Programming System for Tait Orca Conventional Radios

User's Manual

July 1999
439-51100-01

Contents

NOTE: The programming system includes online help that is updated at each software release. If information in this manual conflicts with that in the online help, the information in the online help can be considered the most up-to-date.

About This Manual

Welcome to the programming system for the Tait Orca series of conventional handportable and mobile radios. The programming system provides an easy way to enter settings and features into Tait Orca conventional handportable and mobile radios using a standard IBM-compatible PC.

This manual is intended as an installation guide and reference for the Tait Orca programming system. It provides the following information:

- an overview of the software;
- installation instructions and hardware setup;
- basic usage instructions; and
- a reference guide to all parameters and settings.

Who Should Read This Manual?

This manual has been written for use by Tait dealers and distributors who are programming the Tait Orca series of conventional radios for customers. Other audiences include radio system managers and network managers who may need to know the specific settings available for Tait Orca series conventional radios.

What Do You Need to Know?

You should be familiar with:

- conventional radio systems;
- radio system and radio network settings and parameters;
- general PC operation.

What's Included?

This manual is divided into seven parts.

Part 1, *Getting Started*, contains information on installing and starting the programming system.

Part 2, *Using the Programming System*, contains information on navigating through the programming system.

Parts 3 to 7 contain information on changing settings using the screens in the **Edit** menu.

Part 3, *Basic Radio Settings*, contains detailed information on changing general information about the radio.

Part 4, *Setting Up Channels and Scan Groups*, contains detailed information on the fields related to creating and configuring channels and scan groups.

Part 5, *Setting Up Selcall*, contains detailed information on setting up Selcall systems.

Part 6, *Special Features*, contains detailed information on setting up special features such as DTMF, alpha symbols, channel signalling presets and data operation.

Part 7, *Radio Interface Options*, contains detailed information on setting radio interface options, such as function key settings and user menu options.

What Radios Does this Manual Apply to?

This manual applies to the Tait Orca series of handportable and mobile conventional radios.

Throughout this manual, the radios in the Tait Orca series are referred to by an abbreviated version of their model name. For example, the Orca Elan handportable radio is referred to as the Elan handportable radio.

Where an option or setting only applies to a particular radio, this is stated (see "When an option or setting does not apply to all radios" below). Unless so stated, an option or setting applies to all radios.

For information on the operation of a particular radio, refer to the *User's Manual* for that radio.

Conventions

Throughout this guide, the following conventions are used:

- screen names, field names, screen buttons and computer keys are shown in **bold sans serif**;
- commands you must type are shown in sans serif;
- information you must provide is shown <in brackets>;
- specific entries and available settings for screen fields are shown 'in single quotes'; and
- names of computer directories and files are shown in SANS SERIF ALL-CAPS.
- These conventions are illustrated in "Typographical conventions used in this manual" on page 9.

When an option or setting does not apply to all radios

These fields apply only to Excel and Eclipse radios.

The fields in question do not apply to:

- Elan handportable radios and
- Elan mobile radios,

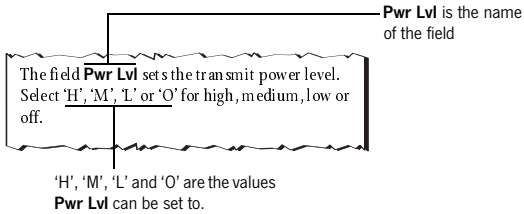
but do apply to all other radios.

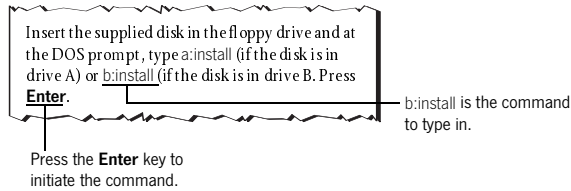
These fields do not apply to Elan handportable radios and to Elan and Excel mobile radios.

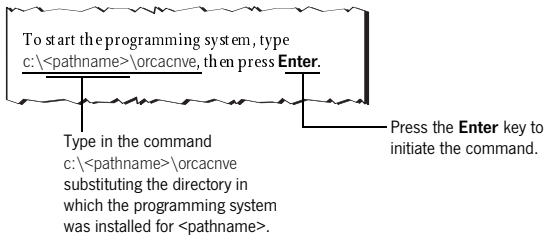
The fields in question do not apply to:

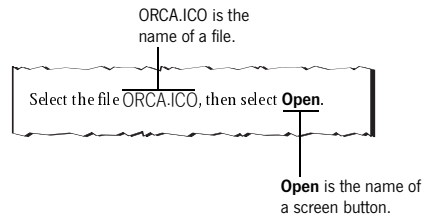
- Elan handportable radios;
- Elan mobile radios; and
- Excel mobile radios.

Typographical conventions used in this manual









PART 1

Getting Started

This part describes the system requirements and installation of the programming system. It also describes how to connect a radio to the PC.

Components and System Requirements

The Tait Orca programming system for conventional radios allows you to tailor a radio to your customer's requirements and to maintain a record of settings. You can use this record to program other radios in the fleet with the same settings.

The programming system has a standard graphical user interface and can be used with a keyboard and/or a mouse. Context-sensitive help is available throughout the program.

Your programming kit will typically contain:

- a 3.5-inch high density 1.44 MB program install disk;
- a radio programming cable with a 25-pin serial connector at one end and a telephone-style plug at the other;
- a radio programming lead with a telephone-style socket at one end and an accessory connector at the other; and
- this manual.

The Tait Orca programming system requires a minimum of:

- an IBM compatible PC with an 80386 microprocessor (or better);
- MS-DOS version 5.0 or higher;
- 4 MB of RAM;
- a VGA colour graphics display;
- a hard disk drive with 2 MB free space; and
- a single 3.5 inch floppy disk drive (1.44 MB capacity);
- a printer (if you intend to keep a hard copy of radio settings); and
- a Microsoft or compatible mouse and driver (if you wish to use the program with a mouse).

Installing the Software

The Tait Orca programming system cannot be run directly from the distribution disk, and so must be installed on your hard disk.

Insert the supplied disk in the floppy drive. If installing the programming system from DOS:

- At the DOS prompt, type a:install (if the disk is in drive A) or b:install (if the disk is in drive B).
- Press **Enter**.

If installing the programming system from Windows 3.x or Windows 95:

- Locate the directory the programming system installer is in (drive A or B).
- Double-click on the file INSTALL.EXE.

The installation program will guide you through the installation process. Read the information presented on the screen carefully. After installing the software, place the original distribution disk in a safe place.

You will be asked to enter the drive and path to which you want the software installed. If you do not change the default directory, then the files will be placed in the \TAITORCA\CNV directory on the target drive. it is highly recommended you use the default directory setting, especially if you have already installed or intend to install other Tait software packages.

To use this program with a mouse, your mouse driver software must be loaded. Usually a command such as c:\<pathname>\mouse.exe can be added to your AUTOEXEC.BAT file to load the mouse driver automatically when your computer starts up. See the instruction manual for your mouse software for more details.

If a mouse is connected to a serial port on your computer, you must have a second serial port available to connect to the radio you wish to read or program. You can select which serial port is used to communicate with the radio in the **Defaults** window (**Utility** menu).

Connecting a Radio

The programming kit contains a radio programming lead and a radio programming cable for connecting the radio being programmed to the computer.

- The programming cable has a 25-pin serial connector at one end and a telephone-style plug at the other.
- The programming lead has a telephone-style socket at one end and a handportable radio accessory connector at the other.

Your radio should be turned off before you connect it to the computer.

- For mobile radios, connect the programming cable to the radio using the telephone-style plug and to the computer's serial port using the serial connector. The programming lead is not required.
- For handportable radios, connect the programming cable to the programming lead, then connect the accessory connector to the radio and the serial connector to the computer's serial port.

You can plug the serial connector into either the COM1 or COM2 port on your computer. If you select COM1, you must change the software configuration in the **Defaults** window (**Utility** menu). For more information on setting up your COM ports, see "Customising Your System" on page 26.

The serial connector is 25-pin; if your computer has a 9-pin serial port, you will need an adaptor cable. This is available from your PC dealer.

Once connected, the radio must be turned on before it can be programmed. The battery should be fully charged or a DC service adaptor used to ensure that the radio does not turn itself off during the programming session.

Starting the Programming System

The programming system can be run from DOS, from Windows 3.x or from Windows 95.

To start the programming system from DOS, change to the directory the programming system was installed in, type orcacnve, then press **Enter**.

To start the programming system from Windows 3.x, either:

- Double-click the programming system icon.

OR

- In **Program Manager**, choose **Run** from the **File** menu. Type c:\<pathname>\orcacnve, then press **Enter**.

To start the programming system from Windows 95, either:

- Double-click the programming system icon.

OR

- Choose **Start** from the taskbar. Choose **Run** and type c:\<pathname>\orcacnve, then press **Enter**.

PART 2 Using the Programming System

This part describes the basic operation of the programming system.

Basic Operations

This part describes the basic operation of the Tait Orca programming system for conventional handportable and mobile radios.

Navigating

The programming system can be used with a mouse or a keyboard or both. To navigate through the programming system using a mouse, simply place the arrow onto the menu option or option button you wish to choose and click the left mouse button once.

All functions can be selected from the keyboard with the keystrokes outlined in Table 1 on page 20.

Using Text Boxes

A text box appears as a simple box and usually contains default text.

Select the box using the **Tab** key or by clicking on it with the mouse. A text cursor will appear in the box and any default text will be highlighted. Type in the data and press **Enter** to set the new value.

Using Screen Buttons

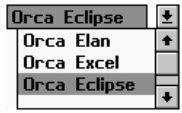
A screen button appears as a box and contains a default setting, such as 'City' for squelch level.

A screen button can toggle between two or more values. Change the value by selecting the button using the **Tab** key and pressing **Enter**, or by clicking on it with the mouse.

Screen buttons also appear on control menus and dialog boxes and contain such entries as **OK** and **Cancel**, in which case only the option displayed is available. Click on the button to activate the command, or select it with the **Tab** key and press **Enter**.

Using List Boxes

A list box is used for fields that have a range of possible values and appears as a box with an arrow at the righthand side.



Using the keyboard, select the desired value by using the **Tab** key to select the field, then press **Enter** to open the drop-down menu. Use the arrow keys to scroll to the desired value, then press **Enter**.

Using the mouse, click on the arrow to the right of the field to open the drop-down menu, then click on the desired value.

Table 1: Programming system keystrokes

Key	Function	Key	Function
F1	Online help for the current field. Pressing the F1 key again accesses general help.	Del	Delete character to the right.
F2	Insert a row into an array box.	Backspace	Delete character to the left.
F3	Delete a row from an array box.	Enter	End edit and validate new value.
F4	Insert a scan group member channel.	Esc	Close a window.
F5	Delete a scan group member channel.	Tab	Move to next.
Alt	Select the window menu bar. The Alt key can be used in conjunction with a hot key to select a specific menu item. For example, pressing Alt, F, S brings up the 'Save File' window.	Shift-Tab	Move to previous.
Up arrow	Scroll a vertical list up or move vertically in a pop-up menu.	Home	Go to beginning of line.
Down arrow	Scroll a vertical list down or move vertically in a pop-up menu.	End	Go to end of line.
Right arrow	Move to the right along the menu items in the menu bar.	Ctrl-Home	Go to top of screen.
Left arrow	Move to the left along the menu items in the menu bar.	Ctrl-End	Go to bottom of screen.
Alt-Right arrow	Scroll across a screen from left to right.	Page Down	Go down one page in the current screen.
Alt-Left arrow	Scroll across a screen from right to left.	Page Up	Go up one page in the current screen.
Ins	Toggle insert/overtype mode. The default is insert.		

Using Array Boxes

An array box is used where many lines of data are required, each containing the same type of information. An array consists of lines of various data entry fields, such as list boxes and text boxes, as shown below.

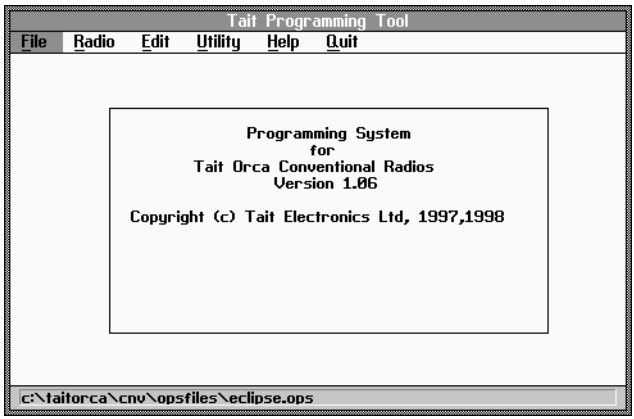
CTCSS/DCS		Tx Pwr	Squelch	
Rx	Tx	Dev	Lvl	Level
		N	L	Country
C250.3	C250.3	N	L	Country

When a line of data entry fields shows only exclamation marks, there is currently no data in the array. Press the **F2** key to insert a new line for data entry. To delete a line from an array, select any field on that line by using the **Tab** key or the mouse and press the **F3** key.

The Main Window

The programming system main window is shown below. This is the window that will appear when you first start the programming system.

Main window



The box in the centre of the window shows the version number of the software, and the bar at the bottom of the window shows the name of the file you are working with. If you have just started the program or have selected **New** from the **File** menu, this will read 'Untitled'.

The menu bar shows the title of six menus.

- Use the options in the **File** menu (**Alt**-**F**) to create, save and load files.
- Use the options in the **Radio** menu (**Alt**-**R**) to read and program a radio.
- Use the options in the **Edit** menu (**Alt**-**E**) to change programmable options.
- Use the options in the **Utility** menu (**Alt**-**U**) to print radio settings and modify some of the facilities in the program.

- Use the options in the **Help** menu (**Alt**-**H**) to get information on the programming system.
- Use the **Quit** menu (**Alt**-**Q**) to exit the programming system.

Select the keywords by clicking on them with the mouse, or by holding the **Alt** key and pressing the underlined letter (for example: **F** for **File**).

Whenever you finish working in a window, you will return to this main window. From the main window, you can exit the programming system and return to the DOS prompt or Windows.

Online Help

The programming system has two forms of online help.

Pressing the **F1** key displays online help specific to the field selected when the key is pressed. Pressing the **F1** key again displays general help.

The **Help** menu gives you access to general navigation information and information about the programming system.

Each of the screens in the **Edit** menu also has a **Help** menu.

Throughout online help, radio keys are referred to as outlined in Table 2 on page 23. For information on key functions, refer to the *User's Manual* for each radio.

The File Menu

The options in the **File** menu allow you to store and retrieve the options you program into a particular radio so you can keep a copy of a customer's requirements if you need to program more radios with the same or similar settings. These files are referred to throughout this manual as radio settings files and may be stored on hard disk or on a floppy disk.

All filenames are automatically given the extension '.ops' unless you specify another extension. Filenames must be eight characters or less in length.

Loading Radio Settings Files

The **Load** option retrieves a radio settings file from a disk. When you choose **Load**, the **File** window will appear. The **File** window is shown below). In it, you

File window

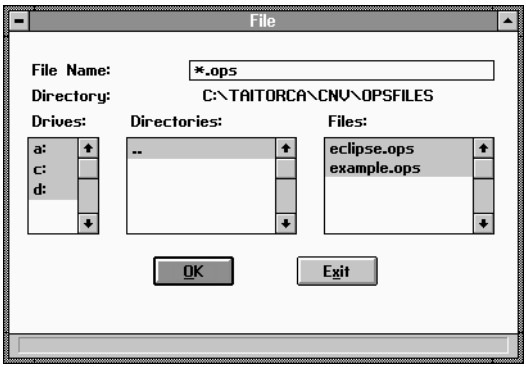


Table 2: Radio keys and their online help equivalents

Key	Description	Help Reference
	Enter	[ENTER]
	Call	[CALL]
	Channel	[CHAN]
	DTMF	[DTMF]
 or	Monitor/Clear	[MON] or [X-CLEAR]
	Status	[STAT]
	Menu	[MENU]
	Alpha	[ALPH]

can either specify the path and name of the file you want to open (in the **File Name** box) or search for the file using the **Drives**, **Directories** and **Files** lists.

The **Drives** list shows all the drives associated with your computer.

The **Directories** list shows all the directories immediately available on the selected drive. When you select a directory, the next level of directories appears. The previous level of directories is indicated by the **..** symbol.

The **Files** list shows all files in the current directory with the properties shown in the **File Name** box. The default is '.ops' or the extension shown in the **Data File Extension** field (**Defaults** window). Select the file you wish to open by clicking on the filename displayed in the **Files** list, or use **Tab** to select the file name and then press **Enter**. Select **OK** to load the file, then **Exit** to exit the window.

Saving Radio Settings Files

The **Save** option saves the current radio settings file you are working on. If the file has already been saved to disk, it will be saved with the same filename, overwriting the original file. The **Save As..** option saves the current file under a new name. The **Save As..** option is useful if you wish to use an existing radio settings file as a template for other files.

When you choose **Save** or **Save As..**, the **Validation** window will appear asking whether you wish to validate the file. You should select **Yes** to avoid saving a file that may cause the radio to malfunction as a result of illogical or impossible options. It is especially important to run a final validation check if you have not run validation after completing work in the screens in the **Edit** menu.

Once validation is complete, the file will be saved and a message to this effect will appear in the bar at the bottom of the main window.

If the file has not previously been saved, the **File** window will appear and prompt you to specify a path and name for the file. The file will automatically be saved with the '.ops' extension unless you specify a different one. Enter the name of the file in the **File Name** box, then select the drive and directory where you wish to save the file. Select **OK** to save the file. When the file has been saved, a message

to this effect will appear in the bottom of the **File** window. Select **Exit** to exit the window.

Creating a New Radio Settings File

The **New** option sets all fields in the screens in the **Edit** menu to their default values. If you have made changes to data since starting the programming system, you will be warned that you may lose data. If you do not wish to save your changes, select **OK**. If you wish to save these changes, select **Cancel** and save the data using the **Save** or **Save As..** commands.

The Radio Menu

The options in the **Radio** menu allow you to program the radio with the operating information you create in the programming system. You can also retrieve information from a radio so you can change it.

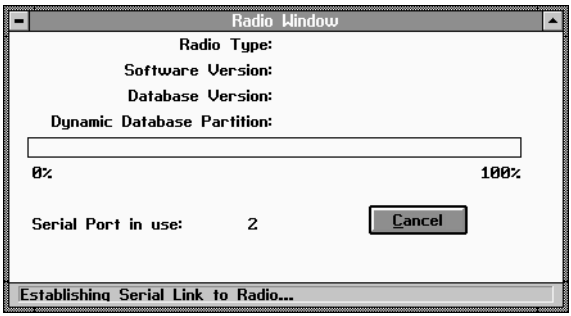
The **Read** option retrieves the current settings from a radio so you can make changes to it. When the **Read** option is selected the **Radio** window (shown below) will appear with the message 'Establishing Serial Link to Radio' in the bar at the bottom of the window. The radio information fields will remain blank until the radio has been read. Select the **Cancel** button if you wish to cancel reading the radio. The **Radio** window will close and you will return to the main window.

The **Cancel** button will change to read **Done** once the radio has been read, and the radio information fields will show the 'Radio Type', 'Software Version', 'Database Version' and 'Dynamic Database Partition'.

Once the radio has been read, select **Done** to exit the window.

The **Program** option programs the radio with the operating information you created in the programming system. When you select **Program**, the **Validation** window will appear. Select **Yes** to run a final validation of your settings. During validation, the programming system will cycle through all the settings in the **Edit** menu screens, and if no conflicts are found, the **Radio** window will appear with the message 'Establishing Serial Link to Radio'. Once the link is established, the radio will be programmed. Select **Done** or **Cancel** to exit the window.

Radio window



Validation is important because it avoids the problems that can occur with impossible or conflicting radio settings. If conflicts are found, the radio will not be programmed; check your settings. If the settings that conflict are acceptable, then select **No** when asked if you want to validate settings.

It is highly recommended that a full validation is done at least once after any changes are made.

Problems Communicating with the Radio

If you are having problems reading from or programming the radio, check that:

- the correct serial port is specified in the **Defaults** window (**Utility** menu);
- the radio programming cable is connected to the correct serial port connector;
- the radio programming cable/lead is connected to the radio;
- the radio type matches the software being used; and
- the radio is turned on.

If you still have problems reading from or programming the radio and are running the programming system from Windows, check that only one copy of the programming system is running and that no other applications that use serial ports are running. Such applications may prevent access to the port even if they are not actively using it.

Make sure no other serial hardware device, such as a modem, is trying to use the same COM port as the programming system. In addition, another COM port cannot be using the same interrupt at the same time as the programming system. For example, a mouse and the programming system cannot be on COM ports that share the same interrupt; however, a modem and the programming system can be on ports that share an interrupt if the modem is not used while the programming system is being used. Typically COM1 and COM3 use the same interrupts, as do COM2 and COM4. If you need to modify these settings, refer to your DOS manual or online help.

If you still have problems, refer to your DOS manual for information on configuring hardware and troubleshooting serial communications.

The Edit Menu

The options in the **Edit** menu allow you to change radio settings. Parts 3 to 7 contain detailed information on changing radio settings using the screens in the **Edit** menu.

The Utility Menu

The **Utility** menu contains three commands for setting up the programming system: **Print**, **Colours** and **Defaults**.

Printing Current Data

The **Print** option in the **Utility** menu allows you to print all of the radio settings you have stored. Printing cycles through all of the **Edit** menu windows and sends the settings to the default parallel port. The **Print** option also appears in individual screens, such as those in the **Edit** menu, in which case only the options for that screen will be printed.

If you select **Print** but your printer will not print, you may need to change the **Parallel Port** and/or **Printer Type** settings (**Defaults** option, **Utility** menu).

Customising Your System

The programming system lets you alter certain settings to suit your computer set-up and operations. These settings are the the screen appearance and colour and the file and port defaults.

Changes are made using the options in the **Utility** menu. The **Colours** option allows you to change the overall appearance of the screen, and the **Defaults** option allows you to change port and file location settings.

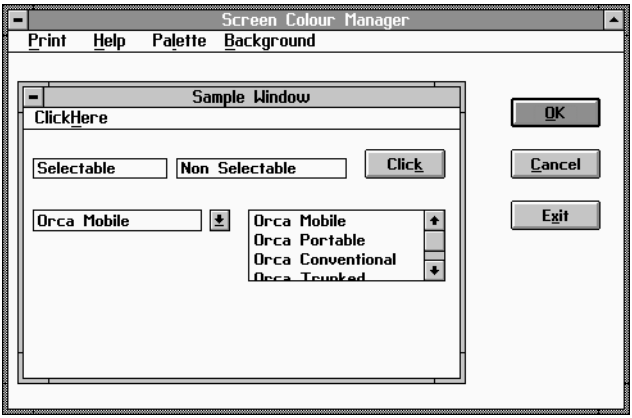
The **Colours** option in the **Utility** menu allows you to change the display colours of the programming system to suit your preferences. When you select **Colours**, the **Screen Colour Manager** will appear. The **Screen Colour Manager** window is shown below. The **Screen Colour Manager** includes a **Sample Window** that displays the current settings.

Palette gives you a choice of colour combinations, and **Background** gives you a choice of background colours. Choose **OK** to apply your colour changes, **Cancel** to restore the previous settings, or **Exit** to exit the **Screen Colour Manager**.

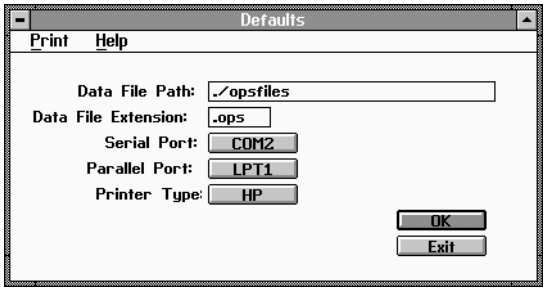
The file location and extension can help you organise your programming data. The port locations are most important because they determine the location of your printer and the specific hardware connection used in attaching a radio to your system for programming. File and port settings can be changed using the **Defaults** option in the **Utility** menu. The **Defaults** window is shown on page 27.

Data File Path determines the default directory on your hard drive that will be used for storing radio data files. The default is './opsfiles'. The full stop represents the directory the programming system is installed in.

Screen Colour Manager window



Defaults window



Data File Extension determines the default filename extension for all data files.

Serial Port determines the hardware connection to which all data for programming radios will be sent. It can be either COM1 or COM2. The default is COM2. If your mouse or modem is using COM2, you will need to change this setting.

Parallel Port determines where data to be printed is sent. The default setting is LPT1, but you can also select LPT2.

Printer Type sets the format that will be used to send data to the printer. If your printer is a Hewlett Packard printer or is compatible with Hewlett Packard's printer command language (PCL), select 'HP'. If not, select 'Other'. Most laser printers and inkjet printers and many dot matrix printers are compatible with HP PCL, and so 'HP' is the default. If the **Parallel Port** setting is correct and all connections are working properly but you cannot print, try setting **Printer Type** to 'Other'.

The Quit Menu

The **Quit** menu allows you to exit the programming system. You will be asked to confirm your selection. Click on **Yes** or press **Enter** to return to the DOS prompt or your operating system.

PART 3 Basic Radio Settings

This part contains detailed information on changing general information about the radio. The **Edit** menu screens discussed in this part are:

- **Specifications**
- **Subaudible Signalling Setup**
- **Receive Monitoring**
- **Transmitter Setup**
- **Power Save Features**

Specifications Screen

The **Specifications** screen shows basic information about the radio such as the radio model and the frequency band. The **Specifications** screen is shown below.

Radio Model

The first four fields in the **Specifications** screen show the radio model and information related to it.

The first field, **Radio Model**, is automatically read from the radio's memory. The next three fields display information contained in the model number that is particularly relevant to the programming system. Modifying any of these three fields will amend the first field to reflect these properties. The other characters in the model number are not relevant to the programming system.

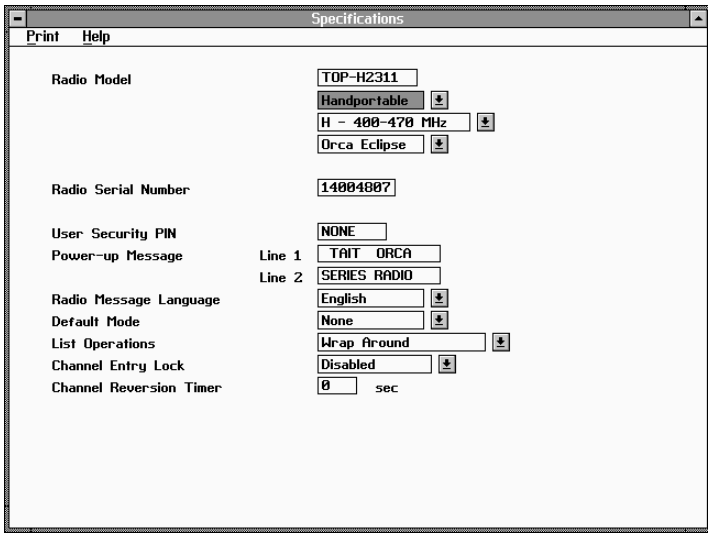
You may wish to modify these fields to read in a radio of a different type and use the previous settings as a template for programming radios of another variant, e.g. a different frequency band.

You can find the model number on the back of the radio. However, if the radio has been reconfigured, the model number on the back of the radio may not match that read from the radio.

Handportable or Mobile

The second field shows whether the radio being programmed is a mobile or handportable radio. Select 'Mobile' or 'Hand-

Specifications screen



portable' appropriate for the radio you are programming. When this field is set to 'Mobile', the third position in the **Radio Model** field will read 'M'. When set to 'Handportable', the third position in the **Radio Model** field will read 'P', e.g. TOP-B1221, P = handportable radio.

This field must be set correctly as not all features programmable using this programming system are available for both handportable and mobile radios.

Frequency Band

The third field sets the frequency band the radio operates at and is indicated by the fourth position (first after the hyphen) in the model number on the back of the radio.

This letter indicates the frequency band as follows:

B 136-174 MHz
C 174-225 MHz
D 220-270 MHz
E 270-310 MHz
F 290-340 MHz
G 336-400 MHz
H 400-470 MHz
I 450-530 MHz
J 806-870 MHz

e.g. TOP-B1211

B = 136-174 MHz band (VHF)

Note: H band may be split into TOP-HxxxL (Rx 400-450 MHz, Tx 400-440 MHz) and TOP-HxxxH (440-470 MHz). TOP-HxxxL and TOP-HxxxH radios should have the **Frequency Band** set to 'H'.

The frequency band must be set correctly in order to validate channel settings.

Feature Set

The fourth field indicates the radio's feature set, which is indicated by the sixth position (third after the hyphen) of the model number. '1' indicates the Orca Elan feature set, '2' indicates the Orca Excel feature set, and '3' indicates the Orca Eclipse feature set. For example, for TOP-B1211, 2 = Orca Excel feature set.

This field must be set correctly as not all features programmable using this programming system are available for all feature sets.

Radio Serial Number

The field **Radio Serial Number** is automatically read from the radio's memory. It is used for identification only and although you can select the field, changes you make will have no effect. The **Radio Serial Number** has no effect on the normal operation of the radio.

Radio Display Messages

Three fields set how the radio displays messages:

- **User Security PIN**;
- **Power-up Message**; and
- **Radio Message Language**.

These fields do not apply to Elan handportable radios and Elan and Excel mobile radios.

The field **User Security PIN** sets the PIN number the user is required to enter during the power-up sequence. Enter a five-

digit number, or 'None' if no PIN number is required.

The **Power-up Message** fields set the message that is displayed when the radio is turned on. It can be up to 24 characters chosen from:

A-Z 0-9 ! # $ % ^ & * + - = { } ( ) [ ]
< > : ; ? | , . _ " ' / space

Enter 12 characters in each box.

The field **Radio Message Language** sets the language in which display messages appear. Select 'English', 'French' or 'German'.

Default Mode

The field **Default Mode** sets the mode the radio will revert to at power up and after 10 seconds of no user activity. Any one of the radio data entry modes can be selected as long as they have been enabled. No default mode is also an option, and if no default mode is selected, the radio will remain in the last selected mode.

- For Elan radios, only channel entry mode is available.
- For Excel handportable radios, the following modes are available: channel entry mode (Channel), DTMF dialling mode (DTMF), Selcall dialling mode (Selcall) and no default mode (None).
- For Excel mobile radios, the following modes are available: channel entry mode (Channel), Selcall dialling mode (Selcall) and no default mode (None).
- For Eclipse radios, the following modes are available: channel entry mode (Channel), DTMF dialling mode (DTMF), Selcall dialling mode (Selcall), Status entry mode (Status), alphanumeric entry mode (AlphaSymbol), user function menu entry mode (Menu) and no default mode (None).

The selection of any of the above modes as a default mode is dependent on whether the modes are available and have been enabled.

- Channel entry mode is automatically available for all radios.
- User function menu entry mode is available when a function is selected to be in the user menu (**User Selectable Parameters** screen), or a group is set to be user programmable (**Scan Groups** screen) or when **Received Call Queuing** or **Call Diversion** are set to 'Enabled' (**Selcall Features** screen).
- DTMF dialling mode is available when the **Manual DTMF Dialling** field in the **DTMF** screen is set to 'Enabled'.
- Selcall dialling mode is available once Selcall has been enabled (**Selcall Option** in the **Selcall Identity** screen).
- Alphanumeric entry mode is automatically available once an alpha symbol has been defined in the **Alpha Symbols** screen.
- Status entry mode is available once Selcall has been enabled and when at least one of the **Status** fields for the **Fixed Call Sequence** or the **Varia-**

ble Call Sequence (**Selcall Identity** screen) contains a 'V'.

List Operations

The field **List Operations** does not apply to Elan handportable radios.

This field determines the behaviour of scrolling lists. There are two options: 'Wrap Around' and 'Stop at End of List'.

In 'Wrap Around' lists, the next entry displayed after the last is the first, and vice versa. The list is treated as a continuous loop with the first and last entries adjacent.

In 'Stop at End of List' lists, the list movement stops when the first or last entry is reached.

This setting does not apply to volume selection, which is always 'Stop at End of List'.

Channel Selection: Excel Handportables

On Excel handportables, channels can be selected from the 16-way selector or from the keypad. The fields **Channel Entry Lock** and **Channel Reversion Timer** apply only to Excel handportables and set properties that can help the user avoid confusion as to what channel is currently selected.

When **Channel Entry Lock** is set to 'Enabled', the user will not be able to select a new channel from the keypad when a valid channel is already selected from the 16-way selector.

The field **Channel Reversion Timer** sets the time the radio will remain on a channel selected from the keypad after a period of inactivity. When the timer expires, the radio will revert to the channel indicated by the 16-way selector. Set this field from 10 to 250 seconds in steps of one second.

Setting **Channel Reversion Timer** to 0 disables the channel reversion timer, which may cause confusion for the user as the position selected will not always correspond to that indicated by the 16-way selector.

Subaudible Signalling Setup Screen

Subaudible signalling can be used to segregate groups of radio users from other groups that use the same channel. With subaudible signalling, additional information is transmitted with normal speech. If a radio receives the signal that identifies that radio's group, the signalling is said to be valid and the radio's mute will be opened so the user can hear the transmission. Otherwise, the transmission will be ignored and the radio will remain silent.

Tait Orca radios can be programmed with two forms of subaudible signalling: CTCSS and DCS.

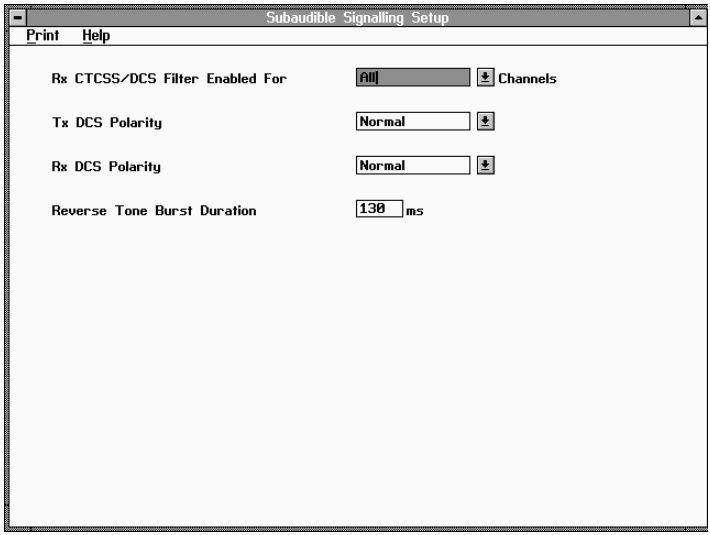
CTCSS (continuous tone-controlled squelch system) transmits subaudible tones in the frequency band 67 to 256 Hz to distinguish groups of users. DCS (digitally coded squelch) transmits digital data in the frequency band 10 Hz to 134 Hz.

The four fields in the **Subaudible Signalling Setup** screen (shown below) set properties of CTCSS and DCS transmissions. CTCSS and DCS codes for individual channels are set in the **Channels (I)** and **Channels (II)** screens.

CTCSS/DCS Filter

The field **Rx CTCSS/DCS Filter Enabled For** determines the settings for the radio's audio filter, which removes any residual CTCSS or DCS signalling that

Subaudible Signalling Setup screen



may cause interference on the received audio. The filter limits the range of frequencies the radio receives and so in some situations will affect signal quality. It can be switched off automatically for channels that do not have CTCSS or DCS.

To switch the filter off on channels that do not have CTCSS or DCS on receive, set **Rx CTCSS/DCS Filter Enabled For** to 'CTCSS/DCS'. To operate the filter continuously, select 'All'.

DCS Polarity

The fields **Tx DCS Polarity** and **Rx DCS Polarity** set the polarity of all transmitted and received DCS codes defined in the **Channels (I)** and **Channels (II)** screens. Some systems require the DCS code to be inverted when transmitted. Select 'Normal' or 'Inverted'.

CTCSS Reverse Tone Burst Duration

The field **Reverse Tone Burst Duration** specifies how long a CTCSS reverse tone burst will be transmitted. Reverse tone burst transmission increases the speed of receiver shutdown in some repeaters and associated equipment. Set a value from 0 to 250 ms in steps of 1 ms.

Setting **Reverse Tone Burst Duration** to 0 disables reverse tone burst transmission.

The recommended value is 130 ms, which will work for all CTCSS tones between 67.0 and 250.3 Hz. Longer durations may be used for lower CTCSS frequencies and shorter durations for higher CTCSS frequencies; however, it should not be necessary to deviate from 130 ms unless your system has specific requirements.

Receive Monitoring Screen

The fields in the **Receive Monitoring** screen (shown below) set properties related to the radio's monitor function.

Four other settings specific to Selcall affect the monitor facility. They are:

- **Third Tone Monitor Reset** and **Appended C Tone Monitor Reset** in the **Selcall Features** screen;
- **Remote Monitor Reset** in the **Selcall Identity** screen; and
- **Selcall Muting** in the **Selcall Setup** screen.

Monitor Properties

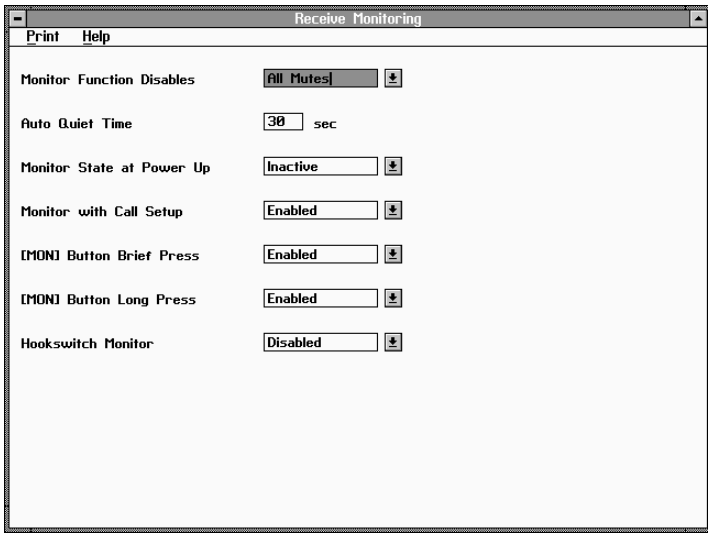
Mutes Affected

The monitor function can override the subaudible signalling mutes and the Selcall mute, depending on the setting of the first field in the **Receive Monitoring** screen, **Monitor Function Disables**.

When **Monitor Function Disables** is set to 'All Mutes', both the Selcall mute and any subaudible signalling mutes will be disabled when the monitor function is active. The user will then be able to hear all voice traffic on a channel.

When **Monitor Function Disables** is set to 'Selcall Mute', only the Selcall mute will be disabled when the monitor func-

Receive Monitoring screen



tion is active. The user will then be able to hear all voice traffic on a channel, except that segregated by subaudible signalling.

Duration Active

The field **Auto Quiet Time** sets a time limit on the monitor function remaining active. When the limit is reached, the radio will resume quiet (muted) operation. Enter a value between 1 and 255 seconds in steps of 1 second. Enter 0 to disable the auto quiet timer.

Automatic Monitor Activation

The field **Monitor State at Power Up** determines whether the monitor facility is inactive or active when the radio is turned on. Select 'Active' to automatically activate the monitor facility when the radio is turned on. Select 'Inactive' to ensure that the monitor facility is inactive when the radio is turned on.

The field **Monitor with Call Setup** sets the radio to automatically activate the monitor facility when an outgoing Selcall call is sent. Select 'Enabled' to activate the monitor facility if a Selcall call is successfully sent. Select 'Disabled' to permit the radio to transmit a Selcall call without activating the monitor facility.

Selcall must be enabled ('Selcall Identity' screen) before **Monitor with Call Setup** can be enabled.

[MON] Button Brief Press

The field **[MON] Button Brief Press** does not apply to Elan handportable radios.

When this field is set to 'Enabled', a brief press of the monitor key (or) activates the monitor facility.

A brief press of the monitor key (or) always deactivates the monitor facility if it is active.

[MON] Button Long Press

The field **[MON] Button Long Press** does not apply to Elan handportable radios.

When this field is set to 'Enabled', a long press of the monitor key (or) activates the squelch override, which permits the user to monitor all activity on a channel. This is useful where there is activity in marginal areas and the signal is too weak to be reliably heard.

Hookswitch Monitor

The field **Hookswitch Monitor** applies only to mobile radios.

When this field is set to 'Enabled', the monitor facility will be activated when the microphone is off the hook. The monitor facility will disable either the Selcall mute or all mutes, as specified by a **Monitor Function Disables** field.

Transmitter Setup Screen

Transmitter options are set in the **Transmitter Setup** screen, which is shown below.

Transmit Timer

The field **Transmit Timer Duration** sets the longest allowable continuous transmission by your radio. When this time is reached, the radio will emit a series of warning tones before returning to receive mode. Enter a value between 1 and 250 seconds in steps of 1 second. Enter 0 to disable the transmit timer. The recommended value is 60 seconds.

It is recommended that you do not disable this function as frequent lengthy transmissions, whether intentional or accidental, could damage the radio's transmitter and can be a nuisance to others.

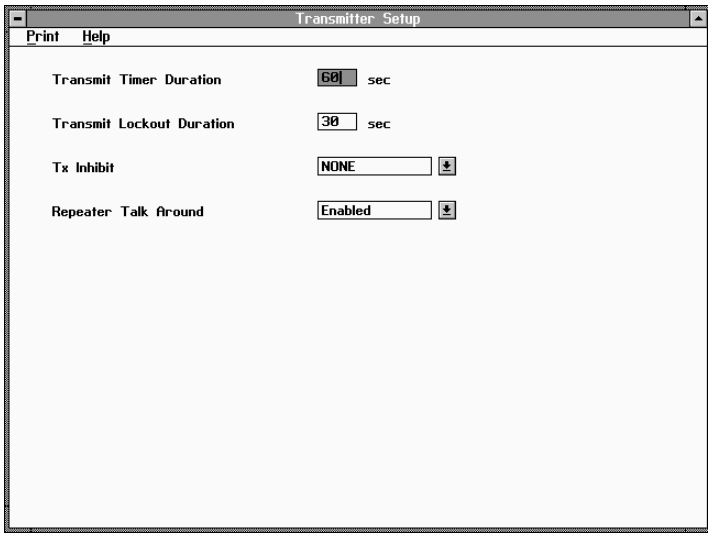
The field **Transmit Lockout Duration** determines how long the radio will be prevented from transmitting after the transmit timer has expired. Enter a value between 1 and 250 seconds in steps of 1 second. Enter 0 to disable the transmit lockout timer. The recommended value is 30 seconds.

Transmit Inhibit

The setting of the field **Tx Inhibit** prevents the radio from transmitting under certain conditions.

- Select 'None' and there will be no transmission inhibit of any kind.

Transmitter Setup screen



- Select 'Busy' to prevent the radio from transmitting when there is activity on the channel.
- Select 'Mute' to prevent the radio from transmitting when there is channel activity but the radio remains quiet (i.e. receiving an invalid signalling tone).

If Selcall muting has been set to 'Enabled' (**Selcall Setup** screen) on the active Selcall system, then all transmission requests except for making a Selcall call will be inhibited, regardless of the setting of **Tx Inhibit**. However, the transmission request by the Selcall call initiation will follow the transmission inhibit conditions set in **Tx Inhibit**.

Repeater Talk Around

Repeater talk around allows you to bypass normal repeater operation and communicate with other radios in simplex mode. This facility may be required if the radio is moved out of range of the repeater.

When **Repeater Talk Around** is set to 'Enabled', repeater talk around (with the transmit frequency set to be the same as the receive frequency) can be selected by a long press of the channel key ( ) (on all but the Elan handportable radios) or a press of the designated function key during normal radio operation.

Power Save Features Screen

Economy mode reduces the radio's power consumption when it is idle. Any operation on the radio (including valid channel activity) will return it to a fully active state; however, the beginning of a transmission may be lost following a period of inactivity.

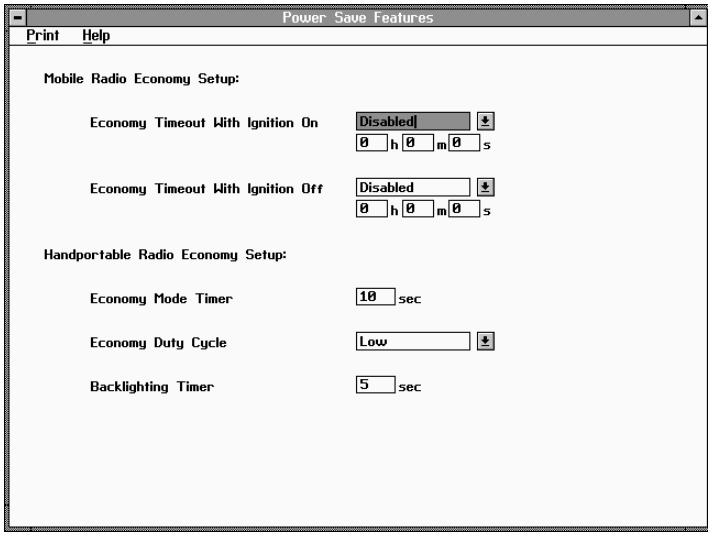
Economy mode is set up in the **Power Save Features** screen, which is shown below. Handportable and mobile radios each have different forms of economy mode.

Mobile Radios

If the vehicle connections are present, the radio will detect whether the vehicle's ignition is on or off and will then behave according to the settings of **Economy Timeout With Ignition On** and **Economy Timeout With Ignition Off**. These fields operate independently of each other and it is not necessary to set both timers; however, if at least one has been enabled and no function key has been programmed to act as the economy mode control or economy mode control has not been included in the user function menu (Eclipse radios), then it is recommended to set **Economy Mode Control** to 'On' in the **User Selectable Parameters** screen.

When the field **Economy Timeout With Ignition On** is set to 'Enabled', the radio will enter economy mode when the vehicle ignition is on and there has been no

Power Save Features screen



activity on the radio for the time period specified in this field. Set hours, minutes and seconds from 10 seconds to 18 hours.

When the field **Economy Timeout With Ignition Off** is set to 'Enabled', the radio will enter economy mode when the vehicle ignition is off and there has been no activity on the radio for the time period specified in this field. Set hours, minutes and seconds from 10 seconds to 18 hours.

Handportable Radios

When economy mode is activated on handportable radios, the radio cycles between the normal receive state and a standby state. While in the receive state, the radio will power up to determine whether the current channel is carrying valid traffic. While in the standby state, the radio's circuitry will be switched off or placed in standby mode. The radio will cycle between these two states until economy mode operation is suspended.

Economy cycling will be deactivated while the radio is scanning or voting; however, economy mode will remain active and economy cycling will begin again when an individual channel is selected.

Battery life can also be extended by reducing the amount of time radio backlighting remains active.

Three fields must be set for handportable radio economy mode:

- **Economy Mode Timer**;
- **Economy Duty Cycle**; and
- **Backlighting Timer**.

Economy Mode Timer

The field **Economy Mode Timer** sets your radio to turn off some internal circuitry after a period of inactivity to conserve battery power.

Enter a value between 1 and 240 seconds in steps of 1 second. Enter 0 to disable the economy mode timer.

If economy mode is enabled and no function key has been programmed to act as the economy mode control or economy mode control has not been included in the user function menu (Eclipse radios), then it is recommended to set **Economy Mode Control** to 'On' in the **User Selectable Parameters** screen.

Economy Duty Cycle

The field **Economy Duty Cycle** sets the amount of time the radio is in standby mode before sampling activity on a channel. Selecting 'Low' sets the standby duration to 200 ms, selecting 'Medium' sets it to 500 ms and selecting 'High' sets it to 800 ms.

If both Selcall and economy mode are enabled, the **Lead In Delay** field (**Selcall Setup** screen) for other radios in the fleet will need to be set to at least 100 ms longer than that of the duty cycle, e.g. for a duty cycle setting of 'Medium', the **Lead In Delay** on other radios should be set to no less than 600 ms. Otherwise the incoming Selcall sequence may not be detected reliably.

If Selcall is being used on a repeater system, **Economy Duty Cycle** should not be set to 'High'.

Backlighting

Backlighting can be activated by the press of a function key (one of the function key settings set to 'Backlighting' in the **Key Settings** screen) or by the activation of night operation mode. Night operation mode can be activated from the user function menu of Eclipse handportable radios (see **Night Operation Backlighting Level** in the **User Selectable Parameters** screen) or by the press of a function key (one of the function key settings set to 'Night Use').

The field **Backlighting Timer** sets the amount of time backlighting will remain on when either backlighting is activated or when night operation mode is activated. Enter a value between 1 and 10 seconds in steps of 1 second.

For 'Backlighting', the backlighting will remain active for the duration of the **Backlighting Timer**. For night operation mode, backlighting will remain on for the duration of the backlighting timer, which will reset whenever a key is pressed or a call is received.

PART 4 Setting Up Channels and Groups

This part contains detailed information on the fields related to creating and configuring channels and scan groups. The **Edit** menu screens discussed in this part are:

- **Channels (I)**
- **Channels (II)**
- **Birdie Channels**
- **Scan Groups**

Channels (I) and (II) Screens

The main settings for channels are set up in the **Channels (I)** and **Channels (II)** screens. The **Channels (I)** screen is shown below.

This screen contains default values for one channel. Press **F2** to insert a new channel. If you wish to delete a channel, press **F3**. There must be at least one channel in the list, and pressing **F3** will not delete the last remaining channel.

Up to 16 channels are possible on Elan radios, up to 100 on Excel radios and up to 400 on Eclipse radios. The maximum number of channels possible is affected by the number of Selcall systems programmed. For Eclipse radios, if more than 255 channels are programmed, the additional channels should be set up in the **Channels (II)** screen. For Elan and Excel handportable radios, any channels numbered from 1 to 16 can be accessed from the 16-way selector.

The **Channels (II)** screen is identical to the **Channels (I)** screen, except it contains no default entry for the first channel. Press **F2** to insert a new channel.

Channel Identification Number

The field **Chan ID** sets the channel number, which must be unique. Because channels and groups are both accessed the same way, no channel or group can share the same identity number.

Channels (I) screen

Channels (I)

Print Help

Chan ID	Chan Name	Rx Freq (MHz)	Tx Freq (MHz)	CTCSS/DCS Rx	CTCSS/DCS Tx	Tx Pwr Dev	Tx Pwr Lvl	Squelch Level	Slcl Sys#	DTMF ID
1	CHAN1	460.10000	460.10000			N	L	Country	1	1
2	CHAN2	400.10000	400.10000			N	L	Country	1	1
3	CHAN3	420.10000	420.10000			N	L	Country	2	2
4	CHAN4	440.10000	440.10000			N	L	Country	3	3
5	CHAN5	460.10000	460.10000	C250.3	C250.3	N	L	Country	4	4
6	CHAN6	420.10000	420.20000	C 67.0	C250.3	N	L	Country	5	5
7	CHAN7	460.10000	460.20000	C100.0	C203.5	N	L	Country	6	N
8	CHAN8	460.10000	460.10000	D 023	D 023	N	L	Country	0	N
9	CHAN9	460.10000	460.10000			M	L	Country	3	N
10	CHAN10	460.10000	460.10000			W	L	Country	4	N
11	CHAN11	460.10000	460.10000			N	L	City	0	N
12	CHAN12	460.10000	460.10000			M	L	City	0	N
13	CHAN13	460.10000	460.10000			W	L	City	0	N
14	CHAN14	460.10000	460.10000			N	M	Country	0	N
15	CHAN15	460.10000	460.10000			N	H	Country	0	N
16	CHAN16	460.10000	460.10000			N	O	Country	1	1

Set a number between 1 and 510. Press **F2** to insert a new channel, or **F3** to delete the current channel.

Channel Name

The field **Chan Name** does not apply to Elan handportable radios and Elan and Excel mobile radios and setting it has no effect on radio operation. This field sets the channel name, which for Excel handportable radios and Eclipse mobile and handportable radios is displayed on the radio display when the radio is in channel entry mode.

Ensure that you do not allocate the same name for different channels or groups since both are accessed in the same way. A default name is generated from the channel identity. For example, the first channel defaults to CHAN1. Enter a name of up to 8 characters from:

A-Z 0-9 ! # $ % ^ & * + - = { } ( )
[ ] < > : ; ? | , . _ " ' / space

Receive and Transmit Frequencies

For each channel, a receive and transmit frequency must be entered between the radio's upper and lower frequency limits. These values are set in the **Rx Freq (MHz)** and **Tx Freq (MHz)** fields.

The letter in the fourth position (first after the hyphen) in the radio model number (see the **Specifications** screen or the back of the radio) indicates the radio's frequency band as follows:

B 136-174 MHz
C 174-225 MHz
D 220-270 MHz
E 270-310 MHz
F 290-340 MHz
G 336-400 MHz
H 400-470 MHz
I 450-530 MHz
J 806-870 MHz

Enter a frequency within the designated range that is a multiple of either 5 kHz or 6.25 kHz.

The transmit frequency for band J must be between 806 and 870 MHz, and the receive frequency must be between 851 and 870 MHz.

Band H may be available as 400-440 MHz (radio model numbers TOP-HxxxL) and 440-480 MHz (radio model numbers TOP-HxxxH).

- For TOP-HxxxL radios, enter a receive frequency between 400 and 450 MHz.
- For TOP-HxxxH radios, enter a receive frequency between 440 and 480 MHz.

The programming system will not differentiate between TOP-HxxxL and TOP-HxxxH radios, and so you will need to ensure that you are programming the correct frequency for receive and transmit frequencies.

Subaudible Signalling

Subaudible signalling for each channel is set in the **CTCSS/DCS Rx** and **CTCSS/DCS Tx** fields.

The **CTCSS/DCS Rx** field sets the receive subaudible coding the radio must receive before the activity will be regarded as valid and the mute opened.

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The **CTCSS/DCS Tx** field sets the transmit subaudible coding that will accompany each transmission made on the channel.

For both fields, enter either a valid CTCSS frequency (e.g. 156.7) or a valid DCS code (e.g. 043) from "Appendix A: Valid DCS and CTCSS Frequencies" on page 107. You can enter a 'C' or 'D' with each entry to indicate CTCSS or DCS (e.g. C156.7). Leave these fields blank to indicate that no subaudible signalling will be used on this channel.

Transmit Deviation

The field **Tx Dev** sets the transmitter deviation. It can be set to 'W', 'M' or 'N', which corresponds to maximum deviation settings of 5 kHz, 4 kHz and 2.5 kHz. Set this field according to the system channel spacing.

- 25 kHz channel spacing will normally require this field to be set to 'W'.
- 20 kHz channel spacing will normally require this field to be set to 'M'.
- 12.5 kHz channel spacing will normally require this field to be set to 'N'.

Channel spacing is indicated in the number in the fifth position (second after the hyphen) in the radio model number (see the **Specifications** screen) or the back of the radio.

- A '1' indicates a wideband radio, which can be programmed for operation on 20 and 25 kHz channels only.
- A '2' indicates a narrowband radio, which can be programmed for operation on 12.5, 20 and 25 kHz channels. For example, TOP-H2110, 2 = narrowband radio.

Power Level

The field **Pwr Lvl** sets the transmit power level. Select 'H', 'M', 'L' or 'O' for high, medium, low or off.

For handportable radios, low is 1 watt, medium is 2.5 watts and high is 5 watts (VHF) or 4 watts (UHF). For 800 MHz handportable radios, only low (1 watt) and high (3 watts) are available. Setting this field to 'O' disables transmitting for this channel.

For mobile radios, low is 5 watts, medium is 15 watts and high is 25 watts. Setting this field to 'O' disables transmitting for this channel.

Squelch Level

The field **Squelch Level** sets the squelch level to control the muting of unwanted noise in the absence of an on-channel signal.

- Setting this field to 'Country' (12 dB SINAD) means the radio can be used in areas where the signal may be weak and where maximum range is desirable.
- Setting this field to 'City' (16 dB SINAD) makes the radio less sensitive to interference so that stronger signals will be required for the radio to unmute.

Selcall System

The field **Slcl Sys#** sets the Selcall system this particular channel will operate on. Selcall systems are set up in the **Selcall**

Identity screen and the number of a particular system is indicated by the field in the bottom lefthand corner of that screen.

Setting **SIcl Sys#** to 0 disables Selcall for this channel.

DTMF Identification

The field **DTMF ID** determines what DTMF call is associated with a particular channel. DTMF preset calls are defined in the **DTMF** screen. Enter the **Preset ID** from the **DTMF** screen for the call string you wish to be associated with this channel.

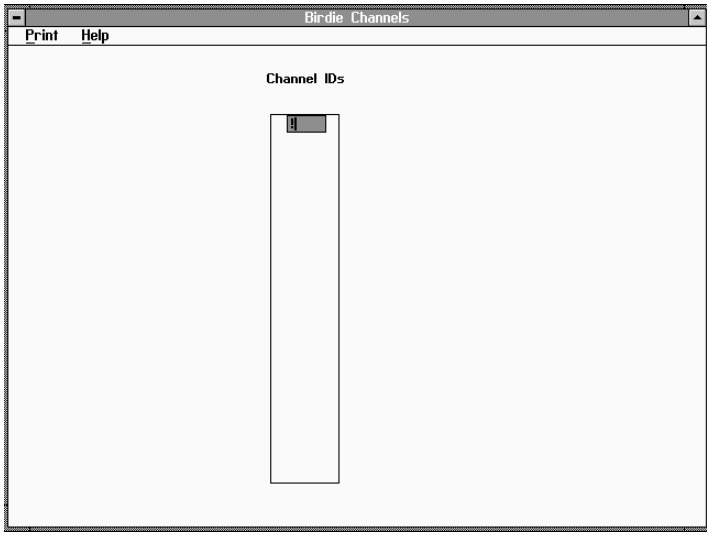
Birdie Channels Screen

A birdie is an undesirable beat caused by internal electronics and may be heard as a hum or whistle.

Your radio has been designed to minimise the possibility of birdie channels. However, if you find a particular channel on a radio is experiencing problems with internal interference, you can set a 'birdie killer' for the affected channel in the **Birdie Channels** screen, which is shown below.

Use the **F2** key to insert each line for data entry or the **F3** key to delete the current line. Enter the channel ID for the channel to be added to the birdie hitlist in the **Channel IDs** field.

Birdie Channels screen



Scan Groups Screen

Groups of channels and how they are scanned or voted are set up in the **Scan Groups** screen (shown below). At least two channels must be defined in the **Channels (I)** screen before a valid group can be set up, and up to 20 groups can be defined.

The **Scan Groups** screen consists of two parts: fields that define group parameters and the group definition array.

A group can be set up for scanning or voting. For scanning, a group of channels is scanned for valid activity. For voting, the same traffic is carried on all member channels, but the channel with the greatest signal strength is selected. Whether a group is set for scanning or voting is set in the group definition array.

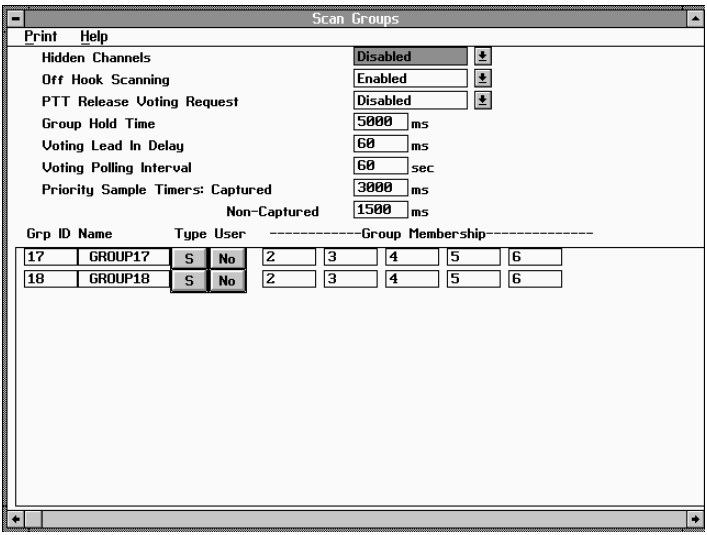
If economy mode is active when a scan group is selected, economy cycling will be deactivated while scanning or voting is taking place. Economy mode will remain active and economy cycling will begin again when an individual channel is selected.

Group Parameters

Hidden Channels

When the field **Hidden Channels** is set to 'Enabled', channels that appear in a scan group will be hidden from the user and so cannot be selected individually. This set-

Scan Groups screen



ting has the effect of making a group of channels appear as one channel.

If you wish to access channels via groups and individually, set **Hidden Channels** to 'Disabled'.

Off Hook Scanning (Mobile Radios)

The field **Off Hook Scanning** applies only to mobile radios and specifies whether scanning will be allowed when the microphone is off-hook.

- When set to 'Enabled', scanning begins as soon as a group is selected. If the user initiates a call while the radio is scanning, the radio will transmit on the home channel, which is the first channel defined in the group definition array.
- When set to 'Disabled', scanning will be suspended when the microphone is off-hook. Once a scan group is selected, the microphone must be on-hook before scanning will begin. All transmission requests will be inhibited while the radio is scanning.

PTT Release Voting Request

When the field **PTT Release Voting Request** is set to 'Enabled', the voting sequence will be initiated whenever the PTT key is released.

Group Hold Time

The **Group Hold Time** field specifies the pause before scanning resumes once valid channel activity has ceased.

Enter a time between 0 and 25,000 ms in steps of 100 ms. If set to 0, the hold timer will be disabled regardless of channel activity and scanning will resume immediately after a channel becomes invalid.

If Selcall is enabled (**Selcall Setup** screen), **Group Hold Time** must be set to a value longer than the time it takes to decode a Selcall sequence, including the Selcall lead-in delay.

If Selcall muting is enabled (**Selcall Setup** screen), it is highly recommended that group hold time is set to a period sufficient to detect an incoming call. If not, calls may never be detected.

Voting Lead In Delay

The field **Voting Lead In Delay** sets the delay between the radio detecting activity on a voting channel and voting taking place.

Enter a value between 0 and 2550 ms in steps of 10 ms.

Voting Polling Interval

The field **Voting Polling Interval** sets the time between votes when the system is busy but carrying invalid subaudible signalling.

Enter a value between 1 and 250 seconds in steps of 1 second.

Priority Sample Timers

The priority sample timers determine how often a priority channel will be scanned in preference to other channels in a scan group.

The **Non-Captured Priority Sample Timer** applies when no channel in a group is busy or when the signalling on a channel is invalid, and the **Captured Priority Sample Timer** applies when a

channel other than the priority channel is busy or when the signalling on a channel is valid.

For both timers, set a value from 500 to 5000 ms in steps of 100 ms.

In some systems, setting the priority sample timers too low will interfere with decoding signalling if the duration of the signal is near or greater than the duration of the timer. In such cases, the signal will never be recognised as valid and so you should not set these timers lower than the default values of 3000 ms (**Captured**) and 1500 ms (**Non-Captured**).

Group Definition Array

What channels belong to a scan group is defined in the group definition array. Press the **F2** key to add a new group, or press **F3** to delete a group.

Group Identity

The field **Grp ID** allows you to define an ID number for a group of channels. Groups and channels must be unique so make sure you assign a different ID number to the groups and the channels since they are both accessed the same way. Enter a unique number between 1 and 510. On Elan and Excel handportable radios, groups numbered from 1 to 16 can be accessed from the 16-way selector.

Group Name

The field **Name** does not apply to Elan handportable and Elan and Excel mobile radios and setting it has no effect on radio operation. **Name** sets the name displayed on the radio front panel when the radio is in channel entry mode. Enter a name of up to 8 characters from:

A-Z 0-9 ! # $ % ^ & * + - = { } ( )
[ ] < > : ; ? | , . _ " ' / space

Group Type

The field **Type** sets the type of scanning/voting used for the group. The options available are described in Table 3 on page 55.

User Programmable Groups

The **Group User Programmable** function is only available on Eclipse mobile and handportable radios.

The field **User** sets a user programmable group, which allows the user to add or delete channels from the selected group. Select 'Yes' or 'No'.

Group Membership List

The **Group Membership** list defines group members by their channel ID. It can include any current channel ID, and any channel can appear only once in the group. Enter a valid channel ID and press the **F4** key to insert a new group member.

The following rules apply.

There must be at least two and no more than 16 entries. The first channel listed is taken to be the home channel.

For priority scanning, the first channel is the priority channel. For dual priority scanning, the first and second channels are the priority channels, and the first channel listed has higher priority than the second.

For groups set for scanning (S), priority scanning (PS) and dual priority scanning (DPS), the first channel listed is taken to be the home channel. For priority scan-

Table 3: Scanning and voting options

Option	Description
Scanning (S)	The radio will scan all group members to find a channel that is busy and has valid signalling and then make that channel the current channel. Scanning resumes when the current channel is no longer busy or valid and the group hold time has expired.
Priority scanning (PS)	The first channel in the group is the priority channel, and continues to be scanned periodically even after another non-priority channel becomes current.
Dual priority scanning (DPS)	The first two channels in the group are priority scanning channels, and both continue to be scanned even after another non-priority channel becomes current. If the second priority channel becomes current, the first continues to be scanned, but if the first becomes current, no further scanning takes place until that channel is no longer busy and the group hold time has expired.
Voting (V)	The radio will scan all group members to find a busy channel. It then measures the signal strengths of all channels and makes the channel with the strongest signal the home channel on which transmissions will be made. Voting resumes when the home channel is no longer busy and the group hold time has expired.
Voting with subaudible signalling (VS)	The radio behaves as for voting, but a channel must have valid signalling if it is to be made the current channel.
Double voting (DV)	The radio behaves as for voting but the signal strength of each channel is measured twice.
Double voting with subaudible signalling (DVS)	The radio behaves as for voting but a channel must carry valid signalling if it is to be made the current channel, and the signal strength of each channel will be measured twice.

ning, the first channel is the priority channel. For dual priority scanning, the first and second channels are the priority channels, and the first channel listed has higher priority than the second.

For groups set for voting (V), voting with signalling (VS), double voting (DV) and double voting with signalling (DVS), the home channel is the channel determined to have the strongest signal. If no channel has been selected as the strongest channel, the home channel will be the first channel assigned in the group membership list.

Each channel can have different Selcall sequences and DTMF strings associated with it (e.g. different function key preset calls for different Selcall systems). If a preset Selcall or DTMF call is made while a scan group is selected, the sequence or string transmitted will be that assigned to the group's home channel. When the radio locks onto a channel in the scan group, the Selcall sequences and DTMF

string will be updated to those set for the held channel.

You can delete the selected group member by pressing the **F5** key. However, there must be at least two entries and so if you wish to delete one of only two group members, you must first insert a new group member.

PART 5

Setting Up Selcall

This part contains detailed information on setting up Selcall systems. The **Edit** menu screens discussed in this part are:

- **User Defined Selcall Tone Set**
- **Selcall Identity**
- **Selcall Setup**
- **Selcall Features**
- **Selcall Emergency Setup**
- **Selcall Rx Decode Setup**
- **Selcall Control Status Definitions**
- **Status Labels**

User Defined Selcall Tone Set Screen

If you are using a tone set that is not among those listed in the **Tone Set** field of the **Selcall Setup** screen, enter your tone set in the **User Defined Selcall Tone Set** screen (shown below).

There are two ways you can define your own tone set, and the option chosen affects how you use the **User Defined Selcall Tone Set** screen. You can:

- reorder the frequency values of an existing tone set; or
- enter your own values.

If you wish to reorder an existing tone set, choose the name of that tone set from the **Tone Set to Define** field. In the right-hand column, enter the tone (0 to 9, A to F) you wish to correspond to the frequency displayed. Use each tone only once. You will not be able to change the values in the left-hand column.

If you wish to define your own tone set, choose 'Non Standard' from the **Tone Set to Define** field. The values in the left-hand column will be set to 0, and you will not be able to change the values in the right-hand column. In the left-hand column, enter the frequency you wish to correspond to the tone displayed. Each tone should be a different frequency, chosen from the **Tone** column of Table 4 on page 60.

User Defined Selcall Tone Set screen

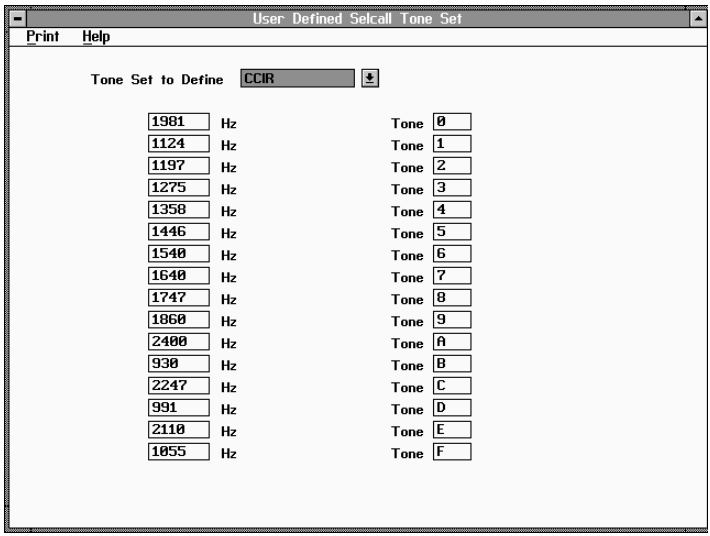


Table 4: Tones and tolerance ranges (in Hz) for non-standard user defined Selcall tone sets

Tone	Tolerance	Tone	Tolerance	Tone	Tolerance	Tone	Tolerance
571	540-589	941	922-960	1275	1257-1298	1995	1950-2036
600	570-618	970	951-989	1305	1287-1328	2000	1955-2041
631	603-649	991	973-1010	1336	1318-1360	2010	1965-2052
680	654-698	1023	1005-1043	1358	1339-1382	2110	2057-2155
697	671-715	1040	1022-1060	1400	1381-1425	2151	2095-2198
740	716-758	1055	1037-1075	1446	1426-1472	2200	2140-2249
741	717-759	1060	1042-1080	1477	1456-1504	2205	2145-2254
770	747-788	1091	1074-1111	1728	1698-1761	2247	2183-2298
810	788-828	1124	1107-1145	1747	1716-1780	2292	2224-2345
825	803-843	1160	1143-1181	1805	1772-1840	2400	2322-2457
852	831-870	1164	1147-1185	1830	1795-1866	2433	2352-2492
882	862-901	1197	1180-1219	1860	1824-1897	2437	2356-2496
885	865-904	1209	1192-1231	1869	1832-1906	2600	2501-2667
930	911-949	1270	1252-1293	1981	1937-2022		

Tone is the frequency used when the radio transmits a Selcall sequence. **Tolerance** is the lower and upper limit of the range of frequencies that will be decoded as the stated tone in received Selcall sequences. For this reason, the **Tolerance** for defined tones cannot overlap.

In the **Tone Set** field of the **Selcall Setup** screen, you will need to select 'User Defined Tone Set' in order to use the tone set defined in the **User Defined Selcall Tone Set** screen.

Selcall Identity Screen

The format that Selcall call sequences are to follow are set up in the **Selcall Identity** screen (shown below).

The set of fields at the bottom of the screen allow you to switch between different Selcall systems and to copy the settings of another system, if required.

The **Current System** field shows the number of the currently displayed Selcall system. Move to the previous system by selecting the **Previous System** button, or to the next system by selecting the **Next System** button.

If you wish to copy the settings of another Selcall system's **Selcall Identity** screen for the system you are currently setting up, enter the other system's number in the **Copy From** box. Note that only the settings for the **Selcall Identity** screen will be copied.

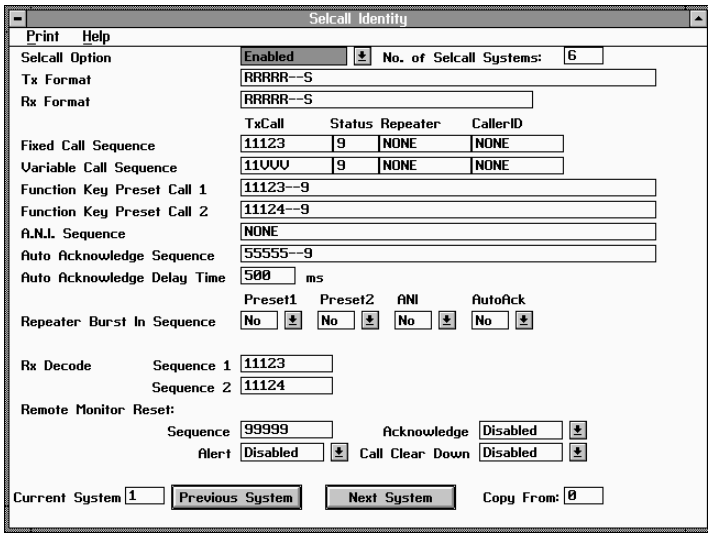
Enabling Selcall

The field **Selcall Option** must be set to 'Enabled' before any Selcall systems can be defined. When 'Enabled', the **No. of Selcall Systems** field will change to '1'.

If you wish to define more than one system, enter the number of systems in the **No. of Selcall Systems** field.

The maximum number of Selcall systems possible is affected by the number of channels programmed, and only one

Selcall Identity screen



Selcall system can be assigned to each channel.

Transmit Format

The field **Tx Format** defines the format required for transmitted fixed and variable Selcall sequences.

Tx Format is defined using the characters 'B' for repeater identity, 'C' for caller identity, 'R' for receiver identity, 'S' for status and '-' for gaps. For example:

BBBBB—CCC—RRRRR—SS
RRRRR—CCCSS

Each burst can consist of up to eight characters and should be separated by a gap burst. There can be no more than eight gaps in any one gap burst, and the sequence cannot start or end with a gap burst. If defined, each element should be defined sequentially. For example:

BBBCCCCC—RRRRRCCC

would be invalid because caller identity is defined twice.

- Receiver identity (R) must always be defined.
- Repeater identity (B), caller identity (C) and status (S) may not be required for some systems.
- If repeater identity (B) is defined, it must come first in the sequence.
- If status (S) is defined, it must be last in the sequence and can only contain one or two characters. Some systems require at least two gaps before status if a single status digit is used.

Receive Format

The field **Rx Format** defines the format required for all received Selcall sequences (**RXDECODE Sequence 1** and **RXDECODE Sequence 2**, **Remote Monitor Reset Sequence**).

Rx Format is defined using the characters 'R' for receiver identity, 'C' for caller identity, 'S' for status and '-' for gaps. For example:

CCC—RRRRR—SS
RRRRRSS

Each burst can consist of up to eight characters and should be separated by a gap burst. There can be no more than eight gaps in any one gap burst, and the sequence cannot start or end with a gap burst. Single tone bursts are not recommended as they may result in unreliable decoding of tones.

If defined, each element should be defined sequentially. For example:

CCCCC—RRRRRCCC

would be invalid because caller identity is defined twice.

- Receiver identity (R) must always be defined.
- Caller identity (C) and status (S) may not be required for some systems.
- If for **Rx Format** status is defined, it can only contain one or two characters. If status is defined for **Tx Format** and **Rx Format**, the number of Ss in each sequence must be the same.

Fixed Call Sequence

The fixed call sequence is not available on Elan handportable radios.

Each Selcall system can have one preset call programmed for a long press of the call key (♪). **TxCall**, **Status**, **Repeater** and **CallerID** can be set for the fixed call sequence.

If the fixed call sequence is defined, the characters 0 to 9, A to D and F can be used. In addition, E can be used in **Repeater**. If any of the characters entered for **TxCall**, **Repeater** and **CallerID** corresponds to the group tone (**Group Tone 'G'** in the **Selcall Setup** screen), a G will automatically be substituted for that character.

Receiver's Identity

The field **TxCall** sets the receiver identity and must be of the same format specified in the **Tx Format** field. If you do not wish to set a **Fixed Call Sequence**, set this field to 'None'.

Status

The fixed call sequence can be programmed with a fixed status digit or no status digit, and **Status** can be set to 'V' on Eclipse radios. When set to 'V', the status transmitted when the call is made will be the current status. For **Status**, enter a valid status digit (0 to 15 or 0 to 99), 'N' for no status or 'V' for variable status (where permitted).

Repeater

The field **Repeater** sets the repeater identity; if **Tx Format** specifies a repeater identity, this field must be set and must match the B burst of **Tx Format**. If no repeater identity is specified, then **Repeater** should be set to 'None'.

Caller Identity

The field **CallerID** sets the caller identification sequence transmitted when the fixed call sequence is transmitted. If **Tx Format** specifies a caller identity, this field must be set and must match that specified in the C burst of **Tx Format**. If no caller identity is specified, then this field should be set to 'None'.

Variable Call Sequence

Excel and Eclipse handportable radios and Eclipse mobile radios can be programmed for manual dialling, for which a **Variable Call Sequence** must be assigned.

TxCall, **Status**, **Repeater** and **CallerID** can be set for the **Variable Call Sequence**.

In the **Variable Call Sequence**, the digits the user will key in are set to variable ('V'). For Excel handportable and mobile radios, up to three digits can be set to variable, but not status. For Eclipse handportable and mobile radios, up to eight digits can be set to variable, plus status.

If the **Variable Call Sequence** is defined, the characters 0 to 9, A to D and F can be used. In addition, E can be used in **Repeater**. If any of the characters entered for **TxCall**, **Repeater** and **CallerID** corresponds to the group tone (**Group Tone 'G'** in the **Selcall Setup** screen), a G will automatically be substituted for that character.

Receiver's Identity

The field **TxCall** sets the receiver identity and must be of the same format specified in the **Tx Format** field. If you do not wish to set a **Variable Call Sequence**, set this field to 'None'.

Status

The **Variable Call Sequence** can be programmed with a fixed status digit or no status digit, and **Status** can be set to 'V' on Eclipse radios. When set to 'V', the status transmitted when the call is made will be the current status. For **Status**, enter a valid status digit (0 to 15 or 0 to 99), 'N' for no status or 'V' for variable status.

Repeater

The field **Repeater** sets the repeater identity. If **Tx Format** specifies a repeater identity, this field must be set and must match the B burst of **Tx Format**. If no repeater identity is specified, then **Repeater** should be set to 'None'.

Caller Identity

The field **CallerID** sets the caller identification sequence transmitted when the variable call sequence is transmitted. If **Tx Format** specifies a caller identity, this field must be set and must match that specified in the C burst of **Tx Format**. If no caller identity is specified, then this field should be set to 'None'.

Free Format Sequences

Free format sequences do not need to conform to **Tx Format**. In the **Selcall Identity** screen, the function key preset calls, the **ANI Sequence** and the **Auto Acknowledge Sequence** are free format sequences.

If defined, free format sequences should follow the general rules outlined in Table 5 on page 65.

Function Key Preset Calls

Two function key preset calls can be programmed for each Selcall system. These calls are set up in the fields **Function Key Preset Call 1** and **Function Key Preset Call 2**. When defining the function key preset call sequences, the rules outlined in Table 5 on page 65 apply.

ANI Sequence

The field **ANI Sequence** sets the automatic number identification sequence sent when any ANI encoding has been enabled.

The sequence can be set to 'None', 'Beep', 'Repeater Access Tone' or the sequence can be defined.

- If set to 'None', no ANI sequence will be transmitted, even if the feature is enabled.
- If set to 'Beep', the ANI sequence will be in the form of a single beep.
- If set to 'Repeater Access Tone', then the ANI sequence will be the single repeater access tone specified for the current system (in the **Selcall Setup** screen).
- If the sequence is defined, the rules outlined in Table 5 on page 65 apply.

Auto Acknowledge Sequence

The field **Auto Acknowledge Sequence** sets the sequence transmitted when auto acknowledgement is required. For an auto acknowledgement to be sent, **Auto**

Table 5: General rules for defining free format Selcall sequences

Burst Type[a]	Characters Allowed	Rules
Receiver identity	0 to 9, A to D, F	Receiver identity must be specified. If any of the characters entered correspond to the group tone, a 'G' will be substituted.
Repeater identity	0 to 9, A to F	Repeater identity is optional. If any of the characters entered correspond to the group tone, a 'G' will be substituted.
Caller identity	0 to 9, A to D, F	Caller identity is optional. If any of the characters entered correspond to the group tone, a 'G' will be substituted.
Status	All radios: valid status digit(s), E Eclipse radios: valid status digit(s), E, 'V' for variable status	Status is optional. If any of the characters entered correspond to the group tone, a 'G' will be substituted.
Gap	-	A sequence cannot begin or end with a gap burst. There can be up to eight gaps in any one gap burst. Up to 24 gap periods can be defined.

a. Bursts can be up to eight characters long, and must be separated by a gap burst. The sequence can be up to 26 digits long, and no more than seven bursts.

Acknowledge (**Selcall Rx Decode Set-up** screen) must be set to 'Enabled'.

An auto acknowledge sequence can be set for each Selcall system. The sequence can be set to 'None' or 'Beep' or the sequence can be defined.

- If set to 'None', auto acknowledge will be disabled on that Selcall system, even if auto acknowledge is enabled.
- If set to 'Beep', the auto acknowledge sequence will be in the form of a single beep.
- If the sequence is defined, the rules outlined in Table 5 above apply.

Auto Acknowledge Delay Time

The field **Auto Acknowledge Delay Time** applies to all Selcall systems.

Auto Acknowledge Delay Time sets the delay between receiving a call and sending an auto acknowledgement. Set a value from 100 to 12,000 ms in steps of 100 ms.

Repeater Burst In Sequence

The four fields **Repeater Burst In Sequence** specify whether there is a repeater burst in **Function Key Preset Call 1**, **Function Key Preset Call 2**, the **ANI Sequence** and the **Auto Acknowledge Sequence**. These sequences are defined in the **Selcall Identity** screen.

If any of these sequences contains a repeater burst, set the corresponding **Repeater Burst In Sequence** field to 'Yes'.

If the **First Tone-Period Multiplier** (**Selcall Setup** screen) is set to greater than one, then this extended first tone will be applied to the first tone of the first burst of a sequence unless the first tone is part of a repeater burst. It is, therefore, essential that these four fields be set correctly.

Rx Decode Sequences

The receive decode sequences represent the identity of the radio being programmed. The radio will respond appropriately to any call that has one of its Rx decode sequences in the receiver identity field.

Two receive decode sequences are allowed for each Selcall system, at least one of which must be programmed. The sequence must match the R burst in the **Rx Format** field, and the characters 0-9, A-D, F and V can be used. V represents a wildcard digit.

Remote Monitor Reset

The four fields under **Remote Monitor Reset** set the remote monitor reset (RMR) sequence and behaviour of the remote monitor control function, which when activated turns off the monitor facility and resets the Selcall emergency facility, if they are active.

The first field, **Sequence**, sets a sequence specific to each Selcall system. The fields **Acknowledge**, **Alert** and **Call Clear Down** set values that apply to all Selcall systems.

Other monitor reset options are set in the **Third Tone Monitor Reset** and **Appended C Tone Monitor Reset** fields in the **Selcall Features** screen.

RMR Sequence

The RMR sequence is used to decode and detect a monitor request sent by another party.

The sequence can be defined using the characters 0-9, A-D, F and V, or it can be set to 'None'. V represents a wildcard digit. If defined, **Sequence** must match the format defined in the R burst of the **Rx Format** field. If set to 'None', the radio's monitor function cannot be reset remotely for the current Selcall system.

RMR Acknowledge

The field **Acknowledge** applies to all Selcall systems. When **Acknowledge** is set to 'Enabled', the radio will transmit the auto acknowledge sequence defined for the Selcall system when a valid remote monitor request is received.

RMR Alert

The field **Alert** applies to all Selcall systems. When this field is set to 'Enabled', the radio will activate an audible alert when a valid remote monitor request is received.

RMR Call Clear Down

The field **Call Clear Down** applies to all Selcall systems. When this field is set to 'Enabled', the radio will clear down any active incoming call when a valid remote monitor request is received.

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Selcall Setup Screen

The settings of the fields in the **Selcall Setup** screen determine how tones in a Selcall sequence will be transmitted. The **Selcall Setup** screen is shown below.

Like the **Selcall Identity** screen, the **Selcall Setup** screen has a set of four fields at the bottom of the screen that allow you to switch between different Selcall systems and to copy the settings of another system, if required.

The **Current System** field shows the number of the currently displayed Selcall system. Move to the previous system by selecting the **Previous System** button, or to the next system by selecting the **Next System** button.

If you wish to copy the settings of another Selcall system's **Selcall Setup** screen for the system you are currently setting up, enter the other system's number in the **Copy From** box. Note that only the settings for the **Selcall Setup** screen will be copied.

Tone Set

The radio can operate with any of the tone sets supported by the radio software, and a tone set can be assigned for each Selcall system.

The available tone sets are: CCIR, EIA, EEA, ZVEI-I, ZVEI-II, ZVEI-III, PZVEI, NATEL and DZVEI, and these tone sets are described in Table 6 on page 68. If you

Selcall Setup screen

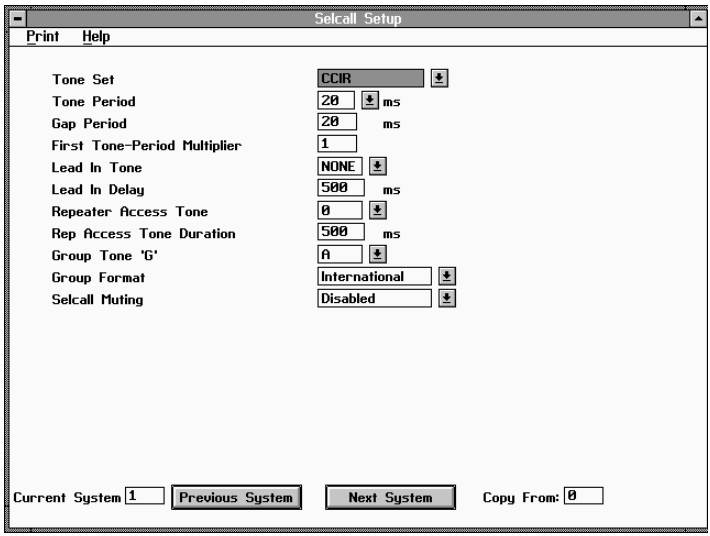


Table 6: Selcall tone sets and frequencies. Note: E is the repeat tone.

Tone	CCIR	EIA	EEA	ZVEI-I	ZVEI-II	ZVEI-III	PZVEI	NATEL	DZVEI
0	1981	600	1981	2400	2400	2400	2400	1633	2200
1	1124	741	1124	1060	1060	1060	1060	631	970
2	1197	882	1197	1160	1160	1160	1160	697	1060
3	1275	1023	1275	1270	1270	1270	1270	770	1160
4	1358	1164	1358	1400	1400	1400	1400	852	1270
5	1446	1305	1446	1530	1530	1530	1530	941	1400
6	1540	1446	1540	1670	1670	1670	1670	1040	1530
7	1640	1587	1640	1830	1830	1830	1830	1209	1670
8	1747	1728	1747	2000	2000	2000	2000	1336	1830
9	1860	1869	1860	2200	2200	2200	2200	1477	2000
A	2400	2151	1055	2800	885	885	970	1995	825
B	930	2433	930	810	825	810	810	571	740
C	2247	2010	2400	970	740	2800	2800	2205	2600
D	991	2292	991	885	680	680	885	2437	885
E	2110	459	2110	2600	970	970	2600	1805	2400
F	1055	1091	2247	680	2600	2600	680	2694	680

wish to use another tone set, you can define it in the **User Defined Selcall Tone Set** screen.

Tone Period

The field **Tone Period** sets the duration of each tone in the Selcall sequence. Set the tone period to 20, 33, 40, 50, 60, 70 or 100 ms.

Gap Period

The field **Gap Period** sets the duration of each gap in the Selcall sequence. Set the gap period from 1 to 150 ms in steps of 1 ms.

If a gap is defined in **Rx Format**, (**Selcall Identity** screen), ensure that the total gap period is equal to or longer than one

Tone Period. Otherwise Selcall sequences will not be decoded properly.

First Tone-Period Multiplier

A **First Tone-Period Multiplier** can be set that determines the length of time the first tone in a Selcall sequence will be transmitted. The **First Tone-Period Multiplier** can be set as an alternative to having a lead-in tone.

Set a value from 1 to 70, where the **Tone Period** for the first tone will be multiplied by this number. For example, if **Tone Period** is set to 20 ms and **First Tone-Period Multiplier** is set to 10, the first tone of a Selcall sequence will be transmitted for 200 ms.

If any of the sequences **Function Key Preset Call 1**, **Function Key Preset Call 2**, **ANI Sequence**, **Auto Acknowledge Sequence** (**Selcall Identity** screen) and **Selcall Sequence** (**Selcall Emergency Setup** screen) contain a repeater burst and you specify a **First Tone-Period Multiplier** greater than one, you must also specify that these sequences have a repeater burst in the **Repeater Burst In Sequence** fields in the **Selcall Identity** screen. Otherwise, the radio will not operate correctly.

Lead In Tone

The field **Lead In Tone** sets the lead-in tone, which is sent during the lead-in delay before any Selcall sequences are transmitted. It can be used to halt scanning on a called radio before critical tones are sent.

Set this tone to any of the valid tones in the current tone set (0 to 9, A to F) or 'N' for none.

Lead In Delay

The field **Lead In Delay** sets the duration of the lead in tone before all Selcall sequence transmissions.

Set **Lead In Delay** to 0 to 5100 ms in steps of 20 ms.

If both Selcall and economy mode are enabled (**Selcall Identity** and **Power Save Features** screens) for other radios in the fleet, the **Lead In Delay** will need to be set to at least 100 ms longer than that of the **Economy Duty Cycle** in the **Power Save Features** screen. For example, for a duty cycle setting of 'Medium', the **Lead In Delay** should be set to no less than 600 ms. Otherwise the incoming Selcall sequence may not be detected reliably.

Repeater Access Tone

The field **Repeater Access Tone** sets the tone that is sent before a voice or data transmission in order to key up the repeater.

Set this field to any of the valid tones in the current tone set (0 to 9, A to F). If no repeater access tone is required, then the value this field is set to will have no effect on radio operation.

Repeater Access Tone Duration

The field **Repeater Access Tone Duration** sets the length of time the repeater access tone will be transmitted, when required.

Select a value from 0 to 5100 ms in steps of 20 ms.

Group Tone

The field **Group Tone 'G'** sets a group tone for each Selcall system. This is the tone that will be substituted when 'G' is used in any outgoing Selcall sequences and that will identify incoming Selcall sequences as group calls. It can be set to any of the tones 0 to 9 and A to F in the current Selcall system, except the repeat tone (E).

The field **Group Dialling** (**Selcall Features** screen) must be set to 'Enabled' if manually dialled group calls are to be made.

Group Format

The field **Group Format** sets the group format, which will depend on the system in use. The 'International' and 'Sigtec' formats differ in the way they encode and decode group calls.

For both formats, the first tone in the sequence defined cannot be a group tone. For the 'International' format, any of the subsequent tones can be the group tone. For the 'Sigtec' format, all tones following the first group tone must also be group tones.

All radios in the system should use the same format.

Selcall Muting

When **Selcall Muting** is set to 'Enabled' and the monitor facility is inactive, the radio will be quiet until a valid Selcall signal is received and calls cannot be made using the PTT key. When the monitor facility becomes active, the Selcall mute will be disabled.

When this field is set to 'Disabled', Selcall muting will be disabled regardless of whether the monitor facility is active or inactive.

Selcall Features Screen

The settings of the fields in the **Selcall Features** screen determine the Selcall features available for the radio. The **Selcall Features** screen is shown below.

The settings of the fields in the **Selcall Features** screen apply to all Selcall systems.

Group Dialling

The field **Group Dialling** does not apply to Elan handportable radios or to Elan and Excel mobile radios.

When **Group Dialling** is set to 'Enabled', manual dialling of group calls is permitted on all Selcall systems. A group tone must also be selected for a particular Selcall system if group calls are to be made (**Group Tone 'G'** in the **Selcall Set-up** screen).

Deferred Calling

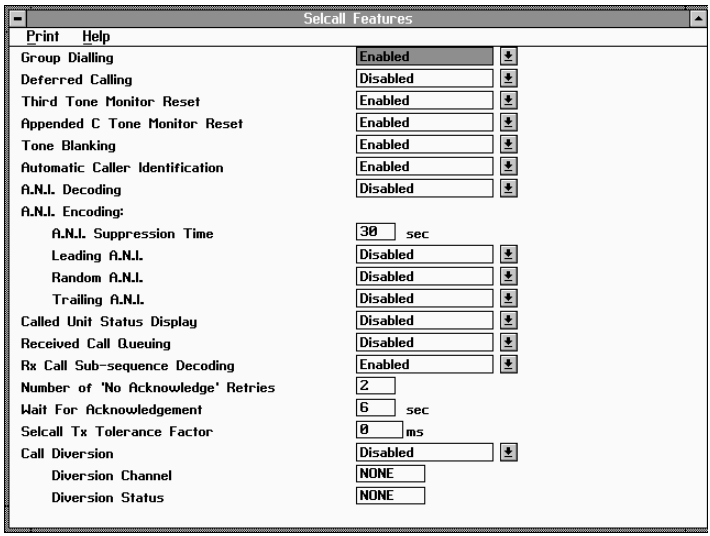
When the field **Deferred Calling** is set to 'Enabled', a Selcall call attempted on a busy channel will be stored and resent at a random time between 1 and 10 seconds after the channel becomes free.

The **Tx Inhibit** field in the **Transmitter Setup** screen must be set to 'Busy' or 'Mute' if **Deferred Calling** is enabled.

Monitor Reset

In the **Selcall Features** screen, there are two fields that when enabled deactivate

Selcall Features screen



the monitor facility when some types of calls are received.

Third Tone Monitor Reset

When **Third Tone Monitor Reset** is set to 'Enabled', any call that carries tones that match only the first three tones of one of the radio's **Rx Decode** sequences (**Selcall Identity** screen) will deactivate the monitor facility if it is active (e.g. after receiving a group call).

Third Tone Monitor Reset will only be valid for a particular Selcall system if there are more than three Rs in the **Rx Format** (**Selcall Identity** screen).

Appended C Tone Monitor Reset

When **Appended C Tone Monitor Reset** is set to 'Enabled', any valid sequence that has a C tone appended to it will deactivate the monitor facility if it is active (e.g. after receiving a group call). The emergency facility will also be deactivated, if it is active.

Tone Blanking

When the field **Tone Blanking** is set to 'Enabled', received Selcall tones are blanked out during decoding. You may still hear the first few tones.

Tone Blanking has no other effect on Selcall operation.

Automatic Caller Identification

The field **Automatic Caller Identification** does not apply to Elan handportable and mobile radios.

When this field is set to 'Enabled', the identity of a caller is displayed whenever an address that matches one of the Rx decode sequences is received. This field will only be valid for a particular Selcall system if the **Rx Format** field (**Selcall Identity** screen) has a C burst.

Automatic Number Identification

An automatic number identification (ANI) code is a tone sequence transmitted during a normal voice transmission in order to identify the radio in use.

The ANI sequence for each Selcall system is set in the **Selcall Identity** screen.

ANI Decoding

The field **ANI Decoding** applies only to Eclipse radios.

When set to 'Enabled', the caller identity of any sequence received that matches the **Rx Format** (**Selcall Identity** screen) will be displayed.

ANI Encoding

Four fields set ANI encoding. At least one of **Leading ANI**, **Random ANI** and **Trailing ANI** must be enabled if ANI transmission is to be enabled.

The ANI sequence may be the repeater access tone, in which case only **Leading ANI** should be set to 'Enabled'.

The field **ANI Suppression Time** sets the amount of time between the end of the transmission of the ANI sequence and when it is next transmitted if a request is made. Set this field to between 0 and 120 seconds in steps of 1 second.

When **Leading ANI** is set to 'Enabled', the ANI sequence will be sent at the start of a transmission initiated by the PTT

key, subject to the expiry of the **ANI Suppression Time**. When set to 'Suppress on Busy', the ANI sequence will be sent at the start of a transmission initiated by the PTT key, but only when the channel is not busy.

If **Random ANI** is set to 'Enabled', the ANI sequence will be sent during the transmission at some random time (0 to 15 seconds) after the initiation of the transmission. There is no lead-in delay for random ANI transmissions. If the transmission is terminated (PTT released or transmit timeout) before the first random ANI has been sent and trailing ANI is set to 'Disabled', then the ANI sequence will be sent in the trailing position, subject to the expiry of the **ANI Suppression Time**.

If **Trailing ANI** is set to 'Enabled', the ANI sequence will be sent at the end of the transmission, subject to the expiry of the **ANI Suppression Time**. The ANI sequence will be sent after release of the PTT but before any subaudible signalling termination sequence (i.e. CTCSS reverse tone burst, DCS stop code). There will be no lead-in delay for trailing ANI transmissions.

Called Unit Status Display

The called unit status display feature is only available on Eclipse radios, and is set in the **Selcall Features** screen.

When **Called Unit Status Display** is set to 'Enabled', the radio will display any status message returned with an auto acknowledge sequence from a called radio. **Called Unit Status Display** will not be valid for a particular Selcall system if the **Rx Format** (**Selcall Identity** screen) contains no S burst.

Received Call Queuing

Received call queuing is only available for Eclipse radios.

When **Received Call Queuing** is set to 'Enabled', unanswered Selcall calls are held in a queue.

Received Call Queuing can only be enabled when **Automatic Caller Identification** is set to 'Enabled'.

Sequence Decoding

When the field **Rx Call Sub-sequence Decoding** is set to 'Enabled', the detection and validation of a signal will depend only on the receiver's identity, and so if the caller's identity and status are absent from the incoming sequence, the call will still be detected as valid.

Unacknowledged Calls

Two fields in the **Selcall Features** screen set how the radio will respond when an auto acknowledge has been requested from a called radio but has not been received.

The field **Number of 'No Acknowledge' Retries** sets the number of times the radio will automatically resend a call when no auto acknowledge is received from the called radio. Set a value from 0 to 15. Setting this field to 0 disables this feature.

The field **Wait For Acknowledgement** sets the delay before the radio will resend a call when no auto acknowledge response is received. Set a value from 1 to 20 seconds in steps of 1 second.

Selcall Transmit Tolerance Factor

The setting of the field **Selcall Tx Tolerance Factor** determines how long the radio will continue transmitting once the last tone in a Selcall sequence has been transmitted. This extra tail time ensures that the called radio will be able to decode the Selcall sequence and should be set to at least one tone period in length.

Set a value from 0 to 2550 ms in steps of 10 ms.

Call Diversion

Call diversion is only available on Eclipse radios, and is set up in the **Selcall Features** screen. Call diversion allows the user to divert received calls to another channel. Full call diversion is available on Eclipse mobile radios. Eclipse handportable radios will recognise the call diversion status in incoming auto acknowledges and will switch to the call diversion channel, but incoming calls cannot be diverted.

Set the first field to 'Enabled' to allow call diversion.

The field **Diversion Channel** sets the channel the radio will switch to so that communication can be established when a called radio is in call diversion mode. Enter a valid channel ID or set **Diversion Channel** to 'None'. When set to 'None', the radio will select the current channel as the diversion channel.

The call diversion channel should be the same for all radios in a system.

The field **Diversion Status** sets the status code that identifies that a radio is in call diversion mode. Enter a valid status digit (assigned in the **Status Labels** screen) or 'None'.

Selcall Emergency Setup Screen

The radio can be programmed to make an emergency call, which can be assigned to a function key. The emergency facility is set up in the **Selcall Emergency Setup** screen, which is shown below.

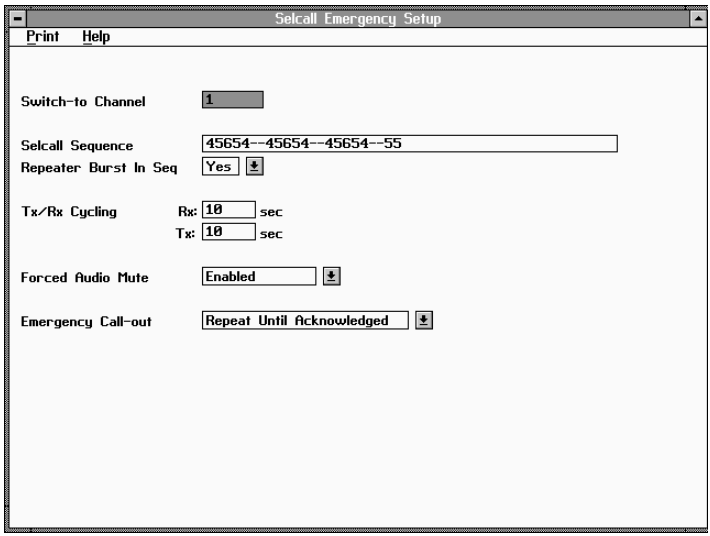
When in emergency mode, the radio will cycle between receiving and transmitting so that the receiver of the call can hear activity near the radio and so decide how to respond.

Switch to Channel

The field **Switch to Channel** sets the channel the radio switches to when emergency mode is activated. Enter a valid channel identity, or 'None'.

If **Switch to Channel** is set to 'None' and the channel that is current when emergency mode is activated has a Selcall system assigned to it, the radio will remain on that channel and transmit the sequence. If the current channel does not have Selcall, the radio will search for the first channel that has a Selcall system and transmit the sequence on that channel; if no channel is found, the sequence will not be transmitted. It is, therefore, highly recommended that a channel be assigned as the **Selcall Sequence** transmitted must match the **Rx Format** of the radio decoding the emergency sequence.

Selcall Emergency Setup screen



Selcall Sequence

The field **Selcall Sequence** is the sequence sent when emergency mode is activated. **Selcall Sequence** must be set or the emergency facility will be disabled.

Selcall must be enabled (**Selcall Identity** screen) before the **Selcall Sequence** can be set.

For **Selcall Sequence**, the receiver identity must be specified, and repeater identity, caller identity and status can also be set. The characters 0-9, A-D and F can be used. E can also be used in the repeater identity. If any of the characters entered for receiver identity, repeater identity and caller identity corresponds to the group tone (**Group Tone 'G'** in the **Selcall Setup** screen), a G will automatically be substituted for that character.

It is recommended that a specific emergency status be assigned and used in the emergency Selcall sequence.

Each burst can consist of up to eight characters and should be separated by a gap burst. There can be no more than eight gaps in any one gap burst and the sequence cannot begin or end with a gap burst. There should be no more than seven bursts, and up to 26 digits and up to 24 gap periods can be defined.

Repeater Burst In Seq

The field **Repeater Burst In Seq** specifies whether there is a repeater burst in **Selcall Sequence**.

If **Selcall Sequence** contains a repeater burst, set this field to 'Yes'.

If the **First Tone-Period Multiplier** (**Selcall Setup** screen) is set to greater than one, then this extended first tone will be applied to the first tone of the first burst of a sequence unless the first tone is part of a repeater burst. It is, therefore, essential that **Repeater Burst In Seq** be set correctly.

Tx/Rx Cycling

While in the emergency mode, the radio can switch between the transmit and receive states so that the dispatcher can listen for and if necessary control the radio. The **Tx/Rx Cycling** fields set the duration of each part of the emergency cycle.

Set a value from 0 to 30 seconds in steps of 1 second for each field.

Setting **Rx Cycling** to 0 disables emergency cycling, and if **Rx Cycling** is set to 0, **Tx Cycling** must also be set to 0. Both fields must be set to 0 if the emergency **Selcall Sequence** is 'None'.

Forced Audio Mute

The radio can be set to remain quiet while in emergency mode. When **Forced Audio Mute** is set to 'Enabled', the radio's receive audio will remain muted while in emergency mode. If set to 'Disabled', the mute state in emergency mode will obey the standard muting operation.

Emergency Call-out

The setting of **Emergency Call-out** determines whether the emergency Selcall sequence will be sent only once or until an acknowledgement is received.

When this field is set to 'Repeat Until Acknowledged', the radio will resend the emergency Selcall sequence every 8 seconds until an acknowledgement is received. When an acknowledgement is

received, the radio will commence emergency cycling, if the **Tx/Rx Cycling** fields are set to values other than 0. If emergency cycling is not enabled, then upon receiving the acknowledgement the radio will exit emergency mode and resume normal operation.

When this field is set to 'Single Call-out Only', the emergency Selcall sequence will be sent only once. The radio will then commence emergency cycling (if enabled) or resume normal operation.

Selcall Rx Decode Setup Screen

How the radio behaves when Selcall calls are received is set up in the **Selcall Rx Decode Setup** screen, which is shown below. In this screen, the behaviour of the radio is defined for four different types of received calls:

- calls matching **Rx Decode Sequence 1**;
- calls matching **Rx Decode Sequence 2**;
- priority calls; and
- group calls.

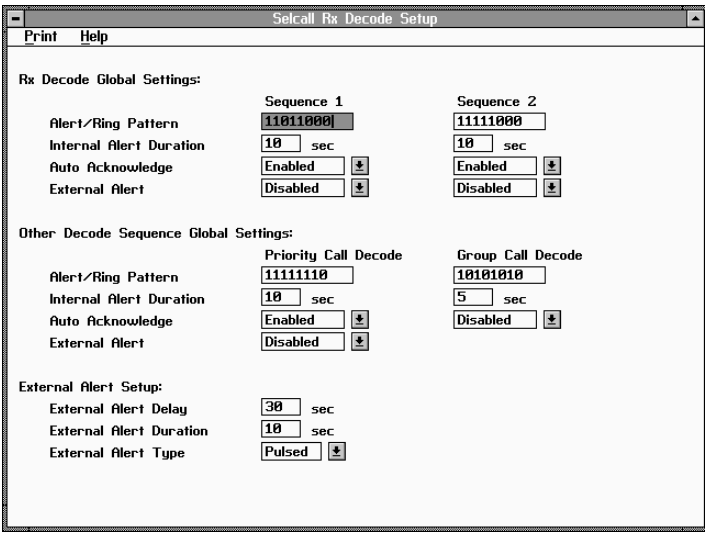
For each type of call, a unique alert can be activated, an auto acknowledge sequence can be sent and, for mobile radios, an external alert can be activated when a call remains unanswered. How the external alert behaves is defined in the **External Alert Setup** fields at the bottom of the **Selcall Rx Decode Setup** screen.

Alert/Ring Pattern

For each type of call, the **Alert/Ring Pattern** field determines how the audible indicator will ring when that type of call is received.

Enter an 8-digit code using 1s and 0s, where a 1 indicates a tone and a 0 indicates a gap. For example, the code 11110000 would sound as one long ring

Selcall Rx Decode Setup screen



followed by a pause of equal length, and the code 11001100 would sound as a short ring followed by a pause, then another short ring and another pause.

If you enter less than 8 digits, the remainder of the code will be filled with 1s.

The **Alert/Ring Pattern** field should be different for each type of call.

Internal Alert Duration

The field **Internal Alert Duration** sets the time a call will remain unanswered and the alert remains activated before the radio enters the unanswered call state. Set a value from 0 to 250 seconds in steps of 1 second. If set to 0, the radio will ring until answered.

Auto Acknowledge

The setting of the field **Auto Acknowledge** determines whether an auto acknowledge response will be transmitted when that type of call is received. If **Auto Acknowledge** is set to 'Enabled', the auto acknowledge sequence defined for the current Selcall system (**Selcall Identity** screen) will be sent. If no sequence is defined, no auto acknowledge will be sent.

External Alert

The **External Alert** option only applies to mobile radios and determines whether an external alert such as a horn will be sounded when a call is not answered.

An external alert can be set for both Rx decode call sequences and priority calls, but not for group calls, which generally do not require a response from the receiver. If set to 'Enabled', the external alert will behave as defined in the **External Alert Setup** fields.

External Alert Setup

On mobile radios, an external alert such as a horn can be sounded when a call remains unanswered. In the **Selcall Rx Decode Setup** screen, three fields are set for the external alert.

External Alert Delay sets the time required for the call to remain unanswered before the external alert activates. Set a value from 1 to 250 seconds in steps of 1 second.

External Alert Duration sets the time the external alert will remain active. Set a value from 0 to 250 seconds in steps of 1 second. If set to 0, the external alert will remain active until the call is answered.

External Alert Type sets the type of output line for the external alert. Select 'Pulsed' or 'Steady'.

Selcall Control Status Definitions Screen

A status message can be transmitted with a Selcall sequence to indicate to the receiver the sender's present activity. Typical status messages are "enroute", "at lunch" and "at home". Status messages are set up in two screens: **Selcall Control Status Definitions** and **Status Labels**.

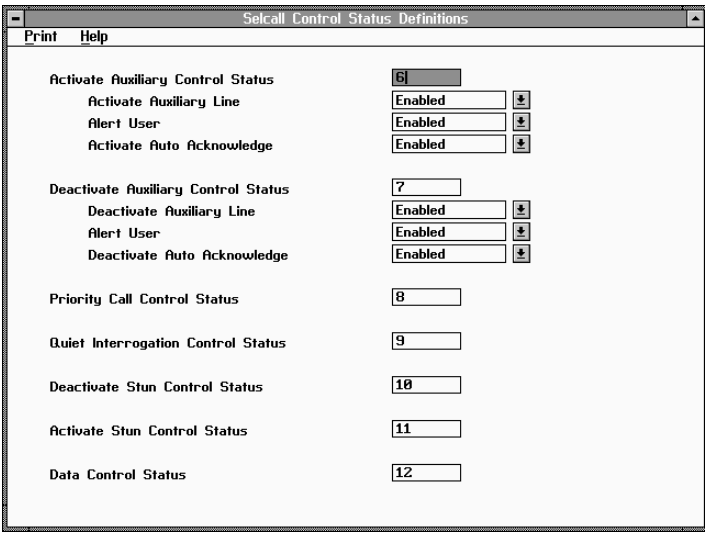
Special control status are defined in the **Selcall Control Status Definitions** screen, which is shown below. There are five functions for which control status are set in this screen. They are:

- auxiliary control;
- priority call;
- quiet status interrogation;
- stun; and
- data.

Each control status should be set to the same value for all radios in a fleet. The number of status permitted depends on the **Rx Format** (**Selcall Identity** screen) in all Selcall systems.

- If there is no S in any **Rx Format**, then no status are expected.
- If all **Rx Format** fields have one S, then up to 16 status are expected (numbered 0 to 15).

Selcall Control Status Definitions screen



- If all **Rx Format** fields have two Ss, then up to 100 status are expected (numbered 0 to 99).
- If the **Rx Format** fields have a mixture of numbers of Ss, up to 100 status can be defined, but will not necessarily be valid on all channels. For example, on a channel with only one S in the **Rx Format**, status 78 will be invalid.

Auxiliary Control

An auxiliary hardware device may be fitted inside the radio. This device can be set to activate or deactivate when a status code is received (**Activate/Deactivate Auxiliary Line** fields). The radio can also be programmed to alert the user that such a status message has been received (**Alert User** fields), and an auto acknowledge can be sent (**Activate/Deactivate Auto Acknowledge** fields).

For the fields **Activate Auxiliary Control Status** and **Deactivate Auxiliary Control Status**, set a valid status number that will activate and deactivate the auxiliary control function, or 'None' if an auxiliary device is not fitted or if you do not wish to set a status code that will activate/deactivate the device. When the status is received, the auxiliary control function will behave as set in the associated fields.

For the fields **Activate Auxiliary Line** and **Deactivate Auxiliary Line**, setting the field to 'Enabled' will activate/deactivate the auxiliary control line when the status is received.

When the field **Alert User** is set to 'Enabled', an indicator will be activated when the activate/deactivate status is received.

For the fields **Activate/Deactivate Auto Acknowledge**, setting the field to 'Enabled' will cause the radio to transmit the auto acknowledge sequence defined for the current Selcall system when the activate/deactivate status is received. If no auto acknowledge sequence is defined, then no acknowledgement will be sent.

Priority Call Control

The field **Priority Call Control Status** defines the status code that identifies a call as a priority call. When the status code is received, the radio will then alert the user that a priority call has been received, as defined in the **Priority Call Decode** fields of the **Selcall Rx Decode Setup** screen. Set a valid status number, or 'None' for no status.

Quiet Interrogation Control

The field **Quiet Interrogation Control Status** defines the status code that identifies a quiet status interrogation. When the status code is received, the radio will transmit the auto acknowledge sequence defined for the current Selcall system without alerting the user or activating the monitor function. If no auto acknowledge sequence is defined, then no acknowledgement will be sent. Set a valid status number, or 'None' for no status.

Stun Control

The fields **Deactivate Stun Control Status** and **Activate Stun Control Status** define the status codes that activate the remote stun and revive function. When the status code defined in the **Activate Stun Control Status** field is received, the radio will enter the stunned state in which the radio will mute regardless of

activity and the user will not be able to send calls or activate any functions. When the status code defined in the **Deactivate Stun Control Status** field is received, the radio will leave the stunned state and the user will again be able to send and receive calls.

For each field, set a valid status number, or 'None' for no status. **Deactivate Stun Control Status** must be set to a value other than 'None' before **Activate Stun Control Status** can be set.

Data Control

The field **Data Control Status** defines the status code that indicates an incoming data message. The radio will switch to data receive mode upon receiving this status code.

Set a valid status number, or 'None' for no status.

Status Labels Screen

The **Status Labels** screen only applies to Orca Eclipse radios.

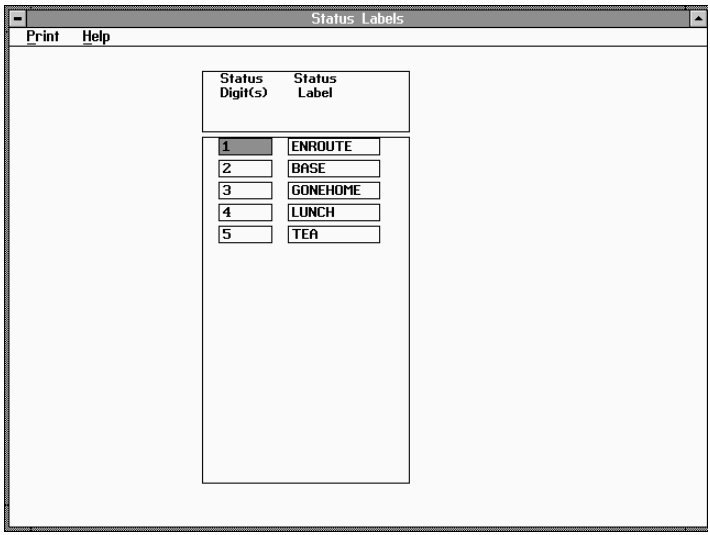
Define additional status labels in the **Status Labels** screen, which is shown below. Use the **F2** key to insert a new line or the **F3** key to delete the current line.

Up to 100 labels can be set, numbered 0 to 99. Status should be set to the same values for all radios in a system. The number of status permitted depends on the **Rx Format** (**Selcall Identity** screen) in all Selcall systems.

- If there is no S in any **Rx Format**, then no status are expected.
- If all **Rx Format** fields have one S, then up to 16 status are expected (numbered 0 to 15).
- If all **Rx Format** fields have two Ss, then up to 100 status are expected (numbered 0 to 99).
- If the **Rx Format** fields have a mixture of numbers of Ss, up to 100 status can be defined, but will not necessarily be valid on all channels. For example, on a channel with only one S in the **Rx Format**, status 78 will be invalid.

The field **Status Digit(s)** sets the digits that will be transmitted. Enter a value from 0 to 99.

Status Labels screen



The field **Status Label** sets the message associated with the sequence transmitted or received (the status digits). Enter a name of up to 8 characters from:

A-Z 0-9 ! # $ % ^ & * + - = { } ( ) [ ]
< > : ; ? | , . _ " ' / space

If a radio receives status digits for which a **Status Label** has been assigned, the label will be displayed. If no **Status Label** has een assigned, the radiowill display the status digits.

PART 6 Special Features

This part contains detailed information on setting up special features such as DTMF, alpha symbols, channel signalling presets and data operation. The **Edit** menu screens discussed in this part are:

- **DTMF**
- **Alpha Symbols**
- **Channel Signalling Presets**
- **Data Parameters**

DTMF Screen

DTMF (dual tone multiple frequency) is the tone-based system used in the world's telephone networks. Options for DTMF dialling are set in the **DTMF** screen (shown below).

The first set of fields applies to manual DTMF dialling, a feature available only on Excel and Eclipse handportable radios and Eclipse mobile radios. The second set of fields determines how DTMF tones are sent, and the array boxes at the bottom of the screen are used to define preset DTMF call strings.

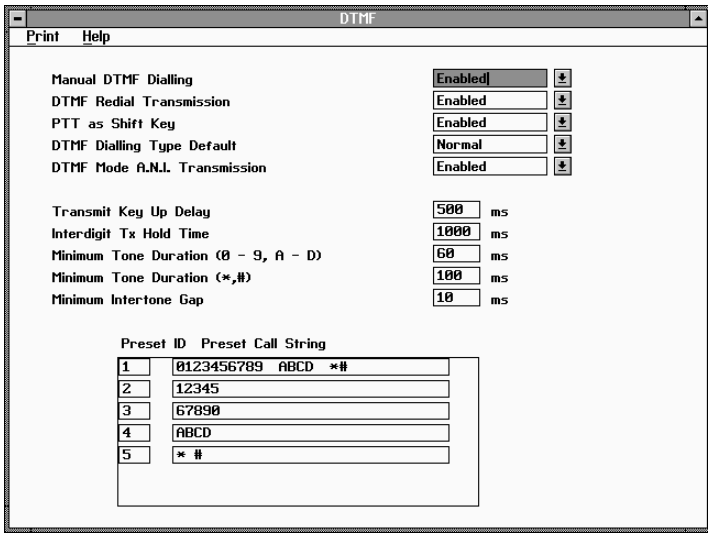
Manual DTMF Dialling

The fields **Manual DTMF Dialling**, **DTMF Redial Transmission**, **PTT as Shift Key**, **DTMF Dialling Mode Default** and **DTMF Mode ANI Transmission** set the manual DTMF dialling options for Excel and Eclipse handportable radios and Eclipse mobile radios, and so these fields do not apply to Elan handportable radios and Elan and Excel mobile radios.

When the field **Manual DTMF Dialling** is set to 'Enabled', DTMF calls can be made from the numeric keypad. If set to 'Disabled', the radio can only send preset DTMF numbers, if programmed to do so.

When the field **DTMF Redial Transmission** is set to 'Enabled', the user can re-

DTMF screen



transmit the last DTMF call by pressing the enter key (↵) when in DTMF dialling mode.

When the field **PTT as Shift Key** is set to 'Enabled', the PTT key can be used as a 'shift' key to access the DTMF tones A to D. If tones A to D are not required, **PTT as Shift Key** should be set to 'Disabled'.

When a DTMF call is made, the string is either transmitted separately as each individual key is pressed (normal dialling) or in its entirety once the enter key (↵) is pressed (buffered dialling). Set the field **DTMF Dialling Type Default** to 'Normal' or 'Buffered'.

When the field **DTMF Mode ANI Transmission** is set to 'Enabled', the ANI sequence for the current channel can still be sent when a DTMF call is made and the radio is in DTMF dialling mode. Some systems may experience interference if an ANI sequence is sent during a DTMF transmission, and in this case **DTMF Mode ANI Transmission** should be set to 'Disabled'.

DTMF Dialling Properties

The fields **Transmit Key Up Delay**, **Interdigit Tx Hold Time**, **Minimum Tone Duration (0-9, A-D)**, **Minimum Tone Duration (*, #)** and **Minimum Intertone Gap** define how manually dialled and preset DTMF sequences are transmitted.

The field **Transmit Key Up Delay** sets a delay for the start of tone transmissions so that a repeater has time to stabilise. Enter a value from 10 to 2250 ms in steps of 10 ms.

The field **Interdigit Tx Hold Time** sets the period the transmitter remains on between the encoding of each digit during manual dialling, which provides a delay for the user to dial the next digit without transmission stopping and restarting. Some systems require continuous transmission between DTMF tones and therefore a long hold time. Enter a value between 10 and 2550 ms, in steps of 10 ms.

The fields **Minimum Tone Duration (0-9, A-D)** and **Minimum Tone Duration (*, #)** set the minimum amount of time tones will be encoded. Enter a value from 10 to 1020 ms in steps of 10 ms.

The field **Minimum Intertone Gap** sets the minimum amount of time between encoded tones. Enter a value from 10 to 500 ms in steps of 10 ms.

Preset DTMF Call Strings

Preset DTMF call strings are defined in the two array boxes at the bottom of the **DTMF** screen. Press **F2** to enter a new line and **F3** to delete the current line.

Up to 20 calls can be defined. These calls can be made by pressing an assigned function key (on all radios) or by pressing the DTMF key (☎) (on Excel and Eclipse handportable and Eclipse mobile radios).

The field **Preset ID** sets the preset ID number a DTMF call string will be associated with. Enter a number from 1 to 20. To assign a DTMF preset call to a particular channel, enter this **Preset ID** number in the **DTMF ID** field in the relevant **Channels** screen.

The field **Preset Call String** sets the signalling sequence. A valid sequence consists of between 1 and 32 characters from 0 to 9, A to D, # or *. You can also enter a space, which will be transmitted as a pause.

Alpha Symbols Screen

Alpha symbols can be used to change to a specific channel, dial a Selcall or DTMF call, change the radio's status, or any combination of these three tasks.

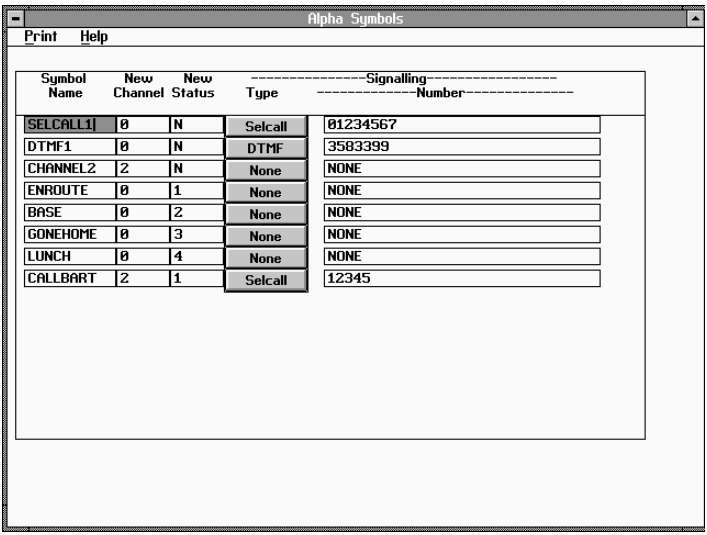
For Eclipse radios, up to 20 symbols can be assigned, and these will be listed when the radio is in alphanumeric entry mode. For all radios, the first symbol listed can be assigned to a function key (by setting one of the function key fields in the **Key Settings** screen to 'One Touch'). For Elan and Excel radios, this is the only symbol that can be set. On Excel radios and Elan mobile radios, an alpha symbol cannot be set to change status, and on Elan hand-portable radios, an alpha symbol cannot be set to change channels or status.

Alpha symbols are set up in the **Alpha Symbols** screen (shown below). This screen uses array boxes; use the **F2** key to insert a new symbol, and the **F3** key to delete a symbol.

On Eclipse radios, the user can scroll through the alpha symbol list and select from these symbols. The order in which these symbols appears in the menu is the order in which they appear in this screen, and it may be desirable to list symbols alphabetically. However, only the first symbol listed can be assigned to a function key.

The user can also search for a specific symbol using the keypad. To search for a

Alpha Symbols screen



symbol beginning with 'B', the user would press '2', which will also match to symbols beginning with '2', 'A' and 'C'. The radio will display the first match, but not subsequent matches, and if a match is not found, the radio will display a '?'.

Symbol Name

The field **Symbol Name** sets a name that when selected by the user will carry out the functions assigned for that symbol. Set a unique name of up to eight characters. Useable characters are in 10 groups, and characters in each group are considered identical so that the symbol 'AGE' is the same as the symbol 'BID'. The groups are:

1 -	2 A B C	3 D E F
4 G H I	5 J K L	6 M N O
7 P Q R S	8 T U V	9 W X Y Z
*	0	#

Symbol Actions

Change Channel

The field **New Channel** sets the channel or group to be selected when the symbol is selected. Enter a valid **Chan ID** (from the **Channels (I)** or **Channels (II)** screens), group **ID** (from the **Scan Groups** screen), or 0 if the channel is not to be changed when the symbol is selected. On Elan handportable radios, this field must be set to 0.

Change Status

The field **New Status** applies only to Eclipse radios, and changes the status of the radio when the symbol is selected. Status digits are assigned in the **Status Labels** screen, and only valid status digits can be entered in the **New Status** field. Enter the digit of an existing status label or 'N' for no new status.

If there is no **New Channel** set (the field is set to 0), the new status will not necessarily be valid on all channels. For example, if **New Status** is set to 78 and the channel selected when the symbol key is pressed is permitted only 16 status messages, the status will be changed but it will not be possible to transmit status if required.

Send a Selcall or DTMF Call

The field **Signalling Type** sets a call signalling type for the symbol, which determines the signalling sequence used when the symbol is activated. Enter 'Selcall', 'DTMF' or 'None'.

If the **New Channel** field is set to 0 and **Signalling Type** is set to 'Selcall', then Selcall must be enabled (**Selcall Identity** screen) or the Selcall call assigned to the symbol will not be transmitted. If **New Channel** is set to a specific channel, then a Selcall system must be assigned to that channel or the Selcall call assigned to the symbol will not be transmitted.

The field **Signalling Number** sets the number that will be dialled when the symbol is selected. The **Signalling Type** field must be set before this field will be valid.

If **Signalling Type** is set to Selcall, the sequence entered for the **Signalling Number** field should be the receiver's identity and can be any number from 1 to

8 digits long. The sequence can contain the characters 0 to 9, A to D and F. The repeater identity, caller identity and status should not be included, and at time of symbol execution, the repeater, caller and status bursts used will be those defined for the Selcall system associated with the current channel.

If **Signalling Type** is set to 'DTMF', the sequence entered for the **Signalling Number** field must consist of 1 to 32 characters from 0 to 9, A to D, # or *.

Channel Signalling Presets Screen

On Eclipse radios, the user can select a new set of CTCSS or DCS signals for a particular channel through the user function menu. These CTCSS or DCS signal pairs are defined in the **Channel Signalling Presets** screen (shown below).

Up to 20 pairs of signalling codes can be defined. Use the **F2** key to insert each line for data entry or the **F3** key to delete the current line.

The field **Label** sets an alphanumeric name to label each pair of Tx/Rx signalling codes. Each label must be unique. Enter a name of up to 8 characters from:

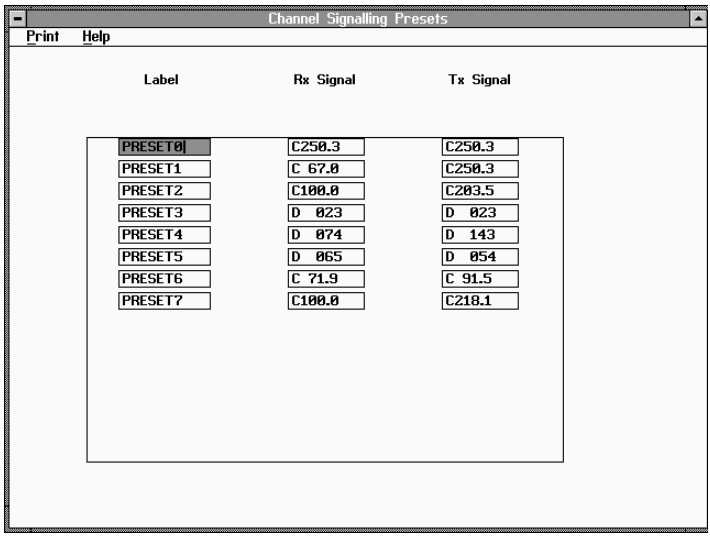
A-Z 0-9 ! # $ % ^ & * + - = { } ( )
[ ] < > : ; ? | , . _ " ' / space

The field **Rx Signal** sets the receive subaudible coding associated with this label. This is the code the radio must receive on the channel once the preset signalling label has been selected before the activity will be regarded as valid and the mute opened.

The field **Tx Signal** sets the transmit subaudible coding associated with this label. This is the code that will accompany each transmission on the channel once the preset signalling label has been selected.

For both **Rx Signal** and **Tx Signal**, enter either a valid CTCSS frequency (e.g. 156.7) or a valid DCS code (e.g. 043) from "Appendix A: Valid DCS and CTCSS Frequencies" on page 107. Leave this field

Channel Signalling Presets screen



blank to indicate that no subaudible tone will be used on this channel.

When the user selects a **Label** from the user function menu, the values of **Rx Signal** and **Tx Signal** for that **Label** will become permanently associated with the current channel.

Data Parameters Screen

Data parameters are set up in the **Data Parameters** screen (shown below).

The setting of the field **Data Option** determines whether the radio can be controlled by an external device through a Computer Controlled Data Interface (CCDI). Select 'Enabled' to allow CCDI operation.

The field **Data Identity** sets the radio's identity for receiving data messages. Enter an identity of up to 8 characters from A to Z, 0 to 9, # or *

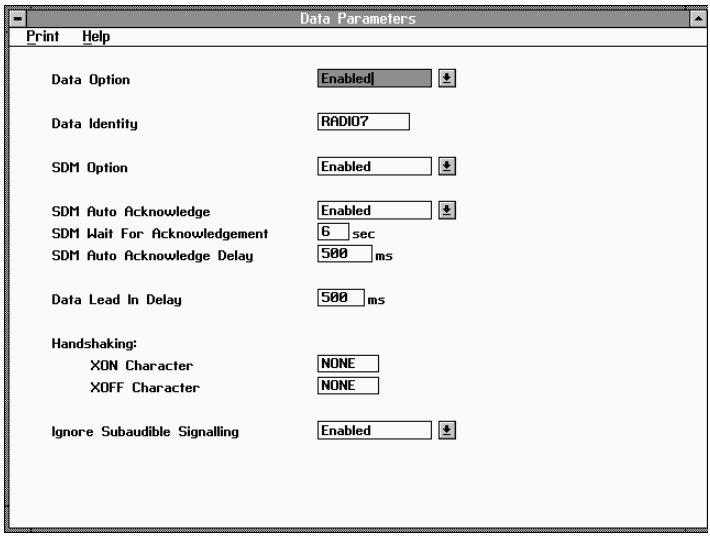
Set the field **SDM Option** to 'Enabled' to allow the radio to send and receive short data messages (SDMs).

When the field **SDM Auto Acknowledge** is set to 'Enabled', the radio will send an auto acknowledge when it receives a short data message (SDM).

The field **SDM Wait For Acknowledgement** sets the delay before the radio will resend a short data message (SDM) when no auto acknowledge response is received. Set a value from 1 to 20 seconds in steps of 1 second.

The field **SDM Auto Acknowledge Delay** sets the delay between receiving a short data message (SDM) and sending an auto acknowledgement. Set a value from 100 to 12,000 ms in steps of 100 ms.

Data Parameters screen



The field **Data Lead In Delay** sets duration of the lead-in delay for all data transmissions. Set a value from 100 to 5100 ms in steps of 20 ms.

Handshaking allows control over the flow of data being sent. Two fields must be set, **XON Character** and **XOFF Character**.

XON Character is the character that indicates when a flow of data should start. **XOFF Character** is the character that indicates when a flow of data should stop. Set both fields to a hexadecimal number between 0 and FF.

When the field **Ignore Subaudible Signalling** is set to 'Enabled', subaudible signalling will be ignored on incoming data transmissions.

PART 7

Radio Interface Options

This part contains detailed information on setting radio interface options, such as function key settings and user menu options. The **Edit** menu screens discussed in this part are:

- **Key Settings**
- **User Selectable Parameters**

Key Settings Screen

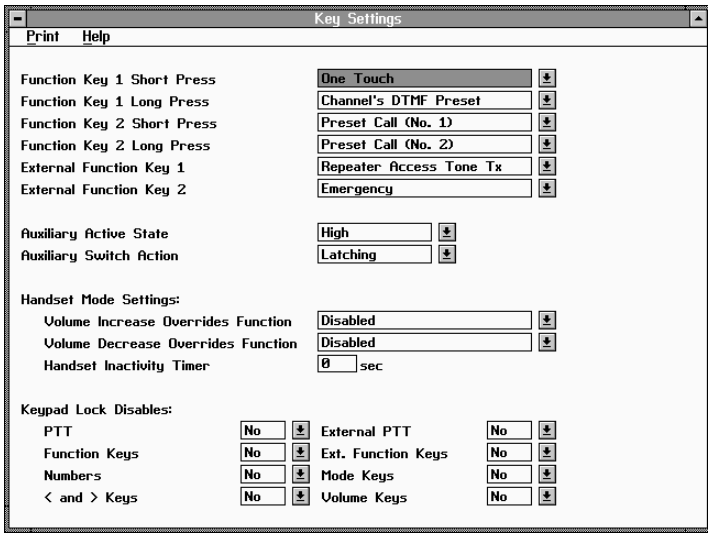
Function key and keypad settings, auxiliary settings and handset mode settings are made in the **Key Settings** screen, which is shown below.

Function Key Settings

There are two function keys on each radio, and a function can be assigned to a short or long press of each key. Functions can also be assigned to external function keys on accessories such as the external lapel microphone. The functions that can be assigned to each of these function key settings are described below.

- 'Audible Indicators': When the function key is pressed, audible indicators will be toggled on and off.
- 'Auxiliary': An auxiliary hardware device may be fitted inside the radio. When the function key is pressed, the auxiliary device will be turned on or off.
  If **Auxiliary Switch Action** (in the **Key Settings** screen) is set to 'Momentary', control of an auxiliary device cannot be assigned to a long press of a function key, nor can any other function.
- 'Economy Mode Control': Economy mode is used to reduce the radio's power consumption when it is idle. When pressed, the function key will toggle the function on and off. Econ-

Key Settings screen



omy mode is set up in the **Power Save Features** screen.

- 'One Touch': When the function key is pressed, the call defined by the first symbol in the **Alpha Symbols** screen will be transmitted.
- 'Channel's DTMF Preset': When the function key is pressed, the DTMF preset call assigned to the current channel will be transmitted (as defined in the **Channels (I)** and **Channels (II)** screens). If no DTMF call is defined for the current channel, none will be transmitted when the function key is pressed.
- 'Preset Call No. 1' and 'Preset Call No. 2': When the function key is pressed, the preset call assigned to the current channel will be transmitted (as defined in the **Selcall Identity** screen). If no function key preset call is defined for the current channel, none will be transmitted when the function key is pressed.
- 'Emergency': When the function key is pressed, the emergency call defined in the **Selcall Emergency Set-up** screen will be transmitted. If Selcall is disabled, no emergency sequence will be transmitted when the function key is pressed.
- 'Nuisance Delete': Nuisance delete can be used to temporarily remove a channel from a scan group. When the function key is pressed, the locked-on channel will be temporarily removed from the scan group and the radio will resume scanning.
- 'Repeater Talk Around': Repeater talk around allows the user to bypass normal repeater operation and communicate with other radios in simplex mode. Repeater talk around may be required if the radio is moved out of range of the repeater or if the repeater is in heavy use. When the function key is pressed, the radio will toggle repeater talk around mode on and off.
- 'Repeater Access Tone Tx': When the function key is pressed, the radio will transmit the repeater access tone in order to key up the repeater.
- 'Toggle Monitor': When the function key is pressed, the monitor facility will be toggled on and off.
- 'Disable Monitor': When the function key is pressed, the monitor facility will be deactivated, if it is active.
- 'Squelch Override': The squelch override state allows the user to listen to all traffic on a channel. When the function key is pressed, the squelch override state will be toggled on and off.
- 'Contrast Adjustment': This option can only be set for Excel and Eclipse handportable radios and Eclipse mobile radios.
  When the function key is pressed, the user can adjust the LCD's contrast.
- 'Backlighting': This option can only be set for Excel and Eclipse handportable radios.
  When the function key is pressed, backlighting will be activated. Back-

lighting will remain activated for the duration of the **Backlighting Timer** (**Power Save Features** screen). This option can only be set for handportable radios.

- 'Night Use': This option can only be set for Excel and Eclipse handportable radios.
  When the function key is pressed, night operation mode will be toggled on and off. In night operation mode, backlighting is turned on and remains on for the duration of the **Backlighting Timer** (set in the **Power Save Features** screen). Any activity on the radio, such as a keypress or a call received will reset the backlighting timer. This option can only be set for handportable radios.

- 'Handset Mode': Handportable radios can be operated as a normal radio or as a handset. When the function key is pressed, the radio will toggle handset mode on and off.

- 'Low Power': When in low power transmit mode, the radio will send signals at low power, regardless of the current channel's power level setting. Pressing the function key toggles low power transmit mode on and off.

- 'Keypad Lock': Keypad lock allows the user to lock a set of keys so that they cannot accidentally be activated. When the function key is pressed, keypad lock will be activated. The clear key (✕) must be pressed to turn the keypad lock off. Keypad lock is only available on Excel and Eclipse handportable radios.

Auxiliary Settings

An auxiliary hardware device can be fitted inside the radio. The field **Auxiliary Active State** determines the active state of the auxiliary control line. Select 'High' (+5 volts) or 'Low' (0 volts).

The field **Auxiliary Switch Action** sets the operating mode of an auxiliary hardware device, which can be controlled by latching or momentary action. When set to 'Latching', a press of the function key will toggle between turning the hardware device on and off. When set to 'Momentary', the function key must be held down for the device to operate and so a function cannot be assigned to a long press of that function key.

Handset Mode

Volume Override

In handset mode, the function keys can be programmed to act as volume control keys, which is set up in the fields **Volume Increase Overrides Function** and **Volume Decrease Overrides Function**. For each field, choose the function key setting that will be used for volume increase or decrease. External function keys cannot be set to control volume in handset mode.

It is highly recommended that you program different keypresses for controlling volume in handset mode and turning handset mode on and off.

These fields can only be set if one of the function keys is programmed to operate handset mode, which is only available on handportable radios.

Handset Timer

The field **Handset Inactivity Timer** sets the amount of time the radio will remain in handset mode if no transmissions are made. Set a value from 0 to 240 seconds in steps of 1 second. If set to 0, the timer will be disabled and the radio will remain in handset mode until the user disables it.

Keypad Lock

The eight fields under the heading **Keypad Lock Disables** in the **Key Settings** screen determine what keys are locked when the keypad lock is activated. Keypad lock is only available on Excel and Eclipse handportable radios.

Keys that can be disabled are:

- the PTT key
- function keys
- numbers keys
- < and > keys
- an external PTT key, e.g. on a lapel microphone
- external function keys
- mode keys, e.g. the alphanumeric entry mode key
- volume keys.

For each field, select 'Yes' or 'No'.

The power on/off (Eclipse handportable radios only) and monitor keys can never be locked.

User Selectable Parameters Screen

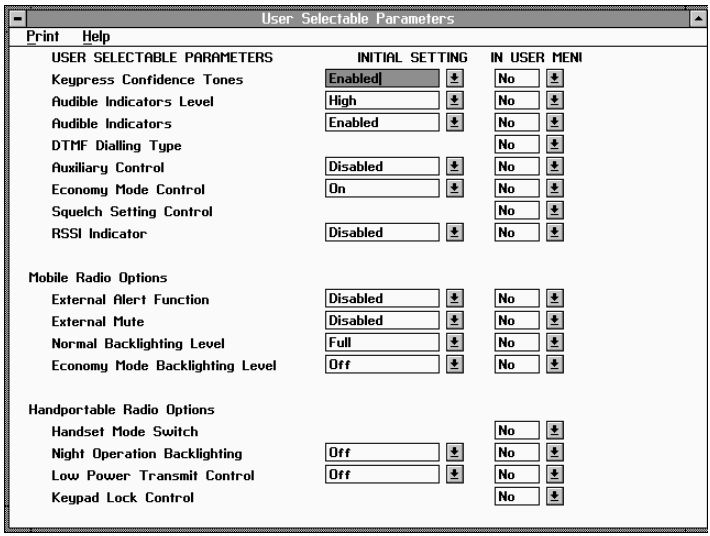
In the **User Selectable Parameters** screen, the initial settings for various parameters are made and the options that appear in the user function menu of Eclipse handportable and mobile radios is set. The **User Selectable Parameters** screen is shown below.

For each parameter, **Initial Setting** is the value the radio is set to when it is first programmed. On Eclipse radios, the value of all parameters in this screen can be changed by selecting them from the user function menu. To place a feature in the user function menu, select 'Yes' in the **In User Menu?** field.

For some parameters, the value can also be changed by assigning the feature to a function key setting (in the **Key Settings** screen). Parameters that can be assigned to a function key setting are:

- **Audible Indicators**
- **Auxiliary Control**
- **Economy Mode Control**
- **Economy Mode Backlighting Level**
- **Handset Mode Switch**
- **Night Operation Backlighting Level**
- **Low Power Transmit Control**
- **Keypad Lock Control**.

User Selectable Parameters screen



If a parameter is not placed in the user function menu (where applicable) or assigned to a function key, the value of that parameter can only be changed by reprogramming the radio.

The parameters set in this screen can be divided into three parts: those that apply to both handportable and mobile radios, those that apply only to mobile radios and those that apply only to handportable radios.

Mobile and Handportable Radios

The following parameters apply to both handportable and mobile radios:

- **Keypress Confidence Tones**
- **Audible Indicators Level**
- **Audible Indicators**
- **DTMF Dialling Type**
- **Auxiliary Control**
- **Economy Mode Control**
- **Squelch Setting Control**
- **RSSI Indicator**.

Audible Indicators

Three fields in the **User Selectable Parameters** screen set properties of audible indicators, which include keypress confidence tones, received call signals, low battery and high temperature warnings, transmit timer and unanswered call signals, but not DTMF tones.

The first field, **Keypress Confidence Tones**, determines the tone set used for keypress confidence tones, the tones heard when a keypad button or function key is pressed. For **Initial Setting**, select 'Enabled' for tones or 'Disabled' for no tones.

The second field, **Audible Indicators Level**, sets the volume of all audible alerts. Set **Initial Setting** to 'High' or 'Low'.

The setting of the third field, **Audible Indicators**, determines whether audible alerts are enabled or disabled. Set the **Initial Setting** to 'Enabled' to turn audible indicators on.

If **Audible Indicators** is set to 'Disabled', the settings of the fields **Keypress Confidence Tones** and **Audible Indicator Level** will have no effect.

DTMF Dialling Type

When a DTMF call is made, the string is either transmitted separately as each individual key is pressed (normal dialling) or in its entirety once the enter key (↵) is pressed (buffered dialling). The default DTMF dialling type is set in the **DTMF** screen. For **DTMF Dialling Type**, select 'Yes' in the **In User Menu?** field to place the option to change the DTMF dialling type in the user function menu of Eclipse radios.

Economy mode is used to reduce the radio's power consumption when it is idle by turning off unnecessary circuitry. Set the **Initial Setting** of the **Economy Mode Control** field to 'On' to turn on economy mode control. Economy mode is set up in the **Power Save Features** screen. A function key can be assigned to turn economy mode on and off.

Auxiliary Control

The **Initial Setting** for the **Auxiliary Control** field allows the user to control a hardware device fitted inside the radio. If such a device is fitted, this field should be set to 'Enabled'. A function key can be assigned to control an auxiliary device.

Economy Mode Control

Economy mode is used to reduce the radio's power consumption when it is idle by turning off unnecessary circuitry. Economy mode is set up in the **Power Save Features** screen.

Squelch Setting Control

Squelch Setting Control is only available on Eclipse radios. Select 'Yes' in the **In User Menu?** field to place the option to switch between city and country squelch settings in the user function menu. The initial squelch setting for each channel is set in the **Channels (I)** and **Channels (II)** screens.

RSSI Indicator

This feature is only available on Excel and Eclipse handportable radios.

When the **Initial Setting** of **RSSI Indicator** is set to 'Enabled', the received signal strength will be shown in the display whenever activity is detected on a channel.

Mobile Radios

The following parameters apply only to mobile radios:

- **External Alert Function**
- **External Mute**
- **Normal Backlighting Level**
- **Economy Mode Backlighting Level**.

External Alert

On mobile radios, an external alert such as a horn can be sounded when a call remains unanswered if the appropriate connections are installed. If you wish to use such an external alert, set the **Initial Setting** of **External Alert Function** to 'Enabled'.

External Mute

An external device such as a car stereo can be muted when the radio is transmitting or receiving if the appropriate connections are installed. To mute an external device when the mobile radio is transmitting or receiving, set the **Initial Setting** of the **External Mute** field to 'Enabled'.

Mobile Radio Backlighting

Two fields affect mobile radio backlighting. The **Initial Setting** of **Normal Backlighting Level** sets the level of backlighting for mobile radios. Select 'Full' or 'Dim'. The **Initial Setting** of **Economy Mode Backlighting Level** sets the level of backlighting for mobile radios when operating in economy mode. Select 'Dim' or 'Off'. A function key can be assigned to turn mobile radio backlighting on and off.

Handportable Radios

The following parameters apply only to handportable radios:

- **Handset Mode Switch**
- **Night Operation Backlighting Level**

- **Low Power Transmit Control**
- **Keypad Lock Control**.

Handset Mode
Handportable radios can be operated as a normal radio or as a handset. For **Handset Mode Switch**, select 'Yes' in the **In User Menu?** field to place the option to turn handset mode on and off in the user function menu of Eclipse handportable radios. For all handportable radios, a function key can be programmed to turn handset mode on and off. Handset mode is always deactivated when the radio is powered up.

Handportable Radio Backlighting
The field **Night Operation Backlighting** sets the level of night operation backlighting for handportable radios. Set the **Initial Setting** to 'On' to enable night operation backlighting. A function key can be programmed to turn night operation backlighting on and off ('Night Use').

Low Power Transmit
When in low power transmit mode, the radio will send signals at low power, regardless of the preprogrammed level. For the **Initial Setting** of the **Low Power Transmit Control** field, select 'On' to turn on low power transmit mode. A function key can be programmed to turn low power transmit on and off ('Low Power').

Keypad Lock
For **Keypad Lock Control**, select 'Yes' in the **In User Menu?** field to place the option to turn keypad lock on and off in the user function menu of Eclipse handportable radios. A function key can be assigned to turn keypad lock on and off for Excel and Eclipse handportable radios.

Appendix A: Valid DCS and CTCSS Frequencies

This appendix lists the settings used for CTCSS and DCS receive and transmit tones. You can enter a valid CTCSS frequency or a valid DCS code in an appropriate field. Leave the field blank to indicate that no subaudible signalling will be used on the channel.

Three tables are provided:

- standard DCS codes and their inverses;
- commonly used DCS codes and their inverses; and
- standard CTCSS tone frequencies.

Table 7: Standard DCS codes and their inverses

Code	Inv	Code	Inv	Code	Inv	Code	Inv	Code	Inv	Code	Inv
023	047	073	506	156	265	263	205	371	734	506	073
025	244	074	174	162	503	265	156	411	226	516	432
026	464	114	712	165	251	271	065	412	143	532	343
031	627	115	152	172	036	306	071	413	054	546	132
032	051	116	754	174	074	311	664	423	315	565	703
043	445	125	365	205	263	315	423	431	723	606	631
047	023	131	364	223	134	331	654	432	516	612	346
051	032	132	546	226	411	343	532	445	043	624	632
054	413	134	223	243	351	346	612	464	026	627	031
065	271	143	412	244	025	351	243	465	331		
071	306	152	115	245	072	364	131	466	662		
072	245	155	731	251	165	365	125	503	162		

Table 8: Commonly used DCS codes and their inverses

Code	Inv	Code	Inv	Code	Inv	Code	Inv	Code	Inv	Code	Inv
017	050	122	225	246	523	274	145	446	255	462	252
036	172	145	274	252	462	325	526	452	053	523	246
050	017	212	356	255	446	332	455	454	266	526	325
053	452	225	122	266	454	356	212	455	332		

Table 9: Standard CTCSS tone frequencies (Hz)

67.0	77.0	88.5	100.0	114.8	131.8	151.4	173.8	203.5	233.6
69.3	79.7	91.5	103.5	118.8	136.5	156.7	179.9	210.7	241.8
71.9	82.5	94.8	107.2	123.0	141.3	162.2	186.2	218.1	250.3
74.4	85.4	97.4	110.9	127.3	146.2	167.9	192.8	225.7	

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