HDS Gen2 Touch
Installation Manual

LOWRANCE

ENGLISH

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Preface

As Navico is continuously improving this product, we retain the right to make changes to the product at any time which may not be reflected in this version of the manual. Please contact your nearest distributor if you require any further assistance.

It is the owner's sole responsibility to install and use the instrument and transducers in a manner that will not cause accidents, personal injury or property damage. The user of this product is solely responsible for observing safe boating practices.

Governing Language: This statement, any instruction manuals, user guides and other information relating to the product (Documentation) may be translated to, or has been translated from, another language (Translation). In the event of any conflict between any Translation of the Documentation, the English language version of the Documentation will be the official version of the Documentation. This manual represents the product as at the time of printing. Navico Holding AS and its subsidiaries, branches and affiliates reserve the right to make changes to specifications without notice.

Copyright

Warranty

The warranty card is supplied as a separate document.

In case of any queries, refer to the brand web site of your display or system:

www.lowrance.com

Declarations and conformance

This equipment is intended for use in international waters as well as inland waters and coastal sea areas administered by countries of the USA, E.U. and E.E.A.

Compliance Statements

Lowrance HDS-7, HDS-9, and HDS-12 Gen2 Touch:

- meet the technical standards in accordance with Part 15.103 of the FCC rules
- comply with CE under RTTE directive 1999/5/EC
- comply with the requirements of level 2 devices of the Radiocommunications (Electromagnetic Compatibility) standard 2008

For more information please refer to our website:

www.lowrance.com

Warning

The user is cautioned that any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that the interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment into an outlet on a circuit different from that of the receiver
- Consult the dealer or an experienced technician for help

About this manual

This manual is a reference guide for installing the Lowrance HDS-7, HDS-9, and HDS-12 Gen2 Touch system.

The manual does not cover basic background information about how equipment such as radars, echo sounders and AIS work. Such information is available from our web site:

http://www.lowrance.com/Support/Library/

Important text that requires special attention from the reader is emphasized as follows:

→ *Note:* Used to draw the reader's attention to a comment or some important information.

⚠ **Warning:** Used when it is necessary to warn personnel that they should proceed carefully to prevent risk of injury and/or damage to equipment/personnel.

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- 'Simrad' is a trademark of Kongsberg Maritime AS Company registered in the US and other countries and is being used under license.
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Contents

1 HDS Gen2 Touch overview

The HDS-7, HDS-9, and HDS-12 Gen2 Touch multifunction displays are available with or without inbuilt sonar and structure scan. The ability to network over NMEA 2000 and ethernet allows access to data as well as control of numerous optional devices that can provide sonar, radar, audio entertainment, weather and even digital switching.

All displays are charting ready, with built-in GPS receiver and Insight cartography (region dependent) and with optional Navionics support via an SD card slot.

The displays may be mounted on to the vessel with the supplied surface mount bracket, or flush mounted in to the dash.

Power should be supplied at around 12V, but due to the variable nature of boat power systems, the displays are designed to operate on 10.8 V - 17 V.

Front - controls
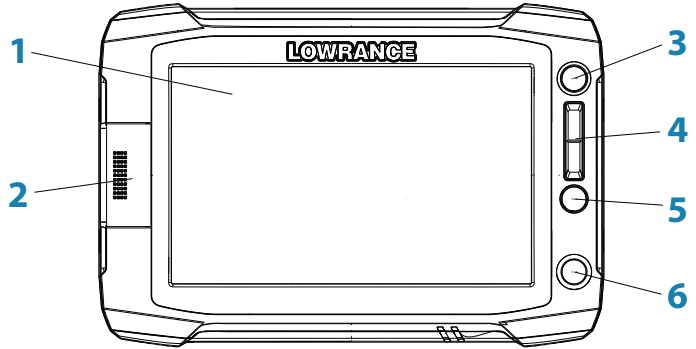
1 **Touchscreen**

2 **Card reader door**

3 **Pages key**

4 **Zoom in / Zoom out key**

5 **Mark / Waypoint key**

6 **Power key**

Rear - connectors

A   **B**

1 2 3 4 4 5   4 5 1 2 3
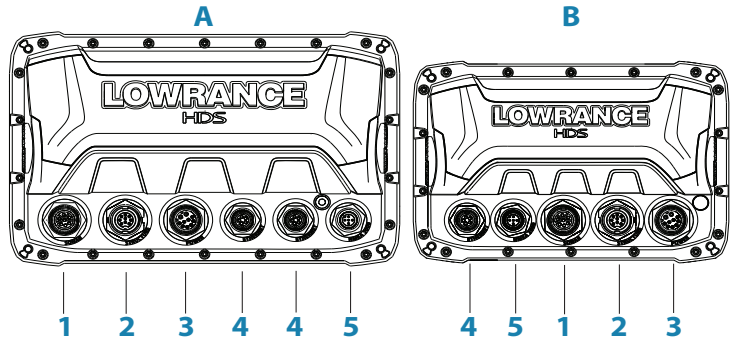
A HDS-9 & 12 connector arrangement

B HDS-7 connector arrangement

1 Sonar

2 StructureScan - connects to LSS-2 HD Transducer

3 Power - also video for HDS-9 & 12, with optional adaptor

4 Ethernet - two ports on HDS-9 & 12, one on 7

5 NMEA 2000

SD card slot

Used for optional Navionics or InsightHD chart data, software updates, transfer of user data and system backup.

The card reader door is opened by lightly pressing and sliding the door to the left, then pulling forward from the left side.
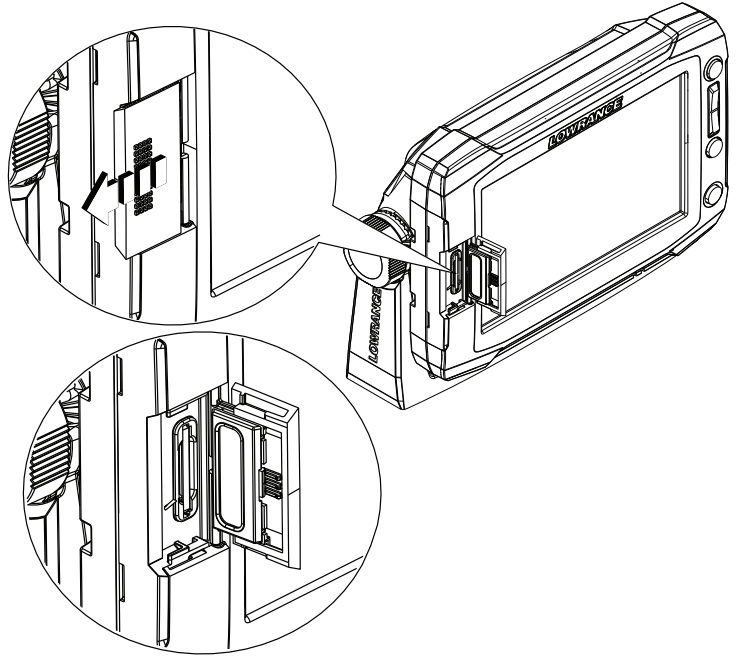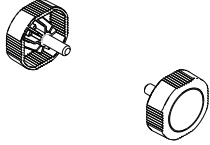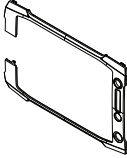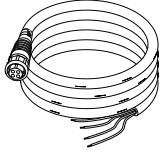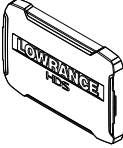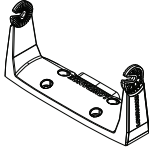
The card reader door should always be shut immediately after inserting or removing a card, in order to prevent possible water ingress.
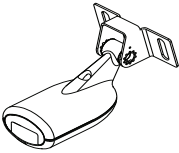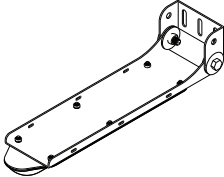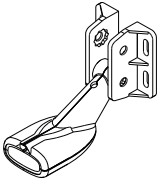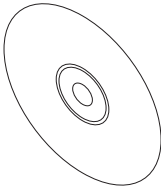
→ *Note:* The HDS-9 and 12 Displays have two card readers, the HDS-7 has one.

2 Check the contents

Display	Bracket knobs (x2)
Front Bezel (attached to unit)	Power cable
Sun cover	Fasteners - #6 x 1.5" (4x)
Mounting bracket	

Parts Included, dependent on model

83/200 KHz transducer	LSS-2 HD transducer
50/200 KHz transducer	DVD - manuals

3

Display Installation

Mounting location

Choose the mounting locations carefully before you drill or cut. The display should be mounted so that the operator can easily use the controls and clearly see the display screen. Be sure to leave a direct path for all of the cables. Lowrance displays are high-contrast and anti-reflective, and are viewable in direct sunlight, but for best results install the display out of direct sunlight. The chosen location should have minimal glare from windows or bright objects.

Ensure that any holes cut are in a safe position and will not weaken the boat's structure. If in doubt, consult a qualified boat builder.

Before cutting a hole in a panel, make sure that there are no hidden electrical wires or other parts behind the panel.

Do not mount any part where it can be used as a hand hold, where it might be submerged, or where it will interfere with the operation, launching or retrieving of the boat.

If bracket mounting the display, choose an area where the display will not be subjected to excessive vibration.

The mounting location will affect the internal GPS receiver. Test the unit in it's intended location to ensure satisfactory reception. An external GPS source may be added to overcome poor reception areas.

Leave sufficient clearance to connect all relevant cables.

Good ventilation is required. Inadequate ventilation may cause the display to overheat. Lowrance displays are designed to operate in temperatures from -15° C to +55° C (+5° F to +131° F).

For overall width and height requirements, please see the dimensions section on page 29.

> ⚠ **Warning:** When installing the displays, ensure appropriate safety equipment is used, eg. ear muffs, protective glasses, gloves and a dust mask.
>
> Power tools may exceed safe noise levels, and can cast off dangerous protectiles.
>
> The dust from many materials commonly used in boat construction may cause irritation or damage to eyes, skin, and lungs.

Bracket mounting

Place the bracket in the desired mounting location, and use a pencil or permanent marker to mark drilling locations.

→ *Note:* ensure that the chosen location has enough height to accomodate the display fitted in the bracket, and allows tilting of the display. Also adequate space is required on both sides to allow tightening and loosening of the knobs.

Use fasteners suited to the mounting surface material. If the material is too thin for self tappers, reinforce it, or mount bracket with machine screws and large washers. Use only 304 or 316 stainless steel fasteners. Mark the screw locations using bracket as template, and drill pilot holes.
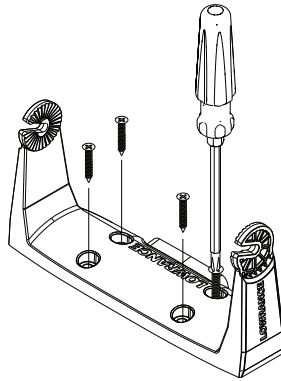
Screw down the bracket.
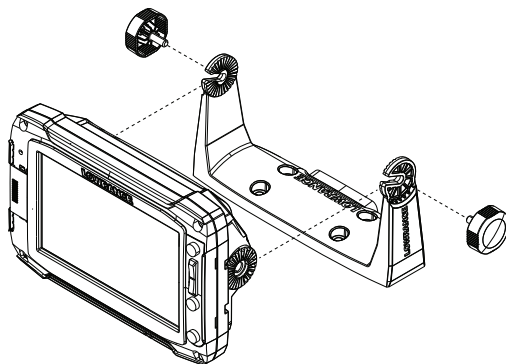
Mount the display to the bracket using the knobs. Hand tighten only. The ratchet teeth in the bracket and display case ensure a positive grip and prevent the unit changing from the desired angle.

Flush mounting

Check the template for scaling accuracy, using a tape measure or ruler against the ruler printed on the template.
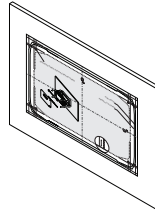
Cut away excess paper, and tape down the template. Check it is correctly aligned to a vertical or horizontal reference. Do not use a bubble level as vessel may be listing! Adjust where required.

Drill all marked pilot holes, then using an appropriate saw, cut through the template and mounting surface, along the dotted line bordering the shaded center of the template.
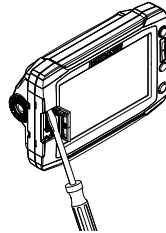
Remove the bezel from the display, using a fingernail or small flat screwdriver, starting at the edges that are closest to the card reader door.
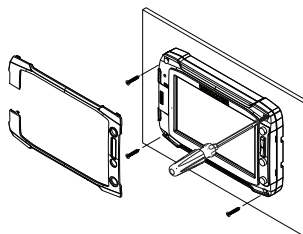
Check the fit of the display, and use a file to remove any remaining obstructions. If water-tightness is required, apply a thin, continuous bead of sealant to the back of the display prior to final installation. Sealant should be of a 'neutral cure' type to prevent damage to the plastics. Secure the display with the supplied screws. Once screws are fully tightened, ensure there is complete contact with the mounting surface. Lastly, fit the bezel with the card reader door open; insert the outermost tabs on the bezel in to the slots on the display, then gently press down the bezel above and below the card reader door till it clicks in to place.

4

Mounting the transducer

Transducer location selection and installation are two of the most critical steps in sonar installation. To function properly the transducer must be in the water at all times, and in a location that has a smooth flow of water when the boat is moving.

Research

Before starting the installation of the transducer, it's advised to check the following;

- Find out if the boat builder has a recommended installation location
- Establish direction of rotation of the propeller(s)
- Watch actual water flow when boat is travelling at cruising speed to determine the area of transom with cleanest flow (least bubbles)

Select a transducer location

The primary aim is to stay clear of propeller and hull generated turbulence, while mounting the transducer as close to the center of the vessel as possible.
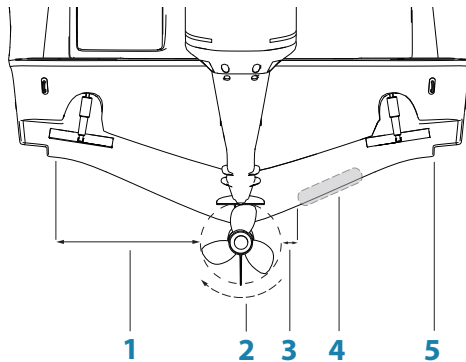
1 **Avoid mounting within 1m (3.3') to port of propeller**

2 **Conventional clockwise propeller rotation**

3 **Avoid mounting within 7.5cm (3") to starboard of propeller**

4 **Best mounting location - undisturbed water flow**

5 **Planing strake - avoid mounting behind here**

→ *Note:* Reverse the distance guides (1 & 3) from propeller where engine is of counterclockwise configuration.

→ *Note:* Boats with strakes or ribs on the hull can create large amounts of turbulence at higher speeds. A good transducer location on these types of boats is between the ribs closest to the engine.

→ *Note:* If the transducer is not placed in a smooth flow of water, interference caused by bubbles and turbulence may show on-screen in the form of random lines or dots. The unit could also lose bottom signal when the boat is on plane.

→ *Note:* Trim tabs will vary in the amount of turbulence they create as they are adjusted, stay clear of these.

Attaching the transducer

The transducer should be installed parallel with the transom's waterline, not the bottom of the boat (deadrise).
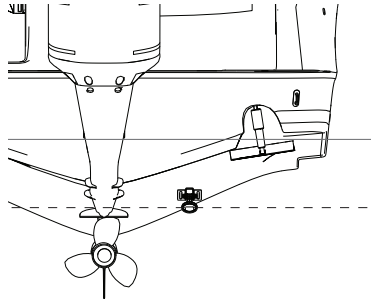
→ *Note:* Ensure the entire bottom surface of the transducer hangs at least couple of millimetres (1/16ths of an inch) lower than the bottom of the hull.
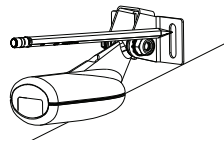
Hold the transducer with bracket up to the transom of the boat and trace the slotted screw hole locations (two on the 83/200 KHz transducer, and four on the 50/200 KHz transducer). Mark drilling points in the middle of each outline, to allow for transducer height adjustment. Drill pilot holes to suit fasteners.

→ *Note:* Check that there is nothing on the other side of the mounting surface that may be damaged by drilling.

Attach transducer to transom, using supplied stainless steel fasteners. Drill a 25mm (1") hole above the waterline, large enough to pass the plug through.

Secure the cable to the hull at regular intervals using cable P clips or saddles and ensure that moving parts such as an outboard motor or boarding ladder can't snag the cable.

Adjusting the transducer

If the sounder image shows interference lines on the screen when moving, which worsen with speed, it may be possible to eliminate these by adjusting the transducer's angle.
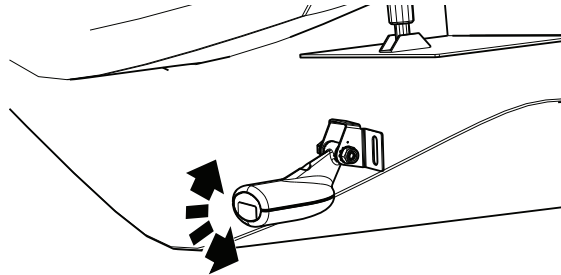
→ *Note:* A transducer that is tilted too far in either direction will not perform well, missing targets, and/or losing the bottom at speed.

If performance does not improve with tilting, try adjusting the height of the transducer relative to the transom of the boat. If the transducer is too high it may be seeing cavitation caused by the trailing edge of the transom.

5

Wiring

Guidelines

Don't do this	Do this
Don't make sharp bends in the cables	Do make drip and service loops
Don't run cables in a way that allows water to flow down into the connectors	Do cable tie all cables to keep them secure
Don't route the data cables in areas adjacent to radar, transmitter, or large current carrying cables	Do solder/crimp and insulate all wiring connections, if extending or shortening power or NMEA 0183 cables
	Do leave room at the back to install and remove cables

> ⚠ **Warning:** Before starting the installation, be sure to turn electrical power off. If power is left on or turned on during the installation, fire, electrical shock, or other serious injury may occur. Be sure that the voltage of the power supply is compatible with the HDS Gen2 Touch display
>
> ⚠ **Warning:** The HDS Gen2 Touch has a voltage rating of 12 V DC, it is not suited for use with 24V DC systems.
>
> ⚠ **Warning:** The positive supply wire (red) should always be connected to (+) DC with the supplied fuse or a circuit breaker (closest available to fuse rating).

Power connection

HDS Gen2 Touch displays are designed to be powered by a 12 V DC system. They are protected against reverse polarity, under voltage and over voltage.

The plug of the supplied power cable has two discrete cables exiting from it. The thickest cable provides the following:

• power into the system (Red and Black wires)

• remote turn-on for certain Navico expansion modules (Yellow wire)
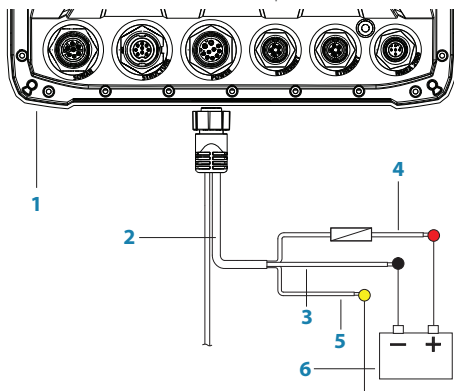
1 **HDS display rear (9 & 12 connector arrangement shown)**

2 **Power cable**

3 **12 V negative wire (black)**

4 **12 V positive wire (red) shown with fuse holder fitted**

5 **Accessory Wake Up wire (yellow)**

6 **Vessel's 12 V DC supply**

Connect red to (+) DC using a 5 A fuse. Connect Black to (-) DC.

Accessory wake up

The yellow colored accessory wake up line may be used to control the power state of Navico modules such as SonicHub, StructureScan, and Broadband radar. This means that the modules are turned on the moment the display is powered up.

→ *Note:* Broadband radar will be put in standby, when triggered by the accessory wake up line.

For connection, simply combine all yellow wires on a common bus or to a single termination point.

The following demonstrates the power connections for a small system.
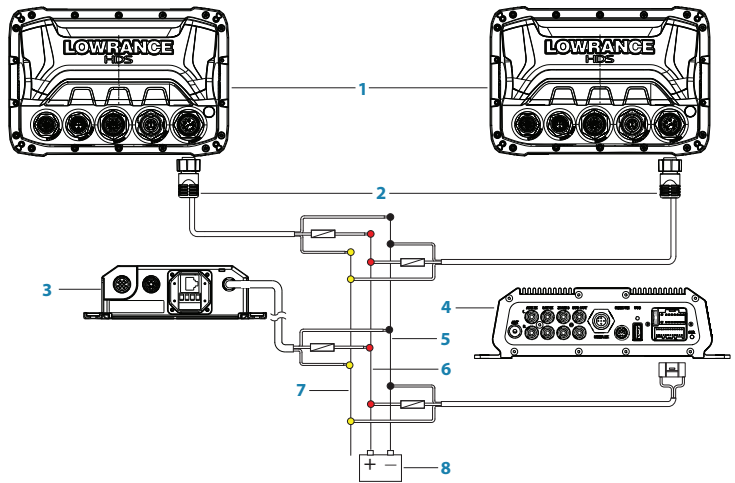
1 HDS Displays

2 HDS power cable

3 Broadband radar interface

4 SonicHub

5 12 V DC negative (-)

6 12 V DC postive (+)

7 Accessory wake up line

8 Vessel's 12 V DC supply

Transducer connection

All Combo HDS Gen2 Touch displays have internal Broadband and StructureScan sonar (chart only units require an external module for sonar). Navico transducers fitted with the 7 pin blue connector can be plugged directly into the corresponding blue socket labeled 'Sonar'. The 9 pin black structure scan connector can be plugged in to the socket labelled 'Structure'. Refer to the Overview section of this manual, or embossed labeling on the unit for connector location.
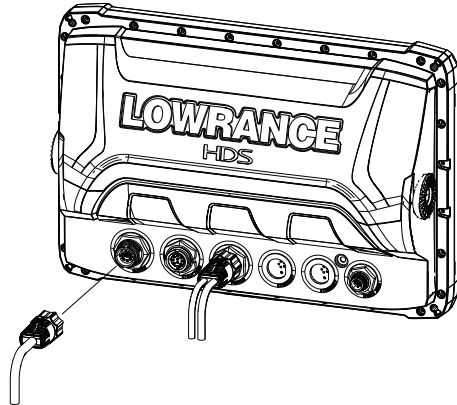
Connector attached to cable is keyed and can only be inserted in one orientation. Once inserted, turn locking collar to secure.

→ **Note:** Connectors are not in same location on the HDS-7 display as they are on the HDS-9 and 12 displays (shown above). The 'Structure' connector is located to the right of the 'Sonar' connector on all units.

→ **Note:** Sonar data can also be supplied by an external sonar source such as the BSM-2 or another sonar capable Navico display connected via ethernet.

→ **Note:** While made for LSS-2 HD transducer, the displays are also compatible with earlier LSS-1 transducers through use of an adaptor cable - see page 30.

Ethernet device connection

Ethernet is used to interconnect high bandwidth devices such as radar, sonar, and other displays. The HDS-7 display has one ethernet port, whereas the HDS-9 and 12 displays have two. Navico ethernet cables have a locking collar, for maintaining a reliable, waterproof connection.

Connecting directly to a single device

The ethernet port is auto sensing, meaning that the unit can connect to one network device directly, without the use of a cross-over cable or switch.
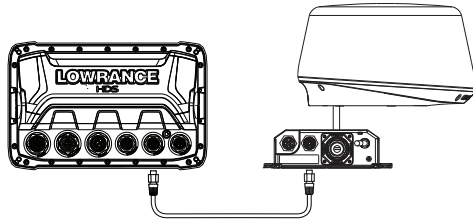
Connecting to multiple devices

If connecting more than one ethernet device to a HDS-7 display, or two devices to a HDS-9 or HDS-12 display, use the optional network expansion Port (NEP-2).
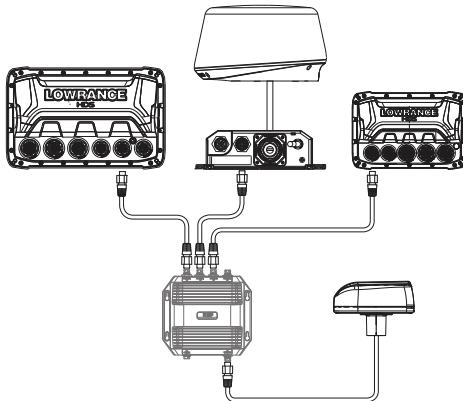
If the number of ethernet devices exceeds the number of available ports on the NEP-2, it is possible to link two or more NEP-2 modules together to provide the required ports. The NEP-2 modules are fitted with 5 ethernet ports. See page 31 for cable options.

→ *Note:* When designing a system, take in to account the ports 'lost' when used for linking multiple NEP-2 modules together.

NMEA 2000 device connection

All HDS Gen2 Touch models are equiped with a NMEA 2000 port, which allows the receiving and sharing of a multitude of data from various sources.

Essential network information

- A NMEA 2000 network consists of a linear "backbone" from which "drop cables" connect to NMEA 2000 devices
- NMEA 2000 is a powered network.
- NMEA 2000 cables used for Lowrance products are of the 'micro-c' style, which is a cable/connector specification approved for use in NMEA 2000 certified networks.
- A single drop cable has a maximum length of 6 m (20 ft). The total length of all drop cables combined should not exceed 78m (256 ft)
- The backbone has a maximum cable length of 100m (328ft). The maximum cable length between any two devices on the network is also 100 m (328 ft) - this is taking in to account device drop cable length.
- A NMEA 2000 network needs to have a terminator at each end of the backbone.

Planning and installing a network backbone

The NMEA 2000 backbone needs to run between the locations of all products you want to install, typically in a bow to stern layout. Route the backbone so that drop cables to devices do not exceed 6m length. Choose from the following components to make up your NMEA 2000 backbone:

- Micro-C cables: 2' (0.61m), 6' (1.82m), 15' (4.55m), 25' (7.58m)
- T-connector. Use at locations where you want to connect a device by drop cable
- Micro-C male and Micro-C female to SimNet adaptor cables for connecting to SimNet bus, or adding devices fitted with a SimNet connector to a Micro-C network.

→ *Note:* If using a wind sensor, plan to connect this to one end of the backbone with the termination resistor at the mast head.

Power the network

A NMEA 2000 network requires its own 12 V DC power supply. The Lowrance NMEA 2000 power cable is pre fitted with an inline fuse holder and 3 amp fuse.

In smaller NMEA 2000 systems, the power connection may be made anywhere in the system,

For larger systems introduce power at a central point in the backbone to 'balance' the voltage drop of the network. Use a power cable without termination.

→ *Note:* When joining a NMEA 2000 network with a Simrad SimNet network, it is important that you do not introduce power to both.

→ *Note:* Do not connect the power cable to the same terminals as the autopilot computer, pulse radar, bow thruster or other high current devices - the network may be affected by voltage drop when these devices are operated. Avoid connection to the engine starting batteries where possible.

The following diagram demonstrates a typical small NMEA 2000 network:
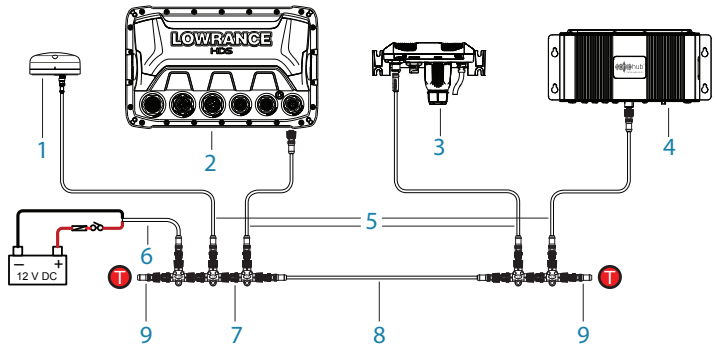
1 GPS antenna

2 HDS Display

3 Broadband radar interface

4 SonicHub

5 'Drop' cables (should not exceed 6m (20') each)

6 Power cable

7 Micro-C T junctions

8 Backbone

9 Micro-C terminator (one male, one female)

NMEA 0183 device connection

The HDS has a NMEA 0183 serial port, providing both an input and output for NMEA 0183 data.

The port can be set to different baud rates, up to 115,200 baud. The NMEA0183 sentences output can be individually turned on or off.

Refer to the section Supported Data / NMEA 0183 for a complete list of sentences.
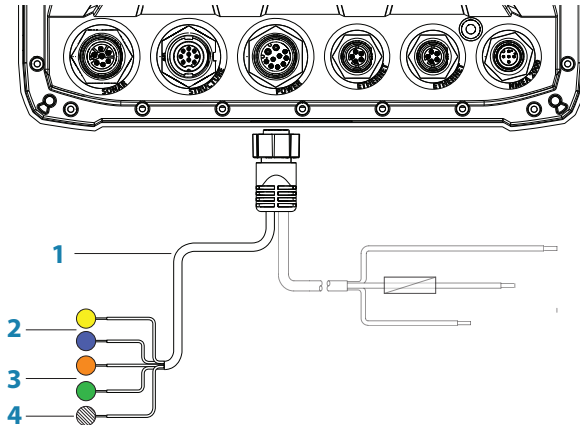
1 **Data cable (combined in same plug as power cable)**

2 **Transmit: A (yellow), B (blue)**

3 **Receive: A (orange), B (green)**

4 **ground (shield)**

→ *Note:* The majority of NMEA 0183 devices communicate at 4,800 baud. AIS is a common exception, and normally transmits at 38,400 baud.

Talkers and Listeners

Do not connect multiple devices outputing data (Talkers) on to the input (Rx) of the unit. The RS422 protocol is not intended for this type of connection, and data will be corrupted if more than one device transmits simultaneously. The output however may drive multiple receivers (Listeners). The number of receivers is finite, and depends on the receiving hardware. Typically three devices is possible.

Video In

On the HDS-9 and HDS-12, a video camera may be added by installing the optional video adaptor cable between the power socket on the unit, and the plug on the power/data cable.

➔ *Note:* The video images will not be shared with another unit via the network. It is only possible to view video on the unit connected to the video source.

Connecting video sources
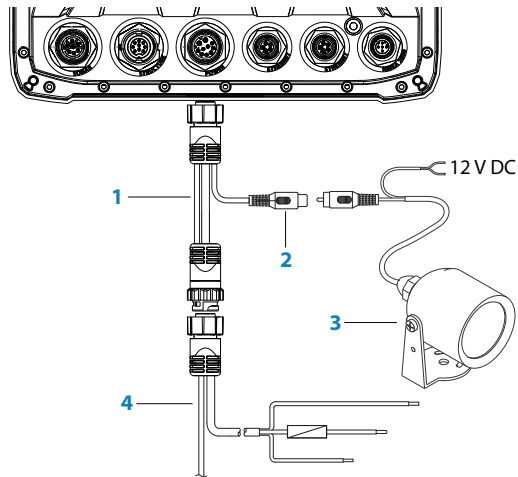
1 Video input adaptor cable

2 RCA plug

3 12 V camera (3rd party)

4 HDS power/data cable

➔ *Note:* Only connect NTSC and PAL video sources

6

Software setup

Sonar installation settings
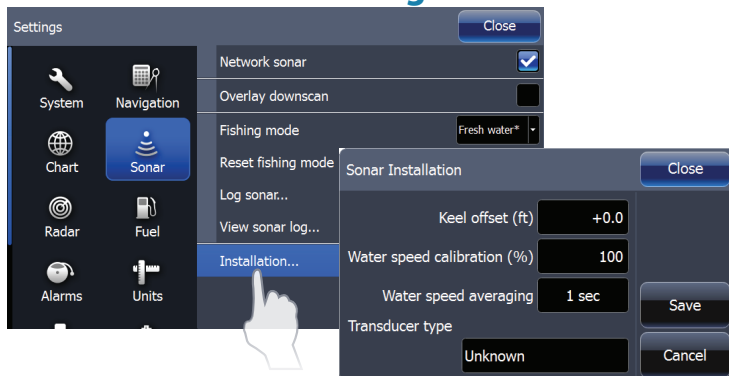
Keel offset

This is a value that can be entered on the Sonar Installation page to make depth readings relate to any point from the water surface, to the deepest point of the vessel.

Below are some typical ways in which the offset is used:

A) For Depth below Keel: Set the distance from transducer to the keel.

Enter a negative value, e.g. `-2.0`

B) For Depth Below Transducer: no offset required.

C) For Depth Below Surface (waterline): Set the distance from transducer to the surface:

Enter a positive value., e.g. `+0.5`
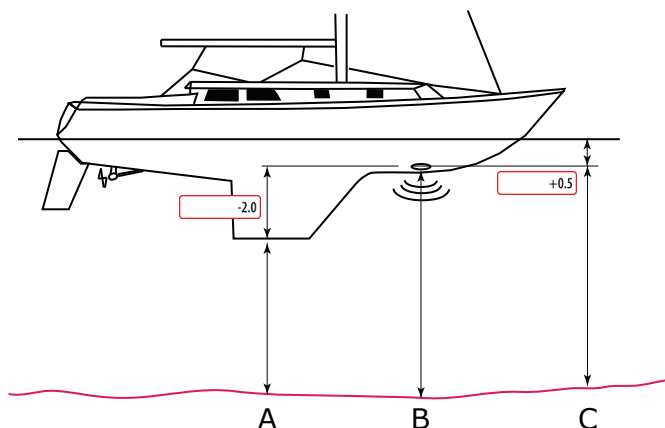
Water speed calibration

Water speed calibration is used to adjust the speed value from the paddle wheel to match the actual boat speed through the water. Actual speed can be determined from GPS speed over ground (SOG) or by timing the boat over a known distance. Water speed calibration should be performed in calm conditions, with minimal wind and current movement.

Water speed averaging

Averages water speed by measuring your speed at a selected interval of time. Water speed intervals range from one to thirty seconds, e.g. If you select five seconds, your displayed water speed will be based on averaging over 5 seconds of sampling.

Water temperature calibration

Temperature calibration is used to adjust the water temperature value from the sonar transducer to match the data from another temperature sensor. It may be required to correct for localized influences to the measured temperature.

➔ *Note:* Water temperature calibration only appears if the transducer is temperature capable. Check transducer type selection if this option should be available.

Transducer type

Transducer type is used for selecting the transducer model that came with your unit. In some transducers with built-in temperature sensors, the temperature reading may be inaccurate if the wrong transducer is selected from the transducer type menu.

Select Transducer	Close
Unknown	
Generic 50/200kHz	
Generic 83/200kHz	
Generic 50kHz	
Generic 200kHz	
Generic 50/200kHz 1000 Watt RMS	
Generic 200kHz 1000 Watt RMS	
HST-WSBL / HST-WSU	
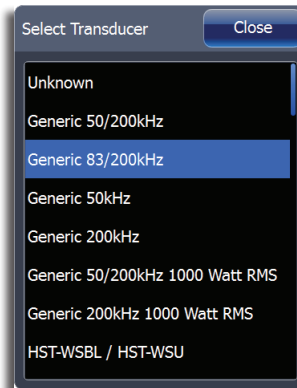
Touch Screen Calibration

In some cases it may be required to re-calibrate the touch screen due to electrical influences on the device from it's installation environment. The following steps should be completed to apply calibration:

1. Turn the unit off
2. Press and hold the Waypoint key, then turn the unit on
3. Hold the Waypoint key during power on, until the calibration utility screen comes up
4. Touch crosshair ⌐¬ shown on screen to perform nine points calibration
5. After successful calibration the unit will return to normal application screen

Software upgrades

The latest software for this unit will be available for download from the Lowrance web site;

www.lowrance.com

An SD card and SD reader/writer are required for this.

Detailed instructions for how to install the software are provided on the update web page.

7

Dimensional drawings

HDS 7 Gen2 Touch

215 mm (8.48")
146 mm (5.76")
166 mm (6.52")
7"
240 mm (9.45")
82 mm (3.23")
30 mm (1.18")
95 mm (3.72")

HDS 9 Gen2 Touch

265 mm (10.43")
178 mm (7.01")
169 mm (6.65")
9"
287 mm (11.30")
30 mm (1.18")
54 mm (2.13")
60.5 mm (2.38")

HDS 12 Gen2 Touch

328.1 mm (12.92")
224.7 mm (8.85")
233.6 mm (9.20")
12.1"
351.0 mm (13.82")
30.3 mm (1.19")
60.9 mm (2.4")
62 mm (2.44")
82.8 mm (3.26")
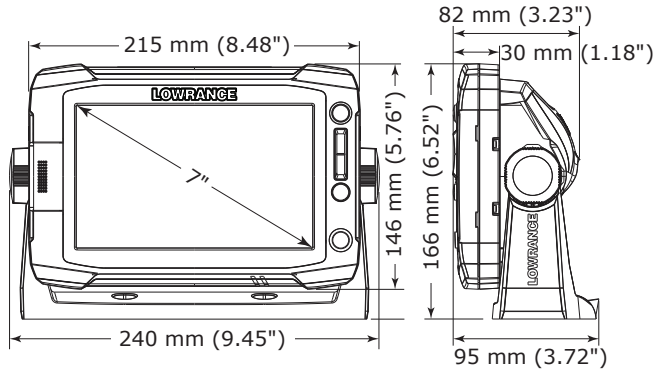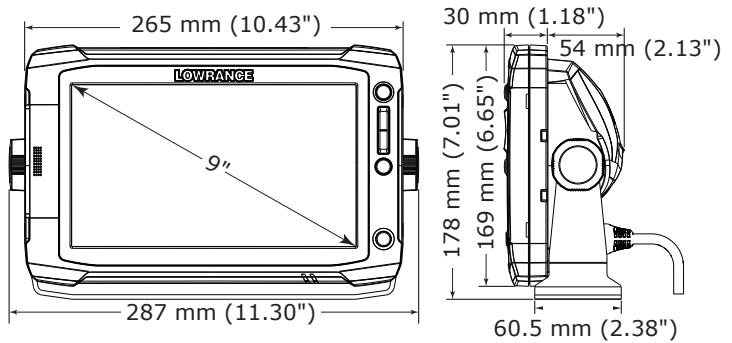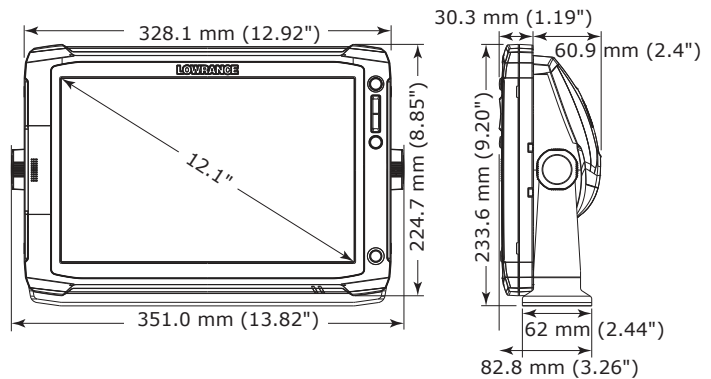
8

Accessories

Refer to website for latest accessories: www.lowrance.com

NMEA 2000

Part number	Description
000-0124-69	NMEA 2000 STARTER KIT
000-0119-88	N2KEXT-2RD 2' (0.61M) EXTENSION CABLE
000-0127-53	N2KEXT-6RD 6' (1.82M) EXTENSION CABLE
000-0119-86	N2KEXT-15RD 15' (4.55M) EXTENSION CABLE
000-0119-83	N2KEXT-25RD 25' (7.58M) EXTENSION CABLE
000-0120-39	EP-60R FUEL FLOW SENSOR
000-0120-41	EP-65R FLUID LEVEL SENSOR
000-0120-49	EP-70R PADDLE WHEEL SPEED SENSOR
000-0120-51	EP-80R TEMPERATURE SENSOR
000-0120-53	EP-80RTH THRU-HULL TEMPERATURE SENSOR
000-0120-73	EP-85R STORAGE DEVICE
000-0120-29	EP-90R PRESSURE SENSOR
000-0125-28	LGC-4000 HIGH SPEED GPS RECEIVER
22090195	RC42 RATE COMPASS

Transducers

Part number	Description
000-0106-72	HST-WSBL 83/200 TRANSOM SKIMMER WITH TEMP
000-0106-74	PDT-WBL 83/200 POD WITH TEMP
000-0106-89	PDRT-WBL 83/200 POD WITH REMOTE TEMP
000-0106-77	HST-DFSBL 50/200 TRANSOM SKIMMER WITH TEMP
000-0106-94	PTI-WBL ICE TRANSDUCER
000-0099-95	TS-1BL EXTERNAL TEMP SENSOR (NON-NMEA 2000)
000-0099-96	SP-BL TRANSOM SPEED WHEEL (NON-NMEA 2000)
000-0099-97	ST-TBL TRANSOM SPEED/TEMP (NON-NMEA 2000)
000-0099-93	XT-12BL 12FT BLUE CONNECTOR TRANSDUCER EXTENSION
000-0099-94	XT-20BL 20FT BLUE CONNECTOR TRANSDUCER EXTENSION
000-10802-001	LSS-2 HDS SKIMMER 20 FT STRUCTURESCAN HD SKIMMR XDCR LSS-2

Part number	Description
000-0136-02	P319 50/200 LOW PROFILE THRU-HULL W/TEMP
000-0136-03	P79 50/200 IN-HULL
000-10116-001	TM260 50/200 TRANSOM MOUNT W/TEMP
000-00021-001	B60 50/200 BRONZE THRU-HULL W/TEMP
000-0136-05	B744V 50/200 BRONZE THRU-HULL W/TEMP AND SPEED
000-10247-001	B164 50/200 BRONZE THRU-HULL W/TEMP 1KW
000-0136-00	B258 50/200 BRONZE THRU-HULL W/TEMP
000-0106-82	B260 50/200 BRONZE THRU-HULL W/TEMP
000-0106-91	M260 50/200 TANK MOUNTED IN-HULL
22098479	DST-800 235 NMEA 2000 SMART SENSOR W/ TEMP AND SPEED (DIGITAL DISPLAY ONLY, NO SONAR IMAGE)
000-11040-001	LSS-1 XDCR TO LSS-2 MODULE ADAPTOR

Ethernet cables

Part Number	Description
000-0127-56	ADAPTER CABLE: ETHERNET YELLOW MALE TO RJ-45 FEMALE 2M (6.5FT)
000-0127-51	ETHERNET CABLE YELLOW 5 PIN 2M (6.5FT)
000-0127-29	ETHERNET CABLE YELLOW 5 PIN 4.5M (15FT)
000-0127-30	ETHERNET CABLE YELLOW 5 PIN 7.7M (25FT)
000-0127-37	ETHERNET CABLE YELLOW 5 PIN 15.2M (50FT)

Display parts

Part Number	Description
000-11010-001	HDS GEN2 VIDEO ADAPTER CABLE
000-11033-001	HDS-7 GEN2 TOUCH BEZEL AND CARD DOOR
000-11034-001	HDS-9 GEN2 TOUCH BEZEL AND CARD DOOR
000-11035-001	HDS-12 GEN2 TOUCH BEZEL AND CARD DOOR
000-11030-001	HDS-7 GEN2 TOUCH SUNCOVER
000-11031-001	HDS-9 GEN2 TOUCH SUNCOVER
000-11032-001	HDS-12 GEN2 TOUCH SUNCOVER
000-11019-001	HDS-7 GEN2 TOUCH GIMBAL BRACKET
000-11020-001	HDS-9 GEN2 TOUCH GIMBAL BRACKET
000-11021-001	HDS-12 GEN2 TOUCH GIMBAL BRACKET
000-11050-001	HDS GEN2 TOUCH FLUSH MOUNT KIT
000-10467-001	BRACKET KNOBS PAIR – NSS/GEN2T

Part Number	Description
000-0127-49	HDS POWER CABLE
000-0124-70	HDS CONNECTOR CAPS
000-0127-50	HDS FUSE & FUSE HOLDER

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Supported data

NMEA 2000

PGN	Description	Rx	Tx
59392	ISO Acknowledgement	1	1
60928	Address Claim	1	1
126208	NMEA Group Function	1	1
126992	System Time	1	1
126996	Product Info	1	1
127237	Heading/Track Control	1	1
127245	Rudder	1	
127250	Vessel Heading	1	1
127251	Rate of Turn	1	
127257	Attitude	1	
127258	Magnetic Variation	1	1
127488	Engine Parameters Rapid Update	1	
127489	Engine Parameters Dynamic	1	
127493	Transmission Parameters Dynamic	1	
127503	AC Input Status	1	
127505	Fluid Level	1	
127506	DC Detailed Status	1	
127508	Battery Status	1	
128259	Speed Water Referenced	1	1
128267	Water Depth	1	1
129808	DSC Call Information	1	
129025	Position Rapid Update	1	1
129026	COG & SOG, Rapid Update	1	1
129029	GNSS Position Data	1	1
129033	Time and Date	1	
129038	AIS Class A Position Report	1	
129039	AIS Class B Position Report	1	
129040	AIS Class B Extended Position Report	1	
129283	Cross Track Error	1	1
129284	Navigation Data	1	1
129285	Route/WP Information		1
129539	GNSS DOPs	1	1
129540	GNSS Sats In View	1	1
129794	AIS Class A Static and Voyage Related Data	1	
129801	AIS Addressed Safety Related Message	1	
129802	AIS Safety Related Broadcast Message	1	
129808	DSC Call Information	1	

PGN	Description	Rx	Tx
130074	Waypoint Name and Position	1	1
130306	Wind Data	1	
130310	Environmental Parameters	1	1
130311	Environmental Parameters	1	1
130312	Temperature	1	1
130313	Humidity	1	
130314	Actual Pressure	1	
130576	Small Craft Status	1	
130577	Direction Data	1	1

NMEA 0183

TX / RX	Category / Sentence							
GPS								
Receive	GGA	GLL	GSA	GSV	VTG	ZDA		
Transmit	GGA	GLL	GSA	GSV	VTG	ZDA		
Navigation								
Receive	RMC							
Transmit	AAM	APB	BOD	BWC	BWR	RMC	RMB	XTE
Echo								
Receive	DBT	DPT	MTW	VLW	VHW			
Transmit	DBT	DPT	MTW	VLW	VHW			
Compass								
Receive	HDG	HDT	HDM					
Transmit	HDG							
Wind								
Receive	MWV	MWD						
Transmit	MWV							
AIS / DSC								
Receive	DSC	DSE	VDM					
MARPA								
Transmit	TLL	TTM						

→ **Note:** AIS sentences are not bridged to or from SimNet.

Supported data | HDS Gen2 Touch Installation Manual

Specifications

Refer to website for updates to specifications: www.lowrance.com

Multi Function Display	HDS-7	HDS-9	HDS-12
Display			
Display resolution	800x480	800x480	1280x800
Display type	7 inch WVGA color TFT LCD	9 inch WVGA color TFT LCD	12.1 inch WXGA TFT LCD
Display brightness	1250 nits	1400 nits	1250 nits
Touch screen	S-CAP	S-CAP	S-CAP
Power			
Power supply	12 V DC (10.8 - 17.0 V DC min - max)	12 V DC (10.8 - 17.0 V DC min - max)	12 V DC (10.8 - 17.0 V DC min - max)
Power consumption	12 W (0.9 A @ 13 V DC)	15.6 W (1.2 A @ 13 V DC)	26 W (2.0 A @ 13 V DC)
Technical / Environmental			
Housing	Plastic	Plastic	Plastic
Temperature	-15° C to + 55° C (+5° F to +131° F)	-15° C to + 55° C (+5° F to +131° F)	-15° C to + 55° C (+5° F to +131° F)
Waterproof standard	IPx7	IPx7	IPx7
Declaration of conformity	Part 15.103 FCC rules & CE RTTE directive 1999/5/EC	Part 15.103 FCC rules & CE RTTE directive 1999/5/EC	Part 15.103 FCC rules & CE RTTE directive 1999/5/EC
Interface			
Ethernet	1 Port	2 Port	2 Ports
NMEA2000	Micro-C (1)	Micro-C (1)	Micro-C (1)
Video input	No	Composite video RCA - single channel	Composite video RCA - single channel
Data card slot	SD (full size)	2x SD (full size)	2x SD (full size)
Other			
Weight (display only)	1.6 kg (3.5 lb)	2.1 kg (4.6 lb)	3.78 kg (8.3 lb)
Pack dimensions (L x W x H)	30.5 x 27.9 x 27.9 cm (12" x 11" x 11")	40.6 x 27.9 x 25.4 cm (16" x 11" x 10")	
Pack weight	2.54 kg (5.6 lb)	2.9 kg (6.5 lb)	
Echo sounder			
Sonar frequency	(50/200 or 83/200 kHz) + 455/800 kHz	(50/200 or 83/200 kHz) + 455/800 kHz	(50/200 or 83/200 kHz) + 455/800 kHz
Sonar output power	Max power 500W RMS	Max power 500W RMS	Max power 500W RMS

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Link-8 VHF
User Guide

ENGLISH

Important safety information Please read carefully before installation and use.	
DANGER	This is the safety alert symbol. It is used to alert you to potential personal injury hazards, Obey all safety messages that follow this symbol to avoid possible injury or death.
⚠ **WARNING**	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury
⚠ **CAUTION**	CAUTION indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.
CAUTION	CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

Section 1 - General information

1-1 Features

Congratulations on your purchase of this Lowrance Link-8 marine band VHF radio. Your Link-8 provides you with the following useful features:

- Access to all currently available Marine VHF Channel Banks (USA, Canada, International) including weather channels where available (model dependant)
- DSC (Digital Select Calling) capability that meets Class D standards
- Separate CH70 DSC receiver built in
- ATIS facility for inland waterways (EU models)
- 10 weather channels (where available)
- NOAA and SAME weather alert capability (US models)
- Dual channel AIS receiver built in - receive AIS transmissions (receive only)
- Choice of High or Low (25 W or 1 W) transmission power
- Special CH16 or CH16/9 key for quick access to the priority (International Distress) channel
- DISTRESS call button to automatically transmit the MMSI and position until an acknowledgement is received
- Special 3CH key for quick selection of your three favorite channels
- Memory channel scan and All channel priority scan
- Dual/Tri Watch capability
- Call log for the 20 most recent incoming DSC calls
- Distress call log for the 20 most recent distress calls
- Easy access to a buddy list of up to 20 favorite people
- MMSI storage for 20 favorite groups
- GROUP CALL and ALL SHIPS CALL facility
- LL position polling and Track Your Buddy feature
- Automatic position and time update when connected to a GPS receiver
- Adjustable keypad backlighting for easy night-time use
- Adjustable contrast settings for the LCD
- Waterproof and submersible to comply with JIS-7
- Rotary channel selector knob with Push To Select function
- Speaker microphone with large PTT key and 6 keys for easy channel and mode selection
- 30 W Hailer with listen back capability
- Foghorn (manual and automatic)
- Great Circle GPS navigation calculations to a waypoint (stores up to 200 waypoints)
- NMEA 2000 & NMEA 0183 connectivity
- Local/Distance sensitivity to eliminate noise in high traffic urban areas.

1-2 Customizing your Lowrance VHF radio

You can customize the radio to suit your individual preferences. Some preferences can be set directly through the keys as explained in this section.

Other preferences are set up through the built-in menus and these are explained in the other sections.

1-3 How to display and navigate menus

1. Press MENU (or CALL) key.
2. Some line items may show an ▲ or ▼ indicator. This means there is more information available to show. Scroll (rotate the Rotary knob, or use + / - keys on the handset mic) to scroll up and down the menu until the cursor is positioned at the desired option. Press ENT (press the Push To Select) to display that option.
3. Make any entries or changes as explained in the following section.
4. Press ENT to confirm changes. Otherwise, press EXIT to keep the original entry.
5. Press EXIT to backup one screen (this key is equivalent to an ESC function on a PC).

1-4 How to enter alphanumeric data

If your radio does not have the optional alphanumeric microphone, you can rotate the rotary knob, or use +/- keys on the handset mic to enter alphanumeric data.

- Press - to count through numbers, or hold down to scroll rapidly to the desired number
- Press + to step through the alphabet, or hold down to scroll rapidly to the desired character
- If you make an error, press - until < is displayed, then press ENT to backup and correct the entry.

1-5 LCD symbols and meanings

A typical operational display is shown here:
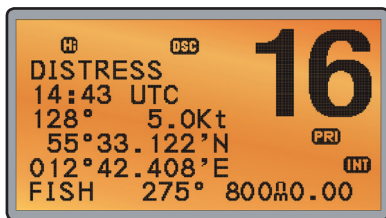
The bottom line is blank when a waypoint is not selected. This operational display shows:

- the channel that you are receiving (**16**) and Tx power is set to high (**Hi**)
- the International channel bank selected (**INT**) and DSC is enabled (**DSC**)
- the channel name tag (**DISTRESS**)

- your current course (**128°**) and speed (**5.0Kt**)
- your latitude (**55°33.122N**) and longitude (**012°42.408E**) and UTC time displayed in 24 hour format (**14:43** - 2:43pm)
- the name of the destination waypoint (**FISH**), its bearing (**275°**), your distance in nautical miles, mile, or kilometres (depending on your choice of units) - in this case, **800nm**, and the cross track error (XTE - **0.00**) are shown.

All the symbols that may appear on the LCD are explained here:

Symbol	Meaning
TX	Transmitting.
BUSY	Receiver busy with an incoming signal.
SCAN	Scanning for the broadcasting channel. Press PTT to stop scanning. When the broadcasting channel is found, scanning stops at that channel.
DW	Dual watch mode.
TRI	Tri watch mode.
DSC	DSC function is enabled.
ATIS	ATIS is enabled for use in European inland waterways. Otherwise, blank.
AIS	AIS function is enabled.
✉	Incoming DSC call, or blinks to notify you of any unread call log messages.
DISTRESS	Channel name tag.
55°33.122N	Your latitude.
012°42.408E	Your longitude.
14:43 UTC	Time (UTC). Local time has suffix LOC (for example; 12:30pm LOC).
16	Channel selected.
LOCAL	Local calling is selected. Otherwise, blank for distance calling.
SKIP	Channel is temporarily deleted 'skipped' from the SCAN operation.
A	Channel suffix, if applicable - **A** or **B** - otherwise blank.
CH1	Shows which of the 3 favorite channels, if any, are selected. **CH1**, **CH2**, **CH3** - otherwise blank.
Hi	Transmission power. High (**Hi**) 25 W or Low (**Lo**) 1 W.
INT	Selected channel bank for VHF radio operations and regulations. **INT**=International; **USA**=USA; **CAN**=CANADA.
Wx	Weather channel.
⚠	Weather alert. *US only.*
SAME	Specific Area Message Encoding. *US only.*

D	Duplex operation. Otherwise, blank for Simplex operation.
PRI	Priority channel is selected.
ACK	Your DSC call has been received.
⊞	Low Battery warning (activates at 10.5 V).
FISH 275°	Waypoint name and bearing.
800nm	Distance to waypoint.
0.00	XTE (Cross track error).
NO GPS	GPS data is not available.
⊠	AUTO SWITCH is disabled.

1-3 Beep tones & call alerts

•	Error	2 short beeps
•	Acknowledge	1 long beep
•	Alarm	Two-tone ring (repeated for 2 minutes or until any key is pressed)
•	LL position call alert	Friendly 5-tone ring sequence (press any key to cancel)
•	WX alert/SAME alert	Ear-catching multi-tone sequence
•	ROUTINE call alert	Friendly 5-tone ring sequence (press any key to cancel)
•	URGENCY call alert	Two-tone ring (repeated for 2 minutes or until any key is pressed)
•	SAFETY call alert	Two-tone ring (repeated for 2 minutes or until any key is pressed)
•	DISTRESS call alert	Two-tone ring (repeated for 2 minutes or until any key is pressed)

Section 2 - Basic operation and key functions

All possible keys and their functions are listed here. Note that some of the keys may not be available, depending on your Lowrance VHF radio model.
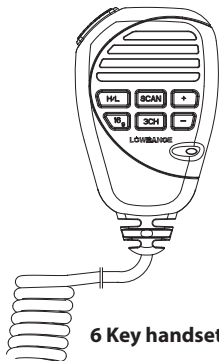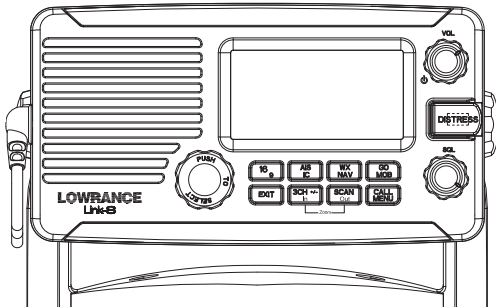
6 Key handset mic   **Link-8 base station radio**

Key:	Function:
VOL / ⏻	**Volume and Power**

VOL / ⏻ **Volume and Power**
Turn clockwise to power on. Continue to turn until a comfortable volume is reached.
VOL / ⏻ will also adjust the settings of an external speaker, if connected.

SQL **Squelch or Threshold Level**
Sets the threshold level for the minimum receiver signal. Turn fully counterclockwise until random noise is heard, then turn slowly clockwise until the random noise disappears. Make another 1/4 turn clockwise for best reception in open sea conditions. In areas of high noise (eg. close to large cities) reception may improve if sensitivity is reduced. Either turn SQL slowly clockwise or use the LOCAL setting. See section 3-4.

16 / 9 **Priority channel**
Also on the handset mic. Press to cancel all other modes and to tune into the priority channel. Press again to return to your original channel. The default Priority Channel is CH16.

For US models: To make Channel 09 the priority channel, hold down 16/9 until a beep sounds and 09 is displayed.

DISTRESS **Send a DSC Distress Call**
DSC must be active and an MMSI must be programmed. See Section 7.
Lift the red cover door then press and release DISTRESS to show the DISTRESS menu. Select the category you want to transmit. Hold down DISTRESS for about 3 seconds to transmit.
The DISTRESS key can also be held down continuously to transmit an "undefined" category Distress call.

See Section 8 for more information about distress calls.

PTT	**Press To Talk**

(Located on the handset mic). Press PTT to transmit at any time on an allowable channel. This automatically exits you from menu mode and stops scanning. You must release PTT to receive a signal.

If PTT sticks, a built-in timer will automatically shut down a transmission after five minutes and sound a short error beep.

PUSH TO SELECT	**Enter (ENT)**

When you are in MENU mode, push the center of the Channel Select knob to enter your choice or setting. This is referred to throughout the manual as "press ENT".

Rotary knob	**Channel select**

Turn to select a channel. The current channel is shown on the LCD in BIG digits and an A or B designator suffix (if applicable) in small letters below the channel number. See Appendix C for a complete listing of channel charts.

Push to activate the **ENT** function.

Alphanumeric entry

You can also use the rotary knob for alphanumeric entry. Turn to step through alphanumeric characters one at a time, then push to confirm each selection. If you make an error, select the < character then push to backup.

+ / -	**Channel select**

(Located on the handset mic). The current channel is shown on the screen in BIG digits with an appropriate designator suffix A or B in small letters below the channel number.

Press + or - to step through the available channels one at a time, or hold down to scroll rapidly through all the available channels.
See Appendix C for a complete listing of channel charts.

Alphanumeric entry

This key can be used for both menu selection and for alphanumeric entry. Press + or - to scroll the cursor up or down to menu options when navigating menus.
When editing an item containing only numbers, press **-** to count through the numbers or hold down to scroll rapidly.
To enter a character, press **+** to step through the alphabet or hold down to scroll rapidly.

EXIT	**Escape (ESC)**

Use EXIT when navigating menus, to clear incorrect entries, to exit from a menu without saving changes, and to back up to the previous screen.

CALL/MENU	**DSC CALL menu**

Quick press to enter the DSC CALL menu and make DSC calls. See Section 5.
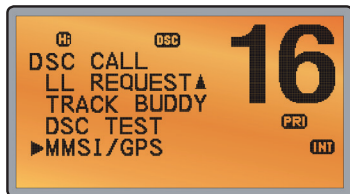
Radio and DSC setup MENU mode

Hold down for about 1 second to show the radio MENU so that you can customize your radio. See section 4.

WX/NAV **Weather channel**

For US models: In USA and Canadian waters, press to hear the most recently selected weather station. The WX symbol is displayed on the LCD. Rotate the dial or + / - on the handset mic to change to a different weather channel. Press WX again to return to the most recent channel. If the weather alert mode (ALT) is ON and an alert tone of 1050 Hz is broadcast from the weather station, it is picked up automatically and the alarm sounds. Press any key to hear the weather alert voice message.

Note: If SAME is activated and the 6 digit County IDs you want to monitor are entered, the radio will sound the weather alarm when it detects a weather alert or weather hazard alert on the selected weather channel.

For all other models: The Wx key can be programmed to a weather channel of your choice. See section 4-11 to program your favourite channel.

NAV (Show waypoint)

Hold down for about 1 second to enter the Navigation mode.
If a waypoint is already selected, the bearing and distance to the waypoint and the cross track error are shown on the bottom line of the LCD.

If you are in Navigation mode and want to scan all the VHF channels while staying in Navigation mode, just hold down SCAN.
Press SCAN to quit scanning.

3CH **Three favourite channels**

Also on the handset mic. Press to toggle between your favourite channels. The CH1, CH2, or CH3 symbol appears on the LCD to show which favourite channel is selected.

To scan only one of your favourite channels, press 3CH then immediately press and release SCAN. If you want to scan all three favourite channels, press 3CH then immediately press and hold SCAN.

To add a favourite channel for the first time, select that channel then hold 3CH to store it in the CH1 location. Repeat the procedure to store two more favourite channels in the CH2 and CH3 locations respectively.

If you try and add another favourite channel it will overwrite the existing CH3. CH1 and CH2 remain unless you delete them.

To delete a favourite channel, select that channel then hold down 3CH until the CH1, CH2 or CH3 symbol disappears off the LCD.

SCAN

Scan *(ALL SCAN & 3CH SCAN)*

There are two SCAN modes you can use to find the broadcast channel:

• ALL SCAN mode scans ALL channels in sequence, and checks the priority channel every 2 seconds.

• 3CH SCAN mode scans the favorite channels and CH16.

When a signal is received, scanning stops at that channel and **BUSY** appears on the LCD. If the signal ceases for more than 5 seconds, the scan restarts.

Press SCAN or PTT to stop at the current channel.

If you are in NAVIGATION mode and want to scan the DSC channels while staying in that mode, just hold down SCAN.

Note: SCAN functionality is limited in some European countries and, if ATIS mode is enabled, the 3CH SCAN mode will be disabled and an error beep will sound.

Note: The weather channel is also scanned if TONE ALERT or SAME is ON (US only).

ALL SCAN mode:

Hold down SCAN for about 3 seconds to start an ALL SCAN. ALL SCAN appears on the LCD.

Press ENT to temporarily skip over (lock out) an "always busy" channel when in ALL SCAN mode. **SKIP** is shown on the top line of the LCD to designate a skipped channel. SKIP will disappear when the radio is powered OFF/ON. With scanning OFF and the SKIP channel selected, press ENT to cancel the skipped channel.

Note: It is not possible to skip over the priority channel.

Press SCAN to stop at the current channel.

Press EXIT to cancel scan mode and return to normal operation.

3CH SCAN mode

With any of your three favorite channels selected (by pressing the 3CH key) hold down SCAN to start all 3CH scanning. Press SCAN again to stop at the broadcast channel, or press EXIT to quit 3CH SCAN and return automatically to the previous broadcast channel.

AIS / IC

AIS (Automatic Identification System)

Quick press to enter the AIS menu.

See section 6 for AIS setup or Section 9 for AIS functionality.
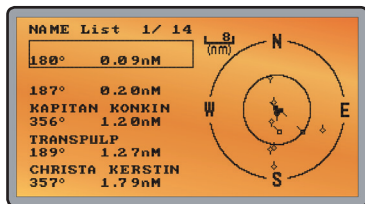
IC (FOG HORN mode)

Hold down for about 1 second to enter HAILER mode. Select FOG HORN. The FOG HORN will sound certain international standard fog horn tones through the hailer speaker depending on the mode selected.

See section 10 for HAILER functionality.
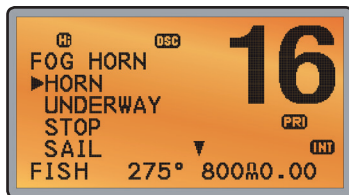
IC (PA HAILER mode)

Hold down for about 1 second to enter HAILER mode. Select PA (Public Address). The PA allows you to make an announcement at high volume to people or vessels using the Link-8 hand mic.

See section 10 for HAILER functionality.

GO / MOB

GO (Reset the Cross Track Error)

Note: A valid GPS signal must be received to see this selection.

Press GO if you are navigating to a waypoint and want to reset the cross track error. This is a **very** useful single keystroke feature to use if you wander a little off-course but want to continue to your active waypoint.

The bearing and distance to the waypoint and any cross track error are shown on the bottom line of the LCD.

MOB (Man Over Board)

Hold down MOB until the radio automatically enters Navigation mode, saves your current latitude and longitude as the MOB waypoint and immediately sets this position as the destination waypoint.

You will see the following sequence of LCDs:

The bearing and distance to the Man Overboard position, and any cross track error (XTE), are shown on the bottom line of the LCD.

To cancel MOB, select another waypoint.

MOB (Temporary waypoint)

To mark your current position as a temporary waypoint, hold down MOB and release the key before the 3 second countdown ends.

You will see the following sequence of LCDs:

```
HOLD 3 SEC
FOR MOB
RELEASE TO
SAVE
```

```
HOLD 2 SEC
FOR MOB
RELEASE TO
SAVE
```

```
HOLD 1 SEC
FOR MOB
RELEASE TO
SAVE
```

The new temporary waypoint is shown in your waypoints list. Hold down MENU, press ENT, then press ENT again to display the waypoints list (TEMP1, WP001, WP002).

You cannot store more than three temporary waypoints. If you store another temporary waypoint, TEMP1 is overwritten with the new information.

H/L **Transmission power**
(Located on the handset mic). High (HI) 25 W or Low (LO) 1 W. Press to toggle between high or low transmission power for the entire channel bank. The HI or LO selection is shown on the LCD.

Some channels allow only low power transmissions. Error beeps will sound if the power transmission setting is incorrect.

Some channels allow only low power transmissions initially, but can be changed to high power by holding down H/L and PTT at the same time.
See Appendix C for a complete listing of channel charts.

Softkeys: This radio uses virtual softkeys during certain functions. A softkey is defined by a name that appears at the bottom of the LCD that positioned immediately above an actual key on the radio. A softkey provides you with the additional function or choice when the softkey appears during certain functions:

ACK **Able key (WX/NAV key)**
Press to ACK (acknowledge) a DSC call.

ACCEPT **Accept key (AIS/IC key)**
Press to ACCEPT a channel request. The radio will immediately change to the requested channel.

NEW-CH **New channel request key (AIS/IC key)**
Press to request a new channel.

PAUSE **PAUSE key (WX/NAV key)**
Press to pause a call when in repeat mode.

RESEND **Resend key (AIS/IC key)**
Press to resend the DSC call.

SILENC **Silence key (AIS/IC key)**
Provided as an option to silence an audible alarm.

Section 3 - Radio MENU SELECT options

Hold down CALL MENU for about 1 second to access any of the following radio MENU SELECT options.

Menu options shown inside the gray boxes are explained in this section.

WAYPOINT			Section 3-1
BACKLIGHT			Section 3-2
BUDDY LIST			Section 3-3
LOCAL/DIST			Section 3-4
CONTRAST			Section 3-5
GPS/DATA	MANUAL		Section 3-6-1
	SETTING	TIME OFFSET	Section 3-6-2
		TIME FORMAT	Section 3-6-3
		TIME DISPLY	Section 3-6-4
		LL DISPLY	Section 3-6-5
		COG/SOG	Section 3-6-6
		GPS ALERT	Section 3-6-7
RADIO SETUP	UIC (US and AUS only)		Section 4-1
	CH NAME		Section 4-2
	RING VOLUME		Section 4-3
	KEY BEEP		Section 4-4
	UNITS		Section 4-5
	INT SPEAKER		Section 4-6
	WATCH MODE (US only)		Section 4-7
	WX ALERT (US only)	TONE ALERT	Section 4-8-1
		SAME ALERT	Section 4-8-2
		SAME CODE	Section 4-8-5
	COM PORT		Section 4-9
	GPS SOURCE		Section 4-10
	FAV CH SETU (EU and AUS only)		Section 4-11
DSC SETUP	USER MMSI		Section 5-1
	GROUP SETUP		Section 5-2
	ATIS MMSI (EU only)		Section 5-3
	ATIS SELECT (EU only)		Section 5-4
	INDIV REPLY		Section 5-5
	DSC FUNC		Section 5-6
	LL REPLY		Section 5-7
	AUTO SWITC		Section 5-8
	TEST REPLY		Section 5-9
	TIMEOUT		Section 5-10
AIS SETUP	AIS FUNC		Section 6-1
	AIS DISPLAY		Section 6-2
	BAUD RATE		Section 6-3
	GPS REDIR		Section 6-4
	CPA ALARM		Section 6-5
	CPA		Section 6-6
	TCPA		Section 6-7
GPS SIM			Section 3-7
RESET			Section 3-8

3-1 Manage your waypoints list (WAYPOINT)

- You can store a maximum of 200 waypoints with their LL positions. When your waypoint list is full, you cannot make a new entry until you have deleted an existing entry
- Each waypoint name can have a maximum of 6 alphanumeric characters
- Waypoints are stored in order of entry, with the most recent entry shown first
- The waypoints are displayed in columns of 6 with a box. Rotate the Channel Select knob to scroll through the columns to easily locate your desired waypoint. Then press ENT and use the Channel Select knob to select a waypoint within the column.

3-1-1 Add a new waypoint

```
MENU SELECT
▶WAYPOINT
 BACKLIGHT
 BUDDY LIST
 LOCAL/DIST▼
```
```
WAYPOINT
▶WP LIST
 NEAREST WP
 TEMP
```
```
WP LIST
NEW WP  R14W05
R01W02  R14W04
R01W01  R14W03
```
```
ENTER WP
____
__°__.____'N
__°__.____'W
```

```
ENTER WP
R01W03
17°32.233'N
160°45.651'E
```
```
SAVE

▶YES
 NO
```
```
WP LIST
NEW WP  R01W01
R01W03  R14W05
R01W02  R14W04
```

1. Select WAYPOINT then WP LIST.
2. Your waypoint list is displayed. Press ENT.
3. NEW WP starts to flash. Press ENT to add a new waypoint.
4. Enter a waypoint name (maximum 6 characters), then the latitude, then the longitude.
5. Press ENT when all the information is correct then select YES.

   The new waypoint is saved and your waypoint list is displayed again.

3-1-2 Edit or delete a waypoint

```
MENU SELECT
▶WAYPOINT
 BACKLIGHT
 BUDDY LIST
 LOCAL/DIST▼
```
```
WAYPOINT
▶WP LIST
 NEAREST WP
 TEMP
```
```
WP LIST
NEW WP  R14W05
R01W02  R14W04
R01W01  R14W03
```
```
R14W05
▶WP EDIT
 DELETE
 GO
 TX WPT DATA
```

```
WP EDIT
R14END
17°32.233'N
160°45.651'E
```
```
SAVE
R14END
▶YES
 NO
```
```
WP LIST
NEW WP  R01W01
R01W03  R14END
R01W02  R14W04
```

1. Select WAYPOINT then WP LIST.

Note: A valid GPS signal must be received to see parts of this selection.

2. Your waypoint list is displayed. Press ENT.

3. NEW WP starts to flash. Scroll down to the incorrect entry. The selected waypoint flashes. Press ENT again.

4. To delete the waypoint, select DELETE then YES. The waypoint is deleted immediately and the waypoint list is refreshed and displayed again.

5. To edit the waypoint, select WP EDIT. The cursor is at the first character of the name. Edit the waypoint name *or* to edit only the latitude or longitude, press ENT repeatedly until the cursor moves to the required line.

6. When you are finished, press ENT (repeatedly if necessary) until an updated page appears.

7. Press ENT to store the changes. The waypoint list is displayed again. If more changes are required, repeat steps 2 through 6. Otherwise, press EXIT to cancel any edits.

3-1-3 Go to a new waypoint

```
MENU SELECT        WAYPOINT           WP LIST            R01W01
►WAYPOINT          ►WP LIST           NEW WP| R14W05     WP EDIT
 BACKLIGHT          NEAREST WP        R01W02| R14W04     DELETE
 BUDDY LIST         TEMP             R01W01| R14W03    ►GO
 LOCAL/DIST▼                         _____|            TX WPT DATA
```

1. Select WAYPOINT then WP LIST.

2. Your waypoint list is displayed. Press ENT.

3. NEW WP starts to flash. Scroll down to the waypoint you want to go to. The selected waypoint flashes. Press ENT again.

4. Select GO.

5. Select Yes. The waypoint is set immediately as the destination waypoint.

Tip: If you are in the NAV big number screen, just turn the Channel Select knob to immediately access the Waypoint List. Select the new waypoint and press ENT.

3-1-4 Go to nearest waypoint (NEAREST WP)

Note: A valid GPS signal must be received to see this selection.

```
MENU SELECT        WAYPOINT           NEAREST WP
►WAYPOINT          ►WP LIST           ►R01W04 001°
 BACKLIGHT          NEAREST WP                  98ℜ
 BUDDY LIST         TEMP               R01W01 003°
 LOCAL/DIST▼                                  136ℜ
```

1. Select WAYPOINT then NEAREST WP.

2. Press ENT to display the nearest waypoint with distance and bearing from your current position.

   Other waypoints are listed in increasing distance from your current position.

3. Press ENT to set the nearest waypoint as the active waypoint OR move the cursor to another waypoint and then press ENT.

   The chosen waypoint is shown on the bottom line of the LCD.

3-1-5 Go to temporary waypoint

```
MENU SELECT
►WAYPOINT
 BACKLIGHT
 BUDDY LIST
 LOCAL/DIST▼
```

```
WAYPOINT
 WP LIST
 NEAREST WP
►TEMP
```

```
TEMP
►TEMP1
 TEMP2
```

```
TEMP1
►GO
 TEMP EDIT
 DELETE
```

1. Select WAYPOINT then TEMP.
2. Your temporary waypoint list is displayed. There are 3 choices for quick access.
3. Select the temporary waypoint to go to. Press ENT.
4. Press ENT to set the temporary waypoint as the destination waypoint. It is immediately shown on the bottom line of the LCD.

Tip: Hold down MOB and release before the 3 second countdown completes. Your current LL position is stored in TEMP1 to TEMP3 in the waypoint list.

If the list is full, a message appears. See following section to delete a TEMP WP.

```
TEMP IS
  FULL
```
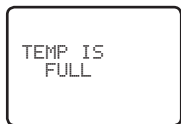
3-1-6 Edit or delete a temporary waypoint

```
MENU SELECT
►WAYPOINT
 BACKLIGHT
 BUDDY LIST
 LOCAL/DIST▼
```

```
WAYPOINT
 WP LIST
 NEAREST WP
►TEMP
```

```
TEMP
 TEMP1
►TEMP2
```

```
TEMP2
 GO
 TEMP EDIT
►DELETE
```

```
DELETE
►YES
 NO
```

```
WAYPOINT
 WP LIST
 NEAREST WP
►TEMP
```
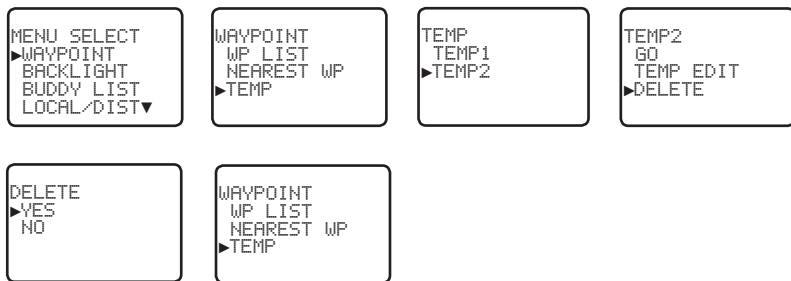
1. Select WAYPOINT then TEMP. Your temporary waypoint list is displayed.
2. Select the temporary waypoint to edit then select TEMP EDIT.

Note: To delete the temporary waypoint, select DELETE then YES. The temporary waypoint is deleted immediately and the temporary waypoint list is displayed again.

3. The waypoint details are displayed. The cursor is at the first character of the name.

4. Edit the temporary waypoint name *or* to edit only the latitude or longitude, press ENT repeatedly until the cursor moves to the required line.

5. When you are finished, press ENT (repeatedly if necessary) until a new LCD appears.

6. Press ENT to store the changes. The waypoint list is displayed again. If more changes are required, repeat steps 2 through 6. Otherwise, press EXIT.

3-1-7 Send waypoint data to a chartplotter

You can send waypoint data over NMEA 2000 to a compatible chartplotter.

```
MENU SELECT          WAYPOINT           WP LIST            TEMP2
►WAYPOINT            ►WP LIST           NEW WP│TEMP2        WP EDIT
 BACKLIGHT            NEAREST WP        MOB                 DELETE
 BUDDY LIST           TEMP             TEMP1                GO
 LOCAL/DIST▼                                              ►TX WP DATA
```
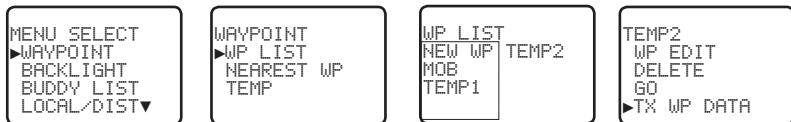
1. Select WAYPOINT then WP LIST. Your waypoint list is displayed. Press ENT. NEW WP starts to flash.

2. Scroll down to the waypoint whose data you want to send to the chartplotter then press ENT. In the example scroll to TEMP2 then press ENT.

3. Scroll down and select TX WPT DATA and press ENT to send the data.

3-2 Set the backlighting level (BACKLIGHT)

There are 8 levels of backlight. Level 8 is the brightest, Level 0 is OFF. The backlight function affects the base station (LCD and Keypad) and the microphone keypad backlight.

```
MENU SELECT          BACKLIGHT
 WAYPOINT            ▪▪▪▪▪▪
►BACKLIGHT            LO    HI
 BUDDY LIST          PRESS ENT
 LOCAL/DIST▼
```
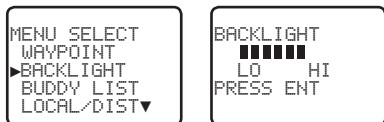
1. Select BACKLIGHT.

2. Select a comfortable level using the Channel Select knob or + or – on the microphone to change the setting.

3. Press ENT to enable the setting and return to the menu.

Note: The DISTRESS key backlight cannot be switched off.

Note: If the backlight setting is set to level 0 (OFF), the backlight will automatically turn ON at level 1 if the radio detects any DSC activity, or any buttons are pressed. The backlight will return to level 0 (OFF) after 10 seconds of inactivity.

3-3 Maintain your buddy list (BUDDY LIST)

Use the buddy list to store the names and associated MMSIs of 20 favorite people. Names are stored in the order of entry, with the most recent entry shown first.

The following sections show how to add, edit and delete entries on your BUDDY LIST.

Section 7-3 explains how to call a buddy.

3-3-1 Add an entry

You can enter a maximum of 20 buddy names. When your BUDDY LIST is full, you cannot make a new entry until you have deleted an existing entry.

Each buddy name can have a maximum of 11 alphanumeric characters.

```
MENU SELECT
 WAYPOINT
 BACKLIGHT
►BUDDY LIST
 LOCAL/DIST▼
```
```
BUDDY LIST
►MANUAL NEW
 SEA ROSE
 MERMAID IV
```
```
ENTER NAME
_____
ENTER MMSI
_____
```
```
ENTER NAME
STARFISH
ENTER MMSI
_____
```

```
ENTER NAME
STARFISH
ENTER MMSI
123456789
```
```
STARFISH2
123456789
►STORE
 CANCEL
```
```
BUDDY LIST
►MANUAL NEW
 STARFISH
 SEA ROSE
 MERMAID IV
```
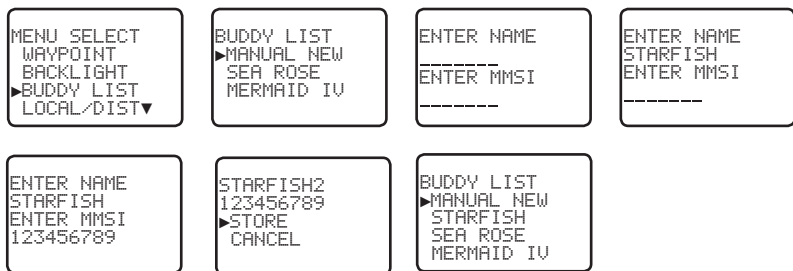
1. Select BUDDY LIST. The cursor is at MANUAL NEW. Press ENT.
2. Enter the buddy name, one character at a time (this may be alphanumeric) then press ENT repeatedly until the cursor moves to the MMSI entry line.
3. Enter the MMSI associated with that buddy name (this must be numeric) then press ENT.
4. The new buddy name and MMSI are displayed. Press ENT to store the new entry, which is displayed at the top of your buddy list.

Note: When the BUDDY LIST is full (20 entries), you can make a new entry and the buddy at the end of the list is automatically erased.

3-3-2 Edit or delete an entry

```
MENU SELECT
 WAYPOINT
 BACKLIGHT
▶BUDDY LIST
 LOCAL/DIST▼
```

```
BUDDY LIST
▶MANUAL NEW
 SEA ROSE
 MERMAID IV
```

```
BUDDY LIST
 MANUAL NEW
▶SEA ROSE
 MERMAID IV
```

```
SEA ROSE
▶EDIT
 DELETE
```

```
EDIT NAME
SEA ROSE
EDIT MMSI
123456789
```

```
EDIT NAME
SEA ROSE 2
EDIT MMSI
122256798
```

```
SEA ROSE 2
122256798
▶STORE
 CANCEL
```

1. Select BUDDY LIST. The cursor is at MANUAL NEW.
2. Scroll down to the incorrect entry and press ENT.
3. To delete the buddy, select DELETE then YES. The buddy is deleted immediately and the buddy list is displayed again.
4. To edit the buddy, select EDIT. The cursor is at the first character of the name. Edit the buddy name *or* to edit only the MMSI, press ENT repeatedly until the cursor moves to the MMSI line.
5. When you are finished, press ENT (repeatedly if necessary) until an updated screen appears.
6. Press ENT to store the changes. The buddy list is displayed again. If more changes are required, repeat steps 2 through 6. Otherwise, press EXIT to ESC.

3-4 Local or distance sensitivity (LOCAL/DIST)

Use LOCAL/DIST to improve the sensitivity of the receiver either locally (LOCAL) or over distances (DIST). LOCAL is not recommended for use in open sea conditions. It is designed for use in areas of high radio noise; for example, close to cities.

See also SQL (Squelch Control) in section 2.

3-4-1 Set distance sensitivity

```
MENU SELECT
 BACKLIGHT ▲
 BUDDY LIST
▶LOCAL/DIST
 CONTRAST  ▼
```

```
SENSITIVITY
▶DISTANT
 LOCAL
```

1. Select LOCAL/DIST then select DISTANT.
2. Press ENT to activate the DIST setting. This disables local sensitivity and the menu is displayed again.

3-4-2 Set local sensitivity

```
MENU SELECT
 BACKLIGHT ▲
 BUDDY LIST
►LOCAL/DIST
 CONTRAST  ▼
```
```
SENSITIVITY
 DISTANT
►LOCAL
```

1. Select LOCAL/DIST then scroll to LOCAL.
2. Press ENT to activate the LOCAL setting. This disables distance sensitivity and the menu is displayed again.

    `LOCAL` is displayed on the LCD as a reminder that sensitivity is reduced.

3-5 Set the contrast level (CONTRAST)

There are 8 levels of contrast.

```
MENU SELECT
 BUDDY LIST▲
 LOCAL/DIST
►CONTRAST
 GPS/DATA  ▼
```
```
CONTRAST
 ▓▓▓▓
 LO     HI
PRESS ENT
```

1. Select CONTRAST.
2. Select a comfortable contrast level using the Channel Select knob or + or – on the microphone to change the setting.
3. Press ENT to enable the setting and return to the menu.

3-6 GPS data and time (GPS/DATA)

If the boat has an operational GPS navigation receiver and is connected by NMEA port, the VHF radio automatically detects and updates the vessel position and the local time.

However, if the GPS navigation receiver is disconnected or absent, you can specify the vessel position and the local time manually, using the GPS/DATA option.

This information is important because it will be used if a DSC distress call is transmitted.

- If GPS data is NOT available for some reason, the NO GPS alert will sound for 5 seconds (or until you press any key) and the radio requests you to enter the position data manually.
- This request is repeated every 4 hours if you do not enter the position data manually. After you have entered the position data manually, you must update it within 23.5 hours otherwise the NO GPS alert sequence repeats.
- The NO GPS warning will be shown whenever GPS data is not available from an operational GPS navigation receiver.

3-6-1 Manually enter position and UTC time (MANUAL)

Note: this function is available only if an operational GPS receiver is **not** connected.

```
MENU SELECT
 LOCAL/DIST
 CONTRAST
►GPS/DATA
 RADIO SETU
```

```
GPS/DATA
►MANUAL
 SETTING
```

```
MANUAL LL
__°__.____'N
__°__.____'W
MAN --:--UTC
```

```
14:38 UTC
M17°32.233'S
160°45.651'E
```

1. Select GPS/DATA then MANUAL.
2. Enter the latitude, then the longitude, then the UTC.
3. Press ENT when all the information is correct.

    The vessel's latitude and longitude are shown on the screen, with the UTC time. The prefix M indicates a manual entry. The manual entries are cancelled if a real GPS position is received.

Note: a warning will be displayed after 4 hours to remind you that the current position information is manually entered.

3-6-2 Local time (TIME OFFSET)

If your position and time data are being updated through a GPS navigation receiver, you can enter the time difference between UTC and local time and display your local time on the LCD.

```
MENU SELECT
 LOCAL/DIST▲
 CONTRAST
►GPS/DATA
 RADIO SETU▼
```

```
GPS/DATA
 MANUAL
►SETTING
```

```
SETTING
►TIME OFFSET
 TIME FORMAT
 TIME DISPLY
 LL DISPLAY ▼
```

```
TIME OFFSET
 +00.00

04:43 UTC
```

```
TIME OFFSET
 +03.00

07:43 LOC
```

```
07:50AM LOC
17°36.233'N
161°05.651'E
```
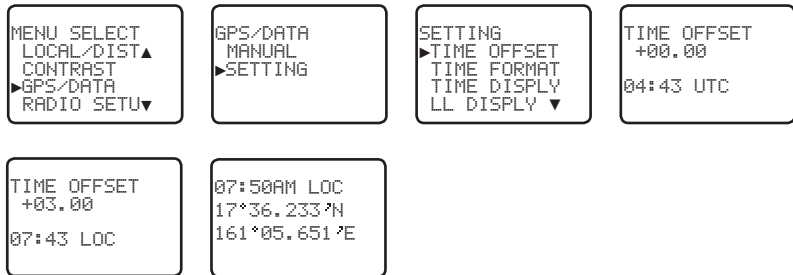
1. Work out the time difference between UTC and your local time (from the following graphic).
2. Select GPS/DATA then SETTING.
3. Select TIME OFFSET to enter the difference between UTC and local time. Use the Channel Select knob *or* + or – to change the time. Half hour increments can be used with a maximum offset of ±13 hours.
4. Press ENT when the local time is correct.

    LOC is displayed after the time on the LCD as a reminder that local time is selected.

STANDARD TIME ZONES
Corrected to January 2011
Zone boundaries are approximate
Daylight Saving Time (*Summer Time*),
usually one hour in advance of Standard
Time, is kept in some places
Map outline © *Mountain High Maps*
Compiled by HM Nautical Almanac Office

Standard Time = Universal Time − value from table
Universal Time = Standard Time + value from table

	h m		h m		h m		h m		h m		h m
Z	0	D*	− 4 30	G	− 7	L	−11	N	+1	Q*	+ 4 30	V	+ 9
A	− 1	E	− 5	H	− 8	L*	−11 30	O	+ 2	R	+ 5	V*	+ 9 30
B	− 2	E*	− 5 30	I	− 9	M	−12	P	+ 3	S	+ 6	W	+10
C	− 3	E†	− 5 45	I*	− 9 30	M*	−12 45	P*	+ 3 30	T	+ 7	X	+11
C*	− 3 30	F	− 6	K	−10	M*	−13	Q	+ 4	U	+ 8	Y	+12
D	− 4	F*	− 6 30	K*	−10 30	M†	−14					§ No Standard Time legally adopted

3-6-3 Time format options (TIME FORMAT)

Time can be shown in 12 or 24 hour format.

```
MENU SELECT
 LOCAL/DIST▲
 CONTRAST
▶GPS/DATA
 RADIO SETU▼
```

```
GPS/DATA
 MANUAL
▶SETTING
```

```
SETTING
 TIME OFFSET
▶TIME FORMAT
 TIME DISPLY
 LL DISPLY ▼
```

```
TIME FORMAT
▶12 Hr
 24 Hr
 06:56PM LOC
```

1. Select GPS/DATA then SETTING.
2. Select TIME FORMAT.
3. Select 12 or 24 hr as desired. In this example, 12 hour format has been selected and so the LCD shows the AM or PM suffix.

3-6-4 Time display options (TIME DISPLY)

If your vessel position and time data are being updated through a GPS navigation receiver, you can show or hide the time on the LCD.

```
┌─────────────┐  ┌─────────────┐  ┌─────────────┐  ┌─────────────┐
│MENU SELECT  │  │GPS/DATA     │  │SETTING      │  │TIME DISPLY  │
│ LOCAL/DIST▲ │  │ MANUAL      │  │ TIME OFFSET │  │►ON          │
│ CONTRAST    │  │►SETTING     │  │ TIME FORMAT │  │ OFF         │
│►GPS/DATA    │  │             │  │►TIME DISPLY │  │             │
│ RADIO SETU▼ │  │             │  │ LL DISPLY ▼ │  │             │
└─────────────┘  └─────────────┘  └─────────────┘  └─────────────┘
```

1. Select GPS/DATA then SETTING.
2. Select TIME DISPLY.
3. Select ON (on) or OFF (off) as desired. In this example, OFF has been selected and the LCD no longer shows the time.

3-6-5 Position display options (LL DISPLY)

If your vessel position and time data are being updated through a GPS navigation receiver, you can show or hide your vessel position on the LCD.

```
┌─────────────┐  ┌─────────────┐  ┌─────────────┐  ┌─────────────┐
│MENU SELECT  │  │GPS/DATA     │  │SETTING      │  │LL DISPLY    │
│ LOCAL/DIST▲ │  │ MANUAL      │  │ TIME FORMAT │  │►ON          │
│ CONTRAST    │  │►SETTING     │  │ TIME DISPLY │  │ OFF         │
│►GPS/DATA    │  │             │  │►LL DISPLY   │  │             │
│ RADIO SETU▼ │  │             │  │ COG/SOG     │  │             │
└─────────────┘  └─────────────┘  └─────────────┘  └─────────────┘
```

1. Select GPS/DATA then SETTING.
2. Select LL DISPLY.
3. Select ON (on) or OFF (off) as desired. In this example, OFF has been selected and the LCD no longer shows the vessel position.

3-6-6 Course & speed display options (COG/SOG)

If your vessel position and time data are being updated through a GPS navigation receiver, you can show or hide your course over ground (COG) and speed over ground (SOG) data on the LCD.

```
┌─────────────┐  ┌─────────────┐  ┌─────────────┐  ┌─────────────┐
│MENU SELECT  │  │GPS/DATA     │  │SETTING      │  │COG/SOG      │
│ LOCAL/DIST▲ │  │ MANUAL      │  │ TIME DISPL▲ │  │ ON          │
│ CONTRAST    │  │►SETTING     │  │ LL DISPLY   │  │►OFF         │
│►GPS/DATA    │  │             │  │►COG/SOG     │  │             │
│ RADIO SETU▼ │  │             │  │ GPS ALERT   │  │             │
└─────────────┘  └─────────────┘  └─────────────┘  └─────────────┘
```

1. Select GPS/DATA then SETTING.
2. Select COG/SOG.
3. Select ON (on) or OFF (off) as desired. In this example, ON has been selected and so the LCD shows the bearing and speed.

3-6-7 GPS alert (GPS ALERT)

If the GPS Alert is ON and the GPS navigation receiver is disconnected, the alarm sounds.

Note: The default setting is ON for the Link-8 EU and OFF for the Link-8 US.

```
MENU SELECT        GPS/DATA         SETTING          GPS ALERT
 LOCAL/DIST▲        MANUAL           TIME DISPL▲     ▶ON
 CONTRAST         ▶SETTING           LL DISPLY        OFF
▶GPS/DATA                            COG/SOG
 RADIO SETU▼                        ▶GPS ALERT
```

1. Select GPS/DATA then SETTING.
2. Select GPS ALERT.
3. Select ON (on) or OFF (off) as desired.

3-7 GPS simulator (GPS SIM)

The GPS simulator is set to OFF whenever the radio is turned ON or whenever real GPS data is available through the COM port. (The GPS simulator will not operate if a GPS signal is received).

However, if you want to test it, turn it ON. Note that DSC transmissions will be blocked while the GPS simulator is ON.

```
MENU SELECT        GPS SIM
 RADIO SETU▲        ON
 DSC SETUP        ▶OFF
 AIS SETUP
▶GPS SIM   ▼
```

1. Select GPS SIM.
2. Select ON (on) or OFF (off) as desired.

3-8 Reset to factory defaults (RESET)

Use this to return every setting to the factory defaults except all MMSI settings and the entries in your buddy list.

```
MENU SELECT        RESET RADIO
 DSC SETUP ▲       ARE YOU SURE
 AIS SETUP          YES
 GPS SIM          ▶NO
▶RESET
```

1. Select RESET. The radio asks for confirmation.
2. Select YES then press ENT to confirm and reset the radio. The menu is displayed again.

Section 4 - Radio setup menu (RADIO SETUP)

Hold down CALL/MENU key for about 1 second to access the following RADIO SETUP options.

The following menu options are explained in this section.

RADIO SETUP	UIC *		Section 4-1
	CH NAME		Section 4-2
	RING VOLUME		Section 4-3
	KEY BEEP		Section 4-4
	UNITS		Section 4-5
	INT SPEAKER		Section 4-6
	WATCH MODE *		Section 4-7
	WX ALERT *	TONE ALERT	Section 4-8-1
		SAME ALERT	Section 4-8-2
		SAME CODE	Section 4-8-5
	COM PORT		Section 4-9
	GPS SOURCE		Section 4-10
	FAV CH SETUP *		Section 4-11

* Model dependant

See sections 1-3 and 1-4 if you want to know how to move around the menu and enter, save and change data.

4-1 Channel (UIC)

US and AUS models only.

Toggle between USA, International, or Canadian channel banks. The selected channel bank is displayed on the LCD along with the last used channel. All the channel charts are shown in Appendix C.

```
RADIO SETUP
▶UIC
 CH NAME
 RING VOLUME
 KEY BEEP   ▼
```

```
UIC
▶USA
 INT'L
 CANADA
```

1. Select RADIO SETUP then UIC.
2. Select the desired channel bank then press ENT.

4-2 Channel names (CH NAME)

The channel charts are listed in Appendix C with their default name tags. CH NAME gives you the option to edit or delete the channel name tags displayed on the LCD.

In this example, the channel name tag PHONE-PORTOP associated with channel 87 is being changed to CALL PORT OP.

```
RADIO SETUP
 UIC
▶CH NAME
 RING VOLUME
 KEY BEEP  ▼
```
```
       63
CH NAME
PHONE-PORTOP
```
```
PHONE-PORTOP
▶EDIT
 DELETE
```
```
EDIT CH NAME
PHONE-PORTOP
```

```
SAVE CH NAME
CALL PORTOP
▶YES
 NO
```

1. Select RADIO SETUP then CH NAME. Use the Channel Select knob **or** + or - to step through the channel name tags until you see the one you want to change then press ENT.
2. To delete the channel name, select DELETE and press ENT.
3. To edit the channel name, select EDIT to edit the existing name tag.
4. Input the new name over the existing name. It can be a maximum of 12 characters.
5. Press ENT (repeatedly is necessary) to display the YES/NO confirmation.
6. Press ENT to confirm the new channel name tag (or the deletion).
7. Press EXIT to return to the CH NAME screen.

4-3 Ring volume (RING VOLUME)

The radio sounds the friendly two-tone alert when it detects an incoming DSC call. You can change the volume level.

```
RADIO SETUP
 UIC
 CH NAME
▶RING VOLUME
 KEY BEEP  ▼
```
```
RING VOLUME
▶HIGH
 LOW
```

1. Select RADIO SETUP then RING VOLUME.
2. Select HIGH (loud) or LOW (soft) then press ENT.

4-4 Key beep volume (KEY BEEP)

You can change the key beep volume or turn the key beeps off completely.

```
RADIO SETUP
 CH NAME   ▲
 RING VOLUME
▶KEY BEEP
 UNITS     ▼
```
```
KEY BEEP
 HIGH
▶LOW
 OFF
```

1. Select RADIO SETUP then KEY BEEP.
2. Select the desired setting then press ENT.

4-5 Select units (UNITS)

You can select your preferred measurement units for distance and cross track error (for waypoint navigation).

```
RADIO SETUP
 RING VOLUM▲
 KEY BEEP
▶UNITS
 INT SPEAKE▼
```
```
UNITS
▶METRIC
 NAUTICAL
 STATUTE
```
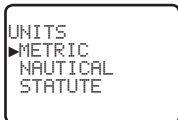
1. Select RADIO SETUP then UNITS.
2. Select your preferred measurement units then press ENT.

Note: Nautical Miles is the only unit used in AIS mode.

4-6 Internal speaker connections (INT SPEAKER)

You can switch the radio's internal speaker ON or OFF. The external speaker is always ON if a speaker is plugged into the external speaker jack.

```
RADIO SETUP
 KEY BEEP  ▲
 UNITS
▶INT SPEAKER
 WATCH MODE▼
```
```
INT SPEAKER
▶ON
 OFF
```
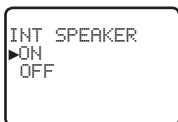
1. Select RADIO SETUP then INT SPEAKER.
2. Select ON (on) or OFF (off) then press ENT to enable the setting and return to the menu.

4-7 Set the priority channel (WATCH MODE)

US model only.

If you are operating on the USA or Canadian channel banks, you can set the priority channel to cover both CH16 and CH09 as well as the working channel, similar to a TRI WATCH.

```
RADIO SETUP
 UNITS     ▲
 INT SPEAKER
▶WATCH MODE
 WX ALERT  ▼
```
```
WATCH MODE
▶ONLY 16
 16CH + 9CH
```
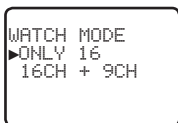
1. Select RADIO SETUP then WATCH MODE.
2. Select the desired setting then press ENT.

4-8 Weather alerts (WX ALERT)

US model only.

Use WX ALERT to set your preferences for weather alert information.

The NOAA provides several weather forecast channels on USA and Canadian channel banks. If severe weather such as storms or hurricanes are forecast, the NOAA broadcasts a weather alert on 1050 Hz.

The NOAA All Hazards Weather Radio Service (NWR) works in conjunction with the Emergency Alert System (EAS) to issue weather alerts for specific geographic areas or specific weather conditions. It uses a digital encoding system known as SAME (Specific Area Message Encoding) to broadcast these alerts.

Each transmitter in the NOAA All Hazards Weather Radio Service (NWR) network is identified with a unique 6-digit SAME code. Each transmitter operates on one of 7 frequencies.

Note: To activate a SAME alert, a SAME CODE (county ID) must be selected and turned ON (see section 4-8-2).

4-8-1 TONE ALERT

If TONE ALERT is ON and an alert tone of 1050 Hz is broadcast from the NOAA weather station, the weather alert is picked up automatically and the alarm sounds. Press any key to cancel the alarm and to hear the weather alert message.

```
RADIO SETUP          ►TONE ALERT        TONE ALERT
 INT SPEAKE▲          SAME ALERT        ►ON
 WATCH MODE           SAME CODE          OFF
►WX ALERT
 COM PORT   ▼
```
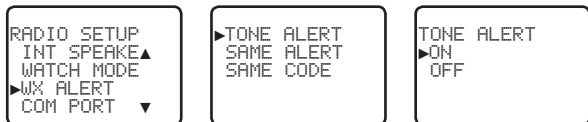
1. Select RADIO SETUP then WX ALERT.
2. Select TONE ALERT.
3. Select ON to hear any weather alerts on 1050 Hz - the TONE ALERT symbol 🔘 will be displayed on the LCD ***or***, to ignore these weather alerts, select OFF.

4-8-2 SAME ALERT

Note: SAME ALERT works only after you have entered and selected a SAME code for your geographic area (see Section 4-8-5 and 4-8-6).

Note: SCAN mode will operate up to 50% more slowly when SAME ALERT is ON to allow time to decode the special warning code transmissions.

```
┌─────────────────┐   ┌─────────────────┐   ┌─────────────────┐
│RADIO SETUP      │   │ TONE ALERT      │   │SAME ALERT       │
│  INT SPEAKE▲    │   │▶SAME ALERT      │   │ ON              │
│  WATCH MODE     │   │ SAME CODE       │   │▶OFF             │
│▶WX ALERT        │   │                 │   │                 │
│ COM PORT  ▼     │   │                 │   │                 │
└─────────────────┘   └─────────────────┘   └─────────────────┘
```

1.   Select RADIO SETUP then WX ALERT.

2.   Select SAME ALERT.

3.   Select ON to receive any local NWR or EAS alerts - the SAME ALERT symbol `SAME`
       will be displayed on the LCD *or*, to ignore these weather alerts, select OFF.

4-8-3 Receiving a SAME ALERT

If SAME ALERT alert is ON and an NWR or EAS alert for your geographic area is broadcast by
the NOAA NWR transmitters, the alert is picked up automatically and the alarm sounds.
Press any key to cancel the alarm.

If the alert is being sent by NOAA NWR, the radio automatically tunes to the designated
frequency so that you can listen to the alert.

If the alert is being sent by the EAS, the nature of the alert is shown on the LCD as WARNING,
WATCH, ADVISORY, or TEST.
Press any key to show the nature of the alert. (The list of alerts is shown in Appendix C.)

4-8-4 Receiving SAME TEST messages

In addition to the WARNING, WATCH and ADVISORY alerts, the EAS also send out TEST mes-
sages so that you can check your WX ALERT setup is working correctly. The TEST message is
usually transmitted between 1000 and 1200 (10.00AM and noon) every Wednesday.

Note: If there is a threat of severe weather, the test is postponed until the next good weather
day.

If your WX ALERT setup is working correctly, the alert sounds and TEST is displayed on the
LCD, followed by a broadcast message from the National Weather Service.

4-8-5 Enter a SAME CODE (County ID)

If you want to receive SAME weather alerts, you must enter and then Select a SAME code for
your geographic area into your radio. You can enter a maximum of 4 SAME codes (4 counties)
in your geographic area.

Telephone 1-888-NWR-SAME (1-888-697-7263) or visit www.nws.noaa.gov/nwr/indexnw.htm
to find the SAME codes for your geographic area (you must be within the United States of
America, Puerto Rico, the U.S. Virgin Islands and U.S. Pacific Territories).

```
┌──────────────┐  ┌──────────────┐  ┌──────────────┐  ┌──────────────┐
│RADIO SETUP   │  │WX ALERT      │  │SAME CODE     │  │INPUT SAME    │
│ INT SPEAKE▲  │  │ TONE ALERT   │  │▶NEW CODE     │  │CODE          │
│ WATCH MODE   │  │ SAME ALERT   │  │              │  │              │
│▶WX ALERT     │  │▶SAME CODE    │  │              │  │_____        │
│ COM PORT  ▼  │  │              │  │              │  │              │
└──────────────┘  └──────────────┘  └──────────────┘  └──────────────┘

┌──────────────┐  ┌──────────────┐
│SAME CODE     │  │SAME CODE     │
│012011        │  │▶NEW CODE     │
│▶STORE        │  │ 0122003      │
│ CANCEL       │  │              │
└──────────────┘  └──────────────┘
```

1. Select RADIO SETUP then WX ALERT.
2. Select SAME CODE. If you have already entered any SAME codes, they are listed on the LCD.
3. Select NEW CODE. Enter the new SAME code along the dashed line, one number at a time. Press ENT to confirm each correct entry and to move to the next digit.

    If you make an error, press – until < appears, then press ENT to backup and correct the entry.
4. Press ENT to store the SAME code.
5. Repeat if necessary to enter a maximum of 10 SAME codes.

4-8-6 Select a working SAME code

You must select a SAME code for your geographic working area that you have previously entered into the radio in order to receive SAME weather alerts:

```
┌──────────────┐  ┌──────────────┐  ┌──────────────┐  ┌──────────────┐
│RADIO SETUP   │  │WX ALERT      │  │SAME CODE     │  │012203        │
│ INT SPEAKE▲  │  │ TONE ALERT   │  │ NEW CODE     │  │ EDIT         │
│ WATCH MODE   │  │ SAME ALERT   │  │▶012203       │  │ DELETE CODE  │
│▶WX ALERT     │  │▶SAME CODE    │  │ 017093       │  │▶SELECT CODE  │
│ COM PORT  ▼  │  │              │  │              │  │              │
└──────────────┘  └──────────────┘  └──────────────┘  └──────────────┘

┌──────────────┐
│SELECT CODE   │
│012203        │
│▶YES          │
│ NO           │
└──────────────┘
```

1. Select RADIO SETUP then WX ALERT.
2. Select SAME CODE. If you have already entered any SAME codes, they are listed on the LCD.
3. Select the SAME# for your geographic area (0122003 in the above example) and press ENT.
4. Choose SELECT CODE. Then select YES.

4-9 NMEA protocol (COM PORT)

The COM PORT must be configured correctly before use. The radio can be added to a group of instruments using NMEA protocol.

```
RADIO SETUP
  WATCH MODE▲
  WX ALERT
▶COM PORT
  GPS SOURCE▼
```

```
NMEA
CHECK SUM
▶ON
  OFF
```

1. Select RADIO SETUP then COM PORT.
2. Select the desired setting then press ENT.

    CHECK SUM ON (on) is the usual setting.

    The COM PORT uses 4800 baud rate and can receive the following GPS data sentences: RMC, GGA, GLL, GNS. Additionally, the radio will output the following NMEA DSC data: DSC (for DSC call), DSE (for enhanced position).

4-10 Select the GPS source (GPS SOURCE)

This radio can use either NMEA 0183 or NMEA 2000 protocol to receive GPS data from a compatible GPS unit.

Note: NMEA 2000 SOURCE options will appear (up to 4 sources showing the actual source name) only if an NMEA 2000 network is connected to the radio and is operational.

```
RADIO SETUP
  WX ALERT  ▲
  COM PORT
▶GPS SOURCE
  FAV CH SETU
```

```
GPS SOURCE
▶NMEA0183
  LGC3000
  LCX113CHD
```
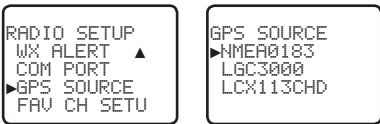
1. Select RADIO SETUP then GPS SOURCE. (If there is only one NMEA protocol available on your vessel, only that will be shown).
2. Select the desired NMEA source then press ENT.

4-11 Favourite channel setup - Wx key (FAV CH SETU)

EU and AUS models only.

The Wx key can be programmed to a weather channel of your choice so that you have quick access to that channel.

1. Select RADIO SETUP then FAV CH SETU.

2. Rotate the CH knob or press UP/DOWN key to select a channel that you want to save it as the WX favorite channel, then press ENT to save with WX icon lighting to indicate.

Section 5 - DSC setup menu (DSC SETUP)

⚠ WARNING

A valid USER MMSI must be entered into the radio before these DSC functions can be used. See Section 5-1 for instructions on entering your USER MMSI.

Hold down CALL/MENU key for about 1 second to access the following DSC SETUP options. The following menu options are explained in this section.

DSC SETUP	USER MMSI		Section 5-1
	GROUP SETUP		Section 5-2
	ATIS MMSI (EU only)		Section 5-3
	ATIS SELECT (EU only)		Section 5-4
	INDIV REPLY		Section 5-5
	DSC FUNC		Section 5-6
	LL REPLY		Section 5-7
	AUTO SWITC		Section 5-8
	TEST REPLY		Section 5-9
	TIMEOUT		Section 5-10

See sections 1-3 and 1-4 if you want to know how to move around the menu and enter, save and change data.

5-1 Enter or view your USER MMSI (USER MMSI)

This is a **once-only** operation. You must enter your user MMSI before you can access the DSC functions.

You can display and read your user MMSI at any time, but you get only one opportunity to enter your user MMSI.

The user MMSI (Marine Mobile Service Identity) is a unique 9 digit number, similar to a personal telephone number. It is used on marine transceivers that are capable of using DSC (Digital Select Calling).

Contact the appropriate authorities in your country to obtain your user MMSI. If you are unsure who to contact, consult your Lowrance dealer.

```
DSC SETUP
▶USER MMSI
 GROUP SETUP
 ATIS MMSI
 ATIS SELEC▼
```

```
INPUT USER
MMSI

_____
```

```
USER MMSI
876543210
▶STORE
 CANCEL
```

```
USER MMSI
INPUT AGAIN

_____
```

```
┌─────────────┐   ┌─────────────┐   ┌─────────────┐
│USER MMSI    │   │DSC SETUP    │   │VIEW MMSI    │
│876543210    │   │▶USER MMSI   │   │             │
│▶STORE       │   │ GROUP SETUP │   │876543210    │
│ CANCEL      │   │ ATIS MMSI   │   │             │
│             │   │ ATIS SELEC▼ │   │             │
└─────────────┘   └─────────────┘   └─────────────┘
```

1. Select DSC SETUP, then USER MMSI.

    If you have already entered your MMSI, it is shown on the LCD.

2. If this is the **first time** that you are entering your MMSI, a dashed line appears.

    Enter your MMSI along the dashed line, one number at a time. Press ENT to confirm each correct entry and to move to the next digit.

    If you make an error, press – until < appears, then press ENT to backup and correct the entry.

3. Press ENT to store your user MMSI.

4. Enter your user MMSI again as a password check, then press ENT to permanently store the user MMSI and return to the menu.

5. You can view your stored user MMSI at anytime by selecting USER MMSI in the main menu.

5-2 Maintain your groups

Use GROUP SETUP to create, edit, or delete 1, 2, or up to 20 groups of frequently called people stored in alphanumeric order. A group MMSI always starts with 0.

5-2-1 Create a group (GROUP SETUP)

```
┌─────────────┐   ┌─────────────┐   ┌─────────────┐   ┌─────────────┐
│DSC SETUP    │   │GROUP SETUP  │   │GROUP NAME   │   │FISHING 1    │
│ USER MMSI   │   │>MANUAL NEW  │   │             │   │012345678    │
│▶GROUP SETUP │   │             │   │_____      │   │▶STORE       │
│ ATIS MMSI   │   │             │   │GROUP MMSI   │   │ CANCEL      │
│ ATIS SELEC▼ │   │             │   │0_____      │   │             │
└─────────────┘   └─────────────┘   └─────────────┘   └─────────────┘
```

1. Select DSC SETUP then GROUP SETUP.

2. Select MANUAL NEW.

3. If this is the **first time** that you are entering a group name, a dashed line appears

4. Enter the group name along the dashed line. It can be a maximum of 12 alphanumeric characters. Press ENT to confirm each correct entry and to move to the next position.

    If you make an error, press – until < appears, then press ENT to backup and correct the entry.

5. Enter the group MMSI. (Note that the first number is always a 0.) Press ENT.

6. The group name and group MMSI are shown in a confirmation screen. Press ENT to store the details and return to the GROUP SETUP screen.

5-2-2 Edit or delete a group name or group MMSI (GROUP SETUP)

You can edit a group name or group MMSI at any time.

```
DSC SETUP
 USER MMSI
▶GROUP SETUP
 ATIS MMSI
 ATIS SELEC▼
```
```
GROUP SETUP
 MANUAL NEW
▶FISHING 1
 SAILING
```
```
FISHING 1
012345678
▶EDIT
 DELETE
```
```
EDIT NAME
FISHING 1
ENTER MMSI
012345678
```

```
FISHING 1
012345678
▶STORE
 CANCEL
```

1.   Select DSC SETUP then GROUP SETUP. The existing group names are displayed.
2.   Select the group you want to edit. Press ENT.
3.   To delete the group, select DELETE then YES. The group is deleted immediately and the group list is displayed again.
4.   To edit the group, select EDIT.
5.   Edit the group name OR to edit only the MMSI, press ENT repeatedly until the cursor moves to the MMSI line.
6.   When you are finished, press ENT (repeatedly if necessary) until a new LCD appears.
7.   Press ENT to store the changes and return to the GROUP SETUP screen.

5-3 Enter or check your ATIS MMSI (ATIS MMSI)

EU models only.

You must enter your ATIS MMSI to access ATIS functionality if you are navigating inland waterways within Europe.

*   ATIS sends a digital message any time that you release the PTT key. Inland waterways rules require 1 W Tx power on Channels 06, 08, 10, 11, 12, 13, 14, 15, 17, 71, 72, 74, and 77.
*   An ATIS MMSI always starts with the number 9
*   This is a **once-only** operation. You must enter your ATIS MMSI before you can access the ATIS functions
*   You can display and read your ATIS MMSI at any time, but you get only one opportunity to enter your ATIS MMSI.

1.   Select DSC SETUP then ATIS MMSI.

     If you have already entered your ATIS MMSI, it is shown on the LCD.

```
DSC SETUP
 USER MMSI
 GROUP SETUP
▶ATIS MMSI
 ATIS SELEC▼
```

```
INPUT ATIS
MMSI

9_____
```

```
ATIS MMSI
9987654321
▶STORE
 CANCEL
```

```
ATIS MMSI
INPUT AGAIN

9_____
```

```
ATIS MMSI
9987654321
▶STORE
 CANCEL
```

2. If this is the **first time** that you are entering your ATIS MMSI, a dashed line appears. Enter your ATIS MMSI along the dashed line. The first number is always 9. Press ENT to confirm each correct entry and to move to the next digit.

    If you make an error, press – until < appears then press ENT to backup and correct the entry.

3. Press ENT to store the ATIS MMS.

4. Enter your ATIS MMSI again as a password check, then press ENT to permanently store the ATIS MMSI and return to the menu.

5. You can view your stored ATIS MMSI at any time by selecting ATIS MMSI in the main menu.

5-4 Enable ATIS functionality (ATIS SELECT)

EU models only.

ATIS functionality will operate only after the ATIS MMSI has been entered (see previous section).

When ATIS functionality is enabled, the ATIS symbol **ATIS** is shown on the LCD.

```
DSC SETUP
 GROUP SETUP
 ATIS MMSI
▶ATIS SELECT
 INDIV REPL▼
```

```
ATIS SELECT
▶ON
 OFF
```

1. Select DSC SETUP then ATIS SELECT.

2. Select OFF to disable ATIS functionality or select ON to enable the ATIS functionality - DSC must be turned off first.

3. Press ENT to confirm.

Note: It is not possible to have both ATIS ON (on) and DSC ON (on) simultaneously. If you want to activate ATIS, you must first switch DSC off. A warning will remind you if DSC is already ON.

5-5 Response to individual calls (INDIV REPLY)

You can respond to incoming individual calls with an automatic response or with a manual response.

An automatic response sends an acknowledgement and then sets the request link channel, ready for a conversation.

A manual response asks if you want to acknowledge the call, and then asks if you want to converse with the caller.

1. Select DSC SETUP, then INDIV REPLY.
2. Select AUTO for an automatic response, or MANUAL for a manual response.
3. Press ENT to confirm your choice and return to the menu.

```
DSC SETUP
 GROUP SETU▲
 ATIS MMSI
 ATIS SELECT
▶INDIV REPL▼
```

```
INDIV REPLY
 MANUAL
▶AUTO
```

5-6 Enable DSC functionality (DSC FUNC)

DSC functionality will operate only after a valid USER MMSI has been entered - see 5-1.

When DSC functionality is selected, the DSC symbol ⬛DSC⬛ is shown on the LCD.

```
DSC SETUP
 ATIS MMSI ▲
 ATIS SELECT
 INDIV REPLY
▶DSC FUNC  ▼
```

```
DSC FUNC
▶ON
 OFF
```

1. Select DSC SETUP then DSC FUNC.
2. Select OFF to disable DSC functionality or select ON to enable the DSC functionality - ATIS (if applicable) must be turned off first.

Note: Disabling DSC functionality is not recommended.

3. Press ENT to confirm.

Note: It is not possible to have both ATIS ON (on) and DSC ON (on) simultaneously. If you want to activate DSC, you must first switch ATIS off. A warning will remind you if ATIS is already ON.

5-7 Response type to LL polling calls (LL REPLY)

You can set up the radio to respond to an LL polling request in one of three ways:

- **MANUAL**   reply manually to any incoming LL polling requests from your buddies.
- **AUTO**   automatically replies to any incoming LL polling requests from any of your buddies.
- **OFF**   ignores all incoming buddy LL polling requests.

```
DSC SETUP
 INDIV REPL▲
 DSC FUNC
▶LL REPLY
 AUTO SWITC▼
```

```
LL REPLY
▶MANUAL
 AUTO
 OFF
```
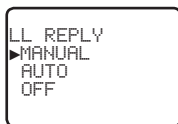
1. Select DSC SETUP then LL REPLY.
2. Select your response and press ENT to confirm and return to the menu.

5-8 Automatic channel switching (AUTO SWITCH)

When a DSC call is received, it may include a request to change to a specific channel for subsequent communications. If a channel switch request is included, your options are:

- allow the radio to switch to the requested channel immediately by pressing the ENT button, or
- do nothing to allow the radio to automatically switch to the requested channel after a delay of 10 seconds, or
- cancel the automatic switch and remain on the current channel by pressing the EXIT button.

However, automatic switching to a subsequent communications channel on receipt of a DSC call might in some cases disrupt important ongoing communications if the working channel changes without the operator knowing.

You can prevent the radio from automatically switching from the current working channel by setting the AUTO SWITCH feature to OFF.

If the AUTO SWITCH feature is set to OFF, an **X** will be displayed on the LCD to remind you that this feature is set to off. Additionally, the text "AUTO SW OFF" will be included in an All Ships or Group call replacing the text "AUTO CHxx"

```
DSC SETUP
 DSC FUNC ▲
 LL REPLY
▶AUTO SWITC
 TEST REPLY▼
```

```
AUTO SWITCH
▶ON
 OFF
```
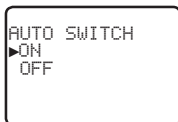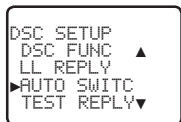
1. Select DSC SETUP, then AUTO SWITCH.
2. Select ON (on) to enable automatic channel switching.
3. Select OFF (off) to disable automatic channel switching.

5-9 DSC Test Reply (TEST REPLY)

You can respond to incoming DSC TEST calls with an automatic response or with a manual response.

- **MANUAL** manual response is required, press ENT to confirm or press EXIT to cancel.
- **AUTO** automatically replies after a 10 second delay with an ACK to any incoming DSC TEST call.

```
DSC SETUP
 LL REPLY  ▲
 AUTO SWITC
▶TEST REPLY
 TIMEOUT
```

```
TEST REPLY
▶AUTO
 MANUAL
```

5-10 Set the inactivity timer (TIMEOUT)

You can set the inactivity timer with the following options:

- **AUTOMATED** you can set the inactivity timer to automatically timeout after a period of inactivity for the following two categories: NON-DISTRESS or DISTRESS.
  Timeout options are:
  DISTRESS: NO TIMEOUT; 5 MINS; 10 MINS (default is NO TIMEOUT)
  NON-DISTR: NO TIMEOUT; 10 MINS; 15 MINS (default is 15 MINS)

- **NON AUTO** you can set the inactivity timer to exit any non-automated procedure activity.
  Timeout options are:
  NO TIMEOUT; 10 MINS; 15 MINS (default is 10 MINS)

Note: If NO TIMEOUT is selected, then you must press the EXIT key to exit the procedure.

Example: to set a 10 minute TIMEOUT for non-automated functions:

1. Select TIMEOUT, then select NON AUTO
2. Select desired timeout period: NO TIMEOUT, 10 MINS or 15 MINS

```
DSC SETUP
 LL REPLY  ▲
 AUTO SWITC
 TEST REPLY
▶TIMEOUT
```

```
TIMEOUT
▶AUTOMATED
 NON AUTO
```

```
NON AUTO
 NO TIMEOUT
▶10 MINS
 15 MINS
```

In this example, 10 MINS has been selected, meaning the radio will exit any non-automated procedure after a period of 10 minutes of non-activity.

Section 6 - AIS setup menu (AIS SETUP)

Hold down CALL/MENU key for about 1 second to access the following AIS SETUP options. The following menu options are explained in this section.

AIS SETUP	AIS FUNC		Section 6-1
	AIS DISPLAY		Section 6-2
	BAUD RATE		Section 6-3
	GPS REDIR		Section 6-4
	CPA ALARM		Section 6-5
	CPA		Section 6-6
	TCPA		Section 6-7

See sections 1-3 and 1-4 if you want to know how to move around the menu and enter, save and change data.

6-1 Enable AIS functionality (AIS FUNC)

The AIS function can be turned ON or OFF. When AIS functionality is selected, the AIS symbol `AIS` is shown on the LCD.

```
AIS SETUP
▶AIS FUNC
 AIS DISPLAY
 BAUD RATE
 GPS REDIR
```

```
AIS FUNC
▶ON
 OFF
```

6-2 AIS data display format (AIS DISPLAY)

When viewing the AIS plotter screen, AIS targets can be displayed with the vessels name or the vessels MMSI.

```
AIS SETUP
▶AIS DISPLAY
 BAUD RATE
 GPS REDIR
 CPA ALARM
```

```
AIS DISPLAY
▶SHIP MMSI
 SHIP NAME
```

6-3 AIS baud rate (BAUD RATE)

AIS data can be output to a compatible chart-plotter / MFD or PC via the NMEA port. The NMEA port baud rate can be set to 4800 or 38400. The default setting is 38400. If 4800 is selected, a warning that data may be lost is displayed.

```
AIS SETUP
▶BAUD RATE
 GPS REDIR
 CPA ALARM
 CPA
```

```
AIS SETUP
 38400
▶4800
```

```
AIS INFO
MAY BE LOST!
▶NO
 YES
```

6-4 GPS redirection (GPS REDIR)

GPS redirection option set to output the GPS information to the chartplotter eliminating the need for an additional multiplexer.
If "yes" is selected, the string $RMC will be redirected to the chartplotter once it is received.

Note: The REDIR function will only redirect RMC and GLL messages from NMEA 0183 input port to the AIS output port.

```
AIS SETUP
▶GPS REDIR
  CPA ALARM
  CPA
  TCPA
```

```
GPS REDIR
▶NO
  YES
```

6-5 Closest point of approach alarm (CPA ALARM)

Enables the CPA alarm. If set to OFF, there will be no T/CPA alarms regardless of the settings.

```
AIS SETUP
  GPS REDIR
▶CPA ALARM
  CPA
  TCPA
```

```
CPA ALARM
▶ON
  OFF
```

6-6 Closest point of approach settings (CPA)

CPA is the minimum distance between you and a target vessel based on the current speed and course. You can set the minimum distance for CPA alarm to sound (1 NM to 30 NM).
Rotate the dial to set the CPA distance in 1 NM increments. Press ENT when done.

```
AIS SETUP
  GPS REDIR
  CPA ALARM
▶CPA
  TCPA
```

```
CPA
▶01NM
```

6-7 Time to closest point of approach (TCPA)

TCPA is the minimum time of intercept between you and a target vessel based on the current speed and course. Set the minimum time for the TCPA alarm to sound (5 Min to 30 Min).
Rotate the dial to set the TCPA time in 30 sec increments. Press ENT when done.

```
AIS SETUP
  GPS REDIR
  CPA ALARM
  CPA
▶TCPA
```

```
TCPA
▶05:00Min
```

Section 7 - Sending and receiving DSC Calls

⚠ WARNING

A valid USER MMSI must be entered into this radio before these DSC functions can be used. See section 5-1.

7-1 What is DSC?

DSC (Digital Selective Calling) is a semi-automated method of establishing VHF, MF, and HF radio calls. It has been designated as an international standard by the IMO (International Maritime Organization) and is part of the GMDSS (Global Maritime Distress and Safety System).

Currently, you are required to monitor Distress Channel 16, but DSC will eventually replace listening watches on distress frequencies and will be used to broadcast routine and urgent maritime safety information.

DSC enables you to send and receive calls from any vessel or coast station that is equipped with DSC functionality and within geographic range. Calls can be categorized as distress, urgency, safety, or routine, and DSC selects a working channel automatically.

7-2 Sending DSC Calls

You can call any other person that has another DSC equipped radio.

- Quick press the CALL / MENU key to access the following DSC CALL menu options – select LAST CALL to quickly call back the person who called you.

- Note that only four DSC CALL menu options can be shown on the LCD at any one time.

- Press + or – on the microphone **or** turn the Channel Select knob on the base station to scroll up or down through the menu until the cursor is positioned at the desired option. Press ENT (the center of the Channel Select knob) to display that option.

The following options are available:

DSC CALL	INDIVIDUAL	Make a DSC Call	Section 7-3
	LAST CALL	Repeat the last DSC Call	Section 7-5
	GROUP	Make a Group DSC Call	Section 7-6
	ALL SHIPS	Make an All Ships DSC Call	Section 7-7
	CALL LOG	View DSC Call Log	Section 7-8
	DISTR LOG	View DSC Distress Log	Section 7-9
	SENT CALL	View DSC Sent Call Log	Section 7-10
	LL REQUEST	Request a position report	Section 7-11
	TRACK BUDDY	Automatically track Buddy's	Section 7-12
	DSC TEST	Make a DSC Test Call	Section 7-13
	MMSI/GPS	View MMSI and GPS information	Section 7-14

Call to a Buddy

```
DSC CALL
▶INDIVIDUAL
 LAST CALL
 GROUP
 ALL SHIPS ▼
```

```
INDIVIDUAL
▶ROUTINE
 SAFETY
 URGENCY
```

```
INDIVIDUAL
 MANUAL NEW
▶MERMAID IV
 SEAROSE
```

```
CHOOSE CH

▶INTER-SHIP
 MANUAL
```

```
MERMAID IV
 INDIVIDUAL
 ROUTINE
▶SET INTER
```

```
MERMAID IV
 INDIVIDUAL
 ROUTINE
▶SEND?
```

```
MERMAID IV
 INDIVIDUAL
 ROUTINE
 WAIT.. 00:00
```

```
INDIVIDUAL
 ROUTINE
 ACK FROM
 MERMAID IV
  ▼ 00:00
```

Call to others

```
DSC CALL
▶INDIVIDUAL
 LAST CALL
 GROUP
 ALL SHIPS ▼
```

```
INDIVIDUAL
>ROUTINE
 SAFETY
 URGENCY
```

```
INDIVIDUAL
>MANUAL NEW
 MERMAID IV
 SEAROSE
```

```
MANUAL MMSI
0_____
```

```
CHOOSE CH

▶INTER-SHIP
 MANUAL
```

```
678912345
 INDIVIDUAL
 ROUTINE
>SEND?
```

```
678912345
 INDIVIDUAL
 ROUTINE
 CALLING...
```

```
678912345
 INDIVIDUAL
 ROUTINE
 WAIT.. 00:00
```

1.   Select DSC CALL then INDIVIDUAL.

2.   Select the priority level: ROUTINE, SAFETY, URGENCY.

3.   Select the buddy you want to call from your buddy list - *or* Select MANUAL NEW then enter the MMSI of the individual you want to call and press ENT.

4.   Choose a working channel to talk on. Select the INTER-SHIP and press ENT. The radio automatically lists all Inter-ship (Simplex) channels that can be used. Duplex channels cannot usually be called, however, If you wish to use a Duplex channel, select MANUAL instead, then select your channel of choice. If the call is to a Coast Station (MMSI begins with 00) the radio will recognize this and specify the correct channel to talk on.

5.   Press ENT to SEND the call. Channel 70 is selected automatically and the Tx symbol is shown on the LCD while the call is being sent.

6.   The radio waits for an acknowledgement (WAIT). If the call is acknowledged (INDIV ACK) press PTT to talk. Rotate the Channel Select knob to view additional options.

7.   If there is no reply (UNABLE TO ACKNOWLEDGE) a message asks if you want to retry (SEND AGAIN?). Press ENT to retry the call.

7-4 Acknowledgement of an individual incoming call (INDIV)

When an incoming call is received, the alarm sounds for 2 minutes and INDIVIDUAL is displayed.

```
INDIVIDUAL
ROUTINE FROM
123456789
NO AUTO SW
    ▼   00:01
```
```
ROUTINE FROM
123456789
NO AUTO SW
CH12 REQUEST
  ▲▼   00:02
```
```
123456789
NO AUTO SW
CH12 REQUEST
12:45 UTC
    ▲   00:03
```
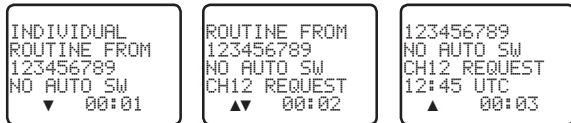
1. Press **SILENC** softkey (AIS/IC key) to silence the alert.

2. Press +/- button or rotate the CH knob to scroll any further information about the call.

3. Press **NEW-CH** softkey (AIS/IC key) to request a different working channel, or press **ABLE** softkey (WX/NAV key) to acknowledge the call.

4. Or press EXIT to return to standby.

7-5 Reply to the Last Call (LAST CALL)

This facility is useful and used frequently.

```
DSC CALL
 INDIVIDUAL
▶LAST CALL
 GROUP
 ALL SHIPS ▼
```
```
SEAROSE
INDIVIDUAL
ROUTINE
10:22AM LOC
```
```
CHOOSE CH

▶INTER-SHIP
 MANUAL
```
```
SEAROSE
INDIVIDUAL
ROUTINE
▶SEND?
```
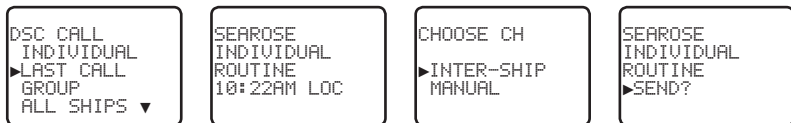
1. Select DSC CALL then LAST CALL.

2. The contact details of the most recent incoming call are displayed. Press ENT.

3. Choose a working channel to talk on. Select the INTER-SHIP and press ENT. The radio automatically lists all Inter-ship (Simplex) channels that can be used. Duplex channels cannot usually be called, however, If you wish to use a Duplex channel, select MANUAL instead, then select your channel of choice. If the call is to a Coast Station (MMSI begins with 00) the radio will recognize this and specify the correct channel to talk on.

4. The call details are shown. Press ENT to send the call. The Tx symbol is displayed on the LCD while the call is being sent.

5. If the call is acknowledged (INDIV ACK) press PTT to talk. If there is no reply a message asks if you want to retry (SEND AGAIN?). Press ENT to retry the call.

7-6 Send a group call (GROUP)

You must already have stored a GROUP MMSI before making the call - see Section 5-2. Group calls are always sent with ROUTINE priority.

```
DSC CALL
 INDIVIDUAL
▶LAST CALL
 GROUP
 ALL SHIPS ▼
```
```
GROUP
▶DIVE 1
 DIVE 2
```
```
CHOOSE CH

▶INTER—SHIP
 MANUAL
```
```
DIVE 1
GROUP CALL

▶SEND?
```
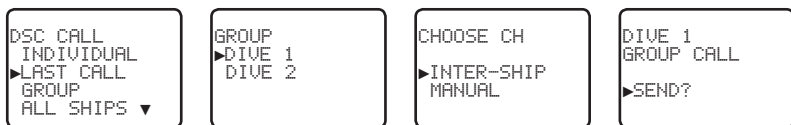
1. Select DSC CALL then GROUP.

    The radio displays the names of your pre-programed groups.

2. Select the group that you want to call (the GROUP MMSI must be set before making the call).

3. Choose a working channel to talk on. Select the INTER-SHIP and press ENT. The radio automatically lists all Inter-ship (Simplex) channels that can be used. Duplex channels cannot usually be called, however, If you wish to use a Duplex channel, select MANUAL instead, then select your channel of choice.

4. The call details are shown. Press ENT to send the call. The Tx symbol is displayed on the LCD while the call is being sent.

7-7 Send an all ships call (ALL SHIPS)

```
DSC CALL
 LAST CALL ▲
 GROUP
▶ALL SHIPS
 CALL LOG  ▼
```
```
ALL SHIPS
▶SAFETY
 URGENCY
```
```
CHOOSE CH

▶INTER—SHIP
 MANUAL
```
```
ALL SHIPS
SAFETY
▶SEND?
```
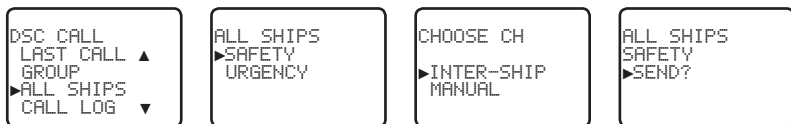
1. Select DSC CALL then ALL SHIPS.

2. Select one of the following call priorities:

    *   **SAFETY**   To send safety information to all other vessels in range.
    *   **URGENCY**   For use when a serious situation or problem arises that could lead to a distress situation.

3. Choose a working channel to talk on. Select the INTER-SHIP and press ENT. The radio automatically lists all Inter-ship (Simplex) channels that can be used. Duplex channels cannot usually be called, however, If you wish to use a Duplex channel, select MANUAL instead, then select your channel of choice.

4. The call details are shown. Press ENT to send the call. The Tx symbol is displayed on the LCD while the call is being sent.

7-8 Send using the call log (CALL LOG)

The Call Log contains the contact details for the 20 most recent incoming calls, so that you can call any of them again quickly.

When the call log is full, the oldest entry is overwritten.

```
DSC CALL
 GROUP      ▲
 ALL SHIPS
►CALL LOG
 DISTR LOG  ▼
```

```
11 12345678
INDIVIDUAL
ROUTINE
09:45 UTC
```

```
11 12345678
►CALL BACK
 DELETE
 SAVE MMSI
```

```
CHOOSE CH

►INTER-SHIP
 MANUAL
```

```
12345678
INDIVIDUAL
ROUTINE
►SEND?
```

1. Select DSC CALL then CALL LOG.
2. The radio displays the contact details for the most recent incoming call as the first entry (01) in the call log. In the example, the contact details for the 11th most recent call are displayed. Press ENT to move to the next screen.
3. Press ENT again to confirm the call back.
4. Choose a working channel to talk on. Select the INTER-SHIP and press ENT. The radio automatically lists all Inter-ship (Simplex) channels that can be used. Duplex channels cannot usually be called, however, If you wish to use a Duplex channel, select MANUAL instead, then select your channel of choice. If the call is to a Coast Station (MMSI begins with 00) the radio will recognize this and specify the correct channel to talk on.
5. The call details are shown. Press ENT to send the call. The Tx symbol is displayed on the LCD while the call is being sent.

7-9 Send using the distress log (DIST LOG)

```
DSC CALL
 ALL SHIPS ▲
 CALL LOG
▶DISTR LOG
 SENT CALL ▼
```

```
02 SEASPRAY
DISTRESS
FLOODING

ENT-->OPTION
```

```
02 SEASPRAY
▶CALL BACK
 DELETE
 INFO
```

```
CHOOSE CH

▶INTER-SHIP
 MANUAL
```

```
02 SEASPRAY
 INDIVIDUAL
 ROUTINE
▶SEND?
```

The Distress Log contains the Distress Log data for the 20 most recent received Distress Calls, so that you can call any of them quickly. Always try to make voice contact on CH16 first, as follows:

1. Select DSC CALL then DIST LOG.

2. The most recently received Distress Call is the first entry (01) in the Distress Log. Select the entry that you want to call and press ENT.

3. Select one of the following options:

   - **CALL BACK** To CALL the station.
   - **DELETE** To delete the details from the distress log.
   - **INFO** To view additional information about the station.

4. Select CALL BACK and press ENT.

5. Choose a working channel to talk on. Select the INTER-SHIP and press ENT. The radio automatically lists all Inter-ship (Simplex) channels that can be used. Duplex channels cannot usually be called, however, If you wish to use a Duplex channel, select MANUAL instead, then select your channel of choice. If the call is to a Coast Station (MMSI begins with 00) the radio will recognize this and specify the correct channel to talk on.

6. The call details are shown. Press ENT to send the call. The Tx symbol is displayed on the LCD while the call is being sent.

7-10 View sent call log (SENT CALL)

The Sent Call log contains the contact details for the 20 most recent sent calls, so that you review details of the call.

```
DSC CALL
 CALL LOG    ▲
 DISTR LOG
▶SENT CALL
 LL REQUEST  ▼
```

```
01 BOBBY D
INDIVIDUAL
ROUTINE
10:45 UTC
```

```
BOBBY D
▶DELETE
```

1. Select DSC CALL then SENT CALL. Scroll down to the desired sent call details.
2. The radio displays the details for the most recent sent call as the first entry (01) in the call log. In the example, the contact details for the most recent call are displayed.
3. Press ENT to advance to next screen. You now have the following options:
    *   **DELETE**   To delete the entry from the sent call log.

7-11 Request the LL position of a Buddy (LL REQUEST)

```
DSC CALL
 DIST LOG    ▲
 SENT CALL
▶LL REQUEST
 TRACK BUDD▼
```

```
LL REQUEST
▶STARFISH
 SEAROSE
 MERMAID IV
```

```
STARFISH
LL REQUEST

▶SEND?
```

```
STARFISH
LL REQUEST

CALLING...
```

```
STARFISH
LL REQUEST

WAIT.. 00:00
```

```
POSITION
REPLY FROM
STARFISH
 99°99.999'X
 ▼      00:00
```

1. Press CALL to enter DSC mode, then select LL REQUEST.

2. Select the buddy whose LL position you want to request then press ENT to send the request.

3. The radio waits for an acknowledgement from your buddy. If there is no reply after 30 seconds the radio asks if you want to retry. Press ENT to retry the call.

4. If the call is acknowledged, press **SILENC** softkey (AIS/IC key) to silence the alert, press +/- button or rotate the CH knob to scroll any further information about the call.

7-12 Track your Buddy (TRACK BUDDY)

You can select a buddy or buddy's to automatically track their positions. You must setup a tracklist first and set their track status to ON before buddy track can begin. You can also start and stop tracking your buddy and add or remove buddies from your buddy tracklist.

7-12-1 Start or stop tracking a Buddy (START TRACK)

Use START TRACK to track the position of a buddy(s) on your TRACKLIST whose status is ON (see the following section). The buddy's position is updated at the interval you select in INTERVAL (15, 30, or 60 minutes).
Note: START TRACK will only track buddy(s) on your TRACKLIST whose status is ON.

```
DSC CALL
  SENT CALL ▲
  LL REQUEST
►TRACK BUDD
  DSC TEST  ▼
```

```
TRACK BUDDY
►START TRACK
  SET BUDDY
  TRACKLIST
  INTERVAL
```

```
START TRACK
  SEAROSE OFF
  MERMAID ON
  SEASPRA ON
```

```
START TRACK
>YES
  NO
```

```
MERMAID IV
LL REQUEST

CALLING...
```

```
SEASPRAY
LL REQUEST

CALLING...
```

1. Select DSC CALL then TRACK BUDDY.
2. Select START TRACK. The status of each buddy on your tracklist (ON or OFF) is displayed.
3. Check that the status of the buddy (or buddies) that you want to track is ON, then press ENT.
4. Select YES then press ENT to start tracking (in this example, MERMAID IV and SEASPRAY.)
   An LL Request is sent to each buddy on CH70 and your radio waits for your buddy's LL position to be displayed on the LCD. See Section 7-20 for more information.
   (Select NO in the START TRACK page to STOP tracking your buddies.)

7-12-2 Select a Buddy to Track (SET BUDDY)

```
DSC CALL
  SENT CALL ▲
  LL REQUEST
►TRACK BUDD
  DSC TEST  ▼
```

```
TRACK BUDDY
  START TRACK
►SET BUDDY
  TRACKLIST
  INTERVAL
```

```
SET BUDDY
  SEAROSE OFF
►MERMAID OFF
```

```
SET BUDDY
MERMAID IV
►ON
  OFF
```

1. Select DSC CALL then TRACK BUDDY.
2. Select SET BUDDY to show the status of each buddy on your tracklist (ON or OFF).
3. Select the buddy whose status you want to change, then select the new status and press ENT to confirm.

7-12-3 Add or delete a Buddy on your track list (TRACKLIST)

```
DSC CALL
 SENT CALL ▲
 LL REQUEST
▶TRACK BUDD
 DSC TEST  ▼
```
```
TRACK BUDDY
 START TRACK
 SET BUDDY
▶TRACKLIST
 INTERVAL
```
```
TRACKLIST
▶ADD NEW
 SEAROSE
```
```
ADD NEW
▶MERMAID IV
 SEASPRAY
```

1. Select DSC CALL then TRACK BUDDY.

2. Select TRACKLIST. Any buddies already on the tracklist will be listed.
    Note: To delete a buddy from the tracklist, select that buddy then press ENT. Select YES then press ENT again to delete.

3. Select ADD NEW to show your buddy list. Buddy's must be already setup in your Buddy list - see section 3-3.

4. Select a buddy then press ENT to add that buddy to the tracklist.

7-12-4 Set the track your Buddy update interval (INTERVAL)

Set the interval rate at which the position of your buddy is updated - options are 15, 30 or 60 minutes.

```
DSC CALL
 SENT CALL ▲
 LL REQUEST
▶TRACK BUDD
 DSC TEST  ▼
```
```
TRACK BUDDY
 START TRACK
 SET BUDDY
 TRACKLIST
▶INTERVAL
```
```
TRACKLIST
▶15 MINUTES
 30 MINUTES
 1 HOUR
```

7-13 Make a DSC test call (DSC TEST)

You can test your radio's DSC operation by sending a DSC TEST CALL to a Buddy or other station equipped with a DSC radio.

Note: You should not use a routine DSC call to test your radio and you should minimize the use of the safety channel for test purposes.

7-13-1 Send a DSC TEST call

1. Select DSC CALL then DSC TEST.

2. Select the buddy you want to call from your buddy list, or Select MANUAL NEW then enter the MMSI of the individual you want to call.

3. Press ENT to accept the selection.

4. Press ENT again to SEND the call. Channel 70 is selected automatically and the **TX** symbol is shown on the LCD while the call is being sent.

5. The radio waits for an acknowledgement (WAIT). If the call is acknowledged a notification is displayed.

```
┌─────────────┐  ┌─────────────┐  ┌─────────────┐  ┌─────────────┐
│DSC CALL     │  │DSC TEST     │  │TOM          │  │TOM          │
│ LL REQUEST▲ │  │ MANUAL NEW  │  │DSC TEST     │  │DSC TEST     │
│ TRACK BUDDY │  │ SAM         │  │             │  │             │
│▶DSC TEST    │  │▶TOM         │  │▶SEND?       │  │WAIT.. 00:17 │
│ MMSI/GPS    │  │             │  │             │  │             │
└─────────────┘  └─────────────┘  └─────────────┘  └─────────────┘
```

6. If there is no reply after 30 seconds, the radio asks you if you want to retry.

7-13-2 Receiving an incoming DSC TEST call reply (DSC TEST ACK)

1. When you receive notification of a DSC TEST reply, press **SILENC** softkey (AIS/IC key) to silence the alert.

2. If the radio recognizes the user MMSI as one of your buddies, the buddy's name is displayed in place of the user MMSI.

7-13-3 Acknowledging an incoming DSC TEST call

The radio sounds a friendly two-tone alert when it detects an incoming DSC TEST call.

Note: If TEST REPLY is set to AUTO, no sound will be emitted.

1. If the radio recognizes the MMSI as one of your buddies, your buddy's name is displayed in place of the MMSI.

2. Press **SILENC** softkey (AIS/IC key) to silence the alert.

3. The radio will automatically acknowledge the call if TEST REPLY is set to AUTO *(See section 5-9)* and after a TIMEOUT period set for AUTO REPLY *(See section 5-10)*.

```
┌─────────────┐  ┌─────────────┐
│TEST         │  │CALL FROM    │
│CALL FROM    │  │TOM          │
│TOM          │  │AUTO ACK     │
│AUTO ACK     │  │ IN 10S      │
│   ▼ 00:01   │  │  ▲▼ 00:02   │
└─────────────┘  └─────────────┘
```

4. Alternatively, if TEST REPLY is set to MANUAL, a manual response is required, press ACK (AIS/IC key) to acknowledge the DSC Test Call.

```
┌─────────────┐  ┌─────────────┐
│TEST         │  │CALL FROM    │
│CALL FROM    │  │TOM          │
│TOM          │  │AUTO ACK     │
│AUTO ACK     │  │IS OFF       │
│   ▼ 00:01   │  │  ▲▼ 00:02   │
└─────────────┘  └─────────────┘
```

5. Press +/- button or rotate the CH knob to scroll any further information (if available), or press EXIT to cancel.

7-14 View user MMSI and GPS information

The radio's MMSI can be viewed as well as the current position.

```
DSC CALL
 LL REQUEST▲
 TRACK BUDDY
 DSC TEST
▶MMSI/GPS
```

```
ID:123456789
 99°99.999'X
999°99.000'Y
```

7-15 Receiving DSC calls

Several types of DSC calls can be received from vessels within range at various priority levels:

- **DISTRESS**   See Section 8.

- **ALL SHIPS**   Urgency or Safety priority (see Section 7-16)

- **INDIVIDUAL**   Urgency, Safety, or Routine priority (see Section 7-17)

- **GROUP**   Routine priority only (see Section 7-18)

- **GEOGRAPHIC**   Routine priority only see Section 7-19)

- **POLLED POSITION**   Routine or Safety priority (see Section 7-20)

In addition to the audible alert, the telephone icon will flash on the screen.

This is to remind you that a call is stored in the CALL LOG. Polled position call data is NOT stored.

7-16 Receiving an all ships call (ALL SHIPS)

```
ALL SHIPS
SAFETY FROM
123456789
AUTO SWITCH
   ▼  00:01
```

```
ALL SHIPS
SAFETY FROM
123456789
AUTO SW OFF
   ▼  00:01
```

```
ALL SHIPS
SAFETY FROM
123456789
CHANGE TO
   ▼  00:11
```

1. When you receive notification of an ALL SHIPS call, press **SILENC** softkey (AIS/IC key) to silence the alert. The priority level and the user MMSI are displayed on the screen. If the radio recognises the user MMSI as one of your buddies, the buddy name is shown in place of the user MMSI.

2. Press **ACCEPT** softkey (AIS/IC key) to switch to the designated channel immediately, Press +/- button or rotate the CH knob to scroll any further information about the call, or press EXIT to return the current DSC receive process.

3. If the display shows "AUTO SWITCH", the radio will automatically switch to the designated channel after 10s if no user intervention. For "AUTO SW OFF", a manual change is required - for "AUTO SWITCH" options , see section 7-18.

4. Press PTT to initiate voice contact on current display channel.

The call data is stored in your Call Log (see Section 7-8).

7-17 Receiving an individual call (INDIV)

```
INDIVIDUAL
ROUTINE FROM
123456789
AUTO SWITCH
   ▼  00:01
```
```
INDIVIDUAL
ROUTINE FROM
123456789
AUTO SW OFF
   ▼  00:01
```

1. When you receive notification of an INDIV call, press **SILENC** softkey (AIS/IC key) to silence the alert. INDIV calls are almost always routine priority. If the radio recognises the user MMSI as one of your buddies, the buddy's name is displayed in place of the user MMSI.

2. Press +/- button or rotate the CH knob to scroll any further information about the call, or press EXIT to return the current DSC receive process.

3. You have the following options to respond the call:

   • **ABLE** softkey (WX/NAV key) respond to the call with requested channel

   • **NEW-CH** softkey (AIS/IC key) respond to the call with but request a different channel

   • **UNABLE** softkey (GO/MOB key) respond to the call with unable to use the requested channel (Note: this option is not available with ROUTINE calls)

4. If the display shows "AUTO SWITCH", the radio will automatically respond to the call after 10s if no user intervention. For "AUTO SW OFF", a manual responce is required - for "INDIV REPLY" options , see section 5-5.

5. The caller should respond to your acknowledgement by making voice contact designated channel. If this does not happen, you can press PTT to initiate voice contact instead.

The call data is stored in your Call Log (see Section 7-8).

7-18 Receiving a group call (GROUP)

```
GP: SAM
CALL FROM
123456789
AUTO SWITCH
   ▼  00:01
```
```
GP: SAM
CALL FROM
123456789
AUTO SW OFF
   ▼  00:01
```
```
GP: SAM
CALL FROM
012345678
CHANGE TO
   ▼  00:11
```

1. When you receive notification of a GROUP call, press **SILENC** softkey (AIS/IC key) to silence the alert. Press +/- button or rotate the CH knob to scroll any further information about the call.

The priority level is always routine, and the group is identified on the screen. The group will be one of the 20 groups of frequently called people that you set up earlier (see Section 5-2).

2. Press **ACCEPT** softkey (AIS/IC key) to switch to the designated channel immediately, or

press EXIT to return the current DSC receive process.

3. If the display shows "AUTO SWITCH", the radio will automatically switch to the designated channel after 10s if no user intervention. For "AUTO SW OFF", a manual change is required - for "AUTO SWITCH" options , see section 5-8.

4. You do not need to send an acknowledgement. If desired, press PTT to initiate voice contact on the designated channel.

   The call data is stored in your Call Log (see Section 7-8).

7-19 Receiving a geographic area call (GEOGRAPH)

```
GEOGRAPHICAL
CALL FROM
254622211
CH12 REQUEST
  ▼   00:01
```

```
GEOGRAPHICAL
CALL FROM
254622211
CHANGE TO
  ▼   00:08
```

A geographic call is received by vessels within a specific geographic boundary area.

1. When you receive notification of a GEOGRAPHICAL call, press **SILENC** softkey (AIS/IC key) to silence the alert. Then press **ACCEPT** softkey (AIS/IC key) to manually select the channel designated in the incoming call.

   The user MMSI or name is displayed on the screen. If the radio recognises the user MMSI as one of your buddies, the buddy's name is displayed in place of the user MMSI.

2. Press +/- button or rotate the CH knob to scroll any further information about the call, or press EXIT to return the current DSC receive process.

3. Monitor the working channel for an announcement from the calling vessel.

7-20 Receiving a polled position call (POSITION)

```
POSITION
REPLY FROM
123456789
82°50.1234 N
  ▼   00:01
```

When you receive GPS position data from a buddy in response to your LL request (see Section 7-12) you are recommended to make a written note of the position, especially is it is a good fishing position.

If enhanced LL position information is available from your buddy, press **SILENC** softkey (AIS/IC key) to silence the alert. Press +/- button or rotate the CH knob to scroll any further information about the call, or press EXIT to return the current DSC receive process.

Note: DSC & DSE sentence will be output on the NMEA 0183 port for indication on a connected chartplotter / MFD.

Section 8 - DISTRESS calls

> ⚠ **WARNING**
>
> A valid USER MMSI must be entered into this radio before these DSC functions can be used. See section 5-1.

8-1 Sending a Distress Call

```
DISTRES CALL        DISTRES CALL        DISTRES CALL
▶UNDEFINED          ▶UNDEFINED          UNDEFINED
 FIRE                HOLD DISTRES       11:23 UTC
 FLOODING            3 SECONDS..         22°12.023'N
 COLLISION                              ▼TX IN 00:01
```

1. Open the red cover labelled DISTRESS.

    If time is available to specify the nature of the distress, go to step 2. Otherwise, go directly to step 3.

2. Press and release the DISTRESS key to display the following categories. Press +/- button or rotate the CH knob to select the category that describes your situation then press ENT.

    - **UNDEFINED**   (Undefined)
    - **FIRE**   (Fire)
    - **FLOODING**   (Flooding)
    - **COLLISION**   (Collision)
    - **GROUNDING**   (Grounding)
    - **LISTING**   (Listing)
    - **SINKING**   (Sinking)
    - **ADRIFT**   (Adrift)
    - **ABANDONING**   (Abandoning)
    - **PIRACY**   (Piracy)
    - **OVER BOARD**   (Overboard)

3. Press and hold down the DISTRESS key for about 3 seconds, until you see the distress call sending message (DISTRESS CALL SENDING) on the screen. The whole display starts to flash and beep loudly.

4. After the Distress Call is sent, the radio waits for an acknowledgment.

    •The Distress call is automatically transmitted every 3.5 to 4.5 minutes, until an acknowledgement is received ("Call repeat" mode).

    •Press ▼ / ▲ to display the transmitted Distress call information.

5. You now have the following options: RESEND, PAUSE, CANCEL:

6. To RESEND the call, press **RESEND** softkey (AIS/IC key) to enter "HOLD DISTRESS 3 SECONDS TO SEND" screen. Hold down DISTRESS key for 3s to resend the call or press **EXIT** softkey (AIS/IC key) to return to waiting for an acknowledgement call.

7. To PAUSE the call, press **PAUSE** softkey (WX/NAV key) to pause the "Call repeat" mode, press **EXIT** softkey (AIS/IC key) to resume the same call.

8. To CANCEL the call, press **CANCEL** softkey (GO/MOB key) to enter "DISTRESS CALL SEND CANCEL" screen.

   • Press **NO** softkey (WX/NAV key) to return to waiting for an acknowledgement call.

   • Press **YES** softkey (AIS/IC key) to send the DISTRESS CANCEL call. Then press PTT to report your situation using the handset mic, after the report, press EXIT to return to the normal operating mode.

9. After receiving the acknowledgment, press **SILENC** softkey (AIS/IC key) then reply using the microphone, or press EXIT key to quit the current distress acknowledgment.

Note: Prior to receiving an acknowledgement, the distress alert call cannot immediately be terminated by you, it can only be cancelled by completing the distress call cancel process as described above (step 8).

8-2 Receiving a distress call (DISTRESS!)

```
DISTRESS
UNDEFINED
123456789
 82°50.123'N
    ▼  00:01
```
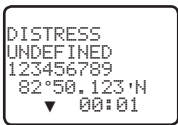
An alert sounds when a distress call (DISTRESS!) is received.

1. Press **SILENC** softkey (AIS/IC key) to silence the alert. You do not need to send an acknowledgement.

2. The radio automatically selects CH16 after 10 seconds if no user intervention, or press **ACCEPT** softkey (AIS/IC key) to change to CH16 immediately.

3. Press +/- button or rotate the CH knob to view details of the distress call. Details include the user MMSI and nature of the emergency (if specified), also the time and the location (if specified). If the location and time are not specified, these are replaced with sequences of 9s and 8s respectively.

   • The radio is capable of receiving enhanced LL position data if the vessel transmitting the distress call is sending this. This provides the position of the distressed vessel to within 20 m (60 ft).

4. Press PTT to establish voice contact or press EXIT key to quit the DISTRESS RECEIVE call.
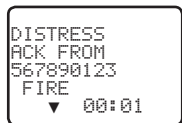
Note: The call data is stored in the Distress Log and location data (DSC & DSE) sentence will be output on the NMEA 0183 port for indication on a connected chartplotter / MFD.

8-3 Distress acknowledgement (DISTRESS ACK) or distress relay all ships (DISTRESS REL)

1. An alert sounds when a Distress ACK or Distress Relay all ship call is received. Press **SILENC** softkey (AIS/IC key) to silence the alert.

2. The radio automatically selects CH16 after 10 seconds if no user intervention, or press **ACCEPT** softkey(AIS/IC key) to change to CH16 immediately.

3. Press +/- button or rotate the CH knob to view details of the distress call. Details include the user MMSI and nature of the emergency (if specified), also the time and the location (if specified). If the location and time are not specified, these are replaced with sequences of 9s and 8s respectively.

4. Press PTT to make voice contact with the calling vessel. Maintain a listening watch on CH16 and standby to lend assistance

   • For a Distress Acknowledgement (DISTRESS ACK) sent from the Search and Rescue (SAR) authorities of your country, your radio automatically cancels Distress Mode transmissions and CH16 appears. Press PTT to establish voice contact with the Search and Rescue (SAR) authority.

   • The Search and Rescue (SAR) authorities of your country are the only instance allowed to send a Distress Acknowledgement (DISTRESS ACK).

5. Press EXIT key to quit the current DSC receive process.

Note: The call data is stored in the Distress Log and location data (DSC & DSE) sentence is sent on the NMEA 0183 port for indication on a connected chartplotter / MFD.

```
DISTRESS
ACK FROM
567890123
 FIRE
   ▼  00:01
```
```
87654321
ALL DISTR
RELAY
123456789
   ▼  00:01
```

8-4 Distress relay individual (INDIV DISTR RELAY)

When an incoming Individual Distress Relay call is received, the alarm sounds and INDIV DISTR RELAY is displayed.

1. Press **SILENC** softkey (AIS/IC key) to silence the alarm.

2. Press +/- button or rotate the CH knob to view details of the distress call. Details include the user MMSI and nature of the emergency (if specified), also the time and the location (if specified). If the location and time are not specified, these are replaced with sequences of 9s and 8s respectively.

3. ALL MODELS: Press **ACCEPT** softkey (AIS/IC key) to immediately accept the channel change before the 10s timer expires

4. US MODELS: Press **ACK** softkey (AIS/IC key) to ACK the call after the 10s delay - for "INDIV REPLY" options, see section 5-15.

5. Press EXIT key to quit current receive DSC process..

Note: The call data is stored in the Distress Log and location data (DSC & DSE) sentence is sent on the NMEA 0183 port for indication on a connected chartplotter / MFD.

Section 9 - AIS functionality

> ### ⚠ **WARNING**
>
> A valid USER MMSI must be entered into this radio before these AIS functions can be used. See section 5-1.

9-1 About AIS

The marine Automatic Identification System (AIS) is a location and vessel information reporting system. It allows vessels equipped with AIS to automatically and dynamically share and regularly update their position, speed, course and other information such as vessel identity with similarly equipped vessels. Position is derived from the Global Positioning System (GPS) and communication between vessels is by Very High Frequency (VHF) digital transmissions.

There are a number of types of AIS device as follows:

- Class A transceivers. These are similar to class B transceivers, but they are designed to be fitted on large vessels such as cargo ships and large passenger vessels. Class A transceivers transmit at a higher VHF signal power than class B transceivers and therefore can be received by more distant vessels, and also transmit more frequently. Class A transceivers are mandatory on all vessels over 300 gross tonnes on international voyages and certain types of passenger vessels under the SOLAS regulations.

- Class B transceivers. Similar to class A transceivers in many ways, but are normally lower cost due to the less stringent performance requirements. Class B transceivers transmit at a lower power and at a lower reporting rate than class A transceivers.

- AIS base stations. AIS base stations are used by Vessel Traffic Systems to monitor and control the transmissions of AIS transceivers.

- Aids to Navigation (AtoN) transceivers. AtoNs are transceivers mounted on buoys or other hazards to shipping which transmit details of their location to the surrounding vessels.

- AIS receivers. AIS receivers will generally receive transmissions from class A transceivers, class B transceivers, AtoNs and AIS base stations but do not transmit any information about the vessel on which they are installed.

This radio contains an AIS receiver only function.

9-2 AIS - Static and dynamic information

Defined transmit rates for Class A vessels shown below are provided for reference purposes only. The frequency of messages received will vary due to a number of factors including but not limited to such factors as antenna height, gain and signal interference.

- Static information is either broadcast every 6 minutes, when data has been amended, or upon request.

- Dynamic information is broadcast depending on speed and course alteration based on the following tables:

Ships dynamic conditions	Normal reporting interval
At anchor or moored	3 Minutes
0-14 knots	10 Seconds
0-14 knots and changing course	3 1/3 Seconds
14-23 knots	6 Seconds
14-23 knots and changing course	2 Seconds
Ship faster than 23 knots	2 Seconds
Ship faster than 23 knots and changing course	2 Seconds

Platforms condition	Normal reporting interval
Class B Shipborne mobile equipment not moving faster than 2 Knots	3 Minutes
Class B Shipbome mobile equipment moving 2-14 Knots	30 Seconds
Class B Shipbome mobile equipment moving 14-23 Knots	15 Seconds
Class B Shipbome mobile equipment moving faster than 23 Knots	5 Seconds
Search and Rescue aircraft (airborne mobile equipment)	10 Seconds
Aids to Navigation	3 Minutes
AIS base station	10 Seconds

Source of information for above tables 1-1, 1-2: (ITU recommendations technical document: ITU-R M.1371-1)

9-3 Using the AIS receiver

Providing that other vessels with AIS transceivers installed are within radio range of your vessel, you should see their details appear on the AIS plotter screen. These details are also repeated on the NMEA ports for display on a compatible chartplotter / MFD.

Specific details of how to configure your chartplotter to make use of the AIS receiver features will be given in your chartplotter manual. If you are using charting software running on a PC, please refer to the instructions provided with your chartplotting software for details of how to configure it to display AIS information.

⚠ **CAUTION**

Not all vessels transmit AIS information and therefore not all vessels will be displayed or listed in the following AIS screens.

AIS vessel information can be displayed on the radios LCD screen:

1. Press the AIS/IC button to display the AIS plotter screen
    Note: You must have LAT/LON position information for targets to be displayed on the plotter PPI.
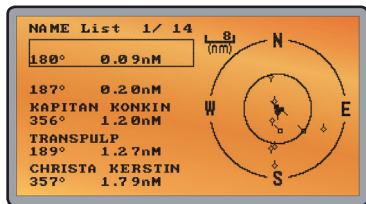
2. AIS target details will be displayed on the left of the screen. Either the vessels name or MMSI will be displayed (if the information is available) depending on the setting you selected in Section "6-2 AIS data display format (AIS DISPLAY)". Also the targets bearing and distance to you are displayed.
    Note: it could take some time before AIS targets are displayed.

3. A simple plotter PPI on the right hand side of the LCD shows the geographical location of the AIS targets with respect to your position which is in the center of the plotter PPI.

4. Press the Zoom In (3CH +/-) or Zoom Out (Scan) keys to change the scale of the plotter. The scale available is 1nm / 2 nm / 4 nm / 8 nm / 16 nm / 32 nm.

5. Press the AIS/IC key again to change the display to T/CPA Approach screen.

6. Rotate the knob to highlight any AIS target shown on the plotter screen. The selected target will have the target symbol filled in.

7. Press ENT to view full details of the highlighted target such as MMSI, Vessel name, distance, bearing, heading, ROT, COG, SOG, status and other vessel information.

9-4-1 T/CPA approach screen

1. When in AIS mode, press the AIS/IC key again to toggle between the standard AIS screen and the T/CPA Approach screen.

2. In TCPA Approach mode, the approaching AIS target's details are listed on the left side along with it's geographical position on the plotter PPI.

3. The zoom range is automatically selected to the best range according to the selected target on the left. You can't change the zoom range in this mode.

4. Press +/- button or rotate the CH knob to select the target, press ENT key to display target information, or press EXIT key to return to the previous display.

Note: If the radio detects a TCPA or CPA breach, the T/CPA Approach screen will automatically popup with an alert tone. Press EXIT to stop the alert. The alert will sound again after 1 minute if the AIS alarm has not been released.

```
T/CPA APPROACH

228278700
0.59Min 1.0nM
```

9-4-2 Plotter symbols and meanings

Your vessel is always in the center of the plotter screen. You are represented by a solid circle, along with a small line that indicates your bearing with respect to North.

All other vessels or targets displayed on the plotter screen are represented by a diamond shape. These are targets around your vessel that are within the current zoom distance setting. The small line indicates the targets bearing.

When a target is selected, it is represented by a solid diamond.

Examples:

You and the target vessel are heading **away** from each other.

You and the target vessel are heading **towards** each other.

Note: Nautical Miles is the only unit used in AIS mode.

Section 10 - General functionality

10-2 Using the Fog Horn

An appropriate PA speaker must be connected to the Hailer wiring before the FOG HORN function can be used. The FOG HORN will sound certain international standard fog horn tones through the hailer speaker depending on the mode selected.

1. Press and hold the AIS/IC button for about 1 second to enter HAILER mode. Select FOG HORN and press ENT.
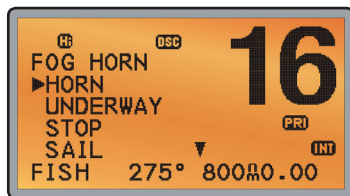
2. There are 8 choices of internationally recognized fog horn sounds and timing:

    - **HORN**   (Horn)   Manual operation
    - **UNDERWAY**   (Underway)   One long tone
    - **STOP**   (Stop)   Two long tone
    - **SAIL**   (Sail)   One long, two short
    - **ANCHOR**   (Anchor)   One long warble
    - **TOW**   (Tow)   One long, three short
    - **AGROUND**   (Aground)   Warble sequence
    - **SIREN**   (Siren)   Manual operation

3. Scroll through the menu to select a fog horn type, then press ENT to start the selected fog horn sounding. All except HORN and SIREN will sound automatically.

4. The fog horn will sound automatically approximately every two minutes until you press EXIT to cancel it. When the fog horn is not sounding, it is in LISTEN mode.

5. To change the volume, turn the Channel Select knob, or press + or – when the fog horn is sounding.

6. To operate HORN or SIREN, once selected, press and hold ENT button. This will sound as long as the ENT button is pressed. You can then also operate PTT to talk through the Hailer.

```
┌─────────────┐  ┌─────────────┐  ┌─────────────┐  ┌─────────────┐
│HAILER       │  │FOG HORN     │  │FOG HORN     │  │SAIL         │
│             │  │►HORN        │  │ UNDERWAY  ▲ │  │OUTPUT       │
│ PA          │  │ UNDERWAY    │  │ STOP        │  │VOL■■■       │
│►FOG HORN    │  │ STOP        │  │►SAIL        │  │   LO    HI  │
│             │  │ SAIL      ▼ │  │ ANCHOR    ▼ │  │             │
└─────────────┘  └─────────────┘  └─────────────┘  └─────────────┘
```

Note: you cannot change the volume of the HORN or SIREN.

10-1 Using the PA (Public Address) Hailer

An appropriate Hailer speaker must be connected to the Hailer wiring before the PA function can be used. The PA allows you to make an announcement at high volume to people or vessels using the Link-8 hand mic. The PA function also features a listen-back mode where the speaker is used as a microphone to listen for a response.

1.   Press and hold the AIS/IC button for about 1 second to enter HAILER mode. Select PA and press ENT.

2.   Press PTT to talk through the hailer. Turn the Channel Select knob, or press + or – to change the volume. Volume can only be changed while the PTT is pressed.

3.   Release PTT to LISTEN for a response.

```
┌─────────────┐  ┌─────────────┐  ┌─────────────┐
│HAILER       │  │PA           │  │PA           │
│             │  │OUTPUT       │  │             │
│►PA          │  │VOL■■■■      │  │LISTEN       │
│ FOG HORN    │  │   LO    HI  │  │             │
│             │  │             │  │             │
└─────────────┘  └─────────────┘  └─────────────┘
```

4.   Press EXIT to return to operational mode.

Appendix A - Technical specifications

LOWRANCE Link-8

GENERAL		Unit	LIMIT
Standard Operation Temperature		°C	-20°C to +55°C (-4°F to 131°F)
Normal Working Voltage		V	12 V DC battery system (negative ground)
Low battery detect Voltage		V	10.5 V
Rx Current Drain at	: Max Audio Power	A	≤1.5
	: Stand-By	A	≤0.25
	: Hailer Power	A	≤3.5
Tx Current Drain at	: Hi Power	A	≤6 (@13.6 V DC)
	: Lo Power	A	≤1.5 (@13.6 V DC)
Dimensions		mm	180.5 x 96.3 x 171
Weight		kg	1.63
VHF Frequency Range: Transmit		MHz	156.025 To 157.425 (default)
VHF Frequency Range: Receive		MHz	156.025 To 163.275 (default)
Oscillate Mode			PLL
Modulation			FM (16KOG3E) DSC (16K0G2B)
Usable channels			International, USA, Canada, Weather (country specific)
Channel Spacing		KHz	25
Frequency Stability		PPM	±5
Audio power of speaker in mike		dBA	80 dBA @ 1m
Audio power of speaker in base		dBA	94 dBA @ 1m (Ø=57mm)
Digital Selectivity Calling (DSC) CH70			Class-D (EN301025) with dual receiver (individual
Standards – DSC			ITU-R M.493-13 (US models), EN 300-338-3 (EU models)
Standards – AIS			ITU-R M.1371-4
Standards - Other			EN 60950-1:2006 /A1:2010
LCD display			128 x 256 pixel LCD FSTN – 1.3" x 2.6"
Contrast control			Yes
Dimming control			Yes
Antenna connector			SO-239 (50 ohm)
NMEA 2000 connector			Micro-C (5 pin)
Waterproof			JIS-7
Compass safe distance:			0.5 m (1.5')

RECEIVER:	Unit	LIMIT
Intermediate Frequency : 1st	MHz	21.4
: 2nd	KHz	450
Sensitivity : 12dB SINAD	dBuV	≤-6
Squelch Sensitivity : at tight	dBuV	≤6
Spurious Response Rejection Ratio	dB	≥70
Adjacent Channel Selectivity	dB	≥70
Intermodulation Response	dB	≥68
S/N at 3KHz Dev.	dB	≥40
Audio Output Power At THD 10%	W	5W (external speaker output)
Audio Distortion	%	≤5
Audio Response	dB	+1 to -3 dB of 6 dB/octave from 300 Hz to 3 kHZ
TRANSMITTER:		
Frequency error	PPM	±5
RF Power	W	Hi: 23 ± 2 / Lo: 0.8 ± 0.2
Maximum Deviation	KHz	± 5
S/N at 3KHz Dev.	dB	40
Modulation Distortion ±3KHz	%	≤5
Audio Response at 1KHz Dev.	dB	+1 to -3 dB of 6 dB/octave from 300 Hz to 3 kHZ
Spurious/Harmonic Emissions : Hi/LO	uW	<0.25
Modulation Sensitivity	mV	≤20
Transmitter Protection		Open/short circuit of antenna
COMMUNICATIONS:		
Comm. port - NMEA 0183		NMEA 0183, 4800 baud
Comm. port - NMEA 2000		NMEA 2000
NMEA 0183 input (receive):		RMC, GGA, GLL, GNS
NMEA 0183 output (transmit):		DSC (for DSC call), DSE (for enhanced position). AIVDM (AIS)
HAILER:		
Audio Power Out	W	30W @ 4 Ohms
AIS:		
AIS function		Yes, dual receivers only
Receiver Frequency	MHz	161.975, 162.025
		CH87 - 161.975; CH88 - 162.025 (default channel)
Supported AIS Information:		–Status/Destination/ETA
–Vessel Name		–Type of vessel
–Call sign		–MMSI number
–IMO number		–Draft/Size of vessel
–Vessel position		–SOG/COG/Rate of turn/Heading

Specifications are subject to change without notice.

Link-8 NMEA 2000 PGNS

127250 Vessel Heading
127258 Magnetic Variation
129025 Position, Rapid Update
129026 COG & SOG, Rapid Update
129029 GNSS Position Data
129033 Time & Date
129038 Class A position report (Rx,Tx)
129039 Class B position report (Rx,Tx)
129040 Class B extended position report (Rx, Tx)
129041 AIS Aids to Navigation (AtoN) Report
129283 Cross Track Error
129284 Navigation Data
129285 Navigation Route/WP Information
129792 DGNSS Broadcast binary message (Tx)
129793 UTC and date report (Tx)
129794 Class A static and voyage related data (rx, tx)
129795 Addressed binary message (tx)
129796 Acknowledge (tx)
129797 Binary broadcast message (tx)
129798 SAR Aircraft Position report (tx)
129799 Radio Frequency/Mode/Power
129800 UTC/Date enquiry (tx)
129801 Addressed safety msg (rx,tx)
129802 Broadcast safety msg (rx,tx)
129803 Interrogation (tx)
129804 Assignment Mode Command (tx)
129805 Data Link Management message (tx)
129807 AIS Group Assignment
129808 DSC Call Information
129809 AIS Class B "CS" Static Data Report, Part A
129810 AIS Class B "CS" Static Data Report, Part B
130074 Route and WP Service - WP List - WP Name & Position
130842 AIS and VHF Messages (Simrad Proprietary for AIS Class B 'CS')

Appendix B - Troubleshooting

1.   The transceiver will not power up.

A fuse may have blown **or** there is no voltage getting to the transceiver.

a)   Check the power cable for cuts, breaks, or squashed sections.

b)   After checking the wiring, replace the 7 Amp fuse.

c)   Check the battery voltage. This must be greater than 10.5V.

2.   The transceiver blows the fuse when the power is switched on.

The power wires may have been reversed.

a)   Check that the red wire is connected to the positive battery terminal, and the black wire is connected to the negative battery terminal.

3.   The speaker makes popping or whining noises when the engine is running.

Electrical noise may be interfering with the transceiver.

a)   Re-route the power cables away from the engine.

b)   Add a noise suppressor to the power cable.

c)   Use resistive spark plug wires and/or use an alternator whine filter.

4.   No sound from the external speaker.

a)   Check that the external speaker cable is physically connected.

b)   Check the soldering of the external speaker cable.

5.   Transmissions are always on low power, even when high (Hi) power is selected.

The antenna may be faulty.

a)   Test the transceiver with a different antenna.

b)   Have the antenna checked out.

6.   Battery symbol is displayed.

The power supply is too low.

a)   Check the battery voltage. This should be at least 10.5 V ± 0.5 V DC.

b)   Check the alternator on the vessel.

7. GPS alarm sounds and LCD shows: Please check GPS link! The NO GPS symbol is shown.

GPS data has been lost. This sequence will repeat every 4 hours until GPS data from an operational GPS receiver is available. The GPS cable may faulty or the GPS setting may be incorrect:

a)   Manually enter your position and UTC time data (see Section 3.6.1)

b)   Check that the GPS cable is physically connected.

c)   Check the polarity of the GPS cable.

d)   Check the baud rate setting of the GPS if applicable. The baud rate setting should be 4800. Parity should be set to NONE.

Appendix C - US & ROW VHF marine channel charts

The following channel charts are provided for reference only and may not be correct for all regions. It is the operators responsibility to ensure correct channels and frequencies are used for local regulations.

C-1 International channel chart

CH	TX (MHz)	RX (MHz)	MODE	TRAFFIC TYPE	SHIP TO SHIP	SHIP TO SHORE	NAME TAG	REMARK
01	156.050	160.650	D	Public Correspondence	No	Yes	TELEPHONE	
02	156.100	160.700	D	Public Correspondence	No	Yes	TELEPHONE	
03	156.150	160.750	D	Public Correspondence	No	Yes	TELEPHONE	
04	156.200	160.800	D	Port Operations	No	Yes	PORT OPS	
05	156.250	160.850	D	Port Operations	No	Yes	PORT OPS/VTS	
06	156.300	156.300	S	Inter-ship Safety	Yes	No	SAFETY	
07	156.350	160.950	D	Port Operations	No	Yes	PORT OPS	
08	156.400	156.400	S	Commercial (inter-ship only)	Yes	No	COMMERCIAL	
09	156.450	156.450	S	Inter-ship	Yes	Yes	CALLING	
10	156.500	156.500	S	Commercial	Yes	Yes	COMMERCIAL	
11	156.550	156.550	S	Port Operations	Yes	Yes	VTS	
12	156.600	156.600	S	Port Operations	Yes	Yes	PORT OPS/VTS	
13	156.650	156.650	S	Inter-ship Navigation Safety (bridge-to bridge)	Yes	No	BRIDGE COM	
14	156.700	156.700	S	Port Operations	Yes	Yes	PORT OPS/VTS	
15	156.750	156.750	S	Port Operations	Yes	Yes	PORT OPS	① 1W only
16	156.800	156.800	S	International Distress, Safety, and Calling	Yes	Yes	DISTRESS	
17	156.850	156.850	S	State Controlled	Yes	Yes	SAR	① 1W only
18	156.900	161.500	D	Port Operations	No	Yes	PORT OPS	
19	156.950	161.550	D	Ship to Shore	No	Yes	SHIP-SHORE	
20	157.000	161.600	D	Port Operations	No	Yes	PORT OPS	
21	157.050	161.650	D	Port Operations	No	Yes	PORT OPS	
22	157.100	161.700	D	Port Operations	No	Yes	PORT OPS	
23	157.150	161.750	D	Public Correspondence	No	Yes	TELEPHONE	
24	157.200	161.800	D	Public Correspondence	No	Yes	TELEPHONE	
25	157.250	161.850	D	Public Correspondence	No	Yes	TELEPHONE	
26	157.300	161.900	D	Public Correspondence	No	Yes	TELEPHONE	
27	157.350	161.950	D	Public Correspondence	No	Yes	TELEPHONE	
28	157.400	162.000	D	Public Correspondence	No	Yes	TELEPHONE	
60	156.025	160.625	D	Public Correspondence	No	Yes	TELEPHONE	
61	156.075	160.675	D	Port Operations	No	Yes	PORT OPS	

62	*156.125*	*160.725*	*D*	Port Operations	No	Yes	PORT OPS	
63	*156.175*	*160.775*	*D*	Port Operations	No	Yes	PORT OPS	
64	*156.225*	*160.825*	*D*	Public Correspondence	No	Yes	TELEPHONE	
65	*156.275*	*160.875*	*D*	Port Operations	No	Yes	PORT OPS	
66	*156.325*	*160.925*	*D*	Port Operations	No	Yes	PORT OPS	
67	156.375	156.375	S	Commercial, bridge-to-bridge	Yes	No	BRIDGE COM	
68	156.425	156.425	S	Inter-ship	Yes	No	SHIP-SHIP	
69	156.475	156.475	S	Port Operations	Yes	Yes	PORT OPS	
70	156.525	156.525	-	Digital Selective Calling - DSC	------	------	DSC	❷
71	156.575	156.575	S	Port Operations	Yes	Yes	PORT OPS	
72	156.625	156.625	S	Inter-ship	Yes	No	SHIP-SHIP	
73	156.675	156.675	S	Port Operations	Yes	Yes	PORT OPS	
74	156.725	156.725	S	Port Operations	Yes	Yes	PORT OPS	
77	156.875	156.875	S	Ship to Shore	Yes	No	SHIP-SHORE	
78	*156.925*	*161.525*	*D*	Ship to Shore	No	Yes	SHIP-SHORE	
79	*156.975*	*161.575*	*D*	Port Operations	No	Yes	PORT OPS	
80	*157.025*	*161.625*	*D*	Port Operations	No	Yes	PORT OPS	
81	*157.075*	*161.675*	*D*	Public Correspondence	No	Yes	TELEPHONE	
82	*157.125*	*161.725*	*D*	Public Correspondence	No	Yes	TELEPHONE	
83	*157.175*	*161.775*	*D*	Public Correspondence	No	Yes	TELEPHONE	
84	*157.225*	*161.825*	*D*	Public Correspondence	No	Yes	TELEPHONE	
85	*157.275*	*161.875*	*D*	Public Correspondence	No	Yes	TELEPHONE	
86	*157.325*	*161.925*	*D*	Public Correspondence	No	Yes	TELEPHONE	
87	*157.375*	*161.975*	*D*	Public Correspondence	No	Yes	TELEPHONE	
88	*157.425*	*162.025*	*D*	Public Correspondence	No	Yes	TELEPHONE	

Special notes on international channel usage

❶. LOW POWER (1W) only.

❷. Channel 70 is designated for use exclusively for Digital Selective Calling (DSC), such as Distress, Safety, and Ship Calls. No voice communication is allowed on CH70.
This channel is only available on DSC enabled radios.

Note:

- The INTERNATIONAL channel bank is not legal for use in U.S. or Canada waters.

- Select the INTERNATIONAL channel bank for use in Australia, New Zealand and other Asia Pacific regions, and all other regions where otherwise not specified.

KEY: S = Simplex operating channel; D = Duplex operating channel.

C-2 USA channel chart

CH	TX (MHz)	RX (MHz)	MODE	TRAFFIC TYPE	SHIP TO SHIP	SHIP TO SHORE	NAME TAG	REMARK
01A	156.050	156.050	S	Port Operations, Selected VTS Areas	Yes	Yes	PORT OPS/VTS	
03A	156.150	156.150	S	US Government, Coast Guard	Yes	Yes	UNAUTHORIZED	④
05A	156.250	156.250	S	Port Operations, Selected VTS Areas	Yes	Yes	PORT OPS/VTS	
06	156.300	156.300	S	Inter-ship Safety	Yes	No	SAFETY	
07A	156.350	156.350	S	Commercial	Yes	Yes	COMMERCIAL	
08	156.400	156.400	S	Commercial (inter-ship only)	Yes	No	COMMERCIAL	
09	156.450	156.450	S	Recreational Calling Channel	Yes	Yes	CALLING	
10	156.500	156.500	S	Commercial	Yes	Yes	COMMERCIAL	
11	156.550	156.550	S	Commercial, VTS in Selected Areas	Yes	Yes	VTS	
12	156.600	156.600	S	Port Operations, Selected VTS Areas	Yes	Yes	PORT OPS/VTS	
13	156.650	156.650	S	Inter-ship Navigation Safety (bridge-to-bridge), 1W with Power-up	Yes	No	BRIDGE COM	③ 1W
14	156.700	156.700	S	Port Operations, Selected VTS Areas	Yes	Yes	PORT OPS/VTS	
15	---	156.750	S	Environmental	------	------	ENVIRONMEN-TAL	② RX only
16	156.800	156.800	S	International Distress, Safety, and Calling	Yes	Yes	DISTRESS	
17	156.850	156.850	S	State Controlled	Yes	Yes	SAR	① 1W only
18A	156.900	156.900	S	Commercial	Yes	Yes	COMMERCIAL	
19A	156.950	156.950	S	Commercial	Yes	Yes	COMMERCIAL	
20	*157.000*	*161.600*	*D*	Port Operations, Canadian Coast Guard	No	Yes	PORT OPS	
20A	157.000	157.000	S	Port Operations	Yes	Yes	PORT OPS	
21A	157.050	157.050	S	U.S. Government, Canadian Coast Guard	Yes	Yes	UNAUTHORIZED	④
22A	157.100	157.100	S	Coast Guard Liaison	Yes	Yes	COAST GUARD	
23A	157.150	157.150	S	U.S. Government, Coast Guard	Yes	Yes	UNAUTHORIZED	④
24	*157.200*	*161.800*	*D*	Public Correspondence, Marine operator	No	Yes	TELEPHONE	
25	*157.250*	*161.850*	*D*	Public Correspondence, Marine operator	No	Yes	TELEPHONE	
26	*157.300*	*161.900*	*D*	Public Correspondence, Marine operator	No	Yes	TELEPHONE	
27	*157.350*	*161.950*	*D*	Public Correspondence, Marine operator	No	Yes	TELEPHONE	
28	*157.400*	*162.000*	*D*	Public Correspondence, Marine operator	No	Yes	TELEPHONE	
61A	156.075	156.075	S	U.S. Government, Canadian Coast Guard	Yes	Yes	UNAUTHORIZED	④
63A	156.175	156.175	S	Port Operations, VTS in Selected Areas	Yes	Yes	PORT OPS/VTS	
64A	156.225	156.225	S	U.S. Government, Canadian Commercial Fishing	Yes	Yes	UNAUTHORIZED	④
65A	156.275	156.275	S	Port Operations	Yes	Yes	PORT OPS	
66A	156.325	156.325	S	Port Operations	Yes	Yes	PORT OPS	
67	156.375	156.375	S	Commercial, bridge-to-bridge, 1W with Power-up	Yes	No	BRIDGE COM	③ 1W

68	156.425	156.425	S	Boat Operations, Recreational	Yes	No	SHIP - SHIP	
69	156.475	156.475	S	Boat Operations, Recreational	Yes	Yes	PLEASURE	
70	156.525	156.525		Digital Selective Calling - DSC	------	------	DSC	⑥
71	156.575	156.575	S	Boat Operations, Recreational	Yes	Yes	PLEASURE	
72	156.625	156.625	S	Boat Operations, Recreational	Yes	No	SHIP - SHIP	
73	156.675	156.675	S	Port Operations	Yes	Yes	PORT OPS	
74	156.725	156.725	S	Port Operations	Yes	Yes	PORT OPS	
77	156.875	156.875	S	Port Operations	Yes	Yes	PORT OPS	① 1W only
78A	156.925	156.925	S	Boat Operations, Recreational	Yes	No	SHIP - SHIP	
79A	156.975	156.975	S	Commercial	Yes	Yes	COMMERCIAL	
80A	157.025	157.025	S	Commercial	Yes	Yes	COMMERCIAL	
81A	157.075	157.075	S	U.S. Government, Environmental Protection Agency Operations	Yes	Yes	UNAUTHORIZED	④
82A	157.125	157.125	S	U.S. Government, Canadian Coast Guard	Yes	Yes	UNAUTHORIZED	④
83A	157.175	157.175	S	U.S. Government, Canadian Coast Guard	Yes	Yes	UNAUTHORIZED	④
84	*157.225*	*161.825*	*D*	Public Correspondence, Marine Operator	No	Yes	TELEPHONE	
84A	157.225	157.225	S	Public Correspondence, Marine Operator				
85	*157.275*	*161.875*	*D*	Public Correspondence, Marine Operator	No	Yes	TELEPHONE	
85A	157.275	157.275	S	Public Correspondence, Marine Operator				
86	*157.325*	*161.925*	*D*	Public Correspondence, Marine Operator	No	Yes	TELEPHONE	
86A	157.325	157.325	S	Public Correspondence, Marine Operator				
87	*157.375*	*161.975*	*D*	Public Correspondence, Marine Operator	No	Yes	TELEPHONE	
87A	157.375	157.375	S	Public Correspondence, Marine Operator				
88	*157.425*	*162.025*	*D*	Public Correspondence, Marine Operator	No	Yes	TELEPHONE	
88A	157.425	157.425	S	Commercial, Inter-ship Only	Yes	No	COMMERCIAL	

Special notes on USA channel usage

①. LOW POWER (1 W) only.

②. Receive Only.

③. LOW POWER (1 W) initially. Override to HIGH POWER by holding down H/L key before transmitting. Used normally in bridge-to-bridge communications.

④. Lightly shaded simplex channels 03A, 21A, 23A, 61A, 64A, 81A, 82A, and 83A cannot be lawfully used in U.S. waters unless special authorization is obtained from the U.S. Coast Guard. Not for use by the general public.

⑤. The letter "A" illuminated by the channel number indicates the USA channel is simplex.

This same channel is always duplex when selecting International. There is no "A" reference for International channels. The letter "B" is only used for some Canadian "Receive only" channels.

⑥. Channel 70 is designated for use exclusively for Digital Selective Calling (DSC), such as Distress, Safety, and Ship Calls. No voice communication is allowed on CH70. This channel is only available on DSC enabled radios.

KEY: S = Simplex operating channel; D = Duplex operating channel.

C-3 CANADA channel chart

CH	TX (MHz)	RX (MHz)	MODE	TRAFFIC TYPE	SHIP TO SHIP	SHIP TO SHORE	NAME TAG	REMARK
01	156.050	160.650	D	Public Correspondence	No	Yes	TELEPHONE	
02	156.100	160.700	D	Public Correspondence	No	Yes	TELEPHONE	
03	156.150	160.750	D	Public Correspondence	No	Yes	TELEPHONE	
04A	156.200	156.200	S	Canadian Coast Guard, SAR	Yes	Yes	CANADIAN CG	
05A	156.250	156.250	S	Port Operations, VTS in Selected Areas	Yes	Yes	PORT OPS/VTS	
06	156.300	156.300	S	Inter-ship Safety	Yes	No	SAFETY	
07A	156.350	156.350	S	Commercial	Yes	Yes	COMMERCIAL	
08	156.400	156.400	S	Commercial (inter-ship only)	Yes	No	COMMERCIAL	
09	156.450	156.450	S	Recreational Calling Channel	Yes	Yes	CALLING	
10	156.500	156.500	S	Commercial	Yes	Yes	COMMERCIAL	
11	156.550	156.550	S	Commercial, VTS in Selected Areas	Yes	Yes	VTS	
12	156.600	156.600	S	Port Operations, VTS in Selected Areas	Yes	Yes	PORT OPS/VTS	
13	156.650	156.650	S	Inter-ship Navigation Safety (bridge-to bridge) 1W with power-up	Yes	No	BRIDGE COM	③ 1W
14	156.700	156.700	S	Port Operations, VTS in Selected Areas	Yes	Yes	PORT OPS/VTS	
15	156.750	156.750	S	Commercial	Yes	Yes	COMMERCIAL	① 1W only
16	156.800	156.800	S	International Distress, Safety, and Calling	Yes	Yes	DISTRESS	
17	156.850	156.850	S	State Controlled	Yes	Yes	SAR	① 1W only
18A	156.900	156.900	S	Commercial	Yes	Yes	COMMERCIAL	
19A	156.950	156.950	S	Canadian Coast Guard	Yes	Yes	CANADIAN CG	
20	157.000	161.600	D	Canadian Coast Guard	No	Yes	CANADIAN CG	① 1W only
21	157.050	161.650	D	Port Operations	No	Yes	PORT OPS	
21A	157.050	157.050	S	U.S. Government, Canadian Coast Guard	Yes	Yes	UNAUTHORIZED	
21B	---	161.650	S	Port Operations	------	------	PORT OPS	RX only
22A	157.100	157.100	S	Canadian Coast Guard Liaison	Yes	Yes	CANADIAN CG	
23	157.150	161.750	D	Public Correspondence	No	Yes	TELEPHONE	
24	157.200	161.800	D	Public Correspondence	No	Yes	TELEPHONE	
25	157.250	161.850	D	Public Correspondence	No	Yes	TELEPHONE	
25B	---	161.850	S	Public Correspondence	------	------	TELEPHONE	RX only
26	157.300	161.900	D	Public Correspondence	No	Yes	TELEPHONE	
27	157.350	161.950	D	Public Correspondence	No	Yes	TELEPHONE	
28	157.400	162.000	D	Public Correspondence	No	Yes	TELEPHONE	
28B	---	162.000	S	Public Correspondence	------	------	TELEPHONE	RX only
60	156.025	160.625	D	Public Correspondence	No	Yes	TELEPHONE	
61A	156.075	156.075	S	U.S. Government, Canadian Coast Guard	Yes	Yes	UNAUTHORIZED	④

62A	156.125	156.125	S	Canadian Coast Guard	Yes	Yes	CANADIAN CG	
64	*156.225*	*160.825*	*D*	Public Correspondence, Duplex	No	Yes	TELEPHONE	
64A	156.225	156.225	S	U.S. Government, Canadian Commercial Fishing	Yes	Yes	UNAUTHORIZED	④
65A	156.275	156.275	S	Port Operations	Yes	Yes	PORT OPS	
66A	156.325	156.325	S	Port Operations	Yes	Yes	PORT OPS	① 1W only
67	156.375	156.375	S	Commercial, SAR	Yes	No	COMMERCIAL	
68	156.425	156.425	S	Boat Operations, Recreational	Yes	No	SHIP - SHIP	
69	156.475	156.475	S	Commercial Fishing Only	Yes	Yes	COMMERCIAL	
70	156.525	156.525	S	Digital Selective Calling - DSC	------	------	DSC	⑥
71	156.575	156.575	S	Boat Operations, Recreational	Yes	Yes	PLEASURE	
72	156.625	156.625	S	Inter-ship	Yes	No	SHIP - SHIP	
73	156.675	156.675	S	Commercial Fishing Only	Yes	Yes	COMMERCIAL	
74	156.725	156.725	S	Commercial Fishing Only	Yes	Yes	COMMERCIAL	
77	156.875	156.875	S	Port Operations	Yes	Yes	PORT OPS	① 1W only
78A	156.925	156.925	S	Boat Operations, Recreational	Yes	No	SHIP - SHIP	
79A	156.975	156.975	S	Commercial	Yes	Yes	COMMERCIAL	
80A	157.025	157.025	S	Commercial	Yes	Yes	COMMERCIAL	
81A	157.075	157.075	S	U.S. Government Operations	Yes	Yes	UNAUTHORIZED	④
82A	157.125	157.125	S	U.S. Government, Canadian Coast Guard	Yes	Yes	UNAUTHORIZED	④
83	*157.175*	*161.775*	*D*	Canadian Coast Guard	Yes	Yes	CANADIAN CG	
83A	157.175	157.175	S	U.S. Government, Canadian Coast Guard	Yes	Yes	UNAUTHORIZED	④
83B	---	161.775	S	Canadian Coast Guard, RX Only	------	------	CANADIAN CG	
84	*157.225*	*161.825*	*D*	Public Correspondence, Marine Operator	No	Yes	TELEPHONE	
85	*157.275*	*161.875*	*D*	Public Correspondence, Marine Operator	No	Yes	TELEPHONE	
86	*157.325*	*161.925*	*D*	Public Correspondence, Marine Operator	No	Yes	TELEPHONE	
87	*157.375*	*161.975*	*D*	Public Correspondence, Marine Operator	No	Yes	TELEPHONE	
88	*157.425*	*162.025*	*D*	Public Correspondence, Marine Operator	No	Yes	TELEPHONE	

Special notes on Canada channel usage

①. LOW POWER (1 W) only.

②. Receive Only.

③. LOW POWER (1 W) initially. Override to HIGH POWER by holding down H/L key before transmitting. Used normally in bridge-to-bridge communications.

④. Lightly shaded simplex channels 21A, 23A, 61A, 64A, 81A, 82A, and 83A cannot be lawfully used in Canada waters unless special authorization is obtained from the Canadian Coast Guard. Not for use by the general public.

⑤. The letter "A" illuminated by the channel number indicates the Canada channel is simplex. This same channel is always duplex when selecting International.
There is no "A" reference for International channels. The letter "B" is only used for some Canadian

"Receive only" channels.

⑥. Channel 70 is designated for use exclusively for Digital Selective Calling (DSC), such as Distress, Safety, and Ship Calls. No voice communication is allowed on CH70.
This channel is only available on DSC enabled radios.

Note: The CANADA mode is not legal to use in U.S. waters.

KEY: S = Simplex operating channel; D = Duplex operating channel.

C-4 US & Canada WEATHER channels

CH	RX (MHz)	TRAFFIC TYPE	NAME	REMARK
WX01	162.550	NOAA Weather Channel	NOAA WX	RX only
WX02	162.400	NOAA Weather Channel	NOAA WX	RX only
WX03	162.475	NOAA Weather Channel	NOAA WX	RX only
WX04	162.425	NOAA Weather Channel	NOAA WX	RX only
WX05	162.450	NOAA Weather Channel	NOAA WX	RX only
WX06	162.500	NOAA Weather Channel	NOAA WX	RX only
WX07	162.525	NOAA Weather Channel	NOAA WX	RX only
WX08	161.650	CANADIAN Weather Channel	CANADA WX	RX only
WX09	161.775	CANADIAN Weather Channel	CANADA WX	RX only
WX10	163.275	NOAA Weather Channel	NOAA WX	RX only

C-5 EAS (Emergency Alert Systems) alerts

National Codes Nature of Activation	Event Codes	Message
Emergency Action Notification (National only)	EAN	WARNING
	EAT	ADVISORY
National Information Center	NIC	ADVISORY
National Periodic Test	NPT	TEST
Required Monthly Test	RMT	TEST
Required Weekly Test	RWT	TEST

State and Local Codes Nature of Activation	Event Codes	Message
Avalanche Warning	AVW	WARNING
Avalanche Watch	AVA	WATCH
Blizzard Warning	BZW	WARNING
Child Abduction Emergency	CAE	WARNING
Civil Danger Warning	CDW	WARNING
Civil Emergency Message	CEM	WARNING
Coastal Flood Warning	CFW	WARNING
Coastal Flood Watch	CFA	WATCH
Dust Storm Warning	DSW	WARNING
Earthquake Warning	EQW	WARNING
Evacuation Immediate	EVI	WARNING
Fire Warning	FRW	WARNING
Flash Flood Warning	FFW	WARNING
Flash Flood Watch	FFA	WATCH
Flash Flood Statement	FFS	ADVISORY
Flood Warning	FLW	WARNING
Flood Watch	FLA	WATCH
Flood Statement	FLS	ADVISORY
Hazardous Materials Warning	HMW	WARNING
High Wind Warning	HWW	WARNING
High Wind Watch	HWA	WATCH

State and Local Codes Nature of Activation	Event Codes	Message
Hurricane Warning	HUW	WARNING
Hurricane Watch	HUA	WATCH
Hurricane Statement	HLS	ADVISORY
Law Enforcement Warning	LEW	WARNING
Local Area Emergency	LAE	WARNING
911 Telephone Outage Emergency	TOE	WARNING
Nuclear Power Plant Warning	NUW	WARNING
Radiological Hazard Warning	RHW	WARNING
Severe Thunderstorm Warning	SVR	WARNING
Severe Thunderstorm Watch	SVA	WATCH
Severe Weather Statement	SVS	ADVISORY
Shelter in Place Warning	SPW	WARNING
Special Marine Warning	SMW	WARNING
Special Weather Statement	SPS	ADVISORY
Tornado Warning	TOR	WARNING
Tornado Watch	TOA	WATCH
Tropical Storm Warning	TRW	WARNING
Tropical Storm Watch	TRA	WATCH
Tsunami Warning	TSW	WARNING
Tsunami Watch	TSA	WATCH
Volcano Warning	VOW	WARNING
Winter Storm Warning	WSW	WARNING
Winter Storm Watch	WSA	WATCH

For more information about the Emergency Alert System and event codes, visit:

http://www.nws.noaa.gov/os/eas_codes.shtml

Appendix D - EU VHF marine channel charts

The following channel charts are provided for reference only and may not be correct for all regions. It is the operators responsibility to ensure correct channels and frequencies are used for local regulations. For specific channel information for your country, please refer to local authorities.

D-1 EU international channel chart

CH	TX (MHz)	RX (MHz)	MODE	TRAFFIC TYPE	SHIP TO SHIP	SHIP TO SHORE	NAME TAG	REMARK
01	*156.050*	*160.650*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
02	*156.100*	*160.700*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
03	*156.150*	*160.750*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
04	*156.200*	*160.800*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
05	*156.250*	*160.850*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
06	156.300	156.300	S	Inter-ship Safety	Yes	No	SAFETY	
07	*156.350*	*160.950*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
08	156.400	156.400	S	Commercial (inter-ship only)	Yes	No	SHIP-SHIP	
09	156.450	156.450	S	Inter-ship	Yes	Yes	SHIP-SHIP	
10	156.500	156.500	S	Inter-ship	Yes	Yes	SHIP-SHIP	
11	156.550	156.550	S	Port Operations	Yes	Yes	PORT OPS	
12	156.600	156.600	S	Port Operations	Yes	Yes	PORT OPS	
13	156.650	156.650	S	Inter-ship Navigation Safety (bridge-to bridge)	Yes	No	SAFETY COM	
14	156.700	156.700	S	Port Operations	Yes	Yes	PORT OPS	
15	156.750	156.750	S	Inter-ship	Yes	Yes	PORT OPS	ⓘ 1W only
16	156.800	156.800	S	International Distress, Safety, and Calling	Yes	Yes	DISTRESS	
17	156.850	156.850	S	Inter-ship	Yes	Yes	PORT OPS	ⓘ 1W only
18	*156.900*	*161.500*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
19	*156.950*	*161.550*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
20	*157.000*	*161.600*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
21	*157.050*	*161.650*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
22	*157.100*	*161.700*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
23	*157.150*	*161.750*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
24	*157.200*	*161.800*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
25	*157.250*	*161.850*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
26	*157.300*	*161.900*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
27	*157.350*	*161.950*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
28	*157.400*	*162.000*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
60	*156.025*	*160.625*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
61	*156.075*	*160.675*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	

62	*156.125*	*160.725*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
63	*156.175*	*160.775*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
64	*156.225*	*160.825*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
65	*156.275*	*160.875*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
66	*156.325*	*160.925*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
67	156.375	156.375	S	Commercial, bridge-to-bridge	Yes	No	SHIP-SHIP	
68	156.425	156.425	S	Port Operations	Yes	No	PORT OPS	
69	156.475	156.475	S	Inter-ship	Yes	Yes	SHIP-SHIP	
70	156.525	156.525	-	Digital Selective Calling - DSC	------	------	DSC	➋
71	156.575	156.575	S	Port Operations	Yes	Yes	PORT OPS	
72	156.625	156.625	S	Inter-ship	Yes	No	SHIP-SHIP	
73	156.675	156.675	S	Inter-ship	Yes	Yes	SHIP-SHIP	
74	156.725	156.725	S	Port Operations	Yes	Yes	PORT OPS	
75	156.775	156.775	S	Port Operations	Yes	Yes	PORT OPS	➀ 1W only
76	156.825	156.825	S	Port Operations	Yes	Yes	PORT OPS	➀ 1W only
77	156.875	156.875	S	Inter-ship	Yes	No	SHIP-SHIP	
78	*156.925*	*161.525*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
79	*156.975*	*161.575*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
80	*157.025*	*161.625*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
81	*157.075*	*161.675*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
82	*157.125*	*161.725*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
83	*157.175*	*161.775*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
84	*157.225*	*161.825*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
85	*157.275*	*161.875*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
86	*157.325*	*161.925*	*D*	Public Correspondence, Port Op	No	Yes	PHONE-PORTOP	
87	157.375	157.375	S	Port Operations	No	Yes	PORT OPS	➂
88	157.425	157.425	S	Port Operations	No	Yes	PORT OPS	➂

Special notes on EU international channel usage

➀. LOW POWER (1W) only.

➁. Channel 70 is designated for use exclusively for Digital Selective Calling (DSC), such as Distress, Safety, and Ship Calls. No voice communication is allowed on CH70.
This channel is only available on DSC enabled radios.

➂. Maybe Duplex in some regions

KEY: S = Simplex operating channel; D = Duplex operating channel.

For specific channel information for your country, please refer to local authorities.

CH	SPECIFIC FOOT-NOTES	TRANSMITTING FREQUENCY (MHZ)		SHIP-TO-SHIP	SHIP-TO PORT	NAUTICAL INFORMATION
		SHIP	LAND			
60	a)	156.025	160.625			x
01	a)	156.05	160.65			x
61	a)	156.075	160.675			x
02	a)	156.1	160.7			x
62	a)	156.125	160.725			x
03	a)	156.15	160.75			x
63	a)	156.175	160.775			x
04	a)	156.2	160.8			x
64	a)	156.225	160.825			x
05	a)	156.25	160.85			x
65	a)	156.275	160.875			x
06	a) b)	156.3	156.3	x		
66	a)	156.325	160.925			x
07	a)	156.35	160.95			x
67	a) c)	156.375	156.375			x
08	a) q)	156.4	156.4	x		
68	a)	156.425	156.425			x
09	a) b) c)	156.45	156.45			x
69	a)	156.475	156.475			x
10	e)	156.5	156.5	x		
70	a)	156.525	156.525	Digital selective calling for distress, safety and calling		
11		156.55	156.55		x	
71		156.575	156.575		x	
12		156.6	156.6		x	
72	a) r)	156.625	156.625	x		
13	f)	156.65	156.65	x		
73	f) g)	156.675	156.675			x
14	q)	156.7	156.7		x	
74	a)	156.725	156.725		x	
15	h)	156.75	156.75			x
75	o)	156.775	156.775		x	
16	i)	156.8	156.8			x
76	j) d) o)	156.825	156.825			x
17	h)	156.85	156.85			x

77	a) k)	156.875	156.875	x		
18		156.9	161.5			x
78		156.925	161.525			x
19		156.95	161.55			x
79	a)	156.975	161.575			x
20		157	161.6			x
80		157.025	161.625			x
21	a)	157.05	161.65			x
81	a)	157.075	161.675			x
22		157.1	161.7			x
82	l) m)	157.125	161.725			x
23	m)	157.15	161.75			x
83	a) m)	157.175	161.775			x
24	m)	157.2	161.8			x
84	m)	157.225	161.825			x
25	m)	157.25	161.85			x
85	a) m)	157.275	161.875			x
26	m)	157.3	161.9			x
86	a) m)	157.325	161.925			x
27	m)	157.35	161.95			x
87	a) d)	157.375	157.375			x
28	m)	157.4	162			x
88	a) p)	157.425	157.425			x
AIS 1	a) n)	161.975	161.975			
AIS 2	a) n)	162.025	162.025			

General remarks to Country Specific table:

1   The channels for service categories ship-to-ship and nautical information may also be used for vessel traffic -systems by traffic centres.

2   In some countries, frequencies certain channels are used for an other service category or other radio services. These countries are Austria, Bulgaria, Croatia, the Federal Republic of Yugoslavia, Hungary, Moldova, Romania, the Russian Federation, the Slovak Republic, the Czech Republic (with exemption of channels 08, 09, 72, 74 and 86), Ukraine and the Federal Republic of Yugoslavia. The Administrations concerned should make any possible attempt to make these frequencies channels as soon as possible available for the radiotelephone service on Inland Waterways and/or the required service category.

Explanation of specific footnotes in Country Specific table:

a.   In the countries mentioned under remark 2, it is strictly prohibited to use this channel.

b.   This channel is not allowed to be used between Rhine km 150 and km 350.

c.   In the Netherlands, this channel is used by for its on-scene communications during safety operations on the North Sea, IJsselmeer, Waddenzee, Ooster- and Westerschelde.

d.   This channel may also be used for piloting, mooring, tugging and for other nautical purposes.

e.   This channel is the first ship-to-ship channel, unless the competent authority has designated an other channel. In the countries mentioned under remark 2, it is allowed that the output power is set to a value between 6 and 25 W until 1 January 2005.

f.   In the countries mentioned under remark 2, this channel is used for service category ship-to-port authorities.

g.   In the Netherlands, this channel is used by its national coastguard for communications during oil pollution operations on the North Sea and for safety messages for the North Sea, Waddenzee, IJsselmeer, Ooster- and Westerschelde.

h.   This channel may be used only for service category on-board communications.

i.   This channel may be used only for communications between seagoing vessels and participating land stations in case of distress and safety communications within the maritime sea-areas. In the countries mentioned under remark 2, this channel may be used only for distress, safety and calling.

j.   The output power shall be reduced automatically to a value between 0.5 and 1 W.

k.   This channel may be used for communications with a social character.

l.   In the Netherlands and Belgium, this channel may be used for transmitting messages concerning bunkering and victualling. The output power has to be reduced manually to a value between 0.5 and 1 W.

m.   This channel may also be used for public correspondence.

n.   This channel will be used for an automatic ship identification and surveillance system (AIS) capable of providing worldwide operating on seas and Inland Waterways.

o.   The availability of this channel is on a voluntary basis. All existing equipment shall be capable to of operating on this channel within a ten-year period after the entry into force of this Arrangement.

p.   After permission of the competent authority, this channel may be used only for special events on a temporary basis.

q.   In the Czech Republic this channel is used for service category nautical information.

r.   In the Czech Republic this channel is used for service category ship-to-port authorities.

D-3 Special channels

Country	Item	Chart	Primary channel
EU Standard, France, Greece, Spain, Portugal	DSC ON	EUR Default	
UK	DSC ON	EUR Default	M, M2
Belgium	DSC ON	EUR Default	31, 37, 96 (1W)
Belgium	ATIS ON	EUR Default	31, 96 (1W)
Norway, Finland	DSC ON		L1, L2, L3, F1, F2, F3
Sweden, Denmark	DSC ON		L1, L2, F1, F2, F3
Italy	DSC ON		
Italy (with Coast)	DSC ON		A0, A1, A2, A3, A4, A5, A6, C0, C1, C2, C3, C4, C5, C6, C7, C8, C9
Holland	DSC ON		31 (1W), 37
Holland	ATIS ON	EUR Default	31 (1W)
Germany	DSC ON		
Germany	ATIS ON	EUR Default	
Austria, Newsland	DSC ON	EUR Default	
Austria, Newsland	ATIS ON	EUR Default	

Appendix E - MMSI and license information

You must obtain a user MMSI (Marine Mobile Service Identity) and enter it into your Link-8 in order to use the DSC functions. Contact the appropriate authorities in your country. If you are unsure who to contact, consult your Lowrance dealer.

The user MMSI is a unique nine digit number, similar to a personal telephone number. It is used on marine transceivers that are capable of using DSC (Digital Select Calling).

Depending upon your location, you may need a radio station license for the Link-8 . You may also need an individual operator's license.

Lowrance recommends that you check the requirements of your national radio communications authorities before operating DSC functions.

Countries of intended use in the EU:

AT - Austria	HU - Hungary	PL - Poland
BE - Belgium	IS - Iceland	PT - Portugal
BG - Bulgaria	IE - Ireland	RO - Romania
CY - Cyprus	IT - Italy	SK - Slovakia
CZ - Czech Republic	LI - Liechtenstein	SI - Slovenia
DK - Denmark	LV - Latvia	ES - Spain
EE - Estonia	LT - Lithuania	SE - Sweden
FI - Finland	LU - Luxembourg	CH - Switzerland
FR - France	MT - Malta	TR - Turkey
DE - Germany	NL - Netherlands	UK - United Kingdom
GR - Greece	NO - Norway	

⚠ CAUTION

Under extreme operating conditions, the temperature of the rear heat-sink on this radio may exceed normal surface temperatures.
Caution is advised to prevent possible skin burns.

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