KONGSBERG

MBR 144
Maritime Broadband Radio
Instruction Manual

G210–34/1

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Document information

- Product: MBR 144
- Document: Instruction Manual
- Document part number: G210–34

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Warning

The equipment to which this manual applies must only be used for the purpose for which it was designed. Improper use or maintenance may cause damage to the equipment and/or injury to personnel. You must be familiar with the contents of the appropriate manuals before attempting to operate or work on the equipment.

Kongsberg Seatex disclaims any responsibility for damage or injury caused by improper installation, use or maintenance of the equipment.

Disclaimer

Kongsberg Seatex AS endeavours to ensure that all information in this document is correct and fairly stated, but does not accept liability for any errors or omissions.

Support information

If you require maintenance or repair, contact Kongsberg Maritime's support organisation. You can contact us using the following address: km.support.seatex@km.kongsberg.com. If you need information about our other products, visit http: //www.kongsberg.com.

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About this manual

Purpose of manual

The purpose of this manual is to provide the descriptions and procedures required to install, configure, operate and maintain the MBR 144.

Target audience

This manual is intended for all users of the MBR 144. This includes project engineering personnel, installation personnel, IT administrators and operators.

License information

The MBR 144 is not subject to product licensing. The product is a radio transmitting device. A frequency license is required for operation.

Maintenance purposes

This manual is also intended as reference material for the maintenance personnel. Keep this manual for later use.

MBR 144

Topics

System description, page 6

System diagram, page 7

Scope of supply, page 7

Restrictions in guarantee, page 8

Radio frequency license, page 8

Equipment identification, page 8

FCC compliance statement, page 8

ISED Canada compliance statement, page 9

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System description

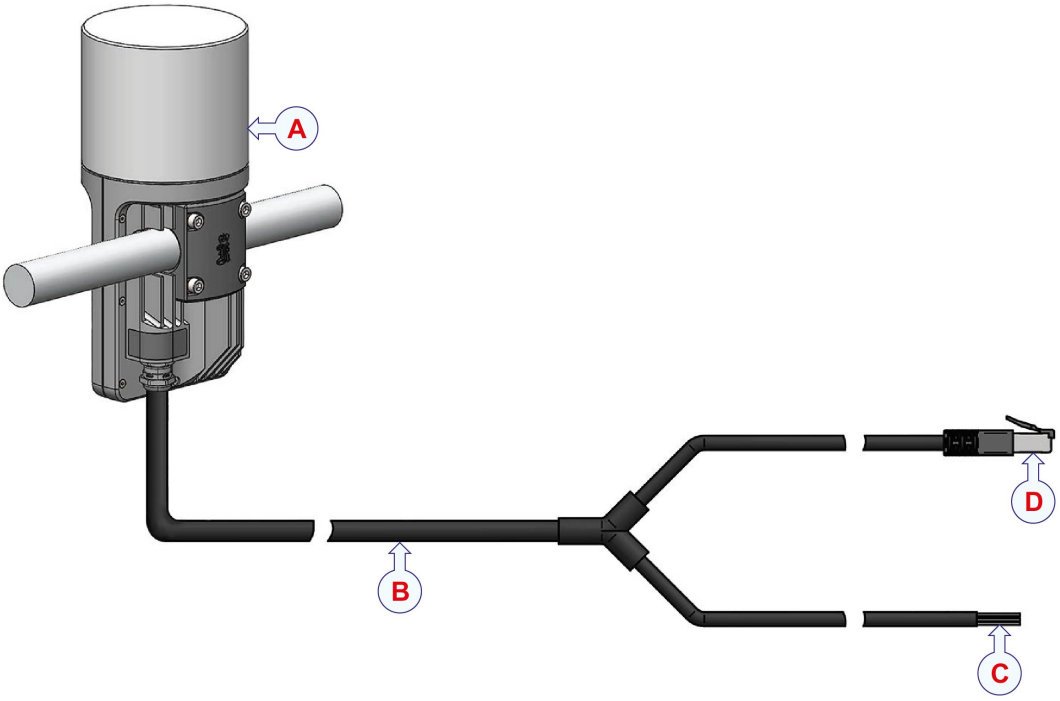
The MBR 144 is a Maritime Broadband Radio (MBR). It is developed for use in maritime applications where reliable communication and data transfer are crucial for efficient and safe operations.

The system is a maritime radio network distribution system which connects computers and systems together in a wireless network. Each MBR 144 works in a network with two or more radio units. A *radio site* is one or several radio units connected together by Ethernet on one location. A *radio network* is a wireless network of radio sites.

The MBR 144 requires no extra infrastructure to operate. It serves as an extension of your local radio network.

The MBR 144 is set up via a web interface which is available on each radio unit.

System diagram



A *Radio Unit*

B *Combined Ethernet and power cable*

C *Connection to power source on vessel*

D *Ethernet connection to user equipment*

Scope of supply

The basic items are included in the delivery. Additional optional items can be purchased from Kongsberg Seatex AS.

Basic items

- 1 ea Radio Unit
- 1 ea Combined Ethernet and power cable, 10 m
- 1 ea End user documentation

Additional required items

Observe these additional items which are required for installation and/or operation. They can be ordered from Kongsberg Seatex AS or purchased locally.

- Power supply
- Computer

For configuration purposes.

Restrictions in guarantee

Changes or modifications to the product not explicitly approved by Kongsberg Seatex AS will void the guarantee.

The liability of Kongsberg Seatex AS is limited to repair of this product only under the given terms and conditions stated in the sales documents. Consequential damages such as customer's loss of profit or damage to other systems traceable back to this product's malfunctions, are excluded.

The warranty does not cover malfunctions of the product resulting from the following conditions.

- Incorrect power connection.

Radio frequency license

This product contains a radio transmitting device. A frequency license for the use of radio frequencies is required for operation. Use in national waters will require a frequency license issued by the relevant national authorities. The owner and user of the equipment are responsible for obtaining such a license prior to switching the product ON.

This product is in compliance with the standard ETSI EN 303 276. This applies to the frequency channels 5862 and 5890 MHz.

This product is in compliance with FCC (Federal Communications Commission) Part 15.407. This applies to the frequency channels 5725 to 5850 MHz.

Equipment identification

This product has the following identifications for FCC (Federal Communications Commissions) and IC (Industry Canada).

- **FCC ID**: Q8IM144M2FIX
- **IC**: 5637A-M144M2FIX

FCC compliance statement

This device complies with Part 15 of the FCC (Federal Communications Commission) Rules. Operation of the device is subject to the following conditions.

1 This device may not cause harmful interference.

2 This device must accept any interference received. Including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a marine and/or commercial environment. This equipment generates, uses and can radiate radio frequency energy. If not installed and used in accordance with the instructions, the equipment may cause harmful interference to radio communication.The equipment is not intended for operation in a residential area. Operation in such an area is likely to cause harmful interference. In which case the user will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by the party responsible for compliance, could void the user's authority to operate the equipment.

ISED Canada compliance statement

Text in English

This device complies with Industry Canada (IC) license-exempt RSS standard(s). Operation is subject to the following two conditions.

1 This device may not cause interference.

2 This device must accept any interference, including interference that may cause undesired operation of the device.

Texte en Français

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes.

1 L'appareil ne doit pas produire de brouillage.

2 L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillard est susceptible d'en compromettre le fonctionnement.

Health and safety

Operation or troubleshooting of this equipment will not imply any risk for high voltages, explosions or exposure to gas. The equipment complies with IEC 61010-1/EN 61010-1 standards regarding product safety.

Network security

If a MBR 144 system is connected to a local area network, data security is important.

Equipment manufactured by Kongsberg Seatex is frequently connected to the vessel's local area network (LAN). When you connect a computer to a local area network you will always expose the data on that computer. All other computers connected to the same network may be able to access your data. Several threats may immediately occur:

- Remote computers can read the data.
- Remote computers can change the data.
- Remote computers can change the behaviour of the computer, for example by installing unwanted software.

Usually, two parameters are used to define the threat level:

1 The likelihood that any remote computer will do any of the above.

2 The damage done if a remote computer succeeds doing this.

Kongsberg Seatex has no information regarding the complete system installation on any vessel. Systems provided by Kongsberg Seatex are regarded as stand-alone offline systems. They are stand-alone even though they may be connected to a network for sensor interfaces and/or data distribution.

Note

No network safety applications are installed on Kongsberg Seatex computers. The computers are therefore not protected against viruses, malware or unintentional access by external users.

Securing the MBR 144 system itself has no meaning unless there is a policy in place that secures all computers in the network. This policy must include physical access by trained and trusted users. The customer/end user of the MBR 144 system will always be in charge of defining and implementing a security policy, and providing the relevant network security applications.

Note

Kongsberg Seatex will not accept any responsibility for errors and/or damages caused by unauthorized use of or access to the MBR 144.

Support information

If you need technical support for your Seatex MBR 144 you must contact your local dealer, or one of our support departments.

- **Company name**: Kongsberg Seatex AS

- **Address**: Havnegata 9, 7010 Trondheim, Norway
- **Telephone**: +47 73 54 55 00
- **Telephone, 24h support**: +47 33 03 2407
- **E-mail address**: km.support.seatex@km.kongsberg.com
- **Website**: http://www.kongsberg.com

Operation

Topics

Getting started, page 12

Operating procedures, page 16

User preference procedures, page 28

User interface, page 29

Functions and dialog boxes, page 30

Getting started

Topics

Turning on the Radio Unit, page 12

Enabling contact with the Radio Unit, page 13

Defining the IP address on the computer network adapter, page 14

Turning on the Radio Unit

The Radio Unit is turned on when the power connector is inserted in the power source on the vessel. The system power is controlled from the power source.

Context

The software is pre-installed and the system will start automatically after it has been turned on.

Note

Use a dedicated power supply or battery to power the Radio Unit.

Procedure

1 Make sure that the Ethernet cable is properly connected.

2 Insert the power connector into the dedicated power source on the vessel. 24 V DC.

3 To turn off the Radio Unit, simply remove the power connector.

Result

The system is now ready for configuration.

Related topics

Enabling contact with the Radio Unit, page 13
Defining the IP address on the computer network adapter, page 14
Setting to work summary, page 48

Enabling contact with the Radio Unit

To be able to set up and communicate with the Radio Unit you must enable contact with the unit via a browser.

Prerequisites

In order to set up the Radio Unit you need these items.

- Computer with an Ethernet adapter.
- Up-to-date browser. For example Chrome, Firefox, Internet Explorer version 10 or newer.

The IP address of the Radio Unit is found on a label at the rear of the unit.

You must define which IP Address and Subnet mask the Ethernet adapter in the computer shall use for this communication.

Context

You only need the computer for configuration or re-configuration purposes.

Note

The **Welcome** *page only appears the first time you set up your site. After the configuration is completed, the web interface takes you directly to the* **Main** *view.*

Procedure

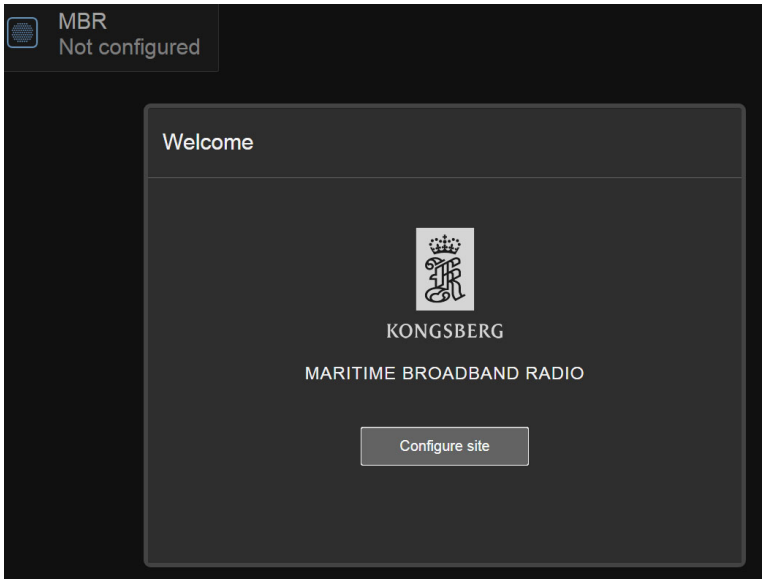
1 Set up the computer with:

- **IP address**: 10.19.127.10
- **Subnet mask**: 255.255.0.0

2 Connect the computer to the Radio Unit via Ethernet.

3 Type the radio's IP address in the browser address bar.

Observe that the **Welcome** page appears.



For previously configured systems the **Main** view appears.

Result

You are now connected to the web interface on your local radio.

Related topics

Turning on the Radio Unit, page 12
Defining the IP address on the computer network adapter, page 14
Setting up the radio site for operation, page 16
Welcome, page 31
Setting to work summary, page 48

Defining the IP address on the computer network adapter

You must define which IP Address and Subnet mask the Ethernet adapter in the computer shall use for this communication. As long as you do not replace the computer or the network adapter in the computer, you only need to do this once.

Prerequisites

This procedure is made for the Microsoft® Windows® 7 and 10 operating systems.
It is assumed that you are familiar with the Windows® operating systems, computer technology, and interface principles.

Procedure

1 Close all the programs that are running on the computer.

2 Open the **Network Connections** dialog box.

This procedure is made for the Microsoft® Windows® 10 operating system.

a In the bottom-left corner of your desktop, select the Windows® **Start** button.

b On the menu, select **Settings**.

c Observe that the **Windows Settings** dialog box opens.

d Select **Network & Internet**.

e Select **Change adapter options**.

f Select the network adapter you are going to use; then right-click and select **Properties** on the short-cut menu.

g On the list of connections, select **Internet Protocol 4 (TCP/IPv4)**, and then **Properties**.

This procedure is made for the Microsoft® Windows® 7 operating system.

a In the bottom-left corner of your desktop, select the Windows® **Start** button.

b On the right-hand side of the **Start** menu, select **Control Panel**.

c Observe that the Control Panel opens.

d Select **Network and Sharing Center**.

(If the Control Panel is shown with categories, select **View network status and tasks**.)

e On the left-hand menu, select **Change adapter settings**.

f Click once on your network adapter to select it, then right-click and select **Properties** on the shortcut menu.

g On the list of connections, select **Internet Protocol 4 (TCP/IPv4)**, and then **Properties**.

3 Select **Use the following IP address**, and type the IP address and network mask.

- IP Address: **10.19.127.10**
- Subnet mask: **255.255.0.0**

4 Select **OK** to save the selected settings, and then close all the dialog boxes.

Related topics

Turning on the Radio Unit, page 12
Enabling contact with the Radio Unit, page 13
Setting up the radio site for operation, page 16
Setting to work summary, page 48

Operating procedures

Topics

Setting up the radio site for operation, page 16

Creating a new radio network, page 21

Joining a radio network, page 23

Editing an existing radio network, page 24

Adding or removing third party equipment, page 25

Checking the status of the MBR network, page 27

Setting up the radio site for operation

The setup is done using a wizard. A *radio site* is one or several radio units connected together by Ethernet on one location. A *radio network* is a wireless network of radio sites. You must set up the radio site before you can start the radio network configuration. All configuration of the MBR 144 Maritime Broadband Radio (MBR) is done through the web interface.

Prerequisites

The IP address for the Radio Unit is located at the bottom of the Radio Unit. You must have enabled contact with the Radio Unit.

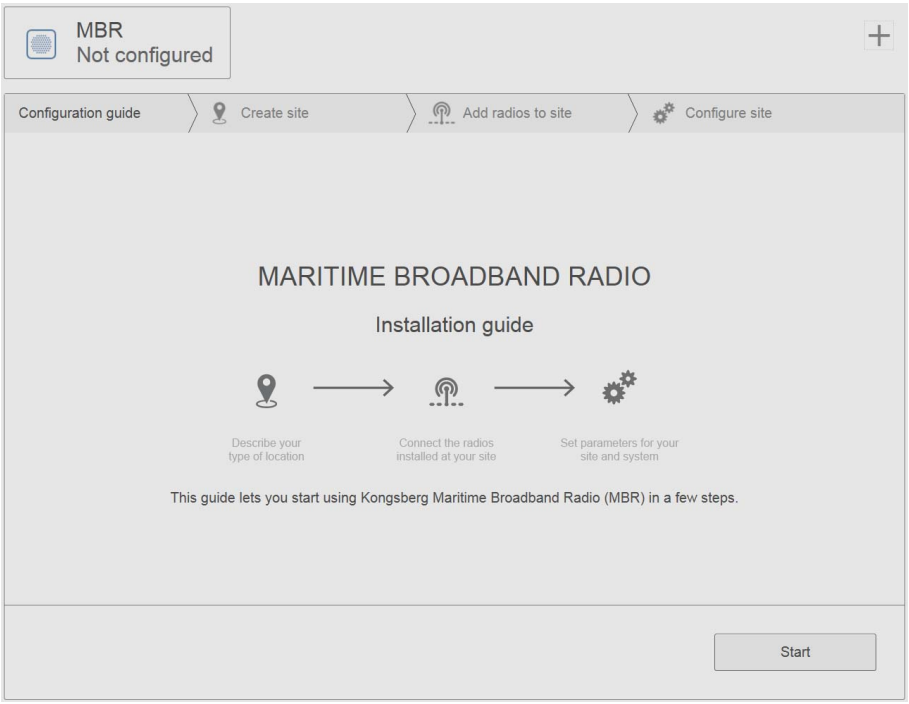
The IP address and the MAC address for the third party equipment must be known.

Context

The MBR 144 Maritime Broadband Radio (MBR) uses static layer 2 bridging (OSI model - Open Systems Interconnection Basic Reference Model). Therefore it needs both the IP address and the MAC address of the equipment in order to establish an IP connection.

Procedure

1 On the **Welcome** page, which appears after you have enabled contact with the Radio Unit, select **Configure site** to start the installation wizard.

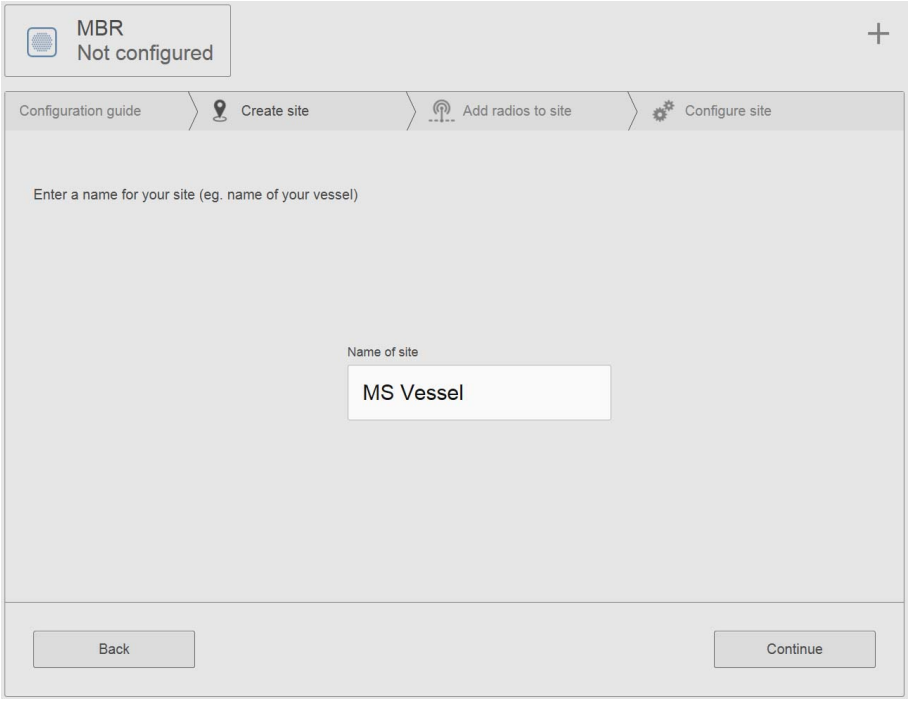


Note

The default colour palette setting is with dark background. If your current light conditions require white background, select the **System menu** *button* **[+]** *to open the* **System** *menu. In the* **Palette** *group you can change the colour palette.*

2 Select **Start** on the **Configuration guide** page to start the step-by-step configuration of your radio site.

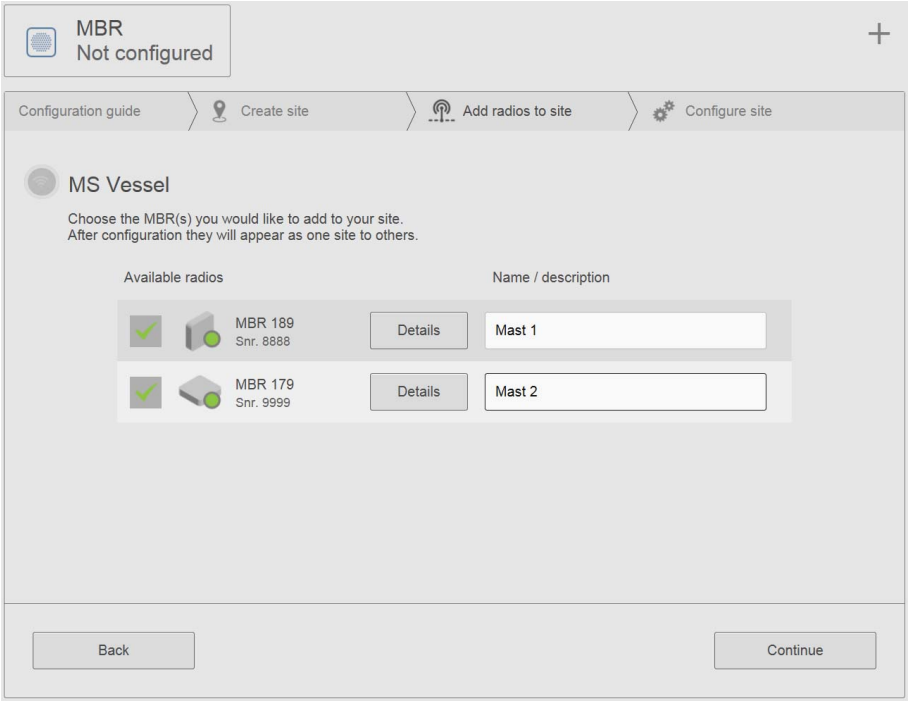
3 Type a suitable name for your radio site and select **Continue**.



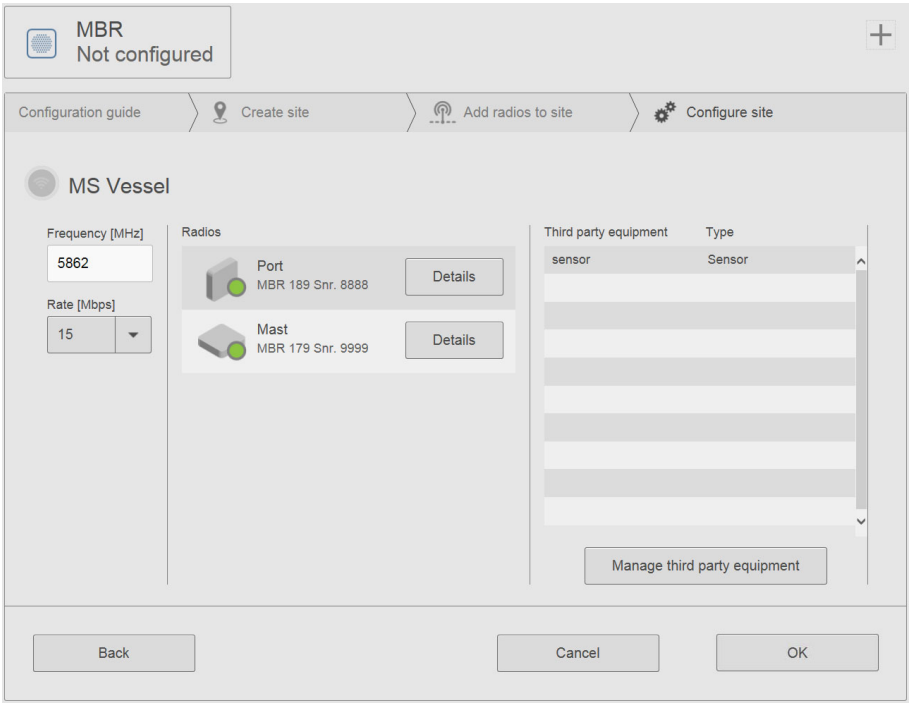
4 Select the radios you want to add to the site. Type a description of the location of the Radio Unit. Select **Continue**.

Note

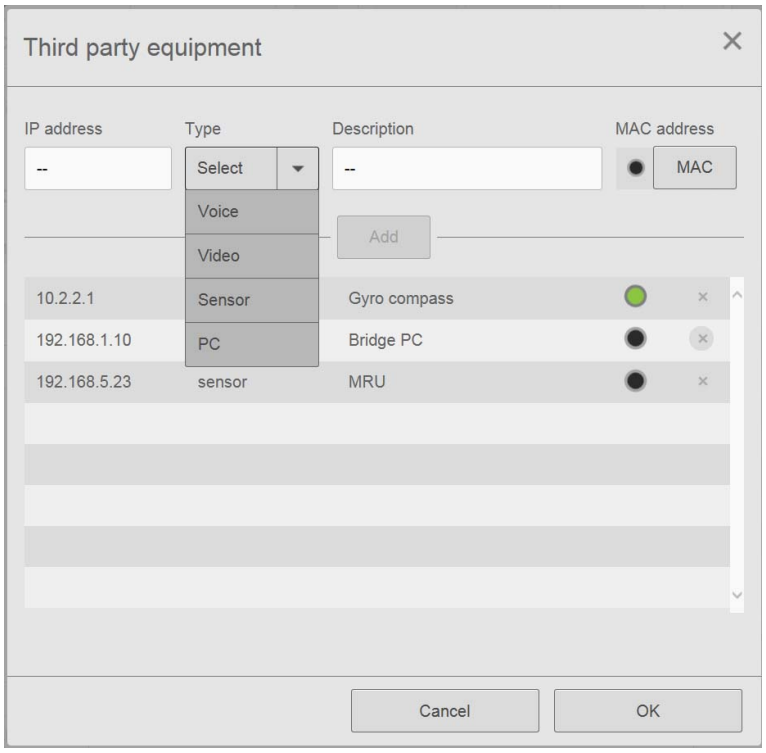
Radio units connected on the local Ethernet will appear automatically. They are by default selected.



5 Type the radio frequency. Select the data rate for the radio site from the **Rate** list.



6 Select **Manage third party equipment** to open the **Third party equipment** dialog box. This is where you add third party equipment to your radio site.



7 Type the IP address of the equipment you want to connect. Select type of equipment from the **Type** list. Type a description of the equipment for identification purposes.

If the third party equipment is switched on, the MAC address appears automatically. If not, type the MAC address. Select **Add** to add the equipment.

Note

You can add and/or change information later by selecting the equipment, making the changes and selecting **Update**. *You can also delete equipment by selecting the* **X** *symbol at the end of the line.*

8 Continue for all the equipment you want to add. Select **OK** to save the selected setting and close the dialog box.

9 Select **Finish** to complete your radio site configuration.

10 Observe the site ID for you radio site. Select **OK**.

Result

The **Main** view appears and you are now ready to start using the radios.

Related topics

Enabling contact with the Radio Unit, page 13
Defining the IP address on the computer network adapter, page 14
Creating a new radio network, page 21
Configuration guide, page 32
Create site, page 33
Add radios to site, page 34
Configure site, page 35
Setting to work summary, page 48

Creating a new radio network

You must create a new radio network in order to communicate with other radio sites.

Context

Important

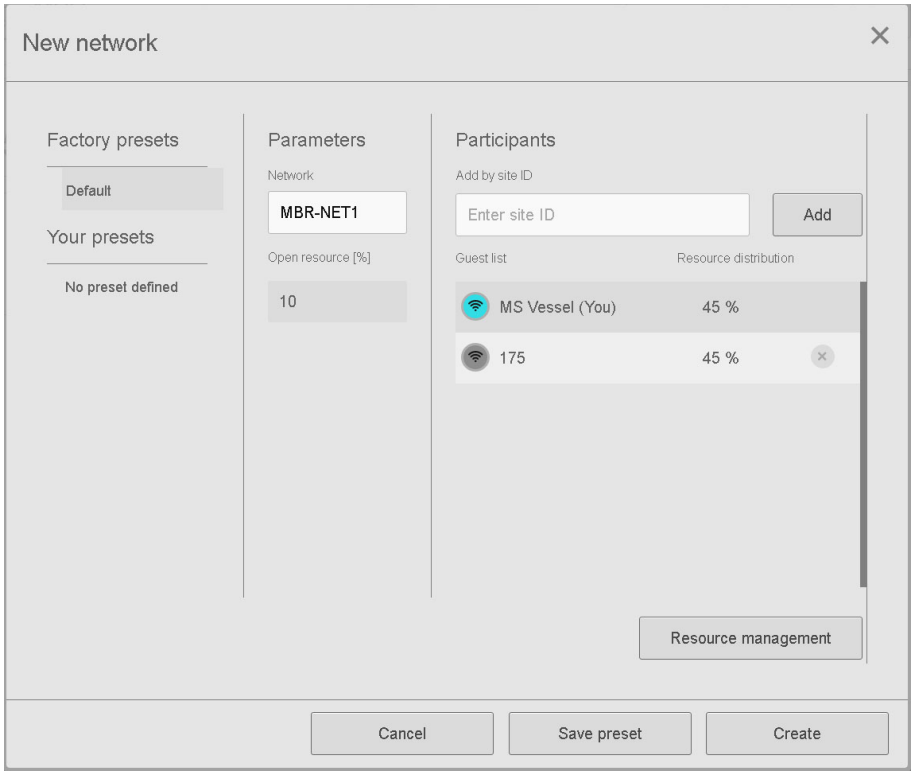
The radio network name is in upper case. It is converted into a numeric value. This numeric value is the ID of the new radio network. It is this name that other sites which shall join this radio network must type in the **Join network** dialog box when they want to join a radio network.

Procedure

1 Select the **System menu** button **[+]** in the top right corner of the **Main** view to open the **System** menu.

2 Under **Network**, select **New** to open the **New network** dialog box.

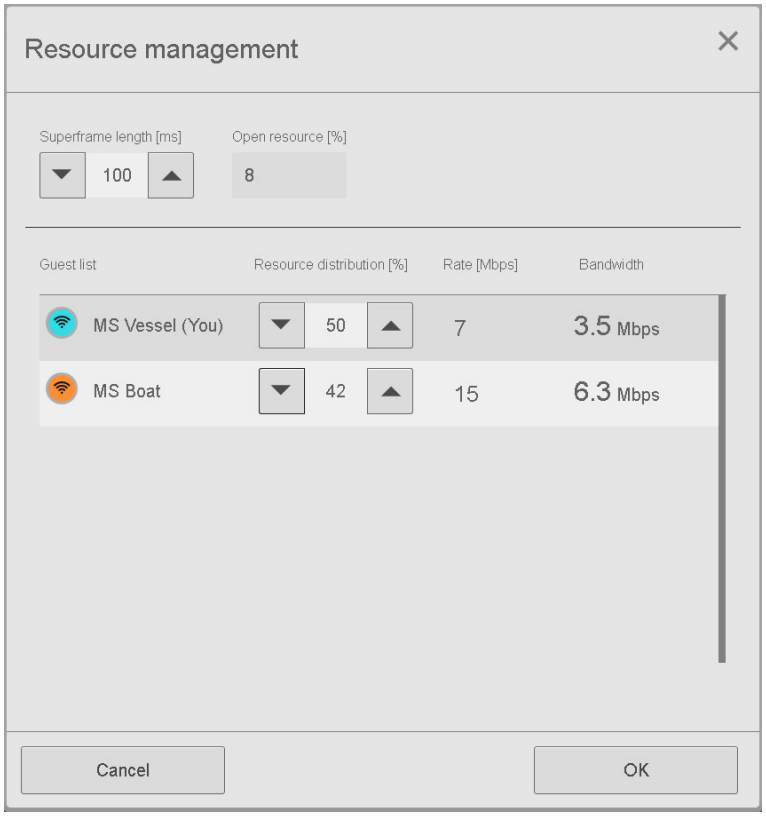
Observe that your own radio site is listed as a participant in the radio network Guest list.



3 In the **Add by site ID** box, type the site ID. Select **Add** to add site IDs for other sites that you want to add to the radio network.

Observe that the new radio site appears in the Guest list. The site ID is the ID you were given by the system at the end of the radio site configuration.

4 Select **Resource management** to open the **Resource management** dialog box. This is where you adjust the bandwidth resource for each radio site.



5 Leave the **Superframe** value at 100 ms. Select the wanted **Resource distribution** from the list.

Note

For Superframe length it is recommended to use 100 ms. However, for applications where a lower latency is needed, the superframe can be adjusted. This will affect the data throughput.

6 Select **OK** to store the bandwidth settings and return to **New network**.

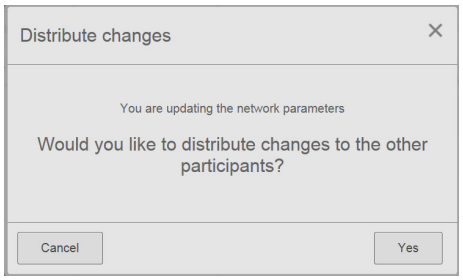
7 Type a radio network name in the **Network** box.

The radio network name is in upper case.

8 Select **Save preset** if you want your network configuration to be stored locally.

9 Select **Create** to create the new radio network.

The **Distribute changes** dialog box appears.



10 Select **Yes** if you want to distribute the network changes to other radio sites. Select **Cancel** if you do not want to distribute the network changes to other radio sites.

Related topics

Setting up the radio site for operation, page 16
New network, page 40
Editing an existing radio network, page 24
Resource management, page 42
Setting to work summary, page 48

Joining a radio network

You must join the radio network which you want your operation to be a part of. If another radio site has created a new radio network, you might want to become a part of this network.

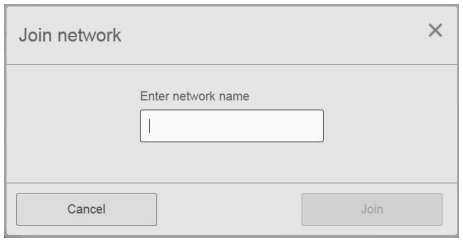
Context

If you are out of range of the radio network at the time you carry out this procedure, the radio will automatically detect the radio network and establish a connection when you are within reach of this network.

Procedure

1 Select the **System menu** button **[+]** in the top right corner of the **Main** view to open the **System** menu.

2 Under **Network**, select **Join** to open the **Join network** dialog box.



3 Type the name of the radio network you want to join.

Note

The radio network name is in upper case.

4 Select **Join** to join the radio network.

Related topics

Setting to work summary, page 48
Join network, page 43

Editing an existing radio network

During operation you might want to administer and make changes to an existing radio network. If a new site has been established or you want to change the bandwidth resources.

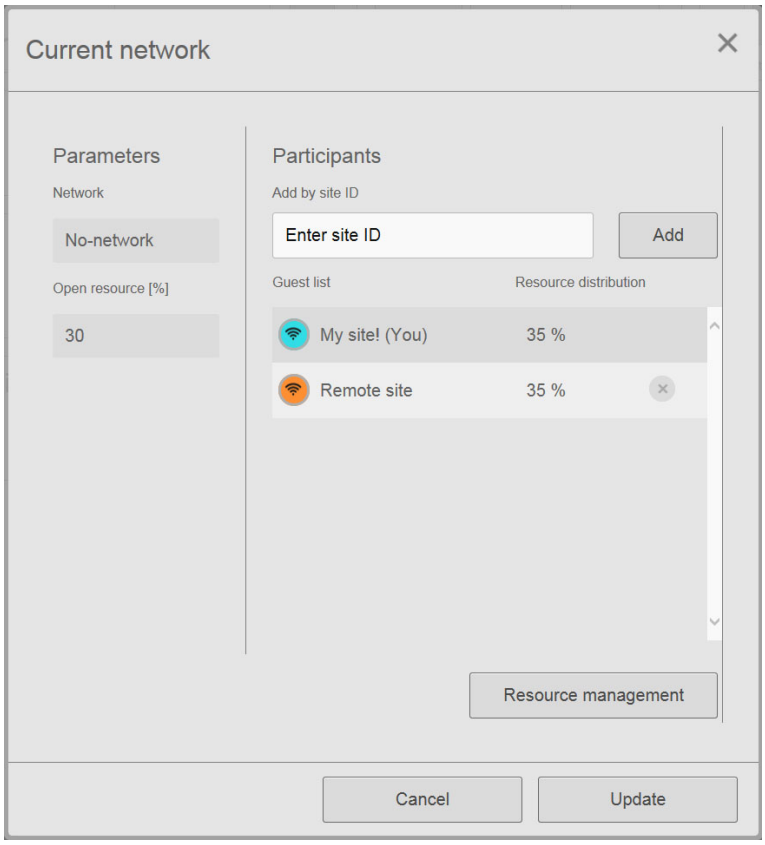
Prerequisites

A radio network must have been set up previously.

Procedure

1 Select the **System menu** button **[+]** in the top right corner of the **Main** view to open the **System** menu.

2 Under **Network**, select **Edit** to open the **Current network** dialog box.



3 Type a new site name in the **Add by site ID** box. Select **Add** to add a new site to the existing network.

4 If you want to adjust the bandwidth resource for each site, select **Resource management** to enter the **Resource management** dialog box.

5 Select **Update** to save the network settings.

Related topics

Creating a new radio network, page 21
Edit current network, page 39
Resource management, page 42

Adding or removing third party equipment

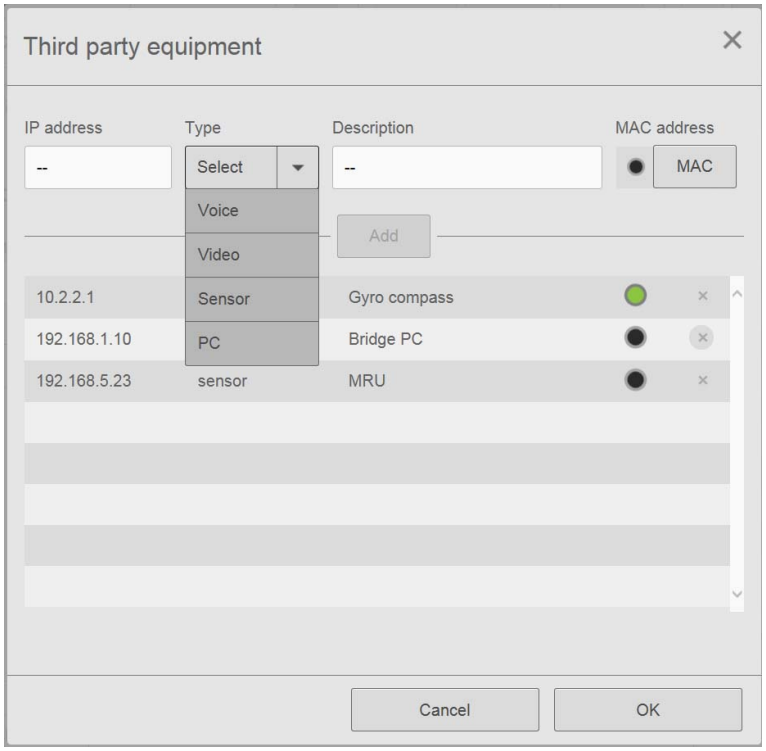
If you want to communicate with other types of equipment, for example sensors, you can add this equipment to your radio site. When third party equipment is no longer in use on your site, you can remove it.

Procedure

1 Select the **System menu** button **[+]** in the top right corner of the **Main** view to open the **System** menu.

2 Select **Site** to enter the **Configure site** page.

3 Select the **Manage third party equipment** button to open the **Third party equipment** dialog box.



4 Type the IP address of the equipment you want to connect. Select equipment type from the drop-down list. Type a description of the equipment for identification purposes.

If the third party equipment is switched on, the MAC address appears automatically. If not, type the MAC address.

Select **Add** to add the equipment.

5 To remove third party equipment, select the X symbol at the end of the line.

6 Continue for all the equipment you want to add or remove. Select **OK** to close the dialog box.

7 Back to the **Configure site** page. Select **OK** to save the chosen settings.

Related topics

Third party equipment, page 37

Checking the status of the MBR network

During operation you can check the status of the local radio site, the remote site(s) and the entire network of radio sites.

Prerequisites

The radio site(s) must have been set up for operation. If not, there is no status information to display.

Context

The status information is located to the left of the Main view. It is easily visible to the operator.

Procedure

1 Look at the system status information to view the status about your local site.

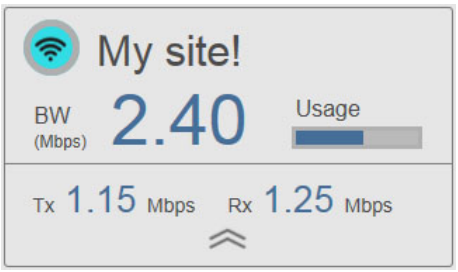
The status is **Active** when the radio site is set up for operation. The status is **Not configured** when the radio site is not set up for operation.

2 Look at the network information to view the status of the current radio network.

The current name and the frequency of the network are displayed.

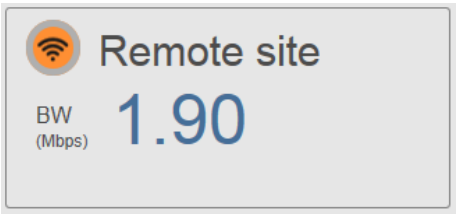
3 Look at the **Site list** to view information about each site in the radio network.

The **Site list** holds information about your local site and remote radio sites. Your local radio site is blue. The remote radio sites are orange.



BW indicates the bandwidth resource allocated to the local radio site. The **Usage** bar indicates the instantaneous usage of the bandwidth resource.

Select the **Unfold** button to show Tx and Rx traffic on the radio site.



BW indicates the bandwidth resource allocated to the remote radio site.

Related topics

System status, page 44
Network status, page 44
Individual radio site status, page 44
Display organisation, page 29

User preference procedures

Topics

Choosing the colour palette, page 28

Choosing the colour palette

You can select a colour scheme for the display which suits your current light conditions.

Context

The **Palette** function provides colour schemes for the display presentation. Two palettes are available. Day black and Day white.

Procedure

1 Select the **System menu** button **[+]** in the top right corner of the **Main** view to open the **System** menu.

2 Under **Palette**, select the colour scheme you want to use.

User interface

Topics

Operational principles, page 29

Display organisation, page 29

Operational principles

The MBR 144 has a graphical configuration and user interface. Use a mouse and keyboard to navigate, select and operate the system.

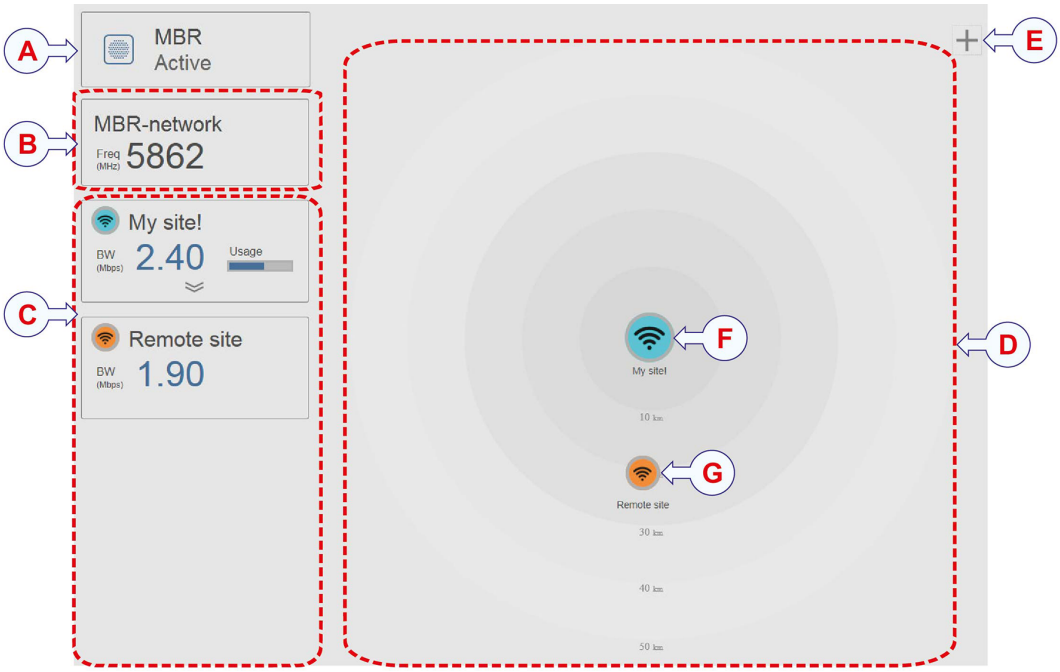
The MBR 144 is operated and configured from the **System** menu.

Related topics

Menu system, page 31

Display organisation

The display is made up of three main parts. Information about the status of the overall system, the networks and the radio sites to the left. A hideable **System** menu, from which you operate and configure the system, in the top right. The **Network view** which displays the Maritime Broadband Radio sites.



A **System status**: *It shows the overall radio system status.*

B **Network information**: *It shows the name and frequency of the current network.*

C **Site list:** *A list of radio sites in the current network.*

D **Network view**: *It displays the MBR sites in the current network.*

E **System menu button**: *It provides various system settings and operational functions.*

F **Local site**: *It shows the position of local site in the network.*

G **Remote sites**: *It shows the position of remote sites in the network.*

Related topics

Checking the status of the MBR network, page 27

Functions and dialog boxes

Topics

Menu system, page 31

Welcome, page 31

Configuration guide, page 32

Create site, page 33

Add radios to site, page 34

Configure site, page 35

Third party equipment, page 37

Status, page 38

Edit current network, page 39

New network, page 40

Resource management, page 42

Join network, page 43

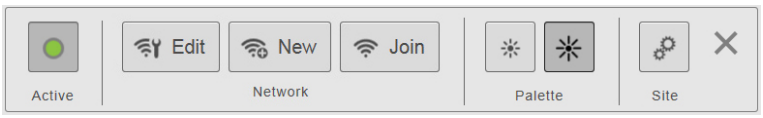
System status, page 44

Network status, page 44

Individual radio site status, page 44

Menu system

Select the **System menu** button **[+]** in the top right corner of the **Main** view to open the **System** menu. When the **System** menu is open, this button changes to a **Close** button **[x]**. Select the **Close** button to close the **System** menu.



The **System** menu provides access to four groups of functions.

Active

Active shows the radio operation mode. **Active** is currently not used in this system and is always green.

Network

Network allows you to add a new radio network, join an existing network or edit an existing network.

Palette

Palette provides you with colour schemes for the display presentation. Select the colour scheme which suits your light conditions.

Site

Site allows you to configure the radio site. Select **Site** to return to the configuration of your radio site. Here you can update the frequency, the data rate the third party equipment for the local radio site. You can also see the radio details for the radios on the local site.

Related topics

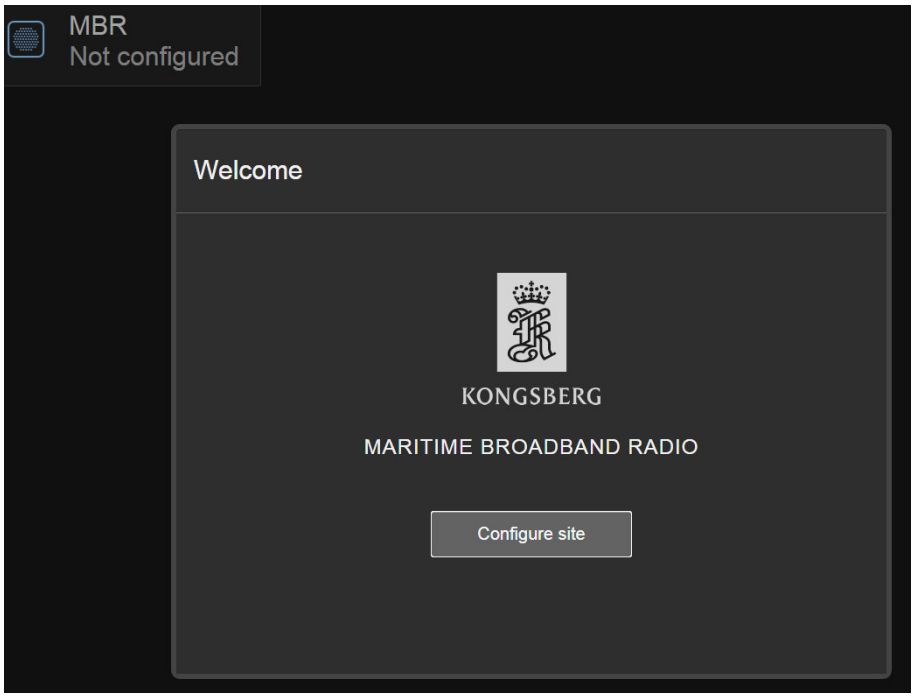
Operational principles, page 29

Welcome

The **Welcome** page is the start page of your radio unit configuration. It only appears the first time you set up your radio site.

How to open

The **Welcome** page appears when you have enabled contact with the radio unit via the web interface.



Details

Configure site button

Select the **Configure site** button to open the installation wizard. The wizard takes you through the step-to-step configuration of your radio site.

Related topics

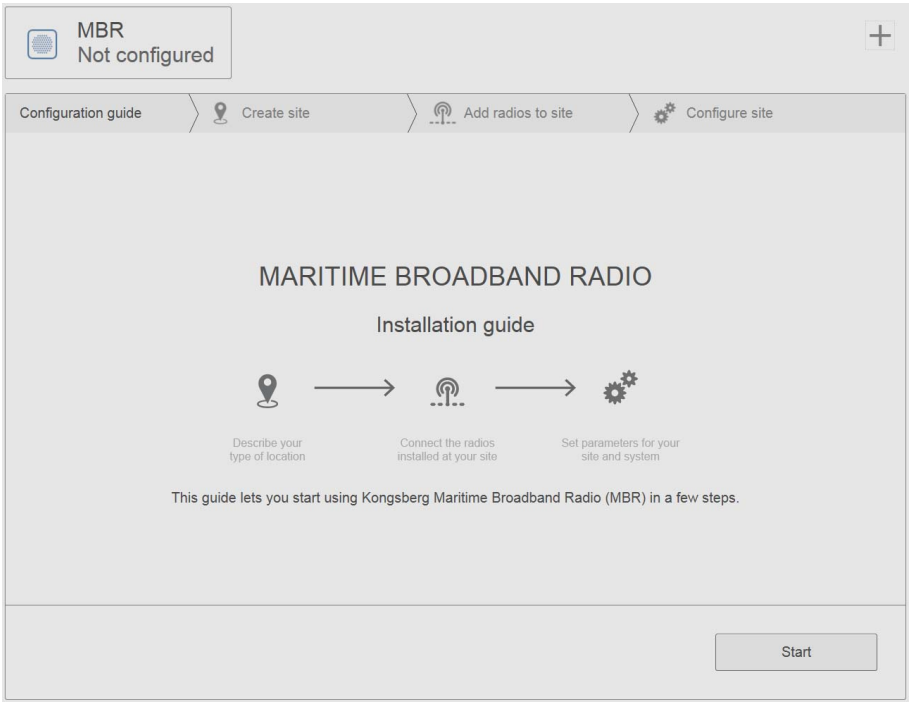
Enabling contact with the Radio Unit, page 13

Configuration guide

An installation wizard takes you through the setup of the radio site. The **Configuration guide** page is the first page in the step-to-step configuration of your radio site.

How to open

Select the **Configure site** button on the Welcome page to open the installation wizard.



Details

Start button

Select the **Start** button to start the step-to-step configuration of your radio site.

Related topics

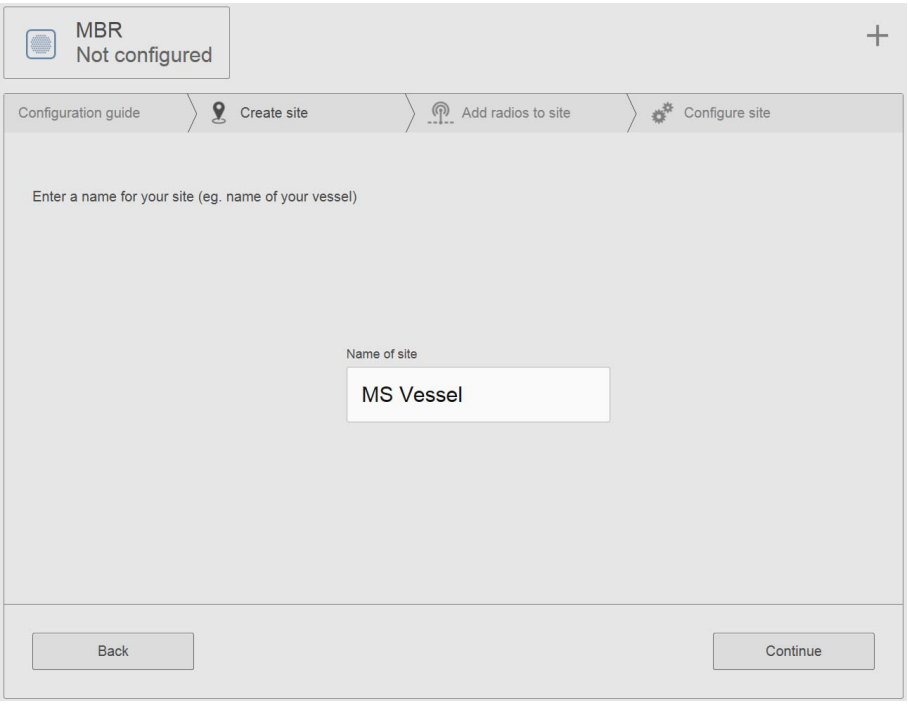
Setting up the radio site for operation, page 16

Create site

Here you can type the name of your radio site.

How to open

This page is step 2 in the step-to-step configuration of your radio site.



Details

Name of site

Type a suitable name for your radio site. This name will be displayed in the **Site list** and in the **Network** view.

Related topics

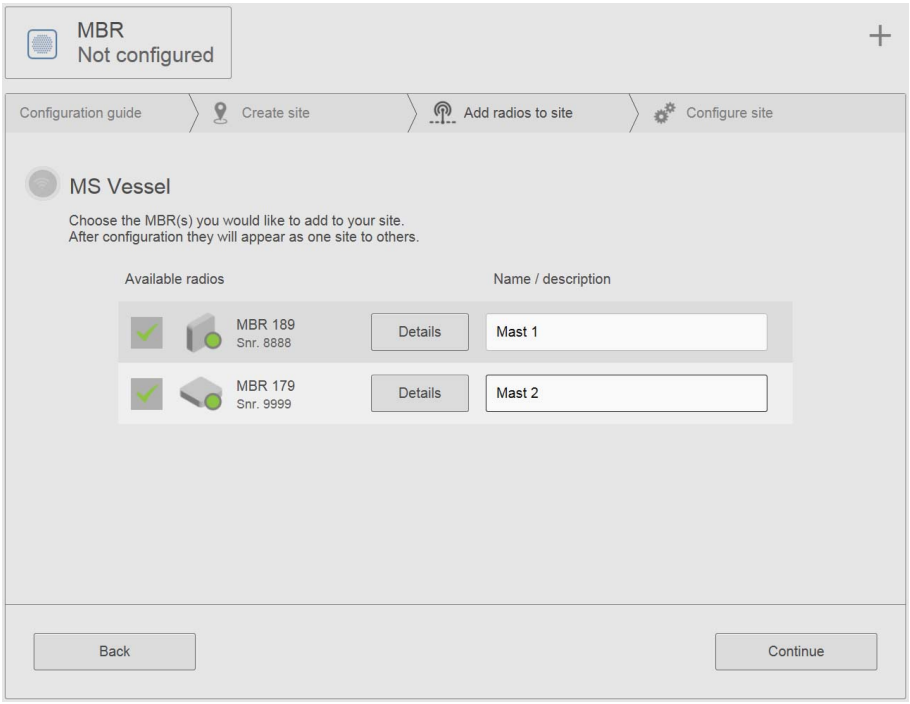
Setting up the radio site for operation, page 16

Add radios to site

Here you can add radios to your radio site.

How to open

This page is step 3 in the step-to-step configuration of your radio site.



Details

Available radios

This is a list of available radios. Radio units connected on the local Ethernet will appear automatically. They are by default selected.

Details

Select the **Details** button to open the **Radio status property sheet**. This dialog box shows the serial number, product version, configured values and diagnostics for the Radio Unit.

Name/description

Here you can type a description of the location of the Radio Unit.

Related topics

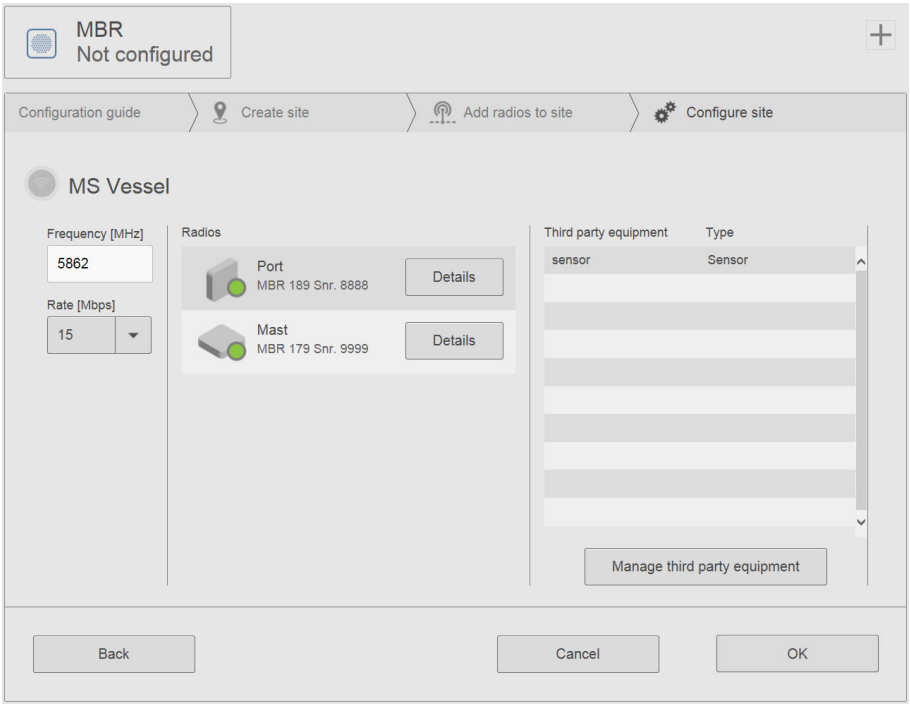
Setting up the radio site for operation, page 16
Status, page 38

Configure site

Here you can set the frequency, the data rate and select third party equipment for the local radio site. You can also see the radio details for the radios on the local radio site. This is also where you make changes to the radio site setup.

How to open

This is the last page in the step-to-step configuration of your radio site.



Details

Frequency

This is the operating frequency of the radio site.

Rate

This is the operating data rate of the radio site.

Radios

This is a list of radios which are added to the radio site.

Details

Select the **Details** button to open the **Radio status property sheet**. This dialog box shows the serial number, product version, configured values and diagnostics for the Radio Unit.

Manage third party equipment

This button opens the **Third party equipment** dialog box. Here you can manage third party equipment which is connected to the radio site.

Related topics

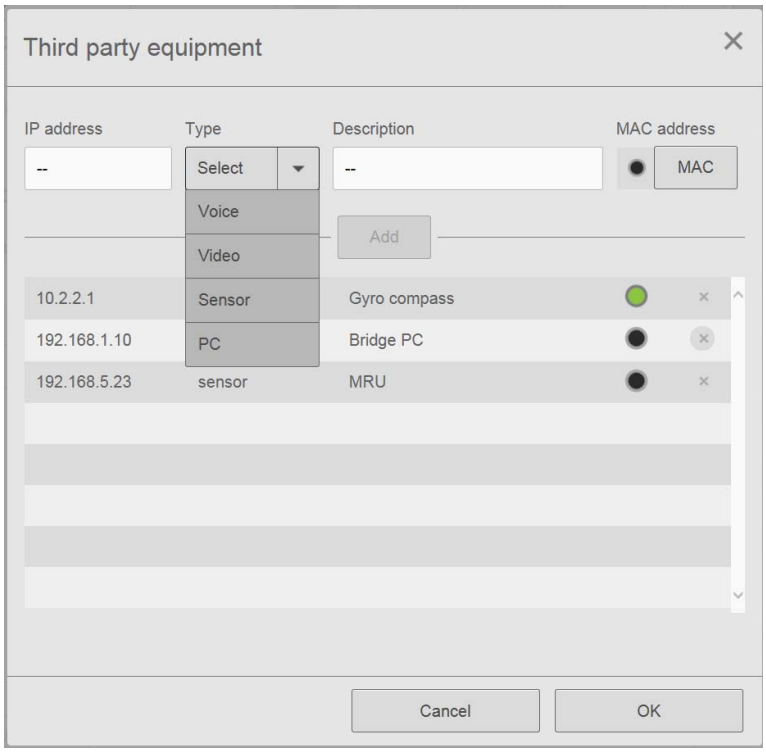
Setting up the radio site for operation, page 16
Third party equipment, page 37
Status, page 38

Third party equipment

In the **Third party equipment** dialog box you can manage third party equipment connected to your radio site. It contains a list of equipment where the radio site provides internet protocol (IP) connectivity in the Maritime Broadband Radio (MBR) network.

How to open

This dialog box is opened from the **Configure site** page.



Details

IP address

This is the IP address of the equipment you want to add to your radio site.

Type

This is a drop-down list of various types of equipment which can be useful to add to your radio site. For example computers and motion sensors.

Description

Here you can type a name which describes the equipment you want to add to your radio site. When you type in this box, the **Add** button becomes active.

MAC address

This is the MAC address of the equipment you want to add to your radio site. The circle becomes green when a MAC address is found automatically for the entered IP address. Select the **MAC** button to change or view the MAC address.

Related topics

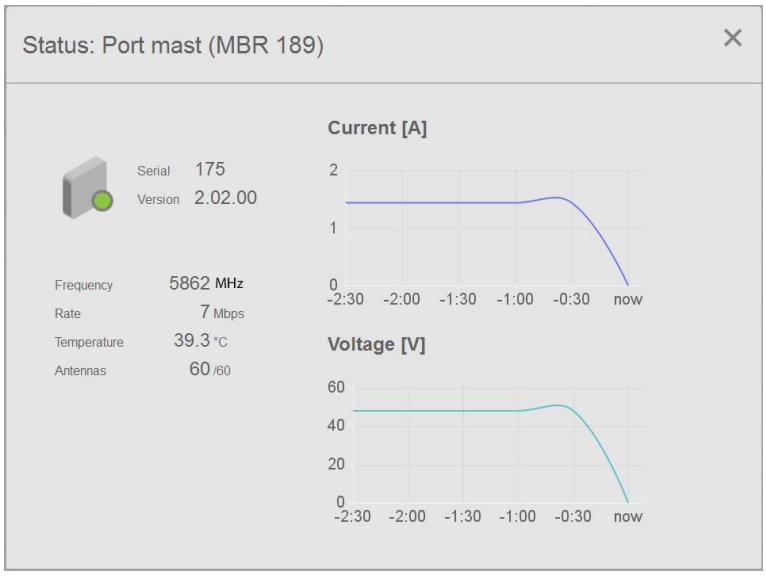
Adding or removing third party equipment, page 25
Configure site, page 35

Status

The radio **Status** dialog box shows the serial number, product version, configured values and diagnostics for the Radio Unit.

How to open

This dialog box is opened by selecting the **Details** button in the **Add radio to site** page or the **Configure site** page in the step-to-step configuration.



Details

Serial

This is the serial number of the Radio Unit.

Version

This is the software version of the Radio Unit.

Frequency

This is the operating frequency of the Radio Unit.

Rate

This is the data rate for the Radio Unit.

Temperature

This is the internal temperature of the Radio Unit.

Antennas

This is the number of active antenna elements.

Current

This graph shows the input current to the Radio Unit.

Voltage

This graph shows the input voltage to the Radio Unit.

Related topics

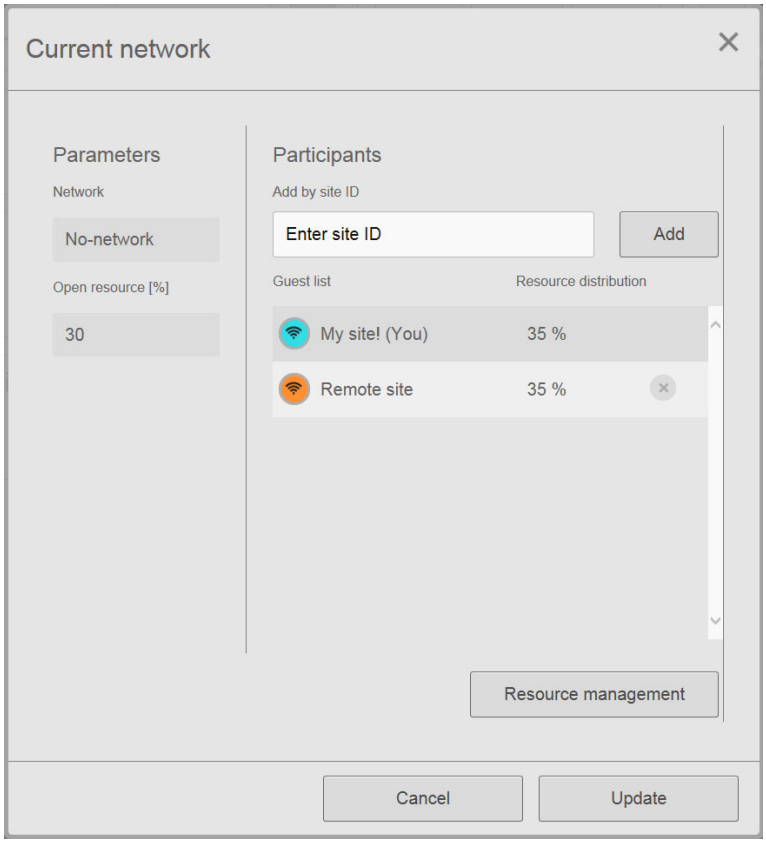
Add radios to site, page 34
Configure site, page 35
Checking the product version, page 55

Edit current network

The **Edit current network** dialog box allows you to edit the current radio network.

How to open

This dialog box is opened from the **System** menu.



Details

Network

This is the name of the current radio network.

Open resource

It shows the percentage of the bandwidth which is an open resource. Open resource is a contention-based multiple access protocol which allows radio sites to communicate without having a fixed allocated time slot.

Add by site ID

You can add a radio site to the guest list of the network by typing the site ID for the remote site.

Guest list and resource distribution

They show all sites in the current network with the same network name and the resource distribution between the radio sites.

Resource management

This button opens the **Resource management** dialog box. This is where you can change the resource distribution between the radio sites.

Related topics

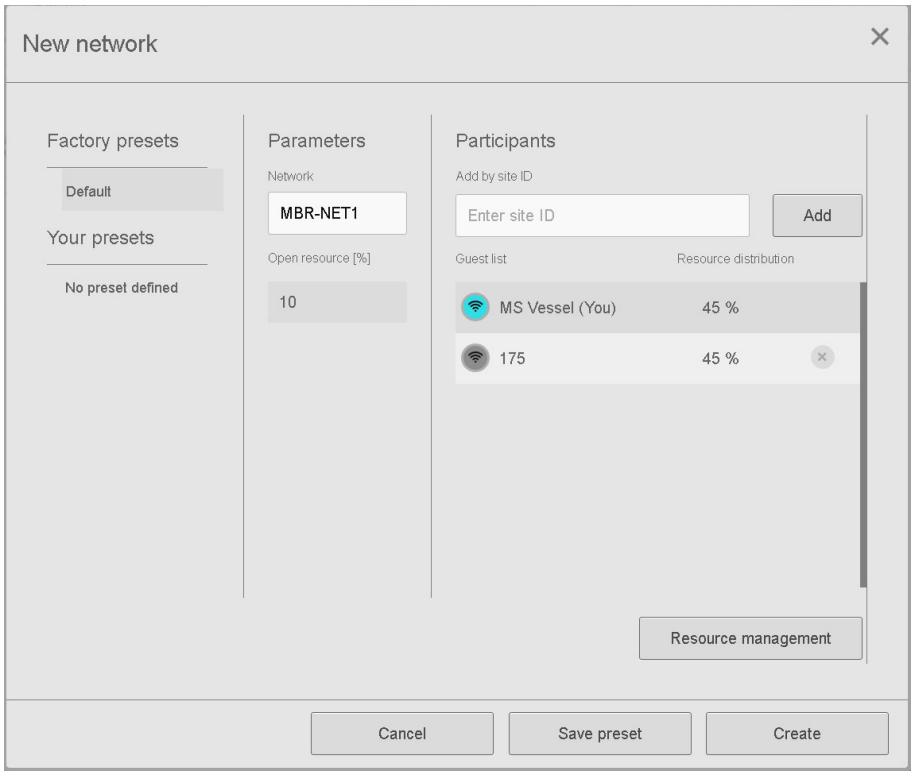
Editing an existing radio network, page 24
Resource management, page 42

New network

The **New network** dialog box allows you to define a new Maritime Broadband Radio (MBR) wireless network for MBR sites. The changes will be distributed to all the radio sites in the network.

How to open

This dialog box is opened from the **System** menu.



Details

Factory presets

Factory presets contains a set of default configuration parameters for the radio network.

Your presets

This is a list of saved presets.

Network

This is the name of the new radio network.

Open resource

It shows the percentage of the bandwidth which is an open resource. Open resource is a contention-based multiple access protocol which allows radio sites to communicate without having a fixed allocated time slot.

Add by site ID

You can add a radio site to the guest list of the network by typing the site ID for the remote site.

Guest list and resource distribution

They show all sites in the current network with the same network name and the resource distribution between the radio sites.

Resource management

This button opens the **Resource management** dialog box. This is where you can change the resource distribution between the radio sites.

Save preset

This button allows you to save the current configuration as a preset.

Related topics

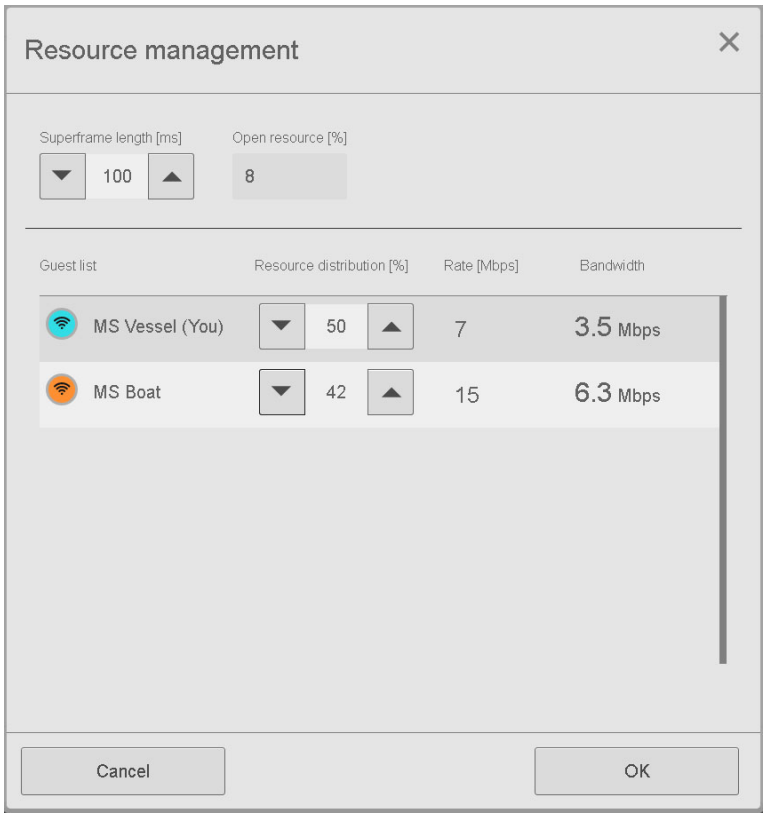
Creating a new radio network, page 21
Resource management, page 42

Resource management

The **Resource management** dialog box allows you to change the resource distribution between the radio sites in the radio network.

How to open

This dialog box is opened from the **Edit current network** or the **New network** dialog boxes.



Details

Superframe length

This is the length of the repeating superframe of bandwidth allocation in milliseconds.

Open resource

It shows the percentage of the bandwidth which is an open resource. Open resource is a contention-based multiple access protocol which allows radio sites to communicate without having a fixed allocated time slot.

Guest list and resource distribution

They show all sites in the current network with the same network name and the resource distribution between the radio sites.

Rate

This is the operating data rate of the radio site.

Bandwidth

It shows the bandwidth of the radio site for the selected resource distribution and the data rate.

Related topics

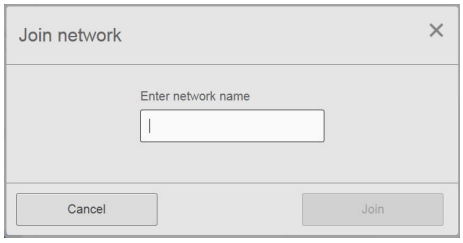
Creating a new radio network, page 21
Editing an existing radio network, page 24
Edit current network, page 39
New network, page 40

Join network

The **Join network** dialog box allows you to join an existing Maritime Broadband Radio (MBR) network by typing the network name.

How to open

This dialog box is opened from the **System** menu.



Details

Enter network name

This is the name of the radio network you want to join. The radio network name is in upper case.

Related topics
Joining a radio network, page 23

System status

The **System status** shows the status for the local radio site. The status is **Active** when the radio site is configured. The status is **Not configured** when the radio site is not configured.

The **System status** is located to the left in the **Main** view.

Related topics
Checking the status of the MBR network, page 27

Network status

The **Network status** shows the current network name and the frequency of the network. The Network status is located to the left in the **Main** view.

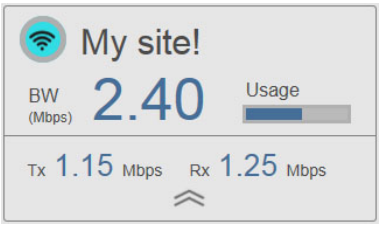
Related topics
Checking the status of the MBR network, page 27

Individual radio site status

The **Site list** contains information about each radio site in the network. Both for local and remote radio sites.

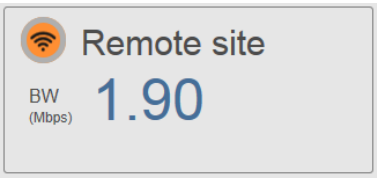
The **Site list** is located to the left in the **Main** view.

Local radio site



BW indicates the bandwidth resource allocated to the local site. The **Usage** bar indicates the usage of the bandwidth resource. Select the **Unfold** button, , to show Tx and Rx traffic on the radio site.

Remote radio site



BW indicates the bandwidth resource allocated to the remote site.

Related topics
Checking the status of the MBR network, page 27

Installation

Topics

Preparations, page 45

Installing the Radio Unit, page 46

Cable layout and interconnections, page 47

Setting to work summary, page 48

Preparations

Topics

Mechanical drawings, page 45

Necessary tools and equipment, page 46

Radio Unit location, page 46

Mechanical drawings

Outline dimension drawings are included in this manual.

Unless otherwise specified, all measurements are in millimetres. The drawings are not to scale.

Related topics

Radio Unit dimensions, page 50

Necessary tools and equipment

We assume that you are equipped with a standard set of tools. This tool set must comprise the normal tools for electronic and electromechanical tasks. This includes different screwdriver types, pliers, spanners, a cable stripper, a soldering iron, etc. Each tool must be provided in various sizes. We recommend that all tools are demagnetized to protect your equipment.

Unless otherwise stated, all mounting hardware (such as bolts, nuts, washers, screws etc.) referred to in this document is to be supplied by the customer or the shipyard.

An external computer is required for configuration of the Radio Unit through a web interface. You also need a computer if you want to change the configuration later.

Radio Unit location

Correct location of the Radio Unit is important for the system performance. Consider these factors when installing the unit.

- Mount the unit in a suitable location where the radio signals will not be obstructed. The antennas in the Radio Unit have a 360–degree operational sector.
- Place the Radio Unit as high as possible above sea level. A suitable location can be in the top of a mast.
- Use a stable power source with correct voltage.

Related topics

Installing the Radio Unit, page 46

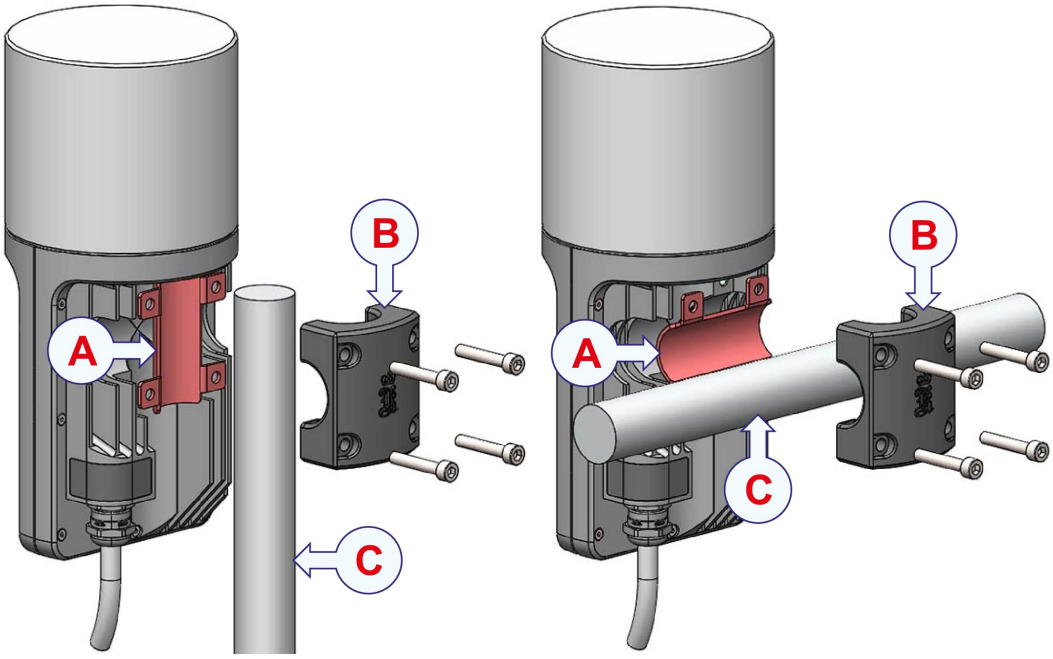
Installing the Radio Unit

The Radio Unit is designed to be mounted on a rail or similar. The unit is omnidirectional.

Context

The Radio Unit is designed for installation on small manned or unmanned vessels. The unit has an integrated bracket for installation on vertical or horizontal rails. The rails can have a diameter of 28 - 32 mm.

The Radio Unit is connected to external equipment with the Ethernet end of the combined Ethernet and power cable. This cable is attached to the Radio Unit by a connector.



A *Insulation shim*

B *Clamping bracket*

C *Rail, 28 mm – 32 mm*

Procedure

1 Find a suitable location for the Radio Unit according to your environment.

2 Remove the clamping bracket from the Radio Unit by unscrewing the four screws.

3 Place the insulation shim in the correct position depending on if you want vertical or horizontal rail mount.

4 Place the Radio Unit of the rail.

5 Refasten the clamping bracket.

6 Connect the Combined Ethernet and power cable to the connector on the Radio Unit.

7 Connect the Ethernet end of the cable to the user equipment.

8 Connect the power end of the cable to a power source on the vessel.

Related topics

Radio Unit dimensions, page 50
Radio Unit location, page 46

Cable layout and interconnections

The cable connections for the Radio Unit consists of:

- Combined Ethernet and power cable from the Radio Unit to user equipment.

Combined Ethernet and power cable

Cable colours	Signal
Orange	ETH Orange
Orange/White	ETH Orange/White
Green	ETH Green
Green/White	ETH Green/White
Brown	DC+
Brown/White	DC+
Blue	DC-
Blue/White	DC-
Cable screen	Ground

Setting to work summary

When all hardware units have been installed, and all the cables have been connected, the Radio Unit can be turned on and set to work.

Procedure

1 Turn on the Radio Unit.

2 Enable contact with the Radio Unit.

3 Configure the radio site.

4 Join a radio network.

Related topics

Turning on the Radio Unit, page 12
Enabling contact with the Radio Unit, page 13
Defining the IP address on the computer network adapter, page 14
Setting up the radio site for operation, page 16
Creating a new radio network, page 21
Joining a radio network, page 23

Drawings

Topics

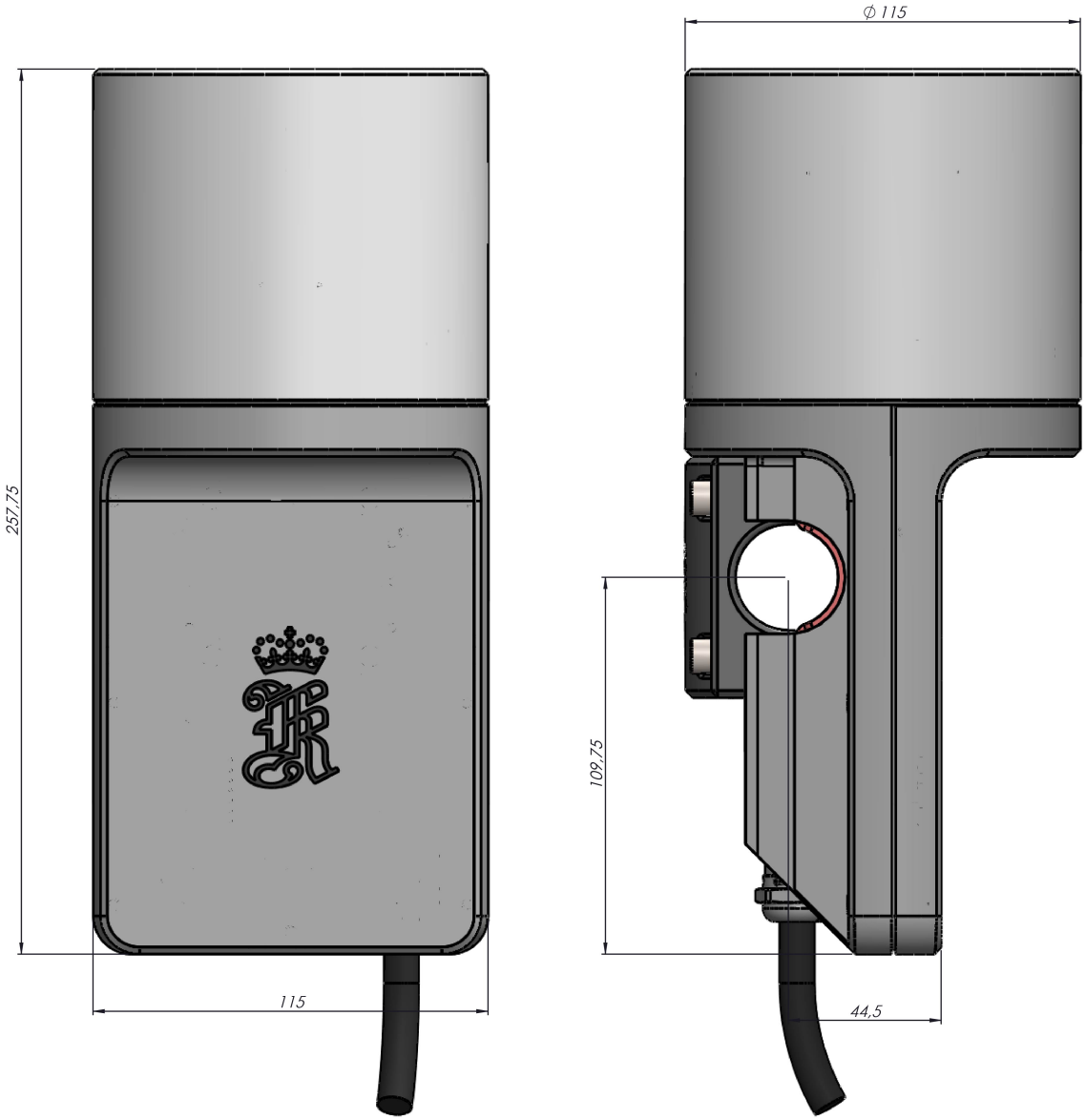
About drawings, page 49

Radio Unit dimensions, page 50

About drawings

Unless otherwise specified, all measurements are in millimetres. The drawings are not to scale.

Radio Unit dimensions



Technical specifications

Topics

Performance specifications, page 51
Interface specifications, page 51
Environmental specifications, page 52
Weight and outline dimensions, page 52
Power specifications, page 52
Frequency specifications, page 52
Standards and regulations, page 53

Performance specifications

These performance specifications summarize the main functional and operational characteristics of the MBR 144.

- **Operating range**: 20 km (Dependent on antenna placement and height).
- **User data**: 0.7 – 16.5 Mbps
  - Available rates: 0.7, 1.4, 2.8, 8.5, 16.5 Mbps
- **Antenna coverage**: 360 degrees azimuth, omni-directional

Interface specifications

The system will interface with external systems and sensors via Ethernet.

- **Ethernet/LAN**: 1 Port

Environmental specifications

These environmental specifications summarize the temperature and humidity specifications for the MBR 144.

- **Enclosure material**: Coated aluminium, UV resistant plastic
- **Operating temperature**: -40 ºC – 55 ºC
- **Operating humidity**: 20 – 100 % RH
- **Storage humidity**: 20 – 70 % RH
- **Ingress protection (IP) rating**: IP66

Weight and outline dimensions

These weights and outline dimension characteristics summarize the physical properties of the MBR 144.

- **Outline dimensions**:
  - **Circumference**: 115 mm
  - **Height**: 260 mm
- **Weight**: 2.5 kg

Power specifications

These power characteristics summarize the supply power requirements for the MBR 144 system.

- **Voltage**: 24 V DC
- **Power consumption**: 25 W (Maximum)
- **Idle**: 7 W

Note

Use a dedicated power supply or battery to power the Radio Unit

Frequency specifications

The radio frequency specifications summarize the frequency specifications for the receivers in the system.

- **Frequency range**:

  - **Frequency overall tuning range**: 4900 MHz - 5900 MHz
    Configurable range for the single 20 MHz channel.
  - **Frequency range ETSI EN 303 276**: 5852 and 5890 MHz
  - **Frequency range FCC part 15.407**: 5725 – 5850 MHz
- **Channel bandwidth**: 20 MHz
- **TX power**:
  - **HW Maximum**: Up to 2 W
  - **ETSI EN 303 276**: Up to 2 W
  - **FCC part 15.407**: Up to 1 W
- **MaximumEIRP**:
  - **HW Maximum**: 39 dBm
  - **ETSI EN 303 276**: 39 dBm
  - **FCC part 15.407**: 36 dBm
- **Modulation**: GMSK
- **Antenna gain**: 6 dBi
- **Antenna elements**: 4

Standards and regulations

This product is in compliance with relevant product standards.

- **Radio Equipment Directive (RED) 2014/53/EU**:
  - Electromagnetic compatibility:
    * ETSI EN 301 843-1
    * ETSI EN 301 843-7
    * IEC 60945/EN 60945
  - Radio spectrum:
    * ETSI EN 303 276
  - Product safety:
    * IEC 61010–1/EN 61010–1
- **Environmental standards**:
  - IEC 60945/EN 60945
  - DNVGL-CG-0339
  - IACS E10

- **Radiation hazard standards**:
  - EN 50385I
  - FCC ET ELLER ANNET ????

Maintenance

Topics

Checking the product version, page 55

Cleaning the Radio Unit cover, page 55

Repairing the Radio Unit, page 56

Checking the product version

For software updates, or contact with customer support, it is useful to know the product version of the Radio Unit.

Procedure

1 Select the **System menu** button **[+]** to open the **System** menu.

2 Select **Site** to enter the **Configure site** page.

3 Under **Radios**, select the **Details** button for the radio for which you want to see the product version.

   Observe that the **Status** property sheet appears. Here you can see both the serial number and the product version of the Radio Unit.

4 Close the dialog box by selecting [**X**] in the upper-right corner.

Related topics

Status, page 38

Cleaning the Radio Unit cover

The Radio Unit is designed to withstand the elements. Such as rain, snow and dust. However, to ensure optimal performance you must keep the surface of the Radio Unit clean. Brush off any ice or snow.

Repairing the Radio Unit

The Radio Unit is not designed for repair in the field. All repairs and modifications of the unit, except for installation of new software versions and system setup, must be done by qualified personnel. A failed Radio Unit should be shipped back to Kongsberg Seatex AS or other agreed service point for repair.

Related topics

Support information, page 10

Equipment handling

Topics

Taking delivery, page 57

Unpacking and handling, page 57

Storage, page 58

Disposal, page 58

Taking delivery

When the equipment arrives at its destination:

- Perform an inspection immediately to register any damage that may have occurred in transit.
- If you find any damage, both the insurance company and the shipping agent must be informed immediately.

Unpacking and handling

Care should be taken when unpacking and handling the equipment. A visual inspection should be made to check that the equipment has not been damaged during shipment and that all components and parts are present according to the packing list.

The equipment contains delicate electronic components – handle with care and avoid shocks.

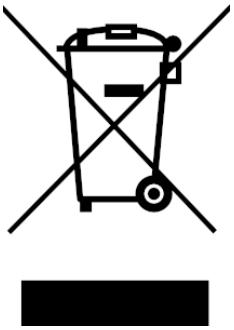
The equipment can be lifted by hand.

Storage

After the equipment in the boxes has been inspected and it has been verified that no damage has occurred, the equipment must be stored in its original packaging until the time of installation. The storage premises must be dry and well protected.

Disposal

At the end of the product lifetime, all Kongsberg Seatex AS products must be disposed of in an environmentally-friendly way.



All electrical and electronic components must be disposed of separately from the municipal waste stream via designated collection facilities appointed by the government or local authorities. The correct disposal and separate collection of your old appliance will help prevent potential negative consequences for the environment and human health. This is a precondition for reuse and recycling of used electrical and electronic equipment. For more detailed information about disposal of your old appliance, please contact your local authorities or waste disposal service.

All disposal of mechanical, electromechanical, electronic and chemical waste - including all types of batteries - must take place according to national and international rules and regulations. Observe the relevant Waste Electrical and Electronic Equipment (WEEE) regulations.

The equipment can be returned to Kongsberg Seatex AS if there is no local WEEE collection. The equipment is marked with this waste pictogram.

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