**TAIT**

**órca**™

# Tait Orca Trunked Programming Application
## User's Manual

**August 2002**
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# Part 1: Using the Trunked Programming Application

This part describes the basic operation of the Trunked Programming Application.

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# Getting Started

This application provides an easy way of changing settings and features of Tait Orca portable radios using a standard IBM-compatible PC.

This manual is intended as an installation guide and reference for the Trunked Programming Application. It provides the following information:

■ installation instructions and hardware setup

■ an overview of the Trunked Programming Application

■ reference guide to all parameters and settings

## Minimum System Requirements

The application requires the following minimum configuration:

■ an IBM compatible PC with an 80486 microprocessor (or better)

■ Windows® 95, Windows 98, Windows 2000 or Windows NT® 4

■ 16 MB of RAM

■ a VGA colour graphics display

■ a hard disk drive with 8 MB of free space (20 MB Recommended)

■ CD-ROM drive

■ a printer (if you intend to keep a hard copy of data)

■ a Microsoft or compatible mouse and driver (if you wish to use the program with a mouse)

## Equipment Supplied

■ application CD-ROM

■ radio programming lead with an RJ-11 telephone-style socket at one end and an accessory connector at the other (TOPA-SV-007)

■ radio programming cable with a 9-pin or 25-pin serial connector at one end and an RJ-11 telephone-style plug at the other

## Application Installation

To install the application:

1. Insert the CD-ROM into your CD drive.

2. If the autorun does not automatically start, double-click on My Computer.

3. Double-click on the CD-ROM drive to view the CD's contents.

4. Double-click on the file setup.exe.

The installation program will guide you through the installation process. Read the information presented on the screen carefully.

## Connecting a Radio to the PC

To connect the radio to the PC:

1. Connect the programming cable to the programming lead.

2. Connect the accessory connector to the radio.

3. Connect the serial connector to the computer's serial port.

Plug the serial connector into one of the COM ports. You can specify the COM port the application uses to communicate with the radio using the File>Preferences command.

*If your serial connector is 25-pin and 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 switched on before it can be programmed. To ensure the radio does not switch itself off during the session, use a fully-charged battery or a DC service adaptor (TOPA-SV-005).

# Trunked Programming Application Basics

When you first start the Trunked Programming Application, the main window appears showing:

- Menus: A series of menus along the top of the window. See "Menu Commands" on page 13.

- Toolbar: A toolbar with a series of buttons. See "The Toolbar" on page 19.

- Forms tree: A list of forms. See "The Forms Tree" on page 19.
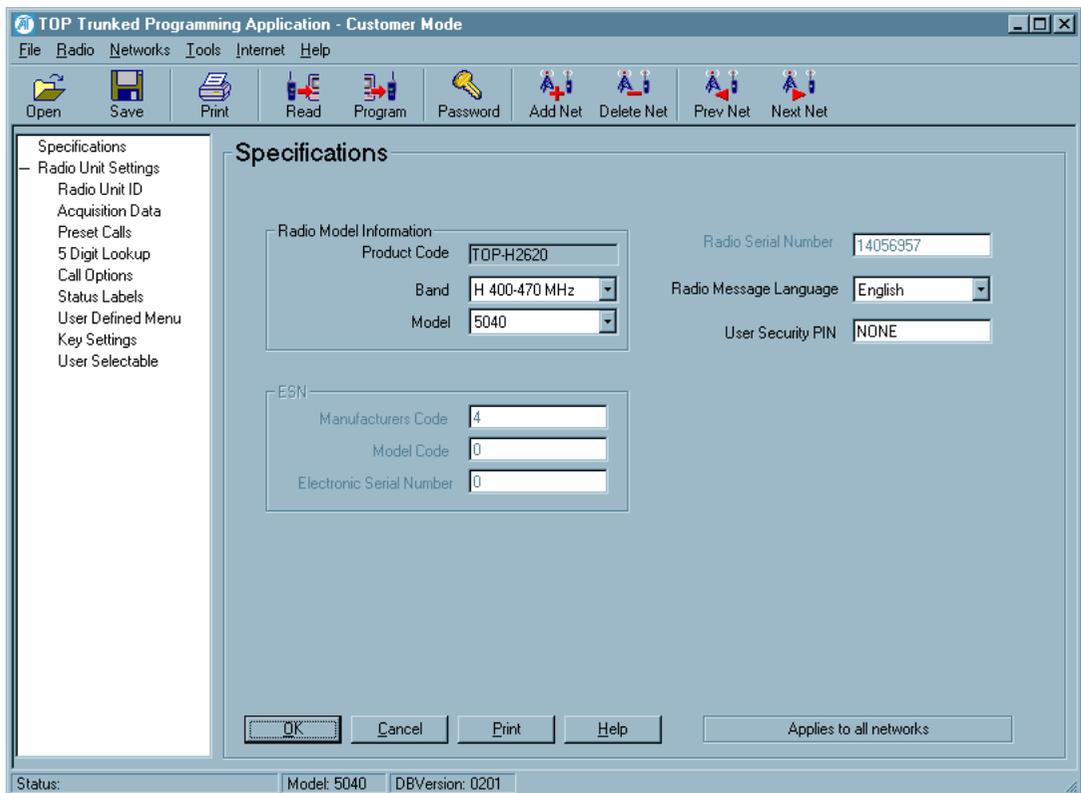
Before changing any radio settings you can:

- read a radio or

- open a radio programming database that has been saved to disk or

- create a new radio programming database file

Press the F1 key for context-sensitive help.

## Reading a Radio

To read a radio, the radio must first be connected to the PC. Once the radio is connected:

- select Radio>Read or

- select the Read button from the tool bar

As the programming database is read from the radio, the application indicates the radio type and tier, and the database, hardware and software version numbers. If you get an error indicating that the correct COM port is not selected, you can change the COM port by selecting the File>Preferences command.

Once the radio's programming database has been read, you can begin changing data. Click on the name of a form in the forms tree. See "The Forms Tree" on page 19 for more information.

## Opening a Radio Programming Database

To open a radio programming database file saved to disk:

- select File>Open or

- select the Open button from the tool bar

Once the data has been loaded, you can begin changing data. Click on the name of a form in the forms tree. See "The Forms Tree" on page 19 for more information.

## Creating a New Database

To create a new database when you first launch the application, start changing the default data in the various forms. See "The Forms Tree" on page 19 for more information.

To begin a new database from an existing database, select File>New.

# The Application Interface

The application interface consists of:

- Menus: A series of menus along the top of the window. See "Menu Commands" on page 13.
- Toolbar: A series of buttons. See "The Toolbar" on page 19.
- Forms tree: A list of forms. See "The Forms Tree" on page 19.

## Menu Commands

The bar along the top of the main window shows the following menus:

- File
- Radio
- Networks
- Tools
- Internet
- Help

Keyboard: Select a menu by pressing the Alt key, then the first letter of the menu's name. Use the up and down arrow keys to scroll through the list of commands, and press the Enter key to select a command. Select another menu using the left and right arrow keys. Press the Esc key to close a menu; the menu bar remains selected. Press the Esc key again to return to the main window.

Mouse: Select a menu by clicking on it, then clicking on the required command.

## File Menu

The commands available from the File menu are:

- New
- Open
- Open (Append)
- Save Current Network
- Save All Networks
- Printer Settings
- Print
- Change Access Level
- Preferences
- Exit

### New

Selecting the File>New command loads the application's default data. Warning: default data should not be programmed to a radio.

### Open

Selecting the File>Open command opens an existing file.

If a file was saved with comments, the comments will be displayed in the Comments window and the radio information will be displayed in the Radio Information window.

### Open (Append)

Selecting the File>Open (Append) command opens an existing programming database file as an additional network. For example, if the programming application has two networks loaded, the new programming database will be added in as Network 3.

### Save Current Network

Selecting the File>Save Current Network command opens the Save file window and saves the currently selected network.

If the programming application contains information for more than one network, then the File>Save Current Network command will only save the programming database for the currently selected network. If you wish to save additional networks as individual files, you will need to switch to the required network and select File>Save Current Network again. However, if you wish to save all networks as one file, use the File>Save All Networks command.

Any comments you enter in the Comments window will be saved with the file, together with the information displayed in the Radio Information window.

### Save All Networks

Selecting the File>Save All Networks command opens the Save file window and saves all networks in a single file.

If you wish to save additional networks as individual files, you will need to switch to the required network and select the File>Save Current Network command.

Any comments you enter in the Comments window will be saved with the file, together with the information displayed in the Radio Information window.

### Printer Settings

Selecting the File>Printer Settings command opens the Print Setup dialog in which you can select the printer you wish to print to.

### Print

Selecting the File>Print command opens the Print Selections window. You can then select one or more forms using the > button (select highlighted form) or >> button (select all forms), and print data in those forms using the Print button.

If you wish to print data from the current form only, you can select the Print button at the bottom of that form.

### Change Access Level

Selecting the File>Change Access Level command allows you to change to a different access level.

### Preferences

Selecting the File>Preferences command opens the Preferences form. The options are:

- Select Application Language
- Communication Port
- WWW Addresses

Select the Advanced button to change Advanced Options, which are:

- Startup Mode
- Prompt to warn about losing data on read/write
- Highlight factory only fields as they become editable

#### Select Application Language

Select the language the application will be displayed in. Changing the application language will cause the default data file to be loaded, so ensure you save any data files before changing languages.

#### Communication Port

Select the port used for communicating with radios.

#### WWW Addresses

If you wish to change the URL used when the options in the Internet menu are selected, enter the new information in the appropriate WWW Address field.

- Tait World Address: The address used when the Internet>TaitWorld command is selected
- Tait Support Address: The address used when the Internet>Tait Support command is selected
- Tait Application Upgrade Address: The address used when the Internet>Tait Update command is selected

#### Startup Mode

The Startup Mode options determine whether the application starts up in Customer or Factory mode.

**access level**

*The access level determines the fields and forms within the Trunked Programming Application that are editable. The access level depends on the password entered, where the lowest access level requires no password.*

If you wish to be prompted to run in Factory mode when you launch the application, tick the box. If not, untick the box and select a Default Startup Mode. There are three options:

■ Save On Exit: The application starts in the mode in which it was last running.

■ Customer: The application will always start in Customer mode.

■ Factory: The application will always start in Factory mode. Note that a DBYXY Security Key must be attached to the PC's Parallel Port to run the application in factory mode.

### Prompt to warn about losing data on read/write

When this option is ticked, the application will warn you when:

■ the Radio>Read command has been selected and the application's current data will be overwritten

■ the Radio>Program command has been selected and a radio's programming database is about to be overwritten.

If you do not wish to be warned upon selecting these commands, untick this box.

### Highlight factory only fields as they become editable

When this option is ticked, factory only fields that can be edited will be displayed as white text on a black background.

### Exit

Selecting the File>Exit command exits the application. You will be asked to confirm your decision.

## Radio Menu

The commands available from the Read menu are:

■ Read

■ Program

### Read

Selecting the Radio>Read command reads the radio's programming database and loads the relevant information into the application's forms. If there are errors in the programming database, the application will display a log of those errors, including the actions taken to correct the information.

### Program

Selecting the Radio>Program command programs the radio's programming database with the settings in the application's forms.

## Networks Menu

The commands available from the Networks menu are:

- Add Network
- Delete Current Network
- Next Network
- Previous Network

For more information, see .

### Add Network

Selecting the Networks>Add Network command adds a new network containing separate network, fleet and radio information.

You can also add a network saved as a file on disk by selecting the File>Open (Append) command.

### Delete Current Network

Selecting the Networks>Delete Current Network command deletes the currently selected network.

### Next Network

Selecting the Networks>Next Network command switches to the next network. If the network displayed is the last defined network, then selecting this command will switch to the first network.

### Previous Network

Selecting the Networks>Previous Network command switches to the previous network. If the network displayed is the first defined network, then selecting this command will switch to the last network.

## Tools Menu

Selecting another Tait application from the Tools menu launches the application. If the application cannot be found, you will be prompted to locate the executable (*.exe) file. If you browse for and select a new executable file, the path for that application will be updated and the application will be launched. Next time you select that application from the Tools menu the new path for the executable file will be used.

The other option in the Tools menu is Radio Messages. Selecting the Radio Messages command opens the Radio Messages form. In the Radio Messages form, you can change the display messages that the radio is programmed with. You must enter a password before you can change messages. If you do not have a password, contact your local Tait office.

Select the language for which you wish to change messages. The Description field tells you where the Radio Message is

used. Each message is restricted in length; you cannot enter more characters than permitted for a message.

Select the OK button to save the changed radio messages and exit the form or the Cancel button to discard changes and exit the form. Selecting the Restore Original Radio Messages button changes all radio messages to their default values.

## Internet Menu

The commands available from the Internet menu are:

■ TaitWorld

■ Tait Support

■ Tait Update

### TaitWorld

Selecting the Internet>TaitWorld command launches your default browser and loads the TaitWorld web page. Enter the address used in the Preferences form (File>Preferences).

### Tait Support

Selecting the Internet>Tait Support command launches your default browser and loads the Tait support request web page. Enter the address used in the Preferences form (File>Preferences).

### Tait Update

Selecting the Internet>Tait Update command launches your default browser and loads the Tait technical issues web page. Enter the address used in the Preferences form (File>Preferences).

If you do not have a Username and Password, contact your local Tait office.

## Help Menu

The commands available from the Help menu are:

■ Contents

■ Search For Help On...

■ About

For context-sensitive help, press the F1 key.

### Contents

Selecting the Help>Contents command launches the online help, open at the Contents tab.

### Search For Help On...

Selecting the Help>Search For Help On... command launches the online help, open at the Search tab.

### *About*

Selecting the Help>About command displays information about the application.

## The Toolbar

The toolbar commands are as follows.

Opens an existing radio programming database file Equivalent to the File>Open command

Prints current data You can select the forms you wish to print data for Equivalent to the File>Print command

Programs a radio with the settings in the application's forms Equivalent to the Radio>Program command

Adds a new network Equivalent to the Networks>Add Network command

Switches to the previous network Equivalent to the Networks>Previous Network command



Saves the current file If the file has not previously been saved, the application uses the radio's serial number to suggest a file name Equivalent to the File>Save command

Reads a radio's programming database and loads the relevant information into the application's forms Equivalent to the Radio>Read command

Allows you to change to a different access level Equivalent to the File>Change Access Level command.

Deletes the currently selected network Equivalent to the Networks>Delete Current Network command

Switches to the next network Equivalent to the Networks>Next Network command

## The Forms Tree

The forms tree on the lefthand side of the main window lists the forms available.

Keyboard: Scroll through the forms using the up and down arrow keys. Press the Enter key or the spacebar to open the form.

Mouse: Click on the name of a form to open it and begin changing data.

The buttons along the bottom of each form are as follows.

■ OK: Saves the form data and exits the form. Pressing the Esc key or Alt–O also saves data and exits the form.

■ Cancel: Discards any changes made and exits the form. Pressing Alt–C also discards changes and exits the form.

■ Print: Sends data from the current form directly to the printer selected in Printer Settings. Pressing Alt–P also prints current data. If you wish to print data in other forms, select File>Print.

■ Help: Displays online help for the form. Pressing F1 or Alt–H also displays online help for the form.

# Changing Data

If a field's data is greyed out, then that data is displayed for information only and cannot be changed. If a field name is greyed out, then that option is not available for the radio being programmed. For information on a field that is greyed out, select the Help button at the bottom of the screen, then select the name of the field you want information on.

Keyboard: Use the Tab key to move between fields.

Mouse: Click on a field.

How you change the data for each field depends on how that data is displayed. There are three options:

- text box
- combo box
- tick box

Where a range of possible numeric values is available for a field, then that range is shown in the bottom righthand corner of the form.

| Min Value: 10 | Max Value: 500 | Step Value: 10 |

## Text Box

A text box is used for numeric and alphanumeric data.

| TAIT ORCA |
| SERIES RADIO |

Keyboard: Select a text box using the Tab key. Enter the required data.

Mouse: Select a text box by clicking on it with the mouse. Enter the required data.

## Combo Box

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

Radio Message Language | English ▼
English
French
Spanish

Keyboard: Select a combo box using the Tab key. You can then display the options available by pressing the Alt key and the down arrow key at the same time. Use the up and down arrow keys to scroll through the options until the required value is displayed, then press the Enter key.

Mouse: Select a combo box by clicking on it, which displays the list of values. Select the required value from the combo box.

## Tick Box

A tick box is used for fields that are either enabled or disabled. If the box is ticked, the field is enabled; if the box is blank the field is disabled.



Keyboard: Select a tick box using the Tab key. Use the spacebar to enable and disable the field.

Mouse: Select a text box and change its value by clicking on it with the mouse.

When the field is selected, a dashed box appears next to the tick box.



## Using Arrays

An array is used where many lines of data are required, each containing the same type of information. The data in an array is displayed in text boxes and combo boxes. Combo boxes in an array appear to be text boxes until they are selected, when an arrow appears on the righthand side.

Forms that contain arrays also contain additional buttons:

- Add: Adds a new row enabling data entry. Pressing F2 also adds a new row.
- Repeat: Duplicates the data from the selected row, giving it a new name.
- Delete: Removes the currently selected row of data. Pressing F3 also deletes the selected row.

Keyboard: Select the different fields in an array using the Tab key or the right and left arrow keys. Pressing the up or down arrow keys moves up or down a row of data.

Mouse: Click on the required field.

# Programming Sequence

When programming Tait Orca trunked radios, you will find that possible entries and availability of certain features sometimes depends upon settings in other forms. The order in which form 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 access level. You can change the access level using the File>Change Access Level command.

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 File>Open command.

**access level**

*The access level determines the fields and forms within the Trunked Programming Application that are editable. The access level depends on the password entered, where the lowest access level requires no password.*

## Network Settings

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

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

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

**network**

*A network is a number of interconnected trunking systems.*

## Fleet Settings

Fleet forms are:

- Fleet Identity
- Fleet Parameters
- Conventional Channels
- DTMF 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.

**fleet**

*Each customer on a trunked network is assigned their own fleet. This keeps each customer unique so that their activities can be monitored and controlled separately from each other. Each radio unit on the network belongs to their associated customer's fleet.*

# Radio Settings

Forms that contain information specific to a radio unit are:

- Radio Identity
- Acquisition Data
- Preset Calls
- Lookup Table for 5 Digit Interfleet Calls
- Call Options
- Key Settings
- User Selectable Parameters

# Working with Multiple Networks

Tait Orca radios can be programmed with one to four network identities, depending on the model and firmware version. This allows the radio user to access different networks, belong to different fleets or belong to fleets with different prefixes.

Programming a radio to operate on additional networks involves programming the radio with additional programming databases. Note that when additional programming databases are loaded, the information in the first database defines common radio items. These common radio items are:

- the Radio Model Information, Radio Serial Number, User Security PIN, Radio Message Language and ESN fields in the Specifications form
- all fields in the User Defined Menu form

Each network is given a name that is displayed when the radio powers up (User Selectable Parameters form, Network Name field). In each form, the number and name of the currently selected network is displayed in the lower righthand corner:
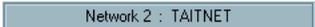
Network 2 : TAITNET

In this example, TAITNET is the name that has been programmed for Network 2 in the Network Name field.

Use the commands in the Networks menu to:

- add additional networks
- delete the currently selected network
- switch to the next or previous network

Additional networks can also be added by using the File>Open (Append) command.

When the File>Save Current Network command is selected, it is important to remember that only the information in the currently selected network is saved. If you wish to save each network in a separate file, you will need to:

**prefix**
*In MPT 1327, radios are identified by a three-digit prefix and a four-digit ident. Radio units in a fleet usually have the same prefix.*

**programming database**
*The programming database is the information that is altered using the Trunked Programming Application. Each programming database consists of separate network, fleet and radio information. When the Radio>Read command is selected, the radio's programming database is read and the information in it is loaded into the fields and forms in the programming application. When the Radio>Program command is selected, the radio's programming database is overwritten with the information altered in the programming application.*

- switch to the network you wish to save and

- select the File>Save Current Network command

These steps will need to be repeated for each network you wish to save. If you wish to save all networks in a single file, select the File>Save All Networks command.

# Specifications Form

The Specifications form shows basic radio information such as the radio model and the frequency band. You can also set various radio interface options in this form, including the security PIN and the radio message language. The Specifications form is shown below.



## Radio Model Information

The radio model information fields show the radio product code and information contained in the product code (e.g. TOP-H2220) that is particularly relevant to radio programming.
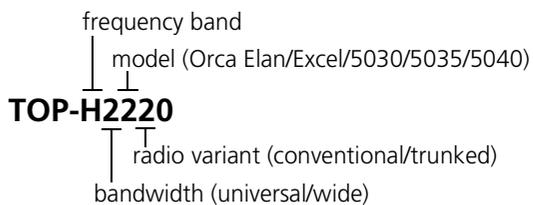


You cannot directly modify the Product Code field. However, if you change Band and/or Model, Product Code is updated to reflect the new values. Fields that are not relevant to the different Band and/or Model are automatically set to their default values.

You may wish to read data from a radio of a different type and use the settings as a template for programming radios of

another variant. If so, change the values of Band and/or Model after loading the template file but before changing any other radio settings.

## Product Code

The Product Code field is automatically read from the radio's memory and shows the radio's model number, which you can find on the back of the radio. However, if the radio has been upgraded, the model number on the back of the radio will not match that read from the radio.

## Band

The Band field sets the frequency band the radio operates at and is indicated by the fourth position (first after the hyphen) in the Product Code number.

### TOP-H2220
┬
frequency band

This letter indicates the frequency band as outlined in the table on the right.

The Band field must be set correctly in order to validate channel settings, and changing the value of Band will:

■ amend the Product Code field to reflect the different frequency band

■ set the values of Start Rx and Tx (Trunked Channels Block form) and the Receive and Transmit Frequencies (Conventional Channels form) to 0, as any frequency values previously entered are invalid for the new Band

| Band | Frequency Range |
|------|-----------------|
| A | 66-88 MHz |
| 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 |
| K | 896-941 MHz |

Note: Contact your local Tait office for information on the availability of different frequency bands.

## Model

The Model field indicates the radio model, which is indicated by the sixth position (third after the hyphen) of the product code.

### TOP-H2220
┬
radio model

1 = Orca Elan

2 = Orca Excel

4 = Orca 5030

5 = Orca 5035

6 = Orca 5040

The Model field must be set correctly as not all programmable features are available for all radio models. Changing the value of Model will:

- amend the Product Code field to reflect the different model
- make selectable fields relevant to the new Model that were greyed out for the previous Model
- grey-out fields not relevant to the new Model

## Radio Serial Number

The Radio Serial Number is automatically read from the radio's memory. It is used for identification only and so the data in the field is greyed out. The Radio Serial Number has no effect on the normal operation of the radio.

## Radio Message Language

The Radio Message Language field does not apply to Orca Elan and Orca 5030 radios.

The Radio Message Language field sets the language radio messages appear in. Select from the languages listed.

## User Security PIN

The User Security PIN field does not apply to Orca Elan, Orca 5030 and Orca 5035 radios.

User Security PIN sets the PIN number the user is required to enter during the power-up sequence. Enter a number up to five digits long, or NONE if no PIN number is required.

## Manufacturer's Code

The Manufacturer's Code is part of the radio's electronic serial number (ESN) and is automatically read from the radio.

You cannot change the value of this field.

## Model Code

The Model Code is part of the radio's electronic serial number (ESN) and is automatically read from the radio.

You cannot change the value of this field.

## ESN

The ESN is part of the radio's electronic serial number (ESN) and is automatically read from the radio.

You cannot change the value of this field.

**security PIN**
*A security PIN (personal identification number) is a number up to five digits long the user is required to enter when the radio first powers up. When a security PIN is required, the radio displays the message ENTER CODE and then waits for the correct PIN to be entered before displaying the power-up message. The radio cannot be used until the correct PIN has been entered.*

# Part 2: Changing Network Settings

This part contains detailed information on changing network settings.

For access to these forms, you will require high-level password access.

**Forms**

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

# Trunked Channel Blocks Form

Trunked channel blocks specify the operating frequencies of all channels on a network. Trunked channel blocks are set up in the Trunked Channel Blocks form, which is shown below.
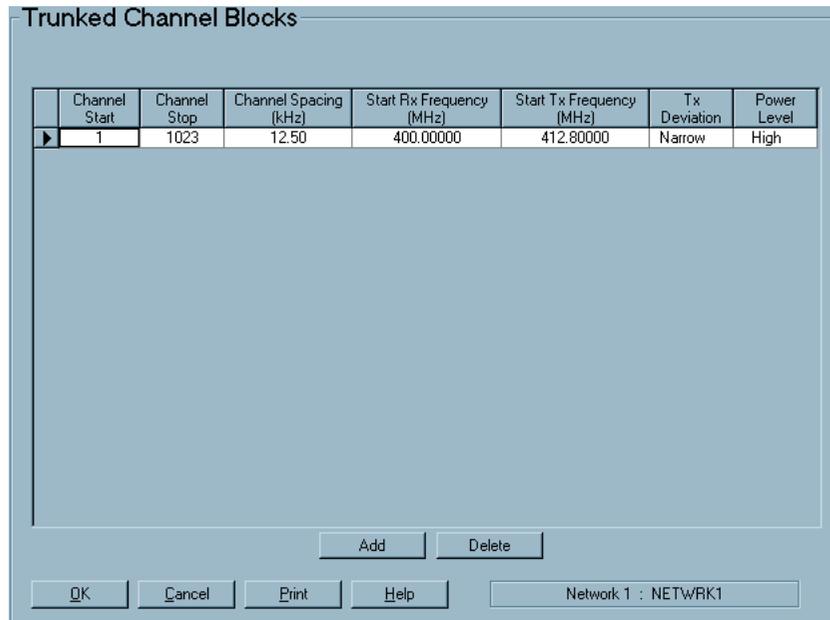


| | Channel Start | Channel Stop | Channel Spacing (kHz) | Start Rx Frequency (MHz) | Start Tx Frequency (MHz) | Tx Deviation | Power Level |
|---|---|---|---|---|---|---|---|
| ▶ | 1 | 1023 | 12.50 | 400.00000 | 412.80000 | Narrow | High |

Add      Delete

OK      Cancel      Print      Help          Network 1 : NETWRK1

Information in this form cannot be altered unless you have high-level password access.

## Trunked Channel Blocks Array

Trunked channel blocks specify the operating frequencies of all channels on a network. Up to 20 blocks can be defined. Select the Add button or press the F2 key to add a new block, or select the Delete button or press the F3 key to delete the currently selected block. At least one channel block must be defined, and so the last remaining channel block cannot be deleted.

## Channel Start and Stop

The Channel Start field sets the first number of each trunked channel block, and the Channel Stop field sets the last chan-nel.

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

If more than one block is defined, the Channel Start value for all subsequent blocks must be at least one greater than the Channel Stop value for the previous block.

Your network operator will tell you what values to set.

## Channel Spacing

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

Enter the value assigned by your network operator, which will be a multiple of one of the following frequencies:

- 5 kHz
- 6.25 kHz.
- 7.5 kHz (if the Transmit Deviation is set to Narrow, and Start RX is between 150 MHz and 174 MHz).

Different blocks can have different channel spacing values.

**channel spacing**

*Channel spacing is the interval between channels. For Tait Orca radios, this is 12.5, 20 or 25 kHz. Wide Band radios can be programmed for operation on 20 and 25 kHz channels only. Universal Band radios can be programmed for operation on 12.5, 20 and 25 kHz channels.*

## Start Rx and Tx

The Start Rx and Tx fields set the receive (Rx) frequency and transmit (Tx) frequency for the first channel in the trunked channel block. The receive and transmit frequencies for all other channels in the block will be calculated from these values using the value of the Channel Spacing field.

For both fields, enter the values assigned by your network operator, which will be a multiple of either 5 kHz or 6.25 kHz 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 Tx Dev field sets the transmitter deviation for the trunked channel block. It can be set to:

- Wide: maximum deviation 5 kHz
- Medium: maximum deviation 4 kHz
- Narrow: maximum deviation 2.5 kHz

Set Tx Dev according to the system channel spacing. Channel spacing is indicated in the number in the fifth position (second after the hyphen) in the product code (see the Specifications form or the back of the radio).

- 1 (Wide Band): The radio can be programmed for operation on 20 and 25 kHz channels only (select a Tx Deviation of Wide or Medium).
- 2 (Universal Band): The radio can be programmed for operation on 12.5, 20 and 25 kHz channels (select a Tx Deviation of Wide, Medium or Narrow).

## Power Level

The Power Level field sets the transmit power level for the trunked channel block. Select a power level setting within the limits permitted for the region in which the radio operates.

■ Off (O): When set to off, the radio cannot transmit on that channel.

■ Low (L): 1 watt VHF, UHF, 800/900 MHz

■ Medium (M): 2.5 watts VHF, UHF, 2 watts 800/900 MHz

■ High (H): 5 watts VHF, 4 watts UHF, 3 watts 800/900 MHz

The transmit power can be temporarily reduced by use of the low power transmit feature and dynamic power control, which conserves battery life.

See "Function Key Option: Low Power" on page 91, "Menu Option: LOW PWR" on page 84, "Function Key Option: Dynamic Power Control" on page 90 and "Menu Option: DYN PWR" on page 85 for more information.

**low power transmit**

*The low power transmit feature can be used to change the transmit power from the programmed level to low.*

**dynamic power control**

*Dynamic power control optimises the radio's power use by reducing the transmit power in high signal strength areas.*

# Network Identity Form

The fields in the Network Identity form set properties of the network the radio will operate on. Appropriate values for the fields in this form will be assigned by the network operator. The Network Identity form is shown below.



Information in this form cannot be altered unless you have high-level password access.

## Network Type and Identity

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

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

The network identity codes set in the array are dependent on the Network Type:

■ National: Enter a code from 0 to 3.

■ Regional: Enter a code from 0 to 127.

Enter the value assigned by your network operator.

Select the Add button or press the F2 key to add a new identity code, or select the Delete button or press the F3 key to delete the currently selected identity code.

**control channel**

*In a trunking system, the control channel is used by the site to let the radio units in the site's coverage area know when they can transmit their call information.*

**acquisition**

*When a radio has successfully acquired a control channel, it is permitted to transmit and receive on that channel. The radio will listen to the control channel until it is directed to a traffic channel to participate in a call.*

## SYNC Sequence

The SYNC Sequence field 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 Field Length (LA)

The Area Field Length (LA) field sets the value of LA, which is used in a test carried out by the radio to see if it can acquire a control channel.

Enter the value assigned by your network operator, which will depend on the value of the Network Type field. For MPT 1327:

- National: Enter a value from 0 to 9.

- Regional: Enter a value from 0 to 4.

## Zone Field Length (LZ)

The Zone Field Length (LZ) field sets the value of LZ, which is used in a test carried out by the radio to see if it can acquire a control channel.

Enter the value assigned by your network operator, which will depend on the value of the Network Type field. For MPT 1327:

- National: Enter a value from 0 to 9.

- Regional: Enter a value from 0 to 4.

## SIL Field Length (LSIL)

The SIL Field Length (LSIL) field sets the value of LSIL, which is used in a test carried out by the radio to check whether the clear down received is from the correct trunking system controller.

Enter the value assigned by your network operator.

## Number of 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 when the PTT is released. These messages assist call maintenance.

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

**codeword**

*Messages on a trunking system are transmitted as codewords. Every codeword is 64 bits long and consists of 48 bits of data and a 16-bit cyclical redundancy code (CRC), which is used for error checking. The codewords are sent over the control channel using fast frequency shift keying (FFSK), where a 1200 Hz tone represents digital one and an 1800 Hz tone represents digital zero.*

**trunking system controller**

*In MPT 1327 the trunking system controller (TSC) is the central intelligence necessary to enable the trunking system to function. The TSC communicates with all radios on the network via the control channel.*

## Pre-Emphasis

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

## Multiple Registration

The Multiple Registration field determines whether the radio can register simultaneously on up to three control channels.

■ Enabled: The radio can store up to three registration records and thereby be simultaneously registered on up to three control channels. It can then roam between those control channels and acquire any of them without re-registering. The oldest registration records expire and are deleted after a period TD following registration (Network Parameters form). 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.

■ Disabled: Only a single registration record is maintained and any previous registration record will be discarded when the radio registers on a control channel.

## Value of INFO in RQR

The Value of INFO in RQR field 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.

Consult your network operator for the appropriate value.

**registration**

*A radio unit must let the trunking system know its current location, especially if the radio unit roams throughout the network. Knowledge of its location allows for an efficient call setup process when the radio unit is called. A radio unit will attempt to register if the area code of the new site's system identity code is different to that of the previous site.*

# Network Parameters Form

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

- Control Channel Acquisition/Retention Parameters
- Background Search Parameters
- Signalling Parameters

The Network Parameters form is shown below.



Information in this form cannot be altered unless you have high-level password access.

## Control Channel Acquisition/ Retention Parameters

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

The same values of parameters NZ1, NZ2 and L1 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.

**control channel**

*In a trunking system, the control channel is used by the site to let the radio units in the site's coverage area know when they can transmit their call information.*

## 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.

## L1

For L1, enter the value assigned by your network operator, which will be from 0 to 40 dB in steps of 1 dB.

## 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.

■ NC1, NC2: Set a value from 1 to 255 for both continuous and time-shared channels.

■ NX1: Set a value from 0 to the value of the corresponding NC1 parameter for continuous and time-shared channels.

■ 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 (code-words) 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 fields listed under Background Search Parameters set parameters the radio uses when carrying out a background search. The Background Search field (Hunting Parameters form) must be enabled for these parameters to have effect.

## TL

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.

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.

## TH

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.

## NS

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.

**background search**

*A background search is carried out as part of the control channel acquisition procedure. The background search 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 specified in the Normal Hunt Channels array (Hunting Parameters form). 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 form) or stronger than the current control channel by a certain margin, the radio will perform a preferential hunt to acquire the new control channel.*

## LM1, LM2, LM3 and LM4

Parameters LM1, LM2, LM3 and LM4 set level margins used during preferential hunts. These values are network depend-ent.

■ 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 Nokia TS Channel Support field (Hunting Param-eters form) is enabled.

■ 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.

■ LM4 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 sampled control channel is preferred over the current control channel.

For LM3 and LM4, 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 qual-ity 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 impor-tant 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.

# Signalling Parameters

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

## NW

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

## ND1

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.

## ND2

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.

## NE

Parameter NE sets the maximum number of random access transmissions of RQE (emergency call request). Enter the value assigned by your network operator, which will be from 1 to 255.

## NR

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.

## TC

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.

## TD

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

## TJ

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.

## TN

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.

## TT

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.

## TA

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.

## TB

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.

## TP

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.

## TW

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.

**ident**

*The ident is the part of the radio's address that uniquely identifies that radio. In MPT 1327, radios are identified by a three-digit prefix and a four-digit ident. All radios in a fleet usually have the same prefix, but no two radios should have the same ident.*

# Hunting Parameters Form

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



Information in this form cannot be altered unless you have high-level password access.

## Nokia TS Channel Support

The Nokia TS Channel Support field sets whether the radio supports Nokia time-shared channels.

When Nokia TS Channel Support is 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. The radio no longer complies with MPT 1343.

## Background Search

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 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 form) 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.

Enable the Background Search field 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 form, together with four other parameters related to background searches, LM1, LM2, LM3 and LM4. See page 39 for more information.

## Hunt Upon Expiry of NE or NR

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

- Normal: The radio will carry out a background search using the information in the Normal Hunt Channels array.

- Preferential: The radio will carry out a background search using the NDD preference data (Acquisition Data form).

- Disabled: No search will be performed.

For the radio to be fully MPT 1343 compliant, you should disable Hunt Upon Expiry of NE or NR 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.

## Comprehensive Hunt

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

## Act On Vote Now

Enable Act On Vote Now to allow the radio to act on vote now BCAST codewords. The signal strength margin that the new control channel must exceed the old control channel by

**vote now**

*Vote now is carried out as part of the control channel acquisition procedure. 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 a particular value, the radio will return to the current control channel. Otherwise it will switch to the control channel specified by the trunking system.*

for the radio to switch to the new control channel is set in the Vote Now Advice Margin field.

## Vote Now Advice Margin

The Vote Now Advice Margin field 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. The Act On Vote Now field must be 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.

## Control Category

The setting of the Control Category field 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 on Orca Elan and Orca 5030 radios.

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

There are two ways to operate the site select function.

On all radios that support site select, the site select function can be selected by the press of a function key. Assign a function key setting with the Site Select option (Key Settings form).

On Orca 5035 and Orca 5040 radios, the site select function can be selected from the user function menu. Tick the SITE SELECT option in the User Defined Menu form.

## Normal Hunt Channels

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 Comprehensive Hunt field (Hunting Parameters form) is enabled.

The channels available to the radio are defined in the Trunked Channel Blocks form.

Up to 32 normal hunt channels can be defined. Select the Add button or press the F2 key to add a new channel, or

select the Delete button or press the F3 key to delete the currently selected channel. At least one channel must be defined, and so the last remaining channel cannot be deleted.

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

## Channel

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

## Type

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

# Non Applicable Channels

The Non Applicable Channels array defines the upper and lower limits of the channel range that will not be included in comprehensive hunt sequences. Select the Add button or press the F2 key to add a new range of channels, or select the Delete button or press the F3 key to delete the currently selected 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 Comprehensive Hunt (Hunting Parameters form) is disabled or if you do not wish to limit the range of channels the radio will search, this list can be left blank.

**comprehensive hunt**

*A comprehensive hunt is carried out as part of the control channel acquisition procedure. When the control channel acquisition procedure has failed to identify a suitable control channel, the radio will then search through all channels in the trunked channel blocks defined for the radio, except those specified as non-applicable in the Non Applicable Channels array.*

# Part 3: Changing Fleet Settings

This part contains detailed information on changing fleet settings.

For access to these forms, you will require medium-level password access.

**Forms**

- Fleet Identity Form
- Fleet Parameters Form
- Conventional Channels Form
- DTMF Parameters Form

# Fleet Identity Form

The fields in the Fleet Identity form provide information about the fleet to which a radio unit belongs. These properties are generally common to call radios in a fleet. The Fleet Identity form is shown below.



Information in this form cannot be altered unless you have medium–level password access.

What fields are available depends on the level of password access and the Dialling Scheme selected. What Fleet Identity fields are applicable for the different dialling schemes is outlined in .

## Dialling Scheme

The Dialling Scheme field 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 support five options.

■ MPT 1343: Suitable for all MPT 1343 networks.

■ ZVEI: Suitable for Regionet 43 networks.

■ Number Presets: Suitable for all MPT 1343 networks. However, dialling will be limited to the preset calls programmed for the radio (in the Preset Calls form).

■ Nokia ANN: Suitable for all Nokia Actionet networks.

Table 1: Fleet Identity form fields available for different dialling schemes

| Field | MPT 1343 | ZVEI | Number Presets | Nokia ANN | CPSX Dialling |
|---|---|---|---|---|---|
| Fleet Number Prefix | ✓ | ✓ | ✓ | ✗ | ✓ |
| Fleet Individual Number | ✓ | ✓ | ✓ | ✗ | ✓ |
| Highest Individual Number in Fleet | ✓ | ✓ | ✓ | ✗ | ✓ |
| Fleet Group Number | ✓ | ✓ | ✓ | ✗ | ✗ |
| Highest Group Number in Fleet | ✓ | ✓ | ✓ | ✗ | ✓ |
| Prime Despatcher Number | ✓ | ✓ | ✓ | ✓ | ✓ |
| Prime Emergency Number | ✓ | ✓ | ✓ | ✓ | ✓ |
| ANN Numbering Model | ✗ | ✗ | ✗ | ✓ | ✗ |
| Fleet Structure Definition | ✗ | ✗ | ✗ | ✓ | ✓ |

■ CPSX Dialling: Suitable for Chinese networks that utilise 5-digit interfleet dialling. It is compatible only with other CPSX dialling trunking systems.

Consult your network operator for the appropriate Dialling Scheme.

## Fleet Number Prefix

The Fleet Number Prefix field is not available if Dialling Scheme is Nokia ANN.

The Fleet Number Prefix field defines the network across which all fleets have been specified. The Fleet Number Prefix is the same for all radios in a fleet.

Enter the value assigned by your network operator, which will be from 200 to 327.

## Fleet Individual Number

The Fleet Individual Number field is not available if Dialling Scheme is Nokia ANN.

The Fleet Individual Number field defines the fleet number and must be common to all radios in a fleet. The Fleet Individual Number is dependent on the Dialling Scheme.

Enter the value assigned by your network operator, which will be:

■ MPT 1343, ZVEI, Number Presets: from 2001 to 6050

■ CPSX Dialling: 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 Fleet Structure Definition array.

## Highest Individual Number in Fleet

The Highest Individual Number in Fleet field is not available if Dialling Scheme is Nokia ANN. If Dialling Scheme is CPSX Dialling, the Highest Individual Number in Fleet is calculated from the values of parameters Large, Medium and Small in the Fleet Structure Definition array, in which case the Highest Individual Number in Fleet field cannot be changed.

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

Enter the value assigned by your network operator, which will be:

■ MPT 1343, Number Presets: from 20 to 89 or 200 to 899
■ ZVEI: from 20 to 79 or 200 to 799

## Fleet Group Number

The Fleet Group Number field is not available if Dialling Scheme is Nokia ANN or CPSX Dialling.

The Fleet Group Number field is used with the group memberships defined in the Group Membership array (Radio Identity form) 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.

## Highest Group Number in Fleet

The Highest Group Number in Fleet field is not available if Dialling Scheme is Nokia ANN. If Dialling Scheme is CPSX Dialling, the Highest Group Number in Fleet is calculated from the values of parameters Large, Medium and Small in the Fleet Structure Definition array, in which case the Highest Group Number in Fleet field cannot be changed.

The Highest Group Number in Fleet field 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 will be:

■ MPT 1343, Number Presets: from 90 to 99 or 900 to 998
■ ZVEI: from 90 to 99 or 900 to 999

## Prime Despatcher Number

The Prime Despatcher Number field 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.

## Prime Emergency Number

The Prime Emergency Number field is the number the unit will default to when an emergency call (*9) is dialled without specifying a unit number. Set the Prime Emergency Number according to the Dialling Scheme.

For MPT 1343, Number Presets and ZVEI:

- 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.

For CPSX Dialling:

- Enter a valid unit number from within the radio's own fleet.

For Nokia ANN:

- Consult your network operator for the Prime Emergency Number to enter in this field.

## ANN Numbering Model

The ANN Numbering Model field is available if Dialling Scheme is Nokia ANN.

The ANN Numbering Model field defines the length of strings to be used for interfleet numbers. There are four options.

- Small: Interfleet numbers contain 5 digits and fleets with prefix 0 are accessible.

- Medium: Interfleet numbers contain 6 digits and fleets with prefixes from 0 to 9 are accessible.

- Large: Interfleet numbers contain 7 digits and fleets with prefixes from 0 to 99 are accessible.

- Extended Large: 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.

# Fleet Structure Definition

The Fleet Structure Definition array is not available if Dialling Scheme is MPT 1343, ZVEI or Number Presets.

■ Nokia ANN: See "ANN Fleet Structure" below.

■ CPSX Dialling: See "CPSX Fleet Structure" below.

## ANN Fleet Structure

When Dialling Scheme is Nokia ANN, the Fleet Structure Definition array defines the ANN (Algorithmic Network Numbering) fleet structure, which differs from MPT 1343 numbering in the way it divides fleets.

Up to 128 blocks can be defined. Select the Add button or press the F2 key to add a new block, or select the Delete button or press the F3 key to delete the currently selected block. For each block, you must set: Start Prefix, Stop Prefix, FPP and MEP.

### Start Prefix

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

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

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

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

## CPSX Fleet Structure

When Dialling Scheme is CPSX Dialling, the Fleet Structure Definition array defines the CPSX fleet structure, which differs from MPT 1343 numbering in the way it divides fleets.

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

■ Large: 699 units, 99 groups

■ Medium: 354 units, 51 groups

■ Small: 236 units, 34 groups

■ Tiny: 118 units, 17 groups

Up to 128 blocks can be defined. Select the Add button or press the F2 key to add a new block, or select the Delete button or press the F3 key to delete the currently selected block. For each block, five fields must be set: Start Prefix, Stop Prefix and the Large, Medium and Small parameters.

### Start Prefix

Start Prefix is the first prefix of the range to which the given values for Large, Medium and Small apply.

Enter a value from 0 to 127.

### Stop Prefix

Stop Prefix is the last prefix of the range to which the given values for Large, Medium and Small apply.

Enter a value from 0 to 127 that is greater than or equal to the value of the corresponding Start Prefix.

### Large, Medium and Small Parameters

How many large, medium, small and tiny fleets there are is determined by the values of the parameters Large, Medium and Small.

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.

Because each type of fleet is fixed in size, the values of the fields in the Fleet Structure Definition array will determine the values of the Number Range for Individual Calls and Number Range for Group Calls fields in the Radio Identity form and the Highest Individual Number in Fleet and Highest Group Number in Fleet fields in the Fleet Identity form.

See "CPSX Dialling" on page 110 for more information.

# Fleet Parameters Form

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



Information in this form cannot be altered unless you have medium–level password access.

## 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 acknowledgement from the called party before setting up a call. The Full Off Air Call Setup field determines whether such acknowledgement is required. There are two options.

■  Allowed: Acknowledgement will be sought from the called party before a traffic channel will be allocated for the call. However, if the system is not capable of seeking acknowledgement, setting Full Off Air Call Setup to Allowed will have no effect.

■  Disallowed: A traffic channel will be allocated for the call before the called radio has answered.

## Default Call Time Limit

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

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

Enter a value as follows:

- 0 for no call time limit

- from 10 to 254 seconds in steps of 1 second

- from 300 to 780 seconds in steps of 60 seconds

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

A different limit can be set for emergency calls (Default Emergency Call Time Limit field).

# Default Emergency Call Time Limit

The Default Emergency Call Time Limit field sets the maximum duration of an emergency call.

Enter a value as follows:

- 0 for no call time limit

- from 10 to 254 seconds in steps of 1 second

- from 300 to 780 seconds in steps of 60 seconds

Note that in MPT 1327, this limit cannot be overwritten by the system.

# Call Timer Count Up

The Call Timer Count-up field does not apply to Orca Elan or Orca 5030 radios.

- Enabled: The radio will display the duration of the call.

- Disabled: The radio will display the time remaining for the call.

# Ignore TSC Call Time Limit

If the Ignore TSC Call Time Limit field is 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

Applies to  CPSX Dialling only.

Dynamic group insert allows a system to add or delete a group using an AHYI signal on a control channel.

- Enabled: If the system offers dynamic group insert, the first group defined in the Group Membership array (Radio Identity form) can be overwritten with the group specified by a system AHYI. The overwritten group is lost permanently unless another AHYI is received to restore it.

- Disabled: The first group in the Group Membership array 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.

■ Enabled: The system operator can send an AHYK signal to stun the radio.

■ Disabled: The system operator cannot stun the radio.

# Conventional Channels Form

A trunked radio can switch between trunked and conventional modes of operation. Up to ten conventional channels can be defined in the Conventional Channels form. The Conventional Channels form is shown below.



Information in this form cannot be altered unless you have medium level password access.

For more information on conventional channels, see "Appendix C: Switching to Conventional Channels" on page 114.

## Tx Inhibit On Busy

The Tx Inhibit field sets the transmit inhibit conditions while the radio is operating in conventional mode. There are three options:

- None: The radio always transmits when the PTT is pressed, even when there is traffic on the channel.

- Busy: The radio does not transmit when the PTT is pressed if there is activity on the channel, whether it is valid or invalid.

- Mute: The radio does not transmit when the PTT is pressed, unless there is valid activity on the channel. If monitor has been activated, the radio transmits regardless of valid or invalid activity.

**transmit inhibit**

*The transmit inhibit feature determines under what conditions a press of the PTT results in the radio not transmitting.*

## Reverse Tone Burst Duration

The Reverse Tone Burst Duration field specifies how long a CTCSS reverse tone burst is transmitted. Reverse tone burst transmission increases the speed of receiver shutdown in some repeaters and associated equipment.

Set a value from 0 to 250 ms in steps of 1 ms. Setting this field to 0 disables reverse tone burst transmission.

The recommended value is 130 ms, which works 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

The Conventional Channels array defines the conventional channels the radio operates on.

Up to 10 conventional channels can be defined for each trunking network. Select the Add button or press the F2 key to add a new channel, or select the Delete button or press the F3 key to delete the currently selected channel. For each conventional channel, set: Access Number, Receive and Transmit Frequencies, Transmit Deviation, Power Level, Subaudible Signalling and Squelch.

## Access Number

The Access Number field 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 Orca Elan and Orca 5030 radios, the user cannot dial strings, and so the Access Number should be entered as one of the preset calls defined in the Preset Calls form. When the user changes to that preset calls position on the 16-way selector, the conventional channel will automatically be selected.

## Receive and Transmit Frequencies

The Rx Freq MHz and Tx Freq MHz fields set the conventional channel's receive and transmit frequencies.

For each channel, enter a frequency within the radio's frequency band that is a multiple of one of the following frequencies:

- 2.5 kHz (if the Transmit Deviation is set to Narrow, and the RX Frequency is between 150 MHz and 174 MHz).

- 5 kHz

- 6.25 kHz

**CTCSS**

*CTCSS (continuous tone controlled squelch system) is a type of signalling used for segregating groups of users. CTCSS uses subaudible tones between 67 and 250.3 Hz to identify a group of radio users.*

The letter in the fourth position (first after the hyphen) in the product code (see the Specifications form or the back of the radio) indicates the radio's frequency band as outlined in the table on page 60.

| Band | Receive Frequency (MHz) | Transmit Frequency (MHz) |
|------|-------------------------|--------------------------|
| A | 66-88 | 66-88 |
| B | 136-174 | 136-174 |
| C | 174-225 | 174-225 |
| D | 220-270 | 220-270 |
| E | 270-310 | 270-310 |
| F | 290-340 | 290-340 |
| G | 336-400 | 336-400 |
| H | 400-470 | 400-470 |
| I | 450-530 | 450-530 |
| J | 851-870 | 806-870 |
| K | 935-941 | 896-941 |

Note that the range of frequencies permitted for bands J and K are different for Rx Freq (MHz) and Tx Freq (MHz).

## Transmit Deviation

The Tx Dev field sets the transmitter deviation. It can be set to:

■ wide: maximum deviation 5 kHz

■ medium: maximum deviation 4 kHz

■ narrow: maximum deviation 2.5 kHz

Set Tx Dev according to the system channel spacing. Channel spacing is indicated in the number in the fifth position (second after the hyphen) in the product code (see the Specifications form or the back of the radio).

■ 1 (Wide Band): The radio can be programmed for operation on 20 and 25 kHz channels only (select a Tx Deviation of Wide or Medium).

■ 2 (Universal Band): The radio can be programmed for operation on 12.5, 20 and 25 kHz channels (select a Tx Deviation of Wide, Medium or Narrow).

**channel spacing**

*Channel spacing is the interval between channels. For Tait Orca radios, this is 12.5, 20 or 25 kHz. Wide Band radios can be programmed for operation on 20 and 25 kHz channels only. Universal Band radios can be programmed for operation on 12.5, 20 and 25 kHz channels.*

## Power Level

The Power Level field sets the transmit power level. Select a power level setting within the limits permitted for the region in which the radio operates.

- Off (O): When set to off, the radio cannot transmit on that channel.

- Low (L): 1 watt VHF, UHF, 800/900 MHz

- Medium (M): 2.5 watts VHF, UHF, 2 watts 800/900 MHz

- High (H): 5 watts VHF, 4 watts UHF, 3 watts 800/900 MHz

The transmit power can be temporarily reduced by use of the low power transmit feature, which is a way of conserving battery life. When low power transmit is active, all transmissions are made at the low power level rather than at the programmed power level. When low power transmit is deactivated, transmissions are made at the programmed power level.

See and for more information.

## Subaudible Signalling

The CTCSS Rx field sets the receive subaudible signalling the radio must receive before channel activity is regarded as valid and the mute opened. The CTCSS/DCS Tx field sets the subaudible signalling that accompanies each transmission made on the channel.

For CTCSS Rx, select the required CTCSS frequency from the drop-down list. For CTCSS/DCS Tx, select the required CTCSS frequency or DCS code from the drop-down list.

Leave these fields set to NONE if no subaudible signalling is used on the channel.

## Squelch

The Squelch Level field sets the squelch threshold. There are two options:

- Country: 12 dB SINAD

- City: 16 dB SINAD

**squelch threshold**

*The squelch threshold is the level the signal must reach before it is regarded as intelligible and the radio's mute is opened. Tait Orca radios can operate at two different squelch thresholds: city and country squelch.*

# DTMF Parameters Form

DTMF options are set in the DTMF Parameters form. This form does not apply to Orca Elan, Orca 5030 and Orca 5035 radios. The DTMF Parameters form is shown below.



Information in this form cannot be altered unless you have medium-level password access or higher.

For more information on DTMF, see:

- "Introduction to DTMF" on page 118
- "DTMF Overdialling" on page 118

## Manual DTMF Dialling

- Enabled: DTMF calls can be made from the numeric keypad.
- Disabled: The radio cannot make DTMF calls.

## PTT as Shift Key

If the user wishes to dial tones A to D or a pause, the PTT can be used as a shift key in conjunction with the numeric keypad. For example, on the Orca Excel:

PTT + **2** = A

PTT + **5** = B

PTT + **8** = C

PTT + **0** = D

PTT + **1** = pause

**DTMF**

*DTMF (dual tone multiple frequency) is the tone-based system used for the world's telephone networks. A DTMF "tone" actually consists of a pair of tones. DTMF tones are sometimes referred to as "touch tones".*

So pressing the PTT key, holding it, then pressing the ② key enters tone A in the DTMF string. Pressing the PTT, holding it, and then pressing the ① key enters a pause in the string. A hyphen is entered in the display to indicate the pause.

Enable PTT as Shift Key if the user will need to dial tones A to D and pauses.

## Transmit Key Up Delay

The Transmit Key Up Delay field 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.

## Minimum Tone Duration (0-9, A-D)

The Minimum Tone Duration (0–9, A–D) field sets the minimum amount of time tones 0 to 9 and A to D are encoded. Enter a value from 10 to 1020 ms in steps of 10 ms.

## Minimum Tone Duration (*, #)

The Minimum Tone Duration (★, #) field sets the minimum amount of time tones ★ and # are encoded. Enter a value from 10 to 1020 ms in steps of 10 ms.

## Minimum Intertone Gap

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

## Interdigit Tx Hold Time

The Interdigit Tx Hold Time field determines how long the radio keeps transmitting between the encoding of each tone. This provides a delay for the user to dial the next digit without transmission stopping and restarting again. 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.

# Part 4: Changing Radio Settings

This part contains detailed information on changing radio settings.

Most of the fields in these forms require only low-level password access.

**Forms**

- Radio Identity Form
- Acquisition Data Form
- Preset Calls Form
- Lookup Table for 5 Digit Interfleet Calls Form
- Call Options Form
- Status Labels Form
- User Defined Menu Form
- Key Settings Form
- User Selectable Parameters Form

# Radio Identity Form

The fields in the Radio Identity form define the radio's identity on a particular network. The Radio Identity form is shown below.



## Radio Unit Number

The Radio Unit Number field defines the unit number that uniquely identifies each radio within its fleet. 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.

The value this field will be set to is affected by the Dialling Scheme field (Fleet Identity form).

■ If Dialling Scheme is MPT 1343, ZVEI or Number Presets, the number entered in the Radio Unit Number field is dependent on the Highest Individual Number in Fleet field (Fleet Identity form). 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.

■ If Dialling Scheme is Nokia ANN, the radio's identity should be defined in the Fully Qualified ANN Radio Unit Number field.

■ If Dialling Scheme is CPSX Dialling, the number entered in Radio Unit Number should be in the range specified

by the Number Range for Individual Calls fields in the Radio Identity form.

## Fully Qualified ANN Radio Unit Number

The Fully Qualified ANN Radio Unit Number field defines the unit number that uniquely identifies each radio within its fleet when Dialling Scheme is Nokia ANN. The Fully Qualified ANN 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.

## Maximum Number of Group Addresses

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

Set a value from 1 to 32.

## Group Membership

The Group Membership array defines what groups the radio belongs to. A radio can belong to up to 32 groups, depending on the number indicated in the Maximum Number of Group Addresses field. Select the Add button or press the F2 key to add a new group address, select the Delete button or press the F3 key to delete the currently selected group address, or select the Repeat button to duplicate the current group address' settings, except for the Number.

How group addresses are entered depends on the Dialling Scheme (Fleet Identity form).

■ If Dialling Scheme is MPT 1343, 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). For MPT 1343 format, the numbers entered are dependent on the Highest Group Number in Fleet field (Fleet Identity form). 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. For MPT 1327 format, enter a Prefix from 0 to 127 and an Ident from 1 to 8100. Whichever format you choose, the other fields must remain set to zero. If the radio will not subscribe to any groups, set all fields to zero.

■ If Dialling Scheme is Nokia ANN, group addresses must be entered in the ANN Group ID field. Enter a valid ANN group identity.

- If Dialling Scheme is CPSX Dialling, enter a group number within the range specified by the Number Range for Group Calls fields (Radio Identity form). If the group is in a different fleet, enter the full interfleet dialling number.

## User Programmable

The User Programmable field 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 options for User Programmable are Dynamic (Orca Elan and Orca Excel radios only), Permanent, Selectable, Scan and Scan + Selectable.

- Dynamic (Orca Excel and Orca Elan radios): 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 form. 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.

**NOTE:** This feature is enabled by default for Orca 5030, Orca 5035 and Orca 5040 radios.

- Permanent: The radio will always respond to calls intended for the group.

- Selectable, Scan or Scan + Selectable: The radio 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.

For more information on groups, see "Appendix B: Selecting Groups" on page 113.

# Number Range for Individual Calls

The Number Range for Individual Calls fields define the range of individual numbers a radio can call. The setting of these fields can restrict the calls a radio can make to other radios in the fleet.

The range entered is dependent on the Highest Individual Number in Fleet field in the Fleet Identity form.

- 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.

## Number Range for Group Calls

The Number Range for Group Calls fields define the range of group numbers a radio can call. The setting of these fields can restrict the calls a radio can make to groups of radios in the fleet.

The range entered is dependent on the Highest Group Number in Fleet field in the Fleet Identity form.

■ 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.

# Acquisition Data Form

The arrays in the Acquisition Data form define data used when the radio is attempting to acquire a control channel. The Acquisition Data form 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. Select the Add button or press the F2 key to add a new definition, select the Delete button or press the F3 key to delete the currently selected definition, or select the Repeat button to duplicate the current definition's settings.

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

## Type

The Type field 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.

## Code

The Code field 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 form).

If the Network Type (Network Identity form) is National, enter a value from 0 to 511. If the Network Type is Regional, set a value from 0 to 15.

# NDD Preference Data

The fields in the NDD Preference Data array define the information used to encourage the radio to acquire certain control channels during a preferential hunt.

Up to four definitions are permitted. Select the Add button or press the F2 key to add a new definition, select the Delete button or press the F3 key to delete the currently selected definition, or select the Repeat button to duplicate the current definition's settings.

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

## Field Length

The Field Length field 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 form).

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

## Priority

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

## Value

The Value field 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 Home Zone field specifies the network zone in which the radio is normally working. The radio also uses the 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 Zone Field Length (LZ) (Network Identity form).

**preferential hunt**

*A preferential hunt is carried out as part of the control channel acquisition procedure. A preferential hunt covers all channel numbers likely to be used as control channels on the selected network. For a preferential hunt, the radio will only acquire a control channel for which a preference exists.*

**registration**

*A radio unit must let the trunking system know its current location, especially if the radio unit roams throughout the network. Knowledge of its location allows for an efficient call setup process when the radio unit is called. A radio unit will attempt to register if the area code of the new site's system identity code is different to that of the previous site.*

# Preset Calls Form

Between 20 to 100 preset calls, depending on the model, can be defined for each radio together with two function key calls. These calls are defined in the Preset Calls form. The Preset Calls form is shown below.



## Preset Calls Array

The Preset Calls array defines the preset calls the radio can make.

For Orca Elan, Orca Excel and Orca 5030 radios, up to 20 preset calls can be defined, numbered 0 to 19. For Orca 5035 and Orca 5040 radios, up to 100 preset calls can be defined, numbered 0 to 99. Select the Add button or press the F2 key to add a new preset call, select the Delete button or press the F3 key to delete the currently selected preset call, or select the Repeat button to duplicate the currently selected preset call's Call String.

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

## Preset ID

The Preset ID field sets the number of the preset call, which must be a number from 0 to 19 (Orca Elan, Orca Excel and Orca 5030 radios), or from 0 to 99 (Orca 5035 and Orca 5040 radios). Entries need not be numbered sequentially.

Preset calls numbered 1 to 16 will be assigned to the corresponding position on the 16-way selector. The first 16 preset

calls entered by default will be automatically numbered from 1 to 16. Zero will not appear by default until the end as it is not a position on the 16–way selector.

## Label

The Label field sets an alphanumeric label for the preset call, which will appear on the display when the call is selected for Orca 5035, Orca 5040 and Orca Excel radios. Each label must be unique. Enter a name of up to 8 characters from:

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

## Call String

The Call String field sets the string that is dialled when the preset call is selected.

Enter any valid dialling sequence using the characters: 0-9 ★ # that conforms to the selected Dialling Scheme.

What strings are valid depends on how the trunking system is configured. Consult your network operator, and see "Appendix B: Selecting Groups" on page 113 and "Appendix C: Switching to Conventional Channels" on page 114 for more information.

The Call String field 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 the Function Key Preset Call 1 and Function Key Preset Call 2 fields, 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 "Appendix B: Selecting Groups" on page 113 and "Appendix C: Switching to Conventional Channels" on page 114 for more information.

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 form.

# Lookup Table for 5 Digit Interfleet Calls Form

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



Up to 20 lookup entries can be set. Select the Add button or press the F2 key to add a new lookup entry, select the Delete button or press the F3 key to delete the currently selected lookup entry, or select the Repeat button to duplicate the current lookup entry's settings, except for the Access String.

At least one of the Interfleet Calls or Interfleet Group Calls fields (in the Call Options form must be enabled before any lookup entries can be made.

For each lookup entry, five fields must be set: Prefix, Fleet Number, Fleet Type, Highest Number in Fleet and 5 Digit Access String.

## Prefix

The Prefix field 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.

## Fleet Number

The Fleet Number field 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.

## Fleet Type

The Fleet Type field 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.

## Highest Number in Fleet

The Highest Number in Fleet field 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.

## 5 Digit Access String

The 5 Digit Access String field defines the five digit, short form number the user will dial.

The first two digits of the 5 Digit 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 5 Digit Access String.

# Call Options Form

The fields in the Call Options form determine the types of calls a radio unit is permitted to make and how they are made. The Call Options form is shown below.



## PABX Calls

The setting of the PABX Calls field determines whether the radio is permitted to make calls to PABX extensions on trunking systems that support PABX calling.

- Enabled: The radio is permitted to make PABX calls.
- Disabled: The radio can receive PABX calls but can only transmit PABX calls programmed as preset calls (in the Preset Calls form).

If the system does not support PABX calls, the setting of the PABX Calls field has no effect on radio operation.

**PABX**

*PABX stands for private automatic branch exchange. A trunking system can be connected to a PABX and so radios using that system can make calls to and receive calls from PABX extensions.*

## PSTN Calls

The setting of the PSTN Calls field determines whether the radio is permitted to make calls to PSTN numbers on trunking systems that support PSTN calling.

- Enabled: The radio is permitted to make PSTN calls.
- Disabled: The radio can receive PSTN calls but can only transmit PSTN calls programmed as preset calls (in the Preset Calls form).

If the  system does not support PSTN calls, the setting of the PSTN Calls field has no effect on radio operation.

**PSTN**

*PSTN stands for public switched telephone network, the public telephone network on which subscribers own or rent tethered communications devices (telephones, facsimiles, modems) as opposed to untethered communications devices (radio telephones, cellular phones). A trunking system can be connected to the PSTN and so radios using that system can make calls to and receive calls from PSTN numbers.*

## Interfleet Calls

When the Interfleet Calls field is enabled, the radio can make calls to individual radios in other fleets.

Unless there is a specific reason to allow this type of call, disable this field.

## Interfleet Group Calls

When the Interfleet Group Calls field is 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, disable this field.

## ALLI Calls

When the ALLI Calls field is enabled, the radio can make calls to all idents (ALLI).

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

## Network Operator Service Calls

When the Network Operator Service Calls field is 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 Direct Despatcher Calls field is disabled, the radio cannot make normal speech calls to the despatcher.

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

## Status Calls

When the Status Calls field is enabled, the user can send status messages.

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

**status message**

*A status message is a short signalling message that carries only a number between 1 and 30. Because of the brevity of the message, no audio channel is used. All the required information can be transferred in the signalling between the network and the radio unit.*

## Abbreviated Dialling

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

Enable the Abbreviated Dialling field to allow the radio to make use of this feature.

If Abbreviated Dialling is enabled, you should also set the Abbreviated Dialling Limit.

## Abbreviated Dialling Limit

The Abbreviated Dialling Limit field 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.

## Callback Facility

The Callback Facility field does not apply to Orca Elan and Orca 5030 radios.

When Callback Facility is enabled, the number of an incoming call will be displayed when the call is cleared down. The user can then call back the calling radio by pressing the PTT.

## Call Queuing

The Call Queuing field does not apply to Orca Elan and Orca 5030 radios.

Call queuing sets a queue to hold unanswered calls, automatically queued calls and status calls. There are three options.

- Full: All calls will be queued.
- Unanswered: Only unanswered calls and status calls will be queued.
- Disabled: Only a single unanswered call will be queued.

## Unanswered Call Timer

The Unanswered Call Timer field 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.

## Divert Own Calls

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

## Divert Third Party Calls

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

## Do Not Disturb

When the Do Not Disturb field is 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 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.

## Join Busy Group

Some networks send repeat go-to-channel messages. On such networks, a radio can make a call to a group it is not subscribed to and if a group call is already in progress, the radio will be directed to the allocated traffic channel. When the Join Busy Group field is enabled, the radio will be able to join busy groups.

Do not enable this field unless authorised to do so by the network operator.

Note that on systems that support group call amalgamation, the radio will automatically join busy groups regardless of the setting of this field.

# Status Labels Form

Status labels are available on Orca 5035 and Orca 5040 radios and are set in the Status Labels form. The Status Labels form is shown below.



Select the Add button or press the F2 key to add a status message, select the Delete button or press the F3 key to delete the currently selected status message, or select the Repeat button to duplicate the current status message's label. Up to 30 status messages can be defined.

## Status ID
The Status ID field sets the status message number that is transmitted. Enter a value from 1 to 30.

## Label
The Label field sets the status label associated with the status message.

Enter a name of up to 8 characters from:

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

# User Defined Menu Form

Items that appear in the user menu of Orca 5035 and Orca 5040 radios are set in the User Defined Menu form. This form is not available to Orca Elan, Orca Excel and Orca 5030 radios. The User Defined Menu form is shown below.



The information displayed is the information that will appear in the radio's user function menu. Ticking a top-level menu (for example, USER SETTINGS) will enable all of that menu's submenu functions, and unticking a top-level menu will disable all submenu functions.

Select the Enable All button to enable all menu items, or the Disable All button to disable all menu items.

You can edit the menu labels by entering a password in the box at the top of the form. If you do not have a password, contact your local Tait office. If menu names have been changed and you wish to use the default text, select the Restore Default Menu Text button. If you wish to save a different set of menu labels as the default, select the Save as Default Text button.

To restore the radio's factory settings, click the Restore Factory Settings button.

The List Operation field determines the behaviour of scrolling lists. There are two options.

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

- Stop at End of List: The list movement stops when the first or last entry is reached.

Items selected are available for all programmed networks.

The availability of some items depends on the value of fields in other forms. The functions available are outlined below:

---

### Menu Option: QUEUED CALLS

**Description:**
The QUEUED CALLS: menu option accesses the call queue. The radio only displays this option when at least one call has been queued.

---

### Menu Option: SELECT PRESET

**Description:**
The SELECT PRESET menu option allows the user to view the list of preset calls programmed in the Preset Calls form. The radio user can scroll through and select from the list of calls.

**Alternatives:**
Preset calls numbered 1 to 16 are automatically accessible from the 16-way selector.

---

### Menu Option: SELECT STATUS

**Description:**
The SELECT STATUS menu option allows the user to view and select from a list of status labels.

---

### Menu Option: SELECT SDM

**Description:**
The SELECT SDM menu option allows the user to view a list of short data messages, and either edit or send an SDM Preset.

---

### Menu Option: HANDSET

**Description:**
The HANDSET menu option turns handset operation on and off.

Handset mode automatically turns off after the handset inactivity timer expires. The handset inactivity timer is set in the Key Settings II tab.

**handset operation**
*Tait Orca radios can be operated as a normal radio where the user holds the radio with the microphone about 15 cm away from the mouth or it can be operated like a telephone handset. Handset mode is useful in noisy environments, when privacy is required or in quiet environments when the lowest volume setting seems too loud.*

**Menu Option: LOW PWR**

**Description:**
The LOW PWR menu option allows the user to turn the low power transmit feature on and off. Low power transmit overrides the power level setting programmed for the channel in the Trunked Channel Blocks form or the Conventional Channels form so that the radio transmits at low power.

**Alternatives:**
Channels can be programmed to always transmit at low power (Power Level field, Trunked Channel Blocks form, Power Level field Conventional Channels form).

**Menu Option: KEYLOCK**

**Description:**
The KEYLOCK menu option allows the user to lock the keypad so the keys cannot be activated accidentally. Which keys are locked depends on how the radio was programmed (Keypad Lock Disables, Key Settings II tab).

A long press of the clear key (✖) turns off keypad lock.

**Menu Option: SQUELCH**

**Description:**
The SQUELCH menu option allows the user to change the squelch threshold, which can be city squelch or country squelch.

**Menu Option: DTMF**
The DTMF menu options turns DTMF overdialling mode on and off.

**Menu Option: QUEUE**

**Description:**
The QUEUE menu option allows the user to turn call queuing on and off.

**Menu Option: QUIET**

**Description:**
The QUIET menu option allows the user to turn do not disturb on and off.

**DTMF overdialling**
*The DTMF overdialling feature allows the radio user to dial DTMF strings using the numeric keypad.*

**call queuing**
*If the radio user is unable to answer calls immediately, they can be stored in the call queue so that the user can call back later. On Orca Elan and Orca 5030 radios, only one unanswered call can be queued. On Orca Excel, Orca 5035 and Orca 5040 radios, up to 20 calls can be stored.*

**do not disturb**
*Do not disturb allows the radio user to ignore incoming calls while still making outgoing calls as usual. Do not disturb can be activated by dialling ✲49# and can be deactivated by dialling #49#.*

**Menu Option: DYN PWR**

**Description:**
The DYN PWR menu option allows the user to turn
dynamic power control on and off.

**dynamic power control**
*Dynamic power control optimises the
radio's power use by reducing the
transmit power in high signal strength
areas.*

**Menu Option: PTTLOCK**

**Description:**
The PTTLOCK menu option allows the user to lock the
PTT key. The user can unlock the PTT key by pressing the
clear key (✗).

**Menu Option: TONES**

**Description:**
The TONES menu option allows the user to turn audible
indicators on and off.

**Menu Option: LEVEL**

**Description:**
The LEVEL menu option allows the user to change the level
of audible indicators. There are two options: HIGH and
LOW.

**Menu Option: KEYTONE**

**Description:**
The KEYTONE menu option allows the user to turn key-
press confidence tones on and off.

**keypress confidence tones**
*Keypress confidence tones are a confi-
dence indicator that tells the radio user
whether or not an action is permitted
whenever a keypad key or function
key is pressed.*

**Menu Option: NIGHT**

**Description:**
The NIGHT menu option allows the user to turn night use
on and off.

**night use**
*When the night use feature is on, the
radio's backlighting activates when-
ever valid activity is detected, a key on
the radio is pressed or when the radio
receives a call. Backlighting remains
on for the duration of the backlighting
timer unless further activity is
detected.*

**Menu Option: CONTRAST ADJUST**

**Description:**
The CONTRAST ADJUST menu option allows the user to
adjust the contrast of the LCD display.

**Menu Option: SELECT SITE**

**Description:**
The SELECT SITE menu option allows the user to access the site select feature and enter a control channel that the radio must acquire.

**Menu Option: SELECT NETWORK**

**Description:**
The SELECT NETWORK menu option allows the user to switch to another trunking network. Tait Orca radios can be programmed to operate on one to four networks, depending on the model and firmware version.

**Menu Option: SW VER**

**Description:**
The SW VER menu option allows the user to view the radio firmware version number.

**Menu Option: HW VER**

**Description:**
The HW VER menu option allows the user to view the radio hardware version number.

**Menu Option: MAIN DB**

**Description:**
The MAIN DB menu option allows the user to view the programming software database version number.

**Menu Option: CAL DB**

**Description:**
The CAL DB menu option allows the user to view the calibration database version number.

# Key Settings Form

Function key, handset mode and keypad lock options are set in the Key Settings form.

The Key Settings form is divided into two tabs.

■ Set function key options, including external function keys, in the Key Settings I tab.

■ Set handset mode and keypad lock options in the Key Settings II tab.

## Key Settings I Tab

Set function key options, including handset mode options, in the Key Settings I tab. The Key Settings I tab is shown below.



### Function Key Settings

Each radio has two function keys above the PTT key. Orca 5035 and Orca 5040 radios have a third function key, which is the leftmost key in the row of four keys underneath the LCD display.

These radio function keys can have functions assigned to both short and long keypresses. A short keypress is less than one second. The radio user may need to experiment to become familiar with the duration of short and long keypresses.

The third function key on Orca 5035 and Orca 5040 radios can also be operated as a "shortcut" to up to three user function menu options. The shortcut menu is a wrap around

menu, with one press of the third function key accessing the option that was last selected, and each subsequent press selecting the next option in a continuous loop. The user function menu options that will appear in the drop-down lists are those that are ticked in the User Defined Menu form.

Some radio accessories also have function keys, and most of the options available for the radio function keys are also available for external function keys. However, these external function keys do not have short and long keypresses.

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

**Function Key Option: Audible Indicators**

**Description:**
Pressing the function key turns audible indicators on and off. Whether audible indicators are on or off when the radio powers up is determined by the Initial Setting for the Audible Indicators field (User Selectable Parameters form).

**Applies To:**
✔ Orca Elan
✔ Orca Excel
✔ Orca 5030
✔ Orca 5035
✔ Orca 5040

**Alternatives:**
Audible indicators can be turned on and off from the user function menu.

**Function Key Option: Backlighting On**

**Description:**
Pressing the function key activates display backlighting. Backlighting deactivates when the backlighting timer expires.

**Applies To:**
✘ Orca Elan
✔ Orca Excel
✘ Orca 5030
✔ Orca 5035
✔ Orca 5040

**Alternatives:**
When the night use feature is on, the radio's backlighting is activated whenever valid activity is detected, a key on the radio is pressed or when the radio receives a call.

**Function Key Option: Clear**

**Description:**
Clears the last request to the trunking system.

**Applies To:**
✔ Orca Elan
✔ Orca Excel
✔ Orca 5030
✔ Orca 5035
✔ Orca 5040

**Limitations:**
Cannot be used to clear calls from the call queue.

**Alternatives:**
On Orca Excel, Orca 5035 and Orca 5040 radios, a short press of the clear key (✘) clears the last request to the trunking system and clears calls from the call queue.

---

**Function Key Option: Contrast Adjustment**

**Description:**
Pressing the function key allows the radio user to adjust the display contrast using the scroll key(s). The radio automatically returns to its previous mode of operation after a few seconds of inactivity. The contrast can be reset to the default by pressing and holding Function Key 2 while turning the radio on.

**Applies To:**
✘ Orca Elan
✔ Orca Excel
✘ Orca 5030
✔ Orca 5035
✔ Orca 5040

**Alternatives:**
On Orca 5035 and Orca 5040 radios, the contrast adjust feature is available from the user function menu.

---

**Function Key Option: Do Not Disturb**

**Description:**
Pressing the function key turns the do not disturb function on and off.

**do not disturb**
*Do not disturb allows the radio user to ignore incoming calls while still making outgoing calls as usual. Do not disturb can be activated by dialling ★49# and can be deactivated by dialling #49#.*

**Applies To:**

✔ Orca Elan

✔ Orca Excel

✔ Orca 5030

✔ Orca 5035

✔ Orca 5040

**Alternatives:**

On Orca Excel and Orca 5040 radios, do not disturb can also be activated by dialling the string ⋆49#. Do not disturb can be deactivated by dialling the string #49#. On all radios, these strings can be entered as preset calls.

On Orca 5035 and Orca 5040 radios, do not disturb can be turned on and off via the user function menu.

---

**Function Key Option: DTMF Mode**

**Description:**

Pressing the function key turns DTMF overdialling mode on and off.

**DTMF overdialling**
*The DTMF overdialling feature allows the radio user to dial DTMF strings using the numeric keypad.*

**Applies To:**

✘ Orca Elan

✔ Orca Excel

✘ Orca 5030

✘ Orca 5035

✔ Orca 5040

---

**Function Key Option: Dynamic Power Control**

**Description:**

Pressing the function key turns dynamic power control on and off.

**dynamic power control**
*Dynamic power control optimises the radio's power use by reducing the transmit power in high signal strength areas.*

**Applies To:**

✔ Orca Elan

✔ Orca Excel

✔ Orca 5030

✔ Orca 5035

✔ Orca 5040

**handset operation**
*Tait Orca radios can be operated as a normal radio where the user holds the radio with the microphone about 15 cm away from the mouth or it can be operated like a telephone handset. Handset mode is useful in noisy environments, when privacy is required or in quiet environments when the lowest volume setting seems too loud.*

---

**Function Key Option: Handset Mode**

**Description:**

Pressing the function key turns handset operation on and off.

Handset mode automatically turns off after the handset inactivity timer expires. The handset inactivity timer is set in the Key Settings II tab.

**Applies To:**
✔ Orca Elan
✔ Orca Excel
✔ Orca 5030
✔ Orca 5035
✔ Orca 5040

**Alternatives:**
On Orca 5035 and Orca 5040 radios, handset mode can be turned on and off via the user function menu.

---

**Function Key Option: Keypad Lock**

**Description:**
Pressing the function key locks the keypad so the keys cannot be activated accidentally. Which keys are locked depends on how the radio was programmed (Keypad Lock Disables, Key Settings II tab).

A long press of the clear key (✘) turns off keypad lock.

**Applies To:**
✘ Orca Elan
✔ Orca Excel
✘ Orca 5030
✔ Orca 5035
✔ Orca 5040

**Alternatives:**
On Orca 5035 and Orca 5040 radios, keypad lock can be activated via the user function menu.

---

**Function Key Option: Low Power**

**Description:**
Pressing the function key overrides the power level setting programmed for the channel in the Trunked Channel Blocks form or the Conventional Channels form so that the radio transmits at low power. Pressing the function key again returns the transmit power to the preprogrammed level. Whether low power transmit is on or off when the radio powers up is determined by the Initial Low Power Transmit Setting field (User Selectable Parameters form).

**Applies To:**
✔ Orca Elan
✔ Orca Excel
✔ Orca 5030
✔ Orca 5035
✔ Orca 5040

**Alternatives:**
Channels can be programmed to always transmit at low power (Power Level field, Trunked Channel Blocks form, Power Level field Conventional Channels form). On Orca 5035 and Orca 5040 radios, low power transmit can be activated via the user function menu.

## Function Key Option: Monitor

**Description:**
Pressing the function key turns monitor on and off.

**Applies To:**
✔ Orca Elan
✔ Orca Excel
✔ Orca 5030
✔ Orca 5035
✔ Orca 5040

**Alternatives:**
On Orca Excel radios, a long press of the clear/monitor key (✗) turns monitor on and off.

**monitor**
*When the radio is operating on conventional channels, monitor allows the radio user to override a channel's signalling and so hear all traffic on a channel.*

## Function Key Option: Night Use

**Description:**
Pressing the function key turns the night use feature on and off. Whether night use is on or off when the radio first powers up is determined by the Initial Setting for the Night Operation Backlighting field (User Selectable Parameters form).

**Applies To:**
✗ Orca Elan
✔ Orca Excel
✗ Orca 5030
✔ Orca 5035
✔ Orca 5040

**Alternatives:**
On Orca 5035 and Orca 5040 radios, night use can be turned on and off via the user function menu.

**night use**
*When the night use feature is on, the radio's backlighting activates whenever valid activity is detected, a key on the radio is pressed or when the radio receives a call. Backlighting remains on for the duration of the backlighting timer unless further activity is detected.*

## Function Key Option: Preset Calls

**Description:**
Pressing the function key sends a preset call.

**Applies To:**

✔ Orca Elan

✔ Orca Excel

✔ Orca 5030

✔ Orca 5035

✔ Orca 5040

**Alternatives:**

On Orca Excel and Orca 5040 radios, calls can also be dialled using the keypad.

---

**Function Key Option: Site Select**

**Description:**

Pressing the function key allows the user to select a control channel to which the radio must tune. Pressing the assigned function key again resumes normal hunting.

**Applies To:**

✘ Orca Elan

✔ Orca Excel

✘ Orca 5030

✔ Orca 5035

✔ Orca 5040

**Alternatives:**

On Orca 5035 and Orca 5040 radios, Select Site can be turned on and off via the user function menu.

---

**Function Key Option: Queue On/Off**

**Description:**

The QUEUE menu option allows the user to turn call queuing on and off.

**Applies To**

✘ Orca Elan

✘ Orca Excel

✘ Orca 5030

✔ Orca 5035

✔ Orca 5040

**Alternatives:**

On Orca 5035 and Orca 5040 radios, the radio queue can be turned on and off via the user function menu.

**call queuing**

*If the radio user is unable to answer calls immediately, they can be stored in the call queue so that the user can call back later. On Orca Elan and Orca 5030 radios, only one unanswered call can be queued. On Orca Excel, Orca 5035 and Orca 5040 radios, up to 20 calls can be stored.*

## Key Settings II Tab

Set function key options, including handset mode options, in the Key Settings II tab. The Key Settings II tab is shown below.



### Handset Volume Override

The radio can be programmed to use the function keys as volume keys while the radio is in handset mode. The volume increase and volume decrease settings can be assigned to short or long presses of function key 1 and function key 2. The programmed settings for the selected keypresses are overridden for use as volume keys while handset mode is active. Note that if a function key is set to turn handset mode on and off, the application does not allow you to select that function key setting for controlling volume in handset mode.

### Handset Inactivity Timer

The field Handset Inactivity Timer sets the amount of time the radio remains 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 is disabled and the radio remains in handset mode until the user disables it.

Note that when a call is received and handset mode is active, the ringing volume is also reduced. While handset mode is active, the user may not hear received calls due to the low ringing volume. You may wish to set Handset Inactivity Timer to a value other than 0 in order to minimise the chances of missing calls because handset mode is active.

## Keypad Lock Disables

Keypad lock is available on Orca Excel, Orca 5035 and Orca 5040 radios.

The Keypad Lock Disables fields determine what keys the keypad lock disables when it is activated. Keys that can be disabled are:

■ PTT key

■ function keys

■ numeric keys (Orca Excel and Orca 5040 only)

■ an external PTT key, e.g. on a lapel microphone

■ external function keys

■ menu/mode keys

Tick the box for each of the keys you wish to be disabled when the keypad lock is activated.

 The clear key can never be locked.

**keypad lock**

*The keypad lock prevents accidental operation of the radio by locking the keypad so that only a certain set of keys can be used.*

# User Selectable Parameters Form

Initial settings for various radio features are set in the User Selectable Parameters form. The User Selectable Parameters form is shown below.



For each parameter, the Initial Setting field is the value the field is set to when the radio is programmed.

## Network Name

Although Orca Elan and Orca 5030 radios do not display the Network Name, the this field can be programmed as an aid to identifying radios.

The Network Name field shows the name of the network, which will be displayed during the power-up sequence. Enter a name of up to 8 characters (Orca 5035 and Orca 5040 radios), or 12 characters (Orca Elan, Orca Excel or Orca 5030 radios) from:

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

## Display Radio Information on Power-up

The Display Radio Information on Power-up field only applies to Orca 5035 and Orca 5040 radios.

When it is enabled, the name of the network together with the radio network ID is displayed when the radio is switched on. This information appears before the power-up message.

# Default Microphone

The setting of the Default Microphone field determines which microphone operates during normal operation. Select Top or Bottom. While the radio is in handset mode, the bottom microphone operates, regardless of the setting of this field.

If the radio being programmed is not capable of supporting this feature, the Default Microphone feature is set to Bottom when the radio is programmed. Radios with a blue function key 1 support this feature.

**handset operation**

*Tait Orca radios can be operated as a normal radio where the user holds the radio with the microphone about 15 cm away from the mouth or it can be operated like a telephone handset. Handset mode is useful in noisy environments, when privacy is required or in quiet environments when the lowest volume setting seems too loud.*

# Channel Display

The Channel Display feature is not available on Orca Elan or Orca 5030 radios.

Channel Display allows the radio 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.

If Channel Display is 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.

# PTT Initiates a Call

This field is available for Orca Elan, Orca Excel and Orca 5030 radios.

The setting of the field PTT Initiates a Call determines whether a press of the PTT initiates a call request.

For Orca Elan and Orca 5030 radios, PTT Initiates a Call should be enabled.

The PTT on Orca 5035 and Orca 5040 radios initiates a call by default if the PTT is not locked. The PTT is locked if the Keypad Lock Disables option for PTT (Key Settings II tab) is ticked and Keypad Lock is accessed by a function key preset or KEYLOCK using the user function menu.

# Menu Button Initiates Call

The Menu Button Initiates Call field only applies to Orca 5035 and Orca 5040 radios.

When enabled, this field lets you initiate a call by simply pressing the Menu Accept Key.

# Initial Low Power Transmit Setting

The Initial Low Power Transmit Setting field determines whether all transmissions are made at low power or at the power level programmed for a channel. Tick the Initial Low

Power Transmit Setting box if all transmissions are to made at low power by default when the radio first powers up.

Orca 5035 and Orca 5040 radios can enable or disable low power transmit via the user function menu. This is defined on the User Defined Menu Form, by ticking the LOW PWR box.

All radios can enable or disable low power via a function key preset using the Low Power option (Key Settings I tab).

## Audio Noise Reduction

When the Audio Noise Reduction field is checked, weak signals such as background noise are reduced when the mute is open and nobody is talking on the channel. This applies to all channels.

## Initial Dynamic Power Setting

The Initial Dynamic Power Setting field determines whether or not dynamic power control is enabled when the radio first powers up.

Orca 5035 and Orca 5040 radios can enable or disable dynamic power control via the user function menu. This is defined on the User Defined Menu Form, by ticking the DYN PWR box.

All radios can enable or disable dynamic power control via a function key preset using the Dynamic Power Control option (Key Settings I tab).

**dynamic power control**

*Dynamic power control optimises the radio's power use by reducing the transmit power in high signal strength areas.*

## Power Reduction Level

The Power Reduction Level field sets the receive power level for the Dynamic Power Control feature, at which point the transmit power will be reduced.

Enter a value between 0 and 255. The default is 32.

## Power-up Message

The Power-up Message fields set the power–up message, which can be up to 24 characters chosen from:

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

Enter up to 12 characters in each box, including leading spaces if you want the message to be centred.

Although Orca Elan and Orca 5030 radios do not display a power-up message, the Power-up Message fields can be pro–grammed as an aid to identifying radios.

**power-up message**

*The power-up message is the message displayed after the radio is turned on.*

## Night Operation Backlighting

The Night Operation Backlighting field enables the night use feature. Tick the Initial Setting box to enable night use.

## Backlighting Timer

The Backlighting Timer field sets the duration of the backlighting timer. Enter a value between 1 and 10 seconds in steps of 1 second.

## Keypress Confidence Tones

The Keypress Confidence Tones field enables and disables keypress confidence tones. Tick the Initial Setting box to enable keypress confidence tones.

Note that if the Audible Indicators Initial Setting field is not ticked, keypress confidence tones are disabled, regardless of the setting of Keypress Confidence Tones. The tone set used is specified in the Tone Set field.

The volume of keypress confidence tones is set in the Audible Indicator Level field.

## Tone Set

The Tone Set field determines the set of confidence tones the radio uses. Two tone sets are available for Tait Orca radios. Select Tait or MPT 1343.

## Audible Indicators

The Audible Indicators field enables and disables audible indicators such as keypress confidence tones and other warnings. This field does not affect DTMF sidetones. Tick the Initial Setting box to enable audible indicators.

The setting of this field overrides that of the Keypress Confidence Tones field.

## Audible Indicator Level

The Audible Indicator Level field sets the volume of the radio's audible indicators. Select High or Low. If the field Audible Indicators is disabled, then the setting of this field has no effect.

**night use**

*When the night use feature is on, the radio's backlighting activates whenever valid activity is detected, a key on the radio is pressed or when the radio receives a call. Backlighting remains on for the duration of the backlighting timer unless further activity is detected.*

**keypress confidence tones**

*Keypress confidence tones are a confidence indicator that tells the radio user whether or not an action is permitted whenever a keypad key or function key is pressed.*

**audible indicators**

*Audible indicators include keypress confidence tones, received call signals, low battery and high temperature warnings, transmit timer and unanswered call signals.*

# Short Data Messages Form

Enter settings for Orca 5035/5040 Short Data Messages (SDMs) on the Short Data Messages Form. This form is not available for Orca Elan, Orca Excel and Orca 5030 radios. The Short Data Messages form is shown below:



## TGI

TGI is the Individual Incoming Short Data Timer. It defines the length of time that the radio shall wait for further signalling, if it expects any, during an individual short data call. If the TGI time elapses the short data state machine is reset and future short data signalling is assumed to be a new transaction.

Valid entries are from 0 to 16

## TGG

TGG is the Group Incoming Short Data Timer. It defines the length of time that the radio shall wait for further signalling, if it expects any, during a group short data call. If the TGG time elapses the short data state machine is reset and future short data signalling is assumed to be a new transaction.

Valid entries are from 1 to 30

## SDM Presets

Five SDM Presets are available for the 5035 and 5040. Each preset has a unique ID that cannot be changed and a string of up to 24 characters.

Valid characters are those which have ASCII values from 32 to 122. That is, upper and lower case letters, numbers and most symbols.

In order to send an SDM Preset the Enter SDM menu item must be selected on the User Defined Menu form.

# Part 5: Reference

This part outlines basic concepts related to the Trunked Programming Application.

**Appendices**

■ Appendix A: Introduction to Trunking
■ Appendix B: Selecting Groups
■ Appendix C: Switching to Conventional Channels
■ Appendix D: Squelch and Signalling in Conventional Mode
■ Appendix E: Introduction to DTMF
■ Appendix F: Radio Features

# Appendix A: Introduction to Trunking

A trunking system is an efficient alternative to a conventional repeater-based system. In a conventional system, radio users compete for access to individual channels, and one channel can be overloaded with traffic while others are virtually unused. A trunking system allows the automatic sharing of several channels by a number of radio users. Channels are pooled and allocated on demand for the duration of a call. As calls are completed, the channels are returned to the pool for allocation for other calls. Channel use is, therefore, optimised and the time each user must wait to make a call is reduced, as shown below.

## Key:

⬤ Call in progress

◯ Caller waiting

Conventional Radio Channels

Trunked Radio Channels
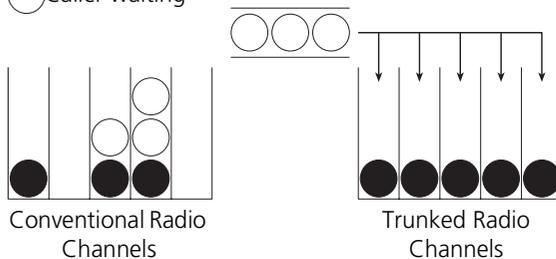
Thus each user has access to any free channel in a system. However, this access is under control of the trunking system and not under user control in much the same way as sub-scribers on the public switched telephone network make calls with equal priority but do not dictate the route that their call takes.

The function of the trunking system is complex; however, radio operation is simple because the system protocol and internal processing are transparent to the radio user. The use of microprocessors throughout the system adds features not found on conventional systems. Automatic call logging assists in monitoring the general performance on the system and provides data to bill trunking system subscribers according to their individual on air time.

## Control Channel Communication

One channel is designated the control channel, which the trunking system controller (TSC) uses to communicate with all radios on the system. Radios listen to the control channel until they are directed to a traffic channel to participate in a call. Traffic channels are allocated by the channel control module for the duration of the call. At the end of a call, the radios revert back to monitor the control channel. The traffic

**channel**

*A channel is a pair of radio frequencies, one used for transmitting and one used for receiving. In trunking systems, the term channel can also refer to the equipment at a site that is used to receive, modulate and transmit communications on a particular frequency.*

**repeater**

*A repeater receives a radio signal and retransmits it. Use of a repeater increases the coverage area of a two-way radio system and ensures more reliable performance in areas where signals are reflected or attenuated by buildings or terrain. In a repeater-based system, the radio's transmit frequency is the frequency the repeater is listening on, and the radio's receive frequency is the frequency the repeater rebroadcasts signals on.*

**control channel**

*In a trunking system, the control channel is used by the site to let the radio units in the site's coverage area know when they can transmit their call information.*

**trunking system controller**

*In MPT 1327 the trunking system controller (TSC) is the central intelligence necessary to enable the trunking system to function. The TSC communicates with all radios on the network via the control channel.*

channel is released into a standby mode awaiting the next allocation for a call.

The control channel communicates with the radios on the system using codewords. Every codeword is 64 bits long and consists of 48 bits of data and a 16-bit cyclical redundancy code (CRC), which is used for error checking. The codewords are sent over the control channel using fast frequency shift keying (FFSK), where a 1200 Hz tone represents digital one and an 1800 Hz tone represents digital zero.

A protocol called "slotted Aloha" is used to communicate over the control channel. All radios monitor the control channel's frequency, communicating continuously with the TSC using the appropriate codewords. Every second the TSC broadcasts approximately 20 codewords to the radios, and every second there are approximately 10 opportunities for radios to send codewords to the TSC. In simple terms, the codewords sent from the TSC ask each radio in turn "do you want to make a call?" If the radio user has not initiated a call, the radio will respond "no". If a call has been initiated, the radio will respond "yes", together with the identity of the called party and the type of call.

The system can be set up so that different channels act as the control channel at different times. The system can also be set up so that if a priority call is attempted when there are no free channels, the control channel can temporarily act as a traffic channel.

A radio remains on the control channel until it requests and receives permission to make a call or until it is notified that a call is being set up. The call setup process for a radio-to-radio call in which the called radio is free and the calling radio ends the call is illustrated below.
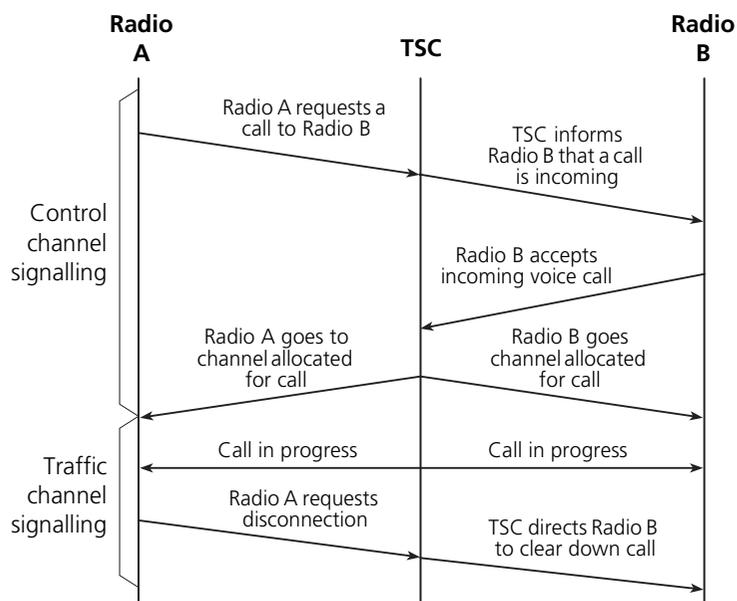
When the call is cleared down, both radios again monitor the control channel.

# Early Trunking Systems

Early trunking systems were usually based on five-tone Selcall or DTMF signalling but they had no common standard.

Over time, the radio spectrum became more crowded and so having some channels overloaded while others were virtually unused became less acceptable. In the early 1980s it become apparent that more efficient management of the frequency spectrum was necessary. The MPT 1327 and MPT 1343 standards were developed as part of the drive to make more efficient use of the frequency spectrum.

Both standards were published by the United Kingdom Department of Trade and Industry. MPT 1327 describes a signalling standard for trunked private land mobile radio systems. It describes the protocol used for communication between a trunking system controller (TSC) and the radios on the network. MPT 1343 describes the radio interface and outlines the minimum performance requirements for radios operating on MPT 1327-compliant networks. In short, MPT 1327 describes the communications protocol used between the network and the radios on the network, whereas MPT 1343 describes the radio performance and the interface between the radio and the radio user. The interactions on an MPT network are illustrated below.

**Selcall**

*Selcall stands for "selective calling", which is a signalling system that uses sequences of audible tones to isolate calls intended for specific radios.*

**DTMF**

*DTMF (dual tone multiple frequency) is the tone-based system used for the world's telephone networks. A DTMF "tone" actually consists of a pair of tones. DTMF tones are sometimes referred to as "touch tones".*
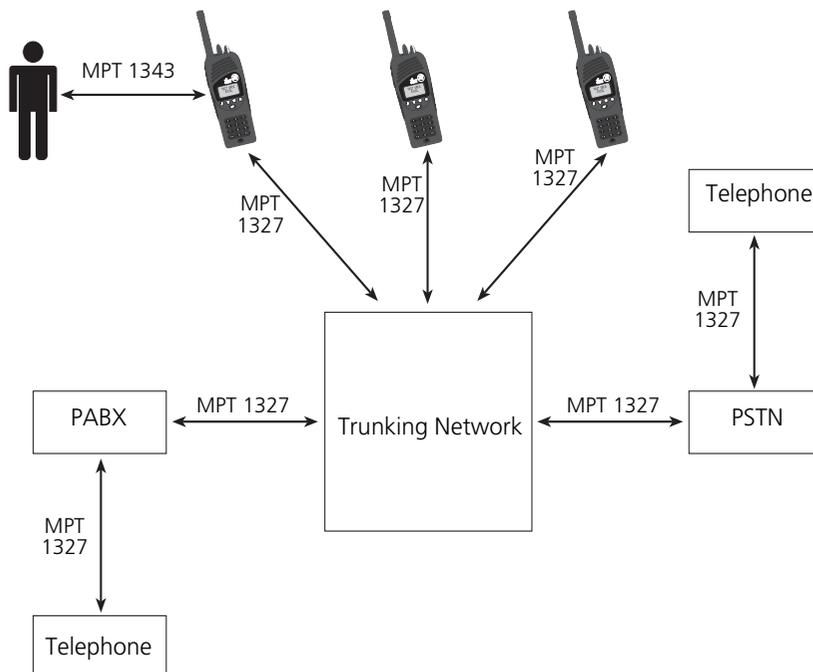
Since MPT 1327 and MPT 1343 were published, a number of variants of the MPT 1343 specification have arisen that offer different radio-user interfaces, which are commonly referred to as dialling schemes. Tait trunked radios are designed to operate on MPT 1327-compliant networks and support the following MPT 1327-compatible dialling schemes:

■ MPT 1343

■ CPSX

■ Nokia ANN

■ ZVEI

■ Number Presets

# Addressing

A unique identity number is programmed into each radio operating on a trunking network so the radio can be contacted by the TSC and, thus, by the other users of the system. The identity number consists of a unique number for the radio and numerical information shared with the other members of the same organisation, or fleet. The identity of each radio provides a unique address that allows it to be contacted by members of the same fleet and other fleets using the same trunking network.

MPT 1327 and MPT 1343 specify different but related numbering schemes for addressing trunked radios.

■ MPT 1327 specifies the numbering scheme used for identifying radios on a network. MPT 1327 numbers are used for all communications between all elements of the trunking network, including the radios operating on that network.

■ MPT 1343 specifies the numbering scheme used by radio users. The MPT 1343 numbering scheme is simpler than the MPT 1327 format and allows radio users to address radios without having to remember long addresses. Typically it is possible to make a call by dialling only a two- or three-digit number.

As discussed in "Early Trunking Systems" on page 107, variants of the MPT 1343 specification have arisen that offer different radio-radio user interfaces, which are commonly referred to as dialling schemes. These dialling schemes include:

■ CPSX dialling

■ Nokia ANN

■ ZVEI

MPT 1327 numbering is described below, and MPT 1343 numbering is described on page 109. CPSX dialling is discussed on page 110.

**CPSX dialling**

*CPSX dialling is a dialling scheme designed for use on Chinese networks that use 5-digit interfleet dialling. It is compatible only with other CPSX dialling trunking systems.*

**Nokia ANN**

*Nokia ANN (Algorithmic Network Numbering) is a dialling scheme designed for use on Nokia Actionet networks. It differs from MPT 1343 in the way it divides up fleets. Nokia ANN numbering reduces the number of digits that must be dialled for calls between fleets.*

**ZVEI**

*ZVEI is a dialling scheme based on the MPT 1343 dialling scheme. The ZVEI dialling scheme is used on Regionet 43 networks.*

## MPT 1327 Numbering

MPT 1327 numbers are used by the trunking system controller for communicating with radios and other devices on the network.

Under MPT 1327, each radio is assigned a unique identity as follows:

3 digit prefix
between 0
and 127

**p p p / i i i i**

4 digit ident
between 1
and 8100
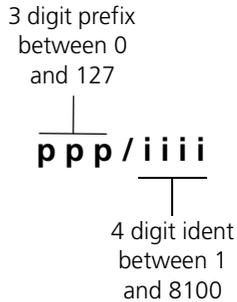
The 3-digit prefix merely extends the range of numbers available for addressing.

The available idents (1 to 8100) are divided to provide individual and group addresses. A block of idents are usually allocated for use by a particular fleet. Idents 0 and above 8100 are reserved for addressing special destinations, such as PABX and PSTN numbers.

## MPT 1343 Numbering

Under MPT 1343, radios on a network are divided into fleets. Since a trunking system is used by many different organisations, a fleet usually includes all the radios of a single organisation, although a large organisation could have several fleets on the network.

All radios within a fleet have the same fleet number and it is usually possible to make calls between radios in different fleets. Each radio in a fleet has a two- or three-digit unit number that is assigned to only one radio in the fleet. If the radio number is two digits, there can be up to 70 radios in that fleet; if the radio number is three digits, there can be up to 700 radios in the fleet. The diagram below illustrates MPT 1343 radio numbering.

3-digit prefix between
200 and 327

2-digit unit number
between 20 and 89,
or a 3-digit unit
number between
200 and 899

**p p p / f f f f / u u**

**p p p / f f f f / u u u**

4-digit fleet number
between 2001 and 6050
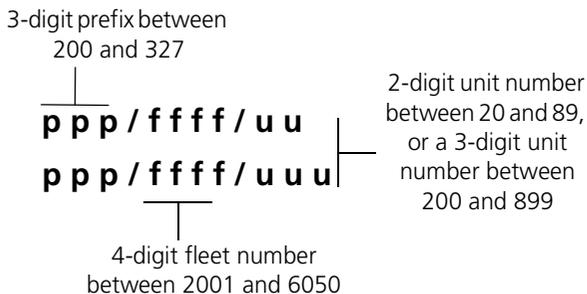
MPT 1343 allows radios to be grouped together so that calls can be received simultaneously. A range of numbers (called group numbers) are reserved for identifying groups of radios, and one or more radio units may be associated with that group number (subscribed to the group). These two- or three-digit group numbers are used in place of the radio unit number, as illustrated below.

**p p p / f f f f / g g**

**p p p / f f f f / g g g**

2-digit group number between 90 and 99, or a 3-digit group number between 900 and 998
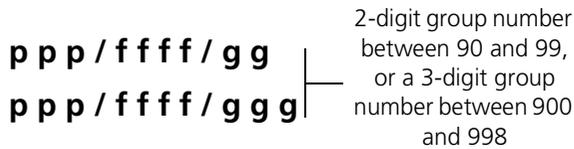
To make a call to another radio, the radio user dials an MPT 1343 number, which is converted to MPT 1327 for communication with the TSC and the receiving radio. In the receiving radio, the MPT 1327 number is converted to MPT 1343 for displaying to the radio user.

In order for the addresses to be converted correctly:

■ the trunking system must be aware of how the available idents are partitioned into fleets, and

■ the radios must be aware of the base ident of their own fleet.

## CPSX Dialling

As with MPT 1343 numbering, radios using CPSX dialling have a prefix, fleet number and unit number, as illustrated below.

3-digit prefix between 200 and 327

3-digit unit number from 200 to 999*

**p p p / f f / u u u**

2-digit fleet number from 20 to 79
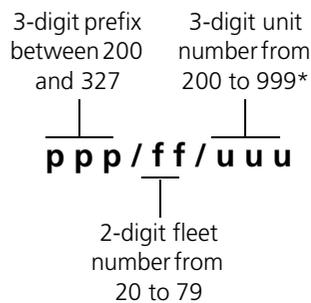
*Unit numbers 900 to 999 are reserved for groups.

The prefix allocation is identical to MPT 1343, but:

■ the fleet number is two digits, from 20 to 79

■ the unit number is three digits, from 200 to 999

■ unit numbers from 900 to 999 are reserved for groups

■ individual and group numbers use the same fleet number.

Within each prefix, there are 8100 user addresses, which are divided into ten blocks of 810 addresses each. Three parameters, Large, Medium and Small, specify how the number and size of fleets within those blocks of 810 addresses. There are four options for fleet size:

- Large: 700 units
- Medium: 354 units
- Small: 236 units
- Tiny: 118 units.

The number of blocks allocated as large, medium, small and tiny fleets in a prefix is calculated as follows.

Large fleets = $l$
Medium fleets = 2 $(m - l)$
Small fleets = 3 $(s - m)$
Tiny fleets = 6 $(10 - s)$

So if parameters *Large*, *Medium* and *Small* are 2, 7 and 9 respectively, there are:

- 2 blocks of large fleets = 2 large fleets
- 5 blocks of medium fleets = 10 medium fleets
- 2 blocks of small fleets = 6 small fleets
- 1 block of tiny fleets = 6 tiny fleets

The allocation of fleets throughout the prefix's 8100 idents, for this example, is as illustrated in the diagram below.



| 0 | 810 | 1620 | 2430 | 3240 | 4050 | 4860 | 5670 | 6480 | 7290 |
|---|---|---|---|---|---|---|---|---|---|
| 809 | 1619 | 2429 | 3239 | 4049 | 4859 | 5669 | 6479 | 7289 | 8100 |

- Large fleet
- Medium fleet
- Small fleet
- Tiny fleet
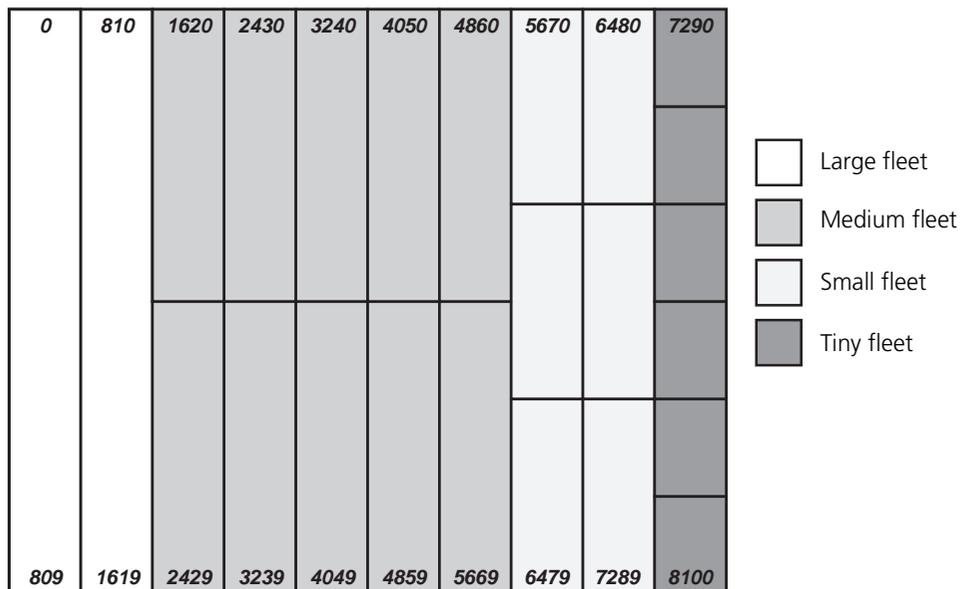
Note that within each prefix, fleets are grouped together according to size. That is, all large fleets will be allocated to the lower idents and all tiny fleets will be allocated to the higher idents.

Within each fleet, there is a range of individual and group addresses. For each fleet size, the possibilities are:

| Fleet Size | Radios | Groups | Radio Number Range | Group Number Range |
|---|---|---|---|---|
| Large | 700 | 100 | 200 to 899 | 900 to 999 |
| Medium | 354 | 51 | 200 to 553 | 900 to 950 |
| Small | 236 | 34 | 200 to 435 | 900 to 933 |
| Tiny | 118 | 17 | 200 to 317 | 900 to 916 |

Under CPSX dialling, the number of digits the radio user is required to dial is only five for interfleet calls (as opposed to 6 or 7 under MPT 1343) and eight for interprefix calls (as opposed to 9 or 10 under MPT 1343). Radios can display the caller's identity for interfleet and interprefix calls, whereas under MPT 1343 radios can only indicate that the call is from outside the fleet or prefix.

# Appendix B: Selecting Groups

Groups set for Selectable, Scan or Scan + Selectable (Group Membership array in the Radio Identity form can be assigned to positions on the 16-way selector by setting them up as pre-set calls numbered 1 to 16 or as function key preset calls.

For groups designated Selectable or Scan + Selectable, the groups number can be entered for Call String, or for the Function Key Preset Calls. When the user switches to the corresponding position on the 16-way selector or presses the assigned function key, the radio will be subscribed to the group. The radio will be unsubscribed when the user switches to another position or presses the assigned function key again.

# Appendix C: Switching to Conventional Channels

Conventional channels can be accessed as follows:

■ They can be assigned to positions on the 16-way selector by setting them up as preset calls numbered 1 to 16. Enter the Access Number (Conventional Channels form) for the conventional channel in the Call String field (Preset Calls form).

■ You can access Conventional Channels via the press of a function key. Enter a conventional channel into the Preset Calls array, add the Preset ID to Function Key Preset Call 1 or 2 (Preset Calls form), and select the corresponding Function Key Preset Call option (Key Settings I tab).

■ For Orca 5035 or Orca 5040 radios, you can access conventional channels using the User Defined Menu. Assign conventional channels to preset calls, and tick the SELECT PRESET box (User Defined Menu form).

■ For Orca Excel or Orca 5040 radios, you can access conventional channels by dialling the access number associated with the channel using the numeric keys on the keypad, then either the enter key (Orca Excel), Menu Accept key (Orca 5040) or PTT.

# Appendix D: Squelch and Signalling in Conventional Mode

Tait Orca trunked radios can switch between trunking and conventional modes of operation. In conventional mode, a radio communicates directly with other radios or via a repeater rather than through the trunking system. Without some mechanism for filtering what the radio broadcasts to the user while in conventional mode, the radio's speaker would operate continuously and the user would hear not only any speech on a channel, but also all noise. This would be annoying for the radio user and so the radio filters out unwanted signals using various methods.

## Squelch

At the most basic level, the squelch feature ensures that the speaker only unmutes when an intelligible signal is received. A signal is considered intelligible when it is strong enough to exceed a predetermined squelch threshold.

Tait Orca radios can operate at two different squelch thresholds, city squelch and country squelch. The specific values of city and country squelch are set at radio calibration time, but are generally:

- country: 12 dB SINAD
- city: 16 dB SINAD

The squelch threshold for city squelch is higher than that for country squelch so that the radio is effectively less sensitive on channels programmed with city squelch than on channels programmed with country squelch. City squelch is intended for use in environments where signal strength is likely to be strong throughout the area where the radio is operating and where a high level of background noise could cause the speaker to unmute for unintelligible signals were it set to a lower squelch threshold. Country squelch is intended for use in lower signal strength areas.

### Programming Squelch Thresholds

At radio programming time, conventional channels are programmed for either city or country squelch in the Conventional Channels form. A radio can have a mix of city and country squelch channels, which can be useful if a radio is going to be used in both high and low signal strength areas.

For example, two channels could be set up with the same transmit and receive frequencies and subaudible signalling but with different squelch levels. Both channels would have the same traffic and the radio operator could tune in to the city channel while they were close to the repeater. If the signal started to become less intelligible as the user started to

move away from the repeater, they could switch to the country channel.

## Mutes

A mute, or squelch, controls the circumstances under which a received signal is passed to the radio's speaker. When a mute is active, the radio's speaker only unmutes under certain conditions, determined by the type of signalling operating on a channel.

## Signalling

Squelch ensures that the radio user only hears intelligible signals, but the user hears all traffic on a channel. This could become a nuisance, particularly if several companies are using the same channel. Signalling provides a way of isolating groups of users so they only hear traffic intended for that group. It does not provide privacy since anyone tuning to a channel can hear its traffic if they wish, but it does minimise the possibility of radio users hearing nuisance traffic.

Signalling is non-voice coding on a channel for the purpose of identifying parties and/or segregating user groups. If a radio receives signalling that matches that programmed for the radio, the signalling is said to be valid and the radio's mute opens. Otherwise, the transmission is ignored and the radio remains silent, although the radio's channel busy indicator is activated.

The types of signalling available for Tait Orca radios are CTCSS and DCS, although DCS signals can only be encoded and sent (not received and decoded) in Tait Orca Trunked radios.

## CTCSS and DCS

CTCSS and DCS use subaudible signalling to segregate groups of users by transmitting additional information with normal speech.

For CTCSS the additional information is transmitted in the form of subaudible tones in the frequency band 67 to 250.3 Hz. For DCS the additional information is transmitted as digital data using frequencies between 10 and 134 Hz.

Subaudible signalling is assigned on a per channel basis (in the Conventional Channels form), and each channel can have different receive and transmit signalling.

**CTCSS**
*continuous tone controlled squelch system*

**DCS**
*digitally coded squelch*

Tables 2, 3 and 4 show the CTCSS frequencies and DCS codes Tait Orca radios support.

Table 2: CTCSS Tone Frequencies Supported by Tait Orca Radios

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 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 | |

Table 3: Standard DCS Codes and Their Inverses

| Code : Inv | Code : Inv | Code : Inv | Code : Inv | Code : Inv | Code : Inv | Code : Inv |
|---|---|---|---|---|---|---|
| 023 : 047 | 073 : 506 | 156 : 265 | 261 : 732 | 365 : 125 | 503 : 162 | 654 : 743 |
| 025 : 244 | 074 : 174 | 162 : 503 | 263 : 205 | 371 : 734 | 506 : 073 | 662 : 466 |
| 026 : 464 | 114 : 712 | 165 : 251 | 265 : 156 | 411 : 226 | 516 : 432 | 664 : 311 |
| 031 : 627 | 115 : 152 | 172 : 036 | 271 : 065 | 412 : 143 | 532 : 343 | 703 : 565 |
| 032 : 051 | 116 : 754 | 174 : 074 | 306 : 071 | 413 : 054 | 546 : 132 | 712 : 114 |
| 043 : 445 | 125 : 365 | 205 : 263 | 311 : 664 | 423 : 315 | 565 : 703 | 723 : 431 |
| 047 : 023 | 131 : 364 | 223 : 134 | 315 : 423 | 431 : 723 | 606 : 631 | 731 : 155 |
| 051 : 032 | 132 : 546 | 226 : 411 | 331 : 654 | 432 : 516 | 612 : 346 | 732 : 261 |
| 054 : 413 | 134 : 223 | 243 : 351 | 343 : 532 | 445 : 043 | 624 : 632 | 734 : 371 |
| 065 : 271 | 143 : 412 | 244 : 025 | 346 : 612 | 464 : 026 | 627 : 031 | 743 : 654 |
| 071 : 306 | 152 : 115 | 245 : 072 | 351 : 243 | 465 : 331 | 631 : 606 | 754 : 116 |
| 072 : 245 | 155 : 731 | 251 : 165 | 364 : 131 | 466 : 662 | 632 : 624 | |

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 | |

# Appendix E: Introduction to DTMF

DTMF (dual tone multiple frequency) is the tone–based system used for the world's telephone networks. A DTMF tone actually consists of a pair of tones.

Tait Orca radios can encode series of DTMF tones (referred to as DTMF strings) and so can make DTMF calls, but cannot decode DTMF tones and so cannot receive DTMF calls. If the system a radio is operating on has access to systems that make use of DTMF tones, the radio can make DTMF calls to those systems. Examples of such systems are the public switched telephone network, message retrieval systems and telephone banking facilities.

**tone**

*A tone is a sound wave of a particular frequency. When defining DTMF strings, the different tones are represented by the characters 0-9, A-D, ★ and #. The frequencies used are determined by an internationally accepted standard.*

**DTMF string**

*A DTMF string is a series of DTMF tone pairs.*

## DTMF Tone Transmission

How DTMF strings are transmitted is illustrated in the diagram below.

| transmit key up delay (ms) | Tone 1 | Gap | Tone 2 | Gap | Tone 3 | ... |
|---|---|---|---|---|---|---|
| | X | Y | X | Y | X | |
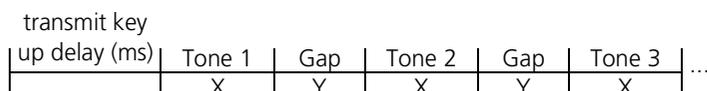
The different timing parameters are programmable and are defined in the DTMF Parameters form.

The transmit key up delay is the time, in milliseconds, between when the transmission has been initiated (by the press of a function key, the DTMF key or the enter key) and the time transmission of the DTMF string actually starts. The transmit key up delay gives the repeater time to stabilise before the first DTMF tone is transmitted, and is set in the Transmit Key Up Delay field.

$X$ is how long each tone in the string is transmitted, or the tone duration, in milliseconds. The minimum tone duration is programmable, as outlined below. The actual duration may be longer if the radio user presses the key for longer than the minimum tone duration.

■ The duration of tones 0-9 and A–D is set in the Minimum Tone Duration (0-9, A-D) field.

■ The duration of tones ★ and # is set in the Minimum Tone Duration (★, #) field.

$Y$ is the amount of time between the transmission of each tone in the string, or the gap duration, in milliseconds. The gap duration is set in the Minimum Intertone Gap field.

## DTMF Overdialling

The DTMF dialling feature allows the radio user to dial DTMF strings using the numeric keypad. DTMF dialling is available on Orca Excel and Orca 5040 radios.

DTMF overdialling features are set in the DTMF Parameters form.

■ The Manual DTMF Dialling field enables and disables DTMF overdialling.

■ The Interdigit Tx Hold Time field determines how long the radio keeps transmitting between the encoding of each tone. This provides a delay for the user to dial the next digit without transmission stopping and restarting again. Some systems require continuous transmission between DTMF tones and for such systems, this field should be set to a long hold time.

■ The PTT as Shift Key field enables and disables the PTT as shift key feature.

# Appendix F: Radio Features

This appendix lists the features available on Tait Orca radios and, if a feature is programmable, in what form or forms it is set up. See the glossary, starting on page 128, for descriptions of the features.

## Man-Machine Interface

| Feature | Orca Elan | Orca Excel | Orca 5030 | Orca 5035 | Orca 5040 | Where Programmed |
|---|---|---|---|---|---|---|
| Preset calls | 20 | 20 | 20 | 100 | 100 | Preset calls are programmed in the Preset Calls form. |
| PTT key | ✔ | ✔ | ✔ | ✔ | ✔ | Not programmable. However, the PTT key can be used for call initiation; this option is enabled in the User Selectable Parameters form (PTT Initiates a Call field), or for Orca 5035 and Orca 5040, in the User Defined Menu form (PTTLOCK) and Key Settings II tab (Keypad Lock Disables > PTT). |
| LED indicator | ✔ | ✔ | ✔ | ✔ | ✔ | Not programmable |
| Function keys | ✔ | ✔ | ✔ | ✔ | ✔ | Functions are assigned to function key settings in the Key Settings form. |
| Keypress confidence tones | ✔ | ✔ | ✔ | ✔ | ✔ | Keypress confidence tones are enabled and disabled in the User Selectable Parameters form. The option to toggle keypress confidence tones on and off via a function key press is programmed in the Key Settings form. On 5035 and 5040 radios, the option to turn keypress confidence tones on and off via the user function menu is set in the User Defined Menu form (TONES option). |
| Handset operation | ✔ | ✔ | ✔ | ✔ | ✔ | Handset mode is assigned to a function key setting in the Key Settings form. On 5035 and 5040 radios, the option to turn handset mode on and off via the user function menu is set in the User Defined Menu form (HANDSET option). |
| Automatic accessory detection | ✔ | ✔ | ✔ | ✔ | ✔ | Not programmable |
| Transmit timer | ✔ | ✔ | ✔ | ✔ | ✔ | Network Parameters form, TT field. |

| Feature | Orca Elan | Orca Excel | Orca 5030 | Orca 5035 | Orca 5040 | Where Programmed |
|---------|-----------|------------|-----------|-----------|-----------|------------------|
| 16-way selector switch | ✔ | ✔ | ✔ | ✔ | ✔ | Preset calls (programmed in the Preset Calls form) numbered 1 to 16 are automatically assigned to positions on the 16-way selector. |
| On/off volume control switch | ✔ | ✔ | ✔ | ✔ | ✔ | Not programmable |
| LCD display (2 x 12 characters) | ✘ | ✔ | ✘ | ✔ | ✔ | Not programmable |
| Received signal strength indicator | ✘ | ✔ | ✘ | ✔ | ✔ | Not programmable |
| Battery charge indicator | ✘ | ✔ | ✘ | ✔ | ✔ | Not programmable |
| Low battery warning | ✔ | ✔ | ✔ | ✔ | ✔ | Not programmable |
| Keypad lock | ✘ | ✔ | ✘ | ✔ | ✔ | Keypad lock is assigned to a function key setting in the Key Settings form. What keys are locked is also set in the Key Settings form. On 5035 and 5040 radios, the option to activate keypad lock via the user function menu is set in the User Defined Menu form (KEYLOCK option). |
| Backlighting | ✘ | ✔ | ✘ | ✔ | ✔ | Backlighting is assigned to a function key setting in the Key Settings form. |
| Night use | ✘ | ✔ | ✘ | ✔ | ✔ | Night use is assigned to a function key setting in the Key Settings form. On 5035 and 5040 radios, the option to turn night use on and off via the user function menu is set in the User Defined Menu form (NIGHT option). |
| International language messages | ✘ | ✔ | ✘ | ✔ | ✔ | The language radio messages appear in is set in the Specifications form. |
| Keypad keys | 0 | 17 | 0 | 5 | 17 | Not programmable |
| Numeric dialling | ✘ | ✔ | ✘ | ✘ | ✔ | Not programmable |

# Power Saving Features

| Feature | Orca Elan | Orca Excel | Orca 5030 | Orca 5035 | Orca 5040 | Where Programmed |
|---|---|---|---|---|---|---|
| Dynamic power control | ✔ | ✔ | ✔ | ✔ | ✔ | Dynamic power control is assigned to a function key setting in the Key Settings form.<br>On 5035 and 5040 radios, the option to turn dynamic power control on and off via the user function menu is set in the User Defined Menu form (DYN PWR option). |
| Low power transmit | ✔ | ✔ | ✔ | ✔ | ✔ | Low power transmit is assigned as a function key setting in the Key Settings form.<br>Channels can also be programmed to permanently transmit at low power (Power Level field, Trunked Channel Blocks form, Power Level field Conventional Channels form).<br>On 5035 and 5040 radios, the option to turn low power transmit on and off via the user function menu is set in the User Defined Menu form (LOW PWR option). |

# Dialling Schemes

| Feature | Orca Elan | Orca Excel | Orca 5030 | Orca 5035 | Orca 5040 | Where Programmed |
|---|---|---|---|---|---|---|
| MPT 1343 | ✔ | ✔ | ✔ | ✔ | ✔ | Select MPT1343 for the Dialling Scheme (Fleet Identity or Radio Identity forms). |
| Regionet (ZVEI) | ✔ | ✔ | ✔ | ✔ | ✔ | Select ZVEI for the Dialling Scheme (Fleet Identity or Radio Identity forms). |
| Nokia ANN | ✔ | ✔ | ✔ | ✔ | ✔ | Select Nokia ANN for the Dialling Scheme (Fleet Identity or Radio Identity forms). |
| CPSX dialling | ✔ | ✔ | ✔ | ✔ | ✔ | Select CPSX Dialling for the Dialling Scheme (Fleet Identity or Radio Identity forms). |
| number presets | ✔ | ✔ | ✔ | ✔ | ✔ | Select Number Presets for the Dialling Scheme (Fleet Identity or Radio Identity forms). The radio user will only be able to dial the preset calls programmed in the Preset Calls form. |

# MPT Network-Driven Function

| Feature | Orca Elan | Orca Excel | Orca 5030 | Orca 5035 | Orca 5040 | Where Programmed |
|---------|-----------|------------|-----------|-----------|-----------|------------------|
| Basic stun and revive | ✔ | ✔ | ✔ | ✔ | ✔ | Stun and revive is enabled and disabled in the Fleet Parameters form. Stun and revive must be supported by the network. |
| Multi-network support | 1 | 3 | 1 | 4 | 4 | Select the Add Net button (or the Network>Add Network command) to add additional networks. |

# Trunked Call Options

| Feature | Orca Elan | Orca Excel | Orca 5030 | Orca 5035 | Orca 5040 | Where Programmed |
|---------|-----------|------------|-----------|-----------|-----------|------------------|
| Priority calls | ✔ | ✔ | ✔ | ✔ | ✔ | Not programmable. However, the only priority calls Orca Elan and Orca 5030 radios can make are those programmed as preset calls (Preset Calls form). |
| Emergency call | ✔ | ✔ | ✔ | ✔ | ✔ | The number the emergency call will be sent to is specified in the Fleet Identity form (Prime Emergency Number field). On Orca Elan and Orca 5030 radios, an emergency call can only be made if one is programmed as one of the preset calls (Preset Calls form). On Orca Excel and Orca 5040 radios, the radio user can also dial an emergency call. If the user specifies a radio number when dialling the emergency call, the Prime Emergency Number is not used. |
| Group calls | ✔ | ✔ | ✔ | ✔ | ✔ | Group calling is enabled by entering a number other than 0 in the Fleet Group Number field (Fleet Identity form). The highest group number that can be called by any radio within a fleet is set in the Highest Group Number in Fleet field (Fleet Identity form). |
| Conference calls | ✔ | ✔ | ✔ | ✔ | ✔ | Conference calling is enabled if group calling is allowed. However, the only conference calls Orca Elan and Orca 5030 radios can make are those programmed as preset calls (Preset Calls form). |

| Feature | Orca Elan | Orca Excel | Orca 5030 | Orca 5035 | Orca 5040 | Where Programmed |
|---|---|---|---|---|---|---|
| Broadcast calls | ✔ | ✔ | ✔ | ✔ | ✔ | Broadcast calling is enabled if group calling is allowed. However, the only broadcast calls Orca Elan and Orca 5030 radios can make are those programmed as preset calls (Preset Calls form). |
| Status calls | ✔ | ✔ | ✔ | ✔ | ✔ | Orca Elan and Orca 5030 radios can send status calls, if programmed as a preset call. However, Orca Elan and Orca 5030 radios cannot display a received status call. |
| PSTN calls | ✔ | ✔ | ✔ | ✔ | ✔ | PSTN calling is enabled in the Call Options form. |
| PABX calls | ✔ | ✔ | ✔ | ✔ | ✔ | PABX calling is enabled in the Call Options form. |
| Interfleet calls | ✔ | ✔ | ✔ | ✔ | ✔ | Interfleet calling is enabled in the Call Options form. |
| Interfleet group calls | ✔ | ✔ | ✔ | ✔ | ✔ | Interfleet group calling is enabled in the Call Options form. |
| ALLI calls | ✔ | ✔ | ✔ | ✔ | ✔ | All ident calling is enabled in the Call Options form. |
| Despatcher call-back request | ✔ | ✔ | ✔ | ✔ | ✔ | The option to send despatcher callback requests is enabled in the Call Options form. The number the despatcher callback request will be sent to is specified in the Fleet Identity form (Prime Despatcher Number field). On Orca Elan and Orca 5030 radios, a despatcher callback request can only be sent if the call is programmed as one of the preset calls (Preset Calls form). On Orca Excel and Orca 5040 radios, the radio user can also dial a despatcher callback request. If the user specifies a radio number when dialling the call, the Prime Despatcher Number is not used. |
| Last number redial | ✔ | ✔ | ✔ | ✔ | ✔ | Not programmable |
| Call diversion | ✔ | ✔ | ✔ | ✔ | ✔ | Not programmable. However, Orca Elan and Orca 5030 radios can only activate and deactivate call diversion if the required strings are programmed as preset calls (Preset Calls form). |

| Feature | Orca Elan | Orca Excel | Orca 5030 | Orca 5035 | Orca 5040 | Where Programmed |
|---|---|---|---|---|---|---|
| Do not disturb | ✔ | ✔ | ✔ | ✔ | ✔ | Do not disturb is assigned to a function key setting in the Key Settings form.However, if no function key is assign the do not disturb option, Orca Elan and Orca 5030 radios can only activate and deactivate do not disturb if the required strings are programmed as preset calls (Preset Calls form). On 5035 and 5040 radios, the option to turn do not disturb on and off via the user function menu is set in the User Defined Menu form (QUIET option). |
| Callback facility | ✘ | ✔ | ✘ | ✔ | ✔ | The callback facility is enabled in the Call Options form. |
| Unanswered call queuing | ✘ | ✔ | ✘ | ✔ | ✔ | Unanswered call queuing is enabled in the Call Options form (Call Queuing set to Unanswered). If Call Queuing is set to Disabled, a single unanswered call will be queued. On 5035 and 5040 radios, the option to turn call queuing on and off via the user function menu is set in the User Defined Menu form (QUEUE option). |
| Full call queuing (up to 20 calls) | ✘ | ✔ | ✘ | ✔ | ✔ | Full call queuing is enabled in the Call Options form (Call Queuing set to Full or Unanswered). On 5035 and 5040 radios, the option to turn call queuing on and off via the user function menu is set in the User Defined Menu form (QUEUE option). |

# Trunked Mode Functions and Features

| Feature | Orca Elan | Orca Excel | Orca 5030 | Orca 5035 | Orca 5040 | Where Programmed |
|---------|-----------|------------|-----------|-----------|-----------|------------------|
| Preferential NDD hunt facility (home hunt) | ✔ | ✔ | ✔ | ✔ | ✔ | Preference data is defined in the NDD Preference Data array (Acquisition Data form. |
| Background search sequence | ✔ | ✔ | ✔ | ✔ | ✔ | The background search feature is enabled in the Hunting Parameters form. Parameters related to background searches include TL, TH, NS, NE, NR, LM1, LM2, LM3 and LM4 and are set in the Network Parameters form. What channels are sampled is defined in the Normal Hunt Channels array (Hunting Parameters form) and preference data is defined in the NDD Preference Data array (Acquisition Data form). 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 NDD Preference Data array) or stronger than the current control channel by a certain margin, the radio will perform a preferential hunt to acquire the new control channel. |
| Vote now | ✔ | ✔ | ✔ | ✔ | ✔ | Vote now is enabled in the Hunting Parameters form (Act On Vote Now field). The vote now advice margin is also set in the Hunting Parameters form. |
| Call cancellation | ✔ | ✔ | ✔ | ✔ | ✔ | The clear function is assigned to a function key setting in the Key Settings form. Calls can also be cancelled by switching to another position on the 16-way selector, and on Orca Excel radios, calls can be cancelled by dialling the string *#. |
| Trunked channel block frequency barring | ✔ | ✔ | ✔ | ✔ | ✔ | Factory only. Limitations to the range of frequencies available are set in the Trunked Channel Blocks form (Bar Access and Rx Partition Frequency fields). |
| User selectable talk groups | ✔ | ✔ | ✔ | ✔ | ✔ | What groups a radio belongs to is set in the Group Membership array. The number of groups a radio can belong to is set in the Maximum Number of Group Addresses field, and how the user selects groups is determined by the User Programmable field. All fields are in the Radio Identity form. |

| Feature | Orca Elan | Orca Excel | Orca 5030 | Orca 5035 | Orca 5040 | Where Programmed |
|---------|-----------|------------|-----------|-----------|-----------|------------------|
| Manual site select | ✘ | ✔ | ✘ | ✔ | ✔ | Site select is assigned to a function key setting in the Key Settings form. On 5035 and 5040 radios, the option to activate site select via the user function menu is set in the User Defined Menu form (SELECT SITE option). |
| Call time limit display | ✘ | ✔ | ✘ | ✔ | ✔ | Not programmable |
| Call time display count up/down | ✘ | ✔ | ✘ | ✔ | ✔ | Whether the duration or the time remaining for a call is displayed is set in the Call Timer Count Up field (Fleet Parameters form). |
| Control channel display | ✘ | ✔ | ✘ | ✔ | ✔ | Control channel display is set in the Hunting Parameters form (Channel Display field). |

## Conventional Mode Features

| Feature | Orca Elan | Orca Excel | Orca 5030 | Orca 5035 | Orca 5040 | Where Programmed |
|---------|-----------|------------|-----------|-----------|-----------|------------------|
| Conventional channels | 10 | 10 | 10 | 10 | 10 | Conventional channels are programmed in the Conventional Channels form. Conventional channels are accessed by dialling the Access Number set in the Conventional Channels array. On Orca Elan and Orca 5030 radios, conventional channels can only be accessed if the Access Number is set for one of the preset calls (Preset Calls form). |
| CTCSS | ✔ | ✔ | ✔ | ✔ | ✔ | Conventional channels are set for CTCSS in the Conventional Channels form. |
| DCS (encode only) | ✔ | ✔ | ✔ | ✔ | ✔ | Conventional channels are set for DCS encoding in the Conventional Channels form. |
| Monitor function | ✔ | ✔ | ✔ | ✔ | ✔ | The monitor function is assigned to a function key setting in the Key Settings form. |

# Glossary

Terms in *italics* are defined in the glossary.

**16-way selector**   The 16-way selector is the larger of the two switches on the top of each radio. Each position on the 16-way selector can be programmed to make a *preset call*, subscribe to a *group*, access a *conventional channel* or change to another trunking *network*.

**access level**   The access level determines the fields and forms within the Trunked Programming Application that are editable. The access level depends on the password entered, where the lowest access level requires no password.

**accessory**   An accessory is an external device fitted to a radio, such as an external speaker microphone or lapel microphone. Accessories are fitted to the radio via the accessory connector on the back of the radio.

**ACK**   ACK is short for acknowledgement. An acknowledgment is a signal sent by a called radio unit as part of the call setup procedure.

**acquisition**   When a radio has successfully acquired a *control channel*, it is permitted to transmit and receive on that channel. The radio will listen to the control channel until it is directed to a *traffic channel* to participate in a call.

**address**   The address is the 20-*bit* number by which a radio unit or *group* of units is known on a *network*

**address codeword**   An address codeword is a 64-*bit codeword* that conforms to the requirements of *MPT 1327* and in which the first bit is set to 1. An address codeword is always the first codeword in any message and defines the nature of the message.

**ALLI call**   An ALLI (all idents) call is a call to all radio units on a *trunking system*.

**audible indicators**   Tait Orca radios use combinations of audible indicators and visual displays to indicate the radio's current state and activity.

Audible indicators include *keypress confidence tones*, received call signals, low battery and high temperature warnings, *transmit timer* and unanswered call signals.

Audible indicators are enabled in the User Selectable Parameters form.

**background search**   A background search is carried out as part of the *control channel acquisition* procedure. The background search 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 specified in the Normal Hunt Channels array (Hunting Parameters form). 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 form) or stronger than the current control channel by a certain margin, the radio will perform a *preferential hunt* to acquire the new control channel.

**backlighting**

The radio's LCD lights up when there is activity on the radio, such as when a key is pressed or when a call is received.

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

Backlighting can be activated in two ways.

- A function key can be programmed to activate backlighting (Backlighting On option).

- The radio can be programmed for *night use*, which can be turned on and off by the press of a function key (Night Use option) and on *Orca 5035* and *Orca 5040* radios via the NIGHT *user function menu* option.

The value of the *backlighting timer* and how backlighting was activated determine how long backlighting remains on.

**backlighting timer**

The backlighting timer determines how long *backlighting* remains on once it is activated. There are two ways backlighting can be activated, and how it was activated affects how the backlighting timer operates.

- If activated via the Backlighting On function key setting, backlighting remains on for the duration of the backlighting timer.

- If activated via the Night Use function key setting or via the NIGHT *user function menu* option, backlighting remains on for the duration of the backlighting timer, which resets whenever a key is pressed or a call is received.

The duration of the backlighting timer is set in the User Selectable Parameters form.

**bit**

Bit is an abbreviation for a binary digit consisting of either a 0 or a 1. Eight bits are equivalent to one *byte*.

**broadcast call**

A broadcast call is a *group call* in which only the radio user who initiated the call may speak. Contrast with *conference call*.

In a broadcast call, all radios in the group are directed to the same *traffic channel* for the duration of the call. However, the call is cleared down as soon as the announcement is delivered and the recipients are not given an opportunity to respond.

**byte**

A byte is a group of 8 *bits*. Half of a byte is a nibble. Computer memory is measured in kilobytes or megabytes.

**calibration**

Calibration is the process whereby a radio is electronically tuned. *Orca Elan* and *Orca Excel* radios are calibrated using a PC running either the Calibration System for Tait Orca Radios (DOS-based) or the Calibration Application (Windows-based). *Orca 5030, Orca 5035* and *Orca 5040* radios are calibrated using the Windows-based Calibration Application.

**call diversion**

Call diversion allows the radio user to divert received calls to another address, such as another radio or a *PSTN* or *PABX* number.

**call queuing**

If the radio user is unable to answer calls immediately, they can be stored in the call queue so that the user can call back later. On *Orca Elan and Orca 5030* radios, only one unanswered call can be queued. On *Orca Excel*, *Orca 5035* and *Orca 5040* radios, up to 20 calls can be stored.

**callback**

When an incoming call is terminated, a radio may be programmed to display the caller's identity. If the radio user wishes to call the party back, they can do so by pressing the enter key.

**CCSC**

CCSC stands for Control Channel System Codeword. The CCSC is used in *MPT 1327* and *MPT 1343* to identify the system to radio units and provides synchronisation for the *address codeword* that follows.

**channel**

A channel is a pair of radio frequencies, one used for transmitting and one used for receiving. In trunking systems, the term channel can also refer to the equipment at a site that is used to receive, modulate and transmit communications on a particular frequency.

The channels used by the *trunking* system are set up in the Trunked Channel Blocks form. The channels used in *conventional channel operation* are set up in the Conventional Channels form.

**channel spacing**

Channel spacing is the interval between *channels*. For Tait Orca radios, this is 12.5, 20 or 25 kHz. Wide Band radios can be programmed for operation on 20 and 25 kHz channels only. Universal Band radios can be programmed for operation on 12.5, 20 and 25 kHz channels.

Channel spacing for the *trunking system channels* is set in the Trunked Channel Blocks form. Channel spacing for *conventional channel operation* is set in the Conventional Channels form.

**city squelch**

When a radio's *squelch threshold* is programmed for city squelch, the radio is less sensitive to interference than if programmed for *country squelch* and so stronger signals are required for the radio's speaker to unmute.

The value of city squelch is set at radio *calibration* time.

**codeword**

Messages on a *trunking system* are transmitted as codewords. Every codeword is 64 bits long and consists of 48 bits of data and a 16-bit cyclical redundancy code (CRC), which is used for error checking. The codewords are sent over the control channel using fast frequency shift keying (*FFSK*),

where a 1200 Hz tone represents digital one and an 1800 Hz tone represents digital zero.

The two types of codeword are: *address codeword* and *data codeword*.

**comprehensive hunt**
A comprehensive hunt is carried out as part of the *control channel acquisition* procedure. When the control channel acquisition procedure has failed to identify a suitable *control channel*, the radio will then search through all channels in the *trunked channel blocks* defined for the radio, except those specified as non-applicable in the Non Applicable Channels array.

**conference call**
A conference call is a *group call* in which all group members can participate in the conversation. Contrast with *broadcast call*.

In a conference call, all radios in the group are directed to the same *traffic channel* for the duration of the call. All radios participate freely, as they would for a normal radio-to-radio call.

**confidence indicator**
Confidence indicators provide feedback to the radio user on how the current operation is proceeding. For example, *keypress confidence tones* are the tones heard when a keypad key or a function key is pressed and tell the user whether or not an action is permitted.

**contrast adjustment**
The contrast adjustment feature allows the radio user to adjust the display contrast. Once activated, the radio user adjusts contrast using the scroll keys. The radio returns to its previous mode of operation after a few seconds of inactivity.

**control channel**
In a *trunking system*, the control channel is used by the *site* to let the radio units in the site's coverage area know when they can transmit their call information.

**control channel acquisition**
Control channel *acquisition* is the procedure by which a radio that is not currently on a *traffic channel* attempts to select a *control channel*. Control channel acquisition consists of *hunting* for a control channel and confirming that any candidate control channels are suitable to acquire.

**conventional channel operation**
A trunked radio can switch between *trunking* and conventional modes of operation. In conventional mode, a radio communicates directly with other radios or via a *repeater* rather than through the *trunking system*.

**country squelch**
When a radio's *squelch threshold* is programmed for country squelch, the radio is more sensitive than if programmed for *city squelch* and so the radio's speaker unmutes more readily. When programmed for country squelch, the radio can be used in areas where the signal may be weak and where maximum range is desirable.

The value of country squelch is set at radio *calibration* time.

**CPSX dialling**   CPSX dialling is a *dialling scheme* designed for use on Chinese networks that use 5–digit interfleet dialling. It is compatible only with other CPSX dialling *trunking systems*.

Unlike radios using *MPT 1343* dialling, radios using CPSX dialling can display the caller's identity for interfleet and interprefix calls.

**CTCSS**   CTCSS (continuous tone controlled squelch system) is a type of *signalling* used for segregating groups of users. CTCSS uses subaudible *tones* between 67 and 250.3 Hz to identify a group of radio users.

**CTCSS invalid confirmation delay**   When an incoming *CTCSS* signal has been found to be *valid* but then degrades to the point where the radio can no longer accurately decode it, the radio continues to consider it valid for the duration of the CTCSS invalid confirmation delay. If once the delay has expired the signal still cannot be accurately decoded, the signal is treated as *invalid*.

**data codeword**   A data codeword is a 64-*bit codeword* that conforms to the requirements of *MPT 1327* in which the first bit is set to 0. Data codewords are linked to an *address codeword* and supplement the information in the address codeword.

**DCS**   DCS (digital coded squelch) is a type of *signalling* used for segregating groups of users. DCS uses subaudible *tones* between 10 and 134 Hz to transmit digital data to identify a group of radio users.

DCS codes take the form of a continuously repeating 23-bit digital codeword that represents a user group. Codewords are identified by a three–digit octal number, which forms part of the codeword. The remainder of the codeword includes a sequence of bits derived mathematically from the three-digit code.

When assigning DCS signalling for a channel, it is only necessary to specify the three-digit code.

**DCS polarity**   *DCS* signals are susceptible to polarity inversion at various points in the signal path from originator to recipient. On some systems, consistent inversions can be compensated for by forcing the radio to decode the inverse of every codeword.

**despatcher**   A despatcher is a person who gives official instructions by radio to a *fleet*.

**despatcher callback request**   A despatcher callback request is a call sent to the fleet's *despatcher*. The despatcher will then call back the calling radio at a convenient time.

**dialling scheme**   The dialling scheme determines how a radio user makes calls to other radios in and outside the *fleet*, *groups* of radios, *PABX* extensions and *PSTN* numbers. The dialling scheme is, simply put, the set of numbers a radio user can dial.

Tait Orca radios support the following dialling schemes:

- *MPT 1343*
- *CPSX Dialling*
- *Nokia ANN*
- *ZVEI*
- *Number Presets*

**do not disturb**  Do not disturb allows the radio user to ignore incoming calls while still making outgoing calls as usual. Do not disturb can be activated by dialling ⋆49# and can be deactivated by dialling #49#.

**DTMF**  DTMF (dual tone multiple frequency) is the tone-based system used for the world's telephone networks. A DTMF "tone" actually consists of a pair of *tones*. DTMF tones are sometimes referred to as "touch tones".

Tait Orca radios can encode DTMF tones and so can make DTMF calls (see *DTMF string*), but cannot decode DTMF tones and so cannot receive DTMF calls.

DTMF signalling is often used for the transmission of telephone dialling information and may be used on systems authorised to operate with connection to a PABX or a PSTN.

**DTMF call**  See *DTMF string*.

**DTMF overdialling**  The DTMF overdialling feature allows the radio user to dial *DTMF strings* using the numeric keypad.

**DTMF string**  A DTMF string is a series of DTMF *tone* pairs.

**dynamic power control**  Dynamic power control optimises the radio's power use by reducing the transmit power in high signal strength areas.

**emergency call**  An emergency call is a call that pre-empts other calls on the *trunking system* when there are no free channels. Emergency calls can have a different call time limit than normal calls.

**ESN**  ESN stands for electronic serial number. This number is a unique identifier given to each radio unit by the manufacturer. Radio units may be validated by this number.

**FFSK**  FFSK (fast frequency shift keying) is the signalling method employed in trunked radios. Data is represented by 1 cycle of 1200 Hz (logic 1) or 1.5 cycles of 1800 Hz (logic 0) and is transmitted at 1200 baud.

**fleet**  Each customer on a trunked *network* is assigned their own fleet. This keeps each customer unique so that their activities can be monitored and control-

led separately from each other. Each radio unit on the network belongs to their associated customer's fleet.

**FOACSU**    FOACSU stands for full off-air call set up. In full off-air call setup, a traffic channel is not allocated for a call until the called party has answered.

**frequency band**    The radio's frequency band is the range of frequencies it is capable of transmitting and receiving on.

The frequency band the radio operates on is set in the Specifications form.

**function key**    Each radio has two function keys above the *PTT key*. *Orca 5035* and *Orca 5040* radios have a third function key, which is the leftmost key in the row of four keys underneath the *LCD display*. This third function key can also have functions assigned to both short and long presses.

These radio function keys can have functions assigned to both short and long keypresses. A short keypress is less than one second. The radio user may need to experiment to become familiar with the duration of short and long keypresses. The third function key on Orca 5035 and Orca 5040 radios can also be operated as a "shortcut" to up to three *user function menu* options.

Some radio accessories also have function keys, and most of the options available for the radio function keys are also available for external function keys. However, these external function keys do not have short and long keypresses.

**function key preset call**    Tait Orca radios can have two function key preset calls defined at radio programming time.

**group**    Group refers to one or more radio units that are the recipient of a *group call*. In *MPT 1327*, each group is given a unique *address*, to which radio units subscribe to be part of that group. The maximum number of groups permitted is dependent on the number entered in the *fleet* record.

**group call**    A group call is a call that involves more than two radios simultaneously. Group calls can only be heard by radios subscribed to the group. Group calls can be *conference calls* or *broadcast calls*.

**GTC**    GTC stands for go to channel. A GTC message is sent by the control channel as part of the call setup procedure. The GTC tells the radio units involved in the call to switch to the traffic channel designated for the call.

**handset microphone**    The handset microphone is the microphone at the bottom of the radio. When handset mode is active, the handset microphone operates. The radio can also be programmed so that the handset microphone is the default microphone (User Selectable Parameters form).

**handset operation**    Tait Orca radios can be operated as a normal radio where the user holds the radio with the microphone about 15 cm away from the mouth or it can be

operated like a telephone handset. Handset mode is useful in noisy environ-
ments, when privacy is required or in quiet environments when the lowest
volume setting seems too loud.

**hunting**   Hunting is a procedure used by the radio unit to select an appropriate *control channel* to allow a session with a *trunking system* to be initiated or continued. The hunting process consists of systematic sampling of the forward *channel* frequencies by the radio unit until it selects and confirms one of the forward channels, which together with its paired return channel is an appropriate control channel.

Types of hunting include:

- *background search*
- *comprehensive hunt*
- *normal hunt*
- *preferential hunt*
- *resuming hunt*
- *single channel hunt*
- *vote now*

**ident**   The ident is the part of the radio's *address* that uniquely identifies that radio. In *MPT 1327*, radios are identified by a three-digit *prefix* and a four-digit ident. All radios in a *fleet* usually have the same prefix, but no two radios should have the same ident.

**indicator**   Indicators provide feedback to the radio user on how the current operation is proceeding and on the operating state of the radio. Tait Orca radios use combinations of audible and visual indicators.

**individual call**   An individual call is a call from one radio to another. Because individual calls take place on a *traffic channel* allocated specifically for that call, they can-not be overheard by other radios in the *fleet* or on the same *trunking network*. Individual calls are the most common type of *trunking* call.

**interfleet call**   An interfleet call is a call between two radio units that belong to different *fleets*.

**interfleet group call**   An interfleet group call is a *group call* in which participating radios belong to different *fleets*.

**invalid activity**   Invalid activity is traffic on a channel that carries *signalling* that does not match that of the receiving radio.

**keypad lock**   The keypad lock prevents accidental operation of the radio by locking the keypad so that only a certain set of keys can be used.

What keys are locked depends on how the radio was programmed (Keypad Lock Disables fields, Key Settings II tab).

**keypress confidence tones**

Keypress confidence tones are a *confidence indicator* that tells the radio user whether or not an action is permitted whenever a keypad key or function key is pressed.

Keypress confidence tones are enabled in the User Selectable Parameters form.

**label**

A label is a sequence of up to eight characters that can give the radio user additional information about the radio's current state. For example, a label can be set that indicates the recipient of a *preset call*.

**last number redial**

When an outgoing call is terminated, a radio can be preprogrammed to display the identity of the called party. If the radio user wishes to call that party again, they can do so by pressing the enter key.

**LCD display**

*Orca Excel*, *Orca 5035* and *Orca 5040* radios have a 2 x 12 character LCD (liquid crystal) display. In combination with the radio's *LED indicator* and *audible indicators*, the display provides the radio user with information on the state of the radio.

**LED indicator**

The LED (light-emitting diode) at the top of the radio is the main indicator for displaying the state the radio is in. The *audible indicators* and the *LCD display* provide information intended to supplement that provided by the LED.

**low power transmit**

The low power transmit feature can be used to change the transmit power from the programmed level to low.

**monitor**

When the radio is operating on *conventional channels*, monitor allows the radio user to override a channel's *signalling* and so hear all traffic on a channel.

Note that monitor is not permitted in some countries.

**MPT 1327**

MPT 1327 is a radio unit signalling standard published by the United Kingdom Department of Trade and Industry that describes the signalling standard for trunked private land mobile radio systems.

**MPT 1343**

MPT 1343 is a performance specification standard published by the United Kingdom Department of Trade and Industry that describes the system interface specification for radio equipment to be used with commercial trunking networks operating in Band III, sub-bands 1 and 2.

MPT 1343 also refers to the set of numbers a radio user can dial (the *dialling scheme*).

**mute**  A mute controls the circumstances under which a received signal is passed to the radio's speaker. When a mute is active, the radio's speaker only unmutes under certain conditions, determined by the type of *signalling* operating on a *channel*.

**NDD**  NDD stands for network dependent data. NDD is an *MPT 1343* term and is a means of identifying specific *control channel* transmissions that originates within a *network*.

**network**  A network is a number of interconnected *trunking systems*.

**night use**  When the night use feature is on, the radio's *backlighting* activates whenever *valid activity* is detected, a key on the radio is pressed or when the radio receives a call. Backlighting remains on for the duration of the *backlighting timer* unless further activity is detected.

**Nokia ANN**  Nokia ANN (Algorithmic Network Numbering) is a *dialling scheme* designed for use on Nokia Actionet networks. It differs from *MPT 1343* in the way it divides up *fleets*. Nokia ANN numbering reduces the number of digits that must be dialled for calls between fleets.

**normal hunt**  A normal hunt is carried out as part of the *control channel acquisition* procedure. A normal hunt covers all *channel* numbers likely to be used as *control channels* on the selected *network*. For a normal hunt, the radio will undergo *registration* on a new control channel, if necessary.

The channels that will be searched as part of the normal hunt procedure are defined in the Normal Hunt Channels array (Hunting Parameters form). If the radio fails to find a suitable control channel among these channels, it will, if programmed, carry out a *comprehensive hunt*.

**number presets**  Number presets is a *dialling scheme* based on the *MPT 1343* dialling scheme. Number presets, however, limits the calls a radio can make to those programmed as preset calls at radio programming time. The calls programmed can be any number the radio user would normally be able to dial using *MPT 1343* numbering.

**off-air**  The term off-air is used to describe the call setup procedure used when the channels are setup and allocated even though the called party has not yet answered. This usually occurs when it is known that the called party is available.

**on/off/volume control**  The on/off/volume control is the smaller of the two switches on the top of each radio.

**Orca 5030**



16-Way Selector

LED
Indicator

On/Off/Volume
Control

Function
Keys 1
and 2

PTT Key

Handset Microphone

**Orca 5035**



16-Way Selector

LED
Indicator

On/Off/Volume
Control

Function
Keys 1
and 2

PTT Key

Speaker/
Microphone

Display

Function
Key 3

Keypad

Handset Microphone

**Orca 5040**



LED Indicator

16-Way Selector

On/Off/Volume Control

Function Keys 1 and 2

PTT Key

Speaker/ Microphone

Display

Function Key 3

Keypad

Handset Microphone

**Orca Elan**



LED Indicator

16-Way Selector

On/Off/Volume Control

Function Keys

PTT Key

Speaker/ Microphone

Handset Microphone

**Orca Excel**



16-Way Selector

On/Off/Volume
Control

LED
Indicator

Function
Keys

Speaker/
Microphone

PTT Key

Display

Keypad

Handset Microphone

**PABX**
PABX stands for private automatic branch exchange. A *trunking system* can be connected to a PABX and so radios using that system can make calls to and receive calls from PABX extensions.

**PABX extension**
A PABX extension is a line on a *PABX* system.

**power-up message**
The power-up message is the message displayed after the radio is turned on.

The power-up message is programmable (Power-up Message fields, User Selectable Parameters form).

**preferential hunt**
A preferential hunt is carried out as part of the *control channel acquisition* procedure. A preferential hunt covers all *channel* numbers likely to be used as *control channels* on the selected *network*. For a preferential hunt, the radio will only acquire a control channel for which a preference exists.

Preference data is defined in the Acquisition Data form.

**prefix**
In *MPT 1327*, radios are identified by a three-digit prefix and a four-digit *ident*. Radio units in a *fleet* usually have the same prefix.

**preset call**
A preset call is a call sequence defined at radio programming time.

**priority call**
A priority call is a call that pre-empts other calls on the *trunking* system when there are no free channels. Priority calls do not, however, pre-empt *emergency calls*.

**programming database**

The programming database is the information that is altered using the Trunked Programming Application. Each programming database consists of separate *network*, *fleet* and radio information. When the Radio>Read command is selected, the radio's programming database is read and the information in it is loaded into the fields and forms in the programming application. When the Radio>Program command is selected, the radio's programming database is overwritten with the information altered in the programming application.

**PSTN**

PSTN stands for public switched telephone network, the public telephone network on which subscribers own or rent tethered communications devices (telephones, facsimiles, modems) as opposed to untethered communications devices (radio telephones, cellular phones). A *trunking system* can be connected to the PSTN and so radios using that system can make calls to and receive calls from PSTN numbers.

**PTT key**

The PTT (press-to-talk) key is the key pressed to transmit. The radio cannot receive while the PTT is pressed.

**PTT as shift key**

The PTT as shift key feature is part of the *DTMF overdialling* feature. If the user wishes to dial tones A to D or a pause, the PTT can be used as a "shift" key in conjunction with the numeric keypad. For example, on the *Orca Excel*:

PTT + **2** = A

PTT + **5** = B

PTT + **8** = C

PTT + **0** = D

PTT + **1** = pause

So pressing the PTT key, holding it, then pressing the **2** key enters tone A in the DTMF string. Pressing the PTT, holding it, and then pressing the **1** key enters a pause in the string. A hyphen is entered in the display to indicate the pause.

PTT as shift key is enabled in the DTMF Parameters form.

**quiet state**

Quiet state is the state the radio is in when *monitor* is inactive, and the radio user does not have to listen to traffic that is not intended for them.

**radio identity**

Each radio operating on a *trunking system* is assigned its own unique identity. How that identity is assigned depends on the *dialling scheme*. In *MPT 1327*, a radio's identity is made up of a three-digit *prefix* and a four-digit *ident*.

**receive (Rx) frequency**

The receive frequency is the frequency that a radio is currently tuned to.

The receive frequency for each channel is set in the Trunked Channel Blocks form and the Conventional Channels form.

**receive signalling**

The receive signalling is the *signalling* that must accompany incoming transmissions in order for the radio to recognise the signal as valid and so open the radio's *mute*.

The receive signalling for each channel is set in the Conventional Channels form.

**registration**

A radio unit must let the *trunking system* know its current location, especially if the radio unit roams throughout the *network*. Knowledge of its location allows for an efficient call setup process when the radio unit is called. A radio unit will attempt to register if the area code of the new *site's* system identity code is different to that of the previous site.

**repeater**

A repeater receives a radio signal and retransmits it. Use of a repeater increases the coverage area of a two-way radio system and ensures more reliable performance in areas where signals are reflected or attenuated by buildings or terrain.

In a repeater-based system, the radio's transmit frequency is the frequency the repeater is listening on, and the radio's receive frequency is the frequency the repeater rebroadcasts signals on.

**resuming hunt**

A resuming hunt is carried out as part of the *control channel acquisition* procedure. When a call is cleared down and a radio leaves a *traffic channel*, a resuming hunt allows the radio to resume the *control channel* on which it was last confirmed prior to going to the traffic channel.

**reverse tone burst**

Reverse tone bursts can be used when *CTCSS subaudible signalling* is used. When reverse tone bursts are enabled, the phase of the generated tones is reversed for a number of cycles just before transmission ceases, which can increase the speed of receiver shutdown in some repeaters and associated equipment.

The reverse tone burst duration is set in the Conventional Channels form.

**roaming**

When a radio unit moves around the *network*, it reaches a point where the signal strength is approaching the preprogrammed lower limit. At this point it will automatically search for a better signal. Once it has received a suitable signal from a valid *site*, it will register on the new site.

**RSSI indicator**

The bars on the display (▪▪▪▪▪) indicate the received signal strength (RSSI), which is displayed whenever the radio is idle. If signal strength is low, calls may not get through.

**RU**

RU stands for radio unit.

**Rx**

Rx is an abbreviation for receive.

**SDM**

A short data message is a message that carries more data than a status message but still does not require an audio channel. The user data is contained in the signalling between the site and the radio unit.

*Orca Excel*, *Orca 5035* and *Orca 5040* radios can display received SDMs on the radio display. *Orca 5035* and *Orca 5040* radios can view, edit and send SDM Presets via the user defined menu.

**SDM entry mode**

SDM entry mode is the mode in which short data messages are received and sent.

**security PIN**

A security PIN (personal identification number) is a number up to five digits long the user is required to enter when the radio first powers up. When a security PIN is required, the radio displays the message ENTER CODE and then waits for the correct PIN to be entered before displaying the *power-up message*. The radio cannot be used until the correct PIN has been entered.

The security PIN is set in the Specifications form.

**Selcall**

Selcall stands for "selective calling", which is a *signalling* system that uses sequences of audible *tones* to isolate calls intended for specific radios.

**short form numbers**

Short form numbers are numbers that allows radio unit users to access *PSTN* numbers without having to enter the whole number. Each radio unit can be associated with a *PABX*/PSTN table that specifies up to 15 short form numbers for that radio unit.

**signalling**

Signalling is non-voice coding on a *channel* for the purpose of identifying parties and segregating groups of users. If a radio receives signalling that matches that programmed for the radio, the signalling is said to be valid and the radio's *mute* opens. Otherwise, the transmission is ignored and the radio remains silent, although the radio's channel busy indicator is activated. See *CTCSS* and *DCS*.

**single channel hunt**

A single channel hunt is carried out as part of the *control channel acquisition* procedure. A single channel hunt occurs when the *trunking system controller* directs a radio to a specific *control channel*.

**site**

A site consists of a control unit, a *control channel* and one or more *traffic channels*. A number of connected sites make up a *trunking system*.

**site select**

The site select feature allows the radio user to specify the *control channel* the radio must acquire. The site select feature overrides the radio's normal *acquisition* processes.

**squelch**

The squelch feature ensures that the radio's speaker only unmutes when an intelligible signal is received. A signal is considered intelligible when it is strong enough to exceed a predetermined *squelch threshold*.

**squelch override**	Squelch override allows the user to disable the radio's *squelch* and so hear all activity on a channel, including noise.

**squelch threshold**	The squelch threshold is the level the signal must reach before it is regarded as intelligible and the radio's *mute* is opened. Tait Orca radios can operate at two different squelch thresholds: *city* and *country squelch*.

**status**	Status is the current activity of the radio user, which can be represented by a *status message*.

**status label**	A status label is a *label* that is associated with a particular *status message*.

If a receiving radio has been programmed with a status label that corresponds to the message transmitted, it displays that label, which is why it is important that all radios in a *fleet* are programmed with the same status labels.

**status message**	A status message is a short signalling message that carries only a number between 1 and 30. Because of the brevity of the message, no audio channel is used. All the required information can be transferred in the signalling between the *network* and the radio unit.

**stun and revive**	A "stun" message can be sent from the *network* to a radio and will render the radio inoperable. The radio remains in communication with the *trunking system controller* but cannot be used to send or receive calls. A "revive" message sent by the network will return the radio to normal operation.

**subaudible signalling**	Subaudible signalling is *signalling* that is at the bottom end of the range of audible frequencies. Tait Orca radios support *CTCSS* and *DCS* subaudible signalling.

**SYNC**	In *MPT 1327* and *MPT 1343*, SYNC refers to the *control channel* codeword synchronisation sequence.

**SYS**	In *MPT 1327* and *MPT 1343*, SYS refers to the system identity code of the transmitting system. Values of SYS which result in the production of the *control channel* codeword synchronisation sequence, SYNC, in any part of the 48 information bits of the *CCSC* are not permitted.

**time-out**	Time-out is when a time limit has been reached and the active call is terminated as a result.

**toggle**	The term toggle is used to describe the switching between two states.

**tone**	A tone is a sound wave of a particular frequency.

For CTCSS and DCS, the tone is transmitted continuously as long as the radio is transmitting. For *DTMF strings*, the transmit time of each tone is programmable (see *tone duration*).

When defining *DTMF strings*, the different tones are represented by the characters 0–9, A–D, ★ and #. The frequencies used are determined by an internationally accepted standard.

**tone duration**  The tone duration is how long a DTMF tone is transmitted. Tone duration is set in the DTMF Parameters form.

**tone set**  The tone set is the set of confidence indicators a radio will use.

**traffic**  Traffic is an intelligible signal on a *channel* that exceeds the radio's *squelch threshold*.

**traffic channel**  The traffic channel is the *channel* on a *trunking system* to which parties participating in a call are directed for the duration of the call. When the call ends, the traffic channel is returned to the pool of channels for use in a new call.

**transmit (Tx) frequency**  The transmit frequency is the frequency that all outgoing transmissions are made on.

The transmit frequency for each *channel* is set in the Trunked Channel Blocks form and the Conventional Channels form.

**transmit inhibit**  The transmit inhibit feature determines under what conditions a press of the PTT results in the radio not transmitting.

The radio can be prevented from transmitting whenever there is activity on the *channel*, whether it is *valid* or *invalid* (Busy option), or *invalid* activity only (Mute option). Note that if the Mute option is selected and the radio user has activated *monitor*, the radio transmits when the PTT is pressed, even if there is valid activity on the channel. The conditions under which transmission is inhibited during *conventional channel operation* are set in the Conventional Channels form (Tx Inhibit On Busy field).

**transmit signalling**  The transmit signalling is the *signalling* that accompanies all outgoing transmissions made.

The transmit signalling for each *channel* is set in the Conventional Channels form.

**transmit timer**  The transmit timer determines the longest continuous transmission permitted by a radio. When the transmit timer expires, the radio emits a series of warning tones before returning to the receive state.

**trunked channel block**  A trunked channel block is a set of equally spaced channels on which a *trunking system* operates.

**trunking**  Trunking is a radio communications system that dynamically shares a number of communications *channels* among a large number of users. This ensures equal channel loading and permits significantly higher loading per channel than found in conventional systems.

**trunking system**  The term trunking system refers to the equipment required to provide the *trunking* communication facilities at one location.

**TSC**  See *trunking system controller*.

**trunking system controller**  In *MPT 1327* the trunking system controller (TSC) is the central intelligence necessary to enable the *trunking system* to function. The TSC communicates with all radios on the *network* via the *control channel*.

**Tx**  Tx is an abbreviation for transmit.

**user function menu entry mode**  User function menu entry mode is available on *Orca 5035* and *Orca 5040* radios.

In user function menu entry mode, the user can customise radio options. For Orca 5030 and Orca 5040 radios, the user defined menu is set up in the User Defined Menu Form.

**valid activity**  Valid activity is traffic on a channel that carries *signalling* that matches that programmed for the receiving radio. The radio's *mute* opens upon detecting valid activity.

**vote now**  Vote now is carried out as part of the *control channel acquisition* procedure. 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 a particular value, the radio will return to the current control channel. Otherwise it will switch to the control channel specified by the trunking system.

**ZVEI**  ZVEI is a *dialling scheme* based on the *MPT 1343* dialling scheme. The ZVEI dialling scheme is used on Regionet 43 networks.