SAILOR A1 VHF-DSC
C4951WP
Operating / Installation Instructions

Distress Call, see page ii. Contents, see page 1.

Introduction

For more than half a century, SAILOR has been synonymous with state-of-the-art high-quality maritime communications equipment known for sturdiness, ease of operation and compact design.

SAILOR is a world leader in the technologically advanced field of maritime communications. A wide range of products from GMDSS equipment and satellite communications equipment to simple VHF radios is ensuring the safety at sea and the daily communications around the world.

The SAILOR A1 Basic and A1 DSC are part of the SAILOR System 4000. This is a full range of maritime communications equipment developed to increase safety and ease communications for all kinds of vessels: leisure boats, fishing vessels, cargo ships, and cruise liners.

The C4951WP control unit for SAILOR A1 VHF is designed for cockpit installation. The C4591WP has been developed to meet the harsh environment at sea and is waterproof according to IP67.

As our central concern is fast and professional service, we have introduced the SAILOR Certified Service Centre (CSC) concept. Thus, we are able to service your SAILOR VHF equipment in the best way possible in more than 90 countries all over the world.

Abbreviations used in this manual

ADDR	Address
ATIS	Automatic Transfer Identification System
BI	Channel mode when sailing on European rivers (see page 00)
CU	Control Unit
DSC	Digital Selective Calling
DUP	Duplex
DW	Dual Watch
GMDSS	Global Maritime Distress and Safety System
GPS	Global Positioning System
LF	Low Frequency
MEM	Memory
MMSI	Maritime Mobile Service Identification
MSG	Message
PTT	Push
RX	Receive/r
SQ	Squelch
STN	Station
TEL	Telephony
TX	Transmit/ter
UTC	Coordinated Universal Time

Doc. No.: B4951GB0 Issue: E/0547

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QUICK DSC DISTRESS CALL (only for emergency use)

1. If necessary, switch on by pressing the **ON** key.

2. Lift handset off its rest.

3. Lift up lid covering the orange **DISTRESS** key and press for 5 seconds.

   The **TX** and **Alarm** indicator lights will flash.

   Release after 5 seconds and wait for answer. Unless stopped manually – by pressing the Cancel key or switching the unit off – the distress call is automatically transmitted every four minutes or so until acknowledgment is received.

4. To view the call, press **RX Log** followed by **Select**

MAYDAY PROCEDURE

1. Press **16** to enter VHF mode on channel 16.

2. Holding handset, press the **PTT** (**P**ress **T**o **T**alk) key and say:

   "MAYDAY"

   "This is"

   - the 9-digit identity and the call sign or other identification of the ship,

   - The ship's position,

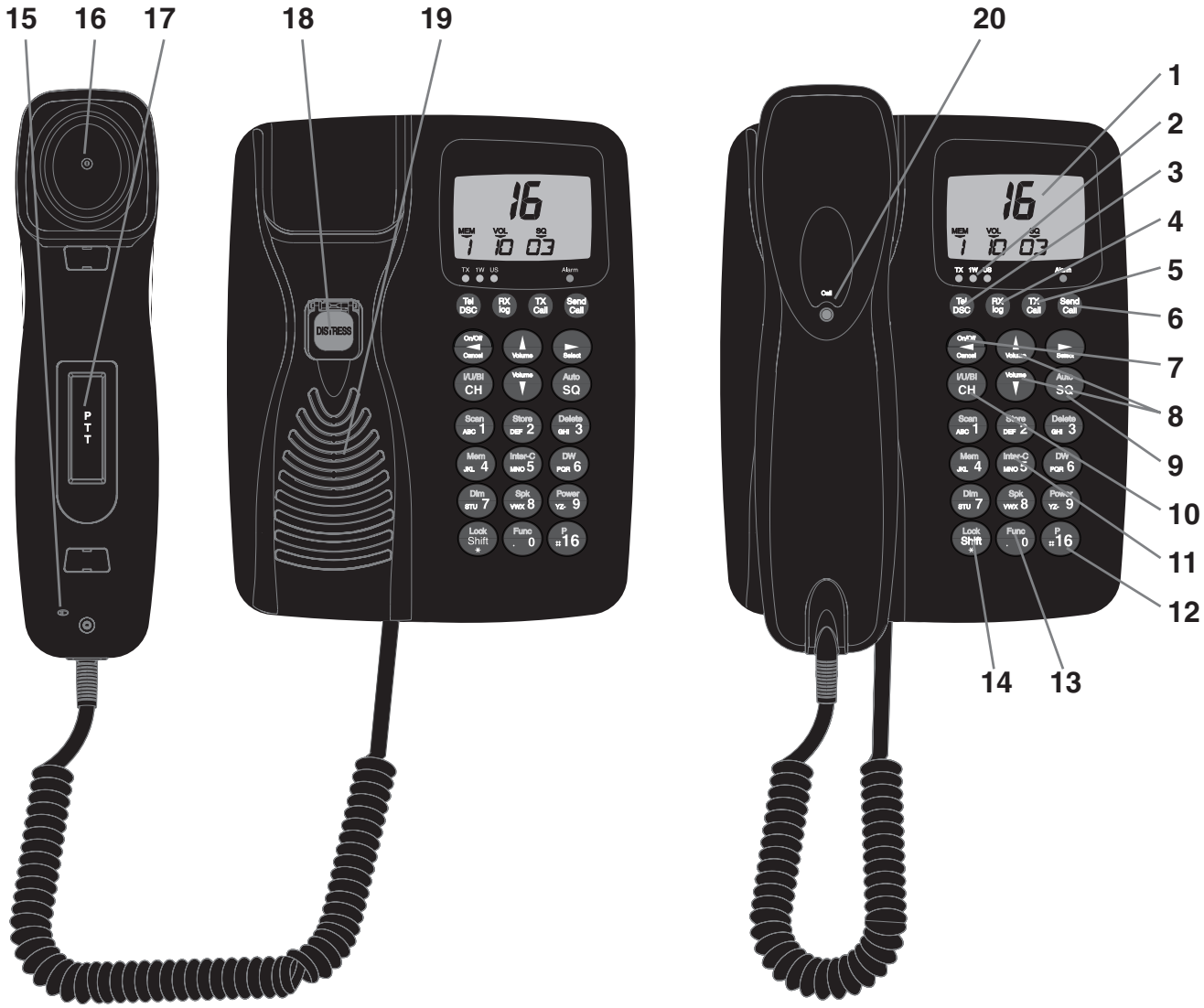
   - The nature of distress and assistance wanted,

   - any other information which might facilitate the rescue.

   "OVER." Release the **PTT** key and listen for a answer.

   Please note that you can only transmit and be heard when pressing the **PTT** key and you can only receive when it is released.

Your handset at a glance



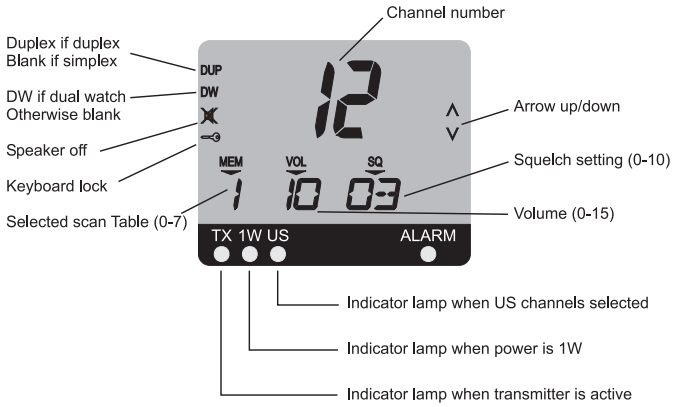
1. Display
2. Indicator lamps. **TX** (lit when transmitting). **1W** (lit when transmitting at 1 watt). **US** (lit when using American channels – see page 17). Alarm (lit when sending a distress call).
3. **Tel/DSC**. Toggles between DSC and normal telephone mode.
4. **RX/Log**. Launches a menu for accessing information on calls received.
5. **TX Call**. Press to setup DSC call.
6. **Send Call**. Press to transmit.
7. **On/Off**. Please also note that the unit should normally be left switched **On**. When switched **Off**, some information – such as data input on the vessel's position – is lost.
8. **Volume** controls: increases volume, reduces volume. These up and down arrows are also used to navigate through menu options.
9. **Squelch** key. This is used to control the background noise present on calls.
10. **Channel** selection key.
11. **Intercom** key.
12. Quick-select key for channel **16**.
13. **Function** key.
14. **Shift** key.
15. Microphone.
16. Earpiece.
17. **PTT** (**P**ress **T**o **T**alk) key.
18. **DISTRESS** key.
19. Loudspeaker.
20. **Call** (lit when DSC call being received).

Contents - Operator

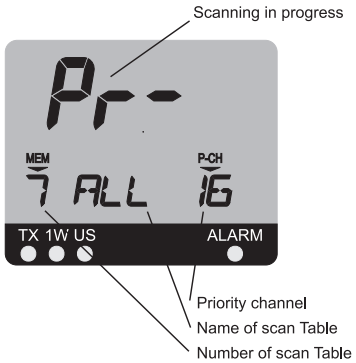
Contents - Installation

1 Telephone display

Normal display



Scanning display



2 Main handset function keys

On/Off
Switches the handset on or off.

Tel/DSC
Changes operation mode of handset. Toggles between DSC and TELEPHONE mode.

RX log
Launches DSC menu to read DSC messages.

TX Call
Launches DSC menu to set up DSC calls for transmission.

Send Call
Transmits the waiting DSC call.

Cancel
Cancels any DSC call that has started. Also cancels a DISTRESS or DISTRESS Repeat call.

16
Selects Telephone mode and switches to channel 16.

Func
Launches the function menu to set up the handset and system. If the function menu is already active, it switches to VHF telephone mode.

After 5 minutes of inactivity, the handset automatically defaults to telephone mode.

3 Your VHF DSC in brief

3.1 Switching On/Off
Press the key on the keyboard to switch **On**.
To switch **Off**, press and hold for 2 seconds.

3.2 Basic telephone operation
Press **Tel DSC** or **16** to activate the VHF telephone functions.

3.3 Listening for telephone calls
According to international rules, *all* ships must continuously monitor channel 16: that includes yours.

1. Select channel 16 by pressing **16**:

2. Set the squelch level using the **up and down arrows**. If noise is present, press the **up arrow** until the hiss disappears. If no noise is present, press **down arrow** until hiss is heard, followed by one press of the **up arrow**.

To listen for calls on other channels, either select the channel number or use the scanning facility.

3.4 Receiving a call on channel 16
When you hear your call name in the loudspeaker:

1. Lift the handset.

2. Press the **PTT** key.

3. Repeat the name of the station calling you and say “This is [your ship’s name].”

4. Suggest a channel other than 16 by saying “Channel [suggested number]”.

5. Say “Over” and release the **PTT** key to allow your caller to accept the suggested new channel.

6. Switch to the new channel – for example, channel 71 – and begin your conversation. Only press **PTT** when you are talking. If you are on a simplex channel (in other words, a channel that can carry just one transmission at a time), always say “Over” just before releasing. With duplex channels, the conversation can be two-way as with a normal land telephone call.

3.5 Making a telephone call
1. If not already in telephone mode, switch to it by pressing **Tel/DSC or 16**.

2. Select channel 16 (by pressing **16**) or other agreed channel.

3. Lift the handset.

4. Press the **PTT** key and make your call. First, say the name of the station you are calling three times. Then say “This is [your ship’s name”], again three times. Finally, say “Over”.

5. Release the **PTT** key to listen.

6. When answered, agree upon a channel, switch to that channel – for example, channel 6 – and begin your conversation. Only press **PTT** when you are talking. If on a simplex channel (in other words, a channel that can carry just one transmission at a time), always say “Over” just before releasing.

3.6 Channel selection

There are three ways to select a channel. First, by using the numeric keys. Second, by using the up or down arrows to move to a higher or lower number. And third (only for channel 16), by pressing **16**.

3.6.1 Channel selection by numeric keys

Press the numeric keys in sequence until the desired channel number is shown on the display:

If available in your VHF system, a private channel can be selected by pushing the keys **Shift** and **P** before the numeric keys. The display then shows the letter P in front of the channel number.

3.6.2 Channel selection by up and down arrows

First, press **CH** to display the current channel. Then use the **up or down arrow** to locate the channel you require. Finally, press **CH** again to exit the selection process.

3.6.3 Channel selection by quick select key 16

Pressing **16** switches to channel 16 at any time.

3.7 Squelch control

The squelch setting is for suppressing background hiss during a call. Never use a higher squelch setting than is necessary.

3.7.1 Setting the squelch level manually

First, press **SQ** to display the current squelch setting (below SQ on the display). Then use the **up or down arrow** to adjust. Finally, press **SQ** again to exit the selection process. If you press the up or down arrow for more than 4 seconds, the squelch level goes up or down automatically.

3.7.2 Setting the squelch level automatically

Your VHF DSC can automatically optimise the squelch level. To do this, press **Shift, SQ**.

3.8 Adjusting the volume

The volume can be adjusted by pressing the up or down arrow from 00 (muted) to 15 (loudest). Once the unit is switched OFF and back ON, the volume will revert to the default setting described below. The Volume has a default setting for both the loadspeaker and the earpiece which can be independently adjusted from 00 (muted) to 15 (loudest).

To adjust the loudspeaker:

1. Press **Shift, Func**.
2. Press the **up or down arrow** twice to display GENERAL.
3. Press **right arrow** to display ILLUMINE.
4. Press **up arrow** to display SOUND.
5. Press **right arrow** to display EARPIECE.
6. Press **up arrow** to display LOUDSPEAKER.
7. Press **right arrow** to display NORM.
8. Now use the **up or down arrow** to increase or reduce the setting.
9. Once you are satisfied you have keyed in the required setting, press **Shift, Func** to exit.

If the loudspeaker is active, its setting is always shown on the display. Only when the handset is off its rest and the speaker is not set to be active is the volume level of the earpiece shown.
When setting any level using the up or down arrows, holding the key down for more than 1 second will progress automatically until the limit is reached.

3.9 Muting the loudspeaker

If the loudspeaker is active, pressing **PTT** automatically mutes it, and releasing **PTT** reactivates it.

To mute the loudspeaker without pressing **PTT,** press **Shift** and the **8** key (which also carries a speaker symbol). To reactivate the speaker, press **Shift** and **8** again. When the loudspeaker is muted, the display includes the appropriate icon.

3.10 Setting the transmitter power

The transmitter power is either 25W (the default) or 1W: there are no intermediate settings. To change the TX power level, press **Shift**, **Power**: when the power is 1W, the indicator light will register this. Please note that some channels are programmed to operate only at low power, i.e. 1W.

3.11 Dimming the display

The handset features a display backlight, a keyboard backlight and lights for the five indicators (CALL placed on handset, TX, 1W, US or BI, and ALARM). The brightness of all of these can be adjusted in four levels from 3 down to 0. The default setting is 3. To reduce the level, press **Shift** and then hold down the **7** key (which also says DIM). The level is indicated in the display and reduces every second. Subsequently, pressing any key will return the brightness to level 3.

4 Basic DSC operation

When switched on, your VHF set automatically monitors channel 70 for incoming DSC calls.

4.1 Receiving a DSC call

When a DSC call is received, the handset will let you know what kind of DSC call it is. Immediately, the handset will display the message dSC RECEIVED, the call indicator lamp will flash, and the loud-speaker will announce the call.

1. If the call includes a proposal for switching to a particular VHF working channel, the unit will toggle between two displays.
2. If you now lift the handset off its rest, a DSC acknowledgment call is automatically transmitted, accepting the proposal and switching both the caller and your handset to the working channel.
3. You can now begin the call in normal telephone mode.

4.2 Transmitting a DSC call to a ship station

To set up and transmit a DSC call and propose a working channel to a ship station:

1. Press **TX Call**.
2. Press **right arrow** to display STN *.
3. Key in the nine-digit MMSI number of the ship station you wish to call, using the numeric keys:
4. Once you are satisfied you have keyed in the correct number, press **right arrow** again to display SEND CALL.
5. Now press **Send Call** to transmit.
6. Once the call has been sent, the display will indicate that it is waiting for an acknowledgment:

4.3 Transmitting a DSC call to a shore station

To set up and transmit a DSC call to a shore station:

1. Press **TX Call**.
2. Press the **up arrow** twice to display SHORE STN.
3. Press the **right arrow** to display STN 00 *.
4. Key in the nine-digit MMSI number of the shore station you wish to call, using the numeric keys:
5. Once you are satisfied you have keyed in the correct number, press **right arrow** again.
6. Now press **Send Call** to transmit.
7. Once the call has been sent, the display will indicate that it is waiting for an acknowledgment:

4.4 Transmitting a DSC call to a landline via shore station

To set up and transmit a public DSC call via a shore station:

1. Press **TX Call.**
2. Press the **up arrow** twice to display SHORE STN.
3. Press the **right arrow** to display STN 00 *.
4. Key in the nine-digit MMSI number of the shore station you wish to call, using the numeric keys:
5. Once you are satisfied you have keyed in the correct number, press **right arrow** again.
6. Press **up arrow**, followed by right arrow.
7. Now key in the phone number you wish to call, using the numeric keys:
8. Once you are satisfied you have keyed in the correct number, press **right arrow** *twice*.
9. Now press **Send Call** to transmit.
10. Once the call has been sent, the display will indicate that it is waiting for an acknowledgment:

4.5 Entering your position into the system

If your VHF DSC is not connected to an external GPS system – which continuously updates your position (please refer to the installation manual)– you may enter the details as follows. Although it appears a lengthy procedure, it does not take long and well worth doing at regular intervals so that, in an emergency, your most recent position will be included in your DISTRESS call.

To input the position of your vessel:

1. Press **Shift Func**
2. Press **up arrow** to display DSC
3. Press **right arrow** twice to display SELF ID
4. Press **up arrow** to display POSITION
5. Press **right arrow** to display POS VIEW
6. Press **down arrow** to display POSUPDATE
7. Press **right arrow** to display POSITION
8. To enter the first part of your position, use the **up** or **down arrow** to select S or N followed by **right arrow** and then the relevant numeric keys. When complete, the word SELECT will appear in the top right of the display.
9. Press **right arrow**.
10. To enter the second part of your position, use the **up** or **down arrow** to select E or W followed by **right arrow** and then the relevant numeric keys. When the position data is complete, the word SELECT will appear in the top right of the display.
11. Press **right arrow** four times to store.
12. Check the stored information by pressing **Tel/DSC** twice. The display will now toggle the various details stored.

5 YOUR VHF DSC IN DETAIL

5.1 Full VHF telephone operation

5.1.1 Setting channel mode

Some VHF radios offer a choice between two sets of channels, called 'channel modes'. If your unit features two modes, you can either switch between international and US channels or between international and BI channels. *International* mode is used when sailing on any sea in the world, except in US waters. *US* mode is used when sailing in US waters. *BI* mode is used when sailing on the rivers of Europe.

5.1.2 Choosing international or US channel mode

If your handset offers the choice, you can switch between international and US mode by pressing **Shift CH**:

When US mode is selected, the yellow US indicator lamp is lit. Otherwise, the radio is in international mode.

0203

5.1.3 Choosing international or BI channel mode

If your handset offers the choice, you can switch between international and BI mode by pressing **Shift CH**:

When BI mode is selected, the yellow BI indicator lamp is lit. Otherwise, the radio is in international mode. When BI mode is selected, ATIS (Automatic Transfer Identification System) is automatically activated.

5.1.4 Transmitting at 25W power

(for US channels 13 and 67 only)

As described on page 3 under 'Setting the transmitter power', the handset can transmit at 1W or at 25W. However, with handsets programmed with US channels, some of the channels are restricted to 1W transmission and the TX power level cannot be changed to 25W as described.

5.2 Memory scan tables

Your VHF DSC has eight independent memory Tables – 0 to 7 – for storing channels for scanning sessions. Each Table may contain any of the channels available in the system. To help distinguish between them, you can attach a name up to seven characters long to each Table number.

To do this, enter the function menu by pressing **Shift** and **Func** (see page 12). The scan Table number is shown in the left corner of the handset display beneath MEM.

Three of the Tables – 5, 6 and 7 – are pre-programmed and the contents cannot be altered in any way. In Table 5, the safety and security channels are 6 and 13, and the priority channel is 16. Table 6 contains the channels for ship-to-ship communication, apart from 6 and 13. And Table 7 contains *all* the channels available to the system.

5.3 Selecting a scan table

To select a scan Table, press **Shift, Mem** followed by the number of the Table. For example, to select Table 0:

1. Press **Shift** followed by **MEM**.

The handset shows the message SEL for select and the MEM symbol flashes. At the same time, the lower part of the display gives the Scan Table number and name (if it has one).

1. Press 0

The display now shows the new Table number, 0.

5.4 Scanning channels

5.4.1 To start scanning

To start scanning, press **Shift, Scan**. From left to right, the lower part of the display shows the number of the scan Table, its name (if it has one), and its priority channel.

If the Table has not been programmed with any channels, the display will show the message MEM EMPTY:

5.4.2 To stop scanning

There are four ways to stop scanning.

1. By pressing **Shift** and **Scan**. The system then resumes normal VHF operation on the channel selected before scanning began.

2. By pressing **16**. The system then resumes normal VHF operation on channel 16.

3. By lifting the handset off its rest. The system then resumes normal VHF operation on the channel selected before scanning began.

4. By pressing **PTT**. If no signal has been detected on any channel, the system resumes normal VHF operation on the channel selected before scanning began. If a signal has been detected on one or more channels, the system resumes normal VHF operation on the last channel where a signal was detected.

When a signal is detected during scanning, the display changes to show the channel number and volume. With priority scanning, channel 16 is scanned once for every channel scanned in the Table. Channel 16 cannot be deleted or excluded from this process.

5.4.3 Adding a channel to a scan table

To add a channel to a scan Table, first select the Table (see above) and check the display. Now select the channel – again check in the display – and press **Shift, Store**. For example, to add channel 6 to scan Table 1:

1. Press **Shift, Mem, 1** to select Table 1.

2. Now press **6** to select channel 6.

3. Finally, press **Shift, Store**. The display shows the message STORES CHANNEL for 2 seconds.

5.4.4 Deleting a channel from a scan table

To delete a channel from a scan Table, first select the Table (see above) and check the display. Now select the channel – again check in the display – and press **Shift, Delete**. For example, to delete channel 6 from scan Table 1:

1. Press **Shift, Mem, 1** to select Table 1.

2. Now press **6** to select channel 6.

3. Finally, press **Shift**, **Delete**. The display shows the message DELETE CHANNEL for 1 second. The display now shows the next channel in the Table. If there are no more channels in the Table and deletion is attempted, the display registers MEM EMPTY.

5.4.5 Viewing contents of a scan table

There are two ways of checking what channels are in a particular scan Table. While the key is pressed, the display will cycle through the channels of the chosen scan Table.

1. Press **Shift** and then hold down **Scan**. The display will keep cycling through the channels – one every second – from low to high and repeating as long as Scan is pressed.

OR

2. Press **Shift** and then hold down **Mem**. The display will keep cycling through the channels – one every second – from low to high and repeating as long as Mem is pressed.

5.5 Dual watch

With your VHF DSC, you can monitor two channels at the same time – a priority channel and your selected channel.

5.5.1 Starting a dual watch

To start a dual watch with priority channel 16 and another channel, press **Shift** followed by the number of the second channel. For example, to start a dual watch with channels 16 and 6, press: **Shift** followed by **6.**

When a dual watch is in progress, the letters DW appear in the top left of the display and the priority channel is shown in the bottom right corner.

5.5.2 Stopping a dual watch

A dual watch can be ended in three ways.

1. By pressing **Shift, DW**.

2. By pressing **PTT**. The system then resumes normal VHF operation on channel 6 and starts transmitting.

3. By pressing **16**. The system then resumes normal VHF operation on channel 16.

5.6 Locking the keyboard

The keyboard can be locked to avoid unintentional channel changes during a telephone call. When the keyboard is locked, the only functions that can be controlled are:

1. The volume.

2. The squelch level.

3. Channel selection using **CH** followed by the **up** or **down arrow**. What you cannot do with the keyboard locked is change channel using the numeric keypad.

To lock the keyboard, press **Shift** once and then again, this time holding down for 1 second. The key symbol appears on the left of the display to show the keyboard is locked.

5.7 Unlocking the keyboard

The keyboard can be unlocked in two ways:

1. By pressing **Shift** twice.

2. By pressing **16** for 1 second. This unlocks the keyboard and switches the unit to channel 16.

5.8 Intercom

If your system has more than one control unit, you can use them for intercom, as follows:

5.8.1 Initiating an intercom call from the handset to another control unit

To call another control unit:

1. Press **Shift** and **Inter-C**. The display shows SELECT NO asking you to type in the location number to be called.

2. Press a numeric key – for example 2 – to select the location you are calling.

3. If the location is *not* available, the display registers IC2 NOT AVAIL and does not dial the number. If it is available, the display shows IC2 CALLING and a ringing tone can be heard in the loudspeaker/earpiece. IC2 indicates that location 2 has been dialled. The lower part of the display now toggles between CALLING and the name of the unit called. During the next 30 seconds, you may lift the handset and speak into the microphone. The person receiving the call will then hear you via the loudspeaker without lifting his handset. In this way, the VHF system can be used as a sort of paging system.

4. If the handset is lifted within the first 30 seconds, intercom is established. If no one answers your call, the handset automatically rings off and reverts to normal VHF operation.

5.8.2 Receiving an intercom call from another control unit

If someone tries to set up an intercom to your handset:

1. The loudspeaker will broadcast a ringing tone and the display will toggle between CALLING and the name of the caller. The display will also show the location number of the caller – for example IC3 for location 3.

2. To answer, simply lift your handset. Connection between the two control units is now established. To communicate, simply press **PTT** and speak into the microphone.

During an intercom call, you can adjust various features from the handset:

1. Adjust volume.

2. Mute/activate the loudspeaker.

3. Adjust squelch.

4. Adjust backlight level.

5.8.3 Terminating an intercom call

The intercom connection can be ended by either of the control units, by:

1. Replacing the handset. VHF mode is resumed.

2. Pressing **Shift** and **Inter-C**. VHF mode is resumed.

3. Pressing **16**. VHF mode is resumed on channel 16.

6 DSC operation in detail

6.1 Receiving DSC calls

When you receive a DSC call, the handset will ring (see next section). At the same time, the **Call** indicator lamp will light and, if it is a DISTRESS call, the **Alarm** indicator lamp will also light. In addition, one of the following will apply.

1. *If the handset is on its rest in VHF mode*

   If the handset is in VHF mode, it automatically switches to DSC mode. The display toggles with the second screen carrying limited information on the call.

2. *If the handset is on its rest in DSC mode*

   If the handset is in DSC mode or with its Function menu active, it continues as normal.

3. *If the handset is off its rest in VHF mode*

   If the handset is in VHF mode, it continues in VHF mode. Press **Tel/DSC** to see the display carrying limited information on the call as in 1.

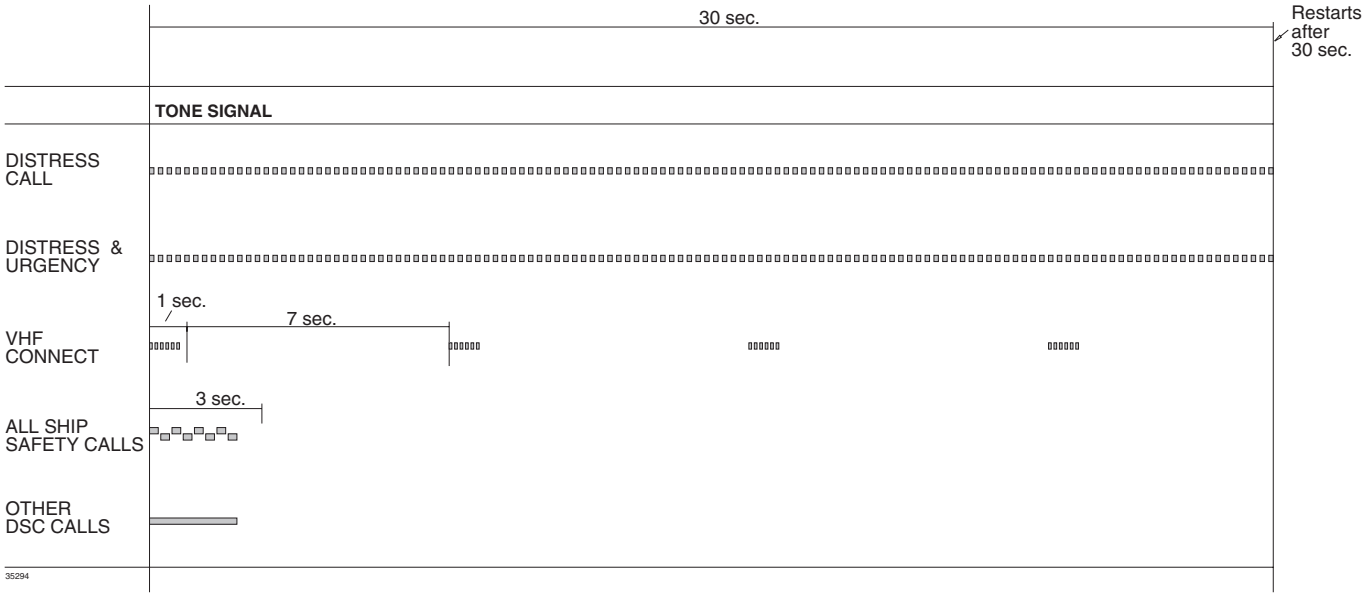
4. *If the handset is off its rest in DSC mode*

   If the handset is in DSC mode or with its Function menu active, it continues as normal.

In every case, to view the complete DSC message, press **RX/Log** and use the **right arrow** to step through the information.

6.2 Differentiating calls by the ringing tone

Your VHF DSC rings in various ways according to the nature of the call, as the following diagram shows.



The sequence of each of these repeats every 30 seconds or until the DSC call is read or answered. If the handset is off its rest, it rings with a short tone every 30 seconds until the call has been read.

6.3 RX Log menu

The **RX log** menu enables you to read the entire contents of a DSC call. It can also be used to set up an acknowledgment response when requested by the incoming DSC call.

To enter the menu, press **RX log** followed by the **up arrow** to cycle through the following three options:

1. LAST CALL

   Select LAST CALL (a) when you have received a DSC call and the handset is toggling call information, (b) to view all calls and/or (c) to respond.

2. ALARM LOG

   Select ALARM LOG (a) to view a DSC DISTRESS call and (b) to view all DISTRESS or urgent calls.

3. CALL LOG

   Select CALL LOG to view DSC calls from the memory buffer of the VHF DSC modem.

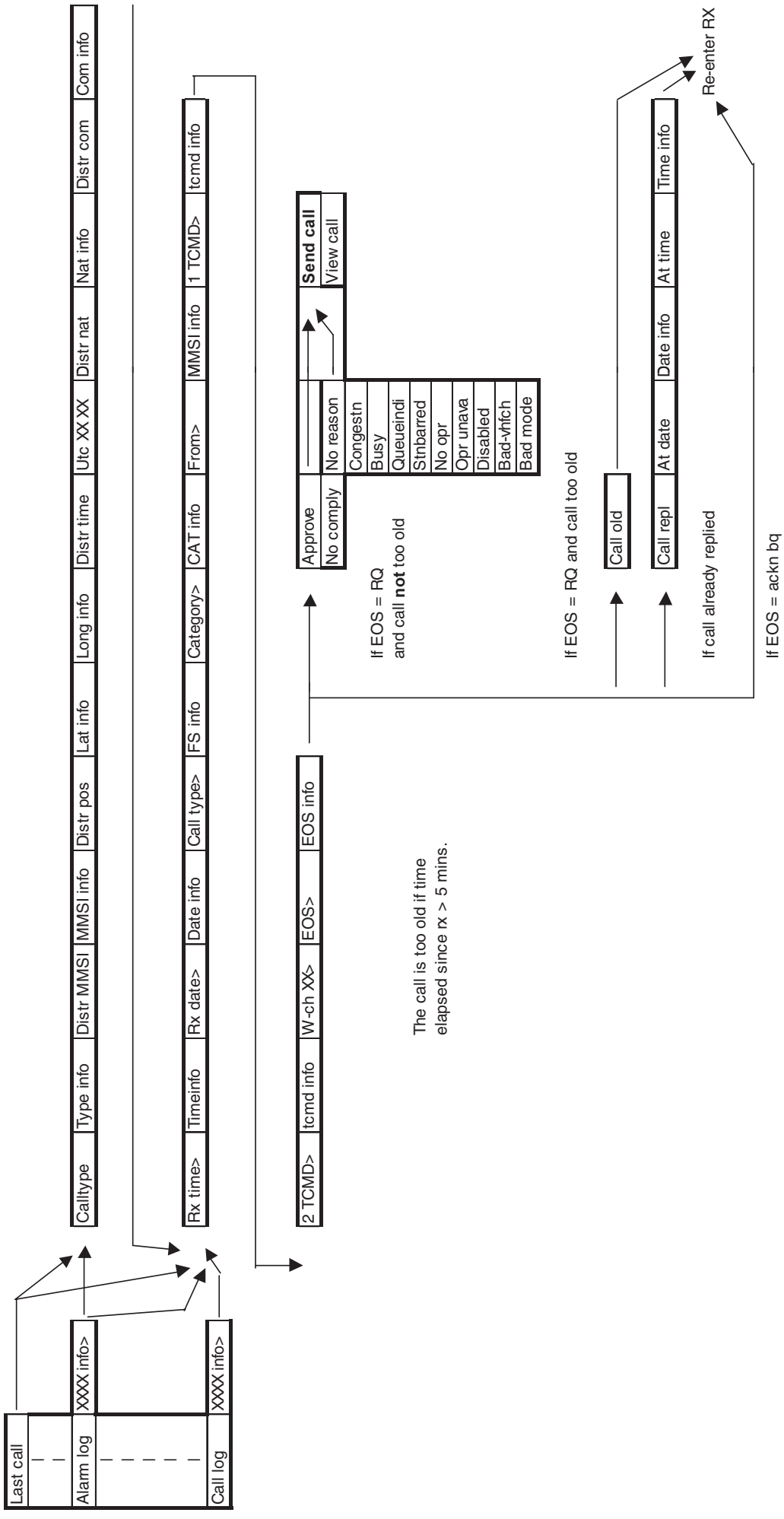
6.4 The RX Log menu tree

The RX LOG MENU is used for reading information on DSC calls received. In addition, if requested by a DSC caller, an acknowledgment call can be set up.
The main menu entries are as follows:

1. LAST CALL. Enter this item when a DSC call has been received and the handset toggles information or when you wish to view all calls and/or answer back.

2. ALARM CALL. Enter this item to view DSC DISTRESS calls and all other DISTRESS or urgent calls.

3. CALL. Enter this item to view DSC calls from the VHF DSC safety or routine ordinary calls buffer.


Last call
Alarm log
Call log
XXXX info>
XXXX info>
Calltype
Type info
Distr MMSI
MMSI info
Distr pos
Lat info
Long info
Distr time
Utc XX XX
Distr nat
Nat info
Distr com
Com info
Rx time>
Timeinfo
Rx date>
Date info
Call type>
FS info
Category>
CAT info
From>
MMSI info
1 TCMD>
tcmd info
2 TCMD>
tcmd info
W-ch XX>
EOS>
EOS info
Approve
No comply
Send call
View call
No reason
Congestn
Busy
Queueindi
Stnbarred
No opr
Opr unava
Disabled
Bad-vhfch
Bad mode
If EOS = RQ
and call not too old
The call is too old if time
elapsed since rx > 5 mins.
If EOS = RQ and call too old
Call old
Call repl
At date
Date info
At time
Time info
If call already replied
Re-enter RX
If EOS = ackn bq

6.5 TX Call menu

The **TX Call** menu offers various ways of setting up DSC calls for transmission. The options range from totally manual setup using the extended calls entry and setting up each item of information involved, to almost automatic setup using the menu entries ADDR BOOK, SHIP STN, and SHORE STN. A DISTRESS call can be set up using the DISTRESS option in the **TX Call** menu. Alternatively, and more simply, pressing the orange DISTRESS key automatically transmits a DISTRESS call.

To access the menu, first press **TX Call**. Pressing the **up arrow** then cycles through the following options. At each level, use the **left** and **right arrows** to select further options.

SHIP STN
Your input: MMSI number or a station stored in the station register, change of working channel if desired.

Call setup: Automatic, individual routine including VHF working channel, requests acknowledgment.

ADDR BOOK
Your input: Name from the address book.

Call setup: Automatic, depending on: Ship station: Shore station: Shore station including telephone number:

SHORE STN
Your input: MMSI number or pre-stored station from the station register, optional telephony number.

Call setup: Automatic, depending on: Telephone number included: No telephone number included:

EXTENDED
Your input: All information in call.

Call setup: As specified by user.

DISTRESS
Your input: Nature of DISTRESS, position and time. If connected to GPS, time and position are automatically inserted.

Call setup: A standard DISTRESS call.

ALL SHIP
Your input: Change of working channel if desired.

Call setup: Automatic. All ships, safety, including VHF working channel.

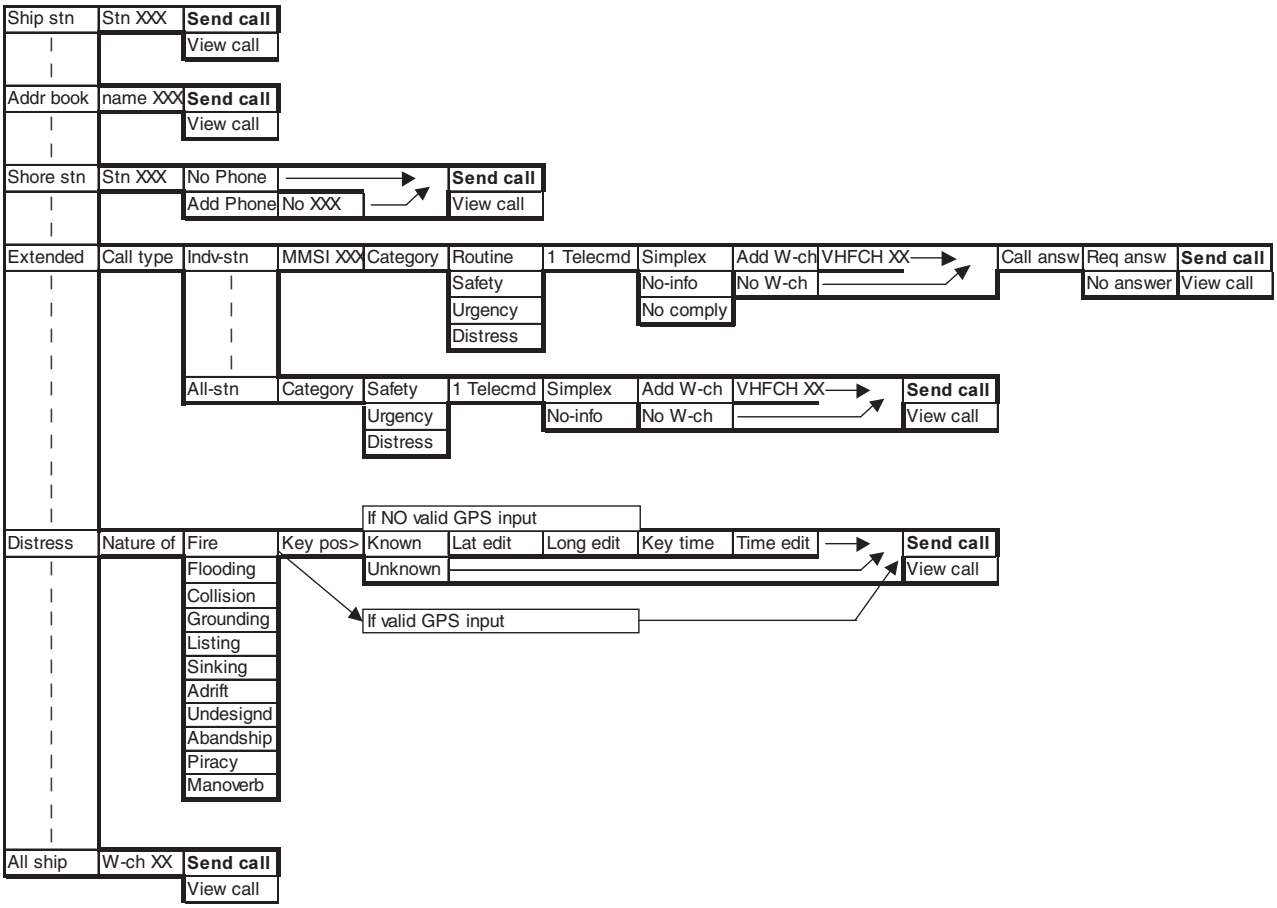
6.6 Setting up a call using the EXTENDED TX Call menu

The following example goes through the various stages of setting up a DSC call in the EXTENDED TX Call menu.

1. Press **TX Call**.
2. Press the **up arrow** three times to display EXTENDED.
3. Press **right arrow** to display CALL TYPE.
4. Press **right arrow** followed by **up** or **down arrows** to select INDV-STN. (The other option here is an ALL-STN call.)
5. Press **right arrow** to display MMSI.
6. Key in the nine-digit MMSI number of the ship or shore station you wish to call, using the numeric keys. When all nine digits have been entered, the word SELECT will appear at the top right of the display.
7. Press **right arrow** to display CATEGORY.
8. Press **right arrow** followed by **up** or **down arrows** to select SAFETY. (The other options here are ROUTINE, URGENCY and DISTRESS.)
9. Press **right arrow** to display 1 TELECMD.
10. Press **right arrow** and then use **up** or **down arrows** to select SIMPLEX. (The other options here are NO-INFO and NO COMPLY.)
11. Press **right arrow** to display ADD W-CH (add VHF working channel).
12. Press **right arrow** and then enter the number of the working channel for example “16”.
13. Press **right arrow** to display CALL ANSW.
14. Press **right arrow** followed by **up** or **down arrows** to select REQ ANSW. (The other option here is NO ANSWER.)
15. Press **right arrow** to display SEND CALL.
16. Finally, to transmit the call, press **Send Call**.

Once the call has been transmitted, the handset waits for an acknowledgment that the call has been received.
Please note that it is not always possible to backtrack if an incorrect choice is made in the menu selection. If this happens, cancel the procedure – for example by pressing **16** – and re-enter your selections.

6.7 TX Call menu tree



6.8 Function menu

The function menu enables you to set up and check the various functions of the handset. It also offers facilities to view and change the functions of the VHF transceiver and of the DSC modem.

6.8.1 To enter the function menu

To set up or view items in the function menu, press **Shift**, **Func**. The display will read TELEPHONY.

6.8.2 To move around the function menu

1. Use the **up** and **down arrows** to locate the function – DSC, GENERAL or SERVICE.

2. Press the **right arrow** to select the function.

3. Press and hold the **left arrow** for 1 second to go back to function selection.

6.8.3 To edit items in the function menu

1. Use the **up** and **down arrows** (a) to toggle between Y (yes) and N (no) and (b) to change single numeric values up or down until the limit is reached.

2. Use the **right arrow** (a) to select an item and move to the next and (b) to move a step to the right in an item with more than one input.

3. Use the **left arrow** (a) to delete the character to the left of the cursor and (b) by holding for 1 second to go back to function selection.

4. Use the alphanumeric keys to enter data at the cursor position.

6.8.4 To exit the function menu

If you have changed any setting while in the function menu, you must turn the handset off and then on again for the changes to take effect. You can exit in one of the following ways:

1. By pressing **16** to activate channel 16 in VHF mode.

2. By pressing **Shift, Func** to activate VHF mode on the last channel you used.

3. By pressing **Tel DSC** to activate VHF mode on the last channel you used.

4. By pressing **RX Log** to enter the DSC RX log menu.

Example
To activate a keyboard beep every time a key is pressed:

1. Enter the function menu by pressing **Shift**, **Func**. The display will read TELEPHONY.

2. Press the **up** or **down arrow** twice to display GENERAL.

3. Press the **right arrow** to display ILLUMIN.

4. Use the **up** or **down arrow** to locate SOUND.

5. Press the **right arrow** to display EARPIECE.

6. Press the **up** or **down arrow** twice to display KEYBOARD.

7. Press the **right arrow** to display KB.BLEEP N

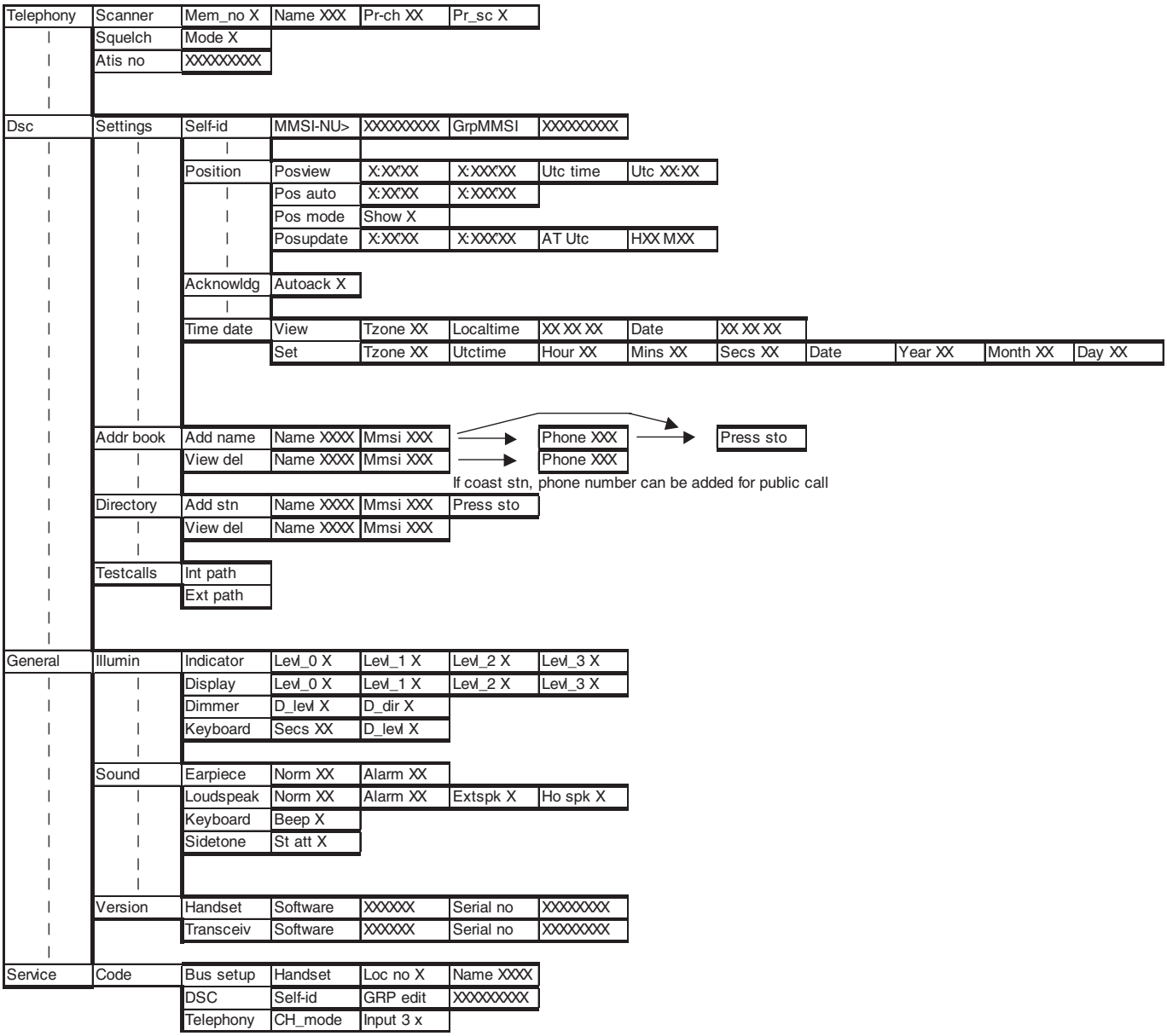
8. Now use the **up** or **down arrow** to toggle the final Y (Yes) or N (No) to select.

9. Finally, press the **right arrow** to re-enter the function menu. To activate the new setting, turn the handset off and then back on again.

6.9 Description of function menu items

Path:	Data:	Description:
DSC\SETTINGS\ACKNOWLDG\AUTOACK	"Y"/"N"	'Y' enables automatic acknowledgment of incoming DSC calls
GENERAL\ILLUMIN\INDICATOR\LEVL_0-3	0-3	Brightness levels of each indicator lamp
GENERAL\ILLUMIN\DISPLAY\DB_L_0-3	0-9	Brightness levels of each backlight display lamp
GENERAL\ILLUMIN\DIMMER\D_LEVL	0-3	Brightness level when handset switched on
GENERAL\ILLUMIN\DIMMER\D_LEVL\DIMDIR	0-2	Start direction of brightness level (see diagram on next page)
GENERAL\ILLUMIN\KEYB0ARD\SECS	0-20	Number of seconds light is on after a key has been pressed
GENERAL\ILLUMIN\KEYB0ARD\SECS\D_LEVL	0-3	Brightness level when any key has been pressed, as long as above setting is at least 1 second
GENERAL\SOUND\EARPIECE\NORM	0-15	Volume level in earpiece when handset is switched on
GENERAL\SOUND\EARPIECE\NORM\ALARM	0-15	Volume level in earpiece when DSC call or intercom received
GENERAL\SOUND\LOUDSPEAK\NORM	0-15	Volume of speaker when handset is switched on
GENERAL\SOUND\LOUDSPEAK\NORM\ALARM	0-15	Volume of speaker when DSC call or intercom received
GENERAL\SOUND\LOUDSPEAK\NORM\ALARM \EXT_SPK	0-3	Handset control of external speaker
GENERAL\SOUND\LOUDSPEAK\NORM\ALARM \EXT_SPK\HO_SPK	0-1	Speaker state when handset is off its rest. Default on = 1 or off = 0
GENERAL\SOUND\KEYB0ARD\KBBEEP	"Y"/"N"	Beep from keys when pressed
GENERAL\SOUND\SIDETONE\ST ATT	0-3	Feedback level of microphone to earpiece. Recommended setting = 1
SERVICE\DSC\SELF-ID\GRPEDIT	0-9	Set up or change Group MMSI number
SERVICE\TELEPHONY\CH+MODE\INPUTS	"Y"/"N"	Set up number of digits to be input when changing VHF channel. Y = 3 digits, N = 2 digits

6.10 Function menu tree



6.11 Setting up the directory

The directory, which is a subset of the DSC items in the function menu, can be programmed with the most frequently used stations. Both the number and name can be stored, if required. These can then later be retrieved for use in the TX Call menu. Entries can also be deleted if seldom used.
The directory makes it easier and quicker to set up DSC calls using the SHIP or SHORE items in the DSC TX Call menu, the MMSI number being selected via identification name.

6.12 Adding an item to the directory

To add an entry to directory:

1. First enter the function menu by pressing **Shift, Func**. The display will read TELEPHONY.
2. Use the **up** or **down arrow** to locate DSC.
3. Press the **right arrow** to display DIRECTORY.
4. Press the **right arrow** followed by **up** or **down arrows** to locate ADD STN.
5. Press the **right arrow** and to display NAME
6. Now enter the name of the new item. This must be nine characters long, including spaces. If the name is shorter than this, add spaces (using the 0 key) until the total is nine. Use the alphanumeric keys to enter the name, cycling through the selection. For example, to type the O of POSEIDON, press the MNO key three times. Then move to the next character by pressing the right arrow. When all nine characters or spaces have been typed, the display will show SELECT in the top right.
7. Press the **right arrow** to select MMSI.
8. Now enter the nine-digit number of the item.
9. Press the **right arrow** to display PRESS STO.
10. Finally, store the name and number by pressing **Shift**, **Store**.

6.13 Viewing/deleting a directory entry

To view/delete a directory entry:

1. First enter the function menu by pressing **Shift, Func**. The display will read TELEPHONY.
2. Use the **up** or **down arrow** to locate DSC.
3. Press the **right arrow** to display DIRECTORY.
4. Press the **right arrow** followed by **up** or **down arrows** to locate VIEW DEL.
5. Pressing the **right arrow** will now display the name of the last station used.
6. Now either

a) use the **up** and **down arrows** to cycle through the stored names
or
b) press the **right arrow** to view the MMSI number
or
c) press **Shift**, **Del** to delete the entry when the name is displayed. When an entry is deleted, the next one in the memory is displayed. If the directory is empty, the display reads MEM EMPTY.

6.14 Setting up the address book

The ADDR BOOK is a subset of the DSC items in the function menu and is very similar to the directory. However, with a coastal station entry, it does offer the extra facility of adding a public telephone number to the name and MMSI number.

The directory makes it easier and quicker to set up DSC calls using the ADDR BOOK item in the DSC TX Call menu.

To use the address book, follow the same procedure as for the directory but adding a public telephone number to the name.

6.15 Description of VHF system

Up to seven control units may be connected to the VHF system, each with a unique location (1–7). However, only one of these – the master control unit – may control the transceiver. The various displays for different system priorities of the control units are described below.

The control unit designated location 1 has the highest priority in the VHF system and is able to become master of the system whenever required. When several control units are connected to the system, the main control unit has to be assigned location 1.

6.15.1 When the system is free

If the handset is in VHF mode, the display will show: the selected channel

If the handset is in DSC mode or the function menu is active, the display will show: dSC and SHIP STN.

6.15.2 When a control unit is master of the system

When a control unit is master of the system, any other control units in VHF mode will show the following display to indicate that the transceiver is in use by another control unit: oCC and name and number of control unit in use.

Any control units in DSC mode or with their the function menu active will display the normal menu screen.

6.15.3 How master priority is obtained

Before a handset can operate the transceiver, it has to have priority in the system. This is achieved by simply lifting the handset off its rest. If the system is clear for the handset to transmit, the display does not change.

If another handset is already in use, the display will read: oCC and name and number of control unit in use.

In that case, hang up and wait for the system to become free.

6.16 International Channels

Channels	TX MHz	RX MHz	SIMPLEX Intership	SIMPLEX Port	DUPLEX Port	DUPLEX Public
1	156,050	160,650			●	●
2	156,100	160,700			●	●
3	156,150	160,750			●	●
4	156,200	160,800			●	●
5	156,250	160,850			●	●
6	156,300	156,300	●			
7	156,350	160,950			●	●
8	156,400	156,400	●			
9	156,450	156,450	●	●		
10	156,500	156,500	●	●		
11	156,550	156,550		●		
12	156,600	156,600		●		
13	156,650	156,650	●	●		
14	156,700	156,700		●		
15	156,750	156,750	●	●		
16	156,800	156,800	**Distress and calling**			
17	156,850	156,850	●	●		
18	156,900	161,500			●	●
19	156,950	161,550			●	●
20	157,000	161,600			●	●
21	157,050	161,650			●	●
22	157,100	161,700			●	●
23	157,150	161,750			●	●
24	157,200	161,800			●	●
25	157,250	161,850			●	●
26	157,300	161,900			●	●
27	157,350	161,950			●	●
28	157,400	162,000			●	●

Channels	TX MHz	RX MHz	SIMPLEX Intership	SIMPLEX Port	DUPLEX Port	DUPLEX Public
60	156,025	160,625			●	●
61	156,075	160,675			●	●
62	156,125	160,725			●	●
63	156,175	160,775			●	●
64	156,225	160,825			●	●
65	156,275	160,875			●	●
66	156,325	160,925			●	●
67	156,375	156,375	●	●		
68	156,425	156,425		●		
69	156,475	156,475	●	●		
70	156,525	156,525	**DSC**	**DSC**		
71	156,575	156,575		●		
72	156,625	156,625	●			
73	156,675	156,675	●	●		
74	156,725	156,725		●		
75	156,775	156,775		● **L)**		
76	156,825	156,825		● **L)**		
77	156,875	156,875	●			
78	156,925	161,525			●	●
79	156,975	161,575			●	●
80	157,025	161,625			●	●
81	157,075	161,675			●	●
82	157,125	161,725			●	●
83	157,175	161,775			●	●
84	157,225	161,825			●	●
85	157,275	161,875			●	●
86	157,325	161,925			●	●
87	157,375	157,375		● *)		
88	157,425	157,425		● *)		

Notes

L) 1W TX power

*) Channels 87 and 88 became simplex channels following the introduction of Automatic Identification channels AIS1 at 161.975MHz and AIS2 on 162.025MHz.

NB The RX and TX frequencies can be read from the handset display by pressing and holding the CH key for more than 1 second. With a front-operated VHF radio, the frequencies can be displayed on a menu.

6.17 US Channels

Channels	TX MHz	RX MHz	SIMPLEX	DUPLEX
1	156,050	156,050	●	
2				B)
3	156,150	156,150	● !)	
4				B)
5	156,250	156,250	●	
6	156,300	156,300	●	
7	156,350	156,350	●	
8	156,400	156,400	●	
9	156,450	156,450	●	
10	156,500	156,500	●	
11	156,550	156,550	●	
12	156,600	156,600	●	
13	156,650	156,650	● L)	
14	156,700	156,700	●	
15		156,750	● RX)	
16	156,800	156,800	Distress and calling	
17	156,850	156,850	●	
18	156,900	156,900	●	
19	156,950	156,950	●	
20	157,000	157,000	●	
21	157,050	157,050	● !)	
22	157,100	157,100	●	
23	157,150	157,150	● !)	
24	157,200	161,800		●
25	157,250	161,850		●
26	157,300	161,900		●
27	157,350	161,950		●
28	157,400	162,000		●

Channels	TX MHz	RX MHz	SIMPLEX	DUPLEX
60				B)
61	156,075	156,075	● !)	
62				B)
63	156,175	156,175	●	
64	156,225	156,225	● !)	
65	156,275	156,275	●	
66	156,325	156,325	●	
67	156,375	156,375	● L)	
68	156,425	156,425	●	
69	156,475	156,475	●	
70	156,525	156,525	DSC	
71	156,575	156,575	●	
72	156,625	156,625	●	
73	156,675	156,675	●	
74	156,725	156,725	●	
75			B)	
76			B)	
77	156,875	156,875	● L)	
78	156,925	156,925	●	
79	156,975	156,975	●	
80	157,025	157,025	●	
81	157,075	157,075	● !)	
82	157,125	157,125	● !)	
83	157,175	157,175	● !)	
84	157,225	161,825		●
85	157,275	161,875		●
86	157,325	161,925		●
87	157,375	157,375	●	
88	157,425	157,425	●	

Channels	WX	RX MHz
P1	WX1	162,550
P2	WX2	162,400
P3	WX3	162,475
P4	WX4	162,425
P5	WX5	162,450
P6	WX6	162,500
P7	WX7	162,525
P8	WX8	161,650
P9	WX9	161,775
P10	WX10	163,275

Notes:

L) 1 W TX power. Pressing the 25W button in the US rest will make the unit transmit at 25W on channel 13 and 67, normally limited to 1W.

B) Channels 2, 4, 60, 62, 75 and 76 cannot be selected in US mode.

!) Channels 3, 21, 23, 61, 64, 81, 82 and 83 may be legally used in some circumstances but not by the general public in US waters.

RX) Only RX: transmissions are blocked.

NB! The RX and TX frequencies can be read from the handset display by pressing and holding the CH key for more than 1 second. With a front-operated VHF radio, the frequencies can be displayed on a menu.

6.18 BI Channels

Channels	TX MHz	RX MHz	SIMPLEX Intership	SIMPLEX Port	DUPLEX Port	DUPLEX Public
1	156,050	160,650			●	●
2	156,100	160,700			●	●
3	156,150	160,750			●	●
4	156,200	160,800			●	●
5	156,250	160,850			●	●
6	156,300	156,300	● L)			
7	156,350	160,950			●	●
8	156,400	156,400	● L)			
9	156,450	156,450	●	●		
10	156,500	156,500	● L)	● L)		
11	156,550	156,550		● L)		
12	156,600	156,600		● L)		
13	156,650	156,650	● L)	● L)		
14	156,700	156,700		● L)		
15	156,750	156,750	● L)	● L)		
16	156,800	156,800	Distress and calling			
17	156,850	156,850	● L)	● L)		
18	156,900	161,500			●	●
19	156,950	161,550			●	●
20	157,000	161,600			●	●
21	157,050	161,650			●	●
22	157,100	161,700			●	●
23	157,150	161,750			●	●
24	157,200	161,800			●	●
25	157,250	161,850			●	●
26	157,300	161,900			●	●
27	157,350	161,950			●	●
28	157,400	162,000			●	●

Channels	TX MHz	RX MHz	SIMPLEX Intership	SIMPLEX Port	DUPLEX Port	DUPLEX Public
60	156,025	160,625			●	●
61	156,075	160,675			●	●
62	156,125	160,725			●	●
63	156,175	160,775			●	●
64	156,225	160,825			●	●
65	156,275	160,875			●	●
66	156,325	160,925			●	●
67	156,375	156,375	●	●		
68	156,425	156,425		●		
69	156,475	156,475	●	●		
70	156,525	156,525	DSC	DSC		
71	156,575	156,575		● L)		
72	156,625	156,625	● L)			
73	156,675	156,675	●	●		
74	156,725	156,725		● L)		
75	156,775	156,775		B)		
76	156,825	156,825		B)		
77	156,875	156,875	● L)			
78	156,925	161,525			●	●
79	156,975	161,575			●	●
80	157,025	161,625			●	●
81	157,075	161,675			●	●
82	157,125	161,725			●	●
83	157,175	161,775			●	●
84	157,225	161,825			●	●
85	157,275	161,875			●	●
86	157,325	161,925			●	●
87	157,375	157,375		● *)		
88	157,425	157,425		● *)		

Notes:

B) Channels 75 and 76 cannot be selected in BI mode.

L) 1W TX power on channels 6, 8, 10, 11, 12, 13, 14, 15, 17, 71, 72, 74 and 77.

*) Channels 87 and 88 became simplex channels following the introduction of Automatic Identification channels AIS1 at 161.975MHz and AIS2 on 162.025MHz.

NB The ATIS function is enabled on all channels. RX and TX frequencies can be read from the handset display by pressing and holding the CH key for more than 1 second. With a front-operated VHF radio, the frequencies can be displayed on a menu.

7 Installation – Control Unit

7.1 Mounting possibilities

Mounting is carried out by first fixing the backplate, after which the Control Unit can simply be slid over and clicked into place. There is a template on page 31 to help you mount the unit.
To avoid theft, the control unit can be removed when leaving the boat or during the off-season simply by pressing the spring and lifting it off the backplate

7.2 Power supply

The Control Unit is supplied with +12V DC from the SPARC-bus interface.
If there is a short circuit or fire, it is important that your VHF remain operational. We therefore recommend that the power cable be connected directly to the ship's battery.

7.3 Control unit connection – Leisure class D VHF

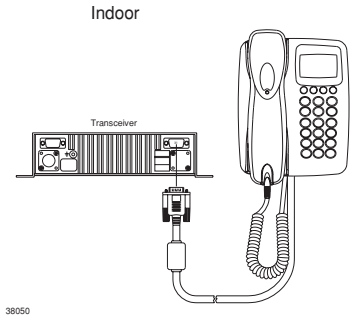
Remote control units can be connected in two ways

1. Directly between the transceiver and the control unit .

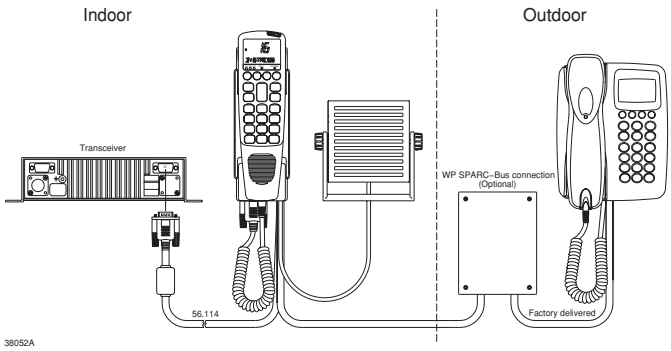
2. Via a SPARC-bus splitter box or WP SPARC-bus connection box (optional, not included).

Both control units with or without DSC can be connected.
Remote speakers may be connected to remote Control Units via a splitter box , or a WP SPARC-bus connection box.
Not more than four Control Units can be simultaneously connected to a transceiver without DSC and not more than seven with DSC.

7.4 Connecting the transceiver / Control Unit



7.5 Connecting the transceiver / splitter box / indoor and waterproof Control Unit



7.6 Control Unit connection – Commercial class A VHF

Remote control units can be connected in two ways:

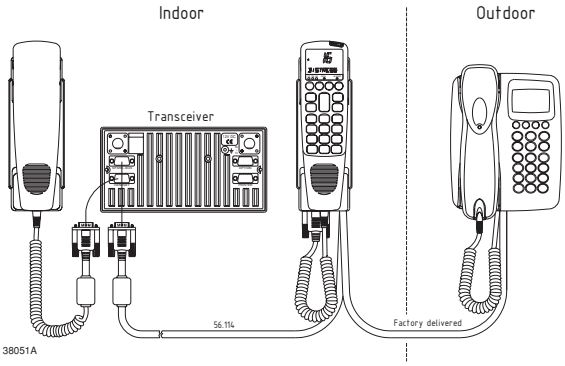
1. Directly between the transceiver and the control unit .

2. Via a SPARC-bus splitter box or WP SPARC-bus connection box.

Both control units with or without DSC can be connected.

Remote speakers may be connected to remote Control Units, to a splitter box , or via a WP SPARC-bus connection box.

Not more than seven handsets can be simultaneously connected to the transceiver with DSC. Always connect the local Control unit to the transceiver. The DSC class of intelligent Control Unit is 'D' even if the radio is Class A.



7.7 Loudspeaker connection

When one or more control units are connected to the VHF system, two of them can be set up to use the transceiver's two loudspeaker outputs to drive external speakers.

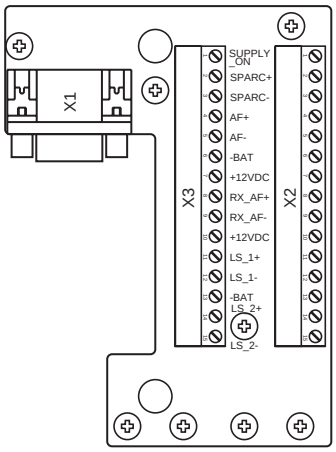
To link a loudspeaker to a control unit:

1. Lift the handset.
2. Press **Shift**, **Func** to display TELEPHONY.
3. Press **down arrow** twice to display GENERAL.
4. Press **right arrow** once to display ILLUMIN.
5. Press **down arrow** twice to display SOUND.
6. Press **right arrow** once to display EARPIECE.
7. Press **up arrow** once to display LOUDSPEAK.
8. Press **right arrow** three times to display EXTSPK.
9. Use **up** and **down arrows** to set external speaker to 1 or 2, as required.
10. Press **right arrow** to complete selection. If you make a mistake at any step, simply press **16** to return to the beginning. It is not possible to step backwards through the menu sequence.

Loudspeaker signals are available in the SPARC-bus cabling, and a loudspeaker can be connected to the system rest, in the SPARC-bus splitter box, or in the WP SPARC-bus connection box. Connect the loudspeaker cables to SPARC-bus signals (LS_1+ and LS1_!) or (LS_2+ and LS_2!) depending on which speaker selection is made by the control unit(s).

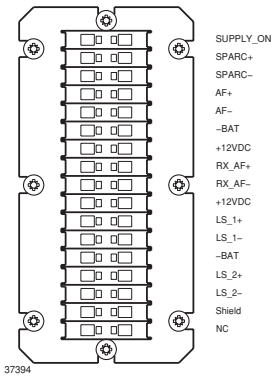
7.8 Connectors

SPARC-bus splitter box



35349A

WP SPARC-bus connection box



37394

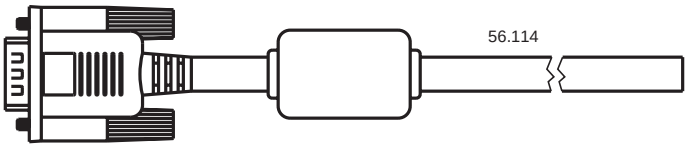
SPARC-bus cable

For systems with a supply voltage of +12V, the table below gives the maximum length of the SPARC-bus cable for the supply to a single control unit furthest away from the transceiver. The cable length depends on the number of supply wires and the wire thickness. For a +24V supply the maximum cable lengths listed may be doubled.

Number	System supply	Number of wires in cable	From	To	Wire mm2	Number of wires - BATT OVDC	Number of wires +12VDC	Max. length
	+12 Volt	2x8	Transceiver	CU	0.25	2	2	30 metres
	+12 Volt	2x8	Transceiver	CU	0.50	2	2	60 metres
	+12 Volt	2x8	Transceiver	CU	0.75	2	2	100 metres
56.114	+12 Volt	2x8	Transceiver	CU	0.14	3	2	5 metres

The SPARC-bus cable length is limited by the output power delivered to an external speaker connected to the LS2 terminals. The speaker output power depends on cable length and cable thickness as in the table below

Wire [mm2]	Length [m]	Max. Power [W]
0.14	5	3.4
0.25	10	3.2
0.25	20	2.0
0.50	20	3.2
0.50	40	2.0
0.75	30	3.2
0.75	60	2.0



35356

SPARC-bus/Option cable 5 metres 56.114

Pin no.	Name	Colour	Twisted pair
pin 1	SUPPLY_ON	Red/White	7
pin 2	SPARC+	Yellow	1
pin 3	SPARC-	Yellow/White	1
pin 4	AF+	Blue/White	2
pin 5	AF-	Blue	2
pin 6	-BAT_0VDC	Red and Orange	7/8
pin 7	+12VDC	Orange/White	8
pin 8	RX_AF+	Green/White	3
pin 9	RX_AF-	Green	3
pin 10	+12VDC	Black/White	6
pin 11	LS_1+	Brown	4
pin 12	LS_1-	Brown/White	4
pin 13	-BAT_0VDC	Black	6
pin 14	LS_2+	Purple	5
pin 15	LS_2-	Purple/White	5
Shield		Shield	

SPARC-bus connections

Transceiver unit X1	Name	Twisted pair	Handset HOOK X1,X3	SPARC-bus connection box X1,X2,X3
pin 1	SUPPLY_ON		1	1
pin 2	SPARC+	1	2	2
pin 3	SPARC-	1	3	3
pin 4	AF+	2	4	4
pin 5	AF-	2	5	5
pin 6	-BAT_0VDC		6	6
pin 7	+12VDC		7	7
pin 8	RX_AF+	3	8	8
pin 9	RX_AF-	3	9	9
pin 10	+12VDC		10	10
pin 11	LS_1+	4	11	11
pin 12	LS_1-	4	12	12
pin 13	-BAT_0VDC		13	13
pin 14	LS_2+	5	14	14
pin 15	LS_2-	5	15	15

7.9 Installing the Control Unit

1. With the VHF system turned off, connect the control unit- to the system as described above.

2. Switch the VHF system on by pressing the **ON/OFF** button

3. The next step is to set up the control unit SPARC-bus location number and SPARC-bus handset name by the following steps.

4. Press **Shift**, **Func** to display TELEPHONY.

5. Press **down arrow** to display SERVICE.

6. Press **right arrow**. An asterisk will flash.

7. Key in your access code **9876** using the alphanumeric keys. To enter the first digit, press the appropriate key rapidly four times to display the digit. Then pause for two seconds until the asterisk moves to the right. Now enter the second digit by pressing four times in quick succession. Continue until all four digits have been entered. If you make a mistake, use the left arrow to move backwards and cancel.

8. Press right arrow three times, to display BUS SETUP, HANDSET and LOC NO in turn.

9. Use **up** or **down arrow** to change SPARC-bus location number.

10. Press **right arrow**.

11. Use the **Func** and **Power** keys to enter or change the name of the handset.

12. Press **right arrow** to move one character to the right or select the name already entered.

13. To finish setup, press **Shift** and **Func**. Alternatively, just press **16**.

7.10 Linking an external speaker

If an external speaker is to be linked to the handset, proceed as follows.

1. Lift the handset.

2. Press **Shift**, **Func** to display TELEPHONY.

3. Press **down arrow** twice to display GENERAL.

4. Press **right arrow** once to display ILLUMIN.

5. Press **down arrow** twice to display SOUND.

6. Press **right arrow** once to display EARPIECE.

7. Press **up arrow** once to display LOUDSPEAK.

8. Press **right arrow** three times to display EXTSPK.

9. Use **up** and **down arrows** to display **0** for no external speaker selected, **1** for external speaker 1, **2** for external speaker 2, or **3** for both external speakers.

10. Press **right arrow** to complete selection. If you make a mistake at any step, simply press **16** to return to the beginning. It is not possible to step backwards through the menu sequence.

ATTENTION: When more control units are connected to the VHF system, they all have to be assigned different location numbers for the system to function correctly. The control unit at a ship's central control should be assigned location number 1. Under the VHF system, the control unit with location number 1 has the highest priority in the system and so is able to control the system at any time.

8 System function checks

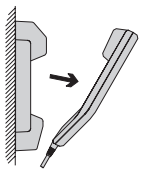
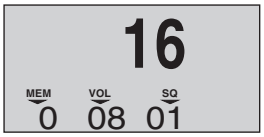
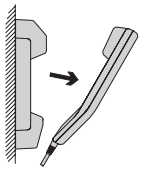
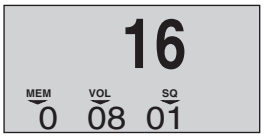
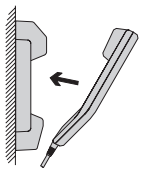
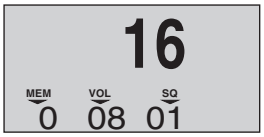
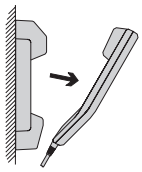
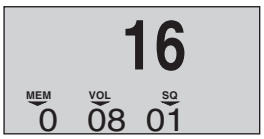
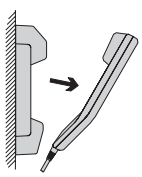
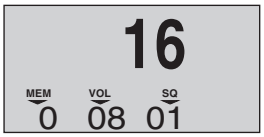
After a handset has been connected to the VHF system, go through the following test procedures to ensure the system is working properly. If the tests are successful, the VHF system is functioning correctly.

Purpose: To test correct assembly of the system, ensuring SPARC-bus command communication between all system units – including system control priorities for the control units – and to check the telephony TX LF and RX LF routing.

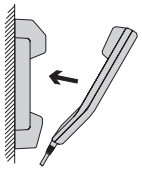
Test setup: Switch all control units on, with all handsets on their rests and each showing VHF display.

8.1 How to check system priorities – system control and SPARC-bus data interface circuits

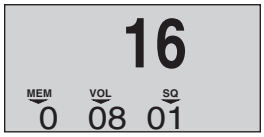
If only one control unit is connected, lift the handset and change the channel or push PTT once to ensure the handset is able to control the system. If more control units are connected, do the following:

Test setup		Result expected	
1a	Handset (loc_1): Hook off. 	Handset loc_1: VHF display.	
		Other control units: oCC display.	
1b	Other control units in Hook off. 	Handset loc_1: VHF display.	
		Other control units: oCC display.	
2	All control units: Hook on. 	All control units: VHF display (system idle).	
3a	Handset (loc_2): Hook off. 	Handset loc_2: VHF display.	
		Other control units: oCC display.	
3b	Handset (loc_1): Hook off. 	Handset loc_1 or loc_2: VHF display.	
		Other control units: oCC display.	

3c Handset (loc_1):
Hook on.

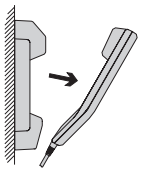


Handset loc_2: VHF display.

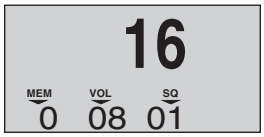


Other control units: OCC display.

3d Handset (loc_3):
Hook off.

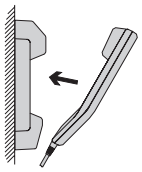


Handset loc_2: VHF display.

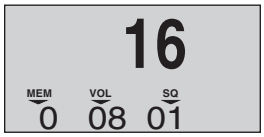


Other control units: OCC display.

3e Handset (loc_3):
Hook on.

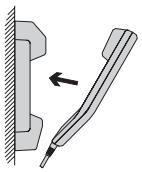


Handset loc_2: VHF display.

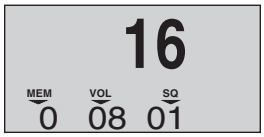


Other control units: OCC display.

3f Handset (loc_2):
Hook on.
All on hook.



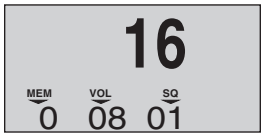
All control units: VHF display (system idle).



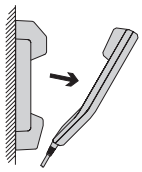
If the various control units do not behave as described, some of them may have been assigned the same location number. If so, check the location number setup in each unit.

8.2 How to check intercom – handset TX AF circuits and handset audio amplifier circuits

If only one control unit is connected, ignore this test. If other control units are connected, proceed as follows.

Test setup		Result expected	
1	Handset (loc_1): 	Handset (loc_1): Inter-C dial display and dialling tone in the handset.	
		Handset (loc_2): Inter-C dial display and dialling tone in the handset.	
		Other control units: VHF display.	
2	Handset (loc_1):	Handset (loc_1): Inter-C dial display	

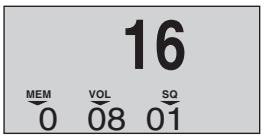
Hook off.



and dialling tone in the handset.

Handset (loc_2): Inter-C dial display and dialling tone in the handset.

Other control units: VHF display.

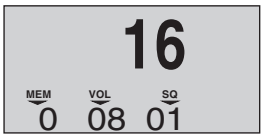


3 Handset (loc_1): Press PTT and talk.

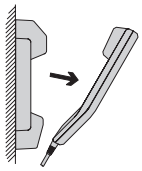
Handset (loc_1): Inter-C dial display and dialling tone in the handset.

Handset (loc_2): Voice output in speaker and dialling tone in the handset.

Other control units: VHF display.



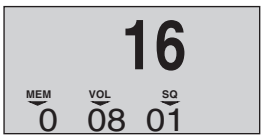
4 Handset (loc_2): Hook off.



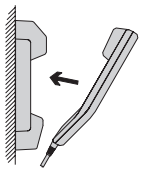
Handset (loc_1): Inter-C display.

Handset (loc_1): Inter-C display. Intercom in progress, talk both ways. Voice in both handset earpieces/speakers.

Other control units: VHF display.

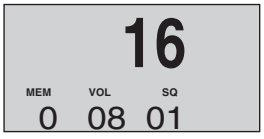


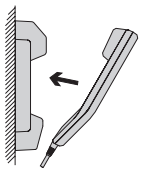
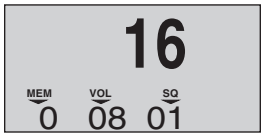
5 Handset (loc_1): Hook on.



Handset (loc_2): VHF display.

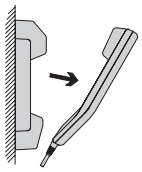
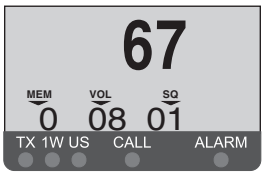
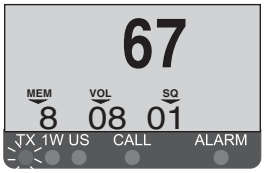
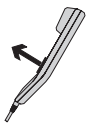
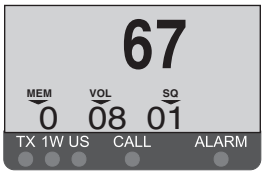
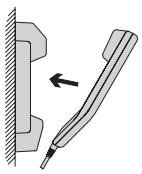
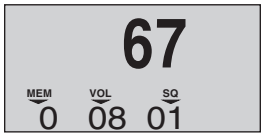
Other control units: oCC display.



6	Handset (loc_2): Hook on (all on hook) 	All control units: VHF display (sys idle).	

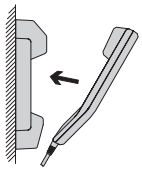
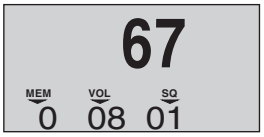
8.3 How to check TX transmitter – handset TX AF circuits and VHF transmitter

For this test, transmitter power level must be 25W (that is, the 1W indicator lamp will not be lit). If the VHF transmitter fails, the 1W indicator lamp will go on when the PTT button is pressed and/or the display will show the error message ANTN FAIL. In this event, check that the aerial and aerial cable are connected correctly.

Test setup		Result expected	
1	Handset (loc_1): Hook off. 	Handset (loc_1): VHF display. Other control units: oCC display.	 
2	Handset (loc_1): Press PTT. 	Handset (loc_1): VHF display. TX indicator lamp is lit. Other control units: oCC display.	 
3	Handset (loc_1): Release PTT. 	Handset (loc_1): VHF display TX indicator lamp turns off. Other control units: oCC display.	 
4	Handset loc_(1): Hook on. 	All control units: VHF display (system idle).	

8.4 How to check VHF signal reception – VHF receiver and handset RX AF circuits

Proceed as follows for each control unit.

Test setup	Result expected
1. All handsets on their rests (VHF display) with squelch thresholds set to zero.  	There is static noise – a background hissing – from all the control unit speakers. If nothing can be heard, switch the speaker on and turn up the volume. 

8.5 How to check the TX/RX DSC mode

To test the system's DSC functionality, two test calls must be made – an INTernal test and an EXTernal test.

Internal test
In this test, the call is looped back internally, not via the transmitter or receiver. The test controls the DSC modem in the transceiver RX and TX internally.

1. Lift the handset.
2. Press **Shift**, **Func** to display TELEPHONY.
3. Press **up arrow** once to display DSC.
4. Press **right arrow** once to display SETTINGS.
5. Press **down arrow** twice to display TESTCALLS.
6. Press **right arrow** once to display INT PATH.
7. Press **right arrow** once to display SENDCALL.
8. Press **Send Call** key.
9. The display will rapidly show, in sequence, TX-CALL, TX-OK.
10. The call is announced by the DSC modem. Read the call info in RX-LOG.

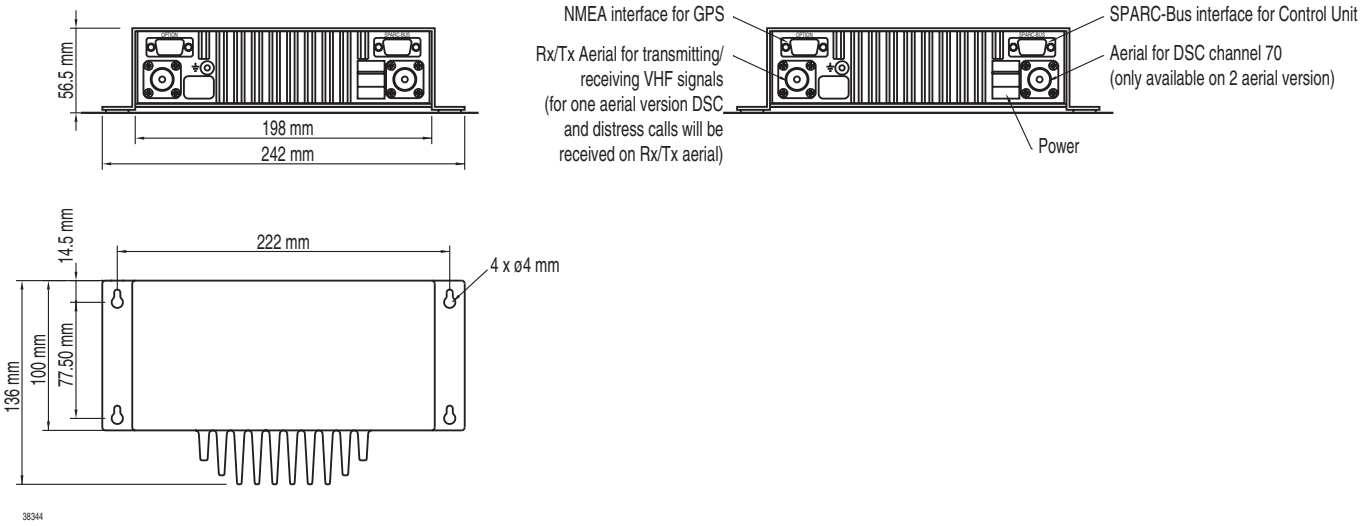
External test
In this test, the call is transmitted and received via the aerials. The test also controls the transmitter and receiver circuits.

1. Lift the handset.
2. Press **Shift**, **Func** to display TELEPHONY.
3. Press **up arrow** once to display DSC.
4. Press **right arrow** once to display SETTINGS.
5. Press **down arrow** twice to display TESTCALLS.
6. Press **right arrow** twice to display EXT PATH.
7. Press **right arrow** once to display SENDCALL.
8. Press **Send Call** key.
9. The display will rapidly show, in sequence, TX-CALL, TX-OK.
10. The call is announced by the DSC modem. Read the call info in RX-LOG.

9 Installation – Transceiver Unit

9.1 Mounting possibilities / Interface connections

The transceiver unit is available in both a one- and a two-aerial version.
A one-aerial DSC transceiver can be converted into a two-aerial version (contact your dealer).
The drawing below shows a two-aerial transceiver unit:

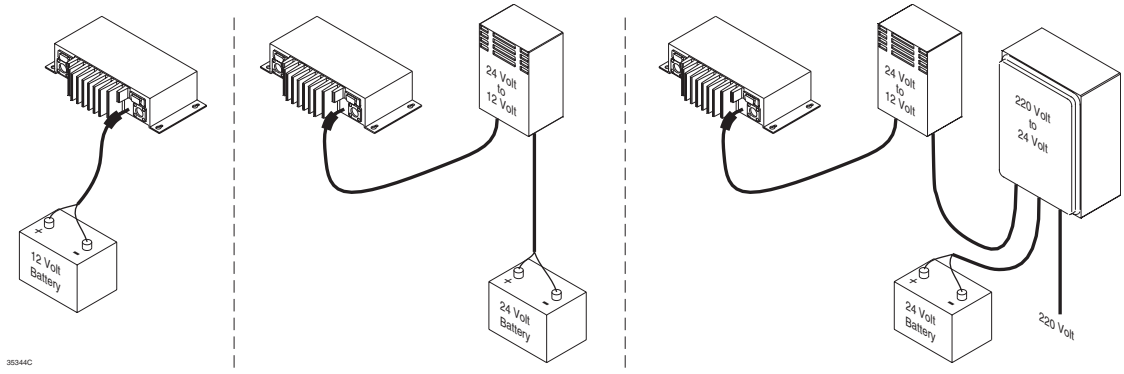


Weight:
Transceiver Unit 1.3 kg

WARNING:
Only use original screws; otherwise you risk short-circuiting the battery ground to the ship ground.

9.2 Power Supply

The standard power supply for the VHF unit is 12V DC.
For 24V DC 10V AC, 127V AC, 220V AC or 237V AC supply external power supplies can be used.



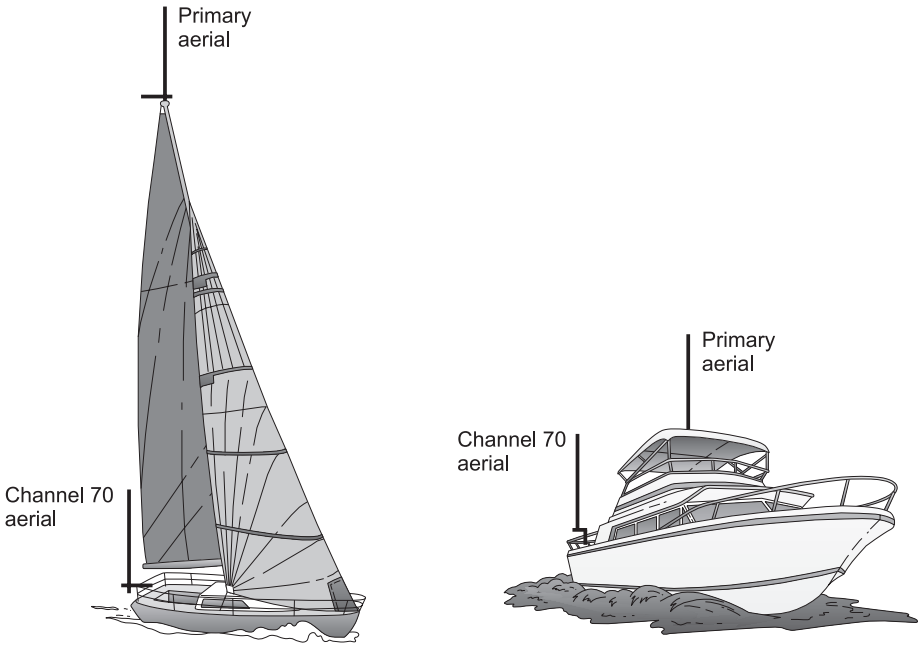
Fuse
The fuse is a standard 10A mini car fuse. There is a spare fuse in the power cable connector.

9.3 Aerial

The transceiver without DSC requires one aerial. The transceiver with DSC is available in both a one- and a two-aerial version.
All common 50Ω aerials covering the used frequency range with a reasonable standing wave ratio, max. 1.5, can be used.
Aerials are connected to the set by means of a 50Ω coaxial cable with low loss, e.g. RG213U. For each cable, two PL259 plugs are used, one mounted at each cable end.

9.3.1 Placing the Aerial(s)

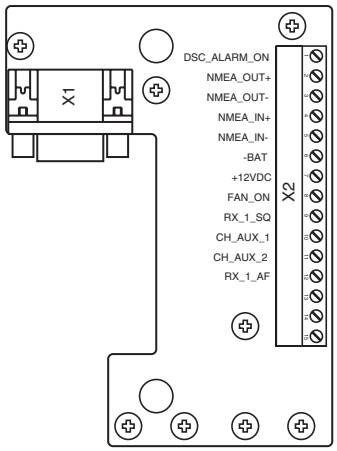
Aerials should be mounted in a place that is as high and clear as possible - like the “primary aerials” in the illustration below. The horizontal distance to metal parts must be at least 1m.
When using two aerials, the primary aerial must be placed at a higher level than the channel-70 aerial:



9.4 Options Connection Box

Options connectors

Transceiver unit X2	Twisted Name	Option box pair	X1,X2
pin 1	DSC_ALARM_ON		1
pin 2	NMEA_OUT+1	1	Optional
pin 3	NMEA_OUT-1	1	Optional
pin 4	NMEA_IN+	2	4
pin 5	NMEA_IN-	2	5
pin 6	-BAT_0VDC	3	6
pin 7	+12VDC	3	7
pin 8	FAN_ON		8
pin 9	RX_1_SQ		9
pin 10	CH_AUX_1		10
pin 11	CH_AUX_1		11
pin 12	RX_1_AF		12
pin 13	N.C.		13
pin 14	N.C.		14
pin 15	N.C.		15



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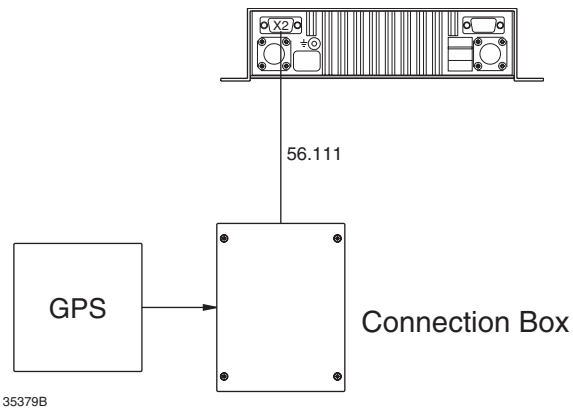
To connect a GPS to the VHF transceiver, connect the GPS signal lines to the options connector pin_4 (NMEA_IN+) and pin_5 (NMEA_IN-).

Alternatively the GPS can be connected directly to the transceiver by means of a 15-pole high density D-sub in the same pins as those mentioned above.
Make sure to use the 15 to 15-pole adaptor between the transceiver and the 15-pole high density D-sub.
The two partsare supplied with the radio.



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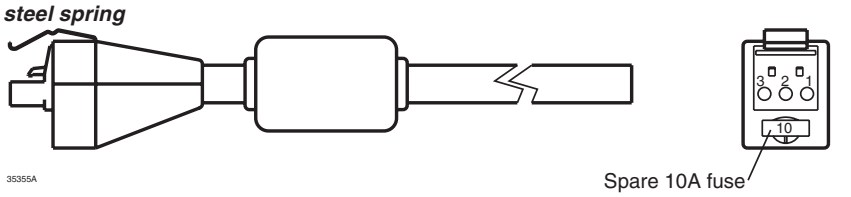
9.5 Cable length

The cable length specified below is the absolute maximum length.

Power Cable

Number	Supply	From	To	Wire mm2	Max. length
56.112	+12 volt	BATTERY	VHF DSC	2.5	1.5 metres
	+12 volt	BATTERY	VHF DSC	5.0	3 metres

Note: The cable length from battery to power supply depends on the wire thickness, but the voltage at the cable end at the power supply should not be less than 18 volt.



Pin no.	Name	Colour
Pin 1	SUPPLY_ON	Blue *
Pin 2	+BAT	Red
Pin 3	-BAT	Black

NB! Press and hold ***steel spring*** on power connector when disconnecting power cable from transceiver. Failure to do so may damage the connector.

* NB! The blue wire is **only** to be used in connection with power supply.

9.6 Electrical connections

Power connector

Transceiver unit	Name	Battery	Power supply
pin 1	SUPPLY_ON	NC	SUPPLY_ON
pin 2	+Battery, +12VDC	+	+12V
pin 3	- Battery, 0VDC	-	0V

9.7 Compass safety distance

Unit	Standard	Steering
Transceiver Unit	0.3 m	0.3 m
Control Unit	1.05 m	0.7 m
Handset	0.3 m	0.2 m
12V power supply	0.6 m	0.3 m
24V power supply	1.2 m	0.7 m

10 Technical specification

Conforms to all relevant international requirements and resolutions as agreed by ETSI, IEC, ITU, and IMO as well as other national requirements. These specifications include ETS 300 162, ETS 300 338, IEC 945, IEC 1097-3 and IEC 1097-7.

General Information

Normal channels	All int. ch's for 25 kHz operation. Up to 40 private channels.
Opt. channels	All int. ch's for 12.5 kHz operation. Up to 224 ch's with up to 54 private ch's.
Channel spacing	25 kHz / opt. 12.5 kHz
Frequency range	150.8 MHz - 163.6 MHz.
Operating modes	Simplex/Semi-duplex.
Modulation	G3EJN for telephony receiver G2B for DSC signaling
Frequency stability	±10 ppm/ opt. ± 5ppm
Aerial connectors	Standard 50 ohm female, SO239
Temperature range	-15°C to +55°C
Supply voltage	13.2V DC Nominal
Supply range	10.8V DC to 15.6V DC
Supply current	Stand-by 0.14 A Transmitter on 1.5 A (Low power) Transmitter on 5 A (High power)
Transceiver dimen.	H*W*D 55*202*136mm.
Transceiver weight	1.3 kg

Receiver

Sensitivity for:	
12 dB SINAD	-119 dBm or 0.25µV p.d.
AF rated power	
Output 1	4 W/ 4 ohms
Output 2	6 W/ 4 ohms
Distortion THD	Below 5%
Signal/noise ratio	Better than 40dB
AF response	- 6dB/octave
Spurious emission	Below 2nW
Spurious resp. att.	More than 70dB
Intermodulation att.	More than 68dB
Blocking	More than 90dBµV
Co-channel rejection	Better than -10 dB
Adj. ch. selectivity	More than 70dB

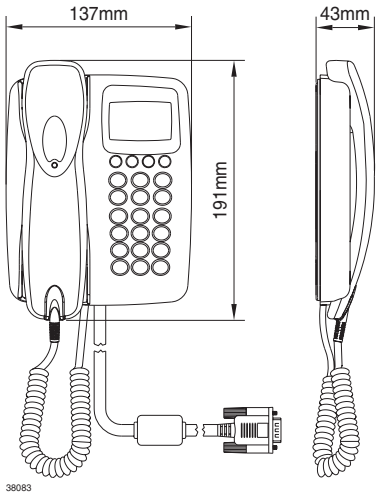
Transmitter

RF output power	High 25 W + 0 dB to -0.5 dB Low 0.9 W +0.5 dB to -1 dB
Adj. ch. power	Below -70dBc
Spurious radiation	Below 0.25µW
Cabinet radiation	Below 0.25µW
AF response	+ 6dB/octave
Distortion	Below 5%
Signal/noise ratio	Better than 40dB

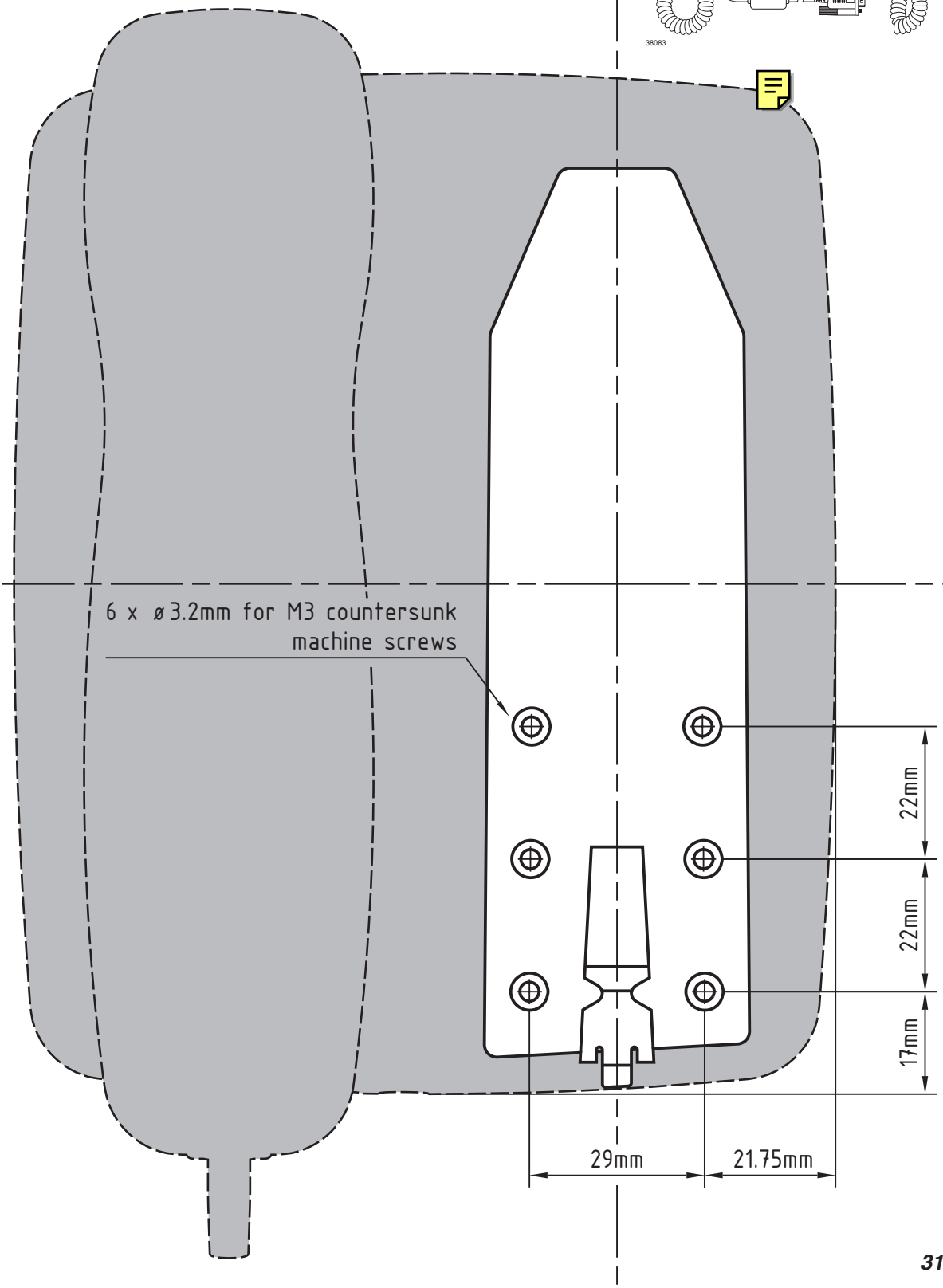
DSC Facilities:

DSC operation	According to Rec. ITU-R M.541-6 and Rec. ITU-R M.689-2
DSC protocol	According to Rec. ITU-R M.493-7 class D
Navigator interface	NMEA 0183, GGA,GLL,ZDA NMEA Input current 8mA type
Symbol error rate	
below $1*10^{-2}$ at	-119 dBm or 0.25µV p.d.
Modulation	1700 Hz ± 400 Hz 1200 baud ± 30 ppm
Frequency error	Below ± 1 Hz
Residual DSC-mod.	Below -26 dB

11 Drilling plan - Control Unit



Scale 1:1



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