



Marine Engineering and Electronics

Planning a new VHF

This document is to give the reader an understanding of what options are out there if thinking about a new VHF

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Minimal Features

Extract from MSN 280 (M) regarding requirements

16. Radio Equipment

16.1 General Requirements

16.1.1 Radio equipment carried by a vessel shall be capable of fulfilling the following functional requirements with respect to distress and safety communications when the vessel is at sea:-

1 Provide for the safety of the vessel by:-

- i) transmitting ship-to-shore distress alerting;
- ii) transmitting ship-to-ship distress alerting;
- iii) transmitting and receiving on-scene communications, including appropriate search and rescue co-ordinating communications; and
- iv) transmitting locating signals.

2. Assist other vessels in distress by:-

- i) receiving shore-to-ship distress alerting; and
- ii) receiving ship-to-ship distress alerting.

3. Receive navigational and meteorological warnings and urgent safety information (Maritime Safety Information).

Notes: 16.1.1.3 (the last section) affects your stereo on board, it should be able to receive LW so you can listen to the shipping forecast on Radio 4 LW

DSC Digital Selective Calling.

This allows for a single press (hold for 5 seconds typically) of a button to send an emergency call for help to the coastguard, and any ship in the vicinity.

You will need to obtain a VHF licence, which is free and can be obtained from the office of communications, OFCOM at (<http://licensing.ofcom.org.uk/radiocommunication-licences/ships-radio/>) This will give you a 9 digit MMSI (the ships phone number) and a Callsign (unique name of the boat as there may be more than one with the same name as yours)

The VHF will need to be connected to a GPS source, i.e. your chartplotter or stand alone GPS receiver to get the full functionality of the DSC emergency calling option.

A secondary feature of DSC, you can call another boat if you have their MMSI (ships phone number). See AIS for details on how to get another ships MMSI number. It will be just like making a telephone call to another ship. No need to listen for a call, your radio will ring (Alert) if someone is calling you, or the person you are calling, there set will ring (Alert).

Note: Press and hold the Distress button, help knows where you are and are on there way.

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Extract from MAIB FLYER TO FISHING VESSELS AND SMALL CRAFT

Safety lessons

1. If you don't have a DSC enabled VHF on your vessel, it is highly recommended that you fit one as soon as possible and connect your GPS to it. When your DSC transmits a call it will, as a minimum, transmit the following information.
 - a. Your vessel's unique MMSI¹ number
 - b. Your vessel's location
 - c. The time of the message
2. DSC is monitored by all coastguard stations, and by all SOLAS vessels and fishing vessels fitted with DSC enabled VHF. Although HM Coastguard continues to monitor VHF channel 16, its primary focus, for distress monitoring purposes, is via the DSC alert system.
3. Pressing the DSC distress button for just 3 to 5 seconds (depending on model) will transmit a basic "Mayday" message.
4. When activated, the distress message is transmitted five times with a brief pause for acknowledgement. If not acknowledged, the process is repeated up to a maximum of five times.
5. Increasingly, vessels with DSC capability rely on it for communication as well as for monitoring distress calls; keeping a listening watch on channel 16 is becoming less common.

Extract from MSN 280 (M) regarding installation of DSC

16.1.2 The Global Maritime Distress and Safety System (GMDSS) was implemented on 1 February 1999. The implementation of the GMDSS has involved the adoption of Digital Selective Calling (DSC) for distress alerting in maritime radio frequency bands, e.g. VHF.

Whilst the UK Coastguard will continue coverage of VHF channel 16 for the foreseeable future, the Coastguard watch on channel 16 is now a dedicated headset watch or a loudspeaker watch. Ships are currently obliged to keep a listening watch on channel 16 only where practicable.

For vessels where a fixed VHF is required, it is strongly recommended that vessels are equipped with VHF DSC with its significant benefits in distress situations.

Other than vessels operating in Category 6, **all new vessels and all those replacing VHF radios, must have installed VHF DSC by February 2005**. Where GMDSS equipment is installed, it should be provided with automatic position updating information from the onboard navigational receiver, or procedures put in place to ensure positional information is manually updated at intervals not exceeding 4 hours.

Other Features

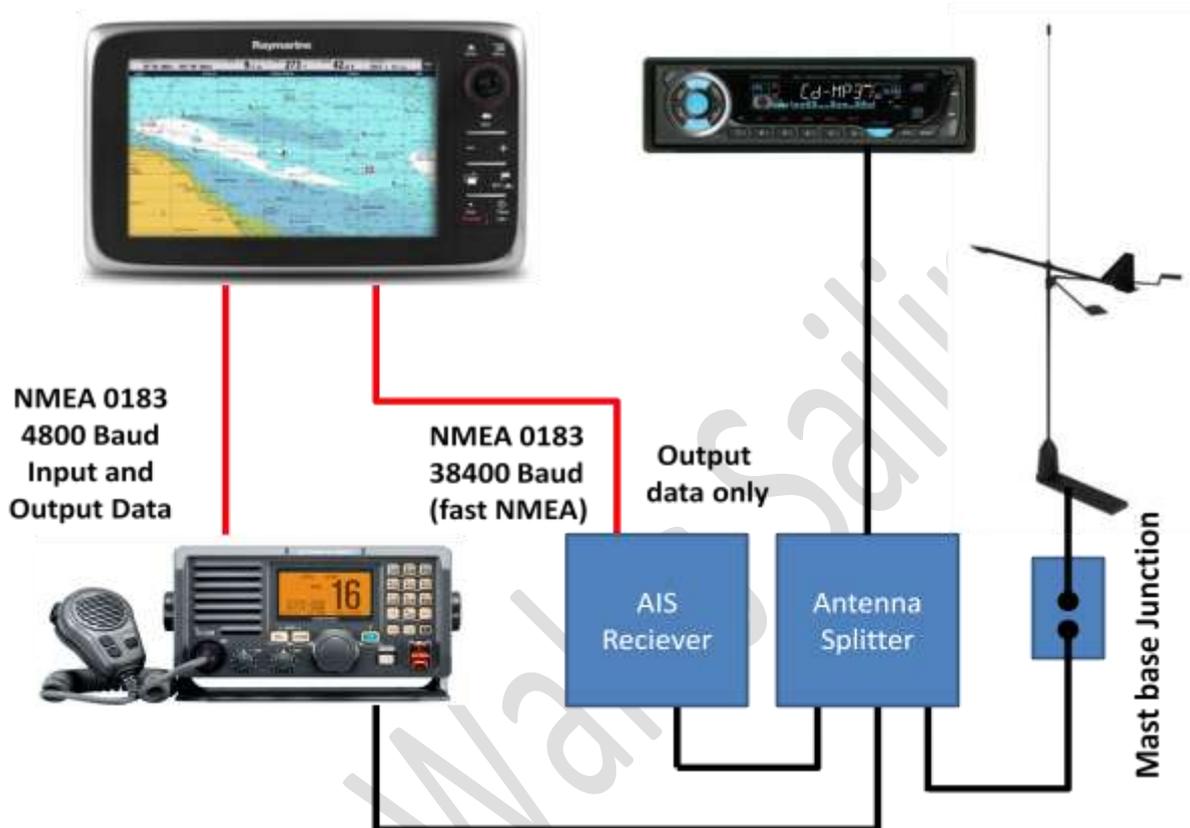
DSC log on your chartplotter

Most Chartplotters will not only send GPS data to the radio, but will also receive DSC data from the radio. The Chartplotter will present all the information from the DSC call on the screen, although this information can be seen on the radio, most radio displays are limiting in their size and easy of seeing the information. Some Chartplotter will automatically or with a user input plot the coordinates given

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in the DSC call. Ideal if you are getting the position of a boat in distress, or you have polled your friends radio to see where he or she is.

Notes: Ensure your installer connects the VHF input and output NMEA interface to the chartplotter



The above diagram shows an integrated system with all the parts you could expect to find, along with their interconnections.

Notes: Ensure that your chosen Electronic installer has utilised the antenna output for the stereo from the Antenna splitter, you get far better reception.

Built in AIS receiver

One way to get another vessel's MMSI is from their AIS information being sent from their vessel. Some VHF's will come with a built-in AIS receiver, although this is on the top of the range models, and therefore likely to be more expensive. The extra cost in the VHF is normally a lot less than a separate AIS receiver, and all the parts needed to connect it into the system (Antenna, and communications with the chartplotter)

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The above shows the simpler configuration with a VHF Radio with built in GPS and AIS. The only down side is that you have lost the antenna feed to the stereo

Notes: A Cheap way of getting AIS information, if you haven't already got AIS this is the way forward.

Calling an AIS target.

Normally the chartplotter and radio will have to be from the same supplier, for this capability. we mentioned earlier that you could call another ship if you know their MMSI number. If the chartplotter has a AIS input and is able to show the AIS targets, selecting one of the AIS targets will send the MMSI to the radio ready to call the ship in question.

Notes: It is no longer a requirement to have a listening watch on channel 16 now, and hasn't been since 2006 ish.

Fog Horn

Some mainly the top of the range VHF will have the facility to make Fog signals in accordance with the International Regulation for Prevention of Collisions at Sea, IRPCS. This will need a Hailer attached to the radio, and mounted usually on the mast of a yacht or fly bridge arch of a power boat.

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Notes: *We don't plan to go sailing in Fog, but a comfort if we are caught out.*

Load Hailer

Again the top of the range VHF's have the facility for a load hailer, this is not so you can shout at other boats, but to communicate with the crew. dropping the anchor, picking up a mooring buoy etc. It will also have a listen facility, this allows you to hear what the crew on deck are saying.

Notes: *You may not want to hear what the crew call you, but they will know when to drop the anchor*

Second Station

Having a second, or if you have a really big boat a third station, gives you the option of being at the helm or at the chart table. With a second station it will also work as an intercom, ideal for fly bridge to main cabin communications.

Note: *In an emergency you may not be able to drive and go to the chart table to use the radio*

Data Connectivity

Connecting the VHF to the existing or new source of GPS data, has a few things that we need to be aware of. First there are 2 data protocols out there NMEA 0183 (old NMEA), and NMEA 2000 (new NMEA, N2K), and the manufactures have their own names too, Raymarine *Seatalk NG*, Simrad *SimNet*.

Most radios out there have NMEA 0183 data interfaces, running at a baud rate of 4800 bits/second (called forty eight hundred), slowly newer radios are moving towards NMEA 2000, or have both.

The most common problem is the radio is NMEA 0183, and the chartplotter (the GPS source) is NMEA 2000. This will need some form of data protocol converter, either a manufacturer specific or a aftermarket product (Actisense). This of course will add a cost to the installation, the parts being in the region of £150.

If we are using old NMEA, we may also come across a problem if we have a VHF radio and a separate AIS receiver. Both may use old NMEA, but the Radio will be using 4800 baud, and the AIS 38400 baud. Our chartplotter (GPS source) may only have one NMEA input. which can be either 4800 baud or 38400 baud, but not both.

Notes: *Have your chosen Electronic installer make sure there are no hidden extras to get all the features of your system to work.*