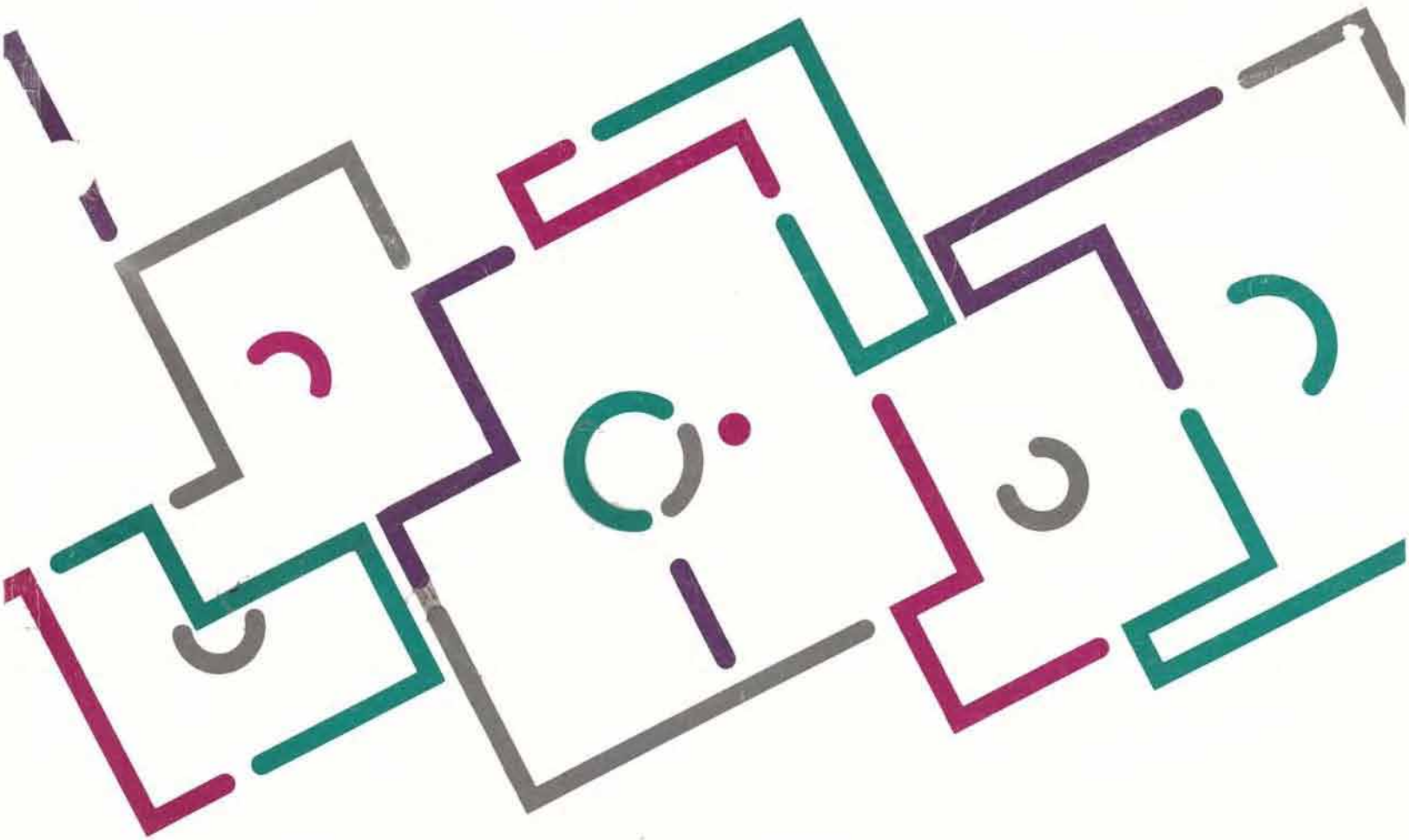
MOTOROLA

MSF 5000™ / MSF 10000™ DIGITAL

FIELD PROGRAMMING USER'S GUIDE

Software Part No.:
RVN-4077



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MSF 5000™ & MSF 10000™

FIELD PROGRAMMER

USER REFERENCE MANUAL

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FIGURE LIST

1. INTRODUCTION

1.1. Application

This Radio Service Software (also referred to as "Field Programmer" or "the program") provides you with the ability to review and change the personality of an MSF station using a standard IBM personal computer (models XT, AT or PS/2). The stations supported by this Radio Service Software package include:

• Digital *MSF 5000* VHF	Models:	C93CXB7106A/AT	C23CXB2106A
		C73CXB7106A/AT	C73CXB2106A
		C43CXB2106A	C63CXB2106A
• Digital *MSF 5000* UHF	Models:	C84CXB7106A/AT/B/BT	C84CXB5103AT/BT
		C74CXB7106A/AT/B/BT	C74CXB5103AT/BT
		C64CXB7106A/AT/B/BT	C64CXB5103AT/BT
		C44CXB7106A/AT/B/BT	C44CXB5103AT/BT
		C34CXB7106A/AT/B/BT	C24CXB2106A
		C24CXB7106A/AT/B/BT	C34CXB2106A
		C44CXB2106A	C64CXB2106A
		C74CXB2106A	
• Digital *MSF 5000* 800 MHz	Models:	C85CXB7106A/AT/B/BT	C85CXB5103AT/BT
		C65CXB7106A/AT/B/BT	C65CXB5103AT/BT
		C45CXB7106A/AT/B/BT	C45CXB5103AT/BT
		C45CXB2106A	C65CXB2106A
		C85CXB2106A	
• Analog Plus *MSF 5000*	Models:	C65GFB7206AT	C65GFB5203AT
		C85GFB7206AT	C85GFB5203AT
		C65GFB2206A	C85GFB2206A

The Field Programmer also supports the international *MSF 10000* station (option C983).

The next section of this manual – "GETTING STARTED" – guides you through the process of installing the software. A description of the overall philosophy of the Radio Service Software is given – including how the screens are formatted, and the method of navigating between the different screens.

The remaining sections of this manual are grouped in the same logical structure as the Radio Service Software itself, starting with the MAIN MENU, the base screen from which all other functions are selected.

*** WARNING ***

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

1.2. Radio Service Software Acronyms and Abbreviations

AMSS	Automatic Multiple Site Selection
ASCII	American Standard Code For Information Interchange
ASE	Area Systems Engineer
CH, CHAN	Channel
CIF	Customer Information Form
COAM	Customer Owned and Maintained
COM	Communications Port
CONF, CONFIG	Configuration
CONV	Conversation
CONV	Conventional
COSC	Company (Motorola) Owned Service Center
CP	Codeplug
CPD	Communications Parts Division
CSP	Communications Systems Products
DEC	Decode
DOS	Disk Operating System
DOS	Data Operated Squelch
DTMF	Dual Tone Multi−Frequency
EEPOT	Electronically Erasable Programmable Potentiometer
EOF	End Of File
ESC	Escape
FCM	Field Code Management
FREQ	Frequency
FTR	Field Technical Representative
GRP	Group
ID	Identification
INDIV	Individual
kHz	Kilohertz
LAS	Local Assignment System
LED	Light Emitting Diode
MHz	Megahertz
LOC PTT	Local Push To Talk

MRSS	Motorola Radio Service Software
MRTI	Motorola Radio Telephone Interconnect
MSS	Motorola Service Station
NSO	National Service Organization
NST	National Service Training
OFP	On–Line Field Programming
PAC–RT	Portable Area Communications Repeater
PC	Personal Computer
PERS	Personality
PgDn	Page Down
PgUp	Page Up
P/N	Part Number
PROM	Programmable Read–Only Memory
PSB	Product Service Bulletin
PTT	Push–To–Talk
RAC	Repeater Access Controller
RAM	Random Access Memory
RESP	Response
RIB	Radio Interface Box
RSS	Radio Service Software
Rx	Receive
SAF	System Authorization File
SAM	Station Access Module
SMR	Specialized Mobile Radio
S/N	Serial Number
SP	Special Product
SRN	Service Repair Note
SSCB	Secure–capable Station Control Board
TCMS	Trunking Code Management System
TSTAT	Transmitter Status
TOT	Time Out Timer
TTRC	Trunked Tone Remote Control
Tx, XMT	Transmit
VCO	Voltage–Controlled Oscillator

1.3. Required Equipment

- Any 80286/386/486 IBM PC family of computers or their **compatible** counterparts equipped with a minimum 512K bytes of available RAM (preferably 1M bytes), a RS−232 asynchronous serial communications adapter, and serial communications ports (COM1 & 2) managed by 8250 or 16540 UARTs.
  The MSF Field Programmer is designed to operate solely on PCDOS Version 3.1 or MSDOS Version 3.1 or later versions. Be aware that any other operating systems (ie. OS/2, WindowNT, DRDOS or any UNIX−base clones) other than those prescribed by this manual **is not guaranteed** by Motorola to work correctly with the MSF Radio Service Software computer program. It should be noted also that MSF Field Programmer may not operate properly if the program is run under environmental platforms such as Windows. It is highly recommended that the MSF Field Programmer be run strictly in the DOS environment.
- PCDOS™ Version 3.1 or later, or MSDOS™ version 3.1 or later.
- Software Licensing Package RPX−4719C
- Radio Service Software − four 5.25 in. disks and two 3.5 in. disks RVN−4077F
- Radio Interface Box (RIB) RLN−4008B
- IBM PC XT™ Computer Interface Cable (25 pin) 30−80369B71

or

- **IBM PC AT™ Computer Interface Cable (9 pin) 30−80369B72**
- ***MSF* Station Interface Cable** 01−80355A30

The Following Are Recommended But Not Required:

- Digital *MSF* User Manual (all bands) 6881082E05
- UHF Digital *MSF* Service Manual 6881082E10 68P81092E80−O

or

- VHF Digital *MSF* Service Manual 6881082E20 68P81092E75−O

or

- 800 MHz Digital *MSF* Service Manual 6881080E90 68P81092E85−O

or

- 900 MHz Analog Plus *MSF 5000* Service Manual 6881084E25 68P81092E90−O
- *MSF* Options Manual (all bands) 6881080E30

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1.6. What's New In Version R05.21

The following is summary of the major changes that have been made since the release of MSF RSS Version R5.19 in March of 1993.

1.6.1. Problems That Were Fixed / Enhancements to Operation

- RAC codeplug (version 1.xx) would not program properly. Problem was fixed by disregarding the /Bye command if a RAC codeplug is programming.
- Changed the operation of the SECURE OPERATION field in the Station Type Information menu so that status tone is set to ENABLED/DISABLED **only if** the field is changed.
- Changed the assignment rules for the SP Mailbox pointer so that the RSS SP Number field always reflects X19 as long as SP code has not been added to the

codeplug. If SP code is added to the codeplug, the RSS Number field is changed to X20.

- NULLS are replaced with SPACES as characters are received from the keyboard. NULLS are interpreted as END–OF–STRING characters.
- A line communication problem would occur if a user attempted to use the Terminal Mode screen without first entering a user. This has been resolved by setting the comm port to its default parameters if any of the comm port parameters are left nulled.
- Changed the Transmit 800 MHz range from 851–869 MHz to 851–870 MHz.

1.6.2. New Fields and Features

- Provided a new feature to bypass STAC Clear/Coded Repeater Delays if the MSF firmware has determined that the wireline link with a Spectra–TAC Comparator has gone down. This feature can be enabled at the ***Bypass S–TAC Rptr Delay*** field on page 3 on the Edit Advanced Information menu.
- Provided a new RF Coupling feature to keep the MSF receiver unmutted at T=R stations; this allows transmitted data to be received and sent out on line 2 for two consoles hooked in parallel. This feature can be enabled at the ***RF Couple @ T=R Stations*** field on page 6 in the Edit Advanced Information menu.
- Provided a new feature to toggle the active polarity level of the Spare Output signal sent to the MSF 5000 junction box connector at J2 pin 9. This feature can be accessed at the ***Spare Output Pin Active*** field on page 8 in the Edit Advanced Information menu.
- Provided a new feature to control the sensitivity of receiver code detection. The sensitivity can be set as LOW, MEDIUM, or HIGH. The HIGH setting allows for greater sensitivity than MEDIUM, but also creates a greater chance for false code detections. The LOW setting requires a clearer signal than MEDIUM, but has a lower chance of falsing code detections. This feature can be accessed at the RX Detect Sensitivity field on page 7 in the Edit Advanced Information menu.

2. GETTING STARTED

2.1. Connecting the RIB and Station

Connect the Radio Interface Box (RIB) and the station to the IBM PC as follows (Figure 2.1):

1. Disconnect the power to the *MSF.*
2. Connect the end of IBM PC Interface Cable (#6 or #7 on page 4) marked "TO IBM" to one of the IBM PC's serial ports. Refer to your IBM PC manual for location of the serial ports.
3. Connect the end marked "TO RIB" to the 15–pin Sub–D connector on the RIB.
4. Connect the 25 pin Sub–D connector on the *MSF* Radio Interface Cable (#8 on page 4) to the 25 pin Sub–D connector on the RIB.
5. Connect the 40 pin ribbon cable connector to the connector located on the top of the control tray.
6. Reapply power to the *MSF.*

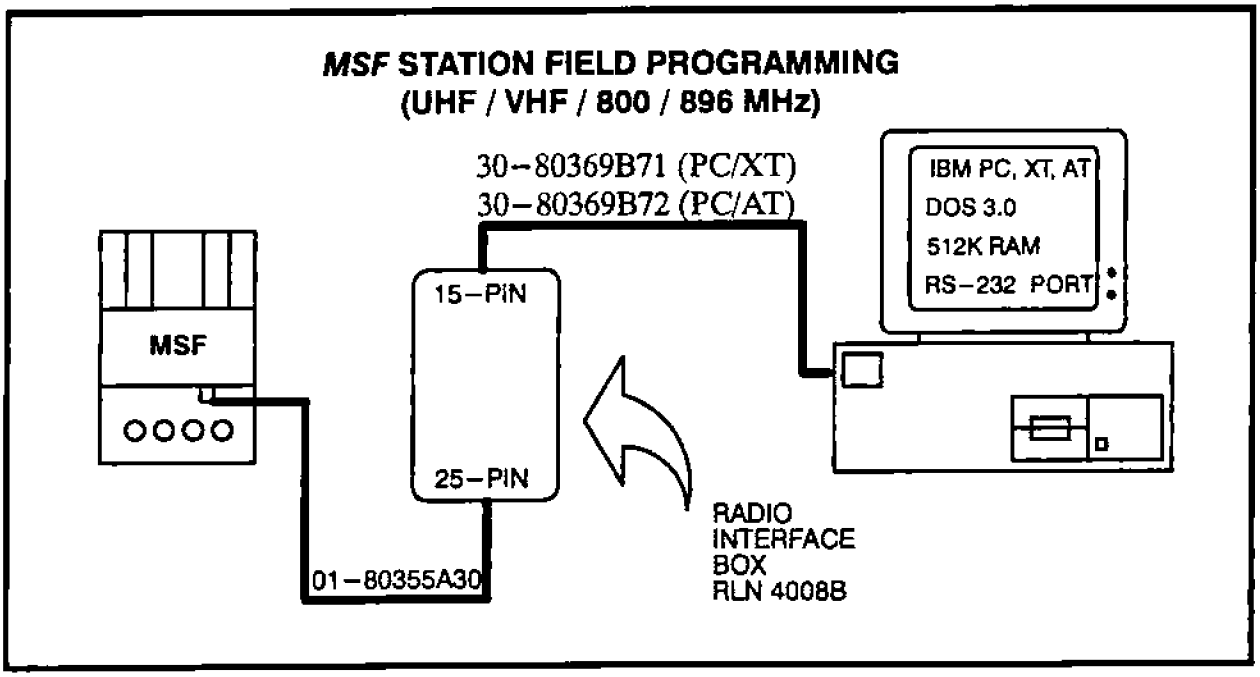


Figure 2.1: Station–RIB–Computer Configuration

NOTE: When programming or calibrating a station, DO NOT disconnect the station from the RIB at any time unless at the MAIN MENU. Disconnecting the RIB at any other time may leave the station inoperable.

2.2. Software Installation

The Radio Service Software is comprised of twenty–five, separate files; it is shipped to you on four 5.25 inch, low density, 360Mbytes floppy disks and on two 3.5 inch, low density, 720Mbytes floppy disks. The default codeplug files (.def extensions) are system version, dependent files; their installation is based on the version of board firmware used within a MSF 5000 base station. MSF 5000 system versions are defined as follows:

	Codeplug Types			
	SSCB	TTRC	SECURE	SAM
System Ver#1	3	4	3	no
System Ver#2	4	5	4	no
System Ver#3	5	5	4	no

The files shown below are provided by Motorola, Inc.

- MSF.EXE — Part of the program's executable file.
- OVRLAY*XX*.OVL — There are ten overlay files which are accessed dur ing execution of the RSS.
- MSF.HLP — The HELP file for the program's screens.
- ENGLISH.DAT — A text file containing most of the program's text in formation.
- CONV.DEF — A System Version 1&2, default Codeplug for a conven– tional station. The transmit, receive, and PL frequencies are set to zero. All other parameters are set to their proper default values.
- CONV_3.DEF — A System Version 3, default Codeplug for a conven– tional station. The transmit, receive, and PL frequencies are set to zero. All other parameters are set to their proper default values.
- CONVSTAC.DEF — A System Version 1&2, default Codeplug for a conven– tional station equipped with a *Spectra–TAC/DigiTAC* en coder (option C269). The transmit, receive, and PL frequencies are set to zero. All other parameters are set to their proper default values. This file includes *Spectra–TAC/DigiTAC* operation since the Field Pro– grammer is not capable of changing this option.

- CVSTAC_3.DEF — A System Version 3, default Codeplug for a conventional station equipped with a *Spectra–TAC/DigiTAC* encoder (option C269). The transmit, receive, and PL frequencies are set to zero. All other parameters are set to their proper default values. This file includes *Spectra–TAC/DigiTAC* operation since the Field Programmer is not capable of changing this option.
- CONVSIMU.DEF — A System Version 1&2, default Codeplug for a conventional station equipped with simulcast (option C777). The transmit, receive, and PL frequencies are set to zero. All other parameters are set to their default values. This file also includes *Spectra–TAC/DigiTAC* operation.
- CVSIMU_3.DEF — A System Version 3, default Codeplug for a conventional station equipped with simulcast (option C777). The transmit, receive, and PL frequencies are set to zero. All other parameters are set to their default values. This file also includes *Spectra–TAC/DigiTAC* operation.
- TRNK.DEF — A System Version 1&2, default Codeplug for a trunked station. The transmit and receive frequencies, and connect tone are set to zero. All other parameters are set to their default values.
- TRUNK_3.DEF — A System Version 3, default Codeplug for a trunked station. The transmit and receive frequencies, and connect tone are set to zero. All other parameters are set to their default values.
- TRNKSTAC.DEF — A System Version 1&2, default Codeplug for a trunked station equipped with a *Spectra–TAC/DigiTAC* comparator (option C269). The transmit and receive frequencies, and connect tone are set to zero. All other parameters are set to their default values. This file includes *Spectra–TAC/DigiTAC* operation since the Field Programmer is not capable of changing this option.
- TKSTAC_3.DEF — A System Version 3, default Codeplug for a trunked station equipped with a *Spectra–TAC/DigiTAC* comparator (option C269). The transmit and receive frequencies, and connect tone are set to zero. All other parameters are set to their default values. This file includes *Spectra–TAC/DigiTAC* operation since the Field Programmer is not capable of changing this option.
- TRNKSIMU.DEF — A System Version 1&2, default Codeplug for a trunked station equipped with simulcast (option C777). The transmit, receive, and connect tone frequencies are set to zero. All other parameters are set to their default values. This file also includes *Spectra–TAC/DigiTAC* operation.

- TKSIMU_3.DEF — A System Version 3, default Codeplug for a trunked station equipped with simulcast (option C777). The trans mit, receive, and connect tone frequencies are set to zero. All other parameters are set to their default values. This file also includes *Spectra–TAC/DigiTAC* operation.

2.2.1. Floppy Disk Installation

Due to its size, and the number of overlays required to run the RSS, it is highly recommended that the RSS be installed on and run from a hard disk drive. It can be run directly from two floppy disk drives, with great loss of efficiency (the computer will prompt the user to change disks frequently). The program cannot be run from only one floppy disk drive.

2.2.2. Loading RSS Software onto Hard Disk

The RSS software consists of several data files, text files, an executable file, all contained on both 3½" and 5½" low density floppy diskettes. Perform the following procedure to copy the software onto your PC hard disk.

Note: It is presumed that the PC is dedicated to the RSS program. Other applications may interfere (or be interfered with) if they use a different **config.sys** file than is recommended in this section, or if they use TSR (Terminate and Stay Resident) programs.

Minimum Resources

1. Make sure your PC meets the hardware and software requirements detailed in 1.3. You can determine the available RAM and disk space by using the DOS command "chkdsk" on the target drive. Refer to your DOS manual for details.

```
C:\>chkdsk
Volume XXXX Created xxx xx, xxxx xx:xx

xxxxxx bytes total disk space
 xxxxx bytes in x hidden files
   xxx bytes in x directories
 xxxxx bytes in x user files
xxxxxx bytes available on disk          √ Minimum of 1.5 Mbytes of available hard disk space

 xxxxx bytes in each allocation unit
  xxxx total allocation units on disk
  xxxx available allocation units on disk

xxxxxx bytes total memory
xxxxxx bytes free                       √ Minimum of 512 Kbytes of available RAM
```

2. Make sure the PC hard disk has a config.sys file and that the file specifies an adequate number of buffers and files by performing the following:

- Type C:\ <enter> to go to hard disk root directory.
- Type **dir** <enter> to list the hard disk directory. Examine the files and make sure there is a **config.sys** file listed. If not, create one.
- Type **more < config.sys** <enter> to list the contents of the file. You may need to hit the space bar to roll the pages.
- Examine the file contents and ensure that:

  DEVICE=C:\DOS\HIMEM.SYS/numhandles = 127
  DEVICE=C:\DOS\EMM386.EXE frame = none
  BUFFERS = 30
  FILE = 30

  if not, edit the lines and make the necessary changes using an available editor.

3. CAUTION: The RSS software program may not load correctly if the PC environment contains an autoexec.bat file that has multiple SET commands. To ensure proper loading of the RSS program, it is **highly recommended** that the autoexec.bat file be eliminated or renamed at the PC's top directory. It is not necessary to have the autoexec.bat to load and run the RSS program. If, however, you choose to maintain the autoexec.bat file in your PC system, you may try to remark (ie. rem) out some of the SET commands in the autoexec.bat file to see if the RSS program will load. You do so at your own peril.

Creating the RSS's directory

An MSF directory will need to be created to store the MSF.EXE, MSF.HLP, ENGLISH.DAT, and the overlay files (OVRLAYn.OVL) on the hard disk. When codeplug data is read or saved to an Archive disk file (Sections 4.2 and 4.3), the Radio Service Software looks for the file in the directory that is specified. It is suggested that a separate archive directory be created to store codeplug files, and within that directory another directory for other default codeplug files. These three directories are created by typing in the following commands:

C: **Enter**
MD C:\MRSS **Enter**
CD C:\MRSS **Enter**
MD MSF **Enter**
CD MSF **Enter**
MD ARCHIVE **Enter**

Next, copy all files from the floppy disks to the newly created directories on the hard disk drive. All files, with the exception of the default codeplug files, will be copied into the C:\MRSS\MSF directory. The default codeplug files will be copied into the C:\MRSS\MSF\ARCHIVE directory.

Installation from 3.5 Inch Floppy Disks

If your computer is equipped with a 3.5 inch floppy disk drive, take the following steps to load the RSS onto your hard disk drive.

Place disk #1 in disk drive A: and type:

COPY A:*.* C:\MRSS\MSF **Enter**
COPY A:\ARCHIVE*.* C:\MRSS\MSF\ARCHIVE **Enter**

Place disk #2 in disk drive A: and type the following commands:

COPY A:*.* C:\MRSS\MSF **Enter**

After the file transfer is complete, remove the supplied copy(s) of the Radio Service Software and keep it in a safe place. THIS WILL ENSURE THAT YOU WILL ALWAYS HAVE AN UNCORRUPTED COPY AVAILABLE SHOULD ANYTHING HAPPEN TO YOUR HARD DISK.

Installation from 5.25 Inch Floppy Disks

If your computer is equipped with a 5.25 inch floppy disk drive, take the following steps to load the RSS onto your hard disk drive.

Place disk #1 in disk drive A: and type:

COPY A:*.* C:\MRSS\MSF **Enter**

Repeat the above procedure for disks #2 through #4.

With disk #4 still inserted in disk drive A:, type the following to load the default codeplug files onto the hard disk:

COPY A:\ARCHIVE*.* C:\MRSS\MSF\ARCHIVE **Enter**

After the file transfer is complete, remove the supplied copy(s) of the Radio Service Software and keep it in a safe place. THIS WILL ENSURE THAT YOU WILL ALWAYS HAVE AN UNCORRUPTED COPY AVAILABLE SHOULD ANYTHING HAPPEN TO YOUR HARD DISK.

2.3. Screens and Function Keys

Every action of the Radio Service Software is controlled through the use of formatted screens and function keys. The four different types of screens are Banner Screen, Menu Screen, Working Screen and Help Screen. The function keys are the ten keys located on the left side or along the top of the keyboard, labeled **F1** to **F10**. The function keys will be denoted as **F1** through **F10**, throughout this manual. **ALT–F1** represents a sequence of keystrokes; the key marked **ALT** must be pressed and held until the **F1** key is pressed, at which time both keys are to be released.

The Banner Screen is shown in Figure 2.6. The remaining screen types are divided into four windows. Window 1, the upper left window, presents the name of the program, the title of the current screen,

the page number, the Station name and the Model type. Window 2, the upper right window, instructs the operator on the type of input to which the programming software will respond. For example, window 2 may state "Select Function Key F1 – F10" or window 2 could read "Use UP / DOWN Arrows To Adjust Value". This window may also contain error and status messages. Window 3, the large center window, and window 4, the bottom window, are different for Menu Screens, Working Screens and Help Screens and will be described in the following sections.

If the station is equipped with Password Protection, a prompt may appear at certain times during the operation of the RSS requesting that the user enter the password. When this screen is displayed, the password must be entered correctly for any communication to take place with the station. For more information on Password Protection, see the Password Equipped field description in Section 5.7.

2.3.1. Menu Screens

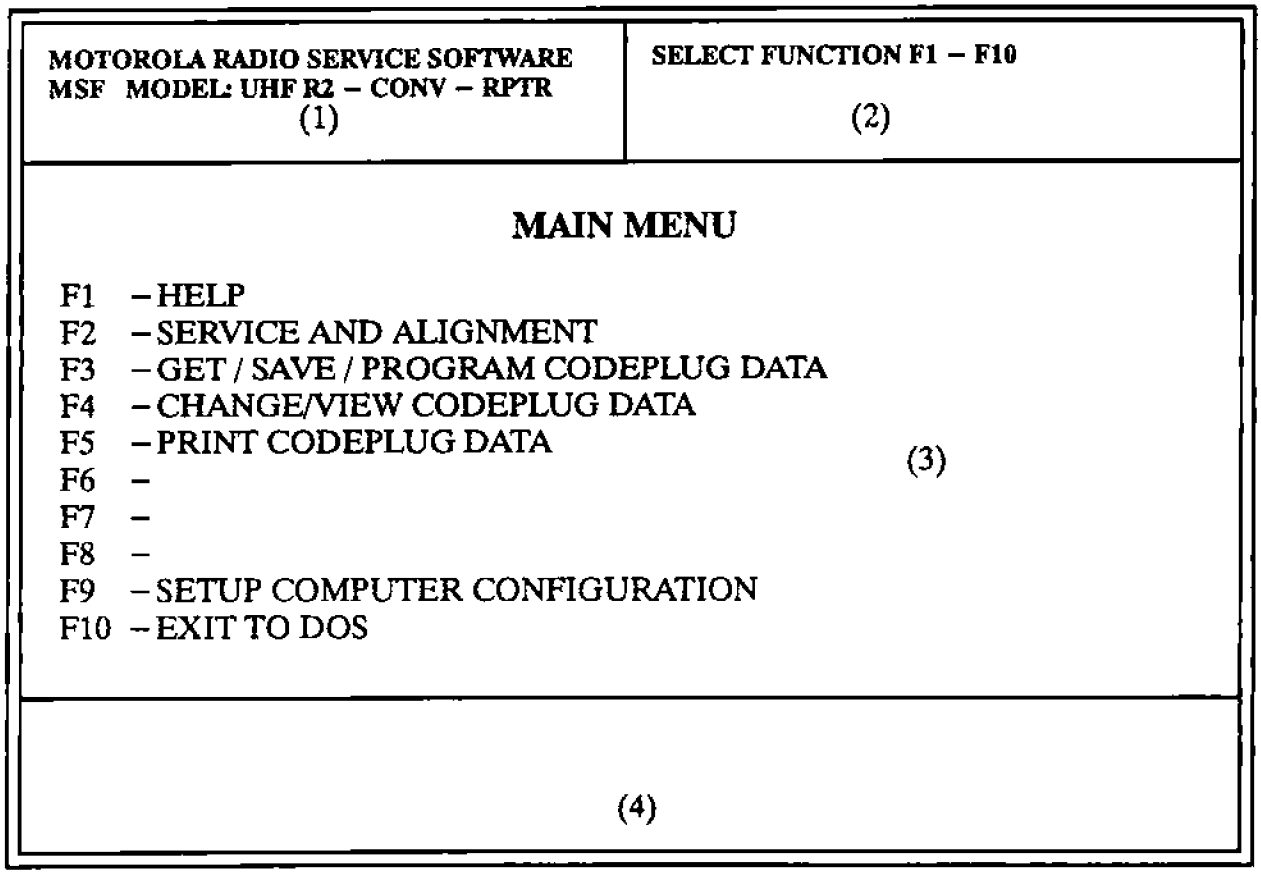


Figure 2.2: Sample Menu Screen (Main Menu)

Window 3 on Menu screens is the menu window. This window presents choices to select with function keys. The function key number is followed by a description of the type of activity that can be accessed by pressing that key. Note that on all menu screens, **F1** is always a HELP function, and **F10** is always an EXIT key. The help function provides information on how to use the currently displayed screen, and the EXIT function will return you to the previous menu screen.

Window 4 on Menu screens is not used.

2.3.2. Working Screens

Two different types of working screens will be displayed.

One type of working screen is the DATA ENTRY SCREEN. The DATA ENTRY SCREEN will request data that you must enter through the keyboard. On each screen, there may be a number of DATA ENTRY FIELDS. The current DATA ENTRY FIELD is highlighted. If the instruction window requests an entry, simply type the requested data to the DATA ENTRY FIELD. If a typing error occurs, move the cursor under the error with the left and right arrow keys, referred to as **Left** and **Right** throughout this manual, and type over the error. Other times, you may be requested to use theup and down arrow keys, referred to as **Up** and **Down** throughout this manual, to choose from a number of predetermined selections. To move to the next DATA ENTRY FIELD, press either **Enter** or **Tab**. **Tab** may also be used to move down to a desired DATA ENTRY FIELD while **BackTab** may be used to move up to a desired DATA ENTRY FIELD. An example of a DATA ENTRY SCREEN is the Edit Mode Information Screen (Figure 2.3).

The other type of working screen is the ADJUSTMENT SCREEN. This screen has a visual scale showing the relative value of the adjustment inside the tuning range of the microprocessor in the station. This screen may be compared to a potentiometer which has a minimum and maximum position and wiper that can be positioned anywhere in between. The user may adjust the relative value using **Up** and **Down**, or do a fast adjust using **PgUp** or **PgDn**. An example of an ADJUSTMENT SCREEN is the Alignment Field Setting Screen (Figure 3.4).

In both types of working screens, window 3, the large center window, is where the data is displayed, and window 4, the bottom window, displays a list of the available function keys (**F1 – F10**) for that data.

Working Screens Key Summary

Key	Action
• **Right**	Right Arrow moves cursor right
• **Left**	Left Arrow moves cursor left
• **Up**	Up Arrow changes the current Data Entry Field to the previous selection in a list of predetermined choices on DATA ENTRY SCREENS, and increases the Relative Value on ADJUSTMENT SCREENS.
• **Down**	Down Arrow changes the current Data Entry Field to the next selection in a list of predetermined choices on DATA ENTRY SCREENS, and decreases the Relative Value on ADJUSTMENT SCREENS.
• **PgUp**	Displays the previous page of information on the DATA ENTRY SCREENS, and increments the Relative Value on the ADJUSTMENT SCREENS in units of 10.
• **PgDn**	Displays the next page of information on the DATA ENTRY SCREENS, and decrements the Relative Value on the ADJUSTMENT SCREENS in units of 10.

- **Enter** Enters data typed and moves to next Data Entry Field
- **Tab** Tab moves to the next Data Entry Field.
- **BackTab** Back Tab moves to the previous Data Entry Field. This may be Shift Tab on some machines.

2.3.3. Help Screens

Help Screens are available by pressing **F1** from both Menu screens and Working screens. When pressing **F1** from a Menu screen, help for the current menu is displayed. When pressing **F1** from a Working screen, the displayed help depends on the type of the current Working screen. If the current Working screen is a Data Entry Screen, a description of the current data entry field is displayed. If the current Working screen is an Adjustment Screen, the procedure for the current adjustment is displayed. An example of help from a Menu screen is shown in Figure 2.3.

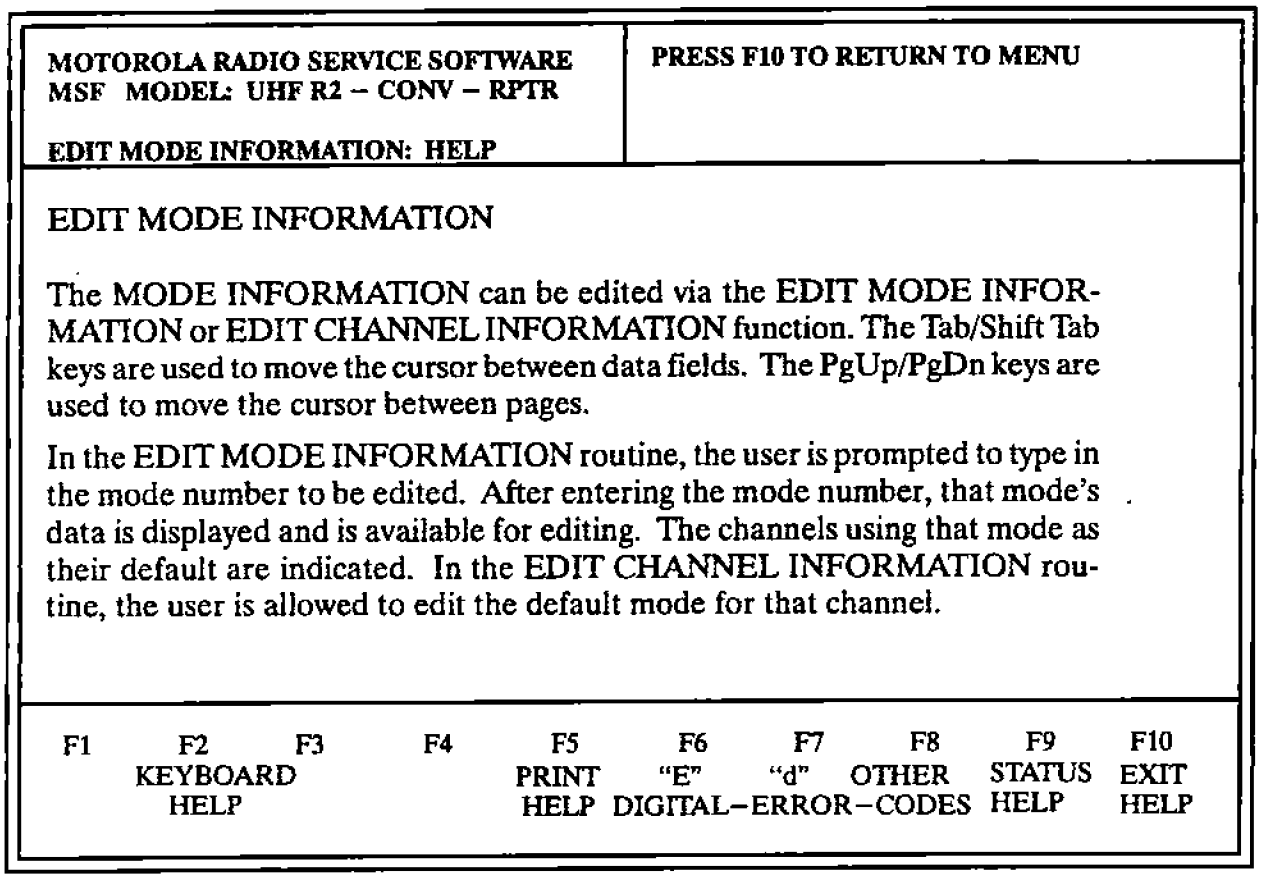


Figure 2.3: Sample Help Screen (Mode Information: Help)

The Help information is displayed in window 3, and window 4 contains a list of the possible functions. The functions available from a Help screen are listed below.

- **F2** – Keyboard Help – Describes cursor control
- **F5** – Print Help
- **F6** – "E" Digital Error Codes – Gives a brief description of front panel error codes beginning with the letter 'E'.

F7 – "d" Digital Error Codes – Gives a brief description of front panel error codes beginning with the letter 'd'.

F8 – Other Digital Error Codes – Gives a brief description of front panel LED displays and error codes that are not contained in F6 or F7 above.

F9 – Status Help – Displays RSS version number, part number, manual number, release date, and Firmware Upgrade Kit number. (see Figure 2.4).

F10 – Exit Help (to previous section)

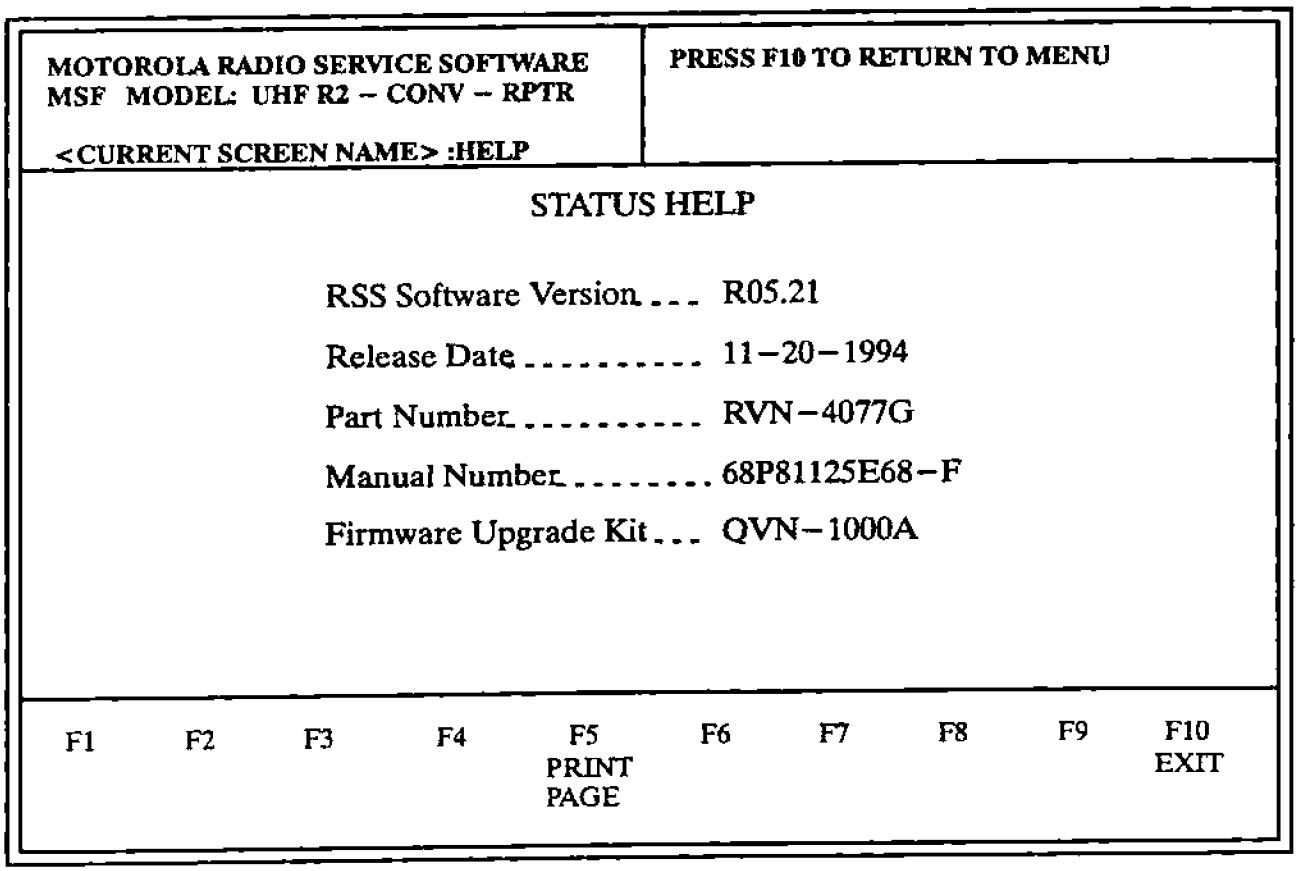


Figure 2.4: Status Help Screen

2.3.4. How the Screens Are Organized

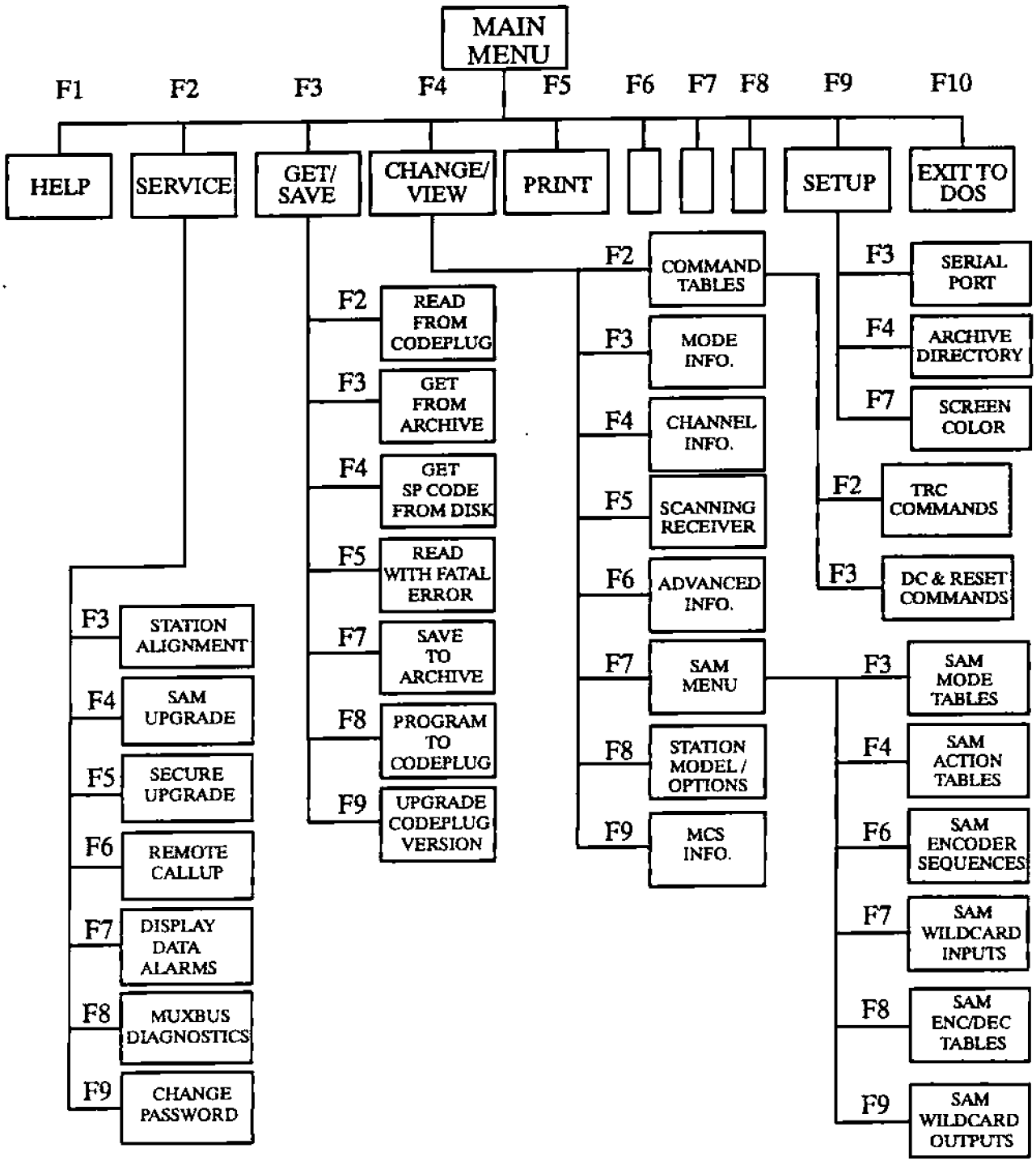


Figure 2.5: Screen Organization

2.4. How to Start the Radio Service Software

After installing the Radio Service Software on a hard drive (see Section 2.2.), move to the MSF directory by typing at the DOS prompt:

CD C:\MRSS\MSF **Enter**

To start the Radio Service Software, type:

MSF **Enter**

If the program has been configured (i.e. MSF.CFG file exists) the Banner Screen (Figure 2.6) will be displayed. Pressing any key will display the MAIN MENU. If this is the first time the program has been used, or the file MSF.CFG does not exist, then the program will respond with the COMPUTER CONFIGURATION MENU (Figure 2.7). The COMPUTER CONFIGURATION MENU is described in the next section.

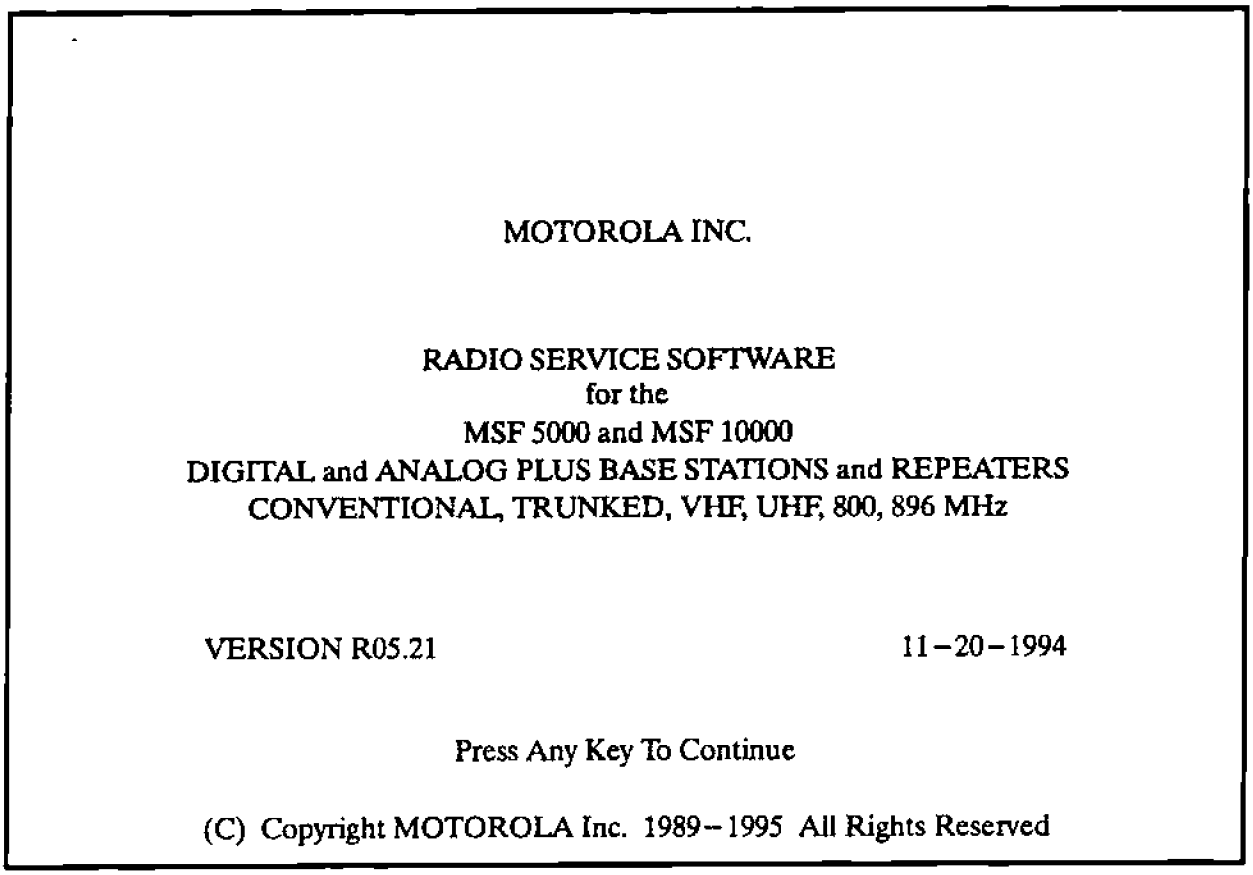


Figure 2.6: Banner Screen

2.5. Configuring the Computer

The COMPUTER CONFIGURATION MENU (Figure 2.7) has five active function keys. **F1** is for Help, **F3** is for setting up your serial port, **F4** is for setting up default directories, **F7** is for setting your display to monochrome or color, and **F10** will return the user to the main menu. This screen will automatically appear if the file MSF.CFG does not exist when the RSS is started.

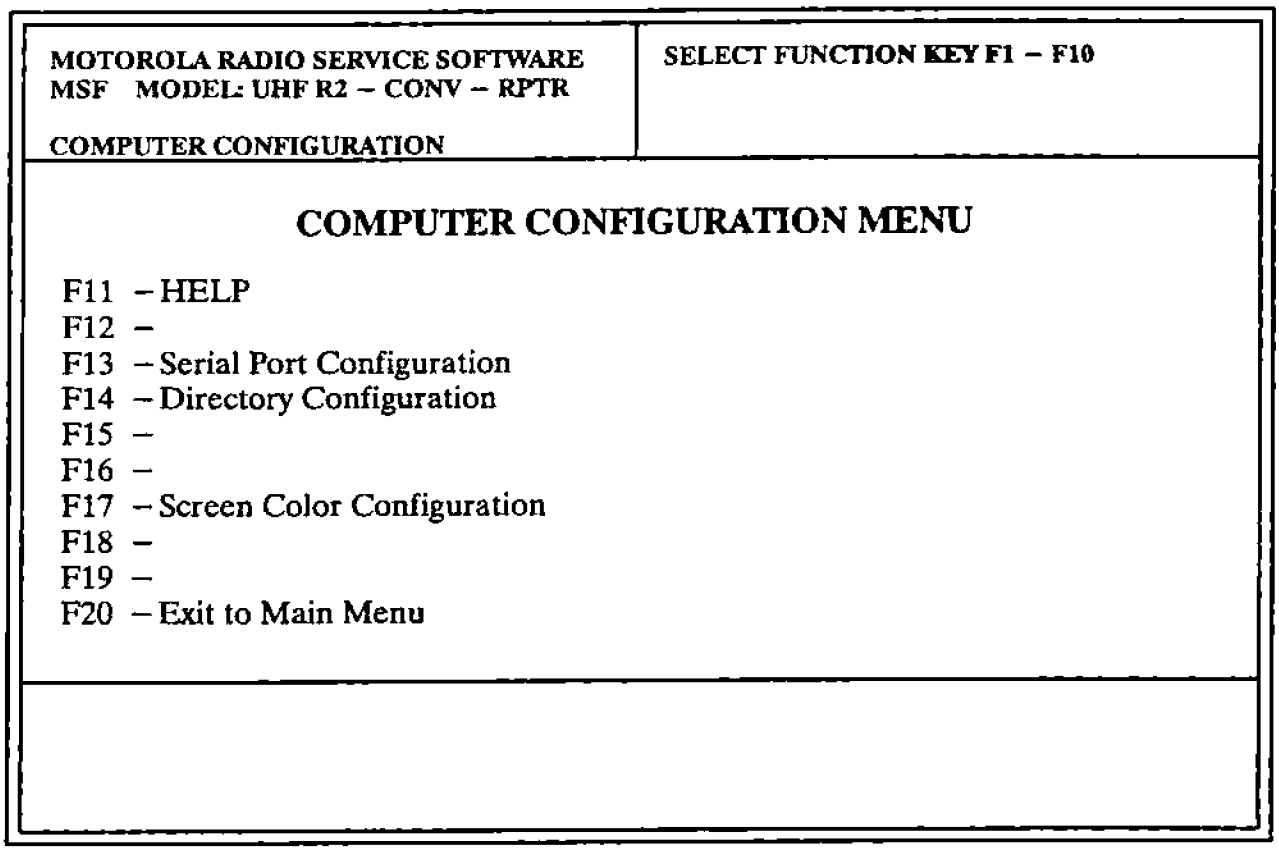


Figure 2.7: Computer Configuration Menu

2.5.1. Serial Port Configuration (F3)

By pressing **F3** at the COMPUTER CONFIGURATION MENU, the computer will display the SERIAL PORT CONFIGURATION screen (see Figure 2.8). This screen contains editable fields for both the Station Port and the Modem Port. There may be from 1–4 (COM1 – COM4) Serial Ports on a PC. The Serial Port is used to transmit data back and forth to the station or it can be used to connect a modem to the PC. The Station Port is the Serial Port to which the RIB is connected. The Modem Port is the serial port to which the modem is connected. The Station Port contains the following fields: Serial Port and Baud Rate. The Modem Port contains the following fields: Serial Port, Wait For Dial Tone, Pause Between Calls, Modem Speaker Status, Modem Speaker Volume and Number Of Redials. It is possible for both the Station Port and Modem Port to be set to the same serial port, i.e. an external modem is connected to the serial port or the station is connected to the serial port. The **BackTab** is used to move the cursor to the previous field. **Enter** and **Tab** are used to advance the cursor to the next field.

IF THE SERIAL PORT IS NOT SET CORRECTLY, YOU WILL GET A "Station Does Not Respond" ERROR MESSAGE WHEN TRYING TO COMMUNICATE WITH THE STATION.

The Serial Port Configuration fields (see Figure 2.8), along with a brief explanation for each are shown below.

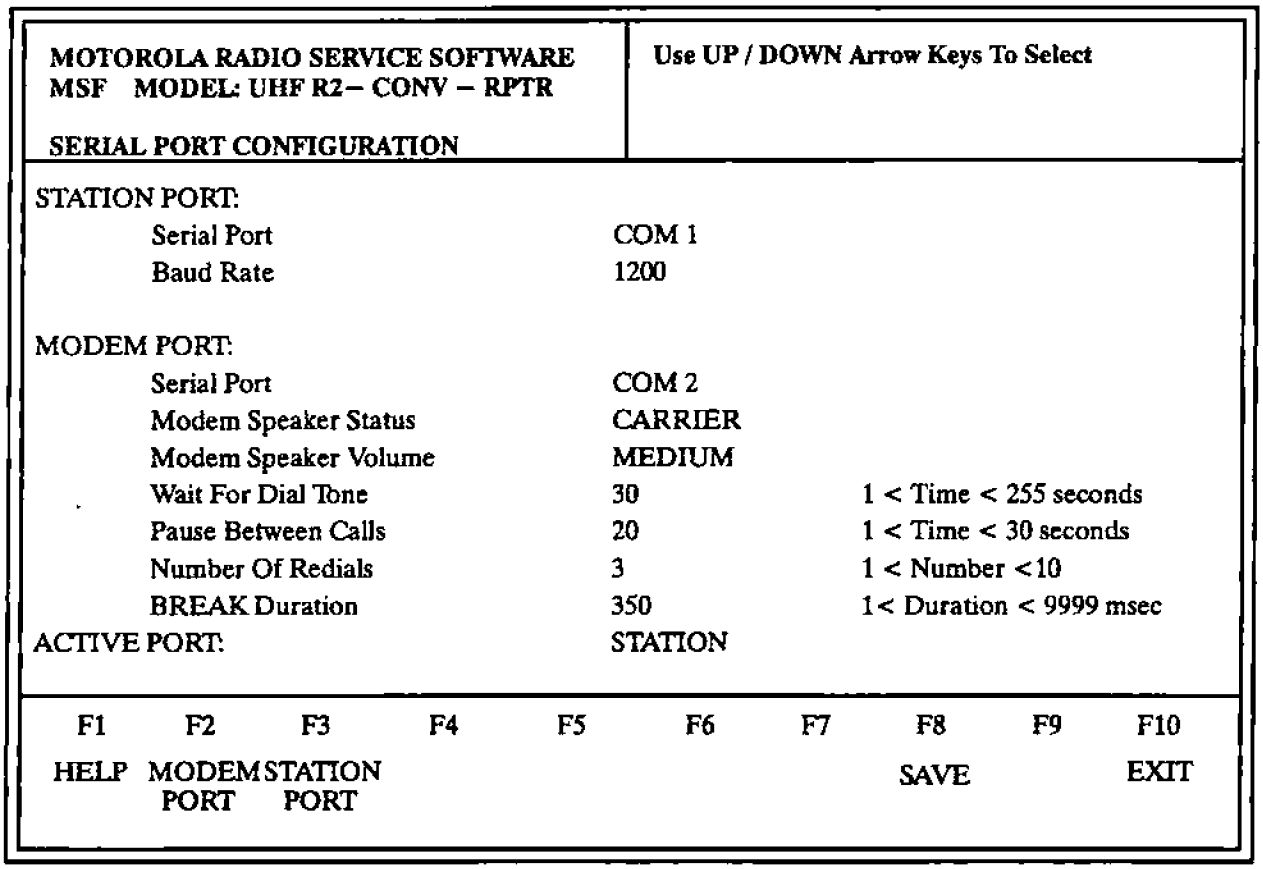


Figure 2.8: Serial Port Configuration Screen

2.5.1.1. Station Port

Serial Port

The Serial Port field indicates to which Serial Port on the PC that the station is connected. The four choices, COM1, COM2, COM3, and COM4, are selected by pressing **Up** and **Down**. The default is COM1.

Baud Rate

The Baud Rate field is the rate of transmission between the station and the computer. Baud Rate is expressed in bits–per–second (bps). The five choices 0300, 1200, 2400, 4800 and 9600 are selected by pressing **Up** and **Down**. The default is 1200 bps.

2.5.1.2. Modem Port

Serial Port

The Serial Port field indicates to which Serial Port on the PC that the modem is connected. The four choices COM1, COM2, COM3 and COM4 are selected by use of **Up** and **Down**. The default is COM1. Many internal modems are configured to COM2.

Modem Speaker Status

The Modem Speaker Status field indicates when the modem speaker is active. The four choices ALWAYS OFF, ALWAYS ON, CARRIER (the speaker is ON until a carrier is detected) and DIAL/

CARR (ON after dialing until carrier detected) are selected by pressing **Up** and **Down**. The default is CARRIER.

Modem Speaker Volume

The Modem Speaker Volume field indicates the range of the modem's speaker. The three choices LOW, MEDIUM and HIGH are selected by pressing **Up** and **Down**. The default is MEDIUM.

Wait For Dial Tone

The Wait For Dial Tone field instructs the modem how long to wait for a dial tone after issuing the dial command and also how long to wait for a connection after dialing the number. If no dial tone is detected or connection is not established then the modem will hang up. The valid range for this field is 1 to 255 seconds. The default is 30 seconds.

Pause Between Calls

The Pause Between Calls field indicates how long the RSS will pause before dialing another number after no connection is made in dialing the preceding number. The valid range for this field is 1 to 30 seconds. The default is 10 seconds.

Number Of Redials

The Number Of Redials field indicates how many times the modem should attempt to redial a number. The valid range for this field is 1 to 10. The default is 3.

BREAK Duration

The length of time to send a BREAK signal when **F8** is pressed in the Modem Terminal Mode Screen. The default for the BREAK Duration is 350 milliseconds. The BREAK signal causes the Transmit Data (TD) line on the serial port of the modem to go active for the entire Break Duration. The BREAK signal can be used for communicating with serial network controllers or other communications equipment.

2.5.1.3. Active Port

The Active Port field is a display only field that informs the user if serial communications are taking place at the Station Port or the Modem Port. The Active Port field will display STATION unless communications with a remote modem are in progress. Once the Remote Callup Screen is entered the Active Port changes to MODEM. After exiting the Remote Callup Screen, the Active Port is changed back to STATION, unless the modem is currently on–line.

2.5.1.4. Definition of Serial Port Configuration Function Keys

F1 – Provide HELP associated with the Serial Port Configuration screen.

F2 – Change the active Serial Port to the Station Port. Any data transmitted by the RSS will be sent to the STATION PORT.

F3 – Change the active Serial Port to the Modem Port. Any data transmitted by the RSS will be sent to the MODEM PORT.

F5 – Print the current page.

F8 – Save the current Serial Port Configuration to the 'MSF.CFG' file.

F10 – Exits the Serial Port Configuration screen.

2.5.2. Directory Configuration (F4)

By pressing **F4** at the COMPUTER CONFIGURATION MENU, the computer will display the DIRECTORY CONFIGURATION screen (Figure 2.9). The Archive, Help, English.Dat, Phone.Cfg, and Sp File Directories can be set here. A valid entry must be made before exiting. To save the selections press **F8**. Pressing **F10** will return you to the COMPUTER CONFIGURATION MENU, but will not save your selections to disk.

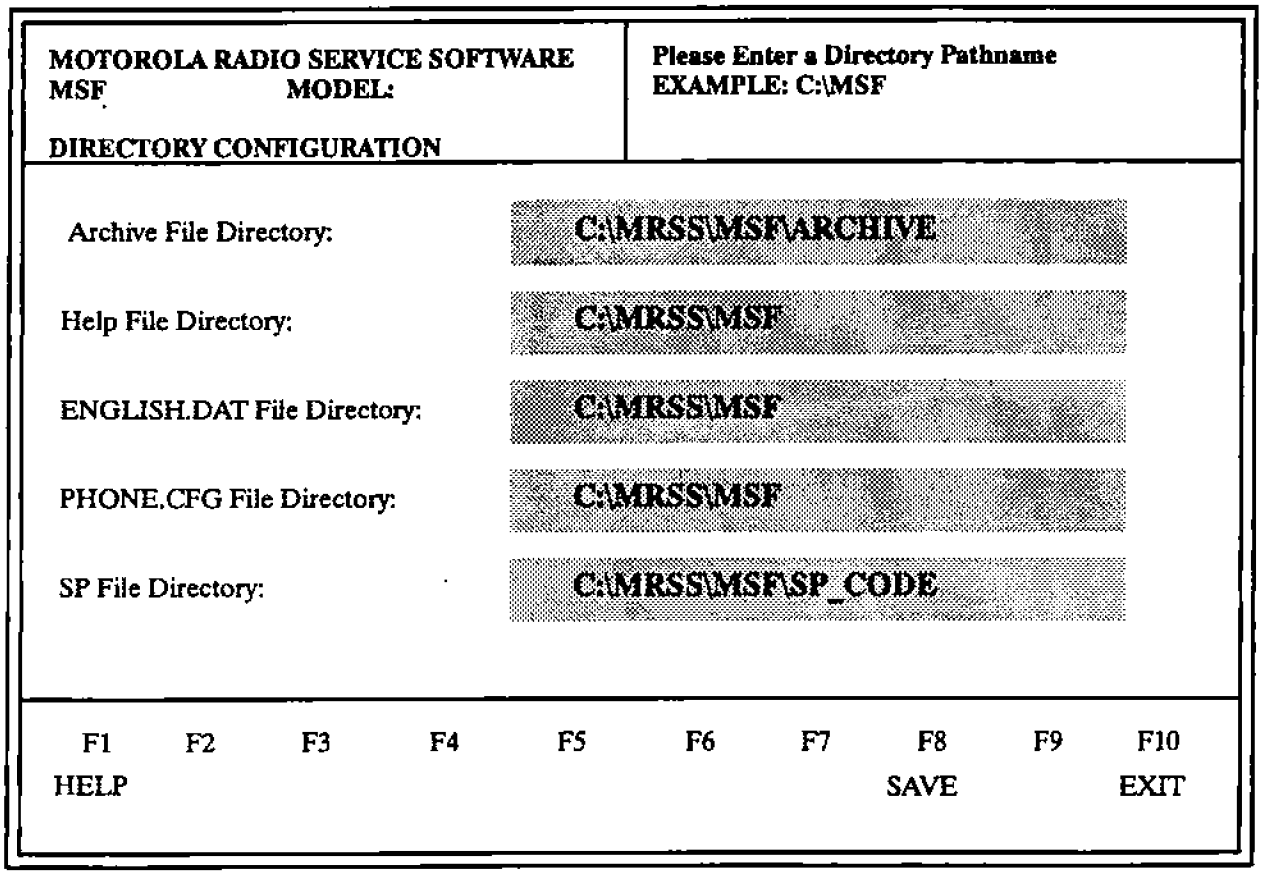


Figure 2.9: Directory Configuration Screen

The Archive File Directory is the directory in which all codeplug files should be stored. The directory that is entered here will also automatically appear in the Read/Save Codeplug from/to Disk screens. This directory may be changed either on the above screen or within the read/save to disk screens. If the directory is changed from the read/save to disk screens, that directory will only automatically appear during the current working session. If the directory is changed from the configuration screen and saved by pressing **F8**, then that directory will appear even after the PC has been re–booted.

The Help File directory is the directory in which the file MSF.HLP exists. If this directory is incorrectly set, the user will be prompted to enter a valid directory where the help file does exist.

The ENGLISH.DAT file directory is the directory in which the ENGLISH.DAT file exists. This file contains all of the text that is displayed on the working screens. Upon starting the program, this file

is loaded into memory, and if the file cannot be found, a screen prompting the user for the correct directory will appear.

The PHONE.CFG file directory is the directory in which the PHONE.CFG file exists. This file contains all of the data used in remote callup procedures.

The SP File Directory is the directory in which the files for SP (Special Product) updates should be stored. Since the SP files are distributed on floppy disks, this setting is typically the A: disk drive.

2.5.3. Configuring the Screen (F7)

Pressing **F7** at the COMPUTER CONFIGURATION MENU will display the COLOR CONFIGURATION screen (Figure 2.10). The highlighted field will be the MONITOR TYPE field. If using a color display, then this field should be set to "COLOR" using **Up** and **Down**. If using a monochrome display, this field should be set to "MONO", and no other fields will appear on the screen. If the color display is enabled, you may now change the colors of various sections of the display by pressing **Up** and **Down**. Move from section to section by using **Tab** or **Enter**. To save your selections, press **F8**. If you do not like your selections, you can start over by pressing **F9** and the screen will return to its original values. Pressing **F10** will return you to the COMPUTER CONFIGURATION menu, but if you did not save your selections by pressing **F8**, your selections will not be saved.

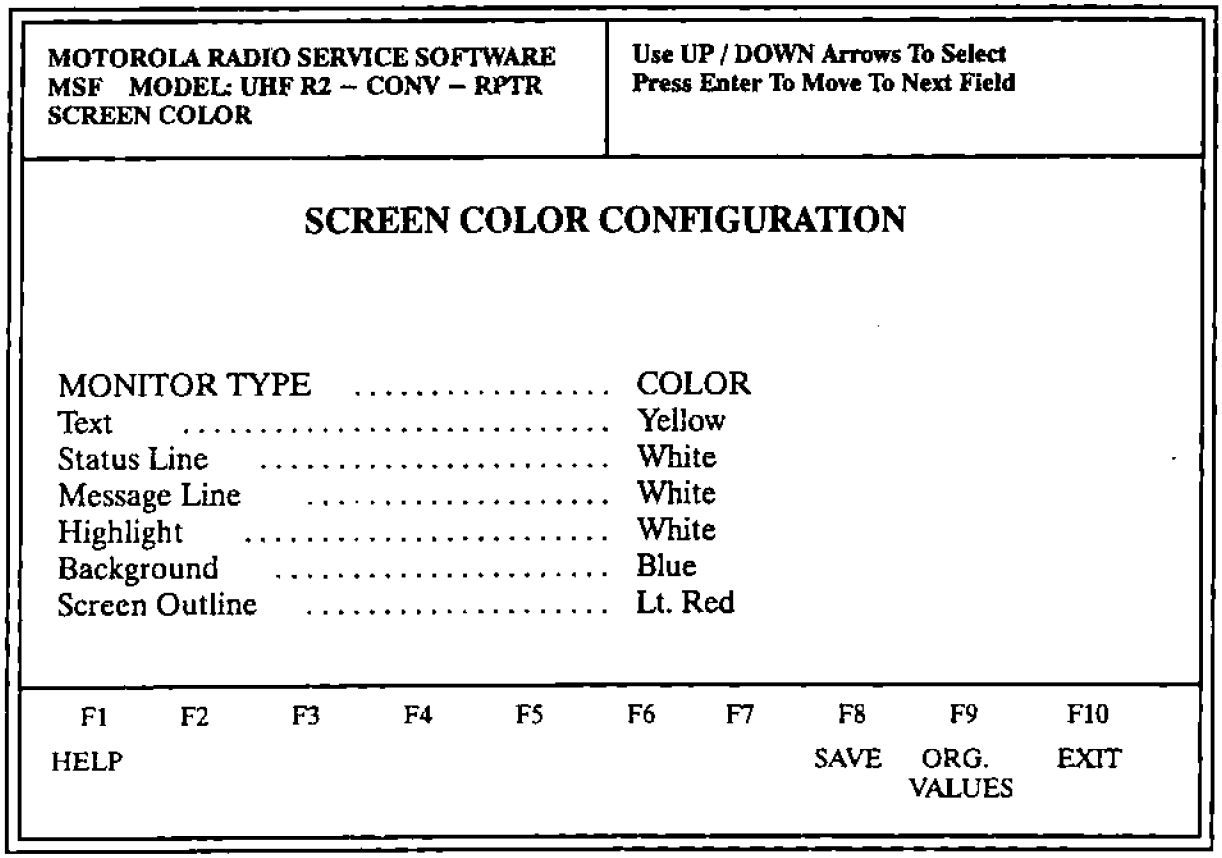


Figure 2.10: Color Configuration Screen

2.5.4. Exiting the Configuration Screens (F10)

When you are through with the configuration screens, pressing **F10** COMPUTER CONFIGURATION MENU will move you to the Banner Screen. The next time the RSS is run, the COMPUTER CONFIGURATION MENU will be bypassed and the program will start from the Banner Screen. If at a later time you wish to change the configuration, you may do so from the COMPUTER CONFIGURATION MENU via the MAIN MENU.

2.6. Main Menu

The Main Menu (See Figure 2.11) is the fundamental screen of the Field Programmer. All functions of the Field Programmer are accessed via this menu. This section briefly describes the operation of each of the seven functions available at the main menu. The functions of **F2**, **F3**, and **F4** are described in detail in Sections 3, 4, and 5, respectively. The detailed description of **F9** was discussed in Section 2.5.

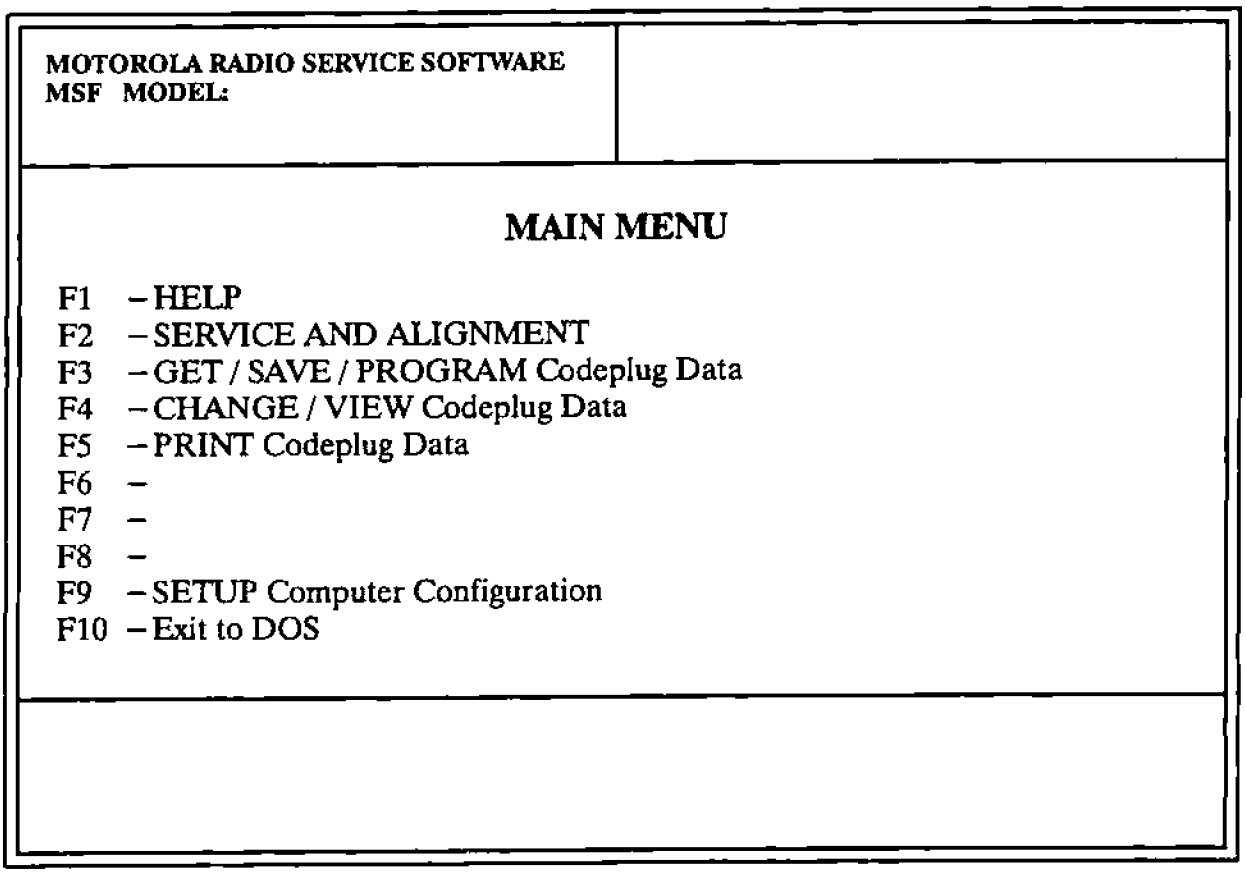


Figure 2.11: Main Menu

2.6.1. Help (F1)

The **F1** key provides context sensitive help whenever it is pressed in the program. The help displayed depends upon what screen was currently active. Since the help key is a constant throughout the RSS, it is not discussed in further sections. For more information on help screens, see Section 2.3.3.

2.6.2. Service and Alignment (F2)

This menu contains seven selections (not including the Help and Exit keys): Individual Station Alignments (**F3**), SAM Transparent Upgrade (**F4**), Secure Transparent Upgrade (**F5**), Remote Callup (**F6**), Display Data Alarms (**F7**), MUXbus Diagnostics (**F8**), and Change Password (**F9**). **F3** is used to make station adjustments such as Rx Level and Tx Level. It is also used to recalibrate the station after a board replacement or repair. **F4** is used to add a SAM (Station Access Module) Board to a station. **F5** is used to add and program a Secure Module. **F6** is used to access a remote station via modems. **F7** is used to display all 24 data alarms that are activated via the SAM Wildcard Outputs screen on the SAM Menu. **F8** is used to monitor bits on the MUXbus. The bits may be set or cleared just as they would be on a DMP (Digital Metering Panel), with the added flexibility of controlling bits at different addresses simultaneously. **F9** is used to change the station's password, if so equipped. For more detailed information on all of these functions, see Section 3.

2.6.3. Get / Save / Program Codeplug Data (F3)

All of the personality and calibration data for an MSF is stored on EEPROMs on each of the control boards. These EEPROMs are called Codeplugs. The Codeplug data is initially programmed by the factory.

This Radio Service Software has the capability to transfer the codeplug data to a disk file, referred to as an archive file. **IT IS RECOMMENDED THAT WHEN A STATION IS FIRST RECEIVED, ITS CODEPLUG DATA BE STORED ON A DISK FILE AS A BACK–UP.** This way, if the memory of the station should ever fail, the disk will provide a quick means of retrieving any lost information, which can then be transferred back into the station.

From this menu, the user may read codeplug data from the station or disk to the computer. This function MUST be done before any changes can be made to the personality. The user may also save the codeplug data to the station or disk from this menu. This is the ONLY time the personality of the station is changed. It is also recommended that the new codeplug information be stored on a disk for future work on this station. For more detailed information on these functions, see Section 4.

2.6.4. Change / View Codeplug Data (F4)

This function allows the personality of the station to be changed. It must be remembered that "F4 – CHANGE / VIEW Codeplug Data" is only working on an image of the codeplug. Use "F3 – GET / SAVE / PROGRAM Codeplug Data" to change the actual station codeplug. For more detailed information on these functions, see Section 5.

2.6.5. Print Codeplug Data (F5)

This function sends the codeplug information to the computer's printer (if present) for future reference. It is recommended that this be done for every station as another form of "archiving". An example of what a print–out of the Codeplug data looks like is shown below (System Version #1). This print–out contains similar information to that contained in the station parameters booklet. If changes are made, then a print–out should be made. This print–out could be used to replace the one in the station parameters booklet.

STATION CONTROL CODEPLUG DATA

STATION TYPE / OPTIONS:

Frequency Range	UHF R2	Frequency Range R2	DISABLED
Synthesizer for R1	NON-MOSAIC	Synthesizer for R2	DISABLED
Repeater Operation	ENABLED	Simulcast Operation	DISABLED
Trunking Operation	DISABLED	TTRC Equipped	ENABLED
Spectra Tac Operation	ENABLED	SECURE Equipped	ENABLED
SECURE Operation	TRANSPRNT	SAM Equipped	ENABLED
Duplex Operation	HALF	MCS Equipped	DISABLED
XL Decryption Operation	ENABLED	PASSWORD Equipped	ENABLED
SP Number	X19ABSP	SmartZone Operation	DISABLED

STATION CONTROL DATA:

Number of Channels	01	Holdoff Delay with PL	ENABLED
Alarm Tone Frequency	1200	S-Tac Clear Rptr Delay	0000
Alarm Tone Duration	125	S-Tac Coded Rptr Delay	0000
Alarm Tone Gap	125	MCS Timer Period	000
Alarm Word Gap	2000	MCS Update Time	0060
Auto ID Tone Frequency	0800	MCS Resolution Time	001
Auto ID Delay	005	Decode Word	031
Auto ID Interval	015	ACK Word	023
Auto ID Rate	20	ACK Time	703
Local Channel Control	REMOTE	MRTI Enable/Disable	DISABLED
Local Mode Control	STATION	RSTAT Mode	NORMAL
Local Key Control	REMOTE	Gate Tx Always	ENABLED
Memory Station	ENABLED	MUXbus Seize	ENABLED
PA Turn On Delay	031	TSTAT on MUXbus	ENABLED
Key Up Delay	039	Fwd & Refl on MUXbus	ENABLED
Relay Idle Delay	031	Audio Diagnostics	ENABLED
EOM Time	000	Power Lvel Chk / Batt Rvrt	ENABLED
Disable Source	MUTE REQ	External SSCB EEPROM	DISABLED
Disable Delay	703	Rx Loopback Frequency	470.9875
Rptr Gate Holdoff Delay	0000	Tx Loopback Frequency	463.9875
Non-Priority Scan Delay	2999	Priority Scan Delay	2999
Scan Sample Time	0031	Priority Recheck Time	0301
Rx Qualify Time	0348	Failsoft Carrier Squelch	DISABLED

CHANNEL DATA:

	TUNE CHAN	CHAN 01
Mode Slaving	ENABLED	ENABLED
Mode Locked	DISABLED	DISABLED

TX Frequency	474.9875	474.9875
RX Frequency	473.9875	473.9875
TX Idle	474.9875	474.9875
ID Over the Wireline	ENABLED	ENABLED
Call Sign		
Default Mode Number	00	01
Audio Tray	R1	R1
Channel Scan	DISABLED	DISABLED
TX Slave	DISABLED	DISABLED

MODE DATA:

	MODE 00	MODE 01
RX PL/DPL CODE	031	MCS
TX PL/DPL CODE	031	CSQ
PTT Priority	DWRLM	DWRLM
Line TOT	000	120
Local TOT	000	000
Repeater TOT	000	060
Data TOT	000	000
MRTI TOT	000	000
RX Audio Control	ON	S
Repeat Audio Activation	OFF	S
Repeat Audio Holdin	OFF	S
RPTR Drop-Out Delay	002	002
Over-The-Air Alarms	ENABLED	ENABLED
Over-The-Wireline Alarms	DISABLED	DISABLED
Line Audio Mixed w/Data	NO	NO
Local Audio Mixed w/Data	NO	NO
Repeat Audio Mixed w/Data	NO	NO
MRTI Audio Mixed w/Data	NO	NO
ID Alarm Mixed w/Data	NO	NO
Pre / De Emphasis	ENABLED	ENABLED
PA Cutback	ENABLED	ENABLED
Mode Power Level	DISABLED	DISABLED
RPT TOT DOD Reset	ENABLED	ENABLED
TX Code Line Qual	DISABLED	DISABLED
MRTI PP Mode	CLEAR	CLEAR
MCS Table Number	1	OFF

TTRC CODEPLUG DATA

S-Tac Mute Time	00020	DC Decode	DISABLED
S-Tac Tone Frequency	2175	TRC Decode	ENABLED
Status Tone	DISABLED	TRC Tone Mix	LINE 2
Failsoft	ENABLED	GT Frequency	2175

Failsoft Tone Duration	00280	HGLT Duration	00120
Failsoft Tone Interval	09700	TX Source	ALC
Failsoft Tone Frequency	0900	Un ALC Source	LINE 1
Trunking Tickle Source	TX DATA	Mute Delay	00100
Failsoft Time Out Time	0001	Stand By Failure Counter	001
Failsoft Line	DISABLED	Bypass RX Notch	DISABLED
Site Failsoft Mode	FS	External TTRC EEPROM	DISABLED
Switch on LPTT:	DISABLED	External PTT	LINE
Line 2 TX Mix	DISABLED	Spare Output	NULL
Line 4 TX Mix	DISABLED	Mute TX Audio	DISABLED
Wireline Activity Source	LINE 1	LPTT Delay	0000
FT Mute Time	0030	LLGT Dropout Time	0150
Full Rx Inhibit	DISABLED	TSTAT DOD	00300

REMOTE CONTROL FUNCTION TONES:

Guard Tone:	MORE	
F TONE 01:	MON	
F TONE 02:	CHN 01	KEY
F TONE 03:	CHN 02	KEY
F TONE 04:		
F TONE 05:		
F TONE 06:		
F TONE 07:		
F TONE 08:	CHN 03	KEY
F TONE 09:	CHN 04	KEY
F TONE 10:	MORE	
F TONE 11:	MORE	
F TONE 12:		
F TONE 13:		
F TONE 14:		
F TONE 15:		

REMOTE CONTROL DC FUNCTIONS:

+12.5 ma Detect:	CHN 02	KEY ON
+12.5 ma UnDet:	KEY OFF	
+5.5 ma Detect:	CHN 01	KEY ON
+5.5 ma UnDet:	KEY OFF	
+2.5 ma Detect:		
+2.5 ma UnDet:		
−12.5 ma Detect:	CHN04	KEY ON
−12.5 ma UnDet:	KEY OFF	
−5.5 ma Detect:	CHN 03	KEY ON
−5.5 ma UnDet:	KEY OFF	
−2.5 ma Detect:	MON	
−2.5 ma UnDet:		
RESET RESPONSE	NULL	

SECURE CODEPLUG DATA

Clear Receiver	DISABLED	Extended Buffer Delay	0080
Clear Transmit	ENABLED	Fail Test Delay	0025
Cross Mode Receiver	ENABLED	Max Code Detect DT Delay	0080
Erase	ENABLED	Rx Code Detect DOD	0320
Rx Fail	ENABLED	Tx Code Detect DOD	0320
Tx Fail	ENABLED	Rx DC End Of Message Delay	40
Proper Code	DISABLED	Tx DC End Of Message Delay	40
Beep Delay	0087	Takeover EOM Delay	0080
Rx Code on Line	ENABLED		

MCS TABLE DATA

MCS TABLE # 1

SLAVED TO MODE (S) : 0

USER #	RX CODE (DESCR)	TX CODE (DESCR)	ACCESS	PRIORITY	ELAPSED TIME	NUMBER OF ACCESSES
01	M7 250.3 Hz	031	ENABLED	YES	0:00	0
02	031	M6 241.8 Hz	ENABLED	YES	0:00	0

SAM DATA:

Diversity Equipped	DISABLED	GCC–480 Equipped	DISABLED
Gate Data Always	ENABLED	MDC Pretime Bit Sync	DISABLED
Inactivity Delay	00000		

SAM MODES

SAM MODE TABLE:	00 of 01
SAM KNOCKDOWN	DISABLED
TONE DECODER	DISABLED
BINARY DECODER	DISABLED
DTMF DECODER	DISABLED

SAM MODE TABLE:	01 of 01
SAM KNOCKDOWN	ENABLED
TONE DECODER	CUSTOM

TONE INPUT	RECEIVER 1				
TARGET#	TARGET	ACT TBL	GROUP	GR TAR	GR ACT TBL
01	1234	01	E	--G-	01
02	1XX2	02	N	----	--

BINARY DECODER	MDC1200		
BINARY INPUT	RECEIVER 1		
TARGET#	OPCODE	ID	ACT TBL
01	REPEAT ACC	1234	01
02	SETUP	ABCD	02

DTMF DECODER	ENABLED		
DTMF INPUT	RECEIVER 2		
TARGET#	TARGET	ACT TBL	
01	123#X34	01	

SAM ACTION TABLES

SAM ACTION TABLE:		01 of 02		
#	ACTION	DEVICE#	COMMAND	ADDR/DATA
01	GENIPCB	1	E	21002102
#	ACTION	ADDRESS	TARG BIT	POLARITY
02	MANIBIT	7234	7	DISABLED
SAM ACTION TABLE:		02 of 02		
#	ACTION	MUXADDR	MUXBIT	
01	SETMUX	15	1	
#	ACTION	MUXADDR	MUXBIT	TIME
02	SETMUXMOM	1	3	10
#	ACTION	ENC DEST	ENC SEQ#	
03	GENENSEQ	TRAN	10	
#	ACTION	ENC DEST	ENC SEQ#	
04	GENENSEQ	LINE	1	

SAM ENCODE SEQUENCES

#	SCHEME	PRETIME	OPCODE	ID
01	MDC1200	100	REPEAT ACC	2100
#	SCHEME	PRETIME	SEQUENCE	DURATION
02	DTMF	100	123456789A	0050
#	SCHEME			
03				
#	SCHEME			
04				
#	SCHEME			
05				
#	SCHEME			
06				
#	SCHEME			
07				
#	SCHEME			
08				
#	SCHEME			
09				

#	SCHEME	PRETIME	SEQUENCE	FIRST DUR	FOLLOWING DUR
10	CUSTOM	200	1234567	2110	2000

TONE ENCODER/DECODER			ZVEI
TONE #	FREQ Hz	TONE #	FREQ Hz
0	2400	8	2000
1	1060	9	2200
2	1160	A	2800
3	1270	B	0810
4	1400	C	0970
5	1530	D	0886
6	1670	E	2600
7	1830		
Decoder TOT First Tone			0120 msec
TOT of Succeeding Tones			0120 msec
Enc / Dec Repeat Tone			E
Decoder Group Tone			A

TONE ENCODER/DECODER			ZVEIM
TONE #	FREQ Hz	TONE #	FREQ Hz
0	2200	8	1830
1	0970	9	2000
2	1060	A	2600
3	1160	B	0810
4	1270	C	0825
5	1400	D	0886
6	1530	E	2400
7	1670		
Decoder TO First Tone			0120 msec
TOT of Succeeding Tones			0120 msec
Enc / Dec Repeat Tone			E
Decoder Group Tone			B

TONE ENCODER/DECODER			ZVEIFR
TONE #	FREQ Hz	TONE #	FREQ Hz
0	2400	8	2000
1	1060	9	2200
2	1160	A	2800
3	1270	B	0810
4	1400	C	0970
5	1530	D	0886
6	1670	E	2600
7	1830		
Decoder TOT First Tone			0070 msec
TOT of Succeeding Tones			0070 msec
Enc / Dec Repeat Tone			C
Decoder Group Tone			2

TONE ENCODER/DECODER			CCIR
TONE #	FREQ Hz	TONE #	FREQ Hz
0	1981	8	1747
1	1124	9	1860
2	1197	A	1055
3	1275	B	0930
4	1358	C	2247
5	1446	D	0991
6	1540	E	2210
7	1640		
Decoder TOT First Tone			0070 msec
TOT of Succeeding Tones			0070 msec
Enc / Dec Repeat Tone			D
Decoder Group Tone			B

TONE ENCODER/DECODER CCIRMOD			
TONE #	FREQ Hz	TONE #	FREQ Hz
0	1981	8	1747
1	1124	9	1860
2	1197	A	2400
3	1275	B	0930
4	1358	C	2247
5	1446	D	0991
6	1540	E	2210
7	1640		
Decoder TOT First Tone			0070 msec
TOT of Succeeding Tones			0070 msec
Enc / Dec Repeat Tone			C
Decoder Group Tone			1

TONE ENCODER/DECODER EEA			
TONE #	FREQ Hz	TONE #	FREQ Hz
0	1981	8	1747
1	1124	9	1860
2	1197	A	2400
3	1275	B	0930
4	1358	C	2247
5	1446	D	0991
6	1540	E	2210
7	1640		
Decoder TOT First Tone			0170 msec
TOT of Succeeding Tones			0170 msec
Enc / Dec Repeat Tone			D
Decoder Group Tone			B

TONE ENCODER/DECODER CUSTOM			
TONE #	FREQ Hz	TONE #	FREQ Hz
0	2400	8	2000
1	1060	9	2200
2	1160	A	2800
3	1270	B	0810
4	1400	C	0970
5	1530	D	0886
6	1670	E	2600
7	1830		
Decoder TOT First Tone			0070 msec
TOT of Succeeding Tones			0070 msec
Enc / Dec Repeat Tone			C
Decoder Group Tone			2

DTMF ENCODER/DECODER

TONE #	PAIRS Hz	TONE #	PAIRS Hz	TONE #	PAIRS Hz	TONE #	PAIRS Hz
D	0941 1633	4	0770 1209	8	0852 1336	#	0941 1477
1	0697 1209	5	0770 1336	9	0852 1477	A	0697 1633
2	0697 1336	6	0770 1477	0	0941 1336	B	0770 1663
3	0697 1477	7	0852 1209	*	0941 1209	C	0852 1633

DTMF Inter–Tone Gap 0050 msec
DTMF Decoder TOT 003000 msec

SAM WILDCARD INPUTS

I/O CONFIGURATION EXP_DATA

WILDCARD INPUT	INPUT TYPE	ACTIVE	INPUT RESPONSE	ACTIVE ACT TBL	INACTIVE ACT TBL
0	EXP_DATA	LOW	TX PL INH	02	
1	EXP_DATA	LOW	RFLOOP EN2		
2					
3	EXP_DATA	LOW	SEIZE/REL		
4	EXP_DATA	LOW	DATA PTT		
5	EXP_DATA	LOW	RX MUTE		
6					
7					
8					
9					
10	EXP_DATA	LOW	MAJORFAULT		
11	EXP_DATA	LOW	ALARM RES		
12	EXP_DATA	LOW	RFLOOP EN1		
13	EXP_DATA	LOW	STN RESET		
14					
15					

FRONT PANEL INPUT	INPUT TYPE	ACTIVE	INPUT RESPONSE	ACTIVE ACT TBL	INACTIVE ACT TBL
FUNCTION A					
FUNCTION B					

SAM WILDCARD OUTPUTS

I/O CONFIGURATION WILDCARD OUTPUT	OUTPUT TYPE	EXP_DATA ACTIVE	OUTPUT ENABLE CONDITIONS
0	EXP_DATA	HIGH	ALM BIT 0
1	EXP_DATA	LOW	ALM BIT 1
2	EXP_DATA	LOW	ALM BIT 2
3	EXP_DATA	LOW	ALM BIT 3
4	EXP_DATA	LOW	ALM BIT 4
5	EXP_DATA	LOW	ALM BIT 5
6	EXP_DATA	LOW	ALM BIT 6
7	EXP_DATA	LOW	ALM BIT 7
8	EXP_DATA	LOW	ALM BIT 8
9	EXP_DATA	LOW	ALM BIT 9
10	EXP_DATA	LOW	ALM BIT 10
11	EXP_DATA	LOW	ALM BIT 11
12	EXP_DATA	LOW	ALM BIT 12
13	EXP_DATA	LOW	ALM BIT 13
14	EXP_DATA	LOW	ALM BIT 14
15	EXP_DATA	LOW	LN PTT SEN
16			
17	EXP_DATA	LOW	RX PL DET
18			
19	EXP_DATA	LOW	CARR DET
20	EXP_DATA	LOW	RPTR PTT
21			
22			
23			

EEPOT SETTINGS

#0 DECRYPTED RX LEVEL	00	#1 FLUTTER FIGHTER LEVEL	00
#2 REPEATER SQUELCH LEVEL	00	#3 RECEIVER SQUELCH LEVEL	00
#4 MAX DEVIATION LEVEL	00	#5 RX LEVEL	00
#6 CODED DEVIATION	00	#7 TX LINE LEVEL	00
#8 STATUS TONE LEVEL	00	#9 HIGH END EQUALIZATION	00
#A LOW END EQUALIZATION	00	#B TRUNKING DATA DEVIATION	00
#C LINE 2 OUTPUT LEVEL	00	#D LINE 4 OUTPUT LEVEL	00
#F SAM ENCODER LEVEL	--		

2.6.6. Setup Computer Configuration (F9)

This function allows you to change your serial ports, directories and screen colors as described earlier on the COMPUTER CONFIGURATION menu (Figure 2.7). These may be changed at any time by pressing **F9** from the main menu. If the file MSF.CFG does not exist then this screen will appear upon starting the field programmer before the banner screen is displayed (See Section 2.5.).

2.6.7. Exit to DOS (F10)

This function allows you to cleanly exit the program and return to the Disk Operating System (DOS). When **F10** is pressed, another window will appear asking the user if he really want to exit to DOS. **F2** must be depressed to actually exit to DOS, and **F10** cancels the exit. This change in function keys is intentionally done to avoid the inadvertent loss of data that might come with being accustomed to using **F10** to move up the RSS hierarchy of menus.

3. SERVICE AND ALIGNMENT(F2)

3.1. Service and Alignment Screen Menu

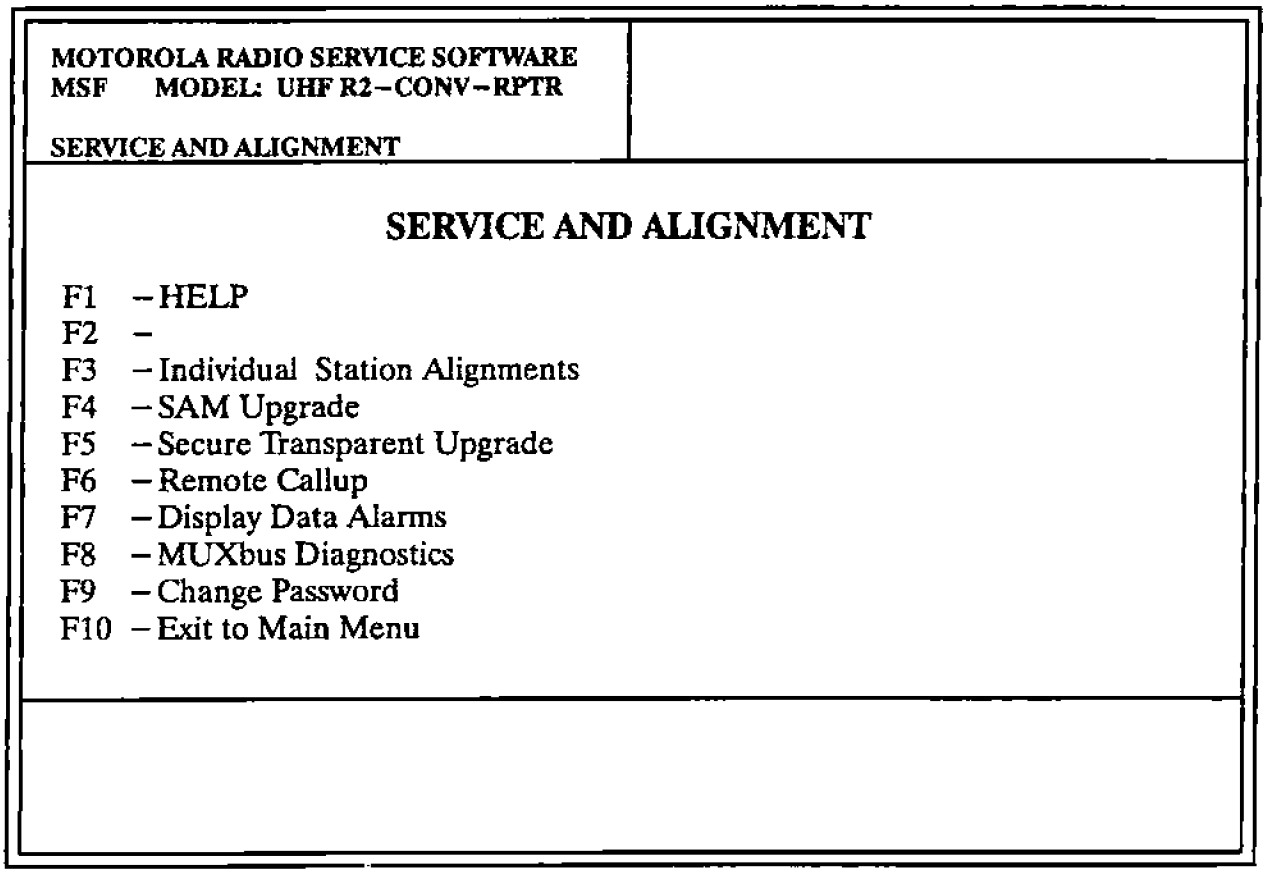


Figure 3.1: Service and Alignment Menu

Pressing **F2** at the main menu will display the SERVICE AND ALIGNMENT MENU. The SERVICE AND ALIGNMENT MENU has nine available functions, which are shown in Figure 3.1 above. Each of these functions are described in detail in the following sections.

3.2. Individual Station Alignments Screens (F3)

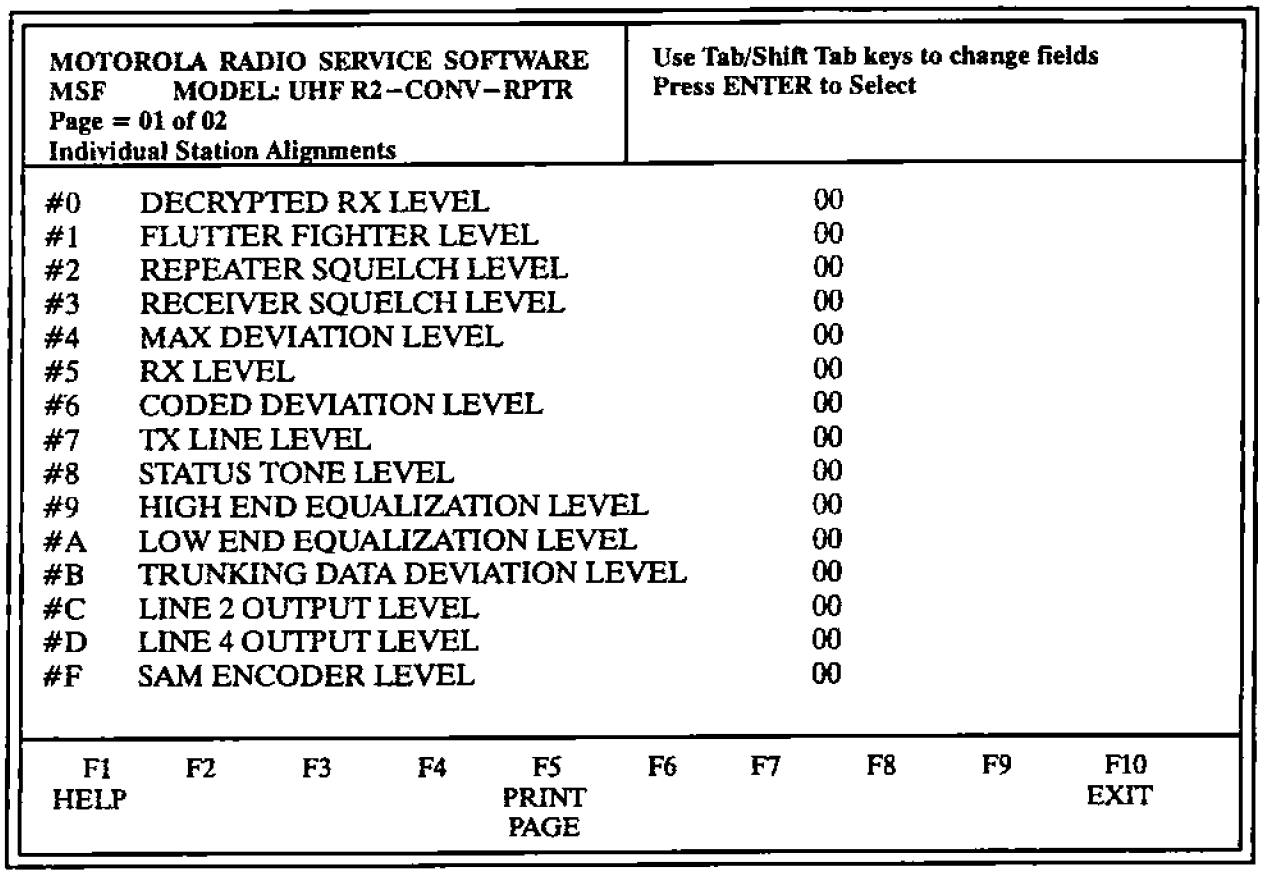


Figure 3.2: Individual Station Alignment Screen #1

The Individual Station Alignment Screen allows the user to select one of the above alignments from either Figure 3.2 or Figure 3.3. Pressing **Tab** allows the user to scroll up in the menu, pressing **Back-Tab** allows the user to scroll down in the menu and pressing **Enter** allows the user to select that alignment. The number displayed to the left of each alignment represents the EEPot number associated with the particular alignment. This is the same hexadecimal number displayed on the front panel when changing the EEPots through the combination of front panel switches. The number displayed to the right of each alignment represents the current relative value of that particular EEPot. These numbers can range from 0 through 99, or if the board containing that EEPot is not present in the station to be aligned, NA.

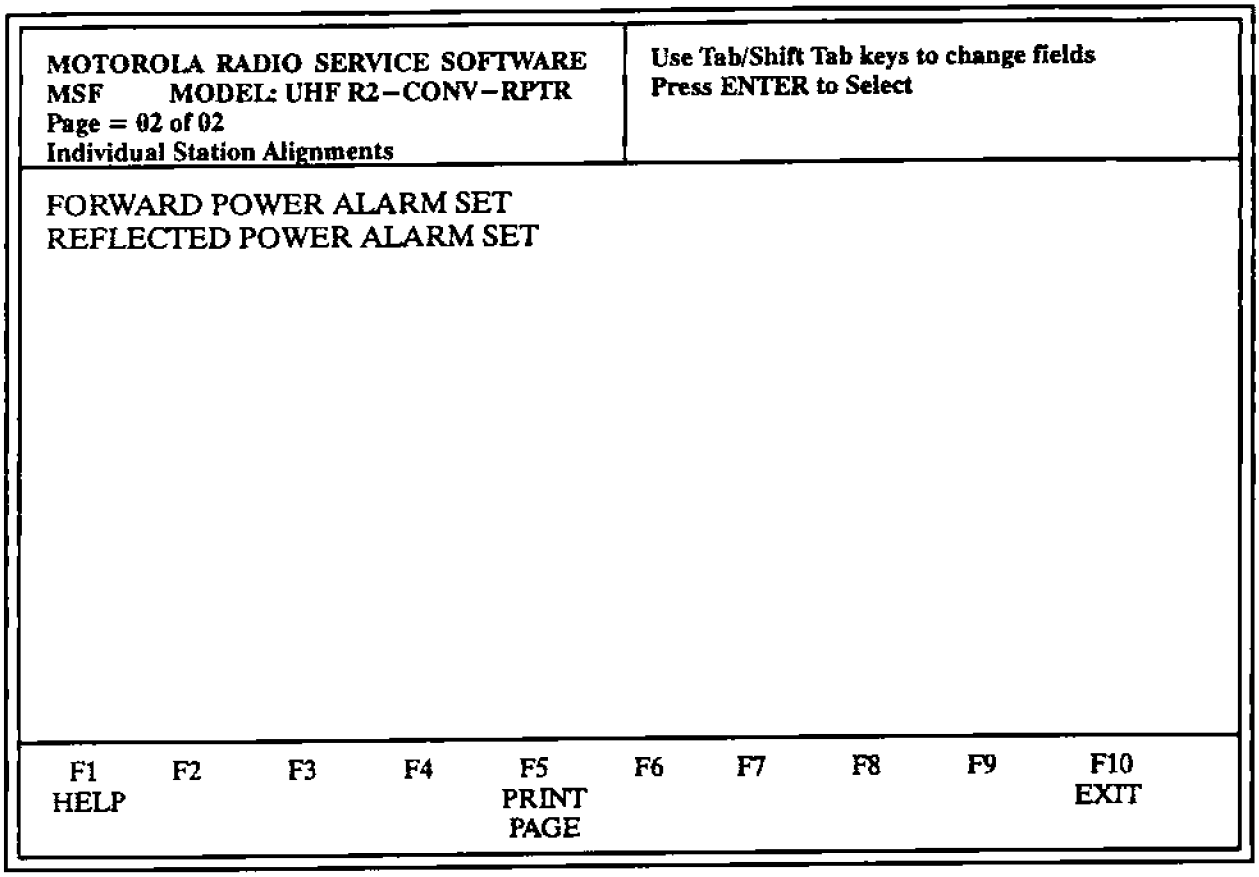


Figure 3.3: Individual Station Alignment Screen #2

3.3. Setting Individual Station Alignment Fields

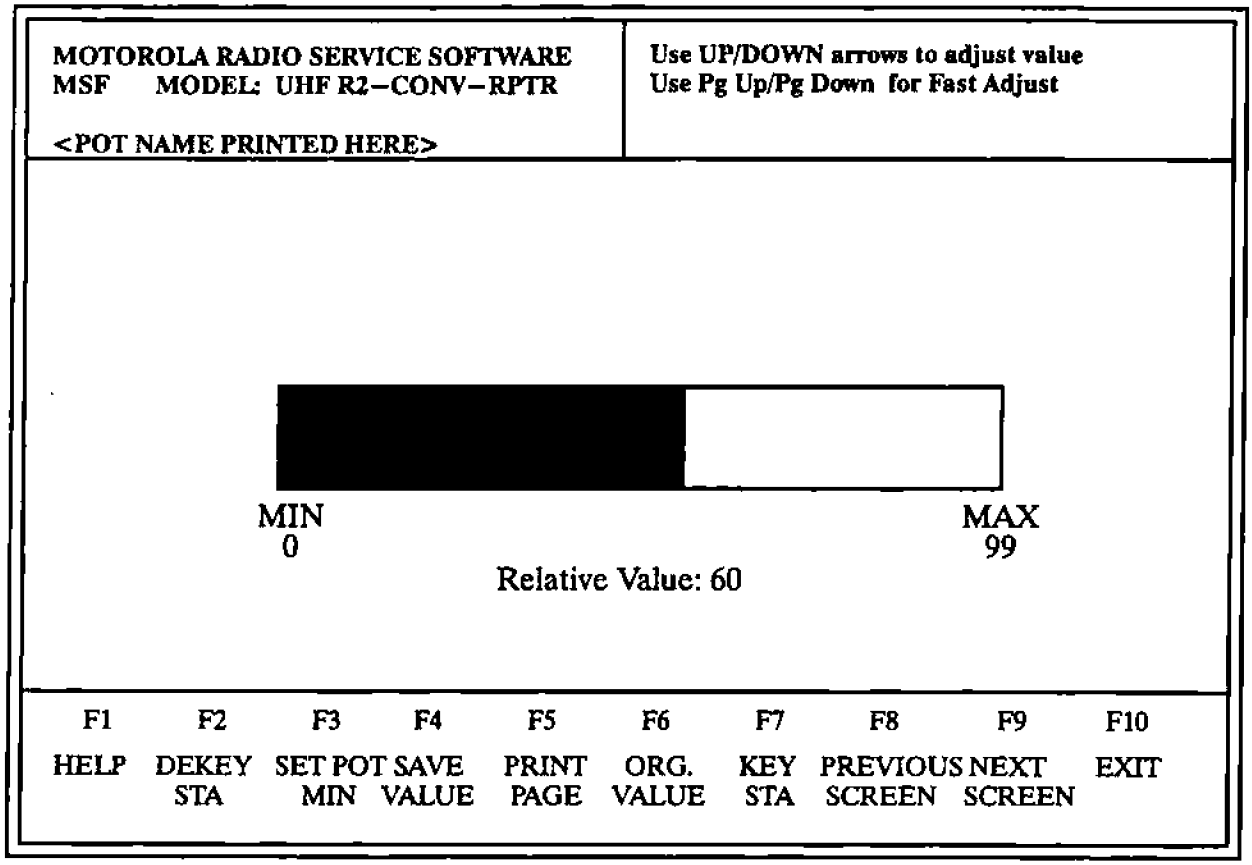


Figure 3.4: Alignment Field Setting Screen

When the station is calibrated at the factory it will perform within specification on any customer frequency within the frequency band. Therefore, any further alignment should not be necessary in the field. The only need for adjustment would be due to aging characteristics over time, to readjust to a customer's needs in the field, or to initialize a newly replaced SSCB, TTRC, or SAM board (The Secure board contains no EEPot information).

After selecting a field to adjust, the screen in Figure 3.4 will appear and will give a reading of the relative pot value. The user may adjust the relative value by pressing **Up** or **Down**, or else do a Fast Adjust by pressing **PgUp/PgDn**, which increments/decrements in units of 10.

3.3.1. Definition of Function Keys

F1 – Provides HELP associated with the particular adjustment being performed.

F2 – Dekeys the station if the station was keyed via the field programmer. will be sent to the station.

F3 – Sets the pot to the minimum value. The relative value will be zero.

F4 – Saves the current pot setting. This becomes the new original value.

F5 – Sends the information on the screen to a printer connected with the computer.

F6 – Restores the pot setting to its original value. The original value is defined as the value upon entering the adjustments routine or the last saved value.

F7 – Keys the station.

F8 – Returns the user to the preceding adjustment as shown in the INDIVIDUAL ADJUSTMENTS SCREEN.

F9 – Advances the user to the next adjustment as shown in the INDIVIDUAL ADJUSTMENTS SCREEN..

F10 – Exits the ADJUSTMENTS SCREEN and returns the user to the INDIVIDUAL ADJUSTMENTS SCREEN.

3.3.2. Special Instructions for each of the Alignment Fields

Note: Readjustment of the EEPots is immediately changed in the station, however, this value is not saved as the original value in the field programmer unless the "F4 – Save the Current Pot Setting" command is executed.

Note: The deviation settings given are for 25 kHz channel spaced systems. Deviation settings for 12.5 kHz channel spaced systems are given in brackets "{ }". The Flutter Fighter Level EEPot should only be adjusted in Analog Plus stations.

Note: The following adjustment procedures are condensed versions of the Site Alignment section of the User Manual (part number 6881080E30, valid for all bands). Any questions or discrepancies should be resolved by reference to the User Manual.

#0 Decrypted Rx Level

Note: Adjust only on Secure Encode/Decode stations. Line 2 level must be set before this adjustment is made.

- The adjustment is made as follows:

  7. Set the PL DISABLE switch.

  8. Connect the coded output of a Secure test set to the modulation input of an RF Signal Generator. The test set and the station must be programmed to the same code.

  9. Inject an on–channel 1 mV RF carrier modulated with an encoded (scrambled) 1 kHz tone at 4 {2} kHz deviation.

  10. Adjust the EEPot by pressing **Up** or **Down** to yield desired clear level +3 dB on line 2. Measure levels with 600 ohms across line 2.

#1 Flutter Fighter Level

Note: The deviation listed is for a 12.5 kHz channel spacing on **900 MHz stations only.**

- The adjustment is made as follows:

  11. Inject an on–channel 1 mV RF carrier modulated with a 1 kHz tone at 1.5 kHz deviation into the receiver.

  12. Set the PL DIS switch for PL stations.

  13. Press **ALT–F1**. This will disable the compandor circuit.

  14. Key the station by pressing **F7** (sets RPT PTT bit on the DMP).

  15. Adjust the EEPot by pressing **Up** or **Down** to yield 1.5 kHz deviation.

  16. Press **F2** to dekey the station.

  17. Press **ALT–F2** to re–enable the compandor circuit.

#2 Repeater Squelch Level

- The adjustment is made as follows:

  18. Inject an on–channel RF signal without modulation at the desired level into the receiver.

  19. Adjust the EEPot by pressing **Up** or **Down** until the receiver squelches (RPT USQ bit on DMP is cleared).

#3 Receiver Squelch Level

- The adjustment is made as follows:

  20. Inject an on–channel RF signal without modulation at the desired level into the receiver.

  21. Adjust the EEPot by pressing **Up** or **Down** until the receiver squelches (R1 UN SQ bit on DMP is cleared).

#4 Max Deviation

- The adjustment is made as follows:

  22. Inject a 1 kHz tone at a 1 Vrms closed circuit level into the MIC AUDIO (J812–3) input on the front panel Control jack or via TP8 on the SSCB.

  23. Select channel 1.

  24. Key station by pressing **F7** (sets the Loc PTT and Acc Dis MUX bus bits).

  25. Adjust the EEPot by pressing **Up** or **Down** to yield 4.6 {2.3} kHz deviation.

  26. Dekey the station by using the **F2** key of the Field Programmer.

Note: If the station has multiple channels (excluding tuning channel), repeat the above procedure for each channel. Change channels by incrementing the channel digit on the SSCB status display, or by sending a channel change command from the console.

#5 RX Level

- The adjustment is made as follows:

  27. Inject an on–channel 1 mV RF carrier modulated with a 1 kHz tone at 2 {1} kHz deviation into the receiver.

  28. Set the R1 PL Det MUXbus bit by pressing **ALT–F3**.

  29. Adjust the EEPot by pressing **Up** or **Down** so that:

  30. Clear the R1 PL Det MUXbus bit by pressing **F2**.

#6 Coded Deviation Level

- The adjustment is made as follows:

  31. The Secure Board generates a 1 kHz test tone upon entering the adjustment screen. Pressing **ALT–F1** allows a 1 kHz tone to be generated at any time.

  32. Key the station pressing **F7** (sets TX CD DT bit on the DMP).

  33. Adjust the EEPot by pressing **Up** or **Down** to yield 3.9 {1.95} kHz transmitter deviation (Make sure the Analyzer is set for wide (> 15 kHz) for this measurement).

  34. Dekey the station by pressing **F2**.

  35. The Secure Board will automatically cancel the 1 kHz test tone upon leaving the adjustment screen. Pressing **ALT–F2** allows the 1 kHz test tone to be turned off at any time.

#7 TX Line Level

- The adjustment is made as follows:

  36. Transmit audio is input on the wirline connections at the junction box, line 1 for 4 wire station, line 2 for 2 wire stations. If the station is configured to have the transmit audio routed to the modulator via the ALC circuit you must key the station with a High Level Guard Tone/Function Tone sequence to activate the ALC properly. **Do not** key the station via the **F7**, or by setting the Line PTT MUXbus bit sinces these methods will not set the ALC correctly. If ALC is not used go on to step 3.

  37. Inject HLGT/FT followed by a 1 kHz tone either from a console or service monitor into the station wireline interface. Set the 1 kHz tone for –10 dBm and the HLGT to +6 dB above the 1 kHz tone. While the station is keyed, set the EEPot for 3 kHz {1.5 kHz} deviation. Dekey the station after setting the deviation.

  38. Inject a 1 kHz tone at a level that matches average audio (typically –10 dBm to –25 dBm) into the station wireline audio interface. Key the station by pressing **F7**, or by writing a Line PTT to the MUXbus, and set the deviation to 3 kHz {1.5 kHz}. Dekey the station after setting the deviation.

  If you can not set the deviation to the desired level, you may have to adjust the TX Coarse Level Adjust EEPot. This pot can be toggled through different

ranges by pressing the **ALT–F1** key. The ranges are 0 (gain of −10 dB), 1 (gain of 0 dB), 2 (gain of +10 dB) and 3 (gain of +20 dB). The Coarse Level EEPot only adjusts audio going through the UN–ALC path, not audio routed through the ALC circuit.

39. If option C115 (Console Priority) is in the station, the TX Line Levl EEPot must be set twice; once for when Line PTT is present, and once without it. Inject the 1 kHz tone into line 3. Leave and re–enter the TX Line Level EEPot adjutment screen and key the station with the XMIT switch on the station front panel. Adjust the EEPot as in step 3 above, the EEPot may have a different value than when you set it with the Line PTT.

40. Reconnect the station to the central controller if disconnected.

***Spectra–TAC/DigiTAC* Adjustments**

#8 Status Tone Level

#9 High End Equalization Level

#A Low End Equalization Level

Note: If the station is not equipped with *Spectra–TAC* (option C269) but is equipped with option C514 and not options C388, C793, C794, C795 or C797 then skip steps 1 – 13.

Note: Rx Level must be set before this adjustment is made.

- The adjustment is made as follows:

41. Set the *Spectra–TAC/DigiTAC* Encode Level EEPot to zero.

42. Using an audio generator, input a 100 mV, 1000 Hz signal into the Local Mic input (TP8) on the Station Control Board.

43. Set the Front Panel Intercom switch to on and activate the the Loc PTT MUXbus bit by pressing **F7**.

44. Use **Up** or **Down** to set the Line 2 Level EEPot so that the station Line 2 output is −10 dBm. Record the level at the SQM input.

45. Adjust the input frequency at the Station Control Board to 3 kHz.

46. Use **Up** or **Down** to set the *Spectra–TAC/DigiTAC* High End Adjust EEPot to yield the same level at the SQM input as was recorded in step 4.

47. Repeat steps 2 through 6 until the difference between 1 kHz and 3 kHz is ±1 dB.

48. Adjust the input frequency at the Station Control Board to 400 Hz.

49. Use **Up** or **Down** to set the *Spectra–TAC/DigiTAC* Low End Adjust EEPot to yield the same level at the SQM input as was recorded in step 4.

50. Remove the audio generator from the Station Control Board. Set the Front Panel Intercom switch to off and clear the Loc PTT by pressing **F2**.

51. Set the PL DISABLE switch.

52. Inject an on–channel 1 mV RF carrier modulated with a 1 kHz tone at 5 {2.5} kHz deviation into the receiver. (Use 3 {1.5} kHz deviation for trunked stations.)

53. Use **Up** or **Down** to adjust the Line 2 Level EEPot for desired level (typically 0 dBm to −10 dBm) at the station Line 2 output. Record the level at the SQM input.

54. Disconnect the RF input into the receiver and set the **PL** Disable switch to its center (off) position.

55. Use **Up** or **Down** to adjust the *Spectra−TAC/DigiTAC* Encode Level pot until the level at the SQM input is 13 dB below the level recorded in step 13.

#B Trunking Data Deviation Level

- The adjustment is made as follows:

56. Connect the station to an operational trunking central controller. Insure that the station is not the control channel.

57. Key the station by pressing **F7** (sets the Loc PTT MUXbus bit).

58. Adjust the EEPot by pressing **Up** or **Down** to yield 0.85 {0.425} kHz deviation.

59. Dekey the station by using the **F2** key of the Field Programmer.

Note: This adjusting the Trunking Data Deviation Level does not change Failsoft data deviation in stations using Version 5.00 or greater SSCB firmware. Failsoft data deviation is not adjustable in stations using version 5.00 or greater SSCB firmware.

#C Line 2 Output Level

Note: If this is a *Spectra−TAC/DigiTAC* system, use the procedure outlined in that section.

- The adjustment is made as follows:

60. Inject an on−channel 1 mV RF carrier modulated with a 1 kHz tone at 3 {1.5}kHz deviation into the receiver.

61. Set PL disable switch.

62. Adjust the EEPot by pressing **Up** or **Down** for desired level (typically 0 dBm to −10 dBm) on line 2. Measure levels with 600 Ω across line 2. If the station is equipped with option C514 and not options C388, C793, C794 or C797 then the status tone level should be set using steps 14 and 15 of the *Spectra−TAC/DigiTAC* Adjustment section.

#D Line 4 Output Level

- The adjustment is made as follows:

  63. Inject an on−channel 1 mV RF carrier modulated with a 1 kHz tone at 3 {1.5} kHz deviation into the receiver.

  64. Set PL disable switch.

  65. Adjust the EEPot by pressing **Up** or **Down** for desired level (typically 0 dBm to −10 dBm) on line 4. Measure levels with 600 Ω across line 4.

#F SAM (Station Access Module) Encoder Level

Note: This adjustment is to be made only on SAM equipped stations.

- The adjustment is made as follows:

  66. The SAM Board generates a 1.2 kHz test tone upon entering the adjustment screen. Pressing **ALT−F1** allows a 1.2 kHz tone to be generated at any time.

  67. Key the station by pressing **F7**(sets DATA PTT bit on the DMP).

  68. Adjust the EEPot by pressing **Up** or **Down** to yield 3.9 {1.95} kHz transmitter deviation.

  69. Dekey the station by pressing **F2**.

  70. The SAM Board will automatically cancel the 1.2 kHz test tone upon leaving the adjustment screen. Pressing **ALT−F2** allows the 1.2 kHz test tone to be turned off at any time.

Forward Power Alarm Set

Note: For Trunking Station Only.

- The adjustment is made as follows:

  71. Key the station by pressing **F7** (sets LOC PTT bit on the DMP).

  72. Adjust the station output power, using Pot R426 on the Uniboard, to the desired trip point level.

  73. Press **F4** to set the alarm trip point.

  74. Dekey the station by pressing the **F2** key.

Reflected Power Alarm Set

Note: For Trunking Station Only.

- The adjustment is made as follows:

  75. Key the station by pressing **F7** (sets LOC PTT bit on the DMP).

  76. Adjust the station output power, using Pot R426 on the Uniboard, to the desired trip point level.

  77. Press **F4** to set the alarm trip point.

  78. Dekey the station by pressing **F2**.

3.4. SAM Upgrade (F4)

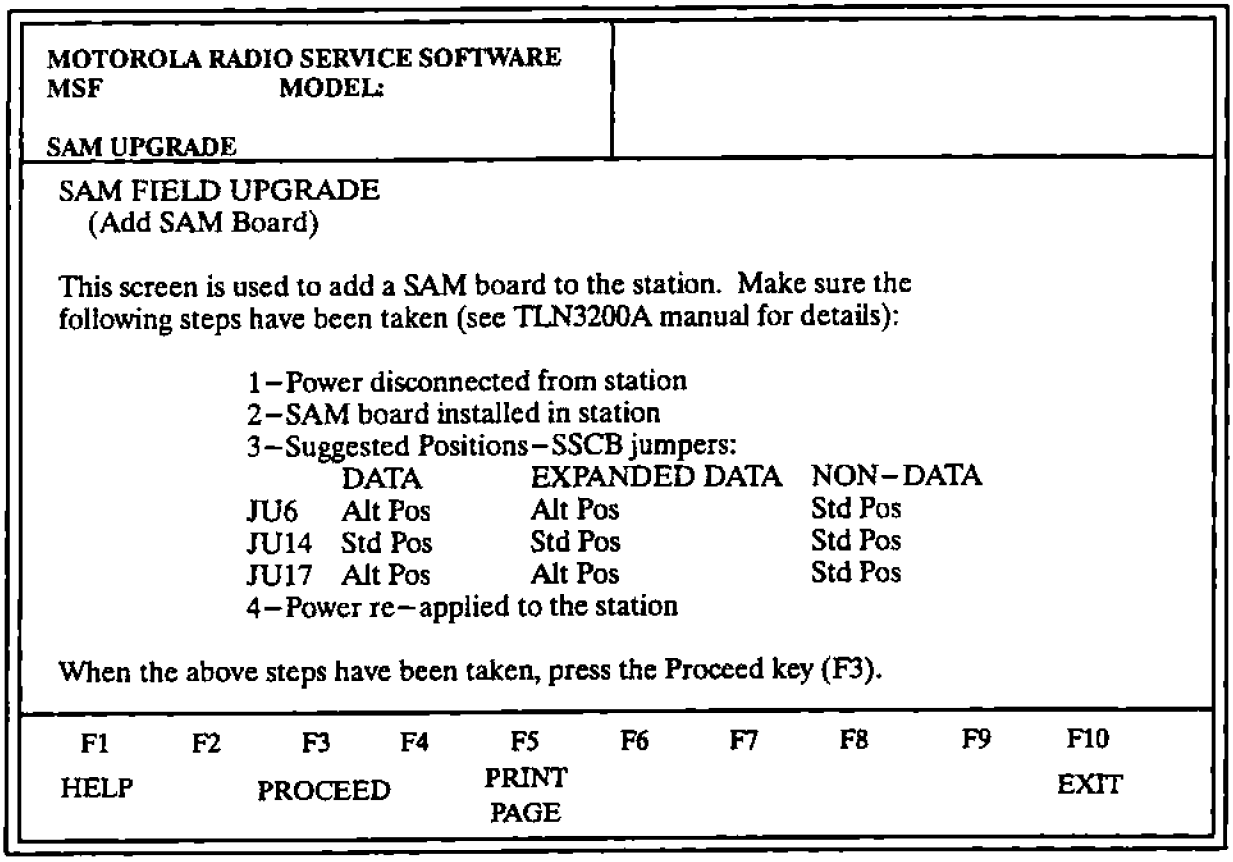


Figure 3.5: SAM Upgrade Screen

This screen allows for the installation of a SAM (Station Access Module) board in a station. A description of the preparations needed before installation is displayed. When ready, the user presses **F3** to start the software installation process. During installation, normal station operation is interrupted while a default SAM codeplug is read from a disk file. The station is then programmed with the new SAM information. If any of the above steps are not completed during SAM board installation, the installation procedure is interrupted and the SAM Upgrade screen is redisplayed. If the installation was interrupted, the installation procedure should be repeated. If the process was completed successfully, control will return to the Service and Alignment Menu.

NOTE: A SAM board upgrade is only allowed if there is Version 2.00 or greater firmware installed in the SAM board.

3.5. Secure Transparent Upgrade (F5)

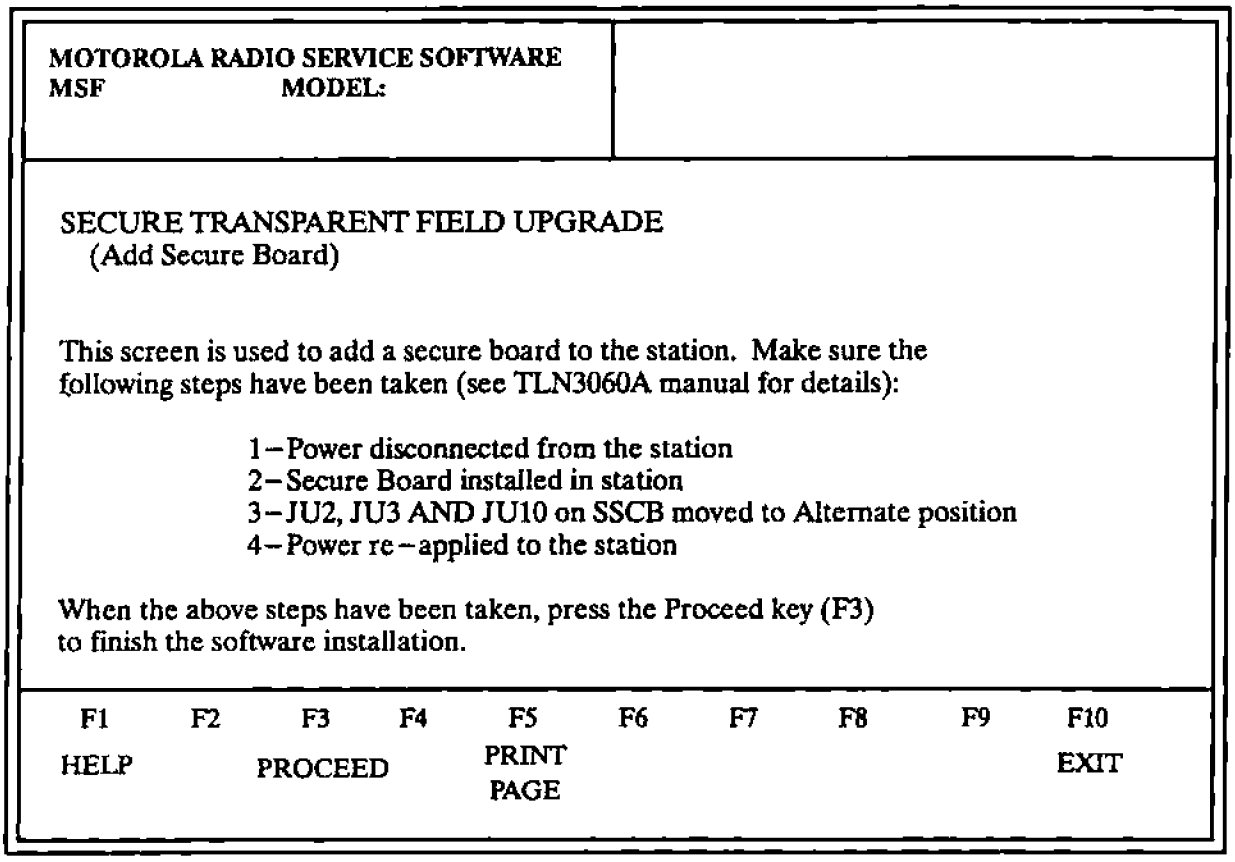


Figure 3.6: Secure Transparent Upgrade Screen

This screen allows for the upgrade of a station to a secure station. A description of the preparations needed before installation is displayed. When ready, the user presses **F3** to begin the software installation process. During installation, normal station operation is interrupted while a default secure codeplug is read. The station is then programmed with the new secure information. If any of the above steps are not completed during secure board installation, the installation procedure is interrupted and the secure transparent upgrade screen is redisplayed. If the installation was interrupted, the installation procedure should be repeated. If the process was completed successfully, control will return to the Service and Alignment Menu.

3.6. Remote Callup (F6)

The Remote Callup Screen allows maintain a list of individual stations or networks of stations to be accessed via the RSS through modems and normal telephone lines. This screen allows the RSS user to monitor, read, or program a station that may be thousands of miles away. The following paragraphs describe the Remote Callup procedure in detail.

The Remote Callup Screen (see Figure 3.7) contains entries of users that may be dialed and connected to the RSS. There is a maximum of 100 users that may be entered on this screen. A maximum

of ten users are displayed on each page. Each user entry consists of the following fields: Name, Number, Baud Rate, Parity, Data Bits, Stop Bits and Tone/Pulse. This screen also contains a status line which indicates parameters of the current call−in−progress. These fields are described in the following section. **Tab** and **BackTab** are used to move the cursor through each field of each user. **Enter** is used to advance the cursor to the next user. **PgUp** and **PgDn** are used to move the cursor between pages. For more specific information on proper setup of the station and modems for remote callup see Appendix E.

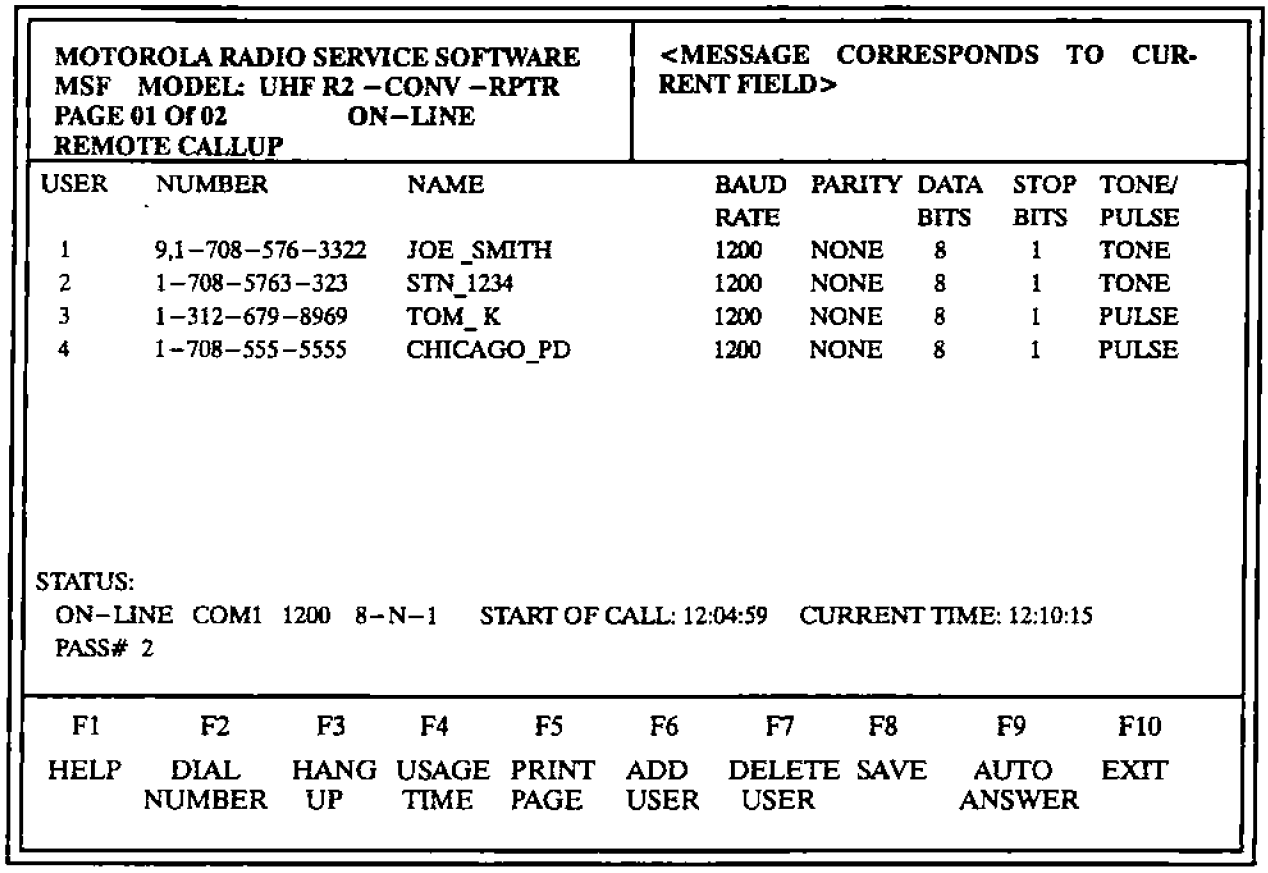


Figure 3.7: Remote Callup Screen

3.6.1. Remote Callup Field Definitions

The Remote Callup fields (see Figure 3.7), along with a brief explanation for each are shown below.

Number

The Number field is the telephone number that is to be dialed. A 1−30 character field must be entered. The digit/characters 0−9 # * A B C D ! − , are used to specify the number to dial. The characters A B C D # * represent specific tone pairs and therefore can be used only when tone dialing is selected. These symbols are ignored when pulse dialing is used. The hookflash dial modifier '!' issues a flash (hookflash) signal, which causes the modem to hang up for 1/2 second, then reconnect. This feature can be used to access such PBX features as call transfer. The comma ',' modifier in the Number field causes the modem to pause for 2 seconds before processing the next character of symbol in

the Number field. The comma is frequently inserted after the 9 (digit generally used to gain outside access from a PBX) to allow sufficient time for the dial tone to occur before the modem dials the telephone number. Multiple commas can be used to produce longer pauses. A dash '–' can be used to separate sections of the number, however it is ignored when the number is dialed. The following is an example of a valid number:

9,555–2368 !, #71234

This number instructs the modem to use 9 to access a number outside a PBX, pause before dialing, dial the number 555–2368, enter a hookflash: pause, and issue the PBX transfer code #7 before dialing extension number 1234.

Name

The Name field contains a description of the number that is to be dialed. This field may be left BLANK or a 1–10 character identifier may be entered. Any embedded blanks that are entered will be replaced by underscore characters.

Baud Rate

The Baud Rate field is based on the rate of transmission between the modem and the local computer and the rate from the modem across the telephone link to the the remote system. Baud Rate is expressed in bits–per–second (bps). The four choices, 1200, 2400, 4800 and 9600 are selected by pressing **Up** and **Down**. The default is 1200.

Parity

The Parity field indicates the type of Parity to be used when sending data. The three choices NONE, EVEN and ODD are selected by pressing **Up** and/or **Down**. The default is NONE.

Data Bits

The Data Bits field indicates the number of Data Bits to be sent for each character. The four choices 5, 6, 7 and 8 are selected by pressing **Up** and/or **Down**. The default is 8.

Stop Bits

The Stop Bits field indicates the number of Stop Bits to be sent with each character. The three choices 1, 1.5 and 2 are selected by pressing **Up** and/or **Down**. The default is 1.

Tone / Pulse

The Tone / Pulse field indicates whether tone or pulse dialing should be used. This field is dependent on the type of phone line being used. The two choices TONE and PULSE are selected by pressing **Up** and/or **Down**. The default is TONE.

Status Line

The Status Line is a display only line to indicate information about the current communication session. The Status Line indicates current dialing status (OFF–LINE, BUSY, DIALING, NO CARRIER or ON–LINE), communication port parameters (Serial Port, Baud Rate, Parity, Data Bits, Stop Bits), start of call, current time and pass number (current attempt to establish connection).

3.6.2. Definition of Remote Callup Function Keys

F1 – Provides HELP associated with the Remote Callup screen.

F2 – Dial the number of the user that is highlighted.

F3 – Hangs up the line connection if the system is currently 'On–Line'.

F4 – Indicates the amount of 'On–Line' usage time of current call–in–progress. If there is no call in progress then the last completed call usage time is displayed.

F5 – Print the current page.

F6 – Adds a user to the end of the user list. There is a maximum of 100 users.

F7 – Delete the user that the cursor is currently highlighting.

F8 – Save the current Remote Callup user list to the 'PHONE.CFG' file. The user will be prompted for the 'PHONE.CFG' pathname if the file 'PHONE.CFG' cannot be found.

F9 – Allows configuration of the modem attached to the modem port. After pressing **F9**, the user chooses **F2** to configure the modem for auto answer mode, or **F5** for normal (non–answering) mode.

When the AUTO–ANSWERING configuration is chosen the following command line is sent to the modem: **AT E S0=1 S2=45 M &W**

These commands turn off echoing, set the modem to answer after 1 ring, set the escape character to '–,' turn off the speaker, and store the configuration to non–volatile memory. **In the case of a temporary power failure, it is very important that echoing is turned off and that the the configuration be saved to non–volatile memory. If not, the station and modem will become inoperable and will need to be manually disconnected, reset, then reconnected.** After the modem has been successfully configured, power may be turned off. Upon reapplying the power, the modem will maintain the auto–answer configuration.

To disable the Auto–Answer capability of a modem, press **F9**, followed by **F5** (Normal). The following command line is sent to the modem: **AT E1 S0=0 S2=42 M1 &W**

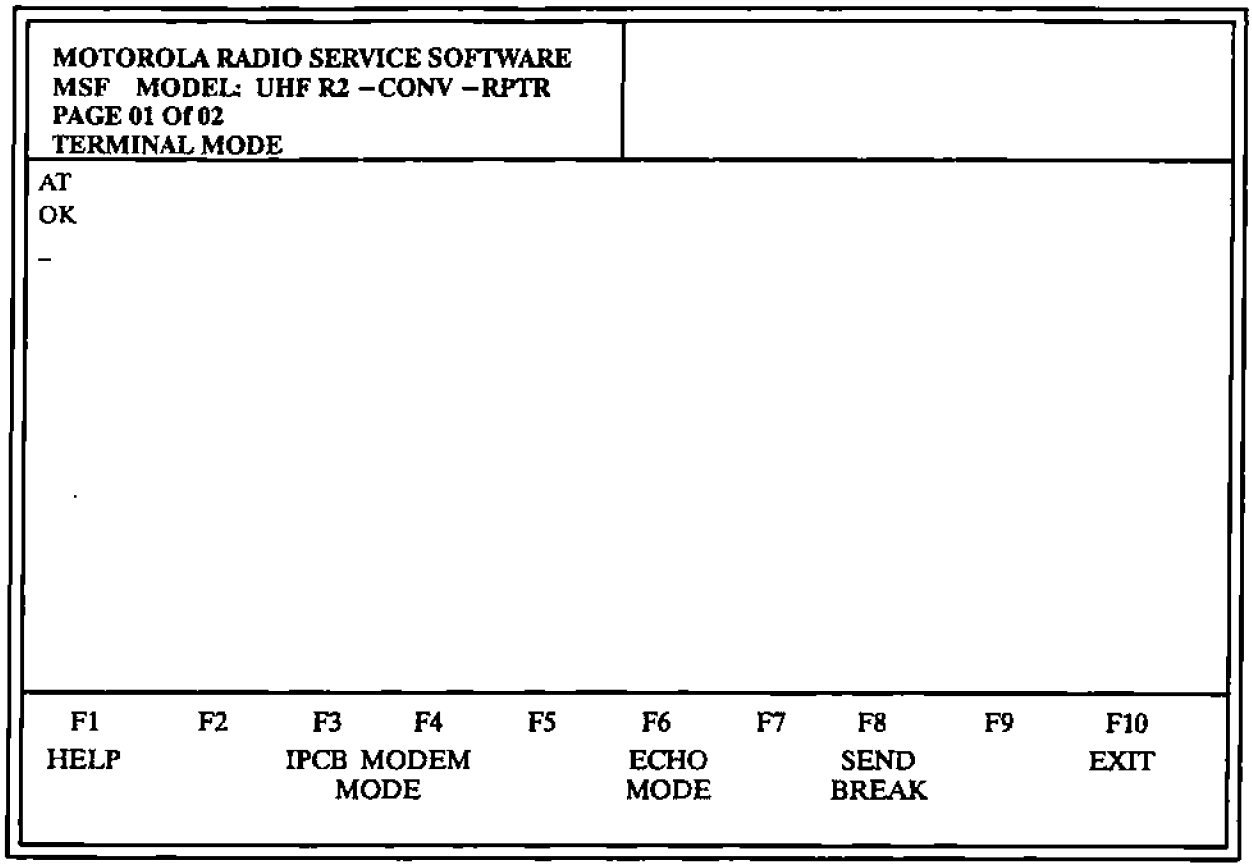
These commands enable echoing, disable auto–answer, set the escape character to '+', and set the speaker mode to ON UNTIL CARRIER DETECTED (factory default).

F10 – Exits the Remote Callup screen.

ALT–F5 – TERMINAL MODE. Allows communications directly with the modem. Keystrokes are transmitted out the modem port as they are entered, and all printable characters received on the modem port are printed to the screen as they are typed.

3.6.3. Terminal Mode (ALT–F5)

The Terminal Mode Screen allows the user a great deal of flexibility in communications via the modem. Pressing **ALT–F5** while in the Remote Callup Screen displays the Terminal Mode Screen. Once in this screen, the PC acts as a dumb terminal. By default, as keystrokes are typed, they are immediately transmitted out of the modem serial port. Likewise, as printable characters are received from the modem, they are displayed directly on the screen. This screen can also be used to monitor IPCB traffic on the MSF 5000 without the modem interface, by simply setting the MODEM PORT in the Serial Port Configuration Screen to the same port to which the station is connected.



IPCB / MODEM MODE (F3 and F4)

Upon entering the Terminal Mode Screen as keystrokes are pressed they are sent immediately to the modem via the Modem Port. This allows communications with a modem, but will not allow commands to be interpreted by the MSF 5000. The IPCB (Inter–Process Communications Bus) in the MSF 5000 allows communications between the various boards installed in the station. It is also used to communicate with the user. Whenever the RSS is communicating with the station, either via RIB or RS–232 communications port, it is communicating with IPCB commands on the IPCB. The various boards in the station can only recognize the IPCB commands if they are received in compact, specific packages. There can be no noticeable delays between any of the characters within an IPCB command. After pressing the IPCB MODE key, **F3**, IPCB commands are only transmitted out the Modem Port after **Enter** is pressed.

For example:

The command for requesting the firmware version of the SSCB is /**1yJ**. If the MODEM MODE was selected, even the fastest typist would leave unacceptable delays between each of the 4 characters, thus the command would not be interpreted correctly by the SSCB, and no response would appear. If in the IPCB MODE, the user would type /**1yJ** then press **Enter**, at which time the entire IPCB command would be sent to the station. The SSCB would respond with the current firmware version followed by the SSCB ID, which is 1.

While in the IPCB MODE, pressing **Enter** commands the RSS to send the characters that have just

been typed, but does not send the **Enter** (Carriage Return) character. While in the MODEM MODE, all characters are transmitted, including non-printable control characters. Non-printable characters will not be displayed on the screen.

Echo Mode (F6)

By default, most modems respond to keystrokes by echoing the character received back to the sending device. Others may only respond after a Carriage Return character (**Enter**) is received. Upon entering the Terminal Mode Screen, it will be immediately apparent is the Echo Mode is setup incorrectly for the particular application. If after pressing a few keystrokes, characters appear doubled on the screen, the Echo Mode needs to be toggled by pressing **F6**. Conversely, if the modem is connected to the correct communications port and no characters are displayed after pressing a few keystrokes, the modem is configured for non-echo, and pressing **F6** should fix the problem.

Break Command (F8)

Pressing **F8** causes the modem to send a BREAK signal. The BREAK signal simply causes the Transmit Data (TD) line on the modem to be held active (SPACE) for the user defined duration, determined in the BREAK DURATION field in the Serial Port Configuration Screen (see Section 2.5.1.2.). The BREAK Command can be used for various signalling purposes. Some network controllers require some form of an escape sequence to change channels, which may incorporate the Break Command.

3.7. Display Data Alarms (F7)

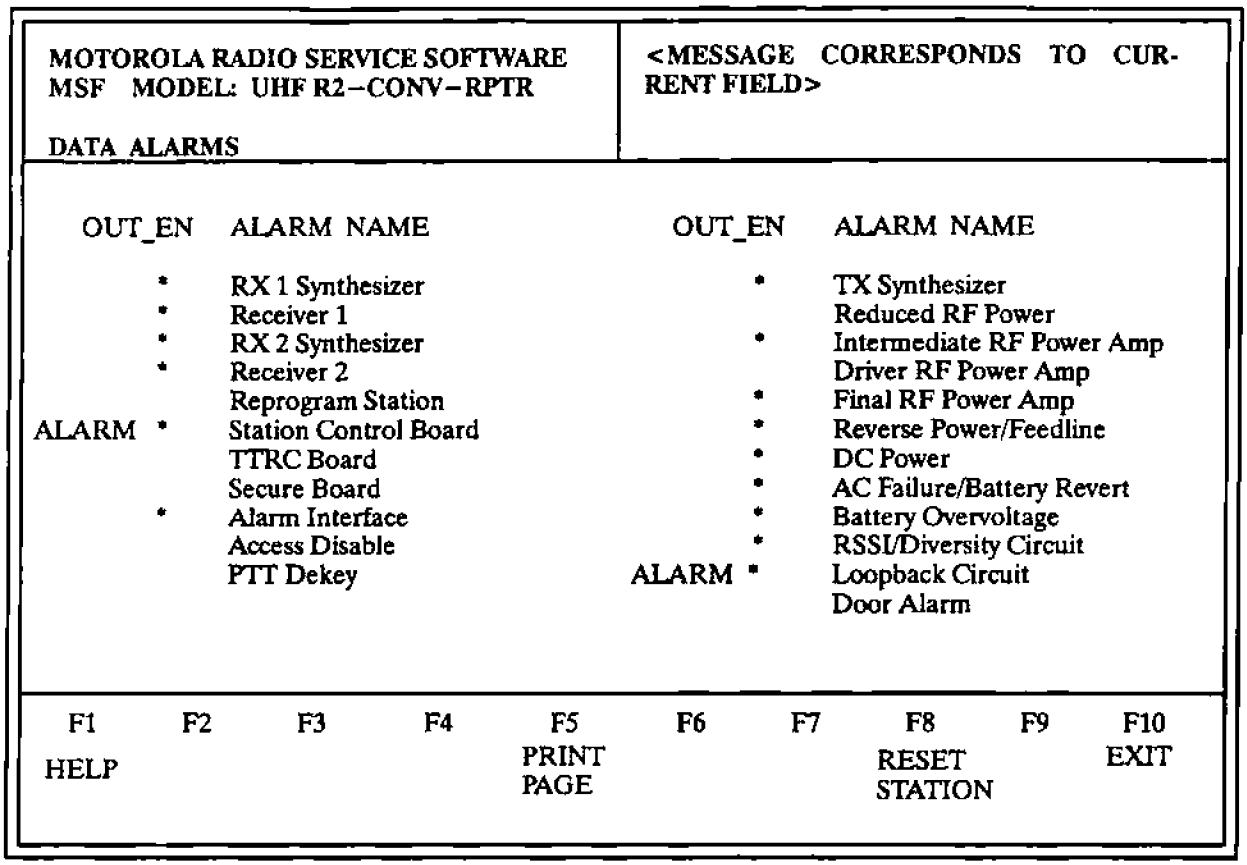


Figure 3.8: Data Alarm Screen

This screen is a listing of all 23 data alarms. The PC must be connected to a SAM (Station Access Module) equipped station in order for the Data Alarm Screen to function. An asterisk to the left of the alarm name indicates that the alarm could be activated for the particular setup. The setup can be viewed and changed from the SAM Wildcard Outputs screen on the SAM Menu. There are four basic setups: EXP_DATA, DATA, DIAGNOSTICS or WILDCARD. The word ALARM to the left of the alarm name indicates that the alarm is active. The status of all alarms is displayed in real time, provided the station is properly connected. The display is updated every time the station has a change in the status of the alarms. If no communication has occurred for 60 seconds, the program automatically requests this information and updates the display. If at any time the program fails to establish communication with the station, the user is warned and is given the choice of trying again or exiting the screen. Pressing **F8** will reset all control boards in the station.

On the SAM Wildcard Outputs screen are several function keys that automatically setup the output for a default EXP_DATA, DATA, DIAGNOSTICS or WILDCARD. The alarm names as they appear on the SAM Wildcard Outputs screen are shorter abbreviations than the alarm name descriptions on the screen above. For a complete description of the individual alarms, see the SAM Wildcard Outputs section, Section 5.6.11. The following is a listing of the valid alarms for each particular default setup.

DATA

RX 1 Synthesizer
Receiver 1
RX 2 Synthesizer
Receiver 2
Reprogram Station
Station Control Board
Alarm Interface
Access Disable
PTT Dekey
Door Alarm
TX Synthesizer
Intermediate RF Power Amp
Final RF Power Amp
Reverse Power/Feedline
DC Power
AC Failure/Battery Revert
Battery Overvoltage
RSSI/Diversity Circuit
Loopback Circuit

DIAGNOSTICS & EXP_DATA

RX 1 Synthesizer
Receiver 1
RX 2 Synthesizer
Receiver 2
Reprogram Station
Station Control Board
TTRC Board
Secure Board
Alarm Interface
Access Disable
PTT Dekey
Door Alarm
TX Synthesizer
Reduced RF Power
Intermediate RF Power Amp
Driver RF Power Amp
Final RF Power Amp
Reverse Power/Feedline
DC Power
AC Failure/Battery Revert
Battery Overvoltage
RSSI/Diversity Circuit
Loopback Circuit

The WILDCARD setup is a custom setup in which any or all alarms may be valid. These alarms are enabled on the SAM Wildcard Outputs screen.

3.8. MUXbus Diagnostics Screen (F8)

3.8.1. Screen Operation

This screen is used to emulate the Diagnostic Meter Panel (DMP), which is a common diagnostic tool used on the MSF stations. For more information on the MUXbus and its bit definitions, see the Digital MSF 5000/10000 User Manual.

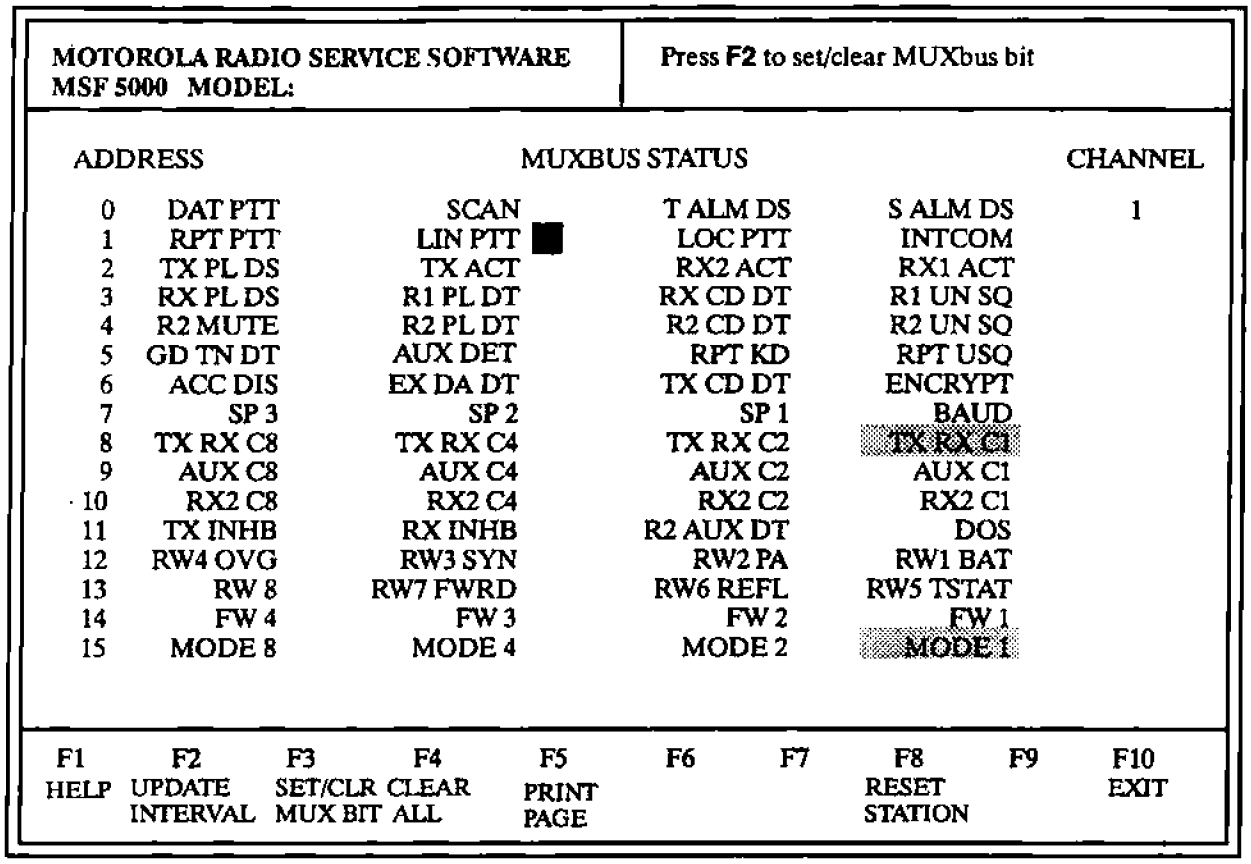


Figure 3.9: DMP Screen

Figure 3.9 shows the DMP screen. The display is updated whenever a bit on the MUXbus changes or if the channel changes. If a particular bit on the MUXbus is set, the corresponding bit name is highlighted in inverse video. The current cursor position is indicated by the solid square. Figure 3.9 indicates that TX RX C1 (Channel 1) and MODE 1 are both active, and the cursor position is at the LIN PTT bit (Address 1 bit 2).

Upon entry to this screen, the program requests the current state of all the MUXbus bits and the current channel number. This information is displayed on the screen. Subsequently, display is updated every time the station dumps the current MUXbus status to the field programmer. If no communication from the station has occurred for 60 seconds (this time interval can be varied by pressing **F2**), the program automatically requests this information and updates the display.

If at any time the program fails to establish communication with the station, the user is warned and is given the choice of trying to regain communications, or exiting the screen.

Upon exiting this screen, any MUXbus bits set by this program are left active. Ultimately, they can only be cleared by re-entering this screen or resetting the station.

Setting/Clearing Bits on the MUXbus

To set bits on the MUXbus, press **Up**, **Down**, **Right**, **Left**, **BackTab**, **Tab**, and **Enter** to move the cursor to the desired bit name, then press **F3**. The bit name should become highlighted, indicating that the bit is indeed set. If not, there may be a problem with the station or the interface.

If the cursor is moved to a bit name that is highlighted, pressing **F3** will clear the bit and the bit name will become unhighlighted. Any MUXbus bits set by something other than this program (eg. the TTRC board) cannot be cleared via this screen. Pressing **F4** will automatically clear all bits set by the RSS.

Select Channel

To change the channel of the station, move cursor into the channel number field. Enter the new channel and move the cursor to the next field by pressing **Enter**, **Tab**, **BackTab**, or any of the other cursor keys. If a new channel number was entered, the program prompts the user that the channel is about to be changed and asks for confirmation. Pressing **F2** at this point causes the station to change channels. Otherwise, if **F10** is pressed, nothing is changed.

Note: This function is only available for SSCB firmware versions 5.00 and greater.

3.8.2. Definition of Function Keys

F1 – Displays help text.

F2 – Allows user to change the time interval at which the program requests MUXbus and channel info.

F3 – Causes the MUXbus bit at the current cursor position to change states.

F4 – Causes the station to clear any MUXbus bits that were set by this program.

F5 – Print current screen.

F8 – Causes the station to be reset.

F10 – Exit the DMP screen.

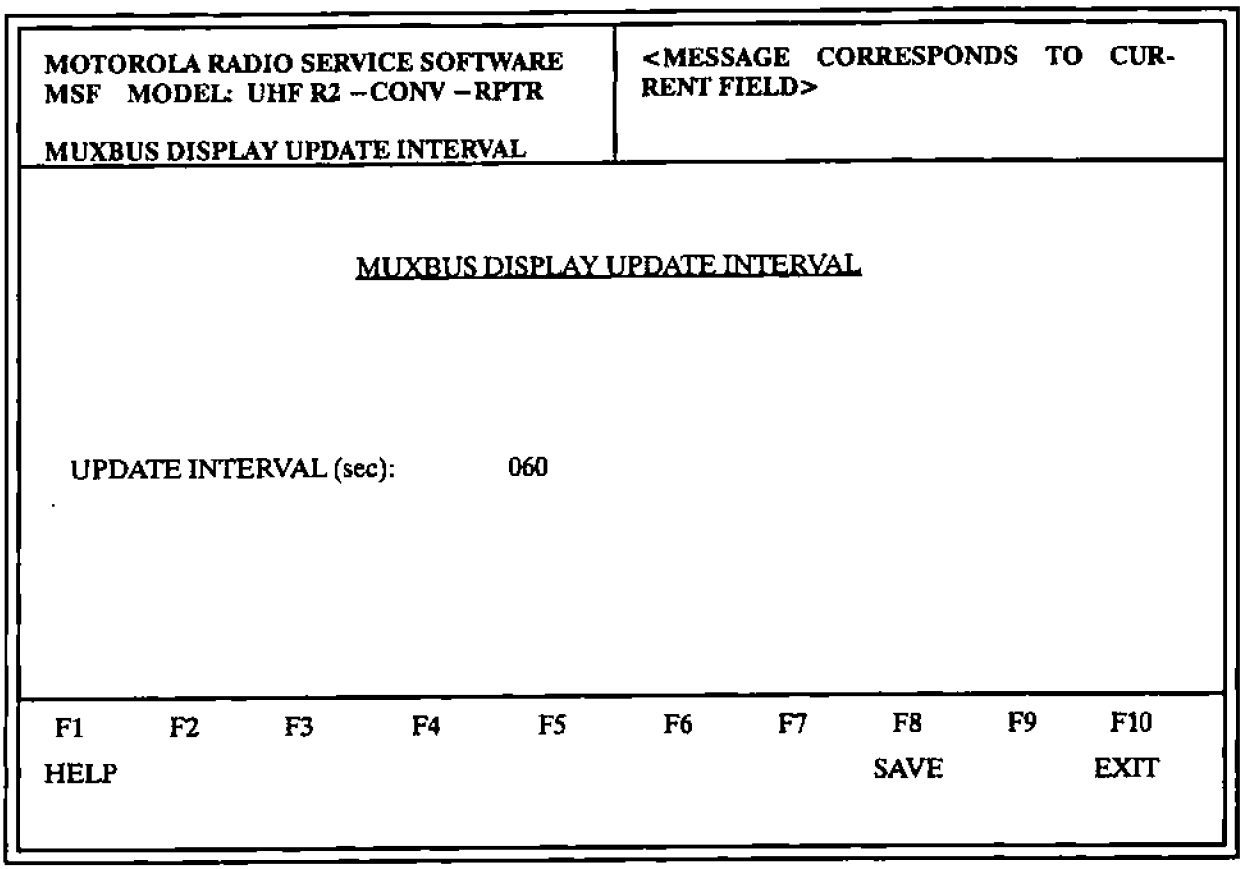


Figure 3.10: MUXbus Display Update Interval Screen

Figure 3.10 depicts the screen to change the update interval. This is the time period that the program uses to request a dump of the MUXbus and channel information.

To change the interval, enter the new value and press **Enter**. The user can then save the new value to the configuration file by pressing **F8**. In that case, the new value will be in effect whenever the program is started up.

Pressing **F10** returns to the DMP screen.

3.8.3. Definition of Function Keys

F1 – Displays help text.

F8 – Save current value of update interval to configuration file.

F10 – Returns to the DMP screen.

3.9. Change Password (F9)

The Change Password screen is used to change the password in a station that is password equipped. Figure 3.11 shows the screen. To change the station's password, enter the current (old) password in the first field. The new password field will then appear; enter the new password. The new password

field will appear a second time, and the same password must be entered again, to protect against typographical errors that may have been made while typing the password the first time. During all entries on this screen, the entry field is blanked, so the passwords entered are not visible.

A password may be made up of any keyboard character. It must be at least 4 characters long, and cannot exceed 8 characters in length.

After entering the old and new passwords, the station is updated with the new data. If the new password is accepted by the station, the user is informed with a message window. If the old password entered into this screen does not match the password in the station, or if the station does not respond to the request, the user is given the choice of retrying or aborting the screen. The screen may be exited at any time by using the **F10** key.

The Change Password screen can also be used to change a password if the user does not know the current password (ie. forgotten password). The user must have access to the front panel of the station while executing the Change Password screen in the RSS. To change an unknown password, enter any characters when prompted for the current password. Enter the new password when prompted to do so. When the program prompts for the new password again, re-type the new password. Before pressing **Enter**, hold the SELECT/SET switch, located on the far right side of the front panel of the station, in the SELECT position. While holding the switch in the SELECT position, press **Enter**. If the new password is accepted by the station, the user is informed with a message window.

For more information on password operation, see the Password Equipped field description in Section 5.7.

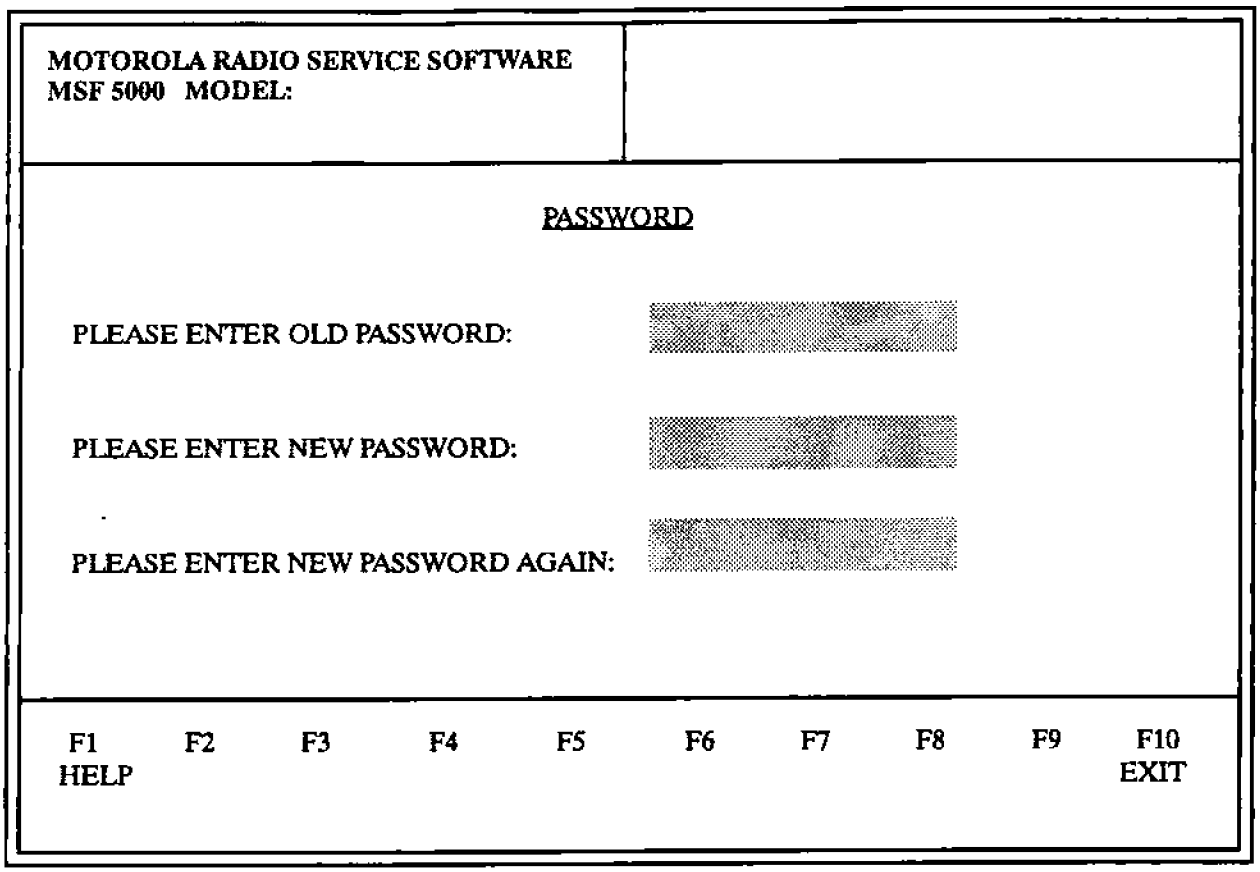


Figure 3.11: Change Password Screen

4. GET / SAVE / PROGRAM MENU (F3)

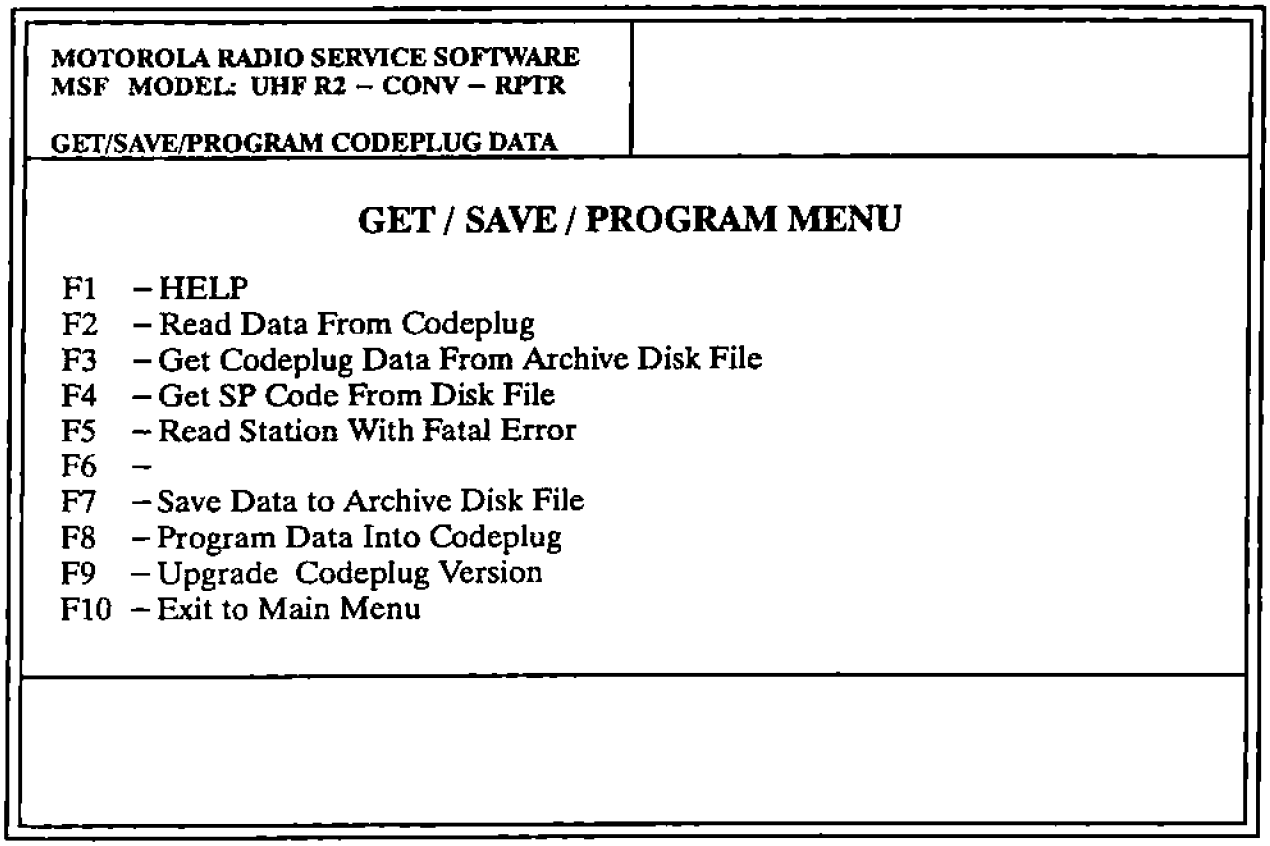


Figure 4.1: Get/Save/Program Menu

Pressing **F3** at the MAIN MENU will display the Get/Save/Program menu (Figure 4.1). The Get/Save/Program menu has nine functions available. Each of these functions are described in detail in the following sections.

The personality data from all control boards is read when **F2** or **F5** is pressed (a read function is performed). When **F8** is pressed (a program function is performed) the personality data from all control boards is updated. Each board does not have to be read or programmed individually. The calibration data (or USER–AREA of the Codeplug) is not updated from this screen, it is only updated from the SERVICE and ALIGNMENT SCREEN (Section 3.1.).

Similarly, the personality data of the station is saved or retrieved from the the archive disk file if **F7** or **F3** are pressed, respectively.

4.1. Read Data from a Codeplug (F2) (F5)

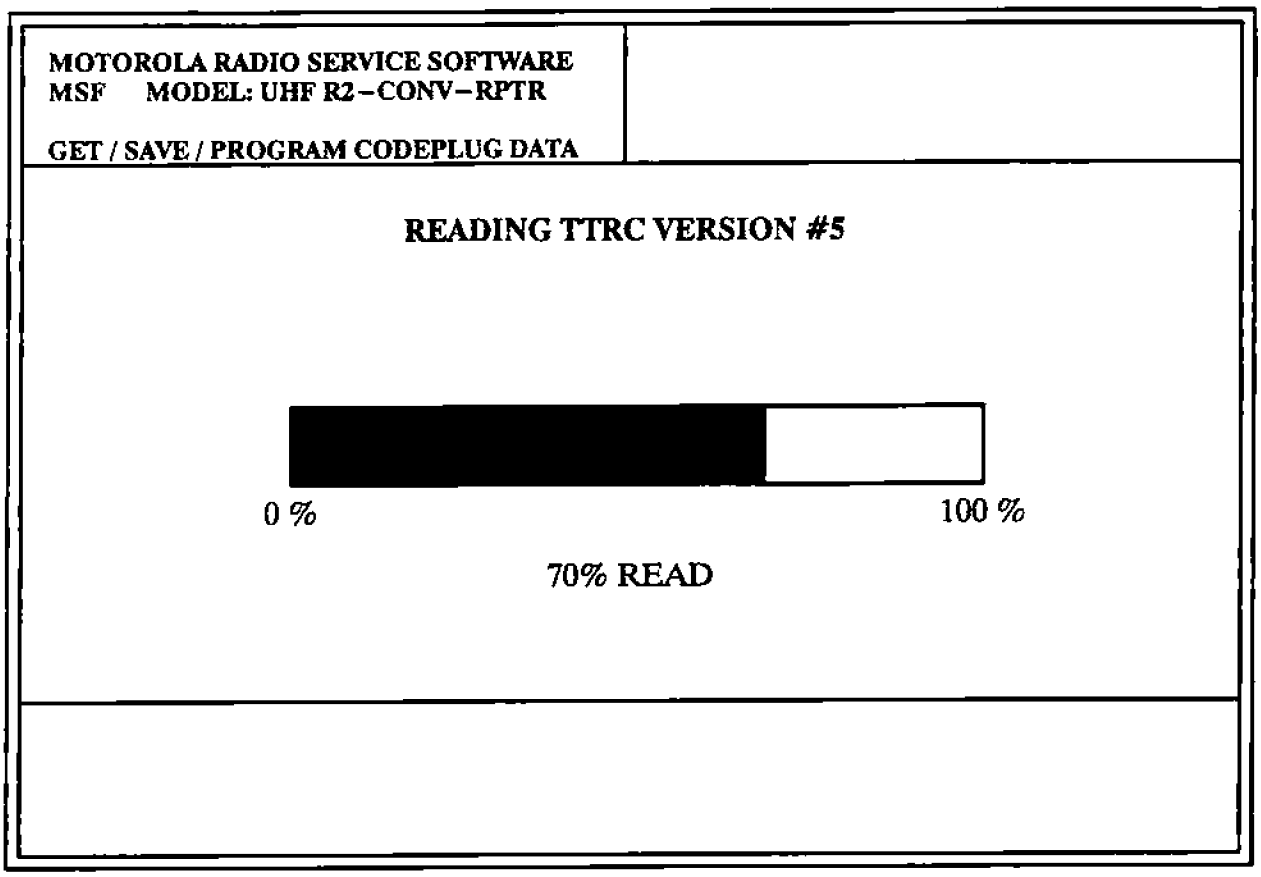


Figure 4.2: Reading Data from a Codeplug

Pressing **F2** or **F5** in the Get/Save/Program menu brings the user to the screen in Figure 4.2. If the codeplug data has not yet been read, it will read up to the 100% mark. If the codeplug has already been read then a message appears asking you to press **F2** to continue reading (Note: This will overwrite existing data) or press **F10** to cancel the read and return to GET/SAVE/PROGRAM menu. A message appears if the station is not connected or if there is a problem reading the data. If this occurs, press **F10** to return to the previous menu.

Note: If a message appears after the read is completed which says "Codeplug Data has been Corrupted", attempt to read the codeplug again. After severaly unsuccessful attempt to read the codeplug information, it may be neccessary to read an archived codeplug file and reprogram the station.

Pressing **F5** will interrupt station operations while reading all available codeplugs, unlike pressing **F2** which allows the station to function normally while the codeplug is being read. Upon completion of the read, the station will be automatically reset. The Read Station With Fatal Error (**F5**) function is **ONLY** recommended if the station has a fatal error and is continually resetting.

After reading a codeplug, the program will decode the station's frequencies to determine which type of synthesizer is being used, mosaic or non-mosaic. If the program cannot determine the synthesizer

type from the existing frequencies, a message will appear to warn the user and request that channel frequencies and their synthesizer type be checked.

4.2. Get Codeplug from an Archive Disk File (F3)

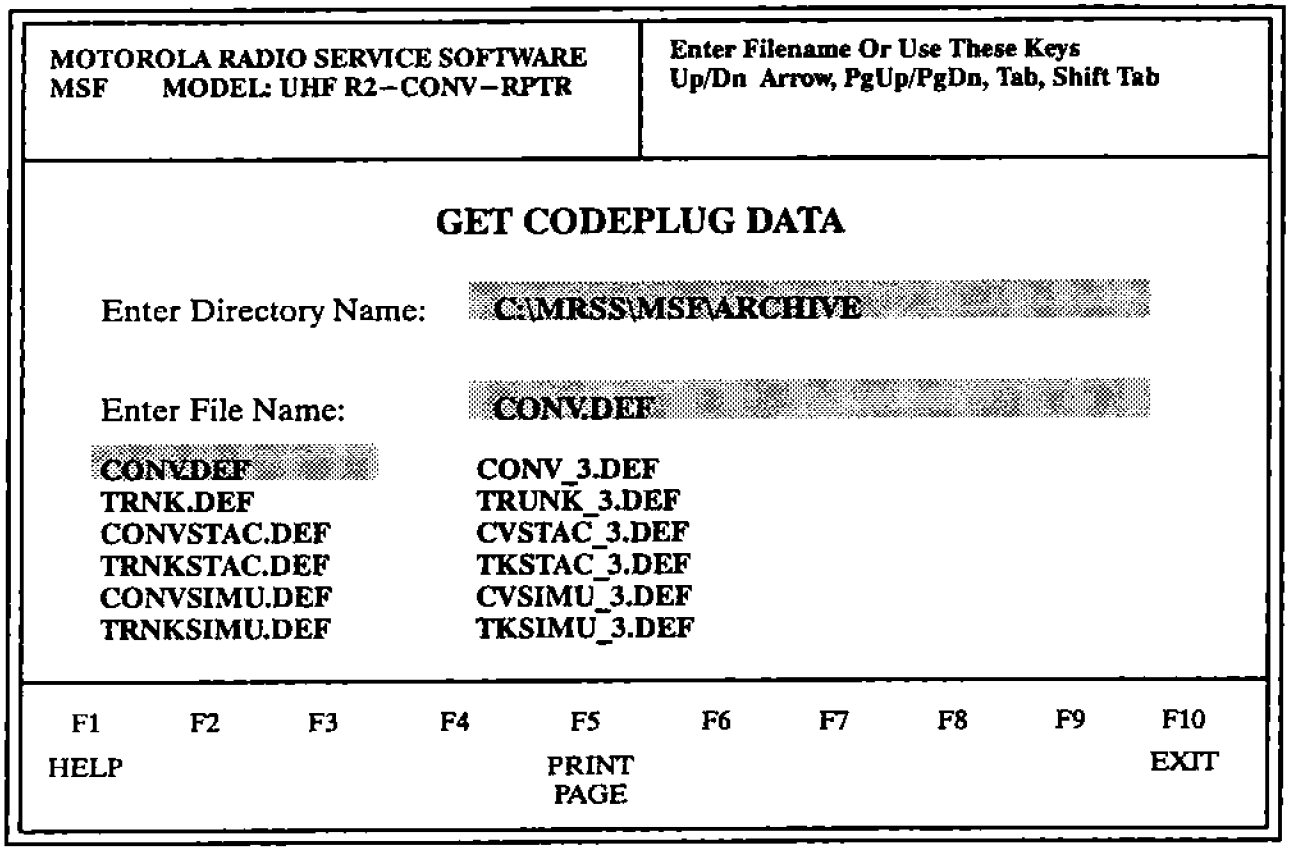


Figure 4.3: Getting Codeplug from a Disk File

Pressing **F3** from the menu in Get/Save/Program Menu (Figure 4.1) will bring up the Get Codeplug Data from Archive Disk File screen (Figure 4.3). This screen will first prompt the user for a valid directory. If an invalid directory is entered the directory will be set to the root directory. Note that the user must enter a valid drive letter as part of the directory name. After a valid directory has been entered, the files in that directory will be displayed on the screen. A maximum of 200 files can be displayed. A maximum of 30 files can be displayed on a page. To view other pages (if they exist) press **PgUp** or **PgDn**.

Note: The user sets up C:\MRSS\MSF\ARCHIVE during the recommended installation procedure found in Chapter 2. This is the directory that should be used to store all codeplug files.

Enter the desired filename after the files are displayed (in the above figure the CONV.DEF filename has been entered) or use **Tab**, **BackTab, Up,** or **Down** to move the cursor onto the file required.

When a file is highlighted, its name will appear simultaneously in the File Name field. To enter the file name, press **Enter**. To view a different directory, Shift Tab up to Directory Name field and enter new directory to view. Upon entering a valid filename a screen similar to that in Figure 4.2, Reading Data from a Codeplug, will appear. Control will be transferred to the menu in Figure 4.1, Get/Save/ Program Menu, after the file has been successfully read.

If the codeplug data has already been read, a message will appear asking if you wish to overwrite the current codeplug. Pressing **F2** allows the user to continue, pressing **F10** cancels the read and returns the user to the Get/Save/Program Menu (Figure 4.1).

Note: The filename that is entered must exactly match the filename of the file that is to be read. The following are examples of valid filenames:

388CPY12.34A
TRUNK.DEF

After reading in a codeplug, the program will decode the station's frequencies to determine which type of synthesizer is being used, mosaic or non-mosaic. If the program cannot determine the synthesizer type from the existing frequencies, a message will appear to warn the user and request that channel frequencies and their synthesizer type be checked.

4.2.1. Customizing Codeplugs from Archive Disk Files via the ALT-F9 Option

Each archive disk file shown in the **GET CODEPLUG DATA** screen contains a complete set of board codeplugs that are used to configure the MSF 5000 base station to a certain convention (see section 2.2 for codeplug definitions). Ordinary, all codeplugs are read from only **one** archive disk file at the time as highlighted in the **Enter File Named** field. However, it is possible to combine codeplugs from more than one archive disk file by means of an ALT-F9 option. For example, through the ALT-F9 option the SSCB codeplug can be read from one archive disk file while the TTRC and Secure codeplugs are read from another; this capability to combine codeplugs from different disk files makes for easy codeplug customization.

To use the ALT-F9 option at the **GET CODEPLUG DATA** screen, hold the SHIFT key down and press the TAB key to get to the **Enter Directory Name** field. Once in this field, hold the ALT key down and press the F9 key to enter the **Codeplug to be Read** field. The **Codeplug to be Read** field will list which board codeplugs you wish to read from the archive disk file shown listed in the **Enter File Name** field at the **GET CODEPLUG DATA** screen. If a YES is labeled next to the board codeplug type in the **Codeplug to be Read** field, the Radio Service Software will attempt to read that particular codeplug. To toggle between YES and NO, hit the Up/Down keys. To gain access to other codeplugs from other archive disk files, simply repeat the process described above.

Please note that caution should be used when combining codeplug information from more than one file. It is possible to read incompatible codeplug versions that is considered "illegal" from a system's standpoint (ie. combining SSCB 5.XX & TTRC 4.XX versions). If you are uncertain about the compatibility of codeplugs, you should enter the **Upgrade Codeplug Version** screen after reading the codeplugs. The **Upgrade Codeplug Version** screen will list compatible versions, and if necessary, allow upgrading of specific codeplugs to make the versions compatible.

4.3. Get SP (Special Product) Code from Disk File (F4)

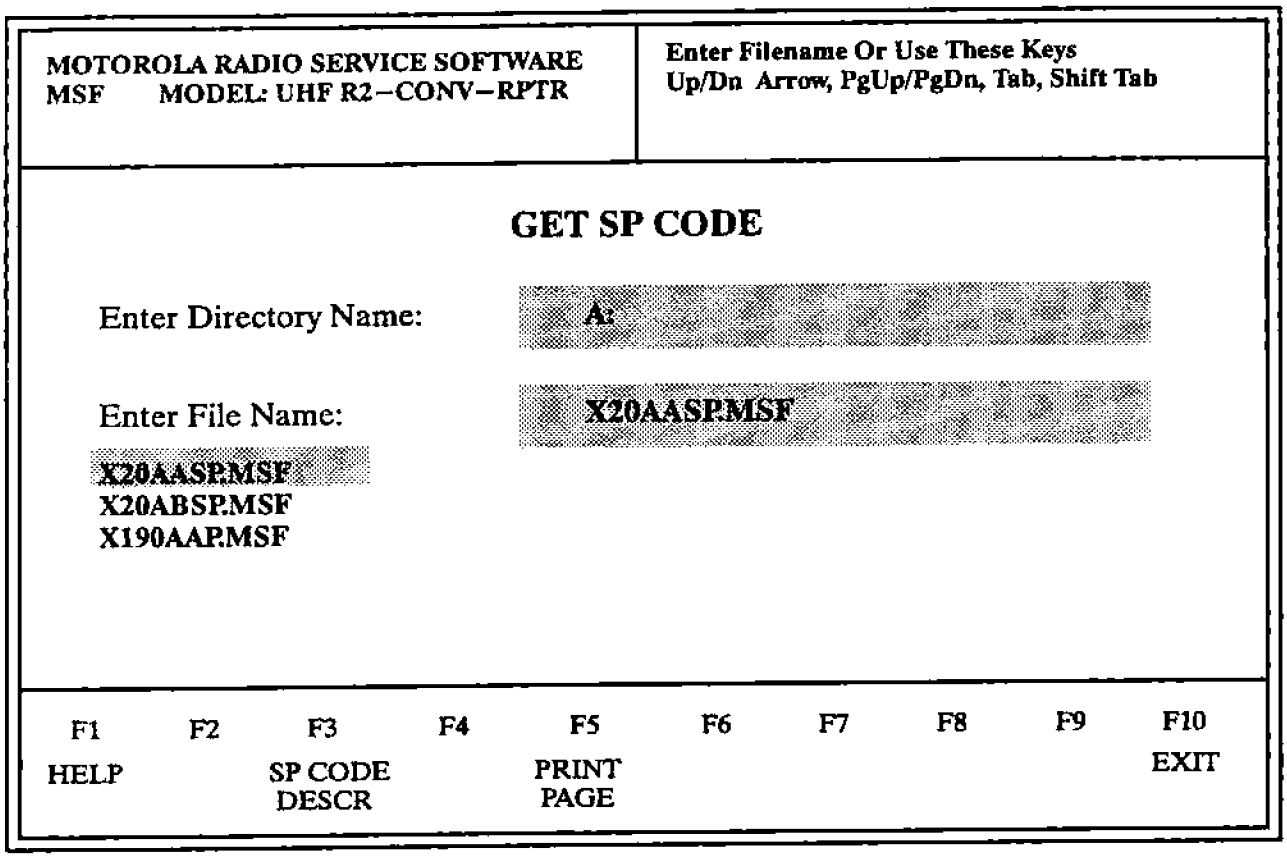


Figure 4.4: Getting SP Code from a Disk File

Pressing **F4** from the menu in Get/Save/Program Menu (Figure 4.1) will bring up the Get SP Code from Disk File screen (Figure 4.4). This screen will first prompt the user for a valid directory. Note that the user must enter a valid drive letter as part of the directory name. After a valid directory has been entered, the files in that directory will be displayed on the screen. A total of 200 files can be displayed, with a maximum of 30 files on a page. To view other pages (if they exist) press **PgUp** or **PgDn** .

Enter the desired filename after the files are displayed (in Figure 4.4, the X20AASP.MSF filename has been entered) or press **Tab**, **BackTab**, **Up**, or **Down** to move the cursor onto the file required. When a file is highlighted, its name will appear simultaneously in the File Name field. To enter the file name, press **Enter**. To view a different directory, **BackTab** to Directory Name field and enter new directory to view. Upon entering a valid filename, pressing **Enter** will modify the codeplug information to include the SP code. Before the program does this, you are asked if you really want to proceed. If you press **F2**, the SP code is installed. Once installed the codeplug information in the RSS has been changed to include the SP code, but must be programmed into a station via **F8**–Program Data Into Codeplug in order to complete the SP code loading procedure. Upon completion, control will be transferred to the Get/Save/Program Menu (Figure 4.1).

Note that the directory used for SPs is usually on drive A:. This is because SP codeplugs are typically distributed on floppy disks and need not be saved on the hard disk.

If no codeplug is currently loaded, a message will appear requesting that a codeplug be loaded before attempting this operation. Also, an SP may not be loaded if the station already contains an SP codeplug. If an SP is loaded, the SP Number field in the Station/Model Options screen displays the SP number.

To see a description of the SP, enter the filename, as described above, then press **F3**. A description will appear on the screen.

4.3.1. Definition of Function Keys

F1 – Displays help text.

F3 – Displays description of the SP code from the current file.

F5 – Print current screen.

F10 – Exit Get SP Code screen.

4.4. Save Codeplug to an Archive Disk File (F7)

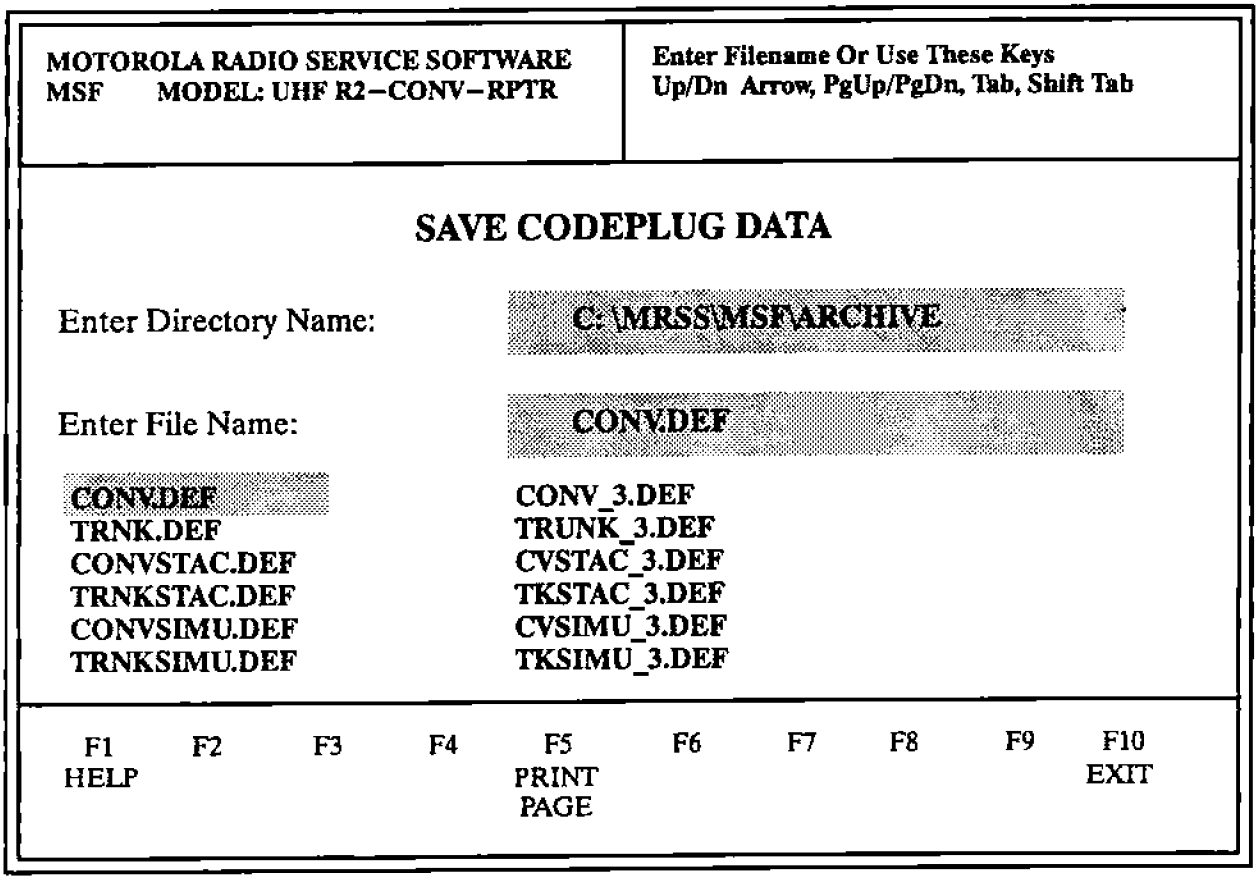


Figure 4.5: Saving Codeplug to a Disk File

Pressing **F7** from the menu in Get/Save/Program Menu (Figure 4.1) will bring up the Save Codeplug Data screen (Figure 4.5). The directory will initially be the same directory that was referenced in the

Configuration screen, but may be changed if desired. After a valid directory has been entered, the files in that directory will be displayed on the screen. A maximum of 200 files can be displayed. A maximum of 30 files can be displayed on a page. To view other pages (if they exist) use **PgUp** or **PgDn**.

Note: The user sets up C:\MRSS\MSF\ARCHIVE during installation. This is the directory that should be used to store all codeplug files.

Enter the desired filename after the files are displayed (in the above figure the filename CONV.DEF has been entered) or use **Tab, BackTab, Up** or **Down** to move the cursor on the file required. When a file is highlighted, its name will appear in the File Name field. To enter the file name, press **Enter**. By entering the directory and filename the user is able to make a copy of the codeplug. Upon entering a valid filename a screen similar to that in Figure 4.2 will appear. After the codeplug is saved the Get/Save/Program Menu (Figure 4.1) will reappear.

Note: The filename must be 8 characters or less otherwise it will be truncated. The following are examples of valid filenames:

388CPY12.34A
TRUNK.DEF

If the filename already exists a message will appear asking if the file is to be overwritten.

******* WARNING *******

ONCE THE FILE IS OVERWRITTEN THE ORIGINAL CANNOT BE RECOVERED!

If the tuning channel (Channel 0), contains zero for any of its frequencies, a message will appear to warn the user. The only choice from this message is to press **F2**, which will return the user to the Get/Save/Program menu. The station will not operate properly if the tuning channel is zero, and the codeplug cannot be saved with zero frequencies in channel zero.

4.5. Program Data into Codeplug (F8)

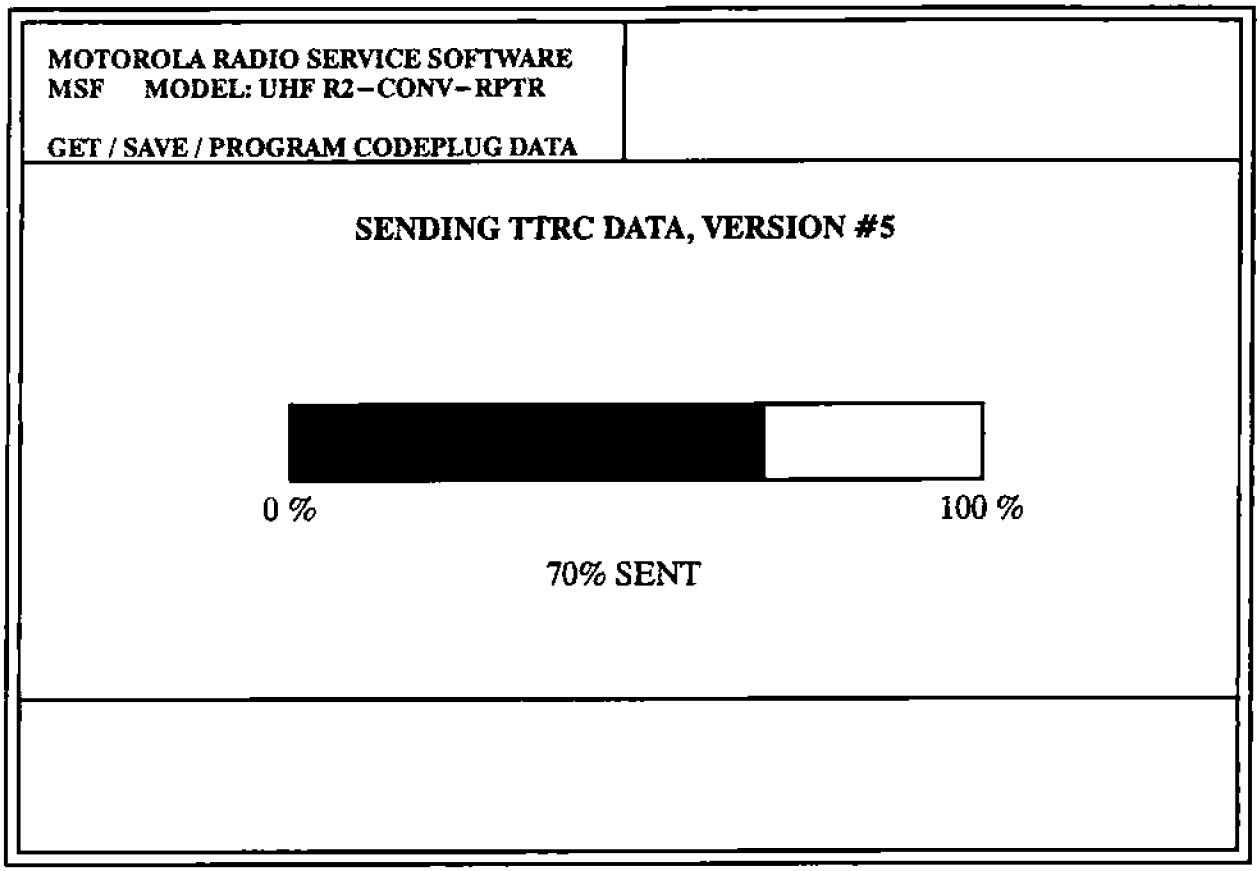


Figure 4.6: Sending Codeplug to Station

Pressing **F8** in the Get/Save/Program menu (Figure 4.1) brings the user to the Sending Codeplug Data to Station screen (Figure 4.6).

If the tuning channel (Channel 0), contains zero for any of its frequencies, a message will appear to warn the user. The only choice from this message is to press **F2** which will return the user to the Get/Save/Program menu. The station will not operate properly if the tuning channel is zero and the codeplug therefore cannot be saved with zero frequencies in channel zero.

A message will arise if the station is not connected or if there is a problem sending the data; in either case press **F10** to return to the previous menu. If the station has received the data successfully then another screen will appear (similar to Figure 4.6) except it will show the data being programmed from the station's RAM into its EEPROM. After the EEPROM has been successfully programmed the program will return to the Get/Save/Program Menu.

4.6. Upgrade Codeplug Version (F9)

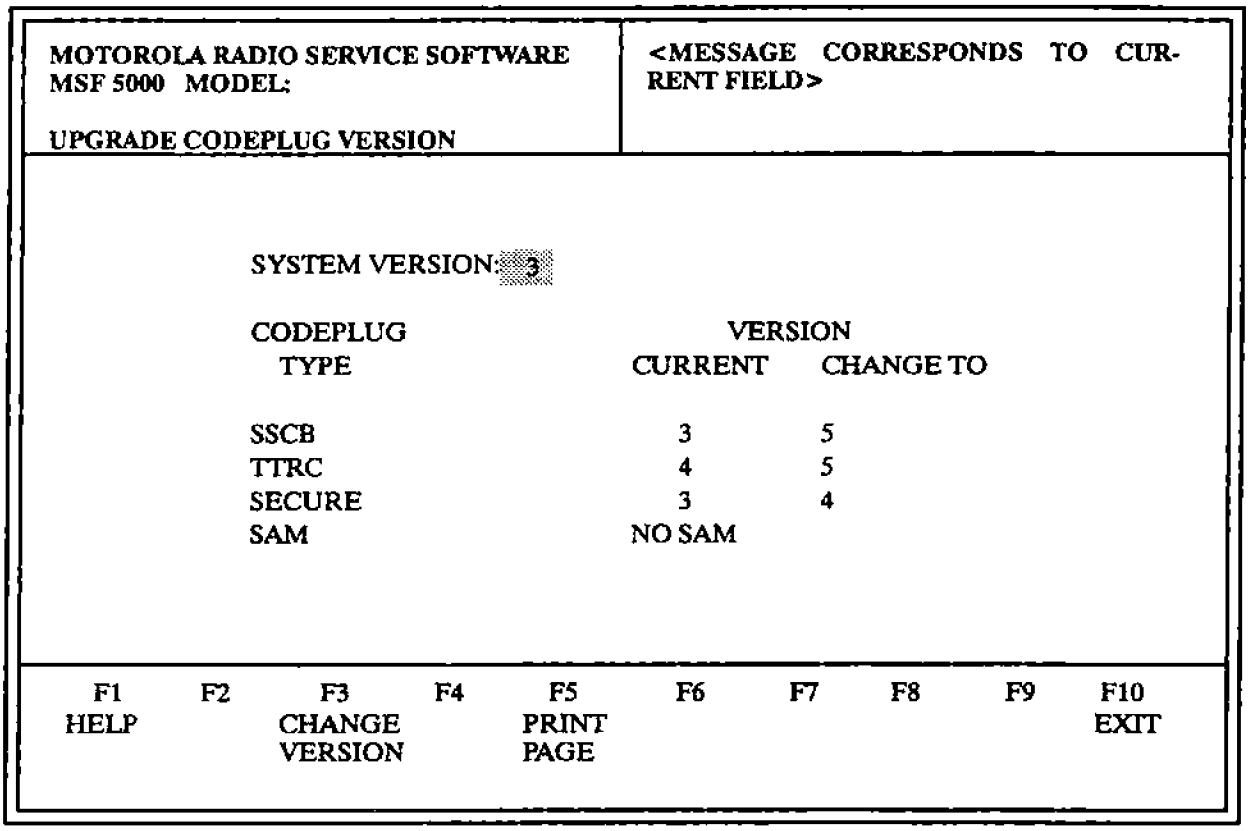


Figure 4.7: Upgrade Codeplug Version Screen

The purpose of the Upgrade Codeplug Version screen is to enable the user to manually upgrade a codeplug to a newer version. For example, if the current SSCB codeplug version is 4, it may be converted to a version 5 codeplug. All programmed settings are retained in the conversion. This allows the user to upgrade the station to newer firmware without losing current settings. This screen is shown in Figure 4.7.

The RSS will automatically upgrade the codeplug versions when programming a station if any of the station's firmware versions are greater than the codeplug version loaded in the RSS. This screen is to be used only in special circumstances when a codeplug version must be changed in an abnormal way.

The normal way to upgrade the firmware in a station is to follow these steps:

79. Read the station's codeplug into the RSS.

80. Save the codeplug to archive disk file.

81. Remove power from the station, remove the old firmware, and install the new firmware.

82. Restore power to the station, and re-program the station using the codeplug information still loaded in the RSS. **Note that this screen (Figure 4.7) will be bypassed and the codeplug will be upgraded automatically.**

System Version

The SYSTEM VERSION refers to groupings of shipping firmware that are able to operate together in the station. The SYSTEM VERSION field can be toggled between 1, 2, or 3. As the SYSTEM VERSION field is changed, the numbers in the CHANGE TO column change if an upgrade is possible. For example, if the SSCB version is currently 3 and the SYSTEM VERSION is changed to 3, the SSCB CHANGE TO colun changes to 5. **The RSS does not have the capability to change a codeplug to a lower version (downgrade).**

Once the desired SYSTEM VERSION is selected, pressing **F3** executes the conversion.

Change To (version)

This is an entry field in which the user can enter the new desired codeplug version, if an upgrade is possible. Once the CHANGE TO field is entered, the user can toggle between all currently valid upgrade possibilities. If the currently selected codeplug is already at its most recent codeplug version, the field is non-editable.

Upon entry to the screen, the program displays the version numbers of the codeplugs currently residing in memory. If a codeplug (eg. a SAM codeplug) is not currently loaded, a message (eg. NO SAM) is displayed in place of a version number. The cursor is initially in the SYSTEM VERSION field. By pressing **Tab**, **BackTab**, or **Enter**, the cursor can be moved up or down to a different codeplug. Once in the desired field, the user can enter the desired new version by pressing **Up** or **Down**. The user then initiates the conversion by pressing **F3**. The program performs the conversion(s) and redisplays the screen with the new version in the CURRENT column.

4.6.1. Definition of Function Keys

F1 – Displays help text.

F3 – Perform requested codeplug conversion.

F5 – Print current screen.

F10 – Exit Upgrade Codeplug Version screen.

5. CHANGE / VIEW CODEPLUG DATA (F4)

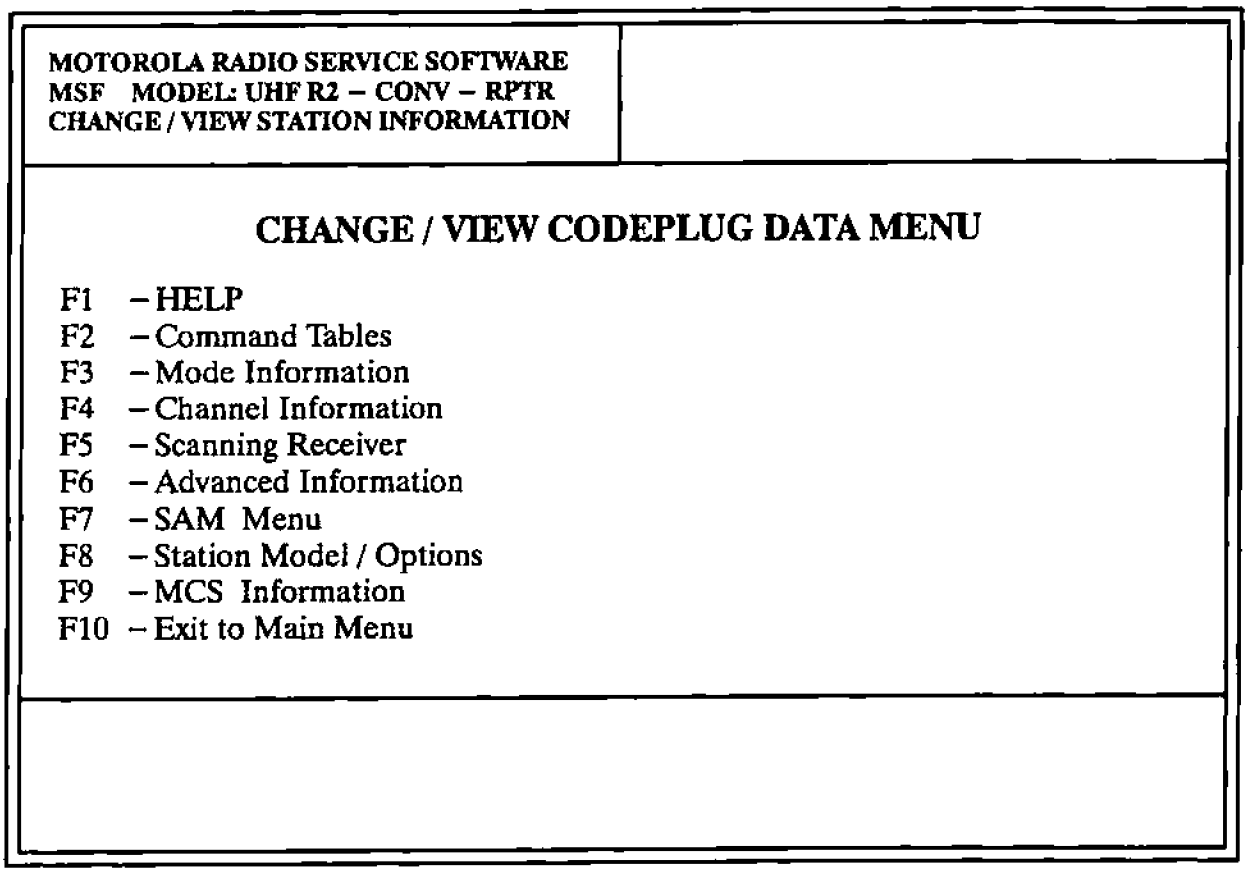


Figure 5.1: Change / View Codeplug Data Menu

Pressing **F4** at the MAIN MENU will display the CHANGE / VIEW CODEPLUG DATA MENU (Figure 5.1). The codeplug data must be loaded into the programmer for this function to work. The CHANGE / VIEW CODEPLUG DATA MENU has ten available functions, which are shown in the Figure above. Each of these functions are described in detail in the following sections.

5.1. Command Tables (F2)

Pressing **F2** at the CHANGE / VIEW CODEPLUG DATA MENU will display the Command Tables Menu (Figure 5.2). From this menu, the user may select to edit either the TRC Command Tables (**F2**) or the DC Command Tables (**F3**). Also, the Reset Command Table is located at the end of the DC Command Tables (**F3**).

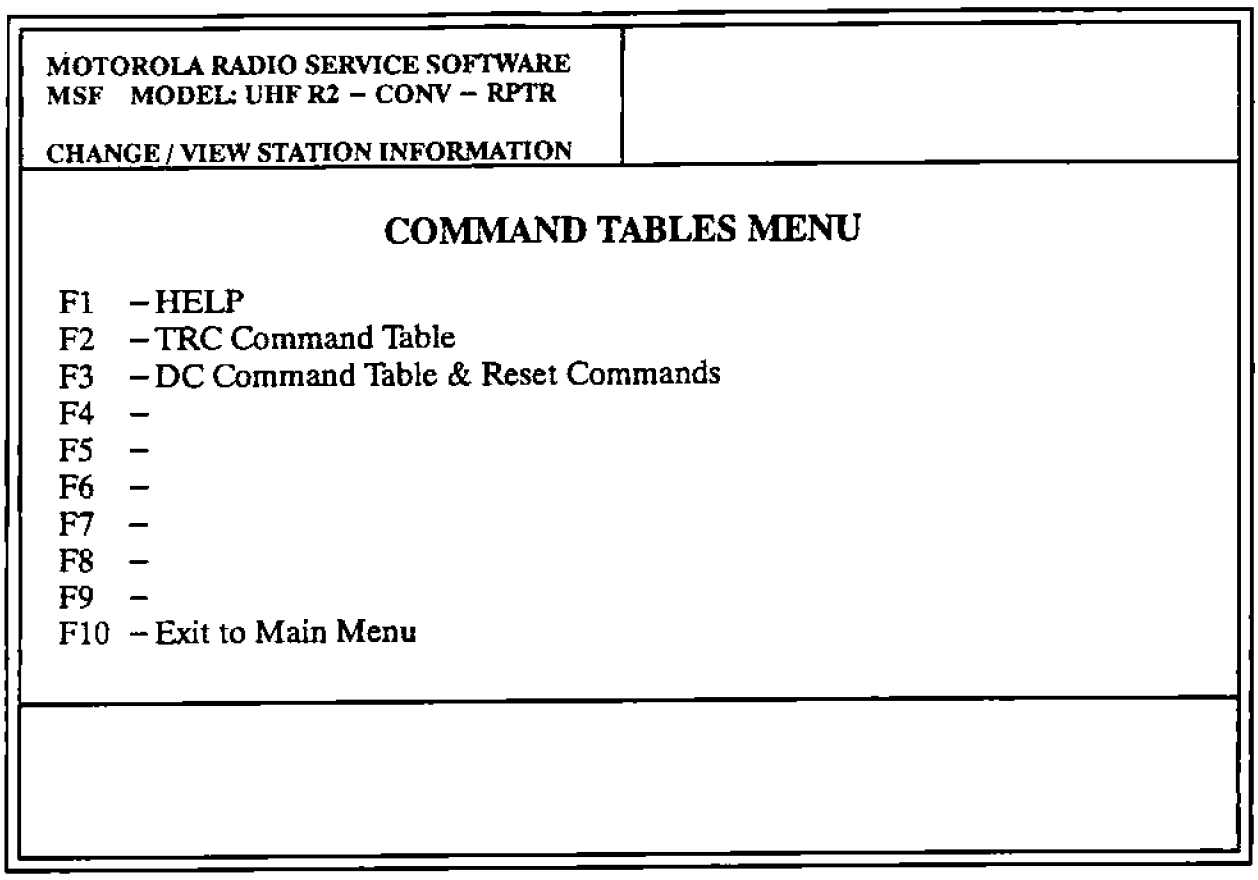


Figure 5.2: Command Table Menu

5.1.1. Tone Remote Control Command Table (F2)

Pressing **F2** at the COMMAND TABLES MENU will display the Tone Remote Control Command Table (Figure 5.3–Figure 5.5). The Tone Remote Control Information screens contain all of the editable fields concerning Tone Remote Control commands. These screens allow configuration of the station's Tone Remote Control capabilities by entering various commands.

There are 15 function tones, FT1 through FT15, which can contain a maximum of 8 executable commands per function tone. Press **Enter** to advance the cursor to the first field of the next function tone. Use **Tab** and **BackTab** to move the cursor right or left. Use **PgUp** and **PgDn** to move from page to page. See Section 5.1.2. for a list of valid commands. Invalid commands will be flagged with the following warning message:

(Command)
is Not a Valid Command! Please Re–enter Data!

Defined function keys provide the following functions:

F1 – Provides HELP and a list of the valid commands.
F3 – Resets Original Values (those present when the screen was entered).
F5 – Prints the current page.
F10 – Exits the TRC Command Table.

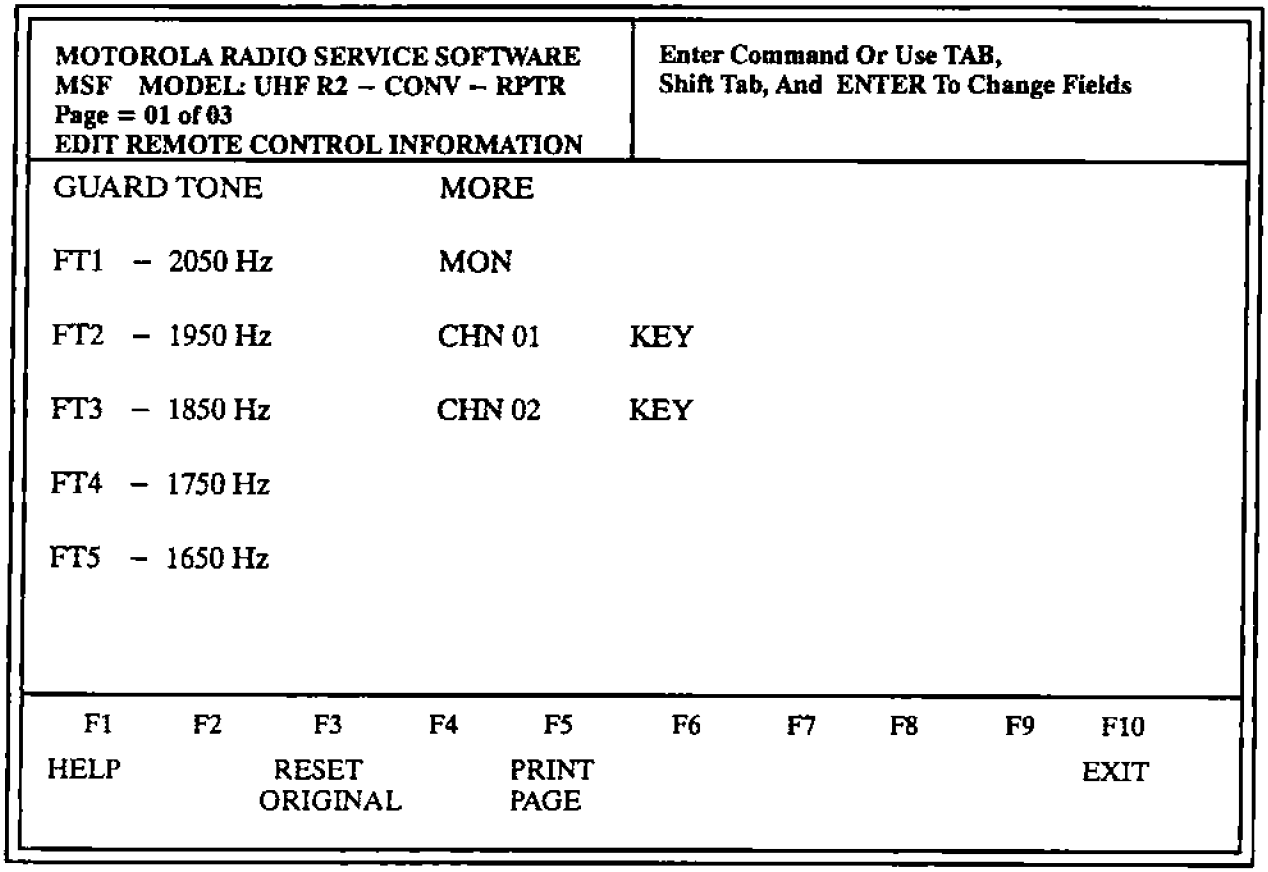
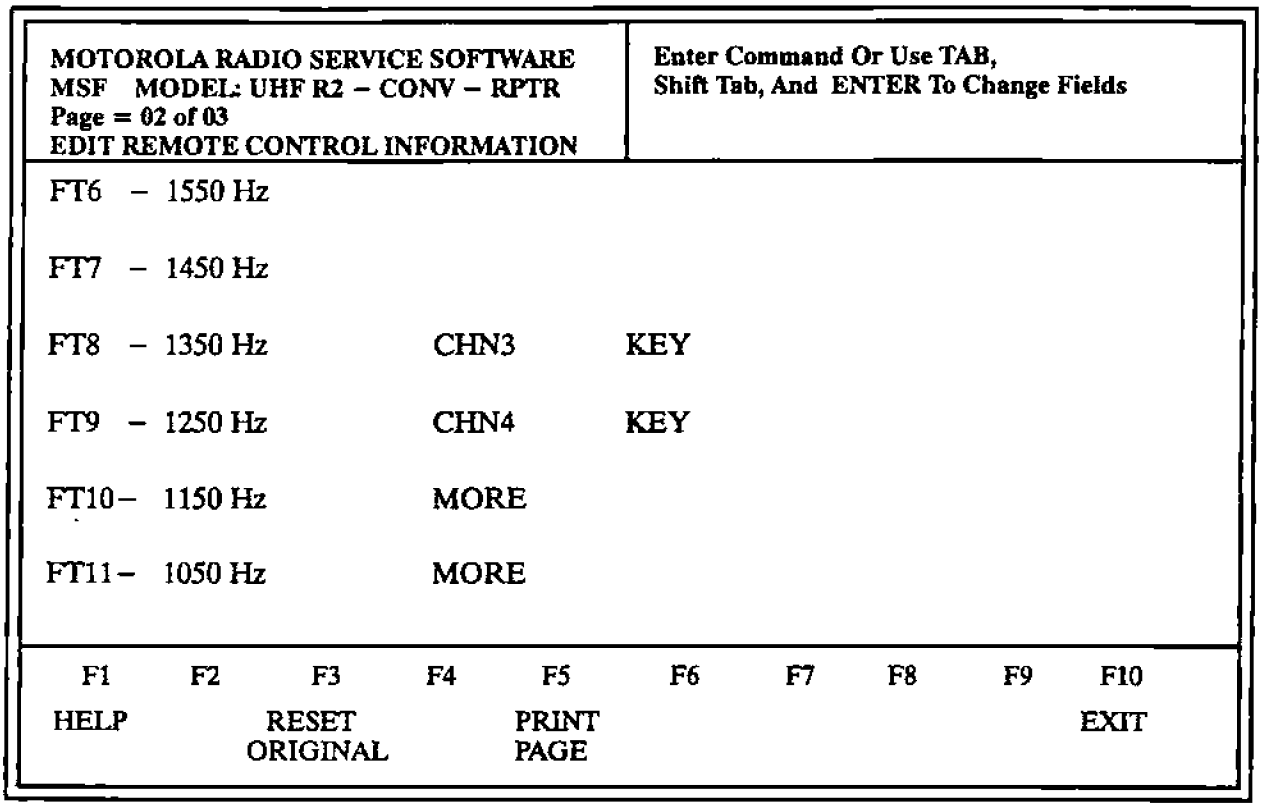


Figure 5.3: Tone Remote Control Information Screen #1



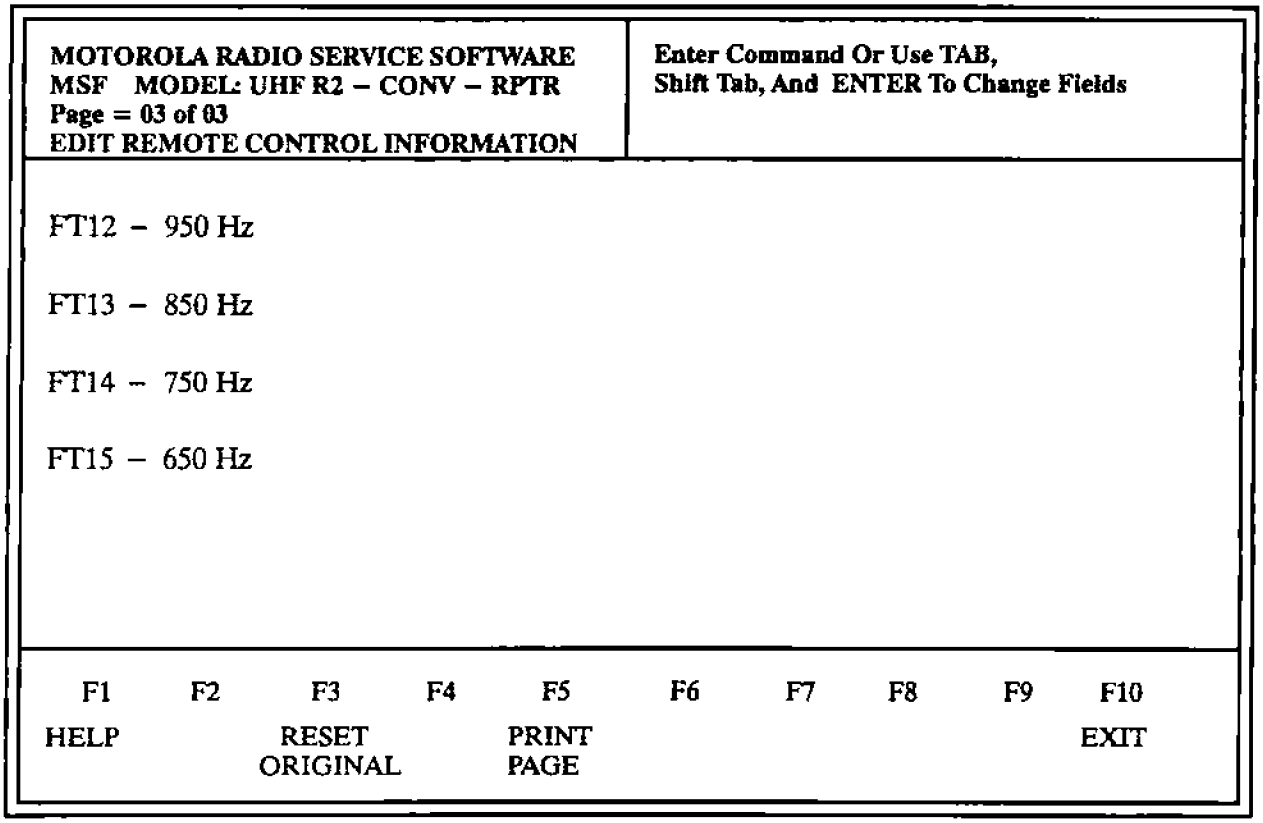


Figure 5.4 & Figure 5.5: Tone Remote Control Information Screen #2 & #3

5.1.2. Commands

The following list describes all valid Remote Control commands and their functions. All commands are valid for Tone Remote Control. The commands marked with an asterisk, "*", are not valid for DC Remote Control. (See Section 5.1.3.)

1. ACK *	Send acknowledge handshake for this function.
2. ALM ON	Enable station alarms.
3. ALM OFF	Disable station alarms.
4. CHN xx	Select Channel xx (xx: 0–15).
5. CONT xx	Continue executing commands at tone xx (xx: 0–15).
6. DVP1 *	Select DVP Code 0.
7. DVP2 *	Select DVP Code 1.
8. ECHO *	Send back Guard tones then function tones.
9. ECHOLLGT *	Send back Guard tones then a function tone followed by a Low Level Guard Tone (LLGT).
10. ENCRYPT ON *	Enable voice encryption.
11. ENCRYPT OFF *	Disable voice encryption.
12. FNCON x,y	Activate a FuNCtion bit on MUXbus address x bit y (x: 0–15, y: 0–3).
13. FNCOFF x,y	Deactivate FuNCtion bit on MUXbus address x bit y (x: 0–15, y: 0–3).
14. KEY *	Keys transmitter until low level guard tone is removed.
15. KEY ON	Key station until KEY OFF command is issued.
16. KEY OFF	Dekey station that was keyed via the KEY ON command.
17. KEYNUM xx *	Select a secure key xx (xx = up to 8 keys). This applies to Digital Equipped (Secure Equipped) stations only.
18. KEYRST *	Clears all encryption keys. This applies to Digital Equipped (Secure Equipped) stations only.
19. LLT *	Perform phone line loop test sequence.
20. MODE xx	Select Mode xx (xx: 0–15).
21. MON	Monitor channel. Disables receiver PL until next key.
22. MORE *	Reset function tone buffer and look for more functions.
23. NIB x,y	Set data NIBble on MUXbus address x to value y (x: 0–15, y: 0–15).
24. NULL	No further action.
25. R2M ON	Mute Receiver 2 audio.
26. R2M OFF	Unmute Receiver 2 audio.
27. RCV2 xx	Select Receiver 2 channel xx (xx: 0–15).
28. RES	Resets the TTRC Board.
29. RPL ON	Enable receiver PL
30. RPL OFF	Disable receiver PL.
31. RPT ON	Set–up repeater operation.
32. RPT OFF	Knock down repeater operation.
33. RXINH ON	Receiver Inhibit Enable.

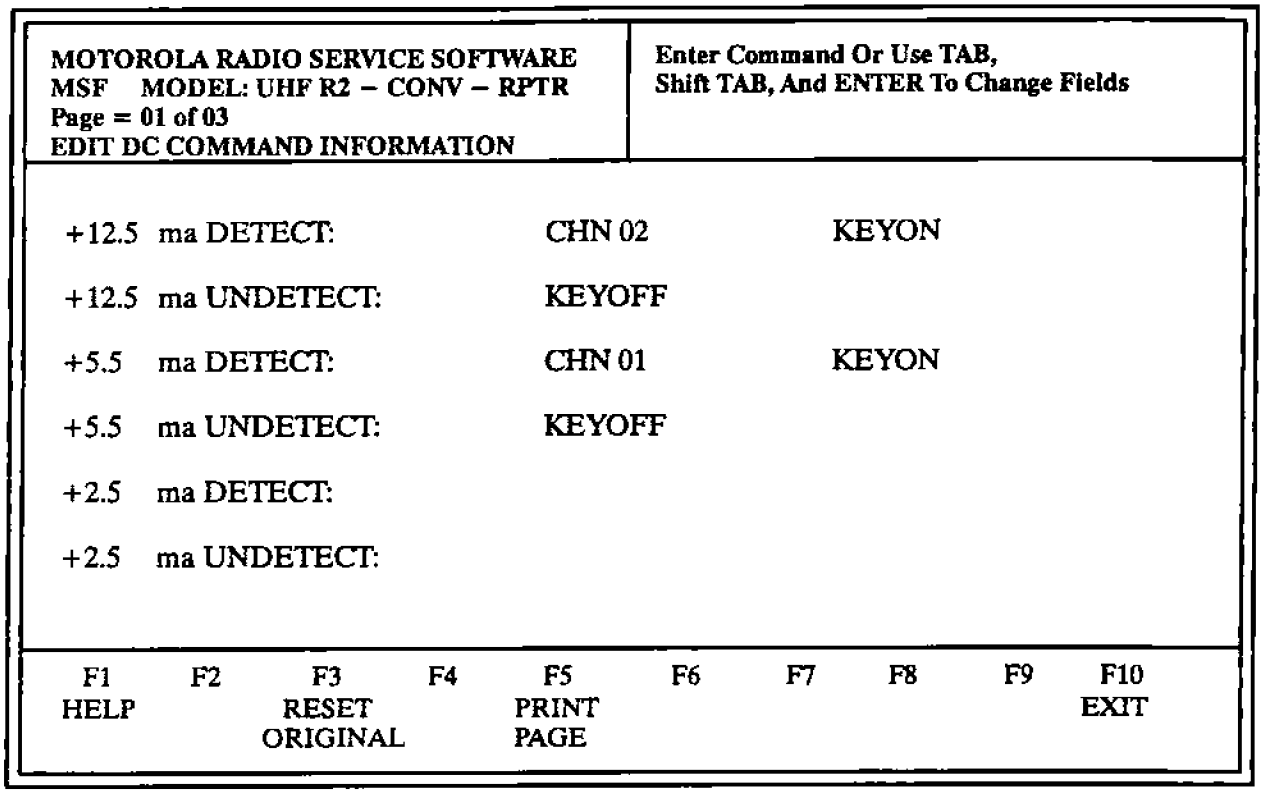
34. RXINH OFF	Receiver Inhibit Disable.
35. SALA ON	Turn On Selective Alarm until a SAL OFF command is received.
36. SALB ON	Turn off Selective Alarm for a period of 100 msec.
37. SAL OFF	Turn off SALA.
38. SCAN ON	Enable channel scan feature.
39. SCAN OFF	Disable channel scan feature.
40. STBY ON	Place station in Standby mode.
41. STBY OFF	Place station in normal operating mode.
42. TPL ON	Enable transmitter PL.
43. TPL OFF	Disable transmitter PL.
44. TXINH ON	Transmitter Inhibit Enable.
45. TXINH OFF	Transmitter Inhibit Disable.
46. UNECHO *	Terminate Low Level Guard Tone (LLGT) initiated by ECHOLLGT.
47. WAIT xxxx	WAIT for xxxx milliseconds (xxxx: 5–21000).
48. WC1 ON	Turn On Forward Wild Card 1 function.
49. WC1 OFF	Turn Off Forward Wild Card 1 function.
50. WC2 ON	Turn On Forward Wild Card 2 function.
51. WC2 OFF	Turn Off Forward Wild Card 2 function.
52. WC3 ON	Turn On Forward Wild Card 3 function.
53. WC3 OFF	Turn Off Forward Wild Card 3 function.
54. WC4 ON	Turn On Forward Wild Card 4 function.
55. WC4 OFF	Turn Off Forward Wild Card 4 function.

5.1.3. DC Command Table & Reset Commands (F3)

The DC Command Table & Reset Commands screens (Figure 5.6–Figure 5.8) contain all the editable fields concerning DC Remote Control and Reset Response commands. These screens allow custom configuration of the station's DC Remote Control and Reset Response capabilities using any of the valid DC Remote Control and Reset Response commands listed in Section 5.1.2. Invalid commands are flagged with the following error message:

(Command)
is Not a Valid Command! Please Re–enter Data!

NOTE: The list of valid DC Remote Control commands is a subset of valid Tone Remote Control commands. See Section 5.1.2. for a list of ALL valid commands. Those commands marked with an asterisk, "*", are not available for use with DC Remote Control. All commands are valid for Reset Response.



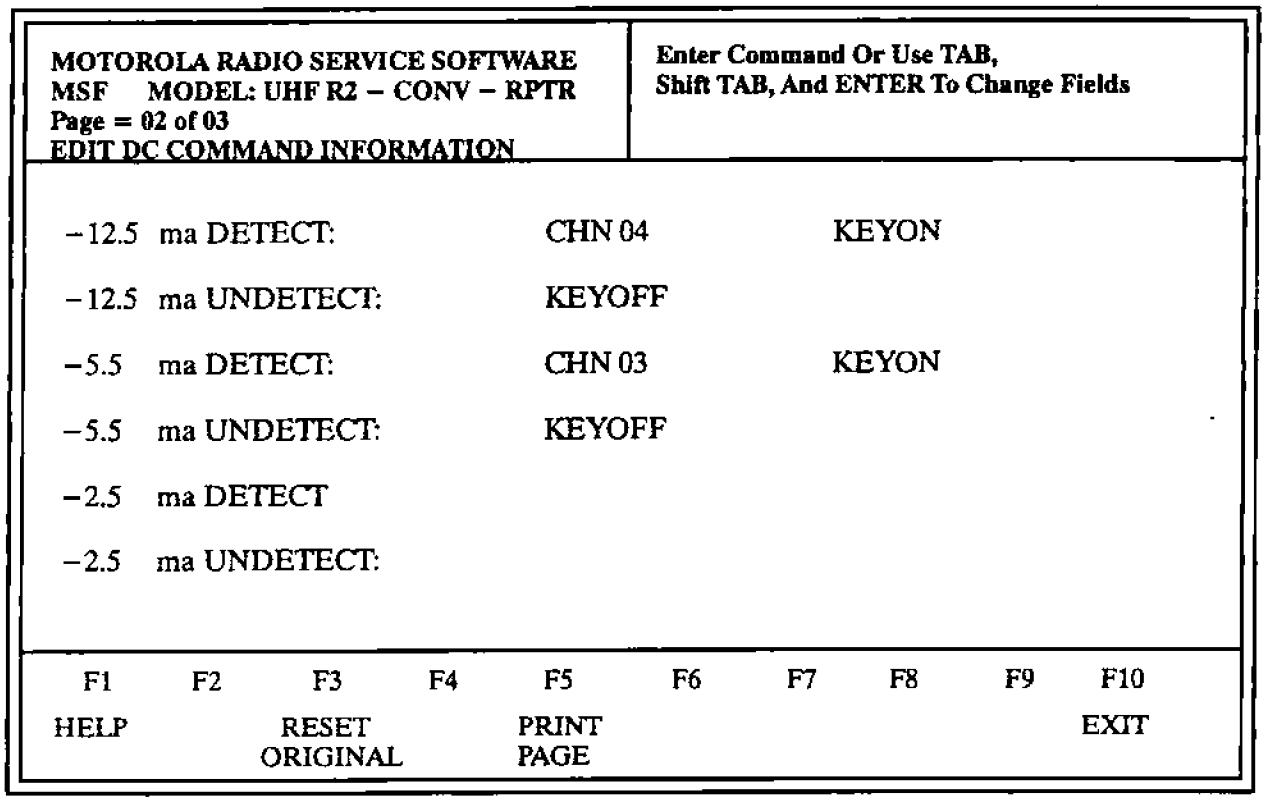


Figure 5.6 & Figure 5.7: DC Command Table & Reset Response Screen #1 & #2

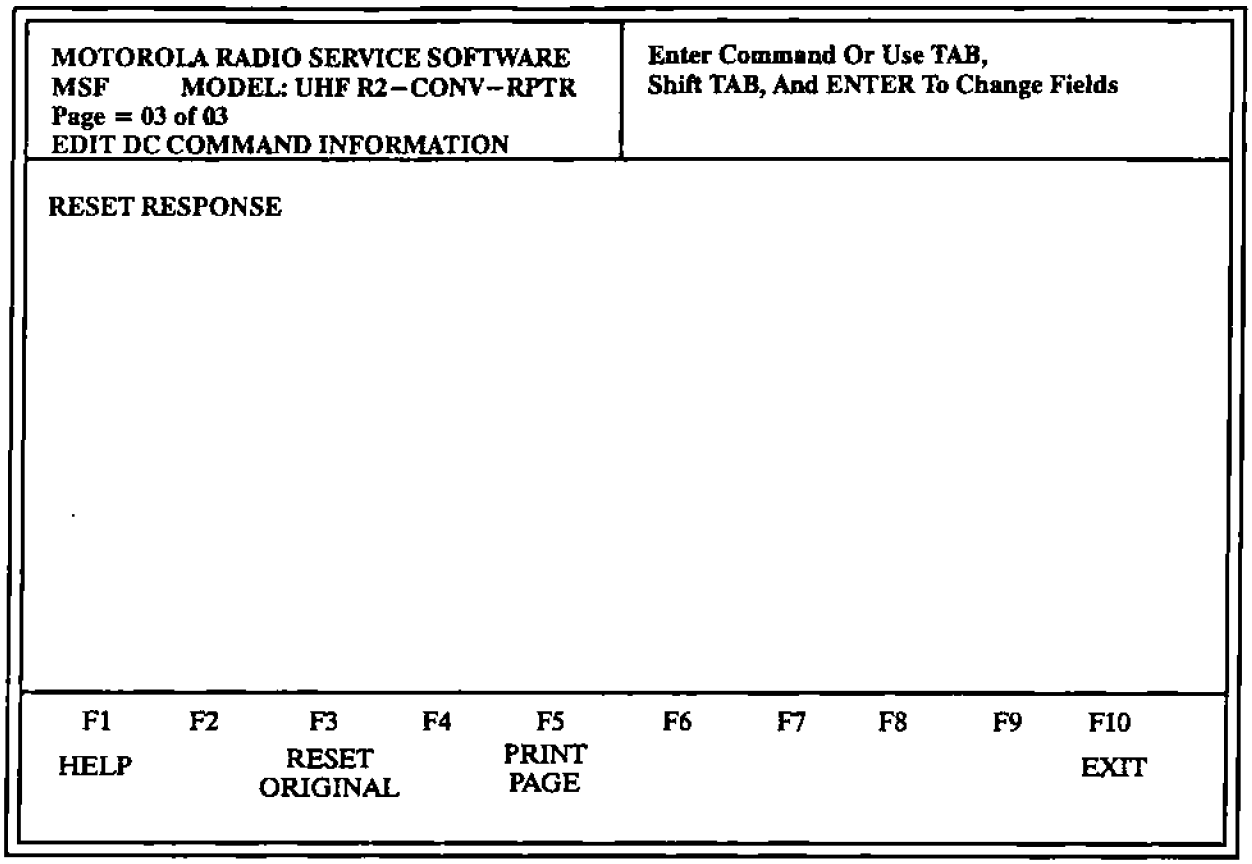


Figure 5.8: DC Command Table & Reset Response Screen #3

Page three (shown above) displays the Reset Response commands. These commands are executed upon station reset regardless if TRC or DC are enabled. The default for Reset Response commands is NULL. All commands listed in Section 5.1.2. are valid.

5.2. Mode Information (F3)

***** WARNING *****

IF THE MODE INFORMATION IS CHANGED FROM THIS SCREEN, IT WILL CHANGE EACH CHANNEL TO WHICH THAT MODE IS SLAVED. THIS SCREEN SHOULD ONLY BE USED BY ADVANCED USERS. TYPICALLY, THIS INFORMATION IS CHANGED VIA THE CHANNEL INFORMATION SCREEN.

Pressing **F3** at the CHANGE / VIEW CODEPLUG DATA MENU will display the Mode Information Screens (Figure 5.9 – Figure 5.11). These screens contain all of the editable fields concerning mode information. In these screens, the user is prompted for the mode number to edit. After entering the mode number, that mode's data is displayed and is available for editing and the channels using that mode as their default are indicated. **Tab** and **BackTab** are used to move the cursor to the next and previous data fields, respectively. **PgDn** and **PgDn** are used to move the cursor between pages.

5.2.1. Deleting Modes (F7)

To remove a mode from a station, simply select toggle the EDIT MODE NUMBER field by pressing **Up** or **Down** until the mode to be deleted is displayed. Press **F7** to delete the mode. All mode numbers greater than the mode deleted will be decreased by one. For example, if you have a station with modes 00 through 04 enabled, and deleted mode 02, mode 03 and 04 would become modes 02 and 03, respectively, while modes 00 and 01 would remain unchanged. Any channel that was previously slaved to modes 03 or 04 will now be slaved to modes 02 and 03, respectively.

If a mode is slaved to a channel, it can not be deleted. The codeplug must always contain a modes 00 and 01. Mode 00 can never be deleted, but mode 01 can be deleted only if mode 02 exists.

5.2.2. Inserting Modes (F8)

Pressing **F8** in the Mode Information Screen inserts a duplicate of the currently selected mode directly after that mode. For example, if the EDIT MODE NUMBER field contains 01 and **F8** is pressed, Mode #02 will be created in the likeness of Mode #01. Changes can then be made to the new mode. A maximum of 16 modes (0 through 15) may be present in the station.

5.2.3. Mode Information Fields

Each entry in the mode information screens is described below.

```
MOTOROLA RADIO SERVICE SOFTWARE          <MESSAGE CORRESPONDS TO CUR-
MSF MODEL: UHF R2-CONV-RPTR              RENT LINE>
PAGE 01 OF 03
EDIT MODE INFORMATION

EDIT MODE NUMBER:                01      MODE #01 OF 01
THIS MODE IS SLAVED TO CHANNEL(S): 01
    RX PL/DPL CODE:              CSQ
    TX PL/DPL CODE:              CSQ
    PTT PRIORITY:                DWRLM   DATA>WLINE>RPTR>LOCAL>MRTI
    TIME-OUT-TIMERS:
        LINE                     120     0 > time > 495 seconds
        LOCAL                    000     0 > time > 495 seconds
        REPEATER                 060     0 > time > 495 seconds
        DATA                     000     0 > time > 495 seconds
        MRTI                     000     0 > time > 495 seconds
    RECEIVER CONTROL:            S       Audio Squelch
    REPEATER CONTROL:
        REPEATER ACTIVATE        S       Audio Squelch
        REPEATER HOLDIN          S       Audio Squelch

 F1      F2      F3      F4      F5      F6      F7      F8      F9      F10
HELP                             PRINT   DELETE  INSERT          EXIT
                                 PAGE      MODE
```

Figure 5.9: Mode Information Screen #1

Edit Mode Number

The Edit Mode Number field determines the mode to be displayed and edited. All enabled modes can be viewed by pressing **Up** or **Down** to increase or decrease the Edit Mode Number field.

Rx PL/DPL Code

The Rx PL/DPL Code field indicates which PL or DPL Code is used in the receiver. The PL/DPL Codes are used so that a receiver will unsquelch only when the proper code is present, thus eliminating unwanted messages. Press **F1** for a list of the PL/DPL Codes. The default is CSQ (carrier squelch), which means that no PL/DPL Code is used. If the MCS Table Number field (described later in this section) is set to MCS Table 1 – 9 then the Rx PL/DPL Code field is non–editable and will display MCS.

In trunking stations this field is called **CONNECT TONE 1.**

The Connect Tone 1 field indicates which Connect Tone is to be used in the station receiver. A Connect Tone is a sub–audible tone transmitted with the carrier signal. After the correct Connect Tone is entered its corresponding frequency is displayed beside it.

Tx PL/DPL Code

The Tx PL/DPL Code field indicates which PL or DPL Code is used in the transmitter. If a PL Code is used, a sub–audible sine wave is transmitted with the carrier signal, and if a DPL Code is used, very low speed data is transmitted with the carrier signal. Press **F1** for a list of the PL/DPL Codes. The default is CSQ which means that no PL/DPL Code is used.

In trunking stations this field is called **CONNECT TONE 2.**

The Connect Tone 2 specifies second Connect Tone. If Connect Tone 1 and Connect Tone 2 contain two different values, the trunked station will recognize either of the two Connect Tones as valid. After the correct Connect Tone is entered its corresponding frequency is displayed beside it.

PTT Priority

The PTT Priority field indicates the priority of the five possible PTT's, Data–D, Wireline–W, Repeater–R, Local–L, and MRTI–M (Motorola Radio/Telephone Interconnect). Only the letters D, W, R, L, and M may be entered. After entering the priority, its description will appear next to it (i.e. WLINE > LOCAL). The default is DWRLM (DATA > WLINE > RPTR > LOCAL > MRTI).

Time Out Timers

There are five types of Time–Out–Timers: Line, Local, Repeater, Data and MRTI. Each indicates the amount of time the station may be keyed by that particular method (Wireline PTT, Local PTT, Repeater PTT, Data PTT or MRTI PTT) before the station dekeys. The time–out–timer prevents a particular user from dominating the station's transmitter. The time–out–time must be an integer between 0 and 495 seconds. If the Time Out Timer field is set to 0, the corresponding PTT will never time out. The default values are as follows: Line=120 seconds, Local=0 (NULL), Repeater=60 seconds, Data=0 (NULL) and MRTI=0 (NULL).

Receiver Control

The Receiver Control field indicates the audio qualifiers needed to unsquelch the receiver. The five choices of audio qualifiers are S (Audio Squelch), C (PL Detect), A (Auxiliary Detect), OFF (never

unsquelch) or ON (continuously unsquelched). The user can toggle to any of the possible combinations of these qualifiers. After toggling to an audio qualifier, its description will appear next to it. For example if CA is entered, then PL Detect, AUX Detect will be shown next to it. This means that a PL Detect and an AUX Detect are required before the receiver unsquelches. The default is S, Audio Squelch.

Repeater Control

There are two fields in this category, Repeater Activate and Repeater Holdin. These dictate the audio qualifiers needed to activate and hold repeater PTT. The five choices of audio qualifiers that may be used are S (Audio Squelch), C (PL Detect), A (Auxiliary Detect), OFF (never repeat) and ON (continuously repeat). The user can toggle to any of the possible combinations of these qualifiers. After toggling to an audio qualifier, its description will appear next to it. For example if CA is entered, then PL Detect, AUX Detect will be shown next to it. This means that a PL Detect and an AUX Detect are required before the repeater is activated or a hold repeater PTT is activated. The default is S, Audio Squelch.

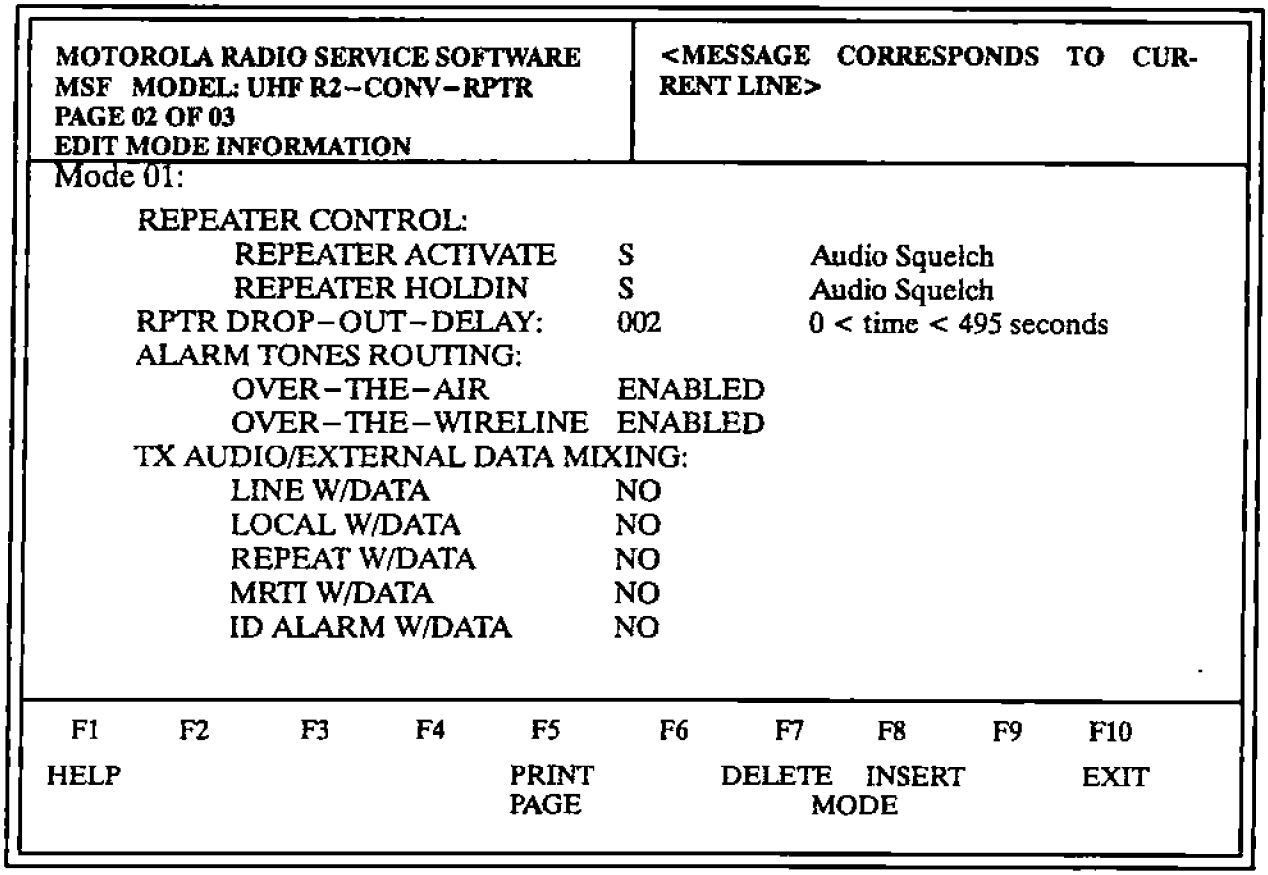


Figure 5.10: Mode Information Screen #2

Rptr Drop-Out Delay

The Repeater Drop-Out Delay field indicates the amount of time the repeater stays keyed after the loss of the repeat audio signal. The delay must be an integer between 0 and 495 seconds. The default is 2 seconds.

Alarm Tones Routing

The Alarm Tones Routing fields indicate whether or not Alarm Tones are routed Over–the–Air and/or Over–the–Wireline. Alarm tones are generated when any of the eight Reverse Wildcard MUXbus bits are active. Most of these bits are predefined as: Battery Overvoltage (RW4), Synthesizer Unlock (RW3), PA Fail (RW2), Battery Revert (RW1), Low Forware Power (RW7), High Reflected Power(RW6), and TSTAT Failure (RW5). Each method may be ENABLED/DISABLED independently by pressing **Up** or **Down**. The default for both is ENABLED.

Tx Audio/External Data Mixing

The Tx Audio/External Data Mixing fields indicate whether or not a particular kind of transmit audio will be mixed with data audio when the EXDADT MUXbus bit is active. Five kinds of transmit audio may be mixed with data: Line, Local, Repeat, MRTI and ID ALARM. Each audio can be set to mix, YES, or not mix, NO, independently by pressing **Up** or **Down**. The defaults are NO for all five kinds of transmit audio.

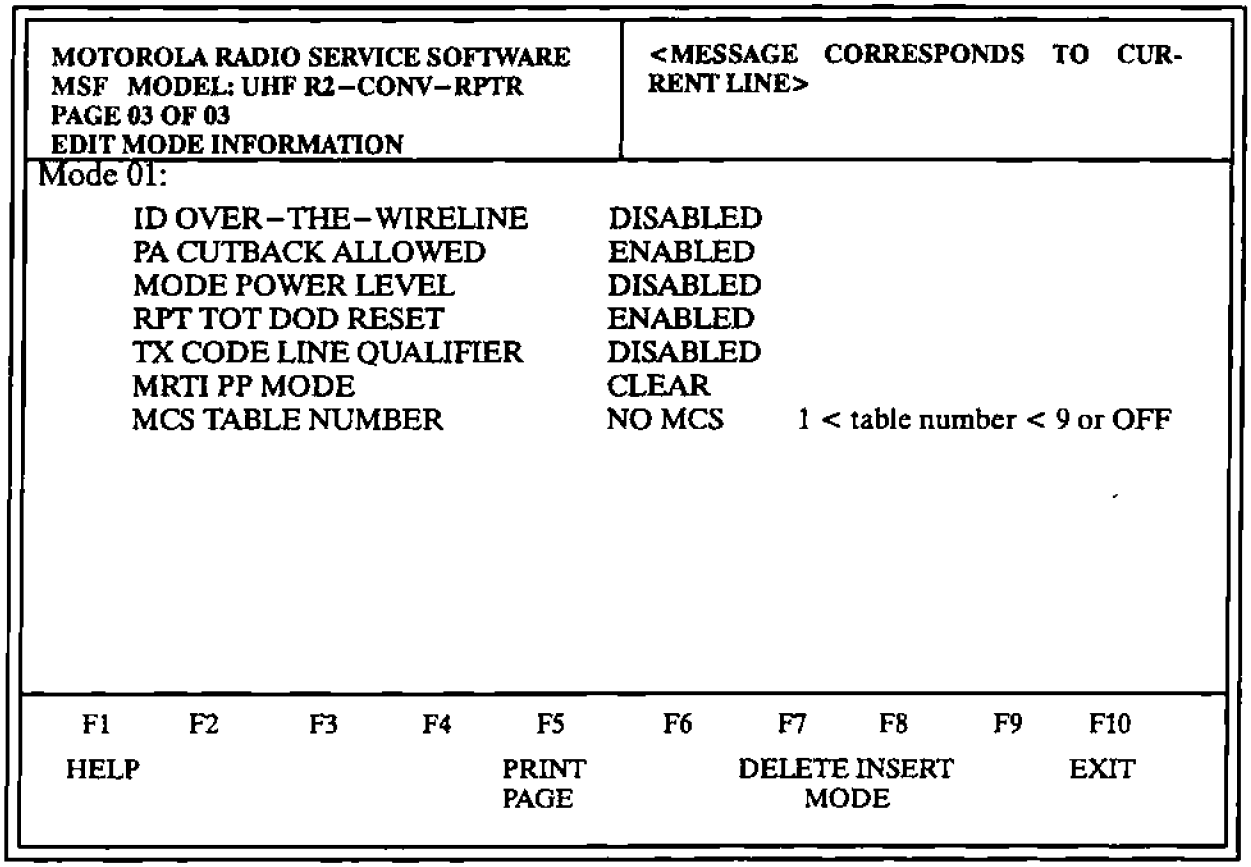


Figure 5.11: Mode Information Screen #3

ID Over–the–Wireline

The ID Over–the–Wireline field indicates whether or not the ID is to be automatically sent down the wireline. The default is DISABLED.

Pre–Emphasis / De–Emphasis

When ENABLED, clear receive audio is de–emphasized and clear transmit audio is pre–emphasized. This is the default configuration for most clear voice applications. When DISABLED, clear

receive and transmit audio signals are not emphasized. This allows the station to have a flat repeater frequency response. The default is ENABLED.

NOTE: It is not possible to selectively disable either pre−emphasis or de−emphasis only. They are simultaneously enabled or disabled.

PA Cutback Allowed

When ENABLED, the station's RF power output will be decreased by 3 dB when operating on battery backup. When DISABLED, full power will be supplied from the station during battery operation. The default is ENABLED.

Mode Power Level

When ENABLED, the station's RF power output will be decreased by 3 dB when operating on this mode. When DISABLED, full power will be supplied from the station. The default is DISABLED.

Rpt TOT DOD Reset

When ENABLED, the station's repeater time−out−timer resets upon loss of Rx activity. When DISABLED, the station's repeater time−out−timer resets upon loss of Tx activity. The default is ENABLED.

Tx Code Line Qualifier

When ENABLED, the station does not key on line code detect and requires a guard tone/function tone sequence to key the station before a coded transmission. When DISABLED, the station will key on line code detect. The default for this field is DISABLED.

MRTI PP Mode

This field sets the Tx audio mode of the MRTI phone patch audio in an encode/decode station. There are four possible settings. The default is RCV SLAVED.

CLEAR	always transmits MRTI audio without encryption
CODED	always transmits MRTI audio with encryption
RCV SLAVED	transmits MRTI audio based on audio last received
LATCHED	Once coded information is received MRTI audio is always encrypted for the duration of the phone call

MCS Table Number

This field indicates which, if any, MCS Table the mode uses. If the Table Number is set to OFF, then this mode is not slaved to any MCS Table but MCS Tables do exist. If the field shows NO MCS then MCS is not enabled for this station. MCS may be enabled or disabled via STATION MODEL OPTIONS SCREEN. When MCS becomes DISABLED all MCS information is removed and cannot be recovered. The valid range for this field is 1 to 9. If the user enters a table number that does not exist, the table must be created before saving the codeplug. If the MCS Table Number field is set to 1 − 9, then the Rx PL/DPL Code field displays MCS and is non−editable.

5.3. Channel Information (F4)

Pressing **F4** at the CHANGE / VIEW CODEPLUG DATA MENU will display the Channel Information Screen (Figure 5.12), which contains editable fields concerning channel information. In this

screen, the user can select which channel is to be displayed and edited by pressing **Up** or **Down** in the EDIT CHANNEL NUMBER field. After entering the channel number, that channel's data is displayed. If the selected channel is slaved to a mode, that channel's mode information is also displayed. **Tab** and **BackTab** are used to move the cursor to the next and previous data fields, respectively. **PgUp** and **PgDn** are used to move the cursor between pages.

5.3.1. Deleting Channels (F7)

Pressing **F7** will cause the currently displayed channel to be removed from the codeplug. All channels with channel numbers greater than the channel number to be deleted will be decreased by one.

For example, if the codeplug currently has channel 00 through 04 enabled and the user wants to delete channel 3, the Edit Channel Number field would be set to 03. Then **F7** would be pressed to execute the deletion. After the deletion is complete, the channel that was 04 prior to the deletion, will now be channel 03.

The station codeplug must always contain at least two channels, 00 and 01. The RSS will never allow deletions of Channel 00, and will only allow deletion of Channel 01 if Channel 02 exists.

5.3.2. Inserting Channels (F8)

To add a channel to the station, press **F8**. A duplicate of the currently selected channel will be inserted immediately after it. A maximum of 16 channels (0 – 15) may be enabled in a single station. If attempting to enable more than three channels, an external EEPROM (Part No. 51–91015A01) may need to be installed in the U808 socket on SSCB board.

5.3.3. Channel Information Fields

***** WARNING *****

TO VIEW THE TUNING CHANNEL, ENTER CHANNEL NUMBER 0, HOWEVER IT IS NOT RECOMMENDED THAT ANY DATA BE CHANGED ON THE TUNING CHANNEL.

Each entry in the channel information screen is described below.

Mode Slaving

The Mode Slaving field indicates whether or not a channel is slaved to a mode. If a channel is slaved to a mode the mode is connected to that channel, but the channel can be slaved to a new mode if desired. If the Mode Control field in the Advanced Information Screen is not set to Station, then this field will have no effect. The default is ENABLED.

Mode Locked

The Mode Locked field indicates whether or not a channel is locked to the mode to which it is slaved. If a channel is locked to a mode, then that mode and only that mode is connected to that channel. If the Mode Control field in the Advanced Information Screen is not set to Station, then this field will have no effect. If Mode Slaving is disabled, then Mode Locked is automatically disabled. The default is DISABLED.

Tx Idle Calculation

This field controls whether the Tx Idle frequency is automatically or manually calculated. The default is AUTO, in which case the Tx Idle frequency (described below) is calculated using a predetermined algorithm. If set to MANUAL, then the user may enter a Tx Idle frequency which will not be changed by the program.

Tx Frequency

The Tx Frequency field indicates the transmitter frequency for the channel being edited. Window 2 of Figure 5.12 will display the correct range depending on the frequency band. All Tx frequencies are located on the R1 Tray. The frequency band can be changed via the Station Model/Options screen. When the band is changed, however, all channel frequencies in the R1 Tray are reset to zero, unless changing between UHF Range 1 and UHF Range 2. The Tx Frequency for channel zero, the tuning channel, is the median Tx frequency of all Tx channel frequencies.

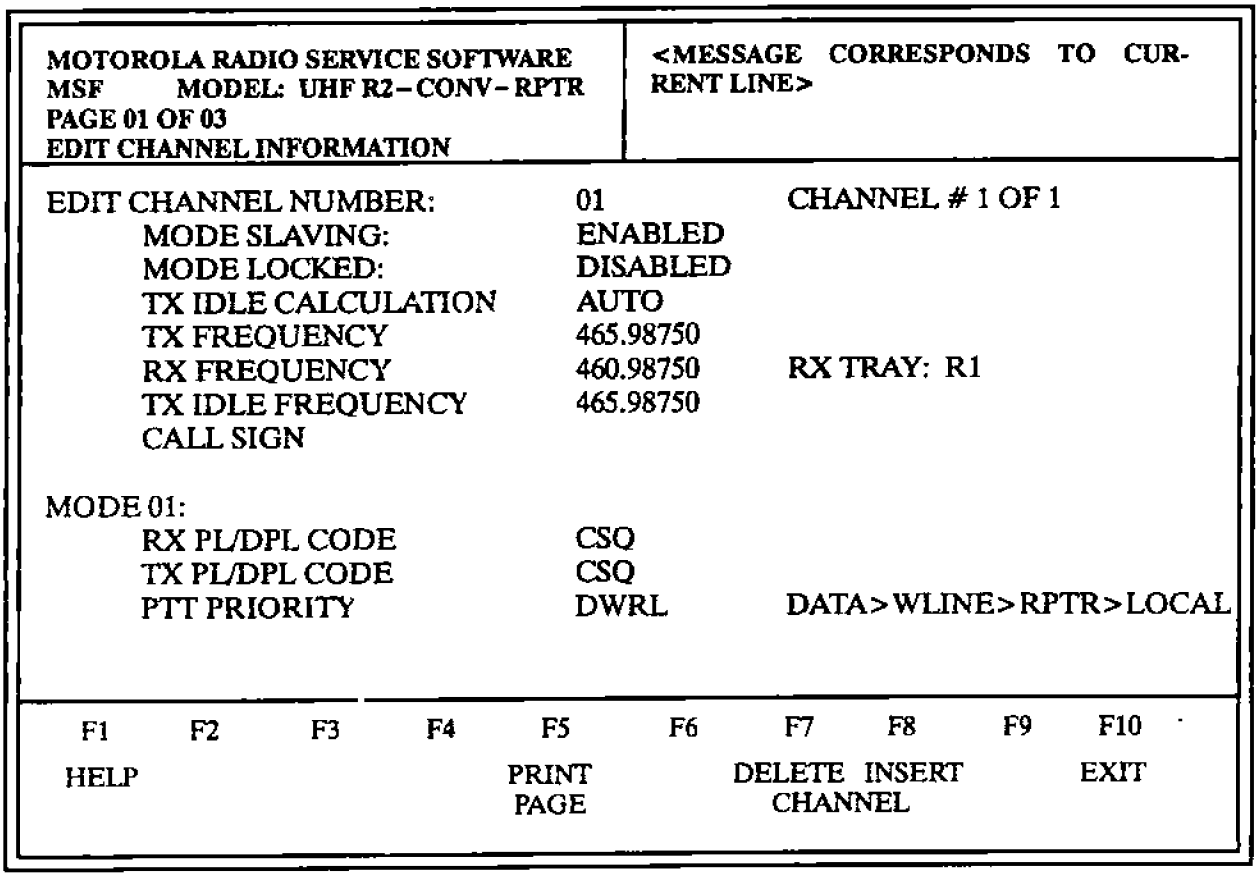


Figure 5.12: Channel Information Screen #1

Rx Frequency

The Rx Frequency field indicates the receiver frequency programmed into the receiver specified by the Rx Tray field. Normally, a station has a single Rx tray, R1, but in the case of a station equipped with the Second Receiver Option, it will have two receiver trays, R1 and R2. Window 2 of Figure 5.12 will display the correct range depending on the frequency band for the tray that has been selected. A non-editable field to the right of the Rx Frequency field indicates which receiver tray has been

selected for this channel's Rx frequency. The frequency band can be changed via the Station Model/ Options screen. When the band is changed, however, all channel frequencies in the tray are reset to zero, unless changing between UHF Range 1 and UHF Range 2. The receiver tray may be changed via the Scanning Receiver screen on a per channel basis, provided the Model Options screen contains a valid frequency range for Frequency Range R2 Tray field (not DISABLED). Channel zero, the tuning channel, contains the median Rx frequency of all R1 tray frequencies. The median frequency of all R2 tray frequencies is also displayed on the tuning channel screen.

NOTE: The Second Receiver Option is only available with SSCB version 5.00 or greater firmware.

Tx Idle Frequency

The Tx Idle field indicates the transmit frequency when the transmitter is idle. If Tx Frequency = Rx Frequency, then the Tx VCO is shifted off–channel during receive to avoid any on channel interference in the receiver. If Tx Frequency is not equal to Rx Frequency, then the transmitter idle frequency should be the same as the transmit frequency. All Tx Idle frequencies are programmed into the R1 Tray.

Call Sign

The Call Sign field indicates the ID Call Sign (option C345). Alphanumeric characters can be entered (up to a maximum of ten characters), and the Call Sign is sent in Morse Code either over the air and / or down the wireline.

Default Mode Number

The Default Mode Number field determines to which mode the current channel is slaved. This field can be toggled between all existing modes by pressing **Up** or **Down**.

The remaining fields on the Channel Information Screen are the same as the Mode Information Screen. The mode data slaved to the current channel may be edited as well as the channel data. If the mode is slaved to any other channel(s), a new mode will be created and slaved to the current channel. All other channels and modes remain unchanged. For a description of the mode–related fields and screens, see Section 5.2.

5.4. Scanning Receiver (F5)

This screen is used as a brief summary of channel and mode information and to control the scanning receiver feature's fields as described below.

Page one contains information for up to 8 channels. Page two, if necessary, contains channel information for channels 9 – 15.

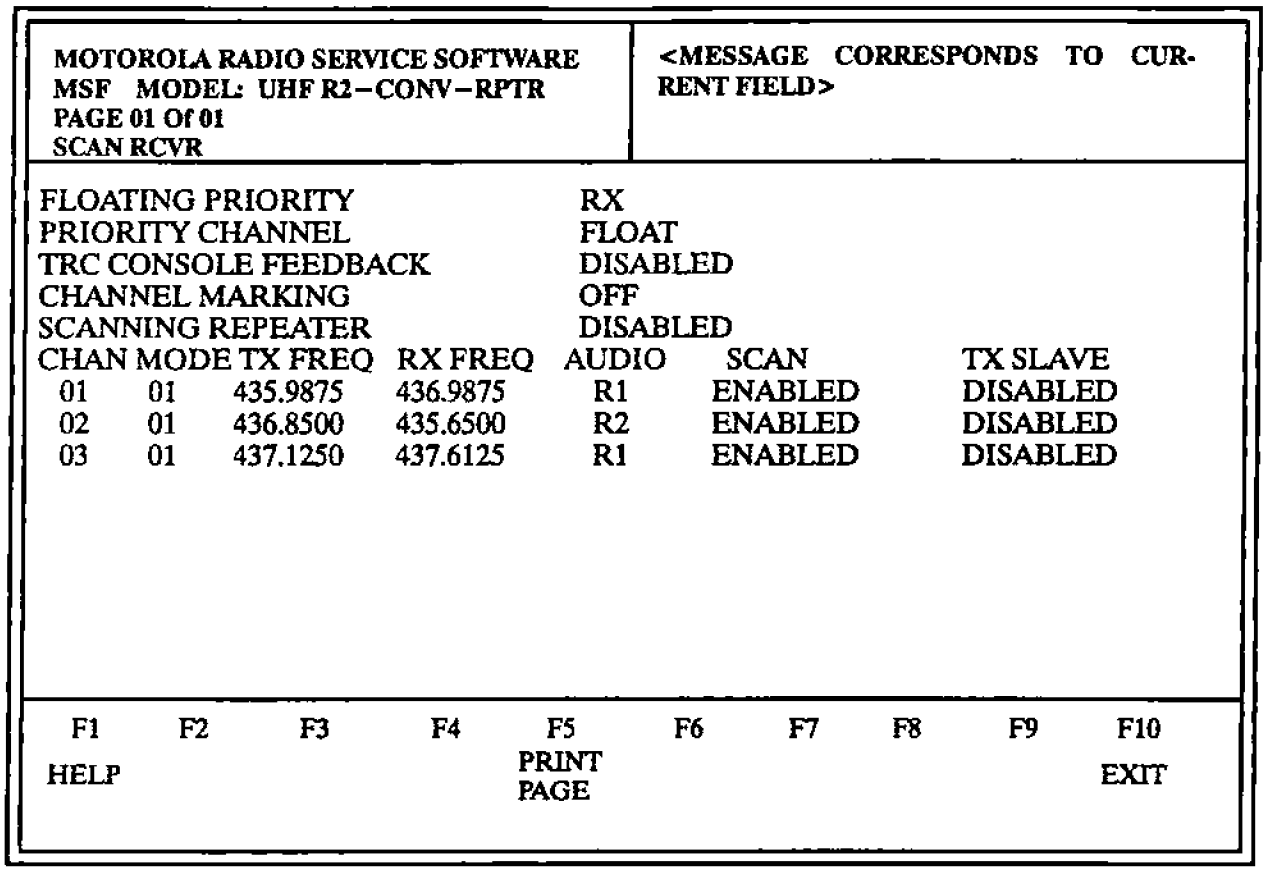


Figure 5.13: Scanning Receiver Screen #1

Floating Priority

The valid toggle choices for this field are OFF, RX, TX or RX & TX. TX sets the priority channel to the most recent transmit channel. RX sets the priority channel to the most recent active receive channel. Selecting RX & TX allows the priority channel to be assigned to the most recent transmit or receive channel. If the Floating Priority field does not contain OFF, then the Priority Channel field will be set to FLOAT and the Priority Channel field becomes non-editable. The default for the Floating Priority field is OFF.

Priority Channel

The Priority Channel field is a two digit field that indicates which channel has priority. The only valid numbers for Priority Channel are those channels on which scan is enabled. The priority channel is scanned between all non-priority channels. The priority channel is also scanned during periods of non-priority channel activity. If a non-priority channel is active with a coded signal, then the priority channel is not scanned until the current channel activity stops. The period of time between checks for priority channel activity is indicated by the Priority Recheck Time field on the Advanced Information Screen. If the Floating Priority field does not contain OFF, then the Priority Channel field will be set to FLOAT and become non-editable. The default for Priority Channel is OFF.

TRC Console Feedback

At this time, TRC Console Feedback is a non-editable field. The default value is DISABLED.

Channel Marking

The valid toggle choices are OFF, NORM, PRIORITY or N & P. This feature allows the station to ignore scan channels that have activity but not the correct coded squelch qualifier. This speeds up the scan by not waiting the full Rx Qualify Time (shown on Advanced Information Screen) for a coded squelch detect if the channel has already been marked. Selecting NORM will only enable non-priority channel marking. Selecting PRIORITY will only enable priority channel marking. Selecting N & P will enable both priority and non-priority channel marking. The mark is removed as soon as the channel loses a carrier detect or when another scan channel becomes active and the scan stops. The mark on the priority channel can only be removed by loss of activity on the priority channel. The default for this field is OFF.

Scanning Repeater

At the time of the release of this RSS, there were plans to add the ability of that station to repeat while scanning. Currently, this field has no affect on station operation. **The current released version of SSCB firmware (R5.45, part number 5191012H75) and all previously released versions DO NOT REPEAT WHILE SCANNING.**

Once the Scanning Repeater option is added to the SSCB firmware (no approximate release date at this time), this field **will have** the following function:

The Scanning Repeater field can only be ENABLED if the station is configured as a Repeater (REPEATER OPERATION field in the Station/Model Options Screen is set to ENABLED). If ENABLED, the station will keyup during SCAN when a received singal on one of the scan-enabled channels is detected. If DISABLED, the station will scan as normal, but will not key.

Chan

This is a non-editable field that indicates the channel number. Only those channels which currently exist will be displayed. New channels may not be added from this screen, but they may be added from either the Channel Information screen or the Advanced Information screen.

Mode

This is a non-editable field that indicates to which mode the corresponding channel is slaved. For a complete listing of the characteristics of the mode, return to the Channel Information screen or the Mode Information screen.

Tx Freq / Rx Freq

Editable channel frequencies with all the same range checking as on the channel screen.

Audio

This field indicates which rf tray's receiver audio is used for each channel. The valid toggle choices are R1 or R2. This value is also reflected in a non-editable field on the Channel Information screen. This field is non-editable if the Frequency Range for R2 Tray field on the Model Options screen contains DISABLED.

Scan

The valid toggle choices are ENABLED or DISABLED. This field indicates whether or not each channel should be scanned. There must be at least two channels enabled or all channels disabled before leaving the screen in order to assure proper station operation.

Tx Slave

The valid toggle choices are ENABLED or DISABLED. When the scan stops on a channel with TX Slave enabled, the transmitter channel number is immediately changed to the scan channel. When the scan stops on a channel with TX Slave disabled, the transmitter channel number is not changed. The default for the TX Slave field is DISABLED.

5.5. Advanced Information (F6)

Pressing **F6** at the CHANGE / VIEW CODEPLUG DATA MENU will display the Advanced Information Screens (Figure 5.14 – 5.21). These screens contain editable fields for station information that is not channel or mode mapped and that usually do not need to be modified by the user. **Tab** and **BackTab** are used to move the cursor to the next and previous data fields, respectively. **PgUp** and **PgDn** are used to move the cursor between pages. If there is no TTRC codeplug loaded, any corresponding field contains NO TTRC and is non–editable. If there is no secure codeplug, any corresponding field contains NO SECURE and is non–editable. If there is no SAM (Station Access Module) codeplug loaded, any corresponding field contains NO SAM and is non–editable. If there is no SCAN option available or SCAN is not turned on then any corresponding field contains NO SCAN and is non–editable.

Each entry in the advanced information screens is described below.

MOTOROLA RADIO SERVICE SOFTWARE MSF MODEL: UHF R2–CONV–RPTR PAGE 01 OF 10 EDIT ADVANCED INFORMATION		<MESSAGE CORRESPONDS TO CURRENT FIELD>
Number of Channels	01	1 < Number of Channels < 15
STATION ALARMS:		
Alarm Tone Frequency	1200	750 Hz < frequency < 1600 Hz
Alarm Tone Duration	125	0 < time < 495 msec
Alarm Tone Gap	125	0 < time < 495 msec
Alarm Word Gap	2000	0 < time < 9998 msec
ID CALLSIGN:		
Auto ID Tone Frequency	0800	750 Hz < frequency < 1600 Hz
Auto ID Delay	005	0 < time < 495 seconds
Auto ID Interval	15	0 < time < 495 minutes
Auto ID Rate	20	5 WPM < rate < 40 WPMCONSOLE
PRIORITY:		
Switch On LPTT	DISABLED	
Line 2 Tx Mix	DISABLED	
Line 4 Tx Mix	DISABLED	

F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
HELP				PRINT PAGE					EXIT

Figure 5.14: Advanced Information Screen #1

Number of Channels

The Number of Channels field indicates the number of operating channels that exist on the station being serviced. This field is non−editable.

5.5.1. Station Alarms

Alarms are a series of beep tones which may be sent down the wireline and/or over the air when any Reverse Wildcard M[illegible]bus bit is active. To specifiy where the alarms are sent, see the Mode Information Screen Information.

Alarm Tone Frequency

The Alarm Tone Frequency field indicates the frequency of the alarm tone beep. The frequency must be an integer between 750 and 1600 Hz. The default is 1200 Hz.

Alarm Tone Duration

The Alarm Tone Duration indicates the length of a station alarm tone. The duration must be an integer between 0 and 495 msec. The default is 125 msec.

Alarm Tone Gap

The Alarm Tone Gap field indicates the amount of quiet time between alarm tones during a given alarm. The tone gap must be an integer between 0 and 495 msec. The default is 125 msec.

Alarm Word Gap

The Alarm Word Gap field indicates the amount of quiet time between consecutive alarms. The word gap must be an integer between 0 and 9998 msec. The default is 2000 msec.

5.5.2. ID Callsign

Auto Id Tone Frequency

This field indicates the frequency at which Auto Id callsigns are transmitted. The frequency must be an integer between 750 and 1600 Hz. The default is 800 Hz.

Auto Id Delay

The Auto Id Delay field indicates the delay period from after a station dekeys until an Id Callsign is transmitted. The delay must be an integer between 0 and 495 seconds. The default is 5 seconds.

Auto Id Interval

The Auto Id Interval field indicates the delay period between Id Callsign transmissions. The delay must be an integer between 0 and 495 minutes. The default is 15 minutes.

Auto Id Rate

The Auto Id Rate field indicates the transmission rate of an Id Callsign. The rate must be an integer between 5 and 40 words per minute. The default is 20 WPM.

5.5.3. Console Priority

Switch On LPTT

The Switch On LPTT field indicates whether or not the Tx source, Line 2 Tx mix and Line 4 Tx mix audio gates change state during a Line Push To Talk. The default is DISABLED. This field is usually enabled when the Console Priority option (C115) is included in the station.

See Appendix D for more information on the audio routing capabilities of the TTRC board.

Line 2 Tx Mix

The Line 2 TX Mix field indicates whether or not the TTRC allows the station's transmit audio to be re-routed out Line 2. The default is DISABLED.

Line 4 Tx Mix

The Line 4 Tx Mix field indicates whether or not the TTRC allows transmit audio to be re-routed out Line 4. The default is DISABLED.

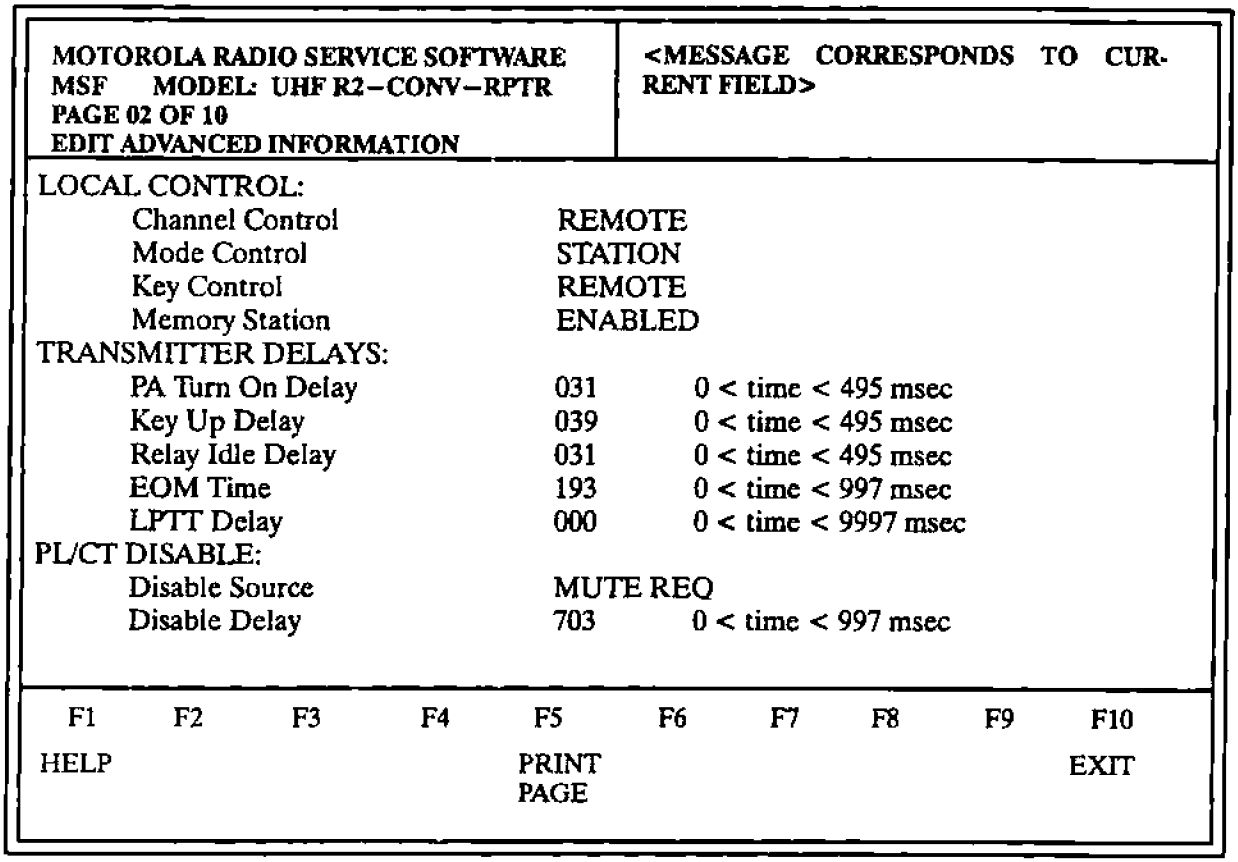


Figure 5.15: Advanced Information Screen #2

5.5.4. Local Control

Channel Control

The Local Channel Control field indicates which control board drives the channel number on the MUXbus. The three choices, STATION, REMOTE, and EXTERNAL, are selected by pressing **Up** or **Down**. STATION indicates that the station control board drives channel number on the MUXbus. STATION is typically used in repeater applications in which there is no console. REMOTE indicates that the TTRC board drives channel number on the MUXbus, and EXTERNAL indicates another external channel control source, typically a Wildcard or Station Access Module (SAM). If no TTRC board is present, REMOTE will not be a choice for this field. The default is REMOTE.

Mode Control

The Local Mode Control field indicates which board drives the mode number on the MUXbus. The three choices, STATION, REMOTE, EXTERNAL, are selected pressing **Up** or **Down**. STATION indicates that the station control board drives mode number on the MUXbus. REMOTE indicates that the TTRC board drives mode number on the MUXbus, and EXTERNAL indicates Wildcard mode control. If no TTRC board is present, REMOTE will not be a choice for this field. The default is STATION.

Key Control

The Local Key Control field indicates which board controls the key number for the station. The choices, STATION and REMOTE, are selected pressing **Up** or **Down**. STATION indicates that the station control board controls the key number. REMOTE indicates that the TTRC module controls the key number. If no TTRC board is present, REMOTE will not be a choice for this field. The default is REMOTE.

Memory Station

The Memory Station field indicates whether or not the channel, mode, and key return to their previous values upon reset or power–up. When disabled, the channel, mode, and key each revert to "1" after reset or power–up. The default is ENABLED.

5.5.5. Transmitter Delays

PA Turn On Delay

The PA Turn On Delay field indicates the time the station waits between antenna relay switching and keying up the PA. This delay must be an integer between 0 and 495 msec. The default is 31 msec.

Key Up Delay

The Key Up Delay field indicates the time the station waits before checking for errors while the PA attempts to reach full power. This delay must be an integer between 0 and 495 msec. The default is 39 msec.

Relay Idle Delay

The Relay Idle Delay field indicates the time the station waits between the PA shutdown and releasing the antenna relay. The delay must be an integer between 0 and 495 msec. The default is 31 msec.

EOM Time

The EOM (End of Message) Time field indicates the time the station stays keyed and generating an EOM signal after a Secure Coded PTT goes away. The EOM Time must be an integer between 0 and 997 msec, inclusive. The default is 193 msec.

NOTE: EOM Time is only editable with SSCB firmware version 5.00 or greater and only affects stations with Secure boards.

LPTT Delay

The LPTT Delay indicates the time the station waits for a Tx Code detect before keying after a wireline key command has been issued. This is used to prevent a secure station from keying in the clear

mode when code follows the TRC keyup sequence. The range for this field is 0 to 9998 msec. The default is 0 msec.

NOTE: LPTT Delay is only editable with TTRC firmware version 5.00 or greater.

5.5.6. PL / CT Disable

The following fields control timed PL or Connect Tone squelch disabling.

Disable Source

The Disable Source field can be toggled between DISABLED, UNSQUELCH and MUTE REQ. DISABLED allows the PL Detect indicator (R1PLDT on the MUXbus) to operate with an actual PL or Connect Tone, as is normally the case. UNSQUELCH forces the PL Detect indicator to be enabled for the Disable Delay Time after any on channel carrier is detected, regardless of receiving the correct PL or Connect Tone. MUTE REQ forces the PL Detect indicator to be enabled for the Disable Delay Time after receiving a pulse on the Mute line from the Trunking Central Controller.

Disable Delay

The Disable Delay field indicates the amount of time that the PL Detect indicator is held active (and therefore the receiver set to CSQ) once the trigger source (defined in the Disable Source field above) activates. If PL is not actually detected within the Disable Delay time, then the PL Detect indicator is deactivated. This delay must be an integer between 0 and 997 msec. The default is 703 msec. If Channel Scanning is enabled, the Disable Delay must be less than the Priority Recheck Time. If the Priority Recheck Time is set to its default of 500 msec, the Disable Delay should be 300 msec.

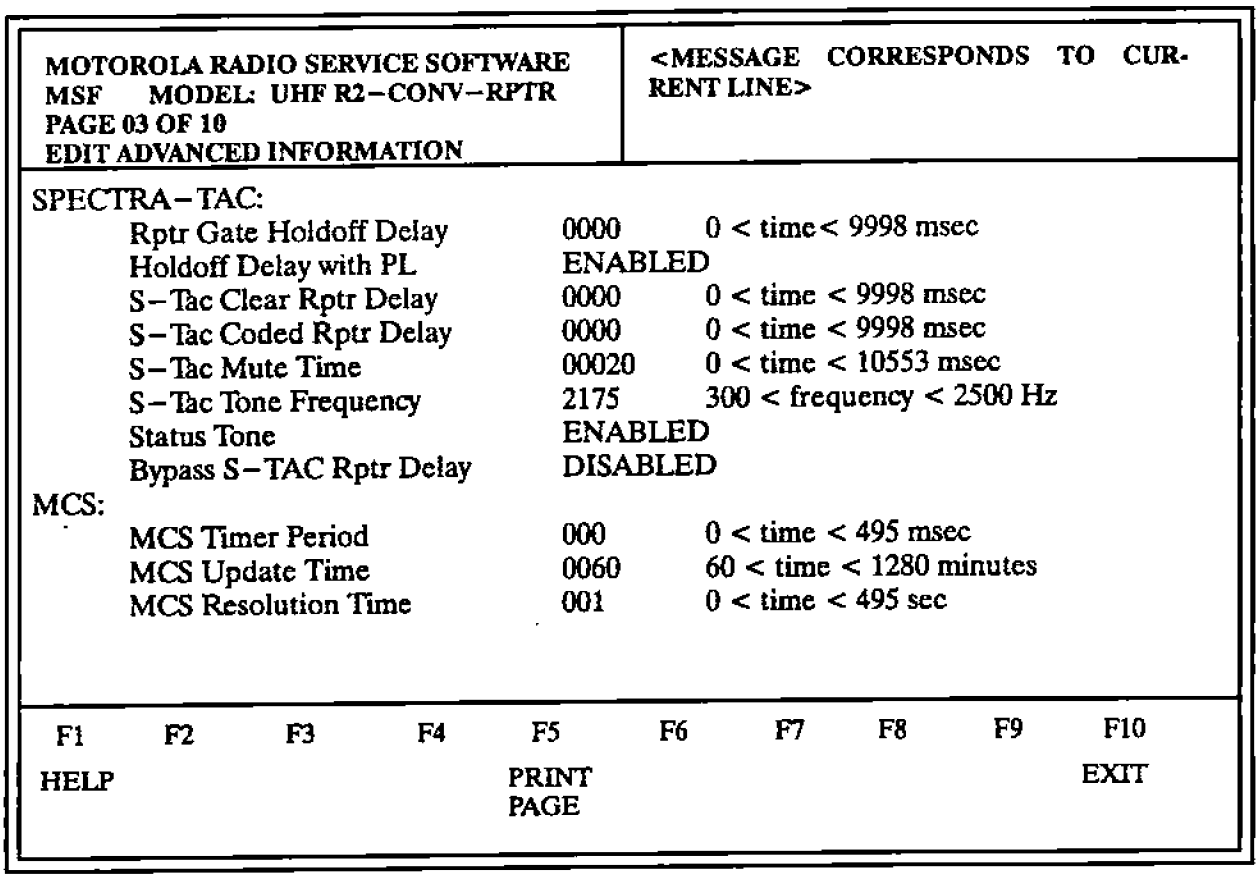


Figure 5.16: Advanced Information Screen #3

5.5.7. *Spectra-TAC*

Rptr Gate Holdoff Delay

The Rptr Gate Holdoff Delay field indicates the delay period between the transmitter (repeater) key-up and when the receiver audio is gated to the modulator for Repeater PTTs (option C587). This delay can be used to prevent repeating data or other audio at the beginning of a transmission. Note that the station does key up during the delay time, but the audio is not gated to the modulator (it is gated to the wireline as usual). The delay must be an integer between 0 and 9998 msec. The default is 0 msec.

Holdoff Delay with PL

When the Holdoff Delay with PL field is ENABLED, the station transmits PL/DPL during the Holdoff Delay. When DISABLED, no PL/DPL is transmitted during the delay. The default is ENABLED.

NOTE: Holdoff Delay with PL is only editable with SSCB firmware version 5.00 or greater.

S-Tac Clear Rptr Delay

The S-Tac Clear Rptr Delay field indicates the delay between satisfying the repeater qualifiers and a clear repeater PTT request. This delay allows time for a Line PTT from a comparator to key the station with voted audio; if no Line PTT is received and the delay time has expired, the station reverts

to a Clear Rptr PTT. The valid range for the S-Tac Clear Rptr Delay is from 0 through 9998 msec. The default is 750 msec for stations with *Spectra-TAC* or Simulcast operation, and 0 msec for all others.

S-Tac Coded Rptr Delay

This delay is similar to the S-Tac Clear Rptr Delay, except that it is used in the coded mode. The S-Tac Coded Rptr Delay field indicates the delay between satisfying the repeater qualifiers and a Coded Repeater PTT request. This delay must be an integer between 0 and 9998 msec. The default is 750 msec for stations with *Spectra-TAC* or Simulcast operation, and 0 msec for all others.

The following table illustrates the way that the S-Tac Clear and Coded Rptr Delay fields should be programmed with different option mixes in the station.

Option Configuration	S-Tac Clear Rptr Delay	S-Tac Coded Rptr Delay
W/O C269	0 msec	0 msec
W/O C269, W/C514 & CSQ	100 msec	0 msec
W/C269 & W/O C514	500 msec	500 msec
W/C269 & W/C514	750 msec	750 msec

S-Tac Mute Time

The S-Tac Mute Time field indicates the amount of time the station mutes all audio to the wireline before starting and ending status tone generation. Values for this field can range from 0 to 10553 msec. The default is 20 msec. This field is usually set to 0 msec in systems using *DigiTac* voting comparators.

S-Tac Tone Frequency

The S-Tac Tone Frequency field indicates the frequency at which a *Spectra-TAC* tone is generated. Values for this field can range from 300 to 2500 Hz. The default is 2175 Hz. This frequency is usually the same as the Guard Tone frequency.

Status Tone

The Status Tone field indicates whether or not the station generates the status tone on the wireline. The default for this field is DISABLED. If *Spectra-TAC* operation is enabled in the station, this field should be ENABLED, in most cases.

Bypass S-TAC Rptr Delay

If the MSF firmware has determined that the wireline link with a S-TAC comparator has gone down, the Bypass S-TAC Rptr Delay field, when ENABLED, allows the firmware to bypass the time delay windows that are set at the Spectra-TAC Clear/Coded Repeater Delay fields. This allows the MSF base station to operate as a repeater with zero delay between the receiver and the transmitter at the same base station. The Bypass S-TAC Rptr Delay field defaults to DISABLE.

5.5.8. Multi-Coded Squelch (MCS)

MCS Timer Period

The MCS Timer Period field indicates the time between repeater DOD and the MCS hit accumulator being incremented. This time must be an integer between 0 and 495 seconds. The default is 0 seconds,

which results in each PL detection being counted as an access to the station (a "hit"). If this time is lengthened, a conversation time is defined, during which all accesses to the station are counted as the same hit.

MCS Update Time

The MCS Update Time field indicates how often the station updates the EEPROM's accumulated Air Usage Time and the Hit Accumulator values. This time must be an integer between 60 and 1280 seconds. The default is 60 seconds.

MCS Usage Time

The MCS Usage Time field indicates the resolution of air–time accumulators. This time must be an integer between 0 and 495 seconds. The default is 1 second.

MOTOROLA RADIO SERVICE SOFTWARE MSF MODEL: UHF R2–CONV–RPTR PAGE 04 OF 10 EDIT ADVANCED INFORMATION	<MESSAGE CORRESPONDS TO CURRENT LINE>

TRUNKING FAILSOFT:		
Failsoft	ENABLED	
Failsoft Tone Duration	00280	0 < time< 10553 msec
Failsoft Tone Interval	09700	0 < time < 10553 msec
Failsoft Tone Frequency	0900	300 < frequency < 2000 Hz
Trunking Tickle Source	TX DATA	
Failsoft Time Out Time	0001	0 < time < 5400 seconds
Failsoft Line	DISABLED	
Site Failsoft Mode	FS	Failsoft
Failsoft Carrier Squelch	DISABLED	
TSTAT DOD	00300	0 < time < 10553 msec

F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
HELP				PRINT PAGE					EXIT

Figure 5.17: Advanced Information Screen #4

5.5.9. Trunking Failsoft

Failsoft

The Failsoft field indicates whether or not the TTRC activates failsoft. The default is ENABLED. Note that the setting of this field has no meaning unless the station is set for trunking (see the Station Model / Options screen, Section 5.7.). In other words, the station will only enter the failsoft condition if it is programmed as a trunked station, **regardless** of how this field is set. In a trunked, Simulcast systems, Failsoft should be DISABLED.

Failsoft Tone Duration

The Failsoft Tone Duration field indicates the length of time a failsoft tone is generated. Values for this field can range from 0 to 10553 msec. The default is 280 msec.

NOTE: Failsoft Tone Duration is only editable with TTRC firmware version 4.00 or below.

Failsoft Tone Interval

The Failsoft Tone Interval field indicates the length of quiet time between each failsoft tone generation. Values for this field can range from 0 to 10553 msec. The default is 9700 msec.

NOTE: Failsoft Tone Interval is only editable with TTRC firmware version 4.00 or below.

Failsoft Tone Frequency

The Failsoft Tone Frequency field indicates the frequency at which a failsoft tone is generated. Values for this field can range from 300 to 2000 Hz. The default is 900 Hz.

NOTE: Failsoft Tone Frequency is only editable with TTRC firmware version 4.00 or below.

Trunking Tickle Source

The Trunking Tickle Source field determines whether the input to Trunking Tickle Source should come from Tx Data Line or Mute Line. If it comes from the Mute Line (option C462, Privacy Plus Slow Failsoft) then Trunking Tickle Source is MUTE; if it comes from the Tx Data Line (option C553, Smartnet Fast Failsoft) then Trunking Tickle Source is TX DATA.

Failsoft Time Out Time

The Failsoft Time Out Time field indicates the length of time before initiating a tickle. Values for this field can range from 0 to 5400 sec. The default is 1 second, for use with a Trunking Tickle Source of TX DATA. If the Trunking Tickle Source is changed to MUTE, this field should be changed to 72 seconds.

Failsoft Line

The Failsoft Line field indicates whether or not the TTRC generates Guard Tone on the receive line during failsoft. The default is DISABLED. This field is typically enabled when the Console Priority option (C115) is included in the station.

Site Failsoft Mode

The Site Failsoft Mode field controls the station mode of operation when the station's Site Failsoft external input is active (low). This field toggles between the Failsoft mode (FS) ,Trunking and Failsoft mode (TR & FS) and Simulcast Site Failsoft mode (SIMUL FS). The Site Failsoft Mode of operation is used for repeater in-cabinet-repeat in a trunked voting system. When FS is chosen, the repeater mutes the audio lines to and from the comparator and in-cabinet repeats when failsoft occurs and the site failsoft input on the system connector is active. When TR & FS is selected, the station in-cabinet repeats as described above in both failsoft and trunking modes. When SIMUL FS is selected, the station is forced into Failsoft when the Site Failsoft input is activated. It in-cabinet repeats as described above. This selection is normally used for simulcast trunking systems with manual or automatic Site Failsoft.

See Appendix C for more information on the use of Site Failsoft.

Failsoft Carrier Squelch

The Failsoft Carrier Squelch field indicates whether or not the station is forced to go Carrier Squelch during failsoft operation. The default is DISABLED.

NOTE: Failsoft Carrier Squelch is only editable with SSCB firmware version 5.00 or greater.

TSTAT DOD

This field will only be used by the station if the TTRC firmware is version R5.29 or greater. The TSTAT DOD field is NON–EDITABLE if the TTRC version is less than 5.00.

The TSTAT DOD (Drop–Out–Delay) determines the amount of time that the TSTAT signal on the Trunking Connector (Pin 10 on J2901) remains active after TX Data (Transmitter Data) ceases (for any reason). This gives the Central Controller an indication that the station is not receiving a TX Data signal, so that it will not assign trunking subscriber units to the partcular station.

For example: The TSTAT DOD field is set to 300 msec. If for some reason TX Data ceases, but resumes within 300 msec (before the TSTAT DOD time expired), no change in the TSTAT signal would occur (assuming that forward/reflected power levels are alright). The TSTAT signal would still be ACTIVE. If TX Data ceases for for more than 300 msec (ie. a line became disconnected), the TSTAT signal would become INACTIVE, and remain there until TX Data resumes and the station is keyed successfully.

The TSTAT on the Trunking Connector is not the same as the TSTAT on the MUXBus (Address 13, D0). It is possible for the TSTAT signal to fail even though the MUXBus is not indicating a problem, since the MUXbus alarm does not look at TX Data detection in order to activate.

The default value for the TSTAT DOD is 300 milliseconds.

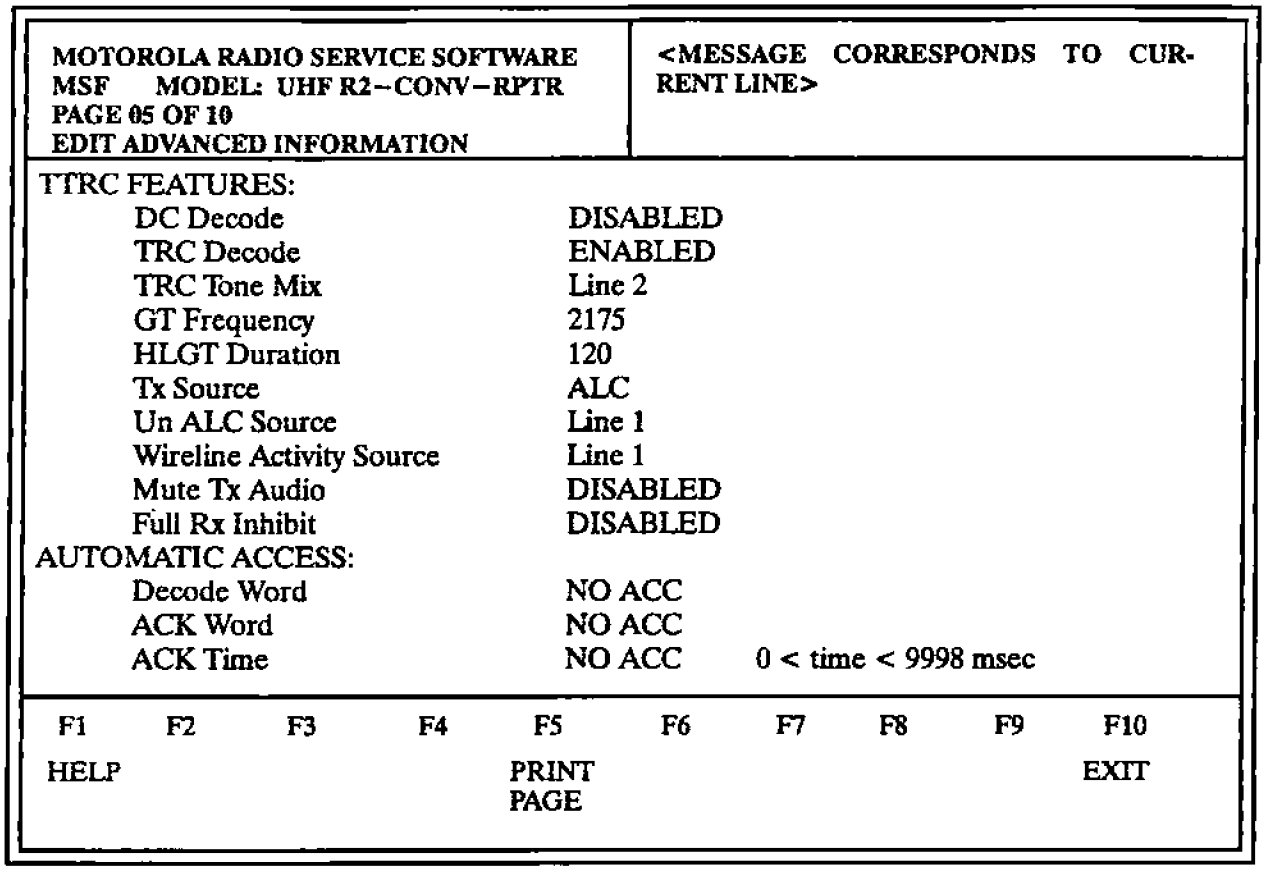


Figure 5.18: Advanced Information Screen #5

5.5.10. TTRC Features

DC Decode

The DC Decode field indicates whether or not the TTRC activates its DC Remote detector. The default is DISABLED.

TRC Decode

The TRC Decode field indicates whether or not the TTRC activates its TRC decoder. The default is ENABLED.

TRC Tone Mix

The TRC Tone Mix field determines whether encoded TRC tones should be routed to Line 2 or Line 4. The default is Line 2.

GT Frequency

The GT (Guard Tone) Frequency field indicates the frequency at which a Guard Tone is encoded and decoded. The GT Frequency is usually set to the same value as the Status Tone frequency. Values for this field can be toggled. The default is 2175 Hz. The three other toggle choices are 2100 Hz, 2325 Hz, and 2432 Hz.

HLGT Duration

The HLGT Duration field indicates the length of time a High Level Guard Tone is encoded and decoded. Values for this field can be toggled between 120 msec and 60 msec. The default is 120 msec for conventional stations, and 60 msec for trunking stations.

Tx Source

The Tx Source field determines whether the input to Tx Source should come from ALC audio or UN ALC audio. Default depends on station configuration.

See Appendix D for more information on the audio routing capabilities of the TTRC board.

UN ALC Source

The UN ALC Source field determines whether the input to UN ALC Source should come from Line 1 or Line 3. Default depends on station configuration.

See Appendix D for more information on the audio routing capabilities of the TTRC board.

Wireline Activity Source

The Wireline Activity Source field determines if the input to the wireline activity detector is Line 1 or Line 3. Default is Line 1. This field is used on some configurations of the *MSF 10000* station.

Mute Tx Audio

The Mute Tx Audio field allows muting of Tx Audio when no activity is present on the wireline defined in the Wireline Activity Source field (above). Default is DISABLED.

Full Rx Inhibit

The Full Rx Inhibit field determines where Receiver Wireline is muted when the RX_INH bit is active on the MUXBus.

When Full Rx Inhibit is DISABLED, the MUXBus RX_INH bit mutes Receiver Audio to the Receiver Wireline, but Status Tone, encoded tones, and alarms are not muted.

When ENABLED, the MUXBus RX_INH bit mutes **all** audio to the Receiver Wireline.

NOTE: Full Rx Inhibit feature is only present in TTRC firmware versions 5.00 or greater. If the TTRC version is less than 5.00, the Full Rx Inhibt field is DISABLED and non-editable.

5.5.11. Automatic Access

Automatic Access is a trunking software option (C816). When trunking subscriber units are out of range of the trunking system, they can scan conventional repeaters until an Automatic Access Repeater is found. Automatic Access allows conventional repeaters to react to Automatic Access interrogations by trunking subscriber units. An interrogation is a 300 ms DPL burst called the Decode Word. The station responds to the interrogation with a 700 ms (programmable) DPL burst called the Ack Word. Once the trunking subscriber unit has decoded the acknowledge, it uses the current station mode's PL for voice conversations.

NOTE: ONLY DPL codes are allowed for the Decode and Ack Words.

NOTE: The Automatic Access fields are only editable with SSCB firmware version 4.00 or greater.

Decode Word

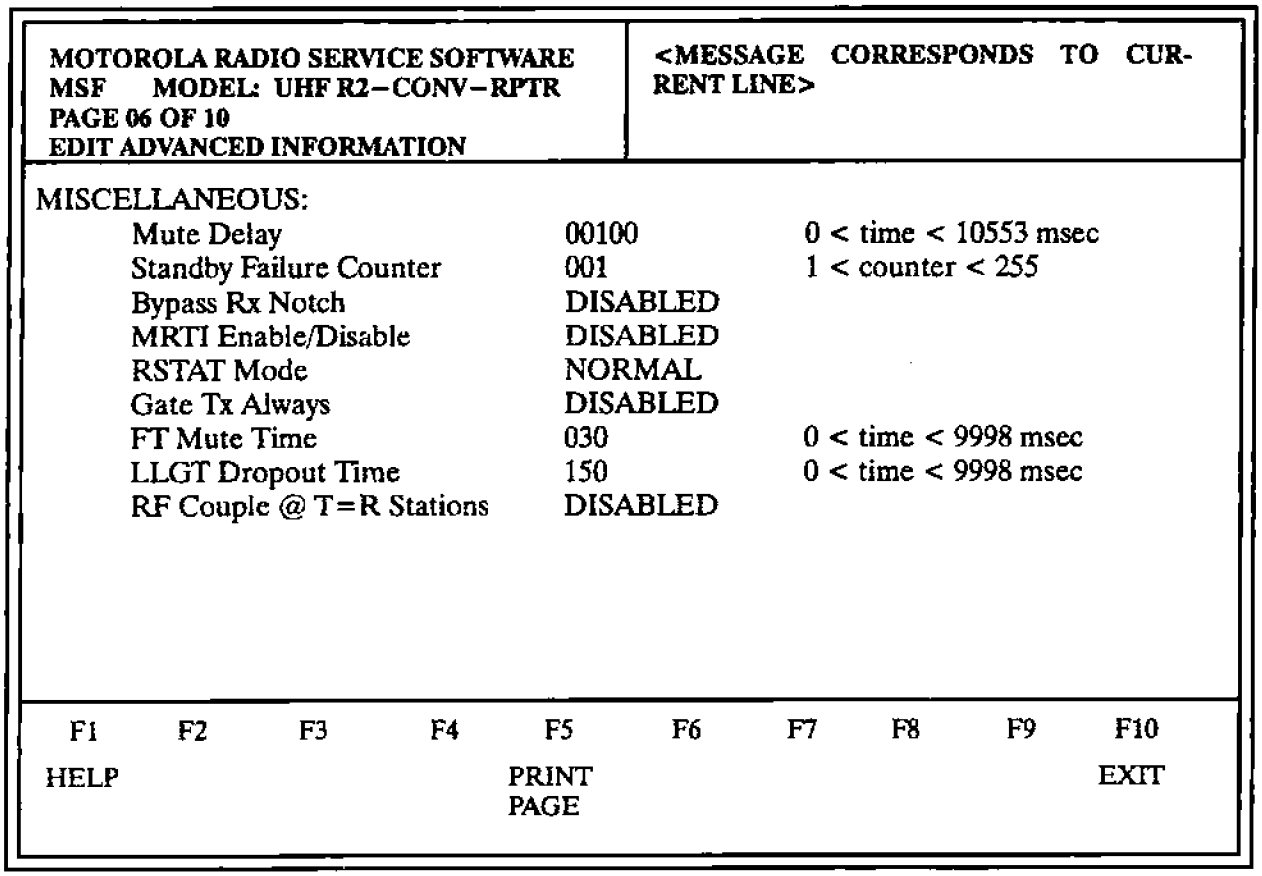
The Decode Word defines the DPL code that the station will accept to allow for Automatic Access. This field accepts all valid DPL codes and NO ACC. If this field is set to NO ACC then the Automatic Access feature is disabled. If the Decode Word is changed from NO ACC to a valid DPL code, the ACK Word is set to the same DPL code and the ACK Time is set to 703 msec. If this field is changed to NO ACC then the ACK Word and ACK Time fields are changed to NO ACC and are non-editable.

ACK Word

The ACK Word is the DPL code that the station transmits after receiving and decoding a valid Decode Word. If the Decode Word is set to NO ACC then this field is non-editable and will display NO ACC. If the Decode Word is set to a DPL Code then this field accepts all valid DPL codes.

ACK Time

The ACK Time defines the length of time the station transmits the ACK Word after receiving and decoding a valid DPL code. If the Decode Word is set to NO ACC then this field is non-editable and will display NO ACC. If the Decode Word is set to a DPL Code then this field has a range of 0 to 9998 msec.



MOTOROLA RADIO SERVICE SOFTWARE MSF MODEL: UHF R2-CONV-RPTR PAGE 06 OF 10 EDIT ADVANCED INFORMATION	<MESSAGE CORRESPONDS TO CURRENT LINE>

MISCELLANEOUS:

Mute Delay	00100	0 < time < 10553 msec
Standby Failure Counter	001	1 < counter < 255
Bypass Rx Notch	DISABLED	
MRTI Enable/Disable	DISABLED	
RSTAT Mode	NORMAL	
Gate Tx Always	DISABLED	
FT Mute Time	030	0 < time < 9998 msec
LLGT Dropout Time	150	0 < time < 9998 msec
RF Couple @ T=R Stations	DISABLED	

F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
HELP				PRINT PAGE					EXIT

Figure 5.19: Advanced Information Screen #6

5.5.12. Miscellaneous

Mute Delay

The Mute Delay field indicates the minimum mute active time required to activate arbitrated mute. Arbitrated mute is the amount of time that the mute input signal from the trunking central controller must stay active before the station actually mutes. Values for this field can range from 0 to 10553 msec. The default is 100 msec.

Standby Failure Counter

The Standby Failure Counter field indicates the number of failures before the Standby station becomes the active station in a Main/Standby system. Values for this field can range from 1 to 255. The default is 1.

Bypass Rx Notch

The Bypass Rx Notch field indicates whether or not the TTRC bypasses the receiver guard tone notch filter. Whenever the Status Tone is ENABLED, the Bypass Rx Notch field should be set to DISABLED. The default is DISABLED (not bypassed).

MRTI Enable/Disable

The MRTI Enable/Disable field indicates if the station is equipped with a phone patch. It allows a MRTI phone patch to be accessed via its connector (J802) on the station control board. The default is DISABLED.

RSTAT Mode

The RSTAT Mode field can be toggled between NORMAL and DUAL CT. NORMAL indicates that RSTAT will go active upon receiver unsquelch. DUAL CT (Dual Connect Tone) indicates that RSTAT will go active upon connect tone detect. Dual Connect Tone is used in trunked systems that contain more than one connect tone. The default is NORMAL.

NOTE: RSTAT Mode is only editable with SSCB firmware version 5.00 or greater.

Gate Tx Always

The Gate Tx Always field allows line audio to always be gated to the modulator when ENABLED. This feature is usually used in secure trunked systems that do not contain a CIU (Console Interface Unit). It is ENABLED with option C415 (Omit Status Tone with Transparent Station). The default is DISABLED.

NOTE: Gate Tx Always is only editable on SSCB firmware version 5.00 or greater.

FT Mute Time

The FT (Function Tone) Mute Time is the amount of time that Tx audio is muted after a TRC key command. This time is used to prevent High Level Gaurd Tone or Function Tones from being transmitted over the air. The range for this field is 0 to 9998 msec. The default is 30 msec.

NOTE: The FT Mute Time field is only editable with TTRC firmware version 5.00 or greater.

LLGT Dropout Time

The LLGT (Low-Level Guard Tone) Dropout Time is the time that the station must lose detection of low-level guard tone before it de-keys. Values for this field range from 0 to 9998 msec. The default is 150 msec.

RF Couple @ T=R Stations

When ENABLED, the receiver will stay unmutted at T=R stations, allowing transmitted data to be received and sent out on line 2.

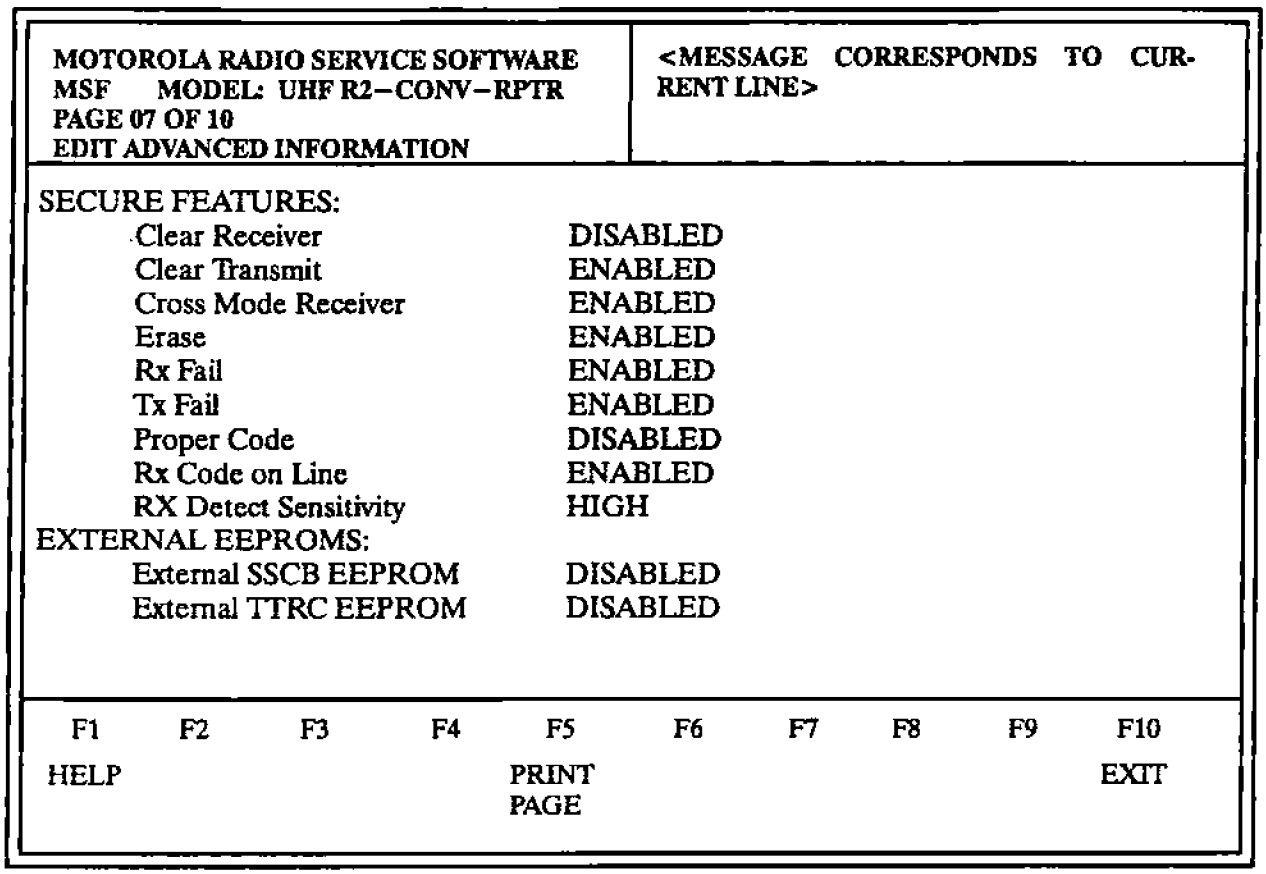


Figure 5.20: Advanced Information Screen #7

5.5.13. Secure Features

Clear Receiver

The Clear Receiver field indicates whether or not an 87 ms beep is ENABLED when receiving clear audio in an encode/decode station. The default is DISABLED.

Clear Transmit

The Clear Transmit field indicates whether or not an 87 ms beep is ENABLED when transmitting clear audio in an encode/decode station. The default is ENABLED.

Cross Mode Receiver

The Cross Mode Receiver field indicates whether or not an 87 ms beep is ENABLED when receiving clear audio and the Tx wireline is coded in an encode/decode station. The default is ENABLED.

Erase

The Erase field indicates whether or not a continuous tone is ENABLED when the key reset line is active in an encode/decode station. The default is ENABLED.

Rx Fail

The Rx Fail field indicates whether or not a 750 Hz tone is ENABLED when current key has failed and station is receiving a coded signal in an encode/decode station. The default is ENABLED.

Tx Fail

The Tx Fail field indicates whether or not a 750 Hz tone is ENABLED when current key has failed and user is attempting to transmit a coded signal in an encode/decode station. The default is ENABLED.

Proper Code

The Proper Code field indicates whether or not the decrypted secure audio is routed to the wireline when the received code does not match the key loaded into the station. The default is DISABLED. Setting this field to ENABLED mutes all coded receiver audio unless the key used in the encryption process matches the one in the station.

Rx Code on Line

The Rx Code on Line controls whether or not received code is routed to the wireline. The default for this field is ENABLED. This field is DISABLED with option C415 (Transparent Operation without Status Tone). This mutes all coded receiver audio from the wireline.

Rx Detect Sensitivity

Allows the user to control the sensitivity of receiver code detection. The default setting is HIGH. HIGH allows a greater sensitivity than MEDIUM, but also creates a greater chance of false code detects, or "falsing". LOW requires a stronger signal than MEDIUM, with a lower chance of "falsing". If the field says CUSTOM, the programmed sensitivity values in the codeplug are not standard values. Once the field has been changed from CUSTOM, the values cannot be recalled.

5.5.14. External EEPROMs

External SSCB EEPROM

The External SSCB EEPROM field indicates if the station control board is equipped with an external serial EEPROM. The default is DISABLED.

External TTRC EEPROM

The External TTRC EEPROM field indicates if the TTRC control board is equipped with an external serial EEPROM. The default is DISABLED.

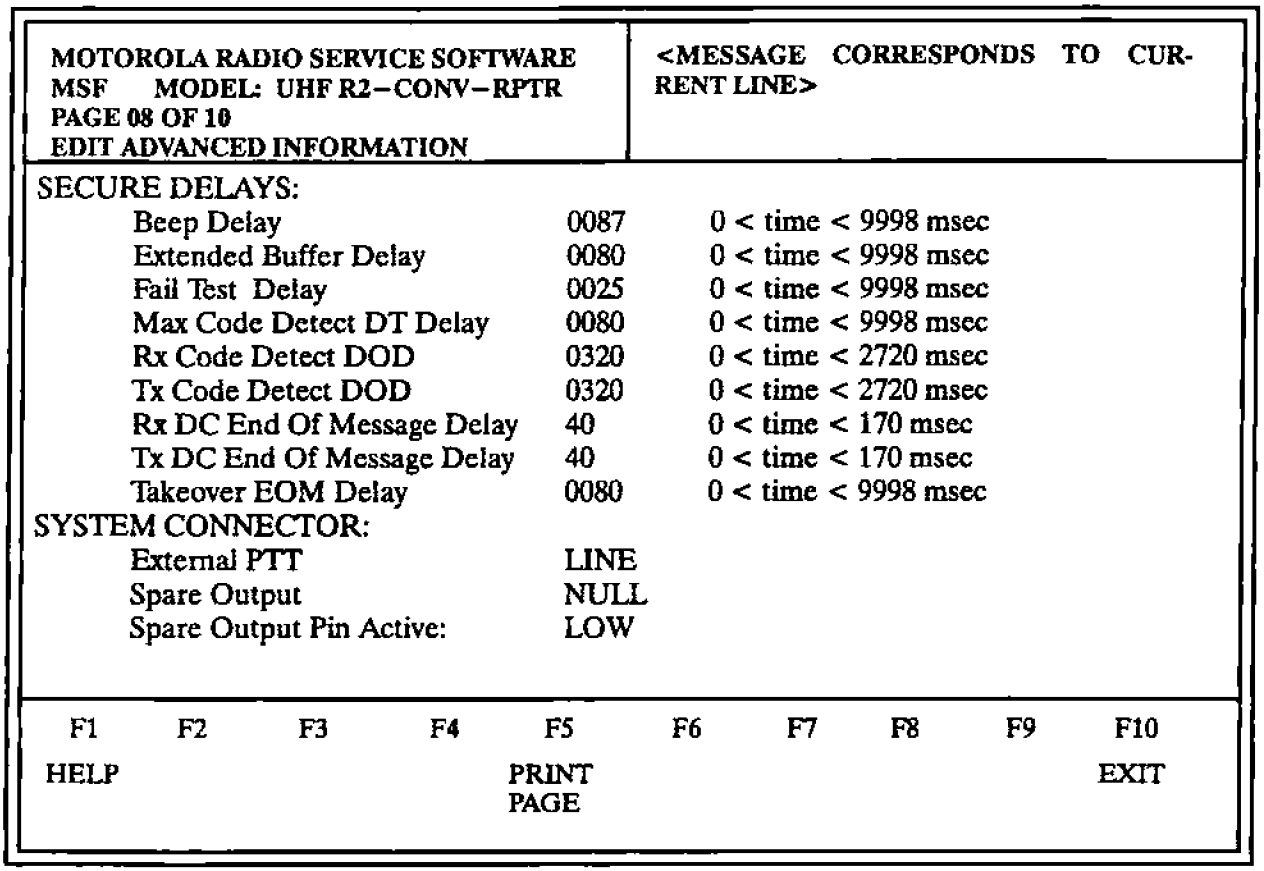


Figure 5.21: Advanced Information Screen #8

5.5.15. Secure Delays

******* WARNING *******

CHANGES ARE NOT RECOMMENDED IN THE FOLLOWING FIELDS. CHANGES WILL IMPACT SYSTEM OPERATION.

Beep Delay

The Beep Delay field indicates the length of time to unmute a 750 Hz tone. The time must be an integer between 0 and 9998 msec. The default is 87 msec.

Extended Buffer Delay

The Extended Buffer Delay field indicates the length of the extended buffer. The delay must be an integer between 0 and 9998 msec. The default is 80 msec.

Fail Test Delay

The Fail Test Delay field indicates the length of time to wait for hybrid failure indication. The delay must be an integer between 0 and 9998 msec. The default is 25 msec.

Max Code Detect DT Delay

The Max Code Detect DT Delay field indicates the maximum time to achieve a code detect. The delay must be an integer between 0 and 9998 msec. The default is 80 msec.

Rx Code Detect DOD

The Rx Code Detect DOD field indicates the delay while waiting for the Rx_Code_Detect to re-activate. The delay must be an integer between 0 and 2720 msec. The default is 320 msec.

Tx Code Detect DOD

The Tx Code Detect DOD field indicates the delay while waiting for the Tx_Code_Detect to re-activate. The delay must be an integer between 0 and 2720 msec. The default is 320 msec.

Rx DC End Of Message Delay

The Rx DC End of Message Delay field indicates the length of time to generate EOM for receiver DC glitch. The time must be an integer between 0 and 170 msec. The default is 40 msec.

Tx DC End Of Message Delay

The Tx DC End of Message Delay field indicates the length of time to generate EOM for wireline DC glitch. The time must be an integer between 0 and 170 msec. The default is 40 msec.

Takeover EOM Delay

The Takeover EOM Delay field indicates the length of time to generate EOM coded takeover. The delay must be an integer between 0 and 9998 msec. The default is 80 msec.

5.5.16. System Connector

External PTT

The External PTT field indicates which bit on the MUXbus will be activated when the External PTT input to the station is activated. The External PTT input is pin 12 of the System Connector (J2 on the Junction Box), and is active low. To set a MUXbus bit in response to the External PTT Input, enter MUX, followed by A (indicating the address), followed by the MUXbus address (0-F), followed by B (indicating the bit), followed by the bit number to set (0-3). For example, MUXA2B3 sets bit 3 of MUXbus address 2 (TX PL DS) when the External PTT Input is active, and clears the bit when the input is inactive. Also, the following inputs are valid: LINE (sets bit 2 of MUXbus address 2), TRNK (sets the Trunking PTT bit on the High Speed Ring), and NULL (sets nothing). Only one command may be entered via the RSS. Some SP stations may use more than one command, in order to set multiple bits on the MUXbus in response to the External PTT Input. When reading a codeplug that contains more than one command, the External PTT field will show MULTIPLE and will be non-editable. The default for this field is TRNK for trunking stations and LINE for all others.

Spare Output

The Spare Output field indicates which bit on the MUXbus or High-Speed Ring (HSR) will be used to activate the Spare Output Pin on the station's Junction Box. The Spare Output is pin 9 of the System Connector (J2 on the Junction Box); see Appendix J for Spare Output Active Polarity. To activate the Spare Output in response to a MUXbus bit being active, enter MUX, followed by A (indicating the address), followed by the MUXbus address (0-F), followed by B (indicating the bit), followed

by the bit number to read (0–3). For example, MUXA2B3 activates the Spare Output when bit 3 of MUXbus address 2 (TX PL DS) is active, and clears the Spare Output when it is inactive. To activate the Spare Output in response to a High Speed Ring (HSR) bit being active, enter HSR, followed by A (indicating the address), followed by the HSR address (0–4), followed by B (indicating the bit), followed by the bit number to read (0–7). For example, HSRA0B5 activates the Spare Output when bit 5 of HSR address 0 (TSTAT) is active, and clears the Spare Output when it is inactive. Also, NULL is a valid input, and it leaves the Spare Output always inactive. Only one command may be entered via the RSS. Some SP station may use more than one command, in order to set the Spare Output when a combination of MUXbus and/or HSR bits are active. When reading a codeplug that contains more than one command, the Spare Output field will show MULTIPLE and will be non–editable. The default for this field is NULL.

See the *MSF 5000* User Manual for a complete description of the MUXbus and High Speed Ring.

Spare Output Pin Active

The Spare Output Pin Level field indicates the "active" polarity level of the spare output signal sent to the Junction Box connector at J2 pin 9. This signal can also be tapped at the TTRC board at J2900 pin 9. The active polarity can be toggled either active HIGH or LOW by means of the UP/DOWN arrow keys. The Spare Output Pin Level field defaults to active LOW.

MOTOROLA RADIO SERVICE SOFTWARE MSF MODEL: UHF R2–CONV–RPTR PAGE 09 Of 10 EDIT ADVANCED INFORMATION	<MESSAGE CORRESPONDS TO CURRENT FIELD>

SCANNING RECEIVER:		
Non–Priority Scan Delay	3000	0 < time < 9998 msec
Priority Scan Delay	3000	0 < time < 9998 msec
Scan Sample Time	0090	0 < time < 9998 msec
Priority Recheck Time	0300	0 < time < 9998 msec
Rx Qualify Time	0347	0 < time < 9998 msec
SAM:		
Rx Loopback Frequency	435.10000	
Tx Loopback Frequency	436.12345	
Diversity Equipped	DISABLED	
GCC–480 Equipped	DISABLED	
Gate Data Always	ENABLED	
MDC Pretime Bit Sync	DISABLED	
Inactivity Delay	000000	0 < delay < 357913 minutes

F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
HELP				PRINT PAGE					EXIT

Figure 5.22: Advanced Information Screen #9

5.5.17. Scanning Receiver Delays

Non–Priority Scan Delay

The Non–Priority Scan Delay field indicates the amount of time that the scan waits after losing non–priority channel activity before resuming the scan. If channel activity resumes before the timer expires, the timer will reset. The valid range is from 0 to 9998 msec. The default value is 2999 msec.

NOTE: All Scanning Receiver fields are only editable on SSCB firmware version 5.00 or greater.

Priority Scan Delay

The Priority Scan Delay field indicates the amount of time that the scan waits after losing priority channel activity before resuming the scan. The valid range is from 0 to 9998 msec. The default value is 2999 msec.

Scan Sample Time

The Scan Sample Time field indicates the length of time that a channel is checked for activity. The valid range is from 0 to 9998 msec. The default for a non–secure station is 30 msec. The default for a secure station is 90 msec.

Priority Recheck Time

The Priority Recheck Time field indicates the interval for which a priority channel is checked while a non–priority channel is active. The Priority Recheck Time must be greater than the Disable Delay. If Priority Recheck Time is set to its default of 301 msec then the default value for the Disable Delay should be 250 msec. The valid range for the Priority Recheck Time field is 0 to 9998 msec.

Rx Qualify Time

The Rx Qualify Time field indicates the time allowed for PL or code detect after a carrier is detected. The valid range for this field is 0 to 9998 msec. The default is 348 msec.

5.5.18. SAM (Station Access Module)

Applicable RSS Versions

The SAM codeplug is supported in the MSF 5000 Radio Service Software from Version 5.16.00 and up. RSS versions below 5.16.00 will only support the RAC codeplug which preceded the SAM codeplug.

Rx Loopback Frequency

The Rx Loopback Frequency field contains the Rx frequency (in MHz) to be used during an RF Loopback test. There must be a version 2.00 or greater SAM codeplug and a version 5.00 or greater SSCB codeplug loaded in order for this field to be editable. If the SSCB codeplug is not 5.00 or greater, the Rx Loopback field contains DISABLED and is non–editable. The Rx Loopback Frequency field contains NO SAM and is non–editable if a version 5.00 or greater SSCB codeplug is present, but there is not a version 2.00 or greater SAM codeplug present.

The Rx Loopback Frequency has the same ranges and error checking as the Channel Frequencies with the following constraints:

The Rx Loopback Frequency must be set to one half channel below the Channel 1 Rx frequency and MUST NOT be a multiple of 4.8 MHz. If one half channel below the Channel 1 Rx frequency is a multiple of 4.8 MHz, then one and one half channels below the Channel 1 Rx frequency should be entered in the Rx Loopback Frequency field. For example:
If the Channel 1 Rx frequency is 450.0000 MHz and the channel spacing is 25 kHz (.025 MHz), the Rx Loopback Frequency to be entered is 449.9875.

Rx Loopback Frequency = Channel 1 Rx frequency − (.5 x Channel Spacing)

Tx Loopback Frequency

The Tx Loopback Frequency field contains the Tx frequency (in MHz) to be used during an RF Loopback test. There must be a version 2.00 or greater SAM codeplug and a version 5.00 or greater SSCB codeplug loaded, in order for this field to be editable. If the SSCB codeplug is not 5.00 or greater, the Tx Loopback field contains DISABLED and is non−editable. The Tx Loopback Frequency field contains NO SAM and is non−editable if a version 5.00 or greater SSCB codeplug is present, but there is not a version 2.00 or greater SAM codeplug present.

The Tx Loopback Frequency has the same ranges and error checking as the Channel Frequencies with the following constraints:

RF BAND	TX LOOPBACK FREQUENCY
800 MHz	Tx Loopback Freq = Rx Loopback Freq + 43.200 MHz
UHF (5 MHz Tx/Rx Spacing)	Tx Loopback Freq = Rx Loopback Freq + 4.800 MHz
All Others	Tx Loopback Freq = Rx Loopback Freq

Diversity Equipped

When ENABLED the Diversity Equipped field indicates that an RLC (RSSI/Loopback/Combiner) board is present and diagnostics will be performed for two receivers. When DISABLED diagnostics will only be performed for one receiver. The default is DISABLED.

NOTE: Diversity Equipped is only editable with SAM firmware version 2.00 or higher.

GCC−480 Equipped

When ENABLED the GCC−480 Equipped field indicates that the SAM is factory programmed to operate with a GCC−480, General Communications Controller. If a GCC−480 is present in the station, special non−editable I/O functions are found in the SAM Action Table Conditions screen. When DISABLED, SAM will not operate properly with a GCC−480.

NOTE: GCC−480 Equipped is only editable with SAM firmware version 2.00 or higher.

Gate Data Always

When ENABLED the Gate Data Always field indicates that the SAM board will always gate transmit data to the station's modulator. When DISABLED the SAM board will only gate transmit data to the station's modulator when Data PTT is active. The default is ENABLED.

NOTE: Gate Data Always is only editable with SAM firmware version 2.00 or higher.

MDC Pretime Bit Sync

When ENABLED the MDC Pretime Bit Sync field indicates that during the pretime of an encoded MDC message from SAM, the MDC bit sync pattern will be repeatedly transmitted. This bit sync

transmission is in addition to the bit sync which is sent at the beginning of the MDC message, as part of that message, and is intended to cover the time which is needed for the transmitter to come to full power. When DISABLED no bit sync will be sent during the encode pretime. However, bit sync will be sent at the beginning of the MDC message, as part of that message. The default is DISABLED.

NOTE: MDC Pretime Bit Sync is only editable with SAM firmware version 2.00 or higher.

Inactivity Delay

The Inactivity Delay determines the amount of time that a receiver can be inactive before SAM performs a loopback test to verify that the receiver has not failed. The valid range is 0 to 357913 minutes (approximately 248 days). A value of 0 in the Inactivity Delay field indicates an infinite delay.

NOTE: Inactivity Delay is only editable with SAM firmware version 2.00 or higher.

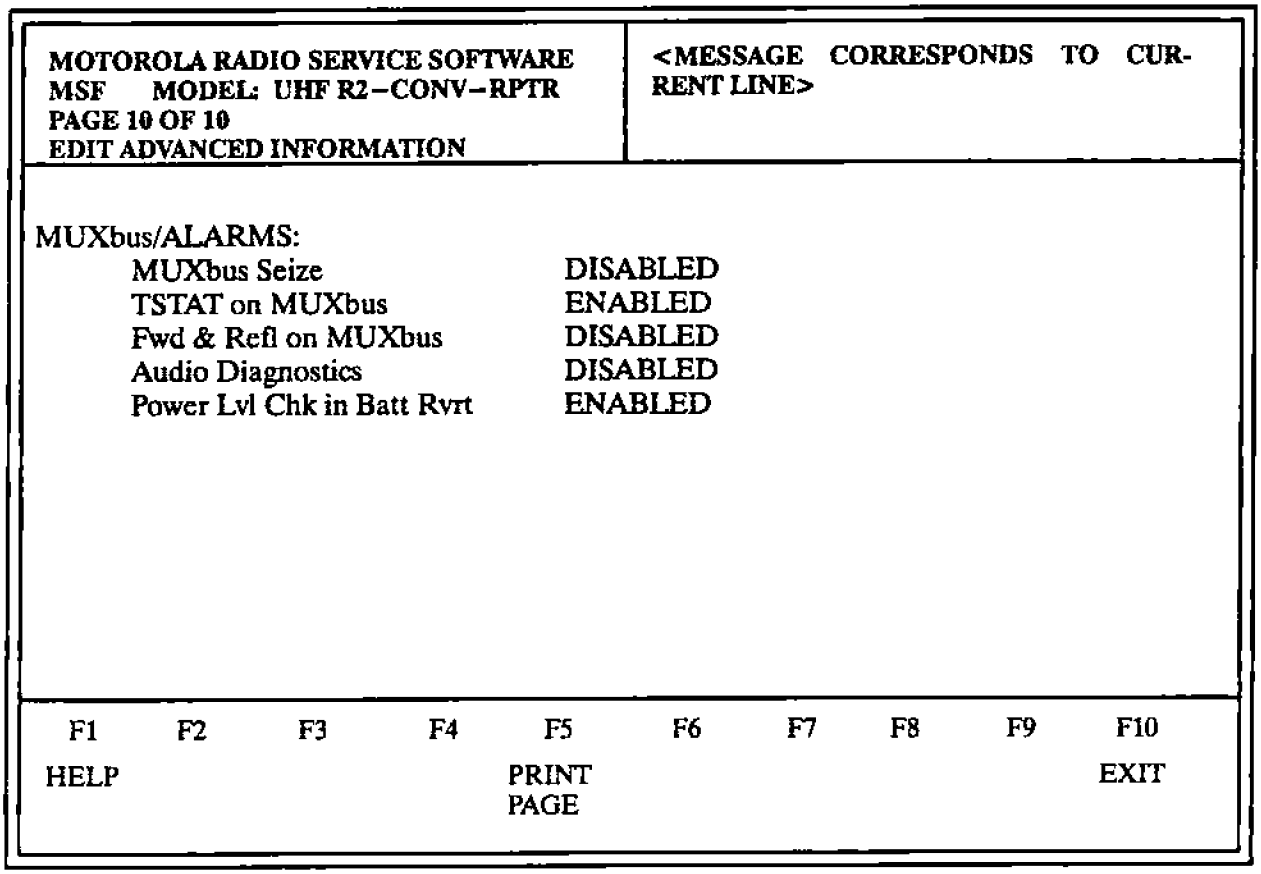


Figure 5.23: Advanced Information Screen #10

5.5.19. MUXbus / ALARMS

MUXbus Seize

The MUXbus Seize field allows the station to use address 10, bit 0 on the MUXbus as a seize/release input for data equipped trunked stations. This input comes from a GCC interface wildcard in a trunking data system. The default is DISABLED.

TSTAT on MUXbus

The TSTAT on MUXbus field indicates whether or not the RWC5 on the MUXbus will indicate a TSTAT failure. TSTAT on MUXbus is ENABLED if the SSCB firmware version is greater than 5.00,

and is DISABLED if it is less than 5.00. RWC5 will indicate a TSTAT failure, should one occur, if TSTAT on MUXbus is ENABLED. This field is non–editable.

Fwd & Refl on MUXbus

The Fwd & Refl (Forward and Reflected) on MUXbus field controls whether RWC7 and RCW6 will indicate forward and reflected power alarms (respectively) on the MUXbus. If ENABLED, these alarms will be indicated on the MUXbus. A watt meter element must be present in the station in order for this feature to work properly. The default is DISABLED.

NOTE: Fwd & Refl on MUXbus is only editable with SSCB firmware version 5.00 or greater.

Audio Diagnostics

The Audio Diagnostics field indicates if Audio Diagnostics are performed on all control boards upon reset. If this field is DISABLED, then Audio Diagnostics are are not performed. Audio Diagnostics can not be disabled unless the SSCB firmware is version 4.00 or greater. The default value is DISABLED.

Power Lvl Chk in Batt Rvrt (Power Level Check in Battery Revert)

The Power Lvl Chk in Batt Rvrt field controls whether the trunking forward and reflected power alarms are issued while the station is operating in the battery revert mode. The default value is ENABLED, which allows the power level checks to be performed. When DISABLED, power level check is NOT performed if station goes into battery revert. This allows the power to be reduced while operating on batteries without issuing a power output alarm.

5.6. SAM (Station Access Module) Menu (F7)

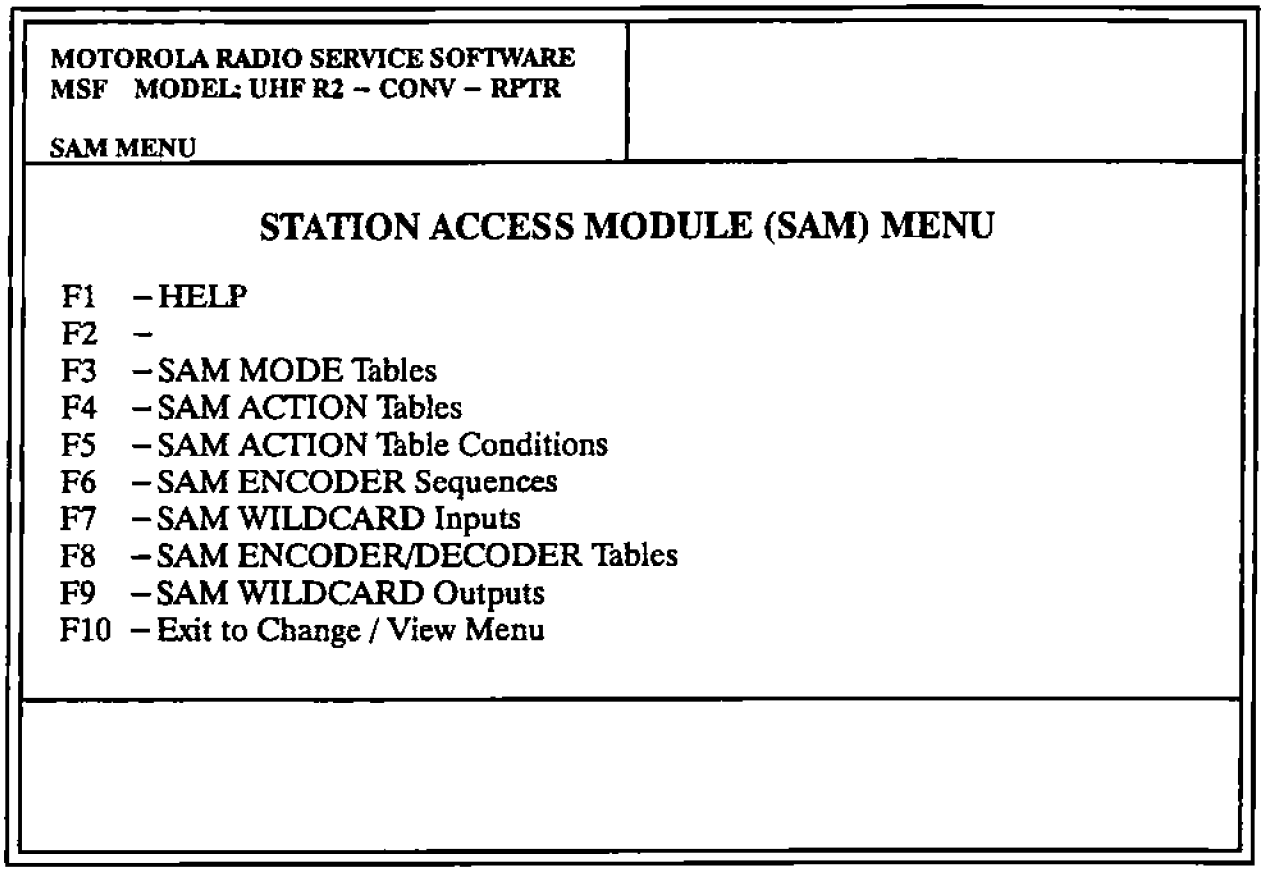


Figure 5.24: SAM Menu

5.6.1. Applicable RSS Versions

The SAM codeplug is supported in the MSF 5000 Radio Service Software from Version 5.16.00 and up. RSS versions below 5.16.00 will only support the RAC codeplug which preceded the SAM codeplug.

5.6.2. Definition of SAM Menu Function Keys

Pressing **F7** at the CHANGE / VIEW CODEPLUG DATA MENU will display the SAM MENU (Figure 5.24). A SAM codeplug must be loaded into the programmer for this function to work. The SAM MENU has nine functions available, which are shown in the Figure above. Each of these functions are described in detail in the following sections.

5.6.3. SAM Screen Interaction

Each SAM Screen is dependent upon information in the other SAM Screens. A discussion of each SAM Screen is continued later in this section. The SAM Screens should be edited in the following

order. Depending upon the application, not all screens need to be edited

A block diagram of these steps is shown below. Data passed between screens is also displayed.

56. Edit the SAM Encode / Decode Tables. These tables contain the parameters for each of the Tone Encoder / Decoder schemes.

57. Edit the SAM Mode Tables to enable the Tone Decoder, Binary Decoder, or DTMF Decoder. The end result of the SAM Mode Table is execution of SAM Action Tables based on decoded messages.

58. Edit the SAM Wildcard Inputs and Outputs Screens. The SAM Wildcard Inputs Screen can cause execution of specific SAM Action Tables and/or predefined Input Responses. The SAM Wildcard Outputs Screen can activate Wildcard Outputs which are dependent on Output Enable Conditions based on conditions in the station.

59. Edit the Action Table Conditions screen. This screen allows actions to be performed based upon MUXbus and / or Alarm conditions.

60. Edit the SAM Action Tables. Each SAM Action Table is composed of individual actions.

61. Edit the SAM Encoder Sequence Table. This table contains all of the SAM Encoder Sequences that may be generated. Tone Sequences that are generated use Tone Encoder parameters from the SAM Encode / Decode Tables. SAM Encoder Sequences can be called from one or more actions in the SAM Action Tables.

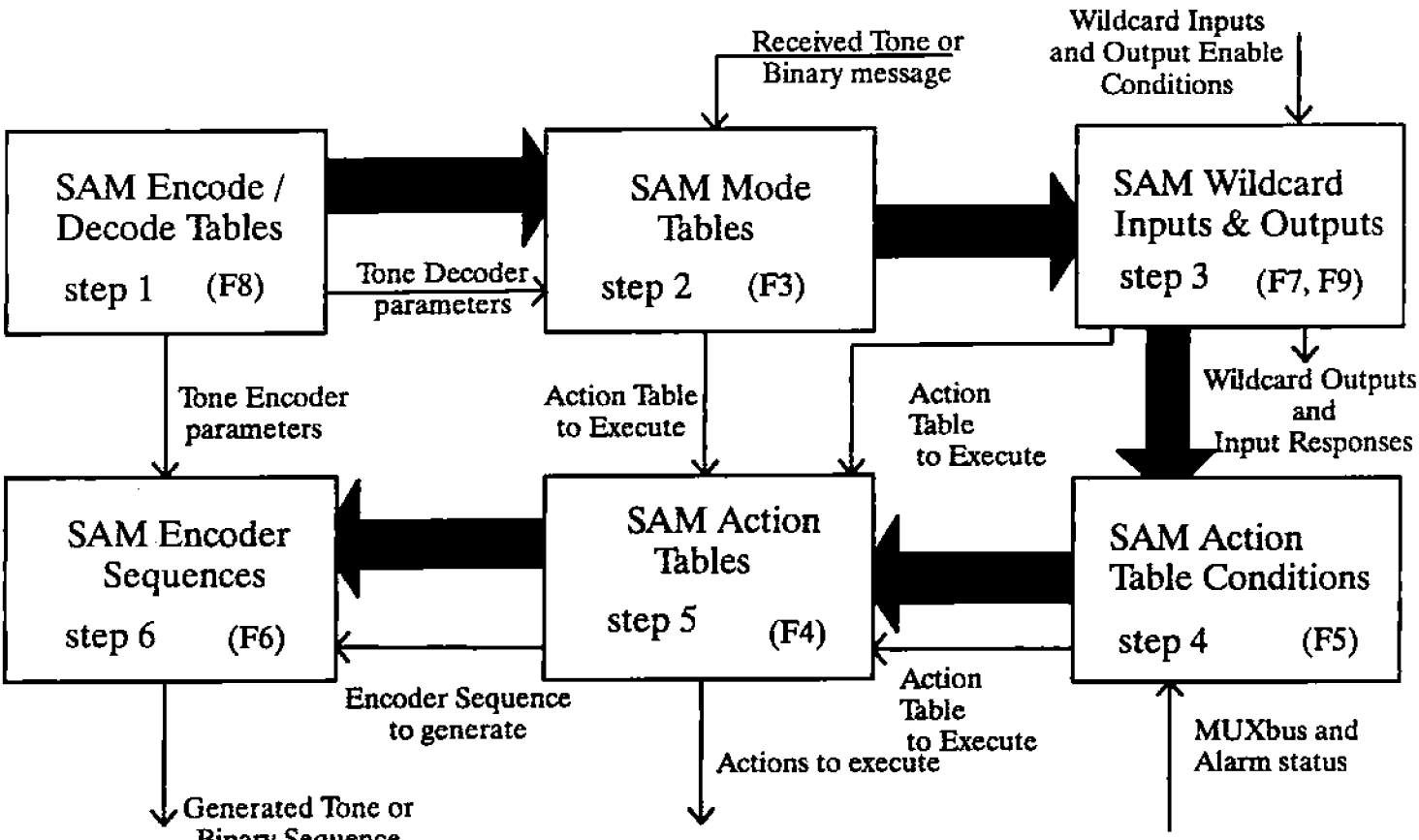
5.6.4. SAM Mode Tables (F3)

The SAM Mode Table Screens (Figure 5.24. – Figure 5.27) contain editable fields for the Station Access Module (SAM) Modes. This screen can display both SAM Modes and Local SAM Modes. The difference between a SAM Mode and a Local SAM Mode is that a SAM Mode has a corresponding Station Mode while a Local SAM Mode does not.

Example:

If there are 2 Station Modes (0 and 1) and 4 SAM Modes (0, 1, 2 and 3) then SAM Modes 2 and 3 are considered to be Local SAM Mode# 2 and Local SAM Mode# 3. Upon entering this screen, the user is prompted to type in the SAM Mode or Local SAM Mode Number to be edited. After entering the SAM Mode or Local SAM Mode Number, that mode's decoder data is displayed and available for editing. There are a maximum of 17 (0–16) and a minimum of 2 (0 and 1) SAM Modes and Local SAM Modes.

Only Local SAM Modes may be added from this screen (see function keys below). To add a SAM Mode it is necessary to create a new unique station mode. Example: Station Modes 0 and 1 currently exist and SAM Modes 0 and 1 and Local SAM Mode 2 also exist. If Station Mode 2 is added then SAM



Mode 2 is also added and Local SAM Mode 2 now becomes Local SAM Mode 3.

The only modes that can be deleted from this screen are Local SAM Modes (see function keys on next page). To delete a SAM Mode the following steps are necessary:

1. References to the SAM Mode to be deleted in any SAM Action Tables 'SELMODE' command (see Section 5.6.5.1.) must be removed.
2. Go to the corresponding Station Mode screen and select the desired mode to be deleted. Press **F7** to delete the mode.

Tab and **BackTab** are used to move the cursor through each field. **Enter** is used to advance the cursor to the next target. **PgUp** and **PgDn** are used to move the cursor between pages.

5.6.4.1. SAM Mode Field Definitions

The SAM Mode Table fields (see Figure 5.24 – Figure 5.27), along with a brief explanation for each are discussed in this section.

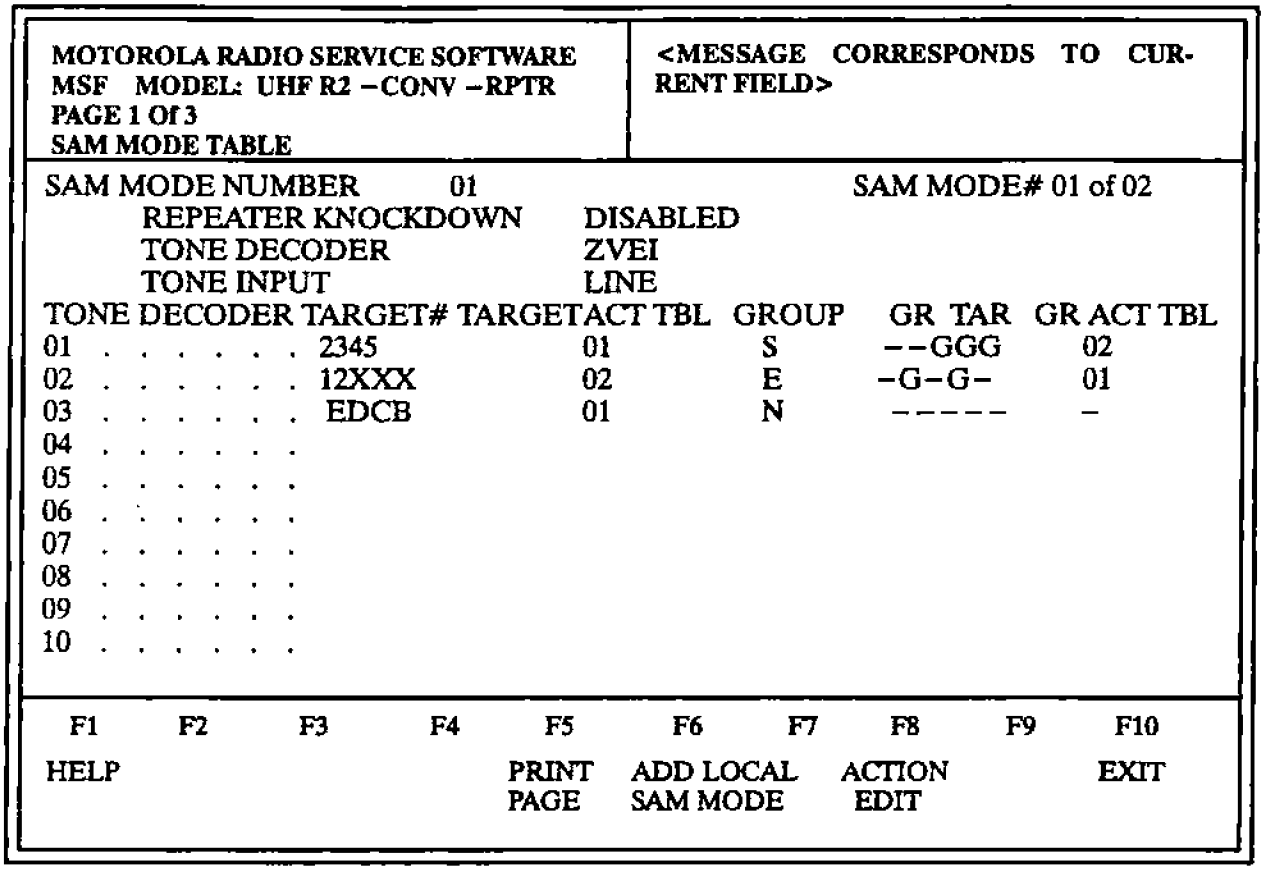


Figure 5.25: SAM Mode Table Screen #1

Repeater Knockdown

The Repeater Knockdown field indicates what the initial status of the Repeater Knockdown bit (RPT_KD) on the MUXbus will be set to upon switching to a SAM Mode or Local SAM Mode. This field is changed by pressing **Up** or **Down**. If ENABLED, the Repeater Knockdown bit (RPT_KD) is initially set and no repeater operation is allowed. If DISABLED, the Repeater Knockdown bit (RPT_KD) is initially cleared and repeater operation is allowed. See Appendix E for more information regarding this field.

Tone Decoder

The Tone Decoder field indicates which Tone Decoder scheme will be used in the current SAM Mode or Local SAM Mode. The Tone Decoder can only be set to a tone decoding scheme if the Binary Decoder and DTMF Decoder are both DISABLED in that same mode. The following Tone Decoder schemes may be toggled through by use of **Up** and **Down**.

ZVEI	ZVEI standard tone decoding scheme.
ZVEIFR	ZVEI French tone decoding scheme.
ZVEIMOD	ZVEI modified tone decoding scheme.
CCIR	CCIR standard tone decoding scheme.
CCIRMOD	CCIR modified tone decoding scheme.
EEA	EEA tone decoding scheme.
CUSTOM	Customized tone decoding scheme.

DISABLED No tone decoder is used.

Some parameters for each of these schemes may be modified in the SAM Encode/Decode screen (see Section 5.6.10.). If the Tone Decoder field is set to DISABLED or changed to a different scheme, all of the fields on this screen associated with the Tone Decoder will be cleared.

Tone Input

The Tone Input field specifies which input the SAM tone decoder will monitor. The choices are RECEIVER 1, RECEIVER 2, LINE, and if the SAM version is 2.00 or greater, DIVERSITY. These may be selected by pressing **Up** or **Down**.

Tone Decoder Target

A Tone Decoder Target is a sequence of tones that must be matched to execute a SAM Action Table. If a valid Tone Decoder is entered and the SAM's Tone Decoder has decoded a message, it will compare this message against the user–definable Tone Decoder Targets. If a match is found, the SAM board will execute the action(s) specified by the matching Target's corresponding Action Table Number. There can be a maximum of 10 Tone Decoder Targets for the Tone Decoder. A Tone Decoder Target consists of the following fields: TARGET, ACT TBL (Action Table), GROUP, GR TAR (Group Target) and GR ACT TBL (Group Action Table).

Target

The Target field defines the sequence of tones that must be matched to execute the SAM Action Table. Each tone in the sequence is specified as a hex number (0 – E), which corresponds to a particular frequency for the current tone decoder signalling scheme. This correspondence is defined in the SAM Encode/Decode screen (see Section 5.6.10.). Each Target is allowed a maximum of seven tones. Wildcards are allowed in place of a specific tone and are indicated by an 'X'. The SAM Tone Decoder will interpret a 'X' as a match for any tone number. For example, the sequences '12345' and '12045' will both match the target '12X45'. To clear the rest of the Tone Decoder Target# fields it is only necessary to clear the Target field.

Note: Since the order of the Targets is important (longer Targets come first in the list), the field programmer will automatically sort the Targets by length.

Act Tbl (Action Table)

The Action Table field specifies which SAM Action Table (see Section 5.6.5.) will be executed when the Tone Decoder Target matches the sequence of received tones. If the Action Table field is set to BLANK, no Action Table will be executed. A current Action Table Number or an Action Table Number that is one greater than the current number of existing Action Tables may be entered (there is a maximum of 30 Action Tables). If an Action Table is entered that does not exist, the user will get a prompt to create an empty Action Table or a duplicate Action Table. After the Action Table is created the user will be automatically taken to the Action Table screen to edit the table.

Group

The Group field defines which group calling method has to be used with the Target. The SAM board supports two group calling methods, Standard and Expanded. Selection of the group calling method is done by pressing **Up** or **Down**. This field may be toggled between the following values: N (None), S (Standard) and E (Expanded). If 'S' is selected then the Group Target requires the following standard rule: Once the Group Tone (defined in the SAM Encode/Decode screen for each tone decoder

scheme) is detected, all following tones in the target must also be group tones for a Group Target match to occur. The start of a group tone sequence can be at any location in the Group Target. If 'E' is selected then group tones can occur at any location in the Group Target. If 'N' is selected then no group calling method is used and it is not possible to execute a Group Action Table.

Gr Tar (Group Target)

The Group Target field specifies where group tones should appear in the Target for a match to occur. If a match occurs then the Group Action Table is executed. The tone that is to represent the group tone ('G') is defined in the SAM Encode/Decode screen. The letter 'G' indicates where a group tone is to appear in the Target, and a '–' indicates the position where no group tones are to appear. If Group is set to 'S' then only group tones should appear after the first group tone. Example: Target = '12345', Group = 'S' then Group Target = '––GGG' is valid but Group Target = '––GG–' is invalid. If Group is set to 'E' then group tones may appear anywhere in the Group Target. Example: Target = '12345', Group = 'E' then Group Target = '–GG–G' is valid.
Example of a Group Target match: Target = '12345', Group = 'S' , Group Target ='––GGG' and the group tone is defined as tone# 9. If tone sequence sent on wireline is '12999' then there is a group target match. If tone sequence sent on wireline is '12995' or '13999' then there is no match. If there is a Group Target match then the Group Action Table is executed.

Gr Act Tbl (Group Action Table)

The Group Action Table field specifies which SAM Action Table (see Section 5.6.5.) will be executed when the Group Target matches the sequence of tones sent on the wireline (see Group Target for an example). If the Group is set to 'S' or 'E' then a SAM Action Table must be entered. If the Group is set to 'N' then '––' must be entered. If the Action Table field is set to '––' then no SAM Action Table will be executed. A current SAM Action Table Number or a SAM Action Table Number that is one greater than the current number of existing SAM Action Tables may be entered (there is a maximum of 20 SAM Action Tables). If a SAM Action Table is entered that does not exist then the user will get a prompt to create an empty SAM Action Table or a duplicate SAM Action Table. After the SAM Action Table is created the user will be taken to the SAM Action Table screen to edit the table.

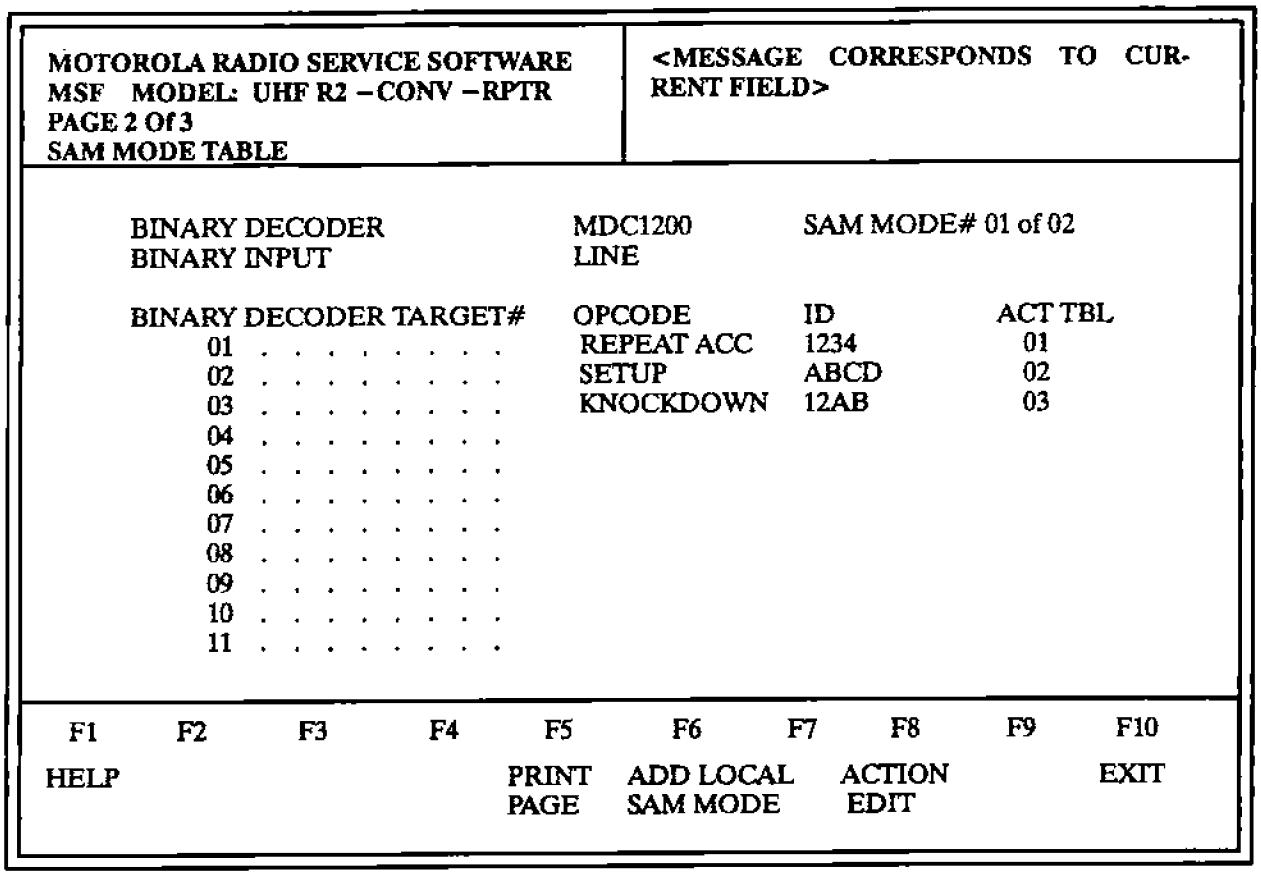


Figure 5.26: SAM Mode Table Screen #2

Binary Decoder

The Binary Decoder field indicates if a Binary Decoder scheme will be used in the current Mode or Local SAM Mode. The field may be toggled between DISABLED AND MDC1200 by pressing **Up** or **Down**. The Binary Decoder can only be set to a binary decoding scheme if the Tone Decoder and DTMF decoder are both DISABLED; this only applies to the current Mode or Local SAM Mode. If the field is toggled to MDC1200 then the MDC1200 binary signalling scheme will be used for decoding the current mode. When the SAM's binary signalling decoder has decoded a message, it will compare this message against a list of binary signalling words which are called Targets. If a match is found, the SAM board will execute a sequence of actions specified by the matching Target's corresponding Action Table. If the field is changed to DISABLED then all of the fields associated with the Binary Decoder will be cleared.

Binary Input

The Binary Input field specifies which input the SAM binary decoder will monitor. The choices are RECEIVER 1, RECEIVER 2, LINE, and if the SAM version is 2.00 or greater, DIVERSITY, is also a toggle choice. These may be selected by pressing **Up** or **Down**.

Binary Decoder Target

A Binary Decoder Target is a specific binary signalling packet that must be matched to execute an Action Table. There can be a maximum of 11 Binary Decoder Targets for the Binary Decoder. A Binary Decoder Target consist of the following fields: OPCODE, ID and ACT TBL (Action Table). These fields are defined below.

Opcode

The following Opcode (Operation code) fields may be entered by pressing **Up** or **Down**: SETUP, KNOCKDOWN, PTT (Push-To-Talk), REPEAT ACC (Repeater Access), ACK (Acknowledge), MSG1, MSG2, MSG3, and MSG4. The field may also be toggled to blank, which is not an Opcode. A Target may be cleared by toggling to the blank choice. The following is a description of each Opcode field:

REPEAT ACC (Repeater Access)
Typically programmed by the user to provide Automatic or Manual Repeater Access.

PTT
Typically passed to the wireline to indicate the mobile ID to the console.

SETUP
Typically programmed by the user to clear the repeater knockdown (RPT_KD) bit on the MUXbus if the ID sent matches the repeater's ID. This enables the repeater operation of the station.

KNOCKDOWN
Typically programmed by the user to set the repeater knockdown (RPT_KD) bit on the MUXbus if the ID sent matches the repeater's ID. This disables the repeater operation of the station.

ACK
Usually encoded in response to receiving a message from another transmitter. Used to acknowledge that a certain Opcode was received.

MSG1, MSG2, MSG3, MSG4
These are spare Opcodes with no predefined meanings at this time. They are encoded/decoded as 4701, 4702, 4703, and 4704 with the MDC1200 Binary Scheme.

See Appendix E for more information on programming this field.

ID

The ID field usually contains the ID of the repeater that is to be accessed. Every repeater has its own unique four digit ID. This ID is set up by the system designer or the customer. For example, it may be the last four digits of the serial number. The valid range for the ID field is from 0000 – FFFF.

Act Tbl (Action Table)

The Action Table field specifies which Action Table (see Section 5.6.5.) will be executed when the current Opcode and ID match the received binary signalling word. If the Action Table field is set to BLANK then no Action Table will be executed. A current Action Table Number or an Action Table Number that is one greater than the current number of existing Action Tables may be entered (there is a maximum of 30 Action Tables). If an Action Table is entered that does not exist then the user will get a prompt to create an empty Action Table or a duplicate Action Table. After the Action Table is created the user will be shown the Action Table screen to edit the table.

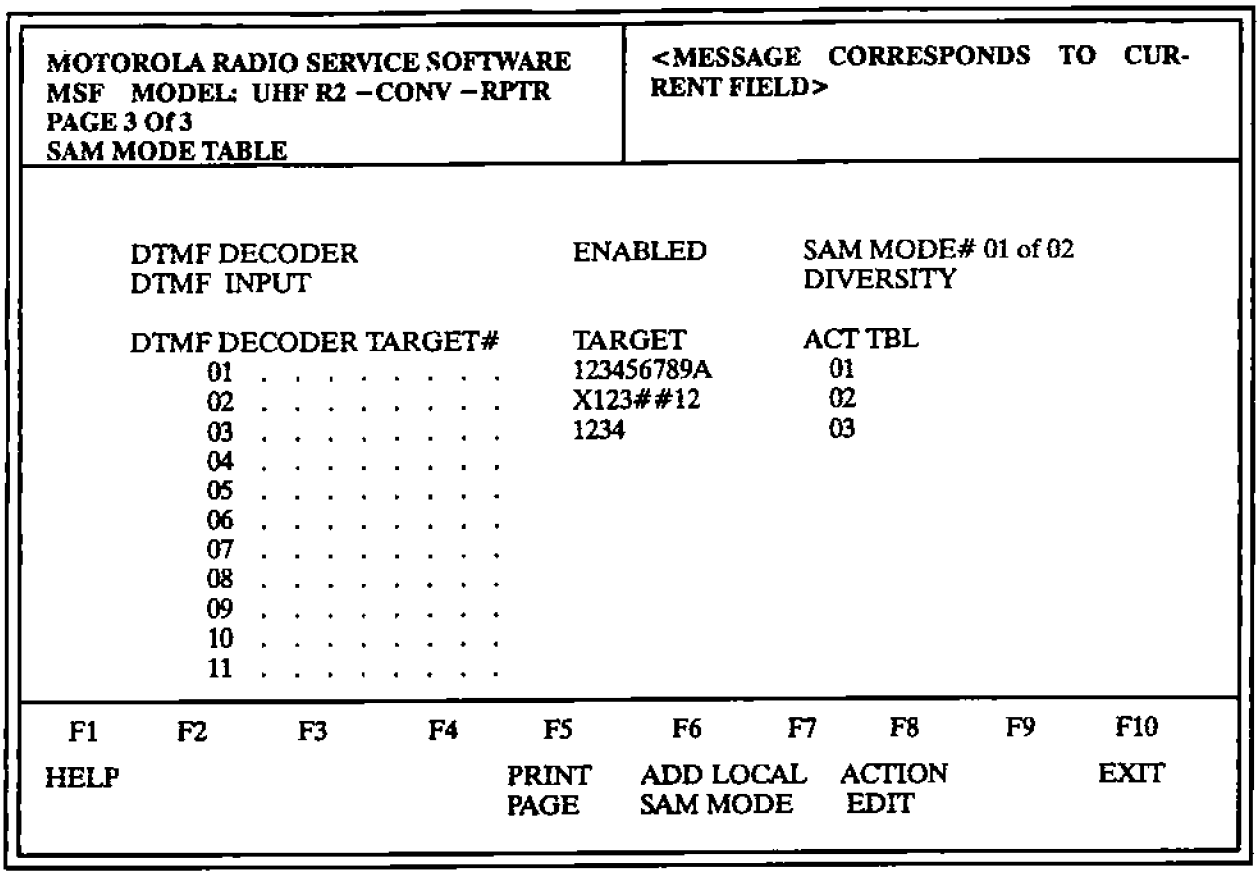


Figure 5.27: SAM Mode Table Screen #3

DTMF Decoder

The DTMF Decoder field indicates if a DTMF Decoder scheme will be used in the current SAM Mode or Local SAM Mode. The DTMF Decoder screen will only be displayed if the SAM board is version 2.00 or greater (versions less than 2.00 do not support the DTMF Encoder/Decoder scheme). The field may be toggled between DISABLED and ENABLED by pressing **Up** or **Down**. The DTMF Decoder can only set to ENABLED if the Tone Decoder and Binary Decoder are both DISABLED in the current SAM Mode. If the field is toggled to ENABLED, the DTMF signalling scheme will be used for decoding in the current mode. When the SAM's DTMF signalling decoder has decoded a message, it will compare this message against a list of Targets. If a match is found, the SAM board will execute a sequence of actions specified by the matching Target's corresponding Action Table. If the field is changed to DISABLED then all of the fields associated with the DTMF Decoder will be cleared.

DTMF Input

The DTMF Input field specifies which input the SAM DTMF decoder will monitor. The choices are RECEIVER 1, RECEIVER 2, LINE, and if the SAM version is 2.00 or greater, DIVERSITY, is also a toggle choice. These may be selected by pressing **Up** or **Down**.

DTMF Decoder Target

A DTMF Decoder Target is a sequence of DTMF tones that must be matched to execute an Action Table. There can be a maximum of 11 DTMF Decoder Targets for the DTMF Decoder. A DTMF Decoder Target consists of the TARGET and ACT TBL (Action Table) fields.

Target

The Target field defines the sequence of DTMF tones that must be matched to execute the Action Table. Each tone in the sequence is specified by a character on a standard telephone keypad (0 through 9, *, and #), or a letter from A through D. Each character corresponds to a particular pair of frequencies. This correspondence is defined in the SAM Encode/Decode Table screen (see Section 5.6.10.). Each Target is allowed a maximum of ten characters. Wildcards are allowed in place of a specific character and are indicated by an 'X'. The SAM DTMF Decoder will interpret an 'X' as a match for any DTMF tones. For example, the sequences '12345' and '12045' will both match the target '12X45'. To clear a DTMF Decoder Target, it is only necessary to clear the Target field.

Note: The order of the Targets is important; longer Targets must come first in the list. The RSS will automatically sort the Targets by length.

Act Tbl (Action Table)

The Action Table field specifies which Action Table (see Section 5.6.5.) will be executed when the DTMF Decoder Target matches the sequence of received tones sent on the wireline. If the Action Table field is set to BLANK then no Action Table will be executed. A current Action Table Number or Action Table Number that is one greater than the current number of existing Action Tables may be entered (there is a maximum of 30 Action Tables). If an Action Table is entered that does not exist then the user will get a prompt to create an empty Action Table or a duplicate Action Table. After the Action Table is created the user will be shown the Action Table screen to edit the table.

5.6.4.2. Definition of SAM Mode Function Keys

F1 – Provides HELP.

F2 – Print the current page.

F6 – Adds a Local SAM Mode. The number of the added Local SAM Mode will be one greater than the total number of Modes and Local SAM Modes. All fields in the added Local SAM Mode will be initially set to DISABLED or blank.

F7 – Deletes the current Mode only if it is a Local SAM Mode. The cursor must be in the SAM Mode Number field. If the Local SAM Mode is referenced in a 'SELLOCMODE' action on any of the SAM Action Tables then the Local SAM Mode cannot be deleted until all references to the Local SAM Mode are removed.

F8 – If the cursor is in the ACT TBL field and a valid Action Table is entered then that Action Table will be displayed and available for editing.

F10 – Exit the SAM Mode Table and return to the SAM Menu.

5.6.5. SAM Action Tables (F4)

The SAM Action Table Screens (Figure 5.28 – Figure 5.29) contain editable fields for each SAM Action Table. An action is an event that the SAM board executes, and an Action Table is a collection of actions that the SAM board will execute. A SAM Action Table is executed when a Tone Decoder Target or Binary Decoder Target is matched in a SAM Mode or Local SAM Mode (see Section 5.6.9.), when a Wildcard Input goes to the Active or Inactive state (see Section 5.6.4.), or when a Trigger

Condition goes Active or Inactive (see 5.6.6.) In this screen, the user is prompted to toggle to the desire Action Table to be edited using **Up** and **Down**. If the SAM Action Table was entered via the SAM Mode Table or the SAM Wildcard Inputs Screen then the Action Number field is not editable. There is a maximum of 30 (1–30) SAM Action Tables. Once a SAM Action Table is created it is not possible to delete it; however the individual Actions can be changed or deleted. Each SAM Action Table can have a maximum on 20 actions.

Tab and **BackTab** are used to move the cursor through each field of each action. **Enter** is used to advance the cursor to the next action. **PgUp** and **PgDn** are used to move the cursor between pages.

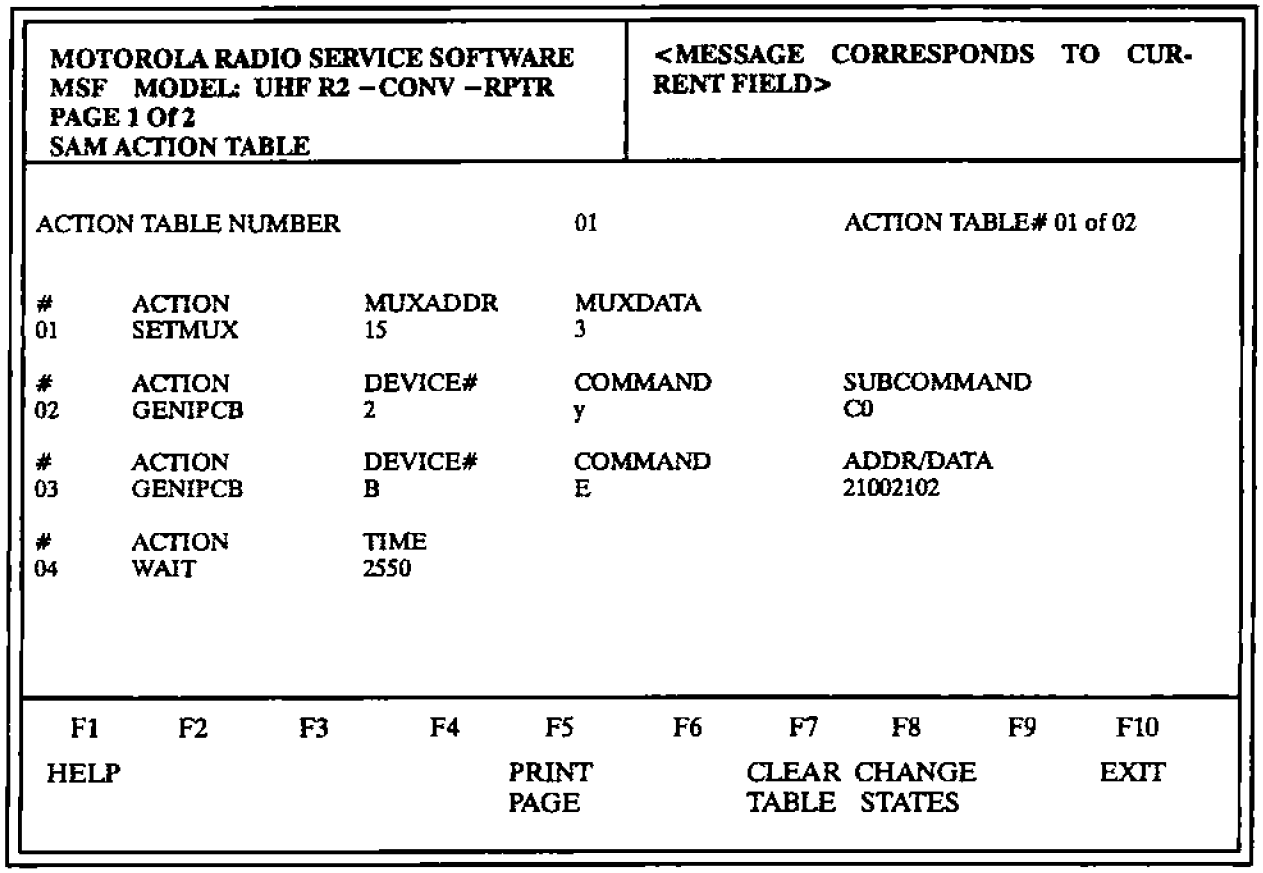


Figure 5.28: SAM Action Table Screen #1

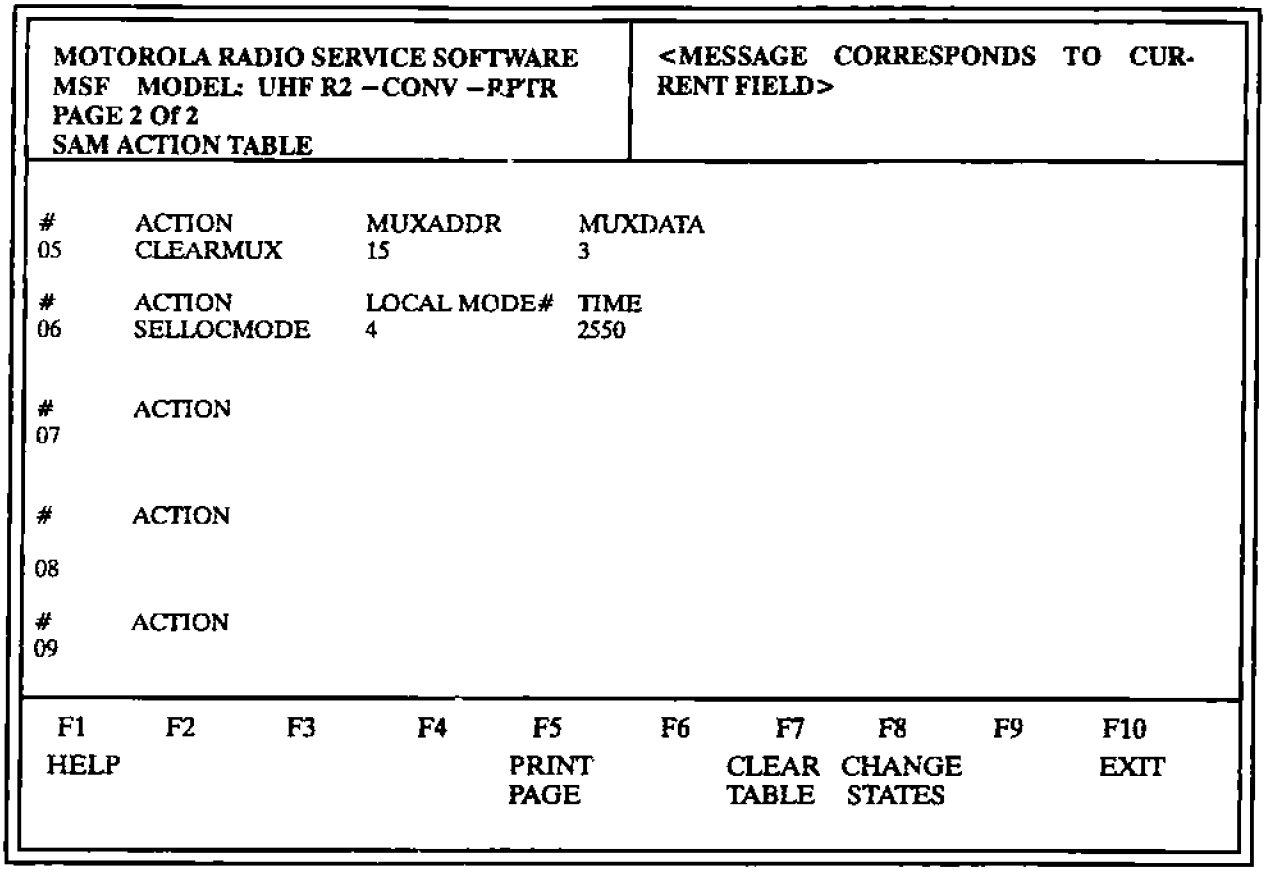


Figure 5.29: SAM Action Table Screen #2

5.6.5.1. SAM Action Table Field Definitions

The list of valid SAM Action Table actions, along with the associated fields for each action, is shown below. When a valid action is entered the associated headers for that action will appear on the screen.

CLEARMUX

This action will clear a bit(s) on the MUXbus.

Field #	Field Name and Description
1.	MUXaddr – Address of the bit(s) on the MUXbus Valid range is 0 – 15.
2.	MUXdata – Data bit(s) on MUXbus to clear. Valid range is 0 – F.

CLRMUXQUAL

This action will clear a bit(s) on the MUXbus and keep it clear as long as the qualifier bit(s) match the qualifier mask and the timer has not expired. Timer is reset when qualifier bit(s) is set.

Field #	Field Name and Description
1.	MUXaddr – Address of the bit(s) on the MUXbus. Valid range is 0 – 15.
2.	MUXdata – Data bit(s) on MUXbus to clear. Valid range is 0 – F.

3. Qualaddr – Address of the qualifier bit(s) on the MUXbus. Valid range is 0 – 15.
4. Qualmask – Mask of bit(s) at Qualaddr that qualify the timing function. Valid range is 0 – F.
5. Time – Duration of how long the MUXbus bit(s) will be clear after the qualifier bit(s) is cleared. Valid range is 10 – 655350 msec.

GENENSEQ (Generate Encode Sequence) and GENID (Generate Station ID)

These actions will generate an encode sequence. The difference between the two, is if at the time when GENID has to be executed the transmitter is already active (MUXbus signal TX_ACT) the reduced modulation level will be used.

Field #	Field Name and Description
1.	Enc Dest (Encode Destination) – Defines the destination that the generated Encode Sequence should be sent to. Valid choices are TRANSMIT (Transmitter), LINE and TRAN+LINE (Transmitter and Line).
2.	Enc Seq (Encode Sequence) – Defines which Encode Sequence should be generated. These sequences are defined in Section 5.6.8. Valid range is 1 – 10.

GENIPCB (Generated IPCB Command)

This action will generate an IPCB (Inter–Processor Communications Bus) command. IPCB commands are actions that allow access of off–board devices using the IPCB.

Field #	Field Name and Description
1.	Device# – Board that the IPCB command will be sent to. Valid choices are: 1 (SSCB), 2 (TTRC), A (Secure) and B (SAM).
2.	Command – IPCB command to be sent to Device#. Following Field# 3 is a list of commands and the associated argument format.
3.	Addr/Data – This field is used to enter in the arguments or subcommands for the Command field. Please see Command/Argument list below for inputs.

Command	Name	Argument format
a	Write address	aaaadd
A	Read address	aaaa
i	Change EEpot value	ptt
I	Read EEpot value	d
y	Execute subcommand	see subcommand list on the next page
1	Reset host	no argument
T	Test IPCB	dd
E	Read string	bbbbeeee

Definition of Argument format

aaaa	Target address (in hexadecimal format)
bbbb	Beginning address (in hexadecimal format)
eeee	Ending address (in hexadecimal format)

p	EEpot number (in hexadecimal format)
tt	New EEpot value
d	One byte of data (in hexadecimal format)

Subcommand	Name	Argument format
0F	Set forward power trip point, SSCB	no argument
0R	Set reflected power trip point, SSCB	no arguments
1	Set station configuration, SSCB	d
2	Save Xmit deviation of current channel	no argument
30	EEprom programming ended, SSCB	no argument
31	EEprom programming started, SSCB	no argument
50	Wake up/begin diagnostics, SSCB	no argument
51	Enter background, SSCB	no argument
52	Shut up/don't begin diagnostics, SSCB	no argument
7	Read system version and station type	no argument
80	Disable test tone generation, SAM and SECURE	no argument
81	Enable test tone generation, SAM and SECURE	no argument
A0	Save system level , SSCB	no argument
A1	Adjust receive level to receiver, SSCB	no argument
C0	Clear PA−test mode	no argument
C1	Set PA−test mode	no argument
D	Display high−priority data, SSCB	ddd
E	Hold station for programming, SSCB	no argument
F	Save ALC/UN−ALC Tx−level EEpot	no argument
G	Read Tx coarse−level adjustment, TTRC	no argument
H0	Disable Failsoft, TTRC	no argument
H1	Enable Failsoft, TTRC	no argument
I0	Disable Compandor and Flutter Fighter	no argument
I1	Disable Compandor, Enable Flutter Fighter	no argument
I2	Enable Compandor, Disable Flutter Fighter	no argument
I3	Enable Compandor and Flutter Fighter	no argument
J	Read firmware version number	no argument
K0	Disable MCS user priority	no argument
K1	Enable MCS user priority	no argument
S	Compute codeplug checksum, non−SAM	no argument
g	Set Tx coarse−level adjustment, TTRC	d
s	Compute and Store SAM codeplug checksum	no argument

MANIBIT

This action changes the state of any writeable bits at a user−defined Address on the SAM board.

Field #	Field Name and Description
1.	Address − Address on the SAM board that contains the bit to be changed. Valid range is 0000 − FFFF.

2. Target Bit – Bit at the user–defined address on the SAM board that is to be changed. Valid range is 0 – 7.

3. Polarity – Indicates if the bit at user–defined Address and Target Bit position is to be ENABLED or DISABLED. This field may be changed by pressing **Up** or **Down**.

QUICKKEY

This action allows the next action in the SAM Action Table to be executed/skipped based on the absence of a programmable bit pattern at a user–defined address on the MUXbus. The next action will be skipped if the timer expires before the programmable bit pattern is cleared on the MUXbus.

Field #	Field Name and Description
1.	MUXaddr – Address of the data bits on the MUXbus that will be compared to the Mask to determine if the next action should be executed or skipped. Valid range is 0 – 15.
2.	Mask – This is a programmable bit pattern which is compared to the data bits contained at MUXaddr. If the data bits specified by the mask are clear, then the next action is executed otherwise the next action is skipped. Valid range is 0 – F.
3.	Time – Amount of time that the data bits contained at the MUXaddr has to match the Mask. If the time expires before a match is made then execution of the following action in the Action Table is skipped. Valid range is 10 – 655350 msec.

RESLOCMODE

This action returns the SAM board to the previous station mode immediately.

SETMUX

This action will set a bit(s) on the MUXbus.

Field #	Field Name and Description
1.	MUXaddr – Address of the bit(s) on the MUXbus. Valid range is 0 – 15.
2.	MUXdata – Data bit(s) on MUXbus to set. Valid range is 0 – F.

SETMUXMOM

This action will set a bit(s) on the MUXbus for a specified amount of time.

Field #	Field Name and Description
1.	MUXaddr – Address of the bit on the MUXbus. Valid range is 0 – 15.
2.	MUXdata – Data bit(s) on MUXbus to set. Valid range is 0 – F.
3.	Time – Amount of time to set MUXbus bit(s). Valid range is 10 – 655350 msec.

SETMUXQUAL

This action will set a bit(s) on the MUXbus and keep it set as long as the qualifier bit(s) match the qualifier mask and the timer has not expired. Timer is reset when qualifier bit(s) is set.

Field #	Field Name and Description
1.	MUXaddr – Address of the bit(s) on the MUXbus. Valid range is 0 – 15.

2. MUXdata – Data bit(s) on MUXbus to set. Valid range is 0 – F.
3. Qualaddr – Address of the qualifier bit(s) on the MUXbus. Valid range is 0 – 15.
4. Qualmask – Mask of bit(s) at Qualaddr that qualify the timing function. Valid range is 0 – F.
5. Time – Duration that the MUXbus bit(s) will be set after the qualifier bit(s) is cleared. Valid range is 10 – 655350 msec.

SELCHAN

This action allows selection of the station channel on the MUXbus. The Local Channel Control field in the Advanced Information Screens **must** be set to EXTERNAL, in order for this action to function properly.

Field #	Field Name and Description
1.	Channel# – Channel number to select. Valid range is 0 – 15.

SELCHAN2

This action allows selection of the 2nd receiver channel on the MUXbus. The Local Channel Control field in the Advanced Information Screens **must** be set to EXTERNAL, in order for this action to function properly.

Field #	Field Name and Description
1.	Channel# – 2nd Receiver channel number to select. Valid range is 0 – 15.

SELLOCMODE

This action allows selection of a Local SAM mode for a user–defined amount of time.

Field #	Field Name and Description
1.	Local Mode# – Local SAM Mode Number to select. Valid range is lowest Local SAM Mode# to Highest Local SAM Mode#.
2.	Time – Amount of time the SAM board should stay in the Local SAM Mode. Valid range is 0 – 2550 msec. If set to less then 10 msec, there will be no time limit for the SAM board to stay in Local SAM Mode.

SELMODE

This action allows selection of the station mode on the MUXbus. The Local Mode Control field in the Advanced Information Screens **must** be set to EXTERNAL, in order for this action to function properly.

Field #	Field Name and Description
1.	Mode# – Mode Number to select. Valid range is 0 – Number of station modes.

TUNEEPOT

This action will change the setting of the EEpot on the SAM board by a user–defined amount.

Field #	Field Name and Description
1.	Step Size – The number of steps that the EEpot on the SAM board will be in–cremented or decremented. The valid range is –99 to +99.

WAIT

This action holds execution of the following actions within the same Action Table, and any pending Action Tables, for a user–defined amount of time.

Field #	Field Name and Description
1.	Wait – Amount of time to suspend execution of following actions in the SAM Action Table. Valid range is 10 – 2550 msec.

WAITSET and WAITCLEAR

These actions will trigger continuing execution of an Action Table depending on the presence of a programmable bit pattern at a user–defined Address within the SAM board Address range. Execution of the rest of the SAM Action Table, and any pending Action Tables, will be performed only if the data bits at the stated Address match the Mask (bits set if Waitset or bits clear if Waitclear) and the timer has not expired.

Field #	Field Name and Description
1.	Address – Address of the byte that will be compared to the mask to determine if execution of the Action Table should continue. The Address corresponds to a unique location on the SAM board. Valid range is 0000 – FFFF.
2.	Mask – This is a programmable bit pattern which is compared to the data bits contained at the Address. If the data bits match the Mask (bits set if WAITSET or clear if WAITCLEAR) then execution of the rest of the Action Table is performed. Valid range is 00 – FF.
3.	Time – Amount of time that the byte contained at the Address has to match the Mask. If the time expires before a match is made then execution of the following actions in the SAM Action Table are terminated. Valid range is 0 – 655350 msec. If set to less than 10 msec, there will be no time limit for the byte contained at the Address to match the Mask.

5.6.5.2. Definition of SAM Action Function Keys

F1 – Provides HELP associated with the SAM action field.

F2 – Print the current page.

F7 – Clears all of the actions associated with the current SAM Action Table.

F8 – Only available when the SAM Action Table screen is entered via the SAM Wildcard Input screen. Allows user to change between the Active and Inactive SAM Action Table if they are defined.

F10 – Exit the SAM Action Table and return to the SAM Menu.

5.6.6. SAM Action Table Conditions (F5)

```
MOTOROLA RADIO SERVICE SOFTWARE          <MESSAGE CORRESPONDS TO CUR-
MSF 5000 MODEL:                          RENT FIELD>
PAGE: 01 OF 01
SAM ACTION TABLE CONDITIONS

                    TRIGGER CONDITIONS
MUX COND1 /         MUX COND2  MUX COND3  LOGIC   ACTIVE      INACTIVE
ALARM                                             ACT TBL     ACT TBL
11,XXX1                                           10          1
DC PWR ALM                                        1           2
12,XXX1             11,X0X1    13,0101    OR      3           2
11,X10X                                           1
15,XXX1             11,X0XX                AND     4
FIN PA RF                                         5           4
RCVR2 ALM                                         2

F1      F2      F3      F4      F5          F6      F7      F8          F9      F10
HELP                            PRINT       ADD     DELETE  ACTION              EXIT
                                PAGE                        EDIT
```

Figure 5.30: SAM Action Table Conditions Screen

The purpose of the SAM Action Table Conditions screen is to tie the occurrence of an alarm or MUXbus condition(s) to the execution of an Action Table. Each definition is characterized by a set of Trigger Conditions, an Active Action Table and an Inactive Action Table. Up to 48 definitions may be entered. This screen is shown in Figure 5.30.

Trigger Conditions

The Trigger Conditions field(s) specify alarms or conditions to be met for the execution of an Action Table. These are similar to the Output Enable Conditions for the SAM Wildcard Outputs. A full description is given in Section 5.6.11. Please refer to that section for more information. Each row may specify either one alarm or up to three MUXbus conditions.

Logic

If more than one MUXbus condition has been specified, an additional qualifier, OR or AND, must be specified to describe how the combination of MUXbus conditions precipitate the execution of an Action Table (see Section 5.6.11.).

Active Action Table

The Active Action Table field describes which Action Table will be executed whenever the Trigger Condition occurs. This field may be left blank if an Inactive Action Table is specified in this row. A

current Action Table Number or an Action Table Number one greater than the current number of existing Action Tables may be entered (valid entries for this field are displayed in the message window). If an Action Table Number is entered that does not exist and the Inactive Action Table is set to BLANK then the user will get a prompt to create an empty Action Table or a duplicate Action Table. After the Action Table Number is entered the user will be taken to the Action Table screen to edit the Action Table. If an Action Table Number is entered that does not exist and the Inactive Action Table is not set to BLANK then the user will get a prompt to create an empty Action Table, duplicate Action Table or a copy of the Inactive Action Table. After the Action Table Number is entered the user will be taken to the Action Table screen to edit the Action Table.

Note: If an Active Action Table is entered it is recommended that an Inactive Action Table also be entered to cancel the actions executed by the Active Action Table.

Inactive Action Table

The Inactive Action Table field describes which Action Table will be executed when the Trigger Condition goes away. This field may be left blank if an Active Action Table is specified in this row. The Inactive Action Table usually contains actions to do the opposite of the Active Action Table. A current Action Table Number or an Action Table Number one greater than the current number of existing Action Tables may be entered (valid entries for this field are displayed in the message window). If an Action Table Number is entered that does not exist and the Active Action Table is set to BLANK then the user will get a prompt to create an empty Action Table or a duplicate Action Table. After the Action Table Number is entered the user will be taken to the Action Table screen to edit the Action Table. If an Action Table Number is entered that does not exist and the Active Action Table is not set to BLANK then the user will get a prompt to create an empty Action Table, duplicate Action Table or a copy of the Active Action Table. After the Action Table Number is entered the user will be shown the Action Table screen to edit the Action Table.

5.6.7. Definition of Function Keys

F1 – Displays help text.

F2 – Print current screen.

F6 – Add a new blank entry line at current cursor position.

F7 – Delete line that cursor is on.

F8 – If the cursor is on an Action Table Number, edit that Action Table.

F10 – Exit the SAM Action Table Condition screen.

5.6.8. SAM Encoder Sequences (F6)

This menu selection contains 10 possible SAM Encoder Sequences. The SAM Encoder Sequences shown are related by number to the SAM Action Tables via GENENSEQ (generate encode sequence), and GENID (generate station ID). Page 1 of 2 is shown below. Page 2 contains tables 6 through 10.

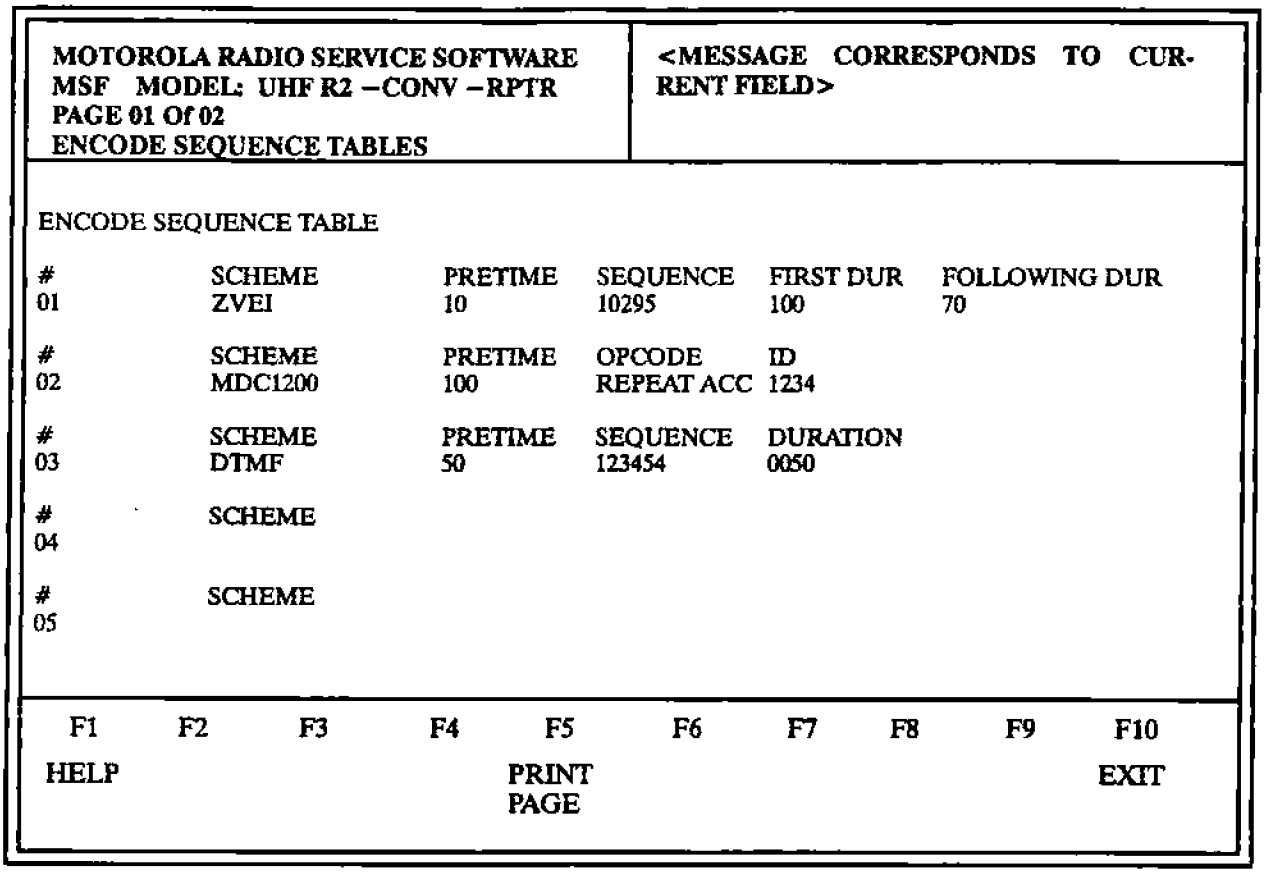


Figure 5.31: SAM Encoder Sequence Table Screen #1

Scheme

A Scheme is the particular Tone, Binary, or DTMF Encoder that is used to generate the encoder sequence. While the cursor is in the Scheme field, all tone, binary, and DTMF Schemes may be toggled through. The following are valid choices:

ZVEI	ZVEI standard tone decoding scheme.
ZVEIFR	ZVEI French tone decoding scheme.
ZVEIMOD	ZVEI modified tone decoding scheme.
CCIR	CCIR standard tone decoding scheme.
CCIRMOD	CCIR modified tone decoding scheme.
EEA	EEA tone decoding scheme.
CUSTOM	Customized tone decoding scheme.
MDC1200	Binary encoder signalling scheme.
DTMF	Dual Tone Modulated Frequency encoder signalling scheme

A blank field is also a toggle choice. Selecting a blank toggle field will blank out all other fields on the line. Upon selection of a Scheme, the rest of the headings of the fields associated with that particular Scheme will appear. The fields however will be blank. All information for the Scheme must be entered before the user is allowed to advance to the next line. A description of these fields is shown below.

Note: DTMF is only a scheme choice if the SAM board is version 2.00 or greater.

Pretime

The Pretime is the amount of time that the encoder delays the generation of the sequence after PTT. The time is entered in milliseconds. The valid range is from 10 to 2550 msec.

Sequence

A Sequence is the order in which tones are encoded. The numbers correspond to a specific frequency as shown on the Encode/Decode screen (see Section 5.6.10.). This field is for tone and DTMF signalling. This field will not appear if the MDC1200 scheme is chosen.

For the Tone signalling scheme, a maximum of seven tones may be entered for each Tone Sequence. The valid range is 0 – E. No wildcards are allowed.

For the DTMF signalling scheme, a maximum of ten tones may be entered for each Sequence. The valid tones are 0 through 9, A through D, *, and #. No wildcards are allowed.

First Dur (First Tone Duration)

The First Tone Duration field is the length of the first tone from the Sequence field to be encoded. This field will not appear if the MDC1200 or DTMF scheme was chosen. The valid range for the First Tone Duration field is 10 to 21100 msec.

Following Dur (Following Tone Duration)

The Following Tone Duration field is the length of all tones except the first tone from the Sequence field to be encoded. This field will not appear if the MDC1200 or DTMF scheme was chosen. Tone Duration is a non-editable field for all schemes except the CUSTOM scheme. All schemes except CUSTOM have a default. The default for ZVEI, ZVEIFR, ZVEIMOD and CCIRMOD is 70 msec. The default for CCIR is 10 msec. The default for EEA is 40 msec. The valid range for the CUSTOM scheme is 10 to 21100 msec.

Duration

The Duration field specifies the duration (in msec) of all DTMF tones. This field will only appear if the DTMF scheme was chosen. Duration is an editable field with a range of 50 to 21100 msec. The default is 50 msec.

Opcode

An Opcode is a code that represents an operation. This field will only appear if MDC1200 scheme has been selected. This information will be displayed following the Pretime and succeeded by the ID information field. The choices for this field may be toggled through. The list of valid choices are SET-UP, REPEAT ACC, KNOCKDOWN, PTT, ACK , MSG1, MSG2, MSG3, and MSG4. These Opcodes are sent as signalling packets. For a description of each Opcode see Section 5.6.4.1.

ID

This field will only appear if MDC1200 scheme has been selected. This field is the 4-digit ID of any particular repeater. Every repeater has its own unique ID. The ID is set up by the system designer or the customer. For example, it may be the last four digits of the serial number of the station. The valid range is 0000 – FFFF.

5.6.8.1. Definition of SAM Encode Sequence Function Keys

F1 – Provides HELP associated with the SAM Encode Sequence field.

F2 – Print the current page.

F10 – Exit the SAM Encode Sequence Table and return to the SAM Menu.

5.6.9. SAM Wildcard Inputs (F7)

The SAM Wildcard Inputs screen defines 16 Wildcard Input lines and 2 Front Panel Inputs (Function A and Function B). Each Wildcard Input and Front Panel Input contains the following fields: Active, Input Type, Input Response, Active Action Table and Inactive Action Table. These fields are described below.

MOTOROLA RADIO SERVICE SOFTWARE
MSF MODEL: UHF R2 –CONV –RPTR
PAGE 01 Of 02
SAM WILDCARD INPUTS

<MESSAGE CORRESPONDS TO CURRENT FIELD>

I/O CONFIGURATION EXP_DATA

WILDCARD INPUT	INPUT TYPE	ACTIVE	INPUT RESPONSE	ACTIVE ACT TBL	INACTIVE ACT TBL
0	EXP_DATA	LOW	TX PL INH	1	
1	EXP_DATA	LOW	RFLOOP EN2	3	4
2					
3	EXP_DATA	LOW	SEIZE/REL	7	5
4	EXP_DATA	LOW	DATA PTT	3	1
5	EXP_DATA	LOW	RX MUTE		
6	WILDCARD	LOW	ALARM RES	3	4
7	WILDCARD	HIGH		5	
8					
9					
10					

F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
HELP	WILDCARD SETUP	DATA SETUP	EXP_DATA SETUP	PRINT PAGE	DIAG SETUP		ACTION EDIT		EXIT

Figure 5.32: SAM Wildcard Input Menu

I/O Configuration

This is a non–editable field that indicates how the Wildcard Inputs and Front Panel Inputs of the Station Access Module are configured. There are four possible choices: EXP_DATA, DATA, DIAGNOSTIC or WILDCARD. This field is changed whenever **F2**, **F3**, **F4**, or **F6** are invoked to change to a new setup. The status of this field determines which fields of the Wildcard Inputs and Front Panel Inputs are available for editing.

Input Type

The Input Type field describes how the Wildcard Input or Front Panel Input has been configured. This field is edited by pressing **Up** or **Down**. The two Front Panel Inputs may be toggled between the fol-

lowing choices: SWITCH or BLANK. SWITCH indicates that the Front Panel Input is connected to an input. If the I/O Configuration field is EXP_DATA then the Input Type field is non-editable. If the I/O Configuration field is DATA and the Input Type field is set to DATA then the Input Type field is non-editable otherwise the Input Type field may be changed to WILDCARD or BLANK. If the I/O Configuration field is DIAGNOSTIC or WILDCARD then the Input Type field may be toggled between the following values: EXP_DATA (only on Wildcard Inputs 0, 1, 3, 4, 5, 10, 11, 12, 13), DATA (only on Wildcard Inputs 0, 1, 3, 4, 5, 10, 11, 12, 13), DIAGNOSTIC (only on Wildcard Inputs 1, 11, 12, 13), WILDCARD or BLANK. If the Input Type field is set to BLANK then the following fields are non-editable: Active, Input Response, Active Action Table and Inactive Action Table. If the Input Type field is set to BLANK then that input is never monitored by the SAM board.

Note: When the Input Type field is changed to a new value, the Active and Inactive Action Table fields for that input are made BLANK.

Active

The Active field determines if the Wildcard Input or Front Panel Input is Active High or Active Low. This field is non-editable if the Input Type field is EXP_DATA, DATA or if on the Front Panel Input line. This field may be toggled between the following values: HIGH and LOW. When the Wildcard Input or Front Panel Input makes a transition to its Active state then the Input Response and Active Action Table will be executed, if it is defined (not BLANK). When the Wildcard Input or Front Panel Input makes a transition to its Inactive State then the Input Response will be cancelled and the Inactive Action Table will be executed, if it is defined (not BLANK).

Input Response

The Input Response field describes a specific event that is to be executed when the Wildcard Input or Front Panel Input makes a transition to the Active state. If the Input Type field is set to EXP_DATA, DATA or DIAGNOSTIC then this field is set to a unique Input Response which is dependent on the Wildcard Input and is non-editable. If the Input Type field is set to WILDCARD then this field may be set to any valid Input Response. If the Input Type field is set to BLANK then it is non-editable. The following is a list of Input Responses along with the abbreviation and description that may be toggled through if the Input Type field is set to WILDCARD:

INPUT RESPONSE	Abbreviation
TRANSMIT PL INHIBIT	TX PL INH

Send current transmission without PL.

RF LOOPBACK ENABLE 1 — RFLOOP EN1

Indicate to the MSF that the GCC / BSC needs to perform an RF Loopback test of the station transmitter and receiver 1 combination. If RFLOOP EN1 and RFLOOP EN2 are enabled at the same time then that will test the diversity operation.

RF LOOPBACK ENABLE 2 — RFLOOP EN2

Indicate to the MSF that the GCC / BSC needs to perform an RF Loopback test of the station transmitter and receiver 2 combination. If RFLOOP EN1 and RFLOOP EN2 are enabled at the same time then that will test the diversity operation.

INPUT RESPONSE	Abbreviation
SEIZE / RELEASE	SEIZE/REL

Indicate to the MSF that the GCC/BSC has taken control of station upon command from the trunking central controller.

DATA PUSH-TO-TALK	DATA PTT

Indicate to the MSF that the GCC / BSC desires to key up the station transmitter.

RECEIVE MUTE	RX MUTE

Mute receive audio to the console.

MAJOR FAULT	MAJORFAULT

Indicates a major fault exists in the BSC. The MSF will ignore all other requests from the BSC.

ALARM RESET	ALARM RES

Used to test each alarm output for proper operation.

STATION RESET	STN RESET

Force the MSF into a full reset.

BLANK	BLANK

No Input Response is executed

Active Action Table

The Active Action Table field describes which Action Table will be executed whenever a Wildcard Input or Front Panel Input makes a transition to its Active state. If the Action Table field is set to BLANK then no Action Table will be executed. If the Input Type field is set to BLANK then this field is non-editable. A current Action Table Number or an Action Table Number one greater than the current number of existing Action Tables may be entered (valid entries for this field are displayed in the message window). If an Action Table Number is entered that does not exist and the Inactive Action Table is set to BLANK then the user will get a prompt to create an empty Action Table or a duplicate Action Table. After the Action Table Number is entered the user will be taken to the Action Table screen to edit the Action Table. If an Action Table Number is entered that does not exist and the Inactive Action Table is not set to BLANK then the user will get a prompt to create an empty Action Table, duplicate Action Table or a copy of the Inactive Action Table. After the Action Table Number is entered the user will be taken to the Action Table screen to edit the Action Table.

Note: If an Active Action Table is entered it is recommended that an Inactive Action Table also be entered to cancel the actions executed by the Active Action Table.

Inactive Action Table

The Inactive Action Table field describes which Action Table will be executed whenever a Wildcard Input or Front Panel Input makes a transition to its Inactive state. If the Action Table field is set to

BLANK then no Action Table will be executed. The Inactive Action Table usually contains actions to do the opposite of the Active Action Table. If the Input Type field is set to BLANK then this field is non-editable. A current Action Table Number or an Action Table Number one greater than the current number of existing Action Tables may be entered (valid entries for this field are displayed in the message window). If an Action Table Number is entered that does not exist and the Active Action Table is set to BLANK then the user will get a prompt to create an empty Action Table or a duplicate Action Table. After the Action Table Number is entered the user will be taken to the Action Table screen to edit the Action Table. If an Action Table Number is entered that does not exist and the Active Action Table is not set to BLANK then the user will get a prompt to create an empty Action Table, duplicate Action Table or a copy of the Active Action Table. After the Action Table Number is entered the user will be taken to the Action Table screen to edit the Action Table.

The following describes the predefined values for the Input Response field when the Input Type field changed to EXP_DATA, DATA or DIAGNOSTIC:

Wildcard Input	EXP_DATA	DATA	DIAGNOSTIC
0.	TX PL INH	TX PL INH	BLANK
1.	RFLOOP EN2	RFLOOP EN2	RFLOOP EN2
2.	BLANK	BLANK	BLANK
3.	SEIZE/REL	SEIZE/REL	BLANK
4.	DATA PTT	DATA PTT	BLANK
5.	RX MUTE	RX MUTE	BLANK
6.	BLANK	BLANK	BLANK
7.	BLANK	BLANK	BLANK
8.	BLANK	BLANK	BLANK
9.	BLANK	BLANK	BLANK
10.	MAJORFAULT	MAJORFAULT	BLANK
11.	ALARM RES	ALARM RES	ALARM RES
12.	RFLOOP EN1	RFLOOP EN1	RFLOOP EN1
13.	STN RESET	STN RESET	BLANK
14.	BLANK	BLANK	BLANK
15.	BLANK	BLANK	BLANK

Front Panel Input	EXP_DATA	DATA	DIAGNOSTIC
Position 1	BLANK	BLANK	BLANK
Position 2	BLANK	BLANK	BLANK

5.6.9.1. Definition of SAM Wildcard Inputs Function Keys

Note: Pressing **F2**, **F3**, **F4**, or **F6** to change setups will also change the SAM Wildcard Outputs screen to the same setup. This will delete all Action Tables referenced in the SAM Wildcard Input screen provided the Action Table is not referenced in any of the SAM Mode Tables. If an Input Type or Output Type field is changed to EXP_DATA, DATA or DIAGNOSTIC then the other fields will be changed for that particular Input / Output Type which is dependent on the Wildcard Input or Wildcard Output.

F1 – Provide help.

F2 – Set the I/O Configuration to WILDCARD. Sets the Input Type field to BLANK for all of the Wildcard Inputs and the Front Panel Input.

F3 – Set the I/O Configuration to DATA. The Input Type field is set to DATA for the following Wildcard Inputs: 0, 1, 3, 4, 5, 10, 11, 12, 13. The remaining Input Type fields are set to BLANK.

F4 – Set the I/O Configuration to EXP_DATA. The Input Type field is set to EXP_DATA for the following Wildcard Inputs: 0, 1, 3, 4, 5, 10, 11, 12, 13. The remaining Input Type fields are set to BLANK.

F5 – Print the current page.

F6 – Set the I/O Configuration to DIAGNOSTIC. The Input Type field is set to DIAGNOSTIC for the following Wildcard Inputs: 1, 11, 12, 13. The remaining Input Type fields are set to BLANK.

F8 – If in the Active or Inactive Action Table field and a valid Action Table is entered then that Action Table will be displayed and available for editing. See section on Editing SAM Action Tables from SAM Wildcard Input Screen.

F10 – Exit the Wildcard Input Menu and return to the SAM Menu.

5.6.10. SAM Encoder / Decoder Tables (F8)

The screen shown below allows entry into the SAM Tone Encoder/Decoder Table screen. There are eight possible tone schemes: ZVEI, ZVEIMOD, ZVEIFR, CCIR, CCIRMOD, EEA, CUSTOM, and DTMF. DTMF is a choice if the SAM board is version 2.00 or greater. CUSTOM is the only scheme that is completely editable. The tone schemes are listed on a submenu of the F8 selection from the SAM menu. The desired tone scheme may be selected by pressing **Tab**, **Up**, and **Down**. The corresponding information will be displayed upon pressing **Enter**. Upon returning from any particular tone scheme, the cursor will automatically advance to the next tone scheme in the list.

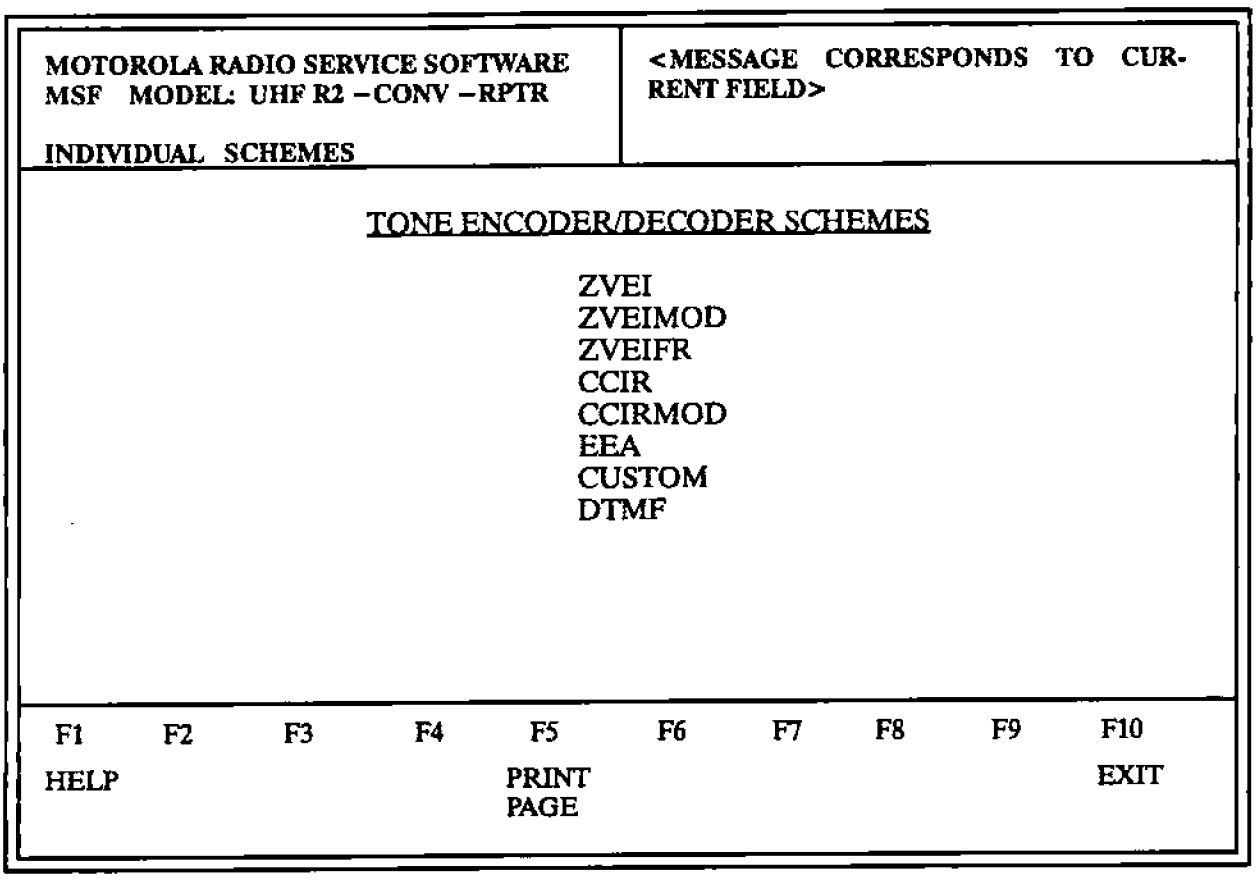


Figure 5.33: Individual Schemes screen

For all Tone schemes the following information will be present: scheme name, frequencies 0 – E, tone duration (except CUSTOM), first TOT, following TOT, repeat tone and group tone. For all schemes except CUSTOM, which is completely editable, only the following are editable: first TOT, repeat tone and group tone. The bandwidth field is an editable field unique to the CUSTOM scheme.

For the DTMF scheme the following information will be present: scheme name, tones and corresponding frequency pairs, and DTMF Inter–tone Gap. Only the Inter–tone Gap and Decoder TOT fields are editable.

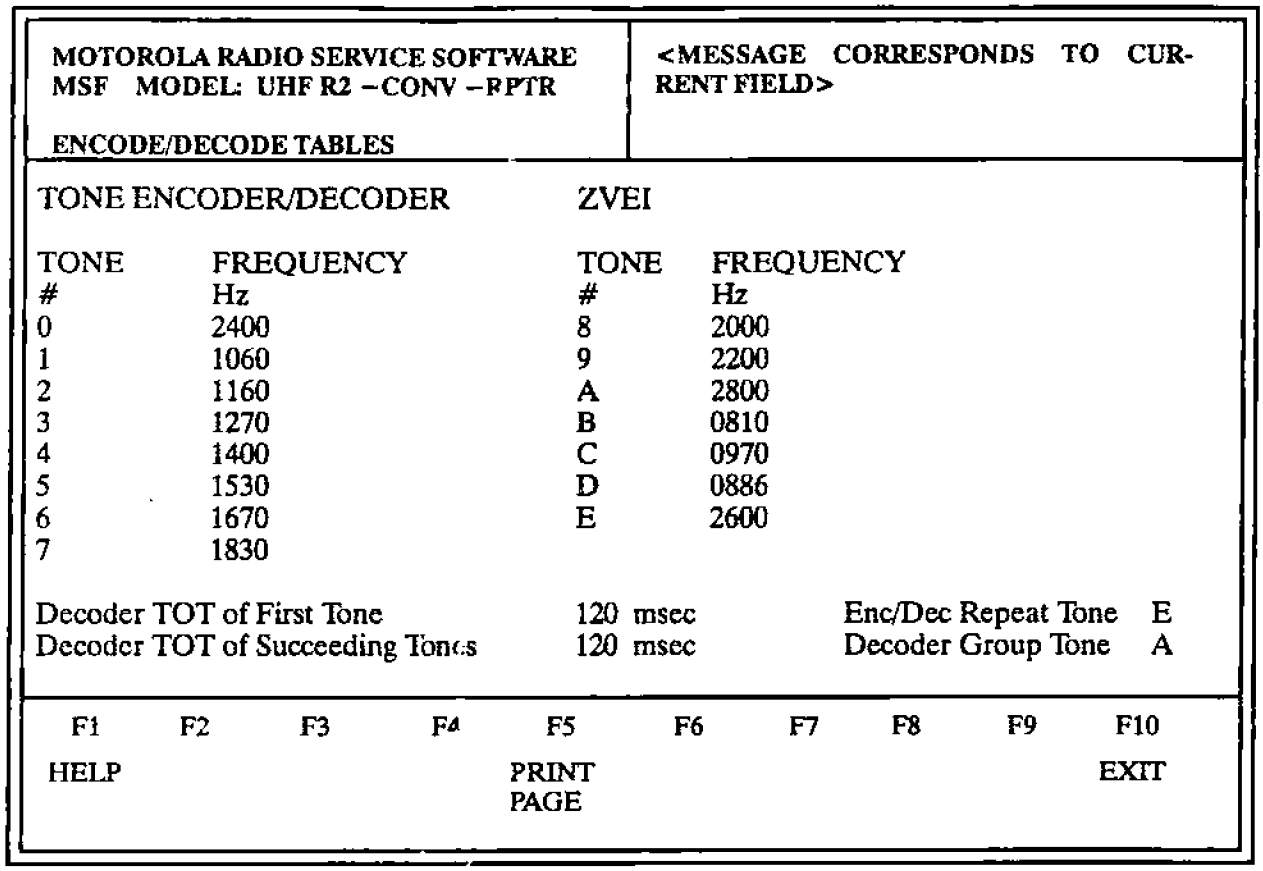


Figure 5.34: Encode / Decode Table for ZVEI scheme

Bandwidth

The Bandwidth field will only appear for the CUSTOM scheme. The valid range is 0 to 9.99 percent. It is the percent bandwidth allowed during tone detection. To avoid aliasing, lower percent values are recommended. The value of this field is not stored in the codeplug. It is used to calculate the DELTA values for the CUSTOM scheme. This field is calculated upon entering and may therefore be slightly different in value than what was typed in previously.

Tone Frequencies

The tone frequencies valid range is 280 to 3300 Hz. These are only editable for the CUSTOM scheme. These frequencies are the center frequencies used in tone detection.

Decoder TOT of First Tone

This field is the amount of time that the station waits until trying to detect the tone following the first tone. The valid range is 70 to 290 msec. The valid range for the CUSTOM scheme is 0 to 655350 msec. Default for ZVEI, ZVEIMOD and ZVEIFR is 120 msec. Default for CCIR is 170 msec. Default for EEA and CCIRMOD is 70 msec.

Decoder TOT of Succeeding Tones

This is the amount of time that the station waits until trying to detect all succeeding tones. The valid range is 70 to 290 msec. The valid range for the CUSTOM scheme is 0 to 655350 msec. Default for CCIRMOD, ZVEI, ZVEIMOD and ZVEIFR is 120 msec. Default for CCIR is 170 msec. Default for EEA is 100 msec. This field is only editable for the CUSTOM scheme.

Enc / Dec Repeat Tone

The Repeat Tone is is the tone that is substituted when identical tones are to be encoded or decoded. For example, if the following tones were to be encoded '12234', and the Repeat Tone was A then the sequence of tones would be '12A34'. The valid range is 0 – E.

Decoder Group Tone

The Group Tone is the tone that is used by the Group Target field on the SAM Mode Tables (see Section 5.6.4.1.). The Target must be matched as defined on the SAM Mode Tables for a Group Action Table to be executed. The valid range is 0 – E.

MOTOROLA RADIO SERVICE SOFTWARE MSF MODEL: UHF R2 –CONV –RPTR ENCODE/DECODE TABLES	<MESSAGE CORRESPONDS TO CURRENT FIELD>

DTMF ENCODER/DECODER

TONE #	PAIRS Hz	TONE #	PAIRS Hz	TONE #	PAIRS Hz	TONE #	PAIRS Hz
D	0941 1633	4	0770 1209	8	0852 1336	#	0941 1477
1	0697 1209	5	0770 1336	9	0852 1477	A	0697 1633
2	0697 1336	6	0770 1477	0	0941 1336	B	0770 1633
3	0697 1477	7	0852 1209	*	0941 1209	C	0852 1633

DTMF Inter–Tone Gap 0050 msec
DTMF Decoder TOT 003000 msec

F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
HELP				PRINT PAGE					EXIT

DTMF Tone Pairs

Each character of the DTMF scheme corresponds to a pair of frequencies. The characters are 0 through 9, A through D, *, and #. The corresponding frequencies range from 600 to 3300 Hz.

DTMF Inter–Tone Gap

This field defines the length of the pause between two DTMF tones. The valid range is 50 to 21100 msec. The default is 50 msec.

DTMF Decoder TOT

This field defines the maximum amount of time that the DTMF Decoder will wait from the detection of a DTMF tone and to the detection of the following tone in a sequence. The valid range is 10–655350 msec. The default is 3000 msec.

5.6.10.1. Definition of SAM Encode / Decode Table Function Keys

F1 – Provides HELP associated with the SAM Encode / Decode field.

F2 – Print the current page.

F10 – Exit the SAM Encode / Decode Table and return to the SAM Menu.

5.6.11. SAM Wildcard Outputs (F9)

The SAM Wildcard Outputs screen defines 24 Wildcard Output lines. Each Wildcard Output contains the following fields: Output Type, Active and Output Enable Conditions. These fields are described below.

```
MOTOROLA RADIO SERVICE SOFTWARE                <MESSAGE CORRESPONDS TO CUR-
MSF MODEL: UHF R2 –CONV –RPTR                  RENT FIELD>
PAGE 01 Of 03
SAM WILDCARD OUTPUTS

I/O CONFIGURATION      EXP_DATA

WILDCARD    OUTPUT     ACTIVE     OUTPUT ENABLE CONDITIONS
 OUTPUT     TYPE
   0        EXP_DATA   HIGH       ALM BIT 0
   1        EXP_DATA   LOW        ALM BIT 1
   2        EXP_DATA   LOW        ALM BIT 2
   3        EXP_DATA   LOW        ALM BIT 3
   4        EXP_DATA   LOW        ALM BIT 4
   5        EXP_DATA   LOW        ALM BIT 5
   6        EXP_DATA   LOW        ALM BIT 6
   7        EXP_DATA   LOW        ALM BIT 7
   8        EXP_DATA   LOW        ALM BIT 8
   9        EXP_DATA   LOW        ALM BIT 9
  10        EXP_DATA   LOW        ALM BIT 10

 F1     F2          F3        F4          F5      F6          F7   F8   F9   F10
 HELP   WILDCARD    DATA      EXP_DATA    PRINT   DIAG                      EXIT
        SETUP       SETUP     SETUP       PAGE    SETUP
```

Figure 5.35: SAM Wildcard Outputs Menu

I/O Configuration

This is a non–editable field that indicates how the Wildcard Outputs of the Station Access Module are configured. There are four possible choices: EXP_DATA, DATA, DIAGNOSTIC or WILDCARD. This field is changed whenever **F2**, **F3**, **F4**, or **F6** are invoked to change to a new setup. The status of this field determines how the 24 Wildcard Outputs are configured and which of their fields are available for editing.

Output Type

The Output Type field describes how the Wildcard Output has been configured. This field is edited by pressing **Up** or **Down**. If the I/O Configuration field is EXP_DATA then the Output Type field is

non–editable. If the I/O Configuration field is DATA then the Output Type field may be toggled between the following values: EXP_DATA (Wildcard Outputs 0 to 14, this will change all Output Types to EXP_DATA on Wildcard Outputs 0 to 14), DATA (all Wildcard Outputs except Wildcard Output 18), DIAGNOSTIC, WILDCARD or BLANK (all Wildcard Outputs except 15,17,18,19 and 20). If the I/O Configuration field is DIAGNOSTIC or WILDCARD then the Output Type field may be toggled between the following values: EXP_DATA (Wildcard Outputs 0 to 14, this will change all Output Types to EXP_DATA on Wildcard Outputs 0 to 14), DATA (all Wildcard Outputs except Wildcard Output 18), DIAGNOSTIC (all Wildcard Outputs except 20), WILDCARD or BLANK. If this field is set to EXP_DATA, DATA or DIAGNOSTIC then the Active and Output Enable Conditions fields are set to predefined and non–editable states. If the Output Type field is set to WILDCARD then the Active and Output Enable Conditions fields are cleared and are editable. If the Output Type field is set to BLANK then the following fields are non–editable: Active and Output Enable Conditions. If the Output Type field is set to BLANK then that output is never activated by the SAM board.

Active

The Active field determines if the Wildcard Output is Active High or Active Low. This field is non–editable if the Output Type field is EXP_DATA, DATA or DIAGNOSTIC. If the Output Type field is set to WILDCARD then this field may be toggled between the following values: HIGH and LOW. If the Output Enable Conditions are satisfied then the Wildcard Output will make a transition to the Active state. When the Output Enable Conditions are no longer satisfied the Wildcard Output will make a transition to its former state.

Output Enable Conditions

The Output Enable Conditions field specify alarms or conditions to be met for the Wildcard Output to switch to the Active state. This field is only editable if the Output Type field is set to WILDCARD. The following is list of alarms along with the abbreviation and description of the alarm:

Alarm	Abbreviation
DC POWER ALARM	DC PWR ALM

Indicates the DC supply voltage used to power the MSF station circuitry has fallen below a preset threshold.

RX1 SYNTHESIZER ALARM	R1 SYN ALM

Indicates a problem exists with the first receive synthesizer. Synthesizer may be out of lock or it has failed to momentarily unlock after a change frequency command.

RECEIVER 1 ALARM	RCVR1 ALM

Indicates a problem with the first receiver in diversity stations only. Generated by activity on receiver 2 but no activity on receiver 1 during a pre–determined amount of time

AC MAINS FAILURE ALARM	AC MN FAIL

Goes active when the AC power at the site has failed.

IPA RF ALARM	IPA RF ALM

Indicates the transmitter is not able to make full rated power due to a problem with Intermediate Power Amplifier (IPA) module.

RSSI/DIVERSITY ALARM	RSSI/DIV

Indicates a problem exists on the Loopback / Combiner board, specifically with the diversity combining circuitry (for diversity stations only) or with the Receiver Signal Strength Indicator (RSSI) circuitry.

FINAL PA RF ALARM FIN PA RF
Indicates the transmitter is not able to make full rated power due to a problem on the final power amplifier.

STATION CONTROL BD ALARM SSCB ALM
Indicates that a fatal error has occurred on the SSCB. Upon detection the SSCB will attempt to reset the station.

LOOPBACK CIRCUIT ALARM LOOPB CIRC
Indicates that the loopback circuitry oscillator failed to startup after it was given the 'loop back on' command.

RECEIVER 2 ALARM RCVR2 ALM
Indicates a problem with the secondary receiver, in diversity stations only. Generated by activity on receiver 1 but no activity on receiver 2 during a pre–determined amount of time.

REVERSE POWER ALARM RV PWR ALM
Indicates a high amount of reverse power is present at the transmitter antenna while the station is keyed.

RX2 SYNTHESIZER ALARM R2 SYN ALM
Indicates a problem exists with the second receive synthesizer (diversity stations only). Synthesizer is out of lock or has failed to momentarily unlock after a change frequency command.

ALARM INTERFACE FAULT ALM INT F
Goes active when Station Access Module itself has a fault.

BATTERY OVERVOLTAGE ALARM BATT OVOLT
Indicates that the voltage of the customer supplied battery for battery revert applications is too high. This will cause the station DC supply to a low value which effectively shuts down the MSF station.

TX SYNTHESIZER ALARM TX SYN ALM
Indicates a problem with the transmit synthesizer. Synthesizer is out of lock or has failed to momentarily unlock after a change frequency command.

LINE PTT SENSE LN PTT SEN
Goes active when a voice line PTT is detected by the station.

PTT DEKEY ALARM PTT DEKEY
Indicates the base station was commanded to dekey and failed and that the station still has transmitter RF power at the antenna.

RX PL DETECT RX PL DET

Indicates the base station is receiving an on–channel signal modulated with the proper Private Line (PL) code.

CARRIER DETECT CARR DET
Indicates the station has detected the presence of a receive RF carrier signal.

REPEATER PTT RPTR PTT
Indicates the station has detected all of the preprogrammed qualifiers necessary to key up the station in repeater mode.

REPROGRAM STATION RPGM STN
Indicates an error code has been detected during MSF reset diagnostics or during normal operation. May be cleared by simply reprogramming the base station.

DOOR ALARM DOOR ALM
Indicates the door to the MSF has been removed (either door in two–door cabinets).

ACCESS DISABLE ACC DIS
Indicates that the Access Disable switch on the front panel of the MSF has been moved to the access disable position or the ACC DIS bit on the MUXbus has been set. When active remote control of the base station, including 'DATA PTT' is disabled.

REDUCED RF POWER ALARM RED RF PWR
Indicates during transmit, the PA and power control circuitry is not able to level at full rated power. The PA is keyed, but at a 3 dB (or selectable) cutback condition.

DRIVER RF POWER ALARM DR RF PWR
Indicates the transmitter is not able to make full rated power due to a problem on the Driver RF Power Amplifier.

SECURE BOARD ALARM SEC BD ALM
Indicates a fatal error has occurred on the secure board. Upon detection the SSCB will attempt to reset the station.

TTRC BOARD ALARM TTRC ALM
Indicates a fatal error has occurred on the TTRC board. Upon detection the SSCB will attempt to reset the station.

ALARM WORD BIT n ALM BIT n (where n is 0..14)
Goes active when an applicable alarm condition is detected by the SAM board. This alarm may only be entered on Wildcard Outputs 0 – 14. The 'n' must match the Wildcard Output Number and setting this field will change Wildcard Outputs 0 to 14 to contain ALM BIT 0 to ALM BIT 14. This alarm is used when Wildcard Outputs 0 to 14 are to be set up in an EXP_DATA configuration and Wildcard Outputs 15 to 23 are desired to be editable.

The following is a list of predefined, non–editable alarms that will appear in the Output Enable Conditions field for each Wildcard Output when the Output Type field is set to EXP_DATA, DATA and DIAGNOSTIC.

Wildcard Output	EXP_DATA	DATA	DIAGNOSTIC
0.	ALM BIT 0	DC PWR ALM	DC PWR ALM
1.	ALM BIT 1	R1 SYN ALM	R1 SYN ALM
2.	ALM BIT 2	RCVR1 ALM	RCVR1 ALM
3.	ALM BIT 3	AC MN FAILAC MN FAIL	
4.	ALM BIT 4	IPA RF ALM	IPA RF ALM
5.	ALM BIT 5	RSSI/DIV	RSSI/DIV
6.	ALM BIT 6	FIN PA RF	FIN PA RF
7.	ALM BIT 7	SSCB ALM	SSCB ALM
8.	ALM BIT 8	LOOPB CIRC	LOOPB CIRC
9.	ALM BIT 9	RCVR2 ALM	RCVR2 ALM
10.	ALM BIT 10	ALM INT F	ALM INT F
11.	ALM BIT 11	R2 SYN ALM	R2 SYNvv ALM
12.	ALM BIT 12	RV PWR ALM	RV PWR ALM
13.	ALM BIT 13	BATT OVLT	BATT OVOLT
14.	ALM BIT 14	TX SYN ALM	TX SYN ALM
15	LN PTT SEN	LN PTT SEN	SEC BD ALM
16.	BLANK	PTT DEKEY	PTT DEKEY
17.	RX PL DET	RX PL DET	DR RF PWR
18.	BLANK	BLANK	TTRC ALM
19.	CARR DET	CARR DET	RED RF PWR
20.	RPTR PTT	RPTR PTT	BLANK
21.	BLANK	RPGM STN	RPGM STN
22.	BLANK	DOOR ALM	DOOR ALM
23.	BLANK	ACC DIS	ACC DIS

If the Output Type field is set to WILDCARD then the Output Enable Conditions field may be set to any of the alarms described above or it may be set up to respond to MUXbus data. MUXbus data consists of one to three conditions on the MUXbus where each condition is of the following format:

MUXaddr, Mask

MUXaddr – Address on the MUXbus that contains bits to compare to the Mask. Valid range is 0 – 15.

Mask – Compared to bits located at MUXaddr. If Mask equals bits located at MUXaddr then condition is evaluated as true. Must be a four character mask where each character corresponds to one of the bits at the MUXaddr. Valid range of each character is 0, 1 or X (don't care).

Example: 14,XX10

This indicates the Wildcard Output will go to its Active state when:

MUX address 14, bit 0 = 0 and bit 1 = 1.

If more than one of these is present for this output, an additional field, AND or OR, is required, which describes the combining logic for these conditions.

Example: 14,XXX1 2,1XXX OR

This indicates the Wildcard Output will go to its Active state when:

MUX address 14, bit 0 = 1 OR
MUX address 2, bit 3 = 1.

5.6.11.1. Definition of SAM Wildcard Outputs Function Keys:

Note: Pressing **F2**, **F3**, **F4**, or **F6** to change setup will also change the SAM Wildcard Inputs screen to the same setup. This will delete all Action Tables referenced in the SAM Wildcard Input screen provided the Action Table is not referenced in any of the SAM Mode Tables. When the Output Type field is changed to EXP_DATA, DATA or DIAGNOSTIC then the other fields will for that output will be changed to their default EXP_DATA, DATA or DIAGNOSTIC values.

F1 – Provide help.

F2 – Set the I/O Configuration to WILDCARD. Sets the Output Type field to BLANK for all of the Wildcard Outputs except output 0, which is set to WILDCARD.

F3 – Set the I/O Configuration to DATA. The Output Type field is set to DATA for all Wildcard Outputs except Wildcard Output 18 which is set to BLANK.

F4 – Set the I/O Configuration to EXP_DATA. The Output Type field is set to EXP_DATA for all Wildcard Outputs except the following: 16, 18, 21, 22 and 23 which are set to BLANK.

F5 – Print the current page.

F6 – Set the I/O Configuration to DIAGNOSTIC. The Output Type field is set to DIAGNOSTIC for all Wildcard Outputs except Wildcard Output 20 which is set to BLANK.

F10 – Exit the SAM Wildcard Output Menu and return to the SAM Menu.

5.7. Station Model / Options (F8)

Pressing **F8** at the CHANGE / VIEW CODEPLUG DATA MENU will display the Station Model / Options Screens. These screens contain all the editable and non–editable fields dealing with the Station Type Information of the station being serviced. **Tab** and **BackTab** are used to move the cursor to the next and previous data fields, respectively. **PgUp** and **PgDn** are used to quickly move between the two Station Model / Option screens.

Each entry in the Station Model / Options screens is described below.

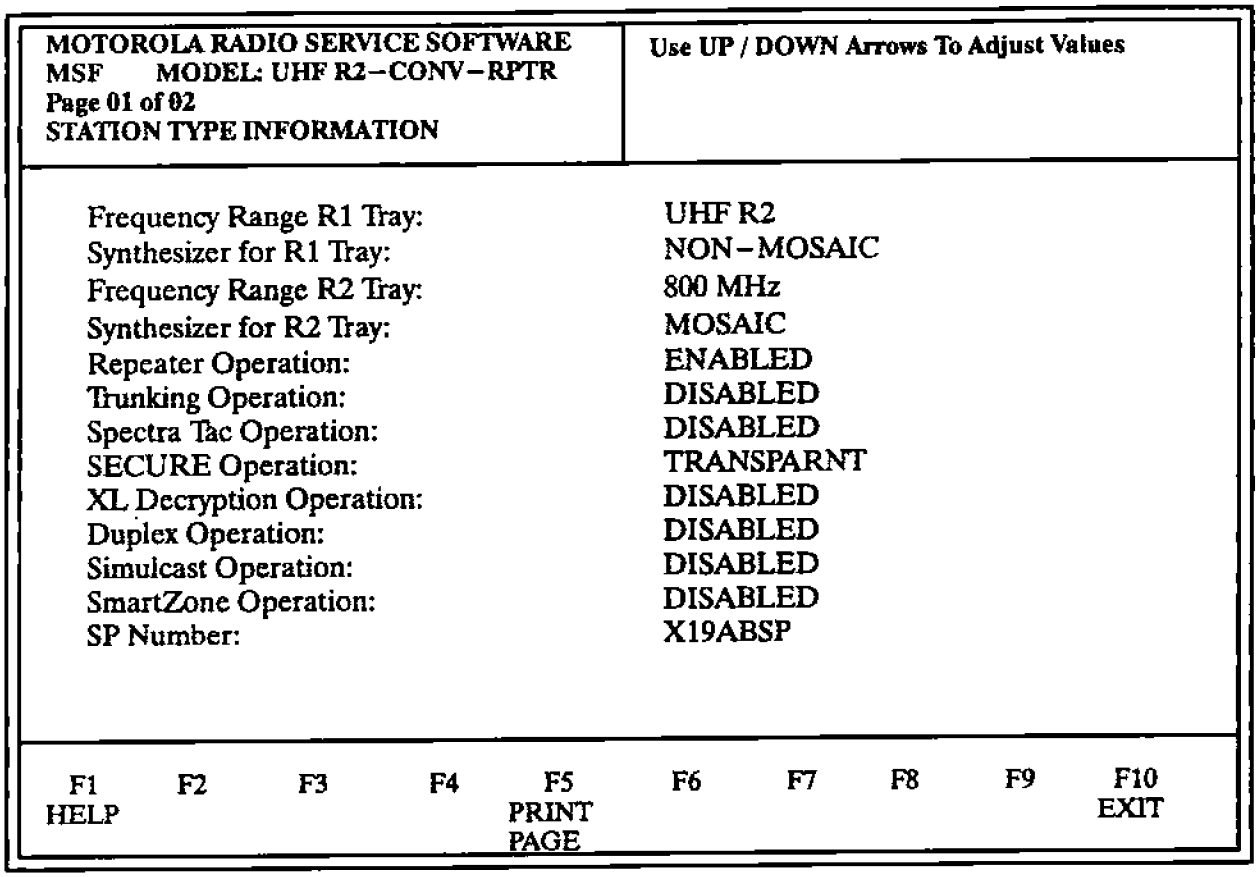


Figure 5.36: Station Type Screen

Frequency Range R1 Tray

***** WARNING *****

ALL CHANNEL FREQUENCIES (RX AND TX) IN THE R1 TRAY WILL CONTAIN ZEROS AFTER CHANGING THIS FIELD!

The following choices of frequency range can be selected by pressing **Up** and **Down**:

Frequency Range	Receiver Frequency	Transmitter Frequency	
VHF R1	132 – 158	132 – 158	[5 kHz or 6.25 kHz steps]
VHF R2	146 – 174	146 – 174	[5 kHz or 6.25 kHz steps]
UHF R1	403 – 435	403 – 435	[5 kHz or 6.25 kHz steps]
UHF R2	435 – 475	435 – 475	[5 kHz or 6.25 kHz steps]
800 MHz	806 – 825	851 – 870	[12.5 kHz steps]
896 MHz	896 – 902	935 – 941	[12.5 kHz steps]

Once selected, the frequency range is reflected in the Model field in the upper left window of the screen. If the frequency range selected is different than the original range then a message will appear to warn the user that changing the frequency range will result in zeroing all channels' frequencies that are contained in the R1 Tray. If the user does not wish to continue at this point, pressing **F10** will cancel the action and return the user to the Frequency Range field.

Synthesizer For R1 Tray

The Synthesizer For R1 Tray field may be toggled between MOSAIC and NON–MOSAIC. This field determines which algorithm will be used to encode and decode channel frequencies and the loopback frequencies if present. The R1 Tray contains all TX and TX IDLE frequencies and may also contain RX frequencies. If the RX frequencies are located in a different frequency band then they will be found in the R2 tray and will be encoded and decoded according to the Frequency Range R2 Tray and the Synthesizer For R2 Tray fields. This field is initialized upon reading in a codeplug. If the program is unable to determine the type of synthesizer (i.e. the channel frequency is zero), a message will appear, warning the user that the synthesizer type for that tray was undetermined and suggesting that the user check the channel frequencies.

Frequency Range R2 Tray

***** WARNING *****

ALL RX CHANNEL FREQUENCIES IN THE R2 TRAY WILL CONTAIN ZEROS AFTER CHANGING THIS FIELD!

The following choices of frequency range can be selected by pressing **Up** and **Down**:

Frequency Range	Receiver Frequency	Transmitter Frequency	
VHF R1	132 – 158	132 – 158	[5 kHz or 6.25 kHz steps]
VHF R2	146 – 174	146 – 174	[5 kHz or 6.25 kHz steps]
UHF R1	403 – 435	403 – 435	[5 kHz or 6.25 kHz steps]
UHF R2	435 – 475	435 – 475	[5 kHz or 6.25 kHz steps]
800 MHz	806 – 825	851 – 870	[12.5 kHz steps]
896 MHz	896 – 902	935 – 941	[12.5 kHz steps]
DISABLED	No R2 Channels Present		

The DISABLED toggle choice indicates that no R2 channels are present or the second receiver tray does not exist for this station. Before changing a channel's RX frequency to be in the R2 tray via the Scanning Receiver screen, this field must be set to a frequency range other than DISABLED. If the frequency range selected is different than the original range then a message will appear to warn the user that changing the frequency range will result in zeroing all channels' frequencies that are contained in the R2 Tray. If the user does not wish to continue at this point, pressing **F10** will cancel the action and return the user to the Frequency Range field.

Synthesizer For R2 Tray

The Synthesizer For R2 Tray field may be toggled between MOSAIC and NON–MOSAIC. This field determines which algorithm will be used to encode and decode channel frequencies and the loopback frequencies if present. This field is initialized upon reading in a codeplug. If the program is unable to determine the type of synthesizer (i.e. the channel frequency is zero), a message will appear warning the user that the synthesizer type for that tray was undetermined and suggesting that the user check the channel frequencies.

Repeater Operation

This option if ENABLED allows in–cabinet repeat. If changed to DISABLED, the station will change from a REPEATER station to a BASE station.

Trunking Operation

This field is non–editable. If necessary to change this field, three trunking codeplugs exist on the original program disks: TRNK.DEF, TRNKSTAC.DEF and TRNKSIMU.DEF. These will enable the user to change the station type. Return to GET/SAVE/PROGRAM Codeplug Data Menu and read the desired file from disk.

***** WARNING *****

AFTER READING A DEFAULT FILE, THE CHANNEL FREQUENCIES WILL BE ZERO. IT WILL BE NECESSARY TO ENTER THE PROPER FREQUENCIES VIA THE CHANNEL INFORMATION SCREEN. RE–READING THE CODEPLUG DATA WILL OVERWRITE THE PRESENT CODEPLUG. TO PRESERVE THE PRESENT CODEPLUG, SAVE TO DISK PRIOR TO READING CONV.DEF, TRNK.DEF, CONVSTAC.DEF, OR.TRNKSTAC.DEF.

Spectra – TAC

This field is non – editable. If necessary to change this field, two *Spectra – TAC* codeplugs exist on the original program disks: CONVSTAC.DEF and TRNKSTAC.DEF. These will enable the user to change the station type. Return to GET/SAVE/PROGRAM Codeplug Data Menu and read the desired file from disk.

If ENABLED this field generates a 2175 Hz tone onto Line 2 (only) during time of no receiver activity and no Rx Code Detect. Also, clear receiver audio is routed through the *Spectra – TAC* equalizer filter before being sent to Line 2.

SECURE Operation

This field will contain DISABLED and be non – editable if the SECURE Equipped field is DISABLED. If SECURE Equipped is ENABLED then this field indicates whether or not the station can operate as a transparent, TRANSPARNT, OR encode/decode, ENC/DEC, secure equipped station. If ENC/DEC is selected, at least one of the following options must also be present:

C388 – DES Encryption
C794 – DVP Encryption
C795 – DES – XL Encryption
C797 – DVP – XL Encryption
C793 – DVI – XL Encryption

XL Decryption Operation

This field indicates type of secure operation, either XL (ENABLED) or CFB (DISABLED). The default is ENABLED. Options C388 (DES Encryption) or C794 (DVP Encryption) will DISABLE this field.

Duplex Operation

This field indicates if the station will operate with a FULL Duplex or HALF Duplex wireline. The default depends upon the station's configuration. Note that this field only changes the Duplex audio routing information; 2 wire vs. 4 wire is a hardware jumper change on the TTRC audio board.

Simulcast Operation

This field is non – editable. If necessary to change this field, two codeplug files exist on the original program disks: CONVSIMU.DEF and TRNKSIMU.DEF. These will enable the user to change the station to a simulcast type. Return to GET/SAVE/PROGRAM Codeplug Data Menu and read the desired file from disk.

SmartZone Operation

At the time of the release of this version of the RSS, the SmartZone Operation field has no affect on station operation. Stations operating in Smartzone systems require the X235ADSP option which incorporates special, non – standard SSCB and TTRC firmware. This field has been included for future development of the standard firmware to include SmartZone Operation. SmartZone is a complex, wide – area trunking system. The field will be notified via MSIN (Motorola Servicers Information Network) as soon as the SmartZone feature is available in standard firmware.

The current shipping versions of firmware (which DO NOT include Smartzone Operation) are: SSCB R5.45, TTRC R5.29, SECURE R4.22.

SP Number

This field displays the SP (Special Product) Number of the SP loaded in the station, or NO SP, if the codeplug has not been modified with an SP. The SP Number field is non – editable.

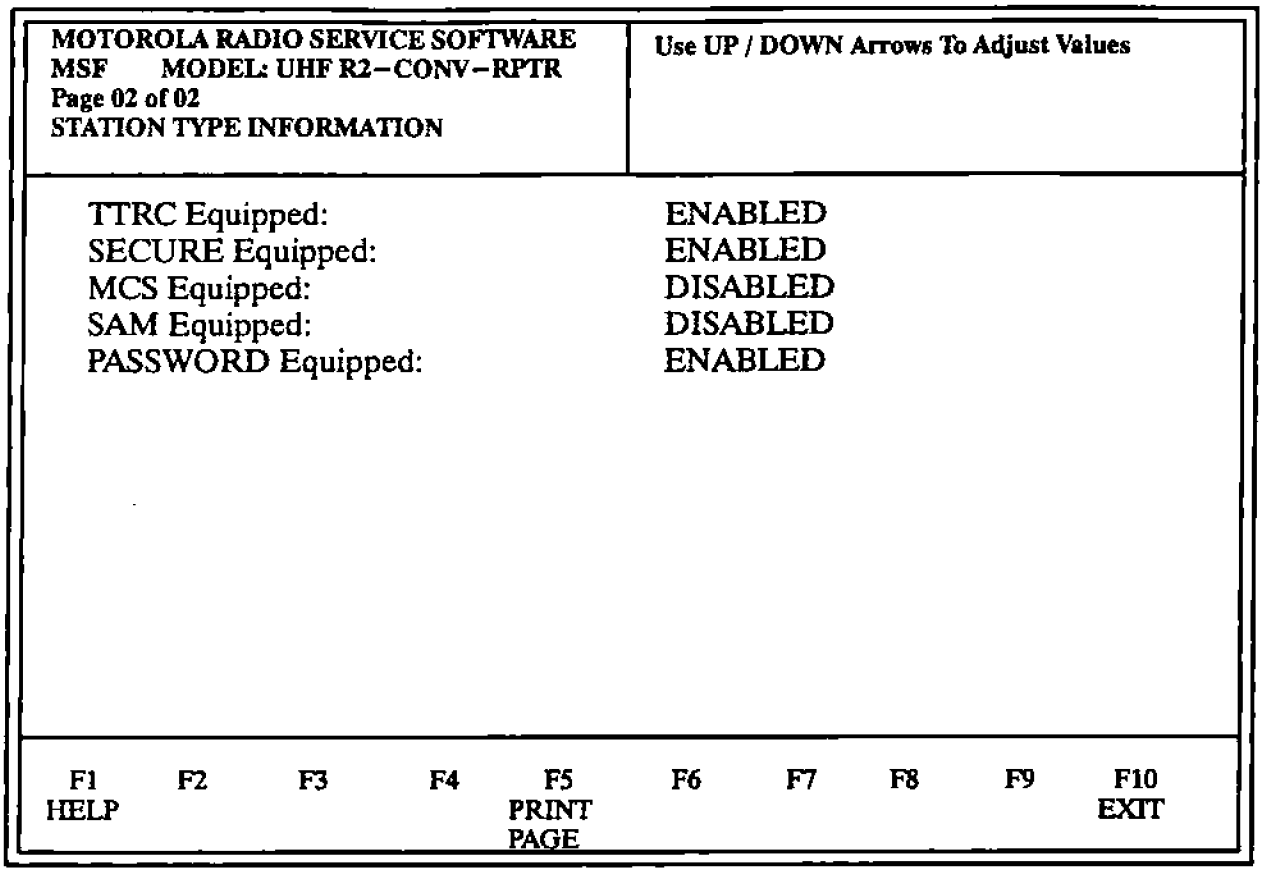


Figure 5.37: Station Type Screen

TTRC Equipped

When ENABLED, this field indicates a TTRC board is present. The other choice is DISABLED. If this field is changed from ENABLED to DISABLED, all TTRC information is removed and cannot be recovered. If DISABLED, all associated fields on the Advanced Information Screen (see Section 5.5.) will display NO TTRC.

SECURE Equipped

When ENABLED, this field indicates a Secure board is present. The other choice is DISABLED. If this field is changed from DISABLED to ENABLED, a temporary screen will appear while the program reads in the default Secure codeplug. If this field is changed from ENABLED to DISABLED, all Secure information is removed and cannot be recovered. If DISABLED, all associated fields on the Advanced Information Screen (see Section 5.5.) will display NO SECURE.

MCS Equipped

When ENABLED, this field indicates a MCS board is present. The other choice is DISABLED. If this field is changed from ENABLED to DISABLED, all MCS information is removed and cannot be recovered. If this field is changed from DISABLED to ENABLED a default MCS Table is created and slaved to mode zero to match factory programming.

SAM Equipped

The SAM codeplug is supported in the MSF 5000 Radio Service Software from Version 5.16.00 and up. RSS versions below 5.16.00 will only support the RAC codeplug which preceded the SAM codeplug.
When ENABLED, this field indicates a SAM board is present. The other choice is DISABLED. If this field is changed from DISABLED to ENABLED, a temporary screen will appear while the program reads in the default SAM codeplug. If this field is changed from ENABLED to DISABLED, all SAM information is removed and cannot be recovered. If DISABLED, all associated fields on the Advanced Information Screen (see Section 5.5.) will display NO SAM.

PASSWORD Equipped

When ENABLED, this field indicates that the station is password protected. If the station is password protected, the RSS user will be required to enter a password before any communication is allowed with the station. If the SSCB firmware is version 5.00 or greater, the PASSWORD Equipped field can be toggled between DISABLED and ENABLED by pressing **Up** and **Down**. The PASSWORD Equipped field reads DISABLED and is non−editable in stations with SSCB firmware versions less than 5.00.

If the PASSWORD Equipped field is changed from DISABLED to ENABLED, the user will be prompted to enter and confirm a password when attempting to program the station. The station WILL NOT be password protected UNTIL the station is successfully programmed.

If the PASSWORD Equipped field is changed from ENABLED to DISABLED, the station remains password protected until the station is programmed. To program the station, the user returns to the MAIN MENU, then presses **F3** (GET/SAVE/PROGRAM Data), followed by **F8** (Program Data into Codeplug). The user will be prompted to enter a password. If the user fails to enter the correct password, the station remains password protected. If the correct password is entered and the data is successfully programmed to the codeplug, the station is no longer password protected, and any subsequent attempts to communicate with the station will not need a password.

If the station is password protected, the password can be changed via the CHANGE PASSWORD SCREEN, found by returning to the MAIN MENU, then selecting **F2** (SERVICE AND ALIGNMENT). More information on changing the password can be found under the SERVICE AND ALIGNMENT section of this manual.

If the station is password protected, the password entry screen will appear and the user will be asked to enter the password whenever an attempt is made to communicate with the station. Note that the password is stored in the station, and not in the RSS. The password must be between 4 and 8 characters long. The set of valid keys for the password are: 0−9 a−z A−Z and the characters above the numbers on a standard keyboard (i.e. a shift 5 is a % which is a valid character for the password). The password does not appear on the screen as the user is typing. Once the password has been validated by the station, normal communication with the station may continue. If the password is invalid, the user may try again or exit the password prompt via the **F10** key. No communication with the station will be allowed until the password has been validated.

All default codeplugs that are shipped with the RSS have the Password protection feature disabled. The user may change the password via the Change Password screen on the Service and Alignment Menu. The user is prompted for the current password followed by the new password. The user is prompted for the new password again to validate the new password. It is imperative that the user remember the station's password!

5.8. MCS Information (F9)

The MCS Information Screen (Figure 5.38) contains editable fields for Multi Coded Squelch(MCS), option C369. In this screen, the user is prompted to type in the MCS Table Number to be edited. After entering the MCS Table Number, that MCS Table data is displayed and available for editing. **Tab** and **BackTab** are used to move the cursor through each field of each user. **Enter** is used to advance the cursor to the next user. **PgUp** and **PgDn** are used to move the cursor between pages.

To add an MCS Table to the station, enter a number one higher than the number of MCS Tables on that station. The MCS Table created will not contain any users. To add users, press **F6**. To delete users, press **F7**.

It is recommended that on stations containing MCS firmware marked '06L99' (shipped prior to 01/31/91), that the MCS board be disconnected during any field programmer communication with the station. The MCS board is located in the expansion tray above the main control boards. The information for the MCS codes is contained in the station control board; therefore, disconnecting the MCS board during communication procedures does not affect programming of the MCS information. It is necessary to reconnect the MCS board after reading or programming the station for the station to operate properly.

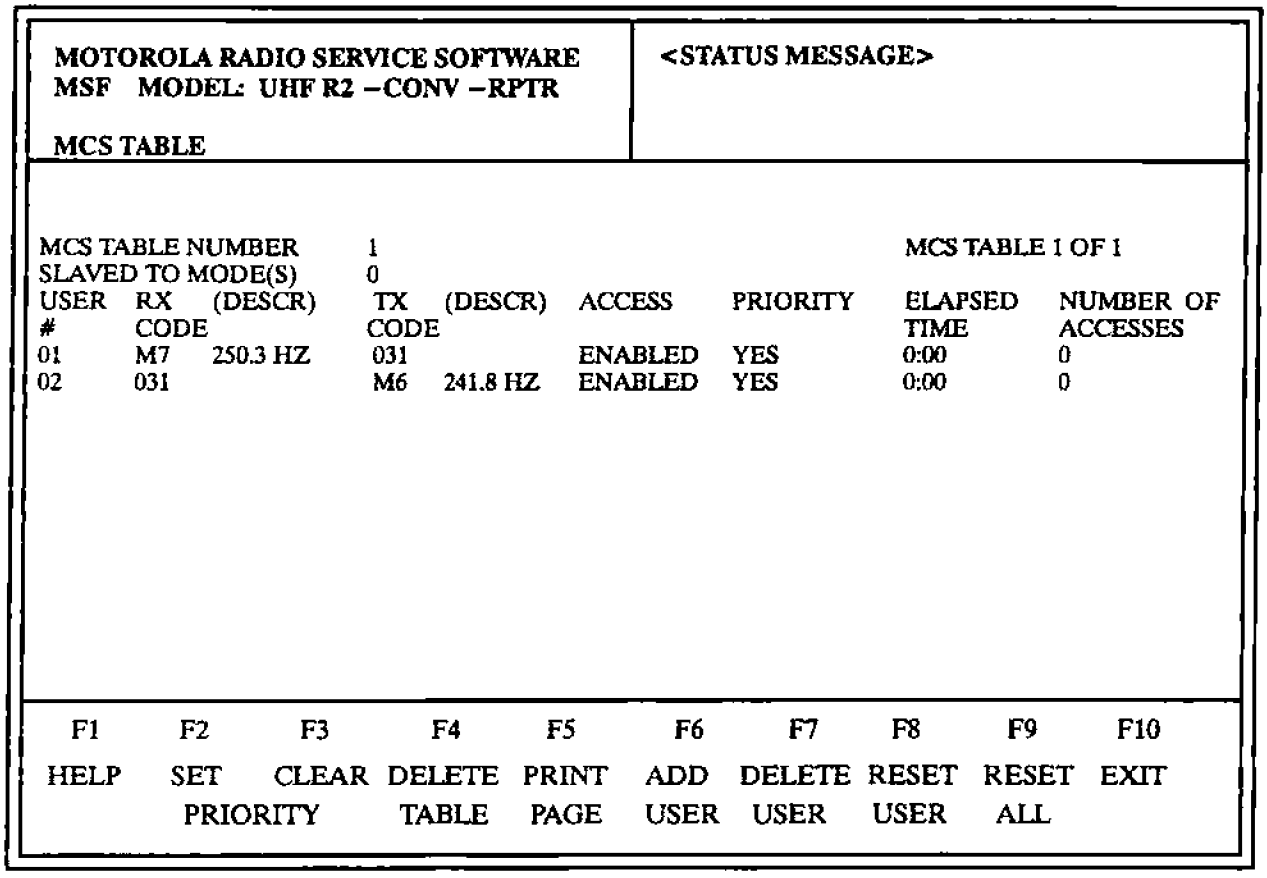


Figure 5.38: MCS Information

5.8.1. Definition of MCS Function Keys

F1 – .Provides HELP associated with the MCS Table

F2 – .Places the MCS module in the priority decode mode. While in the priority mode, the MCS module will not decode non–priority users. This feature can be used to restrict station access during special or emergency situations. If the station mode changes during operation then the set priority function is cleared if previously set.

F3 – Removes the MCS module from the priority decode mode so that all users have access to the station..

F4 – .Deletes the current MCS Table. This key only works on the MCS Table field. The MCS Table cannot be deleted if it is slaved to a mode or if it is the only MCS Table.

F5 – .Print the current page.

F6 – .Adds a user to the end of the user list. There is a maximum of 61 users.

F7 – .Delete the user that the cursor is currently highlighting.

F8 – .Resets the Elapsed Time and Number Of Accesses of the user that the cursor is currently highlighting.

F9 – .Resets the Elapsed Time and Number Of Accesses for all of the users in the MCS Table.

F10 – .Exits the MCS Table.

5.8.2. MCS Field Definitions

The MCS Information fields (see Figure 5.38), along with a brief explanation for each are shown below.

Rx and Tx PL/DPL Code

The Rx and Tx code (PL/DPL) information can be entered by using code or frequency representation. After entering the PL/DPL data, its associated representation is displayed beside it. When an invalid code is entered, the user is prompted and forced to make corrections. There is a maximum of 61 users per table. There is a maximum of 24 Rx DPL codes that may be entered. The Rx code for each user must be unique. The Rx code may not be set to carrier squelch (CSQ). The Tx Code determines what PL or DPL code will be repeated when the user (Rx code) is decoded. The Tx code may be set to any PL/DPL or CSQ code and duplicate transmit codes are permitted.

Access

The MCS user is granted access to the station if the ACCESS field is ENABLED. Pressing **Up** and **Down** will toggle this option. If DISABLED, then the user is turned off and the user's Rx code will not be decoded.

Priority

The MCS module can operate in two modes, Normal Decode Mode and Priority Decode Mode. Upon power up, reset or after reprogramming, the MCS board enters the Normal Decode Mode. In this mode, the state of the priority status parameter is not checked when decoding a PL or DPL code. As a result, any access enabled user (regardless of priority status) can access the station; however, pressing **F2** will place the MCS module in the priority decode mode. While in the priority mode, the

MCS module will not decode non–priority users. This feature can be used to restrict station access during special or emergency situations. The default for this field is NO. **Up** and **Down** will toggle this field.

Elapsed Time

The elapsed time field indicates the amount of time a user has accumulated for billing purposes. This field may be reset to zero for the current user by pressing **F8**. This field may be reset to zero for all of the users on the MCS Table by pressing **F9**.

Number Of Accesses

The Number of Accesses field indicates how many times a user has accessed this station. This field may be reset to zero for the current user by pressing **F8**. This field may be reset to zero for all of the users on the MCS Table by pressing **F9**.

APPENDIX A – GLOSSARY

Adjustment	Means rough tuning of the station to a specified value.
Archive File	Computer disk file that contains the codeplug data of a particular station.
Arrow Keys	The keys that control the cursor and adjustment functions of the software.
Automatic Access	A trunking software option that allows conventional repeaters to react to interrogations by trunking subscribers.
Backup Files	A copy of the archive files that are used in event that the original archive files are lost or erased.
Base	A type of station that does not transmit while receiving.
BSC	Base Station Controller is an enhanced GCC board.
Calibration	The precise method of tuning the station over its entire band spread.
Call Sign	The FCC-assigned ID of the licensee.
Carrier Squelch	A station receive or transmit mode of operation that used receiver squelch as the only method of muting the speaker.
Channel	A pair of receive and transmit frequencies.
Codeplug	The area of non-volatile station memory that stores the station configuration and calibration data.
Com 1 – Com 4	The names of the four serial ports available on IBM PC computers (if the computer is so equipped).
Crystal Aging	The drift of the resonant frequency of a crystal with time.
CSQ	Abbreviation of carrier squelch.
CT	Connect Tone.
Cursor	Flashing underline or block which shows the display location of the next character to be typed from the keyboard.
Data	Numerical information which tells the station what to do.
Defaults	Standard settings the Service Software uses for I/O port locations, file locations and display settings.
Dekey	Turn the transmitter off (remove push-to-talk).
Deviation	The measure of the amount of modulation applied to a transmitter signal.
Disk Drives	Magnetic media that the computer uses to store files.
Display	The CRT terminal that the computer displays information on.
DOS	Abbreviation of Disk Operating System or abbreviation of Data Operated Squelch.

DPL	Abbreviation of Digital Private Line, one form of coded squelch.
DVM	Abbreviation of Digital Volt Meter
DVP	Digital Voice Protection is a proprietary scheme of encrypting voice for security reasons.
EEPROM	Electronically Erasable Programmable Read Only Memory. Used by the station's microcomputer system to store the station's codeplug data.
Encode/Decode	This indicates that a station is equipped to encrypt and decrypt secure audio.
External EEPROM	An EEPROM outside of that contained in the MC68HC11 microprocessor.
Failsoft	A trunking mode that is entered when the Trunking Central Controller is not functional.
Field	A highlighted area on the computer display used to display keyboard entered data.
Files	Information that is saved on the computer disk drive. One file represents the codeplug data for one station.
Floppy Disk Drive	A disk drive that used removable magnetic disks. Service Software, Archive and Backup files are stored on these disks.
Full Duplex	This is the ability to simultaneously receive and transmit wireline audio.
Function Keys	The ten keys located on the PC keyboard labeled F1 to F10.
GCC	General Communications Controller determines trunked station with greatest RSSI value for use in trunking systems.
Hard Disk Drive	A disk drive that used a solid nonremovable magnetic disk. Service Software, Archive and Backup files are stored on these disks.
Key	Either refers to a button on the computer's keyboard or turning the transmitter to the on position.
MCS	Multicoded Squelch is the ability to simultaneously attempt to detect multiple PL and/or DPL.
Menu	A list of functions that are accessed by pressing a function key.
Mode	A mode is a collection of personality values, such as PL codes. A mode is assigned a number that is displayed on the front panel of the station. Personality values are in effect for the mode displayed.
Mosaic	Type of synthesizer chip used to generate frequencies.
MRSS	Motorola Radio Service Software.
MRTI	Microprocessor Radio Telephone Interface (Phone Patch).
MSDOS	Abbreviation of MicroSoft Disk Operating System (MSDOS is a trade mark of MicroSoft Inc.).
MUXbus	A time multiplexed bus.

PCDOS	Abbreviation of Personal Computer Disk Operating System (PCDOS is a trademark of IBM Inc.).
Personality	The data in the codeplug that is custom specific.
PL	Abbreviation of Private Line, a form of coded squelch.
Port	A hardware interface that the computer uses to communicate with other devices.
PTT	Push–to–Talk indicates that the station is transmitting.
RAM	Abbreviation of Random Access Memory. The computer uses RAM to store the program it executes.
Repeater	A type of station that transmits its receiver audio.
RF	Radio Frequency.
RIB	Abbreviation of Radio Interface Box. The RIB is a hardware interface between the station and the computer's serial port.
RMS	Root Mean Square Unit of amplitude measure for AC waveforms.
RSS	Radio Service Software.
RSSI	Received Signal Strength Indicator is RF power received from a station.
SAM	Station Access Module is a board that allows selection of individual repeaters in a multiple repeater system by use of a repeater ID, use of smart Wildcard Inputs and Outputs and remote diagnostics.
Secure	This indicates that a station is equipped to operate in a system in which voice is encrypted.
Screen	A program generated display showing on the computer monitor.
Simulcast	This indicates that multiple stations can transmit on the same RF frequency at the same time.
Spectra–TAC	A type of system that contains multiple receivers, one of whose audio is selected for re–transmission.
Squelch	A station circuit which eliminates noise from the loudspeaker when a received signal is not present.
SSCB	Secure–capable Station Control Board.
Status Tone	A tone indicating that the station is squelched.
Synthesizer	The frequency generating unit of a station.
Transparent	This indicates that a station is equipped to operate in a secure system, but not to encrypt or decrypt audio.
Tree	A way to describe the organization of the Radio Service Software. The Main Menu is considered the trunk and the functions listed on the menu are considered branches.
Trunking	A type of system that assigns and de–assigns RF channels to users as they are needed.

TTRC	Trunked Tone Remote Control is a module in the station that interfaces to a console or a trunking central.
Window	One of the four portions of the screen.
Wireline	A connection between the station and another unit, such as a console (phone line).
XL Decryption	This indicates that the station is equipped for XL operation instead of CFB (cipher feed back).

APPENDIX B – COMMAND SUMMARY

Key	Action
F1	Help Information.
F10	Exit to previous Menu.
ESC	Exit to MAIN MENU.
Right	Right Arrow moves cursor right.
Left	Left Arrow moves cursor left.
Up	Up Arrow changes current Data Entry Field to the previous selection in a list of predetermined choices on DATA ENTRY SCREENS, and increases the Relative Value on ADJUSTMENT SCREENS.
Down	Down Arrow changes current Data Entry Field to the next selection in a list of predetermined choices on DATA ENTRY SCREENS, and decreases the Relative Value on ADJUSTMENT SCREENS.
Enter	Enters data typed and moves to next Data Entry Field. Dignated by RETURN or ENTER on a keyboard.
Tab	Tab moves to the next Data Entry Field.
BackTab	Back Tab (also known as Shift/Tab) moves to the previous Data Entry Field.
BackSpace	Erase the current character in field and move cursor one character left.
Del	Erase current character in field.
PgUp	Display the previous page of information on DATA ENTRY SCREENS, and increments the Relative Value on ADJUSTMENT SCREENS in units of 10.
PgDn	Display the next page of information on DATA ENTRY SCREENS, and increments the Relative Value on ADJUSTMENT SCREENS in units of 10.

APPENDIX C – SITE FAILSOFT APPLICATIONS

1. Introduction

This appendix describes the site failsoft feature of the Digital *MSF 5000* station. The site failsoft feature was designed for use in wide area trunked systems, but can be used in other systems when desired. The site failsoft feature is standard on all Digital *MSF 5000* stations. Some operating modes are not supported by certain station firmware or Radio Service Software (RSS) versions; see Table 1 below for compatibility details.

2. Description

Site failsoft began as a way to allow a *Spectra Tac* equipped station to in–cabinet repeat during special circumstances. It has been expanded to allow control of the repeater operation in a variety of system applications.

To understand the need for site failsoft, it is first necessary to describe the operation of the Digital *MSF 5000* when configured for a wide area system. A wide area system is one in which the station does not in–cabinet repeat; rather, it out–of–cabinet repeats, using some type of audio comparator / voter. In other words, while the station may be receiving and transmitting at the same time, it is not necessarily transmitting its own receiver's audio; it is transmitting the audio sent to it from the comparator / voter via a wireline input. This operation is achieved by setting the station's REPEATER OPERATION codeplug bit to DISABLED; therefore, the station never actually in–cabinet repeats. Examples of wide area systems are simulcast, trunked AMSS, and *Spectra Tac* systems.

The need for site failsoft arises when failure modes of these wide area systems are analyzed. Should the comparator / voter fail, or the link between the comparator / voter and the transmitting station fail, that channel becomes unusable. A fallback mode of operation would be for the the station to change its operation and begin in–cabinet repeating; although the usable range of the system probably degrades, it is still better than complete failure. When the station switches to this mode of operation, it is said to be in "local failsoft" or "site failsoft" operation.

Although the term "site failsoft" implies a trunked system, the feature can be utilized for any type of wide area system, whether trunked or not. The "site failsoft" terminology came about because the original use of the feature was limited to trunked systems, while the station was in failsoft. Other modes of operation have since been added, so that the feature is usable in many different situations. Table 2 below details the site failsoft modes and the differences between them.

The site failsoft mode is set using the RSS. Certain versions of the RSS may be required to access some modes, as detailed in Table 1 below. Figure 4 shows the RSS screen that is used to set the site failsoft mode.

Site failsoft is activated via the system connector on the Digital *MSF 5000*. Figures 1, 2, & 3 below show the details of the system connector. When pin 18 of this connector is grounded, site failsoft becomes active. Again, see Table 2 below for a definition of exactly what happens in each of the site failsoft modes

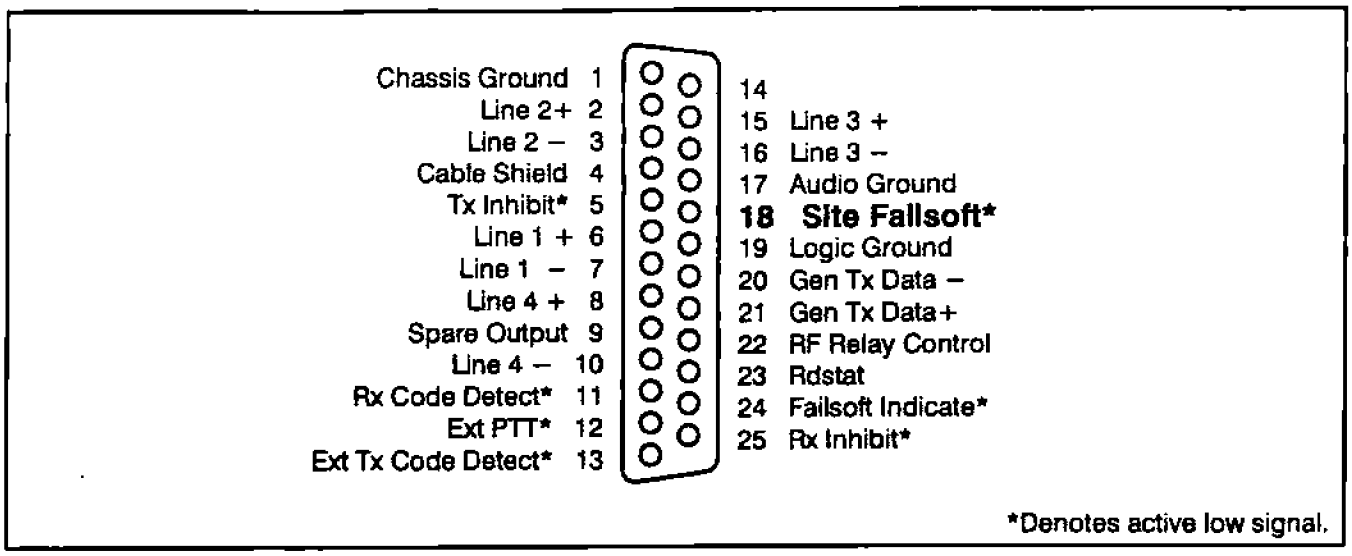


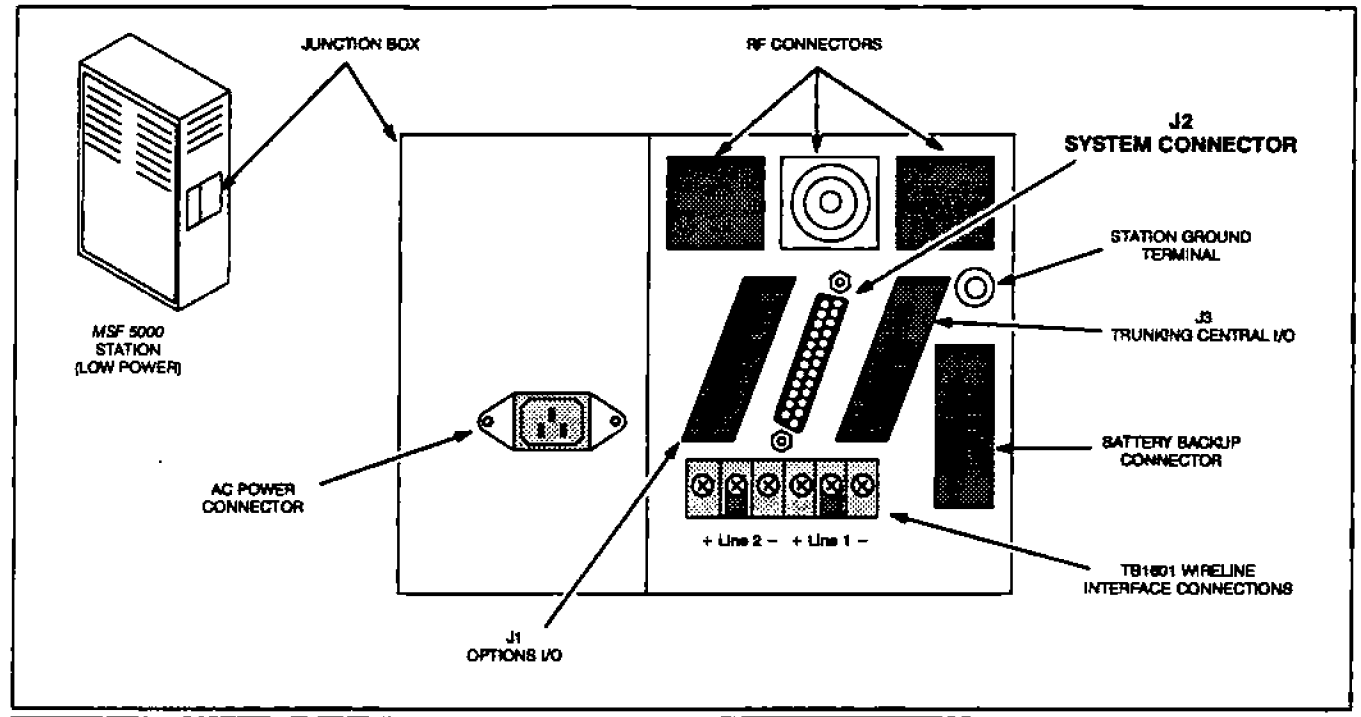
Figure C.1: System Connector (DB–25 Female Connector, J2 on Junction Box)

MOTOROLA RADIO SERVICE SOFTWARE MSF MODEL: UHF R2–CONV–RPTR PAGE 04 OF 08 EDIT ADVANCED INFORMATION	<MESSAGE CORRESPONDS TO CURRENT LINE>

TRUNKING FAILSOFT:		
Failsoft	ENABLED	
Failsoft Tone Duration	00280	0 < time< 10553 msec
Failsoft Tone Interval	09700	0 < time < 10553 msec
Failsoft Tone Frequency	0900	300 < frequency < 2000 Hz
Trunking Tickle Source	TX DATA	
Failsoft Time Out Time	0001	0 < time < 5400 seconds
Failsoft Line	DISABLED	
Site Failsoft Mode	**FS**	**Failsoft**
CONSOLE PRIORITY:		
Switch On LPTT	DISABLED	
Line 2 Tx Mix	DISABLED	
Line 4 Tx Mix	DISABLED	

F1	F2	F3	F4	F5	F6	F7	F8	F9	F10
HELP				PRINT PAGE					EXIT

Figure C.2: RSS Screen with Site Failsoft Mode Control



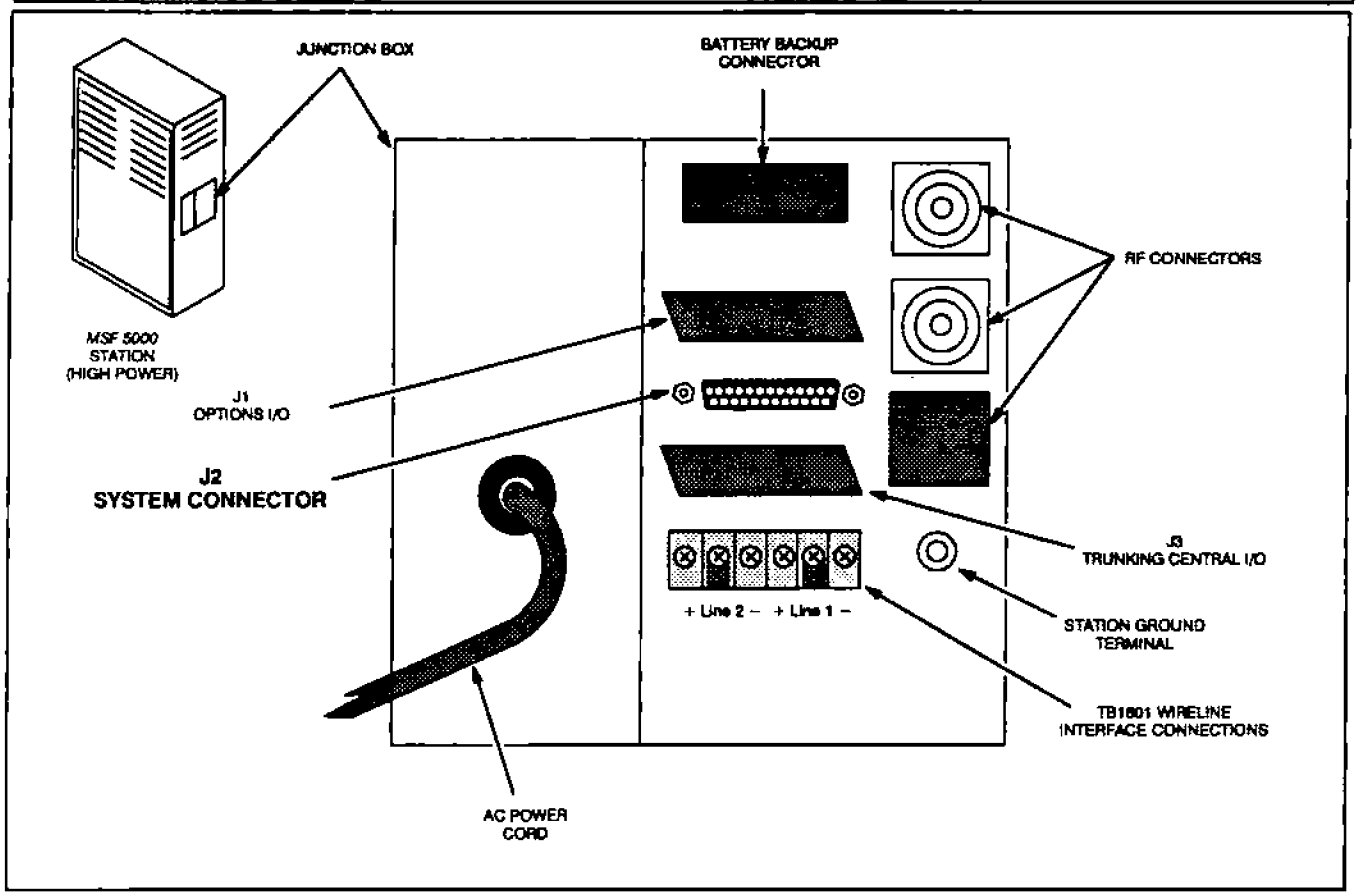


Figure C.3: **MSF 5000** Junction Boxes

*Figure 1. High Power **MSF 5000** Junction Box*

Table 1. Site Failsoft Compatibility

To Use Site Failsoft Mode #:	Requires SSCB Firmware Version:	Requires TTRC Firmware Version:	Requires RSS Software Version:
1	3.05 or higher *	4.02 or higher	4.03 or higher
2	3.05 or higher *	4.13 or higher	4.03 or higher
3	n/a at this time	n/a at this time	n/a at this time
4	4.01 or higher	5.01 or higher	4.03 or higher

Notes: * – SSCB Version 3.05 did not properly mute the TX audio path. To obtain this feature, use SSCB Version 3.19 or higher.

TTRC Versions 4.02 & 4.13 do not mute the simulcast audio path. To obtain this feature, use TTRC Version 5.01 or higher.

SSCB Version 4.01 or higher is required for the site failsoft double beep tone. Versions previous to this generate a low frequency single beep to indicate site failsoft.

Table 2. Site Failsoft Modes

Mode		Prerequisite	Actions when Site Failsoft Input is Active and Prerequisite is met:
#	Name		
1	Failsoft	Must be in Failsoft	In–Cabinet Repeat Change Failsoft beep from single beep to double beep Mute all Wireline and Simulcast audio
2	Failsoft & Trunked	none	Same as Mode 1
3	Modified Failsoft & Trunked	none	Same as Mode 1, except that Wireline audio is not muted, but Status Tone is inhibited
4	Simulcast	none	Forces station into Failsoft, then same as Mode 1

APPENDIX D – AUDIO ROUTING ON THE TTRC BOARD

This appendix is provided to summarize the wireline audio routing on the TTRC board. This routing is very flexible, and controlled via the RSS.

Figure 1 below shows a block diagram of the TTRC audio routing. Typically, only Lines 1 and 2 are used; Lines 3 and 4 are used for special applications or with the Console Priority option (C115). In the description below, fields in the RSS are in **boldface** type.

1. Tx Audio

The audio input to the station which is intended to be transmitted (Tx Audio) may come from either Line1 or Line 3. In addition, it may or may not be routed through the ALC circuity. The **TX Source** gate may be programmed to select either the ALC or UNALC audio. If the UNALC audio is selected, EEPot #E must be set to the desired level. In either case, EEPot #7 sets the final level set to the SSCB board for transmission to the modulator.

The **UNALC Source** is also programmable, to either Line 1 or Line 3. The source for the ALC circuitry is fixed as Line 1. In 2 wire systems, JU4202 allows audio to be input to the station on Line 2.

2. Rx Audio

The audio from the station's receiver is always routed to both Line 2 and Line 4. Status tone can only be routed to Line 2, and is done so whenever the **Status Tone** field is ENABLED or the **Spectra–TAC Station** type is ENABLED. TRC tones may be routed to either Line 2 or Line 4 via the **TRC Tone Mix** field in the RSS. TRC tones are normally only generated in Trunking systems with Console Priority.

Tx Audio may be summed into either Line 2 and / or Line 4 via the **Line 2 Tx Mix** and **Line 4 Tx Mix gates**. These gates are usually off, but may be turned on for special applications or for use with Console Priority.

3. Special Considerations with Console Priority (C115)

When the station is equipped with the Console Priority option, the **Switch on LPTT** RSS field is ENABLED, which causes the Tx Source, Line 2 Tx Mix, and Line 4 Tx Mix audio gates to switch to the opposite of their programmed state during Line PTT (LPTT). In addition, EEPot #7 changes to an alternate setting. The following paragraphs describe the audio routing with Console Priority. For more information, see the MSF Options Manual.

When C115 is added to the station without C269 (*Spectra–TAC / DIGITAC* Encoder), it is assumed that the console will be connected to the station on Lines 1 & 2, and that the CIT (if present) will be connected to Lines 3 & 4. In the quiescent state (no console key–up), Line 3 audio is routed through the UNALC Source gate, Course Adjust circuit, TX Source gate, and EEPot #7 to become the TX Audio (which is then further processed on the SSCB). Receiver audio is routed to both Lines 2 & 4. In addition, TX Audio (derived from Line 3 audio) is routed to Line 2 via the Line 2 Mix gate. This connection allows the console to listen to both sides of a fleet–wide interconnect call. The Line 4 Mix gate is closed to avoid feedback.

When the console begins to transmit, it sends a HLGT burst to the station, which receives it on Line 1. After decoding the guard tone, the station reacts by switching the TX Source, Line 2 Mix, and Line 4 Mix gates to their opposite states. This allows the console audio on Line 1 to become the TX audio (instead of the CIT audio on Line 3), and routes the TX Audio back to the CIT on Line 4 (instead of the console on Line 2). Also, EEPot #7 is automatically changed to its alternate setting. This audio routing remains until the console de-keys; then the audio state is returned to the quiescent state described above.

Note that during a console key-up, the TX Audio is routed through the ALC circuit. The ALC compensates for any changes in the attenuation of Line 1 between the station and the console. If the ALC action is not desired for some reason, it may be removed from the audio path by selecting the TX Source gate to be UNALC Audio, via the field programmer. However, this can only be done if the CIT is not connected to the station on Line 3.

When C115 is added to the station with C269 (*Spectra-TAC/DIGITAC* Encoder), it is assumed that the console will be connected to the station on Lines 1 & 4, and that the comparator will be connected to Lines 2 & 3. In the quiescent state (no console key-up), Line 3 audio is routed through the UNALC Source gate, Course Adjust circuit, TX Source gate, and EEPot #7 to become the the TX Audio (which is then further processed on the SSCB). Receiver audio is routed to both Lines 2 & 4. In addition, TX Audio (derived from Line 3 audio) is routed to Line 4 via the Line 2 Mix gate. This connection allows the console to listen to both sides of a fleet-wide interconnect call. The Line 2 Mix gate is closed to avoid feedback.

When the console begins to transmit, it sends a HLGT burst to the station, which receives it on Line 1. After decoding the guard tone, the station reacts by switching the TX Source, Line 2 Mix, and Line 4 Mix gates to their opposite states. This allows the console audio on Line 1 to become the TX audio (instead of the comparator audio on Line 3), and routes the TX Audio back to the comparator on Line 3 (instead of the console on Line 4). Also, EEPot #7 is automatically changed to its alternate setting. This audio routing remains until the console de-keys; then the audio state is returned to the quiescent state described above.

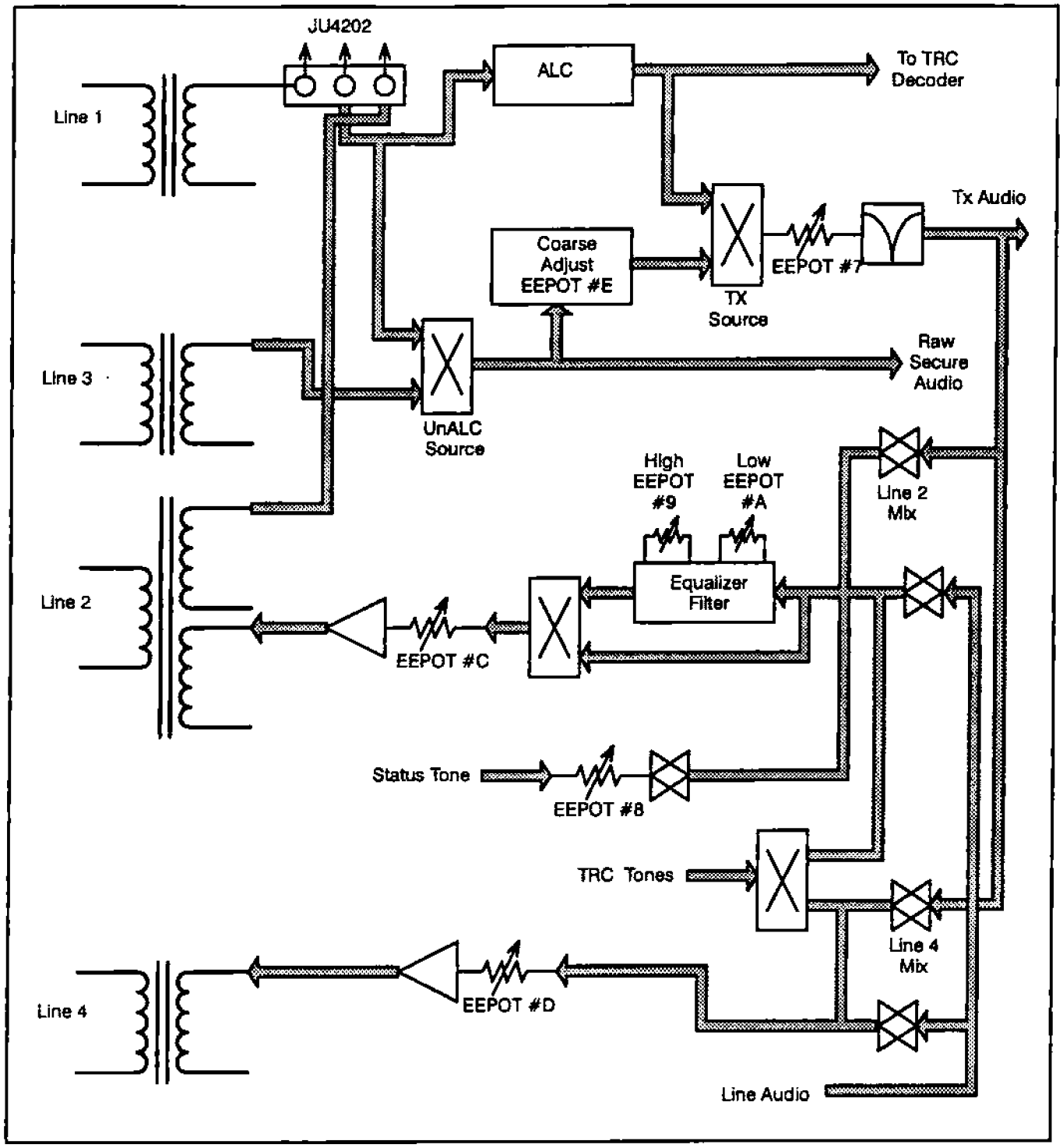


Figure D.1: TTRC Wireline Audio Routing Block Diagram

APPENDIX E – REMOTE CALLUP

This appendix describes how to setup the hardware required to utilize the Remote Callup feature of the RSS (See Section 3.6.). Remote Callup capabilities allow the user to communicate with a station using two modems and ordinary telephone lines. With Remote Callup the user is able to carry out most of the diagnostic, maintenance, and programming procedures provided by the RSS, without physically being at the station.

Required Hardware

There are two methods of setting up the station for Remote Callup. In either case two *Hayes*–compatible modems are required: one at the station, and one connected to, or installed in, the PC running the RSS. Two phone lines are needed, one accessible to each modem. If the station is equipped with an RS–232 serial interface (ie. Wildcard, or SAM board), the only additional hardware needed is a cable to connect the modem directly to the station. If the station **does not** contain an RS–232 serial interface, a Radio Interface Box (RIB) is needed. The same cables required to connect the PC to the station via a RIB are required, with the addition of a no–handshake null modem placed between the modem and the RIB (see Figure E.2) . If the cables are going to be dedicated for use with the modem, the null modem can be eliminated by simply modifying the RIB to PC cable. The wires leading to pins 2 and 3 on the 24–pin side of the RIB to PC cable should be de–soldered, then soldered back in the opposite configuration (the wire originally attached to pin 2 should be attached to pin 3, and the one attached to pin 3 should be attached to pin 2).

Modem Configuration

The modem connected to the station must be configured for auto–answer operation. **It is crucial that the Echo Mode of the modem be turned off.** If the echo mode is not turned off, the station and the modem connected to it will both lock–up during station reset, and will need to be disconnected and reset manually. Pressing **F9** in the REMOTE CALLUP Screen allows the RSS to configure the modem for auto–answer. After pressing **F9**, the RSS prompts the user to enter **F2** to configure the modem for Auto–Answer, or **F5** to restore the modem to a normal configuration without Auto–Answer enabled.

If **F2** (Auto–Answer) is selected, the RSS sends the following AT commands to the modem: **AT E S0=1 S2=45 M &W**. These AT commands disable the echo mode, set the modem to answer after one ring, set the modem's escape sequence to '–––', and disable the speaker. The **&W** stores the configuration to non–volatile memory, so that if the modem loses then regains power, the modem will maintain the current configuration.

If **F5** (Normal) is selected, the RSS sends the following AT commands to the modem: **AT E1 S0=0 S2=42 M1 &W**. These AT commands enable the echo mode, disable auto–answering, set the modem's escape sequence to '***', and enable the speaker. The **&W**, as above, stores the configuration to non–volatile memory.

The RSS contains a Serial Port Configuration screen under the Computer Configuration menu (**F9** from the Main menu) used to properly configure the modem connected to the PC, and the PC for Remote Callup operation. See Section 2.5.1. for details on setting up the correct modem configuration.

Connecting to Station with RS–232 Serial Port

If your station is equipped with an RS–232 Serial Port, located in the junction box on the side of the station, connect the station to the *Hayes* compatible modem as follows (Figure E.1):

4. Disconnect the power to the *MSF.*
5. Connect the phone line from the phone jack into the modem telco receptacle, usually labeled "LINE".
6. Connect one end of the RS–232 cable to the modem's serial port.
7. Connect the other end of the RS–232 cable to the serial port located on the side of the station. It may be necessary to use a gender changer to mate the cable to the station correctly. The station is equipped with a 25–pin female Sub–D connector. Modem serial port connectors may vary.
8. Reapply power to the *MSF.*

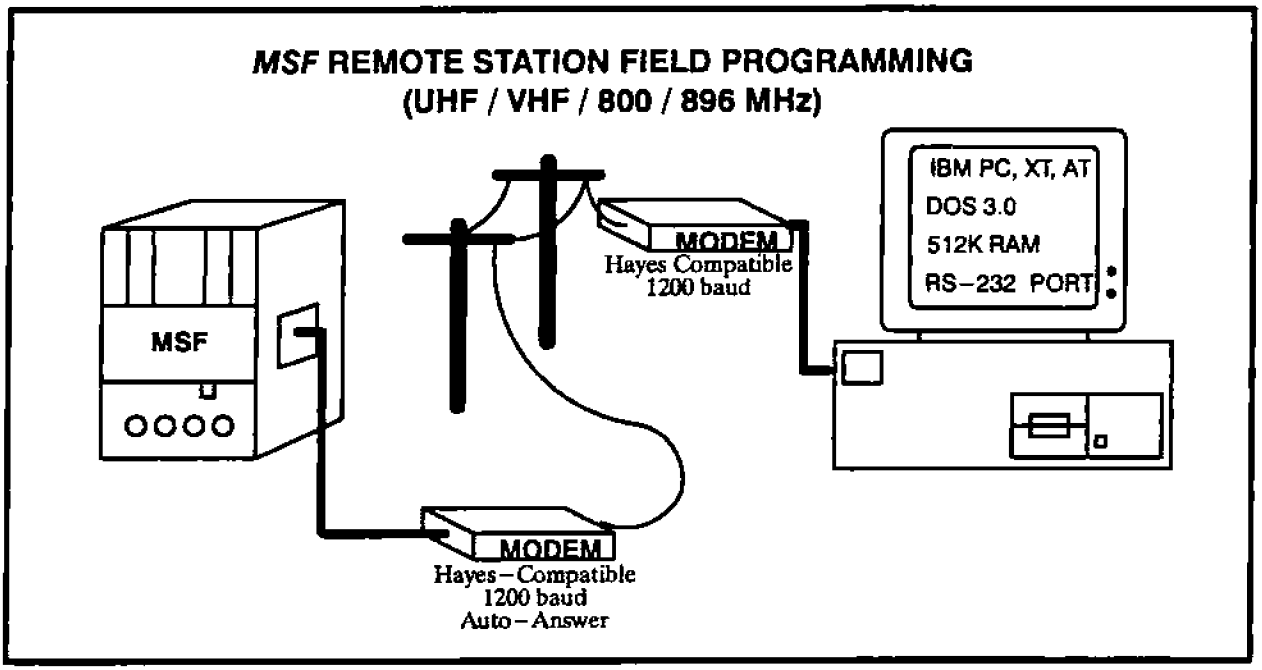


Figure E.1: Remote Callup Connection for Stations with RS–232 Port.

Connecting to Station without RS–232 Serial Port

If your station is **not** equipped with an RS–232 Serial Port, located in the junction box on the side of the station, connect the Radio Interface Box (RIB) and the station to the *Hayes*–compatible modem as follows (Figure E.2):

9. Disconnect the power to the *MSF.*
10. Connect the phone line from the phone jack into the modem telco receptacle, usually labeled "LINE".
11. Connect the null modem to the serial port of the modem.
12. Connect the end of the IBM PC Interface Cable (#6 on page 4) marked "TO IBM" to the free side of the null modem.

13. Connect the free end of the IBM PC Interface Cable to the 15-pin Sub-D connector on the RIB.

14. Connect the 25 pin Sub-D connector on the *MSF* Radio Interface Cable (#8 on page 4) to the 25 pin Sub-D connector on the RIB. Connect the 40 pin ribbon cable connector to the connector on the top of the control tray.

15. Reapply power to the *MSF.*

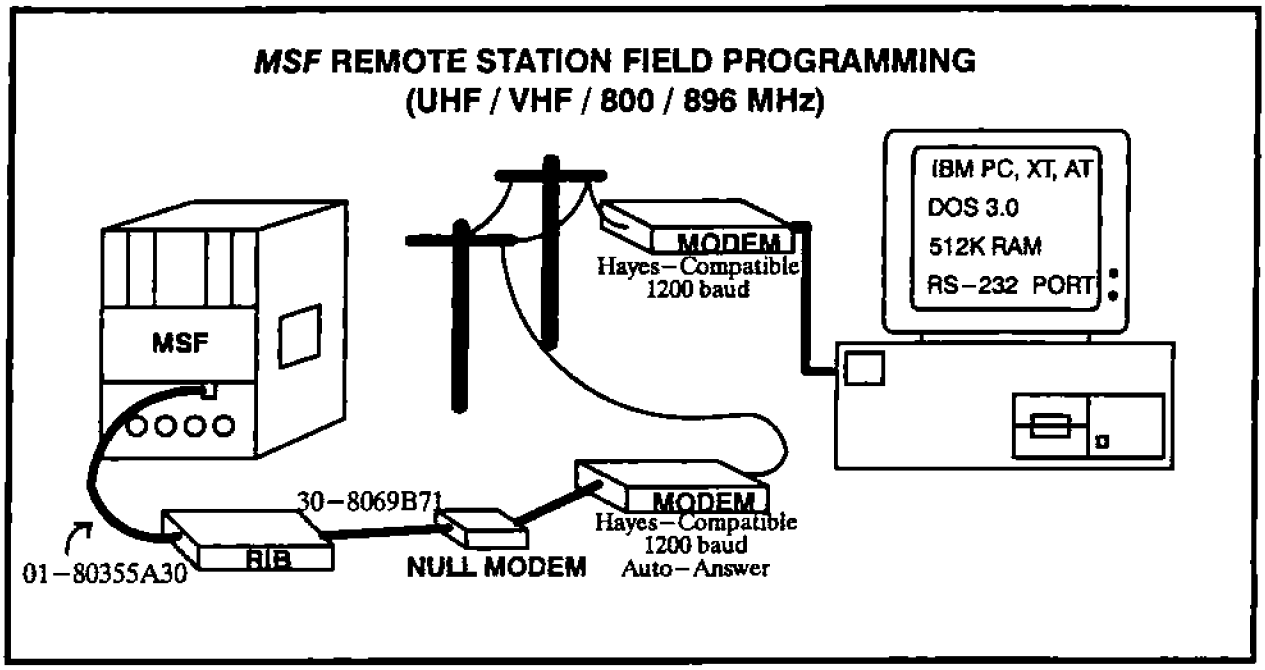


Figure E.2: Remote Callup Connection for Stations without RS-232 Port.

Calling the Station via the Remote Callup Screen

Once the modems are correctly connected to the station and PC, start the RSS. From the main menu press **F9** to enter the Computer Configuration menu. Press **F3** to enter the Serial Port Configuration screen. Enter the correct values that pertain to your PC and modem (the default values will suffice in most cases). When done press **F8** to save the serial port information. Then return to the main menu.

From the main menu press **F2** to enter the Service and Alignment menu. Press **F6** to enter the Remote Callup screen. Enter the telephone number of the remote station in the number field. See Section 3.6.1. for complete information on each of the fields.

When finished entering the field information, press **F8** to save the information to a disk file. Then press **F2** to initiate the call. Within a few seconds the PC should be connected to the remote station. Once communication is established, a "modem-on-line" message will appear in the upper left window of the screen. Exit the Remote Callup screen and use the RSS as you would if you were connected directly to the station (ie. PC to RIB to station).

Disconnecting Remote Communications

When ready to stop communicating with the remote station, re-enter the Remote Callup screen. Pressing **F3**-Hang Up, signals the modems to cease communications. Exiting the program with the

modem on-line will also signal the modems to cease communications. To avoid costly phone bills, remember to **hang up the modem when not in use.**

APPENDIX F – REPEATER ACCESS USING THE SAM BOARD

This appendix describes how to program the SAM board for typical repeater access functions.

1. MDC1200 Repeater Access Information

Currently, the Radio Service Software (RSS) is capable of creating nine MDC1200 opcodes: "REPEAT ACC", "PTT ID", "SETUP", "KNOCKDOWN", "ACK", "MSG1", "MSG2", "MSG3", and "MSG4"; these opcodes are available on the SAM MODE Table screen as parts of Binary Decoder Targets. Although these opcodes seem to imply specific actions, they are actually just identifying names for opcodes which other products can generate. Therefore, entering the "REPEAT ACC" opcode as part of a Binary Decoder Target will not automatically set up SAM to perform Repeater Access. The "REPEAT ACC" opcode is just part of a target to which the user can assign an Action Table. The Action Table is the place where the user would program the necessary action(s) to perform Repeater Access. Examples of three types of Repeater Access are shown below. Note that the user may program additional actions in any Action Table, besides the action(s) required for Repeater Access.

2. Automatic Repeater Access

2.1 Definition

Repeater operation of the station is disabled by default – the RPT_KD, Repeater Knockdown, bit on the Muxbus is active. In order to allow repeater operation, i.e. access the repeater, subscriber radios and/or dispatch equipment automatically send a signalling sequence at the beginning of every transmission. The sequence will cause the station to allow repeater operation for the duration of the transmission. The signalling sequence can be an MDC1200 sequence, a Select V sequence or a DTMF sequence. The following is an example of how the SAM board would be programmed to do Automatic Repeater Access in Mode 1 using a ZVEI Select V sequence received via the station receiver.

2.2 SAM Board Programming

SAM MODE Tables Programming

SAM MODE NUMBER	**1**
REPEATER KNOCKDOWN	**ENABLED**
TONE DECODER	**ZVEI**
TONE INPUT	**RECEIVER 1**
TONE DECODER TARGET	**1**
TARGET	**12345**
ACT TBL	**1**

SAM ACTION Tables Programming

ACTION TABLE NUMBER	**1**
ACTION #1	
CLRMUXQUAL	
MUXADDR	**5**
MUXDATA	**2**
QUALADDR	**1**
QUALMASK	**8**
TIME	**10**

This action will deactivate RPT_KD (Mux Address 5, Mux Data 2) as long as RPT_PTT (Mux Address 1, Mux Data 8) is active, plus 10ms (TIME field).

2.3 Operation Sequence

1. The station is in Mode 1 and RPT_KD is active. The mobile keys up, automatically sending ZVEI sequence 12345.

2. The SAM board decodes ZVEI sequence 12345, compares it to its Mode 1 tone decoder target(s) and finds a match with Tone Decoder Target 1.

3. Since Action Table 1 is "tied to" Target 1, the SAM board executes Action Table 1. Action Table 1, as shown programmed above, will make RPT_KD go inactive, allowing repeater operation, as long as RPT_PTT is present. NOTE: RPT_PTT will be active as long as the station has the conditions required for Repeater Unsquelch.

4. The mobile dekeys removing the conditions needed for Repeater Unsquelch, thereby causing RPT_PTT to go inactive. The SAM board sees RPT_PTT go inactive and activates RPT_KD 10ms later, disabling repeater operation.

3. Manual Repeater Access

3.1 Definition

Repeater operation of the station is disabled by default – the RPT_KD, Repeater Knockdown, bit on the Muxbus is active. In order to allow repeater operation, subscriber radios and/or dispatch equipment manually send a signalling sequence via a dedicated button. The sequence will cause the station to allow repeater operation for as long as defined by the time programmed into the SAM board. The signalling sequence can be an MDC1200 sequence, a Select V sequence or a DTMF sequence. The following is an example of how the SAM board would be programmed to do Manual Repeater Access in Mode 2 using an MDC1200 sequence ("REPEAT ACC" opcode + ID 1234) received via the station receiver. The repeater, in this example, will be accessible for 1 minute.

3.2 SAM Board Programming

SAM MODE Tables Programming

SAM MODE NUMBER	2
REPEATER KNOCKDOWN	ENABLED
BINARY DECODER	MDC1200
BINARY INPUT	RECEIVER 1
BINARY DECODER TARGET	1
OPCODE	REPEAT ACC
ID	1234
ACT TBL	1

SAM ACTION Tables Programming

ACTION TABLE NUMBER	1
ACTION #1	
CLRMUX	
MUXADDR	5
MUXDATA	2
ACTION #2	
WAIT	6000
ACTION #3	
SETMUX	
MUXADDR	5
MUXDATA	2

This action will deactivate RPT_KD (Mux Address 5, Mux Data 2), wait for 6000 ms. and then activate RPT_KD.

3.3 Operation Sequence

1. The station is in Mode 2 and RPT_KD is active. The mobile operator presses the dedicated Repeater Access button, sending MDC1200 sequence "REPEAT ACC 1234".

2. The SAM board decodes MDC1200 sequence "REPEAT ACC 1234", compares it to its Mode 1 binary decoder target(s) and finds a match with Binary Decoder Target 1.

3. Since Action Table 1 is "tied to" Target 1, the SAM board executes Action Table 1. Action Table 1, as shown programmed above, will make RPT_KD go inactive for 60 seconds. After

60 seconds, RPT_KD will be set active. During the time that RPT_KD is inactive, repeater operation is allowed and mobile operators are free to access the repeater with only the proper unsquelch qualifiers.

Note that receiving the "REPEAT ACC 1234" during the 1 minute will not restart the 60 second timer. If the user desires the timer to restart for every mobile keyup then the SAM board should be programmed similar to Automatic Repeater Access operation. This alternate programming is shown below.

3.4 "Alternate" SAM Board Programming

SAM MODE Tables Programming

SAM MODE NUMBER	**2**
REPEATER KNOCKDOWN	**ENABLED**
BINARY DECODER	**MDC1200**
BINARY INPUT	**RECEIVER 1**
BINARY DECODER TARGET	**1**
OPCODE	**REPEAT ACC**
ID	**1234**
ACT TBL	**1**

SAM ACTION Tables Programming

ACTION TABLE NUMBER	**1**
ACTION #1	
CLRMUXQUAL	
MUXADDR	**5**
MUXDATA	**2**
QUALADDR	**1**
QUALMASK	**8**
TIME	**6000**

This action will deactivate RPT_KD (Mux Address 5, Mux Data 2) as long as RPT_PTT (Mux Address 1, Mux Data 8) is active, plus 60 seconds (TIME field).

3.5 "Alternate" Operation Sequence

1. The station is in Mode 2 and RPT_KD is active. The mobile operator presses the dedicated Repeater Access button, sending MDC1200 sequence "REPEAT ACC 1234".

2. The SAM board decodes MDC1200 sequence "REPEAT ACC 1234", compares it to its Mode 1 binary decoder target(s) and finds a match with Binary Decoder Target 1.

3. Since Action Table 1 is "tied to" Target 1, the SAM board executes Action Table 1. Action Table 1, as shown programmed above, will make RPT_KD go inactive, allowing repeater op-

eration, as long as RPT_PTT is present, plus 60 seconds. During the time that RPT_KD is inactive, repeater operation is allowed and mobile operators are free to access the repeater with only the proper unsquelch qualifiers. When mobile activity ends, removing RPT_PTT, the 60 second timer will start to run. If, during the 60 second timer, a mobile with the proper unsquelch qualifiers keys up, RPT_PTT will again go active and the 60 second timer will be terminated. The timer will not restart until RPT_PTT goes inactive again.

4. Repeater Access Enable/Disable

4.1 Definition

Repeater operation of the station is disabled by default – the RPT_KD, Repeater Knockdown, bit on the Muxbus is active. In order to allow repeater operation, subscriber radios and/or dispatch equipment manually send a signalling sequence via a dedicated button. The sequence will cause the station to allow repeater operation indefinitely. The signalling sequence can be an MDC1200 sequence, a Select V sequences or a DTMF sequence. The following is an example of how the SAM board would be programmed to do Manual Repeater Access in Mode 3 using a DTMF sequence received via the station receiver. A second dedicated button will generate a different signalling sequence which disables repeater operation.

Repeater Access *Enable* means that repeater operation is disabled unless SAM is programmed for Automatic or Manual access, as described above, and the mobile is able to send the programmed sequence. Repeater Access *Disable* means that repeater operation is enabled requiring only the proper unsquelch qualifiers.

4.2 SAM Board Programming

SAM MODE Tables Programming

SAM MODE NUMBER	**3**
REPEATER KNOCKDOWN	**ENABLED**
DTMF DECODER	**ENABLED**
DTMF INPUT	**RECEIVER 1**
DTMF DECODER TARGET	**1234567890**
ACT TBL	**1**
DTMF DECODER TARGET	**0987654321**
ACT TBL	**2**

SAM ACTION Tables Programming

ACTION TABLE NUMBER	**1**
ACTION #1	
CLRMUX	
MUXADDR	**5**
MUXDATA	**2**
ACTION TABLE NUMBER	**2**
ACTION #1	
SETMUX	
MUXADDR	**5**
MUXDATA	**2**

Action Table Number 1 will deactivate RPT_KD (Mux Address 5, Mux Data 2), allowing repeater operation indefinitely. Action Table Number 2 will activate RPT_KD, disabling repeater operation indefinitely.

4.3 Operation Sequence

1. The station is in Mode 3 and RPT_KD is active. The mobile operator presses the dedicated Repeater Access *Disable* button, sending DTMF sequence 1234567890.

2. The SAM board decodes DTMF sequence 1234567890, compares it to its Mode 3 DTMF decoder target(s) and finds a match with DTMF Decoder Target 1.

3. Since Action Table 1 is "tied to" Target 1, the SAM board executes Action Table 1. Action Table 1, as shown programmed above, will make RPT_KD go inactive. Repeater operation is now allowed and mobile operators are free to access the repeater with only the necessary unsquelch qualifiers.

4. The mobile operator presses the dedicated Repeater Access *Enable* button, sending DTMF sequence 0987654321.

5. The SAM board decodes DTMF sequence 0987654321, compares it to its Mode 3 DTMF decoder target(s) and finds a match with DTMF Decoder Target 2.

6. Since Action Table 2 is "tied to" Target 2, the SAM board executes Action Table 2. Action Table 2, as shown programmed above, will make RPT_KD go active, disabling repeater operation. Note that, in this case, the user may want to program the SAM board with a third target which would allow Automatic or Manual Repeater Access when RPT_KD is active (Repeater Access Enable sequence has been received). See above examples for programming Automatic and Manual Repeater Access.

5. Repeater Access Enable/Disable

5.1 Definition

Repeater operation of the station is disabled by default – the RPT_KD, Repeater Knockdown, bit on the Muxbus is active. In order to allow repeater operation, subscriber radios and/or dispatch equipment manually send a signalling sequence via a dedicated button. The sequence will cause the station to allow repeater operation indefinitely. The signalling sequence can be an MDC1200 sequence, a Select V sequences or a DTMF sequence. The following is an example of how the SAM board would be programmed to do Manual Repeater Access in Mode 3 using a DTMF sequence received via the station receiver. A second dedicated button will generate a different signalling sequence which disables repeater operation.

Repeater Access *Enable* means that repeater operation is disabled unless SAM is programmed for Automatic or Manual access, as described above, and the mobile is able to send the programmed sequence. Repeater Access *Disable* means that repeater operation is enabled requiring only the proper unsquelch qualifiers.

5.2 SAM Board Programming

SAM MODE Tables Programming

SAM MODE NUMBER	**3**
REPEATER KNOCKDOWN	**ENABLED**
DTMF DECODER	**ENABLED**
DTMF INPUT	**RECEIVER 1**
DTMF DECODER TARGET	**1234567890**
ACT TBL	**1**
DTMF DECODER TARGET	**0987654321**
ACT TBL	**2**

SAM ACTION Tables Programming

ACTION TABLE NUMBER	**1**
ACTION #1	
CLRMUX	
MUXADDR	**5**
MUXDATA	**2**
ACTION TABLE NUMBER	**2**
ACTION #1	
SETMUX	

MUXADDR	**5**
MUXDATA	**2**

Action Table Number 1 will deactivate RPT_KD (Mux Address 5, Mux Data 2), allowing repeater operation indefinitely. Action Table Number 2 will activate RPT_KD, disabling repeater operation indefinitely.

5.3 Operation Sequence

1. The station is in Mode 3 and RPT_KD is active. The mobile operator presses the dedicated Repeater Access *Disable* button, sending DTMF sequence 1234567890.

2. The SAM board decodes DTMF sequence 1234567890, compares it to its Mode 3 DTMF decoder target(s) and finds a match with DTMF Decoder Target 1.

3. Since Action Table 1 is "tied to" Target 1, the SAM board executes Action Table 1. Action Table 1, as shown programmed above, will make RPT_KD go inactive. Repeater operation is now allowed and mobile operators are free to access the repeater with only the necessary unsquelch qualifiers.

4. The mobile operator presses the dedicated Repeater Access *Enable* button, sending DTMF sequence 0987654321.

5. The SAM board decodes DTMF sequence 0987654321, compares it to its Mode 3 DTMF decoder target(s) and finds a match with DTMF Decoder Target 2.

6. Since Action Table 2 is "tied to" Target 2, the SAM board executes Action Table 2. Action Table 2, as shown programmed above, will make RPT_KD go active, disabling repeater operation. Note that, in this case, the user may want to program the SAM board with a third target which would allow Automatic or Manual Repeater Access when RPT_KD is active (Repeater Access Enable sequence has been received). See above examples for programming Automatic and Manual Repeater Access.

APPENDIX G – JUMPER CHARTS

The following jumper information is provided as a reference for the MSF stations. See the Service manuals for more detailed information.

Secure Station Control Board Jumpers			
Jumper #	**Description**	**Normal Position**	**Alternate Position**
JU1	TTRC HSR	TTRC in	TTRC out
JU2	Secure HSR	Secure out	Secure in
JU3	Coded Mod audio	Secure out	Secure in
JU4	post–IDC Tx Data	post–IDC Tx Data out	post–IDC Tx Data in
JU5	Trunking Mod audio	TTRC in	TTRC out
JU6	4800 GCC Data	4800 GCC out	4800 GCC in
JU7	Rx2 Wireline	no Rx2 to wireline	Rx2 to wireline
JU8	Rx2 audio	Rx2 out	Rx2 in
JU9	Secure Alert Tones	Secure out	Secure Enc/Dec in
JU10	Secure Rx audio	Secure out	Secure in
JU11	Rx Diversity audio	no Rx Diversity audio	Rx Diversity audio
JU12	+5V Supply	+5V load in	+5V load out
JU13	rf tray +5V	no +5V to rf tray	+5V to rf tray
JU14	1200 GCC Data	1200 GCC out	1200 GCC in
JU15	pre–IDC Tx Data	pre–IDC Tx Data out	pre–IDC Tx Data in
JU16	Exp Tx audio select	Processed Tx audio to J800	Raw Tx audio to J800
JU17	SAM Line audio	SAM audio not routed to line	SAM audio routed to line
JU18	RX1 gate control	controlled by logic section	controlled by squelch section
JU19	MPT squelch to Exp Conn	Fast key from J800	MPT squelch from J800
JU20	Secure coded mod gain	high gain	low gain
JU21	Wattmeter A–D resolution	use for high power stations	use for low power stations
JU22	Wattmeter A–D resolution	use for high power stations	use for low power stations

Figure G.1: Secure Station Control Board Jumpers

Trunked Tone Remote Control Board Jumpers			
Jumper #	**Description**	**Normal Position**	**Alternate Position**
JU4200	Line 3 termination	600 ohm	900 ohm
JU4201	Line 1 termination	600 ohm	900 ohm
JU4203	Tx Audio Mix notch	notched	un−notched
JU4204	Tx Audio notch	notched	un−notched
JU4205	Line 2 Cancellation circuit	2 wire audio	4 wire audio
JU4208	Trunked Mod audio	Central audio	Gen Tx audio
JU4209	RDM/WBM Simulcast	RDM	WBM
JU4211	Line 1 DC blocking cap	Secure out	Secure in
JU4212	Line 2 DC blocking cap	Secure out	Secure in
JU4213	Line 3 DC blocking cap	Secure out	Secure in
JU4214	Line 4 DC blocking cap	Secure out	Secure in
JU4217	Line 2 termination	600 ohm	900 ohm
JU4218	Line 4 termination	600 ohm	900 ohm
JU4222	Wireline Configuration	2 wire audio	4 wire audio
JU4226	DC control (+) input	2 wire audio	4 wire audio
JU4227	DC control (−) input	2 wire audio	4 wire audio
JU4228	Line 2 resolution	0 dBm	−10 dBm
JU4229	Line 4 resolution	0 dBm	−10 dBm
JU4230	ALC Bypass	ALC	Fixed Gain
JU4231	Status Tone Filter	2175 Hz	Not 2175 Hz
JU4370	Gen Tx Data Input	Non−simulcast	Simulcast
JU4371	Gen Tx Data Input	Non−simulcast	Simulcast
R4381	0 ohm resistor	out	in for SP Simulcast

Figure G.2: Trunked Tone Remote Control Board Jumpers

NOTE: Issue B TTRC Audio board replaces R4370 with JU4370 and R4371 with JU4371. Both jumper's 'normal' position correspond to the 'out' setting of the jumper.

NOTE: Issue B TTRC Audio board replaces JU4202 with JU4222. The functionality of these two jumpers are the same, but the normal position is reversed.

Secure Board Jumpers			
Jumper #	**Description**	**Normal Position**	**Alternate Position**
JU4002	Remote Ket Reset	Disabled	Enabled
JU4003	MRTI audio	no MRTI audio	MRTI audio
JU4004	Receive Equalizer Filter	Filter in	Filter out

Figure G.3: Secure Board Jumpers

APPENDIX H – DEFAULT CODEPLUGS FOR SYSTEM VERSION #1 & #2 (SSCB 3.XX, TTRC 4.XX, SECURE 3.XX)

The default codeplug files for System Version 1&2 are: CONV.DEF, CONVSTAC.DEF, CONVSIMU.DEF, TRNK.DEF, TRNKSTAC.DEF, and TRNKSIMU.DEF. The field values for each of these files are listed in this appendix.

	CONV	CONVSTAC	CONVSIMU	TRNK	TRNKSTAC	TRNKSIMU
STATION TYPE DATA						
Frequency Range R1:	UHF R2	UHF R2	UHF R2	800 MHz	800 MHz	800 MHz
Synthesizer for R1:	NON–MOSAIC	NON–MOSAIC	NON–MOSAIC	MOSAIC	MOSAIC	MOSAIC
Repeater Operation:	ENABLED	ENABLED	DISABLED	ENABLED	DISABLED	DISABLED
Trunking Operation:	DISABLED	DISABLED	DISABLED	ENABLED	ENABLED	ENABLED
Spectra–TAC Operation:	DISABLED	ENABLED	ENABLED	DISABLED	ENABLED	ENABLED
SECURE Operation:	TRANSPRNT	TRANSPRNT	TRANSPRNT	TRANSPRNT	TRANSPRNT	TRANSPRNT
Duplex Operation:	HALF	FULL	FULL	FULL	FULL	FULL
XL Decryption Operation:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
SP Number:	NO SP	NO SP	NO SP	NO SP	NO SP	NO SP
Frequency Range R2:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Synthesizer for R2:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Simulcast Operation:	DISABLED	DISABLED	ENABLED	DISABLED	DISABLED	ENABLED
TTRC Equipped:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
SECURE Equipped:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
SAM Equipped:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
MCS Equipped:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
PASSWORD Equipped:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
SmartZone Operation	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
STATION CONTROL DATA						
Number Of Channels:	01	01	01	01	01	01
Alarm Tone Frequency:	1200	1200	1200	1200	1200	1200
Alarm Tone Duration:	125	125	125	125	125	125
Alarm Tone Gap:	125	125	125	125	125	125
Alarm Word Gap:	2000	2000	2000	2000	2000	2000
Auto Id Tone Frequency:	0800	0800	0800	0800	0800	0800
Auto ID Delay:	005	005	005	005	005	005
Auto ID Interval:	015	015	015	015	015	015
Auto ID Rate:	20	20	20	20	20	20
Local Channel Control:	REMOTE	REMOTE	REMOTE	REMOTE	REMOTE	REMOTE
Local Mode Control:	STATION	STATION	STATION	STATION	STATION	STATION
Local Key Control:	REMOTE	REMOTE	REMOTE	REMOTE	REMOTE	REMOTE
Memory Station:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
PA Turn On Delay:	031	031	031	031	031	000
Key Up Delay:	039	039	039	039	039	039
Relay Idle Delay:	031	031	031	031	031	031
EOM Time:	000	000	000	000	000	000
Disable Source:	MUTE REQ	MUTE REQ	MUTE REQ	MUTE REQ	MUTE REQ	MUTE REQ
Disable Delay:	703	703	703	703	703	703
Rptr Gate Holdoff Delay:	0000	0000	0000	0000	0000	0000
Non–Priority Scan Delay:	NO SCAN	NO SCAN	NO SCAN	NO SCAN	NO SCAN	NO SCAN
Scan Sample Time:	NO SCAN	NO SCAN	NO SCAN	NO SCAN	NO SCAN	NO SCAN
Rx Qualify Time:	NO SCAN	NO SCAN	NO SCAN	NO SCAN	NO SCAN	NO SCAN
Holdoff Delay with PL:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED

	CONV	CONVSTAC	CONVSIMU	TRNK	TRNKSTAC	TRNKSIMU
S-Tac Clear Rptr Delay:	0000	750	750	0000	750	000
S-Tac Coded Rptr Delay:	0000	750	750	0000	750	000
MCS Timer Period:	000	000	000	000	000	000
MCS Update Time:	0060	0060	0060	0060	0060	0060
MCS Resolution Time:	001	001	001	001	001	001
Decode Word:	NO ACC	NO ACC	NO ACC	NO ACC	NO ACC	NO ACC
ACK Word:	NO ACC	NO ACC	NO ACC	NO ACC	NO ACC	NO ACC
ACK Time:	NO ACC	NO ACC	NO ACC	NO ACC	NO ACC	NO ACC
MRTI Enable/Disable:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
RSTAT Mode:	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Gate Tx Always:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
MUXbus Seize:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
TSTAT on MUXbus:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Fwd & Refl on MUXbus:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Audio Diagnostics:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Power Lvl Chk/Batt Rvrt:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
External SSCB EEPROM:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Rx Loopback Frequency:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Tx Loopback Frequency:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Priority Scan Delay:	NO SCAN	NO SCAN	NO SCAN	NO SCAN	NO SCAN	NO SCAN
Priority Recheck Time:	NO SCAN	NO SCAN	NO SCAN	NO SCAN	NO SCAN	NO SCAN
Failsoft Carrier Squelch:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
CHANNEL 01 DATA:						
Mode Slaving:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
Mode Locked:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
TX Frequency:	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
RX Frequency:	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
TX Idle:	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
ID Over The Wireline:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Call Sign:						
Default Mode Number:	01	01	01	01	01	01
Audio Tray:	R1	R1	R1	R1	R1	R1
Channel Scan:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
TX Slave:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
MODE 01 DATA:						
Connect mode 1:				105.9	105.9	105.9
Connect mode2:				CSQ	CSQ	CSQ
RX PL/DPL Code:	CSQ	CSQ	CSQ			
TX PL/DPL Code:	CSQ	CSQ	CSQ			
PTT Priority:	DWRLM	DWRLM	DWRLM	DWRLM	DWRLM	DWRLM
Line TOT:	120	120	120	000	000	000
Local TOT:	000	000	000	000	000	000
Repeater TOT:	060	060	060	000	000	000
Data TOT:	000	000	000	000	000	000
MRTI TOT:	000	000	000	000	000	000
RX Audio Control:	S	S	S	SC	SC	SC
Repeat Audio Activation:	S	S	S	SC	SC	SC
Repeat Audio Holdin:	S	S	S	C	C	C
RPTR Drop-Out Delay:	002	002	002	000	000	000
Over-The-Air Alarms:	ENABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Over-The-Wireline Alarms:	ENABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Line Audio Mixed W/Data:	NO	NO	NO	NO	NO	NO
Local Audio Mixed W/Data:	NO	NO	NO	NO	NO	NO
Repeat Audio Mixed W/Data:	NO	NO	NO	NO	NO	NO
MRTI Audio Mixed W/Data:	NO	NO	NO	NO	NO	NO
ID Alarm Mixed W/Data:	NO	NO	NO	NO	NO	NO
Pre/De Emphasis:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED

	CONV	CONVSTAC	CONVSIMU	TRNK	TRNKSTAC	TRNKSIMU
PA Cutback Allowed:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
Mode Power Level:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
RPT TOT DOD Reset:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
TX Code Line Qual:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
MRTI PP Mode:	RX SLAVE	RX SLAVE	RX SLAVED	RX SLAVED	RX SLAVED	RX SLAVED
MCS Table Number:	NO MCS	NO MCS	NO MCS	NO MCS	NO MCS	NO MCS
TTRC DATA						
S-Tac Mute Time:	00020	00020	00020	00000	00000	00000
S-Tac Tone Frequency:	2175	2175	2175	2175	2175	2175
Status Tone:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
Failsoft:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
Failsoft Tone Duration:	00280	00280	00280	00280	00280	00280
Failsoft Tone Interval:	09700	09700	09700	09700	09700	09700
Failsoft Tone Frequency:	0900	0900	0900	0900	0900	0900
Trunking Tickle Source:	TX DATA	TX DATA	TX DATA	TX DATA	TX DATA	TX DATA
Failsoft Time Out Time:	0001	0001	0001	0001	0001	0001
Failsoft Line:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Site Failsoft Mode:	FS	FS	FS	FS	FS	SIMUL FS
Switch on LPTT:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Line 2 TX Mix:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Line 4 TX Mix:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Wireline Activity Source:	LINE 1	LINE 1	LINE 1	LINE 1	LINE 1	LINE 1
FT Mute Time:	0030	0030	0030	0030	0030	0030
Full RX Inhibit	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
DC Decode:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
TRC Decode:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
TRC Tone Mix:	LINE 2	LINE 2	LINE 2	LINE 2	LINE 2	LINE 2
GT Frequency:	2175	2175	2175	2175	2175	2175
HLGT Duration:	120	120	120	60	60	60
Tx Source:	ALC	ALC	ALC	UNALC	UNALC	UNALC
Un ALC Source:	LINE 1	LINE 1	LINE 1	LINE 1	LINE 1	LINE 1
Mute Delay:	00100	00100	00100	00100	00100	00100
Stand by Failure Counter:	001	001	001	001	001	001
Bypass RX Notch:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
External TTRC EEPROM:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
External PTT:	LINE	LINE	LINE	TRNK	TRNK	TRNK
Spare Output:	NULL	NULL	NULL	NULL	NULL	NULL
Mute Tx Audio:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
LPTT Delay:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
LLGT Dropout Time:	0150	0150	0150	0150	0150	0150
TSTAT DOD	0300	0300	0300	0300	0300	0300
GUARD TONE	MORE	MORE	MORE	KEY	KEY	KEY
F-TONE 01	MON	MON	MON			
F-TONE 02	CHN 01;KEY	CHN 01;KEY	CHN 01;KEY			
F-TONE 03	CHN 02;KEY	CHN 02;KEY	CHN 02;KEY			
F-TONE 04						
F-TONE 05						
F-TONE 06						
F-TONE 07						
F-TONE 08	CHN 03; KEY	CHN 03; KEY	CHN 03; KEY			
F-TONE 09	CHN 04; KEY	CHN 04; KEY	CHN 04; KEY			
F-TONE 10	MORE	MORE	MORE	MORE	MORE	MORE
F-TONE 11	MORE	MORE	MORE	MORE	MORE	MORE
F-TONE 12						
F-TONE 13						
F-TONE 14						
F-TONE 15						

	CONV	CONVSTAC	CONVSIMU	TRNK	TRNKSTAC	TRNKSIMU
12.5 ma DETECT	CHN 02; KEYON					
12.5 ma UNDET.	KEY OFF					
5.5 ma DETECT	CHN 01; KEYON					
5.5 ma UNDET.	KEY OFF					
2.5 ma DETECT						
2.5 ma UNDET.						
-12.5 ma DETECT	CHN 04; KEYON					
-12.5 ma UNDET.	KEY OFF					
- 5.5 ma DETECT	CHN 03; KEYON					
- 5.5 ma UNDET.	KEY OFF					
- 2.5 ma DETECT	MON					
- 2.5 ma UNDET.						
RESET RESPONSE	NULL					
SECURE DATA						
Clear Receiver:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Clear Transmit:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
Cross Mode Receiver:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
Erase:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
Rx Fail:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
Tx Fail:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
Proper Code:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Beep Delay:	0087	0087	0087	0087	0087	0087
Rx Code on Line:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
Extended Buffer Delay:	0080	0080	0080	0080	0080	0080
Fail Test Delay:	0025	0025	0025	0025	0025	0025
Max Code Detect DT Delay:	0080	0080	0080	0080	0080	0080
Rx Code Detect DOD:	0320	0320	0320	0320	0320	0320
Tx Code Detect DOD:	0320	0320	0320	0320	0320	0320
Rx DC End Of Message Dly:	40	40	40	40	40	40
Tx DC End Of Message Dly:	40	40	40	40	40	40
Takeover EOM Delay:	0080	0080	0080	0080	0080	0080

APPENDIX I – DEFAULT CODEPLUGS FOR SYSTEM VERSION #3 (SSCB 5.XX, TTRC 5.XX, SECURE 4.XX)

The default codeplug files for System Version 3 are: CONV_3.DEF, CVSTAC_3.DEF, CVSIMU_3.DEF, TRUNK_3.DEF, TKSTAC_3.DEF, and TKSIMU_3.DEF. The field values for each of these files are listed in this appendix.

	CONV_3	CVSTAC_3	CVSIMU_3	TRUNK_3	TKSTAC_3	TKSIMU_3
STATION TYPE DATA						
Frequency Range R1:	UHF R2	UHF R2	UHF R2	800 MHz	800 MHz	800 MHz
Synthesizer for R1:	NON-MOSAIC	NON-MOSAIC	NON-MOSAIC	MOSAIC	MOSAIC	MOSAIC
Repeater Operation:	ENABLED	ENABLED	DISABLED	ENABLED	DISABLED	DISABLED
Trunking Operation:	DISABLED	DISABLED	DISABLED	ENABLED	ENABLED	ENABLED
Spectra–TAC Operation:	DISABLED	ENABLED	ENABLED	DISABLED	ENABLED	ENABLED
SECURE Operation:	TRANSPRNT	TRANSPRNT	TRANSPRNT	TRANSPRNT	TRANSPRNT	TRANSPRNT
Duplex Operation:	HALF	FULL	FULL	FULL	FULL	FULL
XL Decryption Operation:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
SP Number:	NO SP	NO SP	NO SP	NO SP	NO SP	NO SP
Frequency Range R2:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Synthesizer for R2:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Simulcast Operation:	DISABLED	DISABLED	ENABLED	DISABLED	DISABLED	ENABLED
TTRC Equipped:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
SECURE Equipped:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
SAM Equipped:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
MCS Equipped:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
PASSWORD Equipped:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
SmartZone Operation	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
STATION CONTROL DATA						
Number Of Channels:	01	01	01	01	01	01
Alarm Tone Frequency:	1200	1200	1200	1200	1200	1200
Alarm Tone Duration:	125	125	125	125	125	125
Alarm Tone Gap:	125	125	125	125	125	125
Alarm Word Gap:	2000	2000	2000	2000	2000	2000
Auto Id Tone Frequency:	0800	0800	0800	0800	0800	0800
Auto ID Delay:	005	005	005	005	005	005
Auto ID Interval:	015	015	015	015	015	015
Auto ID Rate:	20	20	20	20	20	20
Local Channel Control:	REMOTE	REMOTE	REMOTE	REMOTE	REMOTE	REMOTE
Local Mode Control:	STATION	STATION	STATION	STATION	STATION	STATION
Local Key Control:	REMOTE	REMOTE	REMOTE	REMOTE	REMOTE	REMOTE
Memory Station:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
PA Turn On Delay:	031	031	031	031	031	000
Key Up Delay:	039	039	039	039	039	039
Relay Idle Delay:	031	031	031	031	031	031
EOM Time:	193	193	193	193	193	193
Disable Source:	MUTE REQ	MUTE REQ	MUTE REQ	MUTE REQ	MUTE REQ	MUTE REQ
Disable Delay:	703	703	703	703	703	703
Rptr Gate Holdoff Delay:	0000	0000	0000	0000	0000	0000
Non–Priority Scan Delay:	2999	2999	2999	2999	2999	2999
Scan Sample Time:	031	031	031	031	031	031
Rx Qualify Time:	348	348	348	348	348	348
Holdoff Delay with PL:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED

	CONV_3	CVSTAC_3	CVSIMU_3	TRUNK_3	TKSTAC_3	TKSIMU_3
S-Tac Clear Rptr Delay:	0000	750	750	0000	750	000
S-Tac Coded Rptr Delay:	0000	750	750	0000	750	000
MCS Timer Period:	000	000	000	000	000	000
MCS Update Time:	0060	0060	0060	0060	0060	0060
MCS Resolution Time:	001	001	001	001	001	001
Decode Word:	NO ACC	NO ACC	NO ACC	NO ACC	NO ACC	NO ACC
ACK Word:	NO ACC	NO ACC	NO ACC	NO ACC	NO ACC	NO ACC
ACK Time:	NO ACC	NO ACC	NO ACC	NO ACC	NO ACC	NO ACC
MRTI Enable/Disable:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
RSTAT Mode:	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL	NORMAL
Gate Tx Always:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
MUXbus Seize:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
TSTAT on MUXbus:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
Fwd & Refl on MUXbus:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Audio Diagnostics:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Power Lvl Chk/Batt Rvrt:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
External SSCB EEPROM:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Rx Loopback Frequency	NO SAM	NO SAM	NO SAM	NO SAM	NO SAM	NO SAM
Tx Loopback Frequency:	NO SAM	NO SAM	NO SAM	NO SAM	NO SAM	NO SAM
Priority Scan Delay:	2999	2999	2999	2999	2999	2999
Priority Recheck Time:	0301	0301	0301	0301	0301	0301
Failsoft Carrier Squelch:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Bypass S-TAC Rptr Delay:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
RF Couple @ T=R Stations:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
CHANNEL 01 DATA:						
Mode Slaving:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
Mode Locked:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
TX Frequency:	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
RX Frequency:	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
TX Idle:	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
ID Over The Wireline:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Call Sign:						
Default Mode Number:	01	01	01	01	01	01
Audio Tray:	R1	R1	R1	R1	R1	R1
Channel Scan:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
TX Slave:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Tx Idle Calculation:	AUTO	AUTO	AUTO	AUTO	AUTO	AUTO
MODE 01 DATA:						
Connect mode 1:				105.9	105.9	105.9
Connect mode2:				CSQ	CSQ	CSQ
RX PL/DPL Code:	CSQ	CSQ	CSQ			
TX PL/DPL Code:	CSQ	CSQ	CSQ			
PTT Priority:	DWRLM	DWRLM	DWRLM	DWRLM	DWRLM	DWRLM
Line TOT:	120	120	120	000	000	000
Local TOT:	000	000	000	000	000	000
Repeater TOT:	060	060	060	000	000	000
Data TOT:	000	000	000	000	000	000
MRTI TOT:	000	000	000	000	000	000
RX Audio Control:	S	S	S	SC	SC	SC
Repeat Audio Activation:	S	S	S	SC	SC	SC
Repeat Audio Holdin:	S	S	S	C	C	C
RPTR Drop-Out Delay:	002	002	002	000	000	000
Over-The-Air Alarms:	ENABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Over-The-Wireline Alarms:	ENABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Line Audio Mixed W/Data:	NO	NO	NO	NO	NO	NO

	CONV_3	CVSTAC_3	CVSIMU_3	TRUNK_3	TKSTAC_3	TKSIMU_3
Local Audio Mixed W/Data:	NO	NO	NO	NO	NO	NO
Repeat Audio Mixed W/Data:	NO	NO	NO	NO	NO	NO
MRTI Audio Mixed W/Data:	NO	NO	NO	NO	NO	NO
ID Alarm Mixed W/Data:	NO	NO	NO	NO	NO	NO
Pre/De Emphasis:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
PA Cutback Allowed:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
Mode Power Level:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
RPT TOT DOD Reset:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
TX Code Line Qual:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
MRTI PP Mode:	RX SLAVE	RX SLAVE	RX SLAVED	RX SLAVED	RX SLAVED	RX SLAVED
MCS Table Number:	NO MCS	NO MCS	NO MCS	NO MCS	NO MCS	NO MCS
TTRC DATA						
S-Tac Mute Time:	00020	00020	00020	00000	00000	00000
S-Tac Tone Frequency:	2175	2175	2175	2175	2175	2175
Status Tone:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
Failsoft:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
Failsoft Tone Duration:	00280	00280	00280	00280	00280	00280
Failsoft Tone Interval:	09700	09700	09700	09700	09700	09700
Failsoft Tone Frequency:	0900	0900	0900	0900	0900	0900
Trunking Tickle Source:	TX DATA	TX DATA	TX DATA	TX DATA	TX DATA	TX DATA
Failsoft Time Out Time:	0001	0001	0001	0001	0001	0001
Failsoft Line:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Site Failsoft Mode:	FS	FS	FS	FS	FS	SIMUL FS
Switch on LPTT:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Line 2 TX Mix:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Line 4 TX Mix:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Wireline Activity Source:	LINE 1	LINE 1	LINE 1	LINE 1	LINE 1	LINE 1
FT Mute Time:	0030	0030	0030	0030	0030	0030
Full RX Inhibit	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
DC Decode:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
TRC Decode:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
TRC Tone Mix:	LINE 2	LINE 2	LINE 2	LINE 2	LINE 2	LINE 2
GT Frequency:	2175	2175	2175	2175	2175	2175
HLGT Duration:	120	120	120	60	60	60
Tx Source:	ALC	ALC	ALC	UNALC	UNALC	UNALC
Un ALC Source:	LINE 1	LINE 1	LINE 1	LINE 1	LINE 1	LINE 1
Mute Delay:	00100	00100	00100	00100	00100	00100
Stand by Failure Counter:	001	001	001	001	001	001
Bypass RX Notch:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
External TTRC EEPROM:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
External PTT:	LINE	LINE	LINE	TRNK	TRNK	TRNK
Spare Output:	NULL	NULL	NULL	NULL	NULL	NULL
Spare Output Pin Active:	LOW	LOW	LOW	LOW	LOW	LOW
Mute Tx Audio:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
LPTT Delay:	0000	0000	0000	0000	0000	0000
LLGT Dropout Time:	0150	0150	0150	0150	0150	0150
TSTAT DOD	0300	0300	0300	0300	0300	0300
GUARD TONE	MORE	MORE	MORE	KEY	KEY	KEY
F-TONE 01	MON	MON	MON			
F-TONE 02	CHN 01;KEY	CHN 01;KEY	CHN 01;KEY			
F-TONE 03	CHN 02;KEY	CHN 02;KEY	CHN 02;KEY			
F-TONE 04						
F-TONE 05						
F-TONE 06						
F-TONE 07						
F-TONE 08	CHN 03; KEY	CHN 03; KEY	CHN 03; KEY			
F-TONE 09	CHN 04; KEY	CHN 04; KEY	CHN 04; KEY			
F-TONE 10	MORE	MORE	MORE	MORE	MORE	MORE

	CONV_3	CVSTAC_3	CVSIMU_3	TRUNK_3	TKSTAC_3	TKSIMU_3
F-TONE 11	MORE	MORE	MORE	MORE	MORE	MORE
F-TONE 12						
F-TONE 13						
F-TONE 14						
F-TONE 15						
12.5 ma DETECT	CHN 02; KEYON					
12.5 ma UNDET.	KEY OFF					
5.5 ma DETECT	CHN 01; KEYON					
5.5 ma UNDET.	KEY OFF					
2.5 ma DETECT						
2.5 ma UNDET.						
-12.5 ma DETECT	CHN 04; KEYON					
-12.5 ma UNDET.	KEY OFF					
- 5.5 ma DETECT	CHN 03; KEYON					
- 5.5 ma UNDET.	KEY OFF					
- 2.5 ma DETECT	MON					
- 2.5 ma UNDET.						
RESET RESPONSE	NULL					
SECURE DATA						
Clear Receiver:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Clear Transmit:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
Cross Mode Receiver:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
Erase:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
Rx Fail:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
Tx Fail:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
Proper Code:	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED	DISABLED
Beep Delay:	0087	0087	0087	0087	0087	0087
Rx Code on Line:	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED	ENABLED
Extended Buffer Delay:	0080	0080	0080	0080	0080	0080
Fail Test Delay:	0025	0025	0025	0025	0025	0025
Max Code Detect DT Delay:	0080	0080	0080	0080	0080	0080
Rx Code Detect DOD:	0320	0320	0320	0320	0320	0320
Tx Code Detect DOD:	0320	0320	0320	0320	0320	0320
Rx DC End Of Message Dly:	40	40	40	40	40	40
Tx DC End Of Message Dly:	40	40	40	40	40	40
Takeover EOM Delay:	0080	0080	0080	0080	0080	0080
RX Detect Sensitivity:	HIGH	HIGH	HIGH	HIGH	HIGH	HIGH

NOTES:

1. All codeplug fields shown in APPENDIX I are applicable to RSS VERSION R05.21.

2. Codeplug fields for RSS VERSION R05.19 and below do not have Bypass S-TAC Rptr Delay, RF Couple @ T=R Stations, Spare Output Pin Active, and RX Detect Sensitivity.

APPENDIX J – SPARE OUTPUT ACTIVE POLARITY

RSS Version	Spare Output Active Polarity	TTRC F/W
5.21, 5.19	**LOW True by default**	**5.41**
5.16 and less	**HIGH True**	**Less than 5.41**

FIRMWARE COMPABILITY MATRIX FOR DIGITAL MSF5000 BASE STATIONS

The following chart illustrates firmware compatibility to RSS versions.

SSCB F/W	TTRC F/W	SECURE F/W	SSCB BOARD	TTRC AUDIO	TTRC LOGIC	SECURE BOARD	RSS VERSION
5.56 5.52	5.41	4.28	ALL	TLN3112A/B/ C/D/E	TLN3114A/B	ALL	5.19 5.21
5.37, 5.43 5.45	5.21 5.34	4.22	ALL	TLN3112A/B	TLN3114A/B	ALL	>=5.16
4.06 4.07	5.04	4.02	ALL	TLN3112A	TLN3114A/B	ALL	>=4.08
3.25	4.22	3.17	ALL	TLN3112A	TLN3114A/B	ALL	>=4.08
<3.25	<4.22	<3.17	ALL	TLN3112A	TLN3114A/B	ALL	>=4.08

Note: When ordering new digital control tray boards from the Parts Department, be aware that the boards will come with the latest firmware on them. Therefore, you **must** either use the firmware from existing boards or order the QVN1000A firmware Upgrade Kit which contains all 3 firmware EPROMS for the digital control tray boards.

SSCB Board Kits: TLN3182A, TLN3189A, TLN3204A, TLN3205A, TLN3318A, TLN3319A, TLN3320A, TLN3342A, TLN3384A, TLN3385A, TLN3386A, TLN3387A

TTRC Audio Board Kits: TLN3112A/B/C/D/E
TTRC Logic Board Kits: TLN3114A/B

SECURE Board Kits: TLN3945A/B/C