Programming System for Tait Orca Trunked Radios

User's Manual

August 1999
439-51200-01

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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.

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About This Manual

Welcome to the programming system for the Tait Orca series of trunked handportable and mobile radios. The programming system provides an easy way to enter settings and features into Tait Orca trunked 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 trunked 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 trunked radios.

What Do You Need to Know?

You should be familiar with:

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

Much of the information programmed into the radio will depend on the network the radio will be operating on. The network operator, therefore, should provide many of the parameters required to program the radio.

MPT Standards

Tait Orca trunked radios are compliant with MPT 1327/1343. For more information on these standards, see:

- *MPT 1327 A Signalling Standard for Trunked Private Land Mobile Radio System*, January 1988, revised and reprinted November 1991
- *MPT 1343 Performance Specification*, January 1988, revised and reprinted November 1991.

What's Included?

This manual is divided into eight 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 8 contain information on changing settings using the screens in the **Edit** menu.

Part 3, *Before Changing Settings*, contains information you should read before changing settings using the screens in the **Edit** menu.

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Part 4, *Changing Network Settings*, contains detailed information on changing network settings.

Part 5, *Changing Fleet Settings*, contains detailed information on changing fleet settings.

Part 6, *Basic Radio Settings*, contains detailed information on changing general information about the radio.

Part 7, *Special Features*, contains detailed information on setting up special features such as DTMF and conventional channels.

Part 8, *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 trunked 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 7.

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.

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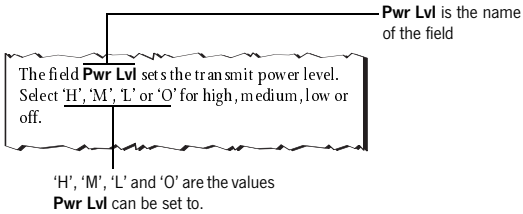
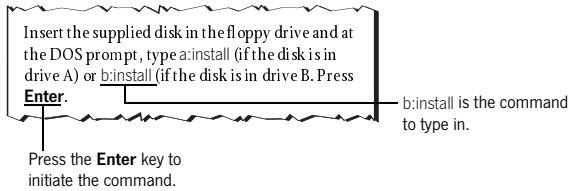
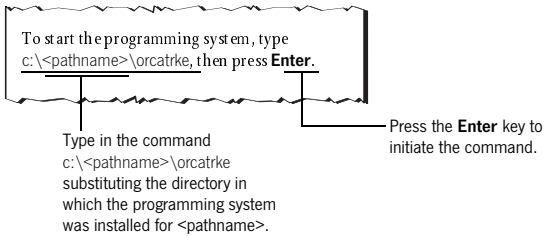
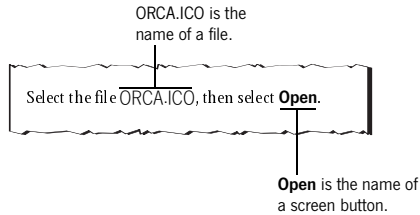
Typographical conventions used in this manual









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PART 1

Getting Started

This part describes the system requirements and installation of the programming system. It also describes how to connect a radio and what to do should you have problems with low memory.

Components and System Requirements

The Tait Orca programming system for trunked 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).

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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\TRK 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).

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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 25.

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.

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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 orcatrke, 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>\orcatrke, 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>\orcatrke, then press **Enter**.

About Passwords

When you start the programming system, you will be asked to enter a password. The password you enter determines the screens and fields you will be able to edit.

It is recommended that you use the lowest level of password access necessary to edit the fields you wish to change. This helps to ensure that you do not accidentally change other data.

The password and access levels are as follows:

- Low level access. No password is required, simply press **Enter**. This level allows you to change selected radio and fleet data. You will not be able to edit network data.
- Medium level access. This level allows you to change all radio and fleet data. You will not be able to edit network data.
- High level access. This level allows you to change all unit, fleet and network data.

When you do not have access to a field, you can view it, but you cannot select the field or change its value. If you do not have access to all fields in a particular screen, the option to select that screen from the **Edit** menu will not be available.

Memory Problems

If you get a low memory message the first time you start the programming system, quit the programming system and:

- run a memory optimising utility; or
- remove unnecessary drivers; or
- remove unnecessary terminate-stay-resident programs.

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Consult your DOS manual for further instructions.

If you are running the programming system from DOS and are unable to make more memory available, the programming system will still run but you may encounter problems if you are setting up complex systems.

If you are running the programming system from Windows 3.x or Windows 95, close other applications. If you still get a low memory message, consider running the programming system from DOS.

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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 trunked 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.

Table 1: Programming system keystrokes

Key	Function	Key	Function
F1	Online help for the current field. Pressing the F1 key again accesses general help.	Alt-Left arrow	Scroll across a screen from right to left.
F2	Insert a row into an array box.	Ins	Toggle insert/overtype mode. The default is insert.
F3	Delete a row from an array box.	Del	Delete character to the right.
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.	Backspace	Delete character to the left.
Up arrow	Scroll a vertical list up or move vertically in a pop-up menu.	Enter	End edit and validate new value.
Down arrow	Scroll a vertical list down or move vertically in a pop-up menu.	Esc	Close a window.
Right arrow	Move to the right along the menu items in the menu bar.	Tab	Move to next.
Left arrow	Move to the left along the menu items in the menu bar.	Shift-Tab	Move to previous.
Alt-Right arrow	Scroll across a screen from left to right.		

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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

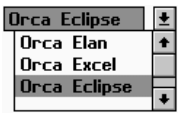
A screen button appears as a box and contains a default setting, such as 'City' for squelch level.

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.

Using Array Boxes

An array consists of lines of various data entry fields, such as list boxes and text boxes, as shown below.

An array box is used where many lines of data are required, each containing the same type of information. 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 on page 21. This is the window that will appear when you first start the programming system.

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'.

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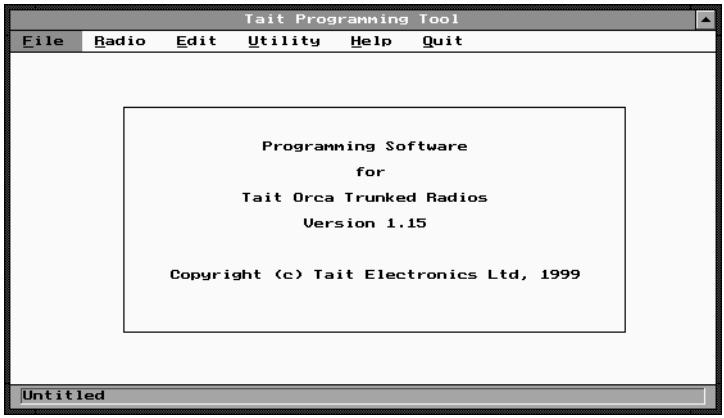

The menu bar shows the title of six menus.

- 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**). Once the menu bar is selected, you can select other options using the right and left arrow keys.

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. For information on key functions, refer to the *User's Manual* for each radio.

Table 2: Radio keys and their online help equivalents

Key	Description	Help Reference
	Enter	[ENTER]
	Despatcher	[DESPATCHER]
	Queue	[QUEUE]
	DTMF	[DTMF]
or	Monitor/Clear	[MON] or [X-CLEAR]
	Status	[STAT]
	Menu	[MENU]
	Alpha	[ALPH]

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 on page 23). In it, you 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

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File window

whether you wish to validate the file. You should select **Yes** to avoid saving a file that may cause a 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 on page 24) 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 **Can-**

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cel 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.

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.

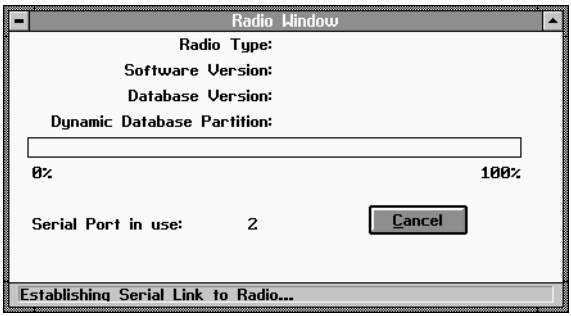
It is highly recommended that a full validation is done at least once after any changes are made.

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.

Radio window



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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 8 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 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 on page 26. The **Screen Colour Manager** includes a **Sample**

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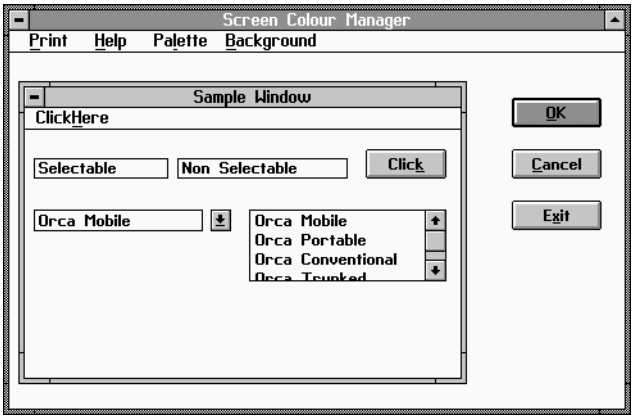
Screen Colour Manager window



Window that displays the current settings.

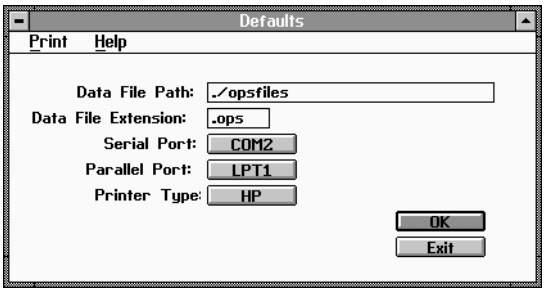
Palette gives you a choice of colour combinations, and **Background** gives you a choice of background colours. Choose **OK** to apply your colour changes, **Cancel** to restore the previous settings, or **Exit** to exit the **Screen Colour Manager**.

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 below.

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.

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

Defaults window



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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.

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PART 3 Before Changing Settings

This part contains general information on programming Tait Orca trunked radios. You should read this part before you start changing settings in the screens in the **Edit** menu.

Programming Sequence

When programming a Tait Orca trunked radio, you will find that possible entries and availability of certain features sometimes depends upon settings in other screens. The order in which screen data is entered is, therefore, important.

The recommended order for changing radio settings is:

- network settings; then
- fleet settings; then
- radio unit settings.

Access to some programming information is restricted by the password you enter when you start the programming system (see "About Passwords" on page 14).

In many cases, you will be supplied with a file that contains the correct network and/or fleet settings and so will need to change settings only for the particular radio being programmed. The supplied file can be loaded using the **Load** option in the **File** menu.

Network Settings

Although few users will need to alter network information, it should be changed first.

Edit menu screens that contain information specific to a network are:

- **Hunting Parameters**
- **Network Identity**
- **Network Parameters**
- **Trunked Channel Blocks.**

Once this information is correct or a suitable network file has been loaded from disk, fleet settings should be changed.

Fleet Settings

Edit menu screens that contain information specific to a fleet are:

- **Fleet Identity**
- **LMS - Fleet Identity**
- **Fleet Parameters.**

Once this information is correct or a suitable file has been loaded from disk, unit settings should be changed.

A file that contains suitable fleet settings will also contain the correct network settings.

Radio Unit Settings

Edit menu screens that contain information specific to a radio unit are:

- **Specifications**
- **Radio Unit Identity**
- **LMS - Radio Unit Identity**
- **Power Save Features**
- **Acquisition Data**
- **DTMF Parameters**
- **Conventional Channels**
- **5 Digit Interfleet Lookup Table**
- **Preset Calls**

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- **Call Options**
- **Key Settings**
- **User Selectable Parameters.**

Validation

As you exit each screen in the **Edit** menu screens, you will be asked if you wish to validate the settings. You should select **Yes** to avoid attempting to program a radio with illogical or impossible options.

You also have the option of validating settings immediately before programming a radio (when you choose **Program** from the **Radio** menu).

A full validation should be done at least once after any changes settings are made.

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PART 4

Changing Network Settings

This part describes how to change network settings.

Some of the fields in these screens require only low- or medium-level password access. However, for access to all fields in these screens, you will need high-level password access.

The **Edit** menu screens discussed in this part are:

- **Hunting Parameters**
- **Network Identity**
- **Network Parameters**
- **Trunked Channel Blocks**

Hunting Parameters Screen

The fields in the **Hunting Parameters** screen relate to network hunts carried out by the radio. The **Hunting Parameters** screen is shown below.

Time-Shared Channels

The field **Nokia TS Channel Support** sets whether the radio supports Nokia time-shared channels. Select 'Enabled' or 'Disabled'.

When **Nokia TS Channel Support** is set to 'Enabled', standard MPT 1343 hunting procedures are varied by recognising Nokia Actionet time-shared control channels and ignoring the preset L2 signal level while performing background searches. Because the L2 signal level is ignored, a radio will always try to find a better control channel regardless of the signal strength of the current control channel.

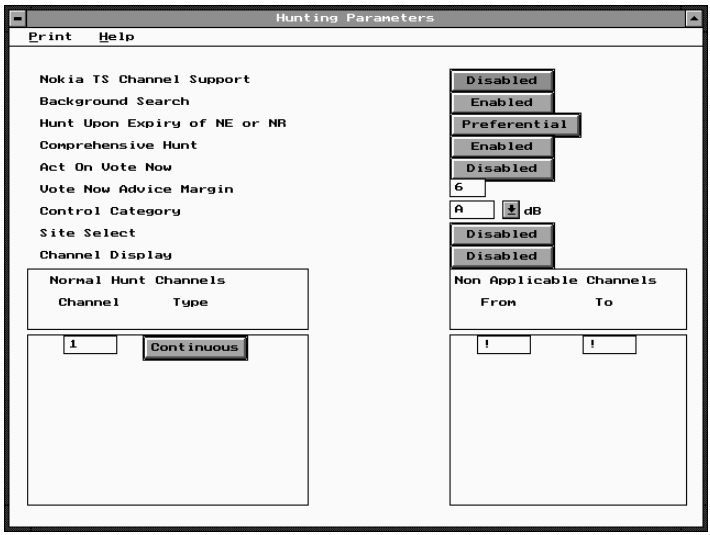
When **Nokia TS Channel Support** is set to 'Enabled', the radio no longer complies with MPT 1343.

Background Searches

The background search sequence is a method prescribed in MPT 1343 for monitoring other control channels and migrating to a superior channel when one is found.

The search is performed by periodically leaving the current control channel and

Hunting Parameters screen



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sampling other control channels. What channels are sampled is defined in the **Normal Hunt Channels** array. If a channel is consistently found for a certain number of consecutive samples to be preferred (according to the NDD preference data defined in the **Acquisition Data** screen) or stronger than the current control channel be a certain margin, the radio will perform a preferential sampled hunt to acquire the new control channel.

Set the field **Background Search Sequence** to 'Enabled' to allow the radio to carry out background searches.

The interval at which the radio performs the search is defined by the parameter **TL**, and the amount of time the radio spends performing hunts is determined by the parameter **TH**. The number of samples taken of each candidate control channel during the background search is determined by the parameter **NS**. These parameters are set in the **Network Parameters** screen, together with three other parameters related to background searches, **LM1**, **LM2** and **LM3**. See "Background Search Parameters" on page 43 for more information.

Acquiring a Control Channel Upon Call Setup Failure

The field **Hunt Upon Expiry of NE or NR** determines the type of control channel hunt performed when an attempt to set up a call is unsuccessful (when NE or NR expire).

Select 'Normal', 'Preferential' or 'Disabled'.

- When **Hunt Upon Expiry of NE or NR** is set to 'Normal', the radio will carry out a background search using the information in the **Normal Hunt Channels** array.
- When set to 'Preferential', the radio will carry out a background search using the NDD preference data (**Acquisition Data** screen).
- When set to 'Disabled', no search will be performed.

For the radio to be fully MPT 1343 compliant, you should select 'Disabled', as MPT 1343 requires that no hunt be performed and the radio wait for further signalling when a call attempt fails.

On some networks, selecting 'Normal' or 'Preferential' may improve the chances of successfully making the call on the next attempt.

Failure to Find a Control Channel

The field **Comprehensive Hunt** determines how the radio behaves when it fails to find a control channel. If **Comprehensive Hunt** is set to 'Enabled', the radio will then search through all defined channels, except those specified as non-applicable in the **Non Applicable Channels** array.

Vote Now

Some trunking systems use a 'vote now' BCAST codeword to help the radio find the best control channel. When the radio receives a vote now BCAST codeword, the radio will switch to the channel specified by the system and monitor its RSSI level. If the RSSI on the new channel is not greater than the current control channel by the value set in the field **Vote Now Ad-**

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vice Margin, the radio will return to the current control channel. Otherwise the radio will switch to the control channel specified by the trunking system.

Set **Act On Vote Now** to 'Enabled' to allow the radio to act on vote now BCAST codewords.

The field **Vote Now Advice Margin** sets the signal strength margin that the new channel must exceed the current control channel by for the radio to switch to the new control channel it has been directed to by a vote now BCAST codeword. **Act On Vote Now** must be set to 'Enabled' for the setting of **Vote Now Advice Margin** to have any effect.

Set a value from 1 to 15 dB in steps of 1 dB.

Access Rights

The setting of the field **Control Category** determines the radio's rights of access to a network's control channels.

A radio can only access a control channel when the radio's **Control Category** corresponds to the value of the LAB field in the system identity code.

Select one of the categories: A, B, C or D.

Site Select

The **Site Select** feature is not available for Elan handportable radios.

The **Site Select** feature allows a user to dial a control channel the radio must then attempt to register on regardless of its suitability for acquisition.

If the field **Site Select** is set to 'Enabled', a function key should be designated for the 'Site Select' option (**Key Settings** screen).

Channel Display

The **Channel Display** feature is not available for Elan handportable radios.

The **Channel Display** feature allows the user to view the current control channel. If the radio is hunting then the user will observe the control channel changing rapidly. However, if there are other messages present on the display then the display of the control channel will take lowest priority.

When **Channel Display** has been set to 'Enabled', the radio will also display the traffic channel while it is engaged in a call. Once the call has been cleared down, the control channel will again be displayed.

Normal Hunt Channels Array

The **Normal Hunt Channels** array defines the channels that will be examined during a normal background search sequence to see if they can be acquired as a control channel.

If the radio fails to find a suitable control channel among these channels, it will search through all channels if the field **Comprehensive Hunt** is set to 'Enabled'.

The channels available to the radio are defined in the **Trunked Channel Blocks** screen. See page 47 for more information.

Up to 32 normal hunt channels can be defined. Press **F2** to insert a new channel, or **F3** to delete the current channel. At least one channel must be defined, and so the

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last remaining channel cannot be deleted.

Two fields must be set for this list: **Channel** and **Type**.

Channel

For the field **Channel**, enter any channel number between the lowest and highest channel defined for the network. See your network operator for these values.

Type

For the field **Type**, select 'Continuous' or 'Time-shared'. See your network operator for the channel type, which will normally be 'Continuous'.

Non Applicable Channels Array

The **Non Applicable Channels** array defines the upper and lower limits of the channel range that will not be included in comprehensive hunt sequences. Press **F2** to insert a new range of channels, or **F3** to delete the current range.

You can define up to ten channel ranges, where the field **From** defines the start of the range not included in the hunt and the field **To** defines the end of the range not included in the hunt. See your network operator for these values.

If the field **Comprehensive Hunt** is set to 'Disabled' or if you do not wish to limit the range of channels the radio will search, this list can be left blank.

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Network Identity Screen

Fields in the **Network Identity** screen set properties of the network the radio will be operating on.

Information in this screen cannot be altered unless you have high level password access. Appropriate values for the fields in this screen will be assigned by the network operator.

The **Network Identity** screen is shown below.

Network Type and Identity

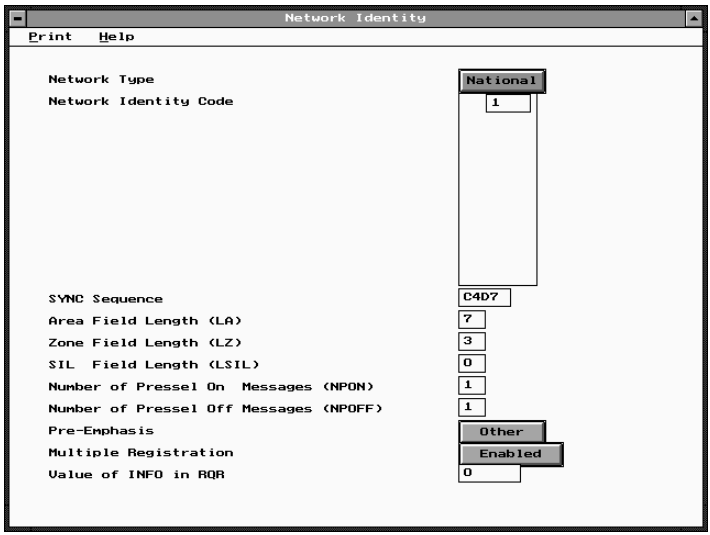
Together, the fields **Network Type** and **Network Identity Code** determine whether a control channel is considered a candidate for acquisition. If the relevant bits decoded from the control channel do not correspond to the values programmed into the radio, the radio will not consider that control channel a candidate.

The field **Network Type** sets the network type, which can be either 'National' or 'Regional'. Consult your network operator for the correct setting.

The field **Network Identity Code** sets the network's identity code. Enter the value assigned by your network operator.

- If the field **Network Type** is 'National', this value will be from 0 to 3.

Network Identity screen



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- If **Network Type** is 'Regional', this value will be from 0 to 127.

If **Network Type** is 'Regional', you can assign up to eight **Network Identity Codes**. Press **F2** to insert a new code or **F3** to delete the current code.

Syncronisation Sequence

The field **SYNC Sequence** sets the codeword synchronisation sequence (SYNC) for messages transmitted on the control channel.

Enter the SYNC sequence code assigned by your network operator, which will be in hexadecimal format.

- MPT 1327 and Regionet 43 define SYNC as C4D7.
- PAA2424 defines SYNC as B433.

Area, Zone and SIL Field Length

The fields **Area Field Length (LA)**, **Zone Field Length (LZ)** and **SIL Field Length (LSIL)** set parameters used in tests carried out by the radio.

The values of the fields **Area Field Length (LA)** and **Zone Field Length (LZ)** are used to see if the radio can acquire a control channel. The value of both fields will depend on **Network Type**.

- In MPT 1327, if **Network Type** is 'National' the values of **Area Field Length (LA)** and **Zone Field Length (LZ)** will be from 0 to 9.
- If **Network Type** is 'Regional', the values of **Area Field Length (LA)** and **Zone Field Length (LZ)** will be from 0 to 4.

The value of the field **SIL Field Length (LSIL)** is used to check whether a clear down received is from the correct trunking system controller. It acts as a safeguard against a radio responding to messages generated by other sites using similar frequencies or received as a result of intermodulation products.

Enter the values assigned by your network operator.

Pressel On/Off Messages

While a speech call is in progress, a radio will send pressel on messages (NPON) when the PTT is pressed and pressel off messages (NPOFF) when the PTT is released. These messages assist call maintenance.

The fields **Number of Pressel On Messages (NPON)** and **Number of Pressel Off Messages (NPOFF)** set how many of these messages will be sent. Enter the value assigned by your network operator, which will be from 1 to 5.

Pre-Emphasis

For the field **Pre-Emphasis**, select 'French' or 'Other'. For PAA2424 networks, **Pre-Emphasis** should be set to 'French'.

Multiple Registration

When the field **Multiple Registration** is set to 'Enabled', the radio is able to store up to three registration records and thereby be simultaneously registered on up to three control channels. It may then roam between those control channels and acquire any of them without re-registering.

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The oldest registration records expire and are deleted after a period **TD** following registration (which is set in the **Network Parameters** screen). The most recent record is known as the Prime record and does not expire. The trunking system announces how many registration records (either 1, 2 or 3) a radio shall maintain, via the BCAST SYSDEF 3 message.

If **Multiple Registration** is set to 'Disabled' only a single registration record is maintained and any previous registration record will be discarded when the radio registers on a control channel.

INFO Field in Request to Register Messages

The field **Value of INFO in RQR** sets the 15-bit value that is added to the INFO field when a radio requests registration.

This is normally set to 0, but in some systems is customised to convey additional information to the trunking system controller (TSC). Consult your network operator.

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Network Parameters Screen

The fields in the **Network Parameters** screen set variables used in communication with the trunking system control channel. They can be divided into three categories:

- control channel acquisition and retention;
- background search sequence parameters; and
- miscellaneous signalling parameters.

The **Network Parameters** screen is shown below.

Control Channel Acquisition and Retention

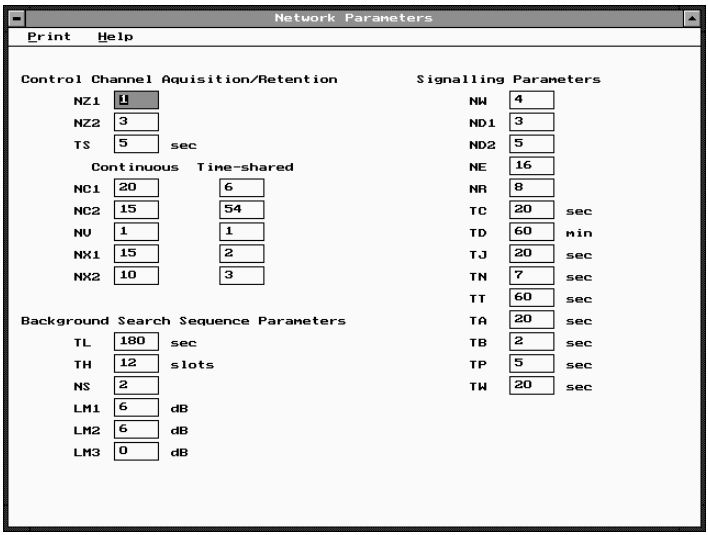
The fields listed under **Control Channel Acquisition/Retention** set parameters the radio uses when attempting to acquire and retain a control channel.

The same values of parameters **NZ1** and **NZ2** apply to both continuous and time-shared channels. Parameter **TS** applies only to time-shared channels.

Different values of parameters **NC1**, **NC2**, **NV**, **NX1** and **NX2** can be set for continuous and time-shared channels.

Your network operator will tell you what value to set these fields to.

Network Parameters screen



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NZ1 and NZ2

Parameters **NZ1** and **NZ2** are used for error checking.

NZ1 is used for error checking during hunting and is the number of contiguous samples of **NC1** codewords without a codeword sample error event that must be recorded before the control channel being sampled can be confirmed.

NZ2 is used for error checking during continuous monitoring of a confirmed control channel. Once an error has been detected, **NZ2** is the number of further contiguous samples of **NC2** codewords each with a codeword sample error event that must be recorded before the radio can reject the control channel on the grounds of unacceptable codeword error rate.

Each field should be set to a value from 1 to 255.

TS

Parameter **TS** is used by the radio when searching for a control channel on a time-shared system. The radio must remain on each channel long enough to receive at least one complete burst from each site using the channel and so the value of **TS** must be set high enough to allow this.

Enter a value from 1 to 10 seconds.

NC and NX

The combination of parameters **NC** and **NX** set the error threshold at which the control channel performance is considered inadequate. Separate values of **NC** and **NX** are set for use during hunting (**NC1** and **NX1**) and during continuous monitoring of a confirmed control channel (**NC2** and **NX2**).

Parameters **NC1** and **NC2** are the number of contiguous positions in which codewords are expected that will be monitored in each codeword.

Parameters **NX1** and **NX2** are the number of errored codewords that must be exceeded in the count of the respective NC codewords before the sample of NC codewords is considered an error event.

For **NC1** and **NC2**, set a value from 1 to 255 for both continuous and time-shared channels.

For **NX1**, set a value from 0 to the value of the corresponding **NC1** parameter for continuous and time-shared channels.

For **NX2**, set a value from 0 to the value of the corresponding **NC2** parameter for continuous and time-shared channels.

NV

Parameter **NV** sets the number of consecutive CCSCs (codewords) with the same value of SYS field that must be received before the radio will attempt to verify that value.

Enter a value from 1 to 16 for both continuous and time-shared channels.

Background Search Parameters

The background search sequence is a method prescribed in MPT 1343 for monitoring other control channels and migrating to a superior channel when one is found.

The background search is performed by periodically leaving the current control channel and sampling other control channels. What channels are sampled is defined in the **Normal Hunt Channels** array (**Hunting Parameters** screen). If a channel is consistently found for a certain number of consecutive samples to be preferred (according to the NDD preference data defined in the **Acquisition Data** screen) or stronger than the current control channel by a certain margin, the radio will perform a preferential sampled hunt to acquire the new control channel.

The fields listed under **Background Search Sequence Parameters** set parameters the radio uses during background searches. The **Background Search Sequence** field in the **Hunting Parameters** screen must be set to 'Enabled' for these parameters to have effect.

TL, TH and NS

Parameter **TL** sets the minimum interval between successive departures from the confirmed control channel. Set a value from 10 to 320 seconds in steps of 10 seconds.

Parameter **TH** sets the amount of time the radio spends sampling other control channels. Set a value from 1 to 100 slots in steps of 1 slot.

If the value of **TL** is low and/or the value of **TH** is high, new control channels will be identified more rapidly; however, because the radio will spend less time listening to the confirmed control channel, it is more likely that important messages will be missed.

Parameter **NS** sets the number of consecutive samples of a channel that must be taken before it is identified as a candidate for acquisition as a control channel.

Set a value from 1 to 10 in steps of 1.

The lower the value of **NS**, the fewer the samples that need to be taken and so the more rapidly a new control channel will be identified. However, the identification will be less accurate than if **NS** is set higher. Setting **NS** higher will mean that identifying a new control channel will take longer, but identification will be more accurate since the radio will tend to ignore temporary fading effects.

LM1, LM2 and LM3

Parameters **LM1**, **LM2** and **LM3** set level margins used during preferential hunts. These values are network dependent.

LM1 sets how much stronger the signal on a sampled control channel must be than the current control channel for it to be considered during a background search sequence when neither channel is preferred.

LM2 sets how much stronger the signal on a sampled control channel must be than the current control channel for it to be considered during a background search sequence when both channels have equal preference.

For both **LM1** and **LM2**, enter the value assigned by your network operator, which will be from 3 to 40 dB in steps of 1 dB. Note that parameter **LM2** is ignored during hunts when the field **Nokia TS Channel Support** (**Hunting Parameters** screen) is set to 'Enabled'.

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Parameter **LM3** sets how much stronger the signal on a sampled control channel must be than the squelch threshold (L0) for it to be considered during a background search sequence when the channel is not preferred at all.

For **LM3**, enter the value assigned by your network operator, which will be from 0 to 40 dB in steps of 1 dB.

Selecting a lower value for **LM1** and/or **LM2** will ensure that the radio will always migrate to a better control channel, even if it is only slightly better, and thus ensure the best quality of speech during a call. However, it will also result in increased hunting activity, which will increase the chance of missing important calls and may load the trunking system unnecessarily with registration requests.

Selecting a higher value for **LM1** and/or **LM2** will ensure that the radio will only migrate to a new control channel if it is significantly better than the confirmed control channel. This will reduce the amount of control channel swapping which occurs and thus reduce the chance of missing important calls and network loading, but it might mean that the radio provides a slightly reduced quality of speech during a call. Raising **LM1** and/or **LM2** too high will prevent the radio from swapping control channels entirely, as the signal strength measurements are most sensitive over a limited range.

Selecting a lower value for **LM3** will ensure that the radio will always migrate to a preferred control channel, even at the expense of speech during a call. However, it will also result in increased hunting activity which will increase the chance of missing important calls and may load the trunking system unnecessarily with registration requests.

Selecting a higher value of **LM3** will ensure that the radio will only migrate to a preferred control channel if the speech quality is of some minimum standard. This will reduce the amount of control channel swapping that occurs and thus reduce the chance of missing important calls and network loading, but it might mean that the radio does not acquire a preferred control channel at the first opportunity. Raising **LM3** too high will prevent the radio from swapping control channels entirely, as the signal strength measurements are most sensitive over a limited range.

Miscellaneous Signalling Parameters

The fields listed under **Signalling Parameters** set various parameters used in communication with the control channel.

Parameter **NW** sets the response delay, in slots. Enter the value assigned by your network operator, which will be from 1 to 15.

Parameter **ND1** sets the number of disconnect messages sent by an individually called radio. Enter the value assigned by your network operator, which will be from 1 to 15.

Parameter **ND2** sets the number of disconnect messages sent by a calling radio. Enter the value assigned by your network operator, which will be from 1 to 5.

Parameter **NE** sets the maximum number of random access transmissions of RQE

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(emergency call request). Enter the value assigned by your network operator, which will be from 1 to 255.

Parameter **NR** sets the maximum number of random access transmission of RQS, RQD, RQX, RQT, RQR or RQQ (non-emergency call requests). Enter the value assigned by your network operator, which will be from 1 to 255.

Parameter **TC** sets the random access timeout. Enter the value assigned by your network operator, which will be from 10 to 120 seconds in steps of 10 seconds.

Parameter **TD** sets the registration record timeout used when **Multiple Registration** (**Network Identity** screen) is set to 'Enbaled'. Enter the value assigned by your network operator, which will be from 5 to 70 minutes in steps of 5 minutes.

Parameter **TJ** sets the further signalling timeout. Enter the value assigned by your network operator, which will be from 10 to 60 seconds in steps of 10 seconds.

Parameter **TN** sets the traffic channel inactivity timeout. Enter the value assigned by your network operator, which will be from 1 to 10 seconds in steps of 1 second.

Parameter **TT** sets the maximum transmit duration. Enter the value assigned by your network operator, which will be from 10 to 60 seconds in steps of 10 seconds.

Parameter **TA** sets the timeout for the radio after receiving an AHY. Enter the value assigned by your network operator, which will be from 1 to 255 seconds in steps of 1 second.

Parameter **TB** sets the time barred from calling the same ident after ACK/ACKX/ACKV or any ident after a ACKT/ACKB. Enter the value assigned by your network operator, which will be from 1 to 255 seconds in steps of 1 second.

Parameter **TP** sets the maximum interval between periodic messages (within speech limits) to be assumed at switch-on. Enter the value assigned by your network operator, which will be from 1 to 255 seconds in steps of 1 second.

Parameter **TW** sets the timeout for the radio waiting for a call. Enter the value assigned by your network operator, which will be from 1 to 255 seconds in steps of 1 second.

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Trunked Channel Blocks Screen

Trunked channel blocks specify the operating frequencies of all channels on a network. Trunked channel blocks are set up in the **Trunked Channel Blocks** screen (shown below).

Up to 20 blocks can be defined. Press **F2** to insert a new channel block, or **F3** to delete the current channel block. At least one channel block must be defined, and so the last remaining channel block cannot be deleted.

Seven fields must be set for each trunked channel block.

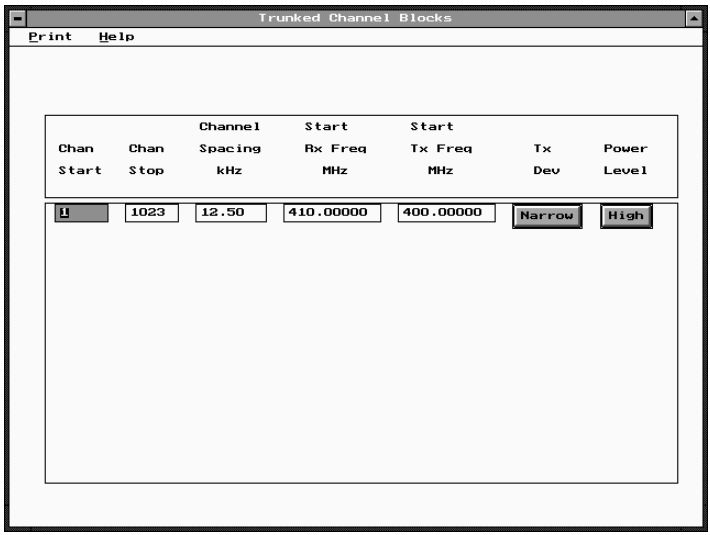
Channel Start and Stop

The field **Chan Start** sets the first number of each trunked channel block, and **Chan Stop** sets the stop channel number.

Enter a value from 1 to 1023 for **Chan Start**, and a value greater than or equal to the **Chan Start** value for **Chan Stop**. **Chan Stop** cannot be set higher than 1023.

If it is not the first block defined, the **Chan Start** value must be one greater than the **Chan Stop** value for the previous block.

Trunked Channel Blocks screen



Your network operator will tell you what values to set.

Channel Spacing

The field **Channel Spacing kHz** sets the channel spacing (in kHz) for all channels in the block and is the value that will be used to calculate receive and transmit frequencies from the values of **Start Rx Freq MHz** and **Start Tx Freq MHz**.

Enter the value assigned by your network operator, which will be a multiple of either 5 kHz or 6.25 kHz.

Different blocks can have different channel spacing values.

Receive and Transmit Frequencies

The field **Start Rx Freq MHz** sets the receive frequency for the first channel in the block. The receive frequency for all other channels in the block will be calculated from this value using **Channel Spacing kHz**.

The field **Start Tx Freq MHz** sets the transmit frequency for the first channel in the block. The transmit frequency for all other channels in the block will be calculated from this value using **Channel Spacing kHz**.

For **Start Rx Freq MHz** and **Start Tx Freq MHz**, enter the value assigned by your network operator, which will be a multiple of either 5 kHz or 6.25 kHz (the same number must be used to calculate both values) and will be within the radio's frequency band.

The first channel in a block always has the lowest frequency, and the frequency range for a block cannot overlap with any other block's frequencies.

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.

Transmit Power

The field **Power Level** 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

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(VHF) or 4 watts (UHF). For 800 MHz handportable radios, only low (1 watt) and high (3 watts) are available.

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.

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PART 5 Changing Fleet Settings

This part describes how to change fleet settings.

Some of the fields in these screens require only low- or medium-level password access. However, for access to all fields in these screens, you will need high-level password access.

The **Edit** menu screens discussed in this part are:

- **Fleet Identity**
- **LMS - Fleet Identity**
- **Fleet Parameters**

Fleet Identity Screen

The fields in the **Fleet Identity** screen set the **Dialling Scheme** the radio will use. If **Dialling Scheme** is 'MPT 1343', 'ZVEI', 'Number Presets' or 'Nokia ANN', additional fleet information is also set in this screen. If **Dialling Scheme** is 'LMS Dialling' additional fleet information is set in the **LMS - Fleet Identity** screen.

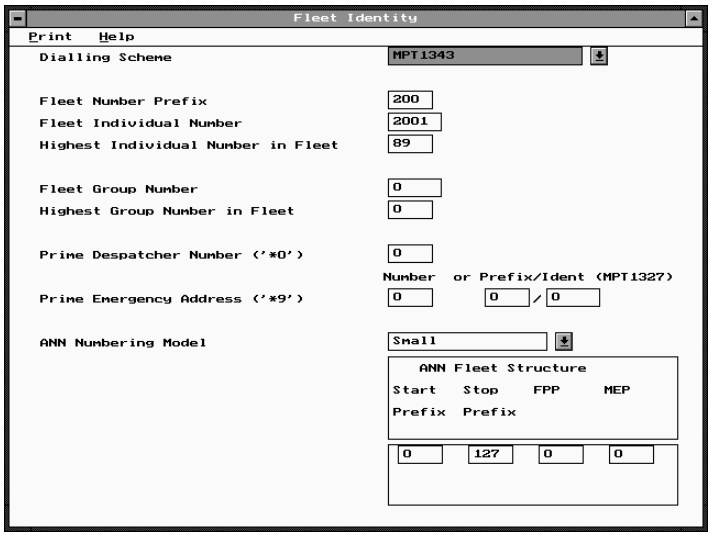
The **Fleet Identity** screen is shown below.

Dialling Scheme

The field **Dialling Scheme** describes the 'dialled digit sequence' categories used by the radio for interfleet and intrafleet calls. It is system dependent and so should be used only with compatible trunking systems. Tait Orca radios currently support five options.

- 'MPT 1343' is suitable for all MPT 1343 networks.
- 'ZVEI is suitable for Regionet 43 networks.
- 'Number Presets' is suitable for all MPT 1343 networks. However, dialling will be limited to the preset calls programmed into the radio (**Preset Calls** screen).
- 'Nokia ANN' is suitable for all Nokia Actionet networks.
- 'LMS Dialling' is designed for Chinese networks that utilise 5-digit in-

Fleet Identity screen



terfleet dialling. It is compatible only with other LMS dialling trunking systems.

Consult your network operator for the appropriate **Dialling Scheme**.

For MPT 1343, Regionet 34, and Nokia ANN networks, radio unit number and group information are set in the **Radio Unit Identity** screen. For LMS networks, radio unit number and group information are set in the **LMS - Radio Unit Identity** screen.

Radio Identity: Fleet

Two components of the full radio identity are set in the **Fleet Identity** screen.

The full radio identity (MPT 1343 format) is made up of:

- prefix (the first three digits);
- fleet number (the next four digits); and
- unit number (the last two or three digits).

The field **Fleet Number Prefix** defines the prefix and must be common to all radios in a fleet. Enter the value assigned by your network operator, which will be from 200 to 327.

The field **Fleet Individual Number** defines the fleet number and must be common to all radios in a fleet. Enter the value assigned by your network operator, which will be from 2001 to 6050.

The radio unit number unique to each radio in a fleet is assigned in the **Radio Unit Identity** screen.

Other Fleet Numbers

The field **Highest Individual Number in Fleet** defines the highest individual number that can be called by any unit within a fleet.

Enter the value assigned by your network operator, which in MPT 1343 networks will be from 20 to 89 or 200 to 899, and in Regionet 43 networks will be from 20 to 79 or 200 to 799.

The field **Fleet Group Number** is used with **Group Memberships** (**Radio Unit Identity** screen) to identify groups of radios in a network. Enter the value assigned by your network operator, which will be from 2001 to 6050. If the user is not allowed group calls, enter 0.

The field **Highest Group Number in Fleet** defines the highest group number that can be called by any unit within a fleet. If the value of **Fleet Group Number** is 0, then this field should also be set to 0. Enter the value assigned by your network operator, which in MPT 1343 will be from 90 to 99 or 900 to 998, and in Regionet 43 will be from 90 to 99 or 900 to 999.

Fleet Call Numbers

Despatcher calls and emergency calls should be common to all radios in a fleet.

The field **Prime Despatcher Number ('*0')** sets the number the unit will default to when a despatcher call (*0) is dialled without specifying a unit number. Enter a valid unit number from within the radio's own fleet. For fleets that have no despatcher, enter 0.

The field **Prime Emergency Address** is the number the unit will default to when

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an emergency call (*9) is dialled without specifying a unit number.

- If the called unit is from within the radio's own fleet, enter the called unit's number in the **Number** field. If so, the **Prefix** and **Ident** fields should be set to 0.
- If the called unit is in another fleet, enter the number in MPT 1327 format in the **Prefix** and **Ident** fields. If so, the **Number** field should be set to 0. **Prefix** should be a value from 0 to 127, and **Ident** should be a value from 1 to 8100.

Consult your network operator if your fleet is not MPT 1327 compliant.

Nokia ANN Numbering

Nokia ANN numbering is an alternative to MPT numbering. ANN stands for Algorithmic Network Numbering. The main difference between the two numbering schemes is how fleets are divided.

The field **ANN Numbering Model** defines the length of string to be used for interfleet numbers when the **Dialling Scheme** (**Fleet Identity** screen) is 'Nokia ANN'.

There are four options.

- If 'Small' is selected then interfleet numbers contain 5 digits. Fleets with prefix 0 are accessible.
- If 'Medium' is selected then interfleet numbers contain 6 digits. Fleets with prefixes from 0 to 9 are accessible.
- If 'Large' is selected then interfleet numbers contain 7 digits. Fleets with prefixes from 0 to 99 are accessible.
- If 'Extended Large' is selected then interfleet numbers contain either 7 or 8 digits. Fleets with prefixes from 0 to 127 are accessible, although in some cases dialling may be abbreviated to 7 digits.

ANN Fleet Structure Array

Fleet structure is defined in the **ANN Fleet Structure** array.

Up to 128 blocks can be defined. Press **F2** to insert a new block, or **F3** to delete the current block. For each block, you must set the **Start Prefix**, **Stop Prefix**, **FPP** and **MEP**.

- **Start Prefix** is the first prefix of the range to which the given values for **FPP** and **MEP** apply. Enter a value from 0 to 127.
- **Stop Prefix** is the last prefix of the range to which the given values for **FPP** and **MEP** apply. Enter a value from 0 to 127 that is greater than or equal to the value of the corresponding **Start Prefix**.
- **FPP** is the Fleet Partitioning Parameter and sets the partition between large and other fleets that are available in the ident range of a prefix. **FPP** gives the number of large fleets in a prefix directly. Set the value assigned by your network operator, which will be from 1 to 10.
- **MEP** is the Miniaturisation Extent Parameter and specifies how the remaining ident range of a prefix is divided between small and mini fleets. Set the value assigned by your network operator, which will be from 1

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to 10 minus the value of **FPP**. For instance, if **FPP** is 4, **MEP** should be between 1 and 6.

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LMS - Fleet Identity Screen

The fields in the **LMS - Fleet Identity** screen provide information about the fleet to which a radio unit belongs when **Dialling Scheme** (in the **Fleet Identity** screen) is 'LMS Dialling'. If **Dialling Scheme** is 'MPT 1343', 'ZVEI', 'Number Presets' or 'Nokia ANN', these properties should be set in the **Fleet Identity** screen.

Until **Dialling Scheme** (**Fleet Identity** screen) is set to 'LMS Dialling', the **LMS - Fleet Identity** screen will not be accessible.

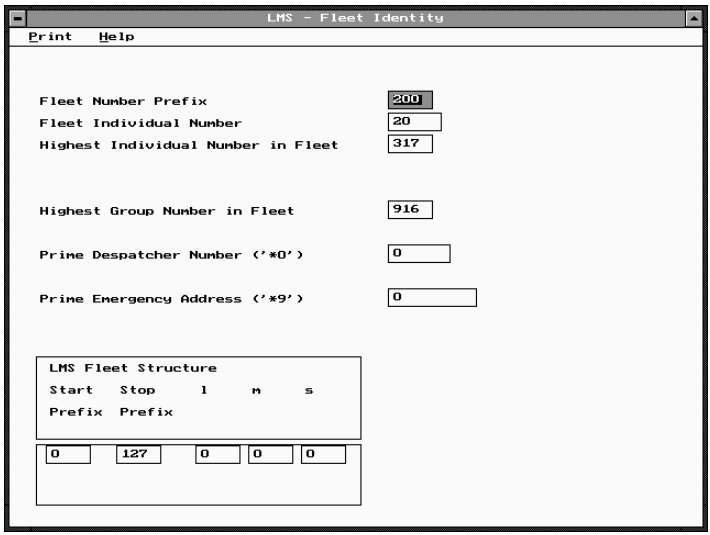
The **LMS - Fleet Identity** screen is shown below.

Radio Identity: Fleet

The field **Fleet Number Prefix** defines the network across which all fleets have been specified. Enter the value assigned by your network operator, which will be from 200 to 327.

The field **Fleet Individual Number** defines the number that defines where in a prefix a particular fleet falls. Enter the value assigned by your network operator, which will be from 20 to 79, although not all numbers in this range will be valid. Whether a fleet number is valid depends on the parameters set in the **LMS Fleet Structure** array.

LMS - Fleet Identity screen



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Other Fleet Numbers

The fields **Highest Individual Number in Fleet** and **Highest Group Number in Fleet** cannot be selected, and their values depend on fleet size, which is set in the **LMS Fleet Structure** array.

The field **Highest Individual Number in Fleet** defines the highest individual number that can be called by any unit within a fleet. **Highest Individual Number in Fleet** will be one of the following values.

- 899 for large fleets
- 553 for medium fleets
- 435 for small fleets
- 317 for tiny fleets.

The field **Highest Group Number in Fleet** defines the highest group number that can be called by any unit within a fleet. **Highest Group Number in Fleet** will be one of the following values.

- 999 for large fleets
- 950 for medium fleets
- 933 for small fleets
- 916 for tiny fleets.

Fleet Call Numbers

Despatcher calls and emergency calls should be common to all radios in a fleet.

The field **Prime Despatcher Number ('*0')** sets the number the unit will default to when a despatcher call (*0) is dialled without specifying a unit number. Enter a valid unit number from within the radio's own fleet. For fleets that have no despatcher, enter 0.

The field **Prime Emergency Address ('*9')** is the number the unit will default to when an emergency call (*9) is dialled without specifying a unit number. Enter a valid unit number from within the radio's own fleet.

LMS Fleet Structure

The **LMS Fleet Structure** array defines the LMS fleet structure that will be used when the field **Dialling Scheme** (**Fleet Identity** screen) is set to 'LMS Dialling'.

LMS systems are divided up into large, medium, small and tiny fleets.

- Large fleets have 699 units and 99 groups.
- Medium fleets have 354 units and 51 groups.
- Small fleets have 236 units and 34 groups.
- Tiny fleets have 118 units and 17 groups.

Up to 128 blocks can be defined. Press **F2** to insert a new block, or **F3** to delete the current block. For each block, five fields must be set.

Start Prefix is the first prefix of the range to which the given values for 'l', 'm' and 's' apply. Enter a value from 0 to 127.

Stop Prefix is the last prefix of the range to which the given values for 'l', 'm' and 's' apply. Enter a value from 0 to 127 that is greater than or equal to the value of the corresponding **Start Prefix**.

How many large, medium, small and tiny fleets there are is determined by the values of the parameters **l**, **m** and **s**.

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- The value of **l** determines how many large fleets there are.
- The value of **m** determines how many medium fleets there are.
- The value of **s** determines how many small fleets there are.

The number of tiny fleets is calculated from the values of **l**, **m** and **s**.

Using these parameters, the network operator can configure a system in which interfleet and interprefix dialling are possible from any radio in any other fleet of any other prefix. Interfleet calls are made by dialling a five-digit number, and interprefix calls are made by dialling an eight-digit number.

Each type of fleet is fixed in size, and so the values of the fields in the **LMS Fleet Structure** array will determine the values of the following fields:

- **Number Range for Individual Calls** (**LMS - Radio Unit Identity** screen);
- **Number Range for Group Calls** (**LMS - Radio Unit Identity** screen);
- **Highest Individual Number in Fleet**; and
- **Highest Group Number in Fleet**.

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Fleet Parameters Screen

The fields in the **Fleet Parameters** screen define how calls are handled. The **Fleet Parameters** screen is shown below.

Full Off-Air Call Setup

Trunking systems can set up calls in two ways. In some systems, it is possible for the system to seek an acknowledgement from the user of a called radio before setting up a call. This is called full off-air call setup.

In other systems, all calls are set up without any acknowledgement from the called user.

The field **Full Off Air Call Set Up** only has an effect with systems where it is possible to seek acknowledgement from the called user before setting up the call. In these systems, when the field **Full Off Air Call Set Up** is set to 'Allowed', acknowledgement will be sought from the called party before a traffic channel will be allocated for the call. If set to 'Disallowed', a traffic channel will be allocated for the call before the called radio has answered.

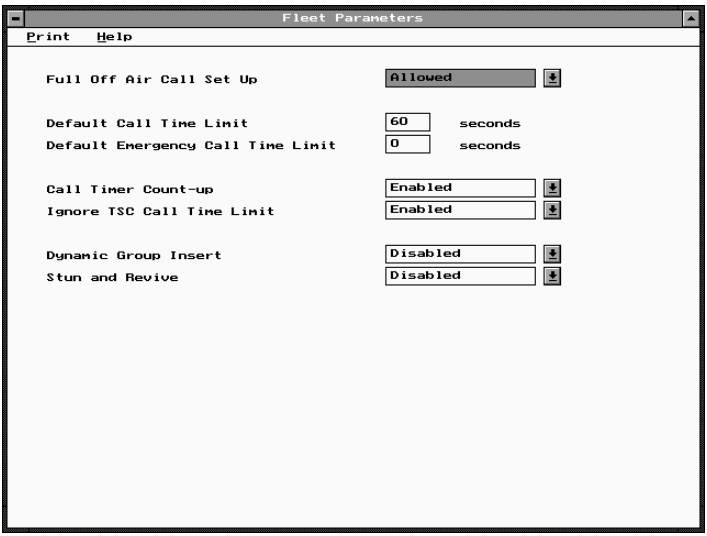
Call Duration

Four fields in the **Fleet Parameters** screen relate to call duration.

Call Duration: Normal Calls

The field **Default Call Time Limit** sets the maximum duration of a call. In MPT

Fleet Parameters screen



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1327, this value can be overwritten by a BCAST message from the system.

Enter a value as follows:

- enter 0 to set no limit on call time;
- enter a value from 10 to 254 seconds in steps of 1 seconds; or
- enter a value from 300 to 780 seconds in steps of 60 seconds.

The system can raise or lower the call time limit if necessary.

Call Duration: Emergency Calls

The field **Default Emergency Call Time Limit** sets the maximum duration of an emergency call. Enter a value as follows:

- enter 0 to set no limit on call time;
- enter a value from 10 to 254 seconds in steps of 1 seconds; or
- enter a value from 300 to 780 seconds in steps of 60 seconds.

In MPT 1327, this limit cannot be overwritten by the system.

Call Duration Display

The field **Call Timer Count-up** does not apply to Elan handportable radios.

During a call, the radio will display the time remaining for the call (counting down). When **Call Timer Count-Up** is set to 'Enabled', the radio will instead count up, starting from 0.

Network Control of Call Duration

If the field **Ignore TSC Call Time Limit** is set to 'Enabled', call time limits set by the system in BCAST SYSDEF messages will be disregarded. The radio will instead always use the call limit set in the **Default Call Time Limit** field.

Dynamic Group Insert

The **Dynamic Group Insert** feature allows a system to add or delete a group using an AHYI signal on a control channel.

If the system offers this feature, setting **Dynamic Group Insert** to 'Enabled' will allow the first group defined in the **Group Memberships** table (**Radio Unit Identity** screen or **LMS - Radio Unit Identity** screen) to be overwritten with the group specified by a system AHYI.

The overwritten group is lost permanently unless another AHYI is received to restore it.

If **Dynamic Group Insert** is set to 'Disabled', the first group in the **Group Membership** table will not be overwritten when a system AHYI is received.

Stun and Revive

The **Stun and Revive** feature allows a system to stun the radio using an AHYK signal on a control channel. While stunned, the radio cannot make or receive calls, but communication with the trunking system controller is maintained. The radio will be inoperative until a corresponding 'Revive' command is received via an AHYL addressed to the radio over the control channel.

If the system offers this feature, setting **Stun and Revive** to 'Enabled' will allow a system operator to stun the radio.

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PART 6 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**
- **Radio Unit Identity**
- **LMS - Radio Unit Identity**
- **Power Save Features**
- **Acquisition Data**

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.

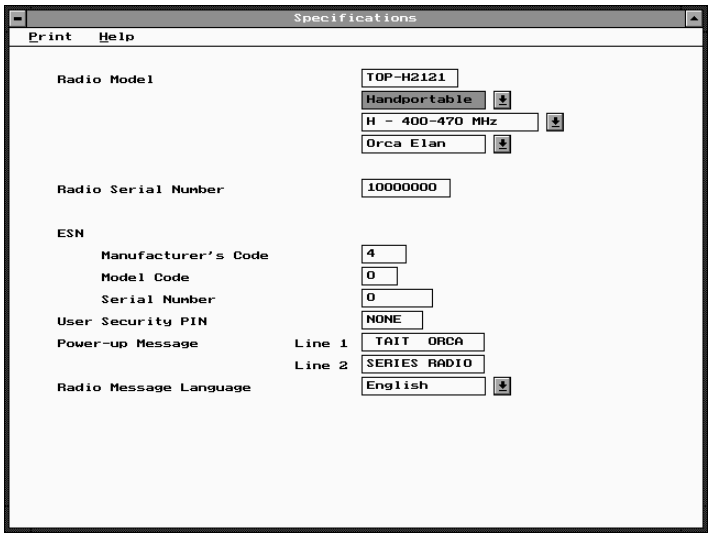
You may wish to modify these fields to read in a radio of a different type and use the previous settings as a template for programming radios of another variant, e.g. a different frequency band.

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 'Handportable' appropriate for the radio you are programming. When this field is set

Specifications screen



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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 and ESN

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.

The **ESN** is the radio's electronic serial number. This number is automatically read from the radio and consists of the **Manufacturer's Code**, **Model Code** and **Serial Number**. You cannot change the values of these fields.

Radio Display Messages

Two fields set how the radio displays messages:

- **Power-up Message**; and
- **Radio Message Language**.

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

The **Power-up Message** fields set the message that is displayed when the radio

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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'.

Radio Unit Identity Screen

The fields in the **Radio Unit Identity** screen define the radio's identity on a particular network when the field **Dialling Scheme** (in the **Fleet Identity** screen) is set to 'MPT 1343', 'ZVEI', 'Number Presets' or 'Nokia ANN'. If **Dialling Scheme** is 'LMS Dialling', the radio's identity information is set in the **LMS - Radio Unit Identity** screen.

The **Radio Unit Identity** screen is shown below.

Radio Identity: MPT 1343

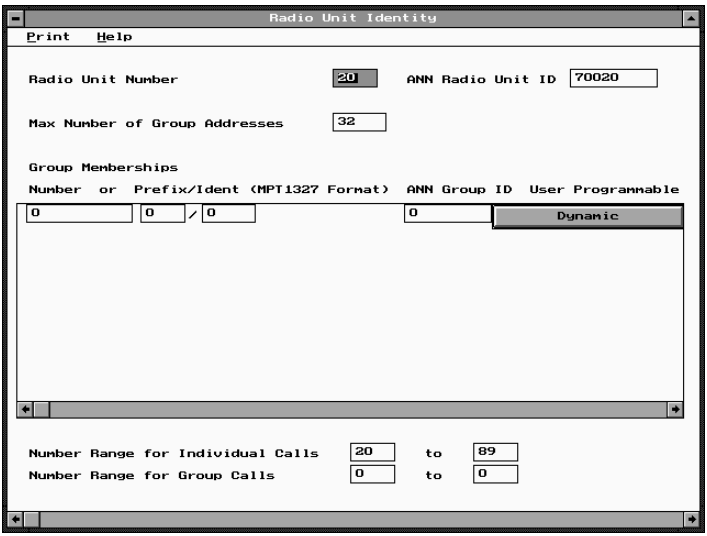
The full radio identity (MPT 1343 format) is made up of:

- prefix (the first three digits);
- fleet number (the next four digits); and
- unit number (the last two or three digits).

The field **Radio Unit Number** defines the unit number that uniquely identifies each radio within its fleet when 'MPT 1343', 'ZVEI' or 'Number Presets' are set for the **Dialling Scheme** field in the **Fleet Identity** screen. The **Radio Unit Number** should already be assigned by the network operator as part of setting up the system. Enter the number assigned by your network operator.

If **Dialling Scheme** is 'Nokia ANN', the radio's identity should be defined in the **ANN Radio Unit ID** field.

Radio Unit Identity screen



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If **Dialling Scheme** is 'LMS Dialling', the radio's identity should be defined in the **Radio Unit Number** field of the **LMS - Radio Unit Identity** screen.

The number entered in the **Radio Unit Number** field is dependent on the **Highest Individual Number in Fleet** field in the **Fleet Identity** screen.

If **Highest Individual Number in Fleet** has two digits, enter a value from 20 to the **Highest Individual Number in Fleet**.

If **Highest Individual Number in Fleet** has three digits, enter a value from 200 to the **Highest Individual Number in Fleet**.

The other components of the full radio identity are set in the **Fleet Identity** screen.

Radio Identity: Nokia ANN

The field **ANN Radio Unit ID** defines the unit number that uniquely identifies each radio within its fleet when **Dialling Scheme** (**Fleet Identity** screen) is 'Nokia ANN'. The **ANN Radio Unit ID** should already be assigned by the network operator as part of setting up the system. Enter the number assigned by your network operator.

Group Addresses

The field **Max Number of Group Addresses** shows the maximum number of group addresses available and that can be programmed in the **Group Memberships** array. Set a value from 1 to 32.

Group Memberships

The **Group Memberships** array defines what groups the radio belongs to. A radio can belong to up to 32 groups, depending on the number indicated in the **Max Number of Group Addresses** field. Press **F2** to add a new group address, or **F3** to delete the current group address.

How group addresses are entered depends on the setting of the **Dialling Scheme** field in the **Fleet Identity** screen.

If the **Dialling Scheme** is 'MPT1343', 'ZVEI' or 'Number Presets', group addresses can be entered in MPT 1343 format (in the **Number** field) or in MPT 1327 format (in the **Prefix** and **Ident** fields). Whichever format you choose, the other fields must remain set to zero. If the **Dialling Scheme** is 'Nokia ANN', group addresses must be entered in the **ANN Group ID** field.

MPT 1343 Format

The number entered in **Number** is dependent on the **Highest Group Number in Fleet** field in the **Fleet Identity** screen.

If **Highest Group Number in Fleet** has two digits, enter a value from 90 to the **Highest Group Number in Fleet**.

If **Highest Group Number in Fleet** has three digits, enter a value from 900 to the **Highest Group Number in Fleet**.

If the radio will not belong to any groups or if the group address will be specified in MPT 1327 format, enter 0 for **Number**.

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MPT 1327 Format

For **Prefix**, enter a number from 0 to 127. For **Ident**, enter a number from 1 to 8100. If the radio will not belong to any groups or if the group address is specified in MPT 1343 format, enter 0 in both **Prefix** and **Ident**.

ANN Group ID

For **ANN Group ID**, enter a valid ANN group identity.

User Programmable

The field **User Programmable** sets the method by which the radio subscribes to different groups. When a radio is subscribed to a group, it will respond to all calls made within that group.

The first group in the array will always be set to 'Dynamic'. This position is left free to allow a network operator to subscribe the radio to a group over the air using the **Dynamic Group Insert** feature, which is enabled in the **Fleet Parameters** screen. Any group number programmed for this first group will be overwritten should the network operator subscribe the radio to a group using the **Dynamic Group Insert** feature, and so it is recommended that the value of the other fields in the first row should be left at 0.

The other four options for **User Programmable** are 'Permanent', 'Selectable', 'Scan' and 'Scan + Selectable'.

- When set for 'Permanent', the radio will always respond to calls intended for the group.
- When set for 'Selectable', 'Scan' or 'Scan + Selectable', the user must select the group before the radio will respond to calls for that group. How the group is selected depends on the setting of **User Programmable**.

To select a group set as 'Selectable', the user switches to a position on the 16-way selector that designates that group. The group's number should be programmed for one of the preset calls in the **Preset Calls** screen and given a **Preset ID** from 1 to 16. The radio will respond to calls for that group as long as the 16-way selector is on the designated position.

To select a group set as 'Scan', the user switches to a position on the 16-way selector that designates group scanning. The string *** should be programmed for one of the preset calls numbered 1 to 16, as for 'Selectable' groups. When the corresponding position on the 16-way selector is selected, the radio will respond to calls from all groups designated 'Scan'. The radio will respond to those groups as long as the 16-way selector is on the designated position.

To select a group designated 'Scan + Selectable', the user either switches to the position designated for the group or to the position designated for group scanning.

Number Ranges for Calls

The last set of fields in the **Radio Unit Identity** screen define the range of numbers the radio can make individual and groups calls to.

For **Number Range for Individual Calls**, the range entered is dependent on the **Highest Individual Number in Fleet** field in the **Fleet Identity** screen.

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If **Highest Individual Number in Fleet** has two digits, the **Number Range for Individual Calls** can be anywhere from 20 to the **Highest Individual Number in Fleet**.

If **Highest Individual Number in Fleet** has three digits, the **Number Range for Individual Calls** can be anywhere from 200 to the **Highest Individual Number in Fleet**.

If you wish to prevent the radio from making individual calls to other radios in its fleet, enter 0 in both fields.

For **Number Range for Group Calls**, the range entered is dependent on the **Highest Group Number in Fleet** field in the **Fleet Identity** screen.

- If **Highest Group Number in Fleet** has two digits, the **Number Range for Group Calls** can be anywhere from 90 to the **Highest Group Number in Fleet**.
- If **Highest Group Number in Fleet** has three digits, the **Number Range for Group Calls** can be anywhere from 900 to the **Highest Group Number in Fleet**.

If you wish to prevent the radio from making group calls to other radios in its fleet, enter 0 in both fields.

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LMS - Radio Unit Identity Screen

The fields in the **LMS - Radio Unit Identity** screen define the radio's identity on a particular network when the field **Dialling Scheme** (in the **Fleet Identity** screen) is set to 'LMS Dialling'. If **Dialling Scheme** is set to 'MPT 1343', 'ZVEI', 'Number Presets' or 'Nokia ANN', the radio's identity information is set in the **Radio Unit Identity** screen.

The **LMS - Radio Unit Identity** screen is shown below.

Radio Identity: LMS Dialling

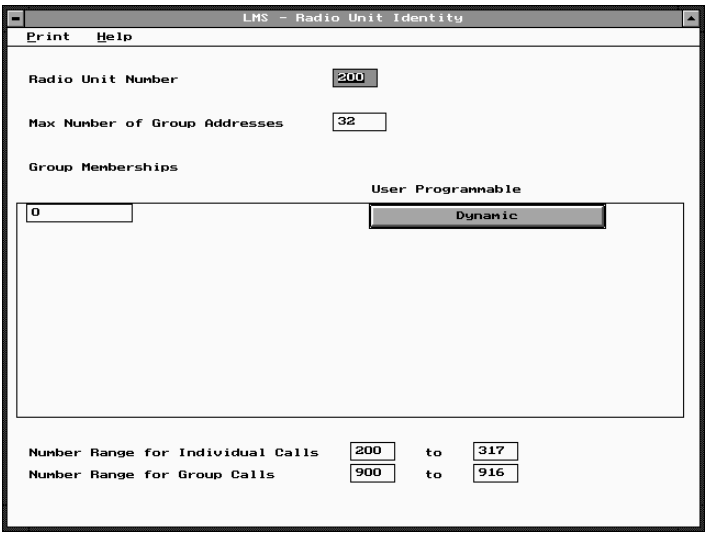
The field **Radio Unit Number** defines the unit number that uniquely identifies each radio within its fleet when 'LMS Dialling' is set for the **Dialling Scheme** field in the **Fleet Identity** screen. The **Radio Unit Number** should already be assigned by the network operator as part of setting up the system. Enter the value assigned by your network operator, which will be in the range specified by the **Number Range for Individual Calls** fields.

Group Addresses

The field **Max Number of Group Addresses** shows the maximum number of group addresses available and that can be programmed in the **Group Memberships** array.

Set a value from 1 to 32.

LMS - Radio Unit Identity screen



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Group Memberships

The **Group Memberships** array defines what groups the radio belongs to. A radio can belong to up to 32 groups, depending on the number indicated in the **Max Number of Group Addresses** field. Press **F2** to add a new group address, or **F3** to delete the current group address.

For each group, enter the group number. If the group is in a different fleet, enter the full interfleet dialling number.

Valid group numbers are in the range specified by the **Number Range for Group Calls** fields.

User Programmable

The field **User Programmable** sets the method by which the radio subscribes to different groups. When a radio is subscribed to a group, it will respond to all calls made within that group.

The first group in the array will always be set to 'Dynamic'. This position is left free to allow a network operator to subscribe the radio to a group over the air using the **Dynamic Group Insert** feature, which is enabled in the **Fleet Parameters** screen. Any group number programmed for this first group will be overwritten should the network operator subscribe the radio to a group using the **Dynamic Group Insert** feature, and so it is recommended that the value of the other fields in the first row should be left at 0.

The other four options for **User Programmable** are 'Permanent', 'Selectable', 'Scan' and 'Scan + Selectable'.

- When set for 'Permanent', the radio will always respond to calls intended for the group.
- When set for 'Selectable', 'Scan' or 'Scan + Selectable', the user must select the group before the radio will respond to calls for that group. How the group is selected depends on the setting of **User Programmable**.

To select a group set as 'Selectable', the user switches to a position on the 16-way selector that designates that group. The group's number should be programmed for one of the preset calls in the **Preset Calls** screen and given a **Preset ID** from 1 to 16. The radio will respond to calls for that group as long as the 16-way selector is on the designated position.

To select a group set as 'Scan', the user switches to a position on the 16-way selector that designates group scanning. The string *** should be programmed for one of the preset calls numbered 1 to 16, as for 'Selectable' groups. When the corresponding position on the 16-way selector is selected, the radio will respond to calls from all groups designated 'Scan'. The radio will respond to those groups as long as the 16-way selector is on the designated position.

To select a group designated 'Scan + Selectable', the user either switches to the position designated for the group or to the position designated for group scanning.

Number Ranges for Calls

The fields **Number Range for Individual Calls** and **Number Range for Group Calls** cannot be selected, and their values

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depend on fleet size, which is set in the **LMS - Fleet Identity** screen.

The possible ranges for **Number Range for Individual Calls** are as follows.

- 200 to 899 for large fleets
- 200 to 553 for medium fleets
- 200 to 435 for small fleets
- 200 to 317 for tiny fleets.

The possible ranges for **Number Range for Group Calls** are as follows.

- 900 to 999 for large fleets
- 900 to 950 for mediumffleets
- 900 to 933 for small fleets
- 900 to 916 for tiny fleets.

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Power Save Features Screen

Economy mode reduces the radio's power consumption when it is idle. 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.

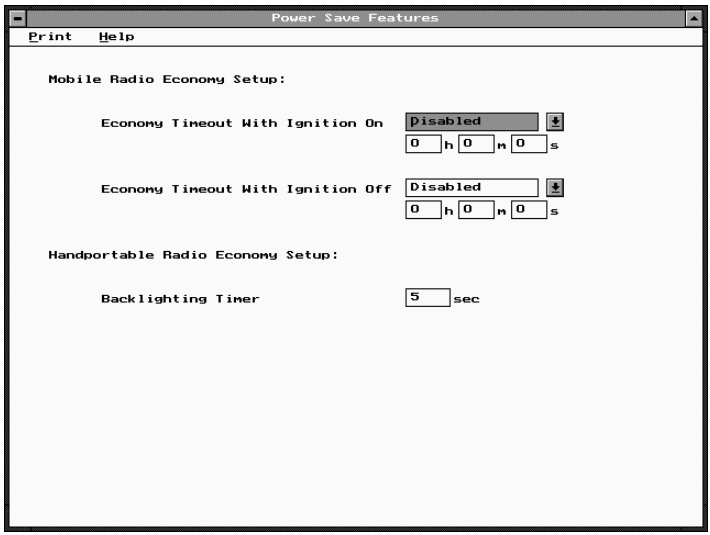
Mobile Radios

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.

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 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.

Power Save Features screen



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Handportable Radios

The setting of one field in the **Power Save Features** screen affects the power consumption in handportable radios.

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

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.

Handportable radios can also make use of dynamic power control, which reduces transmit power in high signal strength areas. Dynamic power control can be enabled in the **User Selectable Parameters** screen, and can also be assigned to a function key setting (**Key Settings** screen).

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Acquisition Data Screen

The arrays in the **Acquisition Data** screen define data that is used when the radio is attempting to acquire a control channel. The **Acquisition Data** screen is shown below.

Acquisition Authorisation

The fields in the **Acquisition Authorisation** array specify how the radio identifies a control channel on which it can operate.

Up to eight definitions are permitted. Press **F2** to insert a new definition, or **F3** to delete the current definition.

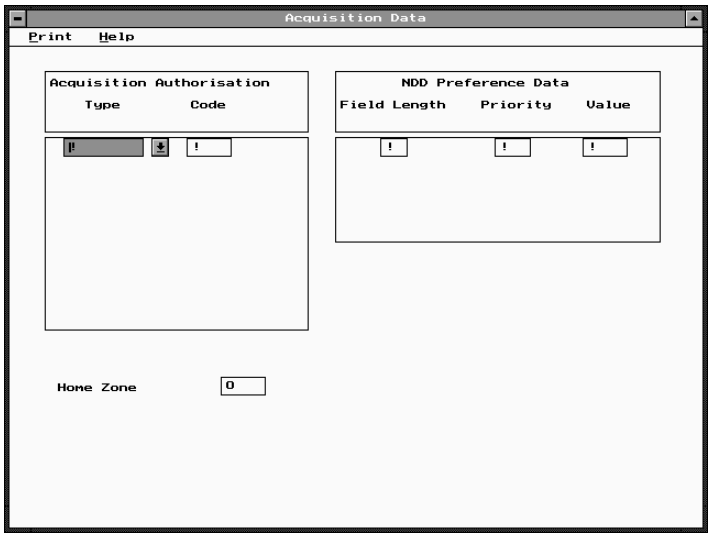
For each definition, you must specify a **Type** and **Code**.

The field **Type** specifies the areas of the trunking network in which the radio may operate. Enter the value assigned by your network operator, which will be 'Full', 'Area' or 'Zone'.

The field **Code** sets the specific code for acquisition authorisation. On some networks, this field is left blank. Possible entries are constrained by the values of the fields **Area Field Length (LA)** and **Zone Field Length (LZ)** (see the **Network Identity** screen).

If the field **Network Type** (**Network Identity** screen) is set to 'National', enter a value from 0 to 511. If **Network Type** is

Acquisition Data screen



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set to 'Regional', set a value from 0 to 15 for **Code**.

Network Dependent Data (NDD)

NDD preference data is used to encourage the radio to acquire certain control channels during a preferential hunt.

Up to four definitions are permitted in the **NDD Preference Data** array. Press **F2** to insert a new definition, or **F3** to delete the current definition.

For each definition, you must specify **Field Length**, **Priority** and **Value**.

The field **Field Length** specifies how many bits of the SYS code are used to determine the identity of the site to be allocated a priority. The maximum number is dependent on **Network Type** (**Network Identity** screen).

If the field **Network Type** is set to 'National', enter a value from 1 to 9 for **Field Length**. If **Network Type** is set to 'Regional', enter a value from 1 to 4 for **Field Length**.

The field **Priority** specifies the priority of the entry, from 1 (high) to 10.

The field **Value** specifies the decimal value of the binary bits derived from the SYS code to determine the site to be given priority. **Value** must be storable in the number of bits specified by **Field Length**.

Home Zone

The field **Home Zone** specifies the network zone in which the radio is normally working. The radio also uses **Home Zone** to determine whether re-registration is required on a network when registration records for the network have only been maintained on a temporary basis.

The maximum value of **Home Zone** depends on the value of the field **Zone Field Length (LZ)** (**Network Identity** screen).

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PART 7

Special Features

This part contains detailed information on setting up special features such as DTMF, conventional channels and 5 digit interfleet dialling. The **Edit** menu screens discussed in this part are:

- **DTMF Parameters**
- **Conventional Channels**
- **5 Digit Interfleet Call Lookup Table**

DTMF Parameters 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 Parameters** screen (shown below).

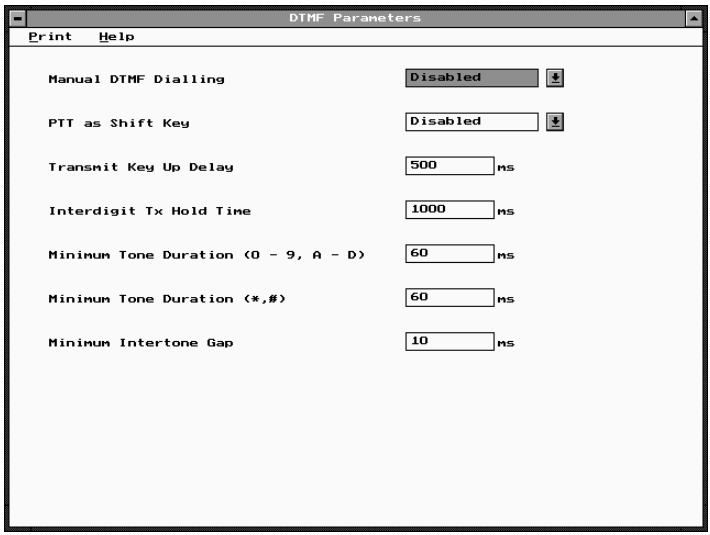
The fields in the **DTMF Parameters** screen do not apply to Elan handportable radios or to Elan and Excel mobile radios.

When the field **Manual DTMF Dialling** is set to 'Enabled', DTMF calls can be made from the numeric keypad. 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'.

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 2550 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.

DTMF Parameters screen



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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.

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Conventional Channels Screen

A trunked radio can switch between trunked and conventional modes. Up to 10 conventional channels can be defined. These channels are set up in the **Conventional Channels** screen (shown below).

Conventional Channel Settings

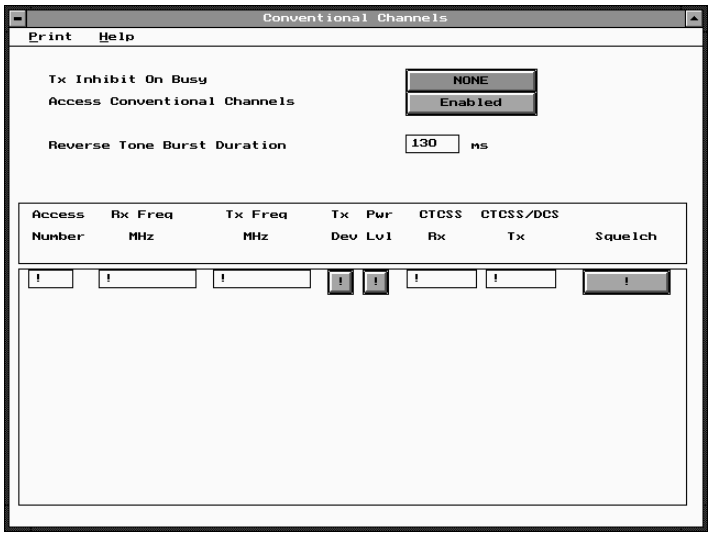
The setting of the field **Tx Inhibit on Busy** limits the conditions under which the radio will transmit when in conventional mode.

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

When the field **Access Conventional Channels** is set to 'Enabled', the radio can operate in conventional mode. You cannot change this setting.

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.

Conventional Channels screen



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.

Conventional Channels Array

The conventional channels the radio can access are defined in the **Conventional Channels** array. Up to 10 conventional channels can be defined. Press **F2** to insert a new conventional channel, or **F3** to delete the current conventional channel.

The field **Access Number** defines the string that must be entered to change to the conventional channel. Enter a value from 101 to 110, or from 101 to 109 for the ZVEI dialling scheme.

On Elan handportable radios, the user cannot dial strings, and so the **Access Number** should be entered as one of the calls defined in the **Preset Calls** screen. When the user changes to that preset call's position on the 16-way selector, the conventional channel will automatically be selected.

Receive and Transmit Frequencies

The fields **Rx Freq MHz** and **Tx Freq MHz** set the conventional channel's 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 cor-

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rect frequency for receive and transmit frequencies.

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.

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.

Subaudible Signalling

Tait Orca trunked radios can be configured to use subaudible signalling on conventional channels. Note that although trunked radios can transmit DCS subaudible signals, they cannot decode DCS.

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

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

For **CTCSS Rx**, enter a valid CTCSS frequency (e.g. 156.7) from "Appendix A: Valid DCS and CTCSS Frequencies" on page 105. Leave the **CTCSS Rx** field blank if no subaudible signalling will be used.

For **CTCSS/DCS Tx**, enter either a valid CTCSS frequency (e.g. 156.7) or a valid DCS code (e.g. 043). Leave **CTCSS/DCS Tx** blank to indicate that no subaudible signalling will be used.

Squelch

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

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- 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.

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5 Digit Interfleet Call Lookup Table Screen

The **5 Digit Interfleet Call Lookup Table** is used to define 5-digit access strings that can be used to make interfleet calls. The **5 Digit Interfleet Call Lookup Table** screen is shown below. This screen only applies to fleets that use MPT numbering. If the network is not MPT 1343 compliant, consult the network operator.

Up to 20 lookup entries can be set. Press **F2** to add a new lookup entry, or **F3** to delete the current lookup entry.

At least one of the fields **Interfleet Calls** or **Interfleet Group Calls** in the **Call Options** screen must be set to 'Enabled' before any lookup entries can be made.

For each lookup entry, five fields must be set.

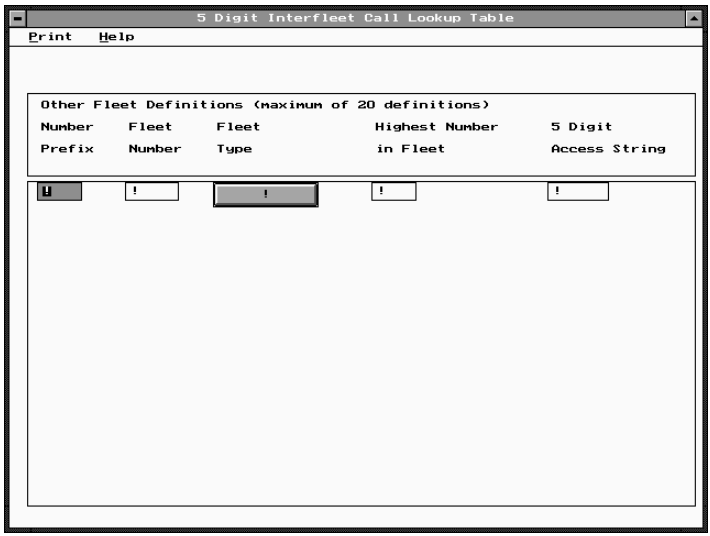
The field **Number Prefix** sets the lookup table number prefix.

In MPT 1343, the number prefix must be from 200 to 327. If you do not know the number prefix of the fleet to be called, consult the network operator.

The field **Fleet Number** sets the number of the fleet that will be called.

In MPT 1343, the fleet number must be from 2001 to 6050. If you do not know the fleet number of the fleet to be called, consult the network operator.

5 Digit Interfleet Call Lookup Table screen



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The field **Fleet Type** sets the type of the fleet that will be called and specifies whether the call is an 'Individual' or 'Group' call. The types are the same for interfleet calls as they are for normal in-fleet calls.

The field **Highest Number in Fleet** sets the highest number in the fleet that will be called.

In MPT 1343, if this lookup entry is being defined for individual calls then the number range is 20 to 89 or 200 to 899. If the lookup entry is being defined for group calls then the number range is 90 to 99, or 900 to 998. If you are not sure of the correct highest number for the fleet to be called, consult the network operator.

The field **Access String** defines the five digit, short form number the user will dial.

The first two digits of the **Access String** must be unique and start with either a 2 or a 9. MPT 1343 recommends you use 2 as the first character of the **Access String** for individual calls and 9 as the first character of the **Access String** for group calls. This convention is not mandatory.

Accept the default number selected by the software, or enter your own **Access String**.

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PART 8 Radio Interface Options

This part contains detailed information on setting radio interface options, such as what preset calls can be made from the radio, what types of calls are allowed for the radio, function key settings and user menu options. The **Edit** menu screens discussed in this part are:

- **Preset Calls**
- **Call Options**
- **Key Settings**
- **User Selectable Parameters**

Preset Calls Screen

For Elan and Excel radios and Eclipse radios with **Dialling Scheme** set to a value other than 'Number Presets', up to 20 preset calls can be defined, plus two function key preset calls. For Eclipse radios with **Dialling Scheme** set to 'Number Presets', up to 100 preset calls can be defined, plus two function key preset calls. These calls are set up in the **Preset Calls** screen.

The **Preset Calls** screen is shown below.

Preset Calls List

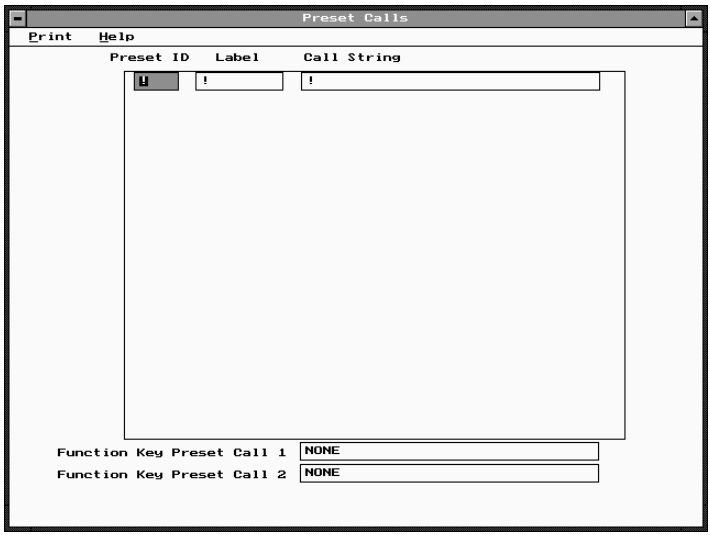
The preset calls list defines the preset calls the radio can make. Press **F2** to insert a new preset call, or **F3** to delete the current preset call.

For each preset call, you must define the **Preset ID**, **Label** and **Call String**.

The field **Preset ID** sets the number of the preset call. For Elan and Excel radios and Eclipse radios with **Dialling Scheme** set to a value other than 'Number Presets', the number must be between 0 and 19. For Eclipse radios with **Dialling Scheme** set to 'Number Presets', the number must be between 0 and 99. Entries need not be numbered sequentially.

On Elan and Excel handportable radios, preset calls numbered 1 to 16 will be assigned to the corresponding position on the 16-way selector.

Preset Calls screen



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The field **Label** does not apply to Elan handportable radios. **Label** sets an alphanumeric label for the preset call. Each label must be unique. Enter a name of up to 8 characters from:

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

The field **Call String** sets the string that is dialled when the preset call is selected. Enter any valid dialling sequence using the characters: 0-9 * #

What strings are valid depends on how the trunking system is configured. Consult your network operator, and see "Selecting Groups" below and "Switching to Conventional Channels" on page 93.

If conventional channels are available on the radio, you can also enter the **Access Number** (**Conventional Channels** screen) for a particular conventional channel as the **Call String**. If a conventional channel is assigned to one of the 16-way selector positions on Elan and Excel handportable radios, the conventional channel will automatically be selected when the user changes to that position.

Call String cannot be left blank, nor can it be set to another preset call **Preset ID**.

Function Key Preset Calls

Each radio can have two function key preset calls that can then be assigned to a function key setting.

For **Function Key Preset Call 1** and **Function Key Preset Call 2**, enter any valid dialling sequence using the characters: 0-9 * #

What strings are valid depends on how the trunking system is configured. Consult your network operator, and see "Selecting Groups" below.

You can also enter a valid **Preset ID** from the **Preset Calls** array, in which case the corresponding **Call String** will be used when the function key preset call is made.

In order to make use of these two preset calls, they must be assigned to one of the function key settings in the **Key Settings** screen.

Selecting Groups

On Elan and Excel handportable radios, groups set for 'Selectable', 'Scan' or 'Scan + Selectable' (**Group Memberships** table in the **Radio Unit Identity** screen or the **LMS - Radio Unit Identity** screen) can be assigned to positions on the 16-way selector by setting them up as preset calls numbered 1 to 16.

For groups designated 'Selectable' or 'Scan + Selectable', the group's number can be entered for **Call String**. When the user switches to the corresponding position on the 16-way selector, the radio will be subscribed to the group. The radio will be unsubscribed when the user switches to another position.

The sequence *** can be entered for **Call String**. When the user switches to the corresponding position on the 16-way selector, the radio will be subscribed to all groups designated 'Scan' or 'Scan + Selectable'. The radio will automatically be unsubscribed from those groups when the user switches to another position.

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Switching to Conventional Channels

On Elan and Excel handportable radios, conventional channels can be assigned to positions on the 16-way selector by setting them up as preset calls numbered 1 to 16.

If conventional channels are available on the radio, the **Access Number** (**Conventional Channels** screen) for a particular conventional channel can be entered for **Call String**. When the user switches to the corresponding position on the 16-way selector, the conventional channel will automatically be selected.

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Call Options Screen

The fields in the **Call Options** screen determine what call types a radio unit is permitted to make and how they are made. The **Call Options** screen is shown below.

Call Types

A trunking system can be set up to make many different types of calls. These include:

- PABX calls;
- PSTN calls;
- interfleet calls;
- interfleet group calls;
- ALLI calls;
- network operator service calls;
- direct despatcher calls; and
- status calls.

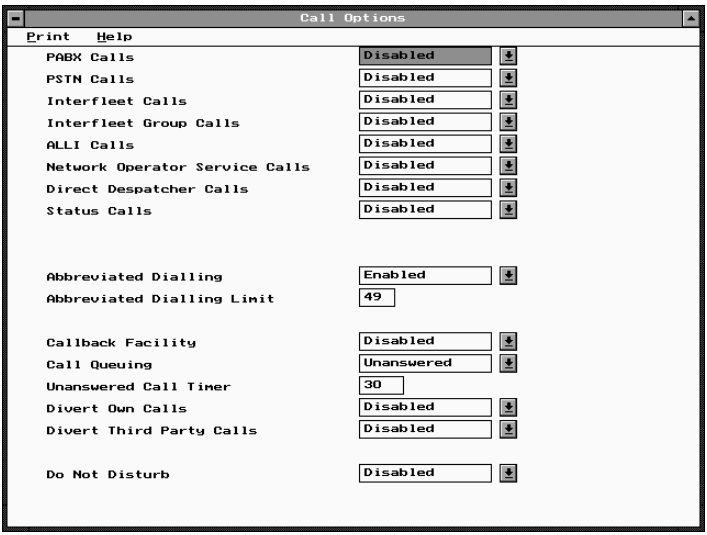
These call types are enabled or disabled in the **Call Options** screen.

Note that even though a particular call type is enabled, the network itself can restrict the types of calls a radio unit can make.

PABX Calls

A trunking system can be set up to make calls to a private automatic branch exchange (PABX).

Call Options screen



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If your system supports this feature and you wish the radio to be capable of making PABX calls, set **PABX Calls** to 'Enabled'.

PSTN Calls

A trunking system can be set up to make calls to the public switched telephone network (PSTN).

If your system supports this feature and you wish the radio to be capable of making PSTN calls, set **PSTN Calls** to 'Enabled'.

Interfleet Calls

When the field **Interfleet Calls** is set to 'Enabled', the radio can make calls to individual radios in other fleets.

Unless there is a specific reason to allow this type of call, set this field to 'Disabled'.

Interfleet Group Calls

When the field **Interfleet Group Calls** is set to 'Enabled', the radio can make calls to groups of radios in other fleets.

Unless there is a specific reason to allow this type of call, set this field to 'Disabled'.

ALLI Calls

When the field **ALLI Calls** is set to 'Enabled', the radio can make calls to all idents (ALLI).

High level password access is required to change the value of this field. This facility is normally used only by network technicians and so this field should be set to 'Disabled' for most radios in a fleet. Do not set this field to 'Enabled' unless authorised to do so by the network operator.

Network Operator Service Calls

When the field **Network Operator Service Calls** is set to 'Enabled', the radio can make a service call to the network operator.

This facility may be set up to aid in the reporting of, for example, faults.

High level password access is required to change the value of this field.

Direct Despatcher Calls

When the field **Direct Despatcher Calls** is set to 'Disabled', the radio cannot make normal speech calls to the despatcher.

The despatcher's number is defined in the **Prime Despatcher Number** field (**Fleet Identity** screen). Users can still enter and leave the despatcher's queue (if available) using the dial strings *0# and #0#.

Status Calls

When the field **Status Calls** is set to 'Enabled', the user can send status calls.

When this field is set to 'Disabled', the user will be able to dial status strings, but the status message will not be sent.

Abbreviated Dialling for PSTN Calls

The trunking system can be configured so that radios on the system can make a call to the PSTN without dialling the full number.

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Set **Abbreviated Dialling** to 'Enabled' to allow the radio to make use of this feature.

If **Abbreviated Dialling** is set to 'Enabled', you should also set the **Abbreviated Dialling Limit**, which sets the number of different abbreviated dialled calls a radio can make.

Tait Orca radios can support up to 50 abbreviated dialling calls, although the number the trunking system supports may be lower. Consult your network operator to determine how many abbreviated dialling calls are available.

Missed Calls

The remaining fields in the **Call Options** screen set properties for calls that are not answered.

The field **Callback Facility** applies only to Excel and Eclipse radios. When **Callback Facility** is set to 'Enabled', the number of the caller will be displayed when a call is received. If the user does not wish to accept the call at that time, a press of the clear key will clear down the call and store the number in the call queue so the user can call back later. If **Call Queuing** is set to 'Disabled', that number is the only number that will be queued, and will be overwritten by future calls.

The field **Call Queuing** sets a queue to hold unanswered calls, automatically queued calls and status calls. Full call queuing is available on Excel and Eclipse radios, and Elan radios can have unanswered calls queued.

When **Call Queuing** is set to 'Full', all calls will be queued; this setting is not available for Elan radios. When set to 'Unanswered', only unanswered calls and status calls will be queued, except on Elan radios, where only unanswered calls will be queued. When set to 'Disabled', only a single unanswered call will be queued.

The field **Unanswered Call Timer** sets how long an unanswered call alert will persist. Set a value from 0 to 255 seconds in steps of 1 second. If **Unanswered Call Timer** is set to 0, the radio will ring until the call is answered or is cleared down.

When the field **Divert Own Calls** is set to 'Enabled', the user can set the radio to divert incoming calls to another destination.

When the field **Divert Third Party Calls** is set to 'Enabled', the user can divert another radio's incoming calls to another destination.

When the field **Do Not Disturb** is set to 'Enabled', the user can set the radio to ignore incoming calls while still allowing outgoing calls to be made as usual.

When **Do Not Disturb** is set to 'Disabled', the radio will always receive calls as long as it is switched on and in range of the network. These calls may be accepted or queued.

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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.

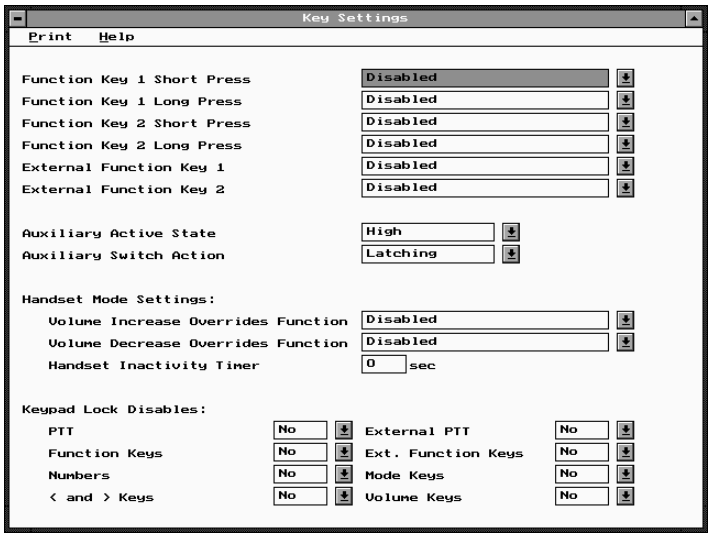
Function Key Settings

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.

If a particular feature is applicable only in trunked mode or only in conventional mode, the function key press will have no effect while in the other operating mode.

- '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.

Key Settings screen



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- 'Dynamic Power Control': Dynamic power control optimises the radio's power use by reducing the transmit power in high signal strength areas. Pressing the function key toggles dynamic power control on and off.

- 'Preset Call No. 1' and 'Preset Call No. 2': Pressing the function key sends the assigned **Function Key Preset Call** (as defined in the **Preset Calls** screen).
  On Elan handportable radios, if the radio is in conventional mode when a trunking preset call is selected, the call will proceed. Once the call is complete and has been cleared down, the radio will return to conventional mode if a conventional channel is selected on the 16-way selector.

- 'Site Select': This feature is not available for Elan handportable radios. Pressing the function key allows the user to dial a control channel the radio must then attempt to register on regardless of its suitability for acquisition. Pressing the function key again deactivates site select and so the radio will resume hunting in the normal manner.
  The field **Site Select** (**Hunting Parameters** screen) must be set to 'Enabled' before this feature can be assigned to a function key setting.

- 'Clear': Pressing the function key cancels the current operation. For example, if a call setup is in progress, it will be cancelled.
  When programmed for 'Clear', the function keypress will have no effect while the radio is in conventional mode.

- 'Do Not Disturb': This function only operates in trunking mode.
  When do not disturb is on, incoming calls will be ignored while outgoing calls can be made as usual. Pressing the function key toggles the do not disturb function on and off.
  Do not disturb is enabled in the **Call Options** screen.

- 'Backlighting': This option can only be set for Excel and Eclipse handportable radios.
  When the function key is pressed, backlighting will be activated. Backlighting 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.

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- '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.
- 'Monitor': This function only operates in conventional mode. Pressing the function key toggles the monitor facility on and off.

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

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- 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.

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User Selectable Parameters Screen

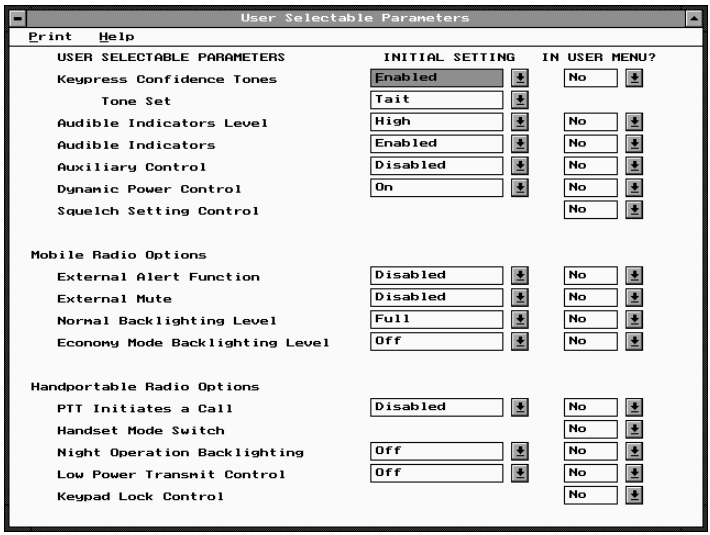
In the **User Selectable Parameters** screen, the initial settings for various parameters are made and the options that appear in the user function menu of Eclipse handportable and mobile radios are set. The **User Selectable Parameters** screen is shown below.

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

User Selectable Parameters screen



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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**
- **Tone Set**
- **Audible Indicators Level**
- **Audible Indicators**
- **Auxiliary Control**
- **Dynamic Power Control**
- **Squelch Setting Control**.

Audible Indicators

Four 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.

For the field **Keypress Confidence Tones**, select 'Enabled' for tones, 'Disabled' for no tones. The tone set used is specified in the **Tone Set** field. Two tone sets are available for Tait Orca radios. Select 'Tait' for the Tait tone set or 'MPT 1343' for the MPT tone set.

Keypress confidence tones will automatically be disabled if the initial setting of the **Audible Indicators** field is 'Disabled'.

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

The setting of the 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.

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.

Dynamic Power Control

Dynamic power control optimises the radio's power use by reducing the transmit power in high signal strength areas. Set the **Initial Setting** of the **Dynamic Power Control** field to 'On' to enable dynamic power control.

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.

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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:

- **PTT Initiates a Call**
- **Handset Mode Switch**
- **Night Operation Backlighting**
- **Low Power Transmit Control**
- **Keypad Lock Control**.

PTT Initiates a Call

The **Initial Setting** of **PTT Initiates a Call** determines whether a brief press of the PTT initiates a call request. For Elan handportable radios, this field should be set to 'Enabled'.

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

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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.

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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 3: 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		

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Table 4: 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 5: 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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