8528S Marine transceiver
Operators handbook

Codan Part No. 15-04015 Issue 5, July 1995

Contents

CODAN

List of drawings

1. About this handbook

Who should use this handbook

This handbook is written for the person who installs and operates the Codan 8528S transceiver.

Icons and standards

The following icons and standards have been used throughout this handbook.

This icon...	Means...
	a reference to other sections within the user guide or related documentation.
	a note or reminder.
	a warning. If you do not observe the warning, you may damage yourself or the equipment.
	example of a button on the transceiver.
	the end of a section.

Glossary

ARQ	Automatic Repeat Request
FEC	Forward Error Correction
LCD	Liquid Crystal Display
LSB	Lower Side Band
PIN	Personal Identification Number
PS	Miscellaneous facilities
PTT	Press To Talk
R	Remote
RFDS	Royal Flying Doctor Service (Australia only)
Rx	Receive
SD	Selective call Decode
Tx	Transmit
USB	Upper Side Band

2. Overview

Your 8528S HF SSB transceiver employs the latest concepts in design and reliability for long range communications. It has been designed for 12V DC operation in fixed base and marine installations.

There are two versions of the transceiver; one with front panel control and the other with extended control. The extended control unit consists of a transceiver and a separate control head which can be located up to 100 metres away from the transceiver.

The control head can also be used as an accessory with the front panel control version to enable local and extended control of the transceiver.

You operate the transceiver through the front control panel, or control head, which contains sealed membrane switches (or buttons) and a liquid crystal display (LCD). The LCD shows the selected channel number along with the transmit and receive frequencies. Messages about the operation of the transceiver are also displayed.

Continual research and development has produced different versions of the 8528S SSB HF transceiver. The different version means a later issue of EPROM which provides different operating features. To check the version of your transceiver, see *Review the EPROM version and options* in Chapter 4. This issue of the handbook incorporates operating information for EPROM versions 4.1 to 5.4.

The main facilities and features of the transceiver are:

- channels
- selective call
- scanning
- free tuning receiver
- tone calling
- telephone interconnect
- ARQ-FEC.

Channels

Your transceiver has a capacity of 600 channels, these cover:

- transmit frequency range 2 MHz to 24 MHz
- receive frequency range 0.25 MHz to 30 MHz.

A maximum of 501 transmit and receive channels can be pre-programmed in the factory, or by an authorised Codan dealer. You, as a user, can program the remaining 99 channels from the front panel as P-channels.

Selective call

This facility allows you to transmit a call to a single transceiver or a group of transceivers. To receive a selective call, your transceiver must be fitted with option SD.

Your transceiver can store details of up to ten stations that have called you while your transceiver was left unattended.

Scanning

This facility scans selected channels for voice signals. You can program a maximum of 15 channels to be scanned in sequence for voice signals. When a selective call decode option (SD) is fitted, a maximum of eight selective channels can be programmed and scanned.

Free-tuning receiver

Your transceiver can be used as a free-tuning receiver covering the world broadcast bands over the frequency range of 250 kHz to 30 MHz.

Tone calling

This facility allows you to send a tone call (two tones transmitted simultaneously) to signal another transceiver.

Telephone interconnect

A base transceiver can be connected to an IPC-500 telephone interconnect. This allows you to use your transceiver to make telephone calls using the public telephone system.

ARQ-FEC

For remote data transmission applications, your transceiver can be connected to a data source comprising computer terminal and interface modem.

There are two types of transmission available:

- Automatic Repeat Request (ARQ)
- Forward Error Correction (FEC).

The transceiver and control head front panels

This section describes the physical appearance of the transceiver and control head front panels.

The front panel of the 8528S transceiver is the same as the front panel of the 8531S extended control head.

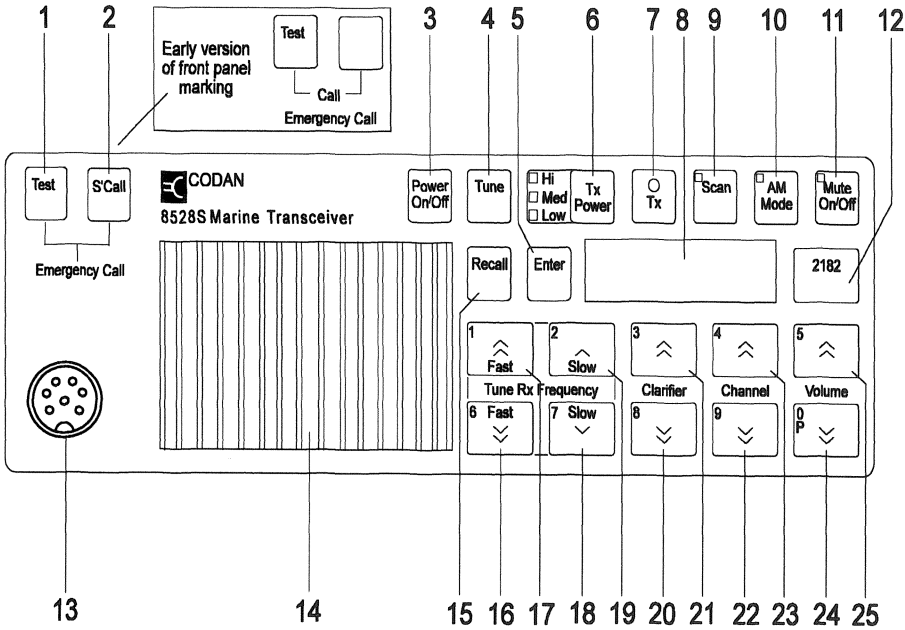
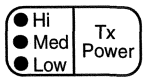
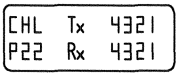
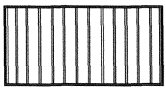
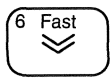
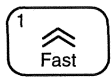
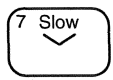
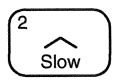
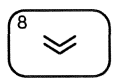
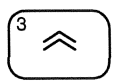
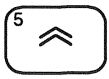


Figure 2.1 Front panel control transceiver

Item No.	Item	Function
1		Used with the adjacent red S'Call button for sending an emergency call. Used alone for testing the emergency tone of an emergency call.
2	 , or 	Used with the adjacent Test button for sending an emergency call. Starts selective calls and two-tone calls if the respective options have been enabled for the channel. Starts Royal Flying Doctor Service (RFDS) if option E has been enabled for the channel. Note: Early versions of 8528S series transceiver use a plain red button  in this position which operates in the same way described for the retitled S'Call button. The handbook text will only make reference to the S'Call button.
3		Switches the transceiver on or off.
4		Transmits a carrier signal so that antenna tuners and automatic antenna systems can be tuned.
5		Sets the transceiver to accept programmed information.
6		Selects high, medium or low transmitter power for an 8528S-H transceiver, and high or low transmitter power for an 8528S transceiver. The indicators show the selected power level. Selects upper or lower sideband when entering P-channels.

Item No.	Item	Function
7		The indicator is on when the transceiver is transmitting.
8		The transceiver display shows channel numbers, frequencies and messages regarding the operation of the transceiver.
9		Selects either channel or band scan. The indicator is on in scan mode.
10		Selects either AM or SSB transmission for an emergency call on the 2182 marine emergency channel. The indicator is on in AM mode.
11		Selects voice mute (suppress background noise when there is no voice signal). If the channel is enabled for selective calls, selects either voice mute or selective call mute (suppress background noise and selective calls for other stations). The indicator is on when voice or selective call mute is selected. Displays channel options when held down.
12		Selects the 2182 marine emergency channel for making an emergency call.
13		Microphone socket.
14		Loudspeaker.

Item No.	Item	Function
15		Selects a specific channel when used with the numeric buttons. Dims the display and indicators when pressed twice within one second.
16		Reduces the programmed frequency in steps of 1 kHz. Keys in number 6.
17		Raises the programmed frequency in steps of 1 kHz. Keys in number 1.
18		Reduces the programmed frequency in steps of 100 Hz. Keys in number 7.
19		Raises the programmed frequency in steps of 100 Hz. Keys in number 2.
20		Reduces the received audio frequency in steps of 10 Hz to help clarify the received speech. Keys in number 8.
21		Raises the received audio frequency in steps of 10 Hz to help clarify the received speech. Keys in number 3.

Item No.	Item	Function
22		Selects the next lower channel. Keys in number 9.
23		Selects the next higher channel. Keys in number 4.
24		Decreases the audio volume. Keys in number 0 and letter P.
25		Increases the audio volume. Keys in number 5.

The transceiver and control head rear panels

This section describes the physical appearance of the transceiver and control head rear panels.

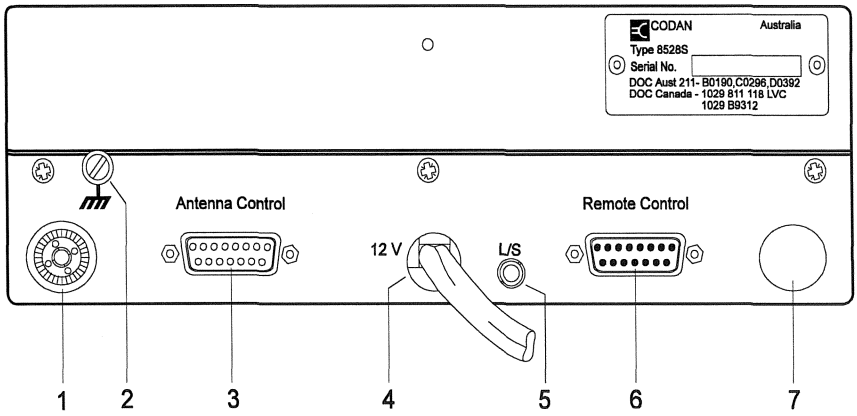


Figure 2.2 The transceiver rear panel

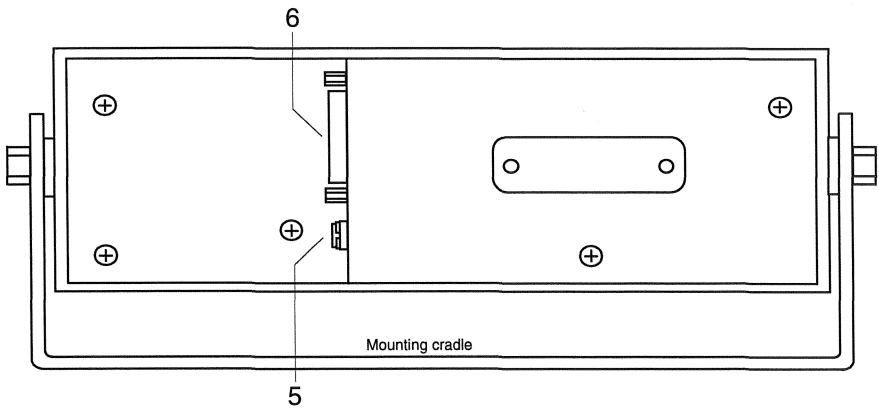
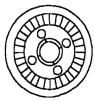
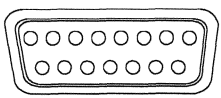
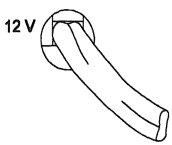
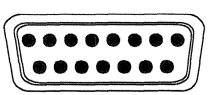


Figure 2.3 The extended control head rear panel

Item No.	Item	Function
1		Antenna socket.
2		Earth (ground) screw.
3		Automatic antenna control socket.
4		12V DC power lead.
5		External 8 ohm loudspeaker socket. You can still use the internal speaker with an external speaker connected.
6		Remote control unit socket.
7		External alarm, battery power output and the miscellaneous facilities socket position.

3. Installation

Before installation, check the contents against the packing list to ensure that no parts are missing.

The following notes are a guide to installation but are not intended to be comprehensive. It is recommended that installation is carried out by qualified and experienced personnel.

There are two types of installation:

- fixed base station
- marine installation.

Fixed base station

The fixed base station installation typically consists of an AC power supply connected directly to the mains. DC output from the power supply is connected to the transceiver, which in turn is connected to an antenna.

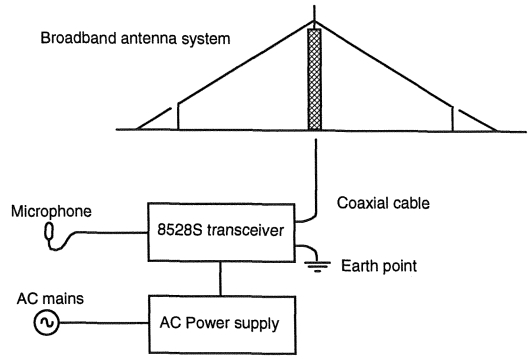


Figure 3.1 Typical fixed base station installation

Marine installation

The marine installation typically consists of a 24V DC power supply (battery) and voltage regulator connected to the transceiver. The transceiver is connected to a manual or automatic tuner by a coaxial and control cable. The tuner is connected to a whip or long wire antenna.

The transceiver may be controlled from the transceiver front panel or from a connected extended control head.

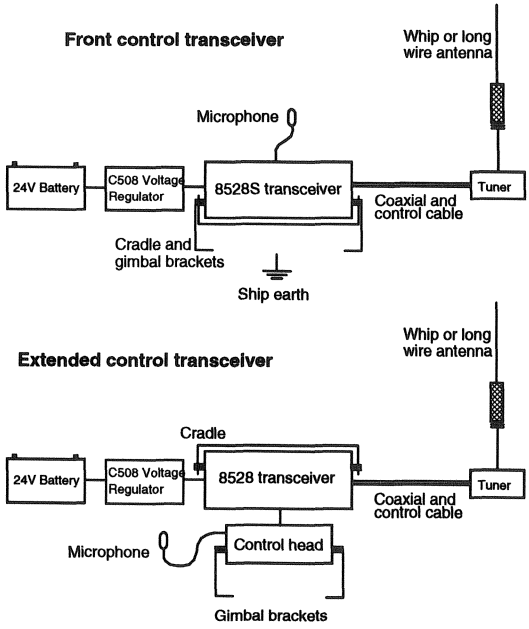


Figure 3.2 Typical marine installation

Mounting the transceiver

In marine installations, the transceiver must be mounted in a position that will not cause injury in the event of an accident.

Mount the transceiver and control head in a position that allows:

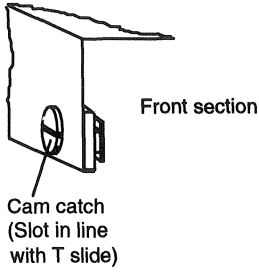
- easy access to the control panel
- a free flow of air through the rear cooling fins.

Use the code 117 mounting cradle (front entry) to install your transceiver. This cradle is supplied with 6 metres of DC power cable.

The gimbal brackets allow you to mount the transceiver at an angle to the horizontal.

Step	Action
1.	The cradle can support the transceiver from above or below permitting roof or floor mounting. If you want to mount the transceiver at an angle to the horizontal, attach the two gimbal brackets to the mounting cradle. To attach a bracket to the cradle, bolt the bracket to one side of the cradle through the centre hole on the bracket flange. Rotate the bracket to the desired angle and fix the position with a second bolt through one of the five positioning holes at the edge of the bracket flange.

Step	Action
2.	Secure the mounting cradle assembly into position with the rotating cam catches on the cradle to the front. Ensure there is sufficient space at the rear of the cradle to take the transceiver heatsink and connectors.
3.	Align both cam catch slots with the T-section slides.



4.	Insert the transceiver side rails into the T-section slides. Push the transceiver fully into the cradle.
5.	Apply gentle pressure to the front panel of the transceiver. Lock into the cradle by turning the cam catches one quarter of a turn in either direction with a suitable tool or small coin.

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Mounting the extended control head

Make sure that the control head is connected to the transceiver before applying power.

The control head is not waterproof. Do not expose it to sea spray or rain.

Failure to connect the control head to the transceiver before applying power may:

- damage the transceiver
- blow the internal fuse
- stop the control head from working.

If the control head stops working, disconnect the power from the transceiver, reconnect the power and switch on again.

Step	Action
1.	Remove the two cradle screws and washers securing the gimbal brackets to the control head.
2.	Secure the gimbal brackets in position. Ensure there is space at the rear of the brackets for the control cable.
3.	Secure the control head to the gimbal brackets with the two screws and washers.
4.	Mount the transceiver (see *Mounting the transceiver* on page 3-3).

Step	Action
5.	Connect the interface cable between the control head and transceiver. Ensure the cable connectors are securely fastened to the control head and transceiver. The extended control head is supplied with a cable approximately 6 m long. To enable correct installation, the cable has different connectors at each end. If necessary, remove the cover from one connector to pass the cable through restricted openings. Gather any excess cable neatly at one point. ❑

Mounting an extension speaker

Where an extension speaker is required for the installation, connection may be made to either the control head—if available—or the transceiver.

Power supply

Ensure that the power supply for your transceiver is 12V DC. Transceiver series 8528S-H operating with the 400 watt PA (type 4404) needs a 24V DC supply.

You can use a 12V battery (or 24V battery with C508 Voltage Regulator) for marine installations or a suitable AC power supply for base station installations.

A qualified technician should check the installations before power is applied to the transceiver.

A heavy duty 6 m power cable is supplied with the mounting cradle for marine installations. It is designed to minimise the voltage drop between the battery and transceiver during transmission. Installation using a smaller core cable size is not recommended.

Protect all cables from sharp edges and mechanical abrasions.

For marine installations, a suitable cartridge fuse (32 Amp-accessory code 711) should be fitted in the active wire close to the battery. This protects the power cable from the risk of fire should damaged insulation touch the vessel. Normal glass in-line automotive fuses are not recommended. The transceiver is fitted with adequate internal protection.

Connect the power cable between the transceiver and the battery or the transceiver and AC power supply.

In extended control installations where the power and control cables are long and follow a common path, separate the cables by at least 200 mm. Failure to observe this will cause distortion of the transmitted audio signals.

You can, however, bring the cables together for short distances, for example, to pass through the same hole in a bulkhead.

Grounding

In all installations an adequate ground, or earth, is essential for correct transceiver operation. A chassis ground or earthing position is provided on the rear panel of the transceiver.

In fixed installations, install an earth cable between the transceiver ground screw and an earth point. Use copper braid or heavy duty cable.

The transceiver chassis is connected to battery negative. If the transceiver needs to be isolated, use the mounting cradle since its plastic runners isolate the transceiver chassis. Use an isolating device such as the code 733 Aerial DC isolator to isolate the tuner from the transceiver.

The control head should be earthed by connecting it to the vessel earth. The exposed area free of paint around the mounting bracket fixing holes provides the electrical connection.

If you need to isolate the control head, mount the control head on an insulating surface and earth it via a 100 nf capacitor.

Antennas and antenna tuners

Correct installation of the antenna and antenna tuner is important for good transceiver operation.

To obtain the best performance and good radiation efficiency from your transceiver, consider the antenna and antenna tuner's:

- physical location
- distance from the transceiver
- earthing.

Follow the installation instructions provided with each antenna and antenna tuner to achieve the best possible performance.

4. Using the transceiver

This chapter tells you how to operate your transceiver. It covers:

- making calls
- receiving calls
- adjusting settings.

The displays in the procedures show examples of channel and frequency numbers. In each procedure select your own channel and frequency numbers as appropriate.

Unless otherwise stated, all procedures assume that:

- 12V DC power is supplied to the transceiver
- the transceiver has been switched on by pressing the front panel Power On'Off button.

See *Switching the transceiver on or off* on page 4-2.

Switching the transceiver on or off

When you switch the transceiver on, the display usually shows the last settings before the transceiver was switched off. If your transceiver has a personal identification number (PIN) allocated, the display requests you to enter your PIN. See *Enter a PIN* (Personal Identification Number) in Chapter 12.

There are two ways of switching your transceiver on or off:

- switching on or off if no PIN has been set
- switching on or off if a PIN has been set.

Switching on or off if no PIN has been set

Step	Action	Display	Remarks
1.	Ensure the transceiver is connected to the power supply.		
2.	To switch the transceiver on, press Power On'Off	For one second you see: 8528 CODAN SEA HELLO then the last channel and frequencies selected are displayed: CHL Tx 123456 123 Rx 123456	The Mute and Mode indicators turn on. The transceiver is automatically set to the last channel and volume settings used.

Step	Action	Display	Remarks
3.	To switch the transceiver off, press [Power On'Off]		

Switching on or off if a PIN has been set

Do not forget your PIN, otherwise you will not be able to switch on your transceiver. If you forget your pin, you will have to return your transceiver to Codan for them to delete the allocated number.

Step	Action	Display	Remarks
1.	Ensure the transceiver is connected to the power supply.		
2.	To switch the transceiver on, press [Power On'Off]	You see this display for one second 8528 CODAN SEA HELLO then Entr PIN ------	The Mute and Mode indicators turn on.

Step	Action	Display	Remarks
3.	Use the numeric buttons to enter your PIN.		The transceiver will not operate unless you enter the correct PIN.
4.	Press Enter		The transceiver is ready for use. It is automatically set to the last channel and volume settings used.
5.	To switch the transceiver off, press Power On'Off		

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The transceiver display

The display shows you the selected channel numbers, and the transmit and receive frequencies. It also shows messages to help you operate the transceiver.

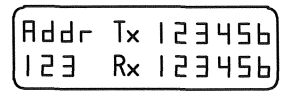
☛ See *Display messages* in Chapter 13 for a description of these messages.

The display and button legends of the control head are back-lit. You can adjust the display brightness.

☛ See *Dimming the display and indicators* on page 4-7.

This section explains what the option codes mean and how to reveal the option codes on the display.

The display contains two rows of information. Each row is split into three groups. What you see in each group depends on the transceiver mode selected. An example is shown below:



Option codes

Code	Description
S	Indicates that selective call is enabled for this channel.
E	Indicates that RFDS emergency calling is enabled for this channel.

Code	Description
t1-4	Indicates this channel has been programmed for tone calling. (Four tone pairs can be used, t1 to t4.)
L	Indicates that lower side band is enabled for this channel.
U	Indicates that upper side band is enabled for this channel.

Displaying the channel options

There are several options that you can select your transceiver to use. The display button allows you to check the options that have been selected (enabled) at the time of purchase by viewing the option bar in the display.

Step	Action	Display	Remarks
1.	Press and hold down for two seconds Mute On'Off	CHL OPTION P22 S__U__	The option bar indicates the options enabled for the channel currently selected. There are six spaces in the option bar that contain either an option code or an underscore (_). An underscore indicates that no function has been enabled.

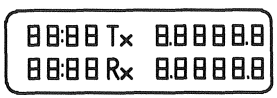
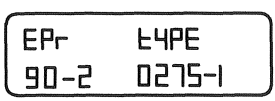
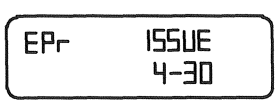
Dimming the display and indicators

The backlit display and indicators are at maximum brightness when you switch the transceiver on. This procedure explains how to reduce the brightness of the display and indicators.

Step	Action	Display	Remarks
1.	Press [Recall] twice within one second		This reduces the brightness of the indicators and dims the display background lighting.
2.	To restore the brightness, press [Recall] twice within one second.		This restores both the display and indicators to their maximum brightness.

Review the EPROM version and options

This facility allows you to review the EPROM version and some of the options fitted to your transceiver.

Step	Action	Display	Remarks
1.	Ensure your transceiver is switched on.		
2.	Press and hold down [Power On'Off]	 At three second intervals the display changes as shown below:	Displays lamp test: all segments and indicators must be on.
			This shows the Program (EPROM) type number (example 90-20275-1). Some indicator lamps turn off.
			Program (EPROM) issue number. This is an example of EPROM issue 4.3.

Step	Action	Display	Remarks
2. cont.		118 CHLS 11 P-CHLS	The top line shows the number of channels programmed by the factory or agent. This can be up to 501. The second line shows the number of channels programmed by the user. This can be up to 99 or 89 with the telephone mode enabled.
		The following displays indicate some of the options fitted to your transceiver:	
		Txd OPTION	'd' indicates that the transceiver is inhibited from entering transmit frequencies from the front panel.
		TxE OPTION	'E' indicates that the transceiver is enabled for entering transmit frequencies from the front panel.
		Txd-A OPTION	'A' indicates that the transceiver is programmed for use on the amateur band.
		TxE H OPTION	'H' indicates that the transceiver is set for use with an external power amplifier.
3.	Release Power On'Off		This switches off your transceiver.

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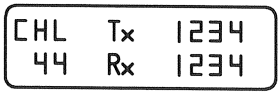
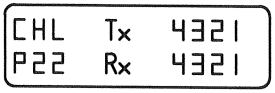
Selecting channels

You can select channels:

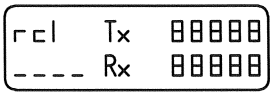
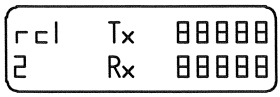
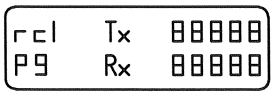
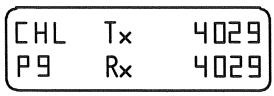
- using the Channel Up and Down buttons
- using the Recall button.

Using the Channel Up and Down buttons is simpler when you are changing to an adjacent channel. Using the Recall button is simpler when you are changing channels over a large range. There may be up to 600 channels available.

Using the Channel Up or Down buttons

Step	Action	Display	Remarks
1.	Press  or 	The channel number selected appears in the lower left hand corner of the display, and the transmit and receive frequencies to the right.  Channels you have programmed from the front panel have either an F or P in front of the number. 	Pressing these buttons moves to the next higher or lower channel. Keep the button pressed to move quickly through the channels. For details on F and P channels, see Chapters 6 & 7 respectively.

Using the recall button

Step	Action	Display	Remarks
1.	Press Recall		
2.	If the channel was installed by the factory, press 2 ^ Slow If the channel was installed by you (F or P channels), press 0 P ⋙ and 9 ⋙	 	This is an example of how to recall channel 2. For details on F and P channels, see Chapters 6 & 7 respectively. This is an example of how to recall channel P9.
3.	Press Enter Note:		The channel you selected is recalled (channel P9 in this example). If you enter an incorrect channel, the display shows the message 'NOT FOUND', and reverts to the next lowest programmed channel to the one you selected.

Adjusting the volume

When the mute is on, pressing any of the volume control buttons opens the mute for approximately one second. This allows you to hear the background noise and helps you to select the correct level.

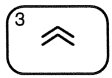
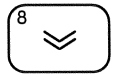
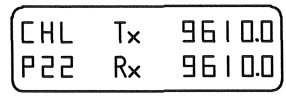
When you switch your transceiver on, the volume level is at the last used setting.

Step	Action	Display	Remarks
1.	Press either  or 		The ⩓ button increases the volume. The ⩔ button decreases the volume. You hear a 'pip' when the volume control has reached its operating limit.

❑

Using the clarifier

The clarifier buttons raise or lower the frequency in steps of 10 Hz. This allows you to fine tune the transceiver to obtain the best clarity for received voice calls.

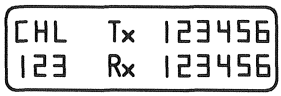
Step	Action	Display	Remarks
1.	Press  or 		Try both buttons to obtain the best clarity. You hear a 'pip' when the clarifier control has reached its operating limit. The clarifier resets to the mid range when you change channels or switch off.

Using the mute controls

You can use the Mute On'Off button to:

- inhibit background noise until a voice signal is received
- inhibit background noise until your transceiver has been selectively called (if your transceiver has option SD fitted and selective calling has been enabled for this channel).

Selective calling not enabled for this channel

Step	Action	Display	Remarks
1.	Press Mute On'Off		You hear a 'pip'. The indicator turns on. Background noise is muted until a voice call is received.
2.	Press Mute On'Off		You hear a 'pip'. The indicator turns off. Mute is turned off and background noise is audible. Return to step 1.

Selective calling enabled for this channel

Step	Action	Display	Remarks
1.	Press Mute On'Off	CHL Tx 123456 123 Rx 123456	You hear a 'pip'. The indicator turns on. Voice mute is on. Background noise is muted until a voice call is received.
2.	Press Mute On'Off	CHL S-CALL 123 Rx 123456	You hear two 'pips'. The indicator stays on and 'S-CALL' is displayed. Selective call mute is on. Background noise is muted until a selective call is received for your station.
3.	Press Mute On'Off	CHL Tx 123456 123 Rx 123456	You hear a 'pip'. The indicator turns off and 'S-CALL' is no longer displayed. Neither voice mute nor selective call mute is on. Background noise is audible. Return to step 1.

Tuning the antenna

Before using the selected channel, the antenna must be tuned to the transmission frequency. The procedure used to tune the antenna depends upon the antenna tuner and the type of antenna.

You can use:

- a whip antenna
- a long wire antenna.

There are two types of antenna tuners: manual and automatic.

☛ For details, refer to the antenna tuner handbook.

Manual antenna tuners

Step	Action	Display	Remarks
1.	Select the required channel.		See *Selecting channels* on page 4-10.
2.	Press and hold down [Tune] while adjusting the antenna tuner.		

Automatic antenna tuners

There are two models of Codan automatic antenna tuners: the 4203 and the 9103. Only the 4203 displays messages on the transceiver.

☛ For details, refer to the antenna tuner handbook.

Step	Action	Display	Remarks
1.	Select the required channel.		See *Selecting channels* on page 4-10.
2.	Press [Tune]	If tuning on model 4203 was successful: TUNE PASS	The Tx indicator is on during this procedure. You hear 'pips' while the antenna is tuning (this can take a few seconds). Once tuned successfully, you hear two high pitched 'pips'.
		If tuning on model 4203 was unsuccessful: TUNE FAIL	You hear two low pitched tones. For details, refer to the antenna handbook.
		For the 9103, the display is unchanged throughout this procedure.	

❑

Tune receive only mode

Your transceiver can be tuned to receive frequencies in the range 0.25 MHz to 30 MHz.

Due to internally generated signals, it is be difficult to receive on and near frequencies 6599, 9

While you are in tune receive mode you cannot receive selective calls or tone calls.

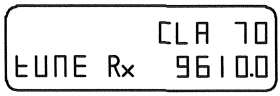
If the transceiver is used with an automatic antenna tuning system, press the Tune button to improve reception. If the transceiver is used with a manual tuner, set the tuner controls to the Scan settings.

This is also recommended for transmit inhibit channels.

The procedure below covers the two methods of changing the receiver frequency, and how to store a receive only frequency:

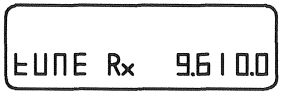
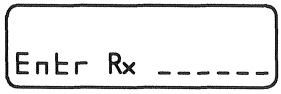
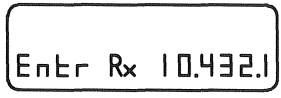
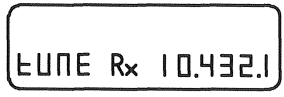
- using the Tune Rx Frequency ⩓ or ⩔ button (for small changes in frequency)
- selecting the desired frequency (for large changes in frequency)
- storing a tuned receive only frequency.

Using the Tune Rx Frequency ⩓ or ⩔ button

Step	Action	Display	Remarks
1.	Press and hold down any Tune Rx Frequency button	The display scrolls through the numbers until you release the button. 	Use the Fast buttons for coarse tuning (1 kHz steps) and the Slow buttons for medium tuning (100 Hz steps). For fine tuning, use the Clarifier ⩓ and ⩔ buttons to make final adjustment in 10 Hz steps.
2.	To exit this mode, press the Channel ⩓ or ⩔ button or the PTT button on the microphone.		

Selecting the desired frequency

This procedure allows you to select a frequency. Once you have selected a frequency, you can store the frequency as a P-channel or exit this facility.

Step	Action	Display	Remarks
1.	Press any Tune Rx Frequency button.		The display shows the last selected channel.
2.	Press 		Your next action must start within 60 seconds.
3.	Enter the frequency number using the numeric buttons.		The decimal point is automatically inserted. This shows the example of typing in 104321.
4.	Press  If required, you can fine tune reception by using the Tune Rx Frequency buttons.		The transceiver now receives this frequency. After pressing the

Step	Action	Display	Remarks
5.	If you wish to store this selection as a P-channel, see *Storing a tuned receive only frequency* on page 4-22.		
6.	To exit this mode, press the Channel ⋀ or ⋁ button or the PTT button on the microphone.		

Storing a tuned receive only frequency

You can store a tuned receive only frequency as a personal channel number in the range P1 to P99. You can then select this frequency using the procedure described in *Selecting channels* on page 4-10.

To store a tuned receive only frequency, the transceiver must be in tune receive only mode.

☛ See *Selecting the desired frequency* on page 4-20.

Step	Action	Display	Remarks
1.	Press the Enter button twice in rapid succession. [Enter]	Entr Tx inhib P__ Rx 4321	
2.	Use the numeric buttons to enter your channel number between 1 and 99.	Entr Tx inhib P33 Rx 4321	The P is automatically inserted. This is an example for number P33.
3.	Press [Enter]		The frequency is now stored as channel P33. The transceiver returns to normal operating mode.

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Transmitting

It is important when transmitting to use the microphone to its best advantage. By following the notes under *Using the microphone* you will obtain the best transmitting results. This section covers two topics:

- using the microphone
- transmitting a message.

Using the microphone

To connect the microphone to the transceiver, push the microphone plug gently into the microphone socket and fasten the locking ring finger tight. Do not over-tighten.

When using the microphone:

- hold the microphone side-on and close to your mouth
- press and hold down the PTT (press to talk) button
- at the start of transmission state the call sign of the person you are calling and your own call sign
- speak clearly at normal volume and rate
- do not use abusive language, remember others may be listening to your conversation and it can offend
- say the word 'over' to indicate you have finished speaking and release the PTT button.

The transceiver has a timeout facility that stops the transmission after a pre-set period. This prevents problems occurring if you have jammed the PTT button down.

To change the timeout period see *Changing the set-up options*, Chapter 12.

Transmitting a message

Step	Action	Display	Remarks
1.	Select a channel for transmission.	The display shows the channel number and the transmit (Tx) and receive (Rx) frequencies.	See *Selecting channels* on page 4-10.
2.	Check the display to see if the channel transmit frequency is enabled.	CHL Tx 4321 P22 Rx 4321 If the display shows 'inhib', you can only receive on this channel. CHL Tx inhib P15 Rx 3600	If the channel is enabled, continue with step 3. If not and the display shows 'inhib', you will have to select another channel on which to transmit.
3.	Tune the antenna.		See *Tuning the antenna* on page 4-16.
4.	Listen and check that the channel is free from traffic.		
5.	Press the PTT button on the microphone and start talking.		The Tx indicator flashes during transmission.

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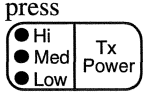
Changing transmitter power

For short range communication where the station you are sending to is very close, you may find the transmitter power of your station is too great . For example, excessive signal strength may cause distortion if you transmit to a vessel berthed along side your own. In such cases, use the Tx Power button to reduce transmitter power.

The 8528S has 'Hi' and 'Low' power settings. The 8528S-H has 'Hi', 'Med' and 'Low' power settings.

Step	Action	Display	Remarks
1.	Ensure the transceiver is not scanning.		
2.	To select the desired power level, repeatedly press 		Each time you press the Tx Power button, the transmitter power changes. The indicator shows the current power setting.

5. Using selective call

Selective call allows you to call an individual transceiver or a group of transceivers. This can be likened to a normal telephone system where the called station has a unique calling address or number.

Selective call also allows you to call a group of stations.

Each transceiver has its own identification number. The identification number is a four digit code that is either:

- programmed into the transceiver using the front panel buttons
- pre-set at the factory.

The selective call feature operates by the transmission and reception of coded signals. These signals contain the identification number of the transceiver being called (the called address) and the number of the transceiver making the call (the self-identification).

All 8528S transceivers can make selective calls. To receive a selective call, option SD must be fitted to your transceiver.

The displays in the procedures show examples of channel and frequency numbers. In each procedure select your own channel and frequency numbers as appropriate.

Selective call terms

The following terms are used in this chapter:

This term...	Means...
Called address	The four digit identification number of the transceiver being called.
Beacon call	A call used to check signal conditions.
Decoding	Receiving and translating the encoded message.
Encode	The translation of the identification number and instructions into a coded message for transmission.
Group call	A call to all transceivers within a selected group. For example, a call using the identification address 0200 (group call) is received by all transceivers whose identification address falls in the two hundred digit range (0201 to 0299).
Preamble	Part of the coded selective call message structure which is transmitted when you press the Call button. The message contains the preamble tone which precedes the called address and the self-identification address codes.
Program	Setting the identification addresses into the transceiver.

This term...	Means...
Revertive Signal	A signal automatically transmitted back from the receiving transceiver to indicate message received and decoded satisfactorily. This signal does not apply to group calls.
Selective beacon call	A call used to check signal conditions to a selected station.
Self-identification	The four digit identification number of the calling transceiver.
Station	The location of a transceiver, either mobile or fixed based.
Selective call encode only	The transceiver can only transmit a selective call (cannot receive). There are two operating conditions that apply: • front panel entry • pre-set controls.
Selective call encode/ decode	The transceiver, fitted with option SD, can transmit and receive a selective call. There are two operating conditions that apply: • front panel entry • pre-set controls.

Setting up selective call

Before you make a selective call, you need to set up:

- the preamble time period
- the called address
- the self-identification address
- the beacon on or off.

You may cancel the set-up procedure at any time by switching the transceiver off (press the Power On/Off button). Switching the transceiver off stores any changes you made to these settings.

The procedures below only apply to transceivers with software issue 4.1 or later. If you own a transceiver with a software issue before 4.1, you will need to reposition an internal link before using these procedures.

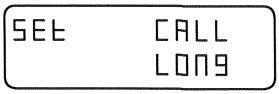
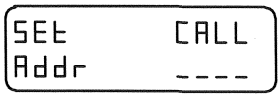
For details on positioning the internal link, see *Changing the position of the front panel link* in Chapter 12.

A long preamble is required when scanning selective calls. The reason for a long preamble is that during scanning the preamble has to be present throughout the time it takes to scan all eight selective call channels.

Do not use identification addresses ending in '00' and '99' as they are used for the group call and beacon facilities.

Once you have started a procedure, skip through unwanted features by repeatedly pressing the S'Call button. In each step you must enter information within 60 seconds of pressing the Enter button, otherwise the transceiver reverts back to normal mode.

Setting the preamble time period

Step	Action	Display	Remarks
1.	Ensure your transceiver is switched off.		
2.	Press and hold down S'Call and press Power On'Off		Hold the S'Call button down for approximately three seconds. This turns on the transceiver in preamble set-up mode.
3.	Press any numeric button to set the preamble length.	 or 	Pressing a numeric button switches between a long and short preamble.
4.	Press Enter		This completes the setting. If your transceiver has the pre-set selective calling switches fitted, go to step 6.

Setting the fixed called address

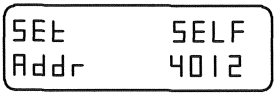
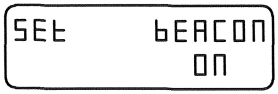
You can enter the called address by:

- using the procedure below (fixes the called address so that it is not easily changed)
- using the pre-set switches (where applicable)
- using the procedure on page 5-17, *Transmitting a selective call* (Open access selective call) which allows the address to be entered from the front panel making it easy to change the called address.

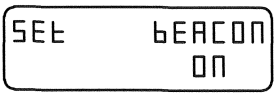
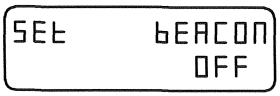
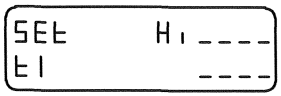
Setting a fixed called address changes the operation of the S'Call button—pressing the S'Call button automatically sends the programmed address. Open access selective calling is disabled.

Step	Action	Display	Remarks
5.	Use the numeric buttons to enter the called address. To delete an address, enter four zeros.	SEt CALL Addr 4835	You can override an existing address by entering a new number.
6.	Press Enter	SEt SELF Addr ----	This completes the setting. If your transceiver has the pre-set selective calling switches fitted, go to step 8. The next step must be completed within 60 seconds.

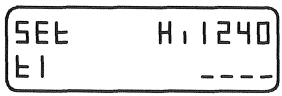
Setting the self-identification address

Step	Action	Display	Remarks
7.	Use the numeric buttons to enter the self-identification address. To delete an address, enter four zeros.		You can override an existing address by entering a new number.
8.	Press Enter		This completes the setting. The next step must be completed within 60 seconds.

Enabling or disabling beacon mode

Step	Action	Display	Remarks
9.	Press any numeric button to switch the beacon on or off.	 or 	Pressing a numeric button switches between beacon on and off. For details, see *Using the beacon feature* on page 5-27.
10.	Press Enter		This completes the setting. For more information on tone calling, see *Using the tone call mode* in Chapter 8.

Setting tone calls

Step	Action	Display	Remarks
11.	No action required		
12.	Press 		This turns your transceiver off and registers all the new selective call settings.

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Setting up the selective call switches

Some transceivers under special circumstances have selective calling ident code switches fitted within the transceiver. These are eight small rotary switches located on PCB 08-03300 or 08-03303 (see Figure 5.1).

The Self ident code switches and the Called address code switches must all be set to allow you to transmit self and called identification addresses. The setting of the code switches overrides all front panel selection of the ident numbers from the transceiver, control head or remote control console 8570. With all the Self ident and Called address code switches set to zero, front panel selection of the ident numbers is re-established

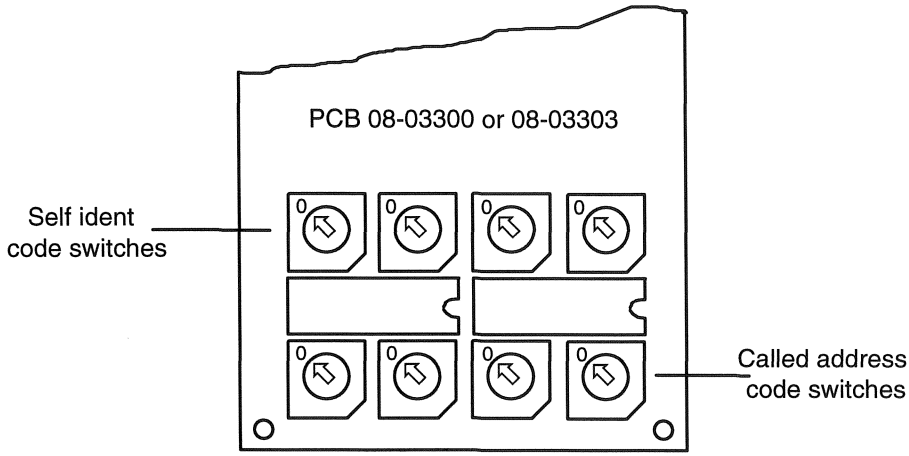

Figure 5.1 Selective call switches

Checking if a channel is enabled for selective call

A channel must be enabled for the selective call facility to operate. If the channel you wish to use has not been enabled, see *Enabling a channel for selective call* on page 5-14.

Step	Action	Display	Remarks
1.	Press and hold down Mute On'Off	CHL 88 OPTION S__U__	An S in the left hand position of the options bar indicates that the channel is enabled for selective calling.
2.	Release Mute On'Off	The original display returns in approximately one second.	Note that you have also changed the mute setting by pressing the Mute On'Off button.

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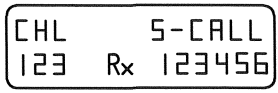
Checking if a selective decode (option SD) is fitted

You need option SD fitted to your receiver if you want to receive selective calls.

You can check whether your transceiver has option SD by checking the operation of the Mute On'Off button. If option SD has been fitted, you can select selective call mute as well as voice mute.

Step	Action	Display	Remarks
1.	Check that selective call mute has been enabled as one of your set-up options.		Pressing the 2182 button should display 'diSP S-CALL ENAbLE'. Press and hold 2182 and switch Power ON. Display will scroll through options at each press of 2182. See *Reviewing set-up options* in Chapter 12.
2.	Select a channel which has been enabled for selective calling.		
3.	Press Mute On'Off several times.		If you hear two 'pips' and 'S-CALL' is displayed, option SD has been fitted to your transceiver.

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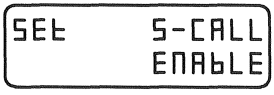
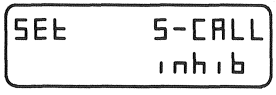
Selective call mute enable or inhibit

This facility enables or inhibits selective call mute operation. When selective call mute is inhibited, you cannot mute selective calls.

Step	Action	Display	Remarks
1.	Turn the transceiver off and move the front panel link to position 1.		Before moving the link, note its original position. See *Changing the position of the front panel link* in Chapter 12.
2.	Press and hold down  and press 	Hold the Mute On'Off button down until the display shows 	
3.	To change the enable/inhibit setting, press 		
4.	Press 		The transceiver is now switched off.

Step	Action	Display	Remarks
5.	Return the front panel link to its original position (E or F).		See *Changing the position of the front panel link* in Chapter 12.
6.	Replace the cover before switching on your transceiver.		

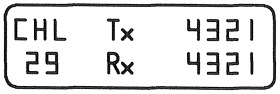
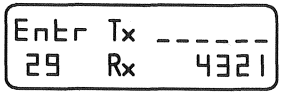
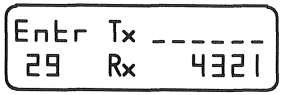
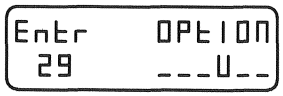
❑

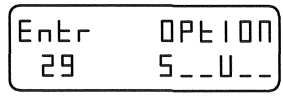
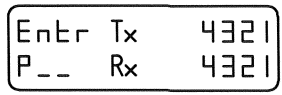
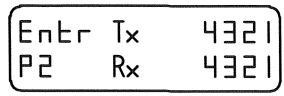
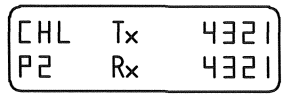
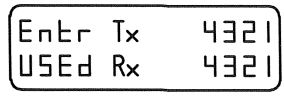
Enabling a channel for selective call

This procedure explains how to enable an existing programmed channel for selective calling. To achieve this you must copy the existing programmed channel into the P-channel program, as outlined below.

This procedure is similar to *Enabling a channel for tone calling* in Chapter 8.

The displays in this section vary depending on the channel you select.

Step	Action	Display	Remarks
1.	Use the Recall or Channel ^ and v buttons to find the channel you wish to enable.		This is an example for channel 29. See *Selecting channels* in Chapter 4.
2.	Press Enter		You hear a pip.
3.	Press Enter		You hear a pip.
4.	Press Enter		You hear a pip. The display shows the options for the chosen channel.

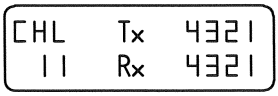
Step	Action	Display	Remarks
5.	Press [S'Call] repeatedly until an S appears in the left hand position of the options bar.		You hear a pip.
6.	Press [Enter]		You hear a pip.
7.	Use the numeric buttons to enter the 'P' channel number you wish to use.		The display automatically inserts a 'P' before the number.
8.	Press [Enter]		
		If the channel is already used, the display shows: 	

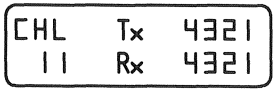
Step	Action	Display	Remarks
9.	If the channel is already used, you can either enter another number or press the Enter button again to override the existing one.	The display reverts back to normal.	The information is either stored under an existing channel number, or you have created a new one.

❑

Transmitting a selective call

For selective call to operate you must have your self-identification number programmed, see *Setting the self-identification address* on page 5-7.

Step	Action	Display	Remarks
1.	Select the channel.		Ensure the channel is enabled for selective calls. Press the Mute On'Off button to view the enabled options. If you need to enable the channel, see *Enabling a channel for selective call* on page 5-10.
2.	Press  to turn mute off.		The indicator turns off and you hear background noise.
3.	Press 		The screen displays the 4-digit address of the station you last called on this channel (1374 in this example). No address is displayed if this channel has never been used for making selective calls. If the address is correct, go to step 5.

Step	Action	Display	Remarks
4.	Use the numeric buttons to enter the address of the station you want to call.		In this example, you are calling station 1144.
5.	Tune the antenna.		See *Tuning the antenna* in Chapter 4.
6.	Check that the channel is free from traffic.		Listen for approximately 10 seconds to ensure the channel is free. If the channel is busy, wait until the channel is free or try another channel.
7.	Press S'Call		The Tx indicator is on and you hear a 'warbling' sound for approximately 10 seconds.
8.	If the other station received your call successfully, you hear the short tones of the revertive signal after a few seconds.		You hear nothing if this is a group call. You can now speak to the other station.

❑

Receiving a selective call

Your transceiver must be fitted with option SD in order to receive selective calls. To see if option SD has been fitted, see *Checking if selective decode (option SD) is fitted* on page 5-11.

Step	Action	Display	Remarks
1.	No action—the transceiver automatically completes this event.	 When you receive a call, the display changes to show you the self-identification address of the calling station.	When you receive a call, tones are heard. You hear a series of three telephone rings for selective calls, and 16 short 'beeps' for group calls.

On receipt of a call you can:

- answer it immediately (see *Answering a received call* on page 5-21)
- let the transceiver automatically store the caller's self identification number in memory to await your reply (see *Returning a received call* on page 5-22).

If your transceiver was unattended at the time the selective call was received, the caller's self identification number is stored in memory for you to review later. See *Reviewing the list of received calls in memory* on page 5-23.

If you do not answer the call immediately, once the call is stored in memory your transceiver continues to emit 'pips' every four seconds to indicate that a call has been received. If you wish to silence these 'pips', yet still retain the display, press the Test ??? button.

If you only wish to receive selective calls, ensure that 'S-CALL' is displayed and selective call mute is on.

If the microphone PTT button is not pressed before the end of the tones:

- the called display remains on to indicate that a call was received
- a pip is heard every four seconds
- the external alarm relay contacts close for approximately two minutes (see *Using the external alarm feature* on page 5-32).

Answering a received call

This procedure is used when you want to answer a call that has just been received on your transceiver which is still producing the ringing tone.

Step	Action	Display	Remarks
1.			The display shows the channel number and the identification address of the caller.
2.	Press the microphone PTT button twice.	The display either reverts back to the normal display or shows the details of the next (if any) unanswered call.	The first press of the PTT button cancels the call and the selective call mute. The second press of the PTT button allows you to transmit to the caller. Proceed to use the transceiver in the normal way.

❑

Returning a received call

This procedure is used when you want to return a call that has been stored in the memory stack.

Step	Action	Display	Remarks
1.	Select the call you wish to return. If necessary, tune the antenna.	CHL 1374 38 S-CALL	The display shows the channel number and the identification address of the caller. See *Reviewing the list of received calls in memory* on page 5-23.
2.	Press S'Call	CHL CALL 38 1374	The transceiver automatically selects the correct channel. The call details are deleted from memory, but the transceiver is ready to transmit.
3.	Check that the channel is free from traffic, then press S'Call	The display shows the details of the next unanswered call.	The transceiver sends the selective call. The transmit indicator is on. If the call is answered, proceed to use the transceiver in the normal way. The caller details are deleted when you press the PTT button on the microphone.

❑

Reviewing the list of received calls in memory

Your transceiver is able to record up to 10 calls in memory from various stations. These may be on different channels if your transceiver is in scan mode. These calls are recorded in a memory stack awaiting your review. If a station calls more than once on the same channel, your transceiver only records one of the calls. If more than 10 calls are made to your transceiver, the first call stored in memory is deleted to make room for the latest call.

Ensure your transceiver is not in scan mode before starting this procedure.

A permanent or brief loss of power to your transceiver will delete information stored in memory. Ensure you record or use all the information stored in the memory stack before switching off the transceiver.

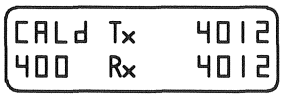
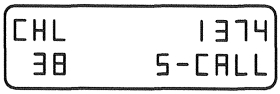
If the transceiver power is lost momentarily, the call memory is retained but the number is lost.

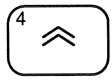
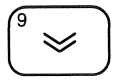
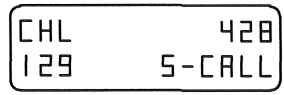
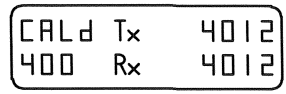
Switching the transceiver off using the Power On'Off button deletes all calls stored in the memory stack.

Reviewing calls held in memory

This procedure allows you to review all calls held in the memory in the order received. Ensure the transceiver is not in scan mode when reviewing the list of selective calls received.

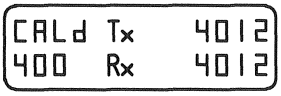
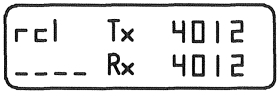
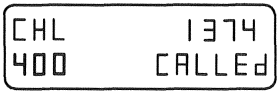
If no calls have been made to your transceiver, the display continues to show both the channel and frequency numbers.

Step	Action	Display	Remarks
1.	No action, this is what you see on the display of your transceiver.		The last call recorded is shown.
	If scanning, and not on the channel that called, the display shows 'CALd'.		
2.	To view the calls held in memory, press Recall then within one second, press S'Call		The first station to call is displayed first. The display shows the callers identification code (1374) and the channel used (38).

Step	Action	Display	Remarks
3.	Press  or  	 	Pressing the ^^ button changes the display to show the next call. Pressing the vv button reverses the order viewed. The identification address and corresponding channel number change for each caller.
4.	If you wish to return a call, see *Returning a received call* on page 5-22.		
5.	To delete a call, press the PTT button on the microphone.	The display shows the next caller's details.	When you press the PTT button, the identification number in the display is deleted from memory. You can then select, call or clear the remainder of the calls from memory.
6.	If you do not clear all the calls, the display shows 'CALd' until memory is empty.	 	If you are on the channel where the call was recorded, the display from step 1 is shown.
7.	Press  	The standard display is shown.	This returns the transceiver to normal operation.

Recalling calls held in memory

Ensure the transceiver is not in scan mode when recalling a selective call held in memory.

Step	Action	Display	Remarks
1.	No action.		
2.	Press Recall then within one second, press S'Call	 	
3.	Check that the channel is free from traffic, then press S'Call	The display shows the details of the next unanswered call.	The transceiver sends the selective call.
4.	Once the recalled channel has been cleared, repeat steps 2 and 3 to recall other calls held in memory.		

Using the beacon feature

The beacon facility is used to check signal conditions between two transceivers fitted with selective call.

The beacon facility has two modes of operation:

- selective beacon mode
- base station (99) beacon mode.

A beacon signal consists of four long tones.

Self-identification addresses ending in 99 should be avoided.

No alarm or call is recorded at the receiving transceiver, only the Tx indicator flashes.

If the receiving transceiver is in scan mode, scanning starts again immediately.

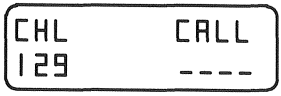
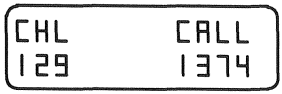
Normal selective call operation is not affected.

Selective beacon mode

This facility is only available for transceivers with EPROM version 4.1 and above.

With the beacon facility enabled on a transceiver, the transceiver transmits a beacon signal on receipt of a selective beacon call from another transceiver.

Both transceivers must be on the same channel, or the receiver of the selective beacon call must be scanning through the same channel.

Step	Action	Display	Remarks
1.	Ensure your transceiver is switched on.	The last channel selected is displayed.	
2.	Select the required test channel and tune the antenna.		See *Selecting channels* in Chapter 4.
3.	Press S'Call		When this button is pressed, selective call mute is automatically switched off.
4.	Use the numeric buttons to enter the required selective call address number.		This allows you to send a selective call to a station whose address number is 1374.

Step	Action	Display	Remarks
5.	Check that the channel is free from traffic, then press Tune (beacon call button)	 Immediately the call has ended, the display shows the last channel and transmit & receive frequencies used.	The transmit indicator is on and you hear a 'warbling' sound for approximately 10 seconds. If the call is successfully decoded, you hear four long revertive tones. You can check these tones for signal strength and compare them with signal strengths from other channels. Select the channel giving the best return signal strength.

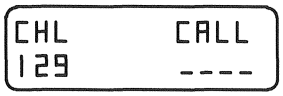
(99) beacon mode

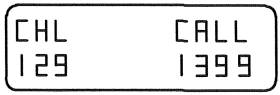
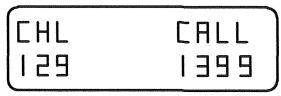
The 99 beacon mode is recommended for use in base station applications and for those transceivers that use selective call but do not have the beacon mode facility.

With a base station enabled for beacon mode, the transceiver transmits a beacon signal on receipt of a selective call ending in 99.

The thousand and hundred digits of the address must be the same for both the beacon transmitting and receiving stations.

If mobile transceivers have the beacon enabled, the first two digits of each mobile transceiver's self-identification address should be set to a different number so that they do not all transmit a beacon response together.

Step	Action	Display	Remarks
1.	Ensure your transceiver is switched on.	The last channel selected is displayed.	
2.	Select the required test channel and tune the antenna.		See *Selecting channels* in Chapter 4.
3.	Press S'Call		When this button is pressed, selective call mute is automatically switched off.

Step	Action	Display	Remarks
4.	Use the numeric buttons to enter the required selective call number. Use the first two digits of the stations self identification number and ensure the last two are 99.		This sends a signal to the base station enabled for beacon call, whose four digit self ident address begins with 13.
5.	Check that the channel is free from traffic, then press S'Call (beacon call button)	 Immediately the call has ended, the display shows the last channel and transmit & receive frequencies used.	The transmit indicator is on and you hear a 'warbling' sound for approximately 10 seconds. If the call is successfully decoded, you hear four long revertive tones. You can check these tones for signal strength and compare them with signal strengths from other channels. Select the channel giving the best return signal strength.

Using the external alarm feature

If your transceiver has option SD fitted, an external alarm facility is available through the external alarm socket on the rear panel (see Figure 2.2).

A pair of relay contacts are wired to the socket which close for two minutes when your transceiver receives a selective call.

The relay contacts can be used to operate an alarm bell or buzzer:

- relay contact rating: 50V DC - 1 Amp
- plug connections: pins 2 and 3.

Further details on the socket can be found in Chapter 14.

These contacts must not be used to switch voltages greater than 50V, or loads that draw more than 1 Amp.

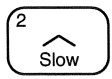
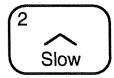
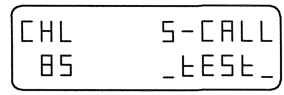
Testing the selective call functions

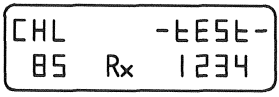
This is a special test mode which is not required for normal operations.

In this mode, the transceiver displays how it decodes and processes selective calls. It displays the addresses to which each selective call was sent and the self identification of the calling station.

No called alarms or revertives are generated unless the selective call is for your station. A revertive is a signal transmitted back from the receiving transceiver to indicate message received and decoded satisfactorily.

Ensure your transceiver is switched off before entering this mode.

Step	Action	Display	Remarks
x1.	Press and hold down  and press 		Do not hold down the Power On'Off button, just the Slow button for approximately five seconds.
2.	Press  within 10 seconds of releasing 		

Step	Action	Display	Remarks
3.	No action. After approximately five seconds the display changes.		The display only changes when a selective call is received.
4.	No action.		When a selective call is received, the display shows the called station identification address and the self identification address.
5.	To exit this mode, press Power On'Off		You must switch your transceiver off and on again to clear this mode.

❑

6. Using the receiver in scan mode

In the receiver scan mode your transceiver is able to listen on selected channels for transmitted signals. Once a signal has been detected, the transceiver holds that channel for a pre-selected time before continuing with the scan. This is determined at set-up.

In normal operating conditions, a maximum of 15 channels can be programmed to be scanned in sequence for audio (voice) signals. A maximum of eight selective call channels can also be included but must be programmed within the first eight entries.

The scanning facilities can only be used with a suitable antenna system. You need an automatic tuner.

It is assumed that before you use any of the procedures in this chapter, you have turned on the transceiver.

The displays in the procedures show examples of channel and frequency numbers. In each procedure select your own channel and frequency numbers as appropriate.

Scan mode terms

The following abbreviations are shown in the displays:

F	Frequency
L	Lower side band
U	Upper side band

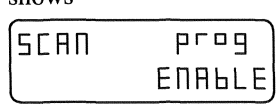
Setting up the scan mode

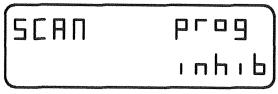
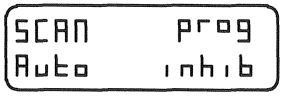
The scan program allows your transceiver to scan a selected number of frequencies. Your transceiver also has the option to run in normal or auto-scan mode. Auto-scan mode automatically puts the transceiver back into scan after five minutes of inactivity (such as no channel change, PTT, or tune).

These scan facilities have two options:

- Enable—scan programs can be entered and deleted from the front panel
- Inhibit—scan programs cannot be entered or deleted from the front panel.

The front panel link does not need to be moved for transceivers with an EPROM issue of 4.1 and above. For these models, ensure the transceiver is switched off and go to step 2.

Step	Action	Display	Remarks
1.	Turn the transceiver off and move the front panel link to position 1.		Before moving the link, note its original position. See *Changing the position of the front panel link* in Chapter 12.
2.	Press and hold down  and press  	Hold down the Scan button until the display shows  	This turns on the transceiver in scan set-up mode.

Step	Action	Display	Remarks
3.	Press 		Each press of the Scan button scrolls to the next option. If this is the option you want, go to step 7.
4.	Press 		Switches to Auto option. If this is the option you want, go to step 7.
5.	Press  Pressing the Scan button again returns you to step 2.		Switches from inhibit to enable. If you select automatic scanning, you can select selective call mute to be enabled as soon as you enter automatic scan mode. If you do not wish to select this option, go to step 7.
6.	Press 		The indicator is on. You have now selected selective call mute to be enabled as soon as you enter the automatic scan mode.

Step	Action	Display	Remarks
7.	Press Power On'Off		The transceiver is now switched off. This procedure is now complete for transceivers with EPROM version 4.1 and above. For earlier models, continue with step 8.
8.	Return the front panel link to its original position (E or F).		See *Changing the position of the front panel link* in Chapter 12.
9.	Replace the cover before switching on your transceiver.		

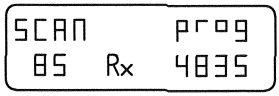
❑

Programming the channels to be scanned

In normal operating conditions, a maximum of 15 channels can be programmed to be scanned in sequence for audio (voice) signals. Channels required to operate on a selective call must be programmed within the first eight entries.

Ensure your transceiver is switched on and scan program has been enabled.

Step	Action	Display	Remarks
1.	Press [Enter] and then [Scan] within one second.	SCAN 85 Rx 4835	The Scan button indicator flashes. All previous channels programmed to be scanned are erased.
2.	To select the relevant channel, press [4 ^^] or [9 vv]	SCAN 85 Rx 4835	See *Selecting channels* in Chapter 4. Channels required to operate on selective call must be enabled. See *Enabling a channel for selective call* in Chapter 5.

Step	Action	Display	Remarks
3.	Press Scan		The channel is programmed for scanning. Repeat this procedure until all channels you want to scan have been programmed.
4.	Press Enter and then Scan within one second.		The channels you have programmed are now registered within the transceiver.

If an error is made, the programming mode must be switched off (follow step 4), and the procedure repeated.

If you try to program more than 15 entries, you hear a single low-pitched tone and the error message 'scan full' is displayed.

The channel entries can be reviewed while in scan programming mode. Use the channel ⩓ and ⩔ buttons to scroll through the channels. Any channel in the scan program is indicated by 'prog' on the display (as shown in step 3 above).

The scan program can be inhibited (see *Setting up the scan mode* on page 6-3).

Receiving in scan mode

This section covers:

- start scanning
- stop scanning.

Start scanning

Step	Action	Display	Remarks
1.	Press 	The display shows details of each channel as it is scanned.	The Scan button indicator is on during scanning. You cannot transmit while the transceiver is in scan mode. If you attempt to transmit, you hear a single 'pip' and the error message 'No Ptt Error' is displayed. If you need to transmit, you must stop the scanning operation.

Stop scanning

Step	Action	Display	Remarks
1.	Press  or press the microphone PTT button twice.	The display shows the last channel scanned.	The Scan button indicator turns off. If you only press the PTT button once, 'NO PTT Error' is displayed for three seconds.

❑

Changing the scan mode

There are either three or four scan modes depending on whether your transceiver is enabled or not for selective calls. You select the scan mode by repeatedly pressing the Mute On'Off button.

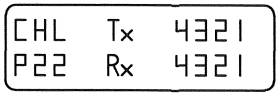
Without selective call enabled

If your transceiver does not have option SD fitted, or it has option SD fitted but selective call mute has been inhibited (see *Selective call mute enable or inhibit* in Chapter 5), you can select one of three scan modes:

- Continuous scanning—each channel is monitored for one second; scanning continues regardless of any audio signal being detected
- Pause scanning—scanning stops for five seconds when an audio signal is detected
- Hold scanning—scanning stops when an audio signal is detected and continues only when the signal ceases.

Scan modes operate for both voice and selective call reception.

The procedure below assumes that you are starting in Continuous scanning mode.

Step	Action	Display	Remarks
1.	Ensure the transceiver is in Scan mode.	 The display shows the frequencies as they are scanned.	The Scan button indicator is on in all scan modes. See *Receiving in scan mode* on page 6-8. You are in Continuous scanning mode and the Mute On'Off button indicator is off.
2.	To change to Pause scanning mode, press 		You hear a single 'pip' and the Mute On'Off indicator turns on.
3.	To change to Hold scanning mode, press 		You hear two 'pips' and the Mute On'Off indicator stays on.
4.	To change back to Continuous scanning mode, press 		You hear a single 'pip' and the Mute On'Off indicator turns off.

With selective call enabled

If your transceiver has option SD fitted and selective call mute is enabled (see *Selective call mute enable or inhibit* in Chapter 5), you can select one of four scan modes:

- Continuous scanning—each channel is monitored for one second; scanning continues regardless of any audio signal being detected
- Pause scanning—scanning stops for five seconds when an audio signal is detected
- Hold scanning—scanning stops when an audio signal is detected and continues only when the signal ceases
- Selective call scanning—scanning stops when a selective call for your station is detected, you hear three telephone rings followed by 'pips' every four seconds.

Selective call scanning ensures that you are only alerted when the incoming calls are addressed to you.

This facility also allows the transceiver to store in memory the addresses of up to ten stations that may have tried to contact the transceiver whilst unattended. These addresses may have been transmitted over any of the programmed channels.

The first eight channels of the scan are used for selective call scanning.

For networks using this facility, it is important for the calling station to transmit a long preamble. For more details on selective calling, see *Using selective call,* Chapter 5.

The procedure below assumes that you are starting in Continuous scanning mode.

Step	Action	Display	Remarks
1.	Ensure the transceiver is in Scan mode.	CHL Tx 4321 P22 Rx 4321 The display shows the frequencies as they are scanned.	The Scan button indicator is on in all scan modes. You are in Continuous scanning mode and the Mute On'Off button indicator is off.
2.	To change to Pause scanning mode, press Mute On'Off		You hear a single 'pip' and the Mute On'Off indicator turns on.
3.	To change to Hold scanning mode, press Mute On'Off		You hear two 'pips' and the Mute On'Off indicator stays on.
4.	To change to Selective call scanning mode, press Mute On'Off	CHL S-CALL P22 Rx 4321	You hear two 'pips' and the Mute On'Off indicator stays on. 'S-CALL' is displayed.

Step	Action	Display	Remarks
4. cont.		If you receive a selective call, the display changes to CHL 128 129 CALLEd	You hear three telephone rings followed by 'pips' every four seconds until you answer the call. Scanning resumes after 2½ minutes if you do not answer the call.
5.	To change back to Continuous scanning mode, press Mute On'Off	CHL Tx 4321 P22 Rx 4321	You hear a single 'pip' and the Mute On'Off indicator turns off.

❑

Programming frequency band scan

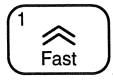
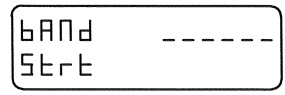
The band scanning facility enables the transceiver to scan between two programmed frequencies. You can program the frequency bands to suit your needs.

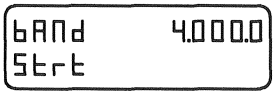
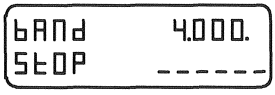
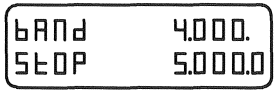
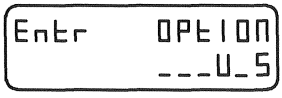
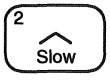
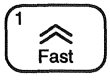
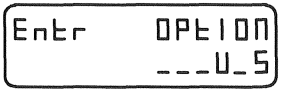
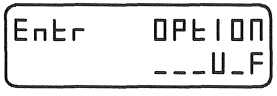
Up to 30 bands can be programmed into the transceiver and stored between channels P70 and P99.

There are two rates of scan available, fast and slow:

- fast scanning changes the frequency in ten 1 kHz steps per second
- slow scanning changes the frequency in ten 100 Hz steps per second.

Your transceiver must be switched on before starting this procedure.

Step	Action	Display	Remarks
1.	The following buttons must be pressed within one second. Press  then press any of the Tune Rx Frequency buttons, eg  , then press  	 	The Scan button indicator flashes. The next action must start within 60 seconds.

Step	Action	Display	Remarks
2.	Using the numeric buttons, enter the start frequency to the nearest 100 Hz.		This is an example of selecting a band scan to start at 4000 kHz.
3.	Press 		The decimal points are entered automatically.
4.	Enter the stop frequency to the nearest 100 Hz.		This is an example of selecting a band scan to stop at 5000 kHz.
5.	Press 		
6.	Press  or 	 	S indicates the slow rate of scan (100 Hz steps). F indicates the fast rate of scan (1 kHz steps).

Step	Action	Display	Remarks
7.	If you need to change the sideband, press ● Hi ● Med ● Low Tx Power	Entr OPtION ___U_F	Each press switches between upper side band (U) and lower side band (L). Option L must be fitted to your transceiver for lower side band operation.
8.	Press Enter	Entr 4000 F__ 5000	
9.	Enter the channel number you have selected (for example, 88).	bAnd 4000 F88 5000 If the display shows either prog 'USEd', 'prog' 'inhib' or 'prog FULL' see the notes below.	Select a number between 70 and 99. The 'F' is automatically entered.
10.	Press Enter	bAnd 4000 F88 5000	The Scan indicator light turns off. The frequency band has been selected. You can repeat the operation until all the channels are full.

If the display shows 'prog USEd', either enter another channel number or press the Enter button to overwrite the existing information.

If the display shows 'prog inhib', the scan facility is inhibited. See *Changing the set-up options,* Chapter 12.

If the display shows 'prog FULL', all 99 user program channels are used. Either press the Enter button to overwrite the existing information, or select a channel that you no longer require and press the Enter button.

☛ For further details on these messages, see *Programming display messages* in Chapter 7.

❑

Scanning frequency bands

The band scanning facility enables the transceiver to scan between two programmed frequencies.

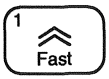
☛ See *Programming frequency band scan* on page 6-15.

There are two rates of scan available, fast and slow:

- fast scanning changes the frequency in ten 1 kHz steps per second
- slow scanning changes the frequency in ten 100 Hz steps per second.

The following procedure explains how to scan the frequency bands.

Step	Action	Display	Remarks
1.	Select the relevant programmed band scan channel between P70 and P99.		See *Selecting channels* in Chapter 4. Band scan channels are indicated as an 'F' number.
2.	Press Scan	bAnd F88 256789 The display shows the channel number and all the frequencies as the band is scanned continuously.	The Scan indicator turns on.

Step	Action	Display	Remarks
3.	To pause the scan, press any fast or slow Tune Rx Frequency button. For example, press 	The display shows the channel number and the current frequency.	To move between the frequencies, use any Tune Rx Frequency button.
4.	To resume scanning, press 	The display shows the channel number and all the frequencies as the band is scanned continuously.	The rate of scan is determined by whether you pressed the fast or slow button in step 3.
5.	To stop scanning, press 		The Scan indicator turns off.
6.	To restart normal scanning, select another non-band scanning channel and press 		See *Selecting channels* in Chapter 4.

Deleting unwanted scan channels

Step	Action	Display	Remarks
1.	Select the channel you wish to delete.	bAnd 4000 F88 5000	This is an example for channel 88. See *Selecting channels* in Chapter 4.
2.	Press Enter	Entr 4000 F__ 5000	
3.	Press twice 0 P ≫	Entr 4000 F00 5000	Two '0's entered as a channel number deletes the information in the selected channel.
4.	Press Enter	The display shows the details of the next lowest channel.	

The scan program can be locked to prevent changes being made. If changes are attempted on a locked channel, the display shows 'prog inhib'.

☛ For details, see *Setting up the scan mode* on page 6-3.

❑

7. Programming channels

Generally transceivers are supplied with an in-built facility (option TXD—Transmit Disabled), which prevents you from programming or changing transmit frequencies from the front panel. Under special circumstances, and where local licensing authorities permit, you may fit option TXE (Transmit Enable) which allows you to create or change the transmit frequencies of your transceiver.

Your transceiver can store up to 600 channels. A maximum of 501 transmit and receive channels can be pre-programmed by the factory or a Codan agent. The remaining 99 programmable channels (P-channels) can be set by you from the front panel.

Pre-programmed channels may be copied as P-channels and have their options modified, such as:

- E—emergency call (RFDS in Australia)
- S—selective call
- t—2-tone calls (four 2-tone calls)
- Upper Side Band (USB) or Lower Side Band (LSB, if fitted).

The factory or agent programmed channels are stored in internal memory and can only be reprogrammed or deleted by the factory or agent. You can only create or change the transmit frequencies if your transceiver has option TXE fitted.

P-channels are stored in memory but can be reprogrammed or deleted at any time by the operator.

The displays in the procedures show examples of channel and frequency numbers. In each procedure select your own channel and frequency numbers as appropriate.

Setting up the P-channel inhibit options

The programmable channel feature (P-channel) that you program from the front panel of the transceiver, has four inhibit options. Each option places different restrictions on the operator to prevent interference to the programmed channels.

The four options are:

- No inhibit (No inhib)—allows you to overwrite or delete P-channels from the front panel
- Standard inhibit (Std inhib)—inhibits you from overwriting and deleting P-channels, but allows you to program new P-channels
- Full inhibit (FULL inhib)—prevents the Enter button from working (which inhibits all P-channel programming) and the Tune Rx Frequency buttons are disabled
- Total inhibit (tOtAL inhib)—same as Full inhibit, plus the transmit and receive frequencies are not displayed.

Apart from 'No inhibit', the remaining options require an Inhibit link fitted to the microprocessor PCB. Further details can be found in Chapter 12, *Inserting the microprocessor PCB link.*

This section covers two procedures:

- Checking if the inhibit link has been fitted to the PCB
- Changing the inhibit options.

Checking if the inhibit link is fitted to the PCB

In this mode, all P-channels may be overwritten or deleted from the front panel. This facility is only available when there is no Inhibit link fitted to the microprocessor PCB.

The front panel link does not need to be moved for transceivers with an EPROM issue of 4.3 and above. For these models, ensure the transceiver is switched off and proceed to step 2.

Step	Action	Display	Remarks
1.	Turn the transceiver off and move the front panel link to position 1.		Before moving the link, note its original position. See *Changing the position of the front panel link* in Chapter 12.
2.	Press and hold down Enter and press Power On'Off	Hold down the Enter button until the display shows CHAN No inhib If there is an Inhibit link fitted, the display shows whichever inhibit has been selected.	This display confirms that no Inhibit link is fitted to your transceiver. The message means that there are no inhibits on P-channel programming.

Step	Action	Display	Remarks
3.	Press [Power On'Off]		The transceiver is now switched off. This procedure is now complete for transceivers with EPROM version 4.3 and above. For earlier models, continue with step 4.
4.	Return the front panel link to its original position (E or F).		See *Changing the position of the front panel link* in Chapter 12.
5.	Replace the cover before switching on your transceiver.		

Changing the inhibit options

Only qualified technicians should complete this procedure.

This mode can only be entered if the Inhibit link is fitted across the number 2 pads on the microprocessor PCB and the front panel link is repositioned. See Chapter 12, *Inserting the microprocessor PCB link* and *Changing the position of the front panel link.*

Step	Action	Display	Remarks
1.	Turn the transceiver off and move the front panel link to position 1.		Before moving the link, note its original position. See *Changing the position of the front panel link* in Chapter 12.
2.	Insert an Inhibit link across the number 2 pads on the microprocessor PCB.		See *Inserting the microprocessor PCB link* in Chapter 12.
3.	Press and hold down Enter and press Power On'Off	Hold the Enter button down until the display shows SEt StD prog inhib	This display shows your last setting, either 'Std', 'FULL' or 'tOtAL inhib'. Pressing the Enter button scrolls through the available options. If this is the option you want, go to step 6.

Step	Action	Display	Remarks
4.	Press [Enter]	SEt FULL prog inhib	Pressing the Enter button scrolls through the available options. If this is the option you want, go to step 6.
5.	Press [Enter]	SEt tOtAL prog inhib	If this is the option you want, go to step 6.
6.	Press [Power On'Off]		The transceiver is now switched off.
7.	Return the front panel link to its original position (E or F).		See *Changing the position of the front panel link* in Chapter 12. The Inhibit link stays in.
8	Replace the cover before switching on your transceiver.		

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Copying channels to P-channels

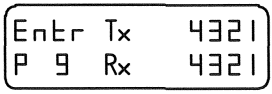
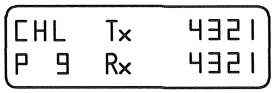
This facility allows you to copy the factory or agent pre-programmed channels already stored in memory and make them P-channels. This allows you to group the most commonly used channels which can save you time searching for them in the main program.

Ensure your transceiver is switched on before starting this procedure.

You need to complete each action within 60 seconds otherwise the procedure automatically aborts without any changes being made.

Step	Action	Display	Remarks
1.	Use the Recall or Channel ⌃⌃ and ⌄⌄ buttons to find the channel you want to copy.	CHL Tx 4321 29 Rx 4321	This is an example for channel 29. See *Selecting channels* in Chapter 4.
2.	Press Enter	Entr Tx ------ 29 Rx 4321	
3.	Press Enter	Entr Tx 4321 29 Rx ------	

Step	Action	Display	Remarks
4.	Press [Enter]		This allows you to select options.
5.	Press [S'Call] if you want to change the E, S, t1, t2, t3, t4 or blank option setting.	Entr OPTION 29 S__U__	Each press of the button selects the next setting in the sequence: E/S/t1/t2/t3/t4/blank. Press the button repeatedly until the required option is displayed. See *Option codes in* Chapter 4.
6.	Press [● Hi ● Med ● Low Tx Power] to select either upper (U) or lower (L) sideband.	Entr OPTION 29 S__U__	Each press of the TX Power button switches between the upper (U) and lower (L) sideband settings. See *Option codes in* Chapter 4.
7.	Press [Enter]	Entr Tx 4321 P__ Rx 4321	The 'P' is displayed ready for you to enter the channel number.

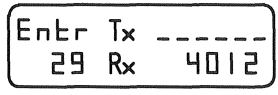
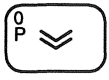
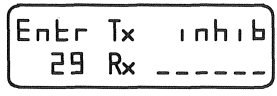
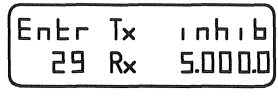
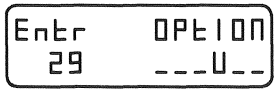
Step	Action	Display	Remarks
8.	Use the numeric buttons to enter your choice of channel number between 1 and 99.		This is an example for channel P9. If the display shows 'FULL', 'USEd' or 'inhib', see *Programming display messages* on page 7-17. Channels using different transmit and receive frequencies (2-frequency
9.	Press Enter		This registers the new channel in your transceiver.

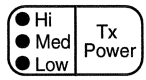
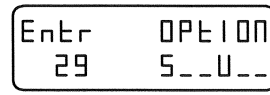
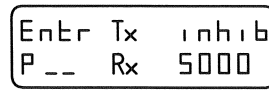
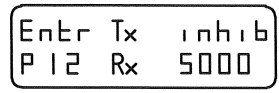
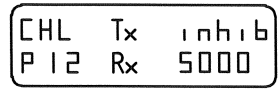
Creating receive only P-channels

All transceivers have the facility to create or change the receive P-channels from the front panel.

Ensure your transceiver is switched on before starting this procedure.

You need to complete each action within 60 seconds otherwise the procedure automatically aborts without any changes being made.

Step	Action	Display	Remarks
1.	Press 		
2.	Press 		
3.	Use the numeric buttons to enter the receive frequency.	 If the display shows either the 'too hi' or 'too lo' error message, see *Programming display messages* on page 7-17.	The frequency must be entered to the nearest 100 Hz, between 250 kHz and 30 MHz. The display shows an example of 5 MHz.
4.	Press 		This facility defaults to the last channel setting.

Step	Action	Display	Remarks
5.	Press  to select either upper (U) or lower (L) sideband.		Each press of the TX Power button switches between the upper (U) and lower (L) sideband settings. See *Option codes* in Chapter 4.
6.	Press 		This registers the options you selected and allows you to enter a channel number. The 'P' is automatically entered.
7.	Use the numeric buttons to enter your choice of channel number between 1 and 99.		This is an example for channel P12. If the display shows 'FULL', 'USEd' or 'inhib', see *Programming display messages* on page 7-17.
8.	Press 		This registers the new channel in your transceiver. You can now continue with normal transceiver operations.

Creating transmit and receive P-channels

All transceivers have the facility to create or change the receive P-channels from the front panel.

You can only create, or change, transmit P-channels from the front panel of your transceiver if it has option TXE fitted. Under special circumstances, and where local licensing authorities permit, option TXE (transmit enable) may be fitted to your transceiver. This option must be requested at the time of purchase.

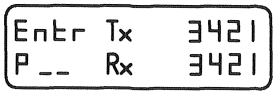
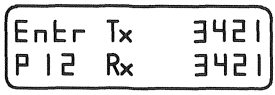
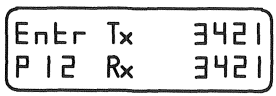
Only under these conditions will the following apply.

Ensure your transceiver is switched on before starting this procedure.

You need to complete each action within 60 seconds otherwise the procedure automatically aborts without any changes being made.

Step	Action	Display	Remarks
1.	Press [Enter]	Entr Tx ------ 29 Rx 4012	
2.	Use the numeric buttons to enter the transmit frequency.	Entr Tx 3421 29 Rx ------	This example is for transmit frequency 3421 KHz. The frequency must be entered to the nearest 100 Hz, between 2 MHz and 24 MHz.

Step	Action	Display	Remarks
3.	Press Enter		
4.	Use the numeric buttons to enter the receive frequency. Or press Enter again if the receive is the same frequency as transmit.	EntEr Tx 3421 29 Rx 3421 If the display shows either the 'too hi' or 'too lo' error message, see *Programming display messages* on page 7-17.	This example is for receive frequency 3421 KHz. The frequency must be entered to the nearest 100 Hz, between 2 MHz and 24 MHz.
5.	Press Enter	EntEr OPtIOn 29 ___U__	This facility defaults to the last channel setting.
6.	Press ● Hi ● Med ● Low Tx Power to select either upper (U) or lower (L) sideband.	EntEr OPtIOn 29 S__U__	Each press of the TX Power button switches between the upper (U) and lower (L) sideband settings. See *Option codes* in Chapter 4.

Step	Action	Display	Remarks
7.	Press Enter		This registers the options you selected and allows you to enter a channel number. The 'P' is automatically entered.
8.	Use the numeric buttons to enter your choice of channel number between 1 and 99.		This is an example for channel P12. If the display shows 'FULL', 'USEd' or 'inhib', see *Programming display messages* on page 7-17.
9.	Press Enter		This registers the new channel in your transceiver. You can now continue with normal transceiver operations.

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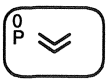
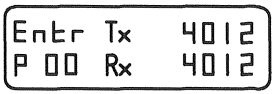
Deleting unwanted P-channels

Ensure your transceiver is switched on before starting this procedure.

You need to complete each action within 60 seconds otherwise the procedure automatically aborts without any changes being made.

Step	Action	Display	Remarks
1.	Use the Recall or Channel ⩓ and ⩔ buttons to find the channel you want to delete.	CHL Tx 4012 P 9 Rx 4012	This is an example for channel P9. See *Selecting channels* in Chapter 4.
2.	Press Enter	Entr Tx ------ P 9 Rx 4012	
3.	Press Enter	Entr OPTION P 9 ---U--	The enter button scrolls through the options.
4.	Press Enter	Entr Tx 4012 P-- Rx 4012	

Step	Action	Display	Remarks
5.	Press twice 		Two zeros entered as a channel number erase the information in that channel.
6.	Press 	The transmit and receive frequencies of the next lowest channel.	If the display shows 'inhib', see *Programming display messages* on page 7-17.

Programming display messages

Whilst programming channels, the display may show the following messages:

- inhibit ('inhib')
- used ('USEd')
- full ('FULL')
- too hi or too low ('too hi', 'too lo').

Inhibit ('inhib')

P-channels can be protected from being accidentally deleted or overwritten by soldering a link on the microprocessor PCB. (See *Inserting the microprocessor PCB link* in Chapter 12.)

If you try to delete or overwrite a channel with the link installed, the display shows 'inhib' when you press the Enter button. You must try another channel number in order to store your selection.

Used ('USEd')

If the display shows 'USEd', the channel number you selected is already being used and the overwrite protection link is not installed (see Inhibit, above). Either enter another channel number or overwrite the existing channel number by pressing the Enter button again.

If the overwrite protection link is not installed, pressing the Enter button again erases the frequency previously allocated to this channel number.

Full ('FULL')

If the display shows 'FULL', all 99 P-channels have been used.

If the overwrite protection link is not installed, pressing the Enter button again erases the frequency previously allocated to this channel number.

Select a channel number you no longer need, and overwrite that number by pressing the Enter button again.

If the overwrite protection link is installed, it will have to be removed before you can save your new channel selection. (See *Inserting the microprocessor PCB link* in Chapter 12.)

Too high or too low ('too hi' or 'too lo')

If you try to program a frequency outside the range of 250 kHz to 30 MHz, the transceiver shows the error message 'too hi' or 'too lo'. To overcome this problem, reprogram another frequency within the transceivers range.

Setting up temporary channels

During any channel programming operation, copying or creating a P-channel, you can press the Enter button instead of entering a channel number. This creates a temporary channel which is not saved when you switch off the transceiver.

8. Using tone call

The tone call facility provides stations within a network to either call (tone encode—TE), or be called (tone decode—TD) by other stations, using the transmission of tones.

Tone calls use two tones (High and Low) transmitted simultaneously to call another station. The tones used must be identical for both the transmitting and receiving transceivers.

The tones fit into two frequency bands, each with a High and Low tone, either 440 Hz or 360 Hz apart. Each of these bands must lie within the frequency range 850 Hz and 1500 Hz.

In Australia, the RFDS uses the 440 Hz frequency band. Telstra maritime also uses the same tones for tone calls. An example for this type of call would be 880 Hz and 1320 Hz. Private communications in Australia use the 360 Hz frequency band. A typical example for this type of call would be 880 Hz and 1240 Hz.

To receive a tone call your transceiver must have option TD fitted. To transmit a tone call, tone call must be enabled on the selected channel.

You cannot have the automatic tuning antenna (option AD, normally only fitted to land transceivers) and 2-tone decoder (option TD) fitted to the same transceiver. Selective call, RFDS emergency call and tone call cannot be enabled on the same channel.

Tones t1 and t2 are given values in the factory. Tones t3 and t4 are not used.

Enabling a channel for tone calling

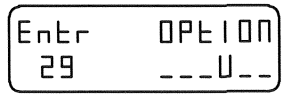
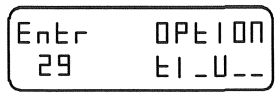
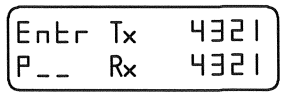
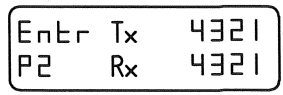
This procedure explains how to enable a channel for tone calling. Initially, you need to select a channel frequency you want to enable, and then choose a tone call pair for that frequency.

You can copy this information into the P-channel program.

This procedure is similar to *Enabling a channel for selective call* in Chapter 5. Once in set-up mode, skip through the non-important steps by pressing the Enter button.

The displays in this section vary depending on the channel you select (ie, the word inhibit may be replaced with a frequency number).

Step	Action	Display	Remarks
1.	Use the Recall or Channel ^ and v buttons to find the channel you wish to enable.	CHL Tx 4321 29 Rx 4321	This is an example for channel 29. See *Selecting channels* in Chapter 4.
2.	Press Enter	Entr Tx ------ 29 Rx 4321	You hear a 'pip'.
3.	Press Enter	Entr Tx ------ 29 Rx 4321	You hear a 'pip'.

Step	Action	Display	Remarks
4.	Press Enter		You hear a 'pip'.
5.	Press S'Call Repeat this action until a 't' and the required tone pair appear in the left hand two spaces of the options bar.		This is an example for tone pair t1. You hear a 'pip'.
6.	Press Enter		You hear a 'pip'.
7.	Use the numeric buttons to enter the channel number you wish to use.		The display automatically inserts a 'P' before the number.

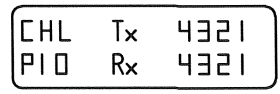
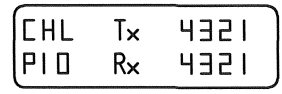
Step	Action	Display	Remarks
8.	Press Enter	CHL Tx 4321 P2 Rx 4321 If the channel is already used, the display shows EntEr Tx 4321 USEd Rx 4321	
9.	If the channel is already used, either enter another number or press the Enter button again to override the existing one.	The display reverts back to normal.	The information is either stored under an existing channel number, or you have created a new one.

Using the tone call mode

Before starting this procedure, ensure the Mute On'Off button is in the off position (indicator off) and the antenna is tuned to the selected frequency.

This section covers both transmitting and receiving a tone call.

Transmitting a tone call

Step	Action	Display	Remarks
1.	Use the channel buttons or Recall button to select the channel you wish to use.		Ensure the channel you select is enabled for tone call. To check, press and hold down the Mute On'Off button.
2.	Ensure that the channel is free from traffic.		Listen for approximately 10 seconds.
3.	Press and hold down S'Call for approximately 10 seconds.		You hear a tone. The Tx indicator is on.
	If the channel you selected was not enabled, an error message is displayed.		You hear a low pitched tone. The call is not transmitted and you must choose another channel.

Step	Action	Display	Remarks
4.	Start communication when contact has been established.		

Receiving a tone call

To receive a tone call your transceiver must be fitted with option TD.

Step	Action	Display	Remarks
1.	No action. Upon receipt of a tone call, your transceiver displays the channel number of the calling station.	CHL 129 TonE CALLEd	You hear an alarm consisting of two sets of three short 'pips'. Following this alarm you hear a 'pip' every four seconds. You can cancel the 'pips' by pressing the microphone PTT button.
2.	Use the microphone to reply to the call.		

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9. Making a telephone interconnect call

If the base station transceiver is linked to an IPC-500 telephone interconnect unit (Figure 9.1), it can make and receive telephone calls through the public switched telephone network (PSTN).

Using the selective call facility on your outstation transceiver to signal the base station telephone interconnect, you can dial any telephone number of up to 16 digits. The number is sent as part of the selective call signal.

Your outstation transceiver can store up to 10 pre-programmed telephone numbers which can be recalled for 'abbreviated dialling'. Your outstation transceiver can receive a selective call containing a telephone number which can be stored and reviewed later.

When the telephone mode is enabled, P-channels P90 to P99 are used for storage of telephone numbers with the base station telephone interconnect facility. These channels are no longer available for general use with channel frequencies.

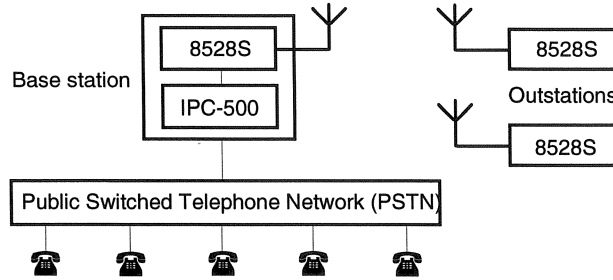
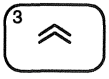
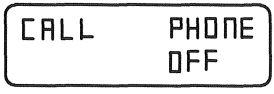
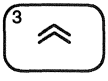
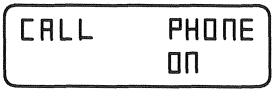


Figure 9.1 Telephone interconnect block diagram

Enabling the telephone mode

You can only make telephone calls from your outstation transceiver if the telephone mode is enabled. You can still use all the transceiver's other functions while this mode is enabled.

To complete this procedure on transceivers with program (EPROM) issue numbers of 4.1 and higher, follow the steps below. If prior to 4.1, the front panel link will have to be moved before starting this procedure. To check the issue number, see *Review the EPROM version and options* in Chapter 4. To move the front panel link, see *Changing the position of the front panel link* in Chapter 12.

Step	Action	Display	Remarks
1.	To enter the phone mode, press and hold down  and press 	Hold down the number 3 button until the display shows 	This turns on the transceiver in phone set-up mode.
2.	To switch between on and off, press 		Continually pressing the number 3 button switches the telephone mode on and off.

Step	Action	Display	Remarks
3.	Switch the transceiver off at your desired setting, or press Enter		This sets the telephone mode you require.

Making a telephone call

This procedure explains how to make a telephone call from your outstation transceiver to the base station transceiver IPC-500 system.

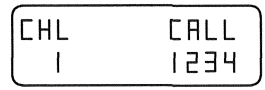
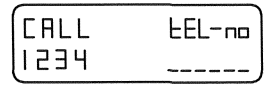
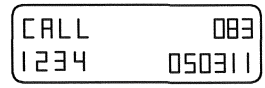
Ensure your transceiver is switched on before starting this operation.

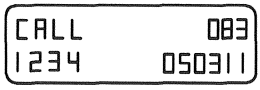
Ensure the antenna is tuned on the selected channel (see *Tuning the antenna* in Chapter 4).

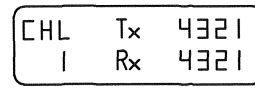
Before making a telephone call, it is often beneficial to make a beacon call to assess the best channel to use (see *Using the beacon feature* in Chapter 5).

When you have finished making a call, you must disconnect the call line (see *Sending a disconnect message* on page 9-8).

Step	Action	Display	Remarks
1.	Use the Channel buttons or Recall button to select the channel you wish to use.	CHL Tx 4321 1 Rx 4321	This is an example for channel 1. See *Selecting channels* in Chapter 4. Ensure the channel is enabled for selective call.
2.	Press S'Call	CHL CALL 1 ----	You must start the next action within 60 seconds.

Step	Action	Display	Remarks
3.	Use the numeric buttons to enter the required selective call address.		This is the self identification number of the base IPC-500 telephone interconnect you are using. See *Using selective call*, Chapter 5.
4.	Press Enter		
5.	Use the numeric buttons to enter the telephone number you wish to call.		This example number is 08 305 0311. Numbers wrap around in the display from the bottom to the top row, including the CALL area—16 digits.

Step	Action	Display	Remarks
6.	Check the channel is free from traffic, then press S'Call		The Tx indicator is on and you hear a 'warbling' sound for approximately 10 seconds as the transceiver sends your call. If the call is received successfully by the IPC-500, you hear a revertive tone followed by a pause while the number is dialled. Once the number has been dialled by the IPC-500, you hear the appropriate telephone network service tones.

Step	Action	Display	Remarks
7.	When the telephone subscriber answers, they hear a short pre-recorded message informing them that this is a radio telephone call. This is followed by a single tone of one second duration heard by both parties. You may now use the transceiver in normal communication mode.		The indicator flashes during talking. On completing the call, you must send a disconnect message (see *Sending a disconnect message* on page 9-8). You may now resume normal transceiver operation.

The telephone number is erased from memory once power has been turned off.

Sending a disconnect message

When a telephone call is made, a circuit is automatically established between your outstation transceiver and the telephone party that the base IPC-500 has dialled. When you finish a call, this call line must be disconnected. This is achieved by sending a disconnect message from your transceiver to the IPC-500.

This procedure assumes that the transceiver is switched on, still on the original channel, and the telephone conversation has been completed.

Step	Action	Display	Remarks
1.	Press S'Call	CHL 1 CALL 1234	This is an example for the last called number 1234 on channel 1.
2.	Press Enter	CALL 1234 083 050311	The last telephone number you called was 08 305 0311.
3.	Press Mute On'Off	CALL 1234 tEL-no ------	This deletes the last number.
4.	Press Mute On'Off	CALL 1234 dISCon tEL	You are now ready to send the disconnect message.

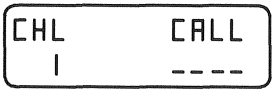
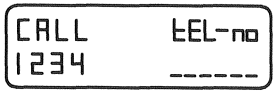
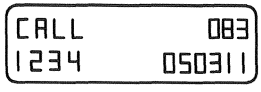
Step	Action	Display	Remarks
5.	Press S'Call		The Tx indicator is on and you hear a 'warbling' sound for approximately 10 seconds as the transceiver sends your call. When you hear five long 'beeps' you know that the circuit has been disconnected. Your transceiver is now ready for normal operation.

An alternative method of disconnect can be used by asking the telephone party to press '99' within two seconds on the DTMF telephone keypad.

Storing a telephone number

This facility allows you to store up to 10 telephone numbers into your transceiver, which can be re-called by entering a single code number (0 to 9) rather than a complete telephone number.

Ensure your transceiver is switched on and a selective call enabled channel has been selected before starting this procedure.

Step	Action	Display	Remarks
1.	Press S'Call		You must start the next action within 60 seconds.
2.	Use the numeric buttons to enter the required selective call address.		This is the self identification number of the base IPC-500 telephone interconnect you are using. See *Using selective call*, Chapter 5.
3.	Press Enter		
4.	Use the numeric buttons to enter the telephone number you wish to store.		This example number is 08 305 0311. Numbers wrap around in the display from the bottom to the top row, including the call area.

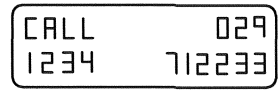
Step	Action	Display	Remarks
5.	Press [Enter]	Stor tEL-no t_	You can store this telephone number as a single code number, t0 to t9.
6.	Use the numeric buttons to enter the code number you want, 0 to 9.	CALL 083 1234 050311	Your selection has now been made.
	If the number you enter has already been used, the display will show 'USEd' and you will have to select another number.	Stor tEL-No t_ USEd	
7.	Continually press [Mute On'Off] until the display shows the original channel settings.		Your transceiver is ready for normal operation.

Reviewing the stored telephone numbers

This facility allows you to review all the numbers you have stored.

Ensure your transceiver is switched on and a selective call enabled channel has been selected before starting this procedure.

Step	Action	Display	Remarks
1.	Press S'Call	CHL 1 CALL ----	You must start the next action within 60 seconds.
2.	Use the numeric buttons to enter the required selective call address.	CHL 1 CALL 1234	This is the self identification number of the base IPC-500 telephone interconnect you are using. See *Using selective call,* Chapter 5.
3.	Press Recall	rcl tEL-No t _	
4.	Press Recall	rcl 083 t1 050311	The display shows you the number first stored. In this example the number is 08 305 0311.
		If there are no numbers stored, the display shows CALL NotEL prog	

Step	Action	Display	Remarks
5.	Keep pressing Recall to scroll through all the stored numbers.	 	This example is for number 02 971 2233. If you do not press the Recall button again, after one second the display changes to give you the option to call this number. See *Calling a stored telephone number* on page 9-14.
6.	Continually press Mute On'Off until the display shows the original channel settings.		Your transceiver is ready for normal operation.

Calling a stored telephone number

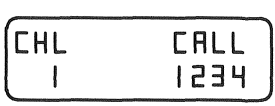
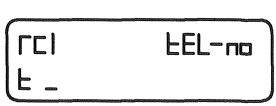
This procedure explains how to make a telephone call to a number you have previously stored.

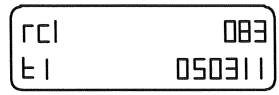
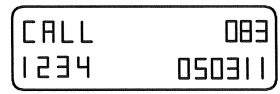
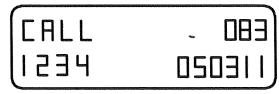
Ensure your outstation transceiver is switched on and a selective call enabled channel has been selected before starting this procedure.

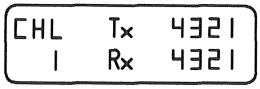
Ensure the antenna is tuned on the selected channel (see *Tuning the antenna* in Chapter 4).

Before making a telephone call, it is often beneficial to make a beacon call to assess the best channel to use (see *Using the beacon feature* in Chapter 5).

When you have finished making a call, you must disconnect the call line (see *Sending a disconnect message* on page 9-8).

Step	Action	Display	Remarks
1.	Press S'Call		You must start the next action within 60 seconds.
2.	Use the numeric buttons to enter the required selective call address.		This is the self identification number of the base IPC-500 telephone interconnect you are using. See *Using selective call*, Chapter 5.
3.	Press Recall		

Step	Action	Display	Remarks
4.	Use the numeric buttons to enter the number you require between 0 and 9.	 After one second the display changes to 	This example shows the recall number t1, and the telephone number to call as 08 305 0311.
5.	Check that the channel is free from traffic, then press S'Call		The Tx indicator is on and you hear a 'warbling' sound for approximately 10 seconds as the transceiver sends your call. If the call is received successfully by the IPC-500, you hear a revertive tone followed by a pause while the number is being dialled. Once the number has been dialled by the IPC-500, you hear the appropriate telephone network service tones.

Step	Action	Display	Remarks
6.	When the telephone subscriber answers, they will hear a short pre-recorded message informing them that this is a radio telephone call. This is followed by a single tone of one second duration heard by both parties. You may now use the transceiver in the normal communication mode.		The indicator light flashes during talking. On completing the call, you must send a disconnect message (see *Sending a disconnect message* on page 9-8). You may now resume normal transceiver operation.

❑

Deleting a stored telephone number

This facility allows you to delete a stored telephone number. Ensure your transceiver is switched on and a selective call enabled channel has been selected before starting this procedure.

As soon as you enter the number to be deleted, it is deleted immediately from memory without any warning. To prevent deleting numbers you need, ensure you make the correct choice first time. You do not get a second chance.

Step	Action	Display	Remarks
1.	Press S'Call	CHL 1 CALL ----	You must start the next action within 60 seconds.
2.	Use the numeric buttons to enter the required selective call address.	CHL 1 CALL 1234	This is the self identification number of the base IPC-500 telephone interconnect you are using. See *Using selective call*, Chapter 5.
3.	Press Enter	CALL 1234 TEL-no ------	If a telephone number is displayed, press the Mute On'Off button to clear this number. This will be the last number called.

Step	Action	Display	Remarks
4.	Press Enter	dEL tEL-no t_	
5.	Use the numeric buttons to enter the stored number you want to delete, 0 to 9.	CALL tEL-no 1234 ------	To prevent deleting numbers you need, ensure you make the correct choice first time. You do not get a second chance.
6.	Continually press Mute On'Off until the display shows the original channel settings.		Your transceiver is ready for normal operation.

❑

Received call messages

When a call has been received and decoded, the display provides you with different messages to indicate the type of call received. The following examples show you the type of messages that are displayed.

This display...	Means...
CHL 428 P2 CALLEd	An ordinary (not telephone) selective call has been received from station 428 on channel P2.
CHL 428 P2 t-CALL	A telephone call from station 428 containing telephone number information has been received on channel P2.
CALd Tx 4012 400 Rx 4012	A call has been received on another channel. This example shows a call whilst the transceiver is on channel 400 and the channel frequencies.
CHL CALLEd P2 Rx 1.234.0	An ARQ call has been received on channel P2.

Reviewing the list of received calls in memory

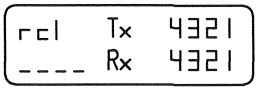
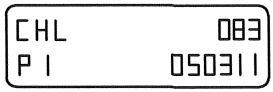
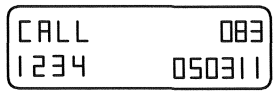
Your transceiver is able to record up to 10 calls in memory from various stations. These may be on different channels if your transceiver is in scan mode. These calls are recorded in a memory stack awaiting your review. If a station calls more than once on the same channel, your transceiver only records one of the calls. If more than 10 calls are made to your transceiver, the first call stored in memory is deleted to make room for the latest call.

Ensure your transceiver is not in scan mode before starting this procedure.

A permanent or brief loss of power to your transceiver will delete information stored in memory. Ensure you record or use all the information stored in the memory stack before switching off the transceiver.

If the transceiver power is lost momentarily, the call memory is retained but the telephone number is lost.

Switching the transceiver off using the Power On'Off button deletes all calls stored in the memory stack.

Step	Action	Display	Remarks
1.	Press Recall then within one second, press S'Call	 If any calls have been recorded, the display shows  and after one second the display shows  If no calls have been received, the normal channel display will remain.	The first call recorded is displayed first. In this example, a call was received on channel P1 from telephone number 08 305 0311. The display now shows you the self identification address, 1234, of the station that called.
2.	Press 4 ⩓ or 9 ⩔	The display shows the next call, and after one second the self identification address of the caller.	Pressing either the channel ⩓ or ⩔ button scrolls you through the list of received calls recorded in the memory.
3.	Press Enter to return to normal operation.		To reply to any of these calls, see *Returning a call* on page 9-22.

❑

Returning a call

This procedure explains how to return a telephone call to one of the numbers recorded in the memory stack.

Ensure your transceiver is switched on before starting this procedure.

Ensure the antenna is tuned on the selected channel (see *Tuning the antenna* in Chapter 4).

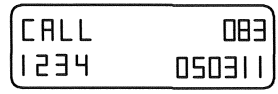
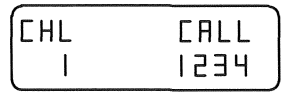
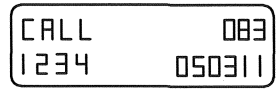
A permanent or brief loss of power to your transceiver will delete information stored in the memory stack. Ensure you record or use all the information stored in the memory stack before switching off the transceiver.

If the transceiver power is lost momentarily, the call memory is retained but the telephone number is lost.

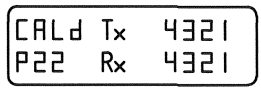
Switching the transceiver off using the Power On'Off button deletes all calls stored in the memory bank.

Before making a telephone call, it is often beneficial to make a beacon call to assess the best channel to use (see *Using the beacon feature* in Chapter 5).

When you have finished returning calls, you must disconnect the telephone line (see *Sending a disconnect message* on page 9-8).

Step	Action	Display	Remarks
1.	Select the call you wish to make (see *Reviewing the list of received calls in memory* on page 9-20, steps 1 & 2).		This display example shows the phone number 08 305 0311 and the self identification address 1234 of the caller.
2.	Press S'Call		The transceiver automatically selects the correct channel, and displays the self identification address (1234) of the caller.
3.	Press Enter		

Step	Action	Display	Remarks
4.	Check that the channel is free from traffic, then press S'Call		The Tx indicator is on and you hear a 'warbling' sound for approximately 10 seconds as the transceiver sends your call. If the call is received successfully by the IPC-500 you hear a revertive tone followed by a pause while the number is being dialled. Once the number has been dialled by the IPC-500, you hear the appropriate telephone network service tones.

Step	Action	Display	Remarks
5.	When the telephone subscriber answers, they hear a short pre-recorded message informing them that this is a radio telephone call. This is followed by a single tone of one second duration heard by both parties. You may now use the transceiver in normal communication mode.	The display shows  for any call that has not been returned.	The indicator flashes during talking. The viewed call is deleted from the memory stack when you press the PTT button on the microphone. On completing the call, you must send a disconnect message (see *Sending a disconnect message* on page 9-8). You may now resume normal transceiver operation.
6.	Repeat steps 1 to 5 to clear all calls stored in the memory stack.		

❑

10. Making emergency calls

This chapter describes how you can use your transceiver to make:

- marine distress emergency calls
- Royal Flying Doctor Service (RFDS) emergency calls.

If you want to be able to make RFDS emergency calls, the selected channel frequencies for RFDS services should be programmed into your transceiver. Make sure the frequencies are effective for operation in the area you will be in.

Types of emergency calls

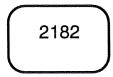
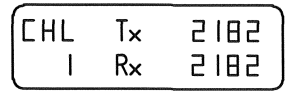
The transceiver is capable of making two types of emergency call:

- marine distress emergency calls
- Royal Flying Doctor Service (RFDS) emergency calls.

In an emergency, you should first try to make a marine distress emergency call using one of the marine distress frequencies. If this fails while you are in Australian waters and your transceiver has been programmed with the correct RFDS channels, you should try to make an RFDS emergency call.

Making a marine distress emergency call

The two Emergency Call buttons are used to make a marine distress emergency call. This call is usually made on the marine distress frequency of 2182 kHz selected by using the red 2182 button. The two supplementary marine distress frequencies of 4125 and 6215 kHz are available if your calls on 2182 kHz fail.

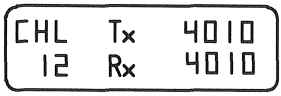
Step	Action	Display	Remarks
1.	Press  to select the marine emergency channel.		Channel 2182 is the standard marine distress frequency.
2.	If necessary, tune the antenna.		See *Tuning the antenna* in Chapter 4.
3.	Check that voice mute is off.		Press the Mute On'Off button until the indicator on the button is off.

Step	Action	Display	Remarks
4.	Press and hold down both  and  for two seconds until you hear a single 'pip', then release the buttons.		When you hold down the two buttons, you hear the emergency tone. If you release the buttons before the 'pip', no call is made. After the 'pip', the emergency tone continues for 45 seconds. During this period the Tx indicator is on. The transceiver automatically selects AM mode and the AM mode button indicator is on.
5.	Wait for a reply before speaking.		To cancel an emergency call during the 45 second transmission time either press  , the PTT switch on the microphone or 

Step	Action	Display	Remarks
6.	Once you are in voice contact, follow standard distress transmission procedures for describing your situation.		If you cannot establish voice contact with the emergency service, try again on the same channel or use either the 4125 or 6215 kHz supplementary marine distress frequencies.

Making an RFDS emergency call

You can make RFDS emergency calls if you are in Australian waters and RFDS channels have been programmed into your transceiver with the E (Emergency) option enabled.

Step	Action	Display	Remarks
1.	Select an RFDS channel.		The channel must have the E (Emergency) option enabled.
2.	If necessary, tune the antenna.		See *Tuning the antenna* in Chapter 4.
3.	Check that voice mute is off.		Press the Mute On'Off button until the indicator on the button is off.
4.	Press and hold down  for two seconds until you hear a single 'pip', then release the button.		When you press the button, you hear the emergency tone. If you release the button before the 'pip', no call is made. After the 'pip', the emergency tone continues for 20 seconds. During this period the Tx indicator is on.

Step	Action	Display	Remarks
5.	Wait for a reply before speaking.		To cancel an emergency call during the 20 second transmission time either press Tune, the PTT switch on the microphone or Power On'Off
6.	Once you are in voice contact, follow standard distress transmission procedures for describing your situation.		If the call was received by an attended RFDS base, they will reply immediately. If the call was received by an unattended RFDS base, they will transmit a tone within two minutes. If you cannot establish voice contact with the emergency service, try again or try another same channel.

11. Teletype, Fax and data

Your transceiver can operate with teletype ARQ-FEC data. Connecting your transceiver to a Codan HF data modem 8580 creates an HF SSB data station for remote data transmission and reception.

Your transceiver can also operate with the transmission and reception of Fax and high speed data when installed with a 9001 HF Fax and data interface or a 9002 HF data modem.

☛ For further details, refer to the Codan handbooks supplied with the equipment.

Terms	Description
ARQ	Automatic Repeat Request The receiving station commands the transmitting station when to transmit and repeat a packet of data. This is known as hand shaking.
FEC	Forward Error Correction Once the data link is established, the transmitting station transmits all the data. Any data error correction is carried out by the receiving computer.

To operate in the teletype ARQ-FEC mode, your transceiver must have the following options installed.

Option	Description
F	Provides extra cooling to the heat sink fins to allow the transceiver to transmit data.
PS	Provides modem interconnect facility.

To operate in Fax and data mode, your transceiver must have the following options installed:

Option	Description
F	Provides extra cooling to the heatsink fins to allow the transceiver to transmit data.
PS	Provides modem interconnect facility.
DM	For operation with 9001 and 9002.

12. Changing the set-up options

Some of the set-up options in this chapter can be completed by the user, others must only be carried out by qualified personnel, either at the Codan factory or by a Codan agent. A statement is made in the procedure whenever qualified personnel are required.

The displays in the procedures show examples of channel and frequency numbers. In each procedure select your own channel and frequency numbers as appropriate.

Set-up option links

Some of the set-up procedures may need a link to be moved inside the transceiver, while some need a link soldered inside the transceiver. The moveable link is called the front panel link (see Figure 12.1), the soldered link is called the microprocessor link (see Figure 12.2).

To complete set-up procedures on transceivers with program (EPROM) issue numbers prior to 4.1, the front panel link will have to be moved. To check the issue number, see *Review the EPROM version and options* in Chapter 4.

The front panel link

The front panel link is located on the front panel display printed circuit board (PCB) assembly.

On front panel control transceivers, the PCB (part number 08-03745-001) is located behind the numeric buttons and display. The link is located on a row of four horizontally mounted pins on the PCB (Figure 12.1), immediately behind the number 9 button.

On extended control transceivers, the PCB (part number 08-04666-001) is located inside the control head. The link is located on a row of four vertically mounted pins on the PCB (Figure 12.1), immediately behind the number 7 button.

The front panel link can fit into four positions on the PCB, only three of which are used:

2 not used

1 used for set-up options

F used for front panel control transceivers

E used for extended control head transceivers.

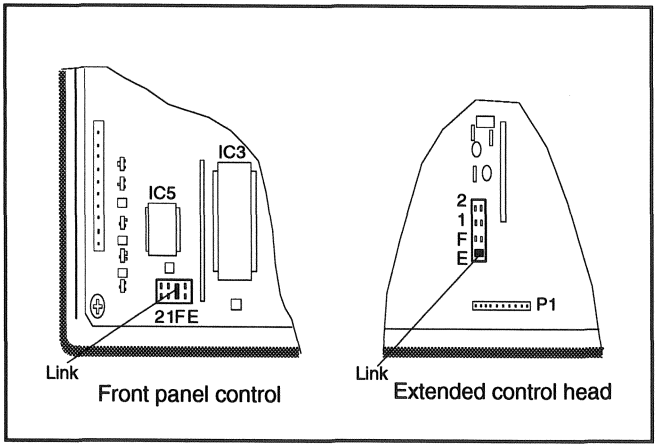


Figure 12.1 The front panel link

Changing the position of the front panel link

The front panel link is a black plastic moulding incorporating linked metal contacts. The contacts short together pins located on the front panel display PCB.

Extreme care should be taken when handling the transceiver to prevent damage to the components.

Step	Action
1.	Turn the transceiver off and disconnect the power.
2.	Remove either: • the bottom cover of front panel control transceivers • the control head rear panel of extended control head transceivers.
3.	Make a note of the position you found the link (E or F). Move the front panel link from position F (front panel control) or E (extended control head) to position 1.
4.	Carry out the relevant set-up procedures.
5.	After completing the set-up procedures, turn the transceiver off and disconnect the power before returning the link to its original position.
6.	Replace the cover before reconnecting the power to your transceiver. Your transceiver is now ready for normal use.

The microprocessor PCB link

The microprocessor link is one that you will have to make and solder on the microprocessor PCB. The PCB (part number 08-03741-001) is positioned on the underside of the transceiver.

The link must only be soldered across the number 2 pads as shown in figure 12.2. A link soldered across the number 2 pads (called the inhibit link) prevents you from changing the inhibit set-up options on P-channel programming.

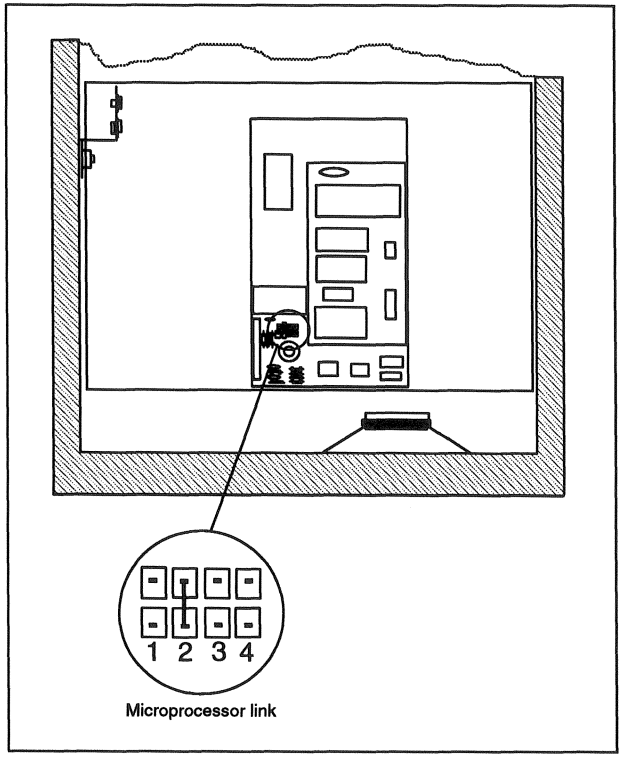


Figure 12.2 The microprocessor link

Inserting the microprocessor PCB link

Extreme care should be taken when handling the transceiver to prevent damage to the components.

This procedure must only be carried out by a qualified technician.

Step	Action
1.	Turn the transceiver off and disconnect the power.
2.	Lay the transceiver on its top with the front panel facing you.
3.	Remove the bottom cover of the transceiver.
4.	Locate the microprocessor PCB and the number 2 pads (see Figure 12.2). The link must only be fitted across the number 2 pads. Pads 1, 3 & 4 are not used.
5.	Solder a suitable piece of wire across the number 2 pads (the Inhibit link).
6.	Replace the cover before reconnecting the power to the transceiver. Your transceiver is now ready for normal use.

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Reviewing set-up options

This procedure displays the set-up options that have been enabled for the transceiver. You can review the set-up options at any time. This procedure does not require you to move or install links in your transceiver.

Step	Action	Display	Remarks
1.	Ensure your transceiver is off.		
2.	Press and hold down 2182 and press Power On'Off	Hold down the Display button until the display shows SCAN prog ENABLE	The display starts with the scan set-up option.

Step	Action	Display	Remarks
3.	To scroll through the options, press 2182	Shows each option.	Each press of the 2182 button scrolls to the next option: SCAN prog ENAbLE CHAN No inhib diSP S-CALL ENAbLE diSP CALL LONG diSP Addr CALL diSP Addr SELF diSP bEACON ON diSP t1 Hi Lo diSP t2 Hi Lo diSP t3 Hi Lo diSP t4 Hi Lo Ptt CutOut diSP bEEPS loud CALL PHONE OFF Ant Contrl CHAN or bANd
4.	To exit the review mode and resume normal operations, press the PTT button.		

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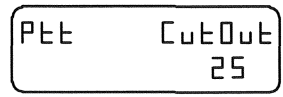
PTT timer

This facility stops the transceiver from being left on in the transmit state. If the transmit time exceeds the PTT timer setting, the transceiver reverts to the receive mode and an error message is displayed.

The timer is set at the factory to 10 minutes. You may turn this facility off, or vary the time, in five minute intervals, between 5 and 35 minutes.

The PTT timer does not operate when operating through the option PS connector.

Step	Action	Display	Remarks
1.	Turn the transceiver off and move the front panel link to position 1.		Before moving the link, note its original position. See the procedure on page 12-3.
2.	Press and hold down Tune and press Power On'Off	Hold the Tune button down until the display shows PtT CutOut 10	This turns on the transceiver in PTT timer set-up mode.

Step	Action	Display	Remarks
3.	Press 1 ^^ Fast or 6 Fast vv		The PTT time out time can be changed from 5 to 35 minutes. Press either the ^^ or vv buttons to increase or decrease the time.
4.	Press Power On'Off		The transceiver is now switched off.
5.	Return the front panel link to its original position (E or F).		See the procedure on page 12-3.
6.	Replace the cover before switching on your transceiver.		

❑

Enter a PIN (Personal Identification Number)

If you select a PIN for the transceiver, you will have to enter this PIN each time you switch the transceiver on. If you fail to enter the correct PIN, the transceiver will automatically switch off.

If a PIN code is set, the transceiver can only be operated by entering the PIN.

It is important that every person who uses the transceiver knows the PIN. Alternatively, do not set the PIN code.

Should you forget the PIN, you will have to return the transceiver to the factory.

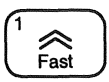
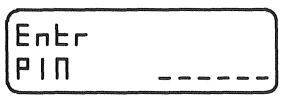
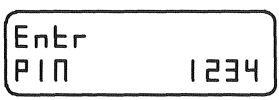
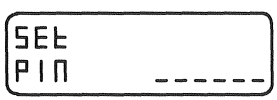
Step	Action	Display	Remarks
1.	Turn the transceiver off and move the front panel link to position 1.		Before moving the link, note its original position. See the procedure on page 12-3.
2.	Press and hold down 1 Fast and press Power On'Off	Hold down the Tune Rx Fast button until the display shows SEt PIn _ _ _ _ _ _	This switches on the transceiver in PIN set-up mode.
3.	Use the numeric buttons to enter your PIN.	The display will show the number you enter.	Select a number between 1 and 999999.

Step	Action	Display	Remarks
4.	Press [Enter]	OPTION SET-UP	Your PIN number has now been registered within the transceiver.
5.	Press [Power On'Off]		The transceiver is now switched off.
6.	Return the front panel link to its original position (E or F).		See the procedure on page 12-3.
7.	Replace the cover before switching on your transceiver.		

❑

Changing or deleting a PIN

This procedure allows you to change your PIN, or delete it.

Step	Action	Display	Remarks
1.	Turn the transceiver off and move the front panel link to position 1.		Before moving the link, note its original position. See the procedure on page 12-3.
2.	Press and hold down  and press  	Hold down the Tune Rx Fast button until the display shows  	This switches on the transceiver in PIN set-up mode.
3.	Use the numeric buttons to enter your existing PIN and then press  	  	This is an example of existing PIN number 1234. You may now change or delete the PIN.

Step	Action	Display	Remarks
4.	To insert a new PIN, use the numeric buttons and press Enter To clear a PIN, do not insert new numbers, just press Enter	The display will show the number you enter, or if you cleared the PIN 	Select a number between 1 and 999999. A new PIN is now registered, or the old PIN has been cleared.
5.	Press Power On'Off		The transceiver is now switched off.
6.	Return the front panel link to its original position (E or F).		See the procedure on page 12-3.
7.	Replace all covers before switching on your transceiver.		

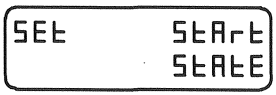
❑

Power-on settings

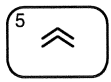
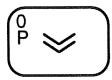
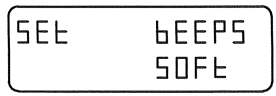
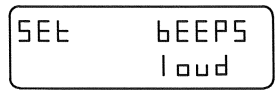
There are two power-on settings that may be set at any time without the need to move or install any internal links. These are the default settings that will always be present when you switch on the transceiver:

- Mute settings—allows you to select either mute on or mute off
- Beep volume—allows you to set the beep volume to either loud or soft.

Mute settings

Step	Action	Display	Remarks
1.	Press and hold down Mute On'Off and press Power On'Off	Hold down the Mute On'Off button until the display shows 	This switches on the transceiver in mute set-up mode.
2.	To select either mute on or mute off, press Mute On'Off		The indicator shows when mute is on.
3.	Press Enter	Reverts to normal display showing channel and frequency numbers.	Your selection has been made and you can switch off the transceiver.

Beep volume

Step	Action	Display	Remarks
1.	Press and hold down  or  , and press 	Hold down either of the volume buttons until the display shows  or 	This switches on the transceiver in beep volume set-up mode. The display shows the last beep volume setting.
2.	Press either of the volume buttons to switch between the beep volume settings.	The display switches between 'SOFt' and 'loud'.	
3.	Press 	Reverts to normal display showing channel and frequency numbers.	Your selection has been made and you can switch off the transceiver.

Clear all settings and P-channels

This facility allows you to clear all settings (except the PIN number) and P-channels automatically.

Do not use this facility if you require any of the P-channels. To restore the transmit frequencies may be extremely difficult.

Step	Action	Display	Remarks
1.	Switch the transceiver off and move the front panel link to position 1.		Before moving the link, note its original position. See the procedure on page 12-3.
2.	Press and hold down Recall and press Power On'Off	Hold down the Recall button until the display shows PUSH CLEAr Entr P-CHLS	This switches on the transceiver in clear all settings and P-channels set-up mode.
3.	Press Enter and wait until the display shows 'dONE'.	-dONE-	All settings and P-channels have now been cleared. You can now switch off the transceiver.

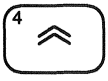
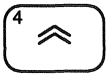
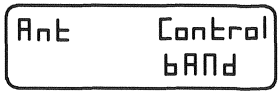
Step	Action	Display	Remarks
4.	Return the front panel link to its original position (E or F).		See the procedure on page 12-3.
5.	Replace the cover before switching on your transceiver.		

❑

Antenna select output

This procedure changes the output configuration of the antenna control connector to provide either channel or frequency band information. Generally, all transceivers are supplied with this facility set to channel ('CHAN').

Where special purpose external linear amplifiers are used and require frequency band selection, the transceiver must be set to 'bANd'.

Step	Action	Display	Remarks
1.	Turn the transceiver off and move the front panel link to position 1.		Before moving the link note its original position. See the procedure on page 12-3.
2.	Press and hold down  and press  	 	This turns on the transceiver in antenna select output mode.
3.	Press  	 	This changes the operating mode to frequency band selection. Repeated pressing of the ⩓ changes from channel to band control.

Step	Action	Display	Remarks
4.	Press Power On'Off		The transceiver is now switched off.
5.	Return the front panel link to its original position (E or F).		See the procedure on page 12-3.
6.	Replace the cover before switching on your transceiver.		

❑

13. Display messages

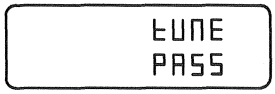
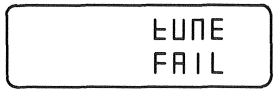
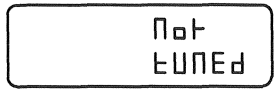
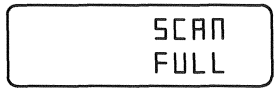
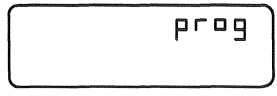
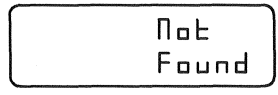
In addition to showing the normal channel information, the display is able to show messages indicating the results of an operation, such as an operator error or a system error.

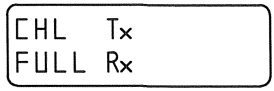
These error or fault messages are generally accompanied by one or more 'beeps'.

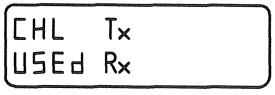
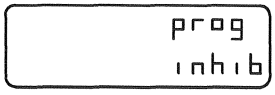
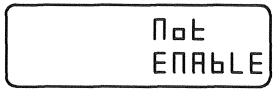
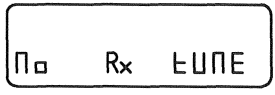
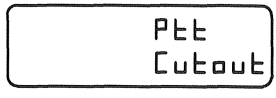
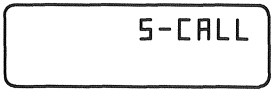
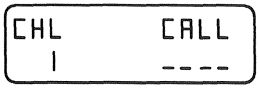
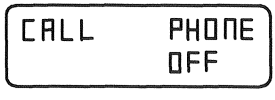
If a transceiver fault is indicated, the transceiver must be switched off and tried again. If the fault re-occurs the transceiver must be sent to Codan, or a Codan agent, to have the fault rectified.

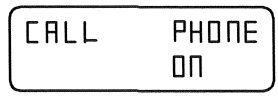
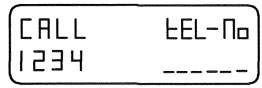
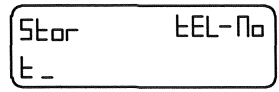
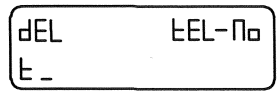
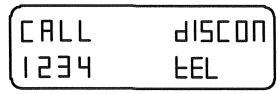
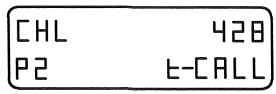
Messages are displayed for five seconds and then normal operation is resumed. Pressing any button or the microphone PTT button during this five second period will immediately restore normal operation.

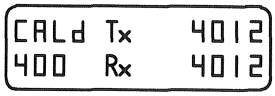
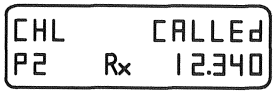
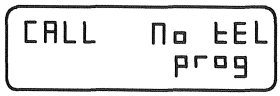
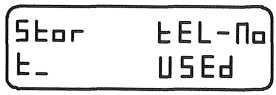
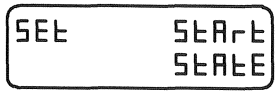
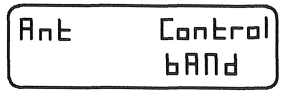
Messages and operator errors

No. of 'beeps'	Message displayed	Meaning
2		The automatic antenna has been satisfactorily tuned.
2		The automatic antenna has failed to tune.
2		An attempt has been made to transmit before the automatic antenna has been tuned. Wait until the automatic antenna has tuned. If a fault exists, refer to the antenna handbook for details.
1		An attempt has been made to enter more than 15 channels in the scan program.
0		Displayed when programming scan and shows that a channel has been entered in the scan program.
1		Channel does not exist.

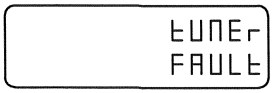
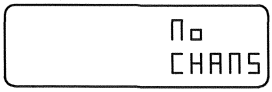
No. of 'beeps'	Message displayed	Meaning
1		An attempt has been made to transmit on a receive-only channel, or while the scan mode is selected. If the transceiver is scanning, press the Scan button to stop scanning. If the channel selected is a receive-only channel, select another channel.
1		An attempt has been made to select the scan mode while the transceiver is transmitting, or no channels have been entered in the scan program. Check that the program has scan channels, if not select another program.
1		An attempt has been made to program a receive frequency higher than 30,000 kHz or a tone frequency higher than 2800 Hz.
1		An attempt has been made to program a channel with a frequency lower than 250 kHz or a tone frequency of 300 Hz or lower.
0		All 99 P-channels are programmed.

No. of 'beeps'	Message displayed	Meaning
1		The nominated channel is already programmed.
1		There are four program inhibit options available. See *Programming channels*, Chapter 7.
1		An emergency call, tone call or a selective call has been attempted on a channel where that function has not been enabled.
1		Full inhibit has been programmed.
2		The microphone PTT has been active for a longer time period than set. See *Changing the set-up options,* Chapter 12.
2		Selective call mute is on.
1		A request for you to enter a selective call address.
1		The telephone mode is off.

No. of 'beeps'	Message displayed	Meaning
0		The telephone mode is on.
1		A request for you to enter a telephone number.
1		A request for you to enter a code number for a particular telephone number.
1		A request for you to enter a telephone number that you want to delete from memory.
1		Indicates that you can send a disconnect telephone message to the call line between your transceiver and the base station
0		An ordinary (not telephone) selective call has been received. This example shows a call received from station 428 on channel P2.
0		A telephone call has been received from station 428 containing telephone number information has been received on channel P2.

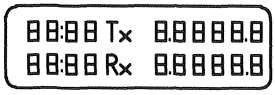
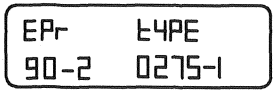
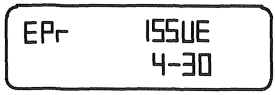
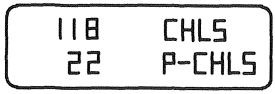
No. of 'beeps'	Message displayed	Meaning
0		A call has been received on another channel. Display shows call on channel 400 and frequencies.
0		An ARQ call has been received. In this example, on channel P2 the frequency is 12.340 MHz.
1		Indicates that no telephone number has been stored.
1		Tried to store a new phone number in a used position.
0		Indicates that your transceiver is switched on in mute set-up mode.
1		Indicates that your transceiver is switched on in antenna select output mode.
1		Indicates that your transceiver is switched on in frequency band operation mode.

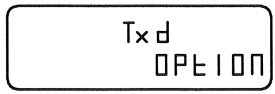
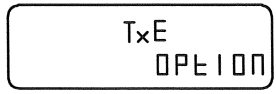
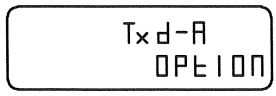
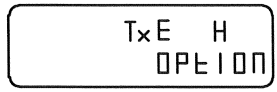
System errors

No. of 'beeps'	Message displayed	Meaning
3		Internal synthesizer is unlocked. All transmission is inhibited and the receiver is muted. Turn the transceiver off and then try again. If the problem persists, the transceiver must be returned for service.
2		The external tuner has not completed a tune operation within five minutes. Turn the transceiver off and then try again.
0		No channels have been programmed into the transceiver.

Reviewing the EPROM program content

With the transceiver on, press and hold down the Power On'Off button. A 'pip' is heard and the display shows the following test displays at three second intervals. On releasing the Power On'Off button the transceiver is turned off.

No. of 'beeps'	Message displayed	Meaning
0		Display lamp test—all segments and indicators must be on.
0		This shows the Program (EPROM) type number (example 90-20275-1).
0		Program (EPROM) issue number. (example 4.3). Some indicator lamps turn off.
0		The top line shows the number of channels programmed by the factory or agent. This can be up to 501. The second line shows the number of channels programmed by the user. This can be up to 99 or 89 with the telephone mode enabled.

No. of 'beeps'	Message displayed	Meaning
0		These displays indicate some of the options fitted to the transceiver.
		d indicates that the transceiver is inhibited from entering transmit frequencies from the front panel.
		'E' indicates that the transceiver is enabled for entering transmit frequencies from the front panel.
		'A' indicates that the transceiver is programmed for use on the amateur band.
		'H' indicates that the transceiver is set for use with an external power amplifier.

14. Front and rear panel sockets

Only suitably qualified personnel should use the information contained in this chapter. Failure to observe the stated and implied criteria could result in damage to the transceiver.

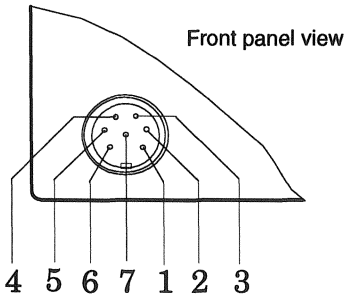
Details are provided on the following sockets:

- microphone socket
- external alarm and battery power outlet socket (options SD and PP)
- miscellaneous facilities socket (option PS)
- miscellaneous facilities socket (option DM)
- antenna control socket
- remote control socket.

Microphone socket

This socket is located on the front panel of the transceiver. It is used to connect the microphone to the transceiver.

The transceiver speaker is controlled by a link in this plug. If the microphone is not connected to the transceiver, the internal speaker is disconnected.



Pin No.	Designation	Pin No.	Designation
1	PTT ground	5	Speaker connection
2	PTT (active low)	6	Audio output
3	Microphone input	7	Audio ground
4	Microphone ground		

If you wish to hear the transceiver speaker with the microphone disconnected, link pins 5 and 7.

External alarm and battery power outlet socket (options SD and PP)

This socket is located on the rear panel of the transceiver. It can be used to accommodate two facilities.

Option SD—selective call alarm

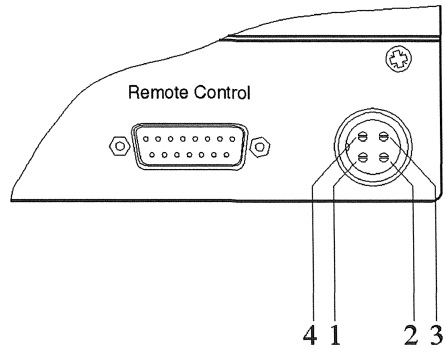
This facility allows an external alarm device to be connected to the transceiver. When a selective call is detected, internal relay contacts close across pins 2 & 3.

The contacts are rated for 1A at 50V DC.

Option PP—unswitched battery power source for external equipment

This facility allows an external device to be connected to, and draw power off, the transceiver. When the transceiver is switched off, the power source is still available at this socket.

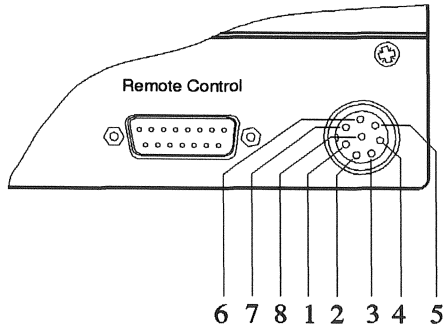
This power source is unswitched battery voltage fused at 5 A.



Pin No.	Designation	Pin No.	Designation
1	Battery voltage (+ve)	3	Relay contact
2	Relay contact	4	Ground

Miscellaneous facilities socket (option PS)

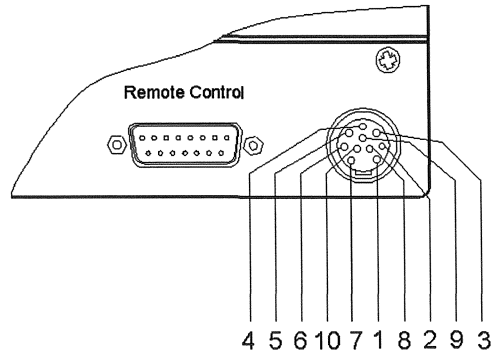
This socket is located on the rear panel of the transceiver. If option PS is fitted to your transceiver, the Option SD and PP socket cannot be fitted.



Pin No.	Designation	Pin No.	Designation
1	Ground	5	Alarm tones input
2	Rx output (1.5 Vpp)	6	PTT (active low)
3	Tx input	7	Scan (+10V output)
4	Quiet line (mute +10V)	8	Switched fused battery voltage

Miscellaneous facilities socket (option DM)

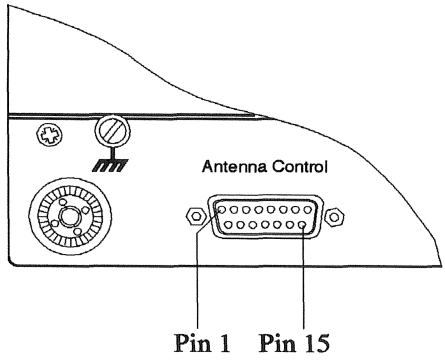
This socket is located on the rear panel of the transceiver. If option DM is fitted to your transceiver, the external alarm and battery power output socket cannot be fitted.



Pin No.	Designation	Pin No.	Designation
1	Ground	6	PTT (active low)
2	Rx output (1.5 Vpp)	7	Scan (+10V output)
3	Tx input	8	Switched fused battery voltage
4	Quiet line (mute +10V)	9	Unused
5	Alarm tones input	10	Unused

Antenna control socket

This socket is located on the rear panel of the transceiver. It allows you to connect an automatic antenna tuner to your transceiver.



Antenna control pins

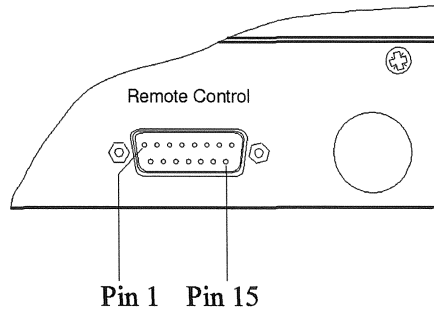
Pin No.	Designation	Pin No.	Designation
1	Channel number Bit 3 (oc)	9	Channel number Bit 1 (oc)
2	Channel number Bit 4 (oc)	10	Channel number Bit 2 (oc)
3	N.C.	11	Tuned in (active low)
4	Tune in/out (active low)	12	Switched fused battery voltage
5	Scan (Active antenna, oc, active low)	13	Switched fused battery voltage
6	N.C.	14	Ground
7	N.C.	15	Ground
8	PTT out (+10V 1kΩ source)		

(oc) = Open Collector (Active high)

Remote control socket

This socket allows the following peripherals to be connected to the transceiver:

- remote control heads 8532 and 8533
- 8571 Remote control interface
- IPC-500 telephone interconnect.



Pin No.	Designation	Pin No.	Designation
1	Loudspeaker	9	Ground
2	Remote PTT (active low)	10	Ground
3	Receiver audio input *	11	Transmit audio input (1.5V pp)
4	Power on (active low, pulse)	12	Receiver demodulator output (1.5V pp)
5	Data (I^2C Bus, 5V)	13	Receiver audio output *
6	Data line enable (I^2C Bus, 5V)	14	Interrupt (I^2C Bus, 5V)
7	Clock (I^2C Bus, 5V)	15	Switched fused battery voltage.
8	Transmit lamp		

* Special: Adjusted to suit attached equipment.

15. Specification

Frequency range	Transmit: 2 to 24 MHz Receive: 250 kHz to 30 MHz
Channel capacity	600. Comprising 501 pre-programmed EPROM controlled channels and 99 front panel operator programmed channels.
Operating mode	Single sideband (J3E; USB) with LSB available as an option.
Transmitted power output	125 watts (PEP). May be set to any output between 25 and 125 PEP. (User selected high, medium and low transmitter power settings.)
Supply voltage	12V DC nominal, negative earth Normal operating range 10.5V to 15V DC Maximum operating range 9V to 16V DC Reverse polarity protection is provided.
Overvoltage protection	Shutdown at 16V DC (nominal) for duration of overvoltage.
Supply current	Receive (no signal): 0.4A Transmit J3E voice: 6A (average) J3E two tone: 9—12A
Size and weight	8528S transceiver 270 mm W x 350 mm D x 90 mm H; 3.9 kg (includes mounting cradle and rear connectors) 8531S control head 255 mm W x 70 mm D x 90 mm H; 0.9 kg (includes mounting bracket)

16. Options and accessories

The following options and accessories are available for the 8528S transceiver.

Code	Options
A	Fit amateur band transmit-receive facility (for licensed amateur radio operators). Note that option LU may also be required.
DM	Fit data mode interface—for operation with 9001 and 9002.
F	Fit for continuous data transmission.
LF	Fit for 1.6 and 2 MHz receive only operation to specification sensitivity.
LU	Fit for LSB capability in addition to USB.
M	Fit morse facility.
PH	Fit headphone output (front control transceivers only).
*PP	Fit unswitched battery power output facility.
*PS	Fit miscellaneous facilities interface.
R	Fit extended/remote control interface (front control transceivers only).
*RS	Fit RS-232 serial communications interface.
SD	Fit selective call decode facility.
SE	Program selective call encode (specify operating channels).
TD	Fit 2-tone decoder.
TE	Program 2-tone encode (specify frequencies and operating channels).
TXE	Enable front panel programming of transmit frequencies (where permitted by local licensing authorities).

* Combination of PP, RS and PS is not admissible.

Code	Accessories
157	E-plate (radio earth plate) for fibreglass or wooden vessels.
602	Headphone complete with cable and connector.
641	Desk microphone complete with cable and connector.
649	Extension loudspeaker.
651PC	Program package—8525/8528 series. For use with IBM compatible PC.
652	Morse key complete with base, cable and connector.
705	Copper earth strip 50 mm x 0.46 mm (26 gauge) for connecting transceiver to E-plate.
711	Bulkhead mounting fuse holder for transceiver DC power cord—supplied with 32 amp fuse.
712	32 amp fuse for code 711.
733	Aerial DC isolator.
2036	Service manual for type 8528 series.
2037	Service manual for type 4402 and 4404.
8531S	Control head complete with 6 metres of interface cable fitted with connectors and hand PTT microphone.

Code	Power Supplies and Cables
507	Heavy duty AC power supply, 27.5 volts, 40 amps DC regulated.
508	Voltage regulator (24 to 12 volt operation).
702	Cable kit for float charging lead-acid storage battery for uninterrupted supply. Suitable for 9113 and 9114.
9113	Transceiver AC power supply, 13.8 volts 6 amps DC. Suitable for transceivers operating on speech only.
—	Adaptor cable for 9113 when used with 8525/8528S transceiver.
9114	Transceiver AC power supply, 13.8 volts 16 amps DC. Suitable for transceivers operating on speech and data.