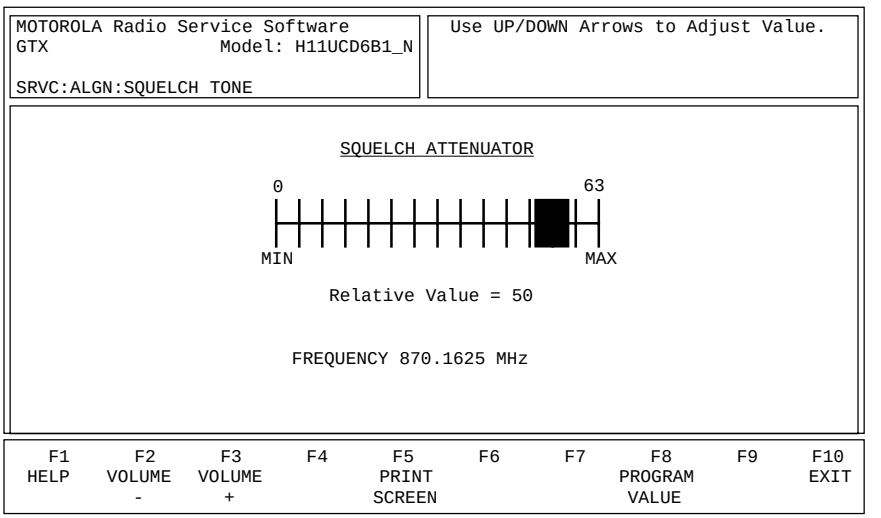

Figure 3-7. Portable Squelch Attenuator

The squelch attenuator setting is increased or decreased by pressing the UP/DOWN arrow keys respectively. A relative value between 0 and 63 is displayed on the screen. Adjust the squelch setting to the desired value.

This screen allows you to adjust the squelch level for Test Mode Frequency. Use the UP/DOWN arrows to change the value of the squelch.

The volume level keys enable you to adjust the volume level of the squelch when it is opened.

3.2 BOARD REPLACEMENT/REPAIR

The BOARD REPLACEMENT function is used for servicing the radio when board repairs and/or replacement are required. Special initialization procedures and step-by-step instructions are given for all realignment procedures when replacing or servicing one or more of the following areas:

Logic Board
Power Amplifier (PA)
TX Deviation Calibration

Refer to your service manual for BOARD REPLACEMENT procedures.

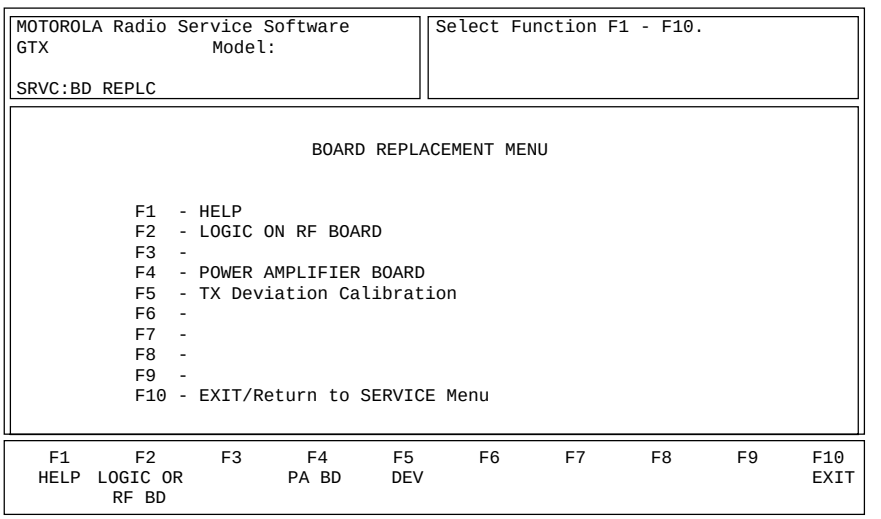

Figure 3-8. Board Replacement Menu

Each procedure is structured for execution in a top-to-bottom order to ensure proper calibration.

3.2.1 LOGIC OR RF BOARD REPLACEMENT

Replacing the Command Board requires the microprocessor to be initialized and the radio to be completely re-aligned. This procedure is used to perform both tasks. Verify that you have the proper alignment equipment ready before attempting this procedure. Once the alignment sequence is started, all steps must be completed in the listed sequence.

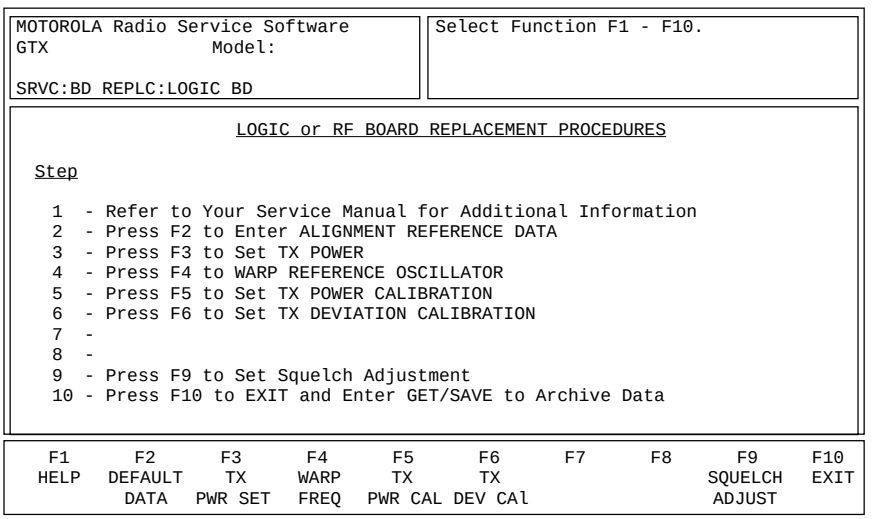

Figure 3-9. Logic Board Replacement

Refer to your service manual for LOGIC or RF BOARD replacement procedures. Only the function key for the step highlighted is active.

The replacement LOGIC OR RF Board should be installed per the service manual instructions. All replacement Command Boards are pre-programmed to enable the radio to function only at a test-mode level.

Perform steps from 2 through 9 to complete the required radio alignment. The RSS program does not allow the skipping of steps.

3.2.2 TRANSMITTER POWER CALIBRATION PROCEDURE

Refer to your service manual for the TRANSMITTER POWER CALIBRATION procedure. Use the ENTER key to move to the next step. Only the function key for the step indicated is active.

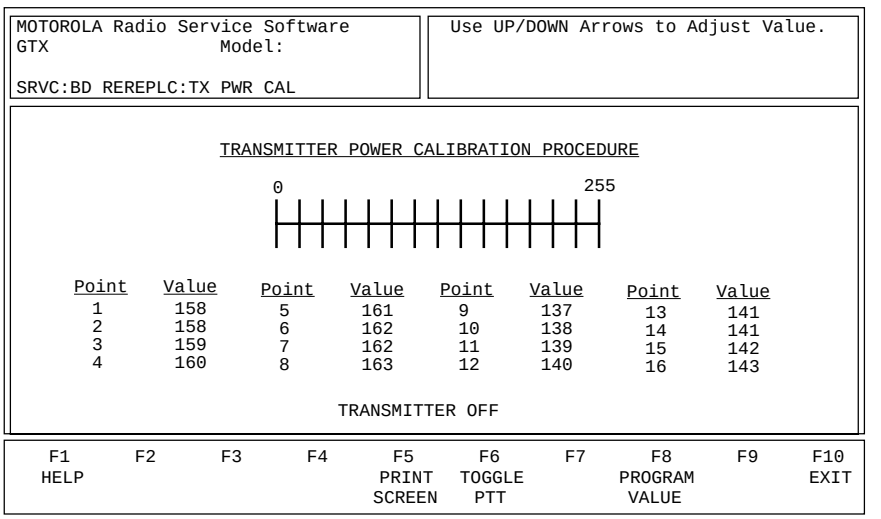

Figure 3-10. Transmitter Power Calibration

3.2.3 TX Deviation Calibration

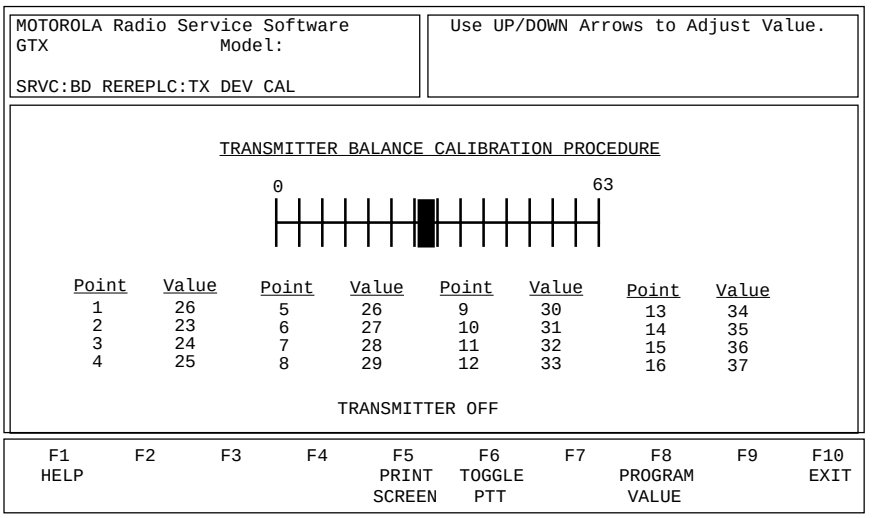

Figure 3-11. TX Deviation Calibration (1 of 2)

The TX Deviation contains two adjustment screens: Balance Attenuator and Deviation Attenuator.

Balance Attenuation

Balance Attenuator Alignment is required after replacing or servicing the board. This alignment procedure balances the modulation contributions of the low and high frequency portions of a baseband signal. Proper alignment is critical to the operation of signalling schemes that have very low frequency components (i.e) DPL which could result in distorted waveforms if not adjusted properly.

This procedure needs to be performed at multiple frequencies to allow proper alignment across the entire RF band. The RF band is divided into frequency zones with calibration point (value) in each zone.

The following procedure should be carried out by qualified service personnel:

1. Press F6 to key-up radio. The radio's RF input must be terminated into a 50 Ohms load.
2. Set the Tx deviation as a reference.
3. Press F4 to switch to 2.5 KHz.
4. Modify the balance attenuator setting using the UP/DOWN arrow keys.
5. Measure the actual Tx deviation with a service monitor.
6. Repeat steps 4 and 5 until balance deviation specification is achieved.
7. Press F6 to de-key the radio.
8. Use the tab key to move between frequency points.
9. Press F8 to save the new values.

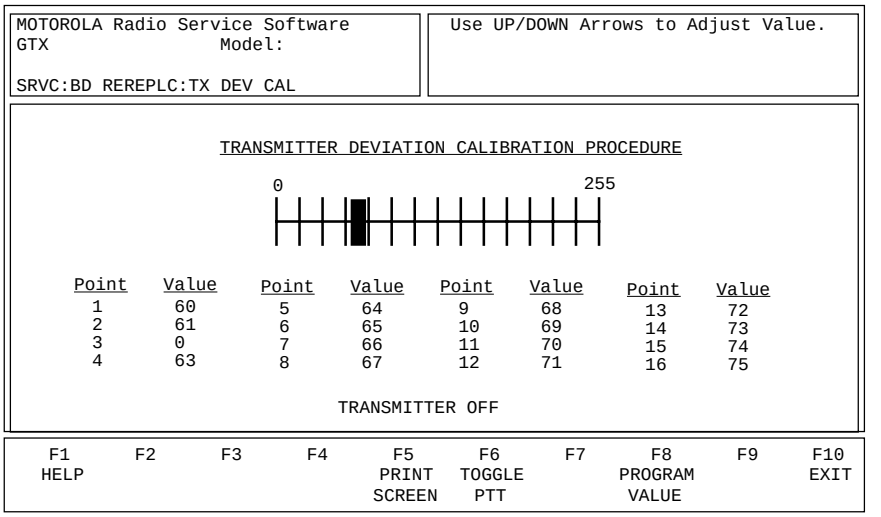

Figure 3-12. TX Deviation Calibration (2 of 2)

Deviation Attenuation

Deviation Attenuator Alignment is required after replacing or servicing a board. This procedure needs to be performed at multiple frequencies to allow proper alignment across the entire RF band. The RF band is divided into frequency zones with calibration point (value) in each zone.

The following procedure should be carried out by qualified service personnel:

1. Press F6 to key-up radio. The radio's RF input must be terminated into a 50 Ohms load.
2. Apply the appropriate signal as instructed in the service manual.
3. While transmitting, modify the deviation attenuator setting using the UP/DOWN arrow keys.
4. Measure the actual TX deviation with a service monitor.
5. Repeat steps 4 and 5 until TX deviation is achieved.
6. Press F6 to de-key the radio.
7. Use the tab key to move between frequency points.
8. Press F8 to save the new values.

4.0 GET/SAVE CODEPLUG DATA

The GET/SAVE functions are used to transfer codeplug data from your radio or an archive file into your computer, thus enabling you to change, view, or print. The GET/SAVE function also permits you to program modified data back into your radio or to save a copy of the codeplug data in an archive file. The GET/SAVE menu is shown in Figure 4-1.

IMPORTANT

Do not turn off the radio or disconnect it from the computer while attempting to program the codeplug. Interrupting the programming process will destroy the codeplug contents and completely disable the radio. If an accident does occur, the radio may be restored from the archive file. For this reason, the archive file should always be created before programming the radio.

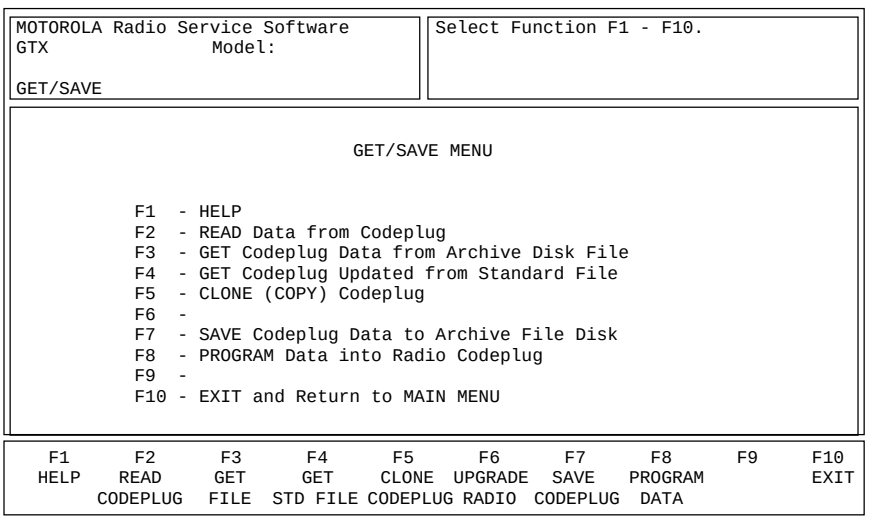

Figure 4-1. GET/SAVE Menu

Function Key Descriptions:

F2 -The READ CODEPLUG function reads the information (data) stored in the radio codeplug (EEPROM) and transfers it to the computer's memory. Ensure that the radio and RIB are properly connected to the computer, and power turned on before using the READ function.

The time required to READ a codeplug will depend directly on your computer type and the size of the codeplug you are reading. The status of the READ operation is displayed at the bottom of the screen.

F3 -The GET Archive File function is used to retrieve an archive file from a diskette or from a hard disk. Once retrieved, the file may be modified via the CHANGE/VIEW functions or programmed into a radio just as codeplug information read from the radio via the F2 READ function.

F4 -The GET Standard File function is used to update information from the disk file.

F5 -The CLONE Codeplug function is used to quickly reprogram a large number of radios by allowing the user to change Individual IDs and the serial number from within one screen while maintaining all other programmed values.

F6 - The UPGRADE RADIO functions are used to transfer codeplug data from radio or an archive file into the computer for upgrading, changing, viewing, or printing it. The data may also be programmed back into the radio or saved in a file.

F7 - The SAVE FILE function is used to create (or update) an archive copy of the codeplug information onto a diskette or hard disk. An archive copy of every radio installed or serviced is strongly recommended to be able to quickly restore customer information in case of a codeplug failure.

F8 - The PROGRAM CODEPLUG function is used to transfer codeplug information from the computer to the radio codeplug. After pressing the F8 function key, you will be prompted to press it a second time to prevent accidental programming. Ensure that the radio and RIB are properly connected to the computer, and power turned on before using the PROGRAM function.

4.1 READ CODEPLUG

The READ CODEPLUG function first reads the information (data) stored in the radio codeplug (EEPROM) and then transfers it to the computer's memory.

A radio and RIB must be properly connected to the computer and power turned ON before you attempt the READ function.

The time required to read a codeplug depends directly on the size of the codeplug being read. The status of the READ operation is displayed at the bottom of the screen.

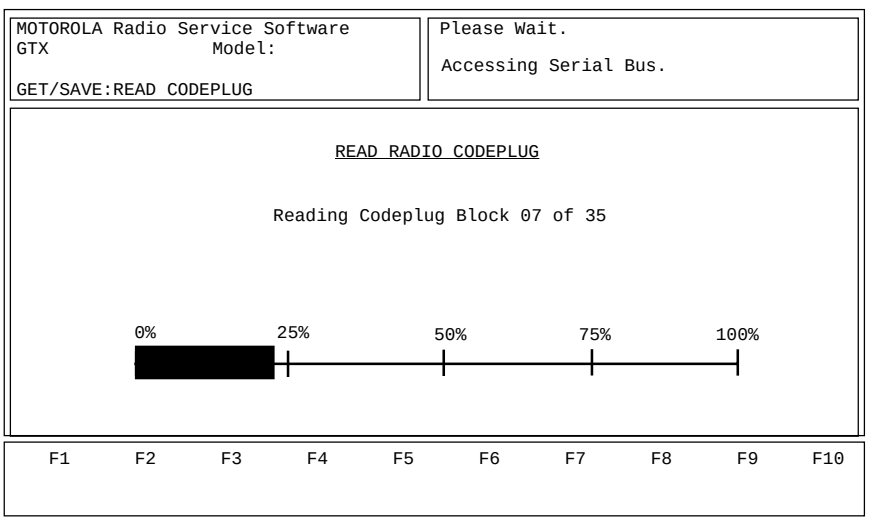

Figure 4-2. Read Codeplug

4.2 GET FILE

The GET FILE function is used to retrieve an archive file from a diskette or hard disk. Once retrieved, the file may be modified via the CHANGE/VIEW functions or programmed into a radio just as codeplug information is read from the radio via the F2 READ function.

Use the TAB (or ENTER) key to select the serial number of the radio to be retrieved. The corresponding model number, customer identification information, and the date the file was created will be displayed across the middle of the screen. The F8 function key is used to get the selected file as described below.

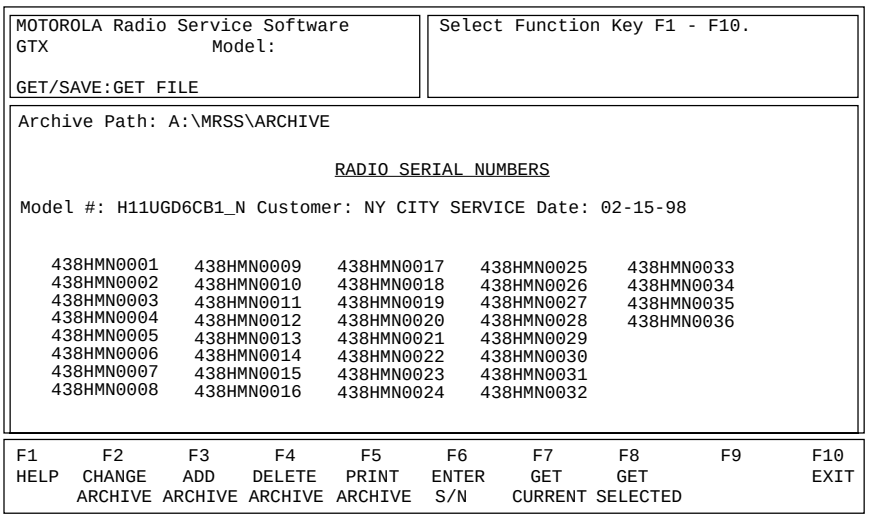

Figure 4-3. Get Archive File

Function Key Descriptions:

F2 - The CHANGE ARCHIVE function is used to specify the directory path where the archive file is to be located. The default archive path will always be the specified default path from the SETUP Menu.

F3 - The ADD ARCHIVE function will allow adding an archive file to the archive directory file in the archive directory path. If the directory file, DBF, is corrupted or erased and can not be recovered from a backup, then the only way to read the archive files is to add the archive files to another DBF file using the ADD ARCHIVE function. Refer to Section 7 of this manual for more information on the archive file structure and the DBF file.

To add a new file, ensure that the archive file is in the Archive path specified (while in DOS). Press F3 (ADD ARCHIVE), enter the 10 character radio serial number and press ENTER. Then enter 1-15 characters for Customer Name or ID and press ENTER. The new file will now be added to the archive directory file and will be visible on the screen. If the Radio Serial Number entered is less than 10 characters or already exists in the archive directory file, then the add operation will be aborted.

F4 -The DELETE ARCHIVE function erases a file from the archive directory file, DBF. The actual file itself is not deleted with this command. If an archive file is no longer needed and you want to delete it to save disk space, use this function to delete it from the directory, then use DOS commands outside the program to delete the actual archive file. Refer to Section 7 of this manual for more information on the archive file structure and the DBF file.

F6 - The ENTER S/N (serial number) function permits you to enter directly the serial number of the file you wish to retrieve. After entering the serial number, press ENTER and the computer will search the specified directory path to locate the file bearing that serial number.

F7 - The GET CURRENT function is used to GET the archive file for the radio currently connected to the computer. The computer will first READ the radio serial number, and then search the specified directory path for an archive file for that serial number. Only the specified path will be searched. Once the file is located, the computer will position the cursor to the archive file bearing that serial number. Press F8 to GET the file and return to the GET/SAVE menu.

The radio and RIB must be properly connected to the computer and turned ON thus enabling the GET CURRENT function to operate. Otherwise you will encounter serial buserrors and be instructed to check your setup.

F8 - The GET SELECTED function is used to GET the archive file highlighted on the screen. After the file is retrieved, the computer will return to the GET/SAVE menu.

Field Descriptions:

ARCHIVE PATH
Enter the directory path where the archive file is to be located. The default archive path will always be the specified default path from the SETUP Menu (see page 10). Refer to your computer owner's manual for a complete description of directories and path names.

SERIAL NUMBER
Enter the serial number of the codeplug archive file that you wish to retrieve and press ENTER. The computer will search the specified directory path to locate the file if it exists. Only the specified path will be searched.

Once the file is located, press F8 to get the selected file. A status message will inform you if the file does not exist on the specified path.

Use the page up and down keys to scroll to the list of the archive files if they appear on the next screen(s).

4.3 GET STANDARD FILE

The GET STANDARD FILE function is used to upgrade the codeplug information in the computer from standard file. In case of a STANDARD FILE not being available, then an error message is displayed. A STANDARD FILE is not applicable to LTR Radios.

After selecting F4 for Standard file update, the screen shown below will appear.

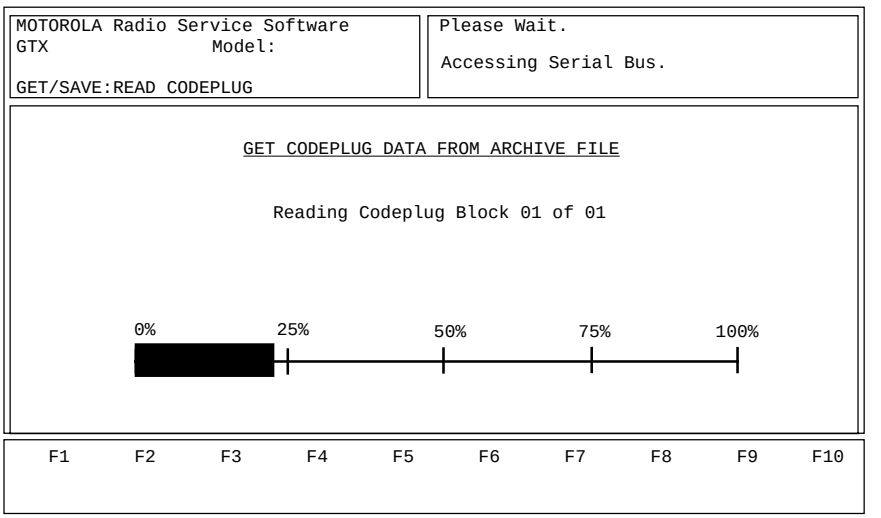

Figure 4-4. Get Standard File

After the “Standard File” is read, the screen shown below will appear.

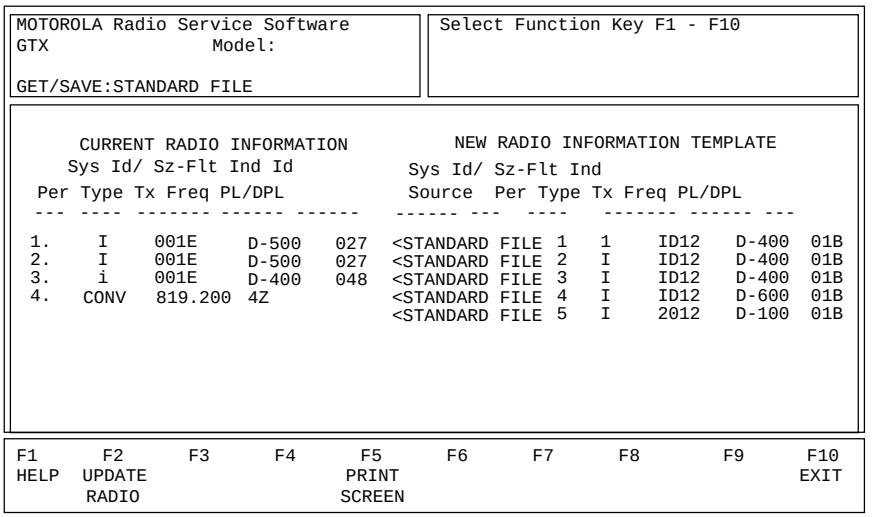

Figure 4-5. Standard File Merge

Function Key Descriptions:

F2 - The UPDATE DATA function is used to update the codeplug information in the computer's memory from the update file download from the ID Assignment System. Upon entering the GET Standard File screen, the program will attempt to locate the update file for the current serial number. If the file exists in the Standard File path defined on the setup screen, press the F2 function key to update the codeplug information.

STANDARD FILE PATH - EDITED ON THE SET UP CONFIGURATION SCREEN

Enter the directory path from where the Standard Update file is to be retrieved. The default path will always be the specified default path from the SETUP Menu (see page 10).

4.4 CLONE RADIO

The CLONE RADIO function is used to copy codeplug information from one radio to another radio. Only radios with the same model number may be cloned. A radio or radio archive must first be read into the program. One of the two cloning choices can then be made.

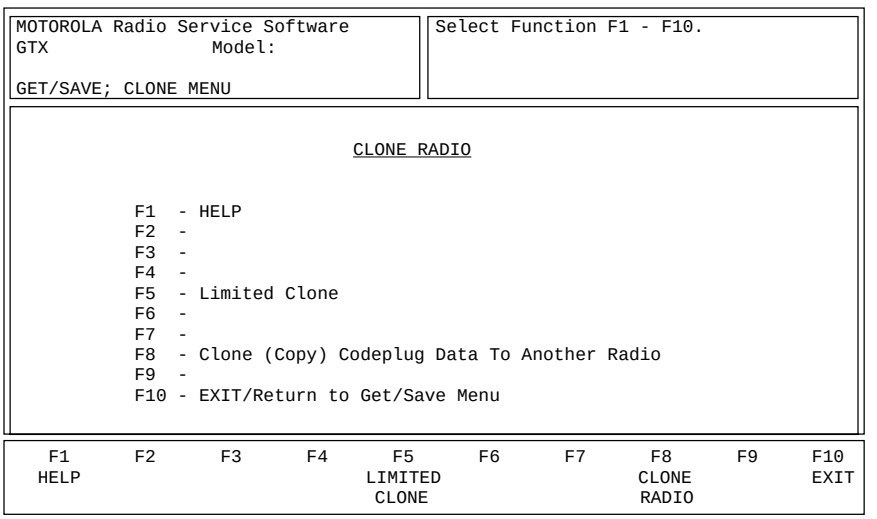

Figure 4-6. Clone Radio Menu

Function Key Descriptions:

F5 - The LIMITED CLONE function will copy codeplug data that has been loaded into the program from a radio or archive into the radio connected to the computer. Only radios with the same model number may be cloned. Trunking data base controlled parameters will not be cloned. Only phone list, call lists, and scan lists will be cloned on trunking radios.

F8 - The CLONE function is used to transfer codeplug information from the computer to the radio codeplug. Radio's serial number will be preserved. When F8 is pressed a screen is displayed which lets the user change the individual IDs and emergency fleet default Individual ID. This function will not be allowed if a system key is not loaded into the program for all the trunking systems being programmed into the radio.

4.4.1 LIMITED CLONE (Not for LTR Radios)

The LIMITED CLONE function is used to copy codeplug information from one radio to another one. Only radios with the same model number may be cloned. Trunking data base controlled parameters will not be cloned. Only phone list, call lists, and scan lists will be cloned on trunking radios. System keys are not required to perform this operation.

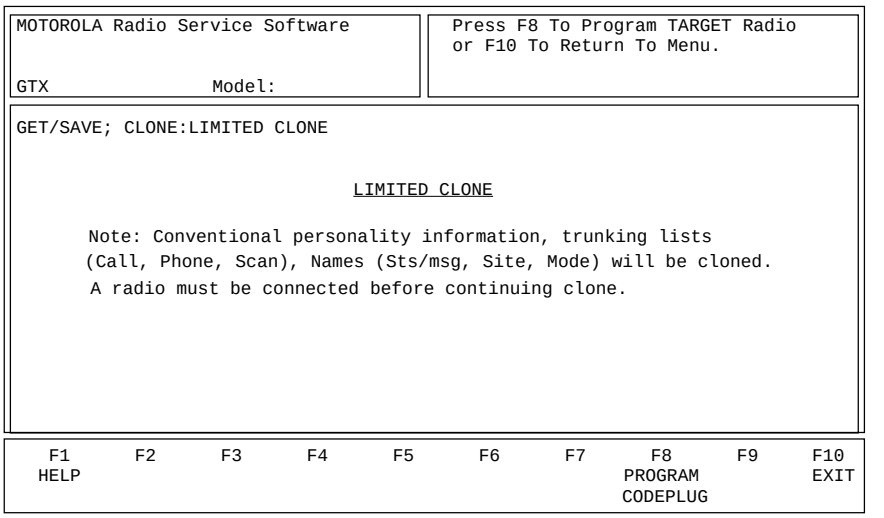

Figure 4-7. Limited Clone

The clone procedure is listed below:

1. Use the GET/SAVE functions to Read the radio codeplug to be cloned, i.e. the "Source" codeplug. An archive file may also be used as the "Source" codeplug.

2. Connect the "Target" radio to the computer, and press the F8 function key to program the "Source" codeplug into the "Target" radio.

4.4.2 CLONE CODEPLUG

The CLONE CODEPLUG function is used to provide rapid reprogramming of radios which are intended to be common with exception to radio serial number and trunking system individual IDs. Codeplug cloning is allowed only if the user is a self maintained user with system key files to match the system IDs of each trunking personality, or if the user has an FTR key.

If cloning is allowed, enter the serial number of the radio to be programmed and the Individual ID assigned to the radio.

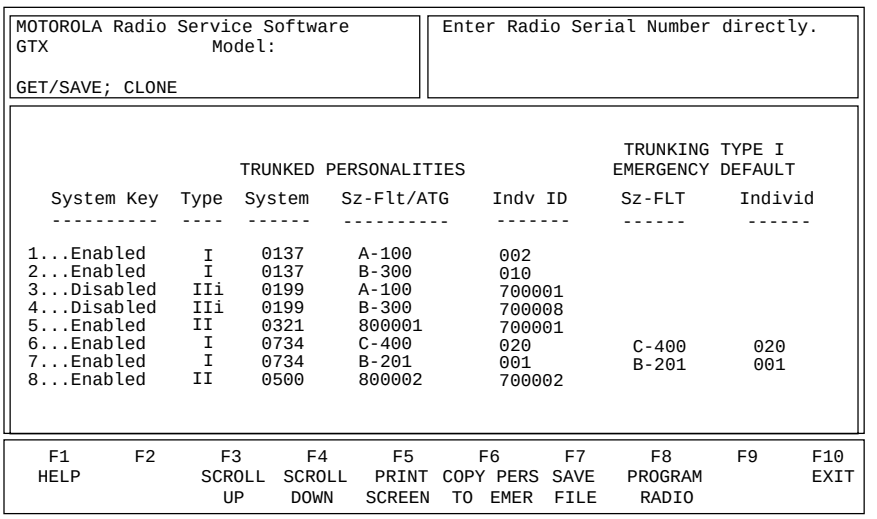

Figure 4-8. Clone Codeplug

Function Key Descriptions:

F3 - The SCROLL UP function is used to page up to the previous group of eight (8) trunking personalities.

F4 - The SCROLL DOWN function is used to page down to the next group of trunking personalities.

F6 - The COPY PERS TO EMER function is used to set all the Type I personality Emergency Default Individual IDs to the same value as the personality Individual IDs

F7 - The SAVE FILE function is used to create (or update) an archive copy of the codeplug information onto a diskette or hard disk. If you are creating the file on a hard disk, you will automatically be instructed to backup the data onto a diskette. Please refer to Section 4.5 for a more detailed description of the SAVE FILE function.

F8 - The PROGRAM RADIO function programs the attached radio with the trunking personality information as displayed on the clone screen. The following four conditions e cloning is allowed:

(1) All System Keys must be enabled,
(2) Radios to be cloned to/from must bear the same Model Number,
(3) Radios to be cloned to/from must be from same Product Line, and
(4) Radios to be cloned to/from must have same version of Radio Software.

The clone procedure is listed below:

1. Use the GET/SAVE functions to Read the radio codeplug to be cloned, i.e. the “Source” codeplug. An archive file may also be used as the “Source” codeplug.

2. Enter the Personality Individual IDs and Emergency Default Individual IDs for the “Target” radio.

3. Connect the "Target" radio to the computer, and press the F8 function key to program the “Source” codeplug into the "Target" radio.

4.5 SAVE FILE

The SAVE FILE function is used to create (or update) an archive copy of the codeplug information onto a diskette or hard disk. If you are creating the file on a hard disk, you will automatically be instructed to backup the data onto a diskette. This backup procedure is described in the next section.

An optional 15-character name can be given to an archive file to facilitate tracking.

Make an archive copy of every radio you install or service. Thus, in case of codeplug failure you have the archive copy ready to quickly restore customer information.

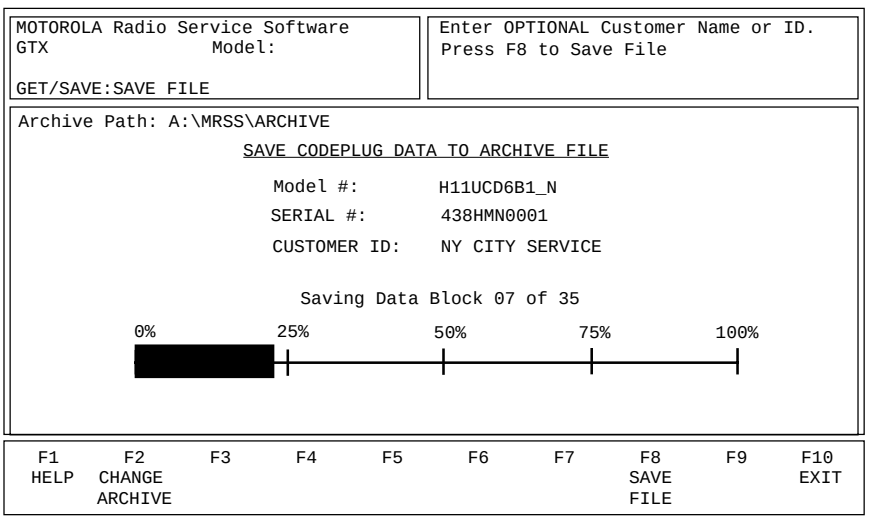

Figure 4-9. Save File

Function Key Descriptions:

F2 - The CHANGE ARCHIVE function is used to specify the directory path where the archive file is to be located. The default archive path will always be the specified default path from the SETUP Menu (see page 13).

The specified ARCHIVE path should be a path other than the root directory path. For example, the root directory path for a hard-disk drive will usually be "C:\". You should save your ARCHIVE data to a path name (or floppy disk) specifically set aside for the purpose of storing your ARCHIVE files.

F8 - The SAVE FILE function executes the save process. Do NOT press F8 until you have entered the customer identification information.

Field Descriptions:

CUSTOMER ID

Enter an optional 15-character (max) name for the archive file to facilitate tracking purposes.

4.5.1 BACKUP FILE

The BACKUP FILE procedure is used to make a backup copy of any archive file SAVED on a hard disk. If you are archiving to a diskette, you will NOT be prompted for a backup.

Diskette backups should be handled via standard DOS file copy procedures. Refer to your computer user's manual for additional information.

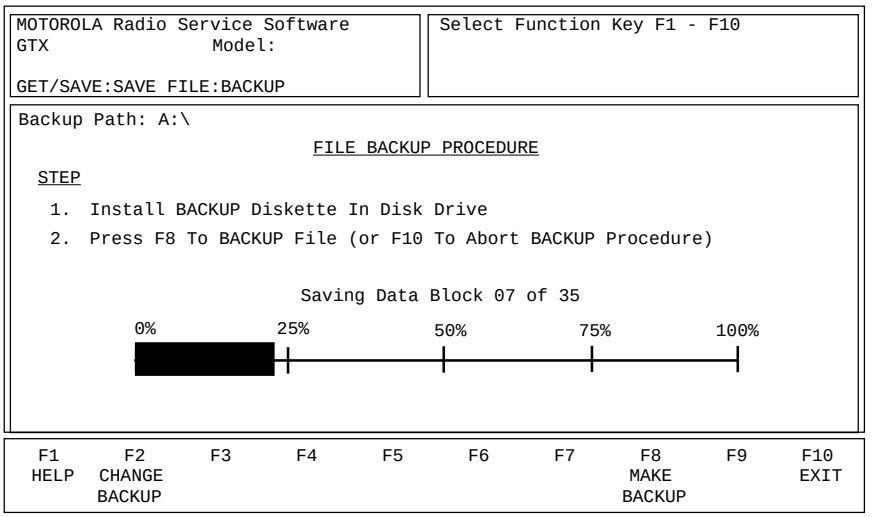

Figure 4-10. File Backup

Function Key Descriptions:

F2 - The CHANGE BACKUP path function is used to specify the directory path where the backup file is to be located. The default backup path will always be the specified default path from the SETUP Menu (see page 13).

F8 - The MAKE BACKUP function executes the backup process. After verifying that the Backup Path is correct and the backup diskette is installed, press F8 to make the backup copy. You will automatically be returned to the GET/SAVE menu.

Field Descriptions:

BACKUP PATH

Enter the directory path where the backup file is to be located. The default backup path will always be the specified default path from the SETUP Menu (see page 10).

Please refer to your computer user's manual for a complete description of directories and path names.

If a floppy disk is used to store archive files or backup files, it must be formatted before starting the program.

4.6 PROGRAM CODEPLUG

The PROGRAM CODEPLUG function is used to transfer codeplug information from the computer to the radio codeplug. After pressing the F8 function key, you will be prompted to press it a second time to prevent accidental programming.

A radio and RIB must be properly connected to the computer and power turned ON before you attempt the PROGRAM function.

The time required to PROGRAM a codeplug will depend directly on the size of the codeplug you are programming. The status of the PROGRAM operation is displayed at the bottom of the screen.

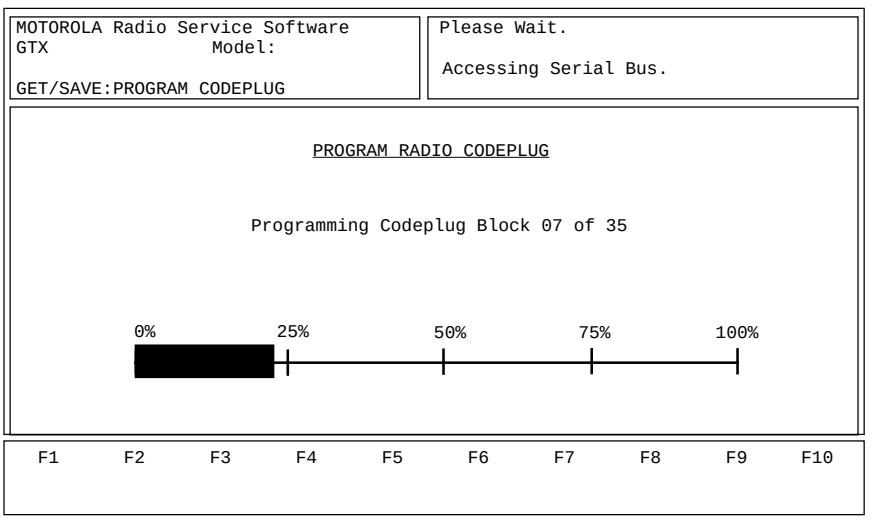

Figure 4-11. Program Codeplug

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5.0 CHANGE/VIEW

CHANGE/VIEW is a multi-level menu that is used to change, view, or modify codeplug features and option configurations. All codeplug parameters are classified as either RADIO-WIDE, MODE, TRUNKING, or DATA related. CHANGE/VIEW permits access to each of these categories. The CHANGE/VIEW functions are organized as shown in Figure 5-1.

NOTE

The CHANGE/VIEW screens observed during actual radio programming may vary from that shown in this section due to different radio models capable of being programmed with this version of radio service software (RSS) and the different features offered by each of them.

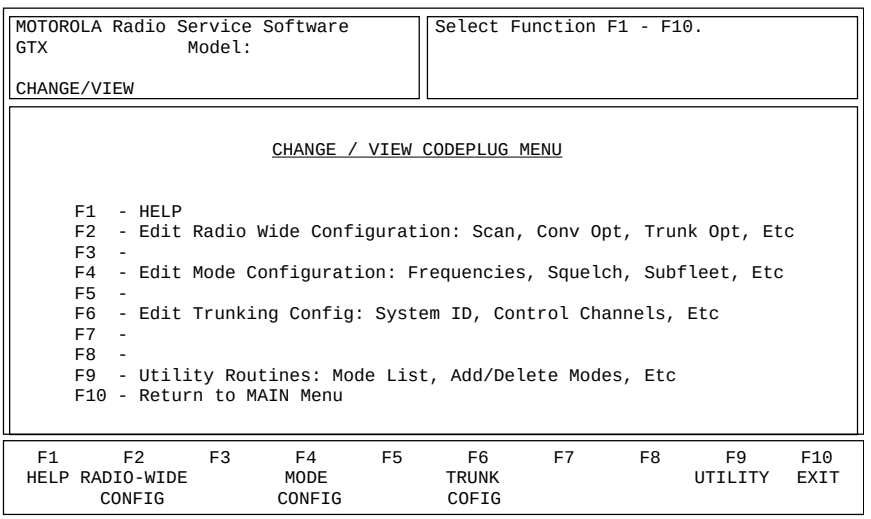

Figure 5-1. Change/View Menu

The radio, with its numerous codeplug parameters and options, offers tremendous flexibility to customize the radio configuration to almost any customer requirement. To insure that this level of flexibility does not complicate the task of field programming, the CHANGE/VIEW screens are organized with the major parameters at the base of the “tree”, and the optional parameters at the lower “branches”.

All radios are shipped from the factory programmed with default trunking and conventional data. Customer specific information must be programmed in the field via the CHANGE/VIEW screens.

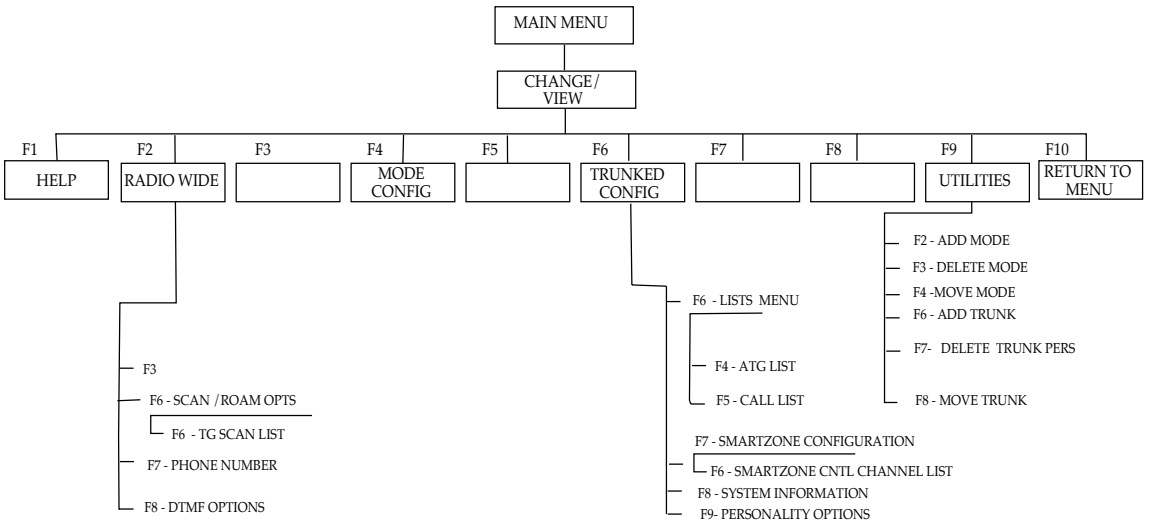

Figure 5-2. Change/View Screens

Function Key Descriptions:

F2 - RADIO-WIDE Configuration is used to change/view radio parameters and options that affect overall radio operation, including both conventional and trunking.

F4 - MODE Configuration is used to change/view mode specific information, such as conventional frequencies, squelch type and squelch codes, TOT, etc. For Trunking models you can VIEW Mode assignments of Personalities, Systems, talkgroup ID's, etc.

F6 - TRUNKING Configuration is a multi-level menu used to change/view trunking-only personalities, systems, system scan lists, and the phone list. All lists (Call and Scan) may be changed.

F9 - The UTILITY screen is used for adding, deleting, or moving the location (order) of Conventional and Trunked modes. Modes may also be copied (duplicated), including scan lists.

IMPORTANT

CHANGE/VIEW does not actually modify the radio codeplug data, but instead it modifies the copy of the data retrieved from the codeplug (or archive file) via the GET/SAVE functions. After all CHANGE/VIEW modifications are completed, you must return to the GET/SAVE menu and program the changes back into the radio or save them to a new archive file. Otherwise the modifications will be lost when you turn off your computer or load in another codeplug.

Unlike the SERVICE function, a codeplug must be loaded into your computer's memory (via the GET/SAVE functions) before you can access the CHANGE/VIEW screens. You may CHANGE/VIEW an archive file without connecting a radio.

NOTE

If your radio model does not contain a specific feature, you will not be permitted access to the corresponding data field or the screen for that feature. Refer to your catalog sheets or service manual for radio model descriptions and features.

5.1 CHANGE/VIEW RADIO-WIDE CONFIGURATION

RADIO-WIDE Configuration is used to Change/View radio parameters that affect overall radio operation, including both conventional and trunking.

NOTE

The following screen is a composite of all features/options available with all radio models. The screen associated with the example radio model during actual radio programming may vary from that shown below.

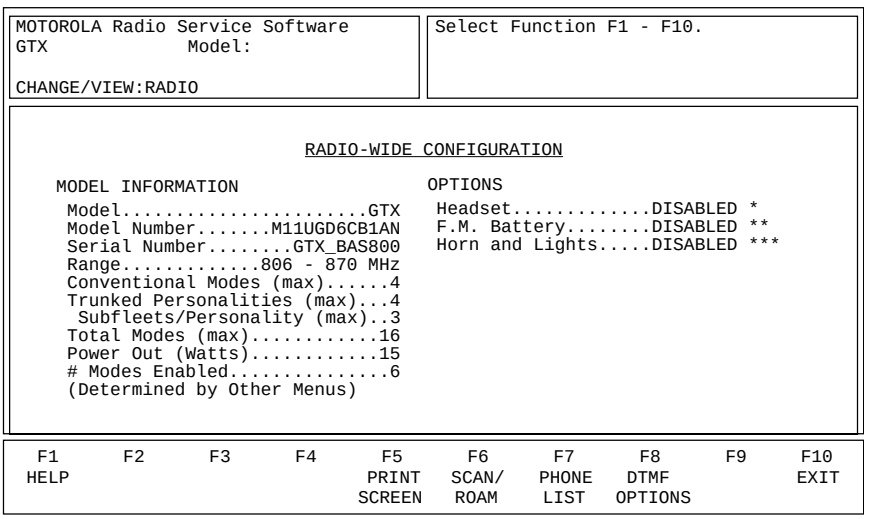

Figure 5-3. Radio Wide Configuration

Scan and wide area coverage (AMSS) options and timing parameters for both Conventional Scan and Trunking Scan may be accessed by pressing the F6 (SCAN/SEARCH) function key.

Pressing F7 will open the Phone List (see Figure 5-6) screen where a multiple phone number may be added or modified. Pressing F8 opens the DTMF options screen (see Figure 5-7).

NOTE:

* Only in Portable (800 MHz)

** Only in Mobile

*** Only in Portable

A brief description of your radio model and the number of modes enabled and available are shown. The mode information cannot be changed from this menu, but will be updated as changes are made at the CHANGE/VIEW:MODE menu (conventional modes) or via Standard File (trunking modes).

Field Descriptions:

HEADSET - Available only in portable radios (800 MHz)

Use the UP/DOWN arrow keys to enable or disable the Headset option.

HORN & LIGHTS - Available only in Mobile Radios
Trunking models with interconnect or call alert features may be equipped with horn and/or lights relays (B116 option) to indicate when a call is being received. Dependent on the model, the horn & lights function may be enabled either by a button on the radio control head / handset or by an external switch (no radio front panel button or display is available). On models which use the external switch, the external alarm is enabled when the switch is set to the appropriate "ON" position. Please refer to your GT X/LTR User's Guide for additional information on HORN & LIGHTS operation.

If HORN & LIGHTS is disabled, the radio control head / handset button and options connector output for triggering the relay (s) are disabled.

The external alarm timer is set for 6 seconds.

5.1.1 SCAN AND ROAM CONFIGURATION

This screen contains radio-wide enable/disable, timing parameters, and options for Conventional/Trunking Scan and Wide Area Coverage (Search) functions. All parameters on this screen are programmed to a default value at the factory and do not require any additional programming for proper radio operation.

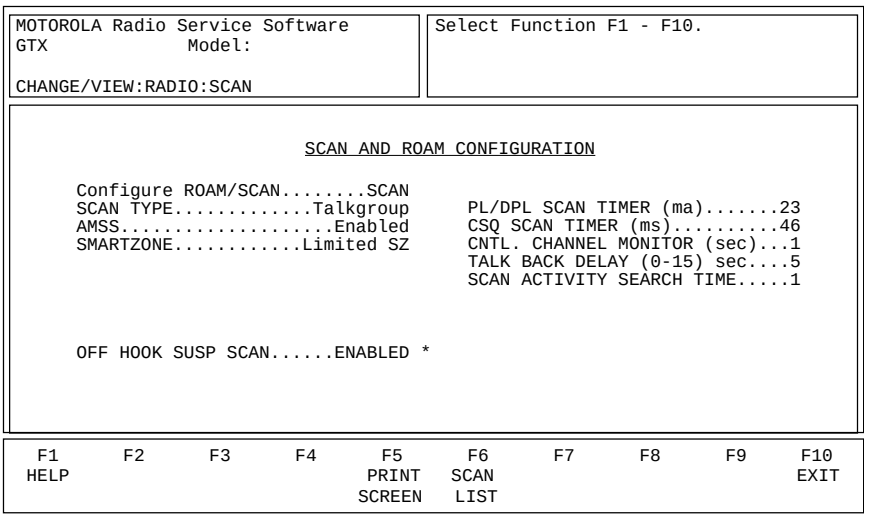

Figure 5-4. Scan and Roam Configuration

* Mobile Only

Field Descriptions:

CONFIGURE ROAM/SCAN
If ROAM is selected, the RSS does not allow access to any scan functions, and the user may select the ROAM mode to be AMSS, SMARTZONE, or NONE (AMSS and SMARTZONE disabled within the RSS).

If SCAN is selected, the RSS does not allow access to AMSS or SMARTZONE functions, and the user may select SCAN to be TALKGROUP or NONE (SCAN disabled within the RSS).

SCAN TYPE
Use the UP/DOWN arrow keys to select the SCAN TYPE, or to Disable Scan.

Scan may be configured for talkgroup scan or disabled depending on the options available for your radio model.

If TALKGROUP SCAN is selected it allows the creation of one scan list with a maximum of eight or ten entries dependent on the radio model. Any combination of eight/ten systems, eight/ten subfleets and/or any of the eight/ten conventional channels may be included. No fleetwide or systemwide modes are allowed in the list

AUTOMATIC MULTIPLE SITE SELECT (AMSS)
Use the UP/DOWN arrow keys to select AMSS Enabled or Disabled. In an AMSS system, multiple sites are linked together to form a large trunked system. Radios programmed for AMSS can use a Site provided they are within the allotted range. However, when they move between sites, the radio can switch sites without dropping any communications that are in progress.

NOTE

ONLY ONE WIDE AREA COVERAGE OPTION MAY BE ENABLED (i.e., AMSS can not be enabled).

SMARTZONE (SmartZone Radios Only)
Use the UP/DOWN arrow keys to enable or disable limited SmartZone operation. When enabled, any type II trunking personality may be set as a SmartZone trunking system in the Trunking System Configuration Screen.

OFF HOOK SUSPEND SCAN
Use the UP/DOWN arrow keys to Enable or Disable SCAN when the microphone is taken off the hang-up box (HUB).

If Off Hook Suspend Scan is enabled, the radio will stop scanning when the microphone is removed from the HUB. Pressing the microphone PTT will transmit on the selected mode.

If Off Hook Suspend Scan is disabled, the radio will continue scanning when the microphone is removed from the HUB. Pressing the microphone PTT will transmit on the selected mode unless Talkback Scan is enabled.

PL/DPL SCAN TIMER (Conventional Only)
Use the UP/DOWN arrow keys to select the PL/DPL Scan Timer value.

The Timer values may be set between 0 - 23 milliseconds (in increments of 23 ms) and determines the time which the radio waits on a channel to detect PL or DPL during the scan operation.

CSQ SCAN TIMER (Conventional Only)
Use the UP/DOWN arrow keys to select the CSQ Scan Timer value.

The Timer values may be set between 0 - 46 milliseconds (in increments of 23 ms) and determines the time which the radio waits on a channel to detect a Carrier during the scan operation.

CONTROL CHANNEL MONITOR (sec)
Use the UP/DOWN arrow keys to select the CNTL CHANNEL MONITOR time (selectable from 1 to 6 seconds in 0.5 second steps or 10 seconds)

The Control Channel Monitor Time is the maximum time the radio will monitor the control channel (OSWs) for a valid talkgroup match (or individual call) before proceeding to the control channel of the next system in the scan list. The radio can also move to the next control channel in the list after it has received two consecutive Scan Marker OSWs without a talkgroup match.

Scan Marker OSWs are supported on Type II SMARTNET systems and newer or upgraded Type I SMART-NET systems and are used to increase the speed with which a mobile can scan. The 10 second value should be used when Scan Marker OSWs are supported.

5.1.1.1 TALKGROUP SCAN LIST

TALKGROUP SCAN LIST allows the creation of one scan list with a maximum of eight or ten entries dependent on the radio model. Any fleet/subfleet combination eight/ten systems, eight/ten subfleet or any of the eight/ten conventional channels may be included. No fleetwide or systemwide modes are allowed in the list.

NOTE

The following screen is a composite of all features/options available with all radio models. The screen associated with the example radio model during actual radio programming may vary from that shown below.

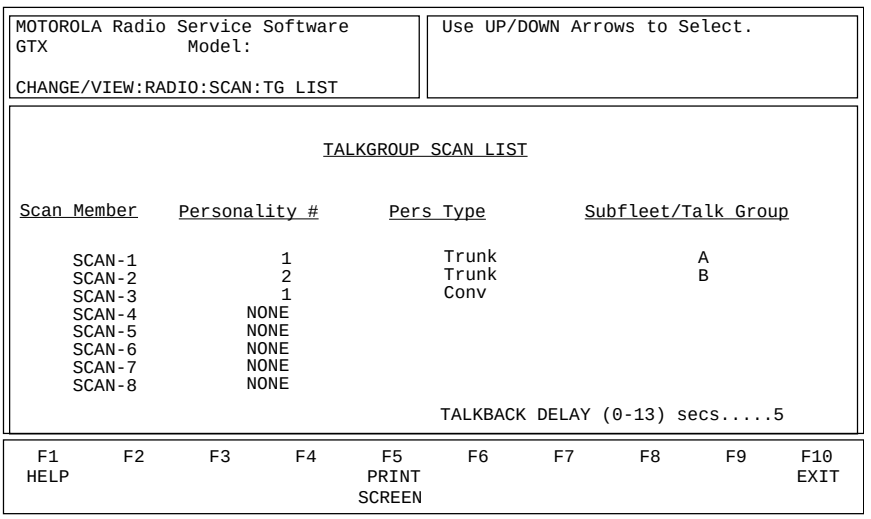

Figure 5-5. Talkgroup Scan List

Field Descriptions:

PERSONALITY NUMBER
Use the UP/DOWN arrow keys to scroll personalities and return to select desired personality. Use the TAB key to move to the next field.

If the selected personality is trunked the edit window will move to the subfleet/talkgroup position; use the UP/DOWN arrow keys to scroll subfleets and return to select desired subfleet.

If the selected personality is conventional, the edit window will move to the next scan member to be edited.

PERSONALITY TYPE
The personality type field indicates whether the personality is trunked or conventional.

TALK BACK DELAY
Use the UP/DOWN arrow keys to set the talkback scan receive hang time.

The delay is the time the radio remains on a scanned active channel after activity has ceased. It can be set from 1 - 15 seconds. If delay is set to 0, talkback scan is disabled. Note that the factory default for talk back Delay is 3 seconds.

5.1.2 CHANGE/VIEW PHONE LIST

This screen provides the capability to add, delete, or modify the phone list entries.

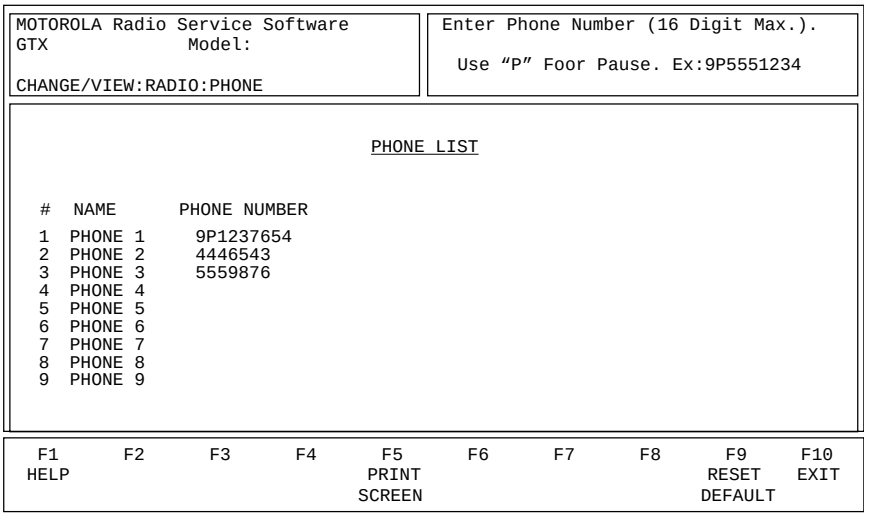

Figure 5-6. Phone List

NOTE

Access to this screen is denied for “Basic” models, which are not allowed to initiate phone calls, call alerts, or private calls.

Function Key Description

F9 - The reset default key is used to erase the complete list of phone numbers.

Field Description:

PHONE NUMBER

This is the field where the phone number is entered. Use the PAGEUP / PAGEDOWN keys to scroll to the next/previous group of phone numbers. A valid phone number entry consists of combination of numbers (0 - 9), 'P', '*' or '#'.

5.1.3 CHANGE/VIEW DTMF OPTIONS

This screen contains the DIGIT TIME and INTERDIGIT TIME DTMF options.

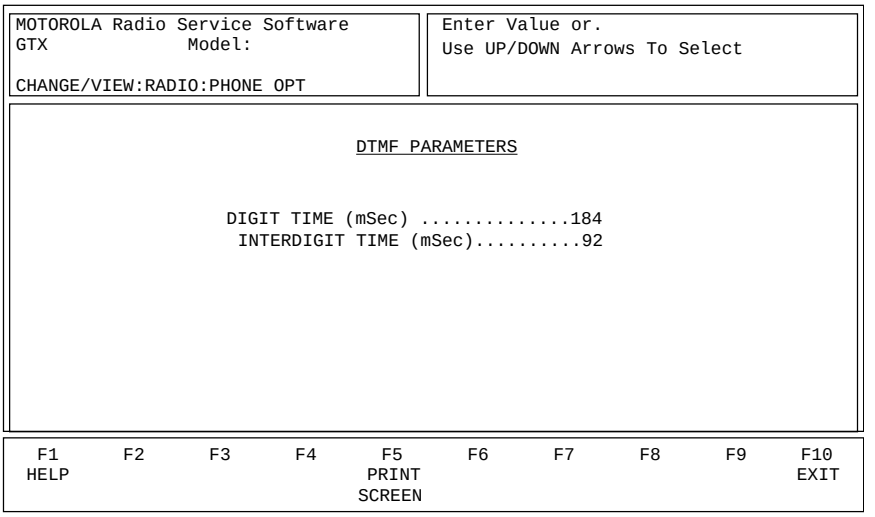

Figure 5-7. Phone Options

NOTE

Access to this screen is denied for “Basic” models, which are not allowed to initiate phone calls, call alerts, or private calls.

Field Descriptions:

DIGIT TIMING (Default = 184 msec)
Use the UP/DOWN arrow keys to select the DIGIT TIME. The timer value is adjustable from 46 to 1012 msec, in increments of 23 msec.

DIGIT TIME is the length of time each DTMF digit is transmitted. Refer to the fixed end-equipment specifications for your system requirements. All radios in a given system should use the same timing values.

INTERDIGIT TIMING (Default = 92 msec)
Use the UP/DOWN arrow keys to select the INTERDIGIT TIME. The timer value is adjustable from 46 to 1012 msec, in increments of 23 msec.

INTERDIGIT TIME is the duration of time between each DTMF digit when autodialing a phone number. Refer to the fixed end-equipment specifications for your system requirements. All radios in a given system should use the same timing values.

5.1.4 SCAN AND ROAM CONFIGURATION (LTR)

This screen contains radio-wide enable/disable, timing parameters, and options for conventional/trunking scan and wide area coverage (roam) functions. All parameters on this screen are programmed to a default value at the factory and do not require any additional programming for proper radio operation.

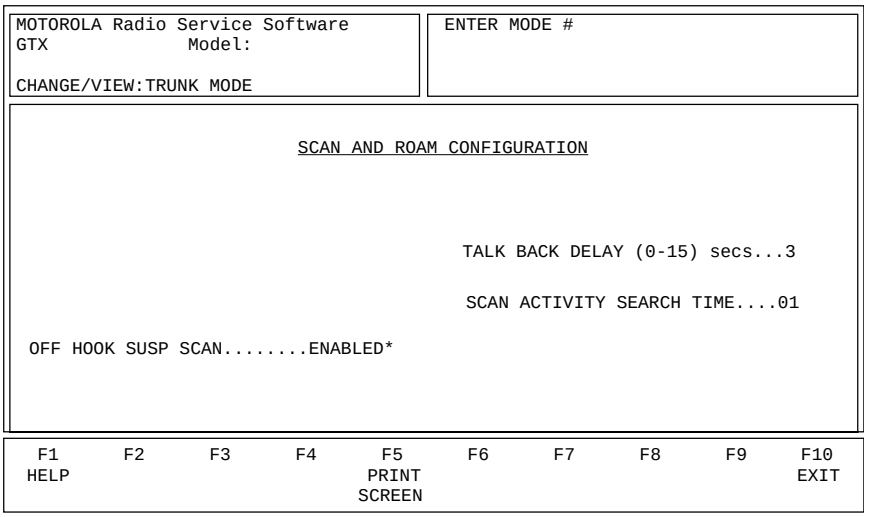

Figure 5-8. Scan and Roam Configuration

Field Descriptions:

OFF HOOK SUSPEND SCAN
This feature is used only in mobile radios during system and user scan. If this feature is enabled, the radio will stop scanning when the microphone is removed from the hub.

TALK BACK DELAY
This is the time that the radio remains on a scanned active channel after activity has ceased. It can be set from (0 -15) seconds in one second steps.

SCAN ACTIVITY SEARCH TIME
This is the maximum time the radio will monitor the channel for a valid talkgroup match in system/user's scan in case of lack of activity.

5.1.5 CHANGE/VIEW PHONE LIST (LTR)

This screen provides the capability to add, delete, or modify the phone list entries.

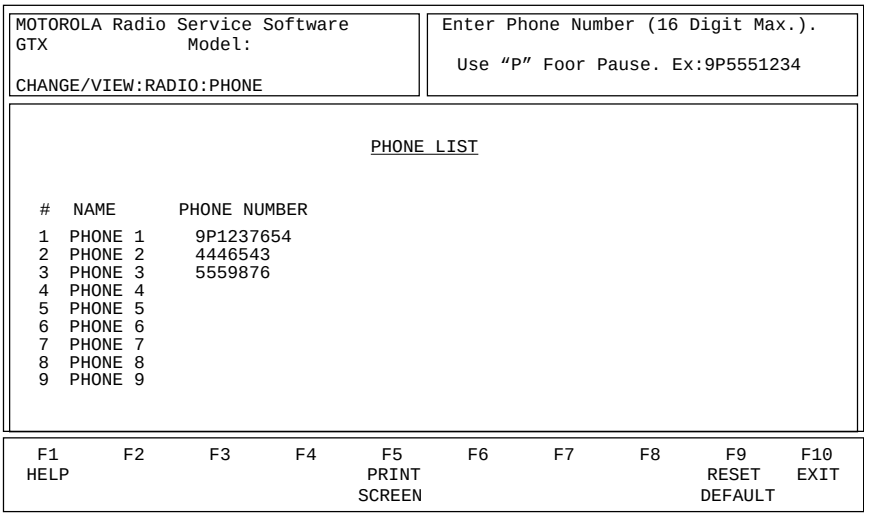

Figure 5-9. Phone List

NOTE

Access to this screen is denied for “Basic” models, which are not allowed to initiate phone calls, call alerts, or private calls.

Field Descriptions:

PHONE NUMBER
This is the field in which the phone number is to be entered. Use the PAGEUP / PAGEDOWN keys to scroll to the next/previous group of phone numbers. A valid phone number entry consists of combination of numbers (0 - 9), 'P', '*' or '#'.

INITIAL DELAY
The initial phone delay is the pre-time for DTMF signalling. This is the length of time between receiving phone channel and transmitting DTMF tones.

5.1.6 CHANGE/VIEW DTMF OPTIONS (LTR)

This screen contains DTMF options such as DIGIT TIME and INTERDIGIT TIME.

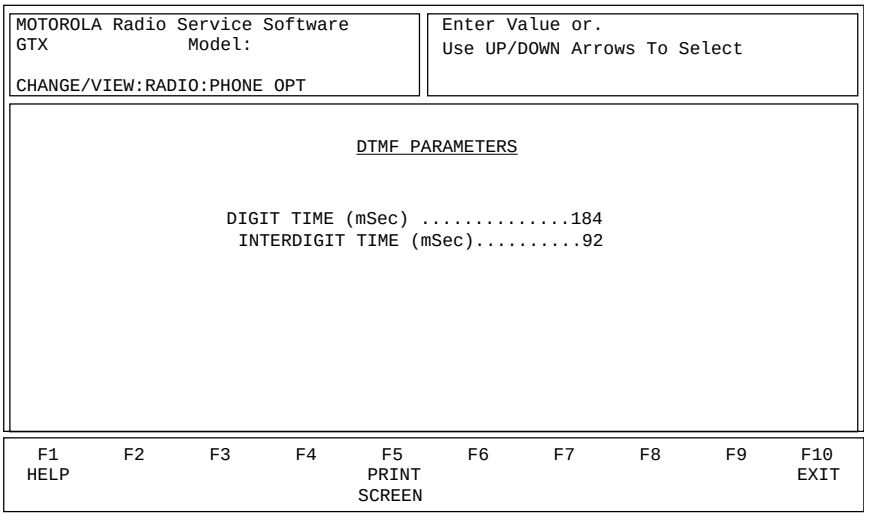

Figure 5-10. Phone Options

NOTE

Access to this screen is denied for “Basic” models, which are not allowed to initiate phone calls, call alerts, or private calls.

Field Descriptions:

DIGIT TIMING (Default = 184 msec)
Use the UP/DOWN arrow keys to select the DIGIT timing. The timer value is adjustable from 46 to 1012 msec, in increments of 23 msec.

DIGIT TIME is the length of time each DTMF digit is transmitted. Refer to the fixed end-equipment specifications for your system requirements. All radios in a given system should use the same timing values.

INTERDIGIT TIMING (Default = 92 msec)
Use the UP/DOWN arrow keys to select the INTERDIGIT timing. The timer value is adjustable from 46 to 1012 msec, in increments of 23 msec.

INTERDIGIT TIME is the duration of time between each DTMF digit when autodialing a phone number. Refer to the fixed end-equipment specifications for your system requirements. All radios in a given system should use the same timing values.

5.2 CHANGE/VIEW MODE CONFIGURATION

CHANGE/VIEW MODE CONFIGURATION is used to change and view specific mode parameters. Most trunked mode parameters are view only, but may be changed via standard file or with a system key. However, all conventional information may be changed.

5.2.1 CHANGE/VIEW TRUNKED MODE

This configuration is used to view the personality and system parameters for each trunked radio mode. All trunked mode parameters must be changed through standard file with a system key.

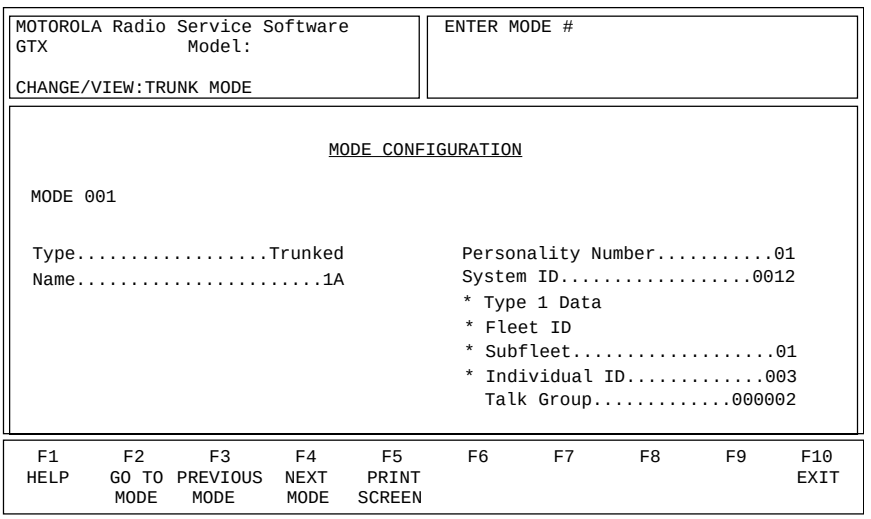

Figure 5-11. Trunking Mode Configuration

* Denotes Type 1 data only.

The F2 - F4 function keys are used to select specific modes.

Field Descriptions:

MODE NAME
A 2-character alphanumeric MODE Name in which the first character indicates personality affiliation and the second character indicates subfleet.

PERSONALITY NUMBER
View-only parameter may be changed through standard file with a system key.

This field indicates the personality affiliation for this mode. The personality defines on which system this mode operates, and which features and options are available for this mode.

SYSTEM ID

View-only parameter may be changed with a system key.

This field contains the system ID, a four-digit hexadecimal number that uniquely identifies the trunked system. Valid IDs are between 0001 and FFFF.

FLEET ID (Type I ONLY)
View-only parameter may be changed only through standard file with a system key.

The valid range for the Fleet ID depends on the size code chosen for this personality. Examples of fleet IDs are 300, 402, 001, and 703.

SUBFLEET (Type 1 ONLY)
View-only parameter may be changed only through standard file with a system key.

This field contains the subfleet assignment for this mode.

INDIVIDUAL ID
View-only parameter may be changed only through standard file with a system key.

Enter the three digit INDIVIDUAL ID for a Type I personality, or a six digit ID (700000 - 765535) for a Type II personality. The valid range for the INDIVIDUAL ID depends the size code selected for this personality.

Examples of Type I INDIVIDUAL IDs are: 001, 02A, 1FF, 200.
Examples of Type II INDIVIDUAL IDs are: 700001, 704032, etc.

TALKGROUP (Type II Only)
View-only parameter may be changed only through standard file with a system key.

Enter a six digit talk group number for a Type II personality. Example: 800001.

5.2.2 CHANGE/VIEW CONVENTIONAL MODE

MODE Configuration is used to CHANGE/VIEW conventional channel specific parameters such as frequencies, squelch type, squelch codes, TOT; to enable/disable mode-slaved features such as scan list and SS&L list.

NOTE

The following screen is a composite of all features/options available with all radio models. The screen associated with the example radio model during actual radio programming may vary from that shown below.

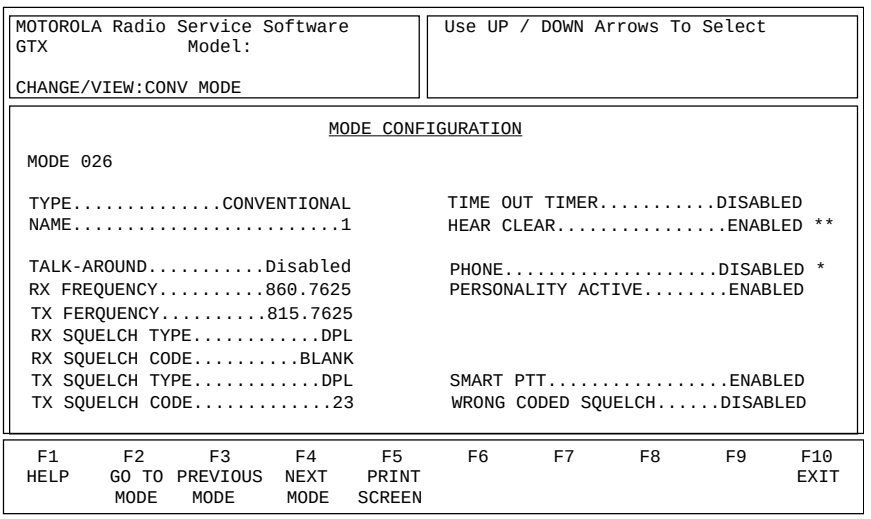

Figure 5-12. Conventional Mode Configuration

* Portable Only
** For 900 MHz Radios only

The F2 - F4 function keys are used to select specific modes.

Field Descriptions:

TALKAROUND
Use the UP/DOWN arrow keys to enable or disable the TALKAROUND feature.

The Talkaround feature is used to talk directly to another unit (mobile-to-mobile) without going through the repeater system. This is useful when you are close to other units with whom you wish to talk, or are outside the range of your repeater system

TALKAROUND FREQUENCY (Default = Rx Frequency)
Enter the RX/TX frequency directly in MHz. Optionally, the UP/DOWN arrow keys may be used to scroll through allowed valid frequencies. The default Talkaround transmit frequency will be the Rx frequency.

Refer to the MOTOROLA Catalog Sheets / Price Pages or your Service Manual for valid TRANSMIT frequencies for this model.

RECEIVE FREQUENCY
Enter the receive frequency directly in MHz. Optionally, the UP/DOWN arrow keys may be used to scroll through allowed valid frequencies. Blank receive frequencies are not allowed.

Refer to the Motorola catalog sheets / price pages or your service manual for valid receive frequencies for this model.

TRANSMIT FREQUENCY
Enter the transmit frequency directly in MHz. Optionally, the UP/DOWN arrow keys may be used to scroll through allowed valid frequencies.

For a “Receive-Only” channel, enter a B. The transmit frequency will be displayed as BLANK. Talkaround should also be disabled, otherwise the radio will transmit on the talkaround frequency.

Refer to the Motorola catalog sheets / price pages or your service manual for valid transmit frequencies for this model.

SQUELCH TYPE
Use the UP/DOWN arrow keys to select the SQUELCH type:

Carrier - Carrier Squelch
PL - Tone Private Line
DPL - Digital Private Line
INV. DPL - Inverted Digital Private Line

Data fields for transmit and receive codes will be displayed for PL, DPL, and INV.DPL.

PL SQUELCH CODE
Enter the PL frequency directly in Hz (Ex.192.8), or enter the alphanumeric code (Ex: 7A). Enter a B for Carrier Squelch operation. The UP/Down arrow keys may be used to scroll through the standard PL codes.

Standard private line frequencies / Motorola codes are as follows:

Standard Private Line Frequencies/Motorola Codes

Freq	Code	Freq	Code	Freq	Code	Freq	Code	Freq	Code
67.0	XZ	91.5	ZZ	123.0	3Z	67.9	6Z	225.7	M4
69.3	WZ	94.8	ZA	127.3	3A	173.8	6A	229.1	9Z
71.9	XA	97.4	ZB	131.8	3B	179.9	6B	233.6	M5
74.4	WA	100.0	1Z	136.5	4Z	186.2	7Z	241.8	M6
77.0	XB	103.5	1A	141.3	4A	192.8	7A	250.3	M7
79.7	WB	107.2	1B	146.2	4B	203.5	M1		
82.5	YZ	110.9	2Z	151.4	5Z	206.5	8Z		
85.4	YA	114.8	2A	156.7	5A	210.7	M2		
88.5	YB	118.8	2B	162.2	5B	218.1	M3		

DPL SQUELCH CODE
Enter the DPL code directly (Ex: 032); leading zeros are required. Enter a B for Carrier Squelch operation. The UP/DOWN arrow keys may used to scroll through all valid codes.

A valid list of MOTOROLA DPL codes are as follows:

Valid DPL Codes

Code	Code	Code	Code	Code	Code	Code	Code	Code
023	071	134	223	306	411	503	631	734
025	072	143	226	311	412	506	632	743
026	073	152	243	315	413	516	654	754
031	074	155	244	331	423	532	662	
032	114	156	245	343	431	546	664	
043	115	162	251	346	432	565	703	
047	116	165	261	351	445	606	712	
051	125	172	263	364	464	612	723	
054	131	174	265	365	465	624	731	
065	132	205	271	371	466	627	732	

TIME-OUT TIMER (TOT) (Default = 60 seconds)
Use the UP/DOWN arrow keys to select the TIME-OUT TIMER value. TOT values from 1 to 255 seconds may be selected, or you may disable it. To disable the TOT, enter 'D', 'B', or "0". Each conventional mode and trunking personality may have a unique TOT value.

The TOT will limit the maximum time allowed for any continuous transmission to prevent locking a repeater or channel. You may not transmit longer than the timer value. If you attempt to do so, the radio automatically stops your transmission. You will hear a low pitched continuous warning tone 4 seconds before the call times out.

Receive operation is not affected by the TOT.

HEAR CLEAR (900 MHz Models Only)
Use the UP/DOWN arrow keys to enable or disable HEAR CLEAR for this mode.

The HEAR CLEAR feature provides improved audio response on the 900 MHz models.

PHONE
Use the UP/DOWN arrow keys to enable or disable hot keypad (DTMF while transmitting) operation for this personality.

When this feature is enabled, the keypad is operable during all dispatch operations. Pressing any digits 0 -9, *, or # cause that digit or symbol to be transmitted.

GTX “Basic” models have no keypad to enter an access code to answer telephone interconnect calls. Therefore, the PHONE field is not present on all basic models.

PERSONALITY ACTIVE
Use the UP/DOWN arrow keys to select the desired PERSONALITY ACTIVE type – Enabled or Disabled.

Enabled means this personality is enabled/active within the radio, and can be used in a scan list, and is displayed/accessed by models with display/keypad.

Disabled means this personality is stored within the radio’s codeplug, but is not active, accessible, or displayed, and is removed by the RSS from any scan list.

If you (re)enable this personality, check RSS SCAN LIST, if applicable.

SMART PTT
Use the UP/DOWN arrow keys to enable the Smart PTT function. The radio can either inhibit transmission on detection of a carrier, or inhibit transmission on detection of a non matching PL code.

This feature prevents the user from listening to conversations or transmitting over conversations.

WRONG CODED SQUELCH
Use the UP/DOWN arrow keys to select WRONG CODED SQUELCH Enabled or Disabled.

5.2.3 LTR TRUNKING

The figure given below shows the mode configuration screen for LTR Trunking radios

NOTE

The following screen is a composite of all features/options available with all radio models. The screen associated with the example radio model during actual radio programming may vary from that shown below.

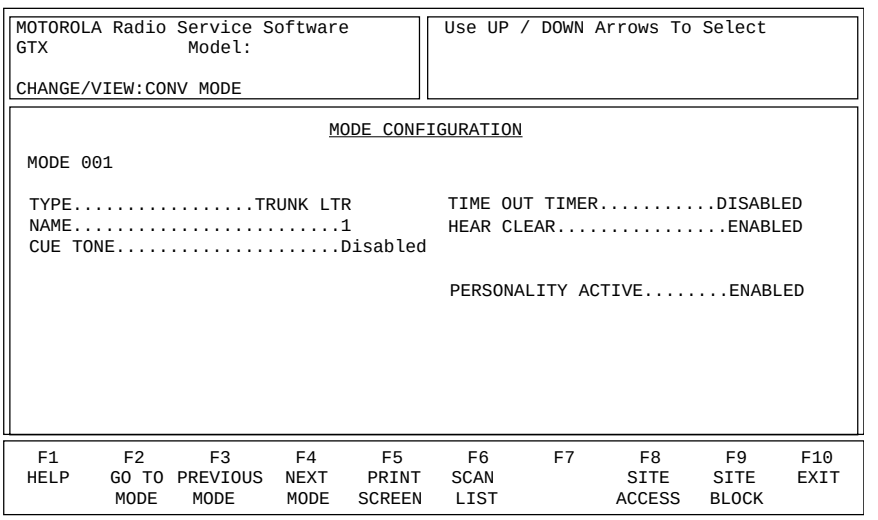

Figure 5-13. LTR Trunking Mode Configuration

TIME-OUT TIMER (TOT) Default = 60 seconds
The TOT will limit the maximum time allowed for any continuous transmission You may not transmit longer than the timer value. If you attempt to do so, the radio automatically stops your transmission. You will hear a low pitched continuous warning tone 4 seconds before the call times out. Receive operation is not affected by the TOT.

PERSONALITY ACTIVE
Use the UP/DOWN arrow keys to select the desired PERSONALITY ACTIVE type – ENABLED or DISABLED.

Enabled means this personality is enabled/active within the radio, and can be used in a scan list, and is displayed/accessed by models with display/keypad.

Disabled means this personality is stored within the radio's codeplug, but is not active, accessible, or displayed, and is removed by the RSS from any scan list.

If you (re)enable this personality, check RSS SCAN LIST, if applicable.

SPECIFIC MODES
Function Keys F2 - F4 are used to select specific modes.

SITE ACCESS BLOCK
Press F8 key to select the SITE ACCESS block

SITE BLOCK SCREEN
Press F9 key to select the SITE BLOCK screen.

CUE TONE
Use the Up/Down arrow keys to enable or disable cue tone. This tone is sounded when the radio has received a channel grant from the system and ready to transmit.

SCAN LIST
Press F6 to select the system scan list for the current personality (See Figure 5-5 Talkgroup Scan List which is also applicable for LTR personality system scan list).

5.2.3.1 SITE ACCESS SETUP

The next step in programming a customer radio is adding the site access configuration information for the radio (Figure 5-14). Each site access block can have up to 10 groups for different RX/TX ID combinations and features. Each site access block can contain up to four universal IDs or as few as none. Each universal ID receive function, is allotted a valid receive ID for any group selected on a particular trunked system mode.

HOME REPEATER
Figure 5-14 shows 01 as the allotted home repeater number. This number is allotted by the system owner when he/she assigns your group IDs for the customer.

ALL GROUP SCAN
When this feature is enabled, the user will be able to scan all IDs that are enabled on the current mode's access block (i.e. all universal and group IDs have been defined on the currently displayed SITE ACCESS INFORMATION screen).

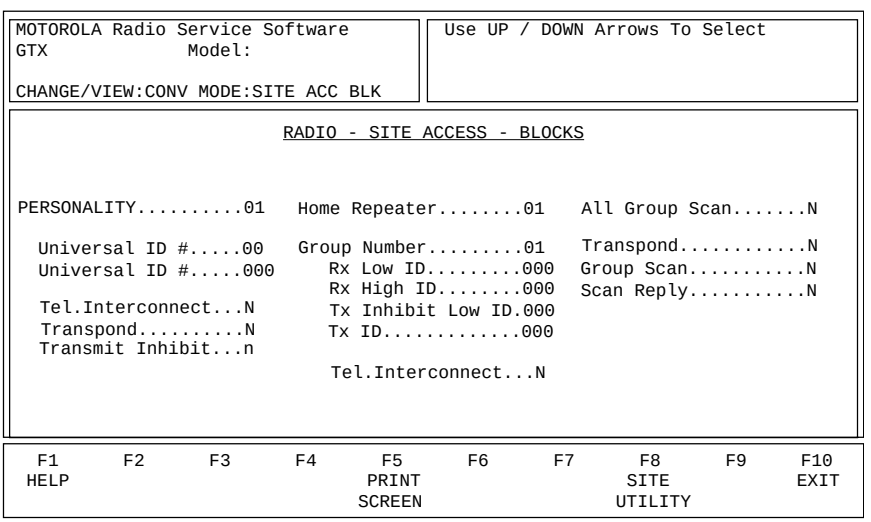

Figure 5-14. Radio Site Access Blocks

5.2.3.2 UNIVERSAL ID FEATURES

The Universal ID includes the following features:

Universal ID
This feature can be programmed for any ID between 0 and 255. The radio will respond to this ID provided the features are enabled. The radio will unmute on the selected repeater when this ID is decoded.

Interconnect
If enabled, the ID is processed as an interconnect ID (for telephone).

Transpond
If enabled, the radio will automatically transpond with the current TX ID when the universal ID is decoded.

Transmit Inhibit
If enabled, the Universal ID is a transmit inhibit ID. The radio will not unmute on this ID unless it appears in another Universal ID # without the Transmit Inhibit enabled or is a member of the current receive group range. After the decoding, the radio will not be allowed to transmit for three seconds unless the operator changes groups or modes. When the TRANSMIT INHIBIT is enabled, INTERCONNECT, and TRANSPOND features are ignored for this ID and home repeater combination, unless it appears in another universal ID or Group Slot.

5.2.3.3 GROUP NUMBER FEATURES

The GROUP NUMBER contains the following features:

RX ID Range Decoding
The radio will unmute on the GO TO REPEATER for any ID number selected from RX Low ID number to RX High ID number provided the radio has a valid home repeater number and currently the radio is not receiving a priority Universal ID call.

TX Inhibit Range Decoding
The radio will transmit inhibit for three seconds after decoding any ID number from TX Inhibit Low ID number to TX Inhibit High ID number.

TX ID
This is the ID that the radio uses for transmitting on this group.

Interconnect
If enabled, the radio will process as an interconnect ID any ID number from RX Low ID number to RX High ID number.

Transpond
If enabled, the radio will automatically transpond with the current TX ID when any ID number from RX Low ID number to RX high ID number is decoded.

Group Scan
Group scan determines whether this group collection will be included in the user/mode slaved/auto-group scan sequence.

Scan Reply
This determines whether this group collection will be allowed to “talkback” during scan hang time.

5.2.3.4 RADIO SITE BLOCKS

Each repeater is allotted to a frequency. The repeater number must match the home repeater number of the “site access block” screen.

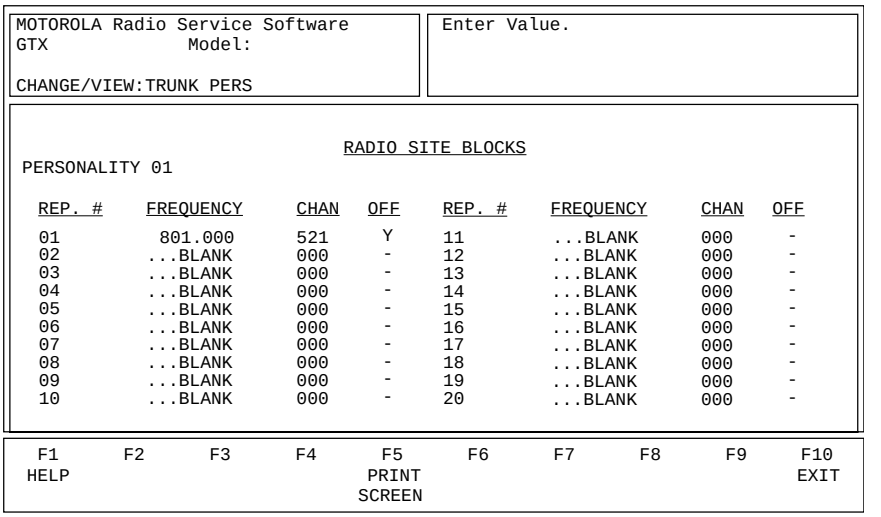

Figure 5-15. Radio Site Blocks

Area ID
Values are 0 or 1. This field indicates the valid area ID of the trunking site.

Frequency
The repeater frequency is entered in MHz.

Channel Number
It is an FCC channel number.

Offset
This field has two values:

- “N” indicates valid FCC channel
- “Y” indicates non-approved FCC channel frequency.

5.2.3.5 SITE UTILITY SCREEN

This is a site utility screen that enables to add or delete a universal ID and to add or delete groups in the site access block.

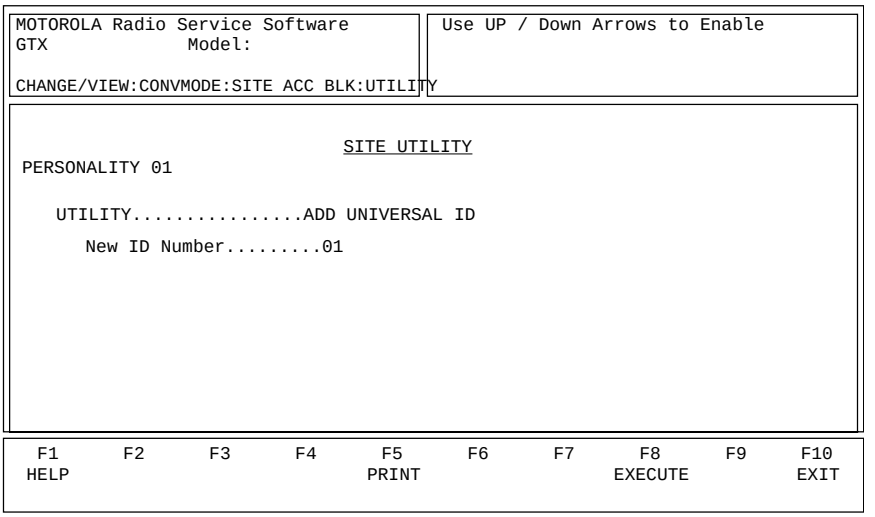

Figure 5-16. Site Utility Screen

5.3 TRUNKING PERSONALITY CONFIGURATION

The CHANGE/VIEW TRUNKING PERSONALITY CONFIGURATION screen is used to change/view trunking personality parameters and features.

A trunking personality is the combination of a system assignment and a set of permitted features and options. A trunking mode is then uniquely determined by the personality assignment and the talkgroup ID. To view the system for this personality, press the F8 function key.

Most personality parameters are controlled with a system key, and are designated as view-only. Trunking features such as call alert, private conversation, and trunking scan may be enabled or disabled individually for each personality.

NOTE

The following screen is a composite of all features/options available with all radio models. The screen associated with the example radio model during actual radio programming may vary from that shown below.

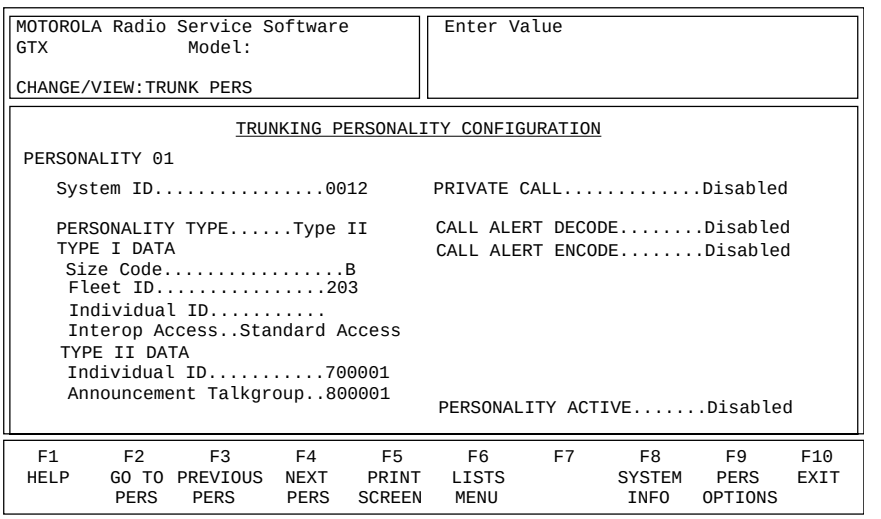

Figure 5-17. Trunking Personality Configuration

The Trunking List Menu may be accessed by pressing F6, the menu includes announcement talk group list, call list, priority talkgroup scan list.

SYSTEM parameters may be accessed by pressing F8.

The fleet ID is a three digit hexadecimal number where the first digit is the prefix and second two digits are the fleet. For any size code, the subfleets for fleetwide are always available.

FLEET ID (Type I ONLY)
View-only parameter may be changed only through a standard file or with a system key.

The valid range for the fleet ID depends on the size code chosen for this personality. Examples of fleet IDs are 300, 402, 001, and 703.

INDIVIDUAL ID (Type I ONLY)
VIEW-ONLY Parameter. May be changed only through s standard file or with a system key.

The valid range for the INDIVIDUAL ID depends the size code selected for this personality. Examples of INDIVIDUAL IDs are: 001, 02A, 1FF, 200.

INDIVIDUAL ID (TYPE II ONLY)
View-only parameter may be changed only through standard file or through a system key.

This field contains the Individual ID, a six digit decimal number that uniquely identifies your radio on a particular system.

The decimal equivalent of the individual ID is used for your radio's Private Conversation Call ID (7 + ID #), interconnect land-to-mobile unit calls (7 + ID #) and interconnect land-to-mobile talkgroup calls (7 + ID #).

For Type II trunking, your radio will have a single individual ID per system, independent of the number of talkgroups, user groups, or personalities it is affiliated with on that system.

ANNOUNCEMENT TALK GROUP (USER GROUP) ID (Type II Only)
View-only parameter may be changed only through a standard file or with a system key.

This field contains the User Group ID for fleetwide announcements for the current personality.

PRIVATE CALL
Use this field to DISABLE or ENABLE this feature.

There are two types of PRIVATE CALL operation available which depend on the model -Standard PRIVATE CALL and Enhanced PRIVATE CALL.

Use the UP/DOWN arrow keys to select the Private call feature for this personality. All radio models are capable of responding to a Private Conversation call initiated by another radio. Some models are limited to RESPONSE operation, i.e. you may only return the call of a unit who has previously called you.

Other models permit LIST-ONLY operation; you may make Private Conversation calls only to those units listed in a preprogrammed list. Some models also permit UNLIMITED operation; you may make Private Conversation calls to any other unit as well as respond to incoming calls. Models with UNLIMITED or LIST-ONLY capability may store frequently called ID's in a preprogrammed list. Up to eight ID's may be stored. Each trunked personality may have a unique call list.

GTX Privacy Plus “BASIC” Models are only capable of responding to a private conversation call initiated by another radio. For example, you may only return the call of a unit who has previously called you.

Press the F6 function key to enter the call list unit ID's for this personality.

CALL ALERT
Use the UP/DOWN arrow keys to Enable or Disable CALL ALERT Encode/Decode.

Call Alert Decode allows the operator to receive pages.

Call Alert Encode allows the operator to transmit pages by selecting an ID out of the 8 member fixed call list. Unlimited operation permits calls to any other unit.

PERSONALITY ACTIVE
Use the UP/DOWN arrow keys to select the desired PERSONALITY ACTIVE type – Enabled Or Disabled.

Enabled means this personality is enabled/active within the radio, and can be used in a scan list, and is displayed/accessed by models with display/keypad.

Disabled means this personality is stored within the radio's codeplug, but is not active, accessible, or displayed, and is removed by the RSS from any scan list.

If you (re)enable this personality, check RSS SCAN LIST, if applicable.

5.3.1 TRUNKING SYSTEM CONFIGURATION

TRUNKING SYSTEM configuration is used to change/view trunking system parameters.

A trunking system refers to a specific repeater site, the system ID, the individual radio ID for that system, the control channel frequencies, and the connect tone which are required to operate on that system. Each system that your radio is programmed to operate on is'linked' to one or more trunking personalities. The personality defines the features available for your radio while operating on that system. Your radio is uniquely identified on each system by your individual ID.

The following screen shows the trunking system configuration screen for SMARTNET.

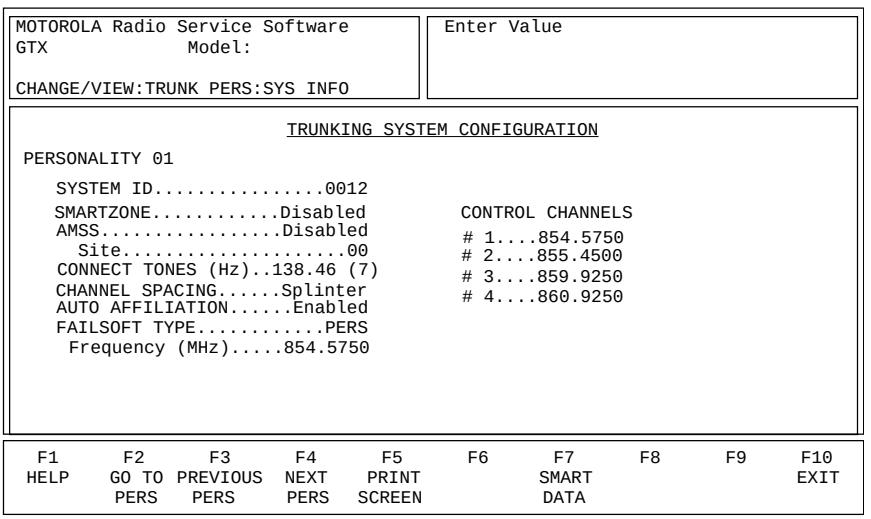

Figure 5-18. Trunking System Configuration

Field Descriptions:

SYSTEM ID
VIEW-ONLY Parameter. May be changed only though Standard File. This field contains the System ID, a four-digit hexadecimal number that uniquely identifies the trunked system. Valid IDs will be between 1 and FFFF.

SMART ZONE
Use the UP/DOWN arrow keys to enable or disable SmartZone operation. This field will only appear for Smart-Zone radios. For a more complete description of SmartZone systems, see Section 5, SmartZone CONFIGU-RATION.

AUTOMATIC MULTIPLE SITE SELECT (AMSS)
VIEW-ONLY Parameter. May be changed only through Standard File or with a system key. In an AMSS sys-tem, multiple sites are linked together to form a large trunked system. Radios programmed for Wide Area AMSS can use the Site that they are in range of and when they move between sites the radio can switch sites without dropping any communications that are in progress. When Wide Area is chosen an eight member Con-trol Channel list and an eight member failsoft list must be selected.

Radios programmed for Local AMSS are only allowed to use one site. When Local AMSS is chosen a Site ID and a four member Control Channel list must be selected. Wide Area AMSS will not be available if any Per-sonality on the selected system has the failsoft by mode option selected at the CHANGE/VIEW:TRUNK:PERS Screen.

AMSS SITE ID
VIEW-ONLY Parameter. May be changed only through Standard File or with a system key. The Site ID limits the operation of the radio to the site with this ID. The valid range of Site ID's is 0 to 63. Use the Site ID supplied by the “Standard File”.

CONNECT TONE
VIEW-ONLY Parameter. May be changed only through Standard File or with a system key.

This field indicates the connect tone frequency. It is a sub audible tone required on the voice channel, to access the trunked repeater. Valid connect tones are shown below:

Tone # Frequency (Hz) Tone # Frequency (Hz)
0 105.9 4 97.3
1 76.6 5 116.1
2 83.7 6 128.6
3 90.0 7 138.5

The function of the trunking connect tone is similar to the conventional PL repeater access tone.

CHANNEL SPACING
VIEW-ONLY Parameter. May be changed only through Standard File or with a system key. Splinter Channel Spacing assigns frequencies in between (12.5 KHz offset) the Standard Channel frequencies.

AUTO AFFILIATION
VIEW-ONLY Parameter. May be changed only with a system key.

Option should be enabled for systems with automatic vehicle registration.

FAILSOFT TYPE
Use the UP/DOWN arrow keys to disable failsoft or select failsoft per personality AMSS or per mode.

When the Central Site Controller fails in a trunked system, the system goes into failsoft mode operation. When the system is in failsoft mode, each trunked base station operates in a manner similar to conventional repeater operation.

Personality failsoft allows a failsoft frequency to be specified for each Personality. If personality failsoft is chosen, a failsoft frequency field is displayed below the failsoft type field and a fre-quency may be entered for this personality.

FAILSOFT FREQUENCIES (AMSS)
View-only parameter may be changed only through a standard file or with a system key.

Up to eight AMSS failsoft frequencies may be allocated if wide area AMSS is selected for this system. Unassigned failsoft frequencies will be displayed as blank.

CONTROL CHANNELS
VIEW-ONLY Parameter. May be changed only through a standard file or with a system key.

This field contains the control channel receive frequency in MHz. The radio will transmit on the corresponding transmit frequency, 45 MHz below the receive frequency.

Each system may have up to four control channels, as designated by the system manager. The control channel frequency may be any assigned repeater frequency in the band.

The radio communicates (digital data) with the trunked central controller on the control channel for channel assignments and other trunked features.

5.3.2 TRUNKING PERSONALITY OPTIONS

The GTX radios contain optional personality parameters, such as talk permit tones, phone options, and trunking emergency features to customize each personality for your specific applications.

NOTE

The following screen is a composite of all features/options available with all radio models. The screen associated with the example radio model during actual radio programming may vary from that shown below.

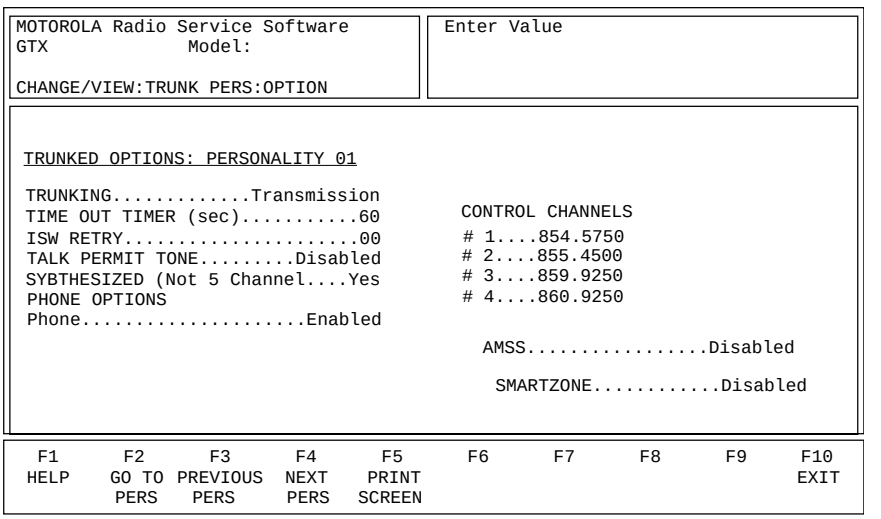

Figure 5-19. Trunking Personality Options

* Type 1 only

These parameters are programmed to a default value at the factory and do not require any additional programming for proper radio operation.

Field Descriptions:

TRUNKING
VIEW-ONLY Parameter. May be changed only through Standard File or with a system key.

This field indicates either MESSAGE, TRANSMISSION, or PTT-ID trunking operation.

For Message trunking, after the initial voice channel assignment, subsequent transmissions will be on the same voice channel as long as the repeater hang time has not expired.

For Transmission trunking, the radio is required to return to the control channel for a new voice channel assignment for each transmission.

For PTT-ID Trunking, the radio is required to send the unit ID for a voice channel assignment on each transmission.

TIME-OUT TIMER
Use the UP/DOWN arrow keys to select the TIME-OUT TIMER value. TOT values from DISABLED to 255 sec. may be selected in increments of 1 sec. All conventional modes and trunking personalities may have a unique TOT value.

The TOT will limit the maximum time allowed for any continuous transmission to prevent locking up a repeater or channel. You may not transmit longer than the timer value. If you attempt to transmit, the radio will automatically stop your transmission. You will hear a low pitched continuous warning tone 4 seconds before the call times out.

As shipped from the factory, the TOT is programmed to 60 seconds. Receive operation is not affected by the TOT.

ISW RETRY TIMER
Use the UP/DOWN arrow keys to select the ISW (Inbound Signaling Word) RETRY TIMER value. Valid values are 0 to 98.

If an ISW is not acknowledged properly, the radio will automatically randomly retransmit the ISW for up to four seconds (typically 10 - 13 retransmissions) or until it receives a proper acknowledgment. The ISW Retry Timer value adds 23.3 msec increments to the retry interval, i.e.

Retry Interval = { [11 + (0,1,2,...or 7) + Timer Value] * 23.3 msec }

This value should not be changed from the default value unless unique system requirements exist as determined by your system manager or area field technical representative.

TALK PERMIT TONE (Default = Disabled)
Use the UP/DOWN arrow keys to Enable or Disable the TALK PERMIT TONE.

The Talk Permit Tone is a series of three quick tones that sound when the PTT switch has been pressed and your radio has keyed up on the voice channel assigned by the trunked central controller. You may begin talking immediately.

SYNTHESIZED (NOT 5 CHANNEL) (DEFAULT = Yes) For Type 1 only
Use the UP/DOWN arrow keys to select Synthesized (Not 5 Channel) Yes or No.

Synthesized should be set to Yes except for special applications.

For systems with more than five channels which contain radios that are not synthesized and can not use more than five different channels, those radios tell the Central Controller not to assign channels to them that they can not lock on to when the Synthesized (not 5 Channel) flag is No.

PHONE OPTIONS:

PHONE
Use the UP/DOWN arrow keys to Enable or Disable Telephone Interconnect.

Use this field to ENABLE/DISABLE GTX “BASIC” Receive-Only telephone.

This field also enables access to other phone option fields.

5.3.3 TRUNKING LISTS

Each trunked personality may have its own unique announcement talk group list, call list.

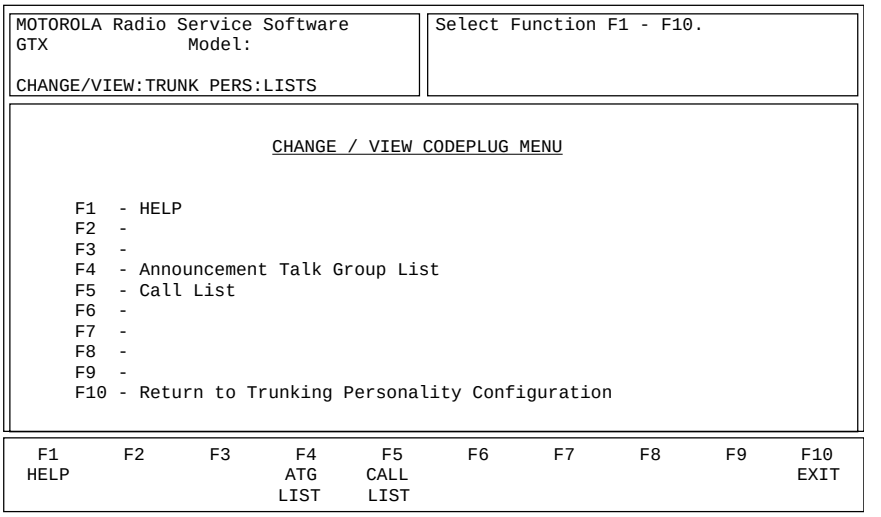

Figure 5-20. Trunking Lists Menu

Announcement talk group list contains the talkgroups that this personality listens to when it is in a fleetwide mode. This list should contain all of the talkgroups associated with this personality's user group.

Radio models with the private call and/or call alert features may store frequently called IDs in a preprogrammed list. Each trunked personality may have a unique list, and up to eight IDs per personality may be stored.

5.3.3.1 ANNOUNCEMENT TALKGROUP LIST (Type II only)

This list contains the talkgroups that this personality will listen to when it is in a fleetwide mode. This list should contain all of the talkgroups associated with this personality's user group.

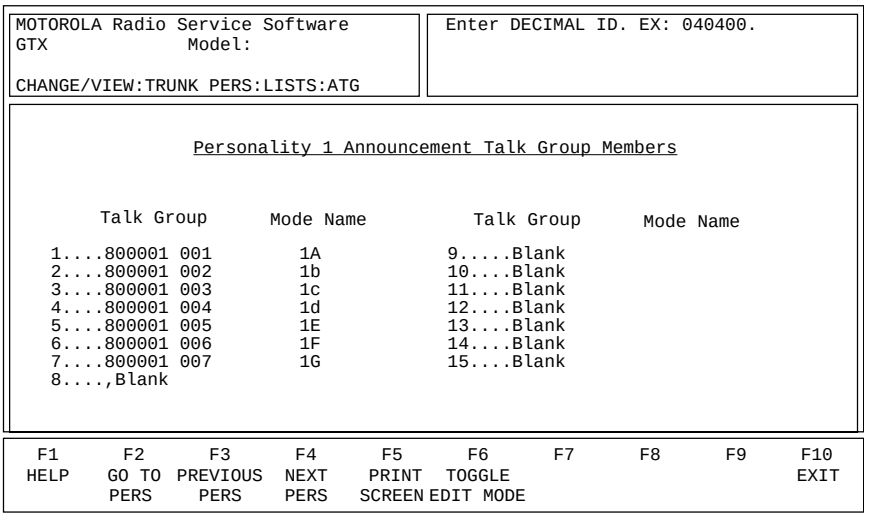

Figure 5-21. Announcement Talkgroup List

Enter the 6-digit (or 3-digit hex) talkgroup number for each ANNOUNCEMENT TALKGROUP LIST member. Enter a "B" (for Blank) to remove a member from the list.

5.3.3.2 TRUNKING PRIVATE CALL LIST

Radio models with the Private Call and/or Call Alert features may store frequently called ID's in a preprogrammed list. Each trunked personality may have a unique list, and up to eight ID's for each personality may be stored.

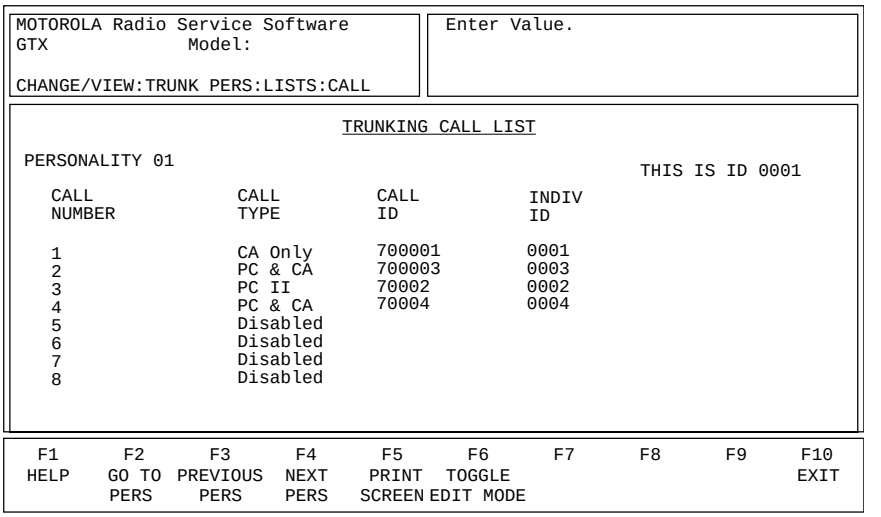

Figure 5-22. Trunking Call List

Field Descriptions:

CALL ID TYPE
Use the UP/DOWN arrow keys to select CALL TYPE I or II.

Select Call Type I for a Private Call I ID.
Select Call Type II for a Private Call II ID or a Call Alert ID.
Select EPC for Enhanced Private Call or a Call Alert ID.

If you would rather enter the six digit ID than the Call ID information then press the F6 key to toggle edit modes.

CALL ID
Enter the six digit CALL ID.

The Call ID is used in private call or call alert to uniquely identify the individual that is to be called or paged. If the radio that is the target of the Private Call or Call Alert has a Universal ID, it is best to use this ID for the Call ID.

If the six digit ID is not known for this Call ID then press the F6 key to toggle edit modes to enter Call ID information rather than six digit ID.

Type II trunking ID's MUST begin with a 7. Example: 712345.

INDIVIDUAL ID
Enter the three digit INDIVIDUAL ID for this Call ID. The valid range for the INDIVIDUAL ID depends the size code selected for this Call ID.

The Call ID is used in Private Call or Call Alert to uniquely identify the individual that is to be called or paged. The Call ID Individual ID is the Individual ID of the radio for the Fleet specified in Call ID Fleet ID. If the radio that is the target of the Private Call or Call Alert has a Universal ID, it is best to use this ID for the Call ID.

If you would rather enter the six digit ID than the Call ID information then press the F6 key to toggle edit modes.

Type II's trunking IDs must begin with a 7. Enter a 7 in the 6 digit call ID field before entering a type II ID.

5.4 UTILITIES

The MODE UTILITY screen is used for adding, deleting, or moving the location (order) of modes or personalities (stand alone versions only). Modes may also be copied (duplicated), including scan lists. All lists and locations will reflect changes made (mode #'s will be incremented or decremented accordingly) from Utility Mode.

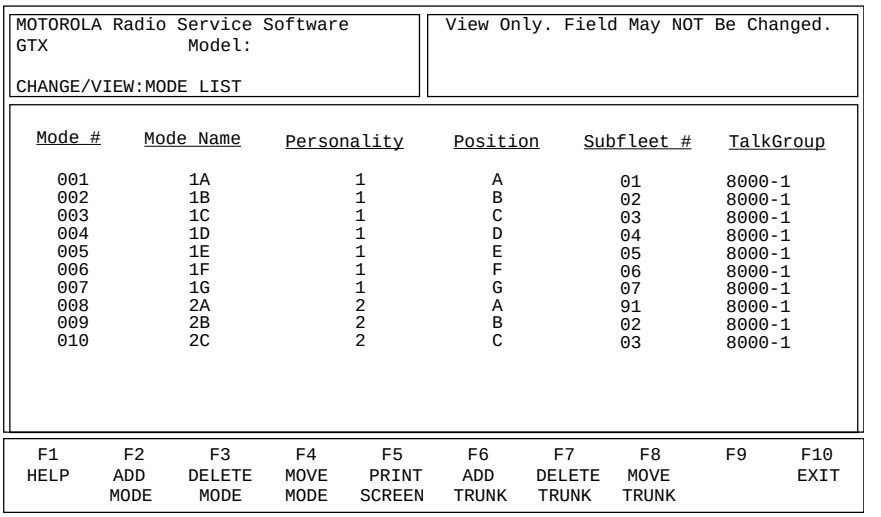

Figure 5-23. Mode List

Use the Page UP/DOWN or RETURN/TAB keys to scroll through the Radio modes.

Function Key Descriptions:

F2 - ADD MODE is used to add modes to the Radio.
F3 - DELETE MODE is used to delete modes from the Radio.
F4 - MOVE MODE is used to move a mode to a different position.
F5 - PRINT SCREEN will print what is currently on the screen.
F6 - ADD TRUNK is used to add trunking personalities (Stand Alone versions Only).
F7 - DELETE TRUNK will delete trunking personalities (Stand Alone versions Only).
F8 - MOVE TRUNK is used to move a trunked personality and its modes to a different position (Stand Alone versions Only).

IMPORTANT UTILITY NOTE

After executing any utilities, all list data will be adjusted to follow the original mode or personality. This will cause the lists to change in appearance but not in function.

Field Descriptions:

MODE NAME
This is the value displayed on the Radio Control Head/Handset.

For all other models this field is a view only field. The value displayed is a combination of the personality number and subfleet position for trunking personalities. For conventional personalities it is simply the number of the conventional mode.

SUBFLEET NUMBER
Use the UP/DOWN arrow keys to select the SUBFLEET NUMBER for this mode.

The choices displayed will be the ones allowed for the current personality configuration. Valid choices for subfleets will depend on the size code chosen for this mode's personality and whether or not Dynamic Regrouping is enabled for this personality (see the EDIT/PERSONALITY SCREEN).

Subfleet FW is defined as fleetwide.

SUBFLEET POSITION
Use the UP/DOWN arrow keys to select the SUBFLEET POSITION for this mode.

Normally subfleet number 01 is subfleet position A, subfleet number 02 is subfleet position B, etc.

5.4.1 ADD MODE

The ADD MODE screen is used to add a new mode to the radio. Two variations of this screen exist: conventional and trunking.

The conventional screen is shown below:

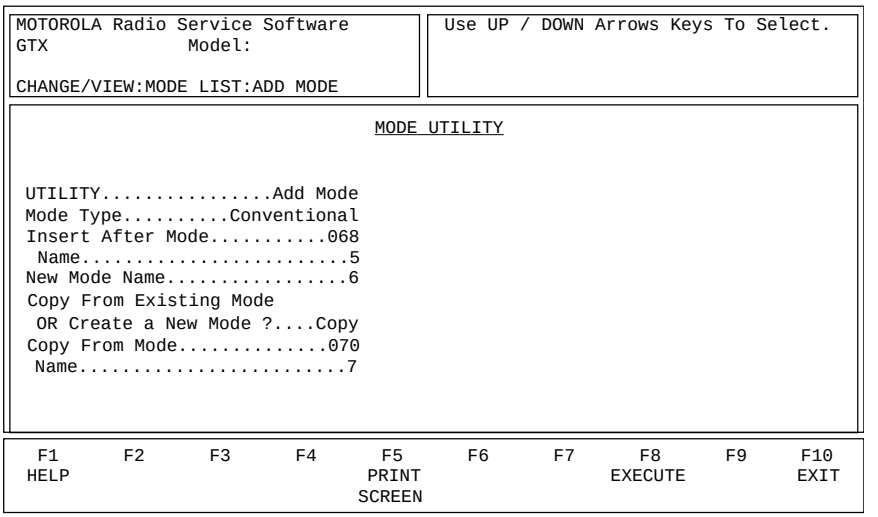

Figure 5-24. Add Conventional Mode

The F8 (EXECUTE) function key is used to execute the changes once all information has been entered.

The GET/SAVE functions must be used to program the changes into the radio, which are required for all CHANGE/VIEW modifications.

Field Descriptions:

MODE TYPE
If the Delete Mode Utility has been selected, then you may use the UP/DOWN arrow keys to select MODE TYPE as conventional or trunked.

INSERT AFTER MODE
Enter the mode number that should be inserted after the mode.

After entering this number and pressing Enter, the mode name for that mode will be displayed. Use the name to verify that the proper number was entered.

For Dual-Mode radios, all Trunking modes must precede all Conventional modes.

COPY FROM EXISTING MODE OR CREATE NEW MODE
Use Up/Down arrows to select Copy or New.

If new is selected, the new mode will be added with default (BLANK) data. If copy is selected, enter the mode to copy. Note: the mode to copy must be the same type as the new mode (example, new conventional mode must copy an existing conventional mode).

MODE TO COPY FROM
Enter the Mode Number TO COPY FROM. Any valid conventional mode number may be entered.

After entering this number and pressing Enter, the mode name for that mode will be displayed. Use the name to verify that the proper number was entered.

Frequencies (Rx, Tx, T/A), squelch type, squelch codes, scan list and all mode options will be copied.

The trunking screen is shown below.

"Standard File" must be used for all Trunking mode additions. Trunked modes already existing in the radio can be copied, deleted, and moved. NOTE: If a trunked mode has been deleted accidentally, a standard file download is necessary to restore it.

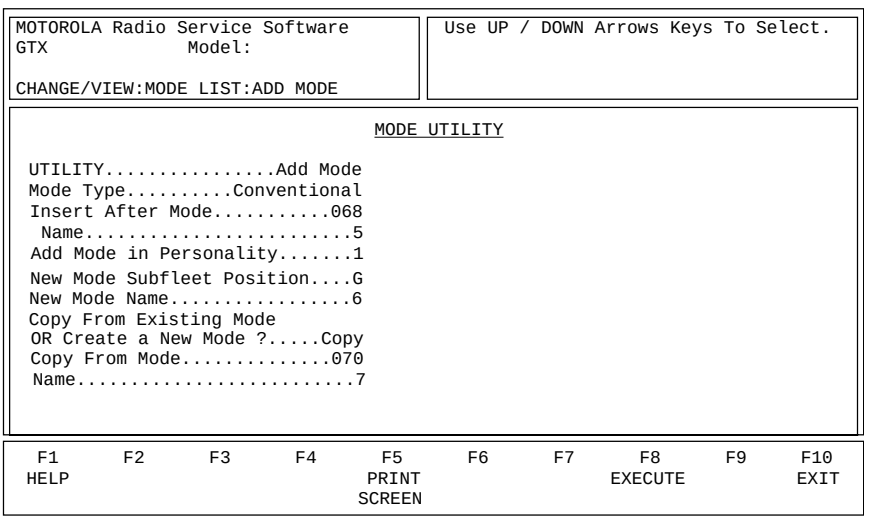

Figure 5-25. Add Trunking Mode

Field Descriptions:

All field descriptions are the same as described in the conventional fields except for the following:

ADD MODE IN PERSONALITY
Use Up/Down arrows or enter value of the personality number.

Enter value of the trunking personality number in which the mode is to be added. To successfully accomplish adding a mode, this personality must have at least one of its mode positions disabled.

NEW MODE SUBFLEET POSITION
Use Up/Down arrows to adjust value.

This subfleet position must not be already used by an existing mode. This is to prevent two modes from occupying the same space on the control head.

5.4.2 DELETE MODE

The DELETE MODE screen is used to delete a trunked or conventional mode from the radio.

NOTE

If a trunked mode has been deleted accidentally, a Standard File download will be necessary to restore it.

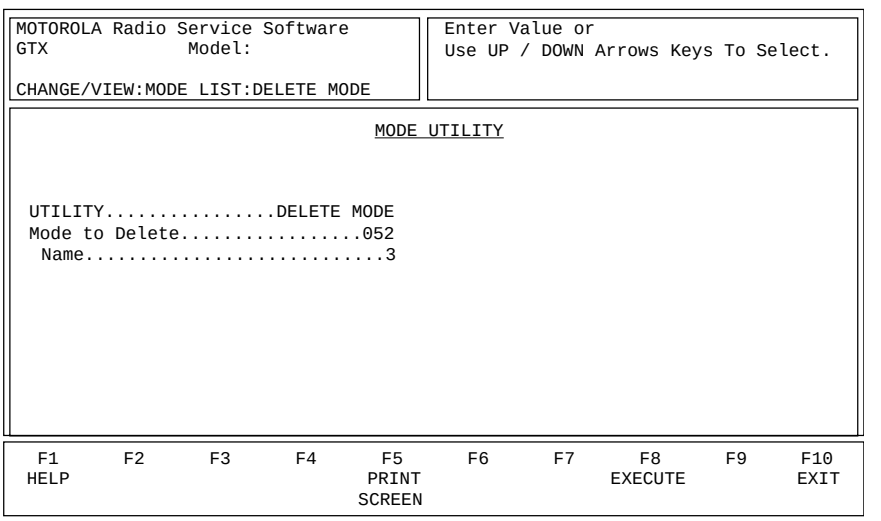

Figure 5-26. Delete Mode

The F8 (EXECUTE) function key is used to execute the changes once all information has been entered.

The GET/SAVE functions must be used to program the changes into the radio, as is required for all CHANGE/VIEW modifications.

Field Descriptions:

MODE TO DELETE
Enter the Mode Number TO DELETE.

After entering this number and pressing Enter, the mode name for that mode will be displayed. Use the name to verify that the proper number was entered. All scan lists (if applicable) will reflect the deleted mode location, but otherwise will not be affected.

IMPORTANT

After the F8 (EXECUTE) function key has been pressed, the mode will be deleted and may not be recovered. However, if you make a mistake AND the data has not been programmed or saved (GET/SAVE function), you may re-read the codeplug or original archive file.

5.4.3 MOVE MODE

The MOVE MODE screen is used to Move Modes in the Radio.

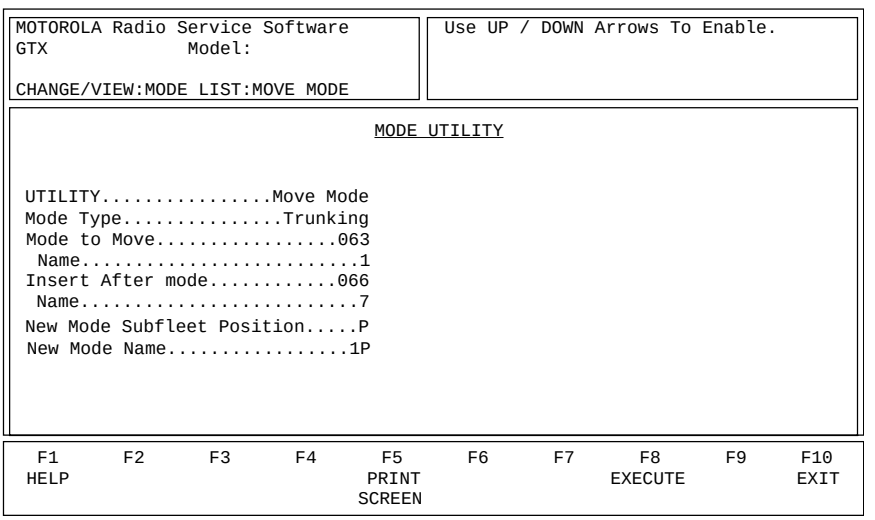

Figure 5-27. Move Mode

The F8 (EXECUTE) function key is used to execute the changes once all information has been entered.

The GET/SAVE functions must be used to program the changes into the radio, as is required for all CHANGE/VIEW modifications.

Field Descriptions:

MODE TYPE (Default = Conventional)
Use the UP/DOWN arrow keys to select desired Mode Type, Trunking or Convention.

MODE TO MOVE
Enter the Mode Number TO MOVE. Any valid conventional and trunking mode number may be moved. After entering this number and pressing Enter, the mode name for that mode will be displayed. Use the name to verify that the proper number was entered.

The mode and all related parameters will be moved to the new position. All scan lists (if applicable) will reflect the new mode location, but otherwise will not be affected.

INSERT AFTER MODE
Enter the mode number that the mode is to be INSERTED AFTER. The mode number entered must be a currently valid mode, or to insert at the beginning of the list a mode number of zero can be entered.

After entering this number and pressing Enter, the mode name for that mode will be displayed. Use the name to verify that the proper number was entered.

NEW MODE SUBFLEET POSITION
Enter the subfleet position where the new mode should be inserted. To add a mode in a subfleet position, that position can not already be used by an existing mode.

Example: If mode 24 is personality 4, SUBFLEET POSITION B AND mode 25 is personality 4, SUBFLEET POSITION E, a mode could be inserted after mode 24 in personality 4, SUBFLEET POSITIONS B, C OR D.

5.4.4 DELETE PERSONALITY

The DELETE PERSONALITY screen is used to Delete a Trunking Personalities from the Radio.

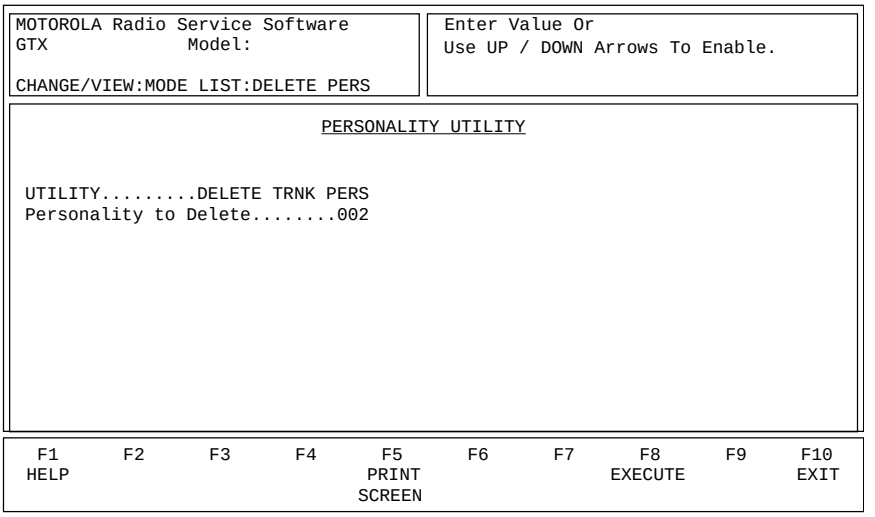

Figure 5-28. Delete Personality

The F8 (EXECUTE) function key is used to execute the changes once all information has been entered.

The GET/SAVE functions must be used to program the changes into the radio, as is required for all CHANGE/VIEW modifications.

Field Descriptions:

PERSONALITY TO DELETE
Enter the Trunking Personality Number TO DELETE.

IMPORTANT
After the F8 (EXECUTE) function key has been pressed, the mode will be deleted and may not be recovered. However, if you make a mistake and the data has not been programmed or saved (GET/SAVE function), you may re-read the codeplug or original archive file.

5.4.5 MOVE PERSONALITY

The MOVE PERSONALITY screen is used to move a personality in the radio.

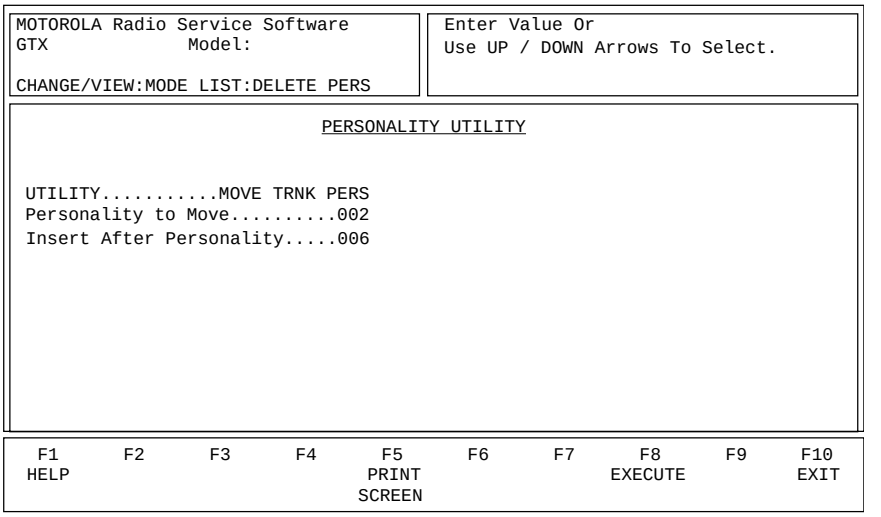

Figure 5-29. Move Personality

The F8 (EXECUTE) function key is used to execute the changes once all information has been entered.

The GET/SAVE functions must be used to program the changes into the radio, as is required for all CHANGE/VIEW modifications.

Field Descriptions:

PERSONALITY TO MOVE
Enter the Personality Number TO MOVE. Any valid trunking personality may be moved. The personality and all modes will be moved to the new position. All scan lists (if applicable) will reflect the new mode location, but otherwise will not be affected.

INSERT AFTER PERSONALITY
Enter the PERSONALITY number that the personality is to be INSERTED AFTER.

6.0 PRINT

The PRINT function is used to produce hardcopy printouts of codeplug configurations and/or RF alignment settings. A printer is required and should be connected to your computer as described in your computer user's manual. Graphics capability is not required. The PRINT MENU screen is shown below in Figure 6-1.

A print function is also available via the F5 function key on all data entry screens and help screens for printing the current screen information. This function is similar to the “print screen” function provided in the DOS mode.

Each printout contains radio model and serial number information, software version numbers, radio service software (RSS) version numbers, and the date and time of the printout.

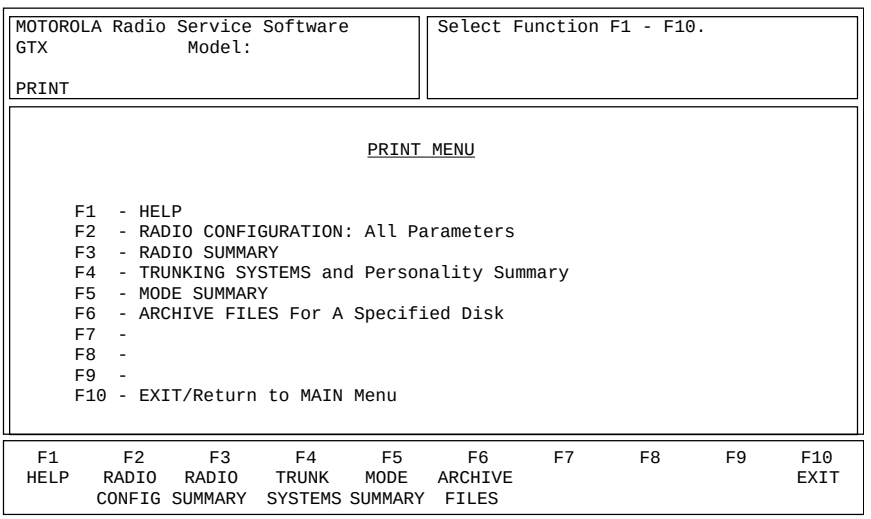

Figure 6-1. Print Menu

NOTE

You must first use the GET/SAVE functions to read a codeplug or get a file before printing the configuration data (F3, F4, and F5).

Each Print function is described below.

Function Key Descriptions:

F2 -The RADIO CONFIGURATION function prints the RADIO SUMMARY, TRUNKED SYSTEMS, and MODE SUMMARY reports.

F3 -The RADIO SUMMARY function prints a summary of the radio configuration, including number of active modes, mode names, home mode, status of all major features, channel scan type, call lists, number of active trunking personalities, and number of active trunking systems.

F4 -The TRUNK SYSTEMS and personality function prints a summary of all trunking system information, including control channels, ID's, connect tones, and status of all major personality features.

F5 -The MODE SUMMARY function prints a summary of all radio mode information, including mode names, frequencies, squelch type and codes, time-out-timer value, personality and system assignments, mode-slaved scan lists, and the enable/disable status of all major features.

F6 -The ARCHIVE Files function prints a list of all codeplug files by serial number for a specified directory path.

7.0 APPENDIX

7.1 ERROR MESSAGES

Improper operation of the Radio Service Software (RSS) may result in four types of errors:

Menu/Data Entry Errors
Radio/Computer Interface Errors
Computer System Errors
Run-Time Errors

The software has been designed to give the user all possible information about what caused an error condition and what to do to resolve it. For these error functions to operate properly, DOS 3.0 or higher (Extended Error Codes) must be used. Otherwise the software may appear to function properly with DOS 2.x, but non-critical errors may require you to terminate the application as opposed to defining the error and indicating the proper corrective action.

The remainder of this section discusses each class of errors that may occur. The RSS may not be able to diagnosis all error conditions that may occur. If you should encounter an error condition that does not provide corrective action, check your set-up and attempt to duplicate error. If you cannot resolve the error condition, consult your local area Motorola Field Technical Representative. Be prepared to give full details of the error, including:

- Error Code
- Error Class and Locus Code (If Applicable)
- Menu Path or Data Entry Screen
- Function Attempted
- Software Version Numbers (Radio and Service Software)

A. Menu / Data Entry Screen Errors
These errors are displayed in box 2 at the upper right of the screen and are self-explanatory as how to correct them. Some examples of menu/data entry errors are:

- Key Not Defined. See Menu Below.
- Replacement Procedures Must Be Performed In Sequence.
- Blank RECEIVE Frequencies Not Allowed.
- Not A Valid Entry.
- Path Does Not Exist.

The HELP function will also give additional information regarding feature and option compatibilities and valid data ranges.

B. Radio/Computer Interface Errors

Radio/Computer Interface errors generally indicate a hardware hook-up problem or a hardware failure. These errors are displayed in a 'pop-up' window in box 3 in the middle of the screen and require user intervention in order to continue the application. Radio/Computer Interface errors are shown in Table A-1.

TABLE A-1. Radio/Computer Interface Errors

Error Code	Error Code Meaning/Corrective Action
01 - 12	**SERIAL BUS FAILURE.** The radio and the computer are not communicating properly. Verify radio is turned on and all RIB interface cables are properly connected. Use the COMM TEST (Section 2.7, Step 4) to verify that your computer is configured for the proper COM port.
	If the COMM TEST fails, you have a hardware problem with either your computer, the RIB, the interface cables, or the radio. Interface cable pinouts are listed in Appendix 7.8.
15	MODEL NUMBERS DO NOT MATCH. Either you are attempting to clone two radios with different model numbers, which is not permitted; or you are attempting to replace a memory module with the wrong kit number.
16	SOFTWARE VERSION NUMBERS DO NOT MATCH. You may not clone two radios with different software release version numbers. Check the radio software version number with the front panel service mode.
20	RADIO NOT SUPPORTED. Your radio is not supported by this software version. Check with your Motorola C&E Parts representative for the current RSS version.
23	MODEL NOT SUPPORTED. Your radio model is not supported by this software version. Check with your Motorola C&E Parts representative for the current RSS version.
30	SERIAL NUMBERS DO NOT MATCH. You may not get codeplug data from one radio and program it into another radio. (Use the CLONE function.) Check the radio serial number with the front panel service mode and check the data serial number with the HELP:OTHER function. Re-connect the original radio and program it, or use the GET/SAVE function to read your current radio.
76	TOO MUCH DATA TO FIT IN EEPROM. EEPROM image has exceeded the physical size of the EEPROM. To fix this problem reduce the number of personalities, lists, or conventional modes.
83	ILLEGAL SCAN MEMBER. A Type II scan member is an Announcement Talk Group which is illegal on type II personalities. To fix, reassign the scan list members which are announcement talk groups.

C. Computer System Errors
System errors are displayed in a 'pop-up' window in box 3 in the middle of the screen. If the error is non-catastrophic, such as "Disk drive not ready", corrective action will be indicated. The user will be prompted to correct the error and to press the F2 function to continue.

TABLE A-2. Computer System Errors.

Error Code	Error Code Meaning/Corrective Action
19	**WRITE-PROTECTED DISKETTE.** Remove write-protect tab from diskette and press F2 to continue.
21	**DISK DRIVE NOT READY**. Verify diskette is placed in disk drive and door is properly closed. Press F2 to continue.
25	**SEEK ERROR**. Dual-floppy system: Diskette is bad or not properly formatted. Replace with a good, formatted diskette and press F2 to continue. Hard disk system: Determine on which drive the error occurred. (If you are not sure, press F2 and note which drive light comes on.) If the floppy drive is failing, see above. Otherwise, your hard disk is failing and must be serviced by your computer service personnel. If you are attempting to archive a codeplug, you may save your current data by doing the following: - Press F10 to abort - Press F2 and change the archive path to A: - Press F7 again to save on drive A.
26	**UNKNOWN MEDIA TYPE**. The computer does not recognize the format of the disk. Most likely cause is attempting to use a formatted 'high density' disk in a 'low' density drive. Change the disk to one formatted for the density of your drive and press F2 to continue.
27	**SECTOR NOT FOUND**. See error # 25 above.
28	**PRINTER OUT OF PAPER**. Replace paper in printer and press F2 to continue.
31	**GENERAL FAILURE**. Software was not able to determine exact nature of failure. Document failure and contact your computer service personnel or your local area Motorola Field Technical Representative.

Some system errors may not be correctable. If you encounter such an error, document the error per Section 7 and consult your local area Motorola Field Technical Representative.

D. Run-Time Errors
Run-time errors are caused by specific unexpected input or output data or conditions that occurred while the program was running. Run-time errors generally indicate a defect in the software and should never occur. If you should encounter a run-time error, document the error per Section 7.1 and consult your Local Area Motorola Field Technical Representative.

7.2 HOW TO RESTORE ARCHIVE FILES FROM BACKUP DISK

If you have a catastrophic hard disk failure, your codeplug archive files may be restored from your backup diskette using the DOS Copy command. You may also restore a codeplug for a single serial number.

A. To Restore Complete Archive:
Restore a complete archive as follows:

1. Place the backup disk in drive A:

2. Log on to the archive path. For example, if your archive path is C:\MRSS\ ARCHIVE, type:

   C:[Enter] and then type
   CD C:\MRSS\ARCHIVE [Enter]

3. Copy the archive file directory from the backup diskette by typing:

   COPY A:*.DBF [Enter]

4. Copy all codeplug files to the archive path by typing:

   COPY A:A???????.* [Enter]

   NOTE

   If your backup disk contains radio codeplug files for other products in addition to this radio on the same path, substitute the following commands for step 4.

   COPY A:A??????.* [Enter] Trunking Files

5. This completes the restore procedure.

B. To Restore (or Replace) A Single File

Restore a single file as follows:

1. Place the backup disk in drive A:

2. Copy the codeplug file from the backup disk to the archive path.

   For example, to copy the codeplug file for radio serial number 438HMN0001 to the archive path C:\MRSS\ARCHIVE, you would type:

   COPY A:A438HMN0.001 C:\MRSS\ARCHIVE [Enter]

NOTE

The file you are restoring must be present in the archive directory. Otherwise, even though you copied it to the archive path, you will not see it in the GET FILE directory.

If the file is not in the archive directory, you may restore it from the backup disk by the following procedure:

1. Start the RSS program.
2. Go to the GET / SAVE menu and select the GET FILE function.
3. Change the archive path to A:.
4. Select the desired serial number and press F8.
5. Change the archive path back to the hard disk.
6. SAVE the file on to your hard disk.

7.3 ARCHIVE FILE STRUCTURE

The RSS stores each codeplug archive file as an encoded ASCII file. The radio serial number is used to name the DOS file as shown in the examples below:

Radio S/N Archive	DOS File Name
438HMN0012	A438HMN0.012
438HMN0010	A438HMN0.010
438HMN0010	B438HMN0.010 (Backup File)

The RSS contains a database program to keep track of these files. The first time a codeplug is archived to a directory (or path), a database file, DBF, is created. As subsequent codeplugs are archived, this file is updated. If the archive directory path is changed, a unique DBF file will be created on that path.

The DBF file utilizes the dBASE III (Ashton-Tate) format for the file header and data records. The DBF structure is shown in Table A-3.

TABLE A-3. DBF File Structure.

DBF Structure:			
Field	**Field Name**	**Type**	**Width**
1	SERIAL	Character	10
2	MODEL	Character	16
3	FILENAME	Character	12
4	DATEPGM	Date	8
5	CUSTOMER	Character	15
Total			62

Specific business application programs can be developed to utilize the archive file information. However, the file structure for the first five fields must not be modified in any way.

To prevent accidental damage to the DBF file, it is suggested that all application programs use a second .dbf file and use the dBASE update command as the basis for changes to data records in the application database file.

Multiple DBF files may be merged in this fashion.

7.4 PROGRAM FILE ORGANIZATION

The RSS is supplied on multiple 3-1/2 inch disk. The application consists of a number of program files which are described below. The program files are compressed in order to conserve disk space. The installation program will uncompress the program files.

3-1/2 inch VERSION

DISK #	File Name	Description
1	INSTALL.EXE	Hard Disk Installation File
	3501.CMP	Compressed Program File
2	Axxxxxxx.xxx	Default Archive Files
	.DBF	Directory of Default Archive Files

Once the files have been uncompressed, the following files will reside in the \MRSS\directory:

.EXE	Main Program
.CFG	Default Configuration File
.HLP	RSS Help File
.MDF	Model Definition File

OTHER FILES CREATED DURING PROGRAM EXECUTION

File Name	Description
.DBF	Directory of Archive Files, Created during GET/SAVE
A438----.---	Trunked Archive File
B438----.---	Trunked Backup Archive File
T438----.---	Update File (Standard File only)

7.5 HOW TO FORMAT A DISK

A disk must be prepared or initialized to a specific recording format before your computer's disk operating system (DOS) can read information from it or save information to it. This initialization process is called 'formatting'. You must format all new disks before using them with your computer.
You format a disk using your computer's DOS FORMAT utility. Refer to your computer owner's manual and your DOS manual for additional information about the FORMAT procedure.

A. Dual-Floppy Disk Drive Systems
To format a disk with a dual-floppy disk system, place your DOS System disk in drive A: and place the disk to be formatted in drive B:. Next type:

A:FORMAT B: /V [Press Enter]

After the disk is formatted, you will be prompted to give the disk a volume label to uniquely identify the disk. The volume label may consist of from 1 to 11 characters.

B. Hard Disk Systems
To format a disk with a hard disk system, log on to the sub-directory that contains your DOS files (specifically the FORMAT.COM file). For example, if your DOS files are installed on a subdirectory called SYSDOS, log on to this sub-directory by typing:

CD C:\SYSDOS [Press Enter]

Place the disk to be formatted in drive A: and type:

C:FORMAT A: /V [Press Enter]

After the disk is formatted, you will be prompted to give the disk a volume label to uniquely identify the disk. The volume label may consist of from 1 to 11 characters.

WARNING

The Format procedure will destroy any previously existing information on the disk. Always double check to be sure that you have placed the correct disk in the drive BEFORE you begin the Format procedure.

GLOSSARY

ARCHIVE	To save a copy of the radio codeplug data, either by printing it or saving it on magnetic media.
ARROW KEYS	The cursor movement keys located on the numeric keypad (UP = #8, DOWN = #2, LEFT = #4, and RIGHT = #6). For the Radio Service Software application, the LEFT and RIGHT arrow keys are used to move the cursor within a data entry field. The UP and DOWN arrow keys are used to increment and decrement values.
ASCII	An acronym for American Standard Code for Information Interchange. It is a seven-bit code that defines 128 standard characters, including control characters, letters, numbers, and symbols.
ASYNCHRONOUS	A method of data communications in which information is transmitted COMMUNICATIONS one character at a time. A start bit precedes each character and a stop bit follows it.
BACKUP	A duplicate copy of a computer file that you save on another floppy disk, in case the original file is corrupted, damaged, or accidentally erased.
BOOT	To load the computer's operating system.
BUS SIGNALING	The protocol used in communication between elements of a system, either within a unit or between units. This usually refers to a definable methodology which may or may not be proprietary to Motorola. Serial bus signaling is typically used to interface a RIB to a radio for the purpose of altering a radio's codeplug or changing service parameters.
CODEPLUG	Data stored in solid state media, i.e. ROM, PROM, EPROM, and EEPROM. Codeplug data is normally accessed via executable code running from firmware.
CURSOR	The flashing marker used to indicate the current position on the display screen.
DATABASE	An organized file containing records on related data.
DATA ENTRY	Formatted display with highlighted fields for entering SCREEN codeplug parameters (data). A prompt for the type of required user action, either data selection from a list or direct keyboard entry, is indicated in box 2.
DECREMENT	To decrease a value.
DEFAULTS	Standard data or parameter values.
DEFAULT DRIVE	The disk drive that the Radio Service Software will use to GET data from or to SAVE data to. You can change the default drive from the SETUP:CONFIGURE COMPUTER menu.
DIRECTORY	A catalog of files on a disk. To view the catalog of files on a disk in drive A:, enter the DOS Directory command: DIR A: [Enter]
DISK DRIVE	The device that reads and programs information on a permanent storage medium; i.e. floppy disks or hard disks.
DISKETTE	An alterable permanent magnetic storage medium for microcomputers. Also called a disk, floppy disk, or mini diskette.
DOWNLOAD	The transfer of information to your computer from a remote computer.

DOS	An acronym for Disk Operating System. DOS is a group of programs that control the way the computer interfaces with other programs, tells the computer how to use, read, and return information to and from application programs, and how to organize and use the information on disks.
DPL	An acronym for Digital Private Line.
DRIVE	See disk drive.
EEPROM	An acronym for Electrically Erasable Programmable Read Only Memory. EEPROMs are used as a permanent storage medium for radio alignment data and customer-specific parameters. The Radio Service Software permits changing and/or viewing of EEPROM information.
ENTER	A synonym for the RETURN key.
EPROM	An acronym for Electrically Programmable Read Only Memory. An EPROM is used as a permanent storage medium for the software program that controls the radio. EPROM information cannot be changed once it is programmed into the device, i.e. “Read Only”.
ERROR	Any condition that prevents the software from functioning properly or any input/response that deviates from what the software was designed to accept.
EXIT	To leave the current displayed screen and return to the previous screen. The Radio Service Software uses the F10 function key for all exit operations.
FIELD	Any data parameter on the computer display. The current selected field is always highlighted via inverse video.
FILE	A collection of information typically stored by the computer on a magnetic medium.
FIRMWARE	Executable code stored in solid state media, i.e. ROM, PROM, EPROM, and EEPROM.
FUNCTION KEYS	The 10 keys at the left or top of the keyboard labeled F1 - F10. The Radio Service Software uses these keys for moving up & down the program tree.
HARD DISK	An alterable permanent data storage medium with a much larger storage capacity than a diskette. Typically a microcomputer hard disk can store 20 - 50 million pieces of data, compared to approximately 400 - 1000 thousand pieces for a floppy disk.
HARDWARE	Physical kits of PC boards, solid state devices, interconnect cabling that you can touch and see.
HELP	An on-line reference manual accessed via the F1 function key. Press the F1 function key at any time for additional information about the current menu or highlighted data field.
INCREMENT	To increase a value.
INVERSE VIDEO	Displaying text on the monitor by using dark letters on a light background.
MEMORY	Electronic storage device (RAM) used by the computer for temporarily storing information that can be extracted when needed. The information is lost when the computer is turned off. The Radio Service Software requires a minimum of 640 K bytes of available RAM (memory).

MENU	A display screen with a list of choices, selected via the function keys. All keyboard keys are disabled on menu screens.
MENU-DRIVEN	A type of computer application that allows the user to select a course of action based upon one or more options. The Radio Service Software uses function keys for menu selections.
MODE	A pre-programmed combination of either a conventional transmit and receive frequency pair, an associated squelch code pair, and time-out timer value or a trunking talkgroup and associated personality assignment.
MODEM	An acronym for MOdulator / DEModulator. A device that enables a computer.
MONITOR	The video screen of your computer. The monitor and the keyboard are used by the operator to communicate with the computer.
OPERATING SYSTEM	The set of instructions that coordinates your computers SYSTEM activities, such as memory allocation, file management, input and output operations, communications, and interfacing to other application software packages, such as the Radio Service Software.
PC	Personal Computer.
PARAMETER	Codeplug data.
PERSONALITY	A trunking term used to describe the combination of a system assignment and a set of permitted features and options. A trunking mode is uniquely determined by the personality assignment and the talk group ID.
PORT	An electrical connection on a computer used to communicate with other devices, such as a radio, modem, or a printer.
PROGRAM	1) A set of computer instructions designed to have the computer perform a specific sequence of actions. 2) The transfer of information from the computer's temporary memory (RAM) to the radio codeplug.
PROGRAM TREE	A figurative term used to describe the organization of a multi-level menu-driven software program.
RAM	An acronym for Random Access Memory. RAM's are electrical devices used for temporary storage of computer or radio information.
READ	The transfer of information from the radio codeplug to the computer's temporary memory (RAM) via the RIB communication link.
RIB	An acronym for Radio Interface Box. The RIB is used to connect a computer system to a radio for the purpose of communicating between the radio and the computer. In conjunction with the RIB, an appropriate RIB-to-radio cable and RIB-to-computer cable must be used.
RS-232	An asynchronous, serial, data transmission standard that defines the required sequence, timing, and hardware interface.
SAVE	The transfer of information from the computer's temporary memory (RAM) to a permanent storage medium (disk).
SOFTWARE	A set of instructions that tells the computer what to do.

STANDARD FILE	The Trunking Standard File is an encrypted file which contains data for the trunking-related RSS fields which cannot otherwise be edited without a System Key. If Standard Files are used in your trunking system, they will be available from the person or agency who performs the fleet mapping and ID assignment functions. The RSS is used to merge this trunking data with a radios' existing codeplug data and then program the radio. A System Key is an alternate means for programming this same protected data into the radio
SYSTEM	A trunking term used to define a specific repeater site via an ID, an individual ID, the control channel frequencies, the connect tones, failsoft information, and a set of permitted features and options.
SUB-DIRECTORY	A subdivision of a directory that contains a group of related files. Subdirectories are used to organize your disks, especially hard disks, and to facilitate good housekeeping.
TALK GROUP ID	A trunking ID number used to partition trunking users into typically smaller groups. The talk group ID is determined by both the Fleet ID and the Subfleet ID.
UPLOAD	The transfer of information from your computer to a remote computer.
USER GROUP ID	A trunking talk group ID configured for fleetwide operation.

ACRONYMS AND ABBREVIATIONS

ACC	Accessory
ACK	Acknowledge
AMSS	Automatic Multiple Site Select
ATG	Announcement Talk Group
C/A	Call Alert
CC	Control Channel
COM	Communications Port
CONFIG	Configuration
CONV	Conventional; Conversation
CP	Codeplug
CSQ	Carrier Squelch
DEC	Decode
DEF	Default
DEV	Deviation
DOS	Disk Operating System or Data Operated Squelch (MDC)
DPL	Digital Private-Line™
DR	Dynamic Regrouping
DTMF	Dual-Tone Multi-Frequency
EEPROM	Electrically-Erasable Programmable Read-Only Memory
EMER	Emergency
ESC	Escape
FE	Field Engineer
FNC	Function
FREQ	Frequency
FW	Fleet Wide
GRP	Group
kHz	Kilohertz
HEX	Hexadecimal
HUB	Hang Up Box
ID	Identification
IF	Intermediate Frequency
INDIV	Individual
ISW	Inbound Signalling Word
LED	Light Emitting Diode
LCD	Liquid Crystal Display
NCCL	Network Control Channel List
MHz	Megahertz
MIC	Microphone
ms	Millisecond
MSG	Message
OSC	Oscillator
OSW	Outbound Signaling Word
PA	Power Amplifier
PB	Push Button
PC	Personal Computer or Private Call
PERS	Personality
Pg Dn	Page Down
Pg Up	Page Up
PL	Private-Line ®
P/N	Part Number

ACRONYMS AND ABBREVIATIONS (cont.)

PP	Privacy Plus
PTT	Push-to-Talk
RAM	Random Access Memory
REF	Reference
REQ	Request
RIB	Radio Interface Box
RSS	Radio Service Software
Rx	Receive
SEL	Select
SIG	Signalling
S/N	Serial Number
SQL	Squelch
SRVC	Service
STS	Status
SYS	System
T/A	Talk Around
TG	Talk Group
TOT	Time Out Timer
TRNK	Trunking
Tx	Transmit
UHF	Ultra High Frequency
VCO	Voltage-Controlled Oscillator
VHF	Very High Frequency
VSP	Voice Speaker Phone

Cut along dotted line

RADIO SERVICE SOFTWARE
USER'S GUIDE QUESTIONNAIRE

We believe that reports from users provide valuable information for producing quality manuals. By taking a few moments to answer the following questions as they relate to this specific manual, you can take an active role in the continuing effort to ensure that our manuals contain the most accurate and complete information of benefit to you. Thank you for your cooperation.

In reference to Manual Number: 68P02948C70-B

GTX/LTR, Mobile and Portable Radio

Use the following scale to answer each question listed below. If you have a specific comment about any section, please write it in the space below the appropriate question.

Strongly Agree	Agree	Disagree	Strongly Disagree
1	2	3	4

1.	The list of required equipment and the setup procedure were clear and complete.	1	2	3	4
2.	The procedure for backing up and installing the software was clear and complete.	1	2	3	4
3.	The explanations of the keyboard commands and screen arrangement were clear.	1	2	3	4
4.	The explanation of the Get/Save procedures is clear and complete.	1	2	3	4
5.	The explanation of the Change/View procedures is clear and complete.	1	2	3	4
6.	The explanation of the Programming procedures is clear and complete.	1	2	3	4
7.	The explanation of the Service/Alignment procedures is clear and complete.	1	2	3	4
8.	The explanation of how to Print the codeplug is clear and complete.	1	2	3	4
9.	The Table of Contents and List of Figures & Tables are complete and accurate.	1	2	3	4

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FOLD FOLD

(Continued)

10. The illustrations and tables added to the understanding of the explanations.	1	2	3	4
11. The Glossary and List of Abbreviations were helpful.	1	2	3	4
12. The User's Guide was well organized and helpful.	1	2	3	4

Please identify any errors you may have found and provide any suggestions you may have for improving the next version of this manual.

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