X100
Operation and Installation Guide

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Before you begin

WARNING

Before you begin, make sure to read the accompanying reference guide, which contains important regulatory information relevant to the installation and use of the equipment, you can find it here.

Take your time and read all of the information in this section and prepare what you need to before you attempt to install and use the X100.

Safety information

Various symbols are used in this manual and on the product itself to ensure correct usage, to prevent danger to the user and others, and to prevent property damage. The meanings of these symbols are described below. It is important that you read these descriptions thoroughly and fully understand the contents.

WARNING

Indicates a situation where improper use may damage to the product and could put the user at risk.

CAUTION

Indicates a situation where improper use may cause important features of the product not working properly.

INFORMATION

Information, hints and advice for better understanding of the instructions to be observed in the operation of the device.

Licensing

Before using your radio, make sure to check if you need a licence. Some regions may require you to have the following:

1. Ship station VHF licence.
2. Operator's licence.
3. MMSI number.

Obtaining an MMSI Number

An MMSI number is like a phone number—it’s unique to your vessel. If you already have an MMSI number and you're outside the United States, you can enter it into your radio the first time you use it. If you don’t have an MMSI number, keep in mind that you won’t be able to use your radio.

In the United States, your dealer or installer should enter your MMSI number along with any other necessary static data for you.

For further details, refer to the relevant Telecommunications Regulatory Body.

Click here and enter your location for information how to obtain an MMSI number.

INFORMATION

The MMSI number can only be entered once, if the number is entered incorrectly or the MMSI number needs to change, the unit will require re-programming by an authorised em-trak Marine Electronics Limited dealer.

Product Overview

The X100 is a Class D DSC/VHF radio equipped with a class B transceiver and Digital Selective Calling (DSC) capabilities. It seamlessly integrates with the Connect-X app, compatible with both iOS and Android devices. The app provides all the functionality of the X100, combined with the convenience of having it right in your pocket.

Here's what the X100 can offer:

- The integrated VHF Link™ turns any compatible iOS or Android device into a pocket sized VHF radio. You can roam around your boat and still be in touch.
- Digital Selective Calling (DSC) calling. This makes it easy for you to call other radios and share your position while asking theirs. If you get into trouble the X100 also allows you to send a distress call, distress calls are received by any radio within range.
- The Global Positioning System (GPS) shows your real time position on screen. Your position data is shared via the NMEA (National Marine Electronics Association) 0183, NMEA2000, and Wi-Fi.
- An optional connection for a GPS antenna.
- VHF and DSC functionality making it easy to stay in touch while on the water.
- One VHF antenna connection handles both AIS and voice communication, keeping things simple and efficient.
- The ultra fast and optimised user interface makes it easy to see and understand.
- The X100 is also completely waterproof.

The image below shows the types of devices the X100 can connect to and how they link together, making it easier for you to understand how the X100 network works.

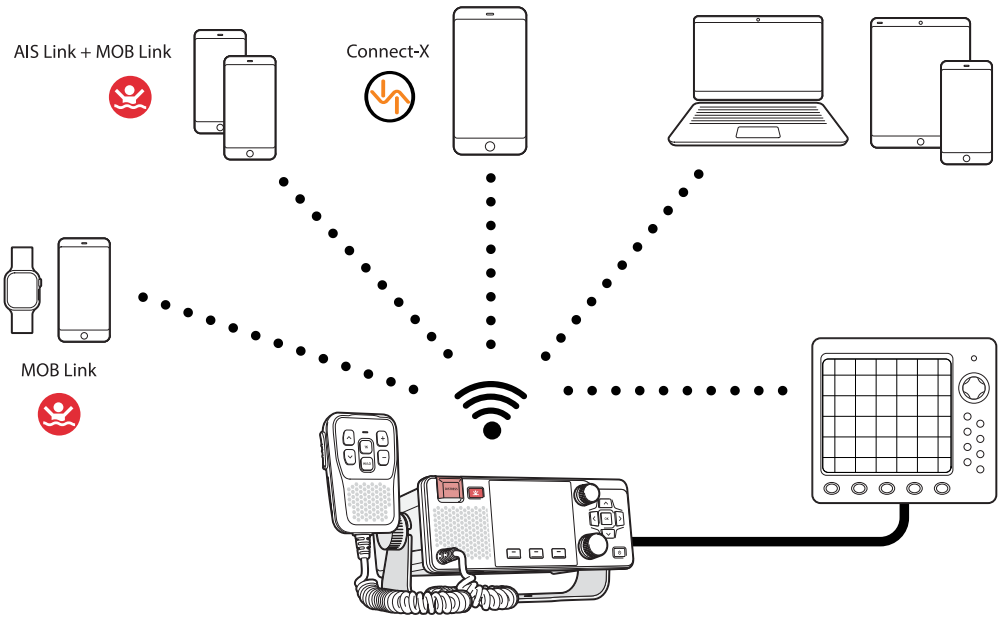


Figure 1 : Device connections

What's in the box?

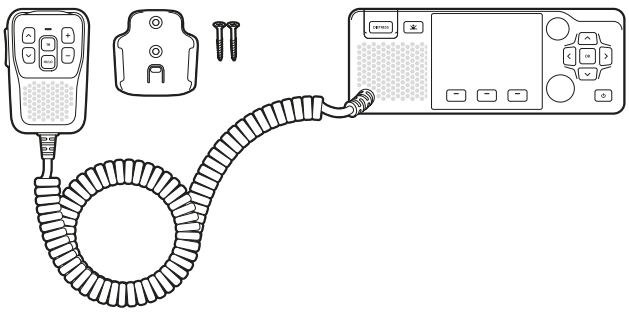
Here's what you will find in the box:

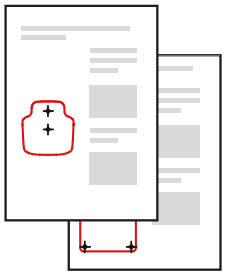
Fist-mic, bracket and fixings

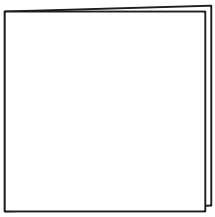
X100

Fist-mic and panel mount bracket templates

Quick start guide





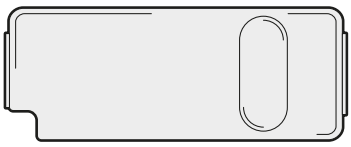


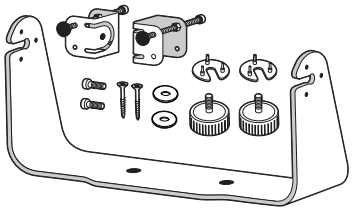
Front cover

Wi-Fi/ Bluetooth antenna

Mounting bracket and fasteners

Panel mount o-ring





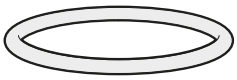


Figure 2 : Package contents

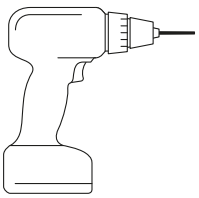
What you'll need

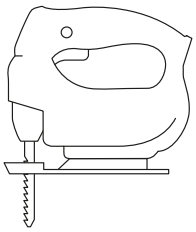
Here's some useful tools to help the installation easier, make sure to have these ready before starting.

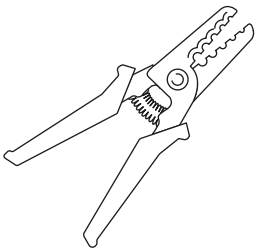
Drill with 4mm drill bit

Jigsaw (optional)

Wire strippers



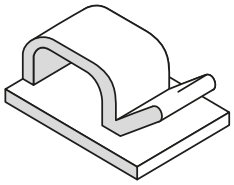


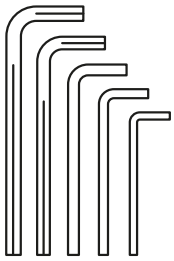


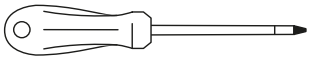
Adjustable cable clips

Allen key set

PZ2 screwdriver







VHF antenna

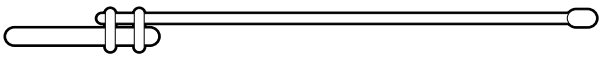


Figure 3 : Tools and equipment

Rear connectors

All the connectors are located on the back of the X100. This is where you'll connect the GPS and VHF antennas, the power cables, Wi-Fi and Bluetooth antennas, NMEA, and make the loud hailer connections.

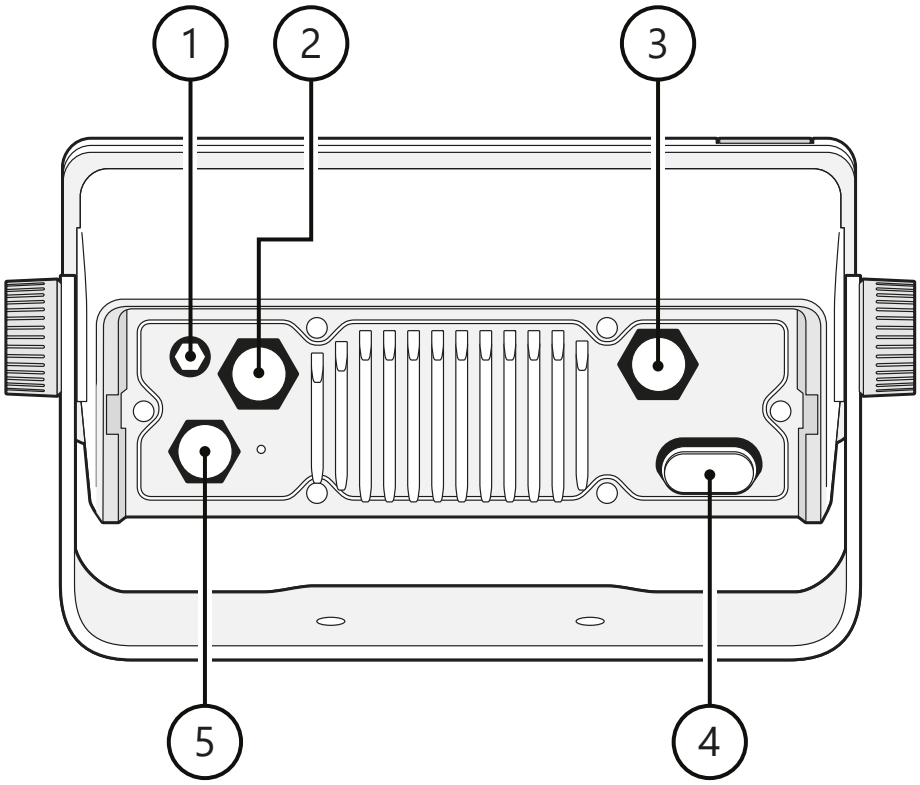


Figure 4 : Rear connectors

No.	Connector Type	Description
1	External Wi-Fi Bluetooth antenna	**External Wi-Fi/Bluetooth antenna** This is where you'll connect the included Wi-Fi or Bluetooth antenna to link your smart devices to the radio.
2	VHF antenna	**VHF antenna** Connect the VHF antenna here so you can communicate with other people on the water.
3	NMEA2000	**NMEA2000** Connect the NMEA2000 devices here, so all of your on board sensors and devices are linked.
4	Red power cable +	**Red Power +** This is the positive power cable, make sure to connect to a supply that gives between 9.6 and 31.2V.
	Black power cable -	**Black Power -** This is the negative power cable, make sure to connect to a power supply that gives between 9.6 and 31.2V.
	NMEA0183	**NMEA0183** Connect the NMEA0183 devices here, so all of your on board sensors and devices are linked.
	Loud hailer	**Black and White Loud hailer** Connect your loud hailer here, once connected the fist-mic can be used to talk through the hailer.
5	External GPS antenna	**External GPS antenna** Connect any external GPS antenna here to keep track of your location.

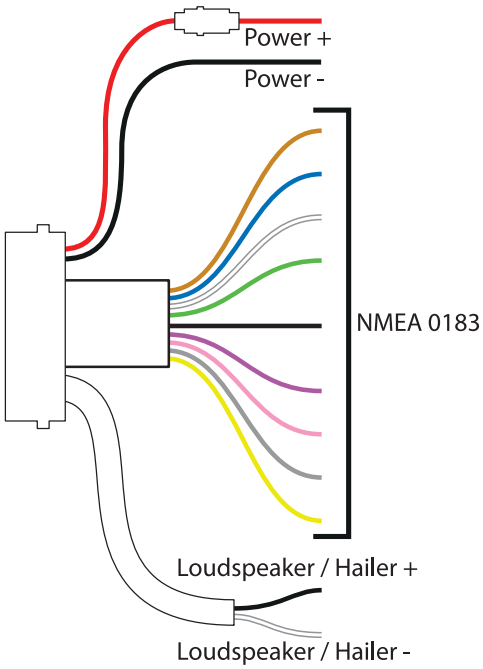


Figure 5 : Bare end connections

Plan your installation

You don’t want any equipment to end up in the wrong place, so it's always best to plan out the installation before hand. To ensure proper placement, plan the installation in advance. This helps with hardware positioning, cable routing, and avoiding interference or signal issues with Wi-Fi, VHF, and GPS.

If you're not sure how to do this, ask someone with experience in installing this kind of hardware.

Vessel construction

The way your vessel is built can affect GPS performance. For instance, being near heavy structures like a bulkhead or inside a larger boat might reduce the signal. Materials like steel, aluminium, or carbon can also impact how well the GPS works.

INFORMATION

Keeping the GPS and VHF antennas clear of heavy structures like bulkheads can help keep the signals strong.

Check list

The check list will help you think through the placement of your hardware, cable routing, any potential interference, as well as any issues with Wi-Fi drop out, VHF and GPS signals.

If you're not sure how to do this, ask someone with experience in installing this kind of hardware.

Take a moment to go through the list below, this will help make sure you choose the right locations for installing the equipment.

Choosing the best locations will help your hardware perform at its best and avoid potential problems down the line.

External GPS antenna placement	
1.	Choose a place with a clear view of the sky, free from obstructions.
2.	Try to mount it as far away from other electronic equipment as possible to avoid interference.
3.	Keep it at least 1m (3 ft) away from any other antennas.
4.	Make sure that the cable is long enough to reach the X100.

VHF antenna placement	
1.	Stay at least 1.8m (5.9 feet) away from the antenna when it's working, especially when transmitting at 25 watts.
2.	If possible, mount the antenna at least 3.8m (12.5ft) above the main deck. If that height isn’t possible, aim for at least 1.8m (5.9 ft).
3.	Use an insulated (plastic) mounting bracket to keep the antenna separated from the vessel’s metal parts for a safe and secure installation.
4.	If you are installing multiple antennas, keep them 2.4m (8ft) apart.
5.	Make sure that the cable is long enough to reach the X100.

X100 placement	
If you’re not using an external GPS antenna, make sure to consider the following when choosing a location for the X100:	
1.	You will have good GPS strength.
2.	Nothing is installed in dangerous areas, especially near fuel tanks.
3.	The cables are out of the way and won't be damaged.
4.	There is enough room behind the X100 for air to flow.

Mounting area	
The mounting surface should be flat and solid, try to steer clear of cutting holes or installing the in areas that could weaken the structure of your vessel.	
1.	There is enough space for cables, and you can easily access the back of the X100.
2.	Check there is nothing behind the mounting surface that you could accidentally damage while drilling.

Ventilation requirements	
The X100 could overheat if it doesn’t have enough room for ventilation.	
1.	Make sure there’s plenty of airflow around the back of the X100.
2.	Position the X100 so that it isn’t in direct sunlight, as this can lead to overheating.

Water ingress coniderations	
1.	The X100 is waterproofed to IPx6 and IPx7 standards, choosing a location that minimizes water exposure helps keep your equipment in top condition for the long haul.
2.	Try to minimise the amount of water that the X100 could get exposed to. Damage from pressure washing is not covered by the warranty.
3.	If at all possible, try to mount the X100 and fist-mic somewhere that protects from rain and salt spray.

CAUTION

Water intrusion and subsequent equipment failure may occur if the product gets exposed to high-pressure washing. em-trak Marine Electronics Limited will not warrant products subjected to high-pressure washing.

Cable routing	
1.	The X100 is waterproofed to IPx6 and IPx7 standards, choosing a location that minimizes water exposure helps keep your equipment in top condition for the long haul.
2.	Try to minimise the amount of water that the X100 could get exposed to. Damage from pressure washing is not covered by the warranty.
3.	If at all possible, try to mount the X100 and fist-mic somewhere that protects from rain and salt spray.

EMC installtion guidelines	
1.	Any cables and equipment are at least 1m (3ft) away from any transmitting equipment, or 2m (7ft) if you're using SSB (Single Side Band) radios.
2.	You maintain a distance of 2m (7 feet) from the path of a radar beam.
3.	Use em-trak Marine Electronics Limited cables and avoid cutting or extending them unless recommended to do so.
4.	If any of this is not possible or practical, just do your best to keep the equipment separated. This will create the best possible conditions for EMC performance.

Loud hailer location requirements
The X100 installation location chosen by you should be at least 3m (9.8ft) away from the loud hailer and it's fist-mic. This helps eliminate the feedback when a loud hailer is used.

Wireless product location requirements	
1.	Install them at least 1m (3ft) away from other wireless devices.
2.	Keep the devices clear of electrical or electromagnetic equipment that could cause interference.
3.	Make sure that there's clean line of sight bwteen your wireless devcies and the router.

Electrical interference
Install the unit away from equipment like motors, generators, and radio transmitters as electrical interference can disrupt both receiving and transmitting signals.

Electrical safe distance from compass	
1.	Keep the X100 at least 1m (3ft) way from the compass.
2.	Test your compass with the X100 powered on to make sure there is no interference.

Installing your radio

Follow the instructions in this section to ensure a smooth and hassle-free installation. Go through each section in order, but feel free to skip any that don't apply to you. For example, if you already have a VHF antenna installed, you can simply move on to the next step.

GPS antenna options

You have two options for installing a GPS antenna: you can either use the X100's internal GPS antenna or an external one. If you need to purchase a GPS antenna, contact support@em-trak.com or visit your local dealer.

If you choose to use the X100's internal antenna, then read the information below. This will help you choose the best location to enjoy reliable GPS signals.

- Installing the X100 above decks (1) gives you the best performance, as the built-in antenna has a better chance of maintaining a strong connection.
- If you install the X100 below decks (2), the performance may not be optimal as the signal may be blocked by your vessel. You might need an external antenna.
- If you install the X100 in the hull (3), you won't be able to receive a location fix and an external GPS antenna will be needed.

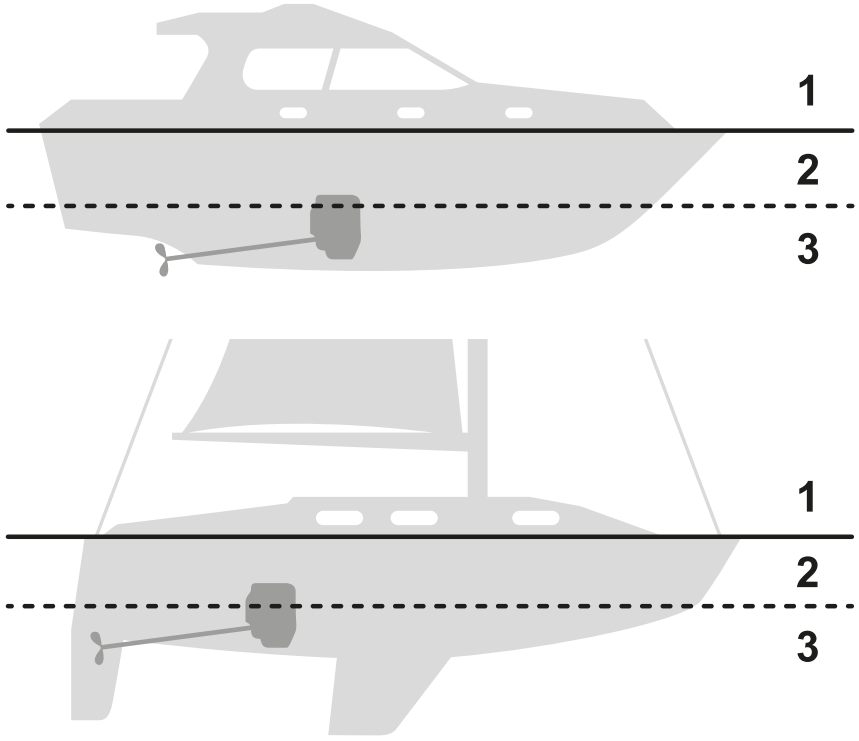


Figure 6 : Mounting locations

No.	Performance
1	This location provides optimal GPS performance (above decks).
2	In this location the GPS performance may be less effective and you may need an external GPS antenna.
3	The GPS performance will be very poor and you will need an external GPS antenna.

If you choose to use an external GPS antenna then try to keep the following in mind:

- Install the antenna on a flat horizontal surface or a suitable pole.
- Make sure that the antenna has a clear view of the sky and it doesn't have anything obstructing it.
- Installing the antenna lower and closer to your vessel can help maintain high accuracy for positional data.
- Try to keep the antenna at least 1m (3ft.) away from any other antenna or electronic equipment as this may cause interference.
- Once the antenna is installed, route the cables to the X100.

Installing the VHF antenna

If you already have a VHF antenna installed, you can skip this section. However, if you’re setting up a new VHF antenna, follow the information below for the best results.

- Make sure that the antenna is above the head height of any crew member.
- Mount the antenna so that nothing can block it's line of sight to the sky.
- Make sure that the VHF antenna is not in the line of sight of any satellite communication antenna.
- Try to keep the VHF antenna at least 3 meters (10 feet) away from any electronic equipment to avoid interference.
- Make sure there's enough space to easily route the cable down to the X100.

Mounting the X100

Everyone has a unique style, so the device can be mounted in various ways to suit your preferences.

Securely mount the X100 using the provided tools and fixings, making sure it's attached to a suitable surface where the screen is clearly visible during use.

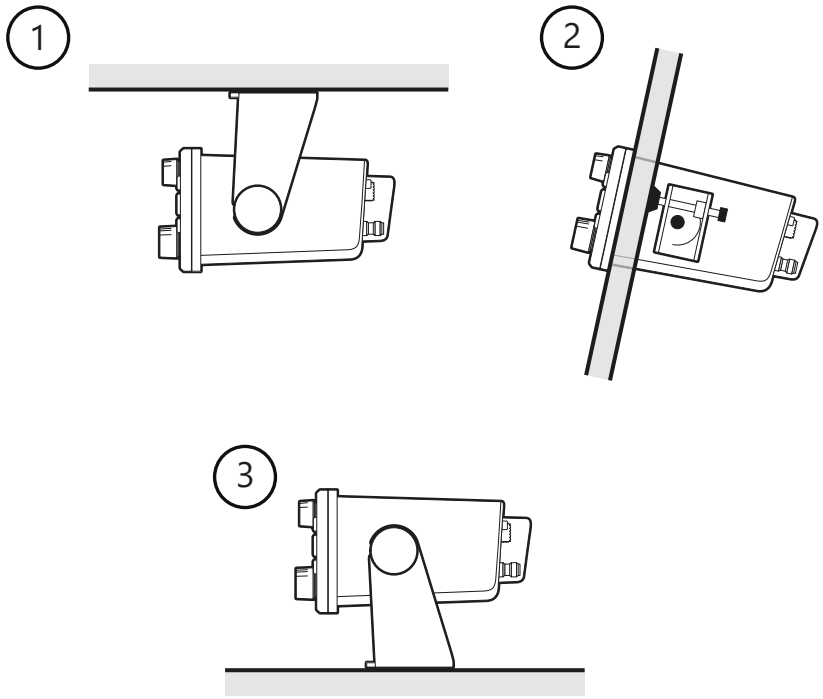


Figure 7 : Mounting options

1 Bracket mount - overhead 2 Panel mount
3 Bracket mount - table top

INFORMATION

Always leave enough space behind the X100 for proper airflow and room for cables. Also, ensure the screen is tilted slightly to reduce glare.

X100 bracket mounting

Bracket mounting is a great solution for people that want to fix the X100 in place while having open access to the rear of the radio.

Before mounting, click **here** to check that the area selected meets the requirements.

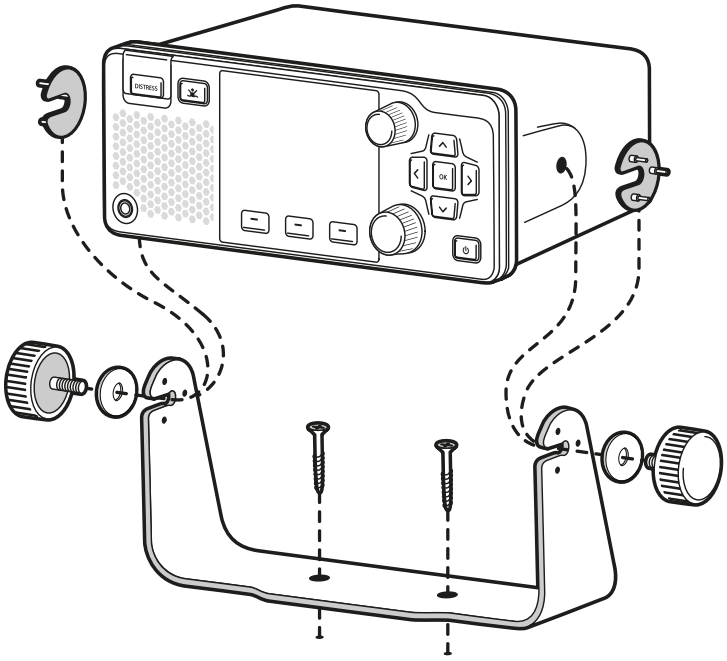


Figure 8 : Bracket mounting the X100

1. Place your bracket onto the mounting surface and use a pencil to mark the screw holes. Make sure that the bracket is in the correct location before you mark the holes.

2. When you are happy with the location, drill the holes in the mounting surface using an appropriate drill bit.

3. Mount the bracket onto the mounting surface using the 2x No.8 x 38mm Pozi countersunk head stainless steel screws, ensure that the screws are tightened well.

4. Connect the VHF and GPS antenna cables to the correct ports in the back of the X100, click **here** for more information.

5. Assemble the X100 onto the mounting bracket using the 2x mounting knobs.

Fist-mic holster mounting

Even though the fist-mic is connected to the X100 by cable, you don’t want it swinging loose while your vessel is moving. Install it close enough to the X100 so it's always easily accessible.

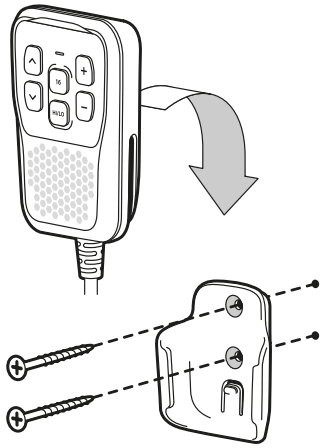


Figure 9 : Mount the fist-mic

1. Make sure the holster is installed in a flat, clear area with enough space around it so you can easily insert and remove the fist-mic.

2. Use the fist-mic bracket or its template to mark the screw hole positions on the mounting surface.

3. Drill two holes for the mounting fixings using a suitable drill bit. Make sure there is nothing behind the mounting surface before drilling.

4. Use the 2 No. 8 x 38mm Pozi countersunk stainless steel screws to securely attach the holster to the mounting surface.

5. And finally, slot the fist-mic into the holster.

Panel mounting the X100

Panel mounting is a great solution for people that want to fix the X100 in place while having open access to the rear of the radio, via a removable panel or an access hatch. Before mounting, click **here** to check that the area selected meets the requirements.

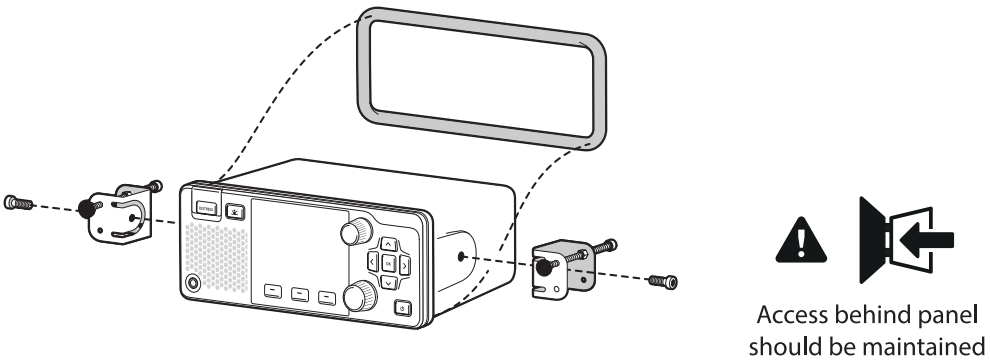


Figure 10 : Panel mounting the X100

1. Use the X100 panel mount template (included in the box) to measure and mark the installation location, then use a suitable tool to cut the hole for the X100.

2. Place the O-ring between the front panel of the X100 and the installation surface.

3. Pull the VHF and GPS antenna cables through the hole cut in step 1, and connect the cables to the correct ports on the back of the X100, click see **here** if you're not sure which ports are the correct ones.

4. Insert the X100 into the slot cut in step 1.

5. Using the appropriate tool, attach the panel brackets to the sides of the X100. Tighten the bracket nuts until the X100 is securely in place. So even in rough seas the X100 stays in place.

Flush mounting the X100 (optional)

Flush mounting is an excellent option for securely and permanently installing the X100, offering both a stable setup and a clean, polished look. One key advantage of flush mounting is that the radio can be easily removed when its not being used.

The flush mount is optional, so if you're interested, simply contact your local dealer and provide the part number 300-0142 to place your order.

Be sure to check the template provided with the flush mount kit, as it will make the installation process much easier for you. This template guides you through the correct placement and helps ensure a smooth and precise installation.

Loud hailer and external speaker connections

The X100 can connect quickly and easily to your vessel's loud hailer, making it especially useful for communicating important messages directly to your crew or nearby vessels. For instance, if you need to announce safety instructions or issue a message to your crew, the hailer will amplify your voice through the loudspeaker, ensuring everyone within earshot can hear you clearly. Any message made through the loudspeaker does not transmit over VHF.

You can connect black and white wires shown below, directly to the loud hailer.

Click **here** to see how to activate the loud hailer or external speaker.

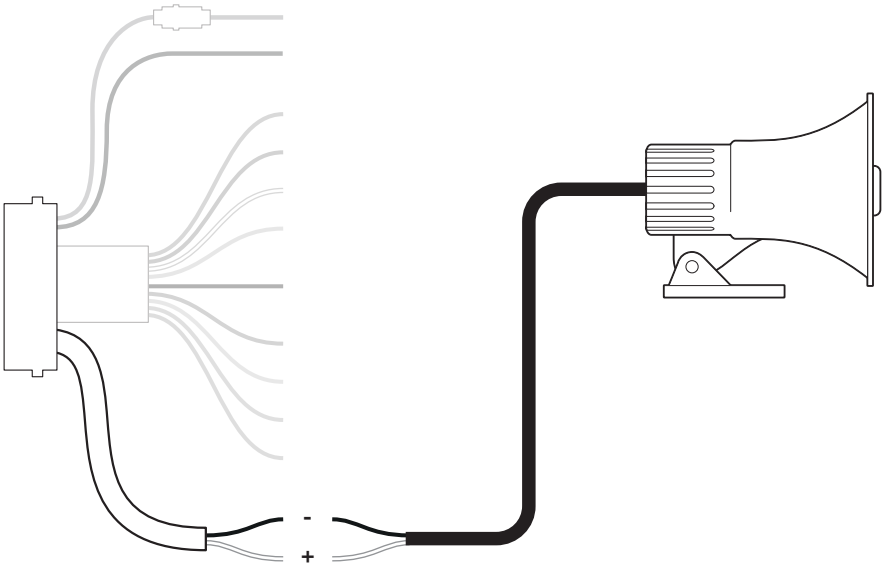


Figure 11 : Loud hailer connections

NMEA0183 and 2000 connections

For older equipment with only NMEA0183 interfaces, you can use the NMEA0183 connector. However, for equipment with both NMEA0183 and NMEA2000, it’s best to use the NMEA2000 connection for faster data flow. Don’t forget to properly terminate the NMEA2000 connection at the end of the bus to ensure everything works smoothly.

The illustration and table below shows the NMEA0183 connections you'll need to make if you want use the NMEA0183 connector.

If you prefer to use the NMEA2000 connection, simply connect your devices to the NMEA2000 port located on the back of the X100. Click **here** to view its exact location.

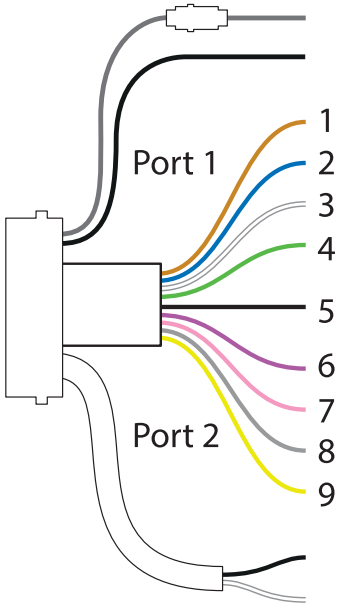


Figure 12 : NMEA 0183 connections

Pin	Function	Colour
1	NMEA 1 Receive +	Brown
2	NMEA 1 Receive -	Blue
3	NMEA 1 Transmit +	White
4	NMEA 1 Transmit -	Green
5	GND	Black
6	NMEA 2 Receive +	Purple
7	NMEA 2 Receive -	Pink
8	NMEA 2 Transmit +	Grey
9	NMEA 2 Transmit -	Yellow

External Wi-Fi / Bluetooth connector

Connect your smart device effortlessly to the X100 by attaching the supplied Bluetooth/Wi-Fi connector into the Wi-Fi port located at the rear of the unit. Once connected, you can download the Connect-X app onto your smart device, enabling you to use your device as a fully functional VHF radio.

Click **here** if you're not sure which port is the Wi-Fi port.

Powering the X100

The X100 requires a power supply of 9.6–31.2V, with a minimum of 6A. Connect the red (+) cable and the black (-) cable to a suitable power source.

Grounding the X100

The X100 has an earth connection that, on steel-hulled vessels, should be connected to a suitable ground. You'll recognize the ground connection by this symbol. Ensuring a proper ground connection helps protect your equipment and ensures safe operation.

Icon	Description
	Grounding point

If your vessel is made of a conductive material, be sure to connect the ground wire using as short as a connection as possible.

The ground wire is connected using a stainless A4 M3 x 5mm screw and a ring clamp to the M3 earthing connection point located on the rear of the X100.

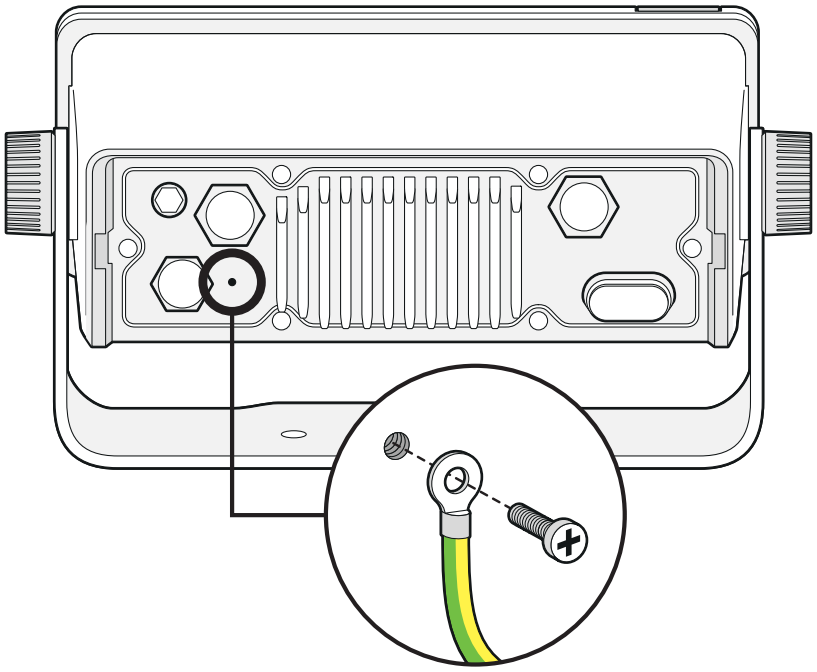


Figure 13 : Grounding the X100

In-line fuse

There is a 5 x 20mm 12A fuse located in a waterproof case on the positive power cable (red). From time to time you may have to replace the fuse, to do this:

1. Power off the X100, disconnect, or isolate the power supply.
2. Gently unscrew the 2x halves of the waterproof case and remove the fuse. Dispose of the fuse in an environmentally safe manner.
3. Install the new 5 x 20mm 12A in-line fuse and securely reconnect the 2x halves of the case.
4. Reconnect the power supply and power on the X100.

Basic use

This section covers the basic functions of the X100 and how to use them effectively.

Controls

X100

Before you start using the X100, take some time to familiarise yourself with the controls.

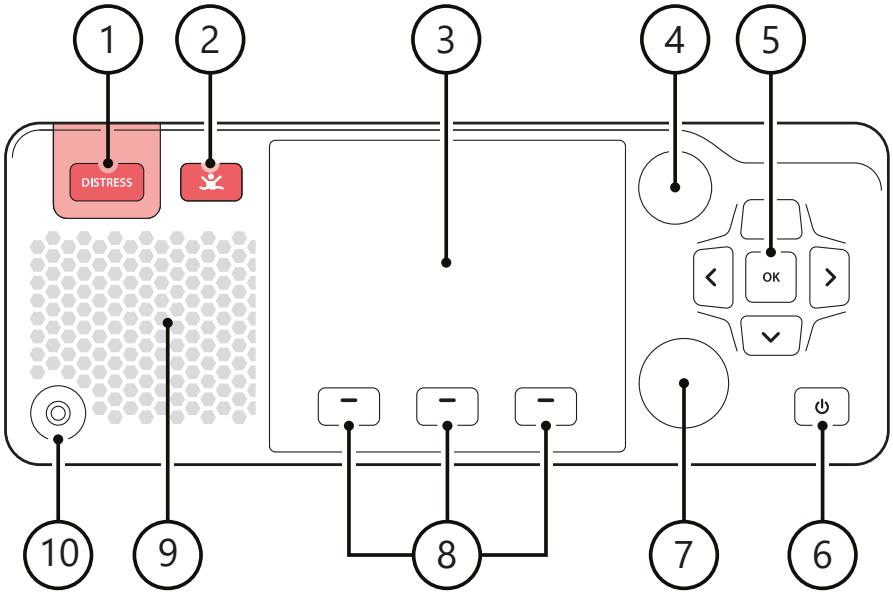


Figure 14 : X100 controls

No.	Name	Description
1	Distress button	The distress button is used in emergencies, such as when there is a threat to life or an immediate danger to a crew member or the vessel. To make a DSC distress call, simply lift the spring-loaded cover and press the button. See **How to make and receive distress calls** on page 48 for more information.
2	MOB (Man Over Board) button	The MOB button is used when someone is seen falling over board, if someone falls over board unnoticed, the MOB alarm triggers automatically providing that crew member is embarked on the X100. To learn how to embark crew members, click **here**. Once pressed, the button drops a waypoint on the chart plotter screen, and on the map on the MOB screen. The MOB screen appears, guiding the vessel to the area where the crew member fell overboard. See **Man overboard (MOB) screen overview** on page 40 for more information.
3	Screen	The screen helps you navigate through all of the available options on the X100 and also provides important information.

No.	Name	Description
4	Volume and squelch rotary	If you need to increase or decrease the volume of incoming transmissions, rotate the rotary knob. Keep in mind that it may be hard to hear transmissions in bad weather, so adjusting the volume can help. If you want to try reducing the amount of background noise, short press the rotary knob to enable the squelch volume control, and turn to adjust.
5	Arrow and OK buttons	Use the arrow buttons to navigate through the software and to turn certain options and functions on or off. Press the OK button to enter menus and select different options.
6	Power button	Short press the power button, the X100 turns on after a couple of seconds. Remember to turn off the X100 when it is not being used, long press the power button to turn the X100 off. To adjust the screen brightness, short press the power button and use the volume knob to make your adjustments. You can also switch between display modes by pressing the labelled softkey.
7	Channel rotary	If you want to manually change the channel to broadcast on, turn the rotary knob until you find the channel you want.
8	Softkey 1 Softkey 2 Softkey 3	If you want to enter the settings, make a DSC call, or adjust the broadcasting power, simply press the corresponding softkey. Keep in mind that the options for each softkey may change depending on which screen you are on.
9	Speaker	The speakers play all incoming transmissions, ensuring you don’t miss any important information.
10	Fist-mic cable	The fist-mic connects to the X100 via this cable.

Fist-mic

Take some time to familiarise yourself with the fist-mic controls.

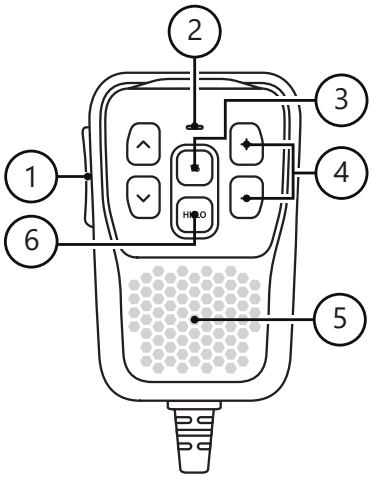


Figure 15 : Fist mic controls

No	Name	Description
1	PTT (Push to talk) button	To send a voice message, simply press and hold the designated button while you speak your message. Once you're finished, release the button to complete the transmission and automatically return to receive mode.
2	Microphone	When sending transmissions, make sure to speak directly into the microphone. This ensures that your message is clear and easily heard by the recipient.
3	Channel 16 Button	To switch directly to Channel 16, simply press the designated button. Channel 16 is the international distress frequency, so it's important to have quick access to it for emergencies or urgent communications.
4	Volume up / down buttons	To adjust the speaker volume, just press the designated button to increase or decrease the sound level. This allows you to find the perfect volume for your environment, ensuring you can hear communications clearly without being overwhelmed by noise.
5	Speaker	Incoming transmissions will play through the speaker, allowing you to hear messages clearly without needing to wear headphones or hold a receiver.
6	High / Low power button	To switch between High (25W) and Low (1W) transmission power, simply press the designated button. High power is ideal for longer distances, while Low power is better for short-range communications. Keep in mind that some channels may not permit broadcasting at 25W.
7	Channel up / down buttons	To change the channel, just press the designated button. This allows you to quickly switch to a different frequency for communication, whether you need to connect with another vessel, a shore station, or simply tune into a different channel for updates.

Initial start-up

Once the planning and installation is done, you're all set to start enjoying everything the X100 has to offer.

Start by powering on the X100 and enter your operational region, input your MMSI number, and download the app onto your smart device.

You will then be asked to connect your device to the X100 by scanning the QR code shown on the screen, the devices connect over Wi-Fi.

CAUTION

The X100 should only be connected to properly secured networks and devices.

On-boarding

At this point, the X100 should be installed with the app downloaded and working on your smart device.

Firstly you will be asked to enter the captains name and pin number. Next, you'll need to enter the static data, which can be done using either your smart device or the X100.

The static data includes:

- Your region - Under this option, you'll find three choices: U.S, Canada and International. Choose the location in which you'll be operating. If you are operating in the U.S., your region is entered automatically.
- MMSI number - If you are in the United States, this will be entered by your dealer or another qualified person. Without this number, features like DSC calling and AIS VHF will not be available.

WARNING

Take care to program the MMSI correctly. If you need to change the MMSI for any reason, contact your local dealer, and they will arrange to have the MMSI reset.

If you're unsure where to find the MMSI or if you don't know what it is, check your VHF radio license. It should match the MMSI used for your VHF/DSC radio.

- Vessel Details: The vessel details include your ship's name, call sign, and ship type. Additionally, you'll need to reference the dimensions of the GPS antenna location that connects directly to the X100.

  Below is an easy to follow break down showing how to enter the GNSS/GPS antenna location accurately:

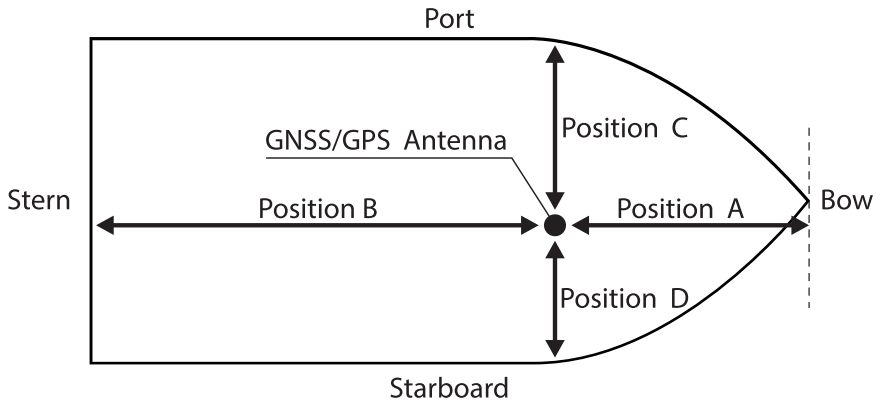


Figure 16 : GNSS antenna location

1. First, measure the distance from your antenna to the bow and enter this value for Position A.
2. Next, measure the distance from your antenna to the port side and enter this value for Position C.
3. Then, subtract measurement A from the total length of your boat and enter this value for Position B.
4. Finally, subtract the Position C value from the total beam of your vessel and enter this value for Position D.

INFORMATION

Entering the information is easier within the app.

CAUTION

Take your time to enter the vessel’s details accurately. It's important to get this right, as it helps other vessels recognize you easily.

Connecting further devices to the X100

At this point you should have finished the on boarding process. If you haven't already, complete that process and come back here. Click **here** to learn how to do this.

If you're setting up a new smart device, you'll want it to join the same network as your X100 for seamless access. To join the network simply press the **JOIN WI-FI** softkey on the **MY VESSEL** screen.

To connect your device to the X100 network, scan the QR code with the device you want to join, then open the Connect-X app. Just follow the app's instructions, and you'll be connected in no time.

Status bar symbols

The following symbols appear along the top of the X100 screen, their meanings are defined below.

Icon	Description
	**Bluetooth** The icon will turn white when a Bluetooth device is connected. If no device is connected, the icon won't appear.
	**Wi-Fi** When the device is connected to a Wi-Fi network, the icon appears white. If disconnected, the icon will turn grey with a red line through it.
	**AIS Tx/Rx** The Rx arrow turns red when receiving an AIS message. When sending an AIS message, the Tx arrow is white. If the unit is in silent mode, an icon will appear with a red line through it.
	**GPS Signal** The GPS icon turns white when a signal is being received.
	**MOB** The MOB icon lights up red when the Man Overboard (MOB) feature is active. When it's inactive, the icon appears grey.
	**Collision** The collision course icon turns red when on a collision course, helping you stay alert to potential hazards. When there's no collision risk, the icon appears grey.
	**Anchor Watch** The Anchor Watch icon is grey when inactive and turns white when an anchor watch limit is set. If the vessel drifts beyond the set limit, the icon will highlight in red, alerting you to potential drift.
	**Link** The icon displays the number of smart devices currently connected to the X100 unit.
	**Volume** The icon shows that the speaker volume is active. If there's a red line through the icon, it means the speaker is muted.
	**Alert** This icon indicates that there is an active alarm, signalling that action is needed. A pop-up notification will appear on the screen, providing details about the specific alarm.
	**Mail** This indicates that you have an unread DSC message.
	**Alarm** This indicates a DSC alert relating to a distress call.
	**Silent mode** This indicates that the X100 is in silent mode, so your location will not be shared.

VHF Radio Screen Overview

For your convenience the features that you are most likely to use are all available on the main screens of the software. These include the VHF screen, AIS List screen, AIS Plot screen and the My vessel screen. You can switch between screens by pressing the left and right arrow keys.

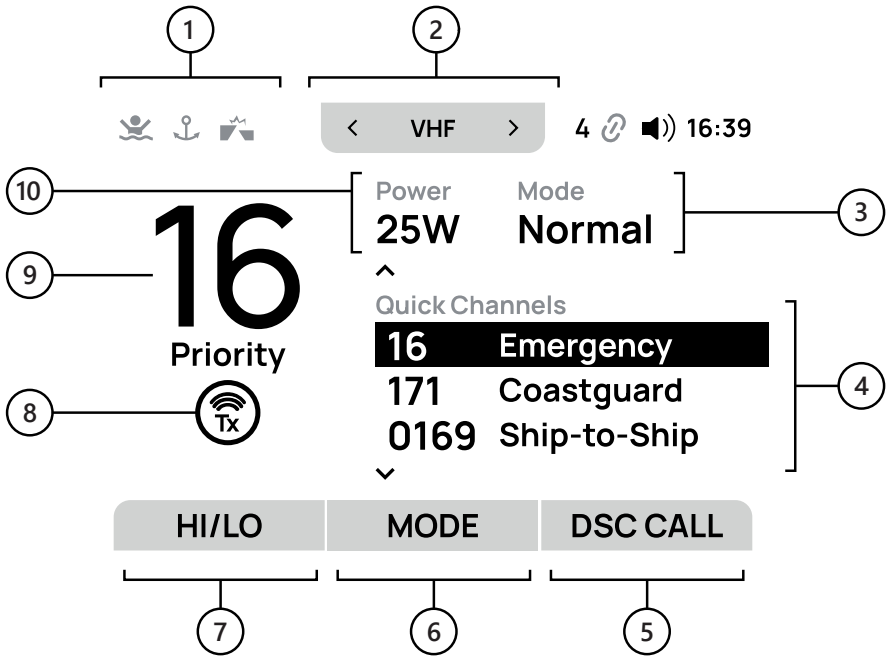


Figure 17 : VHF screen overview

The first main screen is the VHF screen. This is where you can quickly make a DSC call, adjust the transmission power, and monitor or scan channels with ease.

No.	Name	Description
1	Status bar	A handy tool that shows you what status is currently active by highlighting the corresponding icon.
2	Screen name	This is the name of the screen that you are on.
3	Current mode	This shows which mode is currently selected: either Normal, Watch, or Scan mode can be active at one time.
4	Quick channels	This shows a list of channels that you can quickly call while in normal mode. A fourth channel will appear on this list, the fourth channel is the last channel broadcast on.
5	DSC call softkey	When you're ready to make a DSC call, press this softkey. Once pressed, additional options will appear, allowing you to select the type of DSC call you wish to make.
6	Switch mode softkey	If you want to enter watch or scan mode, press this softkey. The options on the screen change based on the mode you've selected.
7	High / Low softkey	If you want to adjust the transmitting power, press the softkey. This toggles between 25W (high power) and 1W (low power).

8	Radio status	This shows the current status of the radio. "Rx" indicates that you're receiving a transmission, while "Tx" means you're transmitting.
9	Channel	This is the channel that you currently have selected.
10	Transmitting power	This displays the amount of power currently being used to transmit your messages. Use low power when communicating with vessels nearby (less than 1 mile) and high power to reach vessels further away.

Quick Channels

QUICK CHANNELS are a handy way of quickly selecting frequently used channels.

For example if you find yourself regularly changing channels between Port operations, your local marina and a friend who has a boat nearby, you can set those channels as **QUICK CHANNELS** in the app.

The Quick channels appear on the VHF screen. Use the arrow keys to select a quick channel and press the **OK** button to select that channel. You can then press the **DSC CALL** softkey to call. Quick channels can be selected in the app.

VHF radio modes

VHF Radio Scan and Watch modes are a good way of listening to one channel without missing information being broadcast on another.

Press the **MODE** softkey when you want to enter **WATCH** or **SCAN** mode.

Normal mode

NORMAL mode is the standard operating mode for the X100. In this mode, all functionality is available, making it ideal for making calls or sending messages. However, you won’t be able to watch or scan any channels, so it’s best used when you need full access to the radio's features without monitoring other frequencies.

Scan Mode

SCAN mode is ideal for listening for important announcements or broadcasts, such as safety alerts or weather updates. When a broadcasting channel is found, the X100 will stay on that channel until the broadcast ends. If no further broadcasts occur on that channel, the X100 will continue scanning for other channels.

To learn how to set how long the channel is scanned after a broadcast ends, click **here**.

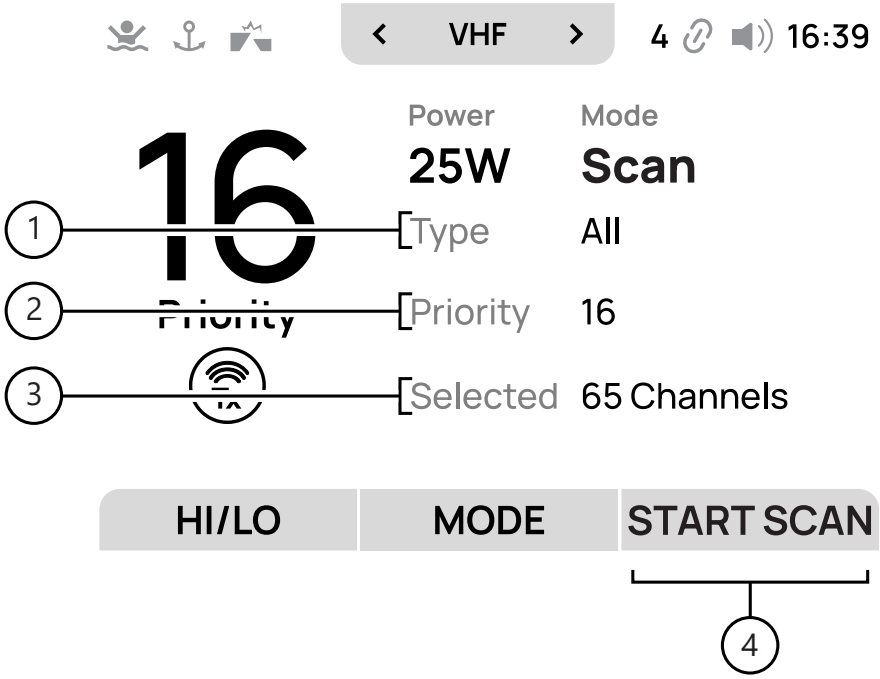


Figure 18 : Scan mode

No.	Name	Description
1	Type	This indicates the scan type selected, scan types give you the flexibility to gather the information you need from broadcasts and announcements more effectively. **All**: All channels in the frequency are scanned. **All-interleaved**: Scans all channels, with channel 16 being scanned in between each. **Custom**: A custom list of channels is scanned in ascending order. **Custom-interleaved**: Scans a custom list of channels, with channel 16 being scanned in between each.
2	Priority	This indicates the priority channel, be aware that the priority channel can change depending on your location.
3	Selected	This indicates the number of channels in the frequency band you have selected to scan.
4	Start scan softkey	Press the softkey when you are ready to start the scan.

To set a **SCAN MODE**:

1. Press the **MODE** softkey until **SCAN MODE** is selected.

2. Press the ok button, and choose between the scan types.

When you have selected a scan type and are ready to begin, press the **START SCAN** softkey.

Watch mode

WATCH mode is perfect for when you want to monitor your priority channel and one other channel simultaneously. For example, this is useful if you want to stay updated on marine channels while keeping an ear on safety or emergency broadcasts.

To learn how to set how long the channel is watched after a broadcast ends, click **here**.

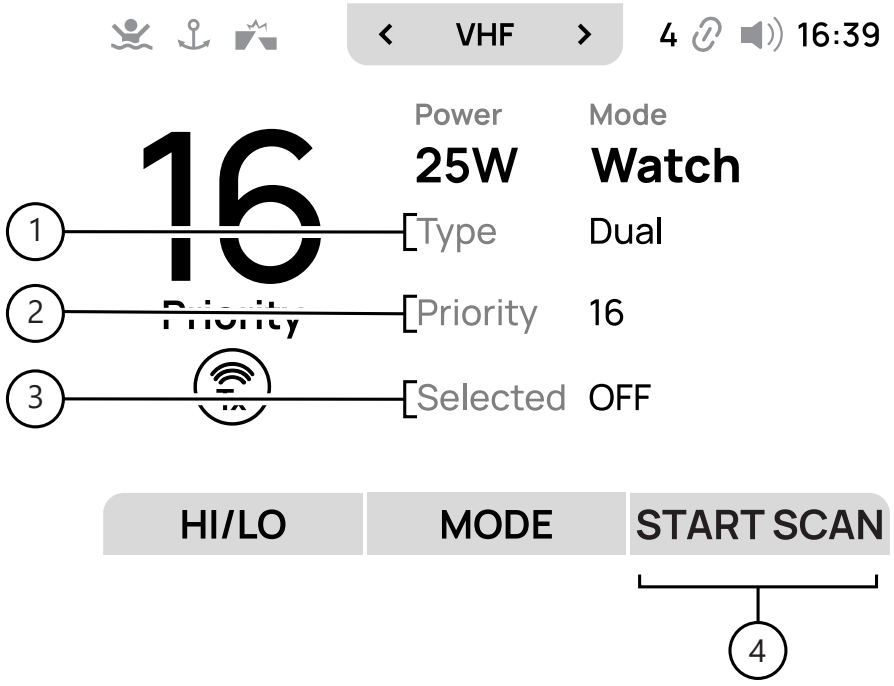


Figure 19 : Watch mode

No.	Name	Description
1	Type	This indicates the watch type selected, watch types give you the flexibility to gather the information you need from broadcasts and announcements more effectively. **Dual**: Allows you to monitor another channel along with the priority channel, giving you the ability to stay updated on both at the same time. **Tri**: Lets you monitor the channel you're on, the priority channel, and an additional channel. This keeps you updated on all three channels simultaneously.
2	Priority	This indicates the priority channel, be aware that the priority channel can change depending on your location.
3	Weather	This shows whether the weather channels are being monitored, allowing you to keep an eye on up to three channels while staying updated on the latest weather news.
4	Start scan softkey	Press the softkey when you are ready to begin the scan.

To set a **WATCH MODE**:

1. Press the **MODE** softkey until **WATCH MODE** is selected.

2. Press **OK** to toggle between **DUAL** and **TRIPLE** modes. **DUAL** mode watches the channel you're currently on, as well as channel 16. **TRIPLE** mode lets you select an additional channel to monitor alongside your current channel and channel 16.

   Once you've selected the channels to watch, you'll start receiving broadcasts on them—provided there are messages being transmitted.

Transmitting power

The X100 gives you the option to adjust the power of your transmissions. To change the power level, just press the **HIGH/LOW** softkey. This will toggle between high power (25W) and low power (1W).

Low power is ideally used to contact vessels that are nearby (less than 1 mile away), where as High power is used to contact vessels that are further away.

INFORMATION

Some channels only broadcast on either 1W or 25W.

Making a DSC call from the VHF RADIO screen

DSC takes the hassle out of communicating at sea, making it easier and more reliable. Instead of broadcasting over the radio to get someone's attention, you can use DSC to connect directly with another vessel. Just select the boat by its MMSI number or pick it from a list, and you're ready to call, it's as simple as making a phone call.

Click **here** to learn how to make a routine DSC call from the AIS list screen, and **here** for the AIS Plot screen.

AIS List Screen overview

The second main screen is the **AIS LIST** screen. This is where you can easily see all nearby vessels with AIS devices, filter the list to show only your saved contacts, and even make a DSC call. You'll also find important information like the range, bearing, TCPA (Time to Closest Point of Approach), and CPA (Closest Point of Approach) of all nearby vessels to help keep you aware of your surroundings.

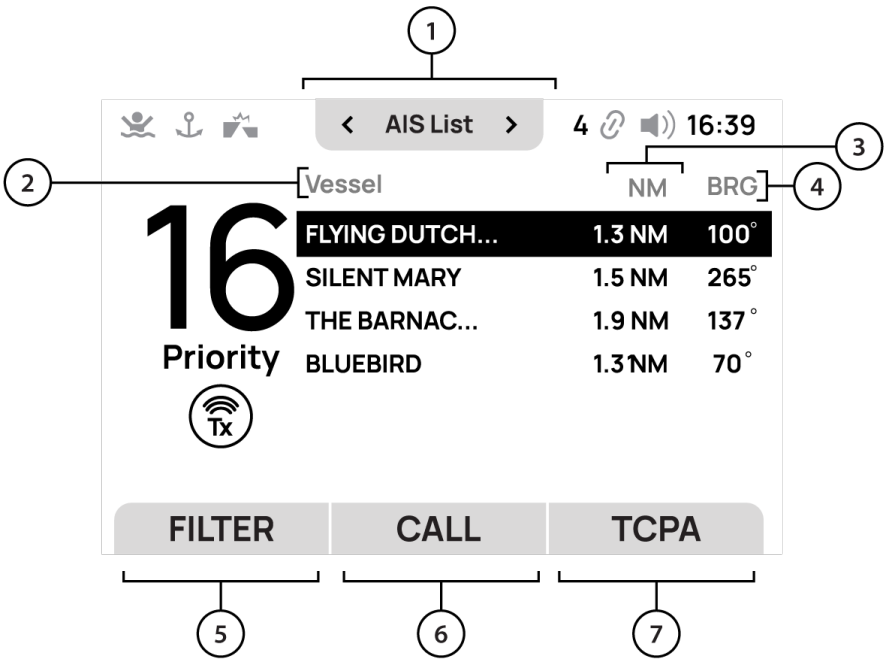


Figure 20 : AIS list screen

No.	Name	Description
1	Screen name	The name of the current screen.
2	NM (Nautical Miles)	The distance of the vessels from you.
3	BRG (Bearing)	Shows the true bearing of the vessels.
4	TCPA / Range softkey	Press the **TCPA** softkey to display the **CPA** and **TCPA** of all nearby vessels. Press the **RANGE** softkey to show the distance of vessels from you, and their true bearing.
5	Call softkey	Press to quick call the highlighted vessel on the list.
6	Filter softkey	Shows only favourite (phonebook entries) or all vessels.
7	Vessel names	A list of nearby vessels.

AIS List vessel information

Use the arrow buttons and the **OK** button to select a vessel. The following vessel information is shown.

- The vessels call sign.
- The vessel type.
- The MMSI number.
- The distance of the vessel from your current position.
- The vessels bearing relative to your position.
- The vessels CPA.
- The vessels TCPA.
- The vessels SOG.
- The vessels COG.
- The vessels current latitude.
- The vessels current longitude.
- The vessels true heading (if provided).
- The length of the vessel.
- The beam (width) of the vessel.
- The time since the last transmission received from that vessel.
- Whether the vessel is marked as a favourite contact: **YES** means it's saved in your phonebook, and **NO** means it's not.

If you want to view only your saved contacts on the screen, simply press the **FILTER** softkey. This feature allows you to customize your display, making it easier to find and manage your contacts without any distractions from other information. It’s a handy way to streamline your communication and stay organized while you're on the water.

Making a DSC call from the AIS list screen

DSC calls can be made from the **AIS LIST** screen.

Click **here** to learn how to make a DSC call from the AIS list screen.

List filter

If you'd like to see only your saved contacts on the list, just press the **FILTER** softkey.

AIS Plot Screen overview

The third main screen is the **AIS PLOT** screen. This screen shows a map with all nearby vessels displayed, with your vessel at the centre. You can easily zoom in or out to adjust the area around your vessel, call another vessel, and change the map's orientation to suit your needs.

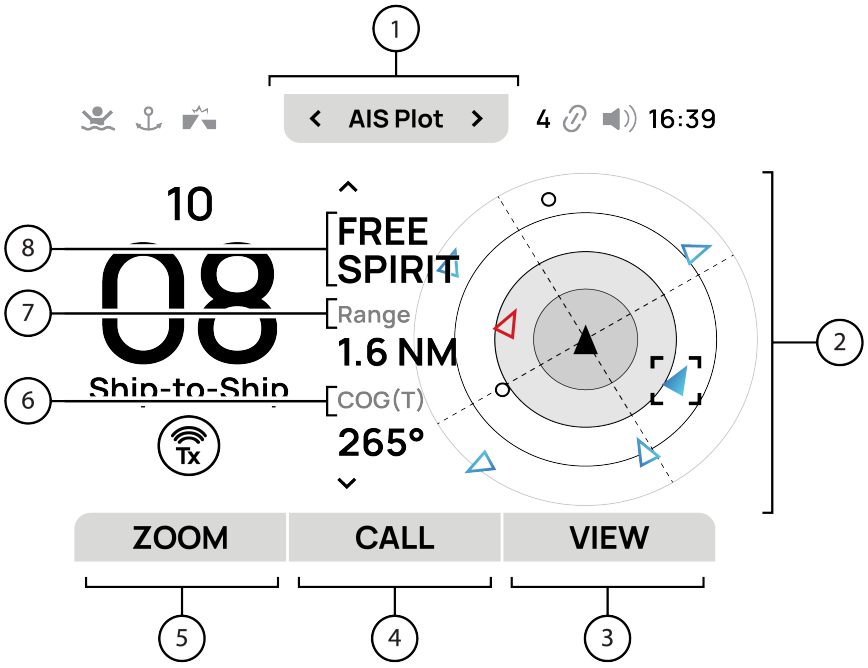


Figure 21 : AIS plot screen

No.	Name	Description
1	Screen name	This is the name of the screen that you are on.
2	Map	This is the area around your vessel, with your vessel in the centre.
3	View softkey	If you'd like to change the map's orientation so that the north marker is always at the top, simply press this softkey.
4	Call Vessel softkey	Press this softkey to make a DSC call to the selected vessel. See **here** to learn how to make a DSC call.
5	Zoom softkey	If you need, press this softkey to increase and decrease the area shown around your vessel.
6	Course over ground (True)	This shows the course of the selected vessel relevant to the earth's surface.
7	Range	This shows the distance between your vessel and the selected vessel.
8	Selected vessel name	This is the name of the vessel that is currently selected.

Screen icons

Below is a list of all icons that may appear on the map and their descriptions.

Icon	Description
	**Your vessel** Your vessel in position relative to other nearby vessels.
	**Distance indicator** Indicators used to measure the distance around your vessel.
	**Other vessel** Currently selected vessel.
	**Other vessel** Currently unselected vessel.
	**Other vessel** Currently selected vessel infringing on the set CPA threshold.
	**Other vessel** Currently unselected vessel infringing on the set CPA threshold.
	**Vessel up** Vessel Up viewing mode is currently selected.
	**North up** North Up viewing mode is currently selected.
	**Scale** Indicates the distance between each ring on the map.
	**Collision** Vessels are on a collision course.
	**Search and rescue** A rescue helicopter.
	**Search and rescue** A rescue plane.

Vessel information

Use the arrow buttons and the **OK** button to select a vessel. The vessel information is shown.

- The vessels call sign.
- The vessel type.
- The MMSI number.
- The distance of the vessel from your current position.
- The vessels bearing relative to your position.
- The vessels CPA.
- The vessels TCPA.
- The vessels SOG.
- The vessels COG.
- The vessels current latitude.
- The vessels current longitude.
- The vessels true heading (if provided).
- The length of the vessel.
- The beam (width) of the vessel.
- The time since the last transmission received from that vessel .
- Whether the vessel is marked as a favourite contact: **YES** means it's saved in your phonebook, and **NO** means it's not.

If you want to view only your saved contacts on the screen, simply press the **FILTER** softkey. This feature allows you to customize your display, making it easier to find and manage your contacts without any distractions from other information. It’s a handy way to streamline your communication and stay organized while you're on the water.

Making a DSC call from the AIS plot screen

DSC calls can be made from the **AIS PLOT** screen.

Click **here** to learn how to make a DSC call from the AIS plot screen.

Zooming in and out

The zoom function on the **AIS PLOT** screen lets you adjust the size of the area around your vessel, helping you see more or less of your surroundings as needed. To decrease the area shown around your vessel, just press the **ZOOM** softkey. When fully zoomed in, pressing the softkey again resets the displayed distance.

My vessel screen overview

The fourth main screen is the **MY VESSEL** screen. Pressing the up and down buttons shows you all the important details about your vessel, like your position, heading, speed (SOG), course (COG), call sign, vessel type, length, and beam.

You can also easily connect your smart device to the Wi-Fi, access the settings menu, and open your phonebook from here.

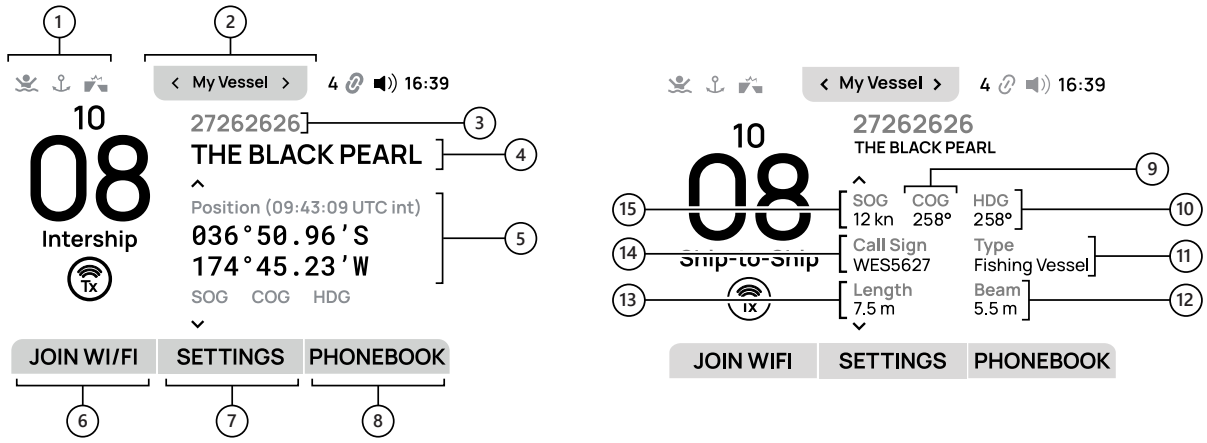


Figure 22 : My vessel screen overview

No.	Name	Description
1	Status icons	These illuminate when the corresponding status is active.
2	Screen name	This is the name of the screen that you are on.
3	MMSI number	This is your MMSI number.
4	Vessel name	This is the name of your vessel.
5	Position	This is your current position.
6	Phonebook softkey	Press this softkey to enter your phonebook.
7	Settings softkey	Press this softkey to enter the settings menu.
8	Join Wi-Fi softkey	Press the softkey to join a smart device to your wireless network.
9	COG (course over ground)	This is your vessel's direction relative to the Earth's surface.
10	Heading (HDG)	This displays your vessel's heading, but this only works if a heading sensor is connected via NMEA.
11	Type	This is the your vessel type.
12	Beam	This is the width of your vessel.
13	Length	This is the length of your vessel.
14	Call sign	This is your call sign.
15	SOG (Speed over ground)	This is the speed of your vessel relative to the ground.

Phonebook

If you're frequently in contact with multiple vessels, you can save these contacts in the **PHONEBOOK**. You can store up to 100 contacts, making it easy to manage important information such as the vessel names, MMSI numbers, vessel details, and call signs all in one place. You can easily add new contacts, edit existing ones, or delete outdated information as needed, ensuring your phonebook stays up to date and organized.

Add, edit and delete contacts

You can easily manage your contacts in the phonebook by adding, editing, or deleting entries as needed.

Add a contact - While in the phonebook, select **+ADD NEW CONTACT** and input the **MMSI** number, the **VESSEL NAME**, and the **CALL SIGN**. When you are done, simply press the **SAVE** softkey.

Edit a contact - Simply select the contact, and edit the **VESSEL NAME**, or **CALL SIGN** as needed. You are not able to edit the MMSI number. When you are done just press the **SAVE** softkey.

Delete a contact - While in the phonebook, select the contact and press the **DELETE** softkey. The contact will no longer appear in the phonebook.

Loud hailer and public address

If you haven't already, connect the black and white wires shown in see **Loud hailer and external speaker connections** on page 18 to the loud hailer, and then see see **Audio devices** on page 78 to see how to activate the loud hailer or external speaker.

To send a message using the loud hailer or external speaker, select **PHONEBOOK**, and then choose **LOUDHAILER** to speak through the loud hailer or **PUBLIC ADDRESS** to speak through the external speaker. Finally, press the **CALL** softkey to start your announcement.

INFORMATION

The loud hailer times out about 30 seconds after your last announcement. After that, it stops working, and you'll need to press the **CALL** softkey again to start a new announcement.

INFORMATION

To avoid audio feedback, ensure the loud hailer is at least 3m away from the X100 and any handset or fist-mic. When talking, ensure that the handset or fist-mic points in the opposite direction of the loud hailer.

Join Wi-Fi

If you're setting up a new smart device, you'll want it to join the same network as your X100 for seamless access. To join the network simply press the **JOIN WI-FI** softkey.

Click **here** to learn how to do this.

Man overboard (MOB) screen overview

To help keep you and your crew safe at sea, the X100 includes a Man Overboard (MOB) feature. Devices connected to the network will receive MOB alerts, so be sure your device is connected.

Click **here** to learn how to connect devices to the X100.

Make sure to embark your device after connecting, (see **here** for more information). The MOB alarm triggers if a device goes out of range of the X100.

When an MOB alert is triggered, all networked devices display an alarm. A waypoint appears on the **AIS PLOT** screen and chart plotter, marking the smart device's last known location.

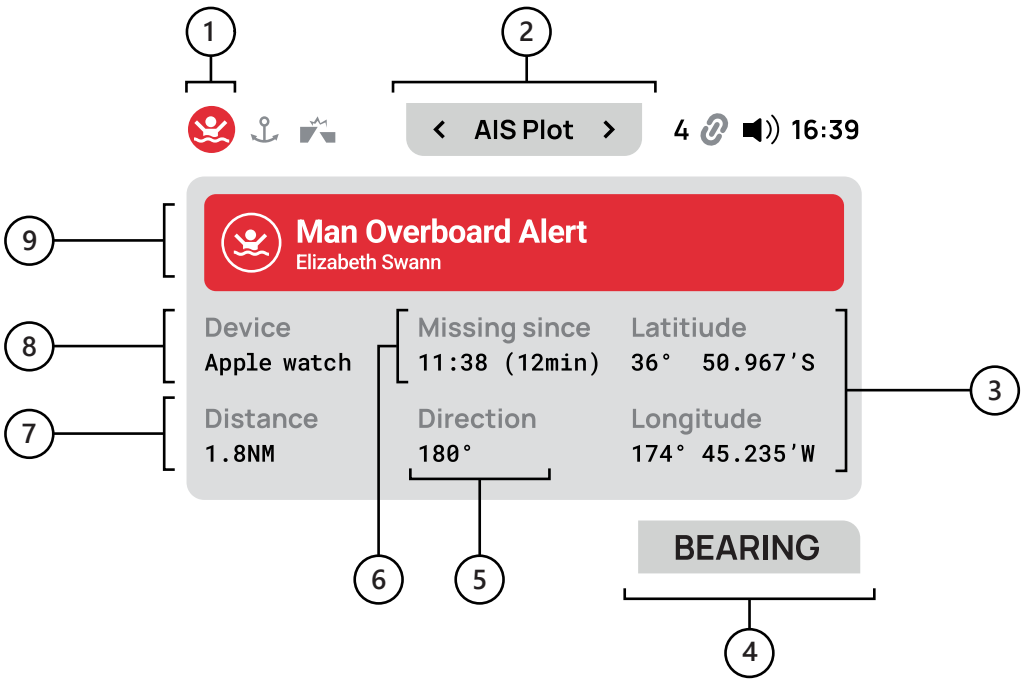


Figure 23 : MOB screen overview

No.	Name	Description
1	MOB Alarm	This appears when an MOB alarm is active.
2	Screen name	This is the name of the screen you are currently on.
3	Latitude and Longitude	The coordinates of the device that is overboard.
4	Bearing	Press the softkey to see how to reach the MOB way point.
5	Direction	This shows the direction to the MOB way point.
6	Missing since	The time since the MOB alert was triggered.
7	Distance	The distance between you and the MOB way point.
8	Device	The type of device that has gone overboard.
9	Name	The name of the person whose device went overboard.

How to manually trigger MOB events

WARNING

Only smart phones and tablets can receive MOB alerts, smart watches will not receive MOB alerts.

Click **here** to learn how to connect devices to the X100, and click **here** to learn how to embark a device.

After connecting and embarking your smart device, you will be connected to the MOB network. This means once a connected device goes out of range of the X100, an alarm triggers. The alarm lets everyone know that there is an MOB event.

You can also manually trigger an alarm.

To do this:

1. Press and hold the MOB button, a countdown appears on screen. Hold the button until the timer counts down to 0.

2. The MOB alert displays on screen showing the details of the alert.

3. A pin is also dropped in the location that the MOB alert was triggered. Press the direction softkey on screen to show to location that he pin was dropped.

Digital Selective Calling (DSC)

Unlike traditional VHF radio systems where users listen passively until they hear a call directed at them, Digital Selective Calling (DSC) streamlines communication by first notifying the intended recipient(s) with an alert. This way, recipients know the message is for them, so they’re prepared to listen on the correct channel when the message begins. This targeted approach enhances efficiency and reduces the risk of missed or unclear communications.

DSC is a system that uses VHF channel 70 to send targeted messages. Each DSC call contains essential information like your vessel's identification number (MMSI), the purpose of the call (e.g., routine, safety, distress), your position, and the channel you'd like to use for voice communication. This system enables efficient, automated calling, helping you reach specific vessels directly without relying on open channel broadcasts.

DSC calls are categorized into four priority levels to ensure that urgent communication is managed effectively:

- Distress - For immediate assistance in emergencies.
- Urgency - For serious but not life threatening situations.
- Safety- For navigational and weather warnings.
- Routine - For standard communication, such as checking in or coordinating with other vessels.

You can initiate any type of DSC call using the **DSC CALL** softkey. Once you press it, simply use the arrow keys to navigate through the different call types, and select your desired option by pressing the OK button. This straightforward process allows you to quickly and efficiently send the appropriate signal, whether it’s for distress, urgency, safety, or routine communication.

Routine (Individual) calls

When you make a routine DSC call, you’re usually reaching out to another vessel, a marina, or a shore station. For example, if you're approaching a marina and need docking instructions, you can send a DSC call to a specified target.

Routine DSC calls can also be made to groups, which is handy when several vessels need the same information. For example, during a yacht race or a club rally, you can use a group-call identity to send a message to all the vessels in your group at once.

You automatically transmit your vessel's precise position data during a DSC call through the internal or external GPS antenna. This is especially useful in emergency situations, as your exact location is shared instantly with nearby vessels or shore stations, improving response times.

When calling a coast station there is no need to select a communication channel. The coast station automatically selects a free channel for you to communicate on.

Sometimes however, the coast station is not able to accept a call, when this happens a reason is given to you. These are listed below:

Reason code	Meaning
No Reason	This means that no reason is or can be given for rejecting your call.
Congestion	This means that the maritime switching centre is congested.
Busy	This means that the coast station has no one free to answer your call.
Queue	This means that there is a queue of people waiting to contact the coast station.
Barred	This means that the station is barred and cannot accept any calls from anyone.
No operator	This means that there is no operator available.
Disable	This means that the equipment at the coast station has been disabled.

How to make DSC calls from the AIS list

By combining AIS and DSC, the X100 simplifies sending a DSC messages to AIS targets from the list screen.

To make a DSC call from the AIS list screen:

1. Start by selecting a vessel to call, and press the **DSC CALL** softkey.
2. Select a **WORKING CHANNEL**, the call is sent to the target vessel.
3. Once a reply is received and the call begins, use the fist mic to communicate.

You can also make a quick DSC call. Quick DSC calls make a call to the target vessel without asking you to select a working channel to call on.

To make a Quick Call:

1. Start by selecting a vessel to call.
2. Press and hold the DSC softkey for 3 seconds.
3. Confirm the call and wait for a reply. Once a reply is received and the call begins, use the fist mic to communicate.

How to make DSC calls from the Plot screen

By combining AIS and DSC, the X100 simplifies sending DSC messages to AIS targets from the plot screen.

To make a DSC call from the AIS Plot screen:

1. Start by selecting a vessel to call, and press the **DSC CALL** softkey.
2. Select a **WORKING CHANNEL**, the call is sent to the target vessel.
3. Once a reply is received and the call begins, use the fist mic to communicate.

You can also make a quick DSC call. Quick DSC calls make a call to the target vessel without asking you to select a working channel to call on.

To make a Quick Call:

1. Start by selecting a vessel to call.
2. Press and hold the DSC softkey for 3 seconds.
3. Confirm the call and wait for a reply. Once a reply is received and the call begins, use the fist mic to communicate.

Group calls

A **GROUP CALL** is initiated when you call a group contact from your **PHONEBOOK** or by entering the Group MMSI number for the specific group you wish to reach. This feature allows you to communicate with multiple vessels at once, making it ideal for coordinating activities, sharing information during events, or managing fleet communications efficiently.

How to make and receive group calls

To make an group call:

1. Start by pressing the **DSC CALL** softkey while on the **AIS LIST** screen or the **AIS PLOT** screen.
2. Select **GROUP CALL** from the options menu that appears.
3. Choose from one of the three options:
    i. **SELECT FROM PHONEBOOK**: If you want to call a group from your phonebook, select this option, choose the desired group, then select a **WORKING CHANNEL**. Finally, press the **SEND** softkey to initiate the call.
    ii. **SELECT FROM RECENT CALLS**: If you wish to call a group you have recently contacted, select this option, choose the group, then select a **WORKING CHANNEL** and press the **SEND** softkey to make the call.
    iii. **ENTER MMSI**: If you have the MMSI number of the group you want to call, select this option. Use the on-screen keyboard to enter the MMSI number, press the **SAVE** softkey, select a **WORKING CHANNEL**, and then press the **SEND** softkey to call the group.

To accept a group call:

INFORMATION

To accept a **GROUP** call, your X100 must have the group MMSI number already saved in the phonebook.

1. When a call is received, press the **ACCEPT** softkey. This will silence the alarm and close the message window. You can choose to accept the call on the proposed channel or suggest a different channel for communication. This flexibility allows you to manage your conversations more effectively, ensuring you can connect in the way that works best for you.

2. Once you've accepted the call, use the fist-mic to communicate. Just hold the mic close and speak clearly to ensure your message comes through loud and clear.

To reject the group call:

1. Press the **REJECT** softkey, this will silence the alarm and close the message window. This allows you to dismiss a call quickly.

2. Select a reason for rejecting the call, this allows you to give a reason to the caller such as being busy or unable to respond at that time. This is a useful way to politely manage communications and let the caller know why you are not answering calls.

To ignore the group call:

1. Press the **IGNORE** softkey. This will silence the alarm and close the message without sending any feedback to the caller, allowing you to continue with your tasks uninterrupted.

2. You also have the option to simply not answer the call. In this case, the call will continue ringing on your end until the caller decides to end it. This lets you ignore the call without pressing any buttons, but keep in mind that the alarm will keep sounding until the caller hangs up.

All Ships Call

You can use an **ALL SHIPS** call to broadcast **SAFETY** and **URGENT** calls to all nearby vessels and coast stations.

SAFETY calls alert nearby vessels to navigational warnings, weather forecasts, and search and rescue updates. They help prevent accidents, avoid hazards, and ensure coordination during emergencies.

Send an **URGENCY** call for situations that pose a danger but don’t require immediate assistance. These calls alert nearby vessels and shore stations, ensuring awareness and possible support while emphasizing caution.

How to make safety calls

Always ensure that you follow up all **SAFETY** calls with a **SÉCURITÉ** voice message on Channel 16. This voice message provides the necessary safety information, ensuring that all nearby vessels and stations are fully informed.

1. To make a **SAFETY** call:
2. Start by pressing the **DSC CALL** softkey while on the **AIS LIST**, or **AIS PLOT** screen.
3. Select **SAFETY CALL** from the options menu that appears, select a **WORKING CHANNEL**, and then press the **SEND** softkey.
4. Once the message has been sent, use the fist mic to make a **SÉCURITÉ** call. You must say the following in the order shown:

SÉCURITÉ, **SÉCURITÉ**, **SÉCURITÉ**.

ALL STATIONS, ALL STATIONS, ALL STATIONS

This is <state the name of your vessel three times>. <State your MMSI>.

<State hazard and position>

<State time of origin>

OUT.

When you make a **SAFETY** call, the following information automatically transmits to all stations within range:

- Your vessel's MMSI number.
- The position of our vessel at the time the safety message was broadcast.
- The local time.
- The transmission frequency.

A safety, or sécurité, call is a type of radio message used to warn other ships about important navigational or weather-related hazards.

How to make urgency calls

Always ensure that you follow up all **URGENCY** calls with a **PAN PAN** voice message on Channel 16. This voice message provides the necessary safety information, ensuring that all nearby vessels and stations are fully informed. Channel 16 is the international distress and calling frequency, making it the ideal channel for such important communications.

To make an **URGENCY** call:

1. Start by pressing the **DSC CALL** softkey while on the **AIS LIST** or the **AIS PLOT** screen.
2. Select **URGENCY CALL** from the options menu that appears, select a **WORKING CHANNEL**, and then press the **SEND** softkey.
3. Once the message has been sent, use the fist mic to make a **PAN PAN** call. You must say the following in the order shown:

PAN PAN, PAN PAN, PAN PAN.

ALL STATIONS, ALL STATIONS, ALL STATIONS.

This is <state the name of your vessel three times>.

Call sign <state your call sign>, **MMSI** <state your MMSI number>.

My position is <state your position>, <state nature of distress>.

Reason to call <state the reason for the call and include all relevant information>.

OVER.

When you make an **URGENCY** call, be aware that the following information automatically transmits to all stations within range:

- Your vessel's MMSI number.
- The position of our vessel at the time the safety message was broadcast.
- The local time.
- The transmission frequency.

Providing this information helps ensure that all nearby vessels are informed of your situation and can take the necessary actions.

Receiving a safety or urgency call

From time to time you may receive a safety or urgency call, when a safety or urgency call is received:

1. Press the **SHOW INFO** softkey to view call details, which may contain important information useful in a potential rescue operation.
2. Press the **ACCEPT** softkey to accept the call, and listen for important information. When a safety or urgency call is accepted, the X100 automatically tunes to channel 16. To learn how to disable this, see **here**.

Distress calls

Distress calls are meant for situations where someone or a vessel is in immediate danger or in need of help. For example if the vessel starts taking on water, or there is a fire and the situation has gotten out of control.

The fastest way to make distress call is by lifting the flap and pressing the **DISTRESS** button located on the front of the X100. You can also make distress calls by using the DSC call softkey found on the AIS List and AIS Plot screens.

Once a distress call is sent, it automatically repeats every four minutes until it is acknowledged by a nearby vessel or coast station. This ensures that your emergency signal continues to broadcast, increasing the likelihood that help will receive your call quickly.

How to make and receive distress calls

Make a distress call using the Distress button

1. Press and hold the **DISTRESS** button for three seconds until a countdown appears. Release it when the countdown reaches zero. The radio will then switch to Channel 16, broadcasting your emergency to nearby vessels and coast stations.
2. When a **DISTRESS** call is made the following information is transmitted to all vessels and stations within range:
   - The position of your vessel at the time the distress call was made (this must be input manually if no position data is available).
   - Your MMSI number.
   - The time that the distress call was sent (this must be input manually if no position data is available).
   - The nature of the distress (if designated).
3. Follow up the distress with a mayday call, say the following in the order shown:

MAYDAY MAYDAY MAYDAY

This is <state the name of your vessel three times>.

Call sign, <state your call sign>,

MMSI <state your MMSI number>.

MAYDAY <state name of vessel one time>.

Call sign <state your call sign>, **MMSI** <state your MMSI number>.

My position is <state latitude and longitude, or true bearings and distance from a known point>.

I am <state nature of distress i.e. sinking, on fire etc.>.

I have <state number of persons on board and any other information — drifting, flares fired etc.>.

I REQUIRE IMMEDIATE ASSISTANCE.

OVER.

If you don’t receive an acknowledgement right away, don't worry. Wait five minutes and resend the distress message. Repeating the call increases the chances of someone hearing and responding.

Make a distress call from the DSC softkey

Press the DSC call softkey while you are on the **AIS LIST** screen or the **AIS PLOT** screen.

Select **DISTRESS**, and then the nature of your distress. For example **FLOODING**, or **SINKING**.

Follow the instructions that appear on the screen, which will prompt you to press and hold the **DISTRESS** button for three seconds until a countdown appears. Release it when the countdown reaches zero. The radio will then switch to Channel 16, broadcasting your emergency to nearby vessels and coast stations.

When a **DISTRESS** call is made the following information is transmitted to all vessels and stations within range.

- The position of your vessel at the time the distress call was made (this must be input manually if no position data is available).
- Your MMSI number.
- The time that the distress call was sent (this must be input manually if no position data is available).
- The nature of the distress (if designated).

Follow up a distress with a mayday call, say the following in the order shown:

MAYDAY MAYDAY MAYDAY.

This is <state the name of your vessel three times>.

Call sign, <state your call sign>,

MMSI <state your MMSI number>.

MAYDAY <state name of vessel one time>.

Call sign, <state your call sign>, and **MMSI** <state your MMSI number> again.

My position is <state latitude and longitude, or true bearings and distance from a known point>.

I am <state nature of distress i.e. sinking, on fire etc.>.

I have <state number of persons on board and any other information — drifting, flares fired etc.>.

I REQUIRE IMMEDIATE ASSISTANCE.

OVER.

If you don’t receive an acknowledgement right away, don't worry. Wait five minutes and resend the distress message. Repeating the call increases the chances of someone hearing and responding.

Receiving a distress call

When a distress call is made it is usually the Coast Guard Radio station (CRS), and not a vessel that co-ordinates the rescue.

After receiving a distress call the X100 automatically tunes to Channel 16, to learn how to disable this click **here**.

When a distress message is received, an envelope icon will appear at the top of the screen, indicating that there is a new message for you to review. This helps ensure that you are aware of any urgent communications and can respond appropriately to assist in the situation.

When connected to a multifunction display (MFD), the position data from the distress call will be displayed in the Chart application. This provides a visual representation of the vessel's location during the emergency. Once the distress call is acknowledged, the radio will resume standard operation, allowing you to return to normal communication activities while staying informed of any further developments related to the distress situation.

Acknowledging a distress call

When a distress call is made its is usually the Coast Guard Radio station (CRS), and not a vessel that co-ordinates the rescue rather than a vessel. You should only acknowledge a distress call in the following situations:

- If a CRS has not answered the distress after 5 minutes.
- If you are close enough to the distress call to offer assistance.
- If you are ready to relay the **DISTRESS** call.

To acknowledge a distress call:

1. Press the acknowledge softkey marked **ACK** to listen for the distress voice message. The X100 will tune to channel 16. By tuning in, you can hear any additional details about the distress situation or any follow-up instructions from the distressed vessel or coordinating rescue authorities. Stay on this channel during distress situations to ensure you don't miss important updates.
2. Wait for the Coast Guard Radio Station (CRS) to acknowledge the distress call. The CRS will usually respond by confirming receipt of the call and providing further instructions. If no acknowledgement is received within five minutes relay the distress call.
3. Follow up the distress with a mayday call, say the following in the order shown:

MAYDAY.

State the name of the vessel in distress <repeat this three times>.

This is <State the MMSI of your vessel>, <state the name of your vessel 3 times> <state the call sign of your vessel>.

RECEIVED MAYDAY.

4. Be sure to notify the shore authorities by any means available to relay the distress call if it hasn't been acknowledged. Notify shore authorities by any available means, such as a cell phone or satellite communication. This ensures rescue services are alerted and can take action.

How to relay distress calls

Distress calls can be relayed if the person or vessel in distress is unable to transmit the call. For example, if red flares are sighted or if the distressed vessel is out of range of the CRS, and you have already acknowledged the distress call by voice message. Relaying the call ensures that the emergency is communicated to the proper authorities or to nearby vessels, increasing the chances of a timely rescue response.

After receiving a distress call, the X100 automatically tunes to Channel 16, to learn how to disable this, click **here**.

If needed you can also manually relay a distress call if nobody answers.

To do this, use the fist mic to say and do the following in the order shown:

1. Switch to channel 16.
2. Press and hold the **PTT** button on the fist-mic.
3. Slowly speak the details of the distress:

MAYDAY RELAY, **MAYDAY RELAY**, **MAYDAY RELAY**.

This is <state the name of your vessel three times>, <state your call sign once>.

Received the following MAYDAY from <state the MMSI of the vessel in distress>, <state the name of the vessel in distress>, and <state the call sign of the vessel in distress>.

Message begins.

Repeat the distress message or details of the distress.

Message ends.

OVER.

Ignoring a distress call

You should only ignore a distress call if you are not in a position to help. For example, if you are in a distress situation yourself, or if the Coastguard Rescue Service (CRS) or another vessel has already acknowledged the distress call. Ignoring a distress call in these cases ensures that rescue coordination remains clear and focused without unnecessary interference.

To ignore a distress call, you can mute the alarm and cancel the distress alert. Press the **ALARM OFF** softkey to silence the alarm. Once the softkey is pressed, the radio will return to standard operation.

Position requests

The radio can send position requests to any vessel equipped with DSC capability. This allows you to request the precise location of another vessel, which can be useful for navigation or coordinating with nearby vessels that are not equipped with AIS transceivers. If the request is acknowledged, the position data will be displayed on your system and all connected displays.

To send a position request:

1. Start by pressing the **DSC CALL** softkey while on the **AIS LIST** screen or the **AIS PLOT** screen.

2. Select **POSITION REQUEST** from the options menu that appears.

3. Here, there are three options:

    i. **SELECT FROM PHONEBOOK**, choose a vessel from your phonebook, and press the **SEND** softkey to send a position request.

    ii. **SELECT FROM RECENT CALLS**, choose a vessel you have recently called, and press the **SEND** softkey to send a position request.

    iii. **ENTER MMSI**, use the on screen keyboard to enter the MMSI number of the vessel you want to call, press the **SAVE** softkey, select a working channel, and press the **SEND** softkey to send a position request.

The radio can also reply to position requests from other vessels with DSC capability. To learn how to automatically respond to such requests, click **here**.

Responding to a position request

You can configure position requests in the **SETTINGS**. To configure position requests, click **here**.

How to make a DSC Test call

A **DSC TEST CALL** is a perfect way to ensure that the DSC functions are working correctly. It's important to periodically test the functionality to make sure your equipment is ready when needed, especially in emergencies.

Perform a **DSC TEST CALL** with your local coast guard to verify that your DSC messages are being transmitted correctly. The coast guard will respond to confirm a successful test.

To perform a DSC call test:

1. From the **AIS LIST** screen or the **AIS PLOT** screen, press the **DSC CALL** softkey.
2. Select **TEST CALL**, from the options menu.
3. Here, there are three options:
    i. **SELECT FROM PHONEBOOK**, choose a vessel from your phonebook, then choose a **WORKING CHANNEL**, and press the **SEND** softkey to call the chosen vessel.
    ii. **SELECT FROM RECENT CALLS** , choose a vessel you have recently called, then choose a **WORKING CHANNEL**, and press the **SEND** softkey to call the chosen vessel.
    iii. **ENTER MMSI**, use the on screen keyboard to enter the MMSI number of the vessel you want to call. Press the **SAVE** softkey, select a **WORKING CHANNEL**, and press the **SEND** softkey to call.
4. A call is sent to the coastguard, and if successful, the coastguard will respond. If you do not receive a reply within one minute, resend the call to ensure that the message has been properly transmitted and received.

Call logs

All DSC calls are logged under the **VIEW CALL LOG**. To access the log, press the **DSC CALL** softkey and choose **VIEW CALL LOG**.

The following types of calls are logged:

- Distress.
- Distress relay.
- Distress acknowledgements.
- Sent position requests.
- Received position requests.
- Group calls.
- All ship calls.
- Individual (routine) calls.

The following details get logged after each call:

- MMSI number(s).
- Type of call.
- Date and time of a call.
- Latitude and Longitude. (If sent with the call).
- Nature of distress (distress calls only).

These details provide a clear record of communication, helping to track important safety information and manage any follow-up actions.

When you first enter the **CALL LOG**, you will see a list of missed calls, you can call back any of these by pressing the **CALL** softkey.

Press the **ALL RX** softkey to display both read and unread call history.

Press the **ALL TX** softkey to show all of the sent calls form your X100.

On the screen you will see icons next to each call, the icons are listed below.

Icon	Description
	**Unread** The bell indicates that this call has been missed.
	**Acknowledged** The arrow indicates that you have received a DSC message and have acknowledged it.
	**DSC Routine call** The boat indicates that this is was a DSC routine individual call.
	**DSC Group call** The boats indicate that this is was a DSC group call.
	**Safety call** The warning icon indicates that this was a safety call.
	**SOS** The SOS icon indicates that this was a distress call.

Enter position manually

If your X100 is connected to an external GPS antenna, your position should be automatically updated. If your X100 is not connected to an external GPS antenna, there will be times when you have to enter your position manually, for example if someone asks for a position request, or when making of a distress call.

To enter your position manually:

1. Start by pressing the **DSC CALL** softkey while on the **AIS PLOT** screen or the **AIS LIST** screen.

2. Select **ENTER MANUAL POSITION** from the options menu that appears. Then use the on-screen keyboard to enter your coordinates. Once you've entered the correct coordinates, press the **SAVE** softkey to confirm. This allows you to manually input your vessel's position if automatic data is unavailable, ensuring accurate information is transmitted or displayed.

Settings

Under **SETTINGS** you will find the configurable options that allow you to customize how the X100 operates.

You can edit and view information for the following options:

- VHF
- AIS
- WIRELESS (network options)
- GNSS
- DSC
- MOB
- ATIS
- ALERTS
- UNITS (speed and distance)
- SENSORS (baud rates)
- USERS
- PREFERENCES
- DIAGNOSTICS
- AUDIO DEVICES (loud hailer and external speaker)
- POWER AND RESET

Some features and options are fixed and can't be changed, this is to ensure that the X100 runs smoothly and safely. For example, the system firmware, which controls the core functions of your device, is set by the manufacturer.

VHF

Under **VHF**, you can customize several key features of the X100, including the **SCAN TIMEOUT**, the **WATCH TIMEOUT**, **NOISE REDUCTION**, and options for certain **CHANNELS** and **ATIS**.

To see these options, from the **SETTINGS**, select **VHF**.

Scan timeout

The **SCAN TIMEOUT** setting lets you adjust how long the scan pauses on a channel after a transmission ends. This can help ensure you don't miss follow-up transmissions on busy channels or, alternatively, speed up scanning if you're monitoring multiple channels and want quicker updates.

Once complete, the X100 returns to normal operation.

To set the **SCAN TIMEOUT**, from **SETTINGS** select **VHF**, and then **SCAN TIMEOUT**.

You can use the arrow buttons to adjust the **SCAN TIMEOUT** duration. This flexibility allows you to tailor the scanning duration to best suit your needs.

Watch timeout

The **WATCH TIMEOUT** setting lets you adjust how long the watch pauses on a channel after a transmission ends. This can help ensure you don't miss follow-up transmissions on busy channels or, alternatively, speed up scanning if you're monitoring multiple channels and want quicker updates.

Below shows you how to set the watch timeout.

Once complete, the X100 returns to normal operation.

To set the **WATCH TIMEOUT**, from **SETTINGS** select **VHF**, and then **WATCH TIMEOUT**.

You can use the arrow buttons to adjust the **WATCH TIMEOUT** duration. This flexibility allows you to tailor the scanning duration to best suit your needs.

Noise reduction

NOISE REDUCTION helps improve the clarity of your broadcasts by minimizing background noise. This feature is especially useful in noisy environments, ensuring that your voice is clear and easy to understand.

If you are trying to transmit a message in a loud environment its best to set the **NOISE REDUCTION** to **HIGH**. This setting effectively filters out background noise, making it easier for others to hear your voice clearly during broadcasts.

To set the noise reduction level, go to **SETTINGS**, then **VHF** and select **NOISE REDUCTION**, you can then use the arrow keys to set the noise reduction to **LOW**, **MEDIUM** or **HIGH**.

Channels

Under **CHANNELS**, you will have two main options, **CALL CHANNEL** and **REGION**. Changing the **REGION** will give you other options like changing the **PRIV CH SET** and the **ATIS REGION**.

The **CALL CHANNEL** is the 3rd channel set while in Tri watch mode. Which channels that are available will vary depending on what **REGION** is set.

For more information on watch and scan modes click **here**.

You can choose from four regions: **INTERNATIONAL**, **USA**, **CANADA**, and **ATIS**. Each region has its own set of channels tailored to local regulations and communication needs. Simply use the arrow keys to select the region that best applies to your current location and requirements, ensuring you have access to the correct channels for effective and compliant communication.

If you choose **INTERNATIONAL**, you can also choose a specific channel set. Use the arrow keys to scroll through and select the channel set that best suits the needs of the area you're navigating. This ensures you're tuned to the appropriate frequencies, helping you stay compliant with local maritime communication protocols and ensuring effective communication with other vessels or authorities.

When navigating Europe's inland waterways, select **ATIS**. This setting allows you to choose a specific **RAINWAT** region to align with local communication standards. Use the arrow keys to select the most applicable region for your area.

AIS

Under **AIS**, you can access a range of options:

- **ALARMS LIST** to view any active alarms,
- **ALARM SETTINGS** to configure alert preferences,
- **SILENT MODE** to enable or disable silent operation,
- **SART TEST** for running a test of the SART (Search and Rescue Transponder),
- **SAFETY MESSAGES** to view received safety alerts, and
- **OWN VESSEL** to check static settings for your vessel (note: this feature is not available in the U.S.).

Each of these options helps you manage AIS functions for safer and more efficient navigation.

To access these options, select **SETTINGS** and then **AIS**.

Alarms list

The **ALARMS LIST** displays all active alarms. To access it, go to **SETTINGS**, select **AIS**, and then choose **ALARMS LIST**.

Acknowledging an alarm silences it, stopping pop-up notifications, though the alarm will stay active in the list until the issue causing it is resolved.

Alarms settings

If your heading sensor becomes misaligned with the front-back axis of your vessel, the **HEADING LOST** alarm triggers. If you don't want the alarm to trigger, go to **SETTINGS**, then **AIS**, and select **ALARM SETTINGS**.

INFORMATION

You should only enable the **HEADING LOST** alarm if your vessel is equipped with a heading sensor, as this alarm relies on that sensor's data.

You can use the arrow keys to toggle the **HEADING LOST** alarm **ON**/**OFF**.

Silent mode

There may be situations where you need your X100 to stop broadcasting your location, for example if you have found a good fishing area that you don't want to share.

To enable **SILENT MODE**, from **SETTINGS**, select **AIS**, and then **SILENT MODE**.

You can choose from three settings:

- **DISABLED** - **SILENT MODE** is off, and your vessel's position will be broadcast periodically.
- **CONTINUOUS** - **SILENT MODE** is on and remains active until you manually change the setting.
- **TIMER** - Selecting **TIMER** activates the **SILENT TIMER**, which enables **SILENT MODE** for a set duration. The timer is adjustable in 30-minute intervals, allowing you to temporarily stop broadcasting your position for a specific period.

SART (Search and rescue radar transponder) test

The X100 can connect to your on board SART (Search and Rescue Transponder) via NMEA. When a test is performed, a SART test message is broadcast to all nearby vessels and AIS-equipped Coast Relay Stations, including your own.

The test runs for 15 minutes, and while it is running you should follow the manufacturers instructions that may include checking all visual and audio indicators.

To perform a SART test, go to **SETTINGS**, select **AIS**, then choose **SART TEST**. Use the arrow keys to start the test.

Safety messages

When a safety message is received, it appears in the safety messages list. These messages might include important information like nearby hazards or weather warnings. You can easily review the message and mark it as read once you've taken action.

To access the list, go to **SETTINGS**, select **AIS**, and then choose **SAFETY MSGS**. Select the message you want, then press the **MARK READ** softkey to acknowledge it.

Own vessel

INFORMATION

In certain regions, like the USA, end users are not allowed to enter or change their own vessel data. If any data needs entering or editing, contact your local em-trak dealer.

There may be times when you need to update details about your vessel. **OWN VESSEL** provides the flexibility to modify key information, including your ship's name, call sign, vessel type, and antenna position.

If you want to re brand your vessel, or change your call sign, you can update this information under **SETTINGS**, **AIS**, and then **OWN VESSEL**.

You can use the on screen keyboard, or the arrow keys to edit the information quickly and easily. Make sure to press the **SAVE** softkey after editing any information.

Wireless

Under **WIRELESS**, you can easily set up a Wi-Fi network in either **STATION MODE** or **AP MODE**. If you want to connect your X100 to an existing network for internet access, **STATION MODE** is the way to go. But if you're looking to create a new network for other devices to join, **AP MODE** is a better option.

If you change your X100 to **STATION MODE** or **AP MODE**, you'll need to make sure your devices are set up accordingly.

For example, if the X100 is in **AP MODE** and you switch it to **STATION MODE**, all of your devices will need to be connected to the same wireless network as the X100 to keep everything working smoothly.

AP mode

When you choose to configure the X100 in **AP MODE**, your X100 acts like a wireless router, making it very convenient to connect your smart devices. For example, if you're out fishing you can use your smart device as a wireless fist-mic. It's a great way to stay connected and make the most of your time on the water.

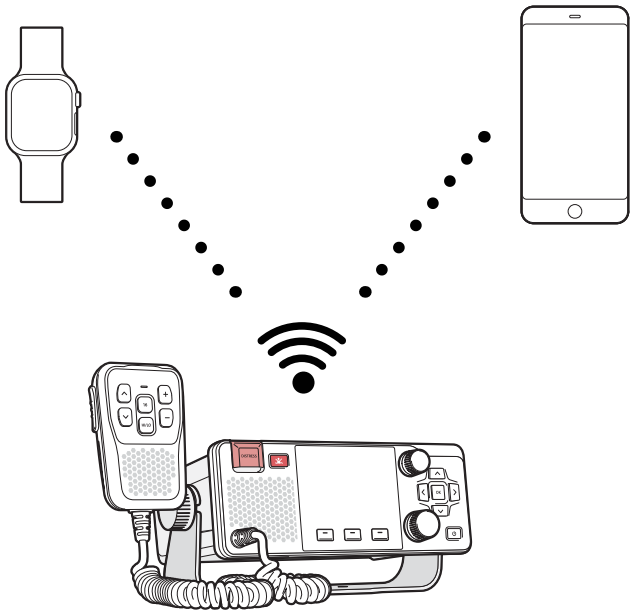


Figure 24 : AP mode connections

Station mode

When you set up the X100 in **STATION MODE**, it connects to your existing onboard wireless network. This means all your smart devices can join the same network as the X100, making it easy to share information and stay connected. For instance, you can stream navigation updates on your tablet while using your phone to communicate with crew members.

But be aware that some options under the **WIRELESS** menu are not available if the X100 is configured in **STATION MODE**.

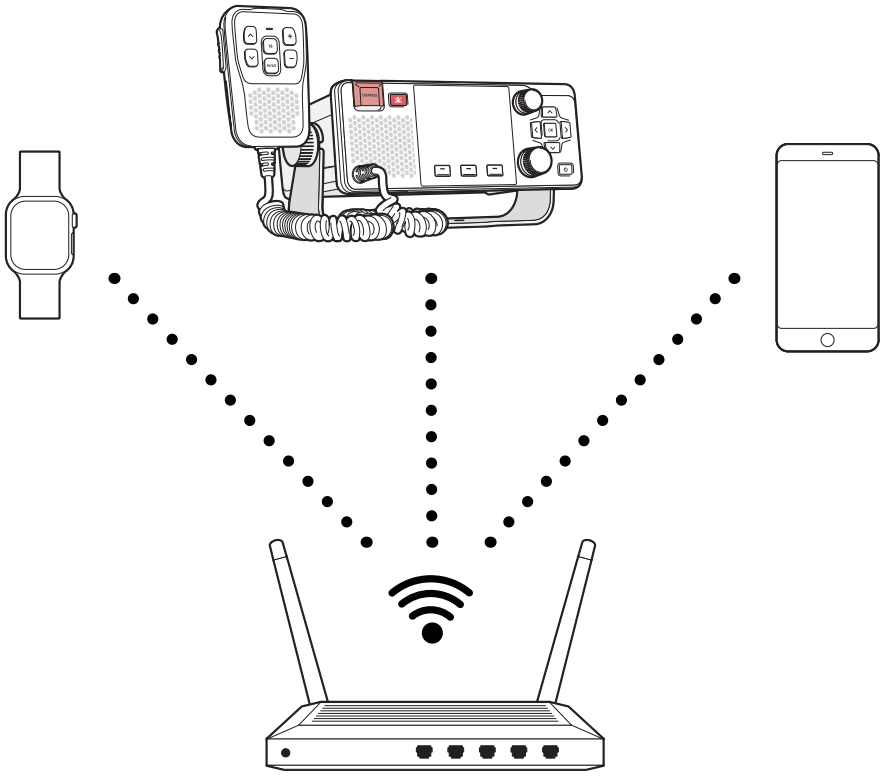


Figure 25 : Station mode connections

Connection status

The **CONNECTION STATUS** displays information about the network your device is connected to.

The following information is shown:

Status	Definition
MODE	This shows which mode your device is currently configured for, either **ACCESS MODE** or **AP MODE**.
STATUS	This shows weather or not your device is connected to a wireless network. If it's configured in **AP MODE** this is will show say your X100 is **DISCONNECTED**.
SSID	When a network is set up, an SSID (network name) is created to identify it. This makes it easy to find and connect to the right network. In **STATION MODE**, the **SSID** will show the name of the network you've joined, so you can quickly confirm you're on the right one. In **AP MODE**, the **SSID** shows the name of the network created by the X100, which helps you connect your smart devices directly to it. This setup ensures you always know which network to join, whether you're connecting to an external network or directly to the X100.
CHANNEL	Under **CHANNEL**, you can see the Wi-Fi channel that the X100 is currently using to broadcast. Knowing the current channel can be useful if you're troubleshooting connection issues or if there's a lot of Wi-Fi traffic in your area. Switching to a less congested channel may improve your network's performance. To see the current channel the X100 is using, from **SETTINGS**, select **WIRELESS**, and then **CHANNEL**.
RSSI	Your Received Signal Strength Indicator (**RSSI**) measures the strength of the wireless signal received by your device. A value around -120 dBm indicates a very weak signal, while 0 dBm means the signal is strong.
AUTH (Authentication)	This is a security process that verifies a device, such as a smart phone or tablet, before it is allowed to connect to your network. This ensures that only authorized users or devices can access the network, helping to protect against unauthorized access and keeping any sensitive data shared on the network secure. To can see the security protocol your network uses by selecting, **SETTINGS**, **CONNECTION STATUS**, and then selecting **AUTH**.
NUM CLIENTS	This indicates the number of Wi-Fi devices that are connected to the X100 via the wireless network. This only applies when in AP mode.

MAC (media access control) Addresses

The **MAC ADDRESS** is a unique 12-digit hexadecimal number assigned to every device connected to a network. It acts like a digital fingerprint, ensuring that your device can communicate properly with others.

The MAC addresses for the following are listed:

- Wi-Fi station.
- Wi-Fi Soft AP.
- Bluetooth.

To see the MAC addresses, from **SETTINGS**, select **WIRELESS**, and then **MAC ADDRESSES**.

Show Wi-Fi QR code

The QR code is a quick and easy way to connect your smart device to your X100. Scan the QR code with your device and follow the instructions to connect your device successfully.

Show app store QR code

This QR code is different from the Wi-Fi QR code—it links directly to the app store so you can download the Connect-X app. Simply scan the code with your device and follow the instructions to install the app. This is especially useful when setting up a new device to connect to your X100.

Current network

Under **CURRENT NETWORK**, you can view all details about the network you're currently connected to, though this information can't be changed here it can be used if you're troubleshooting network connectivity issues, and you need to connect to an external navigation app.

To access this screen, go to **SETTINGS**, select **WIRELESS**, then select **CURRENT NETWORK**. Here, you'll find:

- Mode
- IP Mode
- IP Address
- Gateway Address
- Subnet Mask
- AIS Port

Additionally, you have options to **DISCONNECT** and **FORGET** a wireless network:

To **DISCONNECT** (e.g. if you need to switch to a different network temporarily), select **DISCONNECT**, and the X100 will leave the current network.

To **FORGET** a network, select **FORGET**. This will erase the connected network's password from the X100, which is useful if you want to prevent it from reconnecting automatically.

Available networks

To take full advantage of the X100's features you'll want to connect to a network. You can do that under **AVAILABLE NETWORKS**.

From **SETTINGS**, select **WIRELESS**, and then **AVAILABLE NETWORKS**.

To join a network, simply select a network name form the list and use the on screen keyboard to enter that networks password. When you're done press the **SAVE** softkey.

Reset WI-FI Settings

You can reset the Wi-Fi settings on the X100 to return everything to its original factory settings. This is helpful if you've made changes to the network or connection settings and need to start fresh, or if you're troubleshooting connectivity issues.

Once reset, all custom Wi-Fi configurations (like network names and passwords) will revert to the factory defaults, so you may need to reconnect your devices afterwards.

To reset the Wi-Fi settings, from **SETTINGS**, select **WIRELESS**, and then **RESET WI-FI SETTINGS**.

GNSS (GPS)

Under **GNSS**, you can view information related to:

FIX QUALITY : This shows you how accurate the GNSS fix is.

GNSS Mode: This indicates the current operational mode of the GPS receiver.

GNSS Information: This includes details about the satellites in view, signal quality, and your current position accuracy.

Output NAV: Here, you can see the specific data sentences being output by the GPS receiver, which may include your position, speed, course, and other navigational data.

This information is essential for understanding your device's navigation capabilities and ensuring accurate positioning during your travels.

Fix Quality

The **FIX QUALITY** option indicates whether there's a real-time fix on your location. If you don't have a location fix, the GPS functions won't be operational.

To check the quality of the GNSS, go to **SETTINGS**, select **DIAGNOSTICS**, and then choose **FIX QUALITY**. **YES** indicates a good fix, **NO FIX** means there’s no fix, and **ERROR** signals an issue in determining your position.

If you do not have a fix or see the error message, click **here**.

GNSS (GPS) mode

The X100 automatically selects satellites and constellations based on your location. It supports the following GPS modes:

- GPS (Global Positioning System): This is the most widely used satellite navigation system.
- GLONASS (Global Navigation Satellite System): Russia's satellite navigation system.
- GALILEO: The European Union's satellite navigation system.
- BEIDOU: China's satellite navigation system.

If you cannot get a GNSS fix then you can choose a single navigation system, or a combination of the systems.

To choose a navigation system From **SETTINGS**, select **GNSS** and then **GNSS MODE**. You can use the arrow keys to select which mode(s) you want to use.

GNSS (GPS) information

Under **GNSS INFO**, you can view all of your current position details in one place. This keeps everything organized and easy to access, so you can quickly find the information you need.

To see the information related to **GNSS**, from **SETTINGS**, select **GNSS**, then **GNSS INFO**.

- If you have a fix to the GPS satellite constellations.
- Your current latitude and longitude, SOG and COG.
- The Coordinated Universal Time (UTC).
- The number of satellites currently in view from the connected satellite constellation.
- The number of satellites that are currently in use.
- And the GPS mode that you are using.

Output nav

Turning on the **OUTPUT NAV** option allows your device to send accurate location data to your chart plotter through NMEA for precise positioning. They also help troubleshoot real-time location issues, ensuring smooth navigation.

To generate output sentences, from **SETTINGS** select **GNSS**, and then **OUTPUT NAV**. You can then use the arrow keys to toggle this setting **ON**/**OFF**.

DSC

Under DSC you have the freedom to configure the X100 to automatically respond to messages, requests, enable or even toggle certain features on or off.

An automated procedure is something that you can configure the X100 to do automatically, like respond to position requests by sending your co-ordinates without any manual input.

These settings allow you to customize how your system handles distress, test messages, position requests, and more, ensuring better management of communications in varying situations.

- **AUTO ACKNOWLEDGE TEST MESSAGES** You can configure the X100 to automatically reply to all incoming test messages, so there is no manual input from you.
- **NON AUTOMATED PROCESS TIMEOUT** You can configure a timeout to end any processes that doesn't end automatically like making or receiving a DSC or VHF call.
- **NON DISTRESS AUTOMATED PROCESS TIMEOUT** You can configure a timeout to end any processes that are not distress related such as group calls.
- **RX DISTRESS AUTOMATED PROCEDURE TIMEOUT** This setting lets you adjust how long the X100 waits before finishing the incoming distress process. A warning message will appear on the screen ten seconds before the timeout is triggered, giving you a heads-up. Once the timeout completes, the distress request process automatically ends.
- **COMMUNICATIONS AUTOMATED TIMEOUT PROCEDURE** This is the time limit set to prevent another process from interrupting the task you are currently performing.

  For example, if you are on a DSC call and you receive a position request, you will not receive a notification until the set timeout elapses. You will however have an option to accept and overwrite the timeout or log the call and return to it later.
- **AUTO CHANNEL CHANGE** This lets you configure whether or not the X100 will change to another channel automatically when receiving an incoming call, or request.
- **AUTO ACKNOWLEDGE INDIVIDUAL CALL** This lets you choose whether the X100 automatically accepts incoming individual calls or allows you to decide which calls to answer or ignore.
- **AUTO ACKNOWLEDGE POSITION REQUESTS** This setting allows you to enable the X100 to automatically reply, ignore or require a manual response to any incoming position requests with your current co ordinates.
- **NMEA SENTENCE OUTPUT** This feature allows you to configure the X100 to output NMEA sentences to any connected NMEA-compatible device, such as a chart plotter.
- **DSC QUICK CALL**: This allows you to enable or disable the DSC Quick Call function.

Function	How to
Auto Acknowledge test messages	From **SETTINGS**, select **DSC**, then choose **AUTO ACKNOWLEDGE TEST MESSAGE**. Use the arrow buttons to toggle **ON** or **OFF** as desired.
Non automated process timeout	From **SETTINGS**, select **DSC**, and then **NON AUTOMATED PROCESS TIME OUT**. You can use the arrow keys to increase or decrease the timeout.
Non distress automated timeout	From **SETTINGS**, select **DSC**, and then **NON DISTRESS AUTOMATED PROCESS**. You can use the arrow keys to increase or decrease the timeout.
RX distress automated timeout	From **SETTINGS**, select **DSC**, and then **RX DISTRESS AUTOMATED PROCESS TIMEOUT**. You can use the arrow keys to increase or decrease the timeout.
Communications automated procedure timeout	From **SETTINGS**, select **DSC**, and then **COMMUNICATIONS AUTOMATED PROCEDURE**. You can use the arrow keys to increase or decrease the timeout.
Auto channel change	To configure the **AUTO CHANNEL CHANGE** feature, go to **SETTINGS**, **DSC**, and then **AUTO CHANNEL CHANGE**, you can use the arrow keys to toggle this feature **ON**/**OFF**.
Auto acknowledge individual calls	From **SETTINGS**, select **DSC**, and then **AUTO ACKNOWLEDGE INDIVIDUAL CALLS**, you can use the arrow keys to toggle this feature **ON**/**OFF**.
Auto acknowledge position requests	From **SETTINGS**, select **DSC**, then **AUTO ACK POSITION REQUESTS**. You can use the arrow buttons to choose between: • **MANUAL**: requires a manual reply for each request, • **AUTO**: sends an automatic reply to each request, or • **IGNORE**: ignores all incoming requests.
NMEA sentence output	From **SETTINGS**, select **DSC** and then **NMEA SENTENCE OUTPUT**, use the arrow buttons to toggle **ON**/**OFF**.
DSC Quick call	From **SETTINGS**, select **DSC**, then **DSC QUICK CALL**. You can use the arrow buttons to toggle **ON**/**OFF**.

MOB

You can **EMBARK** or **DISEMBARK** devices, and then **ENABLE MONITORING** of the embarked devices. Only embarked devices receive **MOB** alarms.

Enabling **MONITORING** is particularly useful when you're keeping track of crew members with assigned devices. For example, if someone with a monitored device goes overboard or moves out of range, you'll be alerted immediately, allowing for a quick response in case of emergencies.

Manage devices

MANAGE DEVICES enables you to **EMBARK** and **DISEMBARK** any crew members smart device that is already on the same wireless network as the X100, and to activate the MOB monitoring feature. Every time someone boards the vessel, you should **EMBARK** their device to enable this safety functionality. Likewise, when leaving, you should **DISEMBARK** the device to prevent any false MOB alerts.

Take time to make sure that the monitoring feature is enabled under **ADVANCED**, so that the embarked devices receive all MOB alerts.

To **EMBARK** a device, go to **SETTINGS**, select **MOB**, and then **MANAGE DEVICES**. Press the **EMBARK** softkey to add a device.

To **DISEMBARK** a single device, follow the same steps, but press the **DISEMBARK** softkey. To remove all devices at once, simply press the **DISEMBARK ALL** softkey. This ensures that only active devices are tracked, helping to avoid false **MOB** alerts.

Advanced

Under **ADVANCED**, you can turn enable **MONITORING** and adjust the **MONITORING SENSITIVITY** to control alert timing.

INFORMATION

Before you enable monitoring, make sure that all of the applicable devices are embarked, to learn how to embark a device click **here**.

- **Enable or Disable Monitoring**: When **MONITORING ENABLED** is set to **YES**, you'll receive alerts for any **MOB** incidents. Setting it to **NO** disables these alerts.
- **Adjust Monitoring Sensitivity**: When **MONITORING ENABLED** is set to **YES**, you can set the **MONITORING SENSITIVITY**. Higher sensitivity makes the MOB alarm trigger more quickly but increases the chance of false alerts. Lower sensitivity reduces false alarms but may delay the alarm trigger.

From **SETTINGS**, then **MOB**, and then **MONITORING ENABLED**. You can use the arrow buttons to enable or disable this feature.

To adjust, select **MONITORING SENSITIVITY** and use the arrow buttons to increase or decrease the level.

Audible alert

You can enable or disable the audible alarm that accompanies the MOB alert, if enabled the alarm sounds for the duration of the MOB alert.

By default the audible alarm is enabled.

From **SETTINGS**, select **MOB**, then **AUDIBLE ALERT**, you can use the arrow keys to **ENABLE** or **DISABLE** the audible alert.

ATIS

ATIS is specifically designed for use in the inland waterways of RAINWAT (Regional Arrangement Concerning the Radiotelephone Service on Inland Waterways) countries. When ATIS is enabled, the DSC functions on the device do not operate. It's important to remember not to enable ATIS when you're in open water, as it could hinder your ability to use essential communication features. This ensures that you maintain effective communication and navigation capabilities in various environments.

Under ATIS, you can turn A**TIS MODE ON** or **OFF** and set your unique **ATIS ID**.

You must enter your ATIS ID first in order to enable **ATIS MODE**.

Setting your ATIS ID

You can obtain your **ATIS ID** from the same agency that issues radio operator licenses in your area. This helps to facilitate effective communication and navigation on inland waterways.

An ID typically starts with a 9, consists of 10 digits, and is entered only once. If you ever need to change your ATIS ID, contact your local dealer for assistance. This ensures proper identification and compliance with regulations in inland waterways.

Once entered, the ATIS ID cannot be deleted or changed by you, so make sure it is entered correctly. If you need help contact support@em-trak.com.

To enter your **ATIS ID**, start by going to **SETTINGS**, then select **ATIS**, and choose **SET ID**. Use the on-screen keyboard to enter your ID. Once you've entered it, the ATIS functionality will be enabled automatically.

Enabling and disabling ATIS mode

ATIS mode should only be used when navigating the inland waterways in RAINWAT countries. When ATIS is enabled, the DSC function on the X100 will not work. For this reason, it’s best not to enable ATIS while you're in open water to maintain full communication functionality. This ensures you can use DSC for emergency and routine calls when needed.

To enable the ATIS mode you first must enter your ATIS ID, then go to **SETTINGS**, select **ATIS** and then **MODE**. You can use the arrow keys to toggle ATIS mode **ON**/**OFF**.

Alerts

Under **ALERTS**, you can set the limits and toggle the alerts for the following:

- **Closest Point of Approach (CPA) and Time to Closest Point of Approach (TCPA) alarm**: These alarms work together and cannot be toggled on or off individually. This means that both alarms are activated or deactivated simultaneously, ensuring coordinated alerts for approaching vessels and potential collision risks.
- **CPA and TCPA THRESHOLD**: The **CPA THRESHOLD** sets the minimum distance that another vessel can approach before an alarm is triggered, while the **TCPA THRESHOLD** indicates the time remaining until the vessel reaches the **CPA** limit.
- **ANCHOR WATCH**: This monitors your vessel's position in relation to the anchor point. If your vessel drifts beyond the set **ANCHOR LIMIT**, an alarm will sound, and a pop-up notification will appear on the screen. This feature helps ensure that your vessel stays safely anchored and alerts you if it moves unexpectedly.
- **ANCHOR WATCH LIMITS**: While anchored and your vessel drifts beyond this set limit, an alarm will sound, and a pop-up notification will appear on the display. This visual and audio alert helps you stay informed of any unexpected movement while anchored, ensuring the safety of your vessel.

CPA/TCPA

The X100 allows you to manage the **CPA** and **TCPA** alarms, you might want to turn these off if you're navigating in busy waters.

In open ocean, you might want to set the CPA and TCPA to higher values. This allows the alarm to function more like a proximity detector, giving you early warnings about vessels entering a wide safety zone around your position.

Setting these alarms can help you stay aware of nearby vessels and avoid potential collisions by giving you a good warning before any chance of collision can happen.

Below shows you how to turn the CPA and TCPA alerts **ON**/**OFF**.

To toggle the alarm, go to **SETTINGS**, then **ALERTS** and then select **CPA/TCPA**. You can use the arrow keys to toggle the alarms **ON**/**OFF**.

CPA threshold

If you're navigating in busy waterways or near other vessels, setting the **CPA THRESHOLD** ensures you'll be alerted if another vessel is predicted to get too close, giving you enough time to take action and avoid a collision.

This allows you to define the safe distance around your vessel and receive alerts when other vessels come too close.

To set the threshold, go to **SETTINGS**, then **ALERTS** and then select **CPA THRESHOLD**.

TCPA threshold

If you're approaching a busy area or navigating through narrow channels, setting the **TCPA THRESHOLD** helps you monitor how much time you have before another vessel comes too close, allowing you to adjust your course or speed in advance.

This setting allows you to define how much time remains before both vessels reach the **CPA**, giving you ample warning to take any necessary action.

To set the threshold, go to **SETTINGS**, then **ALERTS** and then select **TCPA THRESHOLD**.

CPA Audio alarm

The **CPA AUDIO ALARM** is a sound that alerts you when the CPA threshold is breached. For example, if another vessel gets too close, the alarm triggers to grab your attention immediately. You can configure the alarm to be audible or silent, depending on your preferences and environment.

To enable the audible alarm, from **SETTINGS**, select **ALERTS**, then **CPA AUDIO ALARM**. You can use the arrow keys to toggle the alarm **ON** or **OFF**.

Anchor watch

There will be times when you're anchored that the current may cause your vessel to drift. You can set an **ANCHOR WATCH** alarm on the X100 that notifies you when you drift too far.

Once set, a virtual safety zone is set up around your anchor point. If your boat drifts beyond this area because of wind, currents, or other factors, **ANCHOR WATCH** will alert you with a pop-up or alarm. Make sure you turn on anchor watch after the boat is anchored and not drifting. It’s a great way to have peace of mind, knowing you’ll be notified if your vessel starts moving unexpectedly.

To set the **ANCHOR WATCH** , go to **SETTINGS**, then **ALERTS** and then select **ANCHOR WATCH**. You can then use the arrow keys to toggle the anchor watch **ON**/**OFF**.

Anchor re-centre

When you drop anchor, it’s a good idea to use the **ANCHOR RE-CENTRE** feature. For example, if your vessel drifts slightly due to wind or currents, this feature recalculates your position from the point the feature is activated. This helps ensure accurate tracking of your position while you’re anchored.

To use it, from **SETTINGS**, select **ALERTS**, then **ANCHOR RE-CENTRE**, and press the right arrow key to use.

Anchor threshold

When you activate **ANCHOR WATCH**, the **ANCHOR THRESHOLD** surrounds your vessel with your vessel in the middle. If the boat drifts beyond this set boundary, an alarm will sound, and a pop-up will appear on the screen to notify you.

To set the **ANCHOR THRESHOLD**, go to **SETTINGS**, select **ALERTS**, and then choose **ANCHOR THRESHOLD**, you can use the arrow key to set the threshold.

Units

On the X100, you can adjust certain settings to suit your needs. For instance, you can choose the preferred way units for distance and speed are shown.

Speed units

You have the flexibility to display speed units on the X100 in knots (**kn**), miles per hour (**mph**), or kilometres per hour (**km/h**), depending on your preference.

From **SETTINGS**, select **UNITS**, and then **SPEED UNITS**. You can use the arrow keys to switch between knots (**kn**), miles per hour (**mph**), or kilometres per hour (**km/h**).

Distance units

You have the flexibility to display distance units on the X100 in nautical miles and meters (**NM & m**), nautical miles (**NM**), miles (**mi**), and Kilometres and Meters (**km/m**).

From **SETTINGS**, select **UNITS**, and then **DISTANCE UNITS**. You can use the arrow keys to switch between nautical miles and meters (**NM & m**), nautical miles (**NM**), miles (**mi**), and Kilometres and Meters (**km/m**).

Length units

You have the flexibility to length speed units on the X100 in metres (**m**), or feet (**ft**), depending on your preference.

From **SETTINGS**, select **UNITS**, and then **LENGTH UNITS**. You can use the arrow keys to switch between the options.

Sensors

Under **SENSORS**, you can view and adjust the **BAUD RATES** for different devices connected to the NMEA0183 ports. The baud rate determines the speed of data communication between your X100 and the connected sensors. Adjusting the baud rate helps ensure that data is transferred efficiently and consistently, matching the requirements of each sensor for optimal performance.

Port 1 and 2 baud

The baud rate is the speed at which data is transmitted over a communication channel. In the context of serial ports, 4800 baud means the serial port can transfer a maximum of 4800 bits per second.

The following baud rates are available for selection:

- 4800 - This is only really used for legacy devices that have slower data transfer.
- 38400 - This works well for communication between the X100 and a chart plotter.

These rates control how quickly data can be sent between devices, and choosing the correct rate helps ensure smooth and reliable communication between your X100 and connected sensors.

If you want to set the **BAUD RATES**, from **SETTINGS**, select **SENSORS**, and then **PORT 1 BAUD** or **PORT 2 BAUD**, you can use the arrow keys you set the rate.

Users

Under **USERS** you are able to set, edit and delete the **CAPTAINS PIN**, and see the list of users that have been registered to your X100.

Set and edit captain's PIN

INFORMATION

This option is only available to the user with the captain's role. The role is configured during the on-boarding process.

Selecting the **SET CAPTAIN'S PIN** option lets you change it. To update the PIN, from **SETTINGS**, select **USERS**, and then **SET CAPTAIN'S PIN**. You can then use the on-screen keyboard to enter a new one.

To edit the **PIN**, from **SETTINGS** , select **USERS**, and then **SET CAPTAIN'S PIN**. Use the on-screen keyboard to enter the new PIN, then press the **SAVE** softkey to confirm.

Delete captains PIN

INFORMATION

If the Captain is the only profile on the X100 and that profile is deleted, you'll need to re-enter the Captain's credentials in the app.

To delete your captains PIN, from **SETTINGS**, select **USERS** and highlight **CAPTAIN'S PIN**, then press the right arrow key. The Captain's PIN is deleted.

User List

From the user list you can see all of the user accounts connected to your X100, you can also delete any account that is no longer needed.

To access the list from **SETTINGS**, select **USERS**, and then **USER LIST**. To delete an account simply highlight the user on the list and press the **DELETE** softkey, the user will be removed.

Preferences

PREFERENCES lets you customize your settings so you can set up your device the way you like it. To do this from **SETTINGS**, select **PREFERENCES**.

Key beep

By default, the **KEY BEEP** function is enabled, so each time you press a button, you'll hear a soft beep for confirmation.

To turn off the key beep, from **SETTINGS**, select **PREFERENCES** and then **KEY BEEP**. You can use the arrow keys to turn this function **ON** or **OFF**.

Channel change beep

By default, the **CH CHANGE BEEP** function is enabled, so each time you change channels, you'll hear a soft beep for confirmation.

To disable this, from **SETTINGS**, select **PREFERENCES**, and then **CH.CHANGE BEEP**. Use the arrow keys to toggle this function **ON** or **OFF**.

Display theme

Here you are able to switch between different display themes **LIGHT**, **DARK**, and **NIGHT** modes.

From **SETTINGS**, select **PREFERENCES**, and then **DISPLAY THEME**. You can use the arrows to choose between the modes.

Softkey grey

The brightness of the softkey labels can be adjusted. By default the **SOFTKEY GREY** is set to **THEME**.

From **SETTINGS**, select **USER**, then **SOFTKEY GREY**. Use the right arrow key scroll go through the brightness levels, the softkey label brightness changes in response to each level selected.

Brightness

BRIGHTNESS indicates the brightness level of the screen, enabling you adjust how light or dark the display appears. This is helpful for visibility in different lighting conditions, ensuring you can easily read the screen whether it's sunny, overcast and everything in between.

To adjust the brightness level, from **SETTINGS**, select **PREFERENCES**, and then **BRIGHTNESS**. You can use the arrow keys to adjust the brightness level to your liking.

Diagnostics

Under **DIAGNOSTICS**, you can verify the validity of your **MMSI** number, check **GNSS** and **AIS TX/RX** fixes, monitor the **SUPPLY VOLTAGE** for the device, assess the **VSWR** ratio, and view the current software versions. This information helps ensure everything is functioning properly.

MMSI valid

MMSI VALID lets you know if your MMSI number is valid, if it is valid a **YES** will be next to this option, otherwise a **NO** appears. If your MMSI is in valid all DSC functionality is disabled and you must acquire a MMSI immediately.

Click **here** for guidelines on how to acquire your MMSI number.

If your MMSI number is valid but displays as not valid, click **here**. The X100 may not be currently receiving a proper location signal, which may affect the ability to validate the MMSI number.

To check to see if your MMSI is valid, from **SETTINGS**, select **DIAGNOSTICS** and then **MMSI VALID**.

Fix Quality

The **FIX QUALITY** option indicates whether there's a real-time fix on your location. If you don't have a location fix, the GPS functions won't be operational.

To check the quality of the GNSS, go to **SETTINGS**, select **DIAGNOSTICS**, and then choose **FIX QUALITY**. **YES** indicates a good fix, **NO FIX** means there's no fix, and **ERROR** signals an issue in determining your position.

If you do not have a fix or see the error message, click **here**.

AIS Tx

You can see how many AIS transmissions have been made from your X100 by selecting **SETTINGS**, then **DIAGNOSTICS**, and finally **AIS TX**.

If the number is 0, it may indicate an issue. For troubleshooting steps click **here**.

AIS Rx

You can see how many AIS transmissions have been received by your X100 by selecting **SETTINGS**, then **DIAGNOSTICS**, and finally **AIS RX**.

If the number is 0, this may indicate an issue, click **here** for potential solutions.

Supply volts

The millivolts powering the device display on screen, which is helpful for monitoring if the power supply is stable. This can alert you to potential power issues, especially in challenging conditions or if your device seems to be under performing.

To see the supply voltage, from **SETTINGS**, select **DIAGNOSTICS**, and then **SUPPLY VOLTS**.

If you have any concerns with the power supply click **here** for troubleshooting steps.

Voltage Standing Wave Ratio (VSWR)

The **VSWR** reflects the quality of signal transmission on a line, with ratios under 5:1 considered good for clear communication. If VSWR exceeds 6:1, it indicates issues with the signal path, which may lead to unclear or failed VHF transmissions. Monitoring this ratio helps ensure optimal performance of your radio equipment.

To check your **VSWR**, from **SETTINGS**, select **DIAGNOSTICS**, and then **VSWR**.

If your VSWR ratio is high and you're experiencing poor VHF transmission quality, check for any wiring faults between the X100 and the VHF antenna. Ensuring solid, intact connections can help improve signal quality.

PA status

The PA status refers to the power amplifier that generates the signal to the antenna. The status should read as **OK**, indicating that nothing is wrong with the amplifier.

To check the PA Status, from **SETTINGS**, select **DIAGNOSTICS**, and then **PA STATUS**.

Boot version

BOOT VERSION displays the currently installed BOOT software version.

From **SETTINGS**, select **DIAGNOSTICS**, then **BOOT VERSION**.

Radio version

RADIO VERSION displays the currently installed radio software version.

From **SETTINGS**, select **DIAGNOSTICS**, then **RADIO VERSION**.

Net version

NET VERSION displays the currently installed NET software version.

From **SETTINGS**, select **DIAGNOSTICS**, then **NET VERSION**.

Licensing

Under **LICENSING**, you can view all licensing information, including compliance, certification, and open-source software license details. A more detailed breakdown is available in the Reference Guide.

To view this information, from **SETTINGS**, select **DIAGNOSTICS** ,and then **LICENSING**.

Audio devices

The **EXTERNAL SPEAKER** allows incoming messages to be amplified in a location separate from the radio, allowing you and the crew to hear all incoming communications.

The **LOUDHAILER** is used for verbal communication with other vessels or people nearby, even if they are away from the boat.

To use these features ensure the **LOUDHAILER** and **EXTERNAL SPEAKER** are first connected to the X100.

Click **here** for details on how to connect them.

You can activate either the **EXTERNAL SPEAKER** or the **LOUDHAILER**, but only one at a time.

To make your selection, go to **SETTINGS**, **AUDIO DEVICES**, and then **EXTERNAL DEVICE**. Use the arrow keys to choose either **EXTERNAL SPEAKER** or **LOUDHAILER**. If you select **EXTERNAL SPEAKER**, ensure that you enable it for use.

Power and reset

Under the **POWER AND RESET** menu, you can reset or power off the X100, as well as restore the factory settings. This allows you to return the device to its original configuration if needed.

Reset

Selecting **RESET** will recycle the device's power while keeping all data and settings unchanged. This can help resolve minor issues without losing your personalized configurations.

To reset the device, from **SETTINGS**, select **POWER AND RESET**, then choose **RESET**. You will be prompted to confirm the reset; press the **ACCEPT** softkey to proceed.

Restore factory settings

The **RESTORE FACTORY SETTINGS** feature wipes your contact list and any custom settings you have set. Be aware that your MMSI number will not be wiped.

INFORMATION

Once the factory reset begins, it must run to completion. If you're troubleshooting or preparing the device for a fresh setup, ensure the process is allowed to finish to avoid any configuration issues.

To reset the device, from **SETTINGS**, select **POWER AND RESET**, then choose **RESTORE FACTORY SETTINGS**. You will be prompted to confirm the reset; press the **ACCEPT** softkey to proceed.

Power off

Selecting the **POWER OFF** option turns off the X100 without affecting any saved data or settings.

To power off the X100,from **SETTINGS**, select **POWER** and **RESET**, then select **POWER OFF**. You will be prompted to confirm the power off, press the **ACCEPT** softkey to proceed.

Troubleshooting

The troubleshooting section offers guidance on diagnosing and fixing common issues related to the installation and operation of your product. Each potential problem is paired with its likely cause and corrective actions, making it easier to identify and resolve issues quickly.

Every product is carefully tested and quality-checked before shipping, but if problems arise, this section is designed to help you restore optimal performance. If you still encounter issues after trying these steps, contact support@em-trak.com for links to additional resources and contact details for Product Support.

Maintenance

WARNING

It is important that you never open the X100 even if you think there may be a problem with the hardware. Opening the X100 exposes you to hazards such as burning, electric shock and Radio Frequency radiation which can lead to significant harm or critical injury.

Routine cleaning

To keep enjoying your X100, it’s important to routinely clean the radio. Regular maintenance will help ensure it stays in great condition and performs well. When cleaning your radio make sure that:

- The power supply is off.
- You use a non-scratch microfibre cloth.
- You DO NOT use an abrasive, acidic, ammonia, solvent, or chemical-based solutions.
- You DO NOT jet wash the X100.

Routine checks

Regular checks are a great way to keep your radio in good working condition and ensure it operates at it's best. Perform the following checks regularly:

- Perform a DSC test message with a recreational vessel on one of the ship to ship channels to verify radio operation.
- Examine cables and hardware for any damage, nicks, cuts, or splits.
- Check that all cable connectors are secure and functioning correctly.

Power

If you encounter any issues while powering up, refer to the solution below:

Possible cause	Solution
Blown fuse / tripped breaker	The fuse on the red power cable might have the wrong rating, open up the waterproof case and check the rating. If the fuse has blown simply replace the fuse with a new 5 x 20 mm 12A fuse. There may be issues with the fuses, breakers, or connections. Check each of these for any problems, and replace them if needed to keep everything running smoothly. If the fuse keeps blowing, take a moment to check for any cable damage, broken connector pins, or incorrect wiring. Addressing these issues can help prevent further problems.
Poor / damaged / insecure power supply cable / connections	There may be damage or corrosion on the cables or connectors, be sure to replace any cables or connectors that show signs of damage. While the unit is turned on, gently flex the power cable to see if it causes the unit to reboot or lose power. If it does, replace the cable. Check the vessel's battery voltage, and inspect the condition of the battery terminals and power supply cables. Ensure all connections are secure, clean, and free of corrosion. If you find any issues, replace parts as necessary to maintain reliable power. Some components may not be performing at their best. While transmitting at 25W, use a multimeter to check for any significant voltage drops across all connectors. If you find any, replace the affected components to ensure everything functions smoothly.
Incorrect power connection	The power supply might be wired incorrectly, double-check that the installation instructions have been followed carefully.
Power source insufficient	Your power supply may be providing less than the minimum voltage of 9.6V DC. See **here** to check the voltage the X100 is receiving when transmitting at 25W and when it is inactive.

Audio

No audio reception

Possible cause	Solution
Incorrect settings	You may need to perform a factory reset, to learn how to do this click **here**.
Incorrect channel type in use.	You may be using the wrong channel type, ensure that you are only using the simplex channels when testing. For example, you can use channels 6, 8, 9, 10, 13, 67, 72, or 73.
Incorrect volume or squelch level.	First, verify that noise is audible from the speakers by setting the squelch level to zero. If you don't hear any noise, try adjusting the volume. If you can hear audio or noise, press the Vol/Sq knob a few times until squelch is displayed, then adjust the squelch level until the noise stops. If you still don't hear any audio after completing these steps, contact support@em-trak.com for help.

No audio transmitting

Possible cause	Solution
Incorrect settings	If the audio settings are incorrect, try a factory reset. To perform a reset see **here**.
Dirt or debris blocking the microphone on the fist mic or handset.	Check if the microphone is clear or any dirt or debris, if you're experiencing muffled audio during communication, a quick check and clean of the mic port can often resolve the issue, ensuring clear sound for effective communication.
Incorrect channel type in use.	You may be using the wrong channels when testing the communication with another vessel, ensure you are only using Simplex channels. For example, you can use channels 6, 8, 9, 10, 13, 67, 72, or 73 to ensure proper functionality.
Insufficient transmission power.	The transmission power might be set to 1W, which is often not enough to communicate with vessels that are farther away. To increase the power, press the Hi/Lo button on the fist mic or use the softkey on the VHF radio screen.

GNSS

No location fix

Possible cause	Solution
No antenna connected to GPS receiver.	The antenna cable may have come loose. Check to make sure it's still connected properly.
GPS antenna location.	For the best performance, it's recommended to mount external GPS antennas and GPS receivers with internal antennas above deck. Making sure they have a clear, unobstructed view of the sky. Avoid placing them near structural bulkheads or other electrical equipment and cables, as these could cause interference.
GPS switched off.	The connection to the GPS satellites might be turned off. To check which modes are enabled, click **here**.
Geographic location or prevailing conditions preventing satellite fix.	You can wait for more favourable weather conditions, or try sailing to a new location that might give you a better fix. Click **here** to see your fix status.

No position data

Possible cause	Solution
Wrong Network mode selected.	You can make sure that the correct mode is selected, click **here**.
Poor / damaged / insecure cable / connection.	Check all cables to ensure they're securely connected, not damaged and are not corroded. You can replace the cables if you need.

DSC

DSC functions are not working

Possible cause	Solution
MMSI number not programmed.	Programme your MMSI number. Each VHF radio requires a unique MMSI number. In the United States, this MUST be programmed into the unit by an authorized dealer. Click **here** for more information.

AIS

AIS functions are not working

Possible cause	Solution
MMSI number not programmed.	Programme your MMSI number. Each X100 requires a unique MMSI number. In the United States, this MUST be programmed into the unit by an authorised dealer. Click **here** for more information.
AIS functions are not enabled on the MFD.	Ensure that both AIS Presentation and AIS Targets are enabled for the MFD. For instructions on how to do this, refer to the Operation instructions for your MFD.

Alarms

Possible cause	Solution
ALR001 - Tx malfunction.	Programme your MMSI number. Each X100 requires a unique MMSI number. In the United States, this MUST be programmed into the unit by an authorised dealer. Click **here** for more information. If the problem persists, contact your local em-trak Marine Electronics Limited dealer.
ALR002 - Antenna Voltage Standing Wave Ratio (VSWR) exceeds the limit.	Make sure that the VHF antenna is compatible with the X100. Check the VHF antenna is connected properly to the X100. Check the VHF antenna cable is in good condition and is not damaged. Replace the cable if necessary. If the problem persists, contact your local em-trak Marine Electronics Limited dealer.
ALR003 - Rx Channel 1 malfunction. The Rx1 frequency synthesizer failed to lock.	Tune to a different channel, then re-tune back to the original channel. Power recycle the X100. If the problem persists, contact your local em-trak Marine Electronics Limited dealer.
ALR004 - Rx Channel 2 malfunction. The Rx2 frequency synthesizer failed to lock.	Tune to a different channel, then re-tune back to the original channel. Power recycle the X100. If the problem persists, contact your local em-trak Marine Electronics Limited dealer.

ALR007 - UTC Sync Invalid, the internal GPS transmitter is no longer directly synchronized with the GPS receiver.	Check the GPS receiver is connected properly to the X100. Check the receiver cable is in good condition and is not damaged. Replace the cable if necessary. Use a spectrum analyser to check if the GPS receiver is receiving a signal. If the problem persists, contact your local em-trak Marine Electronics Limited dealer.
ALR011 - Heading sensor offset.	Make sure that your heading sensor is correctly aligned with the front-back axis of your vessel. Ensure there are no metallic bulkheads, items or electronic equipment within 1m of the heading sensor. Check the heading sensor cable is in good condition and is not damaged. Replace the cable if necessary. If the problem persists, contact your local em-trak Marine Electronics Limited dealer.
ALR026 - No sensor position in use.	Check that the GPS antenna is not obstructed. Check the GPS cable is in good condition and is not damaged. Replace the cable if necessary. Check that your GPS antenna is compatible with the X100. If the problem persists, contact your local em-trak Marine Electronics Limited dealer.
ALR029 -No valid SOG information.	Verify that the GPS is displaying the correct location. If not, make sure you've waited long enough to get a fix (5 minutes). Check that the GPS antenna is not obstructed. Check that the GPS antenna is connected, there is no damage to the cables and functioning properly. Replace the cable if necessary. If the problem persists, contact your local em-trak Marine Electronics Limited dealer.
ALR030 - No valid COG information.	A GPS fix has not been acquired. Wait five minutes for a GPS fix to be established. Check that the GPS antenna is not obstructed. Check that the GPS antenna is connected, there is no damage to the cables and is functioning properly. Replace the cable if necessary. If the problem persists, contact your local em-trak Marine Electronics Limited dealer.
ALR057 - Power supply.	Check the power supply voltage is between 12V DC to 24V DC. Power recycle the X100. If the problem persists, contact your local em-trak Marine Electronics Limited dealer.

ALR067 - Noise threshold exceeded on Channel A. ALR068 - Noise threshold exceeded on Channel B.	In busy shipping lanes, this alarm may appear. This is within expected behaviour. Check the VHF antenna is connected properly, there is no damage to the cables and is working correctly. Replace the cable if necessary. Make sure the VHF antenna is compatible with the X100. If the problem persists, contact your local em-trak Marine Electronics Limited dealer.

Fist-mic

Fist-mic not working

Possible cause	Solution
Poor / damaged / insecure cables / connections	The X100 might not be correctly powered on, try and move the fist-mic cable to see if this causes the fist mic to loose power. If it does loose power contact your local em-trak Marine Electronics Limited dealer and they will assist you. If the problem persists, contact your local em-trak Marine Electronics Limited dealer. If the recommended solution has not fixed the issue then contact your local em-trak Marine Electronics Limited dealer who will assist you.

Wireless network

Device cannot find network

Possible cause	Solution
Wi-Fi router not powered on.	Ensure the router is powered on, there are no loose connections, and no damaged cables. Replace and damaged cables if necessary.
Unexpected power loss or router unplugged.	Restart your router. Then re-scan for available networks.
Weak connection on device.	Restart your router. Then re-scan for available networks.
Devices out of range or signal being blocked.	Move devices closer to your Wi-Fi router. Wireless performance degrades over distance, then re-scan for available networks. If possible, move any obstructions between the device and the router, then re-scan for available networks.

Device cannot connect to router

Possible cause	Solution
Incorrect password.	Ensure you are using the correct password. Usually the password can be located underneath or on the back of your router.
Heavy structure (i.e. decks, bulkheads or walls) are interfering with the wireless signal.	Move your router so that the heavy structure is no longer in direct line of sight. Install a signal booster, or a mesh network onto your router. Make sure the signal booster is compatible with your router before installing.

Slow or unreliable connection

Possible cause	Solution
Router installed close to maximum wireless range.	Move device closer to the router.
Interference being caused by other wireless-enabled devices.	Change the routers wireless channel and retry the connection. You can use free wireless analyser apps on your smartphone or tablet to choose a less-congested channel.
Interference caused by other devices that use the 2.4 GHz frequency. See the list below of some common devices that use the 2.4 GHz frequency: • Fluorescent lighting • Mobile phones • Security cameras	Switch off each device in turn until you have identified the device causing the interference, then remove or reposition the device(s) or your wireless router.
Interference caused by electrical and electronic devices and associated cabling could generate an electromagnetic field which may interfere with the wireless signal.	Switch off each item in turn until you have identified the device causing the interference, then remove or reposition the offending device(s) or your wireless router.
Interference from devices on other vessels. When in close proximity to other vessels, many other wireless signals may be present; for example, when moored up in a marina.	Change the routers wireless channel and retry the connection. You can use free wireless analyser apps on your smartphone or tablet to help you choose a less congested channel. If possible, move your vessel to a location with less wireless traffic.

Appendices

Appendix A NMEA 0183 Sentences

The radio supports the following NMEA 0183 sentences.

Sentence	Description	Receive	Transmit
DSC	Digital Selective Calling		●
DSE	Expanded Digital Selective Calling		●
VDM	AIS VHF Data Link Message		●
GGA	Global Positioning System Fix Data	●	●
GLL	Geographic Position — Lat/Long	●	●
GNS	GPS Fix Data	●	●
RMA	Recommended Minimum Specific Loran-C Data	●	●
RMC	Recommended Minimum Specific GPS Data	●	●
DTM	Datum	●	●

Appendix B NMEA 2000 PGN List

The radio supports the following NMEA 2000 Parameter Group Number (PGN). These are applicable to NMEA 2000 and SeaTalking ® protocols.

PGN	Description	Receive	Transmit
59392	ISO Acknowledgement	●	●
59904	ISO Request	●	●
60416	Transport Protocol (group function BMA)	●	
60928	ISO Address Claim	●	●
65420	ISO Commanded Address		●
65396	AIS Transmitter Status		●
126208	NMEA — Request Group Function	●	
126208	NMEA — Command Group Function	●	
126208	NMEA — Acknowledge Group Function		●
126464	PGN List		●
126992	System Time	●	●
126993	Heartbeat		●
126996	Product Information		●
127258	Magnetic variation	●	
129025	Position Rapid Update	●	●
129026	COG / SOG Rapid Update	●	●
129029	GPS Position Data	●	●
129033	Local Time Offset	●	●
129038	AIS Class A Position Report		●
129039	AIS Class B Position Report		●
129040	AIS Class B Extended Position Report		●
129041	AIS Aids to Navigation (AtoNs)		●
129044	Datum	●	●
129540	GPS Satellites in View	●	●
129542	GPS Pseudo Range Noise Statistics	●	●
129547	GPS Pseudo Range Error Statistics	●	●
129793	AIS UTC and Date Report		●
129794	AIS Class A Static and Voyage Related data		●
129797	AIS Binary Broadcast		●
129798	AIS SAR Aircraft Position Report		●

PGN	Description	Receive	Transmit
129801	AIS Addressed Safety Related Message		●
129802	AIS Safety Related Broadcast Message		●
129808	DSC Call Information		●
129809	AIS Class B "CS" Static Data Report, Part A		●
129810	AIS Class B "CS" Static Data Report, Part B		●

Appendix C VHF Channels

International marine VHF channels and frequencies.

CH No.	TX Freq	RX Freq (MHz)	Single Freq (MHz)	Use
01	156.050	160.650		Public correspondence, Port operations and Ship movement.
02	156.100	160.700		Public correspondence, Port operations and Ship movement.
03	156.150	160.750		Public correspondence, Port operations and Ship movement.
04	156.200	156.800		Public correspondence, Port operations and Ship movement.
05	156.250	156.850		Public correspondence, Port operations and Ship movement.
06	156.300	156.300	X	Intership. Coordinated search and rescue and ship stations working frequency.
07	156.350	160.950	X	Public correspondence, Port operations and Ship movement.
08	156.400	156.400	X	Intership. Preferred intership channel.
09	156.450	156.450	X	Intership, Port operations and Ship movement.
10	156.500	156.500	X	Intership, Port operations and Ship movement. SAR, Pollution incidents, MSI broadcasts coordinated with HMCG.
11	156.550	156.550	X	Port operations and Ship movement.
12	156.600	156.600	X	Port operations and Ship movement.
13	156.650	156.650	X	Intership navigation safety (Bridge-to-bridge). International navigation safety channel. May also be used for ship movement, port operations and limited coast stations.
14	156.700	156.700	X	Port operations and Ship movement.
15	156.750	156.750	X	On-board communications. 1 watt maximum power.
16	156.800	156.800	X	International Distress, Safety and Calling.
17	156.850	156.850	X	On-board communications. 1 watt maximum power.
18	156.900	161.500		Public correspondence, Port operations and Ship movement.

CH No.	TX Freq	RX Freq (MHz)	Single Freq (MHz)	Use
19	156.950	161.550		Public correspondence, Port operations and Ship movement.
1019	156.950	156.950	X	Port operations and Ship movement.
2019	161.550	161.550	X	Port operations and Ship movement. Channel is limited to coast stations only unless otherwise permitted by UK regulation.
20	157.000	161.600		Public correspondence, Port operations and Ship movement.
1020	157.000	157.000	X	Public correspondence, Port operations and Ship movement.
2020	161.600	161.600	X	Port operations and Ship movement. Channel is limited to coast stations only unless otherwise permitted by UK regulation.
21	157.050	161.650		Public correspondence, Port operations and Ship movement. Available for VDSMS.
22	157.100	161.700		Public correspondence, Port operations and Ship movement. Available for VDSMS.
23	157.150	161.750		Safety. HNCG — SAR and MSI broadcasts.
24	157.200	161.800		Public correspondence, Port operations and Ship movement. Available for VDSMS.
1024	157.200	157.200	X	For future use.
2024	161.800	161.800	X	For future use.
25	157.250	161.850		Public correspondence, Port operations and Ship movement. Available for VDSMS.
1025	157.250	157.250	X	For future use.
2025	161.850	161.850	X	For future use.
26	157.300	161.900		Public correspondence, Port operations and Ship movement. Available for VDSMS.
1026	157.300	157.300	X	For future use.
2026	161.900	161.900	X	For future use.
27	157.350	161.950		Public correspondence, Port operations and Ship movement. Available for testing of new AIS applications.
1027	157.350	157.350	X	Port operations and Ship movement.
2027	161.950	161.950		Application specific message (ASM1)

CH No.	TX Freq	RX Freq (MHz)	Single Freq (MHz)	Use
28	157.400	162.000		Public correspondence, Port operations and Ship movement. Available for testing of new AIS applications.
1028	157.400	157.400		Port operations and Ship movement.
2028	162.000	162.000		Application specific message (ASM2).
60	156.025	160.625		Public correspondence, Port operations and Ship movement.
61	156.075	160.675		Public correspondence, Port operations and Ship movement.
62	156.125	160.725		Public correspondence, Port operations and Ship movement.
63	156.175	160.775		Public correspondence, Port operations and Ship movement.
64	156.225	160.825		Public correspondence, Port operations and Ship movement.
65	156.275	160.875		UK National Coastwatch.
66	156.325	160.925		Public correspondence, Port operations and Ship movement.
67	156.375	156.375	X	Intership, Port operations and Ship movement. HMCG — SAR and Safety.
68	156.425	156.425	X	Port operations and Ship movement.
69	156.475	156.475	X	Intership, Port operations and Ship movement.
71	156.575	156.575	X	Port operations and Ship movement.
72	156.625	156.625	X	Intership. Preferred intership channel.
73	156.675	156.675	X	Intership, Port operations and Ship movement. HMCG — SAR and MSI broadcasts.
74	156.725	156.725	X	Port operations and Ship movement.
75	156.775	156.775	X	Intership Navigation related communications only with 1 watt maximum power.
76	156.825	156.825	X	Intership Navigation related communications only with 1 watt maximum power.
77	156.875	156.875	X	Intership. Preferred intership channel.
78	156.925	161.525		Public correspondence, Port operations and Ship movement.

CH No.	TX Freq	RX Freq (MHz)	Single Freq (MHz)	Use
1078	156.925	156.925	X	Port operations and Ship movement.
2078	161.525	161.525	X	Port operations and Ship movement. Channel is limited to coast stations only unless otherwise permitted by UK regulation.
79	156.975	161.575		Public correspondence, Port operations and Ship movement.
1079	156.975	156.975	X	Port operations and Ship movement.
2079	161.575	161.575	X	Port operations and Ship movement. Channel is limited to coast stations only unless otherwise permitted by UK regulation.
80	157.025	161.625		Public correspondence, Port operations and Ship movement. Also marinas and yacht clubs UK only. Available for VDSMS.
81	157.075	161.675		Public correspondence, Port operations and Ship movement. Available for VDSMS.
82	157.125	161.725		Public correspondence, Port operations and Ship movement. Available for VDSMS.
83	157.175	161.775		Public correspondence, Port operations and Ship movement. Available for VDSMS.
84	157.225	161.825		Port operations and Ship movement. HMCG — SAR and MSI broadcasts.
1084	157.225	157.225	X	For future use
2084	161.825	161.825	X	For future use
85	157.275	161.875		Public correspondence, Port operations and Ship movement. Available for VDSMS
1085	157.275	157.275	X	For future use.
2085	161.875	161.875	X	For future use.
86	157.325	161.925		Port operations and Ship movement. HMCG — SAR and MSI broadcasts.
1086	157.325	157.325	X	For future use.
2086	161.925	161.925	X	For future use.
87	157.375	157.375	X	Port operations and Ship movement. Available for testing of new AIS applications.
88	157.425	157.425	X	Port operations and Ship movement. Available for testing of new AIS applications.

Be aware that:

- Intership channels are for communications between ship stations. Intership communications should be restricted to channels 6, 8, 72 and 77. If these are not available, the other channels marked for Intership may be used.
- Channel 70 is used exclusively for Digital Selective Calling (DSC) and is not available for regular voice communications.

Note:

1. Channel 06 may also be used for communications between ship stations and aircraft engaged in coordinated search and rescue operations. Ship stations should avoid harmful interference to such communications on channel 06 as well as to communications between aircraft stations, ice breakers and assisted ships during ice seasons.
2. Within the European Maritime Area and in Canada, channels 10, 67 and 73 may also be used by the individual administrations concerned for communication between ship stations, aircraft stations and participating land stations engaged in coordinated search and rescue and anti-pollution operations in local areas. Channel 10 or 73 (depending on location) are also used for the broadcast of Marine Safety Information by the Maritime and Coast Guard Agency in the UK only.
3. Channel 13 is designated for use on a worldwide basis as a navigation safety communication channel, primarily for intership navigation safety communications.
4. Channels 15 and 17 may also be used for on-board communications provided the effective radiated power does not exceed 1 Watt.
5. The use of channels 75 and 76 should be restricted to navigation related communications only and all precautions should be taken to avoid harmful interference to channel 16. Transmit power is limited to 1 Watt.

Private Channels (Europe only)

Country	Channel designations	Tx frequency	Rx frequency	Channel use
Belgium	96	162.425	162.425	Marina
Denmark	L1 L2	155.500 155.525	155.500 155.525	Pleasure Pleasure
Finland, Norway & Sweden	L1 L2 L3	155.500 155.525 155.650	155.500 155.525 155.650	Pleasure Pleasure Pleasure
Holland (Netherlands)	31 37	157.550 157.850	162.150 157.850	Marina Leisure
Denmark, Finland, Norway & Sweden	F1 F2 F3	155.625 155.775 155.825	155.625 155.775 155.825	Fishing Fishing Fishing
United Kingdom	M1 M2	157.850 161.425	157.850 161.425	Marina Marina

The national channels listed above have been allocated for the specific use within the countries listed. To use these channels you must have the appropriate licence.

US Marine VHF Channels and Frequencies

Note:

Some of the channel numbers have recently changed. For completeness, both old and new numbers are shown in the table below.

Ch No. (NEW)	Ch No. (OLD)	TX Freq (MHz)	RX Freq (MHz)	Single Freq	Use
1001	01A	156.050	156.050	x	Port operations and commercial, VTS. Available only in New Orleans / Lower Mississippi area.
1005	05A	156.250	156.250	x	Port operations or VTS in the Houston, New Orleans and Seattle areas.
06	06	156.300	156.300	x	Intership safety.
1007	07A	156.350	156.350	x	Commercial. VDSMS.
08	08	156.400	156.400	x	Commercial (Intership only). VDSMS.
09	09	156.450	156.450	x	Boater calling. Commercial and Non-commercial. VDSMS.
10	10	156.500	156.500	x	Commercial. VDSMS.
11	11	156.550	156.550	x	Commercial. VTS in selected areas. VDSMS.
12	12	156.600	156.600	x	Port operations. VTS in selected areas.
13	13	156.650	156.650	x	Intership navigation safety (Bridge-to-bridge). Ships >20 metres in length maintain a listening watch on this channel in US waters.
14	14	156.700	156.700	x	Port operations. VTS in selected areas.
15	15	-	156.750	x	Environmental (Receive only). Used by Class 'C' EPIRBs.
16	16	156.800	156.800	x	International Distress, Safety and Calling. Ships required to carry radio, USCG, and most coast stations maintain a listening watch on this channel.
17	17	156.850	156.850	x	State Control.
1018	18A	156.900	156.900	x	Commercial. VDSMS.
1019	19A	156.950	156.950	x	Commercial. VDSMS.
20	20	157.000	161.600		Port operations (duplex).
1020	20A	157.000	157.000	x	Port operations.
1021	21A	157.050	157.050	x	US Coast Guard only.

1022	22A	157.100	157.100	x	Coast Guard Liaison and Maritime Safety Information Broadcasts. Broadcasts announced on channel 16.
1023	23A	157.150	157.150	x	US Coast Guard only.
24	24	157.200	161.800		Public correspondence (Marine operator).
25	25	157.250	161.850		Public correspondence (Marine operator).
26	26	157.300	161.900		Public correspondence (Marine operator).
27	27	157.350	161.950		Public correspondence (Marine operator).
28	28	157.400	162.00 0		Public correspondence (Marine operator).
1063	63A	156.175	156.175	x	Port operations and commercial VTS, Available only in New Orleans / Lower Mississippi area.
1065	65A	156.275	156.275	x	Port operations.
1066	66A	156.325	156.325	x	Port operations.
67	67	156.375	156.375	x	Commercial. Used for bridge-to-bridge communications in lower Mississippi river (Intership only).
68	68	156.425	156.425	x	Non-commercial. VDSMS.
69	69	156.475	156.475	x	Non-commercial. VDSMS.
71	71	156.575	156.575	x	Non-commercial. VDSMS.
72	72	156.625	156.625	x	Non-commercial (Intership only). VDSMS.
73	73	156.675	156.675	x	Port operations.
74	74	156.725	156.725	x	Port operations.
77	77	156.875	156.875	x	Port operations (Intership only).
1078	78A	156.925	156.925	x	Non-commercial. VDSMS.
1079	79A	156.975	156.975	x	Commercial. Non-commercial in Great Lakes only). VDSMS.
1080	80A	157.025	157.025	x	Commercial. Non-commercial in Great Lakes only). VDSMS.
1081	81A	157.075	157.075	x	US Government only — Environmental protection operations.
1082	82A	157.125	157.125	x	US Government only.
1083	83A	157.175	157.175	x	US Coast Guard only.

84	84	157.225	161.825		Public correspondence (Marine operator). VDSMS.
85	85	157.275	161.875		Public correspondence (Marine operator). VDSMS.
86	86	157.325	161.925		Public correspondence (Marine operator). VDSMS.
87	87	157.375	161.975		Public correspondence (Marine operator). VDSMS.
88	88	157.425	157.425		Commercial, Intership only. VDSMS.

Be aware that:

- Recreational boaters normally use channels listed as Non-commercial: 68, 69, 71, 72 1078.
- Channel 70 is used exclusively for DSC and is not available for regular voice communications.
- Channels 75 and 76 are reserved as guards bands for channel 16 and are not available for regular voice communications.

Note:

1. Four digit channels indicate simplex use of the ship station transmit side of an international semi-duplex channel. Operations are different from that of international operations on that channel.
2. Channel 13 should be used to contact a ship when there is danger of collision. All ships of length 20 metres or greater are required to guard VHF channel 13, in addition to VHF channel 16, when operating within US territorial waters.
3. Channel 15 is receive only.
4. Channel 16 is used for calling other stations or for distress calls.
5. Channel 17 and channel 77 have a fixed power output of 1 watt.
6. Channel 13 and channel 67 have an initial power output of 1 watt. User can temporarily override this restrictions to transmit at high power.
7. VDSMS (VHF Digital Small Message Services). Transmissions of short digital messages in accordance with RTCM Standard 12301.1 is allowed.

WX (Weather) Channels (North America only)

Weather channel	Frequency in MHz
WX1	162.550.
WX2	162.400.
WX3	162.475.
WX4	162.425.
WX5	162.450.
WX6	162.500.
WX7	162.525.
WX8	161.650.
WX9	161.775
WX10	163.275

Canadian marine VHF channels and frequencies

Note:

Some of the channel numbers have recently changed. For completeness, both old and new numbers are shown in the table below.

Ch No. (NEW)	Ch No. (OLD)	Tx Freq (MHz)	Rx Freq (MHz)	Single Freq	Areas of operation	Use
01	01	156.050	160.650		BCC	Public correspondence.
02	02	156.100	160.700		BCC	Public correspondence.
03	03	156.150	160.750		BCC	Public correspondence.
1004	04A	156.200	156.200	x	BCC, EC	Intership, Ship/Shore, Commercial and Safety DFO / Canadian Coast Guard only in BCC area. Commercial fishing in EC area.
1005	05A	156.250	156.250	x	AC, BCC, EC, GL, NL, INLD BC, WC	Ship movement.
06	06	156.350	156.350	x	All areas	Intership, Commercial, Non-Commercial and Safety Maybe used for search and rescue communications between ships and aircraft.
1007	07A	156.350	156.350	x	AC, BCC, EC, GL, NL, INLD BC, WC	Intership, Ship/Shore and Commercial.
08	08	156.400	156.400	x	EC, INLD BC, WC	Intership, Commercial and Safety. Also assigned for Intership in the Lake Winnipeg area.
09	09	156.450	156.450	x	AC, INLD PRA, BCC	Intership, Ship/Shore, Commercial, Non-commercial, Safety and Ship movement. Commercial — BCC area. May be used to communicate with aircraft and helicopters in predominantly maritime support operations.

10	10	156.550	156.550	x	AC, BCC, GL	Intership, Ship/Shore, Commercial, Non-commercial, Safety and Ship movement. Commercial — BCC area. May also be used for communications with aircraft engaged in coordinated search and rescue and antipollution operations.
11	11	156.550	156.550	x	AC, BCC, GL	Intership, Ship/Shore, Commercial, Non-commercial and Ship movement. VTS — BCC area. Also used for pilotage purposes.
12	12	156.600	156.600	x	AC, BCC, GL, WC	Intership, Ship/Shore, Commercial, Non-commercial and Ship movement. VTS — BCC area. Port operations and pilot information and messages.
13	13	156.650	156.650	x	AC, BCC, EC, GL, NL, INLD BC, WC	Intership, Commercial, Non-commercial and Ship movement. VTS — BCC area. Bridge-to-bridge navigational traffic.
14	14	156.700	156.700	x	AC, BCC, GL	Intership, Ship/Shore, Commercial, Non-commercial and Ship movement. VTS — BCC area. Port operations and pilot information and messages.
15	15	156.750	156.750	x	AC, BCC, EC, GL, NL, INLD BC, WC	Intership, Ship/Shore, Commercial, Non-commercial and Ship movement. Port operations and Ship movement — BCC area. All operations limited to 1 watt maximum power. May also be used for on-board communications.
16	16	156.80	156.80	x	All areas	International distress, safety and calling.

17	17	156.850	156.850	x	AC, BCC, EC, GL, NL, INLD BC, WC	Intership, Ship/Shore, Commercial, Non-commercial and Ship movement. Port operations and Ship movement — BCC area. All operations limited to 1 watt maximum power. May also be used for on-board communications.
1018	18A	156.900	156.900	x	AC, BCC, EC, GL, NL, INLD BC, WC	Intership, Ship/Shore and Commercial. Towing — BCC area.
1019	19A	156.95 0	156.95 0	x	All areas	Intership and Ship/Shore. DFO / Canadian Coast Guard. Pacific Pilots — BCC area
20	20	157.00	161.600		AC, BCC, EC, GL, NL, INLD BC, WC	Ship/Shore, Safety and Ship movement. Port operations only with 1 watt maximum power
1021	21A	157.05 0	157.050	x	All areas	Intership and Ship/Shore. DFO / Canadian Coast Guard only.
2021	21B	-	161.650	x	All areas	Safety Continuous Marine Broadcast (CMB) service.
1022	22A	157.100	157.100	x	All areas	Intership, Ship/Shore, Commercial and Non-commercial. For communications between Canadian Coast Guard and non-Canadian Coast Guard stations only.
23	23	157.150	161.750	x	BCC, INLD BC	Ship/Shore and Public correspondence.
2023	-	-	161.750	x	GL	Safety Continuous Marine Broadcast (CMB) service.
24	24	157.200	161.800		All areas	Ship/Shore and Public correspondence.
25	25	157.250	161.850		BCC	Ship/Shore and Public correspondence.
2025	25B	-	161.850	x	AC	Safety Continuous Marine Broadcast (CMB) service.
26	26	157.300	161.900		All areas	Safety and Public correspondence.

27	27	157.350	161.950		AC, BCC, GL	Ship/Shore and Public correspondence.
28	28	157.400	162.00	x	BCC	Ship/Shore, Safety and Public correspondence.
2028B	28B	-	162.000	x	AC, GL	Safety Continuous Marine Broadcast (CMB) service.
60	60	156.025	160.625		BCC	Ship/Shore and Public correspondence.
1061	61A	156.075	156.075	x	BCC	Intership, Ship/Shore and Commercial DFO / Canadian Coast Guard only in BCC area. Commercial fishing only in EC area.
1062	62A	156.125	156.125	x	BCC, EC	Intership, Ship/Shore and Commercial DFO / Canadian Coast Guard only in BCC area. Commercial fishing only in EC area.
1063	-	156.175	156.175	x	BCC	Intership, Ship/Shore and Commercial. Tow boats — BCC area.
64	64	156.225	160.825		BCC	Ship/Shore and Public correspondence.
1064	64A	156.225	156.225	x	EC	Intership, Ship/Shore and Commercial fishing only.
1065	65A	156.275	156.275	x	All Areas	intership, Ship/Shore, Safety, Commercial and Non-commercial. Search and rescue and antipollution operations on the Great Lakes. Towing on the Pacific coast. Port operations only in the St. Lawrence river area with 1 watt maximum power. Intership in INLD PRA area.
1066	66A	156.325	156.325	x	AC, BCC, EC, GL, NL, INLD BC, WC	Intership, Ship/Shore, Safety, Commercial and Non-commercial. Port operations only in the St. Lawrence river / Great Lakes areas with 1 watt maximum power. 1 watt marine channel in BCC area.

67	67	156.375	156.375	x	All areas	Intership Ship/Shore, Safety, Commercial and Non-commercial. May also be used for communications with aircraft engaged in coordinated search and rescue and antipollution operations. Commercial fishing only in EC and INLD PRA areas. Pleasure craft — BCC area.
68	68	156.425	156.425	x	All areas	Intership, Ship/Shore and Non-commercial. For marinas, yacht clubs and pleasure craft.
69	69	156.475	156.475	x	AC, BCC, EC, GL, NL, INLD BC, WC	Intership, Ship/Shore, Commercial and Non-commercial. Commercial fishing only — EC area. Pleasure craft — BCC area.
71	71	156.575	156.575	x	AC, BCC, EC, GL, NL, INLD BC, WC	Intership Ship/Shore Safety, Commercial, Non-commercial and Ship movement. Ship movement — BCC area. Marinas and yacht clubs — EC area and on Lake Winnipeg.
72	72	156.625	156.625	x	BCC, EC	Intership, Commercial and Non-commercial May be used to communicate with aircraft and helicopters in predominantly maritime support operations. Pleasure craft — BCC area.
73	73	156.675	156.675	x	All areas	Intership, Ship/Shore, Safety, Commercial and Non-commercial. May also be used for communications with aircraft engaged in coordinated search and rescue and antipollution operations. Commercial fishing only in EC and INLD PRA areas.
74	74	156.725	156.725	x	BCC, EC	Intership, Ship/Shore, Commercial, Non-commercial and Ship movement. VTS and Ship movement — BCC area.

75	-	156.775	156.775	x	All areas	Intership, Ship/Shore, Commercial and Ship movement. Simplex port operation, ship movement and navigation related communication only. 1 watt maximum power.
76	-	156.825	156.825	x	All areas	Intership, Ship/Shore, Commercial and Ship movement. Simplex port operation, ship movement and navigation related communication only. 1 watt maximum power.
77	77	156.875	156.875	x	AC, BCC, EC, GL, NL, INLD BC, WC	Intership, Ship/Shore, Safety and Ship movement. Pilotage BCC area, 25 watts. Port operations only in the St. Lawrence River/Great Lakes areas with 1 watt maximum power.
1078	78A	156.925	156.925	x	BCC, EC	Intership, Ship/Shore and Commercial. Fishing industry — BCC area.
1079	79A	156.975	156.975	x	BCC, EC	Intership, Ship/Shore and Commercial. Fishing industry — BCC area.
1080	80A	157.025	157.025	x	BCC, EC	Intership, Ship/Shore and Non-commercial. Whale watching — BCC area.
1081	81A	157.075	157.075	x	AC, BCC, EC, GL, NL, INLD BC, WC	Intership, Ship/Shore and Safety. DFO / Canadian Coast Guard use only.
1082	82A	157.125	157.125	x	AC, BCC, EC, GL, NL, INLD BC, WC	Intership and Ship/Shore. DFO / Canadian Coast Guard use only.
1083	83A	157.175	157.175	x	BCC, EC	Intership and Ship/Shore DFO / Canadian Coast Guard and other government agencies.
2083	83B	-	161.775	x	AC, BCC, GL	Safety Continuous Marine Broadcast (CMB) service
84	84	157.225	161.825		BCC	Ship/Shore and Public correspondence.

85	85	157.275	161.875		AC, BCC, GL ,NL	Ship/Shore and Public correspondence.
86	86	157.325	161.925		BCC	Ship/Shore and Public correspondence.
87	87	157.375	157.375	x	AC, BCC, GL, NL	Intership, Non-commercial and Ship movement. Port operation and ship movement — EC area. Pleasure craft — BCC area.
88	88	157.425	157.425	x	AC, BCC, GL, NL	Intership, Commercial and Ship movement. Port operation and ship movement — BCC area.

Area of operation:

- AC — Atlantic Coast, Gulf and St. Lawrence River up to and including Montreal.
- BCC — British Columbia Coast (Pacific Coast).
- EC — East Coast: includes NL, AC, GL and Eastern Arctic areas.
- GL — Great Lakes: includes St. Lawrence above Montreal.
- NL — Newfoundland and Labrador.
- WC — West Coast: includes BCC, Western Arctic and Athabasca-Mackenzie Watershed areas.
- INLD BC — Inland waters of BC and the Yukon.
- INLD PRA — Inland waters of MB, SK and AB.

Note:

1. Four digit channels indicate simplex use of the ship station transmit side of an international semi-duplex channel. Operations are different from that of international operations on that channel.
2. Channel 16 is used for calling other stations or for distress calls.
3. Channel 70 is used exclusively for Digital Selective Calling and is not available for regular voice communications.

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