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# 1 GENERAL

## 1.1 Introduction

The RD68 is a combined VHF radio and Class D Digital Selective Calling (DSC) unit. It supports the latest GMDSS requirements for non-SOLAS vessels from the International Maritime Organization (IMO). This will enable you to make digitally selected calls, which are quicker and simpler to make than traditional voice calls using channel 16. Should a distress situation occur, with the RD68 you can quickly raise an alert, indicating your identity, your position, and automatically establish distress communication on the emergency voice channel.

The RD68 is robustly constructed using a pressure die-cast aluminum case for effective heat dissipation, ensuring maximum transmission performance even after many hours' constant use.

### **Thank you for choosing Simrad!**

If you are pleased with your VHF, we hope you will be interested in our range of marine electronic equipment, which is manufactured to the same high standards as the RD68. Please contact your nearest Simrad Agent for a catalog showing our increasing range of high tech navigational instruments, GPS, Autopilots, Radar, Fishfinders and VHF radio sets.

Simrad operates a policy of continual development and reserves the right to alter and improve the specification of their products without notice.



*Fig 1.1 - RD68 combined VHF & DSC*

## 2 OPERATION

### 2.1 General

The RD68 VHF is very simple to operate, with the controls falling into five groups:



*Softkeys & labels*

1. The rotary **Volume** (On/Off) & **Squelch** controls.
2. The **alphanumeric keypad** used to select the channel, MMSI number, etc.
3. The **dedicated controls**, for commonly used functions such as output power, Dual Watch, and channel 16 select, etc.
4. The four **softkeys** to the right of the display are multi-function keys whose function changes depending on which menu is displayed. The label showing the current function for each softkey appears on the right side of the display (*see left*).
5. There is also a **Distress button** under a sliding cover. **This must only be used in an emergency** (*see section 5.1*).

The radio functions are split into two main modes:

- **Radio mode** allows access to the standard VHF radio functions, such as Tri-Watch, scanning, etc.
- **DSC mode** covers the digital selective calling functions.

These modes are toggled by pressing softkey **1** (labeled **DSC** or **RAD**).

At any stage of the DSC mode menu structure, pressing the **DSC** softkey will return to the DSC mode main menu. At any stage of the DSC mode menu structure, pressing the **C** key will cancel any unconfirmed action, or step back one level in the menu structure.

*Note Some menu options will only be displayed if the relevant information is available.*

If the radio is receiving NMEA GPS data, the current Lat/Long will be displayed when in DSC mode, and the time will be displayed in both Radio and DSC modes in 24-hour UTC (GMT) format (the local time can also be entered).

### 2.2 Rotary controls

Switch the radio on by turning the **VOLUME** knob clockwise. To increase the volume, turn the knob further clockwise. Turn the knob fully counterclockwise to switch off.

The **SQUELCH** knob is used to adjust the receiver muting threshold (squellch) level. To cut out weaker signals, increase the squellch until the background interference noise disappears. To receive weaker signals, decrease the squellch.

## 2.3 Backlighting (☼)



There are five levels of brightness – press and hold the ☼ key to step through and release when the required level is shown.

## 2.4 Changing channels

### 2.4.1 Standard International channels



**Note** To select channels, the RD68 will need to be in Radio mode. If in DSC mode, press the **RAD** softkey before entering the channel number.

## 2.5 Transmit power

This function allows toggling of the transmit power between 25W (**Hi**) and 1W (**Lo**) for short range transmissions, for example, when in a marina. This preserves battery power.



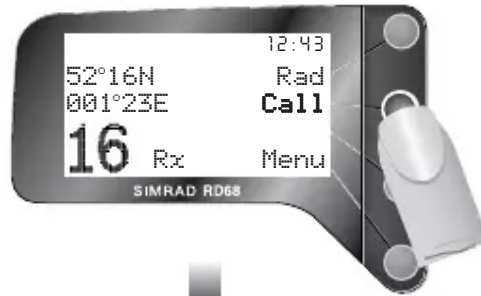
*Note Regulations restrict some channels, such as 15 and 17, to low power only, in which case this key will have no effect.*

## 2.6 Making a DSC call

Press the **DSC** softkey to enter DSC mode:

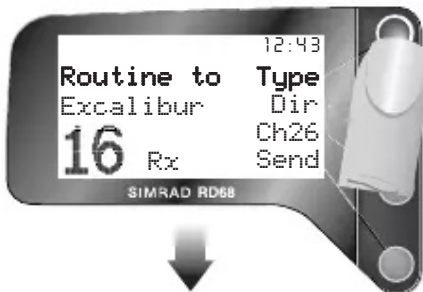


*/continued*

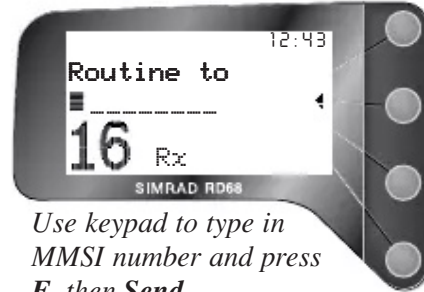


**SELECTING CALL TYPE**  
 Press **Type** to scroll through the different types of calls (see also p. 16):

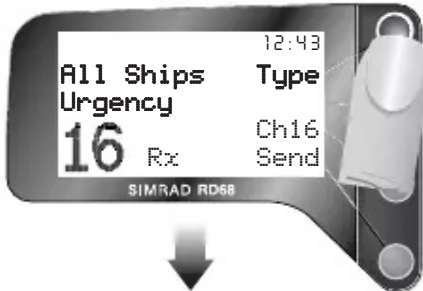
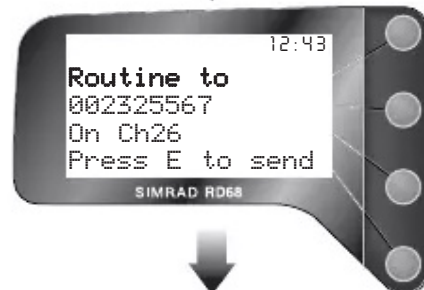
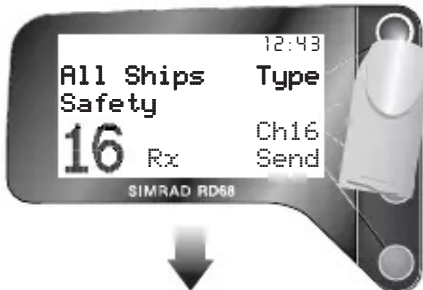
**MANUAL ENTRY**  
 To manually enter an MMSI number (Routine call):



Use **←** key to correct any mistakes



Use keypad to type in MMSI number and press **E**, then **Send**



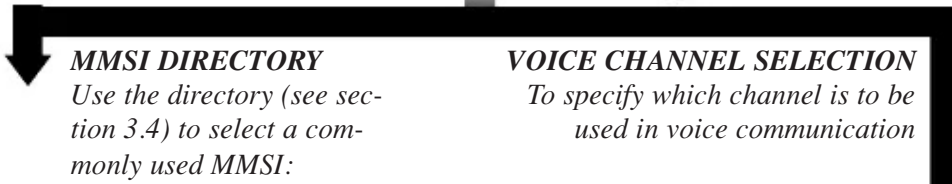
Press **Stop** to cancel call



Only displayed if a Group MMSI number has been entered (see section 1.3)

Select call type and press **Send** to transmit

/continued

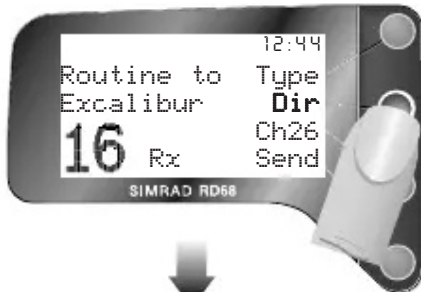


**MMSI DIRECTORY**

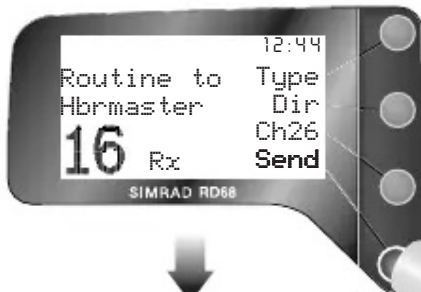
Use the directory (see section 3.4) to select a commonly used MMSI:

**VOICE CHANNEL SELECTION**

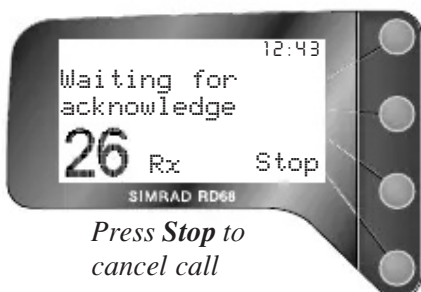
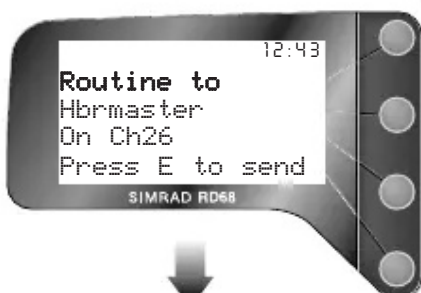
To specify which channel is to be used in voice communication



Press **Dir** to scroll through directory entries

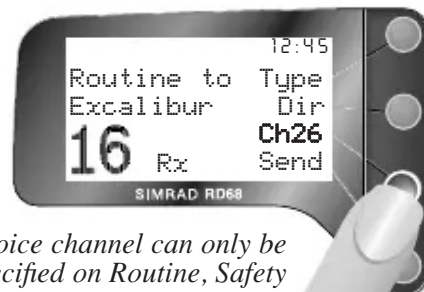


Press **Send** to transmit call



Press **Stop** to cancel call

Press softkey 3 (**ChXX**) to specify voice channel.



Voice channel can only be specified on Routine, Safety and Group calls (simplex only). Urgency and Distress calls are set to Ch16. When making a Routine call to a coast station (MMSI begins with "00"), the option to select a voice channel is not available.



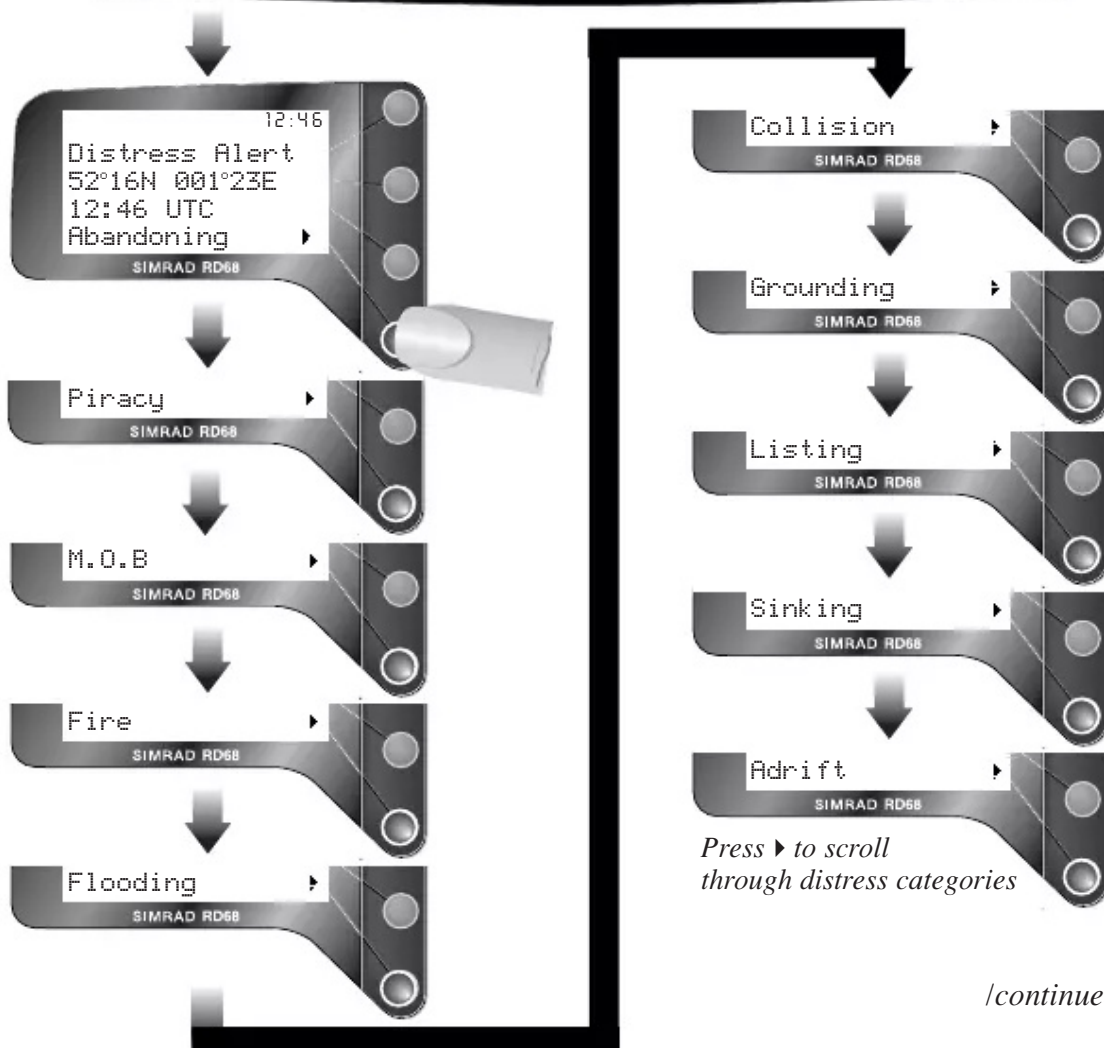
Press **Chan** to scroll through a selection of pre-programmed channels, or type in the channel number and press **E**.



## 2.7 Making a Distress Alert call

**WARNING** This call should only be made if the vessel is in a genuine distress situation. It is an offense to send a Distress Alert call if the vessel or crew are not in grave and imminent danger (see section 5.1).

The **DISTRESS** button is located under a protective cover that must be slid back before the button can be pressed. Press the **DISTRESS** button to access the Distress Alert screen:



/continued



To send the call, **press and hold** the **DISTRESS** key for five seconds. A countdown to the transmission will be displayed. Release the key at any time during this countdown to abort the transmission and press **C** to return to the main menu.

The Distress Alert transmission contains the following data:

- The vessel's MMSI
- The vessel's position (either from the NMEA 0183 input, or manually entered)
- The time (from NMEA or manual)
- The nature of the distress

*Note If the boat's position and time are not being received via the NMEA interface, then the display will allow this data to be entered manually (refer to section 3.2 for more details).*

After the Distress Alert has been sent, the RD68 will tune to channel 16 and will automatically repeat the alert approximately every four minutes, until either an acknowledgment is received or **C** is pressed (*it is not recommended that the Distress Alert is cancelled manually by pressing **C**, unless you are requested to do so by the rescue authorities*).

While the Distress Alert remains active, an intermittent alarm will continue to sound.

When an acknowledgment is received from the Rescue Co-ordination Center, this will automatically cancel the Distress Alert transmission. The subsequent rescue co-ordination will be performed using the voice working channel.

## 2.8 Receiving a DSC call

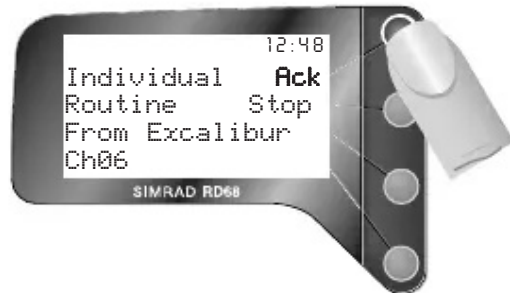
When a call is received, the RD68 will ring and the display will show the call information.

Press **Ack** (for individual calls requesting acknowledgment only) or **OK** to cancel and switch to the working channel. Press **Stop** to cancel ring only.

*Individual Routine call*



*Individual Routine call from MMSI stored in directory*



*All Ships Safety call All Ships Urgency call*



*Group call*



*Distress Alert call*

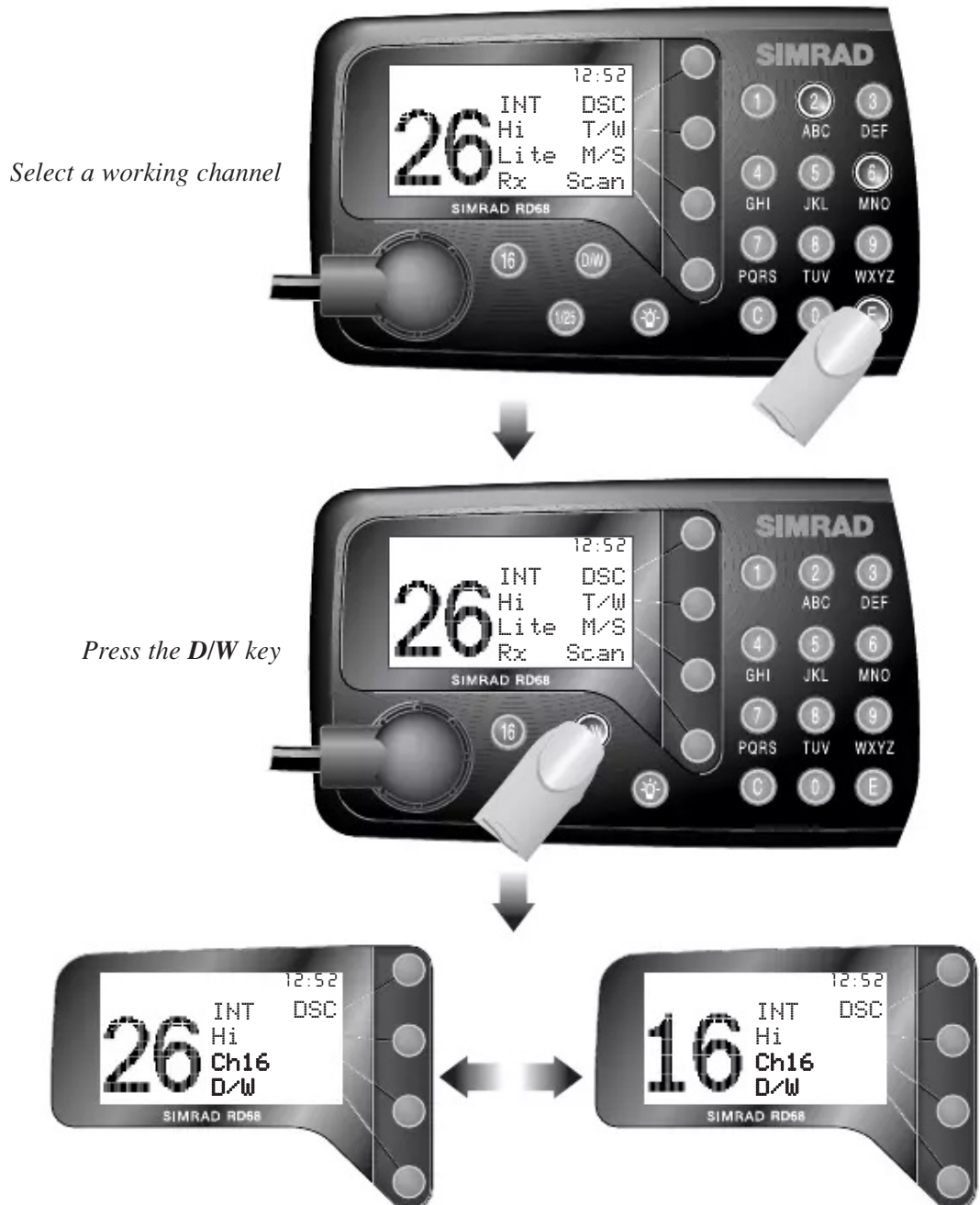


Press ▼ key for more information



## 2.9 Dual Watch

Dual Watch allows the radio to scan between a selected working channel and the priority channel (normally Ch16).



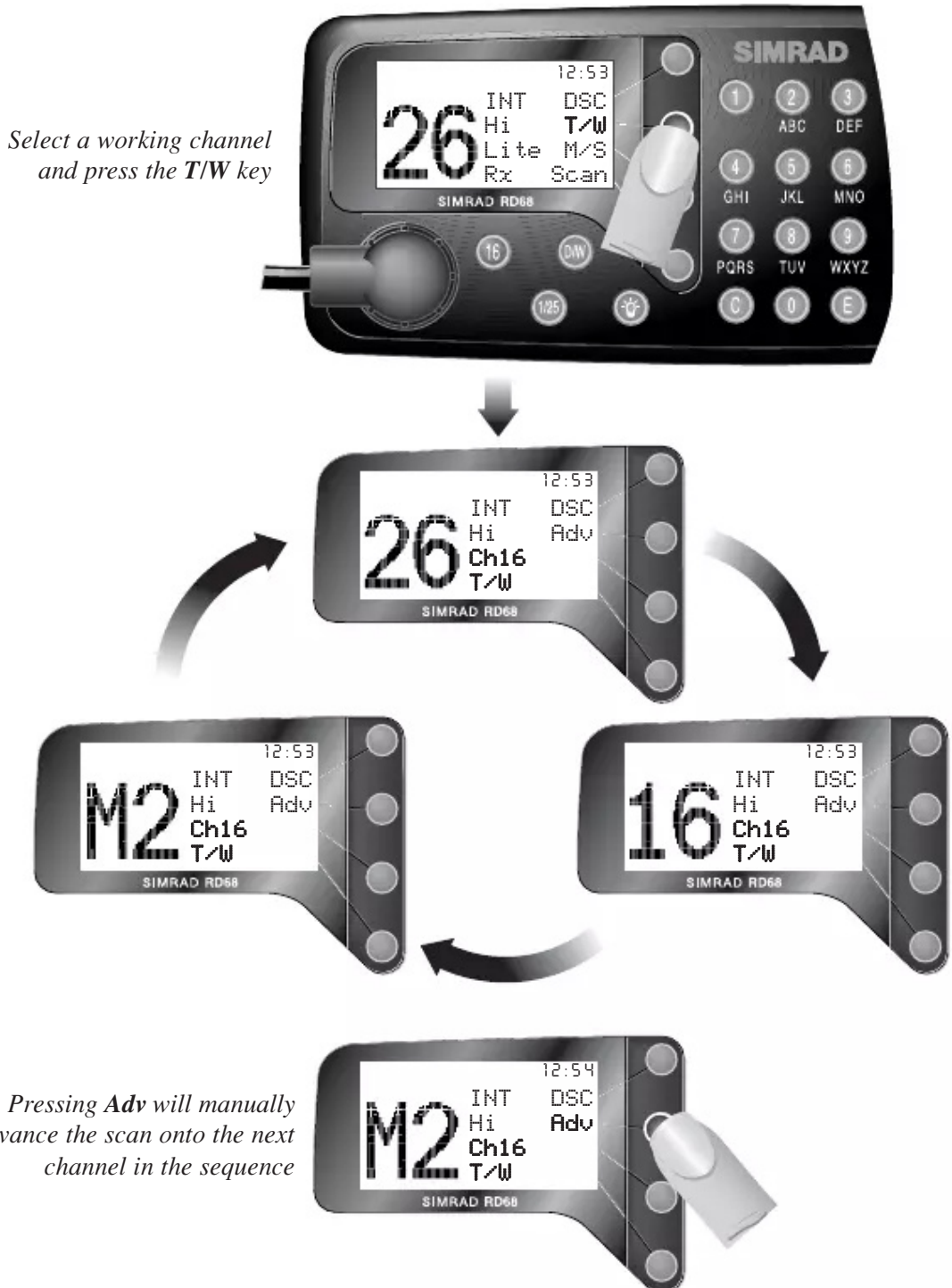
*The RD68 will monitor the working channel and the priority channel sequentially*

**Note** Normal VHF functions will not be available when in Dual Watch

mode. To change channel or transmit, press **16**, **D/W**, or **C** to exit Dual Watch. DSC functions can still be accessed by pressing **DSC**; however, sending a DSC call will automatically cancel Dual Watch.

## 2.10 Tri-Watch

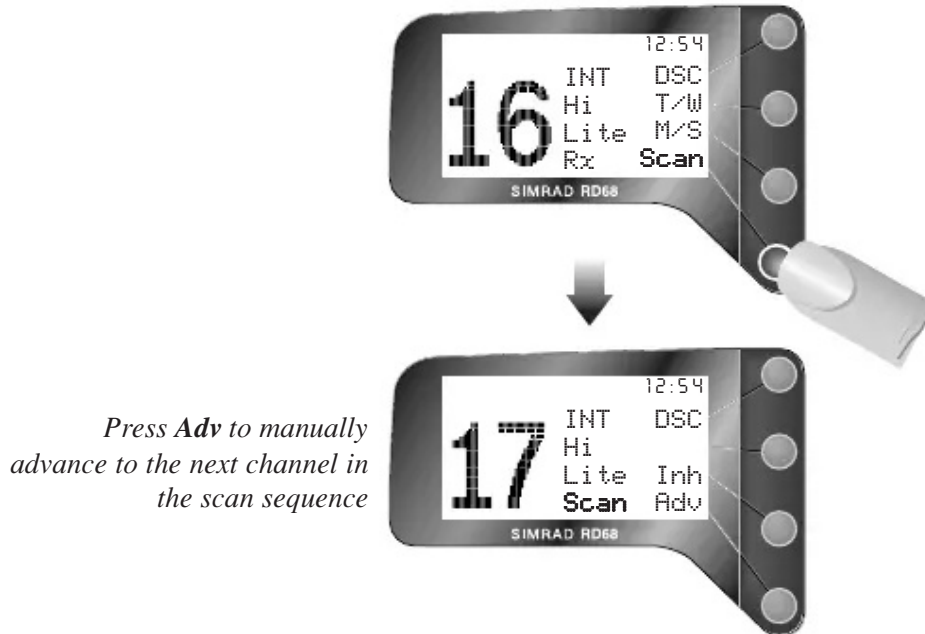
Tri-Watch operates on the same principle as Dual Watch, but this function scans between the working channel, priority channel, and the User channel. *For more information on the User channel and how it is specified, please refer to section 2.13.*



**Note** As with Dual Watch, normal VHF functions will not be available when in Tri-Watch mode. Exit Tri-Watch by pressing 16 or C.

## 2.11 Scan mode

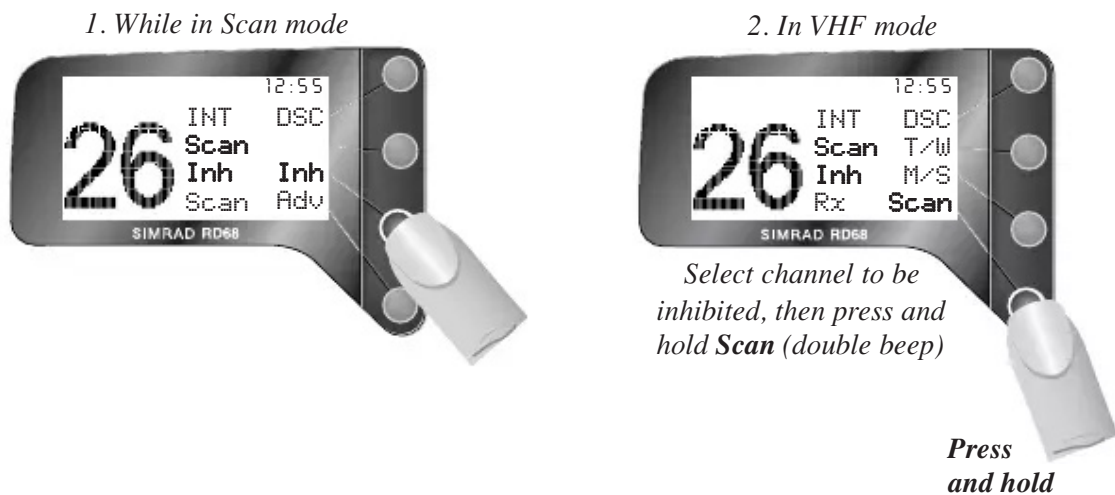
The Scan function cycles the RD68 sequentially through each enabled channel, pausing when a signal is detected.



**Note** While in Scan mode, normal VHF functions are not available.  
To exit Scan mode, press **C** or **16**.

### 2.11.1 Inhibiting channels from scan

In some areas the Scan function may repeatedly lock on a channel at each cycle, for example, if it is transmitting a carrier signal. Rather than pressing **Adv** each cycle, selected channels may be inhibited from the scan cycle.



To re-enable an inhibited channel into the scan cycle, repeat sequence 2:

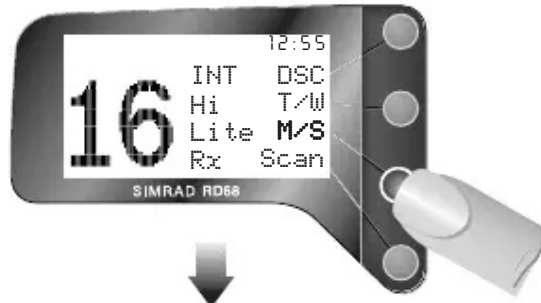
*Select channel to be enabled  
then press and hold Scan  
(double beep)*



## 2.12 Memory Scan

Like the Scan function, Memory Scan will cycle sequentially through the channels, but only those which have been pre-selected.

→ Refer to the next subsection 2.12.1 for more information on preselecting Memory Scan channels.



*Press Adv to manually  
advance to the next channel in  
the Memory Scan sequence*



**Note** While in Memory Scan mode, normal VHF functions are not available. To exit Memory Scan mode, press **C** or **16**.

## 2.13 Priority & User channel select

The priority channel (usually Ch16, depending on the configuration of the RD68) can be accessed immediately by pressing **16**. This will cancel any function currently in operation.

The User channel is a programmable priority channel which is accessed by pressing **16** twice:



*Press 16 twice*

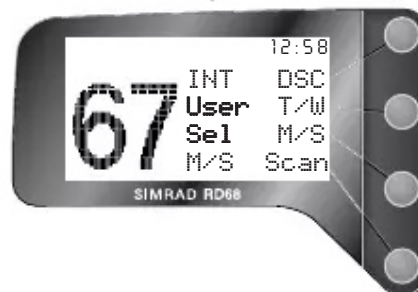


### 2.13.1 Programming the User channel

*Select the required channel  
Press and hold T/W  
(double beep)*



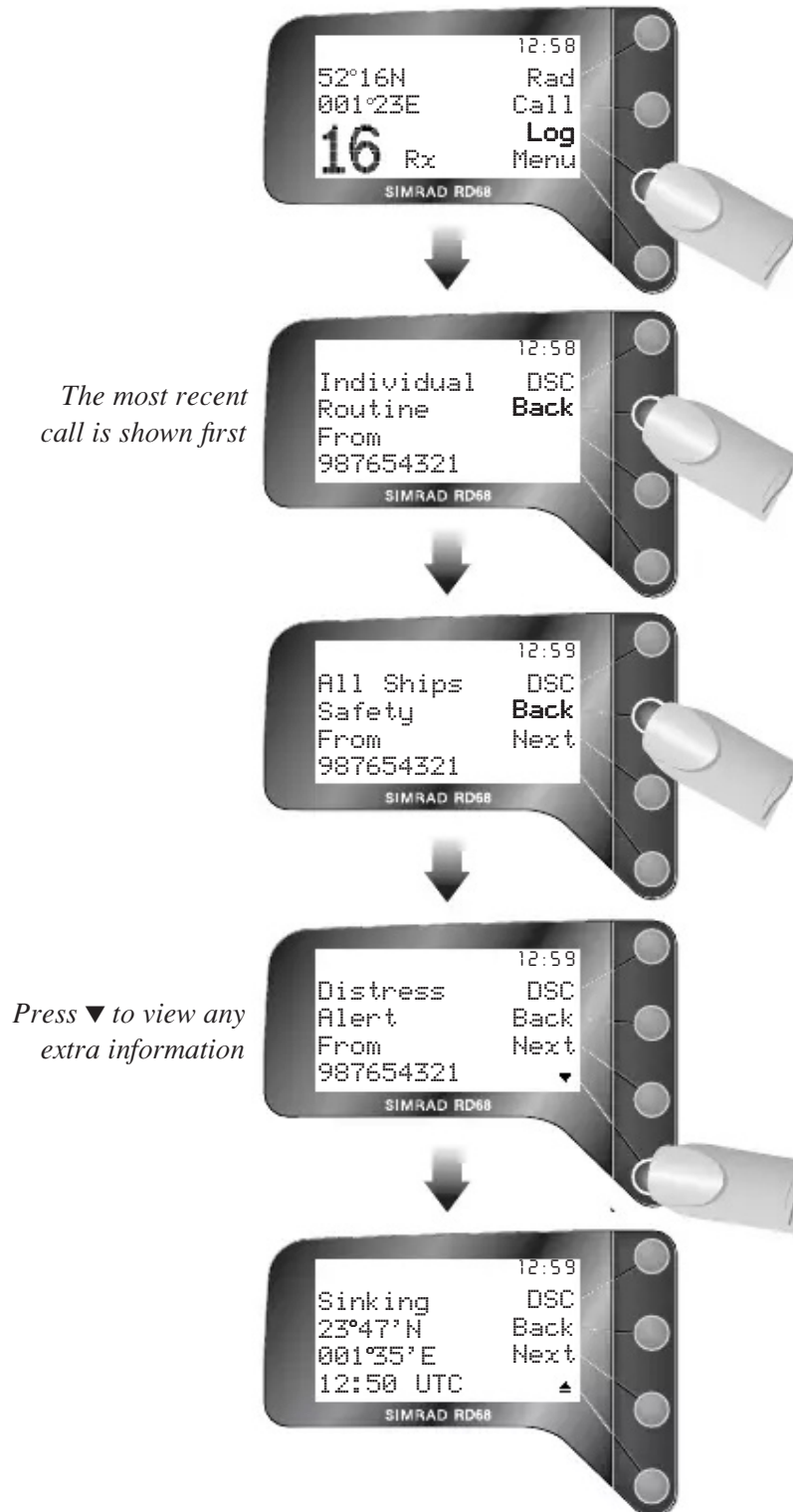
*Press  
and hold*





## 2.14 Viewing the call log

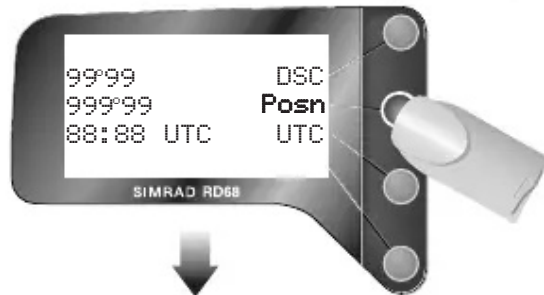
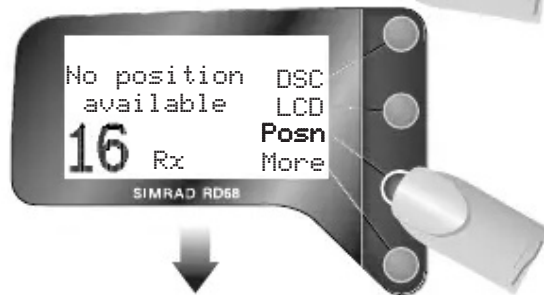
The last 16 incoming DSC calls are logged by the RD68 and can be viewed later (this function will not be displayed if no calls have been received).



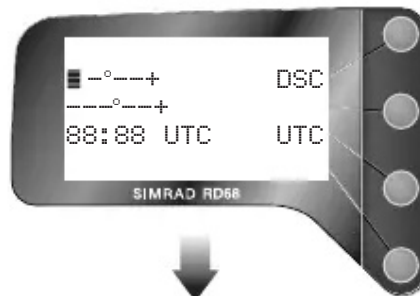
### 3.2 Entering position and time manually

The boat's position and the time (transmitted as part of a Distress Alert call) would normally be given by an interfaced GPS. If this is not available, the information can be manually entered:

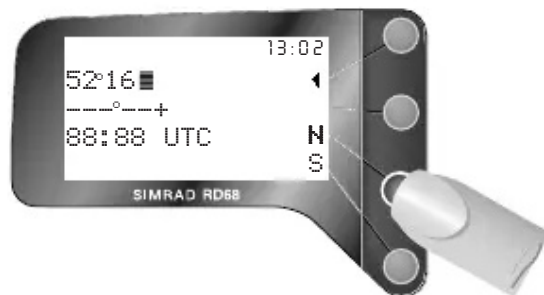
*If no GPS information is being received, the clock is not shown and the display shows "No position available"*



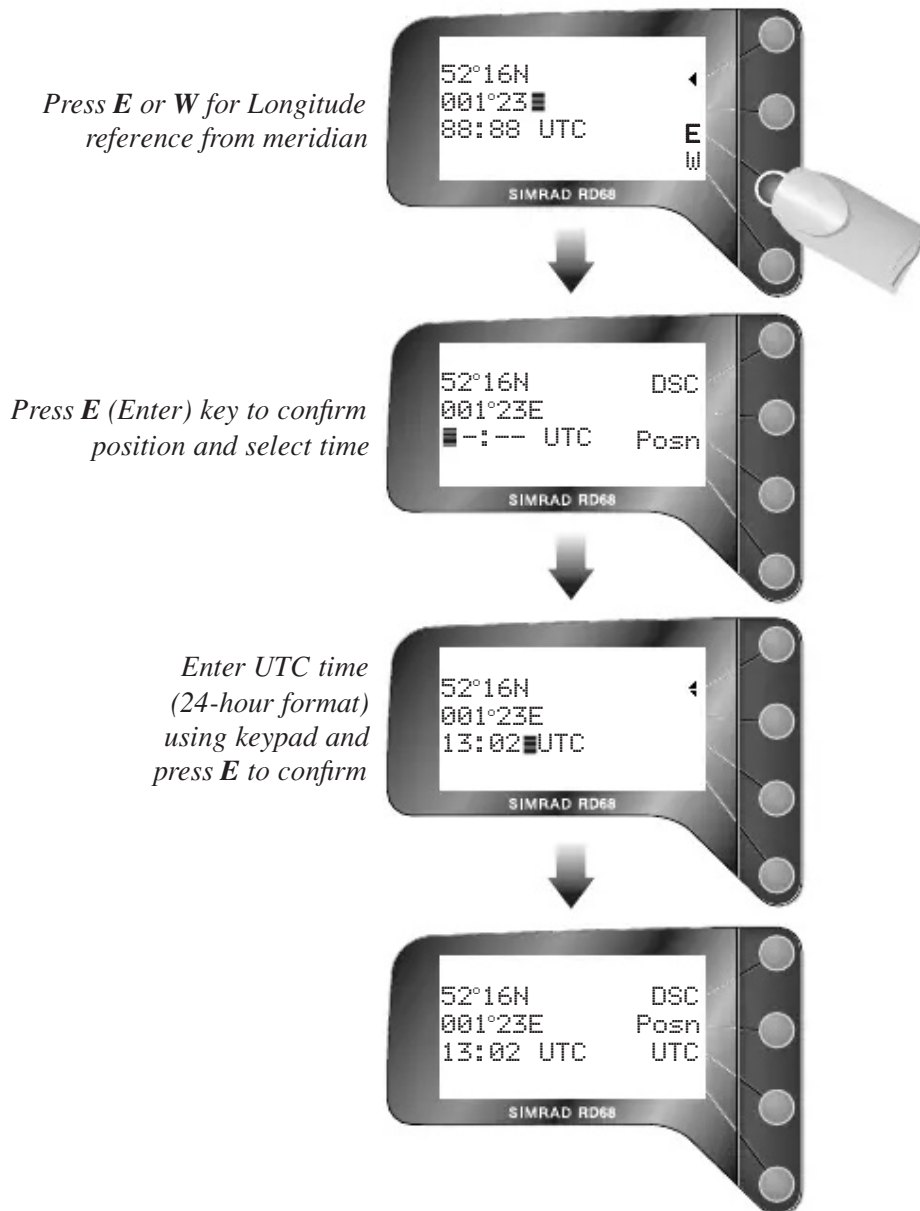
*Enter Lat and Long using the keypad*



*Press N or S for Latitude*

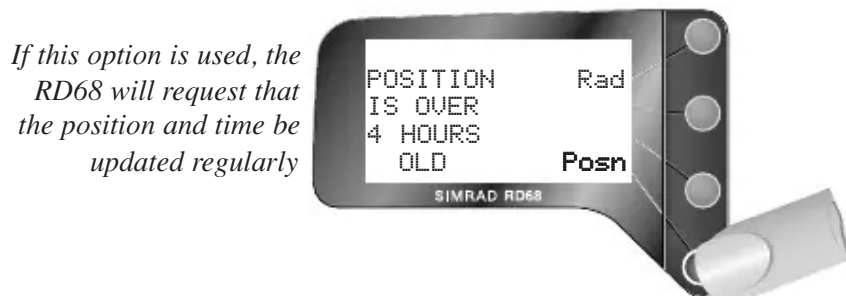


*/continued*



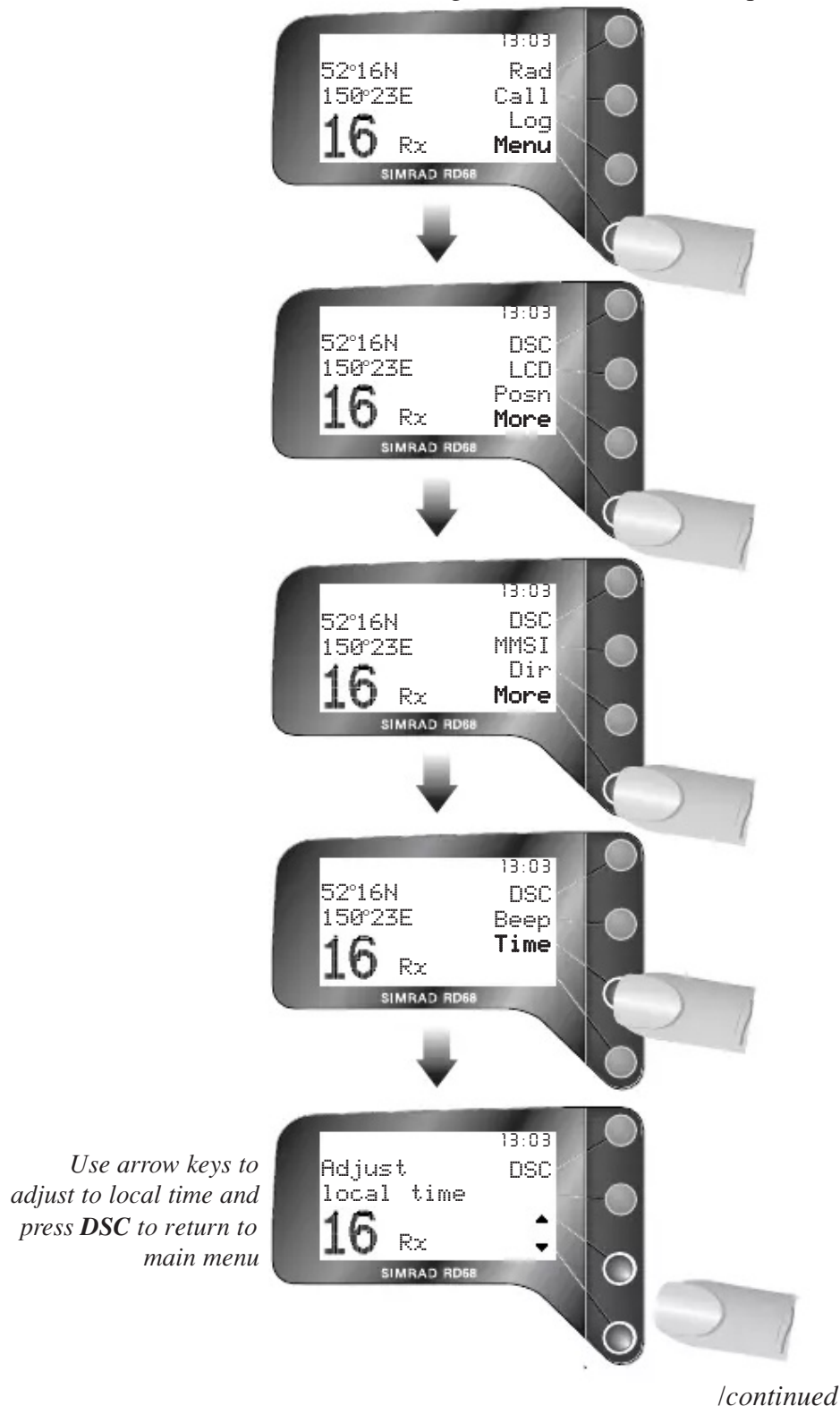
**Note** *The display will now show the manual Lat and Long when in DSC mode, but the clock display will not be shown (this is only available if NMEA position and time data is being received).*

**Note** *This option will not be available if position and time data is being received via the NMEA input.*



### 3.3 Entering local time

When a GPS is connected to the RD68 via the NMEA interface, the display will show the UTC (GMT) time in the top right-hand corner. This can be changed to the local time if required:

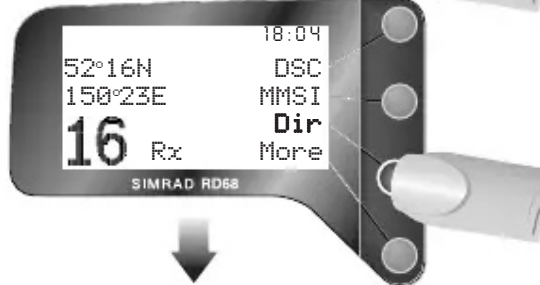
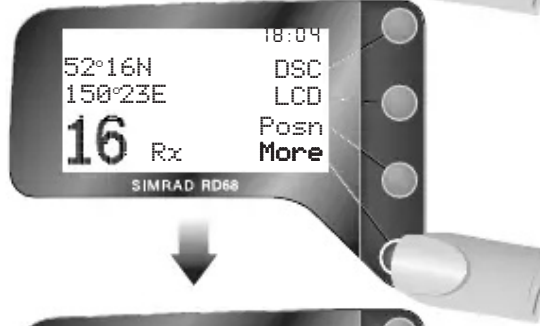
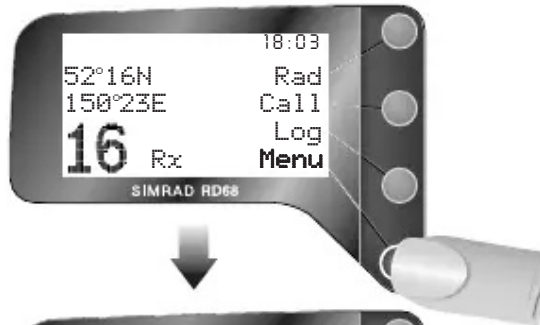


*The display will now show local time*

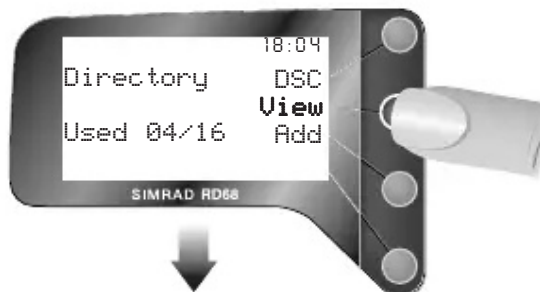


### 3.4 Viewing the directory

The directory allows up to 16 MMSI numbers to be stored in the RD68's memory. These can then be recalled when making an Individual Routine call:



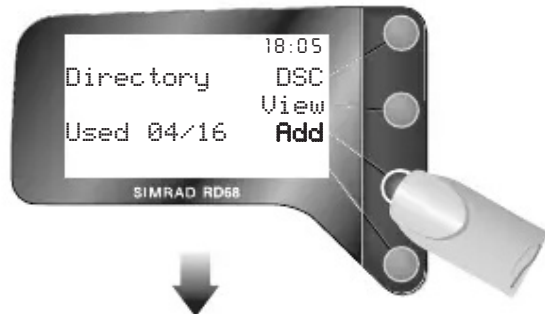
*The main directory screen shows the number of directory entries*



*/continued*



### 3.4.1 Adding an entry to the directory



Enter name using the keypad (10 chars max) -

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

Press **E** to confirm name -



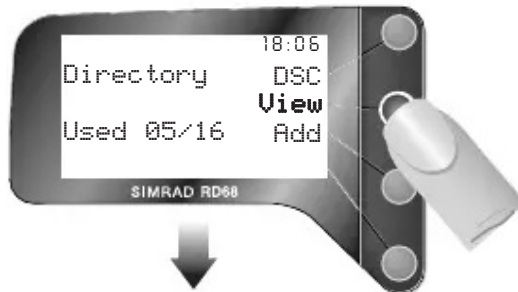
Enter MMSI number, then press **E** to save entry to directory



### 3.4.2 Editing/deleting an entry

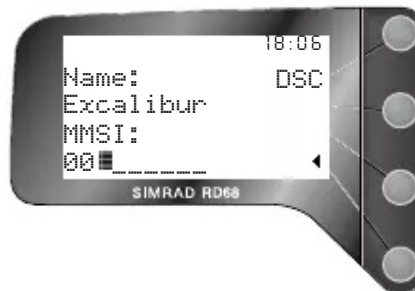
To edit an existing entry:

*The main directory screen shows the number of entries*



*Edit MMSI number*

*Re-enter the MMSI using the keypad. Press E to enter*



*Edit Name*

*Re-enter the name using the keypad. Press E to enter*



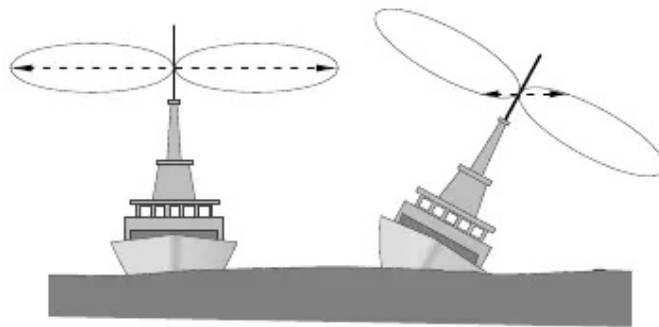
To delete an entry from the directory:





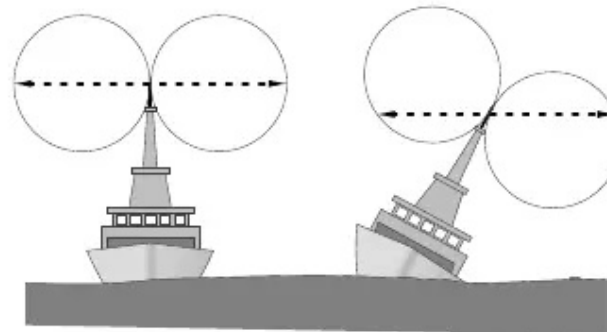
The most popular antennas for marine use are 1 m (3 ft 3 in) long. On sailboats these are usually mounted on the masthead, where the length of the antenna keeps it clear from the navigation lights and windvanes, etc. This type of antenna can also be mounted on the cockpit roof or garage of power boats.

Longer whip antennas are recommended for larger boats – these radiate the same total power as smaller antennas, but concentrate it into a narrower beam, which is advantageous on a tall mast at extreme range where concentrating the available power into a narrow horizontal beam becomes more important. However, if the antenna is not vertical when transmitting, the beam will be angled either too high or too low (Fig 4.6).



*Fig 4.6 - Effect of heel on range of longer whip antennas*

Here the wider beam of the shorter antenna will be more universally effective, although the signal will be weaker (Fig 4.7).



*Fig 4.7 - Effect of heel on range of 1 m marine antennas*

Therefore, for vessels with a large heel angle (small sailboats) a short masthead antenna would be a better choice. Your local agent should be able to provide specific advice on antenna choice for the vessel it is to be fitted to.

***WARNING The antenna coaxial cable and any connectors used must be rated at 50  $\Omega$ . Under no circumstances should standard domestic TV cable and connectors be used. Incorrectly rated cabling and connectors could result in power not reaching the antenna, but power could also be reflected back into the radio, damaging it in the process.***

## 5 APPENDIX

### 5.1 Operating procedures

The following operating procedure summary has been proposed by the UK Maritime and Coastguard Agency. It is not exhaustive and should not be regarded as a replacement for information provided by the proper two-day VHF/DSC training course required for all UK VHF license holders.

#### 5.1.1 Sending a Distress Alert

1. Send a Distress Alert call (see section 2.7).
2. Wait approx. 15 seconds for a DSC acknowledgment from the Coastguard or a ship station.
3. On receipt of a DSC acknowledgment, or after about 15 seconds, transmit the following distress call on channel 16:
  - “Mayday, Mayday, Mayday”
  - “This is (*name of vessel, repeat three times*)”
  - “Mayday (*MMSI number and name of vessel or callsign – Position – Nature of distress – No. of persons on board*)”
  - “I require immediate assistance”
  - “Over.”

If the vessel is not in grave and imminent danger, an All Ships Urgency call followed by a spoken “Pan Pan” or a routine call to the nearest Coastguard station may be more appropriate.

***WARNING It is a prosecutable offense to initiate a Distress Alert call for any other reason than that the vessel and/or crew is in grave and imminent danger.***

#### 5.1.2 Acknowledging and relaying a Distress Alert

When a DSC Distress Alert is received, an audible alarm will sound. Immediately cease any transmission that may interfere with distress traffic and continue a watch on channel 16.

If there is no DSC acknowledgment from a coast station or ship, after a short interval acknowledge by voice on channel 16:

- “Mayday (*MMSI of vessel in distress, repeat three times*)”
- “This is (*name of own vessel, repeat three times*)”
- “Received Mayday (*state the assistance you can give*)”
- “Over.”

A similar response should be given to a distress relay, using the words “Mayday Relay” instead of “Mayday”.

### 5.1.3 Cancelling a Distress Alert

If a DSC Distress Alert is sent accidentally, cancel it immediately on the RD68 by pressing the **C** button to prevent repeats, then make the following announcement on channel 16:

*“This is (name of vessel, callsign, MMSI)”*  
*“Cancel DSC Alert sent (date & time UTC)”*  
*“Over.”*

**DO NOT** simply cancel the DSC alert without verbally cancelling it as well, otherwise the rescue authorities will not be aware that this is a false alarm.

### 5.1.4 Alerting all vessels within range

If the vessel is outside of coast radio range and needs to issue a safety warning to all vessels within radio range, transmit an All Ships Safety call by DSC. After about 15 seconds transmit on channel 16 the safety call and message as follows:

*“Securité, Securité, Securité”*  
*“All stations (or called station – repeat three times)”*  
*“This is (MMSI and name or callsign of own vessel – repeat text of safety message) – Over.”*

### 5.1.5 Calling a coast radio station

Enter the MMSI of the station into the RD68, either manually, or from the directory. When the call is acknowledged, the working channel for voice communication will be indicated and the RD68 will automatically switch to that channel. Make a voice call as normal.

### 5.1.6 Making an intership call

Enter the vessel’s MMSI into the RD68, either manually, or from the directory. Before sending the call, enter the intership channel to be used for subsequent communication. When the alarm sounds on the called vessel, its operator should acknowledge by DSC, then respond by voice on the selected channel.

If the MMSI number of the vessel is not known, call as now on channel **16**. If no response is received, call on channel **13** (this is the GMDSS bridge-to-bridge communication channel).

## 5.2 NMEA sentences received

The following NMEA0183 sentences are processed by the RD68 in order to transmit the boat’s position when a Distress Alert is initiated:

NMEA version 2.0 – *GGA, GLL, RMC*.

## 5.3 Transmission range

Because VHF signals travel in a straight line and are not reflected back off the ionosphere as lower frequency signals are, the range of VHF signals is limited to 'line of sight', beyond which other vessels pass behind the curve of the Earth.

Therefore, the range will increase greatly the higher above sea level the antenna is positioned, as Fig 5.1 illustrates (assuming maximum transmission power is used):

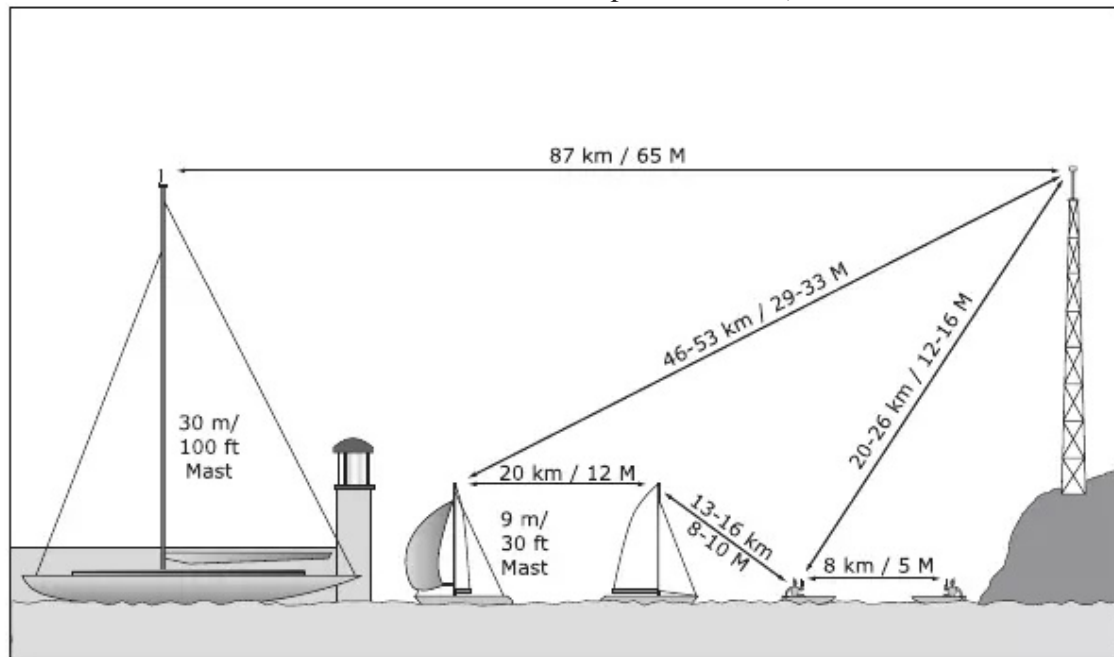


Fig 5.1 - VHF transmission range

The typical ship-to-ship range of a fixed VHF radio, such as the RD68, with a masthead antenna will be approximately 20 km (12 miles). This will increase as height above sea level increases, or if the other radio user's antenna is at a greater height – note, that the range between the yacht with the antenna mounted on a 9 m (30 ft) mast and the shore station increases to 46–53 km (29–33 miles).

## 5.4 Channel frequencies

Channel Designators	Tx	INT Rx	USA Rx
0	156.000	156.000	156.000
60	156.025	160.625	156.025
01	156.050	160.650	156.050
61	156.075	160.675	156.075
02	156.100	160.700	156.100
62	156.125	160.725	156.125
03	156.150	160.750	156.150
63	156.175	160.775	156.175
04	156.200	160.800	156.200
64	156.225	160.825	156.225
05	156.250	160.850	156.250
65	156.275	160.875	156.275
06	156.300	156.300	156.300
66	156.325	160.925	156.325
07	156.350	160.950	156.350
67	156.375	156.375	156.375
08	156.400	156.400	156.400
68	156.425	156.425	156.425
09	156.450	156.450	156.450
69	156.475	156.475	156.475
10	156.500	156.500	156.500
70	156.525	156.525	156.525
11	156.550	156.550	156.550
71	156.575	156.575	156.575
12	156.600	156.600	156.600
72	156.625	156.625	156.625
13	156.650	156.650	156.650
73	156.675	156.675	156.675
14	156.700	156.700	156.700
74	156.725	156.725	156.725
15	156.750	156.750	156.750
75	156.775	156.775	156.775
16	156.800	156.800	156.800
76	156.825	156.825	156.825
17	156.850	156.850	156.850
77	156.875	156.875	156.875

Channel Designators	Tx	INT Rx	USA Rx
18	156.900	161.500	156.900
78	156.925	161.525	156.925
19	156.950	161.550	156.950
79	156.975	161.575	156.975
20	157.000	161.600	161.600
80	157.025	161.625	157.025
21	157.050	161.650	157.050
81	157.075	161.675	157.075
22	157.100	161.700	157.100
82	157.125	161.725	157.125
23	157.150	161.750	157.150
83	157.175	161.775	157.175
24	157.200	161.800	161.800
84	157.225	161.825	161.825
25	157.250	161.850	161.850
85	157.275	161.875	161.875
26	157.300	161.900	161.900
86	157.325	161.925	161.925
27	157.350	161.950	161.950
87	157.375	157.375	157.375
28	157.400	162.000	162.000
88	157.425	157.425	157.425
29	–	–	157.450
89	–	–	157.475
WX01	–	–	162.550
WX02	–	–	162.400
WX03	–	–	162.475
WX04	–	–	162.425
WX05	–	–	162.450
WX06	–	–	162.500
WX07	–	–	162.525
WX08	–	–	161.650
WX09	–	–	161.775
WX10	–	–	163.275

Note: Duplex channels are marked in grey.

Designation	Tx	Rx	Country
M	157.850	157.850	UK
M2	161.425	161.425	UK
31	157.550	161.150	Holland / Belgium
96	162.425	162.425	Belgium
L1/1L	155.500	155.500	Scandinavia
L2/2L	155.525	155.525	Scandinavia
L3/3L	155.650	155.650	Scandinavia (not Denmark)
F1/1F	155.625	155.625	Scandinavia
F2/2F	155.775	155.775	Scandinavia
F3/3F	155.825	155.825	Scandinavia

The supplementary table (see left) lists further channels, which may be fitted to your radio. These are only licensed for use in the countries indicated. No attempt should be made to use them in any other country.

Note *Ch 0* will only be made available in the UK to Coastguard users with written authorization.

Channel 70 is the designated Digital Selective Calling (DSC) channel and may not be used for voice transmissions.