Manual

Navico RT1200 / RT1400 VHF Radio

SIMRAD

A KONGSBERG Company

For service and advice please contact the main Simrad dealer in your country of residence.

MDL 2/12/98

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CONTENTS

1 General

1.1 Introduction

The RT1200 and RT1400 fixed VHF radio is designed by Simrad and manufactured at our modern factory facility in the UK. The radio is designed to meet or exceed stringent International Regulations including ETS300-162.

The RT1200 and RT1400 are robustly constructed using a pressure die cast aluminium case for effective heat dissipation, ensuring maximum transmission performance even after many hours constant use.

Please note that VHF regulations vary from country to country. Simrad sets are approved specifically by the countries in which they are sold and consequently there may be differences in the programming of sets bought in different countries. If using outside the country of purchase, it is vital to check that the set conforms to local regulations before 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 RT1200/1400. Please contact your nearest Simrad Agent for a catalogue showing our increasing range of high tech navigational instruments, GPS, autopilots, Radar, Fishfinders and VHF radio sets.

Simrad operate a policy of continual development and reserve the right to alter and improve the specification of their products without notice.
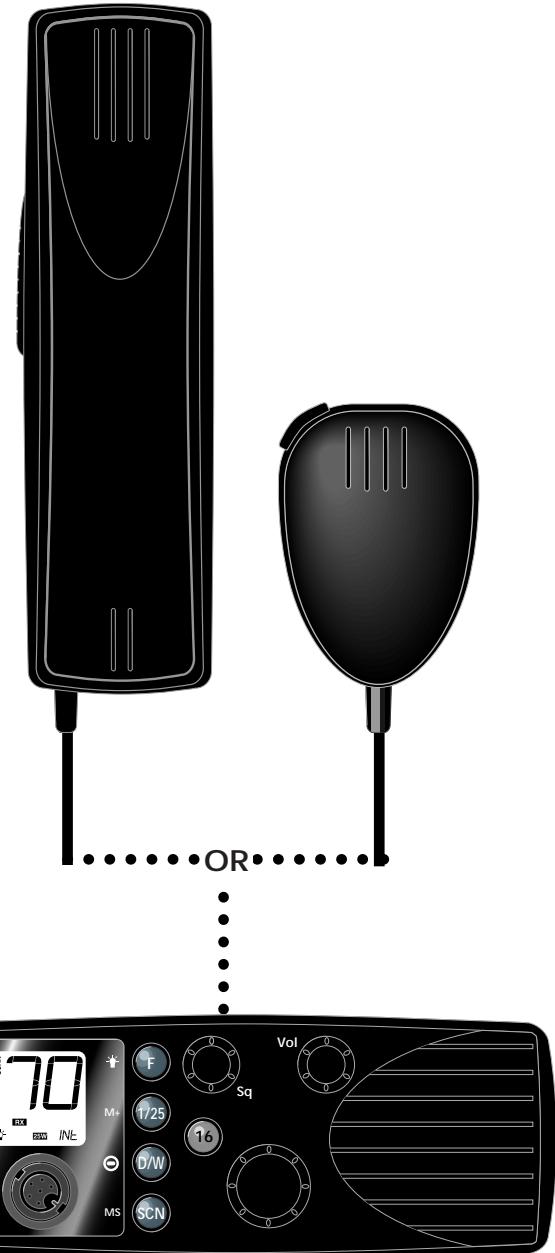
RT1200 & RT1400 Waterproof Fixed VHF

1.2 RT1200 and RT1400

The Simrad fixed VHF range consists of two models - the RT1200 and RT1400. Both are available with either a fistmike or telephone handset, and offer the same features including channel scan, channel memory, dual watch etc. The details in this owner's manual apply to both models.

The RT1400 model features an additional watchkeeping receiver, allowing it to use the Digital Selective Calling (DSC) system for routine and distress calling on VHF channel 70. For this the RT1400 will need to be linked to the Simrad DSC control unit **DSC1400** (DSC Class D). **DSC compatibility is not available with the RT1200 model**.

This manual describes all operating features available to the RT1200 and RT1400 models, including channel scan, which is not permitted in certain countries. Therefore this feature may not be available on the set supplied if it was purchased or configured for one of these countries.

1.3 Technical Specification

Power Supply	12v DC (10.8v - 15.5v DC)
Channel Capability	55 international channels 1-28, 60-88 simplex & semi-duplex
	UK : includes M (previously 37) and M2
	USA : includes 0, 29, 89, 75, 76, Wx1-10 receive only.
	Scandinavia : leisure or fishing channels as appropriate.
	Canada : Canadian and USA channels.
Private Channels	Up to 16 private channels*
External Speaker Impedance	8Ω

Transmit -

Frequency Range	155-163Mhz
Power Output	1 watt or 25 watts
Current Consumption	5.5A (25 watts)
	1.3A (1 watt)
Harmonic and Spurious Emissions	< 0.25μW
Hum / Noise	< -40dB
Modulation	±5kHz

Receive

Audio Output Power	6 watts
Current Consumption	300mA (Full Volume, illumination on)
	180mA (Fully Squelched, illumination off)
Sensitivity	< 0.5μV emf for 20 dB SINAD
Harmonic and Spurious Emissions	< -2nW
Hum / Noise	< -40dB
Adjacent Channel Selectivity	70dB
Intermodulation Rejection	70dB

   * Contact local Simrad Technical Dealer for further details of channel programming etc.

Environmental

VHF Radio	Waterproof to IP66 (IP67 when flush mounted)
Fistmike / Telephone Handset	Waterproof to IP67

1.4 Dimensions

70mm (2.8in)

54mm (2.2in)

213mm (8.4in)

47mm (1.8in) 55mm (2.2in)

79mm (3.1in)

158mm (6.2in)

66mm (2.6in)

22mm (0.9in)

185mm (7.4in)

F

M+

D/W

MS

1/25

16

SCN

Vol

Sq
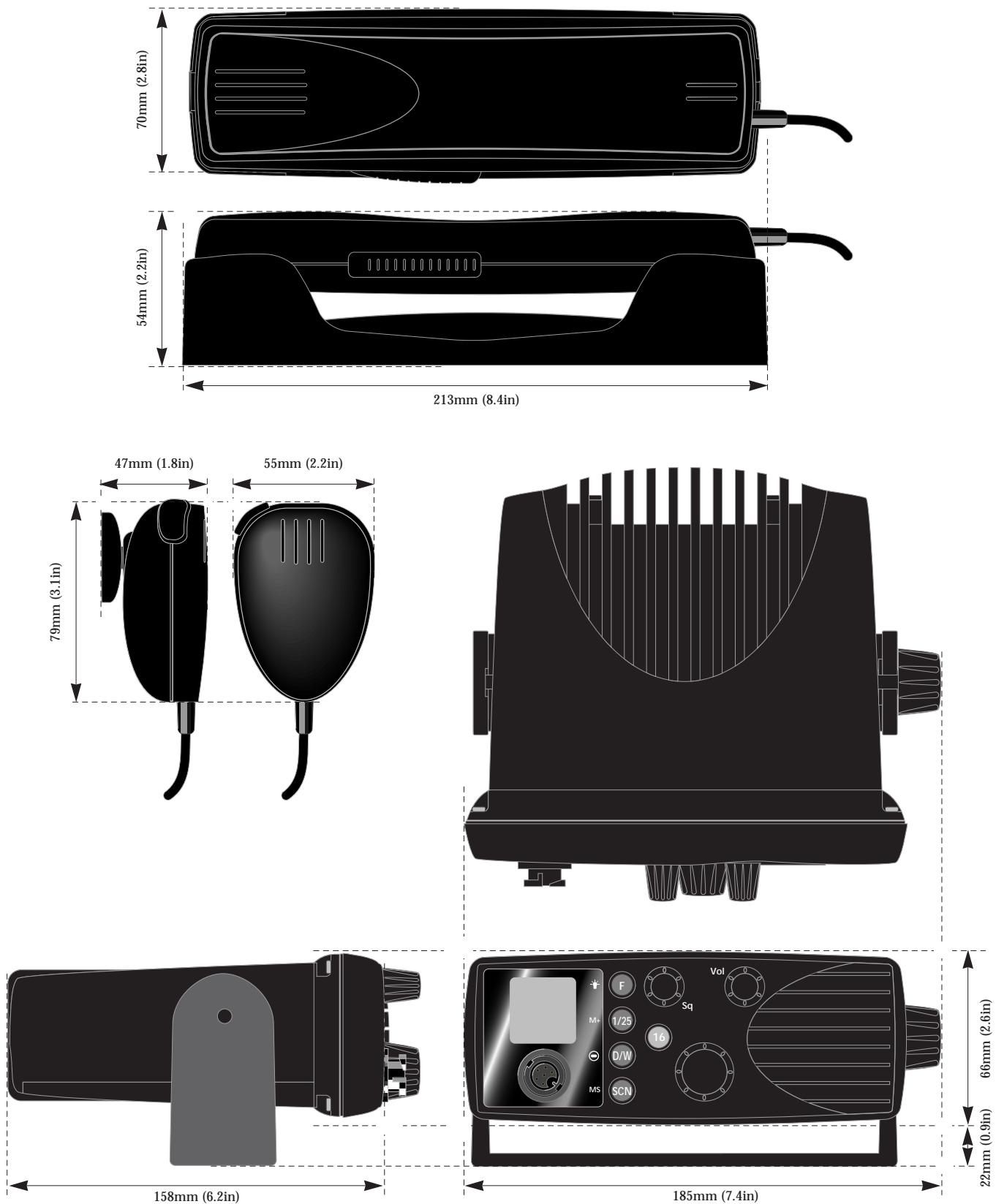
1.5 Licensing

Prior to use check the national licensing requirements for the operator.

In the UK license applications and queries should be made to the following authority -

Wray Castle
Ship Radio Licensing
PO Box 5
Ambleside
LA22 0BF
Tel - 01539 434662

A set may only be operated by, or under the supervision of a holder of a **Certificate of Competence** and **Authority to Operate**. This involves a simple examination and an annual license renewal fee. The VHF only certificate is administered by the Royal Yachting Association -

Royal Yachting Association
RYA House
Romsey Road
Eastleigh
Hants, SO5 4YA
Tel - 01703 629962

Holders of the Restricted Certificate of Competence in Radio-telephony (which covers MF/HF SSB etc), do not need a separate VHF certificate.

In the **USA** license applications should be made to -

Federal Communications Commission
Gettysburg
PA17325
Washington DC 20554

In **Canada**, license applications should be made to -

Department of Communications
300 Slater Street
Ottawa
Ontario, K1A 0C8

In all other countries, please contact your regional authority for information.

2 Operation

2.1 Location of Controls

The RT1200 and 1400 VHFs are very simple to operate, using only five buttons and three rotary knobs to access a variety of functions. The functions available will depend on whether the radio is a scanning or non-scanning version (scanning functions are not permitted in certain countries).

Control	Legend	Primary function	Secondary function
1	F☼	Used to access secondary functions*	Switch backlighting on/off
2	1/25	Select transmit power (1w / 25w)	Enter selected channel into memory*
3	D/W	Dual Watch	Inhibit channel from scan*
4	SCN/P	Scan all channels* / Select working channel†	Scan channels in memory sequentially*
5	16	Select channel 16	
6	Sq	Squelch adjust	
7	Vol	On–off / Volume adjust	
8	Ch	Channel select knob	

* Scanning versions only   † Non-scanning versions only
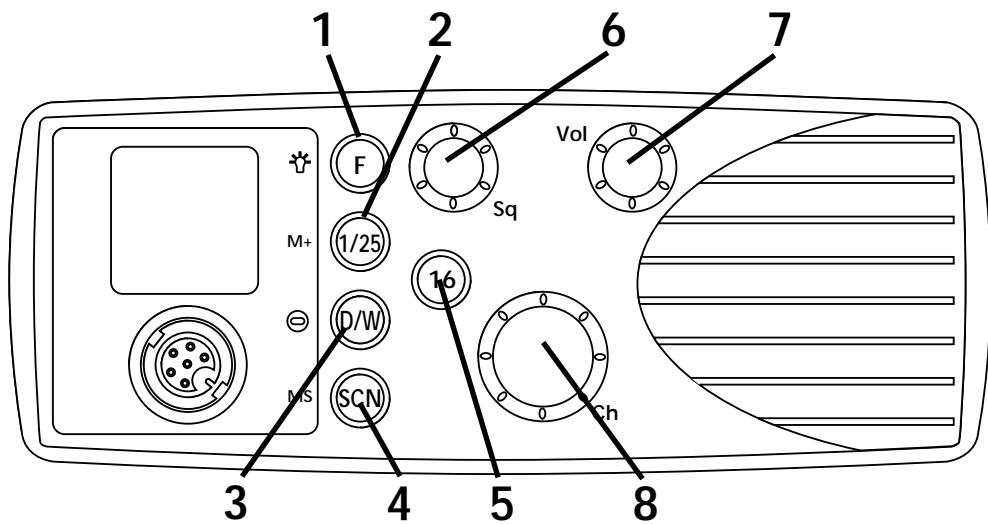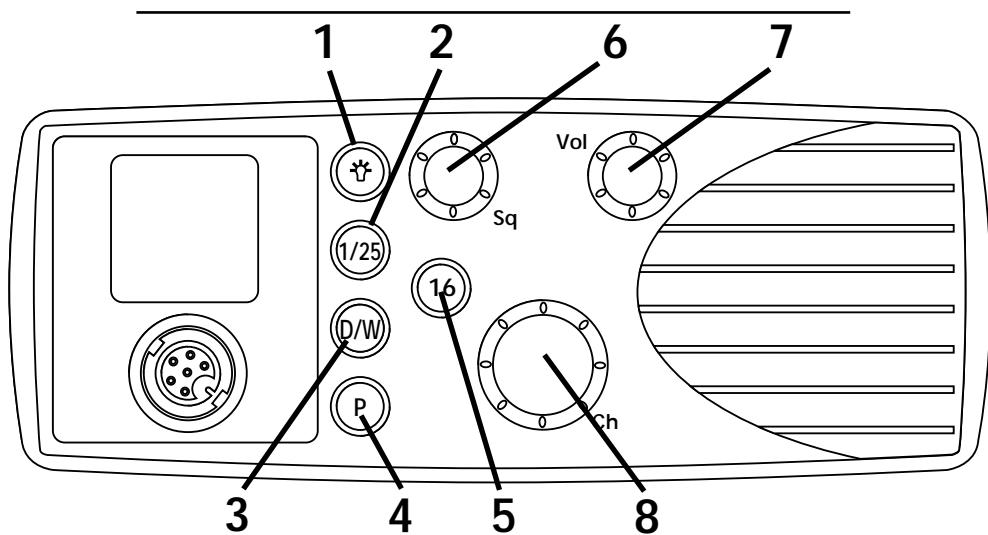
Fig 2.1 - Control functions

2.2 Operation - Scanning Versions

The radio is switched on by turning the volume knob clockwise. The VHF starts up automatically on channel 16* at maximum power (25w).

2.2.1 Function (F) / Backlight (☼)

NOTE - Secondary functions are only available on scanning versions of the VHF.

Several of the keys have secondary functions in addition to the main function. These are accessed by pressing **F**, then the appropriate key within two seconds (do not hold the **F** key down). When **F** is pressed, the F legend will appear on the LCD for the two seconds it is active. Pressing another key within this time will access its second function.

Backlighting - The LCD backlighting is switched on and off as a secondary function of the **F** key. To turn the backlighting on/off press **F** twice (Fig 2.2). If the **F** key is kept held down the second time when switching the backlighting on, the lighting will step through five brightness levels. Release the key when the desired lighting level is reached.

2.2.2 Power (1/25) / Channel Memory (M+)

Although the radio has a maximum transmit power of 25 watts*, this is not always necessary if communicating with a station or vessel that is very close. To reduce power consumption, the transmit power can be reduced to 1 watt. This key operates as a toggle, switching between 1w and 25w (Fig 2.3).

NOTE - Some channels are restricted to 1w transmit power. The radio is programmed to switch to low power automatically when one of these channels is selected

Channel Memory function - This will add the currently selected channel into the Scan Memory. Press **F** then **1/25** - the LCD display will show ENT indicating that the channel has been entered into the Scan Memory. Pressing **F** then **1/25** if the channel is already in the memory will remove it - indicated by DEL appearing on the bottom line of the LCD display.

* Programmable - please enquire with authorised Simrad Technical Dealer

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PRESSED ⬇ **TWICE**
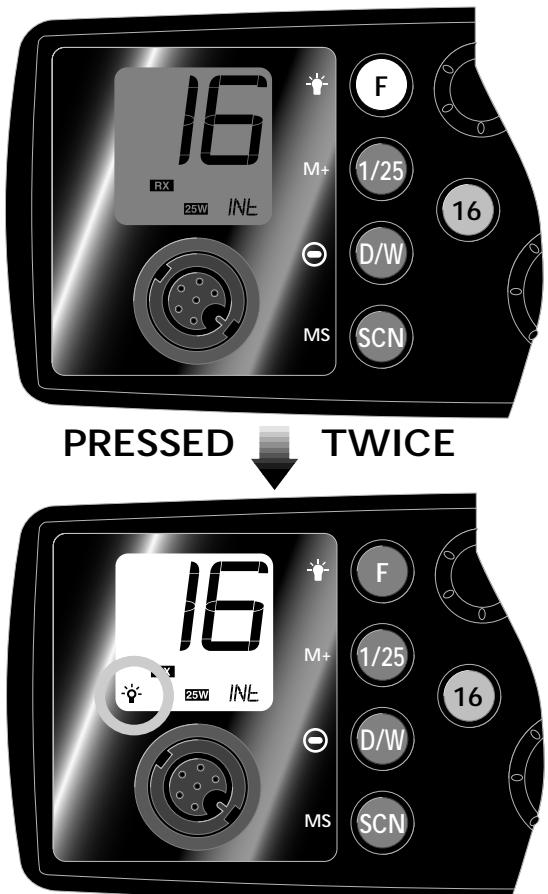
Fig 2.2 - Switching backlighting on
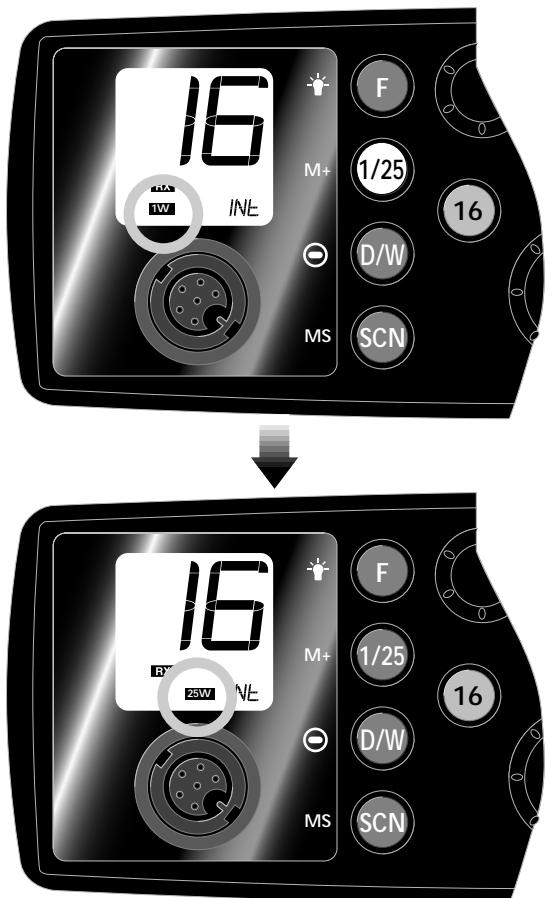
Fig 2.3 - Selecting transmission power (1/25W)

2.2.3 Dual Watch (D/W) / Channel Inhibit (⊝) + Revert function

Dual Watch enables the radio to scan between the selected channel and the priority channel (normally CH16). To activate Dual Watch Mode, select the channel and press **D/W** - the D/W legend will be displayed on the LCD.

Note that the radio will not transmit, nor will alternative channels be able to be selected while in Dual Watch mode. To restore normal operation, either press **SCN**, **16** or rotate the channel select knob anticlockwise.

Inhibit Function - Since the Scan function stops on channels where a signal is detected, the radio will lock onto a channel with a lot of interference noise, or if it is transmitting a continuous carrier wave signal, preventing the radio from continuing the scan. The Inhibit function allows channels to be removed from the Scan while remaining available for use on the radio. Pressing **F** then **D/W** will inhibit the current channel - indicated by INH appearing on the bottom line of the display (Fig 2.4). Pressing **F** then **D/W** if the channel is already in inhibited will restore it to the Scan - indicated by SCN appearing on the bottom line of the display.

REVERT Function - If **D/W** is pressed when CH16 is selected, the VHF will revert to the previously selected channel.

2.2.4 Scan (SCN) / Memory Scan (MS)

This function scans through each channel sequentially until a signal is detected above the squelch level set. Once the signal ends or drops below the squelch level, the radio will continue scanning. Press **SCN** to enter scan mode. The LCD will show SCAN (Fig 2.5).

Note that the radio will not transmit, nor will alternative channels be able to be selected while in Scan mode. To restore normal operation, either press **SCN**, **16** or rotate the channel select knob anticlockwise. Rotating the channel selector clockwise while in Scan Mode will step the scan on to the next channel.

The **Memory Scan function** (**F** then **SCN**) operates in the same way as the Scan function, except that it will only scan channels that have been entered into the Scan Memory. If no channels have been entered into the memory then this function will not be available.
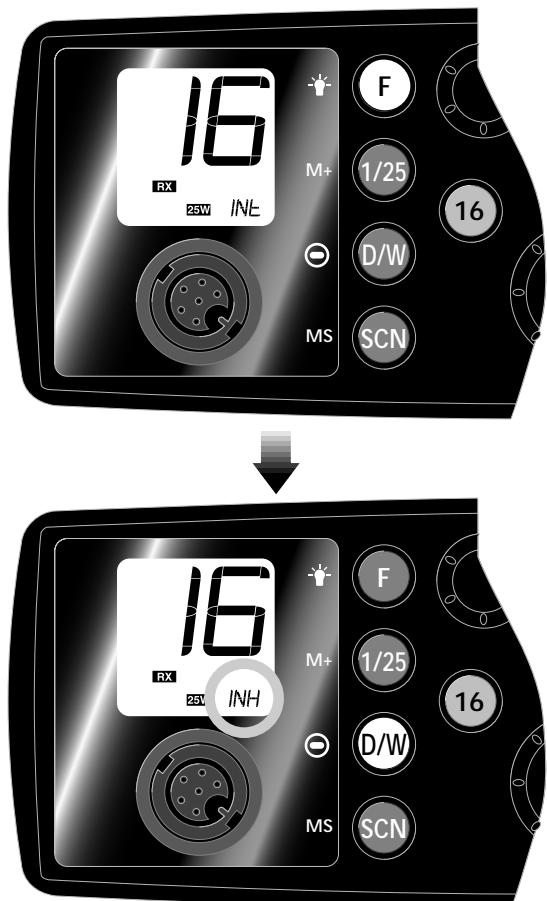
Fig 2.4 - Inhibiting channel from Scan

Fig 2.5 - Entering Scan mode

2.2.5 Channel 16 (16)

Will automatically select Channel 16 on High Power when pressed. Any function active (Dual Watch, Scanning etc) will be cancelled.

2.2.6 Squelch (Sq)

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

2.2.7 Volume, On/Off (Vol)

The radio is switched on by turning the volume knob clockwise. To increase the volume, turn the knob further clockwise. To reduce the volume, turn the knob anticlockwise. Turn the knob fully anticlockwise to switch off.

2.2.8 Channel Select (Ch)

The VHF features a rotary channel selector. Rotate the knob clockwise to scroll up through the available channels, anticlockwise to scroll down (Fig 2.6).

2.3 Operation - Non-scanning Versions

In countries where scanning radios are not permitted, the secondary functions listed are not available (Fig 2.7). The primary functions are the same with the following exceptions -

2.3.1 Backlight (☀)

On non-scanning versions of the radio the **F** key is replaced with a backlighting key ☀. Turning the backlighting on and off requires only a single press of the ☀ key. Press and hold the key when switching the backlight on to step through the five lighting levels and release when the desired lighting level is reached.

2.3.2 Working Channel (P)

This function allows a user selectable working channel to be programmed. Select the channel, then press and hold **P**. Initially the display will show the previously selected channel, but after 2 seconds the display will show the new channel and USE will appear on the bottom line of the display. This channel can now be directly accessed by pressing **P**.
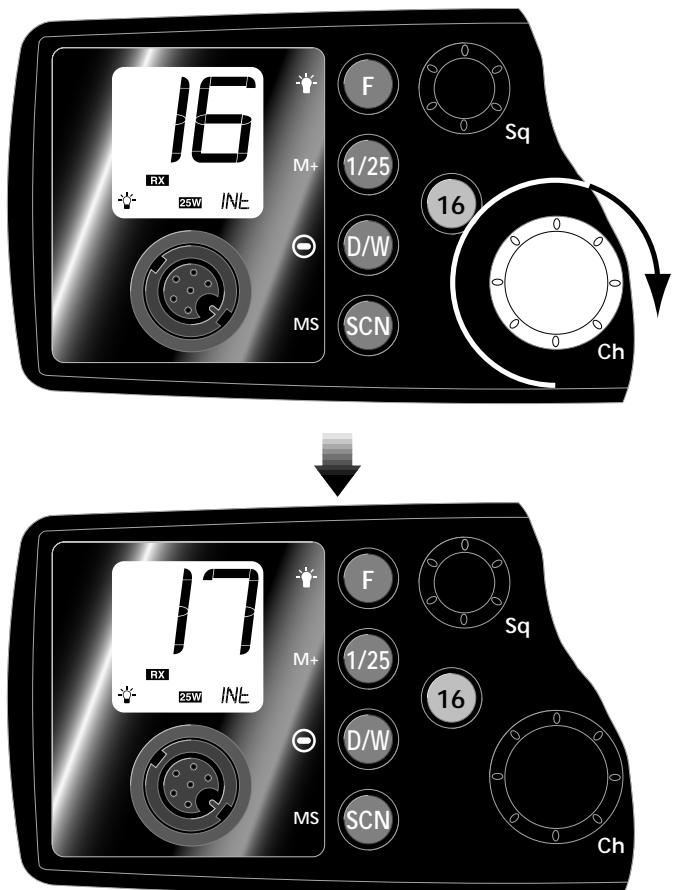
Fig 2.6 - Changing channels

Fig 2.7 - Controls – non-scanning versions

2.4 Memory Mode

This function is only available on scanning versions of the VHF. It allows the radio to operate using only the channels programmed into the channel memory (see section 2.2.2).

Press **F** then **SCN**, keeping **SCN** held down for 2 seconds. Rotating the channel select knob will then only select the channels programmed into the memory. To disable this mode and return to normal operation, either switch the radio off and on again, or press **16**.

This mode will only be available if there are channels programmed into the memory.

2.5 Second Channel Mode

In countries where it is permitted, holding **F/☀** down while turning the radio on will enable the radio to operate on a secondary set of channels - normally the USA channels (Fig 2.8). Where the LCD will normally show INT on the bottom line (indicating that it is using the standard International channel set), the display will show USA for USA channels, CAN for Canadian channels etc. Channel sets available will vary depending on which country the radio is programmed for use in. Please enquire with your national licensing authority for details of permitted channel sets.

The radio will revert to normal operation if it is switched off then on again.

2.6 Speaker Mute

On models fitted with a telephone handset, lifting the handset from the cradle will normally mute the loudspeaker automatically.

If required, this function can be disabled by holding down **D/W** while turning the radio on. The loudspeaker will subsequently remain on when the handset is lifted.

As this setting is stored in the radio's non-volatile memory it will be remembered even if the radio is totally disconnected from the power. To restore speaker muting, hold down **D/W** again while turning the power on.


POWER ➡ ON
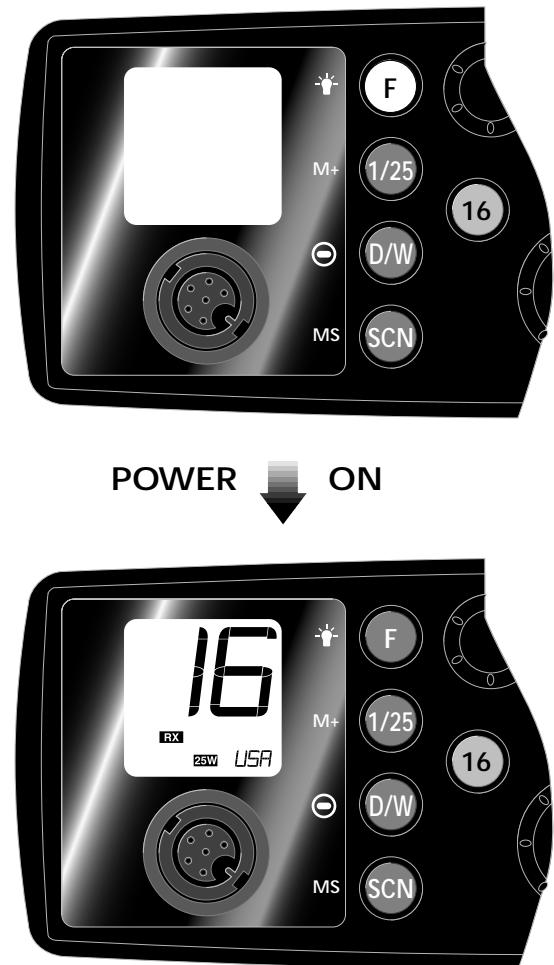
Fig 2.8 - Selecting secondary channel set

3 Installation

3.1 VHF Installation

The radio should be sited so that engine noise and vibration or other background noise do not make it difficult for the operator to hear.

Although the RT1200/RT1400 radio is water-proof when flush mounted, it is recommended that it is not installed where it will be exposed to continuous direct sunlight, as this will eventually damage the LCD display.

As microphones and loudspeakers contain powerful magnets, the radio should not be installed within 1m (3ft 3in) of any compasses, whether magnetic or electronic.

The fins on the back of the case act as a heatsink to dissipate heat generated by the set when in use, which maintains the high efficiency of the radio. The free circulation of air is essential - if mounting the radio in an enclosed space, ensure that the space is vented.

The VHF is supplied with a reversible mounting bracket. This can be used to mount the VHF on the chart table or on an overhead bulkhead (Fig 3.1). The bracket is fixed in place using four No.10x¾ screws (supplied). Before installing, ensure that there is at least 88mm (3.5 in) vertical clearance and 70mm (2.8in) horizontal clearance behind the bracket to allow the radio to fit (Fig 3.2).

The radio is fixed to the bracket using a simple clamp arrangement. The peg on the left side of the radio is slotted into the hole in the bracket. The clamp on the right side of the radio can then be slid into the slotted aperture on the bracket and tightened to hold the radio firmly in place (Fig 3.3). The rake angle of the radio can be adjusted by slackening the clamp.

An alternative mounting method is to use the flush mounting kit FMB1000BK (supplied separately). This allows the radio to be neatly installed inside a bulkhead, so that only the fascia of the radio is visible. For more details of this and other accessories available, please refer to section 4.1.

Desktop mounting   Overhead mounting
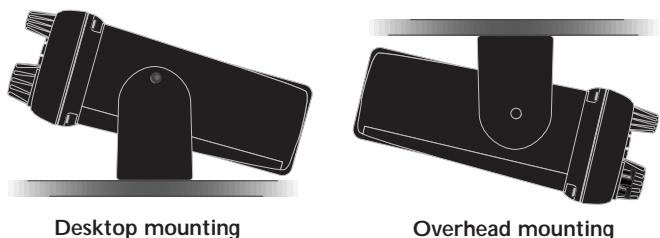
Fig 3.1 - Standard mounting options

88mm (3.5in)

100mm (3.9in)
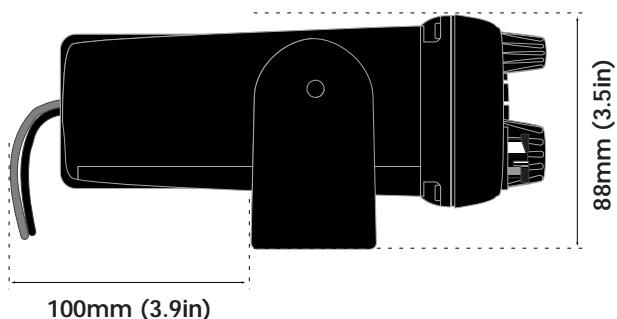
Fig 3.2 - Minimum clearance required
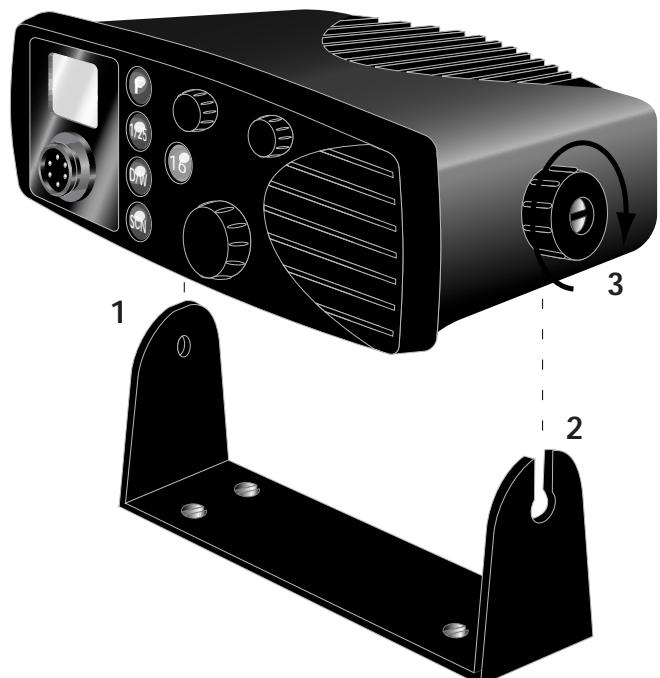
1. *Fit locating peg (left side) into hole in bracket*
2. *Slide locking clamp (right) into slot in bracket*
3. *Tighten clamp*

Fig 3.3 - Fixing VHF to bracket

3.2 Electrical Installation

The RT1200/1400 has four electrical connections - the handset/fistmike socket is on the front panel below the LCD display (Fig 3.4A). The other three are situated on the back of the case - the antenna socket is on the left (Fig 3.4B). DC power is supplied to the set via a two core flying lead (Fig 3.4C), below which is a 3.5mm jack socket for an optional extension speaker (Fig 3.4D). This socket is covered by a weather plug when not in use.

The VHF requires a 12v DC supply to operate, and is supplied with a power lead which incorporates an in-line 7.5 amp fuse. This lead should be connected to the vessel's power supply, keeping the cable runs as short as possible. Although the radio draws very little current when receiving, a heavier current is drawn when transmitting which may result in a voltage drop if very long cable runs are used of inadequate core diameter. If the supplied power lead is not long enough, an extension of up to 3m (10 ft) can be made using at least 2.5mm^2 (13AWG) wire.

The red wire is positive and black is negative. If polarity is accidentally reversed, the set is protected but the fuse will blow. Ensure that it is replaced with a fuse of the correct 7.5 amp rating. The radio is designed to be easily removable for storage or security, so leave an adequate length of cable to ease disconnection. The flying lead from the rear of the radio can then be plugged into the power supply lead. Note that the configuration of the plug prevents incorrect connection.

The antenna is connected to the radio using a standard PL259 type connector as fitted to most marine antennae. If fitting to an existing antenna, check that the contacts are not corroded before connecting, as this will affect the quality of the signal. Ensure that the retaining collar of the antenna plug is securely tightened to prevent accidental disconnection.

The extension speaker socket takes a standard 3.5mm jack plug. The speaker used must have a minimum impedance of 8Ω.
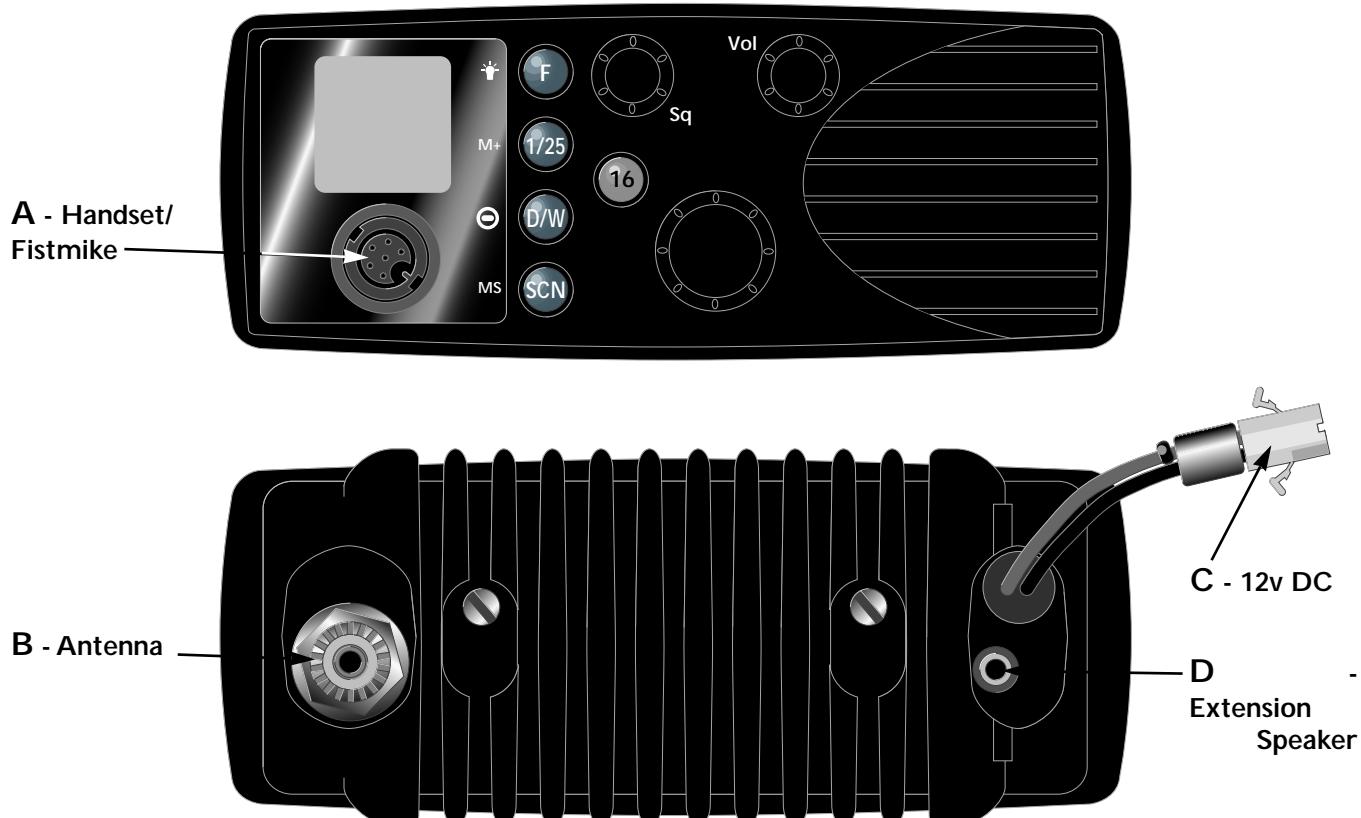
Fig 3.4 - External connections

3.3 Antenna Installation Recommendations

The most important factor in the performance of the radio will be the quality and positioning of the antenna. Most recorded problems with VHF radios are related to poor antenna siting, faulty cabling, poor quality cable joints and low voltage supply. Even a VHF as highly advanced as the RT1200/RT1400 cannot compensate for these factors. Therefore, if replacing an existing VHF installation, it is important that these factors are checked when installing the radio.

As the range of VHF signals are governed by line of sight (see section 4.2), the antenna should be placed as high as possible, while remaining clear of any metallic objects that could influence the resonance of the antenna.

The most popular antennae for marine use are 1m (3ft 3in) long. On sail boats 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 antennae are recommended for larger boats. These radiate the same total power as smaller antennae, 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 3.6). Here the wider beam of the shorter antenna will be more universally effective, although the signal will be weaker (Fig 3.5). Therefore vessels with a large heel angle (small sailboats) would be better choosing a short masthead antenna. Your local agent should be able to provide specific advice on antenna choice for the vessel it is to be fitted to.

The antenna coaxial cable and any connectors used must be rated at 50Ω. 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 also power could be reflected back into the radio, damaging it in the process.
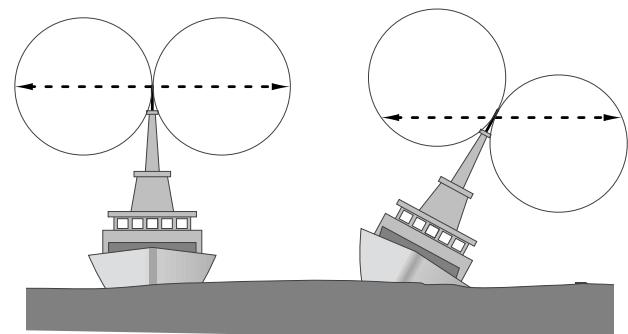

Fig 3.5 - Effect of heel on range of 1m marine antenna
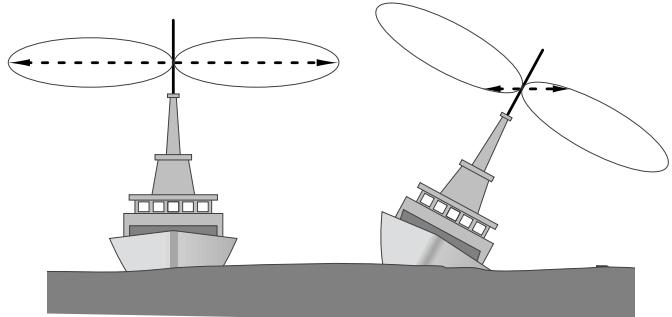
Fig 3.6 - Effect of heel on range of longer whip antenna

The quality of any connections and integrity of the cable (i.e no breaks in the sheathing) will directly affect the performance of the radio. Poor soldering or corrosion of the terminals can impair performance. It is recommended that screw or crimp terminal type connectors are not used for any through deck fittings - a good quality waterproof solder terminal connector will be less susceptible to poor connection due to corrosion of the contacts.

3.4 Electrical Interference Suppression

Interference generated by the alternator of the engine may occasionally cause problems. The radio has been designed to minimise the effects of outside interference. However, precautions should still be taken - route the power supply and antenna cables away from the engine compartment. The cable run should not be down the same trunking as other cables carrying high current. The antenna cable should also be kept seperate from the radio's power cable.

Engines with spark ignition - and also some refrigerators - should be fitted with suppressors. Your local agent should be able to give advice on this, and also supply suppression kits where necessary.

4 Appendix

4.1 Optional Accessories

The following accessories are available from your nearest Simrad Technical Dealer. Please quote the correct part number when ordering.


DSC1400 DSC Controller (Class D) for use with RT1400
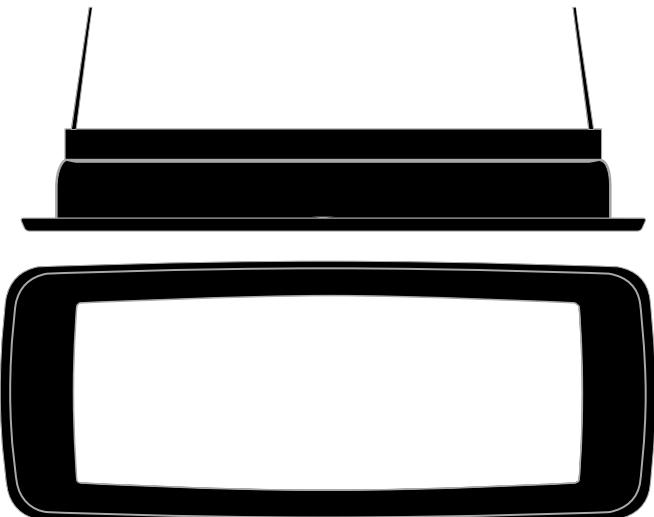
FMB1000BK Flush Mount Kit
Sutiable for RT1200, RT1400 and DSC1400
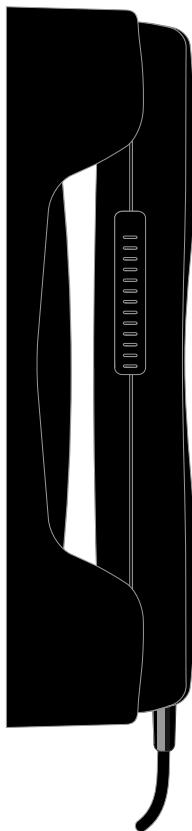
THS-4BK Spare telephone handset

FTM-4BK Spare fistmike

4.2 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 the other vessel passes behind the curve of the Earth. Therefore, the range will increase greatly the higher above sea level the antenna is, as Fig 5.1 illustrates (assuming maximum transmission power is used):
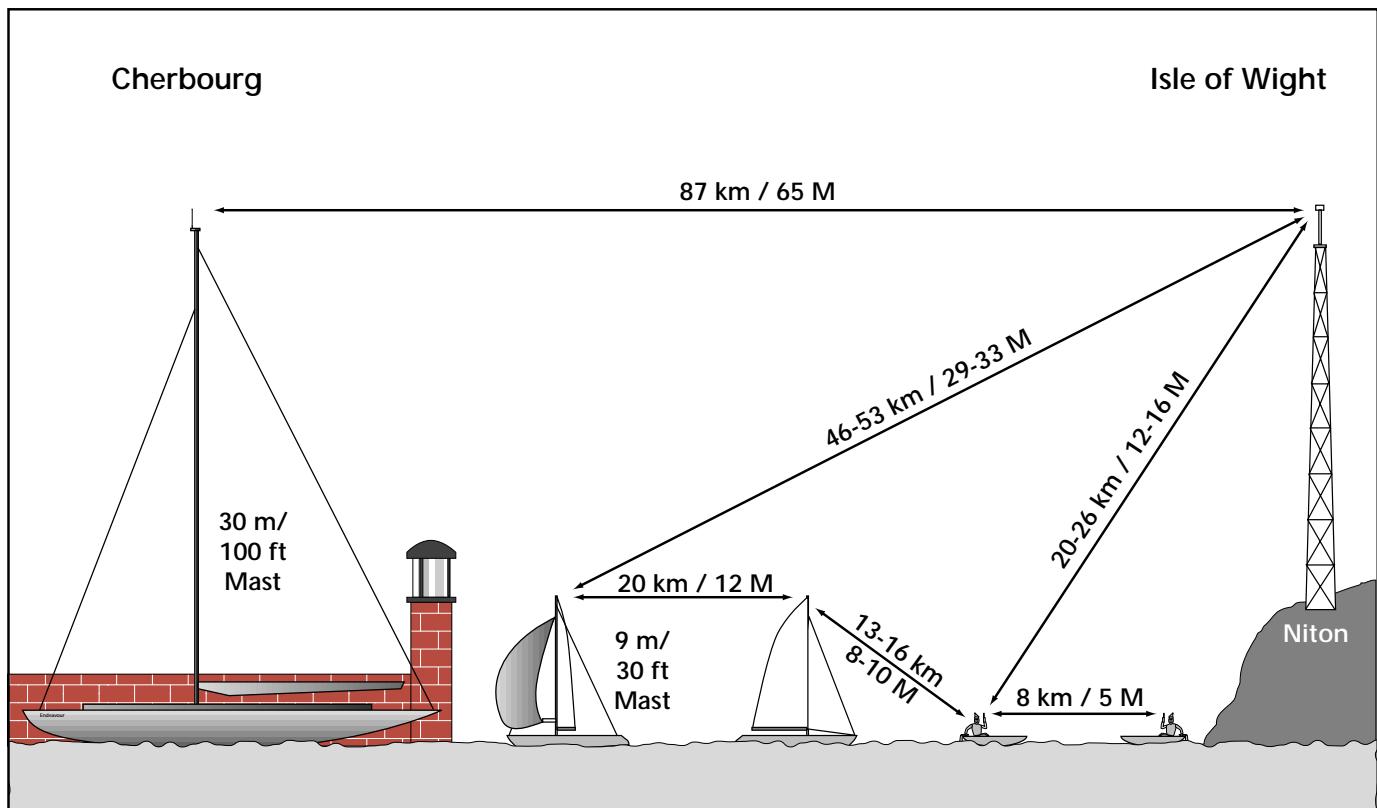
Fig 4.1 - VHF transmission range

Therefore, the typical ship to ship range of a fixed VHF radio such as the RT1200/RT1400 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).

4.3 Frequency of Channels

Channel Desig-nators		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
16		156.800	156.800	156.800
	76	-	156.825	156.825

		Tx	INT Rx	USA Rx
M		157.850	157.850	-
M2		161.425	161.425	-

Channel Desig-nators		Tx	INT Rx	USA Rx
17		156.850	156.850	156.850
	77	156.875	156.875	156.875
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	161.975	161.975
28		157.400	162.000	162.000
	88	157.425	162.025	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

Channel 0 will only be made available in the UK to Coastguard users with written authorisation.

Channels M and M2 are UK marina channels and will not be programmed on non-UK radios. Channel 70 is the designated Digital Selected Calling (DSC) channel and can only be used by an RT1400 + DSC1400.

4.4 Fault Finding

Symptom	Possible Cause	Remedy
Unit will not switch on	* Faulty connection to power * Fuse has blown	* Check power connection * Replace fuse and check power supply current
Scan or Memory Scan is locking on a channel without a signal	* Noise on the channel is holding the scan	* Increase squelch level * Inhibit channel from scan (see section 2.2.3)
Dual Watch not being entered	* Priority channel selected * Handset off cradle	* Select a working channel * Replace handset
Cannot change channel	* Dual Watch (D/W) engaged	* Exit Dual Watch
Certain channel numbers are not obtainable	* Some channels are restricted and not programmed depending on country of purchase	* Consult your national authority for permitted channels in your region
Will not transmit	* Scanning or D/W function active	* Exit D/W or Scan
Will not transmit on 25W but OK on 1W	* Low voltage when full transmitting current is drawn * Some channels are restricted to low power transmission only	* Check power supply * Consult your national authority
Transmissions persistently weak / display flashes 'ANT'	* Damaged antenna * Antenna cable broken * Poor contact	* Replace antenna * Replace cable * Check antenna sockets & through deck connector

These simple checks should be carried out before seeking technical assistance and may save time and expense. Before contacting your servicing agent please obtain the radio's serial number. The software iteration should also be quoted - this is shown in the large digits on the display for 2 seconds after the radio is turned on and should be written in the box below for future reference.

RADIO SERIAL No.	SOFTWARE ITERATION

4.5 Service & Warranty

Your radio should seldom need servicing, although it will benefit from an application of silicone or Teflon grease to the antenna and mic sockets each season. If it is necessary to have the unit repaired, the warranty card supplied with the unit should have been filled in and sent to Simrad when the unit was purchased. Please refer to the Warranty Card booklet for more details.

The unit is guaranteed for 12 months from date of retail sale. If it is necessary to have the unit repaired, return it carriage prepaid to the agent in the country of purchase with a copy of the receipted invoice showing the date of purchase. Where possible, return all the components unless you are certain that you have located the source of the fault. If the original box is not available, ensure that it is well cushioned in packing; the rigours of freight handling can be very different from the loads encountered in the marine environment for which the unit is designed.

For Worldwide Warranty details, please refer to the Warranty Card supplied with this unit.

A list of official worldwide Simrad dealers is included in the Warranty Card.