KONGSBERG

EA440

Hydrographic single beam echo sounder

Reference manual

Release 19.1

This manual provides you with reference information required to operate and fully understand the commands, menus, operational modes and options provided by the Kongsberg EA440 Hydrographic single beam echo sounder.

Note

The EA440 echo sounder must never be powered up when the ship is in dry dock. The transducer will be damaged if it transmits in open air. To prevent inadvertent use of the EA440, disconnect the mains power whenever the vessel is in dry dock.

392615/G

Document information

- **Product**: Kongsberg EA440
- **Document**: Reference manual
- **Document number**: 392615
- **Revision**: G
- **Date of issue**: June 2019

Note

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

Comments

To assist us in making improvements to the product and to this manual, we welcome comments and constructive criticism.

e-mail: km.documentation@km.kongsberg.com

For technical support issues, please contact km.support@km.kongsberg.com.

Support information

If you require maintenance or repair, contact your local dealer. You can also contact us using the following address: km.hydrographic.support@kongsberg.com. If you need information about our other products, visit http: //www.km.kongsberg.com

Table of contents

About this manual

The purpose of this manual is to provide the descriptions, procedures and detailed parameter explanations required to allow for safe and efficient use of the EA440. The manual also provides you with a thorough understanding of the EA440 parameters and adjustments.

Target audience

This manual is intended for all users of the EA440. Due to the nature of the descriptions and the level of detail provided by this manual, it is well suited for those who are - or wish to be - expert users.

A good understanding of system functions and controls is essential to fully take advantage of the functionality provided. Sea conditions vary, sometimes drastically, and it is not possible to identify settings that will provide the best data at all times. A careful study of the information in this manual is highly recommended, preferably while exploring the EA440 functionality.

Online information

For information about the EA440 and other products from Kongsberg Maritime, visit our website.

https://www.km.kongsberg.com

Software version

This EA440 Reference manual complies with software version 19.1.

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Kongsberg EA440

Topics

System description

EA440 is a high performance hydrographic wide band single beam echo sounder. The echo sounder is developed for hydrographic use in shallow to medium depth waters. It supports portable and hull mounted sidescan and sub-bottom light for shallow waters.

For maximum flexibility and ease of operation, the EA440 echo sounders uses the Microsoft Windows® 7 operating system. The EA440 software can be run on any medium range Windows compatible commercial computer.

Wide band frequency sweep (FM) in combination with advanced signal processing gives an exceptionally good signal to noise ratio and range resolution.

The EA440 offers internal storage of all raw sample data. This includes all external input sensor data for replay purposes. A highly flexible processing regime makes it possible to log high density complex raw data for advanced post-processing. We recommend using an additional external storage device.

You can set up the display to suit your special needs. You can choose different presentations on the screen for echograms, digital depth and other features. Save user settings for different operations and use them again for similar operations.

EA440 supports a wide range of inputs from third party sensors and you can also export these data and data from EA440 to a wide range of different outputs.

Available frequencies span from 30 to 500 kHz. A variety of highly efficient transducers are available to suit all your operational needs from extreme shallow to 3000 m water depths.

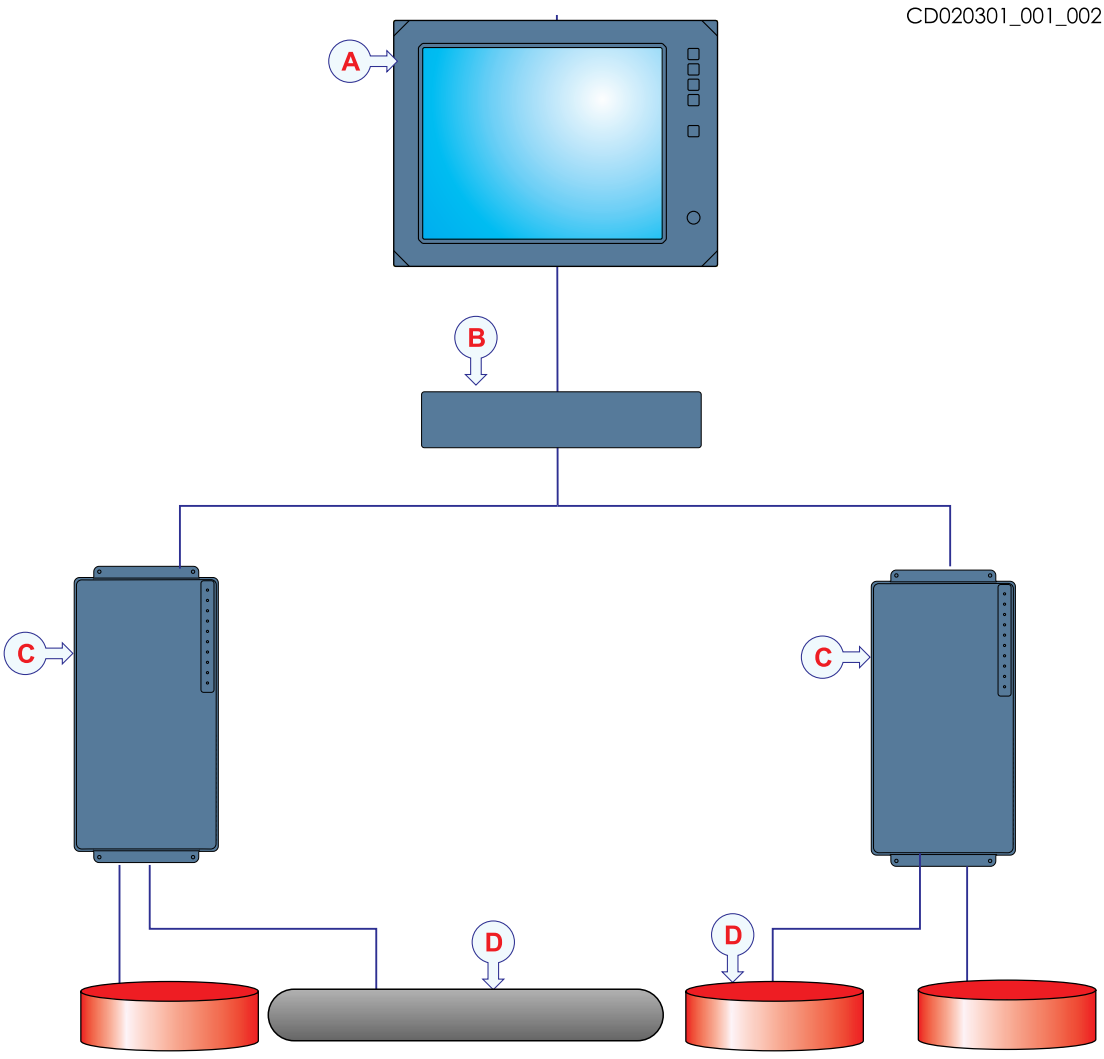
Available frequencies from 10 to 30 kHz and limited to 300 metres range for the sub-bottom functionality.

120, 200 and 500 kHz are available for the high resolution sidescan functionality. The software is prepared for dual sidescan operation and presentation, even with a normal echo sounder doing acoustic imaging at the same time.

System diagram

The system diagram identifies the main components of a basic EA440 system. Only the main connections between the units are shown. Detailed interface capabilities and power cables are not shown.

The basic EA440 Hydrographic single beam echo sounder consists of one transducer and one WBT. Additional transceivers and transducers can be added to meet your operational and functional requirements. You also need a computer and a display. These can be delivered by Kongsberg Maritime or bought separately.



A *Operator Station*

B *Ethernet switch*

C *WBT*

D *Transducer*

System units

Topics

Operator Station description

The Operator Station may be a panel computer or a separate computer with a display.

The computer is based on a commercial design, but the software and hardware have been specified by Kongsberg Maritime to suit the EA440 requirements.

WBT description

The WBT is provided to transmit acoustic energy through water. This transmission and reception are commonly referred to as a *ping*. After each transmission, the transceiver receives the echoes from the targets in the water and/or the seabed. These echoes are filtered and amplified and then converted into digital format.

The Wide Band Transceiver (WBT) comprises a rugged box providing all necessary transmitter and receiver electronics. The receiver is designed for low noise, and it can handle input signals spanning a very large instantaneous dynamic amplitude range.

The Wide Band Transceiver (WBT) is designed for applications where performance is the top priority. The design is optimized for applications where power consumption and physical size is not critical.

A high quality Ethernet cable connects the Wide Band Transceiver (WBT) to the Operator Station. The distance between the Operator Station and the transceiver can be extended up to maximum 70 meters. If a longer cable is required, cut it in half, and insert an Ethernet switch to provide buffer amplification.

Note

If more than one Wide Band Transceiver (WBT) is used, a small high capacity Ethernet switch is required to connect the transceivers to the Operator Station.

A suitable power supply is provided with the delivery.

Single-beam transducers

The EA440 Hydrographic single beam echo sounder can be used with our efficient single-beam transducers.

Kongsberg Maritime can provide a large range of efficient and accurate single-beam transducers for underwater mapping applications. A large number of operational frequencies is available. For more information about our transducers, see our website.

https://www.km.kongsberg.com

Network security

If a EA440 system is connected to a local area network, data security is important.

Equipment manufactured by Kongsberg Maritime 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 Maritime has no information regarding the complete system installation on any vessel. Systems provided by Kongsberg Maritime 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 Maritime computers. The computers are therefore not protected against viruses, malware or unintentional access by external users.

Securing the EA440 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 EA440 system will always be

in charge of defining and implementing a security policy, and providing the relevant network security applications.

Note

Kongsberg Maritime will not accept any responsibility for errors and/or damages caused by unauthorized use of or access to the EA440.

If you wish to connect the EA440 system to the ship's local area network, you must implement the same security mechanisms on the EA440 computer(s) as for the rest of the network. This is a task for the network responsible person on board. Some key elements here must be:

- The same anti-virus protection on all computers, including routines for updating this protection.
- The same settings for the firewall on all computers.
- Controlled physical access to computers on the network.
- Trusted and trained operators.
- Log-in access mechanisms.
- Same policy for attaching peripheral equipment to the computers (USB devices, hard drives etc).
- Installation of programs on any computer in the network, verification that each program is authentic.
- Definition of which programs are allowed to run on each computer.
- Logging mechanism of computer activity, and inspection of these logs.

How to define and implement these rules depends on each end user's network system configuration, which again must be a result of the policies and threat levels the end user has defined for the complete installation. For some products the network consists of only processor units and/or work stations, transceivers and a few sensors. On other vessels, larger computer systems can be installed to include numerous products and data systems. There must be one responsible person for the security of the system, large or small.

Support information

Should you need technical support for your EA440 you must contact a Kongsberg Maritime office. A list of all our offices is provided on our website. You can also contact our main support office in Norway.

A 24 hour telephone support service may also be available depending of the level of SLA (Service Level Agreement).

- **Company name**: Kongsberg Maritime AS
- **Address**: Strandpromenaden 50, 3190 Horten, Norway

- **Website**: https://www.km.kongsberg.com
- **E-mail address**: km.hydrographic.support@kongsberg.com

Getting started

Topics

Starting normal operation

Topics

Turning on the EA440

In order to use the EA440, you must first turn it on. You must first turn on the display, the Operator Station, the transceiver(s), and the Ethernet switch (if applicable). After this you can start the EA440 program.

Prerequisites

The EA440 is installed as specified in the EA440 *Installation manual*. Minimum one transceiver with one or more transducers has been connected.

Caution

You must never turn on the EA440 when the ship is in dry dock. The transducer(s) may be damaged if the EA440 transmits in open air.

Procedure

1 Make sure that each WBT is turned on.

2 Turn on the display.

3 Turn on the Operator Station.

4 Double-click the EA440 icon on the Operator Station desktop to start the program.

5 On the **Main** menu in the top right corner of the presentation, select **User Settings**, and then choose the default settings.

6 At the bottom of the **Main** menu, observe that the **Operation** menu icon is flashing.

It is flashing to indicate that even if the EA440 is turned on, "pinging" is disabled. The EA440 is in *Normal* mode, but **TX Power** is set to *Off* to prevent transmission. This is for safety reasons.

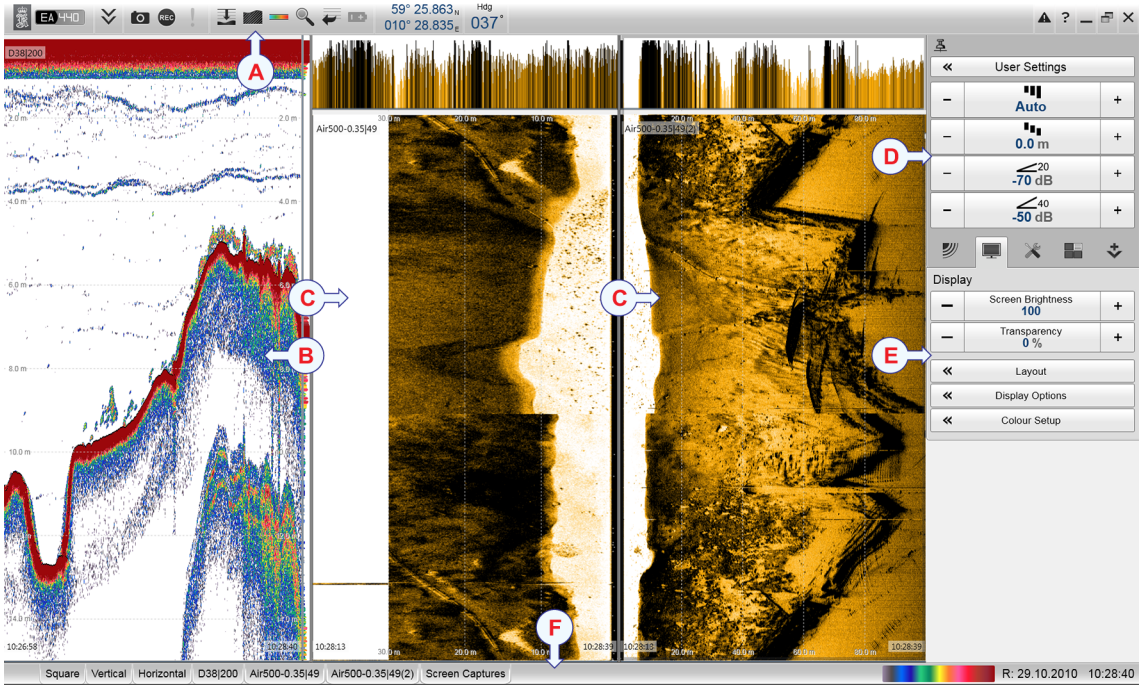
Related topics

Ping function, page 252
Ping Mode function, page 254

EA440 presentation overview

By default, the EA440 presentation covers the entire screen. The EA440 consists of specific visual elements that work together. The visual elements provide you with the echo information you need, they help you to control the functionality needed to understand this information, and finally, they allow you to control the operational parameters.

This EA440 screen capture shows you a typical operational situation. The presentation provides you with a lot of information. You can see three echogram views; one vertical and two sidescan views. The top bar shows you navigational information, and offers buttons for key functions and information panes. The menu system on the right side gives you easy access to all the functionality offered by the EA440.



A *Top bar*

B *Echogram view*

C *Sidescan echogram*

D *Main menu*

E *Secondary menus*

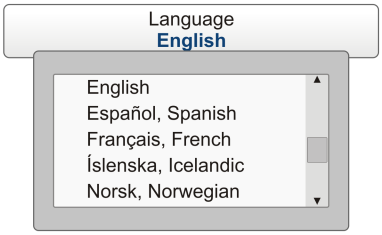
F *Bottom bar*

Selecting menu language

You may prefer to use the EA440 with a user interface in your own language. The **Language** function allows you to select the language to be used in the EA440 presentations, menus and dialog boxes.

Context

With a few exceptions, the chosen language will also be used for all other text on the EA440. The EA440 online help may not be available for the language you choose. If your language is not supported, the English online help is provided.



Procedure

1 Select the **Setup** icon.

The icon is located under the **Main** menu. It is used to open the **Setup** menu.

2 Select the middle of the **Language** button to open the list of available options.

3 Select the language you wish to use.

Result

All the texts in the user interface (menu buttons, dialog boxes etc) are changed to the selected language.

Further requirements

The context sensitive on-line help file may also be available in your language. To change the language in the on-line help, you must restart the EA440 program.

Related topics

Language function, page 328

Selecting *Normal* mode to start "pinging"

In order to transmit ("ping") you must set the EA440 to *Normal* mode.

Context

The **Operation** function controls the operating mode of the EA440. You can set it to *Inactive*, *Normal* or *Replay*. *Normal* mode allows the EA440 to transmit ("ping") through the water, and to receive the echoes.

The transmission ("pinging") from the EA440 can be turned on or off. The **Ping** function enables or disables the EA440 transmissions into the water. Once pinging is *On*, use

the **Ping Mode** function to choose how often the EA440 will transmit. Use the **Ping Interval** function to choose the time (in milliseconds) between each transmission ("ping") when **Ping Mode** is set to *Interval*.

Caution

You must never turn on the EA440 when the ship is in dry dock. The transducer(s) may be damaged if the EA440 transmits in open air.

Procedure

1 Open the **Operation** menu.

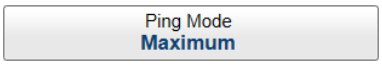
2 Select **Operation**, and set it to *Normal*.

The **Operation** function controls the operating mode of the EA440. You can set it to *Inactive*, *Normal* or *Replay*. *Normal* mode allows the EA440 to transmit ("ping") through the water, and to receive the echoes. The EA440 is now ready for use.

3 Set **Ping** to *On*.

The **Ping** function enables or disables the EA440 transmissions into the water. Once pinging is *On*, use the **Ping Mode** function to choose how often the EA440 will transmit.

4 Set **Ping Mode** to *Maximum*.



Result

The EA440 is now transmitting acoustic pulses ("pinging") into the water.

Checking transceiver and transducer settings

In order to use the EA440, the Operator Station must be connected to one or more transceivers, and each of them must in turn be connected to one or more transducers. Each channel must be installed before it can be put to use. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency. It is often useful to verify that all the channels are properly set up. This is a requirement for the EA440 performance.

Prerequisites

The EA440 is installed as specified in the EA440 *Installation manual*. The EA440 is turned on, and it is working normally. Minimum one WBT with one or more transducers has been connected.

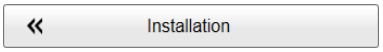
Context

If you are using a EA440 that has been in use for some time, you can safely assume that the transceivers and transducers have been set up properly. However, the procedure may prove useful if you are an inexperienced user. Make sure that you do not change any important settings.

Procedure

1 Verify that the currently connected transducer(s) are shown as "tabs" at the bottom of the EA440 presentation.

2 On the **Setup** menu, select **Installation**.



3 On the left side, select **Transducer Installation**.

Observe that the **Transducer** page opens with all settings unavailable. This is a safety precaution to prevent unintentional changes to the transducer settings.

4 Verify that each transducer has been installed with all settings defined.

5 On the left side of the **Installation** dialog box, select **Transceiver**.

6 Check that all applicable transceivers and transducers are connected and operational.

For each transceiver, this is indicated by the green label with text "Installed".

7 Close the **Installation** dialog box without making any changes.

Opening the context-sensitive online help

EA440 has a comprehensive context-sensitive on-line help system. All information in the EA440 Reference manual can also be found in the on-line help. The online help can be opened from all dialog boxes in the EA440 user interface. You can also use the **Help** button on the top bar.

Context

The context sensitive on-line help is located in a single proprietary Microsoft® CHM file. This CHM file will run on any computer with a Microsoft operating system. You can also copy the CHM file to any tablet device if you have a reader application that supports the CHM format.

Note

Due to limitations defined by Microsoft®, CHM files will not open from websites and servers.

To open the help system, select **Help** in any dialog box. This will provide instantaneous information about the relevant dialog box. Links to related procedures and topics are provided. You navigate in the online help file using the menu system on the left side, as well as the interactive links within the document.

Note

The EA440 online help may not be available for the language you have chosen for the user interface. If your language is not supported, the English online help is provided.

Procedure

1 Select **Help** on the top bar.

The online help opens on its start page. Observe the menu on the left side of the help window. If you have a computer keyboard connected, you can use the search functionality.

2 Select **Help** in the top right corner of each dialog box.

The description of the relevant dialog box opens. Observe the menu on the left side of the help window. If you have a computer keyboard connected, you can use the search functionality.

Basic operation

Topics

Selecting which echogram type to use in the EA440 presentation

The EA440 supports several different echogram types. Each echogram is shown in a separate view in the EA440 presentation. To select which echogram types you wish to see in the EA440 presentations, use the **Echogram** dialog box.

Context

Use this function to select what kind of echogram you wish to see in the current ("active") view.

- **Surface**: A *Surface* echogram is mainly used when you wish to look at the entire water column starting from the sea surface and down to the sea bottom.
- **Bottom**: A *Bottom* echogram is mainly used when you want to examine the echoes from fish close to the sea bottom.
- **Sidescan**: The *Sidescan echogram* shows the bottom as seen from the side of the vessel hull. The *Sidescan echogram* is default when the transducer is installed on the port or starboard side.

Procedure

1 Click once in the echogram view that you wish to change.

This will make the view "active". A thick border is placed on the selected view to visualize this.

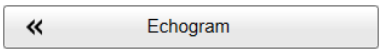
2 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

3 Select the **Active** icon.

The icon is located under the **Main** menu. It is used to open the **Active** menu.

4 Select **Echogram**.



5 Select the **Echogram** tab to open the page.

6 Use the **Echogram Type** function to select the type you wish to apply to the chosen view.

7 Apply the change(s) you have made.

   a Select **Apply** if you wish to apply the chosen setting only to the currently active echogram view.

   b Select **Apply to All** if you wish to use the chosen setting on all the echograms of the same type.

8 Close the dialog box.

Further requirements

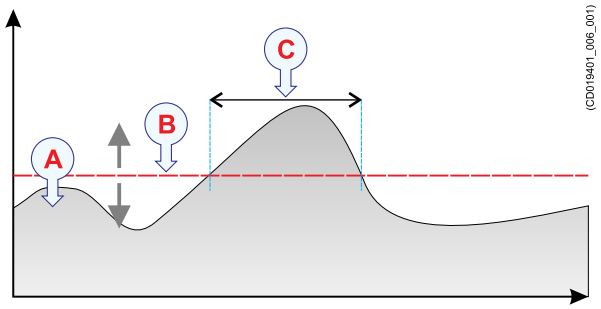
If necessary, adjust the **Range** and **Start Range** settings accordingly.

Adjusting the gain (echo sensitivity)

You can compare this gain setting with the volume control on your car radio. When the gain is increased, the echoes will appear stronger. Weak echoes will be easier to see. However, since you also increase the acoustic noise in the reception, the EA440 presentations will also show this noise. Too much gain may therefore "distort" the presentation.

Context

Comparing the gain function with the volume control on your car radio is not very accurate. In fact, the gain in the EA440 is constant. The **Gain** function is used to adjust the sensitivity. This done by controlling the minimum level of detection. When you *increase* the gain level (more positive number) , you reduce the minimum level, and thus *increase* the sensitivity.



*The echo strength (A) changes with time. The minimum level of detection (B) is adjusted up or down with the **Gain** function. Increasing the **Gain** with a more positive number*

reduces the minimum level, and this increases the sensitivity. Only echoes over the minimum level are shown in the echogram (C).

Tip

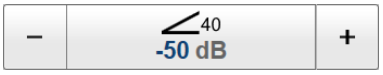
Do not confuse this **Gain** *setting with the* **TVG** *(Time Varied Gain) setting.*

Procedure

1 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

2 Observe the **Gain** button.



3 The following methods can be used for this adjustment:

- **Method 1**: Select [+] or [-] to choose the level.
- **Method 2**: Select the middle of the button and keep the mouse button pressed. Drag the cursor sideways to increase or decrease the level.
- **Method 3**: Select the middle of the button to open the menu. Type the requested value.

Choosing the depth range and the start depth for the echograms

In each echogram, the start depth is defined by the **Start Range** depth value. This is the "upper limit" of the echogram. The range from this start depth and down is defined by the **Range** value.

Context

The **Range** setting defines how "deep" you wish the EA440 to detect echoes. In other words, this is the vertical distance between the "top" and the "bottom" of the echogram. The **Range** setting specifies the "bottom" depth, while the **Start Range** setting specifies the "top" depth. The way the **Range** and **Start Range** settings work depends on the echogram type.

- **Surface**

  A *Surface* echogram is mainly used when you wish to look at the entire water column starting from the sea surface and down to the sea bottom. Since this echogram is referenced to the sea surface, the sea bottom contour will vary with the actual depth. In a *Surface* echogram, the start depth is defined by the positive **Start Range** depth value.

- **Bottom**

  A *Bottom* echogram is mainly used when you want to examine the echoes from fish close to the sea bottom. Since this echogram is referenced to the sea bottom, the sea

surface will vary with the actual depth, while the bottom is drawn flat. In a *Bottom* echogram, the start depth is defined by the negative **Start Range** depth value.

- **Sidescan**

  The *Sidescan echogram* shows the bottom as seen from the side of the vessel hull. The *Sidescan echogram* is default when the transducer is installed on the port or starboard side. The horizontal angle is determined by the physical angle of the transducer installation. You can select the start range (the depth from which the sidescan echo starts) and the horizontal range by means of the **Start Range** and **Range** settings on the **Main** menu.

Procedure

1 Observe the **Main** menu.

  Its default location is on the right side of the EA440 presentation.

2 Locate the **Start Range** function.

3 The following methods can be used for this adjustment:

  - **Method 1**: Select [+] or [-] to choose the level.
  - **Method 2**: Select the middle of the button and keep the mouse button pressed. Drag the cursor sideways to increase or decrease the level.
  - **Method 3**: Select the middle of the button to open the menu. Type the requested value.

  Note

  Remember that in a Bottom echogram, the **Start Range** *value must be negative.*

4 Locate the **Range** function.

5 The following methods can be used for this adjustment:

  - **Method 1**: Select [+] or [-] to choose the level.
  - **Method 2**: Select the middle of the button and keep the mouse button pressed. Drag the cursor sideways to increase or decrease the level.
  - **Method 3**: Select the middle of the button to open the menu. Type the requested value.

  Note

  By selecting **Auto***, the EA440 automatically adjusts the range according to the current depth.*

Example

In a surface echogram, set the **Start Range** value to 0 metres. This will make the echogram start from the sea surface (provided that the transducer offset has been defined). Set **Range** to the current depth plus 20 metres. The echogram will now show the area from the sea surface and down to 20 metres "below" the sea bottom. The sea bottom contour is easily detected when the depth changes.

In a bottom echogram, set the **Start Range** value to –5 metres. This will make the echogram start from 5 metres above the sea bottom. Set **Range** to the 5 metres plus 10 = 15 metres. The echogram will now show the area from 5 metres above the depth, and down to 10 meters "below" the sea bottom. The sea bottom contour will appear as a flat line.

Choosing the colours used to present the echograms

Several different colour scales are predefined and available for the presentation of echograms. You can easily choose which colours to use. The presentation colours have no effect on the operational performance of the EA440. The **Colour Setup** dialog box controls the presentation colours used by the EA440. This includes the palette ("skin"), the number of colours in use, and the colour scale.

Context

Which colour scale to use is mainly a personal preference based on ambient light conditions, the nature of the echoes and your own experience.

Keep in mind that in the basic scale with 12 colours, each discrete colour represents a 3 dB range of echo signal strength. This implies that the next colour is selected every time the echo strength is doubled.

Tip

By default you have 64 or 12 colours available to present the echoes, and a selection of palettes. The colour scale can be retrieved any time by selecting **Colour Scale** *on the top bar. The chosen colours are shown at the bottom of the EA440 presentation.*

If you choose to use many colours, the resolution of the EA440 presentation is greatly improved.

Tip

You can adjust the echo level range by means of the **Colour Scale** *settings. These are opened from the Colour Scale information pane. You can find the same settings in the* **Information Pane Options** *dialog box on the* **Active** *menu.*

The following colour scales are available.

12 colours | Sonar colours | Smooth ES | Grayscale | BI500 colours

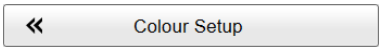
The **Smooth Echosounder** scale is based on the standard 12-colour scale. Additional colours have been added between them to make smoother colour transitions.

In addition to these colour scales, a special colour scale is available for sidescan presentations.

Procedure

1 Open the **Display** menu.

2 Select **Colour Setup**.



3 Select the number of colours you want to use.

Note

If you want to apply one of the predefined colour scales, you must select 64 colours.

4 Select the colour scale you want to use.

5 At the bottom of the dialog box, select **Apply** to preview your choice(s).

6 Select **OK** to save the selected setting and close the dialog box.

Defining the file and folder settings for raw data recording

The EA440 allows you to record both raw and processed echo data. The data are saved on the Operator Station hard disk - or on an external data storage device - according to the preferences you have defined.

Context

The **File Setup** parameters control how and where the recorded files are saved on the Operator Station hard disk, or on an external disk. By adding a file name prefix, you can also identify files recorded from any specific mission or survey. You can also define a maximum size of the data files.

Tip

Raw data files will normally become very large. If you wish to record large amounts of EA440 data, make sure that you have enough space on your hard disk. Unless your Operator Station is equipped with a very large disk, we recommend that you save the data to an external storage device.

Set up the file and folder parameters before you start the recording. If you wish to save your recorded data on an external hard disk, make sure that it is connected to the Operator Station.

If the current file size gets too big during recording, use the **File Setup** *function on the* **Record RAW** *button.* **Record RAW** *is located on the* **Operation** *menu.*

Procedure

1 Select the **Operation** icon.

The icon is located under the **Main** menu. It is used to open the **Operation** menu.

2 Select **Output**.

Observe that the **Output** dialog box opens. This dialog box contains a number of pages selected by the menu on the left side.

3 On the left side of the **Output** dialog box, select **File Setup** to open the page.

4 On the **File Setup** page, define the recording parameters.

5 Select **OK** to save the selected settings and close the dialog box.

Defining the file and folder settings for processed data recording

The EA440 allows you to record processed data. The data are saved on the Operator Station hard disk - or on an external data storage device - according to the preferences you have defined. You can also define the which file format to use.

Context

The **File Setup** parameters control how and where the recorded files are saved on the Operator Station hard disk, or on an external disk. By adding a file name prefix, you can also identify files recorded from any specific mission or survey. You can also define a maximum size of the data files.

Tip

Data files will normally become very large. If you wish to record large amounts of EA440 data, make sure that you have enough space on your hard disk. Unless your Operator Station is equipped with a very large disk, we recommend that you save the data to an external storage device.

Set up the file and folder parameters before you start the recording. If you wish to save your recorded data on an external hard disk, make sure that it is connected to the Operator Station.

If the current file size gets too big during recording, use the **File Setup** *function on the* **Record RAW** *button. This will close the current file, and then automatically continue recording to a new file.* **Record RAW** *is located on the* **Operation** *menu.*

Procedure

1 Select the **Operation** icon.

The icon is located under the **Main** menu. It is used to open the **Operation** menu.

2 Select **Output**.

Observe that the **Output** dialog box opens. This dialog box contains a number of pages selected by the menu on the left side.

3 On the left side of the **Output** dialog box, select **File Setup** to open the page.

4 On the **File Setup** page, define the relevant file and folder properties.

5 On the left side of the **Output** dialog box, select **Processed Data Output** to open the page.

6 Specify the recording parameters.

a Select an output type from the list.

Observe that the **Processed Data Output Configuration** dialog box opens to record the relevant settings for the chosen output format.

b Select the settings for the chosen output format.

- The output destination has been previously selected on the **File Setup** page.
- Select the channel to be used as source for the information. You can only choose from the channels that have already been installed. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

Note

Note that some formats will not allow you to create an output file.

c Select **Add** to save the output format.

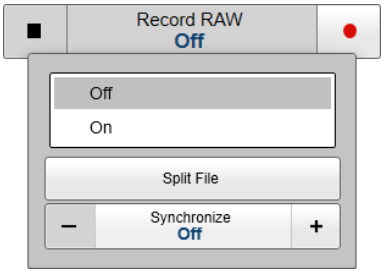
7 At the bottom of the **Output** dialog box, select **OK** to save the chosen parameters and close it.

Recording raw data

The raw data recording function provided by the EA440 allows you to save echo data using the `*.raw` format. The data files can be copied or moved to other recordable media, or to another computer on the network. You can keep the recorded files for scientific studies, future references, or for training purposes. The recording is controlled by the **Record RAW** function.

Prerequisites

Before you start data recording, make sure that you have defined where to store the files. To define which disks and folders to use to save the data files, use the **File Setup** page. The **File Setup** page is located in the **Output** dialog box. If you wish to save your recorded data on an external hard disk, make sure that it is connected to the Operator Station.



Context

On the EA440, you can save and recall echo information using the following methods and formats.

- Bitmap images (containing the full EA440 screen capture) are saved whenever you select **Screen Capture** on the top bar. The screen captures you make are saved in .jpg format on the hard disk in the Operator Station.
- Raw data is recorded using the **Record RAW** function on the **Operation** menu.
- A "history file" is recorded automatically and continuously. When the file is full, it will start to overwrite the oldest data, thus creating a "ring buffer".
- Processed data is recorded using the **Record Processed** function on the **Operation** menu.

Note

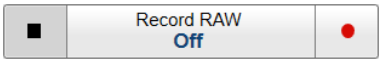
Raw data files will normally become very large. If you wish to record large amounts of EA440 data, make sure that you have enough space on your hard disk. Unless your Operator Station is equipped with a very large disk, we recommend that you save the data to an external storage device.

Procedure

1 Select the **Operation** icon.

The icon is located under the **Main** menu. It is used to open the **Operation** menu.

2 To start data recording, open the **Record RAW** button, and select *On*.



Alternatively, simply select the red circle on the right side of the button.

The **Record** indicator on the top bar changes its colour to reflect that recording is active.

On the EA440 you can record both RAW and processed data using the **Record RAW** and **Record Processed** functions. It may be useful to synchronize these two functions to automatically record all data formats simultaneously. To synchronize the recording functions, open the **Record RAW** button, and set **Synchronize** to *On*. The **Record Processed** button is then inhibited, and you can start and stop all recording by means of the **Record RAW** button.

3 If you wish to reduce the size of the data file you are recording, click the middle of the **Record RAW** button to open it, and select **Split File**.

The current file is closed, and a new file is automatically started.

4 To stop recording, open the **Record** button, and select *Off*.

Alternatively, select the black rectangle on the left side of the button to stop the recording.

Recording processed data

The processed data recording function provided by the EA440 allows you to save processed data on a selected format. The data files can be copied or moved to other recordable media, or to another computer on the network. You can keep the recorded files for scientific studies, future references, or for training purposes. The recording is controlled by the **Record Processed** function.

Prerequisites

Before you start data recording, make sure that you have defined where to store the files. To define which disks and folders to use to save the data files, use the **File Setup** page. The **File Setup** page is located in the **Output** dialog box. If you wish to save your recorded data on an external hard disk, make sure that it is connected to the Operator Station.

Before you start recording, you must also define which output format(s) you wish to use. To choose which processed data formats to record, select **Processed Data Output**. The **Processed Data Output** page is located in the **Output** dialog box.

Context

On the EA440, you can save and recall echo information using the following methods and formats.

- Bitmap images (containing the full EA440 screen capture) are saved whenever you select **Screen Capture** on the top bar.

- Raw data is recorded using the **Record RAW** function on the **Operation** menu.
- A "history file" is recorded automatically and continuously. When the file is full, it will start to overwrite the oldest data, thus creating a "ring buffer".
- Processed data is recorded using the **Record Processed** function on the **Operation** menu.

Note

The processed data is only an export format, and can not be played back on the EA440.

Data files will normally become very large. If you wish to record large amounts of EA440 data, make sure that you have enough space on your hard disk. Unless your Operator Station is equipped with a very large disk, we recommend that you save the data to an external storage device.

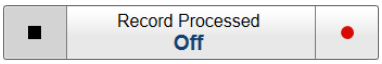
On the EA440 you can record both RAW and processed data using the **Record RAW** and **Record Processed** functions. It may be useful to synchronize these two functions to automatically record all data formats simultaneously. To synchronize the recording functions, open the **Record RAW** button, and set **Synchronize** to *On*. The **Record Processed** button is then inhibited, and you can start and stop all recording by means of the **Record RAW** button.

Procedure

1 Select the **Operation** icon.

The icon is located under the **Main** menu. It is used to open the **Operation** menu.

2 Make sure that the **Record Processed** function is available.



If the **Record Processed** function is unavailable, it is most likely because you have forgotten to specify an output format. Select output format and recording parameters on the **Processed Data Output** page. The **Processed Data Output** page is located in the **Output** dialog box.

3 To start data recording, open the **Record Processed** button, and select *On*.

Alternatively, simply select the red circle on the right side of the button.

4 To stop recording, open the **Record Processed** button, and select *Off*.

Alternatively, select the black rectangle on the left side of the button to stop the recording.

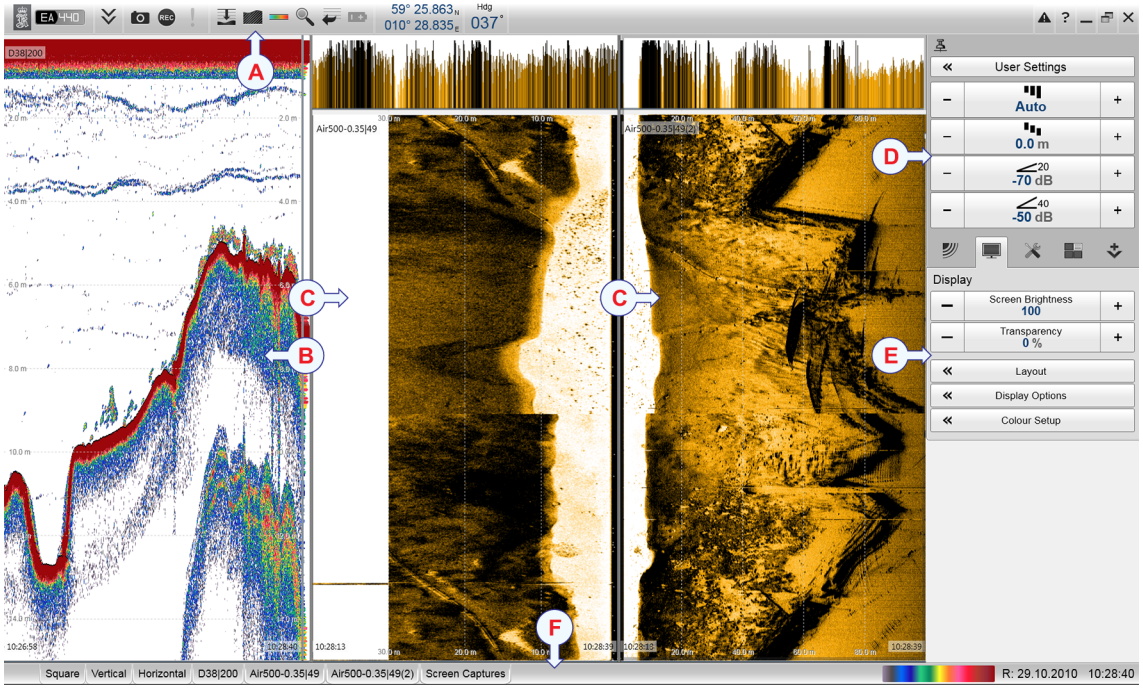
User interface introduction

Topics

EA440 presentation overview

By default, the EA440 presentation covers the entire screen. The EA440 consists of specific visual elements that work together. The visual elements provide you with the echo information you need, they help you to control the functionality needed to understand this information, and finally, they allow you to control the operational parameters.

This EA440 screen capture shows you a typical operational situation. The presentation provides you with a lot of information. You can see three echogram views; one vertical and two sidescan views. The top bar shows you navigational information, and offers buttons for key functions and information panes. The menu system on the right side gives you easy access to all the functionality offered by the EA440.



A *Top bar*

B *Echogram view*

C *Sidescan echogram*

D *Main menu*

E *Secondary menus*

F *Bottom bar*

Echogram views

The EA440 supports several different echogram types. Each echogram is shown in a separate view in the EA440 presentation. The tabs at the bottom of the EA440 presentation allows you to choose which channels to open.

Supported echogram types

- **Surface**

  A *Surface* echogram is mainly used when you wish to look at the entire water column starting from the sea surface and down to the sea bottom. Since this echogram is referenced to the sea surface, the sea bottom contour will vary with the actual depth. If you set up the **Start Range** and **Range** depths to place the sea bottom contour at the lower end of the echogram, you will have good opportunity to study the echoes from the water column.

- **Bottom**

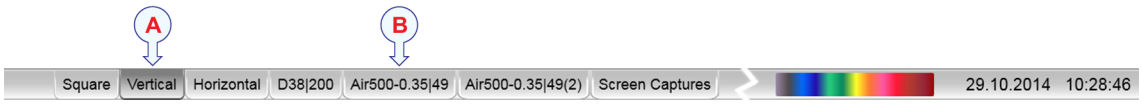
  A *Bottom* echogram is mainly used when you want to examine the echoes from fish close to the sea bottom. Since this echogram is referenced to the sea bottom, the sea surface will vary with the actual depth, while the bottom is drawn flat. This makes it easy to study the echoes from the sea bottom. You can investigate the sea bottom conditions and hardness, and detect fish.

- **Sidescan**

  The *Sidescan echogram* shows the bottom as seen from the side of the vessel hull. The horizontal angle is determined by the physical angle of the transducer installation. Sidescan operations can only be done if suitable transducers have been installed on the vessel.

Bottom bar

The number of tabs available on the bottom bar depends on how many channels your EA440 has. Two tab "groups" allow you to select channels and views. This example shows the EA440 with three channels. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.



A **Presentation modes**

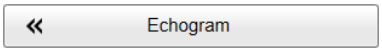
Three presentation modes are available when you wish to see all the echogram channels simultaneously in the EA440 presentation. The three tabs will arrange the echogram views vertically, horizontally, or in rectangular rows and columns.

By default, the echogram views are automatically arranged in the EA440 presentation. You can click and drag the border of each individual view to change its size. The size of the other views are reduced accordingly.

B **Selecting individual echogram channels**

Each channel is shown with a dedicated tab. The channel is identified with the name of the transducer in use. This name is the custom name you provided when you installed the transducer. Select a specific transducer tab to see only that channel in the EA440 presentation.

Selecting which echogram type to use



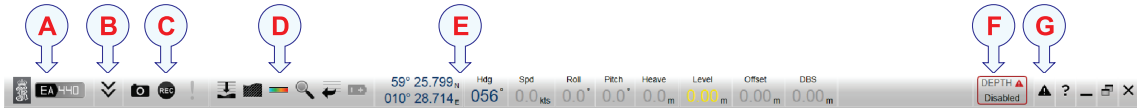
Once one or more echogram views are open, you can choose which echogram type to see.

Click once in the echogram view that you wish to change. This will make the view "active". A thick border is placed on the selected view to visualize this. Open the **Active** menu, click **Echogram** to open the dialog box, and select **Echogram Type** on the **Echogram** page.

In each echogram view, you can also select from a number of markers, lines and annotations to enhance the echogram, or to provide additional information. These can be selected on the **Lines** page in the **Echogram** dialog box.

Top bar description

The EA440 top bar is located at the top of the display presentation and stretches from the far left to the far right. The top bar gives you fast access to key functionality and navigational information. It provides buttons for hiding and showing the menu, making screen captures, opening the **Messages** dialog box, and opening context-sensitive help. And more importantly, from the top bar you can see when data recording is active.



A **Logo and product name**

This information identifies the brand and the product.

B **Menu button**

Select this button to hide or show the menu.

C **Screen Capture / Event / Record**

Select **Screen Capture** to make a copy of the current EA440 presentation. Select **Event** to initiate an event annotation on the echogram. The **Record** indicator shows you when recording is active.

D **Information panes**

Each information pane is opened and closed with its dedicated button on the top bar.

E **Navigational information**

These are not buttons, but separate read-outs that show useful information related to the vessel and/or EA440 navigation and operation. The information shown on the EA440 top bar must not be used for vessel navigation.

F **Depth Alarm**

You can define alarm limits for minimum and maximum depths. If the current depth changes to exceed the limits you have chosen, the alarm is triggered.

G **Messages button**

By flashing, the **Messages** button shows you that the EA440 has issued a message. The colour of the triangle reflects the severity of the most serious message. Select the button to open the **Messages** dialog box.

Information panes

The EA440 offers several *information panes* to provide additional and detailed data from the EA440 presentation. The information panes are opened and closed using the buttons on the top bar.

Before you open an information pane, you must first click in an echogram view to make it "active". By doing this you select the channel. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

Select the relevant button on the top bar to open the information pane.

In most cases, the data in the information pane is only valid for the selected channel.

To *close* the information pane, select the button on the top bar one more time. You can also select **Close** in the top right corner of the pane.

- **Depth**

  The *Depth* information pane provides the water depth in the current echogram view. If you have several echogram views open, you can place one pane in each view.

- **Bottom Hardness**

  The *Bottom Hardness* information pane shows you the current bottom reflectivity. This gives an indication to how hard the bottom is. The value is calculated using the bottom echo strength in the current ping.

- **Colour Scale**

  The *Colour Scale* information pane allows you to view the current colour scale in use, and to make changes to the echo levels it presents.

- **Zoom**

  The *Zoom* information pane allows you to magnify a chosen area of the current echogram.

- **History**

  The *History* information pane allows you to view previously recorded echogram sequences. Note that this information pane does not use the same presentation method as the other panes.

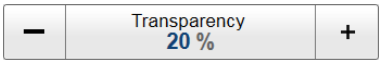
- **Transceiver Power Supply**

This readout shows you the current supply voltage provided to the transceiver.

Tip

You can easily change the physical size and shape of each information pane. Click in its lower right corner, and drag to a new size.

The **Transparency** *function allows you to adjust how much you are able to see "through" the information panes you have opened. The* **Transparency** *function is located on the* **Display** *menu.*

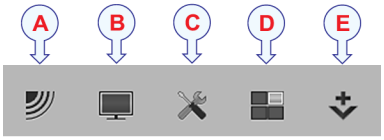


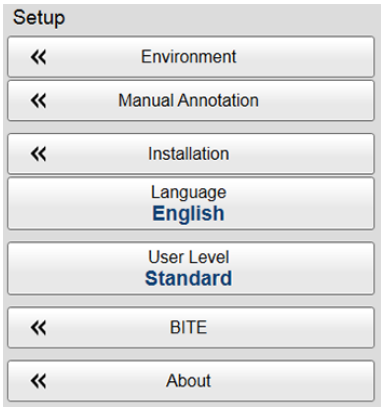
Menu system

The menu system is by default located on the right hand side of the EA440 presentation. The menus are organized in a tree structure with a main menu, a set of secondary menus, and several menu buttons. Some of the menu buttons open dialog boxes or sub-menus to offer additional choices.

The **Main** menu is located at the top of the menu structure. It offers the most common functions for efficient use of the EA440. Unless you hide the entire menu system from view, the **Main** menu is visible at all times, even if you close the secondary menus.

Below the **Main** menu, a set of dedicated icons are used to open the secondary menus.





A **Operation menu**: The **Operation** menu offers the most common functions for basic EA440 operation.

B **Display menu**: The **Display** menu provides basic functions related to the screen behaviour and presentation of EA440 data.

C **Setup menu**: The **Setup** menu provides basic functions related to the EA440 installation parameters and its communication with peripheral systems.

D **Active menu**: The **Active** menu offers parameters related to current views and data presentations shown by the EA440.

E **Extras menu**: The **Extras** menu is - in spite of its name and location - not a menu at all. This "menu" opens a small view to monitor key operational parameters.

Tip

Unless you need to make frequent changes to the operating parameters, you may want to hide the menu from the EA440 presentation. This will give you more space to present echo data. To hide the menu, select **Menu** *on the top bar. To retrieve it, select* **Menu** *one more time. When the menu is hidden, it is temporarily shown on the left or right side of the EA440 presentation if you move the cursor to that position.*

Setting up the EA440 Hydrographic single beam echo sounder for the first time

Installing the EA440 operational software

If your EA440 Hydrographic single beam echo sounder is provided with a Operator Station, the EA440 software has already been installed. If you intend to use your own computer, you must install the software yourself.

Prerequisites

In order to install the software, you need the relevant file set on a suitable media. If the software is provided on a CD or a DVD, and your computer is not fitted with a suitable drive, copy the files to a USB flash drive.

Note

Make sure that you have administrative rights on the Operator Station. You need this to install the software. If you purchased your own computer, you must verify that it meets the technical requirements for use with the EA440. Do this before you install the software.

Context

One or more valid software licenses are required to operate the EA440. The software licenses are installed after the EA440 software installation. The **Software License** page is provided for this purpose.

Procedure

1 Turn on the Operator Station.

2 Switch off any firewall applications.

3 Insert the EA440 software media.

If the EA440 software is provided on a CD or DVD, and your Operator Station is not fitted with a suitable drive, copy the files to a USB flash drive.

4 Use a file manager application on the Operator Station to access the software files.

5 Double-click `Setup.exe` to start the installation.

6 Allow the installation wizard to run. Follow the instructions provided.

We recommend that you install the software in the default folder suggested by the wizard.

In the last dialog box you are permitted to remove old settings. Since this is your first installation of the software, you can disregard this option.

7 Once the software installation has been completed, double-click the EA440 icon on the desktop to start the program.

8 Depending on your operating system parameters, certain dialog boxes may open.

a The Windows® 7 Firewall may open a dialog box requesting information about the network. Select **Public**, and then select **Allow access**.

b The operating system may also open other dialog boxes to verify that the EA440 software can run on the computer. You must permit this.

Further requirements

Observe the dedicated procedures for obtaining and installing the software licence(s).

Turning on the EA440 to *Passive* mode

In order to use the EA440, you must first turn it on. In this situation we do not want the EA440 to transmit, so we will leave it in *Passive* mode.

Prerequisites

This procedure assumes that the entire EA440 installation has been inspected. All power sources have been measured and verified. All system cables and connectors have been checked and tested. The EA440 has been installed on the Operator Station.

Context

The EA440 program is not automatically started when the Operator Station is turned on. Once the operating system has started, select the EA440 program icon on the desktop.

When the EA440 is powered up and set to *Normal* mode, it will use the transducer to transmit acoustic pulses into the water.

Caution

You must never start EA440 transmissions ("pinging") when the ship is in dry dock. The transducer may be damaged if it transmits in open air.

Procedure

1 Make sure that each WBT is turned on.

The WBT power supply is fitted with an on/off switch.

2 Turn on the display.

3 Turn on the Operator Station.

Wait while the operating system loads.

4 Double-click the EA440 icon on the Operator Station desktop to start the program.

5 Select user settings.

During the program load, a dialog box appears to let you choose from the current user settings available on the EA440. The dialog box is only visible a few seconds. You do not need to make a choice here. You can select your predefined user setting at any time by means of the **User Settings** dialog box on the **Main** menu.

6 Once the EA440 program has started, observe that the presentation fills the entire screen.

Obtaining and installing the software license

To operate the EA440 with a transceiver you need a valid software license. Before you can use the EA440 you must obtain a "license string" and install it on your Operator Station. Without a license you will not be able to communicate with the transceiver.

Prerequisites

This procedure assumes that the EA440 operating software has been successfully installed on the Operator Station.

Context

The software license is a 32 character hexadecimal string based on the transceiver's serial number. It defines several key parameters that control the functionality and behaviour of the transceiver(s) you use. Each software license code "unlocks" one WBT for operational use with a set of predefined properties.

The software license is not linked to the physical Operator Station. You can therefore easily move the software from one computer to another, just remember to make a copy of the license string.

In order to obtain a software license for your EA440, you must contact one of Kongsberg Maritime's dealers or agents. You can also contact our support department directly.

Note

Once you receive your software license string(s), do not lose them. We suggest that you copy the information into a text file (for example Notepad), and add relevant information. Place the text file on the Operator Station desktop, and make sure that backup copies are made.

Procedure

1 Obtain the necessary information about your transceiver(s) and transducer(s). Write down:

   a The serial number for each transceiver.

   b Which transducers you have connected to each transceiver.

   c The center frequency for each transducer.

   d The Q-value for each transducer.

   e The maximum nominal power rating for each transducer.

2 Send the necessary information directly to our support department.

   You can use the following e-mail address:

   km.hydrographic.support@kongsberg.com

Once the software license string(s) have been returned to you (most likely by e-mail), you can install the licenses into the software.

3 Observe the **Main** menu.

   Its default location is on the right side of the EA440 presentation.

4 Select the **Setup** icon.

   The icon is located under the **Main** menu. It is used to open the **Setup** menu.

5 On the **Setup** menu, select **Installation**.

   Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected from the menu on the left side.

6 On the left side of the **Installation** dialog box, select **Software License**.

   Observe that the **Software License** page opens.

7 Select **Type License String**, and type the license string into the dialog box.

If you do not have a computer keyboard connected to your EA440 system, select the **Keyboard** button to open an on-screen keyboard. If you have received the license string on an electronic format (e-mail or text file), you can copy the string from the source document and paste it into the **Type License String** dialog box.

8 Select **OK** to save the license string and close the **Type License String** dialog box.

9 Verify that the license string is placed in the **Currently active licenses** list.

If necessary, select the license string on the left side, and click the arrow button [>] to move it to the **Currently active licenses** list.

10 Select **Apply** and then **Close** to save all the parameters and close the **Installation** dialog box.

Defining the IP address on the Operator Station network adapter

The communication between the Operator Station and the transceiver(s) is made using a high capacity Ethernet cable. If more than one transceiver is used, an Ethernet switch is added.On the EA440, the necessary IP address is generated automatically. However, we recommend that you manually define which IP Address and Subnet mask the Ethernet adapter in the Operator Station shall use for this communication.

Prerequisites

This procedure is made for the Microsoft® Windows® 7 operating system. It is assumed that you are familiar with this operating system.

Context

As long as you do not change the Operator Station to another computer, or replace the network adapter in your Operator Station, you will only need to do this once.

Procedure

1 On the Operator Station, close the EA440 program.

2 Open the **Network and Sharing Center** dialog box.

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**: 157.237.15.16 *(Example, any IP address can be used)*
- **Subnet mask**: 255.255.255.0

You can leave **Subnet mask** blank and select **OK**. When you see an error message saying that the message subnet mask is missing, select **OK** again. A default subnet mask is then automatically generated.

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

Further requirements

If you later need to change the IP address, always restart the transceiver before you start the EA440.

Installing one or more transducers

The transducers you wish to use with the EA440 must be "installed" as a part of the software configuration. Which transducers to use depends on the number of transceivers in your system, and the licenses you have for these. Unless you replace a broken transducer, or add a new, you only need to do this once.

Prerequisites

It is assumed that the EA440 software has been installed, and that all relevant license strings have been applied. You need to know the type and serial number of each transducer that you wish to install.

Context

Each transducer is added using the **Transducer Installation** page. The **Transducer Installation** page is located in the **Installation** dialog box.

You can only choose a transducer from the **Model** list. The list is generated from a system file on your Operator Station. It contains all the transducers that are compatible with the WBT, but since the software is common for several systems there may also be non-compatible transducers in the list. The list also includes technical specifications for each transducer. You can not see this information, but it is used by the EA440 to set up the operational parameters. This allows the WBT to optimize its performance for the individual transducer models.

If you cannot find your transducer in the list, contact you dealer, agent or Kongsberg Maritime to upgrade the relevant software component in the EA440.

Note

Just making changes and selecting **OK** *at the bottom of the page will not install anything. Select what to install, define the relevant parameters, and then select* **Add**.

Procedure

1 Open the **Setup** menu.

2 On the **Setup** menu, select **Installation**.

This dialog box contains a number of pages selected from the menu on the left side.

3 On the left side of the **Installation** dialog box, select **Transducer Installation**.

4 Select the transducer you wish to install from the **Model** list.

Note

Make sure that you select a transducer that is supported by your current license.

5 Insert the serial number.

Some new Kongsberg transducers with built-in "intelligence" will automatically provide this serial number.

6 Type the name you wish to use into the **Custom Name** box.

Type any name that you wish to use to identify the transducer. The name you select will only be used to identify the transducer in other dialog boxes. It is not used in the echo data that you export. If you do not have a computer keyboard connected to your EA440 system, select the **Keyboard** button to open an on-screen keyboard.

7 Select mounting method.

8 Specify the orientation of the transducer beam.

9 Provide the accurate physical location of the transducer with reference to the vessel's coordinate system.

Use the centre of the transducer face as reference, and define the offset values related to the *Ship Origin*.

a Select the offset value on the X axis (fore-and-aft direction) from the *Ship Origin*. Adjust with a positive value for X if the transducer is located ahead of the ship origin.

b Select the offset value on the Y axis (athwartship) from the *Ship Origin*. Adjust with a positive value for Y if the transducer is located on the starboard side of the ship origin.

c Select the offset value on the Z axis (vertical) from the *Ship Origin*. Adjust with a positive value for Z if the transducer is located under the ship origin.

10 Select **Add** to save the information you have provided.

The transducer is added to the list in the **Installed Transducers** box.

11 Repeat for each transducer that you wish to install.

12 Continue your work in the **Installation** dialog box, or select **OK** to close it.

Result

Once a transducer has been installed, it is listed in the **Installed Transducers** box. To see the information you have collected about the transducer, select the relevant transducer in the list.

The **Edit** functionality on the **Transducer Installation** page makes it possible to change the information you have provided for the transducer. You cannot change the model identification and the serial number. The custom name is used several places in the user interface, and it can be changed.

The **Remove** functionality on the **Transducer Installation** page makes it possible to delete the information you have provided for the transducer. There is no "undo" functionality.

Installing transceiver channels

In order to use the EA440, the Operator Station must be connected to one or more transceivers, and each of them must in turn be connected to one or more transducers. Each channel must be installed before it can be put to use. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

Prerequisites

The EA440 has been set up with its hardware units connected as specified in the EA440 *Installation manual*.

- The EA440 is installed as specified in the EA440 *Installation manual*.
- All cables are connected and tested.
- Each transceiver is powered up.
- The software license for each transceiver is installed and activated.
- The Ethernet adapter in the Operator Station is set up with a unique IP address.
- All relevant transducers are installed using the **Transducer** page.

Context

The **Transceiver Installation** parameters control the installation and disconnection of transceivers. Every time the page is opened, the EA440 software automatically performs a search on the Ethernet network for transceivers.

The list in the upper part on the **Transceiver Installation** page shows you an overview of the transceivers and channels that are currently available. In this context, the phrase

channel is used as a common term to identify the combination of transceiver, transducer and operating frequency. Each channel is identified by the transceiver type and serial number and the transducer(s) in use. The current status for each channel is also provided.

- **Busy**: The channel is already in use, probably by another echo sounder on the same network. You cannot connect to this channel.
- **Installed**: This channel is connected to your EA440 system.
- **Lost**: This channel cannot be used.
- **Available**: This channel is vacant and ready for use.

Procedure

1 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

2 Select the **Setup** icon.

The icon is located under the **Main** menu. It is used to open the **Setup** menu.

3 On the **Setup** menu, select **Installation**.

Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected from the menu on the left side.

4 Install the channels(s).

a Observe that the transceiver(s) you have connected to the Operator Station are listed.

Each transceiver is identified with type and serial number. The available channels on each transceiver are listed separately.

b For each channel, choose which transducer to connect to.

The list of transducers available for installation is defined by those you installed on the **Transducer** page.

Note

This is a critical task. Make sure that the correct transducer is selected.

c Observe that the status for the relevant frequency channels change to *Installed*.

Tip

If no transceivers are listed:

- *Select* **Browse** *in the* **Transceiver Browsing** *box, and open the* **Local IP Address** *box. Select the correct address for the Ethernet adapter you are using. This will make the EA440 search the network for available transceivers.*
- *Check that each transceiver has been turned on.*
- *Verify that the Ethernet communication between the units is operational.*
- *If you are using an Ethernet switch, make sure that it works.*

5 Repeat until all the channels have been installed.

6 Close the **Installation** dialog box.

Result

When all channels have been installed, you can start normal operation.

Caution

You must never set the EA440 into normal operation when the ship is in dry dock. The transducer may be damaged if it transmits in open air.

Setting up the input from a navigation system (GPS)

For the EA440 to use and offer correct navigational information, one or more external sensors must be connected. Typical sensors are those that provide speed, heading and geographical position. To select which sensors to install, use the **Sensor Installation** page.

Prerequisites

- The new sensor is physically connected to the EA440 using a serial or network cable.
- The interface port is set up with the correct communication parameters.

Context

The **Sensor Installation** page allows your EA440 to communicate with external sensors and systems. You must specify which communication port to use (LAN (Local Area Network) or serial port). You can type a custom name to identify the sensor import. In the list of valid datagram formats, select the format(s) to be accepted by the EA440. Once a sensor has been chosen, you must select the offset values that define the sensor's physical location relative to your vessel's coordinate system.

Note

Certain sensors can not be interfaced using the **Sensor Installation** *page. To set up the input from these sensors, you must use the* **Select Inputs** *dialog box on the* **I/O Setup** *page.*

- *Annotations*

To open the **Select Inputs** *dialog box, select a serial or LAN port on the* **I/O Setup** *page, and select* **Input**.

Procedure

1 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

2 Select the **Setup** icon.

The icon is located under the **Main** menu. It is used to open the **Setup** menu.

3 On the **Setup** menu, select **Installation**.

Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected from the menu on the left side.

4 On the left side of the **Installation** dialog box, select **Sensor Installation**.

5 Select the type of sensor you want to interface.

6 Select which port you want to import the sensor information on.

7 Type a custom name to identify the interface in other dialog boxes.

8 Select which datagram(s) you want to import from the sensor.

9 If relevant, specify a dedicated talker ID.

10 Provide the accurate physical location of the sensor (or its antenna) with reference to the vessel's coordinate system.

The position of certain sensors must be defined as an *offset* to the *Ship Origin* in the coordinate system to maximize performance. These offset values are all required to allow the EA440 to give you as accurate information as possible. The degree of accuracy offered by the EA440 is directly related to the accuracy of the information you enter on the **Sensor Installation** page.

a Select the offset value on the X axis (fore-and-aft direction) from the *Ship Origin*. Adjust with a positive value for X if the sensor is located ahead of the ship origin.

b Select the offset value on the Y axis (athwartship) from the *Ship Origin*. Adjust with a positive value for Y if the sensor is located on the starboard side of the ship origin.

c Select the offset value on the Z axis (vertical) from the *Ship Origin*. Adjust with a positive value for Z if the sensor is located under the ship origin.

11 Select **Add** to save the new sensor interface you have defined.

The sensor interface is added to the **Installed Sensors** list on the **Sensor Installation** page.

12 Repeat for each sensor interface that you need to set up.

13 Close the **Installation** dialog box.

Further requirements

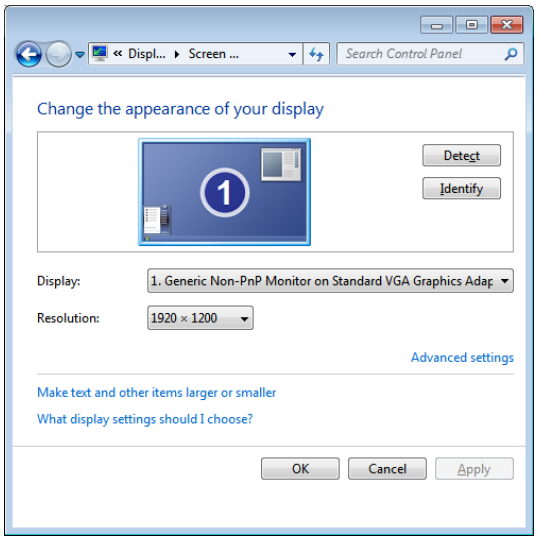
On the left side of the **Installation** dialog box, select **Sensor Configuration**. Define the priority of the datagrams, and set up relevant configuration parameters.

Adjusting the screen resolution

Some computers have graphic adapters that are not able to detect the resolution of the current display. This limitation can also be caused by the display cable, or by imperfections in a display matrix system. In such cases, you must use the functionality of the operating system to adjust the screen resolution.

Prerequisites

This procedure is made for the Microsoft® Windows® 7 operating system. It is assumed that you are familiar with this operating system.



Context

As a general recommendation, you should set the screen resolution as high as possible. This will allow you more "space" in the EA440 presentation to offer more detailed information. The physical width of your top bar will also be extended, and free space for icons and navigational information.

Unless you change the hardware (computer, graphic adapter or display), you will only need to do this once.

Procedure

1 On the Operator Station, close the EA440 program.

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

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

4 Observe that the Control Panel opens.

5 In the **Control Panel** dialog box, under **Appearance and Personalization**, select **Adjust screen resolution**.

6 Change the display settings.

   a Make sure that the correct display is shown.

   b Change the resolution to maximum permitted resolution for the display.

   c Select **OK**.

   d Observe that the screen resolution changes.

   e If you are satisfied with the new resolution, select **Keep changes** in the acknowledge dialog box.

7 Click the [**X**] in the top right corner to close the Control Panel.

Context sensitive on-line help

EA440 has a comprehensive context-sensitive on-line help system. All information in the EA440 Reference manual can also be found in the on-line help.

The context sensitive on-line help is located in a single proprietary Microsoft® CHM file. This CHM file will run on any computer with a Microsoft operating system. You can also copy the CHM file to any tablet device if you have a reader application that supports the CHM format.

Note

Due to limitations defined by Microsoft®, CHM files will not open from websites and servers.

To open the help system, select **Help** in any dialog box. This will provide instantaneous information about the relevant dialog box. Links to related procedures and topics are provided.

You navigate in the online help file using the menu system on the left side, as well as the interactive links within the document.

Note

To open the online help on its start page, select **Help** *on the top bar. To read about a dialog box and the options provided, select the* **[?]** *button in its top right corner.*

The EA440 online help may not be available for the language you have chosen for the user interface. If your language is not supported, the English online help is provided.

Operating procedures

Topics

Turning on the EA440

In order to use the EA440, you must first turn it on. You must first turn on the display, the Operator Station, the transceiver(s), and the Ethernet switch (if applicable). After this you can start the EA440 program.

Prerequisites

The EA440 is installed as specified in the EA440 *Installation manual*. Minimum one transceiver with one or more transducers has been connected.

Caution

You must never turn on the EA440 when the ship is in dry dock. The transducer(s) may be damaged if the EA440 transmits in open air.

Procedure

1 Make sure that each WBT is turned on.

2 Turn on the display.

3 Turn on the Operator Station.

4 Double-click the EA440 icon on the Operator Station desktop to start the program.

5 On the **Main** menu in the top right corner of the presentation, select **User Settings**, and then choose the default settings.

6 At the bottom of the **Main** menu, observe that the **Operation** menu icon is flashing.

It is flashing to indicate that even if the EA440 is turned on, "pinging" is disabled. The EA440 is in *Normal* mode, but **TX Power** is set to *Off* to prevent transmission. This is for safety reasons.

Related topics

Ping function, page 252
Ping Mode function, page 254

Choosing operating mode and key transmit parameters

Topics

Selecting *Normal* mode

In order to transmit ("ping") you must set the EA440 to *Normal* mode.

Context

The **Operation** function controls the operating mode of the EA440. You can set it to *Inactive*, *Normal* or *Replay*. *Normal* mode allows the EA440 to transmit ("ping") through the water, and to receive the echoes.

Caution

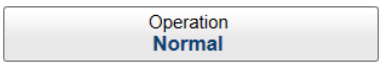
You must never start EA440 transmissions ("pinging") when the ship is in dry dock. The transducer may be damaged if it transmits in open air.

Procedure

1 Select the **Operation** icon.

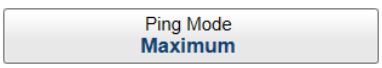
The icon is located under the **Main** menu. It is used to open the **Operation** menu.

2 Select **Operation**, and set it to *Normal*.



3 Set **Ping** to *On*.

4 Set **Ping Mode** to *Maximum*.



Result

The EA440 is now transmitting acoustic pulses ("pinging") into the water.

Related topics

Operation function, page 247
Ping function, page 252
Ping Mode function, page 254

Selecting *Inactive* mode

Inactive mode is provided to pause the EA440 operation temporarily. Neither transmission nor reception will take place. The current echoes will be removed from the presentation.

Context

The **Operation** function controls the operating mode of the EA440. You can set it to *Inactive*, *Normal* or *Replay*.

Note

Note that Inactive operating mode is not the same as Passive mode. While Inactive mode stops both transmission and reception, Passive mode will still allow the EA440 to receive echoes. If you wish to switch to Passive mode, use the **Normal Operation** *dialog box.*

Procedure

1 Select the **Operation** icon.

The icon is located under the **Main** menu. It is used to open the **Operation** menu.

2 Select **Operation**, and set it to *Inactive*.

Result

When the EA440 has been disabled using this function, it will stop. The transmission ("pinging") stops.The current echoes will be removed from the presentation.

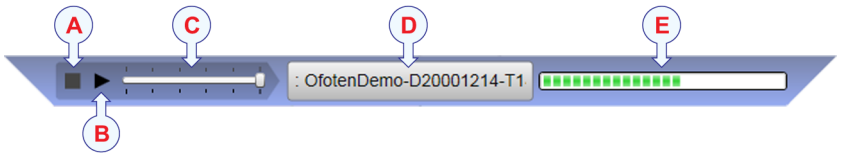
Related topics

Operation function, page 247

Selecting *Replay* mode

The *Replay* mode allows you to play back previously recorded raw data. The EA440 is not operational while in *Replay* mode. Neither transmission nor reception takes place.

All playback is controlled by the replay bar.



A ***Stop****: Select this button to stop the playback.*

B ***Play/Pause****: Select this button to start the playback, or to pause it.*

C ***Replay speed****: Select this slider and move it sideways to adjust the replay speed.*

D ***Replay file****: This button shows which file you are currently playing.*

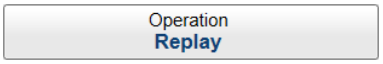
E ***Progress****: This bar shows you the replay progress of the current file.*

Procedure

1 Select the **Operation** icon.

The icon is located under the **Main** menu. It is used to open the **Operation** menu.

2 Set **Operation** to *Replay*.



The replay bar opens automatically. It is positioned directly below the top bar at the top of the EA440 presentation.

If you need to select which files to replay, click **Replay File** under the **Operation** button. You can also click the large button in the middle of the replay bar.

3 Select **Play/Pause** to start the playback.

4 To stop the replay, choose any other operational mode.

Related topics

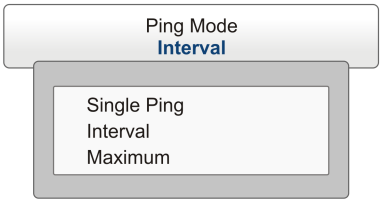
Operation function, page 247
Record RAW function, page 256

Transmitting at maximum ping rate

You can set up the EA440 to transmit a ping as often as possible.

Context

The **Ping Mode** function is used to control how often the EA440 will transmit its energy into the water. For normal use, choose *Maximum*. This will allow the EA440 to transmit continuously and as often as possible.



Procedure

1 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

2 Select the **Operation** icon.

The icon is located under the **Main** menu. It is used to open the **Operation** menu.

3 Set **Ping Mode** to *Maximum*.

4 On the **Operation** menu, set **Ping** to *On*.

Related topics

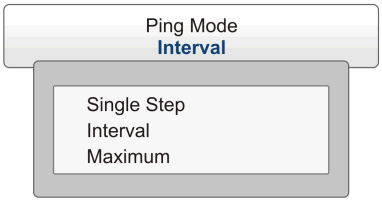
Ping function, page 252
Ping Mode function, page 254

Transmitting single pings

You can set up the EA440 to transmit a ping only when you select the **Ping** button.

Context

The **Ping Mode** function is used to control how often the EA440 will transmit its energy into the water. For normal use, choose *Maximum*. This will allow the EA440 to transmit continuously and as often as possible.



If you choose *Single Ping*, you can transmit single pings by selecting the ping symbol on the **Ping** button.

Procedure

1 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

2 Select the **Operation** icon.

The icon is located under the **Main** menu. It is used to open the **Operation** menu.

3 Set **Ping Mode** to *Single Ping*.

4 Select the ping symbol on the right side of the **Ping** button to transmit one single ping.

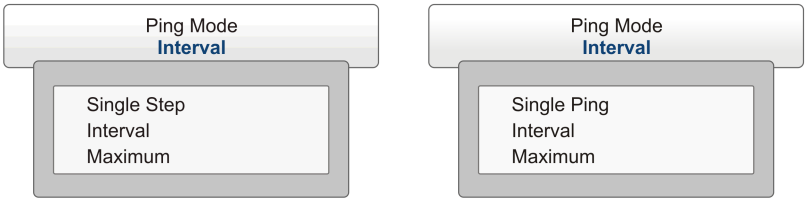
Related topics

Ping function, page 252
Ping Mode function, page 254

Transmitting with fixed-time intervals

You can set up the EA440 to transmit a ping at a fixed time interval.

Context



The **Ping Mode** function is used to control how often the EA440 will transmit its energy into the water. For normal use, choose *Maximum*. This will allow the EA440 to transmit continuously and as often as possible.

If you choose *Interval*, you must define the time between each ping with the **Ping Interval** function. The time interval (in milliseconds) is chosen with the **Ping Interval** function.

Procedure

1 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

2 Select the **Operation** icon.

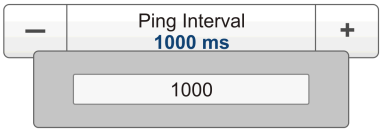
The icon is located under the **Main** menu. It is used to open the **Operation** menu.

3 Set **Ping Mode** to *Interval*.

4 Specify the interval between each ping.

a Select either side (+ or –) of the **Ping Interval** button to select the requested time between each ping.

b Select **Ping Interval** to open it, and type the requested time between each ping.



Select either side of the button to choose a value. Select the middle of the button to open it. If you have a keyboard connected to the EA440, you can type the requested value in the text box.

You can also change the value by selecting - and holding - the middle of the button, and move the cursor sideways. Move the cursor towards left to reduce the value, or towards right to increase the value. Release the mouse button when the requested value is shown on the button.

5 On the **Operation** menu, set **Ping** to *On*.

6 Select the symbol on the right side to start pinging.

Related topics

Ping function, page 252
Ping Mode function, page 254
Ping Interval function, page 255

Verifying or changing the environmental parameters

In order to make correct measurements of the targets in the water column, as well as the current depth, you must set up the correct environmental parameters.

Context

In order to obtain accurate depth readings and fish echoes, it is very important that the sound speed through the water is set correctly. Several parameters are required to calculate the correct sound speed value. If these parameters are not known to you, use the default value 1494 m/s. This is a typical mean value for sound speed.

Procedure

1 Select the **Setup** icon.

The icon is located under the **Main** menu. It is used to open the **Setup** menu.

2 Select **Environment**.

Observe that the **Environment** dialog box opens.

Water Column page, page 297

3 Specify if you work in fresh or salt water.

4 Specify the relevant environmental parameters.

5 Specify the sound speed.

If you select *Calculated*, the EA440 will calculate the sound speed based on the parameters you have provided. If you select *Manual*, you can provide your own value.

6 To study the resulting absorption curve, select the **Absorption** page.

To increase the physical size of the curve, simply increase the size of the dialog box.

7 Select **OK** to save the settings and close the dialog box.

Related topics

Environment dialog box, page 296

Setting the user level

Set the user level to **Basic** to test the system without changing important settings.

Context

Use the Basic user level to test out functions in the system without changing important settings. The Basic user level does not have access to **Record Processed**, **Output**, **Environment** and **Installation**. The standard user level has access to all functions.

Procedure

1 On the **Setup** menu, select **User Level**.

2 Select **Set User Level** to open the dialog box.

3 Enter **Password** as the password for changing the user level.

The same password is used for both basic and standard user.

4 Select the **User Level** you want.

5 Select **Apply** for the change to occur.

6 Select **OK** to close the dialog box.

Related topics

Set User Level dialog box, page 328

Opening the context-sensitive online help

EA440 has a comprehensive context-sensitive on-line help system. All information in the EA440 Reference manual can also be found in the on-line help. The online help can be opened from all dialog boxes in the EA440 user interface. You can also use the **Help** button on the top bar.

Context

The context sensitive on-line help is located in a single proprietary Microsoft® CHM file. This CHM file will run on any computer with a Microsoft operating system. You can also copy the CHM file to any tablet device if you have a reader application that supports the CHM format.

Note

Due to limitations defined by Microsoft®, CHM files will not open from websites and servers.

To open the help system, select **Help** in any dialog box. This will provide instantaneous information about the relevant dialog box. Links to related procedures and topics are provided.

You navigate in the online help file using the menu system on the left side, as well as the interactive links within the document.

Note

The EA440 online help may not be available for the language you have chosen for the user interface. If your language is not supported, the English online help is provided.

Procedure

1 Select **Help** on the top bar.

The online help opens on its start page. Observe the menu on the left side of the help window. If you have a computer keyboard connected, you can use the search functionality.

2 Select **Help** in the top right corner of each dialog box.

The description of the relevant dialog box opens. Observe the menu on the left side of the help window. If you have a computer keyboard connected, you can use the search functionality.

Related topics

Updating the online help file, page 166
Adding an online help file in a new language, page 167

Controlling the gain and range settings

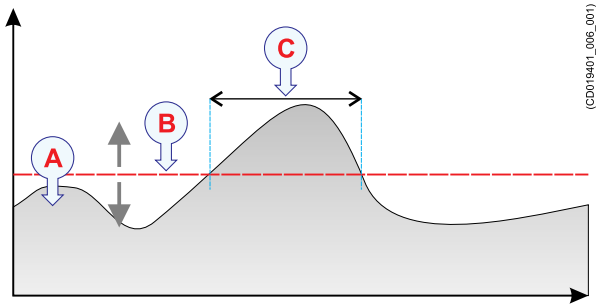
Topics

Adjusting the gain (echo sensitivity)

You can compare this gain setting with the volume control on your car radio. When the gain is increased, the echoes will appear stronger. Weak echoes will be easier to see. However, since you also increase the acoustic noise in the reception, the EA440 presentations will also show this noise. Too much gain may therefore "distort" the presentation.

Context

Comparing the gain function with the volume control on your car radio is not very accurate. In fact, the gain in the EA440 is constant. The **Gain** function is used to adjust the sensitivity. This done by controlling the minimum level of detection. When you *increase* the gain level (more positive number) , you reduce the minimum level, and thus *increase* the sensitivity.



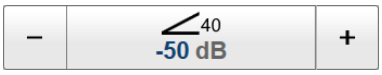
*The echo strength (A) changes with time. The minimum level of detection (B) is adjusted up or down with the **Gain** function. Increasing the **Gain** with a more positive number reduces the minimum level, and this increases the sensitivity. Only echoes over the minimum level are shown in the echogram (C).*

Procedure

1 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

2 Observe the **Gain** button.



Gain function, page 243

3 The following methods can be used for this adjustment:

- **Method 1**: Select [+] or [-] to choose the level.
- **Method 2**: Select the middle of the button and keep the mouse button pressed. Drag the cursor sideways to increase or decrease the level.
- **Method 3**: Select the middle of the button to open the menu. Type the requested value.

Note

Do not confuse this **Gain** *setting with the* **TVG** *(Time Varied Gain) setting.*

Adjusting the TVG (Time Variable Gain) setting, page 69

TVG function, page 342

Related topics

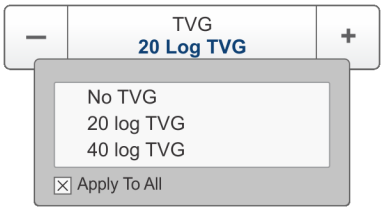
Adjusting the TVG (Time Variable Gain) setting, page 69
Gain function, page 243

Adjusting the TVG (Time Variable Gain) setting

When an acoustic pulse is sent through the water, it will gradually lose its energy. The greater the distance between the transducer and the target(s), the greater the loss of energy. **TVG** (Time Variable Gain) compensates for the loss of acoustic energy due to geometric spread and absorption. Use the **TVG** button or the **Echogram** dialog box.

Context

The TVG (Time Varible Gain) compensation is designed to counteract the natural phenomena of geometric spread and absorption loss. In the EA440, the TVG compensation is made using digital signal processing software.



Tip

You can select TVG using this function. You can also adjust the TVG setting in the **Echogram** *dialog box. The* **TVG** *function is located on the* **Echogram** *page.*

Procedure

1 Click in any echogram view to make it "active".

The setting you choose will only be valid for the currently "active" echogram. The "active" echogram view is identified with a thicker border.

2 Select the **Active** icon.

The icon is located under the **Main** menu. It is used to open the **Active** menu.

3 Locate the **TVG** button.

4 Choose your requested setting for TVG (Time Variable Gain).

- **No TVG**: TVG compensation is not implemented. This setting is hardly ever used.
- **20 Log TVG**: Volume backscattering strength
- **40 Log TVG**: Point backscattering strength

5 Select **Apply to All** if you wish to use the chosen setting on all the echograms of the same type.

Related topics

Adjusting the gain (echo sensitivity), page 68
TVG function, page 342
Echogram page, page 347

Choosing **Range** and **Start Range** values in a surface-related echogram

A *Surface* echogram is mainly used when you wish to look at the entire water column starting from the sea surface and down to the sea bottom. In a *Surface* echogram, the start depth of the echogram is defined by the positive **Start Range** depth value. The range from this start depth and down is defined by the **Range** value.

Context

The **Range** setting defines how "deep" you wish the EA440 to detect echoes. In other words, this is the vertical distance between the "top" and the "bottom" of the echogram. The **Range** setting specifies the "bottom" depth, while the **Start Range** setting specifies the "top" depth.

The range you specify applies to the currently selected echogram. (It is identified with a thick border.) Several echogram types are available.

In a *Surface* echogram, the **Start Range** value is used to determine from which depth the echogram will start. This is normally a few metres below the sea surface. The **Range** value is then used to define the vertical extension of the echogram. The **Range** may be

set to *Auto*, but for scientific purposes a fixed range is recommended. The *Auto* setting allows the EA440 to automatically determine the depth range based on bottom detection.

Example

Start Range in a surface-related echogram

In a surface echogram, set the **Start Range** value to 0 metres. This will make the echogram start from the sea surface (provided that the transducer offset has been defined). Set **Range** to the current depth plus 20 metres. The echogram will now show the area from the sea surface and down to 20 metres "below" the sea bottom. The sea bottom contour is easily detected when the depth changes.

Procedure

1 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

2 Locate the **Start Range** function.

Start Range function, page 241

3 Choose a positive value for **Start Range** to place the top of the echogram at the preferred depth below the sea bottom.

4 Locate the **Range** function.

Range function, page 240

5 Choose a positive value for **Range** to place the bottom of the echogram at the preferred depth over or under the sea bottom.

Related topics

Range function, page 240
Start Range function, page 241
Surface echogram description, page 202

Choosing **Range** and **Start Range** values in a bottom-related echogram

A *Bottom* echogram is mainly used when you want to examine the sea bottom conditions. In a *Bottom* echogram, the start depth of the echogram is defined by the negative **Start Range** depth value. The range from this start depth is defined by the **Range** value.

Context

The **Range** setting defines how "deep" you wish the EA440 to detect echoes. In other words, this is the vertical distance between the "top" and the "bottom" of the echogram. The **Range** setting specifies the "bottom" depth, while the **Start Range** setting specifies the "top" depth.

The range you specify applies to the currently selected echogram. (It is identified with a thick border.) Several echogram types are available.

In a *Bottom* echogram, the **Range** value is "added" to the **Start Range** value to determine the vertical depth of the echogram. The **Start Range** value must be negative because the echogram must start from a preferred height over the bottom.

Example

Start Range and **Range** in bottom-related echogram

In a bottom echogram, set the **Start Range** value to –5 metres. This will make the echogram start from 5 metres above the sea bottom. Set **Range** to the 5 metres plus 10 = 15 metres. The echogram will now show the area from 5 metres above the depth, and down to 10 meters "below" the sea bottom. The sea bottom contour will appear as a flat line.

Procedure

1 Click in any echogram view to make it "active".

The setting you choose will only be valid for the currently "active" echogram. The "active" echogram view is identified with a thicker border.

2 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

3 Locate the **Start Range** function.

4 Choose a negative value for **Start Range** to place the start depth at the preferred distance over the sea bottom.

The following methods can be used for this adjustment:

- Select [+] or [-] to choose the requested setting.
- Select the middle of the button and keep the mouse button pressed. Drag the cursor sideways to increase or decrease the level.

- Select the middle of the button to open the menu. Type the requested value.

You can only type a new value if a computer keyboard is connected to your EA440 Operator Station.

5 Locate the **Range** function.

6 Choose a positive value for **Range** to place the bottom of the echogram at the preferred depth under the sea bottom.

Related topics

Range function, page 240
Start Range function, page 241
Bottom echogram description, page 205

Choosing **Range** and **Start Range** values in a sidescan echogram

In a sidescan echogram, the start depth of the echogram is defined by the positive **Start Range** depth value. The range from this start depth and sideways is defined by the **Range** value.

Context

The **Range** setting defines how "deep" you wish the EA440 to detect echoes. In other words, this is the vertical distance between the "top" and the "bottom" of the echogram. The **Range** setting specifies the "bottom" depth, while the **Start Range** setting specifies the "top" depth.

In a sidescan echogram, the **Start Range** value is used to determine from which slant distance from the hull the echogram shall start. This is normally chosen to be a few meters away from the hull. The **Range** value is then used to define the horizontal extension of the presentation.

Note

The bottom detection functionality of the EA440 is disabled in sidescan echograms. This means that the **Range** *value you define will be used to determine the ping rate. A very long range will make the EA440 wait for a long time between each ping.*

Procedure

1 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

2 Locate the **Start Range** function.

3 Choose a positive value for **Start Range** to place the start of the echogram at the preferred distance from the hull.

The following methods can be used for this adjustment:

- Select [+] or [-] to choose the requested setting.
- Select the middle of the button and keep the mouse button pressed. Drag the cursor sideways to increase or decrease the level.
- Select the middle of the button to open the menu. Type the requested value.

You can only type a new value if a computer keyboard is connected to your EA440 Operator Station.

4 Locate the **Range** function.

5 Choose a positive value for **Range** to place the outer limit of the echogram at the preferred horizontal distance.

Related topics

Range function, page 240
Start Range function, page 241
Sidescan echogram description, page 207

Recording and replaying raw echo data

Topics

Defining the file and folder settings for raw data recording

The EA440 allows you to record both raw and processed echo data. The data are saved on the Operator Station hard disk - or on an external data storage device - according to the preferences you have defined.

Context

The **File Setup** parameters control how and where the recorded files are saved on the Operator Station hard disk, or on an external disk. By adding a file name prefix, you can also identify files recorded from any specific mission or survey. You can also define a maximum size of the data files.

Tip

Raw data files will normally become very large. If you wish to record large amounts of EA440 data, make sure that you have enough space on your hard disk. Unless your Operator Station is equipped with a very large disk, we recommend that you save the data to an external storage device.

Set up the file and folder parameters before you start the recording. If you wish to save your recorded data on an external hard disk, make sure that it is connected to the Operator Station.

If the current file size gets too big during recording, use the **File Setup** *function on the* **Record RAW** *button.* **Record RAW** *is located on the* **Operation** *menu.*

Procedure

1 Select the **Operation** icon.

The icon is located under the **Main** menu. It is used to open the **Operation** menu.

2 Select **Output**.

Observe that the **Output** dialog box opens. This dialog box contains a number of pages selected by the menu on the left side.

3 On the left side of the **Output** dialog box, select **File Setup** to open the page.

4 On the **File Setup** page, define the recording parameters.

5 Select **OK** to save the selected settings and close the dialog box.

Related topics

Accessing the processed data files to delete, move or copy them, page 85
File Setup page, page 262

Recording raw data

The raw data recording function provided by the EA440 allows you to save echo data using the `*.raw` format. The data files can be copied or moved to other recordable media, or to another computer on the network. You can keep the recorded files for scientific studies, future references, or for training purposes. The recording is controlled by the **Record RAW** function.

Prerequisites

Before you start data recording, make sure that you have defined where to store the files. To define which disks and folders to use to save the data files, use the **File Setup** page. The **File Setup** page is located in the **Output** dialog box. If you wish to save your recorded data on an external hard disk, make sure that it is connected to the Operator Station.

Context

On the EA440, you can save and recall echo information using the following methods and formats.

- Bitmap images (containing the full EA440 screen capture) are saved whenever you select **Screen Capture** on the top bar. The screen captures you make are saved in .jpg format on the hard disk in the Operator Station. The **Screen Captures** tab on the bottom bar opens a dedicated viewer that allows you to open these images. In the viewer you can also open the file folder on the Operator Station hard disk. You can copy, rename or delete the image files.
- Raw data is recorded using the **Record RAW** function on the **Operation** menu. To play back data, use **Operation** to select *Replay* mode.This mode allows you to replay previously recorded data on the EA440. When in *Replay* mode, the EA440 is not able to transmit ("ping"). For this reason, the EA440 is inactive during playback.
- A "history file" is recorded automatically and continuously. When the file is full, it will start to overwrite the oldest data, thus creating a "ring buffer". These images can be recalled using the *History* information pane. The information in

the *History* presentation is the same as on the original echogram presentation. To open the *History* information pane, select the button on the top bar.

- Processed data is recorded using the **Record Processed** function on the **Operation** menu.

  Note

  The processed data is only an export format, and can not be played back on the EA440.

Note

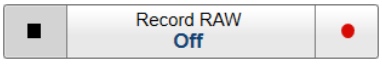
Raw data files will normally become very large. If you wish to record large amounts of EA440 data, make sure that you have enough space on your hard disk. Unless your Operator Station is equipped with a very large disk, we recommend that you save the data to an external storage device.

Procedure

1 Select the **Operation** icon.

The icon is located under the **Main** menu. It is used to open the **Operation** menu.

2 To start data recording, open the **Record RAW** button, and select *On*.



Alternatively, simply select the red circle on the right side of the button.

The **Record** indicator on the top bar changes its colour to reflect that recording is active.

On the EA440 you can record both RAW and processed data using the **Record RAW** and **Record Processed** functions. It may be useful to synchronize these two functions to automatically record all data formats simultaneously. To synchronize the recording functions, open the **Record RAW** button, and set **Synchronize** to *On*. The **Record Processed** button is then inhibited, and you can start and stop all recording by means of the **Record RAW** button.

3 If you wish to reduce the size of the data file you are recording, click the middle of the **Record RAW** button to open it, and select **Split File**.

The current file is closed, and a new file is automatically started.

4 To stop recording, open the **Record** button, and select *Off*.

Alternatively, select the black rectangle on the left side of the button to stop the recording.

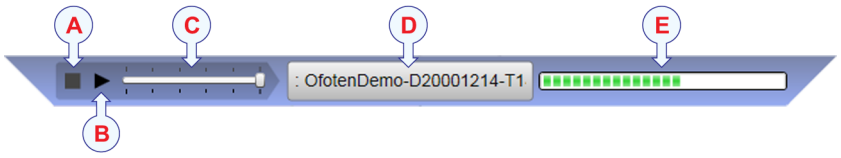
Related topics

Defining the file and folder settings for processed data recording, page 81
Accessing the processed data files to delete, move or copy them, page 85
Record RAW function, page 256
File Setup page, page 262

Selecting *Replay* mode

The *Replay* mode allows you to play back previously recorded raw data. The EA440 is not operational while in *Replay* mode. Neither transmission nor reception takes place.

All playback is controlled by the replay bar.



A ***Stop****: Select this button to stop the playback.*

B ***Play/Pause****: Select this button to start the playback, or to pause it.*

C ***Replay speed****: Select this slider and move it sideways to adjust the replay speed.*

D ***Replay file****: This button shows which file you are currently playing.*

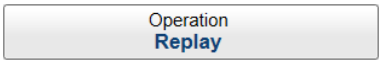
E ***Progress****: This bar shows you the replay progress of the current file.*

Procedure

1 Select the **Operation** icon.

The icon is located under the **Main** menu. It is used to open the **Operation** menu.

2 Set **Operation** to *Replay*.



The replay bar opens automatically. It is positioned directly below the top bar at the top of the EA440 presentation.

If you need to select which files to replay, click **Replay File** under the **Operation** button. You can also click the large button in the middle of the replay bar.

3 Select **Play/Pause** to start the playback.

4 To stop the replay, choose any other operational mode.

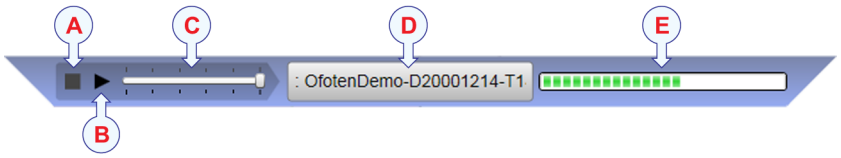
Related topics

Operation function, page 247
Record RAW function, page 256

Choosing which echo data file(s) to replay

Every time you record echo data, the information is stored on the Operator Station hard disk. Depending on your initial settings, the files may also be stored on a USB hard disk or even a network disk. The echo data files can be retrieved, and played back on the EA440.

All playback is controlled by the replay bar.



A ***Stop****: Select this button to stop the playback.*

B ***Play/Pause****: Select this button to start the playback, or to pause it.*

C ***Replay speed****: Select this slider and move it sideways to adjust the replay speed.*

D ***Replay file****: This button shows which file you are currently playing.*

E ***Progress****: This bar shows you the replay progress of the current file.*

Procedure

1 Select the **Operation** icon.

The icon is located under the **Main** menu. It is used to open the **Operation** menu.

2 Select **Operation** to see the available choices.

3 Select **Replay File** to open the dialog box.

The **Replay File** dialog box allows you to choose which file(s) to play back. The file names were generated automatically during recording, and each file is identified with the time and date it was made.

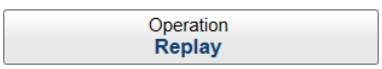
4 Select **Add** to choose a replay file.

A standard operating system dialog box is used to locate and select the files you wish to use.

5 If you wish to replay the selected files in an "endless" loop, select **Loop**.

6 Select **OK** to save the selected settings and close the dialog box.

7 Set **Operation** to *Replay*.



The replay bar opens automatically. It is positioned directly below the top bar at the top of the EA440 presentation.

Related topics

Operation function, page 247
Record RAW function, page 256
Record Processed function, page 258

Accessing the raw data files to delete, move or copy them

The raw data recording function provided by the EA440 allows you to save echo data using the `*.raw` format. You can save to the Operator Station hard disk, or onto an external disk. You can keep the recorded files for scientific studies, future references, or for training purposes. The data files can be copied or moved to other recordable media, or to another computer on the network.

Prerequisites

It is assumed that you are familiar with the Microsoft® operating system utilities for file handling.

You need a data storage device. This is typically a large capacity USB flash drive or a small portable hard disk. You can also connect the Operator Station to a network, and copy the files to a server.

Procedure

1 Prepare a data storage device.

2 Observe the **Screen Captures** tab at the bottom of the EA440 presentation.

3 Select the **Screen Captures** tab to open the screen capture browser.

4 In the browser, select **Open Image Folder** to open the operating system folder.

5 In the file manager utility, locate the folder you defined on the **File Setup** page.

6 Use the functionality provided by the operating system to delete the files, or to copy or move them to the storage device.

7 Close the file manager utility.

8 To resume normal EA440 operation, select any other tab on the bottom bar.

Related topics

Screen Capture button description, page 179
Bottom bar, page 218

Exporting processed echo data

Topics

Defining the file and folder settings for processed data recording

The EA440 allows you to record processed data. The data are saved on the Operator Station hard disk - or on an external data storage device - according to the preferences you have defined. You can also define the which file format to use.

Context

The **File Setup** parameters control how and where the recorded files are saved on the Operator Station hard disk, or on an external disk. By adding a file name prefix, you can also identify files recorded from any specific mission or survey. You can also define a maximum size of the data files.

Tip

Data files will normally become very large. If you wish to record large amounts of EA440 data, make sure that you have enough space on your hard disk. Unless your Operator Station is equipped with a very large disk, we recommend that you save the data to an external storage device.

Set up the file and folder parameters before you start the recording. If you wish to save your recorded data on an external hard disk, make sure that it is connected to the Operator Station.

If the current file size gets too big during recording, use the **File Setup** *function on the* **Record RAW** *button.* **Record RAW** *is located on the* **Operation** *menu.*

Procedure

1 Select the **Operation** icon.

The icon is located under the **Main** menu. It is used to open the **Operation** menu.

2 Select **Output**.

Observe that the **Output** dialog box opens. This dialog box contains a number of pages selected by the menu on the left side.

3 On the left side of the **Output** dialog box, select **File Setup** to open the page.

4 On the **File Setup** page, define the relevant file and folder properties.

5 On the left side of the **Output** dialog box, select **Processed Data Output** to open the page.

6 Specify the recording parameters.

a Select an output type from the list.

Observe that the **Processed Data Output Configuration** dialog box opens to record the relevant settings for the chosen output format.

b Select the settings for the chosen output format.

- The output destination has been previously selected on the **File Setup** page.
- Select the channel to be used as source for the information. You can only choose from the channels that have already been installed. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

Note

Note that some formats will not allow you to create an output file.

c Select **Add** to save the output format.

7 At the bottom of the **Output** dialog box, select **OK** to save the chosen parameters and close it.

Related topics

Record Processed function, page 258
Recording processed data, page 83
File Setup page, page 262

Recording processed data

The processed data recording function provided by the EA440 allows you to save processed data on a selected format. The data files can be copied or moved to other recordable media, or to another computer on the network. You can keep the recorded files for scientific studies, future references, or for training purposes. The recording is controlled by the **Record Processed** function.

Prerequisites

Before you start data recording, make sure that you have defined where to store the files. To define which disks and folders to use to save the data files, use the **File Setup** page. The **File Setup** page is located in the **Output** dialog box. If you wish to save your recorded data on an external hard disk, make sure that it is connected to the Operator Station.

Before you start recording, you must also define which output format(s) you wish to use. To choose which processed data formats to record, select **Processed Data Output**. The **Processed Data Output** page is located in the **Output** dialog box.

Context

On the EA440, you can save and recall echo information using the following methods and formats.

- Bitmap images (containing the full EA440 screen capture) are saved whenever you select **Screen Capture** on the top bar. The screen captures you make are saved in .jpg format on the hard disk in the Operator Station. The **Screen Captures** tab on the bottom bar opens a dedicated viewer that allows you to open these images. In the viewer you can also open the file folder on the Operator Station hard disk. You can copy, rename or delete the image files.
- Raw data is recorded using the **Record RAW** function on the **Operation** menu. To play back data, use **Operation** to select *Replay* mode.This mode allows you to replay previously recorded data on the EA440. When in *Replay* mode, the EA440 is not able to transmit ("ping"). For this reason, the EA440 is inactive during playback.
- A "history file" is recorded automatically and continuously. When the file is full, it will start to overwrite the oldest data, thus creating a "ring buffer". These images can be recalled using the *History* information pane. The information in the *History* presentation is the same as on the original echogram presentation. To open the *History* information pane, select the button on the top bar.
- Processed data is recorded using the **Record Processed** function on the **Operation** menu.

Note

The processed data is only an export format, and can not be played back on the EA440.

Data files will normally become very large. If you wish to record large amounts of EA440 data, make sure that you have enough space on your hard disk. Unless your Operator Station is equipped with a very large disk, we recommend that you save the data to an external storage device.

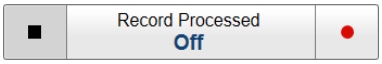
On the EA440 you can record both RAW and processed data using the **Record RAW** and **Record Processed** functions. It may be useful to synchronize these two functions to automatically record all data formats simultaneously. To synchronize the recording functions, open the **Record RAW** button, and set **Synchronize** to *On*. The **Record Processed** button is then inhibited, and you can start and stop all recording by means of the **Record RAW** button.

Procedure

1 Select the **Operation** icon.

The icon is located under the **Main** menu. It is used to open the **Operation** menu.

2 Make sure that the **Record Processed** function is available.



If the **Record Processed** function is unavailable, it is most likely because you have forgotten to specify an output format.

a On the **Operation** menu, select **Output**.

b On the left side of the **Output** dialog box, select **Processed Data Output** to open the page.

c Select **New** in the **Installed Outputs** area.

d Select an output type from the list.

e Select the settings for the chosen output format.

f Select **Add** to save the output format.

g At the bottom of the **Output** dialog box, select **OK** to save the chosen parameters and close it.

3 To start data recording, open the **Record RAW** button, and select *On*.

Alternatively, simply select the red circle on the right side of the button.

4 To stop recording, open the **Record Processed** button, and select *Off*.

Alternatively, select the black rectangle on the left side of the button to stop the recording.

Related topics

Record Processed function, page 258

Accessing the processed data files to delete, move or copy them

The processed data recording function provided by the EA440 allows you to save processed data on a selected format. You can save to the Operator Station hard disk, or onto an external disk. The data files can be copied or moved to other recordable media, or to another computer on the network.

Prerequisites

It is assumed that you are familiar with the Microsoft® operating system utilities for file handling.

You need a data storage device. This is typically a large capacity USB flash drive or a small portable hard disk. You can also connect the Operator Station to a network, and copy the files to a server.

Procedure

1 Prepare a data storage device.

2 Observe the **Screen Captures** tab at the bottom of the EA440 presentation.

3 Select the **Screen Captures** tab to open the screen capture browser.

4 In the browser, select **Open Image Folder** to open the operating system folder.

5 In the file manager utility, locate the folder you defined on the **File Setup** page.

6 Use the functionality provided by the operating system to delete the files, or to copy or move them to the storage device.

7 Close the file manager utility.

8 To resume normal EA440 operation, select any other tab on the bottom bar.

Related topics

Screen Capture button description, page 179
Bottom bar, page 218

Setting up the echogram presentation

Topics

Selecting which echogram type to use

The EA440 supports several different echogram types. Each echogram is shown in a separate view in the EA440 presentation. To select which echogram types you wish to see in the EA440 presentations, use the **Echogram** dialog box.

Context

Use this function to select what kind of echogram you wish to see in the current ("active") view.

- **Surface**

  A *Surface* echogram is mainly used when you wish to look at the entire water column starting from the sea surface and down to the sea bottom. Since this echogram is referenced to the sea surface, the sea bottom contour will vary with the actual depth.

- **Bottom**

  A *Bottom* echogram is mainly used when you want to examine the echoes from fish close to the sea bottom. Since this echogram is referenced to the sea bottom, the sea surface will vary with the actual depth, while the bottom is drawn flat.

- **Sidescan**

  The *Sidescan echogram* is default when the transducer is installed on the port or starboard side. A *Sidescan* echogram is mainly used when you wish to look sideways over the bottom. The echogram will then show the bottom as a plain surface. Objects on the seabed are easily identified, also because they will cast shadows that are easy to see.

  Sidescan operations can only be done if suitable transducers have been installed on the vessel.

Procedure

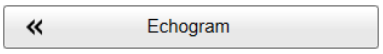
1 Click once in the echogram view that you wish to change.

  This will make the view "active". A thick border is placed on the selected view to visualize this.

2 Select the **Active** icon.

  The icon is located under the **Main** menu. It is used to open the **Active** menu.

3 Select **Echogram**.



4 Select the **Echogram** tab to open the page.

5 Use the **Echogram Type** function to select the type you wish to apply to the chosen view.

6 Apply the change(s) you have made.

  a Select **Apply** if you wish to apply the chosen setting only to the currently active echogram view.

  b Select **Apply to All** if you wish to use the chosen setting on all the echograms of the same type.

7 Close the dialog box.

Further requirements

If necessary, adjust the **Range** and **Start Range** settings accordingly.

Related topics

Surface echogram description, page 202
Bottom echogram description, page 205
Sidescan echogram description, page 207

Selecting echogram views on the bottom bar

The bottom bar in the EA440 presentation allows you to select which echogram views you wish to see, and how these are organized. The number of tabs available on the bottom bar depends on how many channels your EA440 has.

Context

The bottom bar is available all the time. The tabs on the bottom bar allows you to choose channel and presentation mode. A dedicated tab provides a special view for you to see the screen captures you have made. The bottom bar also shows you the current colour scale, as well as the time and date.

The number of tabs available on the bottom bar depends on how many channels your EA440 has. Two tab "groups" allow you to select channels and views. This example shows the EA440 with two channels. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

The tabs on the bottom bar allows you to control the echogram presentation.

- **Selecting presentation modes**

  Three presentation modes are available when you wish to see all the echogram channels simultaneously in the EA440 presentation. The three tabs will arrange the echogram views vertically, horizontally, or in rectangular rows and columns.

  The **Vertical** and **Horizontal** tabs are only shown if you have two or more channels in use on your EA440. The **Square** tab is only shown if you have three or more channels.

  By default, the echogram views are automatically arranged in the EA440 presentation. You can click and drag the border of each individual view to change its size. The size of the other views are reduced accordingly.

- **Selecting individual echogram channels**

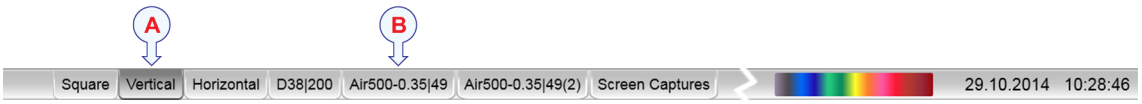
  Each channel is shown with a dedicated tab. The channel is identified with the name of the transducer in use. This name is the custom name you provided when you installed the transducer. Select a specific transducer tab to see only that channel in the EA440 presentation. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

Tip

In a large system with many transceivers and transducers in simultaneous use, it can be useful to hide channels temporarily from view. When two or more echograms are shown, you can use the **Layout** *dialog box to decide in which order - from top to bottom or left to right - you wish to see the echogram channels. The* **Layout** *dialog box is located on the* **Display** *menu.*

Procedure

- Observe the bottom bar at the bottom of the EA440 presentation.



- Select the appropriate tab to set up the presentation of the echogram views.

  A *Select **Square**, **Vertical** or **Horizontal** to arrange the echogram views accordingly.*

  B *Click the name of a transducer to see the relevant echogram. The echograms from the other channels are hidden.*

Related topics

Bottom bar, page 218

Selecting the echogram presentation layout

In a large system with many transceivers and transducers in simultaneous use, it can be useful to hide channels temporarily from view. When two or more echograms are shown, you can use the **Layout** dialog box to decide in which order - from top to bottom or left to right - you wish to see the echogram channels. The **Layout** dialog box is located on the **Display** menu.

Context

The EA440 can work with several channels simultaneously. It is possible to select which channels to see in the EA440 presentation. You can also position the echograms in relation to each other.

In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

Tip

The bottom bar in the EA440 presentation allows you to select which echogram views you wish to see, and how these are organized. The number of tabs available on the bottom bar depends on how many channels your EA440 has.

Procedure

1 Select the **Display** icon.

The icon is located under the **Main** menu. It is used to open the **Display** menu.

2 Select **Layout**.

Observe that the **Layout** dialog box opens.

3 Verify that all the current channels are listed.

4 Select **Visible** to hide or view the specific echograms.

5 Select the two arrows on the right hand side of the **Layout** dialog box to place the echograms in the preferred vertical order.

6 Select **OK** to save the selected settings and close the dialog box.

Changing the size of the echogram views

You can modify the size of each individual echogram view in the EA440 presentation.

Context

The physical size of each echogram view can be changed individually. The content in a view that changes size will automatically be adjusted to take full advantage of the space available. The modifications you make are erased when you select one of the tabs on the bottom bar.

Tip

When two or more echograms are shown, you can use the **Layout** *dialog box to decide in which order - from top to bottom or left to right - you wish to see the echogram channels.*

The bottom bar in the EA440 presentation allows you to select which echogram views you wish to see, and how these are organized. The number of tabs available on the bottom bar depends on how many channels your EA440 has. In this context, the phrase channel is used as a common term to identify the combination of transceiver, transducer and operating frequency.

Procedure

1 Move the cursor to the border line between two echogram views.

Observe that the cursor changes its shape; it now appears as two parallel lines with arrows pointing sideways or up/down.

2 Change the size of the view.

a Click on the left mouse button, and keep it depressed.

b Move the mouse - or roll the control wheel - and observe that the border line moves.

c Release the mouse button when the border line has been moved to desired position.

Defining the ping (transmission) modes

You can easily control how often the EA440 will transmit acoustic energy (a ping) into the water. You can disable the transmission altogether, set it to operate as fast as possible, or select a time interval.

Context

Once pinging is *On*, use the **Ping Mode** function to choose how often the EA440 will transmit. You use this function to control the *behaviour* of the transmissions ("pinging").

- If you choose *Single Ping*, you can transmit single pings by selecting the ping symbol on the **Ping** button.
- If you choose *Interval*, you must define the time between each ping with the **Ping Interval** function.
- If you choose *Maximum*, the EA440 will transmit ("ping") as often as possible.

Procedure

1 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

2 Select the **Operation** icon.

The icon is located under the **Main** menu. It is used to open the **Operation** menu.

3 On the **Operation** menu, set **Ping** to *On*.

- Select the symbol on the right side to start pinging.
- Select the symbol on the left side to stop pinging.
- Select the middle of the button to open the button menu.

4 Set **Ping Mode** to *Maximum*.

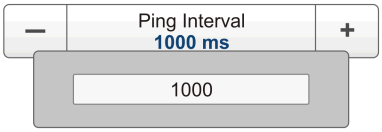
This will make the EA440 ping with maximum ping rate ("speed"). The time between each ping ("ping rate") depends mainly on the current range. In some systems, a low performance Operator Station and/or a slow hard disk may reduce the ping rate. How fast your Operator Station communicates with external peripherals may also have an effect on the ping rate.

5 Set **Ping Mode** to *Interval*.

6 Specify the interval between each ping.

a Select either side (+ or –) of the **Ping Interval** button to select the requested time between each ping.

b Select **Ping Interval** to open it, and type the requested time between each ping.



Select either side of the button to choose a value. Select the middle of the button to open it. If you have a keyboard connected to the EA440, you can type the requested value in the text box.

You can also change the value by selecting - and holding - the middle of the button, and move the cursor sideways. Move the cursor towards left to reduce the value, or towards right to increase the value. Release the mouse button when the requested value is shown on the button.

7 Set **Ping Mode** to *Single Ping*.

8 Select the ping symbol on the right side of the **Ping** button to transmit one single ping.

Related topics

Ping function, page 252
Ping Mode function, page 254
Ping Interval function, page 255

Choosing the colours used to present the echograms

Several different colour scales are predefined and available for the presentation of echograms. You can easily choose which colours to use. The presentation colours have no effect on the operational performance of the EA440. The **Colour Setup** dialog box controls the presentation colours used by the EA440. This includes the palette ("skin"), the number of colours in use, and the colour scale.

Context

Which colour scale to use is mainly a personal preference based on ambient light conditions, the nature of the echoes and your own experience.

Keep in mind that in the basic scale with 12 colours, each discrete colour represents a 3 dB range of echo signal strength. This implies that the next colour is selected every time the echo strength is doubled.

Tip

By default you have 64 or 12 colours available to present the echoes, and a selection of palettes. The colour scale can be retrieved any time by selecting **Colour Scale** *on the top bar. The chosen colours are shown at the bottom of the EA440 presentation.*

If you choose to use many colours, the resolution of the EA440 presentation is greatly improved. It is then easier to distinguish the difference between the various echoes of different size and/or target strength.

Tip

You can adjust the echo level range by means of the **Colour Scale** *settings. These are opened from the Colour Scale information pane. You can find the same settings in the* **Information Pane Options** *dialog box on the* **Active** *menu.*

The following colour scales are available.

12 colours | Sonar colours | Smooth ES | Grayscale | BI500 colours

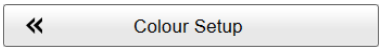
The **Smooth Echosounder** scale is based on the standard 12-colour scale. Additional colours have been added between them to make smoother colour transitions.

Procedure

1 Select the **Display** icon.

The icon is located under the **Main** menu. It is used to open the **Display** menu.

2 Select **Colour Setup**.



3 Select the number of colours you want to use.

Note

If you want to apply one of the predefined colour scales, you must select 64 colours.

4 Select the colour scale you want to use.

5 At the bottom of the dialog box, select **Apply** to preview your choice(s).

6 Select **OK** to close the dialog box.

Related topics

Colour Setup dialog box, page 291
Colour Scale information pane description, page 193

Adjusting the TVG in the Echogram dialog box

The Time Varied Gain (TVG) can be defined in the **Echogram** dialog box, or by means of the **TVG** function on the **Active** menu.

Context

When an acoustic pulse is sent through the water, it will gradually lose its energy. The greater the distance between the transducer and the target(s), the greater the loss of energy.

- **Geometric spread**

  Once transmitted, the acoustic energy will spread out to form a circular beam. The width of this beam increases with the physical distance to the target(s).

- **Absorption loss**

  Depending on the salinity and temperature, the water will absorb some of the energy from the transmission. The absorption loss increases as the physical distance to the target(s) increases.

Both the geometric spread and the absorption will also have an effect on the returned echo signal. That is why we normally refer to these factors as the *two-way transmission loss*.

The TVG (Time Varible Gain) compensation is designed to counteract the natural phenomena of geometric spread and absorption loss. In the EA440, the TVG compensation is made using digital signal processing software.

The TVG compensation is expressed as a logarithmic curve. You can choose from a selection of curves. Each curve has a different slope creating a different gain compensation. Each curve is identified with the equation *X log TVG*. The coefficient "*X*" is an integer. Typical values for "*X*" are 10 to 40.

Several TVG compensation settings are available.

- **No TVG**

  TVG compensation is not implemented. This setting is hardly ever used.

- **20 Log TVG**

  Volume backscattering strength

- **40 Log TVG**

  Point backscattering strength

Procedure

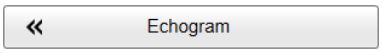
1 Click in the echogram view you wish to change.

  This will make the view "active". The "active" echogram view is identified with a thicker border.

2 Select the **Active** icon.

  The icon is located under the **Main** menu. It is used to open the **Active** menu.

3 Select **Echogram**.



Observe that the **Echogram** dialog box opens.

4 In the **Echogram** dialog box, select the **Echogram** tab to open the page.

5 Choose your requested setting for TVG (Time Variable Gain).

6 Apply the change you have made.

a Select **Apply** if you wish to apply the chosen setting only to the currently active echogram view.

b Select **Apply to All** if you wish to use the chosen setting on all the echograms of the same type.

7 Select **OK** to save the selected settings and close the dialog box.

Related topics

TVG function, page 342
Echogram page, page 347

Removing noise and false echoes from the echogram

The **Ping-Ping Filter** analyses the historical information from previous consecutive pings in order to remove unwanted noise and interference from the EA440 presentation.

Context

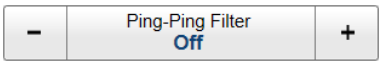
The following filter options are provided.

- **Off**: The filter is disabled. The historical information from previous transmissions ("pings") are not used to remove noise and unwanted echoes.
- **2 of 3**: For the current echo to be shown, the same echo must be present in at least *two* of the previous *three* pings.
- **2 of 2**: For the current echo to be shown, the same echo must be present in *both* of the previous *two* pings.
- **3 of 3**: For the current echo to be shown, the same echo must be present in *all* of the previous *three* pings.

Procedure

1 Open the **Active** menu.

2 Locate the **Ping-Ping Filter**.



3 Choose the required setting.

4 Select **Apply to All** if you wish to use the chosen setting on all the echograms of the same type.

Related topics

Ping-Ping Filter function, page 351

Selecting the horizontal scale in the echograms

The horizontal scale controls how "fast" the echograms move from right towards left across the EA440 presentation. You can change the horizontal scale on the **Horizontal Axis** page in the **Echogram** dialog box.

Context

The echograms travels from right towards left across the EA440 presentation. On the **Horizontal Axis** page you can choose the horizontal scale of the echogram. This controls the "speed" of the echogram.

- **Distance**

  The horizontal scale of the echogram is based on sailed distance. Select resolution and unit.

- **Time**

  The horizontal scale of the echogram is based on time. Select resolution and unit.

- **Ping**

  The horizontal scale of the echogram is based on the number of transmissions ("pings") made. Select **View Size** to specify that the number of horizontal pixels shall define the number of displayed horizontal pings using one ping per pixel.

- **Speed**

  The horizontal scale of the echogram is based on the relative speed you choose. Select speed with the ruler.

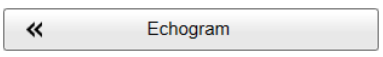
Procedure

1 Click once in the echogram view that you wish to change.

  This will make the view "active". A thick border is placed on the selected view to visualize this.

2 Open the **Active** menu.

3 Select **Echogram**.



  Observe that the **Echogram** dialog box opens.

4 On the left side of the **Echogram** dialog box, select **Horizontal Axis** to open the page.

5 Select the horizontal scale you wish to use.

6 Apply the change you have made.

a Select **Apply** if you wish to apply the chosen setting only to the currently active echogram view.

b Select **Apply to All** if you wish to use the chosen setting on all the echograms of the same type.

7 Select **OK** to close the dialog box.

Related topics

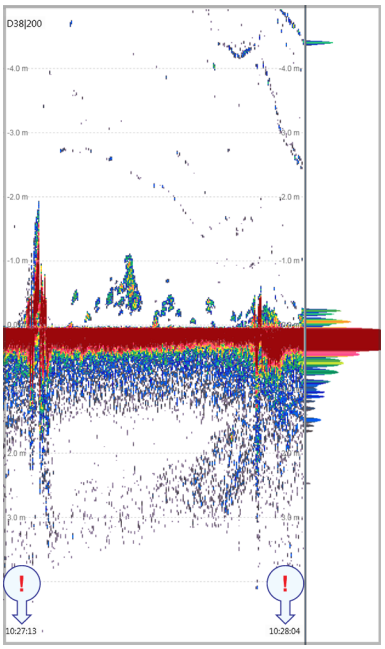
Horizontal Axis page, page 350

Adding scale labels to the echograms

In order to identify the horizontal scale of your echogram views, you can enable scale labels.

Context

Small labels are shown in the bottom left and right corners of the echogram. These labels can contain time or distance to identify the horizontal axis of the echogram. You can hide the labels from view.



The following label options are available.

- **None**: The labels are hidden
- **Auto**: The horizontal scale is set automatically
- **Time**: The horizontal scale is defined by time. The time shown in the bottom right corner of the echogram is then the current time (now).
- **Distance**: The horizontal scale is defined by distance. The distance shown in the bottom right corner of the echogram is then 0 nautical miles (starting point).

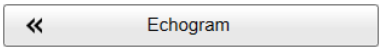
Procedure

1 Click once in the echogram view that you wish to change.

This will make the view "active". A thick border is placed on the selected view to visualize this.

2 Open the **Active** menu.

3 Select **Echogram**.



Observe that the **Echogram** dialog box opens.

4 On the left side of the **Echogram** dialog box, select **Horizontal Axis** to open the page.

5 Choose the label you wish to use.

6 Apply the change you have made.

   a Select **Apply** if you wish to apply the chosen setting only to the currently active echogram view.

   b Select **Apply to All** if you wish to use the chosen setting on all the echograms of the same type.

7 Select **OK** to close the dialog box.

Related topics

Horizontal Axis page, page 350

Enhancing the bottom contour in the echograms

In order to make the bottom easier to identify, certain visual enhancements may be applied. These enhancements are made using the **Lines** page in the **Echogram** dialog box.

Context

The following enhancements can be used to increase the readability of the bottom contour.

- **Bottom Line**

  The *Bottom Line* can be added to your echogram to enhance the visual bottom detection. It appears as thin line that follows the bottom contour. The line is drawn in the current foreground colour.

- **White Line**

  The *White Line* can be added to your echogram to enhance the visual bottom detection. It appears as thick line in the current background colour (normally white) that follows the bottom contour. This line will not remove information, it will simply "push" the echo information further down in order to make the bottom easier to see.

  You can use the *White Line* and the *Bottom Line* functions simultaneously.

  This is a visual enhancement. It does not have any effect on the EA440 performance.

Procedure

1 Click once in the echogram view that you wish to change.

  This will make the view "active". A thick border is placed on the selected view to visualize this.

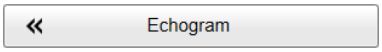
2 Observe the **Main** menu.

  Its default location is on the right side of the EA440 presentation.

3 Select the **Active** icon.

The icon is located under the **Main** menu. It is used to open the **Active** menu.

4 Select **Echogram**.



Observe that the **Echogram** dialog box opens.

5 Select **Lines** to open the page.

6 Select *White Line* and/or *Bottom Line* to suit your preferences.

7 Apply the change(s) you have made.

a Select **Apply** if you wish to apply the chosen setting only to the currently active echogram view.

b Select **Apply to All** if you wish to use the chosen setting on all the echograms of the same type.

8 Close the dialog box.

Related topics

Bottom Line description, page 210
Hardness Line description, page 211
White Line description, page 211
Variable Depth Line description, page 212
Lines page, page 345

Adding a variable depth line to the echogram

The variable depth line function offers a horizontal line with a depth readout. You can move this line up and down in your echogram view to read the depth.

Context

When enabled, a horizontal depth line is placed in the echogram. To move the depth line, click on it, and drag it up or down. The depth of the line is displayed in a small box at the left side of the echogram.

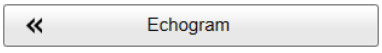
Procedure

1 Click once in the echogram view that you wish to change.

This will make the view "active". A thick border is placed on the selected view to visualize this.

2 Open the **Active** menu.

3 Select **Echogram**.



Observe that the **Echogram** dialog box opens.

4 Select **Lines** to open the page.

5 Select **Variable Depth** to add a depth line to your echogram.

6 Apply the change you have made.

   a Select **Apply** if you wish to apply the chosen setting only to the currently active echogram view.

   b Select **Apply to All** if you wish to use the chosen setting on all the echograms of the same type.

7 Select **OK** to close the dialog box.

Related topics

Variable Depth Line description, page 212
Lines page, page 345

Adding vertical marker lines to the echogram

In order to create a horizontal scale, you can add short vertical marker lines to your echogram. These lines are used to measure time or distance.

Context

The following options are available:

- **None**: No vertical markers are shown.
- **Time**: A short vertical line is drawn in the upper part of the echogram once every minute.

This is a visual enhancement. It does not have any effect on the EA440 performance.

Procedure

1 Click once in the echogram view that you wish to change.

   This will make the view "active". A thick border is placed on the selected view to visualize this.

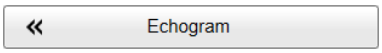
2 Observe the **Main** menu.

   Its default location is on the right side of the EA440 presentation.

3 Select the **Active** icon.

   The icon is located under the **Main** menu. It is used to open the **Active** menu.

4 Select **Echogram**.



   Observe that the **Echogram** dialog box opens.

5 Select **Lines** to open the page.

6 Select the vertical marker lines you wish to use.

7 Apply the change(s) you have made.

   a Select **Apply** if you wish to apply the chosen setting only to the currently active echogram view.

   b Select **Apply to All** if you wish to use the chosen setting on all the echograms of the same type.

8 Close the dialog box.

Related topics

Vertical Tick description, page 213
Lines page, page 345

Adding comments and annotations to the echograms

When you study an echogram, it is often useful to add personal comments to it. Several different annotation types may be added to the echogram. They are displayed on the echogram if this feature is enabled in the **Echogram** dialog box.

Context

Use the **Annotations** page to type comments and insert annotations into the echograms. Comments can be used to identify specific events such as specific echoes, unusual bottom conditions, or simply for keeping track of time or distance. The **Annotations** page is located in the **Installation** dialog box.

The **Lines** page in the **Echogram** dialog box allows you to enable or disable annotations in the echograms. Annotations can only be added to the echogram while in *Normal* operational mode.

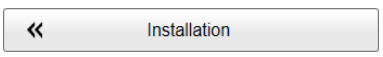
When you save raw data, the annotations you have defined are stored as annotation datagrams.

Procedure

1 Select the **Setup** icon.

   The icon is located under the **Main** menu. It is used to open the **Setup** menu.

2 On the **Setup** menu, select **Installation**.



   Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected from the menu on the left side.

3 On the left side of the **Installation** dialog box, select **Annotations**.

   Observe that the **Annotations** page opens.

4 Specify the annotations you wish to use, and how you wish to trigger them.

5 Select **Apply** and then **Close** to save all the parameters and close the **Installation** dialog box.

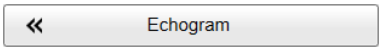
6 Click once in the echogram view that you wish to change.

This will make the view "active". A thick border is placed on the selected view to visualize this.

7 Select the **Active** icon.

The icon is located under the **Main** menu. It is used to open the **Active** menu.

8 Select **Echogram**.



Observe that the **Echogram** dialog box opens.

9 Select the **Lines** tab to open the page.

10 Select the annotation types you wish to see in your echogram.

11 Apply the change(s) you have made.

a Select **Apply** if you wish to apply the chosen setting only to the currently active echogram view.

b Select **Apply to All** if you wish to use the chosen setting on all the echograms of the same type.

12 Close the dialog box.

Related topics

Annotation markers description, page 214
Lines page, page 345

Adding a single text comment to the echogram

Sometimes it can be useful to place a single written comment on the echogram. The **Manual Annotation** dialog box offers that function.

Context

Several different annotation types may be added to the echogram. Annotations can only be added to the echogram while in *Normal* operational mode.

Tip

Use the **Annotations** *page to type comments and insert annotations into the echograms. The* **Annotations** *page is located in the* **Installation** *dialog box.*

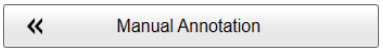
Procedure

1 Click once in the relevant echogram view.

This will make the view "active". A thick border is placed on the selected view to visualize this.

2 Open the **Setup** menu.

3 Select **Manual Annotation**.



4 Type any text into the box.

The size of the box will adjust to the length of your text.

If you do not have a computer keyboard connected to your EA440 system, select the **Keyboard** button to open an on-screen keyboard.

5 Select **OK** to place the annotation in the echoghram.

6 Select **Cancel** to close the dialog box.

Investigating the depth and the bottom conditions

Topics

Selecting bottom echogram

In order to investigate the bottom conditions the bottom echogram is best suited.

Context

A *Bottom* echogram is mainly used when you want to examine the sea bottom conditions. Since this echogram is referenced to the sea bottom, the sea surface will vary with the actual depth, while the bottom is drawn flat. Set up the **Start Range** and **Range** depths to hide the surface and place the sea bottom contour at the middle of the echogram. This makes it easy to study the echoes from the sea bottom. You can investigate the sea bottom conditions and hardness. With a low frequency channel you can also study echoes from *below* the sea bottom (also known as "bottom penetration").

Keep in mind that since the *Bottom echogram* view is referenced to the bottom, the **Start Range** value must be negative. For example, if you wish to start your echogram from 10 meters above the bottom, you must set the **Start Range** to *–10 m*. The **Range** defines the vertical range from the start depth and down.

Procedure

1 Click once in the echogram view that you wish to change.

This will make the view "active". A thick border is placed on the selected view to visualize this.

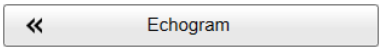
2 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

3 Select the **Active** icon.

The icon is located under the **Main** menu. It is used to open the **Active** menu.

4 Select **Echogram**.



Observe that the **Echogram** dialog box opens.

5 Select the **Echogram** tab to open the page.

6 Select **Bottom** in the **Echogram Type** area.

7 Apply the change you have made.

   a Select **Apply** if you wish to apply the chosen setting only to the currently active echogram view.

   b Select **Apply to All** if you wish to use the chosen setting on all the echograms of the same type.

8 Select **OK** to close the dialog box.

Related topics

Echogram page, page 347

Choosing **Range** and **Start Range** values in a bottom-related echogram

A *Bottom* echogram is mainly used when you want to examine the sea bottom conditions. In a *Bottom* echogram, the start depth of the echogram is defined by the negative **Start Range** depth value. The range from this start depth is defined by the **Range** value.

Context

The **Range** setting defines how "deep" you wish the EA440 to detect echoes. In other words, this is the vertical distance between the "top" and the "bottom" of the echogram. The **Range** setting specifies the "bottom" depth, while the **Start Range** setting specifies the "top" depth.

The range you specify applies to the currently selected echogram. (It is identified with a thick border.) Several echogram types are available.

In a *Bottom* echogram, the **Range** value is "added" to the **Start Range** value to determine the vertical depth of the echogram. The **Start Range** value must be negative because the echogram must start from a preferred height over the bottom.

Example

Start Range and **Range** in bottom-related echogram

In a bottom echogram, set the **Start Range** value to –5 metres. This will make the echogram start from 5 metres above the sea bottom. Set **Range** to the 5 metres plus 10 = 15 metres. The echogram will now show the area from 5 metres above the depth, and down to 10 meters "below" the sea bottom. The sea bottom contour will appear as a flat line.

Procedure

1 Click in any echogram view to make it "active".

The setting you choose will only be valid for the currently "active" echogram. The "active" echogram view is identified with a thicker border.

2 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

3 Locate the **Start Range** function.

4 Choose a negative value for **Start Range** to place the start depth at the preferred distance over the sea bottom.

The following methods can be used for this adjustment:

- Select [+] or [-] to choose the requested setting.
- Select the middle of the button and keep the mouse button pressed. Drag the cursor sideways to increase or decrease the level.
- Select the middle of the button to open the menu. Type the requested value.

You can only type a new value if a computer keyboard is connected to your EA440 Operator Station.

5 Locate the **Range** function.

6 Choose a positive value for **Range** to place the bottom of the echogram at the preferred depth under the sea bottom.

Related topics

Range function, page 240
Start Range function, page 241
Bottom echogram description, page 205

Opening the Depth information pane to read the current depth

You can easily read the current water depth in the *Depth* information pane.

Context

The *Depth* information pane provides the water depth in the current echogram view. If you have several echogram views open, you can place one pane in each view.

Procedure

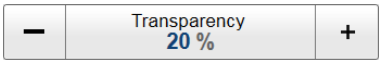
1 Click in the echogram view you wish to change.

This will make the view "active". The "active" echogram view is identified with a thicker border.

2 On the top bar, select the appropriate button to open the information pane.

3 Click the bottom right corner of the information pane, and drag to requested size.

4 Select a **Transparency** setting that fits your requirements.



The chosen transparency percentage is used on all open information panes.

5 Investigate the information provided by the information pane.

The depth measure by the selected channel is shown. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency. By default, the depth is shown in meters. You can change the unit of measurement on the **Units** page. The **Units** page is located in the **Installation** dialog box.

6 Select **Setup** in the top right corner of the information pane to change the pane parameters.

Selecting **Setup** in the *Depth* information pane opens the **Bottom Detection** page in the **Information Pane Options** dialog box. The purpose of the **Bottom Detection** parameters are to define the upper and lower depth limits most likely to be used during the EA440 operation.

7 Select **Close** in the top right corner to close the information pane.

Related topics

Depth information pane description, page 190

Investigating the bottom characteristics

The *Bottom Hardness* information pane shows you the current bottom reflectivity. This gives an indication to how hard the bottom is.

Context

The bottom hardness shown in the information pane was detected by the latest ping in the selected view.

Tip

The Hardness Line can be added to your echogram to retrieve additional information. It appears as thick colour coded line that follows the bottom contour. This line does not remove information, it simply "pushes" the echo information further down in order to show you the bottom reflectivity.

Procedure

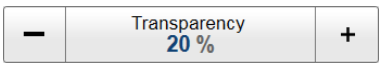
1 Click in any echogram view to make it "active".

The setting you choose will only be valid for the currently "active" echogram. The "active" echogram view is identified with a thicker border.

2 On the top bar, select the appropriate button to open the information pane.

3 Click the bottom right corner of the information pane, and drag to requested size.

4 Select a **Transparency** setting that fits your requirements.



The chosen transparency percentage is used on all open information panes.

5 Investigate the information provided by the information pane.

The colours on the left side of the scale indicate a soft bottom, while the colours on the right hand side indicate a harder bottom. The vertical line in the hardness colour scale positions the latest ping. The current reflectivity is also shown measured in dB.

6 Select **Close** in the top right corner to close the information pane.

Related topics

Bottom Hardness information pane description, page 191

Detecting the second layer bottom

The can also be used to find the bottom under the sand, the second layer bottom.

Prerequisites

To find the second layer bottom, you need two transducers. A low frequency transducer to penetrate the sand, and a higher frequency transducer to find the sandy bottom.

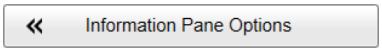
Procedure

1 Make sure you have a stable reading of the sandy bottom in the higher frequency channel.

2 Click the channel with the low frequency transducer, to make it active.

3 Open the **Active** menu.

4 Select **Information Pane Options** and the **Bottom Detection** page.



5 Clear the **Apply to All Channels** check box, if it is selected.

6 Select **Detect Second Layer Bottom**.

7 Select the channel with the higher frequency as a base for the sandy bottom.

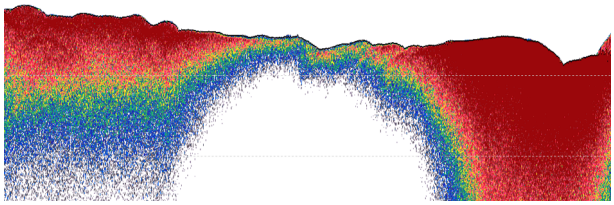
8 Adjust the **Gain below reference depth** as needed.

9 Select **OK** to save the selected settings and close the dialog box.

Investigating the sub-bottom conditions

The **Bottom Gain** setting controls the gain below the detected bottom depth. This gives you information about the current bottom conditions.

Context



*The typical effect of the **Bottom Gain** adjustment*

Procedure

1 Click in any echogram view to make it "active".

The setting you choose will only be valid for the currently "active" echogram. The "active" echogram view is identified with a thicker border.

2 Select the **Active** icon.

The icon is located under the **Main** menu. It is used to open the **Active** menu.

3 Locate the **Bottom Gain** function.

4 Set the **Bottom Gain** to your chosen value.

The following methods can be used for this adjustment:

- Select [+] or [-] to choose the requested setting.
- Select the middle of the button and keep the mouse button pressed. Drag the cursor sideways to increase or decrease the level.
- Select the middle of the button to open the menu. Type the requested value.

Related topics

Bottom Gain function, page 352

Investigating the bottom using sidescan echograms

Topics

Selecting sidescan echogram

The sidescan echogram view is provided so that you can see the bottom from the side of the vessel hull. The horizontal centre angle is determined by the physical angle of the transducer installation.

Context

A *Sidescan* echogram is mainly used when you wish to look sideways over the bottom. The echogram will then show the bottom as a plain surface. Objects on the seabed are easily identified, also because they will cast shadows that are easy to see.

Note

Sidescan echograms scroll in vertical direction from the top of the presentation and down.

Procedure

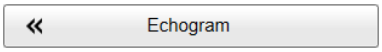
1 Click once in the echogram view that you wish to change.

This will make the view "active". A thick border is placed on the selected view to visualize this.

2 Select the **Active** icon.

The icon is located under the **Main** menu. It is used to open the **Active** menu.

3 Select **Echogram**.



4 Select the **Echogram** tab to open the page.

5 Use the **Echogram Type** function to select the type you wish to apply to the chosen view.

Note

Sidescan transducers must be installed to show the sidescan echogram type.

6 Specify the sidescan options by defining which side of the vessel each transducer is located.

7 Apply the change(s) you have made.

8 Close the dialog box.

Further requirements

If necessary, adjust the **Range** and **Start Range** settings accordingly.

Related topics

Echogram page, page 347

Choosing **Range** and **Start Range** values in a sidescan echogram

In a sidescan echogram, the start depth of the echogram is defined by the positive **Start Range** depth value. The range from this start depth and sideways is defined by the **Range** value.

Context

The **Range** setting defines how "deep" you wish the EA440 to detect echoes. In other words, this is the vertical distance between the "top" and the "bottom" of the echogram. The **Range** setting specifies the "bottom" depth, while the **Start Range** setting specifies the "top" depth.

In a sidescan echogram, the **Start Range** value is used to determine from which slant distance from the hull the echogram shall start. This is normally chosen to be a few meters away from the hull. The **Range** value is then used to define the horizontal extension of the presentation.

Note

The bottom detection functionality of the EA440 is disabled in sidescan echograms. This means that the **Range** *value you define will be used to determine the ping rate. A very long range will make the EA440 wait for a long time between each ping.*

Procedure

1 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

2 Locate the **Start Range** function.

3 Choose a positive value for **Start Range** to place the start of the echogram at the preferred distance from the hull.

The following methods can be used for this adjustment:

- Select [+] or [-] to choose the requested setting.
- Select the middle of the button and keep the mouse button pressed. Drag the cursor sideways to increase or decrease the level.
- Select the middle of the button to open the menu. Type the requested value.

You can only type a new value if a computer keyboard is connected to your EA440 Operator Station.

4 Locate the **Range** function.

5 Choose a positive value for **Range** to place the outer limit of the echogram at the preferred horizontal distance.

Related topics

Range function, page 240
Start Range function, page 241
Sidescan echogram description, page 207

Saving and recalling screen captures

Topics

Saving an echogram screen capture image

When you use the EA440 actively, you may need to make a screen capture to save an instantaneous image of the current presentation. The screen captures you make are saved in .jpg format on the hard disk in the Operator Station.

Context

On the EA440, you can save and recall echo information using the following methods and formats.

- Bitmap images (containing the full EA440 screen capture) are saved whenever you select **Screen Capture** on the top bar. The screen captures you make are saved in .jpg format on the hard disk in the Operator Station. The **Screen Captures** tab on the bottom bar opens a dedicated viewer that allows you to open these images. In the viewer you can also open the file folder on the Operator Station hard disk. You can copy, rename or delete the image files.
- Raw data is recorded using the **Record RAW** function on the **Operation** menu. To play back data, use **Operation** to select *Replay* mode.This mode allows you to replay previously recorded data on the EA440. When in *Replay* mode, the EA440 is not able to transmit ("ping"). For this reason, the EA440 is inactive during playback.
- A "history file" is recorded automatically and continuously. When the file is full, it will start to overwrite the oldest data, thus creating a "ring buffer". These images can be recalled using the *History* information pane. The information in the *History* presentation is the same as on the original echogram presentation. To open the *History* information pane, select the button on the top bar.
- Processed data is recorded using the **Record Processed** function on the **Operation** menu.

  Note

  The processed data is only an export format, and can not be played back on the EA440.

Procedure

1 Before you make the screen capture, you may wish to place an event marker on the echogram.

The event marker may be useful later to identify the information.

2 Observe the **Screen Capture** button on the top bar.

3 Select **Screen Capture** to make a copy of the current EA440 presentation.

Every time you do this, a new image file is created.

Result

The screen captures you make are saved in .jpg format on the hard disk in the Operator Station. Each capture includes the entire visible presentation. It includes the current echograms and the menu.

Related topics

Recalling single echogram screen capture images, page 115
Accessing the screen capture images to delete, move or copy them, page 116
Screen Capture button description, page 179

Recalling single echogram screen capture images

The **Screen Capture** function on the top bar allows you to make a copy of the current EA440 presentation. The screen captures you make are saved in .jpg format on the hard disk in the Operator Station. The **Screen Captures** tab on the bottom bar opens a viewer that allows you to open these images.

Context

The screen capture browser simply presents a miniature version of each screen capture that you have made. Each file is provided in standard JPG format, which can be opened by most commercial bitmap editors. The file names are created automatically using the date and time when you used the **Screen Capture** button.

Procedure

1 Observe the **Screen Captures** tab at the bottom of the EA440 presentation.

2 Select the **Screen Captures** tab to open the screen capture browser.

3 Double-click the image you wish to enlarge.

4 Select **Return to Browser** to close the image.

5 To resume normal EA440 operation, select any other tab on the bottom bar.

Related topics

Saving an echogram screen capture image, page 114
Accessing the screen capture images to delete, move or copy them, page 116
Screen Capture button description, page 179
Bottom bar, page 218

Accessing the screen capture images to delete, move or copy them

Once the screen capture images have been saved, you may also wish to delete them, copy them, or move them from the Operator Station to a separate storage device.

Prerequisites

It is assumed that you are familiar with the Microsoft® operating system utilities for file handling.

You need a data storage device. This is typically a large capacity USB flash drive or a small portable hard disk. You can also connect the Operator Station to a network, and copy the files to a server.

Procedure

1 Prepare a data storage device.

2 Observe the **Screen Captures** tab at the bottom of the EA440 presentation.

3 Select the **Screen Captures** tab to open the screen capture browser.

4 In the browser, select **Open Image Folder** to open the operating system folder.

5 Use the functionality provided by the operating system to delete the files, or to copy or move them to the storage device.

6 Close the file manager utility.

7 To resume normal EA440 operation, select any other tab on the bottom bar.

Related topics

Saving an echogram screen capture image, page 114
Recalling single echogram screen capture images, page 115
Screen Capture button description, page 179
Bottom bar, page 218

Defining settings related to user preferences and individual customizing

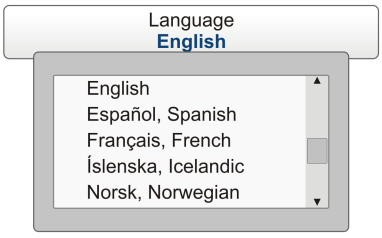
Topics

Selecting menu language

You may prefer to use the EA440 with a user interface in your own language. The **Language** function allows you to select the language to be used in the EA440 presentations, menus and dialog boxes.

Context

With a few exceptions, the chosen language will also be used for all other text on the EA440. The EA440 online help may not be available for the language you choose. If your language is not supported, the English online help is provided.



Procedure

1 Select the **Setup** icon.

The icon is located under the **Main** menu. It is used to open the **Setup** menu.

2 Select the middle of the **Language** button to open the list of available options.

3 Select the language you wish to use.

Result

All the texts in the user interface (menu buttons, dialog boxes etc) are changed to the selected language.

Further requirements

The context sensitive on-line help file may also be available in your language. To change the language in the on-line help, you must restart the EA440 program.

Related topics

Language function, page 328

Reducing the light emitted from the display presentation

When the bridge is dark, the light emitted by the EA440 display can affect your night vision. In order to compensate for this, you can reduce the intensity

Context

The intensity of the light given off by the EA440 presentation can be adjusted. You can use this function to increase or decrease the light from the screen to match the ambient light. The intensity of light emitted by the display can be reduced from 100% to 0% in steps of 10.

Tip

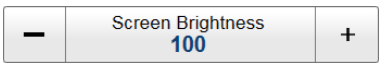
If you wish to adjust the colour intensity and/or colour scheme of the EA440 presentation, you can also try the **Palette** *function in the* **Colour Setup** *dialog box.*

Procedure

1 Select the **Display** icon.

The icon is located under the **Main** menu. It is used to open the **Display** menu.

2 Select a **Screen Brightness** setting that fits your requirements.



To change the setting, move the cursor to either side of the button, and observe that the background colour changes. Select [—] on the left side to decrease the value, or select [+] on the right side to increase the value. Select the middle of the button to open it.If you have a keyboard connected to the EA440, you can type the requested value in the text box.

Related topics

Screen Brightness function, page 284

Increasing the visibility of the information panes

When you open an information pane, you will see that it is transparent. This transparency allows you to see the echograms data behind the pane, but it may also reduce the visibility of the information in it.

Context

The information panes provided by the EA440 can be placed anywhere on top of the views in the presentation.

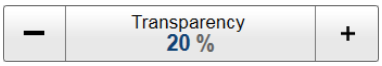
In order not to loose information, the panes have been designed so you can see through them. The degree of transparency can be controlled with this **Transparency** function. You can adjust the setting from 0% (no transparency) to 90% (almost full transparency) in steps of 10%.

Procedure

1 Select the **Display** icon.

The icon is located under the **Main** menu. It is used to open the **Display** menu.

2 Select a **Transparency** setting that fits your requirements.



The chosen transparency percentage is used on all open information panes.

To change the setting, move the cursor to either side of the button, and observe that the background colour changes. Select [—] on the left side to decrease the value, or select [+] on the right side to increase the value. Select the middle of the button to open it.If you have a keyboard connected to the EA440, you can type the requested value in the text box.

Related topics

Transparency function, page 285

Selecting the navigational information to appear on the top bar

The top bar can contain navigational information. You can select which navigation elements that will be shown at the top of the EA440 presentation.

Context

The **General** page offers a range of "on/off switches". Some of these "on/off switches" are used to enable or disable the navigational information on the top bar.

Note

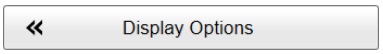
The information shown on the EA440 top bar must not be used for vessel navigation.

Procedure

1 Select the **Display** icon.

The icon is located under the **Main** menu. It is used to open the **Display** menu.

2 Select **Display Options**.



3 Select **General** to open the page.

4 In the **Top Bar** list, select the navigational information you want to see on the top bar.

5 Select **OK** to save the selected settings and close the dialog box.

Related topics

General page, page 287
Tooltip page, page 290

Selecting which tooltips to appear in the user interface

When you move the cursor over the echograms in the EA440 presentation, small "tooltips" are shown to provide additional information. The **Tooltip** page controls which tooltips that are shown.

Context

Several tooltips can be shown in the EA440 presentation. When a tooltip is enabled, the cursor location is detected and a small information box is shown. By default, the information is related to the exact position of the cursor. Each tooltip represents a specific piece of information, and they are listed separately.

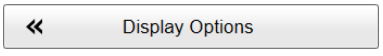
The **Tooltip** page offers a range of "on/off switches". Each tooltip is presented in the list, and you can enable or disable each of them independently.

Procedure

1 Select the **Display** icon.

The icon is located under the **Main** menu. It is used to open the **Display** menu.

2 Select **Display Options**.



3 Select **Tooltip** to open the page.

4 In the list of tooltips, select the tooltips you want to see.

5 Select **OK** to save the selected settings and close the dialog box.

Related topics
General page, page 287
Tooltip page, page 290

Enabling Coordinated Universal Time (UTC) on the bottom bar

You can set up the EA440 to show Coordinated Universal Time (UTC). When disabled, the software will use local time.

Context

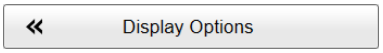
This is an "on/off" switch. The time is shown on the bottom bar of the EA440 presentation.

Procedure

1 Select the **Display** icon.

The icon is located under the **Main** menu. It is used to open the **Display** menu.

2 Select **Display Options**.



3 Select **General** to open the page.

4 Select **UTC Time** to enable Coordinated Universal Time (UTC).

5 Select **OK** to save the selected settings and close the dialog box.

Changing the colour palette ("skin") used in the EA440 presentations

Depending on the ambient light, it is possible to change the EA440 presentation colours to help you see the information. The **Palette** function allows you to choose which colour theme ("skin") to be used by the EA440.

Context

Select a palette to suit the ambient light conditions and your personal preferences. The choice you make does not have any effect on the EA440 performance. The following options are available:

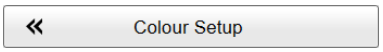
- **Day Black**: intended for use on the bridge during dusk and dawn.
- **Day White**: intended for daytime use on the bridge.
- **Night**: intended for night-time use on the bridge.

Procedure

1 Select the **Display** icon.

The icon is located under the **Main** menu. It is used to open the **Display** menu.

2 Select **Colour Setup**.



Colour Setup dialog box, page 291

3 Select the colour palette ("skin") you want to use.

4 At the bottom of the dialog box, select **Apply** to preview your choice.

5 Select **OK** to save the selected setting and close the dialog box.

Related topics

Colour Setup dialog box, page 291

Rearranging the layout of the EA440 presentation

The information from each channel is shown in a separate view. With the **Docking Views** function you can move and re-size the views in the EA440 presentation.

Context

The physical location and size of each view can be changed individually. The content in a view that changes size will automatically be adjusted to take full advantage of the space available.

Procedure

1 We recommend that you first save your current user settings.

When a complete reorganisation of the view positions and sizes have been completed , you may wish to restore the EA440 presentation to what it was *before* you changed it. You must use the **User Settings** dialog box to do this. We suggest that you save your current user settings before you activate the **Docking Views** function.

a Observe the **Main** menu.

b Select **User Settings**.

c Select **Save Current Setting**.

d Type a name for the user setting.

e Select **OK** to save the chosen name.

f Select **OK** to close the dialog box.

2 Open the **Display** menu.

3 Set **Docking Views** to *On*.

4 Click in the title bar of the view that you want to move.

The frame of the selected view will change colour to indicate that it has been selected.

5 Press the mouse button, and keep it depressed to drag the selected view to another position in the EA440 presentation.

The docking positions show you where to drag and drop the selected view. Any view can selected, and then repositioned as indicated by the docking positions.

Moving a view to another display

The echograms take up the largest part of the EA440 presentation. The information from each channel is shown in a separate view. If you have several displays connected to your Operator Station you can even move selected views to another display.

Context

The physical location and size of each view can be changed individually. The content in a view that changes size will automatically be adjusted to take full advantage of the space available.

Procedure

1 Open the **Display** menu.

2 Set **Docking Views** to *On*.

3 Click in the title bar of the view that you want to move.

The frame of the selected view will change colour to indicate that it has been selected.

Press the mouse button, and keep it depressed to drag the selected view to another display.

Further requirements

To move a view back onto the main display, select it, and drag it over. Place the view among the other views as indicated by the docking positions.

Restoring the locations and sizes of the views

If you have used the **Docking Views** function to rearrange the position and size of your views, a dedicated function is available to restore all the views to their default positions. You can use the **User Settings** dialog box and functions to switch between your favourite view settings.

Context

With the **Docking Views** function you can move and re-size the views in the EA440 presentation. When a complete reorganisation of the view positions and sizes have been completed , you may wish to restore the EA440 presentation to what it was *before* you changed it.

The **Reset layout** function restores all the views to their default positions.

Procedure

1 Select the middle of the **Docking Views** button to see the button menu.

2 Select **Reset layout** to restore the default view configuration.

If you wish to change the views to a configuration you have used before, you must fetch it from the user settings. Of course, you can only do this if you have saved it.

3 On the **Main** menu, select **User Settings**.

4 Select the preferred user setting.

5 Select **Activate Selected Setting**.

Result

All views are placed back to their original or previous positions and sizes.

Selecting measurement units

The EA440 is prepared to work with several international standards for units of measurements. From the **Units** page you control which units of measurements that are used.

Context

The EA440 user interface presents many measurements. These measurements are for example related to depth, range and distance. Use the **Units** options to select the units of measurements you want to work with. The EA440 uses them in all presentations. You only need to define them once.

Procedure

1 Select the **Setup** icon.

The icon is located under the **Main** menu. It is used to open the **Setup** menu.

2 On the **Setup** menu, select **Installation**.

Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected from the menu on the left side.

3 On the left side of the **Installation** dialog box, select **Units**.

Observe that the **Units** page opens.

4 Adjust the settings to fit your requirements.

5 Select **OK** to save the selected settings and close the dialog box.

Related topics

Installation dialog box, page 300
Units page, page 323

Saving, retrieving and handling user settings

Topics

Saving the current user settings

When you have spent some time working with the EA440, you are probably using specific settings that you know are efficient for your purpose. It is a good idea to save these settings.

Context

The **User Settings** dialog box is used to store your favourite EA440 settings.

User Settings dialog box, page 237

These settings can be related to different operations, environmental conditions or basic personal preferences. You can use different settings to create as many user profiles as you like, and give them any name. All the settings you have chosen using functions and dialog boxes in the EA440 user interface are saved.

To save the settings you are using, select the **Save Current Setting** button.

Procedure

1 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

2 Select **User Settings**.

3 Select **Save Current Setting**.

A small dialog opens to accept the name of the new setting.

4 Type a name for the user setting.

Note

If you do not have a computer keyboard connected to your EA440 system, select the **Keyboard** *button to open an on-screen keyboard.*

5 Select **OK** to save the chosen name.

6 Observe that the name you have chosen appears on the **Saved Settings** list.

7 Select **OK** to close the dialog box.

Related topics

User Settings dialog box, page 237

Choosing previously saved user settings

User settings that either you or any of your colleagues have saved can easily be retrieved and put to use. This shortens down the time it takes to get started with the EA440.

Context

The **User Settings** dialog box is used to store your favourite EA440 settings.

User Settings dialog box, page 237

These settings can be related to different operations, environmental conditions or basic personal preferences. You can use different settings to create as many user profiles as you like, and give them any name. All the settings you have chosen using functions and dialog boxes in the EA440 user interface are saved.

To activate either a factory or a saved setting, click the relevant name in one of the lists, then click the **Activate Selected Setting** button.

Procedure

1 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

2 Select **User Settings**.

3 Observe the list of previously saved user settings in the **Saved Settings** list.

4 Select the setting you wish to use.

5 Select **Activate Selected Setting**.

6 Select **OK** to apply your changes and close the **User Settings** dialog box.

Related topics

User Settings dialog box, page 237

Renaming existing user settings

An existing user setting can easily be renamed.

Context

The **User Settings** dialog box is used to store your favourite EA440 settings.

User Settings dialog box, page 237

These settings can be related to different operations, environmental conditions or basic personal preferences. You can use different settings to create as many user profiles as you like, and give them any name. All the settings you have chosen using functions and dialog boxes in the EA440 user interface are saved.

To rename a user setting, select its name in the list, and then select **Rename**. The factory settings can not be renamed.

Procedure

1 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

2 Select **User Settings**.

3 Observe the list of previously saved user settings in the **Saved Settings** list.

4 Select the setting you wish to rename.

5 Select **Rename**.

A small dialog box opens to accept the new name.

6 Type a name for the user setting.

Note

If you do not have a computer keyboard connected to your EA440 system, select the **Keyboard** *button to open an on-screen keyboard.*

7 Select **OK** to save the chosen name.

8 Observe that the name you have chosen appears on the **Saved Settings** list.

9 Select **OK** to apply your changes and close the **User Settings** dialog box.

Related topics

User Settings dialog box, page 237

Deleting user settings that are no longer used

When you save the user settings, the files you have created are shown on the **Saved Settings** list. The list may be too long. User settings that you do not need can be deleted.

Context

The **User Settings** dialog box is used to store your favourite EA440 settings.

User Settings dialog box, page 237

These settings can be related to different operations, environmental conditions or basic personal preferences. You can use different settings to create as many user profiles as you like, and give them any name. All the settings you have chosen using functions and dialog boxes in the EA440 user interface are saved.

To delete a user setting, select its name in the list, and then select **Delete**. The factory settings can not be deleted.

Procedure

1 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

2 Select **User Settings**.

3 Observe the list of previously saved user settings in the **Saved Settings** list.

4 Select the setting you wish to delete.

5 Select **Delete**.

A small dialog box opens so that you can verify your choice.

6 Observe that the name you have chosen is removed from the **Saved Settings** list.

7 Select **OK** to apply your changes and close the **User Settings** dialog box.

Related topics

User Settings dialog box, page 237

Choosing EA440 factory default settings

Sometimes it may be useful to reset the EA440 to work with a set of known user settings. A set of "factory settings" is provided for this purpose. The settings may be put to use if you are uncertain of which values to use. They offer "best practice" settings for typical use.

Context

The **User Settings** dialog box is used to store your favourite EA440 settings.

User Settings dialog box, page 237

These settings can be related to different operations, environmental conditions or basic personal preferences. You can use different settings to create as many user profiles as you like, and give them any name. All the settings you have chosen using functions and dialog boxes in the EA440 user interface are saved.

To activate either a factory or a saved setting, click the relevant name in one of the lists, then click the **Activate Selected Setting** button. The factory settings cannot be altered.

Note

Unless they are saved, all your current settings are lost when the factory settings are applied.

Procedure

1 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

2 Select **User Settings**.

3 Observe the **Factory Settings** list.

4 Select the setting you wish to use.

5 Select **Activate Selected Setting**.

6 Select **OK** to apply your changes and close the **User Settings** dialog box.

Related topics

User Settings dialog box, page 237

Adjusting the transceiver parameters

Selecting *Passive* transceiver mode

In *Passive* mode, the EA440 will receive and compute the signals detected by the transducer(s). Therefore, this mode is useful for test purposes, and when you want to measure the ambient background noise in the sea. It can also be useful to run the EA440 in *Passive* mode to discriminate between target echoes (present only in *Active* mode) and noise (present in both *Active* and *Passive* modes).

Context

If you wish to investigate the ambient noise, choose *Passive* mode in the **Normal Operation** dialog box. Any noise or disturbance in the water - within the transducer's

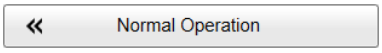
frequency range - will then be detected and shown. This feature will for example be able to pick up disturbances from other hydroacoustic systems on your own vessel, or on other vessels in the vicinity.

Procedure

1 Select the **Operation** icon.

The icon is located under the **Main** menu. It is used to open the **Operation** menu.

2 Select **Normal Operation**.



Observe that the **Normal Operation** dialog box opens.

Normal Operation dialog box, page 249

3 For the relevant transceiver channel, set **Mode** to *Passive*.

Note

If you set **Mode** *to Passive, your EA440 will no longer provide any information in the echogram(s).*

4 Select **OK** to save the selected setting and close the dialog box.

Related topics

Normal Operation dialog box, page 249

Adjusting the output power

You are permitted to adjust the output power of the EA440. You can not increase the power to beyond the transducer's capacity, but you may reduce it for better performance in shallow water, or if you are struggling with reverberation.

Context

The **Power** parameter in the **Normal Operation** dialog box displays the transmitter's output power measured in Watts. You can change the output power manually. Output power is limited either to the maximum rating of the transducer, or the maximum rating of the transmitter, whichever is the smallest. For all practical purposes, this means that you can *reduce* the power output, but you can not increase it to beyond the power rating of the transducer.

The current setting of this parameter is also shown in the **Extras** menu.

Procedure

1 Click in any echogram view to make it "active".

The setting you choose will only be valid for the currently "active" echogram. The "active" echogram view is identified with a thicker border.

2 Locate the **Power** function.

3 For the relevant transceiver channel, set **Power** to the requested value.

The following methods can be used for this adjustment:

- Select [+] or [-] to choose the requested setting.
- Select the middle of the button to open the menu.

Related topics

Power function, page 244
Normal Operation dialog box, page 249

Adjusting the pulse duration

The **Pulse Duration** setting specifies the current duration ("length") of the transmitted pulse. You can manually select a pulse duration that suits your operation.

Context

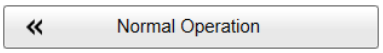
The pulse duration can be selected according to the current depth and what kind of bottom you are looking at. The deeper you wish to see, the longer pulse duration should be selected. Remember that in the EA440, the pulse duration and the bandwidth are mutually dependant.

Procedure

1 Select the **Operation** icon.

The icon is located under the **Main** menu. It is used to open the **Operation** menu.

2 Select **Normal Operation**.



Observe that the **Normal Operation** dialog box opens.

Normal Operation dialog box, page 249

3 For the relevant channel, set **Pulse Duration** to your chosen value.

4 Select **OK** to save the selected setting and close the dialog box.

Related topics

Normal Operation dialog box, page 249

Defining the frequency sweep (chirp) within each transmission

The EA440 supports wideband transmissions using frequency sweeps. This is often referred to as "chirp", and means that the transmission frequency changes from a "start" frequency to an "end" frequency within the transmission. In order to use the frequency sweep ("chirp") functionality, you must use frequency modulated pulses. You must also use a wideband transducer that supports the complete frequency range.

Context

The **Start Frequency** and **End Frequency** parameters are used to set up a frequency sweep ("chirp"). If the parameters for start and end frequencies are unavailable, the transducer used on the relevant channel does not support wideband transmissions. In order to use the frequency sweep ("chirp") functionality, you must use frequency modulated pulses.

Note

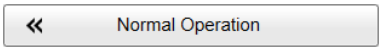
It is very important that the transducer you are using complies to the frequencies you choose. The frequency range of each transducer is defined in the transducer setup file. If you choose a frequency range that is not supported, and error message will appear.

Procedure

1 Select the **Operation** icon.

The icon is located under the **Main** menu. It is used to open the **Operation** menu.

2 Select **Normal Operation**.



Observe that the **Normal Operation** dialog box opens.

3 For the relevant channel, set **Start Frequency** and **End Frequency** to values permitted by your transducer.

4 Set **Ramping** to the requested function.

5 Select **OK** to save the selected settings and close the dialog box.

Related topics

Normal Operation dialog box, page 249

Defining the pulse type for the EA440 transmissions

The **Pulse Type** function allows you to select the "shape" of the transmitted pulses ("pings").

Context

The abbreviation "CW" means "Continuous Wave". "FM" means "Frequency Modulated".

Note

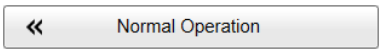
The settings in the **Normal Operation** *dialog box are limited by the specifications in the transducer setup file. Therefore, you cannot make any changes that will damage your transceiver or transducer. Do not to make any changes unless you are well aware of the consequences.*

Procedure

1 Select the **Operation** icon.

The icon is located under the **Main** menu. It is used to open the **Operation** menu.

2 Select **Normal Operation**.



Observe that the **Normal Operation** dialog box opens.

Normal Operation dialog box, page 249

3 For the relevant channel, set **Pulse Type** to *FM* or *CW* as permitted by your transducer.

4 Select **OK** to save the selected setting and close the dialog box.

Related topics

Normal Operation dialog box, page 249

Interfacing peripheral equipment

Topics

Installing navigation sensors and other sensors

For the EA440 to use and offer correct navigational information, one or more external sensors must be connected. Typical sensors are those that provide speed, heading and geographical position. To set up the communication parameters on the serial and LAN ports, use the **I/O Setup** page. To select which sensors to install, use the **Sensor Installation** page. The **Sensor Configuration** page allows you to define a datagram priority, so that the information from the "most reliable" sensor is used by the EA440. You can also define manual values in case a sensor is unserviceable, or not installed.

Prerequisites

The new sensor is physically connected to the EA440 using a serial or network cable.

Context

The **Sensor Installation** page allows your EA440 to communicate with external sensors and systems. However, in order to communicate with each sensor, you must first set up the relevant communication parameters. Once the communication has been established and the sensor is connected, you must define the datagram priority and finalize the configuration.

Procedure

1 Select the **Setup** icon.

The icon is located under the **Main** menu. It is used to open the **Setup** menu.

2 On the **Setup** menu, select **Installation**.

This dialog box contains a number of pages selected from the menu on the left side.

3 Set up the interfaces to the navigation sensors.

a On the left side of the **Installation** dialog box, select **I/O Setup**.

b Set up the relevant serial or Ethernet (LAN) communication parameters.

c On the left side of the **Installation** dialog box, select **Sensor Installation**.

d Select the type of sensor you want to interface, and define the relevant parameters.

e On the left side of the **Installation** dialog box, select **Sensor Configuration**.

f Define the priority of the datagrams, and set up relevant configuration parameters.

4 Repeat for each sensor interface that you need to set up.

5 Close the **Installation** dialog box.

Related topics

Defining the serial and Ethernet (LAN) port parameters, page 136
Setting up the input from a navigation system (GPS), page 138
Configuring the sensor interface, page 139
Setting up a serial or LAN (Ethernet) port for annotation input, page 141
Setting up depth output to an external system, page 143
Exporting sensor data to a peripheral system, page 145

Defining the serial and Ethernet (LAN) port parameters

For any sensor interface to work, the communication parameters must be set up correctly. The EA440 software automatically scans the Operator Station to locate and identify the available communication ports. Once the software has established a list of valid interfaces, you can set up and control the communication parameters.

Prerequisites

- The new sensor is physically connected to the EA440 Operator Station using a serial or Ethernet cable.
- The communication parameters required for the sensor interface are known.

Context

The **I/O Setup** page provides two lists; one for serial ports and one for Ethernet (LAN) ports. Each list is supported with a set of functions to set up and monitor the communication ports. Select the port you want to work with and then select one of the buttons below the list.

Tip

The **Sensors** *page in the* **BITE** *(Built-In Test Equipment) dialog box provides an overview of all the communication lines and sensors in use. All relevant status information is provided. You open the* **BITE** *dialog box from the* **Setup** *menu.*

Procedure

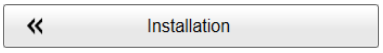
1 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

2 Select the **Setup** icon.

The icon is located under the **Main** menu. It is used to open the **Setup** menu.

3 On the **Setup** menu, select **Installation**.



Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected from the menu on the left side.

4 On the left side of the **Installation** dialog box, select **I/O Setup**.

5 Observe that the available serial and network interface ports on the Operator Station are listed.

6 Select the interface port you wish to set up.

7 Select **Setup** below the list to open the **Serial Port Setup** or **LAN Port Setup** dialog box.

8 Set up the relevant serial or Ethernet (LAN) communication parameters.

The communication parameters defined for **NMEA 0183** are:

- **Baud Rate**: 4800 b/s
- **Data Bits**: 8
- **Parity**: None
- **Stop Bits**: 1

Some instruments may offer other parameters and/or options. You must always check the relevant documentation provided by the manufacturer.

9 Select **OK** to save the selected settings and close the dialog box.

10 Repeat for any other communication ports that you need to set up.

11 Close the **Installation** dialog box.

Related topics

I/O Setup page, page 265

Setting up the input from a navigation system (GPS)

For the EA440 to use and offer correct navigational information, one or more external sensors must be connected. Typical sensors are those that provide speed, heading and geographical position. To select which sensors to install, use the **Sensor Installation** page.

Prerequisites

- The new sensor is physically connected to the EA440 using a serial or network cable.
- The interface port is set up with the correct communication parameters.

Context

The **Sensor Installation** page allows your EA440 to communicate with external sensors and systems. You must specify which communication port to use (LAN (Local Area Network) or serial port). You can type a custom name to identify the sensor import. In the list of valid datagram formats, select the format(s) to be accepted by the EA440. Once a sensor has been chosen, you must select the offset values that define the sensor's physical location relative to your vessel's coordinate system.

Note

Certain sensors can not be interfaced using the **Sensor Installation** *page. To set up the input from these sensors, you must use the* **Select Inputs** *dialog box on the* **I/O Setup** *page.*

- *Annotations*

To open the **Select Inputs** *dialog box, select a serial or LAN port on the* **I/O Setup** *page, and select* **Input**.

Procedure

1 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

2 Select the **Setup** icon.

The icon is located under the **Main** menu. It is used to open the **Setup** menu.

3 On the **Setup** menu, select **Installation**.

Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected from the menu on the left side.

4 On the left side of the **Installation** dialog box, select **Sensor Installation**.

5 Select the type of sensor you want to interface.

6 Select which port you want to import the sensor information on.

7 Type a custom name to identify the interface in other dialog boxes.

8 Select which datagram(s) you want to import from the sensor.

9 If relevant, specify a dedicated talker ID.

10 Provide the accurate physical location of the sensor (or its antenna) with reference to the vessel's coordinate system.

The position of certain sensors must be defined as an *offset* to the *Ship Origin* in the coordinate system to maximize performance. These offset values are all required to allow the EA440 to give you as accurate information as possible. The degree of accuracy offered by the EA440 is directly related to the accuracy of the information you enter on the **Sensor Installation** page.

a Select the offset value on the X axis (fore-and-aft direction) from the *Ship Origin*. Adjust with a positive value for X if the sensor is located ahead of the ship origin.

b Select the offset value on the Y axis (athwartship) from the *Ship Origin*. Adjust with a positive value for Y if the sensor is located on the starboard side of the ship origin.

c Select the offset value on the Z axis (vertical) from the *Ship Origin*. Adjust with a positive value for Z if the sensor is located under the ship origin.

11 Select **Add** to save the new sensor interface you have defined.

The sensor interface is added to the **Installed Sensors** list on the **Sensor Installation** page.

12 Repeat for each sensor interface that you need to set up.

13 Close the **Installation** dialog box.

Further requirements

On the left side of the **Installation** dialog box, select **Sensor Configuration**. Define the priority of the datagrams, and set up relevant configuration parameters.

Related topics

Sensor Installation page, page 314

Configuring the sensor interface

With several sensors connected to the EA440, many of them will provide the same datagrams. We cannot expect that the datagrams provide the same information. The **Sensor Configuration** page allows you to define a datagram priority, so that the information from the "most reliable" sensor is used by the EA440. You can also define manual values in case a sensor is unserviceable, or not installed.

Prerequisites

- The new sensor is physically connected to the EA440 using a serial or network cable.
- The interface port is set up with the correct communication parameters.

- The navigation sensor is installed into the EA440 software. The relevant interface parameters and physical location properties are defined.

Context

Any information in a datagram, for example the current depth, may be provided in different datagrams from several sensors. Due to a number of reasons (environmental conditions, installation, configuration, accuracy, etc.), the numerical values provided can be different from one sensor to another.

Several sensor are provided on the **Sensor Configuration** page, one for each type of information. Select the sensor you wish to configure in the **Sensor** list. For each type, you can define a priority sensor by rearranging the datagrams in a list. You can also define manual values in case a sensor is unserviceable, or not installed.

The EA440 can communicate with several different sensor types. On the **Sensor Installation** page you define which external sensors your EA440 will import information from. You must also decide which datagram formats that will be accepted. Open the **Sensor Installation** page in the **Installation** dialog box.

Note

Certain sensors can not be interfaced using the **Sensor Installation** *page. To set up the input from these sensors, you must use the* **Select Inputs** *dialog box on the* **I/O Setup** *page.*

- *Annotations*

To open the **Select Inputs** *dialog box, select a serial or LAN port on the* **I/O Setup** *page, and select* **Input**.

Procedure

1 Select the **Setup** icon.

The icon is located under the **Main** menu. It is used to open the **Setup** menu.

2 On the **Setup** menu, select **Installation**.

3 On the left side of the **Installation** dialog box, select **Sensor Configuration**.

Sensor Configuration page, page 319

4 Select the sensor you wish to configure in the **Sensor** list.

5 If you wish to use the built-in datagram priority, select **Auto**.

- With **Auto** *enabled*, the priority list is used. Information is imported from the sensor at the top of the list. If the sensor fails to provide information for more than 20 seconds, data from the next sensor is used.
- With **Auto** *disabled*, the priority list is not used. Information is imported from the sensor at the top of the list. All other sensors are ignored.

6 If you wish to control the datagram priority manually, *do not* select **Auto**.

To change the priority for a given datagram, select it, and change its location on the list using the arrow buttons.

7 If relevant, add a manual value for the sensor input.

8 At the bottom of the dialog box, select **Apply** to save your settings.

9 Repeat for each sensor interface that you need to set up.

10 Close the **Installation** dialog box.

Related topics

Sensor Configuration page, page 319

Setting up a serial or LAN (Ethernet) port for annotation input

Several different annotation types may be added to the echogram. They are displayed on the echogram if this feature is enabled in the **Echogram** dialog box. You can add annotations manually, or import information as datagrams using a serial or LAN (Ethernet) communication port.

Prerequisites

This procedure assumes that:

- You have a vacant interface port on your Operator Station.
- You are familiar with NMEA and other relevant datagram formats.
- You know how to set up the parameters for serial and local area network (LAN) communication.

Context

The **Sensor Installation** page allows your EA440 to communicate with external sensors and systems. You must specify which communication port to use (LAN (Local Area Network) or serial port). You can type a custom name to identify the sensor import. In the list of valid datagram formats, select the format(s) to be accepted by the EA440.

Note

Just making changes and selecting **OK** *at the bottom of the page will not install anything. Select what to install, define the relevant parameters, and then select* **Add**.

The EA440 supports the following datagram format for annotations.

- **Simrad ATS datagram format**

  Simrad ATS is a proprietary datagram format created by Kongsberg Maritime. It allows you to import annotations from external devices.

Procedure

1 Connect the peripheral system providing the annotations to an available communication port on your Operator Station.

This is described in the EA440 *Installation manual*.

2 On the **Setup** menu, select **Installation**.

Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected from the menu on the left side.

3 On the left side of the **Installation** dialog box, select **Sensor Installation**.

4 Select *Annotations* to import information from the peripheral system.

5 Select the port you wish to use (serial or LAN).

6 If you want to check the communication parameters, select **Inspect Port**.

You cannot make any changes here. To change the communication parameters, use the **I/O Setup** page. The **I/O Setup** page is located in the **Installation** and **Output** dialog boxes.

7 If you want to check that the peripheral system is transmitting data to the EA440, select **Monitor**.

The **Port Monitor** dialog box provides one text box for incoming messages (**Rx Data**), and one for outgoing messages (**Tx Data**). Use these boxes and your knowledge of the data communication to investigate the datagrams. The **Port Monitor** dialog box is a tool for debugging purposes. It is neither required nor intended for normal operation of the EA440.

8 Type a custom name to identify the interface in other dialog boxes.

9 Select which datagram(s) you want to import from the peripheral device.

When you select sensor type Annotation, only one datagram can be selected.

10 Do not specify a dedicated Talker ID.

11 Select **Add** to save the new device interface you have defined.

Select **Add** to save the new device interface you have defined.

12 Select **Apply** and then **Close** to save all the parameters and close the **Installation** dialog box.

Related topics

Annotations page, page 324

Setting up depth output to an external system

The EA440 can export depth information on a dedicated communication port (serial or Ethernet) The **Depth Output** page is used to set up the output parameters.

Prerequisites

This procedure assumes that:

- You have a vacant interface port on your Operator Station.
- You are familiar with NMEA and other relevant datagram formats.
- You know how to set up the parameters for serial and local area network (LAN) communication.

Context

The EA440 can export the depth information on several NMEA datagram formats. You can export several depth formats simultaneously, as each of them is handled independently.

Procedure

1 Connect the peripheral system to an available communication port on your Operator Station.

This is described in the EA440 *Installation manual*.

2 Select the **Operation** icon.

The icon is located under the **Main** menu. It is used to open the **Operation** menu.

3 Select **Output**.

Observe that the **Output** dialog box opens. This dialog box contains a number of pages selected by the menu on the left side.

4 On the left side of the **Output** dialog box, select **Depth Output**.

Observe that the **Depth Output** page opens.

5 On the **Depth Output** page, set up the data export parameters.

a Select which depth datagram to export.

b Select **Add** to start export of the chosen data format.

Once an output type has been defined, it is listed in the **Installed Outputs** box on the left side of the page.

c Select the communication port you wish to use.

d Choose which channel to use as source for the depth information.

"Best practice" is to use the lowest frequency. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

e If applicable, specify a dedicated Talker ID.

f Select **Inspect Port** to check the communication parameters on the chosen port.

The **Inspect Port** function does not allow you to set up or change any communication parameters. To do this, you must open the **Serial Port Setup** or **LAN Port Setup** dialog box from the **I/O Setup** page.

g Select **OK** to save the selected settings and close the dialog box.

6 On the left side of the **Outputs** dialog box, select **I/O Setup**.

7 Observe that the available serial and network interface ports on the Operator Station are listed.

8 Set up the relevant serial or Ethernet (LAN) communication parameters.

a On the **I/O Setup** page, select the port you wish to set up.

b Select **Setup** below the list to open the **Serial Port Setup** or **LAN Port Setup** dialog box.

c Set up the relevant communication parameters.

d Select **OK** to save the selected settings and close the dialog box.

9 Make sure that the communication port is functional.

a On the **I/O Setup** page, select the port you wish to check.

b Select **Monitor** to open the **Port Monitor** dialog box.

c Make sure that there is data traffic on the output port (shown in the **Tx Data** box).

In order to see this data traffic, your EA440 must be active and transmitting information to the peripheral system.

d Select the [**X**] in the upper-right corner of the **Port Monitor** dialog box to close it.

10 Select **Apply** and then **Close** to save all the parameters and close the **Output** dialog box.

Related topics

Depth Output page, page 272

Exporting sensor data to a peripheral system

The information provided to the EA440 from various sensors can also be useful for other systems on board. The EA440 allows you to export the same sensor data that was originally imported. This can "reuse" the same information on other systems. The **Relay Output** page is used to set up and control this export functionality.

Prerequisites

This procedure assumes that:

- You have a vacant interface port on your Operator Station.
- You are familiar with NMEA and other relevant datagram formats.
- You know how to set up the parameters for serial and local area network (LAN) communication.

Context

The information imported to the EA440 from various sensors can also be useful for other systems on board your vessel. The EA440 allows you to "re-export" this sensor information. When activated, the selected sensor information is sent out on the chosen communication port (serial or LAN) on the Operator Station.

The following sensor data can be exported:

- Navigation
- Motion sensor

Procedure

1 Connect the peripheral system to an available communication port on your Operator Station.

This is described in the EA440 *Installation manual*.

2 Select the **Operation** icon.

The icon is located under the **Main** menu. It is used to open the **Operation** menu.

3 Select **Output**.

Observe that the **Output** dialog box opens. This dialog box contains a number of pages selected by the menu on the left side.

4 On the left side of the **Output** dialog box, select **Relay Output**.

Observe that the **Relay Output** page opens.

5 On the **Relay Output** page, set up the data export parameters.

a Select which information to export.

b Select **Add** to start export of the chosen data format.

c Select the communication port you wish to use.

d Select **Inspect Port** to check the communication parameters on the chosen port.

The **Inspect Port** function does not allow you to set up or change any communication parameters. To do this, you must open the **Serial Port Setup** or **LAN Port Setup** dialog box from the **I/O Setup** page.

e Select **OK** to save the selected settings and close the dialog box.

6 On the left side of the **Outputs** dialog box, select **I/O Setup**.

7 Observe that the available serial and network interface ports on the Operator Station are listed.

8 Set up the relevant serial or Ethernet (LAN) communication parameters.

a On the **I/O Setup** page, select the port you wish to set up.

b Select **Setup** below the list to open the **Serial Port Setup** or **LAN Port Setup** dialog box.

c Set up the relevant communication parameters.

d Select **OK** to save the selected settings and close the dialog box.

9 Make sure that each communication port is functional.

a On the **I/O Setup** page, select the port you wish to check.

b Select **Monitor** to open the **Port Monitor** dialog box.

c Make sure that there is data traffic on the output port (shown in the **Tx Data** box).

In order to see this data traffic, your EA440 must be active and transmitting information to the peripheral system.

d Select the [**X**] in the upper-right corner of the **Port Monitor** dialog box to close it.

10 Select **Apply** and then **Close** to save all the parameters and close the **Output** dialog box.

Related topics

Relay Output page, page 275

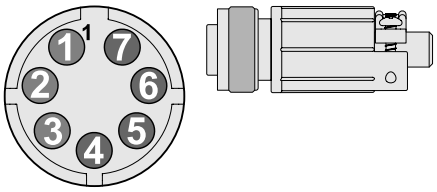
Synchronizing the EA440 by means of the Auxiliary port

The WBT offers an AUXILIARY port that can be used for synchronisation purposes. This synchronization method may be more stable that the traditional CTS/RTS connection to a serial port.

Prerequisites

An external synchronisation system is connected to the AUXILIARY socket on the WBT.

Context



The AUXILIARY socket on the WBT can be used to interface an external synchronization system.

The socket is made to fit a Conxall 7-pin **Mini-Con-X®** shielded connector. The connections are made on pins 2, 3 and 5. The connector can be ordered from the manufacturer, or purchased from Kongsberg Maritime using order number **387563**.

- **Manufacturer**: Switchcraft Conxall
- **Manufacturer's website**: http://www.conxall.com

Pin number	**1**	**2**	**3**	**4**
Purpose	Future use	Synchronization Output	Synchronization Input	Future use
Pin number	**5**	**6**	**7**	
Purpose	Digital ground	Not used	Not used	

The parameters on the **Synchronization** page allow you to choose which communication port to use for the physical connection to the external system, and which synchronization mode to use. The **Synchronization** page is located in the **Installation** dialog box on the **Setup** menu.

To use the synchronisation functionality offered by the AUXILIARY socket on the WBT, the necessary cable to the external synchronisation system must be connected. The parameters on the **Synchronization** page allow you to choose which communication port to use for the physical connection to the external system, and which synchronization mode to use. The **Synchronization** page is located in the **Installation** dialog box on the **Setup** menu.

Note

If you use more than one WBT in your EA440 system, all synchronization input signals to the AUXILIARY ports must be provided by the same source. Individual synchronization of a single WBT is not supported.

If you use more than one computer in your EA440 system, the synchronization inputs to the AUXILIARY ports can not be used. This functionality is not supported.

Procedure

1 Connect the dedicated cable from the WBT to the external synchronisation system.

This is described in the EA440 *Installation manual*.

2 Turn on the EA440, and set it to normal use.

3 Open the **Setup** menu.

4 On the **Setup** menu, select **Installation**.

Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected from the menu on the left side.

5 On the left side of the **Installation** dialog box, select **Synchronization**.

6 From the list of ports available, select **Transceiver Auxiliary Port**.

7 Observe that when **Transceiver Auxiliary Port** is selected, only *Slave* synchronization mode is permitted.

Slave mode is used if the EA440 is going to transmit only when permitted by a peripheral system. When *Slave* mode is selected, the EA440 does not transmit ("ping") unless an external trigger appears on the chosen synchronization port. The peripheral system may be any other hydroacoustic product (for example an echo sounder or sonar), or even a dedicated synchronization system.

8 Select **Synchronization Delay**.

In *Slave* mode, the EA440 waits for the delay time after the external trigger signal has arrived before transmitting the ping. This is often referred to as a *post-trigger*.

9 At the bottom of the page, select **Apply** to save your settings.

10 Continue your work in the **Installation** dialog box, or select **OK** to close it.

Setting up the EA440 in a synchronized system

If you want to use the EA440 as a master or slave in a synchronized system, you must set it up for such operation. To do this, you must select which communication port to use for the synchronization interface, and you must select the requested synchronization mode.

Prerequisites

For "slave" operation, a remote system (for example *K-Sync*) must be available to provide trigger pulses.

For "master" operation, a remote hydroacoustic system (sonar, echo sounder) is connected. This remote system must be set up in "slave" mode.

Context

Whenever more than one hydroacoustic system is installed on a vessel, interference may occur. To avoid interference, you have these options:

- The systems are all connected to a common synchronization system.
- One of the acoustic systems is set up as "master", and controls the transmissions on the other systems.

The EA440 offers functionality for remote transmit synchronization. It can be set up to operate in either *Master* or *Slave* mode.

Procedure

1 Connect the synchronization cable from the remote system to an available communication port on your Operator Station.

This is described in the EA440 *Installation manual*.

2 Select the **Setup** icon.

The icon is located under the **Main** menu. It is used to open the **Setup** menu.

3 On the **Setup** menu, select **Installation**.

Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected from the menu on the left side.

4 On the left side of the **Installation** dialog box, select **Synchronization**.

5 Select **Synchronization Mode**.

- **Stand-alone**

  Synchronization is turned off.This synchronization mode is used if the EA440 is working by itself and with no synchronization required. This is the default setting. The EA440 operates using its internal ping interval parameters, independent of any trigger signals arriving at the synchronization port.

  The **Synchronization Delay** setting is not applicable when synchronization is switched off.

- **Master**

  Master mode is used if the EA440 is going to act as the controlling unit in a synchronized system. The peripheral hydroacoustic system(s) are only permitted to transmit when enabled by the EA440. When *Master* mode is selected, the EA440 will run using its internal ping interval parameters and send trigger signals to the peripheral system(s).

- **Slave**

  Slave mode is used if the EA440 is going to transmit only when permitted by a peripheral system. When *Slave* mode is selected, the EA440 does not transmit ("ping") unless an external trigger appears on the chosen synchronization port. The peripheral system may be any other hydroacoustic product (for example an echo sounder or sonar), or even a dedicated synchronization system.

6 Select **Synchronization Delay**.

This delay parameter is used differently depending on the chosen synchronization mode. Note that if you select the same delay for the master and the slave, the systems will ping at the same time.

- **Stand-alone**

  The **Synchronization Delay** setting is not applicable when synchronization is switched off.

- **Master**

  In *Master* mode, the EA440 waits for the delay time after the external trigger signal has been sent to the slaves before transmitting the ping. This is often referred to as a *pre-trigger*.

  Note

  This delay will only work when the synchronization is set up using a serial port.

- **Slave**

  In *Slave* mode, the EA440 waits for the delay time after the external trigger signal has arrived before transmitting the ping. This is often referred to as a *post-trigger*.

7 From the list of ports available, select **Synchronization Port**.

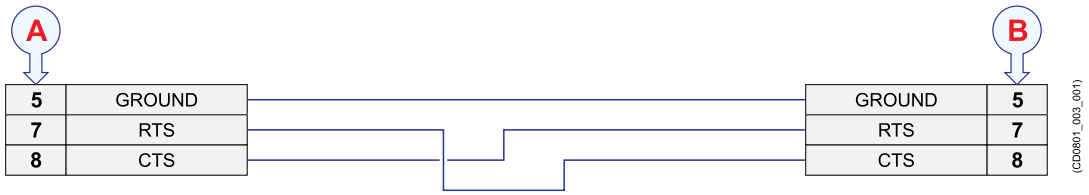
  This is the interface port currently used to transmit or receive synchronization signals. It must be an RS-232 serial port. Since the synchronization function only uses the *Request To Send (RTS)* and *Clear To Send (CTS)* signals on a serial port, you can use a port that is already used for other purposes. For the same reason, you do not need to define any baud rate.

8 Select **Apply** and then **Close** to save all the parameters and close the **Installation** dialog box.

Synchronization using Clear To Send (CTS) and Request To Send (RTS) signals

In many applications, the synchronisation interface is based on an RS-232 serial port. Only the Clear to Send (CTS) and Request to Send (RTS) connections of the RS-232 interface are then used.

According to the standard specifications for RS-232, an output must generate a voltage level of +5 to +15 VDC (logic "low"), and -5 to -15 VDC (logic "high") into a load of 3 to 7 kΩ. An RS-232 receiver must present a 3 to 7 kΩ load , converting an input of +3 to +25 VDC to logic "low", and an input of +3 to +25 VDC to logic "high". With a positive trigger pulse, the offset voltage does not have any significance. Even small variations (flutter) over and below 0 VDC will not trigger the interface.

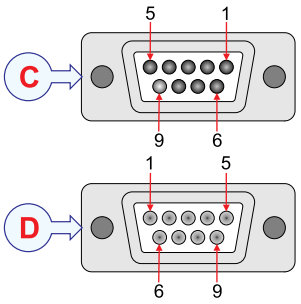


A *Local connection*

B *Connection on remote device*

C *Female 9-pin D-Subminiature connector*

D *Male 9-pin D-Subminiature connector*



RS-422 serial interfaces can also be used for synchronization purposes. In RS-422, the voltage levels are +6 VDC and –6 VDC. The positive voltage is logic "low". In general use, the advantage of RS-422 is the speed and maximum range. The same pins (5, 7 and 8 on a 9–pin D-connector) are used for synchronization.

Note

When you use RS-422 you must keep in mind that the shift from logic "low" to logic "high" happens at 0 VDC. Your offset voltage must therefore be negative to prevent small variations (flutter) over and below 0 VDC to trigger the interface.

System setup and software installation procedures

Obtaining and installing the software license

To operate the EA440 with a transceiver you need a valid software license. Before you can use the EA440 you must obtain a "license string" and install it on your Operator Station. Without a license you will not be able to communicate with the transceiver.

Prerequisites

This procedure assumes that the EA440 operating software has been successfully installed on the Operator Station.

Context

The software license is a 32 character hexadecimal string based on the transceiver's serial number. It defines several key parameters that control the functionality and behaviour of the transceiver(s) you use. Each software license code "unlocks" one WBT for operational use with a set of predefined properties.

The software license is not linked to the physical Operator Station. You can therefore easily move the software from one computer to another, just remember to make a copy of the license string.

In order to obtain a software license for your EA440, you must contact one of Kongsberg Maritime's dealers or agents. You can also contact our support department directly.

Note

Once you receive your software license string(s), do not lose them. We suggest that you copy the information into a text file (for example Notepad), and add relevant information. Place the text file on the Operator Station desktop, and make sure that backup copies are made.

Procedure

1 Obtain the necessary information about your transceiver(s) and transducer(s). Write down:

   a The serial number for each transceiver.

   b Which transducers you have connected to each transceiver.

   c The center frequency for each transducer.

   d The Q-value for each transducer.

   e The maximum nominal power rating for each transducer.

2 Send the necessary information directly to our support department.

   You can use the following e-mail address:

   km.hydrographic.support@kongsberg.com

Once the software license string(s) have been returned to you (most likely by e-mail), you can install the licenses into the software.

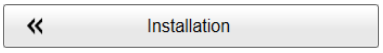
3 Observe the **Main** menu.

   Its default location is on the right side of the EA440 presentation.

4 Select the **Setup** icon.

   The icon is located under the **Main** menu. It is used to open the **Setup** menu.

5 On the **Setup** menu, select **Installation**.



   Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected from the menu on the left side.

6 On the left side of the **Installation** dialog box, select **Software License**.

   Observe that the **Software License** page opens.

7 Select **Type License String**, and type the license string into the dialog box.

   If you do not have a computer keyboard connected to your EA440 system, select the **Keyboard** button to open an on-screen keyboard. If you have received the license string on an electronic format (e-mail or text file), you can copy the string from the source document and paste it into the **Type License String** dialog box.

8 Select **OK** to save the license string and close the **Type License String** dialog box.

9 Verify that the license string is placed in the **Currently active licenses** list.

If necessary, select the license string on the left side, and click the arrow button [>] to move it to the **Currently active licenses** list.

10 Select **Apply** and then **Close** to save all the parameters and close the **Installation** dialog box.

Related topics

Software License page, page 326

Moving the software license from one Operator Station to another

Without a license you will not be able to communicate with the transceiver. The software license for the EA440 is not linked to the physical Operator Station. If necessary, you can therefore easily move the EA440 software from one computer to another.

Prerequisites

This procedure assumes that:

- Your existing EA440 is operational with all necessary software licenses installed.
- You have a new computer to be used as Operator Station.
- The EA440 software has been installed on the new Operator Station.
- The new Operator Station is connected to the transceiver(s).

In order to do this task you will need a small text editor (for example the Microsoft® *Notepad*) running on both computers. You will also need a USB flash drive.

The GPT licenses can not be moved to another computer.

Context

The software license is a 32 character hexadecimal string based on the transceiver's serial number. It defines several key parameters that control the functionality and behaviour of the transceiver(s) you use. Each software license code "unlocks" one WBT for operational use with a set of predefined properties.

Procedure

1 Start the EA440 on the "old" Operator Station.

2 Select the **Setup** icon.

The icon is located under the **Main** menu. It is used to open the **Setup** menu.

3 On the **Setup** menu, select **Installation**.

Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected from the menu on the left side.

4 On the left side of the **Installation** dialog box, select **Software License**.

Observe that the **Software License** page opens.

5 Copy all the current license strings to a text file on the USB flash drive.

a Move all the software licenses to the **Currently active licenses** list.

b Insert a USB flash drive on your computer.

c Open a small text editor.

d For each software license string:

1 Click on the license string to select it.

2 Select **Copy** to copy the license string to the computer's clipboard.

3 Activate the text editor, and paste in the license string.

e When all the software license strings have been pasted into the text file, save it to the USB flash drive.

f Remove the USB flash drive, and insert it on the "new" Operator Station.

6 Start the EA440 on the "new" Operator Station.

7 Install the license strings using copy/paste from the text file.

Related topics

Software License page, page 326

Defining the IP address on the Operator Station network adapter

The communication between the Operator Station and the transceiver(s) is made using a high capacity Ethernet cable. If more than one transceiver is used, an Ethernet switch is added. On the EA440, the necessary IP address is generated automatically. However, we recommend that you manually define which IP Address and Subnet mask the Ethernet adapter in the Operator Station shall use for this communication.

Prerequisites

This procedure is made for the Microsoft® Windows® 7 operating system. It is assumed that you are familiar with this operating system.

Context

As long as you do not change the Operator Station to another computer, or replace the network adapter in your Operator Station, you will only need to do this once.

Procedure

1 On the Operator Station, close the EA440 program.

2 Open the **Network and Sharing Center** dialog box.

   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**: 157.237.15.16 *(Example, any IP address can be used)*
   - **Subnet mask**: 255.255.255.0

   You can leave **Subnet mask** blank and select **OK**. When you see an error message saying that the message subnet mask is missing, select **OK** again. A default subnet mask is then automatically generated.

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

Further requirements

If you later need to change the IP address, always restart the transceiver before you start the EA440.

Installing one or more transducers

The transducers you wish to use with the EA440 must be "installed" as a part of the software configuration. Which transducers to use depends on the number of transceivers in your system, and the licenses you have for these. Unless you replace a broken transducer, or add a new, you only need to do this once.

Prerequisites

It is assumed that the EA440 software has been installed, and that all relevant license strings have been applied. You need to know the type and serial number of each transducer that you wish to install.

Context

Each transducer is added using the **Transducer Installation** page. The **Transducer Installation** page is located in the **Installation** dialog box.

You can only choose a transducer from the **Model** list. The list is generated from a system file on your Operator Station. It contains all the transducers that are compatible with the WBT, but since the software is common for several systems there may also be non-compatible transducers in the list. The list also includes technical specifications for each transducer. You can not see this information, but it is used by the EA440 to set up the operational parameters. This allows the WBT to optimize its performance for the individual transducer models.

If you cannot find your transducer in the list, contact you dealer, agent or Kongsberg Maritime to upgrade the relevant software component in the EA440.

Note

Just making changes and selecting **OK** *at the bottom of the page will not install anything. Select what to install, define the relevant parameters, and then select* **Add**.

Procedure

1 Open the **Setup** menu.

2 On the **Setup** menu, select **Installation**.

This dialog box contains a number of pages selected from the menu on the left side.

3 On the left side of the **Installation** dialog box, select **Transducer Installation**.

4 Select the transducer you wish to install from the **Model** list.

Note

Make sure that you select a transducer that is supported by your current license.

5 Insert the serial number.

Some new Kongsberg transducers with built-in "intelligence" will automatically provide this serial number.

6 Type the name you wish to use into the **Custom Name** box.

Type any name that you wish to use to identify the transducer. The name you select will only be used to identify the transducer in other dialog boxes. It is not used in the echo data that you export. If you do not have a computer keyboard connected to your EA440 system, select the **Keyboard** button to open an on-screen keyboard.

7 Select mounting method.

8 Specify the orientation of the transducer beam.

9 Provide the accurate physical location of the transducer with reference to the vessel's coordinate system.

Use the centre of the transducer face as reference, and define the offset values related to the *Ship Origin*.

a Select the offset value on the X axis (fore-and-aft direction) from the *Ship Origin*. Adjust with a positive value for X if the transducer is located ahead of the ship origin.

b Select the offset value on the Y axis (athwartship) from the *Ship Origin*. Adjust with a positive value for Y if the transducer is located on the starboard side of the ship origin.

c Select the offset value on the Z axis (vertical) from the *Ship Origin*. Adjust with a positive value for Z if the transducer is located under the ship origin.

10 Select **Add** to save the information you have provided.

The transducer is added to the list in the **Installed Transducers** box.

11 Repeat for each transducer that you wish to install.

12 Close the **Installation** dialog box.

Result

Once a transducer has been installed, it is listed in the **Installed Transducers** box. To see the information you have collected about the transducer, select the relevant transducer in the list.

The **Edit** functionality on the **Transducer Installation** page makes it possible to change the information you have provided for the transducer. You cannot change the model identification and the serial number. The custom name is used several places in the user interface, and it can be changed.

The **Remove** functionality on the **Transducer Installation** page makes it possible to delete the information you have provided for the transducer. There is no "undo" functionality.

Related topics

Transducer Installation page, page 311

Installing transceiver channels

In order to use the EA440, the Operator Station must be connected to one or more transceivers, and each of them must in turn be connected to one or more transducers. Each channel must be installed before it can be put to use. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

Prerequisites

- The EA440 is installed as specified in the EA440 *Installation manual*.
- All cables are connected and tested.
- Each transceiver is powered up.
- The software license for each transceiver is installed and activated.
- The Ethernet adapter in the Operator Station is set up with a unique IP address.
- All relevant transducers are installed using the **Transducer** page.

Context

The **Transceiver Installation** parameters control the installation and disconnection of transceivers. Every time the page is opened, the EA440 software automatically performs a search on the Ethernet network for transceivers.

The list in the upper part on the **Transceiver Installation** page shows you an overview of the transceivers and channels that are currently available. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency. Each channel is identified by the transceiver type and serial number and the transducer(s) in use. The current status for each channel is also provided.

- **Busy**: The channel is already in use, probably by another echo sounder on the same network. You cannot connect to this channel.
- **Installed**: This channel is connected to your EA440 system.
- **Lost**: This channel cannot be used.
- **Available**: This channel is vacant and ready for use.

Procedure

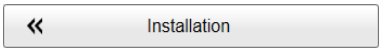
1 Observe the **Main** menu.

Its default location is on the right side of the EA440 presentation.

2 Select the **Setup** icon.

The icon is located under the **Main** menu. It is used to open the **Setup** menu.

3 On the **Setup** menu, select **Installation**.



Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected from the menu on the left side.

4 Install the channels(s).

a Observe that the transceiver(s) you have connected to the Operator Station are listed.

Each transceiver is identified with type and serial number. The available channels on each transceiver are listed separately.

b For each channel, choose which transducer to connect to.

The list of transducers available for installation is defined by those you installed on the **Transducer** page.

Note

This is a critical task. Make sure that the correct transducer is selected.

c Observe that the status for the relevant frequency channels change to *Installed*.

Tip

If no transceivers are listed:

- *Select* **Browse** *in the* **Transceiver Browsing** *box, and open the* **Local IP Address** *box. Select the correct address for the Ethernet adapter you are using. This will make the EA440 search the network for available transceivers.*
- *Check that each transceiver has been turned on.*
- *Verify that the Ethernet communication between the units is operational.*
- *If you are using an Ethernet switch, make sure that it works.*

5 Repeat until all the channels have been installed.

6 Close the **Installation** dialog box.

Result

When all channels have been installed, you can start normal operation.

Caution

You must never set the EA440 into normal operation when the ship is in dry dock. The transducer may be damaged if it transmits in open air.

Related topics

Transceiver Installation page, page 303
Transceiver IP Address page, page 309

Disconnecting transceiver channels

In order to use the EA440, the Operator Station must be connected to one or more transceivers, and each of them must in turn be connected to one or more transducers. A transceiver channel can be disconnected from the EA440 Operator Station. This is typically useful if the transceiver is meant to be used by another Operator Station on another echo sounder system. It is also useful if you have a large number of channels and want to reduce the number of echogram views in your presentation.

Context

The **Transceiver Installation** parameters control the installation and disconnection of transceivers. Every time the page is opened, the EA440 software automatically performs a search on the Ethernet network for transceivers.

The list in the upper part on the **Transceiver Installation** page shows you an overview of the transceivers and channels that are currently available. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency. Each channel is identified by the transceiver type and serial number and the transducer(s) in use. The current status for each channel is also provided.

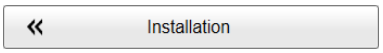
- **Busy**: The channel is already in use, probably by another echo sounder on the same network. You cannot connect to this channel.
- **Installed**: This channel is connected to your EA440 system.
- **Lost**: This channel cannot be used.
- **Available**: This channel is vacant and ready for use.

Procedure

1 Select the **Setup** icon.

The icon is located under the **Main** menu. It is used to open the **Setup** menu.

2 On the **Setup** menu, select **Installation**.



Observe that the **Installation** dialog box opens. This dialog box contains a number of pages selected from the menu on the left side.

3 Disconnect the requested frequency channels(s).

a Observe that the transceiver(s) you have connected to the Operator Station are listed.

Each transceiver is identified with type and serial number. The available channels on each transceiver are listed separately.

b Write down which transducers you are using on each channel.

c For each channel you want to disconnect, set transducer to *None*.

d Observe that the status of the relevant frequency channels changes to *Available*.

4 Select **Apply** and then **Close** to save all the parameters and close the **Installation** dialog box.

Result

You cannot use the disconnected channels. If you want to use them again, each must be reinstalled.

Related topics

Transceiver Installation page, page 303

Installing the EA440 operational software

If your EA440 Hydrographic single beam echo sounder is provided with a Operator Station, the EA440 software has already been installed. If you intend to use your own computer, you must install the software yourself.

Prerequisites

In order to install the software, you need the relevant file set on a suitable media. If the software is provided on a CD or a DVD, and your computer is not fitted with a suitable drive, copy the files to a USB flash drive.

Note

Make sure that you have administrative rights on the Operator Station. You need this to install the software. If you purchased your own computer, you must verify that it meets the technical requirements for use with the EA440. Do this before you install the software.

Context

One or more valid software licenses are required to operate the EA440. The software licenses are installed after the EA440 software installation. The **Software License** page is provided for this purpose.

Procedure

1 Turn on the Operator Station.

2 Switch off any firewall applications.

3 Insert the EA440 software media.

If the EA440 software is provided on a CD or DVD, and your Operator Station is not fitted with a suitable drive, copy the files to a USB flash drive.

4 Use a file manager application on the Operator Station to access the software files.

5 Double-click `Setup.exe` to start the installation.

6 Allow the installation wizard to run. Follow the instructions provided.

We recommend that you install the software in the default folder suggested by the wizard.

In the last dialog box you are permitted to remove old settings. Since this is your first installation of the software, you can disregard this option.

7 Once the software installation has been completed, double-click the EA440 icon on the desktop to start the program.

8 Depending on your operating system parameters, certain dialog boxes may open.

a The Windows® 7 Firewall may open a dialog box requesting information about the network. Select **Public**, and then select **Allow access**.

b The operating system may also open other dialog boxes to verify that the EA440 software can run on the computer. You must permit this.

Further requirements

Observe the dedicated procedures for obtaining and installing the software licence(s).

Upgrading the EA440 operational software

When a new EA440 software version is released, it must be installed on your Operator Station.

Prerequisites

In order to upgrade the EA440 software, you need the relevant file set on a suitable media. If the EA440 software is provided on a CD or a DVD, and your computer is not fitted with a suitable drive, copy the files to a USB flash drive.

It is assumed that you are familiar with the Microsoft® operating system utilities for file handling.

Context

The EA440 needs one or more software licenses to work. Each software license code "unlocks" one WBT for operational use with a set of predefined properties. The software licences are not affected by the software upgrade.

The new version of the EA440 will automatically replace the old version.

Procedure

1 Turn on the Operator Station.

2 Switch off any firewall applications.

3 Insert the EA440 software media.

If the EA440 software is provided on a CD or DVD, and your Operator Station is not fitted with a suitable drive, copy the files to a USB flash drive.

4 Use a file manager application on the Operator Station to access the software files.

5 Double-click `Setup.exe` to start the installation.

6 Allow the installation wizard to run. Follow the instructions provided.

We recommend that you install the EA440 in the default folder suggested by the wizard.

In the last dialog box you are permitted to remove old settings. Read the options carefully. Do not remove any existing settings unless this is your intention.

7 Once the software installation has been completed, double-click the EA440 icon on the desktop to start the program.

Upgrading the software on the WBT

Certain software upgrades for the EA440 also include an upgrade for the WBT. To ensure maximum operational performance, these software versions must always be compatible.

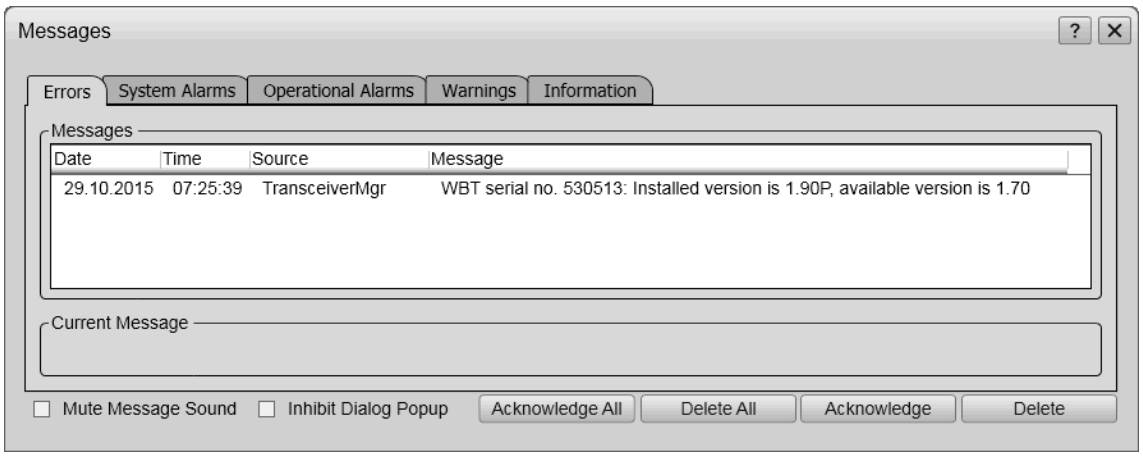
Prerequisites

In order to upgrade the EA440 software, you need the relevant file set on a suitable media. If the EA440 software is provided on a CD or a DVD, and your computer is not fitted with a suitable drive, copy the files to a USB flash drive.

It is assumed that you are familiar with the Microsoft® operating system utilities for file handling.

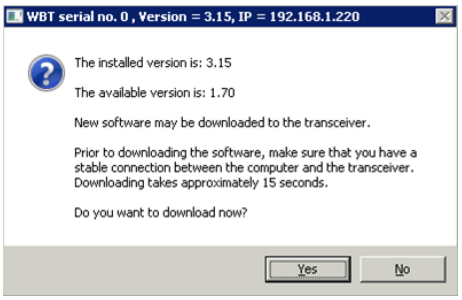
Context

When the EA440 is powered up for normal use, the software checks that the operation software version matches the software version in the WBT. If there is a mismatch, an error message will be provided.



The software download process is supported by several dialog boxes with information.

Procedure



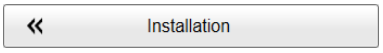
1 Turn on the Operator Station, and start the EA440 program.

2 Select **Operation**, and set it to *Inactive*.

3 Select the **Setup** icon.

The icon is located under the **Main** menu. It is used to open the **Setup** menu.

4 On the **Setup** menu, select **Installation**.



This dialog box contains a number of pages selected from the menu on the left side.

5 On the left side, select **Transceiver**.

Observe that the **Transceiver Installation** page opens.

6 Download the new software version.

a In the list of transceivers, select the transceiver you wish to upgrade.

b Select **Download Transceiver Software**.

c In the dialog box that opens, choose the software file you wish to use, and select **Open**.

The file name reflects the type of receiver the software is created for.

d Observe the information provided in the next dialog box.

e If you still wish to download and install the software, select **Yes**.

Note

The communication between the Operator Station and the WBT must not be interrupted while the software is downloaded!

f Wait while the software downloads.

g Observe the resulting message.

If the download process fails, restart it.

h If you have more than one transceiver, repeat the download process for the next one.

7 When the software has been downloaded, close all dialog boxes, and resume with normal operation.

Further requirements

If the download process fails repeatedly, contact Kongsberg Maritime support.

Related topics

Transceiver Installation page, page 303

Maintaining the EA440

Topics

Updating the online help file

EA440 has a comprehensive context-sensitive on-line help system. The help file is updated periodically. You can then update your EA440 installation with the new information.

Prerequisites

In order to update the on-line help system, you need a USB flash drive. It is assumed that you are familiar with the Microsoft® operating system utilities for file handling.

Context

The context sensitive on-line help is located in a single proprietary Microsoft® CHM file. This CHM file will run on any computer with a Microsoft operating system. You can also copy the CHM file to any tablet device if you have a reader application that supports the CHM format.

Note

Due to limitations defined by Microsoft®, CHM files will not open from websites and servers.

Procedure

1 Obtain the new help file.

   a Change the name of the file to `EA440.chm`

   b Copy the file to a USB flash drive.

2 Observe the **Screen Captures** tab at the bottom of the EA440 presentation.

3

4 Select the **Screen Captures** tab to open the screen capture browser.

5 In the browser, select **Open Image Folder** to open the operating system folder.

6 Navigate to the folder with the on-line help files.

```
C:\Program Files (x86)\Kongsberg Mar-
itime\Echosounder\EA440\EA440_Settings\Language
```

Observe that the folder contains one sub-folder for each language. Examples are "en" for English, "es" for Spanish and "de" for German. Language folders may be missing. In such cases, the EA440 help is provided in English.

7 Update the existing help file.

a Open the relevant language folder.

b Rename the existing (old) CHM file to `old_EA440.chm`.

c Copy the downloaded file `EA440.chm` from the USB flash drive to the correct language folder.

8 Close the file manager utility.

9 Restart the EA440.

Adding an online help file in a new language

EA440 has a comprehensive context-sensitive on-line help system. Help is occasionally available in a new language. You can then update your EA440 installation with the new information.

Prerequisites

In order to update the on-line help system, you need a USB flash drive. It is assumed that you are familiar with the Microsoft® operating system utilities for file handling.

Context

The context sensitive on-line help is located in a single proprietary Microsoft® CHM file. This CHM file will run on any computer with a Microsoft operating system. You can also copy the CHM file to any tablet device if you have a reader application that supports the CHM format.

Note

Due to limitations defined by Microsoft®, CHM files will not open from websites and servers.

Procedure

1 Obtain the new help file.

   a Change the name of the file to `EA440.chm`

   b Copy the file to a USB flash drive.

2 Observe the **Screen Captures** tab at the bottom of the EA440 presentation.

3

4 Select the **Screen Captures** tab to open the screen capture browser.

5 In the browser, select **Open Image Folder** to open the operating system folder.

6 Navigate to the folder with the on-line help files.

```
C:\Program Files (x86)\Kongsberg Mar-
itime\Echosounder\EA440\EA440_Settings\Language
```

   Observe that the folder contains one sub-folder for each language. Examples are "en" for English, "es" for Spanish and "de" for German. Language folders may be missing. In such cases, the EA440 help is provided in English.

7 Add the new help file.

   a Create a folder for the new language.

   Make sure that you use the correct folder name.

   b Copy the downloaded file `EA440.chm` from the USB flash drive to the correct language folder.

8 Close the file manager utility.

9 Restart the EA440.

Accessing and retrieving message log files

Whenever the EA440 issues a message, it is shown in the **Messages** dialog box. Simultaneously, all messages are stored in a number of log files on the Operator Station hard disk. If you experience abnormal behaviour, and wish to consult support, these log files are very useful.

Prerequisites

In order to update the on-line help system, you need a USB flash drive. It is assumed that you are familiar with the Microsoft® operating system utilities for file handling.

Procedure

1 Observe the **Screen Captures** tab at the bottom of the EA440 presentation.

2 Select the **Screen Captures** tab to open the screen capture browser.

3 In the browser, select **Open Image Folder** to open the operating system folder.

In the file manager utility, locate the folder you defined on the **File Setup** page.

4 Navigate to the folder with the log files.

```
C:\ProgramData\Kongsberg Maritime\EA440\Log
```

5 Use the functionality provided by the operating system to copy the files to the storage device.

6 Close the file manager utility.

7 Send the file(s) by e-mail to your support contact.

Monitoring the supply voltage

The *Transceiver Power Supply* information pane shows you the current supply voltage provided to the transceiver. This is very useful if you operate your EA440 from a battery.

Context

If you operate your EA440 from a battery, it is very useful to keep an eye on the supply voltage. The EA440 software measures this supply voltage in the transceiver, and the result is automatically returned to the *Transceiver Power Supply* information pane.

- As long as the supply voltage is kept between 11.5 and 15 Vdc, the transceiver will work normally.
- If the supply voltage drops to any value between 10 and 11.5 Vdc the transceiver will still work, but the EA440 will give you a message to say that the supply voltage is low.
- If the supply voltage drops to below 10 Vdc, the transceiver will stop. The EA440 will then notify you with another message.

One information pane shows you the supply voltage for all the transceivers in use on your EA440 system.

Procedure

1 Click in any echogram view to make it "active".

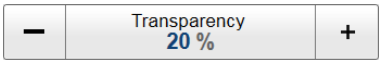
The information pane you open are only valid for the selected echogram. The "active" echogram view is identified with a thicker border.

2 On the top bar, select *Transceiver Power Supply*.

3 Change the physical size and shape to fit your preferences.

Click in its lower right corner, and drag to a new size. To reset the information pane to its default size, select the **Reset size** button in its top right corner.

4 Use the **Transparency** function to control how much you can see "through" the information pane.



You can adjust the setting from 0% (no transparency) to 90% (almost full transparency) in steps of 10%. The **Transparency** function is located on the **Display** menu.

5 Select **Close** in the top right corner to close the information pane.

Rules for transducer handling

To secure long life and accurate results, the transducer must be handled correctly.

A transducer must always be handled as a delicate instrument. Incorrect actions may damage the transducer beyond repair. Observe these transducer handling rules:

1 **Do not** activate the transducer when it is out of the water.

2 **Do not** handle the transducer roughly and avoid impacts.

3 **Do not** expose the transducer to direct sunlight or excessive heat.

4 **Do not** use high-pressure water, sandblasting, metal tools or strong solvents to clean the transducer face.

5 **Do not** damage the outer protective skin of the transducer face.

6 **Do not** lift the transducer by the cable.

7 **Do not** step on the transducer cable.

8 **Do not** damage the transducer cable, and avoid exposure to sharp objects.

Transport protection

Some transducers are delivered with a cover plate to protect the face during transport and installation. Let this plate stay on as long as possible, but do not forget to remove it before the vessel goes to sea.

Cleaning and painting the transducer face

During normal use, the transducer is subjected to biological fouling. If this marine growth is excessive, it will reduce the performance of the EA440.

The transducer has not been designed with any protection against biological fouling. Whenever opportunity arise, typically when the vessel is dry-docked, the transducer face must be cleaned for shells and other marine growth.

- Be careful so that you do not accidentally make cuts or inflict other physical damage to the transducer face.

- Remove biological fouling carefully using a plastic brush, a suitable synthetic detergent and fresh water. Biological material which is strongly rooted in the substrate can be removed carefully with a piece of wood or plastic.
- **Do not** use high-pressure water, sandblasting, metal tools or strong solvents to clean the transducer.

Anti-fouling paint may be applied to the transducer face. To minimize the negative acoustical effects the layer of anti-fouling paint must be as thin as possible.

Note

The anti-fouling paint will reduce the acoustical performance of the transducer. The surface roughness of the transducer substrate and the thickness of the paint may also influence the performance. Kongsberg Maritime cannot be held responsible for any negative consequences of the anti-fouling paint.

Because some paint types may be aggressive to the polyurethane in the transducer, consult our list of approved paints. Observe the relevant instructions and safety information provided by the paint manufacturer.

Special rules for acoustic windows

Arctic tanks have acoustic windows made of polycarbonate. These must neither be painted nor cleaned with chemicals. Acoustic windows must not be exposed to direct sunlight.

Rules for transducer maintenance

Once installed, the transducer is maintenance free. However, when the vessel is docked, it is highly recommended to clean the transducer face to remove marine growth.

1 Perform a thorough visual check of the transducer.

2 If necessary, clean the transducer.
   - To clean the transducer, use normal synthetic soap and water.
   - To remove marine growth, use fine-grade sandpaper or emery paper.

3 If necessary, apply a new layer of anti-fouling paint to the transducer face.

   Because some paint types may be aggressive to the polyurethane in the transducer face, please consult our list of approved paints.

Observe these transducer handling rules:

- **Do not** activate the transducer when it is out of the water.
- **Do not** lift the transducer by the cable.
- **Do not** step on the transducer cable.
- **Do not** damage the transducer cables, and avoid exposure to sharp objects.
- **Do not** handle the transducer roughly and avoid impacts.

- **Do not** expose the transducer to direct sunlight or excessive heat.
- **Do not** use high-pressure water, sandblasting, metal tools or strong solvents to clean the transducer face.
- **Do not** damage the outer protective skin of the transducer.

Approved anti-fouling paints

This is our list of approved antifouling paints for all transducer types. Always refer to the manufacturer's documentation and data sheets for a complete procedure and for relevant safety information.

Important

Do not paint the transducer with traditional hull plating paint. Use only the correct type of approved paint specified.

Do not use high-pressure water, sandblasting, metal tools or strong solvents to clean the transducer face.

Jotun

- **Manufacturer**: Jotun
- **Address:** P.O.Box 2021, N-3248 Sandefjord, Norway
- **Manufacturer's website**: http://www.jotun.com

Products:

- SeaQuantum Ultra S
  - **Primer**: Safeguard Universal ES

    Apply 80 µm wet film thickness (50 µm dry film thickness).
  - **Paint**: SeaQuantum Ultra S

    Apply 250 µm wet film thickness (125 µm dry film thickness).
- Seaforce 200 AV
  - **Primer**: Safeguard Universal ES AV

    Apply 70 µm wet film thickness (50 µm dry film thickness).
  - **Paint**: Seaforce 200 AV

    Apply 140 µm wet film thickness (90 µm dry film thickness).

Data sheets and application guides can be downloaded from:

http://www.jotun.com/ww/en/b2b/technical-info/tds/index.aspx

International Marine Coatings

- **Manufacturer**: International Marine Coatings

- **Address:** Stoneygate Lane, Felling, Gateshead, Tyne & Wear, NE10 0JY United Kingdom
- **Manufacturer's website**: www.international-marine.com

Products:

- Intersleek 1100SR
  - **Primer**: Intersleek 737

    Apply 50 µm dry film thickness.
  - **Paint**: Intersleek 1100SR

    Apply 150 µm dry film thickness.
- Intersmooth 7465Si SPC
  - **Primer**: Intergard 269

    Apply 40 µm dry film thickness.
  - **Paint**: Intersmooth 7465Si SPC

    Apply 100 µm dry film thickness.

The list can also be found on http://www.simrad.com.

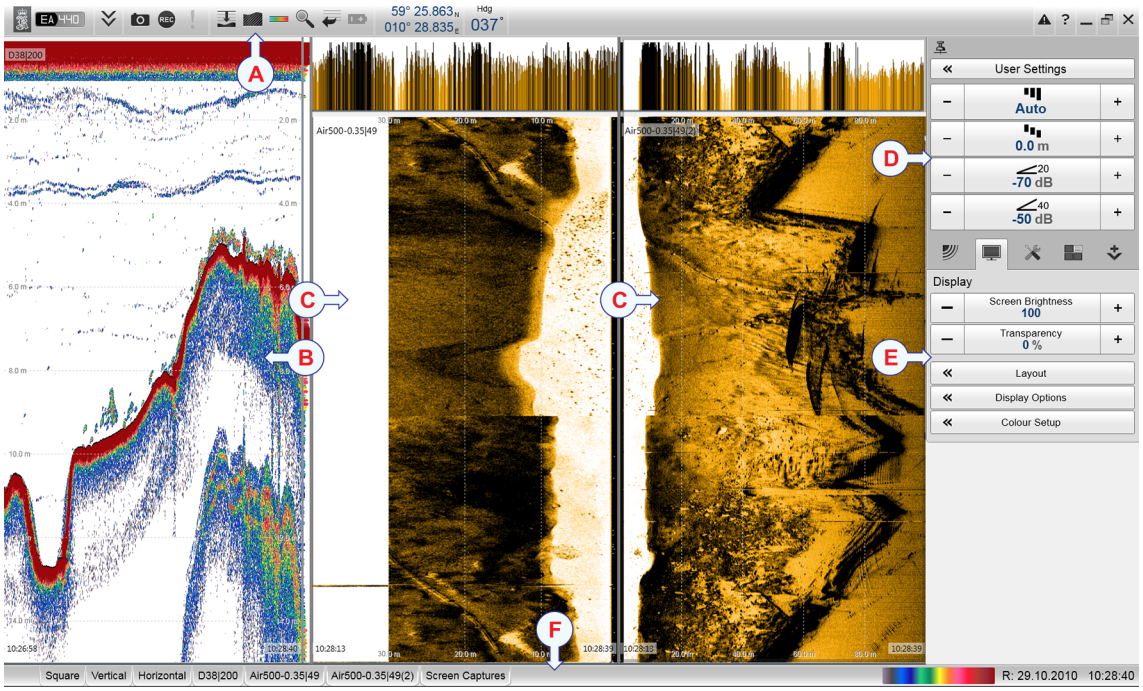
User interface

Topics

EA440 user interface familiarization

The visual elements provide you with the echo information you need, they help you to control the functionality needed to understand this information, and finally, they allow you to control the operational parameters.

This EA440 screen capture shows you a typical operational situation. The presentation provides you with a lot of information. You can see three echogram views; one vertical and two sidescan views. The top bar shows you navigational information, and offers buttons for key functions and information panes. The menu system on the right side gives you easy access to all the functionality offered by the EA440.



A **Top bar**

The EA440 top bar is located at the top of the display presentation and stretches from the far left to the far right. The top bar gives you fast access to key functionality and navigational information. It provides buttons for hiding and showing the menu, making screen captures, opening the **Messages** dialog box, and opening context-sensitive help. And more importantly, from the top bar you can see when data recording is active.

B **Echogram views**

By default, you have one echogram for each frequency channel. You can choose which type of echogram you wish to see. If you have more than one frequency channel, the echograms for each channel can be presented horizontally with one over the other, or vertically next to each other. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

C **Sidescan echogram**

The *Sidescan echogram* shows the bottom as seen from the side of the vessel hull. The horizontal angle is determined by the physical angle of the transducer installation. You can select the start range (the depth from which the sidescan echo starts) and the horizontal range by means of the **Start Range** and **Range** settings on the **Main** menu.

D **Main menu**

The **Main** menu is located at the top of the menu structure. It offers the most common functions for efficient use of the EA440. By default, the **Main** menu is open. It is placed on the right side of the EA440 presentation. On the top bar, use the **Menu** button to hide or show the menu.

E **Secondary menus**

Below the **Main** menu you find the icons for opening (and closing) the secondary menus. Select an icon to open the relevant menu, and reselect the icon to close the menu.

F **Bottom bar**

The bottom bar is located at the bottom of the EA440 presentation and stretches from the far left to the far right. The tabs on the bottom bar allows you to choose channel and presentation mode. A dedicated tab provides a special view for you to see the screen captures you have made. The bottom bar also shows you the current colour scale, as well as the time and date.

Related topics

Top bar, page 177

Echogram views, page 201

Bottom bar, page 218

Top bar

Topics

Top bar overview

The EA440 top bar is located at the top of the display presentation and stretches from the far left to the far right. The top bar gives you fast access to key functionality and navigational information. It provides buttons for hiding and showing the menu, making screen captures, opening the **Messages** dialog box, and opening context-sensitive help. And more importantly, from the top bar you can see when data recording is active.

A **Logo and product name**

This information identifies the brand and the product.

Logo and product name, page 179

B **Menu button**

Select this button to hide or show the menu.

Menu button, page 179

C **Screen Capture / Event / Record**

Select **Screen Capture** to make a copy of the current EA440 presentation. Select **Event** to initiate an event annotation on the echogram. The **Record** indicator shows you when recording is active.

Event button description, page 181

Record indicator description, page 180

Screen Capture button description, page 179

D **Information panes**

Each information pane is opened and closed with its dedicated button on the top bar.

Information panes overview, page 181

E **Navigational information**

These are not buttons, but separate read-outs that show useful information related to the vessel and/or EA440 navigation and operation. The information shown on the EA440 top bar must not be used for vessel navigation.

Navigational information, page 182

Depth read-out, page 185

Geographical position read-out, page 183

Heading read-out, page 184

Motion read-outs (roll, pitch and heave), page 186

Speed read-out, page 184

Temperature read-out, page 185

F **Depth Alarm**

You can define alarm limits for minimum and maximum depths. If the current depth changes to exceed the limits you have chosen, the alarm is triggered.

Alarm Limits dialog box, page 187

G **Messages button**

By flashing, the **Messages** button shows you that the EA440 has issued a message. The colour of the triangle reflects the severity of the most serious message. Select the button to open the **Messages** dialog box.

Messages button description, page 188

Logo and product name

The brand logo and product name are shown on the left side of the top bar.

Description

This information identifies the brand and the product.

Double-click the logo to reduce the size of the EA440 presentation. Double-click one more time to return to full screen presentation.

Menu button

The **Menu** button is located on the left side of the top bar. This is an "on/off" button.

Description

Unless you need to make frequent changes to the operating parameters, you may want to hide the menu from the EA440 presentation. This will give you more space to present echo data.

To hide the menu, select **Menu** on the top bar. To retrieve it, select **Menu** one more time.

When the menu is hidden, it is temporarily shown on the left or right side of the EA440 presentation if you move the cursor to that position.

Related topics

Top bar, page 177

Related topics

Main menu, page 223

Screen Capture button description

When you use the EA440 actively, you may need to make a screen capture to save an instantaneous image of the current presentation.

Description

Select **Screen Capture** to make a copy of the current EA440 presentation.

The screen captures you make are saved in .jpg format on the hard disk in the Operator Station. To view the images you have saved, select **Screen Capture** on the bottom bar. This opens the built-in image browser, which allows you to retrieve the images.

Tip

Before you make the screen capture, you may wish to place an event marker on the echogram. The event marker may be useful later to identify the information.

Related tasks

Saving an echogram screen capture image, page 114

Recalling single echogram screen capture images, page 115

Related topics

Screen capture browser description, page 220

Record indicator description

A key function of the EA440 is it ability to record echo data. The raw data recording function provided by the EA440 allows you to save echo data using the `*.raw` format. The data files can be played back on the EA440. The files can later be deleted, copied or moved to another storage device.

Description

The **Record** indicator shows you when recording is active. The indicator is red when recording is in progress.

The **Record RAW** button allows you to start and stop recording, split the current recording file (if it gets too large), and set up the file output parameters. Once all the recording parameters have been defined, you can start recording by clicking the red circle on the button, and stop it by clicking the left rectangle. **Record RAW** is located on the **Operation** menu.

On the EA440 you can record both RAW and processed data using the **Record RAW** and **Record Processed** functions. It may be useful to synchronize these two functions to automatically record all data formats simultaneously. To synchronize the recording functions, open the **Record RAW** button, and set **Synchronize** to *On*. The **Record Processed** button is then inhibited, and you can start and stop all recording by means of the **Record RAW** button.

Note

Data files will normally become very large. If you wish to record large amounts of EA440 data, make sure that you have enough space on your hard disk. Unless your Operator Station is equipped with a very large disk, we recommend that you save the data to an external storage device.

Related tasks

Recording raw data, page 76

Recording processed data, page 83

Event button description

An event is a type of annotation that you can add to the echogram. You can use an event to identify echoes of special interest, or when something special happened. Events may be triggered by external devices, set by a timer, or initiated by selecting the **Event** button on the top bar.

Description

The **Event** button is used to initiate an event annotation on the echogram. To set up the event type, use the options on the **Annotations** page.

Tip

The **Annotations** *page is located in the* **Installation** *dialog box. The* **Installation** *dialog box is located on the* **Setup** *menu.*

Related topics

Annotation markers description, page 214

Manual Annotation dialog box, page 299

Information panes overview

The EA440 offers several *information panes* to provide additional and detailed data from the EA440 presentation. The information panes are opened and closed using the buttons on the top bar.

Before you open an information pane, you must first click in an echogram view to make it "active". By doing this you select the channel. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

Select the relevant button on the top bar to open the information pane.

In most cases, the data in the information pane is only valid for the selected channel.

To *close* the information pane, select the button on the top bar one more time. You can also select **Close** in the top right corner of the pane.

- **Depth**

  The *Depth* information pane provides the water depth in the current echogram view. If you have several echogram views open, you can place one pane in each view.

  Depth information pane description, page 190

- **Bottom Hardness**

  The *Bottom Hardness* information pane shows you the current bottom reflectivity. This gives an indication to how hard the bottom is. The value is calculated using the bottom echo strength in the current ping.

Bottom Hardness information pane description, page 191

- **Colour Scale**

  The *Colour Scale* information pane allows you to view the current colour scale in use, and to make changes to the echo levels it presents.

  Colour Scale information pane description, page 193

- **Zoom**

  The *Zoom* information pane allows you to magnify a chosen area of the current echogram.

  Zoom information pane description, page 195

- **History**

  The *History* information pane allows you to view previously recorded echogram sequences. Note that this information pane does not use the same presentation method as the other panes.

  History information pane description, page 196

- **Transceiver Power Supply**

  This readout shows you the current supply voltage provided to the transceiver.

  Transceiver Power Supply information pane description, page 198

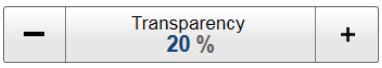
- **Spectrum**

  The *Spectrum* information pane shows you the amplitude of the selected frequency band.

  Spectrum information pane description, page 199

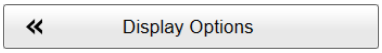
Tip

You can easily change the physical size and shape of each information pane. Click in its lower right corner, and drag to a new size.
The **Transparency** *function allows you to adjust how much you are able to see "through" the information panes you have opened. The* **Transparency** *function is located on the* **Display** *menu.*



Navigational information

The navigational information is located in the middle of the top bar. To choose which navigational information to be displayed on the top bar, use the **Top Bar** functions in the **Display Options** dialog box. The **Display Options** dialog box is located on the **Display** menu.



Description

These are not buttons, but separate read-outs that show useful information related to the vessel and/or EA440 navigation and operation.

Note

The information shown on the EA440 top bar must not be used for vessel navigation.

The following colours are used to indicate the quality of the information:

- **Blue**: The information is good.
- **Yellow**: The information contains manually overwritten values.
- **Red**: The input from the relevant sensors is missing.

Tip

Which navigational elements to see on the top bar is selected in the **Display Options** *dialog box.*

For more information: *General page, page 287*

To set up the various operational parameters related to navigational inputs, open the **Installation** *dialog box, and investigate the functionality related to sensor interfaces.*

For more information: *Sensor Installation page, page 314*

To set up the various operational parameters related to navigational inputs, open the **Installation** dialog box, and investigate the functionality related to sensor interfaces.

Geographical position read-out

When enabled, the vessel's current geographical position is shown of the top bar.

Prerequisites

To see this information on the top bar, you must enable it using the **Top Bar** functions in the **Display Options** dialog box. The **Display Options** dialog box is located on the **Display** menu.

Description

If a positioning sensor (GPS) is connected to the EA440, the top bar can show you the vessel's geographical position in longitude and latitude.

Note

The information shown on the EA440 top bar must not be used for vessel navigation.

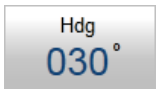
Related topics

Navigational information, page 182

Top bar overview, page 177

Heading read-out

When enabled, the vessel's current heading is shown on the top bar.



Prerequisites

To see this information on the top bar, you must enable it using the **Top Bar** functions in the **Display Options** dialog box. The **Display Options** dialog box is located on the **Display** menu.

Description

If a heading sensor (gyro compass) is connected to the EA440 Operator Station, the top bar may show you the vessel's current heading.

Note

The information shown on the EA440 top bar must not be used for vessel navigation.

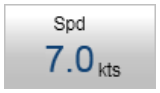
Related topics

Navigational information, page 182

Top bar overview, page 177

Speed read-out

When enabled, the vessel's current speed is shown on the top bar.



Prerequisites

To see this information on the top bar, you must enable it using the **Top Bar** functions in the **Display Options** dialog box. The **Display Options** dialog box is located on the **Display** menu.

Description

When a speed log is connected to the EA440, the vessel's current speed can be presented in the user interface.

Tip

By default, the vessel speed is shown in knots. You can change the unit of measurement on the **Units** *page. The* **Units** *page is located in the* **Installation** *dialog box.*

Related topics

Navigational information, page 182

Top bar overview, page 177

Depth read-out

If enabled, the current water depth is shown on the top bar.

Prerequisites

To see this information on the top bar, you must enable it using the **Top Bar** functions in the **Display Options** dialog box. The **Display Options** dialog box is located on the **Display** menu.

Description

The current depth measured by one of the transceiver channels is shown on the top bar.

Which channel to use for the depth read-out is selected in the **Display Options** dialog box. The chosen channel is identified in the read-out rectangle. The **Display Options** dialog box is located on the **Display** menu. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

Tip

By default, the depth is shown in meters. You can change the unit of measurement on the **Units** *page. The* **Units** *page is located in the* **Installation** *dialog box.*

Related topics

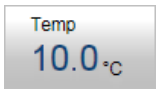
Navigational information, page 182

Top bar overview, page 177

Temperature read-out

The navigational information on the top bar may include a read-out of the current water temperature.

Prerequisites



To see this information on the top bar, you must enable it using the **Top Bar** functions in the **Display Options** dialog box. The **Display Options** dialog box is located on the **Display** menu.

Description

If a suitable sensor is connected to the EA440 Operator Station, the top bar may show you the current temperature. The function is offered to allow you to monitor the water temperature, but it will display any temperature reading that is made by the sensor.

Tip

By default, the temperature is shown in Celcius. You can change the unit of measurement on the **Units** *page. The* **Units** *page is located in the* **Installation** *dialog box.*

If you define a manual temperature value in the **Environment** dialog box, it is shown in the **Temperature** read-out. The **Environment** dialog box is opened from the **Setup** menu.

Related topics

Navigational information, page 182

Top bar overview, page 177

Motion read-outs (roll, pitch and heave)

When enabled, the navigational information on the top bar includes the vessel's current roll, pitch and heave movements.

Prerequisites

To see this information on the top bar, you must enable it using the **Top Bar** functions in the **Display Options** dialog box. The **Display Options** dialog box is located on the **Display** menu.

Description

If a suitable motion reference unit (MRU) sensor is connected to the EA440 Operator Station, the top bar can show you the vessel's current movements. The roll and pitch information is always shown in degrees.

Related topics

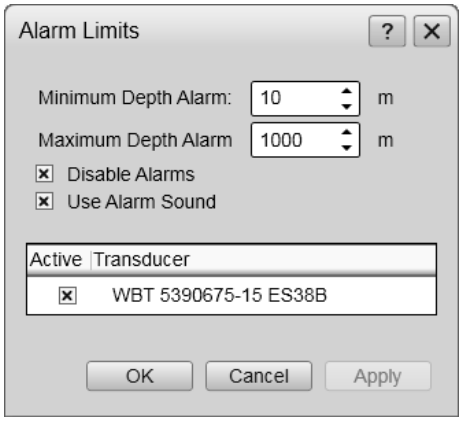
Navigational information, page 182

Top bar overview, page 177

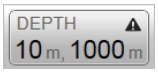
Alarm Limits dialog box

The **Depth Alarms** readout is located on the right hand side of the top bar. The depth alarms provided by the EA440 fulfils the requirements made by the International Maritime organization (IMO) for navigational purposes. If the current depth changes to exceed the limits you have chosen, the alarm is triggered. Use this dialog box to define the alarm limits for minimum and maximum depths.

How to open



To open the **Alarm Limits** dialog box, double-click **Depth Alarm** on the top bar.



Description

The **Alarm Limits** dialog box allows you to set up the operational properties for the depth alarm. In addition to the depth limits, you can disable the entire alarm, and control the alarm sound. You can also control from which channel the depth information shall be taken. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

An alarm is triggered if:

- The current depth is shallower than the minimum alarm depth you have chosen
- The current depth is deeper than the maximum alarm depth you have chosen

When the alarm is triggered, the **Depth Alarms** box changes background colour to red. The warning is also provided as a message and - if enabled - as an audio signal.

To acknowledge the alarm, double-click **Depth Alarms** to open the dialog box. Select **Disable Alarms**. You can acknowledge the alarm in the **Messages** dialog box, but without disabling the actual alarm, new messages will appear as long as the alarm limits are met.

Details

Shallow Water Alarm Limit

This setting allows you to set the minimum depth to trigger the alarm.

The following situation will set off the alarm: The current depth is shallower than the minimum alarm depth you have chosen

Deep Water Alarm Limit

This setting allows you to set the maximum depth to trigger the alarm.

The following situation will set off the alarm: The current depth is deeper than the maximum alarm depth you have chosen

Disable Alarms

This function allows you to disable both depth alarms simultaneously. The appearance and content of the **Depth Alarms** field on the top bar is then changed to reflect the new operational status.

Use Alarm Sound

The audible alarm signal can be controlled using this function; you can enable or disable an alarm tone.

Active / Transducer

The table presents the channels that may be used for the depth detection. This setting will not have any effect on the echograms. You only choose which channel to be used by the alarm system for bottom detection. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

If you deselect all frequency channels, the alarm system is disabled.

Related topics

Top bar overview, page 177

Messages button description

The **Messages** button is located on the right side of the top bar.

Description

A new message is flagged with the **Messages** button on the top bar. The button is flashing to draw your attention. The colour of the triangle reflects the severity of the most serious message.

- **Yellow**: This indicates a warning.
- **Red**: This indicates an alarm.

If you hold the cursor over the button, a short list of the current messages is shown.

Select the button to open the **Messages** dialog box.

Related topics

Messages dialog box, page 369

Top bar overview, page 177

Information panes

Topics

Depth information pane description

The *Depth* information pane provides the water depth in the current echogram view. If you have several echogram views open, you can place one pane in each view.

How to open

To open the *Depth* information pane, click in the chosen view to activate it, then select the **Depth** button on the top bar. To *close* the information pane, select the button on the top bar one more time. You can also select **Close** in the top right corner of the pane.

Description

The depth measure by the selected channel is shown. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

Tip

By default, the depth is shown in meters. You can change the unit of measurement on the **Units** *page. The* **Units** *page is located in the* **Installation** *dialog box.*

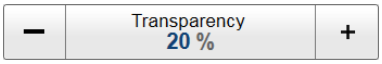
Selecting **Setup** in the *Depth* information pane opens the **Bottom Detection** page in the **Information Pane Options** dialog box. The purpose of the **Bottom Detection** parameters are to define the upper and lower depth limits most likely to be used during the EA440 operation.

Before you open an information pane, you must first click in an echogram view to make it "active". By doing this you select the channel. In most cases, the data in the information pane is only valid for the selected channel. In this context, the phrase

channel is used as a common term to identify the combination of transceiver, transducer and operating frequency.

You can easily change the physical size and shape of each information pane. Click in its lower right corner, and drag to a new size. To reset the information pane to its default size, select the **Reset size** button in its top right corner.

The **Transparency** function allows you to adjust how much you are able to see "through" the information panes you have opened. You can adjust the setting from 0% (no transparency) to 90% (almost full transparency) in steps of 10%.



Details

Close

Select this button to close the information pane. The pane closes immediately. If you wish to reopen it, simply click the button on the top bar one more time.

Reset size

You may have manually changed the physical size of the information pane. To reset the information pane to its default size, select the **Reset size** button in its top right corner.

Setup

Select **Setup** to open the **Information Pane Options** dialog box. This dialog box allows you to change the presentation parameters related to the information pane.

Related topics

Information panes overview, page 181

Top bar overview, page 177

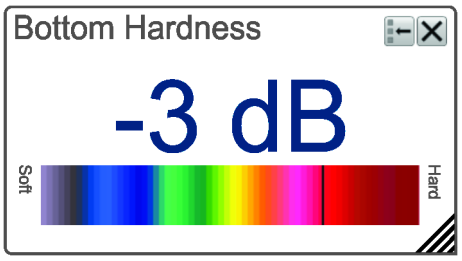
Bottom Hardness information pane description

The *Bottom Hardness* information pane shows you the current bottom reflectivity. This gives an indication to how hard the bottom is. The value is calculated using the bottom echo strength in the current ping.

How to open

To open the *Bottom Hardness* information pane, click in the chosen view to activate it, then select the **Bottom Hardness** button on the top bar. To *close* the information pane, select the button on the top bar one more time. You can also select **Close** in the top right corner of the pane.

Description



The bottom hardness shown in the information pane was detected by the latest ping in the selected view. The colours on the left side of the scale indicate a soft bottom, while the colours on the right hand side indicate a harder bottom. The vertical line in the hardness colour scale positions the latest ping. The current reflectivity is also shown measured in dB.

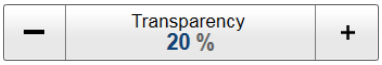
Tip

The Hardness Line can be added to your echogram to retrieve additional information. It appears as thick colour coded line that follows the bottom contour. This line does not remove information, it simply "pushes" the echo information further down in order to show you the bottom reflectivity.

Before you open an information pane, you must first click in an echogram view to make it "active". By doing this you select the channel. In most cases, the data in the information pane is only valid for the selected channel. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

You can easily change the physical size and shape of each information pane. Click in its lower right corner, and drag to a new size. To reset the information pane to its default size, select the **Reset size** button in its top right corner.

The **Transparency** function allows you to adjust how much you are able to see "through" the information panes you have opened. You can adjust the setting from 0% (no transparency) to 90% (almost full transparency) in steps of 10%.



Details

Close

Select this button to close the information pane. The pane closes immediately. If you wish to reopen it, simply click the button on the top bar one more time.

Reset size

You may have manually changed the physical size of the information pane. To reset the information pane to its default size, select the **Reset size** button in its top right corner.

Related topics

Information panes overview, page 181

Hardness Line description, page 211

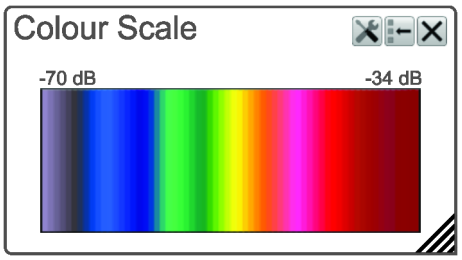
Colour Scale information pane description

The *Colour Scale* information pane allows you to view the current colour scale in use, and to make changes to the echo levels it presents.

How to open

To open the *Colour Scale* information pane, click in the chosen view to activate it, then select the **Colour Scale** button on the top bar. To *close* the information pane, select the button on the top bar one more time. You can also select **Close** in the top right corner of the pane.

Description



The *Colour Scale* information pane shows you the current colour scale in use for the EA440 presentations. Note that additional functions related to the colour scales are available.

- **Colour Scale**

  The colour scales used by the EA440 are designed to reflect the how strong the echoes are. The echo strength is measured in decibels (dB). In the basic colour scale with 12 colours, each colour represents a 3 dB step. This means that the entire scale covers 36 dB. The dynamic range of the EA440 is much larger. The **Colour Scale** parameters allow you to change the lower limit of colour scale range to match the current echoes.

  Colour Scale page, page 355

- **Colour Setup**

  The **Colour Setup** dialog box controls the presentation colours used by the EA440. This includes the palette ("skin"), the number of colours in use, and the colour scale.

  Colour Setup dialog box, page 291

- **Bottom bar**

  The colour scale is shown on the bottom bar even when the *Colour Scale* information pane is closed.

  Bottom bar, page 218

The following colour scales are available.

12 colours | Sonar colours | Smooth ES | Grayscale | BI500 colours

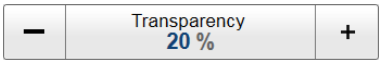
The **Smooth Echosounder** scale is based on the standard 12-colour scale. Additional colours have been added between them to make smoother colour transitions.

In addition to these colour scales, a special colour scale is available for sidescan presentations.

Before you open an information pane, you must first click in an echogram view to make it "active". By doing this you select the channel. In most cases, the data in the information pane is only valid for the selected channel. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

You can easily change the physical size and shape of each information pane. Click in its lower right corner, and drag to a new size. To reset the information pane to its default size, select the **Reset size** button in its top right corner.

The **Transparency** function allows you to adjust how much you are able to see "through" the information panes you have opened. You can adjust the setting from 0% (no transparency) to 90% (almost full transparency) in steps of 10%.



Details

Close

Select this button to close the information pane. The pane closes immediately. If you wish to reopen it, simply click the button on the top bar one more time.

Reset size

You may have manually changed the physical size of the information pane. To reset the information pane to its default size, select the **Reset size** button in its top right corner.

Setup

Select **Setup** to open the **Information Pane Options** dialog box. This dialog box allows you to change the presentation parameters related to the information pane.

Related topics

Colour Setup dialog box, page 291

Information panes overview, page 181

Top bar overview, page 177

Zoom information pane description

The *Zoom* information pane allows you to magnify a chosen area of the current echogram.

How to open

To open the *Zoom* information pane, click in the chosen view to activate it, then select the **Zoom** button on the top bar. To *close* the information pane, select the button on the top bar one more time. You can also select **Close** in the top right corner of the pane.

Description

Once the *Zoom* information pane is opened, the zoomed area is visible as a dotted rectangle in the echogram. You can change the size of this zoomed area, and you can move the rectangle anywhere inside the active view.

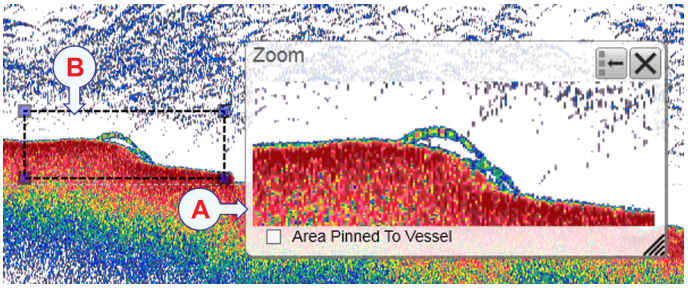
- Click inside the rectangle, hold the mouse button depressed, and move the rectangle within the borders of the view.
- Click any of the four corners, hold the mouse button depressed, and drag the rectangle to any other size and shape.

The echoes inside the zoomed area will always be shown in the *Zoom* information pane.

Use **Area Fixed To Vessel** to control the behaviour of the zoom function.

A *Zoom information pane*

B *Zoom rectangle used to define the size of the zoomed area*

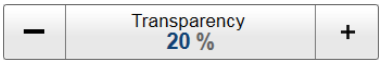


In this screen capture, the zoomed area rectangle is positioned close to the *Zoom* information pane. You can however place the pane and the zoomed area independently anywhere you like inside the active view.

Before you open an information pane, you must first click in an echogram view to make it "active". By doing this you select the channel. In most cases, the data in the information pane is only valid for the selected channel. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

You can easily change the physical size and shape of each information pane. Click in its lower right corner, and drag to a new size. To reset the information pane to its default size, select the **Reset size** button in its top right corner.

The **Transparency** function allows you to adjust how much you are able to see "through" the information panes you have opened. You can adjust the setting from 0% (no transparency) to 90% (almost full transparency) in steps of 10%.



Details

Area Fixed to Vessel

Use **Area Fixed To Vessel** to control the behaviour of the zoom function. When the rectangular zoomed area is established, it can either follow the echogram while it moves towards the left, or it can stay put.

- When **Area Fixed To Vessel** is active, the zoomed area will be permanently positioned on the echogram. The echoes shift through the area, and therefore also shift through the *Zoom* information pane.
- When **Area Fixed To Vessel** is switched off, the zoomed area will "follow" the echogram data from right towards left.

Close

Select this button to close the information pane. The pane closes immediately. If you wish to reopen it, simply click the button on the top bar one more time.

Reset size

You may have manually changed the physical size of the information pane. To reset the information pane to its default size, select the **Reset size** button in its top right corner.

Related topics

Information panes overview, page 181

History information pane description

The *History* information pane allows you to view previously recorded echogram sequences. Note that this information pane does not use the same presentation method as the other panes.

How to open

To open the *History* information pane, select the button on the top bar. A dedicated view on the left side of the EA440 presentation opens to show you a history image. To *close* the *History* view, click this button one more time.

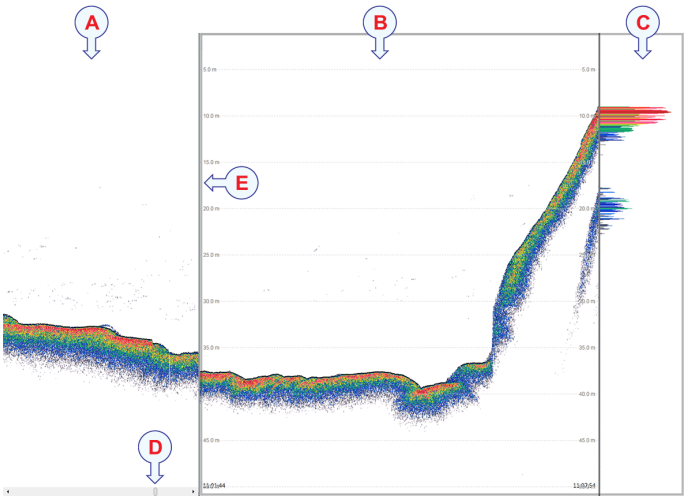
A *The History view*

This image is fixed, even if the echogram is scrolling sideways on the right hand side.

B *The active echogram presentation*

C *The active scope view presentation*

D *Click this button and drag it sideways to scroll through the recorded images*



E *Click this border and drag it sideways to change the size of the History view*

Description

The *History* function saves the echogram images automatically on the Operator Station hard disk These images can be recalled using the *History* information pane. The information in the *History* presentation is the same as on the original echogram presentation.

In order to show you the recorded echograms, the echogram presentation is split in two. The right side will show you the active echogram, while the left side is used to display the recorded history. Move the slider button at the bottom of the presentation to view the full extent of the image.

Note

The number of history files is limited. After reaching the maximum number of files, the latest echogram picture overwrites the oldest one. The history function still allows you to quickly look through echogram pictures from several hours.

The history function only logs the visible channels. When you replay a file with a previously hidden channel, an error message shows in the **Messages** *dialog box.*

Every time the *History* file is saved to the hard disk, the pinging may be interrupted. It is therefore possible to disable the *History* function. This function is located on the **File Setup** page in the **Output** dialog box.

Related topics

Information panes overview, page 181

File Setup page, page 262

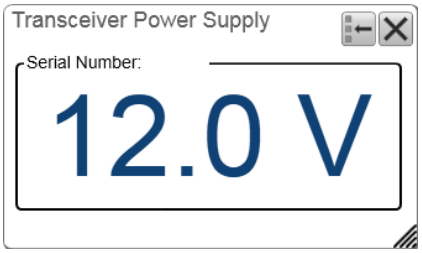
Transceiver Power Supply information pane description

The transceiver may be powered by an external power source. If the transceiver runs of a battery, you must monitor the supply voltage. The *Transceiver Power Supply* information pane shows you the current supply voltage provided to the transceiver.

How to open

To open the *Transceiver Power Supply* information pane, click in the chosen view to activate it, then select the **Transceiver Power Supply** button on the top bar. To *close* the information pane, select the button on the top bar one more time. You can also select **Close** in the top right corner of the pane.

Description



If you operate your EA440 from a battery, it is very useful to keep an eye on the supply voltage. The EA440 software measures this supply voltage in the transceiver, and the result is automatically returned to the *Transceiver Power Supply* information pane.

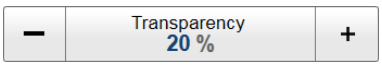
- As long as the supply voltage is kept between 11.5 and 15 Vdc, the transceiver will work normally.
- If the supply voltage drops to any value between 10 and 11.5 Vdc the transceiver will still work, but the EA440 will give you a message to say that the supply voltage is low.
- If the supply voltage drops to below 10 Vdc, the transceiver will stop. The EA440 will then notify you with another message.

One information pane shows you the supply voltage for all the transceivers in use on your EA440 system.

Before you open an information pane, you must first click in an echogram view to make it "active". By doing this you select the channel. In most cases, the data in the information pane is only valid for the selected channel. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

You can easily change the physical size and shape of each information pane. Click in its lower right corner, and drag to a new size. To reset the information pane to its default size, select the **Reset size** button in its top right corner.

The **Transparency** function allows you to adjust how much you are able to see "through" the information panes you have opened. You can adjust the setting from 0% (no transparency) to 90% (almost full transparency) in steps of 10%.



Details

Close

Select this button to close the information pane. The pane closes immediately. If you wish to reopen it, simply click the button on the top bar one more time.

Reset size

You may have manually changed the physical size of the information pane. To reset the information pane to its default size, select the **Reset size** button in its top right corner.

Setup

Select **Setup** to open the **Information Pane Options** dialog box. This dialog box allows you to change the presentation parameters related to the information pane.

Related topics

Information panes overview, page 181

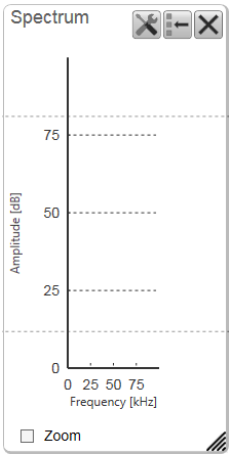
Spectrum information pane description

The *Spectrum* information pane is made for hydrophones. Select the frequency band you want to observe.

How to open

Select **Spectrum** on the top bar.

Description

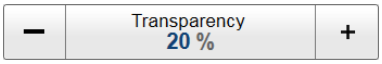


The *Spectrum* information pane shows you the amplitude of the selected frequency band. Selecting **Setup** in the *Spectrum* information pane opens the **Information Pane Options** dialog box.

Before you open an information pane, you must first click in an echogram view to make it "active". By doing this you select the channel. In most cases, the data in the information pane is only valid for the selected channel. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

You can easily change the physical size and shape of each information pane. Click in its lower right corner, and drag to a new size. To reset the information pane to its default size, select the **Reset size** button in its top right corner.

The **Transparency** function allows you to adjust how much you are able to see "through" the information panes you have opened. You can adjust the setting from 0% (no transparency) to 90% (almost full transparency) in steps of 10%.



Details

Close

Select this button to close the information pane. The pane closes immediately. If you wish to reopen it, simply click the button on the top bar one more time.

Reset size

You may have manually changed the physical size of the information pane. To reset the information pane to its default size, select the **Reset size** button in its top right corner.

Setup

Select **Setup** to open the **Information Pane Options** dialog box. This dialog box allows you to change the presentation parameters related to the information pane.

Related topics

Information panes overview, page 181

Echogram views

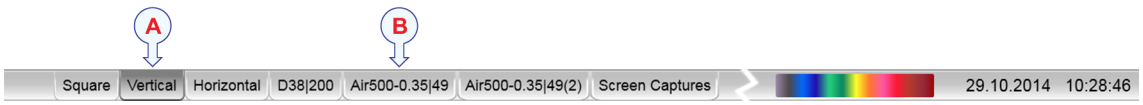
Topics

About the echogram views

The EA440 supports several different echogram types. Each echogram is shown in a separate view in the EA440 presentation. The tabs at the bottom of the EA440 presentation allows you to choose which channels to open.

Selecting echogram views on the bottom bar

The number of tabs available on the bottom bar depends on how many channels your EA440 has. Two tab "groups" allow you to select channels and views. This example shows the EA440 with three channels. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.



A Presentation modes

Three presentation modes are available when you wish to see all the echogram channels simultaneously in the EA440 presentation. The three tabs will arrange the echogram views vertically, horizontally, or in rectangular rows and columns.

By default, the echogram views are automatically arranged in the EA440 presentation. You can click and drag the border of each individual view to change its size. The size of the other views are reduced accordingly.

B Selecting individual echogram channels

Each channel is shown with a dedicated tab. The channel is identified with the name of the transducer in use. This name is the custom name you provided when you installed the transducer. Select a specific transducer tab to see only that channel in the EA440 presentation.

Supported echogram types

- **Surface**

  A *Surface* echogram is mainly used when you wish to look at the entire water column starting from the sea surface and down to the sea bottom.

  Surface echogram description, page 202

- **Bottom**

  A *Bottom* echogram is mainly used when you want to examine the sea bottom conditions.

  Bottom echogram description, page 205

- **Sidescan**

  A *Sidescan* echogram is mainly used when you wish to look sideways over the bottom.

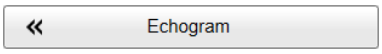
  Sidescan echogram description, page 207

- **Spectrogram**

  A *Spectrogram* echogram is used for hydrophone systems.

  Spectrogram echogram description, page 209

Selecting which echogram type to use



Once one or more echogram views are open, you can choose which echogram type to see.

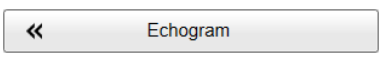
Click once in the echogram view that you wish to change. This will make the view "active". A thick border is placed on the selected view to visualize this. Open the **Active** menu, click **Echogram** to open the dialog box, and select **Echogram Type** on the **Echogram** page.

In each echogram view, you can also select from a number of markers, lines and annotations to enhance the echogram, or to provide additional information. These can be selected on the **Lines** page in the **Echogram** dialog box.

Surface echogram description

A *Surface* echogram is mainly used when you wish to look at the entire water column starting from the sea surface and down to the sea bottom. Since this echogram is referenced to the sea surface, the sea bottom contour will vary with the actual depth. You can select the start range (the depth from which the echogram starts) and the vertical range (the vertical "length" of the echogram) by means of the **Start Range** and **Range** settings. Both the **Range** and the **Start Range** functions are located on the **Main** menu.

How to open



To activate *Surface* echogram, click in the chosen view to make it "active". Select **Echogram** on the **Active**

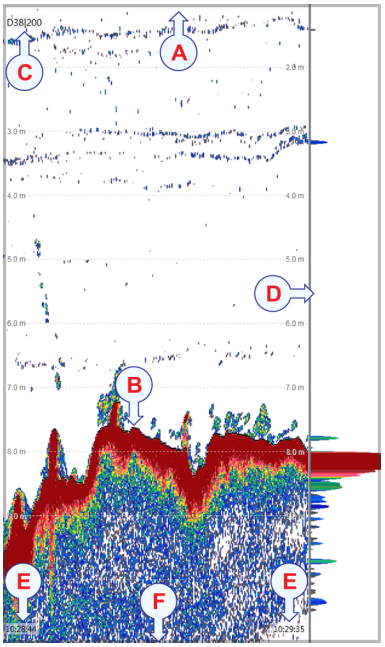
menu. Select the **Echogram** tab to open the page. On the **Echogram** page, set **Echogram type** to *Surface*.

Description

The *Surface* echogram is often used to study the water column from a few meters under the hull and down to the bottom. If you set up the **Start Range** and **Range** depths to place the sea bottom contour at the lower end of the echogram, you will have good opportunity to study the echoes from the water column. Since this echogram is referenced to the sea surface, the sea bottom contour will vary with the actual depth.

The biomass is automatically calculated based on choices you make in the **Calculation Interval** dialog box; within a given time frame, a defined number of pings, or a portion of the echogram view. The data is then taken from an echo area starting immediately after the transmit pulse, and ending just over the detected depth.

If you have limited your vertical range (using the **Start Range** and **Range** settings), the resulting area is used for the biomass calculation. If the seabed is clearly defined with a unique bottom detection, the bottom echo will not be included in the calculations. Therefore, if you switch the bottom detector off, the bottom echo will be included in the calculation.



A **This is the start depth of the echogram**

In a *Surface* echogram you may wish to start the echogram from the surface, and will then set the **Start Range** to *0 (zero)*. You will then see the transmit pulse as a strong echo at the top of the echogram. Try setting **Start Range** to a small value, for example *1 meter*. The echogram will then start immediately *under* the keel or transducer face.

B **This is the bottom (seabed)**

The bottom is shown with a strong contour. Since the echogram is referenced to the sea surface, the bottom will vary with the actual depth. Different bottom conditions will have a visual effect on how the bottom echo is drawn. A hard bottom (rock) will give you a stronger echo - and thus a darker colour - than a soft bottom (mud or silt).

The **Echogram** page in the **Echogram** dialog box allows you to make adjustments to the bottom contour. You can add a black bottom line, and a white line to make the bottom "stand out".

C **Transducer identification**

This text identifies the transducer - and thus also the channel - used to create the echogram. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

D **This is the scope view**

The *Scope* view is used to indicate how strong each echo is. The colour and the length of each line reflects the received echo amplitude.

E **These are the labels**

Small labels are shown in the bottom left and right corners of the echogram. These labels can contain time or distance to identify the horizontal axis of the echogram. You can hide the labels from view.

- **None**: The labels are hidden
- **Auto**: The horizontal scale is set automatically
- **Time**: The horizontal scale is defined by time. The time shown in the bottom right corner of the echogram is then the current time (now).
- **Distance**: The horizontal scale is defined by distance. The distance shown in the bottom right corner of the echogram is then 0 nautical miles (starting point).

The label information can be changed using the **Label** options on the **Horizontal Axis** page in the **Echogram** dialog box.

F **This is the lower end of the chosen depth range**

This depth is normally a few meters below the bottom contour, depending on the chosen range. The total echogram range (A) to (F) is defined with the **Range** button on the **Main** menu.

Example

Start Range in a surface related echogram

In a surface echogram, set the **Start Range** value to 10 meters. This will make the echogram start from 10 meters below the sea surface (provided that the transducer offset has been defined). Set **Range** to the current depth plus 20 meters. The echogram will now show the area from 10 meters below the sea surface, and down to 10 meters “below” the bottom. The bottom contour is easily detected when the depth changes.

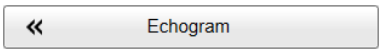
Related topics

About the echogram views, page 201

Bottom echogram description

The *Bottom* echogram shows the echoes over and below the sea bottom contour. Since this echogram is referenced to the sea bottom, the sea surface will vary with the actual depth, while the bottom is drawn flat. You can select the start range (the depth from which the echogram starts) and the vertical range (the vertical "length" of the echogram) by means of the **Start Range** and **Range** settings. Both the **Range** and the **Start Range** functions are located on the **Main** menu.

How to open



To activate *Bottom* echogram, click in the chosen view to make it "active". Select **Echogram** on the **Active** menu. Select the **Echogram** tab to open the page. On the **Echogram** page, set **Echogram type** to *Bottom*.

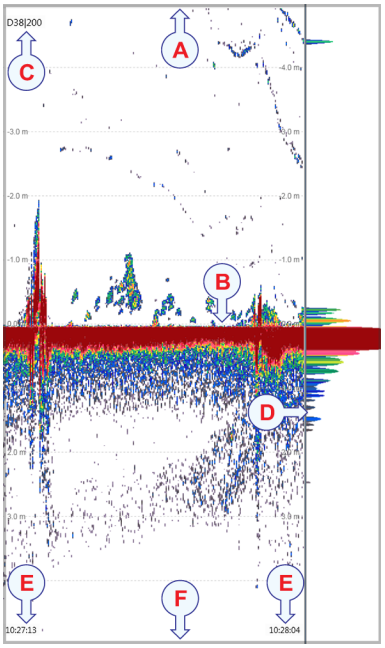
Description

A *Bottom* echogram is mainly used when you want to examine the echoes from fish close to the sea bottom. Set up the **Start Range** and **Range** depths to hide the surface and place the sea bottom contour at the middle of the echogram. You can investigate the sea bottom conditions and hardness. With a low frequency channel you can also study echoes from *below* the sea bottom (also known as "bottom penetration").

Note

The echogram is only drawn for pings that have a successful bottom detection.

Since the *Bottom* echogram is referenced to the bottom, the **Start Range** value must be negative. If you wish to start your echogram from 10 meters above the bottom, you must set the **Start Range** to *–10 m*. The **Range** setting defines the vertical range from the start depth and down.



A **This is the start depth of the echogram**

In a *Bottom* echogram you will probably wish to start the echogram from a fixed distance above the bottom. To do this, you must set the **Start Range** to a negative value, for example *-10 m*. This negative value defines how many meters above the bottom the echogram will start.

The **Range** value defines the vertical "height" of the echogram. To make sense, the value must be positive, and numerically larger than the chosen **Start Range**. If you have chosen to start your echogram from *-10 m*, the range must be larger than 10 meters, for example 20 meters.

B **This is the bottom (seabed)**

The bottom is shown with a strong contour. Since the echogram is referenced to the sea surface, the bottom will vary with the actual depth.

Different bottom conditions will have a visual effect on how the bottom echo is drawn. A hard bottom (rock) will give you a stronger echo - and thus a darker colour - than a soft bottom (mud or silt).

The **Echogram** page in the **Echogram** dialog box allows you to make adjustments to the bottom contour. You can add a black bottom line, and a white line to make the bottom "stand out".

C **Transducer identification**

This text identifies the transducer - and thus also the channel - used to create the echogram. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

D **This is the scope view**

The *Scope* view is used to indicate how strong each echo is. The colour and the length of each line reflects the received echo amplitude.

E **These are the labels**

Small labels are shown in the bottom left and right corners of the echogram. These labels can contain time or distance to identify the horizontal axis of the echogram. You can hide the labels from view.

The label information can be changed using the **Label** options on the **Horizontal Axis** page in the **Echogram** dialog box.

F **This is the lower end of the chosen depth range**

This depth is normally a few meters below the bottom contour, depending on the chosen range. The total echogram range (A) to (F) is defined with the **Range** button on the **Main** menu.

Example

Start Range and **Range** in bottom-related echogram

In a bottom echogram, set the **Start Range** value to –5 metres. This will make the echogram start from 5 metres above the sea bottom. Set **Range** to the 5 metres plus 10 = 15 metres. The echogram will now show the area from 5 metres above the depth, and down to 10 meters "below" the sea bottom. The sea bottom contour will appear as a flat line.

Related topics

About the echogram views, page 201

Sidescan echogram description

The *Sidescan echogram* shows the bottom as seen from the side of the vessel hull. The horizontal angle is determined by the physical angle of the transducer installation. You can select the start range (the depth from which the sidescan echo starts) and the horizontal range by means of the **Start Range** and **Range** settings on the **Main** menu.

A *Sidescan* echogram is mainly used when you wish to look sideways over the bottom. The echogram will then show the bottom as a plain surface. Objects on the seabed are easily identified, also because they will cast shadows that are easy to see.

Note

Sidescan echograms scroll in vertical direction from the top of the presentation and down.

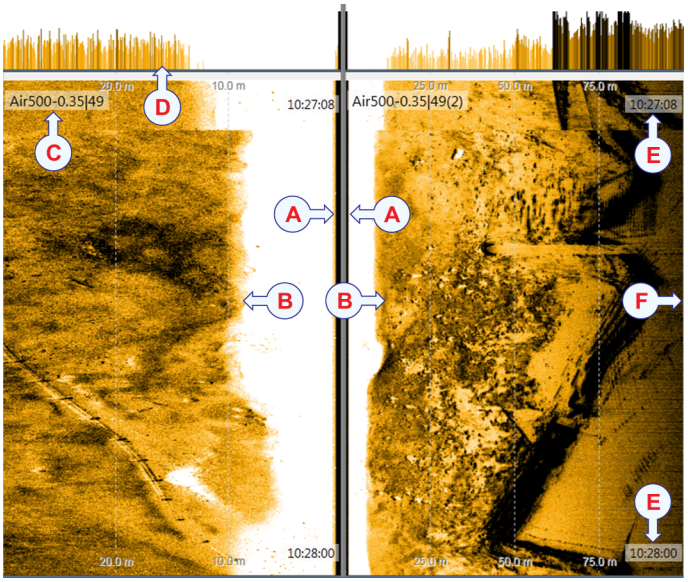
Sidescan operations are frequently used to search for wrecks, and for surveying shallow channels for obstacles that may prevent safe navigation. Sidescan is also used to monitor riverbanks, erosion, land slides and flow induced sediment deposits. In most cases, two channels are used with one sidescan transducer on each side of the vessel hull.

In the *Sidescan echogram* view, the **Range** setting controls the horizontal extent of the echogram. The **Start Range** value is used to control where the echogram starts, and this will depend on the current depth and the installation angle of the transducer(s).

Note

Sidescan operations can only be done if suitable transducers have been installed on the vessel.

The bottom detection functionality of the EA440 is disabled in sidescan echograms. This means that the **Range** *value you define will be used to determine the ping rate. A very long range will make the EA440 wait for a long time between each ping.*



A **This is the vessel's hull**

In most cases, two transducers are used, one on each side of the hull.

B **This is the start depth of the echogram**

The location of the actual start depth can not be identified on the sidescan echogram. However, the distance between the transducer (the side of the view(A)) and the first bottom echo is reduced if you increase the start depth value. The physical installation angle of the transducer, as well as the transducer's beam width and the current depth, define where the first bottom echo appears.

C **Transducer identification**

This text identifies the transducer - and thus also the channel - used to create the echogram.

D **This is the scope view**

This view is used to indicate how strong each echo is. The colour and the length of each line reflects the received echo amplitude.

E **Label**

Labels are located at the top and the bottom of the echogram. This information can be changed using the **Label** options on the **HorizontalAxis** page in the **Echogram** dialog box.

F **This is the outer end of the chosen depth range**

The **Range** value defines the horizontal range of the echogram. Note that the range will also depend on the physical installation angle and the beam width of the sidescan transducer that you are using. This means that even if you increase the range value, it may not increase the area that you see.

Related topics

About the echogram views, page 201

Spectrogram echogram description

The *Spectrogram echogram* shows a visual representation of the spectrum of frequencies over time.

A *Spectrogram* echogram is used for hydrophone systems. It is used to observe the intensity of the different frequencies. The *Spectrogram* view might be used for finding the noise sources around the vessel.

Related topics

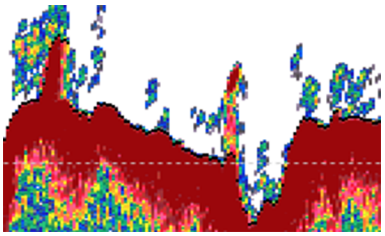
About the echogram views, page 201

Echogram lines and markers

Topics

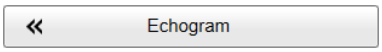
Bottom Line description

The *Bottom Line* can be added to your echogram to enhance the visual bottom detection.



How to open

To activate the *Bottom Line*, click in the echogram view to make it "active".



Select **Echogram** on the **Active** menu. Select the **Lines** tab to open the page. On the **Lines** page, enable the *Bottom Line* function.

Description

The *Bottom Line* appears as thin line that follows the bottom contour. The line is drawn in the current foreground colour. You can use the *White Line* and the *Bottom Line* functions simultaneously.

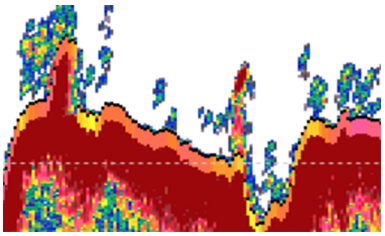
This is a visual enhancement. It does not have any effect on the EA440 performance.

Related topics

Lines page, page 345

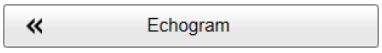
Hardness Line description

The *Hardness Line* is a thick colour coded line that shows you the bottom reflectivity - that is how "hard" the bottom is.



How to open

To activate the *Hardness Line*, click in the echogram view to make it "active".



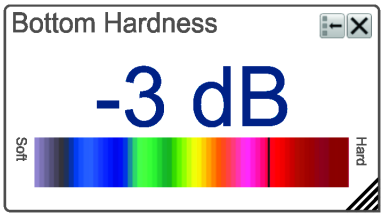
Select **Echogram** on the **Active** menu. Select the **Lines** tab to open the page. On the **Lines** page, enable the *Hardness Line* function.

Description

The *Hardness Line* can be added to your echogram to retrieve additional information. It appears as thick colour coded line that follows the bottom contour. This line does not remove information, it simply "pushes" the echo information further down in order to show you the bottom reflectivity. You can use the *Hardness Line* and the *Bottom Line* functions simultaneously, but each can not be used together with the *White Line*.

Tip

If you wish to keep an eye on the bottom hardness, you can also use the Bottom Hardness information pane. The colours on the left side of the scale indicate a soft bottom, while the colours on the right hand side indicate a harder bottom. The information pane shows you the current reflectivity measured in dB. The bottom hardness shown in the information pane was detected by the latest ping in the selected view.



Related topics

Bottom Hardness information pane description, page 191

Lines page, page 345

White Line description

The *White Line* can be added to your echogram to enhance the visual bottom detection. It appears as thick line in the current background colour (normally white) that follows the bottom contour.

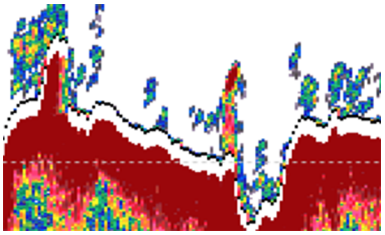
How to open

To activate the *White Line*, click in the echogram view to make it "active".

Echogram

Select **Echogram** on the **Active** menu. Select the **Lines** tab to open the page. On the **Lines** page, enable the *White Line* function.

Description



The *White Line* will not remove information, it will simply "push" the echo information further down in order to make the bottom easier to see. You can use the *White Line* and the *Bottom Line* functions simultaneously.

This is a visual enhancement. It does not have any effect on the EA440 performance.

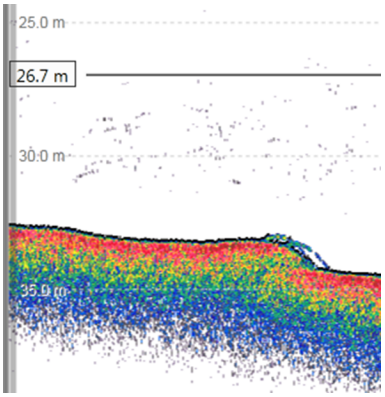
Related topics

Lines page, page 345

Variable Depth Line description

The *Variable Depth Line* is an extra horizontal line that you can place anywhere in the echogram. It provides a measurement of depth.

How to open



To activate the *Variable Depth Line*, click in the echogram view to make it "active".

Echogram

Select **Echogram** on the **Active** menu. Select the **Lines** tab to open the page. On the **Lines** page, enable the *Variable Depth Line* function.

Description

The *Variable Depth Line* can be added to your echogram to measure the depth. A horizontal line with a depth readout is placed in the echogram. To change the depth, select the line, keep the mouse button depressed, and move it up and down to place it at the requested position. This function is typically used to measure the water depth, the depth of an object near the bottom, or even objects in the water column.

To remove the *Variable Depth Line*, simply "switch it off".

This is a visual enhancement. It does not have any effect on the EA440 performance.

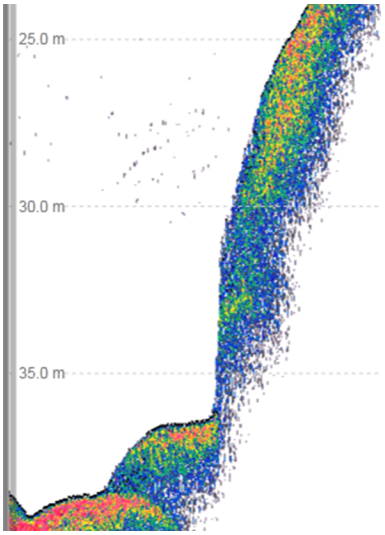
Related topics

Lines page, page 345

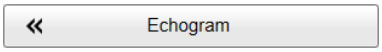
Scale Lines description

In order to estimate the depth of the bottom and/or your echoes, you can enable the *Scale Line* function. These are a chosen number of horizontal lines placed in your echogram view. Each line represents a certain depth.

How to open



To activate the *Scale Lines*, click in the echogram view to make it "active".



Select **Echogram** on the **Active** menu. Select the **Lines** tab to open the page. On the **Lines** page, enable the *Scale Lines* function.

Description

When enabled, equidistant horizontal scale lines are drawn inside the echogram in the current foreground colour; black during day and white during night. A maximum of 10 scale lines can be selected. No scale lines are drawn when the scale line count is set to 0 (zero).

This is a visual enhancement. It does not have any effect on the EA440 performance.

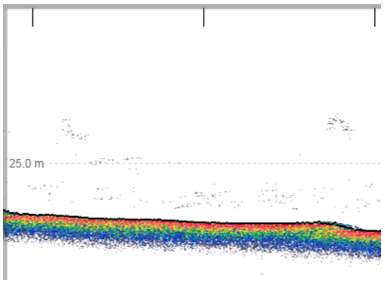
Related topics

Lines page, page 345

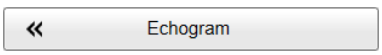
Vertical Tick description

In order to create a horizontal scale, you can add short vertical marker lines to your echogram. These lines are used to measure time or distance.

How to open



To activate the *Vertical Tick* function, click in the echogram view to make it "active".



Select **Echogram** on the **Active** menu. Select the **Lines** tab to open the page. On the **Lines** page, enable the *Vertical Tick* markers by selecting the type of markers you wish to see.

Description

This function places short vertical markers on the top of the echogram. These lines are used to measure time or distance.

- **None**: No vertical markers are shown.
- **Time**: A short vertical line is drawn in the upper part of the echogram once every minute.

This is a visual enhancement. It does not have any effect on the EA440 performance.

Related topics

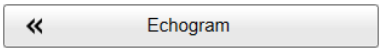
Lines page, page 345

Annotation markers description

Annotation markers may be added to the echogram to identify special echoes or special events.

How to open

To activate the *Annotation* markers, click in the echogram view to make it "active".



Select **Echogram** on the **Active** menu. Select the **Lines** tab to open the page. On the **Lines** page, enable the *Annotation* markers you wish to see.

Description

When you study an echogram, it is often useful to add personal comments to it. Comments can be used to identify specific events such as specific echoes, unusual bottom conditions, or simply for keeping track of time or distance. Use the **Annotations** page to type comments and insert annotations into the echograms. Annotations can be typed in manually, set up for automatic generation, or imported from an external device. The **Annotations** page is located in the **Installation** dialog box.

When you save raw data, the annotations you have defined are stored as annotation datagrams.

The **Lines** page in the **Echogram** dialog box allows you to enable or disable annotations in the echograms. Select *Text* or *Line* to allow *Annotation* markers to be shown in the echogram. If you select *Line*, each text annotation is followed by a vertical line for improved visibility.

Related topics

Lines page, page 345

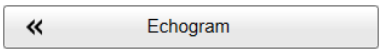
Annotations page, page 324

Label markers description

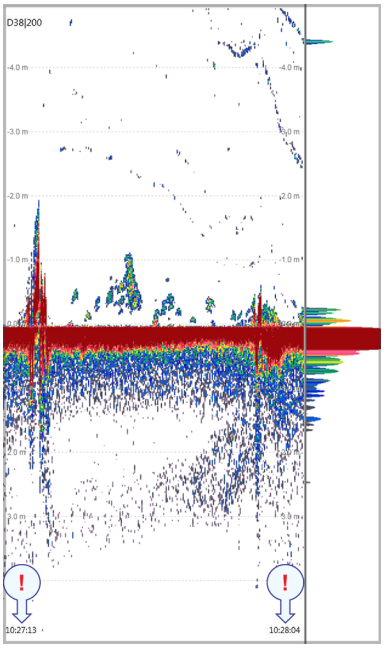
Small labels are shown in the bottom left and right corners of the echogram. These labels can contain time or distance to identify the horizontal axis of the echogram. You can hide the labels from view.

How to open

To activate the *Label* markers, click in the echogram view to make it "active".



Select **Echogram** on the **Active** menu. Select the **Horizontal Axis** tab to open the page. On the **Horizontal Axis** page, enable the *Label* marker you wish to see.



Description

The following label options are available.

- **None**: The labels are hidden
- **Auto**: The horizontal scale is set automatically
- **Time**: The horizontal scale is defined by time. The time shown in the bottom right corner of the echogram is then the current time (now).

The label information can be changed using the **Label** options on the **Horizontal Axis** page in the **Echogram** dialog box.

Note that in sidescan echogram views, the labels are placed in the top and bottom corners of the view. This is because the sidescan echograms travel in vertical direction from the top to the bottom of the view.

This is a visual enhancement. It does not have any effect on the EA440 performance.

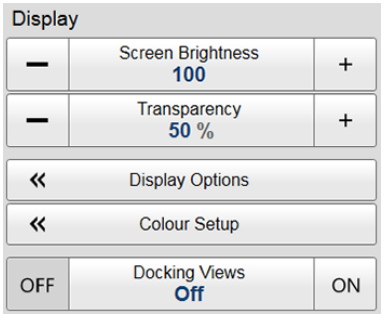
Related topics

Horizontal Axis page, page 350

The EA440 menu system

The menu system is by default located on the right hand side of the EA440 presentation. The menus are organized in a tree structure with a main menu, a set of secondary menus, and several menu buttons. Some of the menu buttons open dialog boxes or sub-menus to offer additional choices.

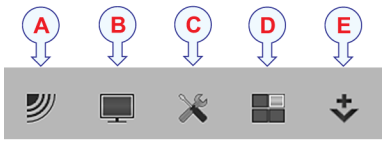
Description



To change operational settings in the EA440, observe the menu system and its tree structure. It offers a main menu, a set of secondary menus, and several menu buttons. Each button shows the purpose of the button. Some of them also display the current setting.

The **Main** menu is located at the top of the menu structure. It offers the most common functions for efficient use of the EA440. Unless you hide the entire menu system from view, the **Main** menu is visible at all times, even if you close the secondary menus.

Below the **Main** menu, a set of dedicated icons are used to open the secondary menus.



A **Operation menu**: The **Operation** menu offers the most common functions for basic EA440 operation.

B **Display menu**: The **Display** menu provides basic functions related to the screen behaviour and presentation of EA440 data.

C **Setup menu**: The **Setup** menu provides basic functions related to the EA440 installation parameters and its communication with peripheral systems.

D **Active menu**: The **Active** menu offers parameters related to current views and data presentations shown by the EA440.

E **Extras menu**: The **Extras** menu is - in spite of its name and location - not a menu at all. This "menu" opens a small view to monitor key operational parameters.

Tip

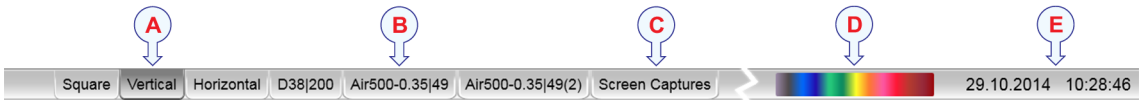
Unless you need to make frequent changes to the operating parameters, you may want to hide the menu from the EA440 presentation. This will give you more space to present echo data. To hide the menu, select **Menu** *on the top bar. To retrieve it, select* **Menu** *one more time. When the menu is hidden, it is temporarily shown on the left or right side of the EA440 presentation if you move the cursor to that position.*

Related topics

Main menu, page 223
Operation menu, page 225
Display menu, page 227
Setup menu, page 228
Active menu, page 231
Extras menu, page 233

Bottom bar

The tabs on the bottom bar allows you to choose channel and presentation mode. A dedicated tab provides a special view for you to see the screen captures you have made. The bottom bar also shows you the current colour scale, as well as the time and date.



Description

The number of tabs available on the bottom bar depends on how many channels your EA440 has. Two tab "groups" allow you to select channels and views. This example shows the EA440 with two channels.

A **Presentation modes**

Three presentation modes are available when you wish to see all the echogram channels simultaneously in the EA440 presentation. The three tabs will arrange the echogram views vertically, horizontally, or in rectangular rows and columns.

B **Selecting individual echogram channels**

Each channel is shown with a dedicated tab. The channel is identified with the name of the transducer in use. Select a specific transducer tab to see only that channel in the EA440 presentation.

C **Screen Captures**

You can use the **Screen Capture** button on the top bar to save echograms as picture files on *.jpg format. The **Screen Captures** tab on the bottom bar opens a viewer that allows you to open these images. You can also open the file folder on the Operator Station hard disk to copy, rename or delete the image files.

D **Colour Scale**

The colour scale on the status bar reflects the colour choice you have made for the echograms. To change the colour scale, use the **Colour Setup** dialog box on the **Display** menu.

Colour Scale page, page 355

E **Date and time**

The date and time for the last ping is shown on the right side of the bottom bar.

During replay, the date and time recorded with the data file are shown. The date and time is shown with prefix "P:" for ping and R:" for replay.

Related topics

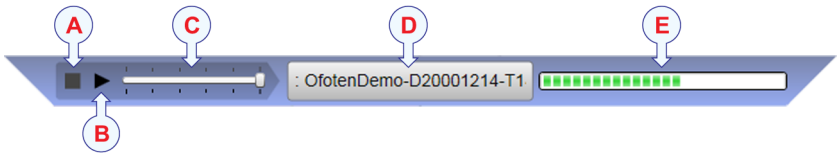
EA440 user interface familiarization, page 175

Replay bar description

During replay, the dedicated replay bar is shown immediately under the top bar. The replay bar allows you to retrieve saved files, and to control the playback.

How to open

The replay bar is opened automatically when **Operation** is set to *Replay*.



Description

All playback is controlled by the replay bar. During data playback, the replay offers visual monitoring of the speed and progress. You can also edit the list of replay files that are used.

A **Stop**

Select this button to stop the playback.

Note that the replay bar will not be removed from the presentation until you select another operational mode.

B **Play/Pause**

Select this button to start the playback, or to pause it.

C **Replay speed**

Select this slider and move it sideways to adjust the replay speed.

D **Replay file**

This button shows which file you are currently playing. Select the button to open the **Replay File** dialog box.

E **Progress**

This bar shows you the replay progress of the current file. If you have chosen to loop the replay file(s), the green indicator will start from left every time the start of the file appears.

Tip

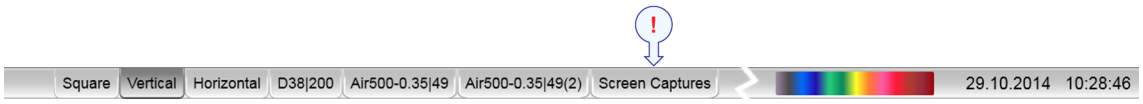
To select Replay operational mode, use the **Operation** *function. The* **Operation** *function is located on the* **Operation** *menu. If you wish your playback file to run continuously, select* **Loop** *in the* **Replay File** *dialog box.*

Screen capture browser description

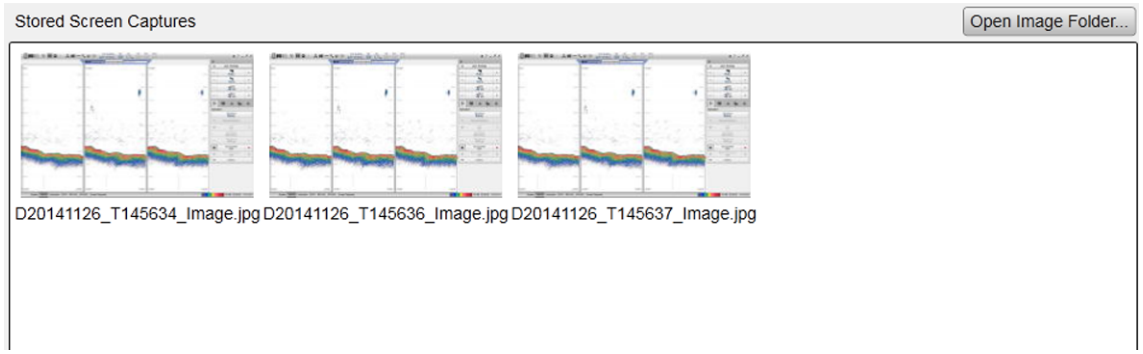
The EA440 provides a built-in screen capture function to create snapshots of the echogram presentation. The EA440 also provides a dedicated browser to view the saved images.

How to open

To open the screen capture browser, select the **Screen Captures** tab on the bottom bar.



To close the browser, click any of the other tabs on the bottom bar.



Description

The screen capture browser simply presents a miniature version of each screen capture that you have made. Each file is provided in standard JPG format, which can be opened by most commercial bitmap editors. The file names are created automatically using the date and time when you used the **Screen Capture** button.

Double-click a miniature image to open it. Once opened, select **Return to Browser** to return to the browser view.

To find the image files, select **Open Image Folder** in the image browser. By means of standard operating system functionality you can move, copy or delete each image file.

To make a screen capture, select **Screen Capture** on the top bar. Every time you do this, a new image file is created.

Related topics

Screen Capture button description, page 179

Menu system

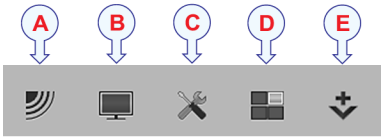
Topics

About the menus and menu buttons

To select operational parameters on the EA440, use the menu system. The menus are organized in a tree structure with a main menu, a set of secondary menus, and several menu buttons. Some of the menu buttons open dialog boxes or sub-menus to offer additional choices. The menu system is by default located on the right hand side of the EA440 presentation.

The **Main** menu is located at the top of the menu structure. It offers the most common functions for efficient use of the EA440. Unless you hide the entire menu system from view, the **Main** menu is visible at all times, even if you close the secondary menus.

Below the **Main** menu, a set of dedicated icons are used to open the secondary menus.



A **Operation menu**: The **Operation** menu offers the most common functions for basic EA440 operation.

B **Display menu**: The **Display** menu provides basic functions related to the screen behaviour and presentation of EA440 data.

C **Setup menu**: The **Setup** menu provides basic functions related to the EA440 installation parameters and its communication with peripheral systems.

D **Active menu**: The **Active** menu offers parameters related to current views and data presentations shown by the EA440.

E **Extras menu**: The **Extras** menu is - in spite of its name and location - not a menu at all. This "menu" opens a small view to monitor key operational parameters.

Tip

Unless you need to make frequent changes to the operating parameters, you may want to hide the menu from the EA440 presentation. This will give you more space to present echo data. To hide the menu, select **Menu** *on the top bar. To retrieve it, select* **Menu** *one more time. When the menu is hidden, it is temporarily shown on the left or right side of the EA440 presentation if you move the cursor to that position.*

Main menu

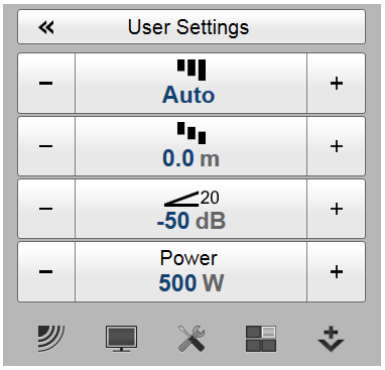
The **Main** menu is located at the top of the menu structure. It offers the most common functions for efficient use of the EA440. Unless you hide the entire menu system from view, the **Main** menu is visible at all times, even if you close the secondary menus.

How to open

By default, the **Main** menu is open. It is placed on the right side of the EA440 presentation.

On the top bar, use the **Menu** button to hide or show the menu. When the menu system is hidden, it appears temporarily on the left or right hand side of the screen if you move the cursor to that position.

Description



- **User Settings**

  The **User Settings** dialog box allows you to save the current user settings (your current selection of operational parameters), and to retrieve factory or previously saved user settings.

- **Range**

  The **Range** function allows you to specify the maximum theoretical vertical depth and horizontal distance covered by the EA440. The range is defined from a selected start range, and down to a value beneath the current bottom depth. The range value shown and selected is by default only applied to your currently selected echogram.

- **Start Range**

  The **Start Range** function allows you to specify the start depth of the echogram. The value defines from which depth in the water column the presentation shall start. The depth value shown and selected is by default only applied to the currently selected echogram.

- **Gain**

  The purpose of the **Gain** function is to adjust the echo level in the EA440 presentations. Adjusting the **Gain** you can control how much amplification is applied to the received echoes. By default, the gain setting is only applied to the currently selected echogram (identified with a thick border).

- **Power**

  The **Power** function allows you to increase or decrease the transmitted power.

Secondary menus

Below the **Main** menu you find the icons for opening (and closing) the secondary menus. Select an icon to open the relevant menu, and reselect the icon to close the menu.

Hiding the menu system

If you do not need to use the menu system, you can hide it. This allows more space for the EA440 presentation.

On the top bar, use the **Menu** button to hide or show the menu. When the menu system is hidden, it appears temporarily on the left or right hand side of the screen if you move the cursor to that position.

Related topics

Menu button, page 179
The EA440 menu system, page 216

Operation menu

The **Operation** menu offers the most common functions for basic EA440 operation.

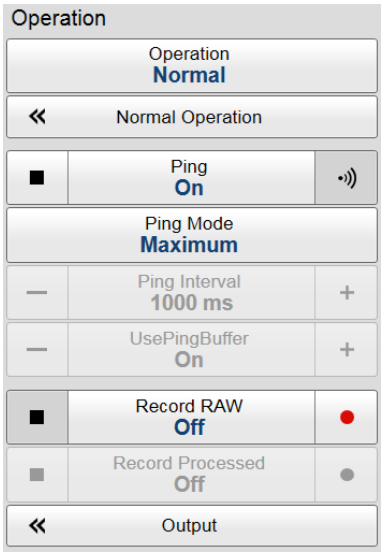
How to open

Select the **Operation** icon. The icon is located under the **Main** menu. Select the icon one more time to close the menu.

Note

Immediately after you have powered up the EA440, the **Operation** *menu icon is flashing. It is flashing to indicate that even if the EA440 is turned on, "pinging" is disabled.* **Ping** *is set to Off to prevent transmission. This is for safety reasons.*

Description



- **Operation**

  The **Operation** function controls the operating mode of the EA440.

- **Normal Operation**

  The purpose of the **Normal Operation** dialog box is to provide you with an overview of the current transceiver parameters. It also allows you to change these parameters to match your current operational requirements.

- **Ping**

  The purpose of the **Ping** function is to enable or disable the EA440 transmissions into the water. Such transmissions are often referred to as "pinging".

- **Ping Mode**

  The **Ping Mode** function is used to control how often the EA440 will transmit its energy into the water. For normal use, choose *Maximum*.

- **Ping Interval**

  The **Ping Interval** function is used when **Ping Mode** is set to *Interval*. The **Ping Interval** function permits you to choose the time (in milliseconds) between each transmission ("ping").

- **Use Ping Buffer**

  Use the buffer function to get a more stable ping rate in shallow waters up to 200 metres.

- **Record RAW**

The **Record RAW** function allows you to record the *unprocessed* echo data received by the transducer.

- **Record Processed**

  The **Record Processed** function allows you to record the *processed* echo data received by the transducer. Which processing to apply is controlled by the **Processed Data Output** settings in the **Output** dialog box.

- **Output**

  A key function of the EA440 is its ability to export data. The purpose of the **Output** dialog box is to collect all functionality related to EA440 data output in one easily accessible location. To control the data export, use the **Output** dialog box.

Related topics

The EA440 menu system, page 216

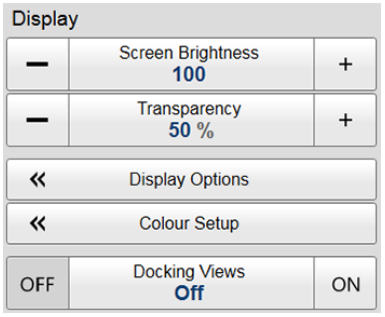
Display menu

The **Display** menu provides basic functions related to the screen behaviour and presentation of EA440 data.

How to open

Select the **Display** icon to open the menu.

Description



- **Screen Brightness**

  The intensity of the light given off by the EA440 presentation can be adjusted. You can use this function to increase or decrease the light from the screen to match the ambient light.

- **Transparency**

  The transparency can be adjusted. When you open a pane, you will see that it is transparent.

- **Display Options**

  Which navigational elements to see on the top bar is selected in the **Display Options** dialog box. You can also select which tooltips to appear when you move the cursor over the echograms.

- **Colour Setup**

  The **Colour Setup** dialog box controls the presentation colours used by the EA440. This includes the palette ("skin"), the number of colours in use, and the colour scale.

Docking Views

With the **Docking Views** function you can move and re-size the views in the EA440 presentation. If you have several displays connected to your Operator Station you can even move selected views to another display.

Related topics

The EA440 menu system, page 216

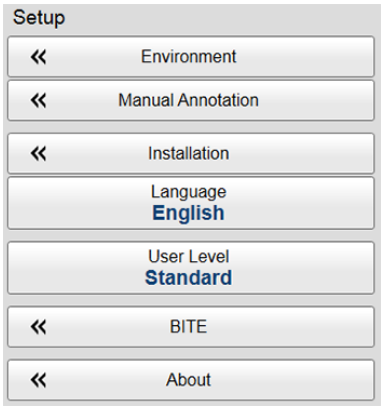
Setup menu

The **Setup** menu provides basic functions related to the EA440 installation parameters and its communication with peripheral systems.

How to open

Select the **Setup** icon. The icon is located under the **Main** menu. Select the icon one more time to close the menu.

Description



- **Environment**

  Environmental parameters such as salinity, sound speed and water temperature all play an important part to present accurate echo data. Use the **Environment** parameters to define these values.

  Environment dialog box, page 296

- **Manual Annotation**

  Sometimes it can be useful to place a single written comment on the echogram. The **Manual Annotation** dialog box offers that function.

  Manual Annotation dialog box, page 299

- **Installation**

  Prior to use, the EA440 must be set up to communicate with the relevant peripherals. This includes the transducer(s). The **Installation** dialog box collects all relevant peripherals on individual pages, and allows you to set up the basic parameters related to installation and operation. In most cases, you only need to do this once.

  Installation dialog box, page 300

  The following pages are provided.

  – **Transceiver**

    The **Transceiver** pages are used to define the settings necessary to connect the Operator Station to each transceiver. In turn, each transceiver is assigned one or more transducers. Two pages are used. The **Transceiver Installation** page shows you a list of the available transceivers, and allows you to make the connections to the Operator Station, and to the transducers you have installed. The **Transceiver IP Address** page allows you to control the Internet Protocol (IP) Addresses used by the Operator Station to communicate with the transceivers.

    Transceiver pages, page 302

  – **Transducer Installation**

    The transducers you wish to use with the EA440 must be "installed" as a part of the software configuration. Which transducers to use depends on the number

of transceivers in your system, and the licenses you have for these. Unless you replace a broken transducer, or add a new, you only need to do this once.

Transducer Installation page, page 311

– **I/O Setup**

  In order to communicate with peripheral devices, the Operator Station offers several serial and/or Ethernet (LAN) ports. The number of communication ports depends on how your Operator Station is set up and configured. The **I/O Setup** settings allow you to define which information is imported by the Operator Station.For each port, you can set up the communication parameters, and monitor the data flow.

  I/O Setup page, page 265

– **Sensor Installation**

  For the EA440 to use and offer correct navigational information, one or more external sensors must be connected. Typical sensors are those that provide speed, heading and geographical position. On the **Sensor Installation** page you define which external sensors your EA440 will import information from. You must also decide which datagram formats that will be accepted. Once a sensor has been chosen, you must select the offset values that define the sensor's physical location relative to your vessel's coordinate system.

  Sensor Installation page, page 314

– **Sensor Configuration**

  With several sensors connected to the EA440, many of them will provide the same datagrams. We cannot expect that the datagrams provide the same information. The **Sensor Configuration** page allows you to define a datagram priority, so that the information from the "most reliable" sensor is used by the EA440. You can also define manual values in case a sensor is unserviceable, or not installed.

  Sensor Configuration page, page 319

– **Synchronization**

  The purpose of the **Synchronization** parameters is to set up the EA440 to operate alone, or as a master or slave in a synchronized system. Synchronization is required in order to avoid interference if the EA440 is used simultaneously with other hydroacoustic instruments within the same frequency range.

  Synchronization page, page 321

– **Units**

  The EA440 user interface presents many measurements. From the **Units** page you control which units of measurements that are used.

  Units page, page 323

– **Annotations**

When you study an echogram, it is often useful to add personal comments to it. Comments can be used to identify specific events such as specific echoes, unusual

bottom conditions, or simply for keeping track of time or distance. The **Annotations** choices allow you to type comments and annotations into the echograms. The comments are automatically saved when you enable raw data recording.

Annotations page, page 324

- **Software License**

  The EA440 needs one or more software licenses to work. Each software license code "unlocks" one WBT for operational use with a set of predefined properties. The **Software License** settings allow you to type a license code (text string) to unlock the EA440 functionality.

  Software License page, page 326

- **Language**

  The **Language** function allows you to select the language to be used in the EA440 presentations, menus and dialog boxes.

  Language function, page 328

- **User Level**

  The standard user level has access to all functions. The basic user level does not have access to important settings.

  Set User Level dialog box, page 328

- The EA440 is a computerized Hydrographic single beam echo sounder. There are hardly any analogue circuitry, and the possibility of traditional troubleshooting is limited. In order to rectify this, a built-in software application is available to offer test and maintenance functionality. The **BITE** (Built-In Test Equipment) dialog box controls the test and diagnose program that checks the performance of the EA440.

  BITE (Built-In Test Equipment) dialog box, page 329

- **About**

  The **About** dialog box displays the software version of the EA440 program.

  About dialog box, page 340

Related topics

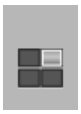
The EA440 menu system, page 216

Active menu

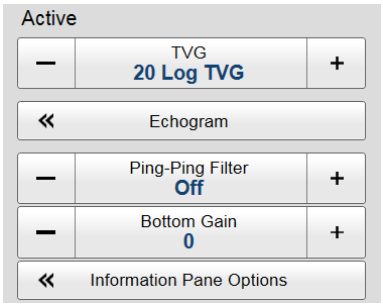
The **Active** menu offers parameters related to current views and data presentations shown by the EA440.

How to open

Select the **Active** icon to open the menu.



Description



- **TVG**

  TVG (Time Variable Gain) compensates for the loss of acoustic energy due to geometric spread and absorption.

  TVG function, page 342

- **Echogram**

  The **Echogram** dialog box allows you to set up the parameters controlling the echogram presentation. Two pages control the horizontal lines and the echogram type with applied TVG (time variable gain). One page controls how fast the echogram travels horizontally across the presentation.

  Echogram dialog box, page 344

- **Ping-Ping Filter**

  The **Ping-Ping Filter** analyses the historical information from previous consecutive pings in order to remove unwanted noise and interference from the EA440 presentation.

  Ping-Ping Filter function, page 351

- **Bottom Gain**

  The **Bottom Gain** setting controls the gain below the detected bottom depth. This gives you information about the current bottom conditions.

  Bottom Gain function, page 352

- **Information Pane Options**

  The **Information Pane Options** dialog box allows you to change the operational parameters used to present the data in the information panes.

  Information Pane Options dialog box, page 353

  – **Bottom Detection**

    Locating the bottom is important for the EA440. The purpose of the **Bottom Detection** parameters are to define the upper and lower depth limits most likely to be used during the EA440 operation. You can also modify the setting for **Bottom Backstep** to change the bottom detection relative to the bottom echo.

Bottom Detection page, page 357

– **Colour Scale**

  The colour scales used by the EA440 are designed to reflect the how strong the echoes are. The echo strength is measured in decibels (dB). Each colour in the scale represents an increase (or decrease) in the echo strength. In the basic colour scale with 12 colours, each colour represents a 3 dB step. The **Colour Scale** parameters allow you to change the echo strength range (in decibels) that each colour represent.

  Colour Scale page, page 355

– **Spectrum**

  Select the frequency band for the *Spectrum* information pane in the **Spectrum** page.

  Spectrum page, page 359

Related topics

The EA440 menu system, page 216

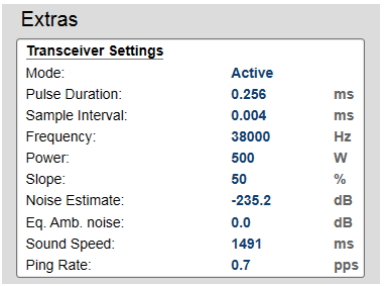
Extras menu

The **Extras** menu is - in spite of its name and location - not a menu at all. This "menu" opens a small view to monitor key operational parameters.

How to open

Select the **Extras** icon. The icon is located under the **Main** menu. Select the icon one more time to close the menu.

Description



The **Extras** "menu" gives you an overview of the main operational parameters. The information is based on the currently "active" echogram.

Details

Mode

The **Mode** is controlled by the **Operation** function on the **Operation** menu. The **Operation** function controls the operating mode of the EA440. You can set it to *Inactive*, *Normal* or *Replay*.

Pulse Duration

This setting is controlled in the **Normal Operation** dialog box. The **Pulse Duration** setting specifies the current duration ("length") of the transmitted pulse. You can manually select a pulse duration that suits your operation. You can also choose automatic duration.

Sample Interval

The information from each EA440 transducer is a continuous flow of analogue data. In signal processing, *sampling* is the reduction of this continuous signal to a discrete signal.We convert a sound wave (which is an analogue *continuous-time signal*) to a sequence of samples (which is a *discrete-time signal*). The *sample rate* is the average number of samples obtained in one second. The *sample interval* is 1/*sample rate* to allow readout in time (normally milliseconds).

Start/End Frequency

This setting is controlled in the **Normal Operation** dialog box. The **Start Frequency** and **End Frequency** parameters are used to set up a frequency sweep ("chirp"). If the parameters for start and end frequencies are unavailable, the transducer used on the relevant channel does not support wideband transmissions. In order to use the frequency sweep ("chirp") functionality, you must use frequency modulated pulses.

Power

This setting is controlled in the **Normal Operation** dialog box. The **Power** parameter in the **Normal Operation** dialog box displays the transmitter's output power measured in Watts. You can change the output power manually. Output power is limited either to the maximum rating of the transducer, or the maximum rating of the transmitter, whichever is the smallest.

Ramping

This setting is controlled in the **Normal Operation** dialog box. The **Ramping** parameter provided in the **Normal Operation** dialog box defines how fast the output level of each transmission ("ping") shall increase from 0 V to maximum level.

Noise estimate

For every transmission ("ping") the EA440 measures the echo levels along the chosen range. Typically, these measurements are made every five meters, even for long ranges.

All echoes and noise in the water are recorded. This includes noise generated by your own vessel (electric, propellers, machinery etc), water flow, cavitation and interference. Echoes from fish and other species, as well as from the bottom, are detected and added to the equations.

By comparing these measurements, the EA440 calculates a noise estimate.

Tip

If you set the EA440 to Passive mode, all echoes from the transmissions are removed from the equations. This gives you with better information about the actual noise.

Equivalent ambient noise

The noise estimate provided by the EA440 includes all noises. This includes noise generated by your own vessel, for example electric noise, propellers, machinery and mechanical vibrations. By means of additional equations, the noise values are compensated for the bandwidth. The equivalent ambient noise value attempts to present the total noise as if it was all from ambient sources.

Sound Speed

This shows the current sound speed value, whether it is provided by a sensor, calculated or entered manually.

Ping Rate

The phrase *ping rate* is used to describe the parameter that controls how often the EA440 can or shall transmit acoustic energy (a "ping") into the water. The ping rate is normally limited by the maximum range settings. It will also be dependant on hardware issues. This may be, for example, how fast your Operator Station can handle the information from each ping, how fast your system communicates with external peripherals, or how long time the system uses to save data.

Related topics

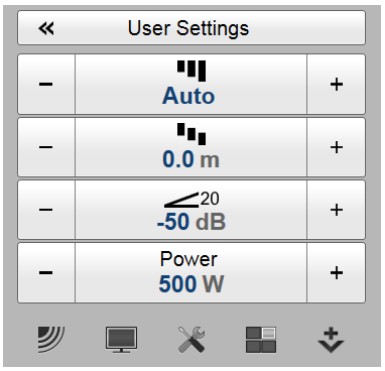
The EA440 menu system, page 216

Functions and dialog boxes

Topics

Main menu; Functions and dialog boxes

The **Main** menu is located at the top of the menu structure. It offers the most common functions for efficient use of the EA440. Unless you hide the entire menu system from view, the **Main** menu is visible at all times, even if you close the secondary menus.



How to open

By default, the **Main** menu is open. It is placed on the right side of the EA440 presentation.

On the top bar, use the **Menu** button to hide or show the menu. When the menu system is hidden, it appears temporarily on the left or right hand side of the screen if you move the cursor to that position.

Topics

User Settings dialog box, page 237

Range function, page 240

Start Range function, page 241

Gain function, page 243

Power function, page 244

User Settings dialog box

The **User Settings** dialog box allows you to save the current user settings (your current selection of operational parameters), and to retrieve factory or previously saved user settings.

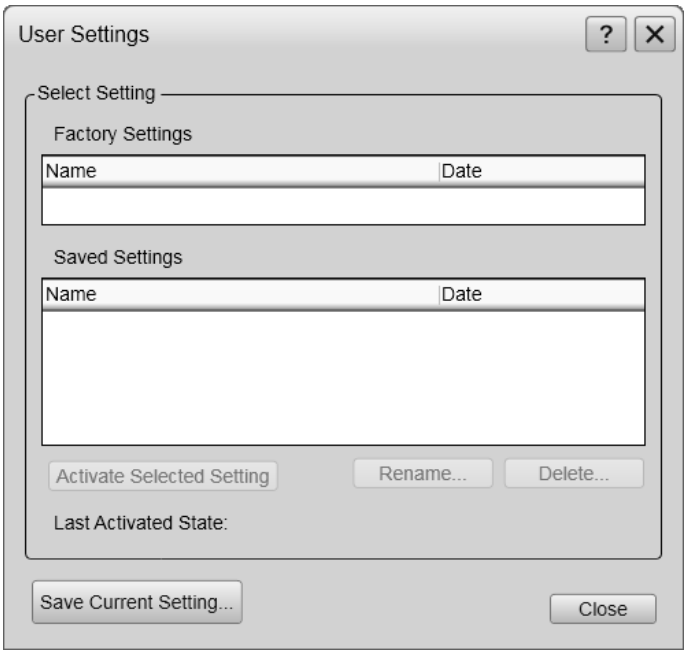
How to open

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

Description

The **User Settings** dialog box is used to store your favourite EA440 settings.

These settings can be related to different operations, environmental conditions or basic personal preferences. You can use different settings to create as many user profiles as you like, and give them any name. All the settings you have chosen using functions and dialog boxes in the EA440 user interface are saved.



Details

Factory Settings

These settings are the default values provided with the EA440. The settings may be put to use if you are uncertain of which values to use. They offer "best practice" settings for typical use. When you wish to apply the factory settings, a small dialog box will appear to request confirmation.

The factory settings cannot be altered.

Note

Unless they are saved, all your current settings are lost when the factory settings are applied.

Saved Settings

"Saved settings" are those created and saved by you and other EA440 users.

Each setting is identified by its name, as well as the time and date it was created. These settings may be deleted or renamed. You can save an unlimited number of profile settings, only limited by the size of the hard disk on your Operator Station.

Activate Selected Setting

User settings that either you or any of your colleagues have saved can easily be retrieved and put to use. This shortens down the time it takes to get started with the EA440.

To activate either a factory setting or a saved setting, click the relevant name in one of the lists, and click **Activate Selected Setting**.

Rename

Use this function to rename one of your saved settings. To rename a user setting, select its name in the list, and then select **Rename**. A small dialog box opens to accept the new name.

Note

The factory settings can not be renamed.

If you do not have a computer keyboard connected to your EA440 system, select the **Keyboard** button to open an on-screen keyboard.

Delete

When you save the user settings, the files you have created are shown on the **Saved Settings** list. The list may be too long. User settings that you do not need can be deleted.

Use this function to delete one of your saved settings. To delete a user setting, select its name in the list, and then select **Delete**. A small dialog box opens so that you can verify your choice.

Note

The factory settings can not be deleted.

Save Current Setting

When you have spent some time working with the EA440, you are probably using specific settings that you know are efficient for your purpose. It is a good idea to save these settings.

Use this function to save the currently applied EA440 settings. To save the settings you are using, select **Save Current Setting**. A small dialog opens to accept the name of the new setting.

You can only add settings to the **Saved Settings** list.

If you do not have a computer keyboard connected to your EA440 system, select the **Keyboard** button to open an on-screen keyboard.

Related tasks

Choosing previously saved user settings, page 127

Choosing EA440 factory default settings, page 129

Deleting user settings that are no longer used, page 129

Renaming existing user settings, page 128

Saving the current user settings, page 126

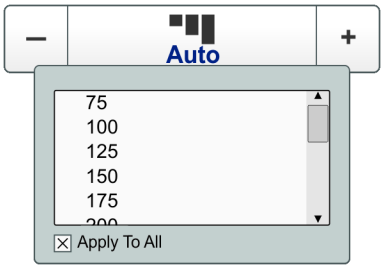
Range function

The **Range** function allows you to specify the maximum theoretical vertical depth covered by the EA440. The range is defined from a selected start range, and down to a value beneath the current bottom depth. The range value shown and selected is by default only applied to your currently selected echogram.

How to open

This function is opened from the **Main** menu.

Description



The **Range** setting defines how "deep" you wish the EA440 to detect echoes. In other words, this is the vertical distance between the "top" and the "bottom" of the echogram. The **Range** setting specifies the "bottom" depth, while the **Start Range** setting specifies the "top" depth.

The range you specify applies to the currently selected echogram. It is identified with a thick border. Several echogram types are available.

Tip

If you wish to apply the new range setting to all the current echograms of the same type, select **Apply to all**.

To select which echogram types you wish to see in the EA440 presentations, use the **Echogram** *dialog box.*

You can only type a new value if a computer keyboard is connected to your EA440 Operator Station. Without a keyboard, select a predefined value. You can also adjust the setting by clicking the [+] and [−] buttons.

Example

Start Range in a surface-related echogram

In a surface echogram, set the **Start Range** value to 0 metres. This will make the echogram start from the sea surface (provided that the transducer offset has been defined). Set **Range** to the current depth plus 20 metres. The echogram will now show the area from the sea surface and down to 20 metres "below" the sea bottom. The sea bottom contour is easily detected when the depth changes.

Example

Start Range and **Range** in bottom-related echogram

In a bottom echogram, set the **Start Range** value to –5 metres. This will make the echogram start from 5 metres above the sea bottom. Set **Range** to the 5 metres plus 10 = 15 metres. The echogram will now show the area from 5 metres above the depth, and down to 10 meters "below" the sea bottom. The sea bottom contour will appear as a flat line.

Details

Range

This setting controls the displayed depth range in the echograms. The start (upper) depth of the echogram is the value defined by the **Start Range** setting.

Select either side of the button to choose a value. Select the middle of the button to open it.

Apply to all

The range value shown and selected is by default only applied to your currently selected echogram. If you wish to apply the new range setting to all the current echograms of the same type, select **Apply to all**.

Related tasks

Choosing **Range** and **Start Range** values in a surface-related echogram, page 70

Choosing **Range** and **Start Range** values in a bottom-related echogram, page 105

Choosing **Range** and **Start Range** values in a sidescan echogram, page 112

Start Range function

The **Start Range** function allows you to specify the start depth of the echogram. The value defines from which depth in the water column the presentation shall start. The depth value shown and selected is by default only applied to the currently selected echogram.

How to open

This function is opened from the **Main** menu.

Description

You use **Start Range** to define the minimum depth of the displayed targets. In other words, this is the depth of the "top" of the echogram. The **Range** setting specifies the "bottom" depth, while the **Start Range** setting specifies the "top" depth.

The start range you specify applies to the currently selected echogram. It is identified with a thick border. Several echogram types are available.

Tip

If you wish to apply the new start range setting to all the current echograms of the same type, select **Apply to all**.

To select which echogram types you wish to see in the EA440 presentations, use the **Echogram** *dialog box.*

You can only type a new value if a computer keyboard is connected to your EA440 Operator Station. Without a keyboard, select a predefined value. You can also adjust the setting by clicking the [+] and [−] buttons.

Example

Start Range in a surface-related echogram

In a surface echogram, set the **Start Range** value to 0 metres. This will make the echogram start from the sea surface (provided that the transducer offset has been defined). Set **Range** to the current depth plus 20 metres. The echogram will now show the area from the sea surface and down to 20 metres "below" the sea bottom. The sea bottom contour is easily detected when the depth changes.

Example

Start Range and **Range** in bottom-related echogram

In a bottom echogram, set the **Start Range** value to –5 metres. This will make the echogram start from 5 metres above the sea bottom. Set **Range** to the 5 metres plus 10 = 15 metres. The echogram will now show the area from 5 metres above the depth, and down to 10 meters "below" the sea bottom. The sea bottom contour will appear as a flat line.

Details

Start Range

This setting controls the upper start depth for the echogram. The vertical height of the echogram is the value defined by the **Range** setting.

Select either side of the button to choose a value. Select the middle of the button to open it.

Apply to all

The depth value shown and selected is by default only applied to the currently selected echogram. If you wish to apply the new start range setting to all the current echograms of the same type, select **Apply to all**.

Auto

By selecting **Auto**, the EA440 automatically adjusts the range according to the current depth.

Related tasks

Choosing **Range** and **Start Range** values in a surface-related echogram, page 70

Choosing **Range** and **Start Range** values in a bottom-related echogram, page 105

Choosing **Range** and **Start Range** values in a sidescan echogram, page 112

Gain function

The purpose of the **Gain** function is to adjust the echo level in the EA440 presentations.

How to open

This function is opened from the **Main** menu.

Description

You can compare this gain setting with the volume control on your car radio. When the gain is increased, the echoes will appear stronger. Weak echoes will be easier to see. However, since you also increase the acoustic noise in the reception, the EA440 presentations will also show this noise. Too much gain may therefore "distort" the presentation.

Tip

Do not confuse this **Gain** *setting with the* **TVG** *(Time Varied Gain) setting.*

There are two gain buttons, one for each TVG setting (*20 log R* and *40 log R*). Each of these will only work on echograms with the same TVG setting.

Tip

If you work with both sidescan and bottom/surface echograms simultaneously, set the TVG in the sidescan echogram(s) to 40 log R, and the TVG in the bottom/surface echograms to 20 log R. That makes it easy to adjust the gain individually for both echogram types.

The scale is in dB. If you wish to *increase* the gain, you must click the *left* [–] button to *reduce* the damping.

You may wish to adjust the gain on single echograms. To do this, click the middle of the **Gain** button to open it, and deselect **Apply to all**.

Tip

You can also adjust the gain in the **Colour Scale** *dialog box. This dialog box is opened from the Depth information pane.*

Details

Gain

This setting controls the minimum level applied to the currently selected ("active") echogram If you have a keyboard connected to the EA440, you can type the requested value in the text box. You can also change the value by selecting - and holding - the middle of the button, and move the cursor sideways. Move the cursor towards left to reduce the value, or towards right to increase the value. Release the mouse button when the requested value is shown on the button.

Apply to all

By default, the gain setting is applied to all echograms.You may wish to adjust the gain on single echograms. To do this, click the middle of the **Gain** button to open it, and deselect **Apply to all**.

Related tasks

Adjusting the gain (echo sensitivity), page 68

Adjusting the TVG (Time Variable Gain) setting, page 69

Related functions

TVG function, page 342

Power function

The **Power** function allows you to increase or decrease the transmitted power.

How to open

This function is opened from the **Main** menu.

Description

The **Power** function lets you change the transmitted power in Watts in increments of 50 up to maximum power.

Details

Power

The **Power** function allows you to increase or decrease the transmitted power.

Auto

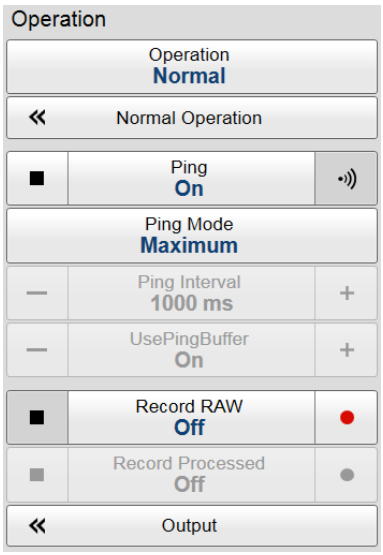
By selecting **Auto**, the EA440 automatically adjusts the power according to the current range.

Related tasks

Adjusting the output power, page 131

Operation menu; Functions and dialog boxes

The **Operation** menu offers the most common functions for basic EA440 operation.



How to open

Select the **Operation** icon.

The icon is located under the **Main** menu. Select the icon one more time to close the menu.

Note

Immediately after you have powered up the EA440, the **Operation** *menu icon is flashing. It is flashing to indicate that even if the EA440 is turned on, "pinging" is disabled.* **Ping** *is set to Off to prevent transmission. This is for safety reasons.*

Topics

Operation function

The **Operation** function controls the operating mode of the EA440. You can set it to *Inactive*, *Normal* or *Replay*.

How to open

This function is opened from the **Operation** menu.

Description

The EA440 offers several operating modes.

- *Inactive* mode is provided to pause the EA440 operation temporarily.
- *Normal* mode allows the EA440 to transmit ("ping") through the water, and to receive the echoes.
- *Replay* mode allows you to play back previously recorded data.

Click the middle of the **Operation** button to select mode.

Tip

When you set the EA440 to Replay mode, select the **Replay File** *button. The* **Replay File** *dialog box allows you to choose which file(s) to play back. To control the actual playback, use the replay bar. The replay bar opens automatically at the top of the EA440 presentation when you choose Replay mode.*

Note that *Inactive* operating mode is not the same as *Passive* mode. While *Inactive* mode stops both transmission and reception, *Passive* mode will still allow the EA440 to receive echoes. If you wish to switch to *Passive* mode, use the **Normal Operation** dialog box.

The current operational mode is also shown in the **Extras** menu.

Details

Inactive

Select this option to disable the EA440 operation. Neither transmission nor reception will take place. When the EA440 has been disabled using this function, it will stop. The current echoes will be removed from the presentation.

Normal

Select this option to start normal operation. The EA440 will now transmit ("ping"), and then receive the echoes. The information is processed in the Operator Station, and the resulting data are shown in the EA440 presentation.

The EA440 will transmit according to the currently selected "ping" parameters.

Note

The EA440 will transmit ("ping") only if **Ping** *is set to On.*

If you wish to establish a passive system (transmission switched off, but normal reception), use the function offered by the **Normal Operation** dialog box.

Replay

This mode allows you to replay previously recorded data on the EA440. When in *Replay* mode, the EA440 is not able to transmit ("ping"). For this reason, the EA440 is inactive during playback.

Do not confuse the **Record** function with the automatic **History** function. The *History* function saves the echogram images automatically on the Operator Station hard disk These images can be recalled using the *History* information pane. The number of history files is limited. After reaching the maximum number of files, the latest echogram picture overwrites the oldest one. The **Record** function allows you to record raw echo data. Echo data files may be kept for future references. The amount of data you can record is only limited by the size of your storage media.

Tip

The **Replay File** *dialog box allows you to choose the echo data file(s) you wish to play back.*

The **Record RAW** *function allows you to record the unprocessed echo data received by the transducer.*

Related topics

Operation menu, page 225

Extras menu, page 233

Normal Operation dialog box, page 249

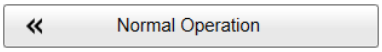
Ping function, page 252

Ping Interval function, page 255

Replay File dialog box, page 371

Normal Operation dialog box

The purpose of the **Normal Operation** dialog box is to provide you with an overview of the current transceiver parameters. It also allows you to change these parameters to match your current operational requirements.

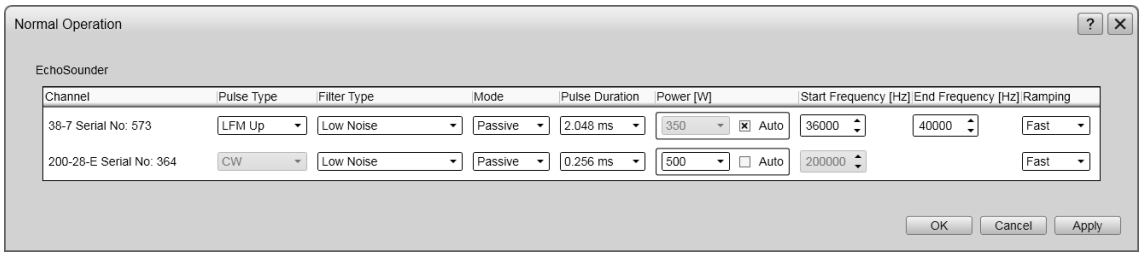


Prerequisites

The **Normal Operation** dialog box is only available when the EA440 operates in *Normal* mode.

How to open

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



Description

The **Normal Operation** dialog box lists all the transmission parameters. The dialog box provides one row for each channel in use. You can change the parameters.

Note

Do not to make any changes unless you are well aware of the consequences.

If you wish to investigate the ambient noise, choose *Passive* mode in the **Normal Operation** dialog box. Any noise or disturbance in the water - within the transducer's frequency range - will then be detected and shown. This feature will for example be able to pick up disturbances from other hydroacoustic systems on your own vessel, or on other vessels in the vicinity.

Details

Channel

This column identifies the channel. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency. The text string provides the following information:

- Transducer name
- Transducer serial number

Pulse Type

The **Pulse Type** function allows you to select the "shape" of the transmitted pulses ("pings").

- CW
- FM

The abbreviation "CW" means "Continuous Wave". "FM" means "Frequency Modulated".

Note

In order to use the frequency sweep ("chirp") functionality, you must use frequency modulated pulses. You must also use a transducer that supports the frequency range.

Mode

This column specifies the current transceiver mode. You can manually select the mode that suits your current operation.

The following modes are available:

- **Active**

  The transmitter and receiver are both active. This is the normal mode for operation.

- **Passive**

  In *Passive* mode, the EA440 will receive and compute the signals detected by the transducer(s). Therefore, this mode is useful for test purposes, and when you want to measure the ambient background noise in the sea. It can also be useful to run the EA440 in *Passive* mode to discriminate between target echoes (present only in *Active* mode) and noise (present in both *Active* and *Passive* modes).

Pulse Duration

The **Pulse Duration** setting specifies the current duration ("length") of the transmitted pulse. You can manually select a pulse duration that suits your operation.

The deeper you wish to see, the longer pulse duration should be selected. Remember that in the EA440, the pulse duration and the bandwidth are mutually dependant.

For CW transmissions:

- Long pulses provides longer detection range. They make the EA440 less sensitive for noise, but offer lower range resolution.
- Short pulses provides shorter detection range. They make the EA440 more sensitive for noise, but offer higher range resolution.

For FM transmissions:

- Long pulses provide longer detection range, and the range resolution is independent of the pulse duration..
- Short pulses provide shorter detection range, and they make the EA440 more sensitive for noise.

Power

The **Power** parameter in the **Normal Operation** dialog box displays the transmitter's output power measured in Watts. You can change the output power manually. Output power is limited either to the maximum rating of the transducer, or the maximum rating of the transmitter, whichever is the smallest. For all practical purposes, this means that you can *reduce* the power output, but you can not increase it to beyond the power rating of the transducer.

By selecting **Auto**, the EA440 automatically adjusts the power according to the current range.

Start/End Frequency

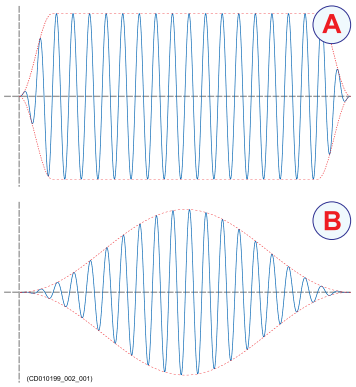
The **Start Frequency** and **End Frequency** parameters are used to set up a frequency sweep ("chirp"). If the parameters for start and end frequencies are unavailable, the transducer used on the relevant channel does not support wideband transmissions. In order to use the frequency sweep ("chirp") functionality, you must use frequency modulated pulses.

Note

It is very important that the transducer you are using complies to the frequencies you choose. The frequency range of each transducer is defined in the transducer setup file. If you choose a frequency range that is not supported, and error message will appear.

Ramping

The **Ramping** parameter provided in the **Normal Operation** dialog box defines how fast the output level of each transmission ("ping") shall increase from 0 V to maximum level. You have two options; *Fast* and *Slow*.



The principle is shown in the illustration. Curve (A) has **Ramping** set to *Fast*, and the level is increased from 0 V to maximum level using from minimum two (2) up to maximum ten (10) cycles. At the end of the pulse, maximum ten down to minimum two cycles are used to reduce the output level.

The number of cycles used depend on the q-factor (bandwidth relative to centre frequency) for the connected transducer. The number of ramping cycles will be upward limited to the number of cycles in half a pulse length.

Curve (B) has **Ramping** set to *Slow*. The output level is increased from 0 V to maximum level using the first half the pulse duration. The second half of the pulse is then used to reduce the output level.

The current setting of this parameter is also shown in the **Extras** menu.

Related topics

Operation menu, page 225

Extras menu, page 233

Operation function, page 247

Ping function

The purpose of the **Ping** function is to enable or disable the EA440 transmissions into the water. Such transmissions are often referred to as "pinging".

Prerequisites

The **Ping** function is only available when the EA440 operates in *Normal* mode.

How to open

This function is opened from the **Operation** menu.

Description

The transmission ("pinging") from the EA440 can be turned on or off. Select the middle of the button to see the choices, or either side to enable or disable transmission. The ping symbol on the right side of the button is also used to transmit single pings.

Once pinging is *On*, use the **Ping Mode** function to choose how often the EA440 will transmit.

Details

On

The EA440 "pings" (transmits) energy into the water. The ping mode if controlled by the **Ping Mode** and **Ping Interval** settings.

Off

The EA440 does not "ping". No transmissions take place. When **Ping** is set to *Off*, the EA440 stops with the current echogram shown.

Tip

If you wish to establish a passive system (transmission switched off, but normal reception), use the function offered by the **Normal Operation** *dialog box.*

If you wish to investigate the ambient noise, choose Passive mode in the **Normal Operation** *dialog box. Any noise or disturbance in the water - within the transducer's frequency range - will then be detected and shown. This feature will for example be able to pick up disturbances from other hydroacoustic systems on your own vessel, or on other vessels in the vicinity.*

Auto Start

The Auto Start function allows the EA440 to start "pinging" automatically when the software program is started.

Two conditions must be present:

- The EA440 installation must be operational with all relevant transceivers and transducers.
- The EA440 was in *Normal* mode the last time you switched it off.

Caution

This function must be used with care. It will start the EA440 even if your vessel is in dry dock.

Related topics

Operation menu, page 225

Operation function, page 247

Ping Mode function, page 254

Ping Interval function, page 255

Related tasks

Defining the ping (transmission) modes, page 91

Ping Mode function

The **Ping Mode** function is used to control how often the EA440 will transmit its energy into the water.

Prerequisites

The **Ping Mode** function is only available when the EA440 operates in *Normal* mode.

How to open

This function is opened from the **Operation** menu.

Description

Once pinging is *On*, use the **Ping Mode** function to choose how often the EA440 will transmit. You use this function to control the *behaviour* of the transmissions ("pinging").

- If you choose *Single Ping*, you can transmit single pings by selecting the ping symbol on the **Ping** button.
- If you choose *Interval*, you must define the time between each ping with the **Ping Interval** function.
- If you choose *Maximum*, the EA440 will transmit ("ping") as often as possible.

Details

Single Ping

This option allows the EA440 to transmit single pings. The EA440 will transmit ("ping") only when you click the right side of the **Ping** button.

Interval

The EA440 transmits ("pings") with a fixed time interval. The time interval (in milliseconds) is chosen with the **Ping Interval** function.

Maximum

The EA440 transmits ("pings") as frequently as possible. The time between each ping ("ping rate") depends mainly on the current range. In some systems, a low performance Operator Station and/or a slow hard disk may reduce the ping rate. How fast your Operator Station communicates with external peripherals may also have an effect on the ping rate.

Related topics

Operation menu, page 225

Ping function, page 252

Related tasks

Defining the ping (transmission) modes, page 91

Ping Interval function

The **Ping Interval** function is used when **Ping Mode** is set to *Interval*. The **Ping Interval** function permits you to choose the time (in milliseconds) between each transmission ("ping").

Prerequisites

The **Ping Interval** function is only available when the EA440 operates in *Normal* mode, and **Ping Mode** is set to *Interval*.

How to open

This function is opened from the **Operation** menu.

Description

Use the **Ping Interval** function to choose the time (in milliseconds) between each transmission ("ping") when **Ping Mode** is set to *Interval*. You can choose any value from 10 ms and upwards.

To change the setting, move the cursor to either side of the button, and observe that the background colour changes. Select [—] on the left side to decrease the value, or select [+] on the right side to increase the value. Select the middle of the button to open it.If you have a keyboard connected to the EA440, you can type the requested value in the text box.

Related topics

Operation menu, page 225

Ping function, page 252

Related tasks

Defining the ping (transmission) modes, page 91

Use Ping Buffer function

The **Use Ping Buffer** function is used to stabilise the ping rate in shallow waters.

Prerequisites

The **Use Ping Buffer** function is only available when the EA440 operates in *Inactive* mode.

How to open

This function is opened from the **Operation** menu.

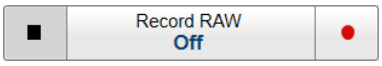
Set **Operation** to **Active** to start using the buffer.

Description

Use the buffer function to get a more stable ping rate in shallow waters up to 200 metres. This function will buffer up to 50 pings.

Record RAW function

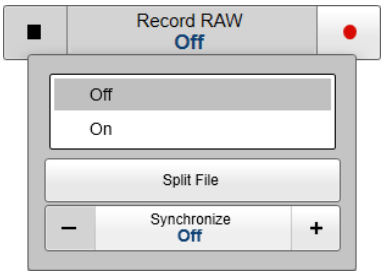
The **Record RAW** function allows you to record the *unprocessed* echo data received by the transducer. You can save to the Operator Station hard disk, or onto an external disk. The data files can be played back on the EA440. You can keep the recorded files for future reference, or for training purposes.



How to open

This function is opened from the **Operation** menu.

Description



The raw data recording function provided by the EA440 allows you to save echo data using the `*.raw` format. By means of the *Replay* function you can later play back the recorded file(s) on the EA440. This may prove useful if more a detailed study of the data is requested. You can also use the file(s) to experiment with the EA440 operational settings, as this will help you to gain more experience. The amount of data you can record is only limited by the size of your storage media.

The **Record RAW** button allows you to start and stop recording, split the current recording file (if it gets too large), and set up the file output parameters. Once all the recording parameters have been defined, you can start recording by clicking the red circle on the button, and stop it by clicking the left rectangle.

Tip

The **Output** *dialog box on the* **Operation** *menu allows you to set up the recording parameters. To define which disks and folders to use to save the data files, select* **File Setup**.

On the EA440 you can record both RAW and processed data using the **Record RAW** and **Record Processed** functions. It may be useful to synchronize these two functions to automatically record all data formats simultaneously. To synchronize the recording functions, open the **Record RAW** button, and set **Synchronize** to *On*. The **Record Processed** button is then inhibited, and you can start and stop all recording by means of the **Record RAW** button.

Note

Raw data files will normally become very large. If you wish to record large amounts of EA440 data, make sure that you have enough space on your hard disk. Unless your Operator Station is equipped with a very large disk, we recommend that you save the data to an external storage device.

To change the file and folder parameters, open the **Output** dialog box on the **Operation** menu, and select **File Setup**.

Ways to start and stop recording

On the EA440, you can start and stop data recording in several ways.

- On the **Operation** menu, select the red circle in the **Record** button to start recording.
- Select the middle of the **Record** button to open it, and select *On* or *Off*.

The **Record** indicator on the top bar will switch to red colour when recording is active.

Details

On/Off

You can use the **Record RAW** button menu to start and stop recording. Click the middle of the button to open it, and select *On* or *Off*. For faster control, use the right and left side of the **Record RAW** button. To start recording, click the red circle on the right side. To stop recording, click the black rectangle on the left side.

Note

We recommend that you set up all the necessary recording parameters before you start data recording. To do this, use the settings on the **File Setup** *page in the* **Output** *dialog box.*

Split File

During recording, you can click this command at regular intervals. Every time you do so, the current recording file will be terminated, and a new file will be started. In this way you can manually control the size of each recorded file.

Synchronize

On the EA440 you can record both RAW and processed data using the **Record RAW** and **Record Processed** functions. It may be useful to synchronize these two functions to automatically record all data formats simultaneously. To synchronize the recording functions, click **Synchronize** and set it to *On*. The **Record Processed** button is then inhibited, and you can start and stop all recording by means of the **Record RAW** button.

Related tasks

Choosing which echo data file(s) to replay, page 79

Recording raw data, page 76

Related topics

File Setup page, page 262

Output dialog box, page 260

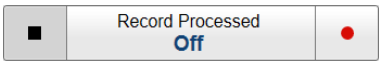
Record Processed function, page 258

Replay File dialog box, page 371

Datagram formats, page 387

Record Processed function

The **Record Processed** function allows you to record the *processed* echo data received by the transducer. Which processing to apply is controlled by the **Processed Data Output** settings in the **Output** dialog box.



How to open

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

Description

You can set up the EA440to record the processed echogram information on the internal hard disk, or other recordable media. These files may be kept for future references.

The **Record Processed** button allows you to start and stop recording, split the current recording file (if it gets too large), and set up the file output parameters. Once all the recording parameters have been defined, you can start recording by clicking the red circle on the button, and stop it by clicking the left rectangle.

Tip

The **Output** *dialog box on the* **Operation** *menu allows you to set up the recording parameters. To define which disks and folders to use to save the data files, select* **File Setup**. *To choose which processed data formats to record, select* **Processed Data Output**.

On the EA440 you can record both RAW and processed data using the **Record RAW** and **Record Processed** functions. It may be useful to synchronize these two functions to automatically record all data formats simultaneously.

To synchronize the recording functions, open the **Record RAW** button, and set **Synchronize** to *On*. The **Record Processed** button is then inhibited, and you can start and stop all recording by means of the **Record RAW** button.

Note

Data files will normally become very large. If you wish to record large amounts of EA440 data, make sure that you have enough space on your hard disk. Unless your Operator Station is equipped with a very large disk, we recommend that you save the data to an external storage device.

Details

On/Off

You can use the **Record Processed** button menu to start and stop recording. Click the middle of the button to open it, and select *On* or *Off*.

For faster control, use the right and left side of the **Record Processed** button. To start recording, select the red circle on the right side. To stop recording, select the black rectangle on the left side.

Processed data formats

The following processed data output formats are available.

- **XTF**

  XTF means *eXtended Triton Format*. This is a file format for recording various types of hydrographic survey data. The source systems include sidescan sonar, shallow seismic and multibeam bathymetry, as well as associated position and altitude information. Note that a navigation input must be available.

- **SEGY**

  The SEGY (sometimes abbreviated "SEG-Y") file format is one of several standards developed by the *Society of Exploration Geophysicists (SEG)* for storing geophysical data. It is an open standard, and is controlled by the SEG Technical Standards Committee. For more information, see http://community.seg.org. Note that a navigation input must be available.

- **XYZ**

  This is processed and interpolated "xyz" data in ASCII format. Note that a navigation input must be available.

- **Echogram**

  This is the proprietary **EK500** datagram format. The datagrams consists of user defined excerpts of the processed sample data (pixel data), ie the backscatter value of the targets. The echograms are stored as time tagged datagrams in separate files.

- **EA400**

  This is the proprietary format that was originally created for the EA400 echo sounder.

- **SILAS**

  This is a proprietary format that was created for the SILAS software.

- **Out**

  This is a proprietary format.

- **TIFF**

  The Tagged Image File Format output creates an image every 1000 pings. If you stop recording before 1000 pings you will still get an image.

Related tasks

Choosing which echo data file(s) to replay, page 79

Recording processed data, page 83

Related topics

Output dialog box, page 260

Processed Data Output page, page 269

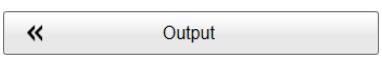
Record RAW function, page 256

Replay File dialog box, page 371

Datagram formats, page 387

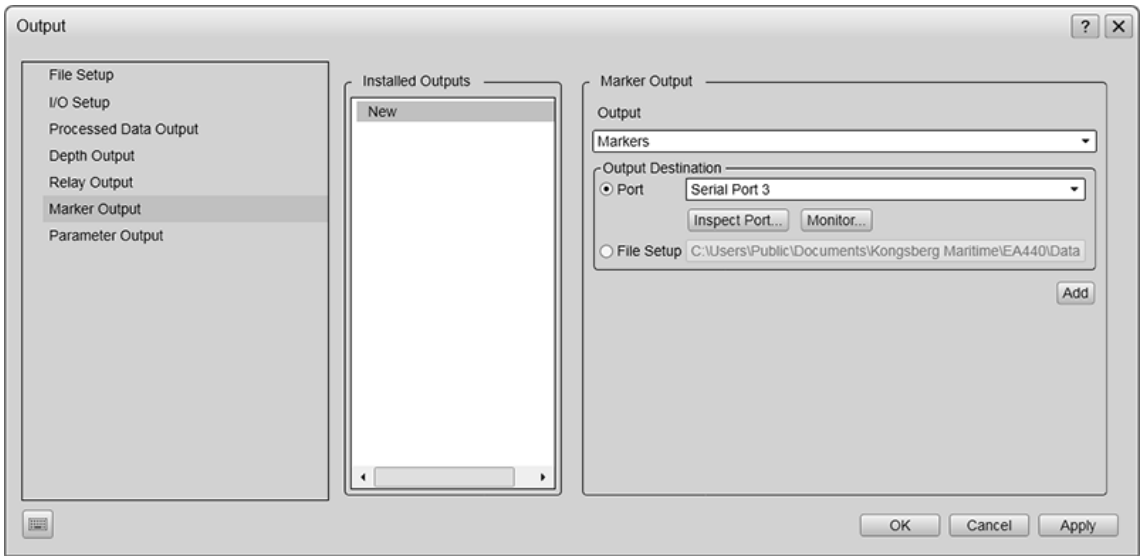
Output dialog box

A key function of the EA440 is its ability to export data. The purpose of the **Output** dialog box is to collect all functionality related to EA440 data output in one easily accessible location.



How to open

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



Description

The **Output** dialog box offers a menu on the left side, and several pages for parameters on the right side. When outputs are added to the EA440 configuration, these are also added as collapsible items on the menu.

Tip

The **I/O Setup** *page can also be opened from the* **Installation** *dialog box. The* **Installation** *dialog box is located on the* **Setup** *menu.*

The **Output** dialog box is not available when your EA440 is set to *Inactive* mode.

The following pages are provided.

- **File Setup**

  The **File Setup** parameters control how and where the recorded files are saved on the Operator Station hard disk, or on an external disk.

  File Setup page, page 262

- **I/O Setup**

  The EA440 software automatically scans the Operator Station to locate and identify the available communication ports. Once the software has established a list of valid interfaces, you can set up and control the communication parameters.

  I/O Setup page, page 265

- **Processed Data Output**

  The purpose of the **Processed Data Output** page is to define which processed data formats to export, and whereto place the files.

  Processed Data Output page, page 269

- **Depth Output**

The EA440 can export depth information on a dedicated communication port (serial or Ethernet) The **Depth Output** page is used to set up the output parameters.

Depth Output page, page 272

- **Relay Output**

  The EA440 allows you to export the same sensor data that was originally imported. The **Relay Output** page is used to set up and control this export functionality.

  Relay Output page, page 275

- **Marker output**

  The parameters on the **Marker output** page allow you to export the current geographical reference markers to a communication port or a file.

  Marker output page, page 277

- **Parameter Output**

  The parameters can be sent to a file or directly to a port.

  Parameter Output page, page 279

Related topics

Record Processed function, page 258

Record RAW function, page 256

Related tasks

System setup and software installation procedures, page 151

File Setup page

A key function of the EA440 is it ability to record echo data. To retrieve the data files, you need to know where they are, and which file names that have been used. The purpose of the **File Setup** settings is to define the file and folder properties for the echo data files that you are recording. You can select the disk and folder for the files, you can define the maximum file size, and you can choose a prefix for the file names.

Prerequisites

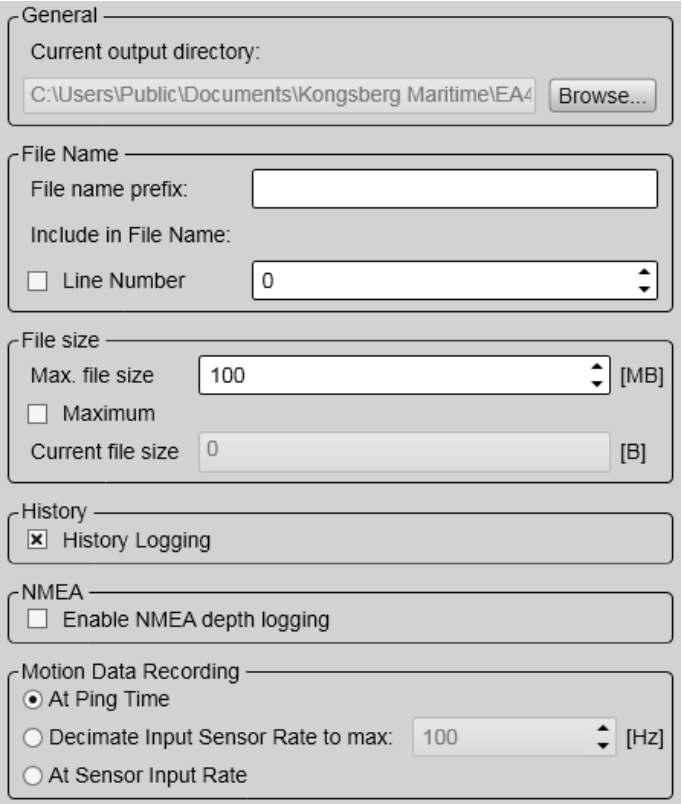
The **Output** dialog box is not available when your EA440 is set to *Inactive* mode.

How to open

This page is located in the **Output** dialog box. To open, select it on the **Operation** menu.

Description

The **File Setup** parameters control how and where the recorded files are saved on the Operator Station hard disk, or on an external disk. By adding a file name prefix, you can also identify files recorded from any specific mission or survey. You can also define a maximum size of the data files.



Tip

Set up the file and folder parameters before you start the recording. If you wish to save your recorded data on an external hard disk, make sure that it is connected to the Operator Station.

If the current file size gets too big during recording, use the **File Setup** *function on the* **Record RAW** *button. This will close the current file, and then automatically continue recording to a new file.* **Record RAW** *is located on the* **Operation** *menu.*

Details

Current Output Directory

This text box shows you the file path that is currently used to store the data files. Select **Browse** to choose a different output directory (folder) to store the files. A standard operating system dialog box is used. You are also permitted to create a new folder.

Note

In order to change the output directory, both **Record RAW** *and* **Record Processed** *recording must be set to Off.*

File Name Prefix

You may find it useful to use a common file name prefix to identify all the recorded files from a specific mission, survey or trip. Type any text into the box. The chosen name will be used as prefix on all the file names. Observe the file name limitations in the operating system.

Include in File Name

Include the line number in the file name. The line number comes before the file name prefix and the files will be sorted according to line numbers.

Max(imum) File Size

Define a limit for the maximum amount of bytes to be contained in one data file. A value of 0 (zero) means that the file size is limited to 1 Gb.

Data files will normally become very large. If you wish to record large amounts of EA440 data, make sure that you have enough space on your hard disk. The EA440 is not provided with unlimited disk capacity. We recommend that you either save the data files to an external storage device, or use a network disk.

Select the **Maximum** check box for 1 Gb file size.

Current File Size

The current size of the RAW data file is displayed during data recording. If the current file size gets too big during recording, use the **File Setup** function on the **Record RAW** button. **Record RAW** is located on the **Operation** menu.

History Logging

The *History* function saves the echogram images automatically on the Operator Station hard disk These images can be recalled using the *History* information pane. The information in the *History* presentation is the same as on the original echogram presentation.

Every time the *History* file is saved to the hard disk, the pinging may be interrupted. It is therefore possible to disable the *History* function.

Note

If you open the History information pane while history logging is disabled, the information presented reflects the latest echoes recorded before the logging was disabled. When history logging is enabled after some time, you will have a "hole" in the ping sequence.

NMEA depth logging

Select the **Enable NMEA depth logging** check box for adding the DPT datagram to the raw files.

Motion Data Recording

When the EA440 receives motion data from a sensor, these data will typically be refreshed at 100 Hz. The motion data are always included in the raw data for every ping. The **Motion Data Recording** function allows you to control how often the motion data are saved in the raw data file.

- **At Ping Time**: The motion data are saved for every ping.
- **Decimate Input Sensor Rate to max**: The motion data are decimated, and are saved at the chosen rate.
- **At Sensor Input Rate**: The motion data are saved every time information is provided by the sensor.

If motion data is saved more often than every ping, the additional information are saved in the MRU0 datagram.

Return to...

Output dialog box, page 260

Related topics

History information pane description, page 196

Record RAW function, page 256

Processed Data Output page, page 269

Depth Output page, page 272

I/O Setup page

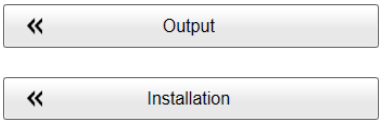
In order to communicate with peripheral devices, the Operator Station offers several serial and/or Ethernet (LAN) ports. The number of communication ports depends on how your Operator Station is set up and configured. The **I/O Setup** settings allow you to define which information is imported by the Operator Station. For each port, you can set up the communication parameters, and monitor the data flow.

Prerequisites

The **Installation** dialog box is not available when your EA440 is set to *Replay* mode. The **Output** dialog box is not available when your EA440 is set to *Inactive* mode.

How to open

This page is located in the **Installation** dialog box. This page is also located in the **Output** dialog box. To open, make a selection on the **Operation** or **Setup** menus.



Description

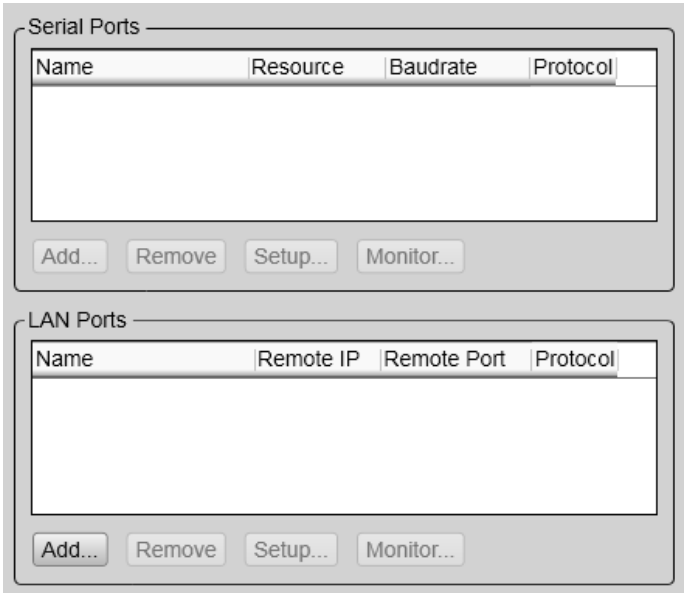
The EA440 software automatically scans the Operator Station to locate and identify the available communication ports.

Once the software has established a list of valid interfaces, you can set up and control the communication parameters. The **I/O Setup** page provides two lists; one for serial ports and one for Ethernet (LAN) ports. Each list is supported with a set of functions to set up and monitor the communication ports. Select the port you want to work with and then select one of the buttons below the list.

Note

*You can define all your EA440 inputs using the **I/O Setup** settings, but not the outputs. To control the data export, use the* **Output** *dialog box. The* **Output** *dialog box is located on the* **Operation** *menu.*

Details



Serial Ports

This table shows the available serial ports on the Operator Station. The list is automatically populated the first time you open **I/O Setup** after a EA440 software installation. It then reflects the initial number of serial ports available on the Operator Station. If you add interface hardware to your Operator Station, you must select **Add** to add the new ports to the list. You can have a maximum of 24 serial ports in the EA440 system.

- **Name**

  This is the given identity of the serial port. By default, the ports are numbered.

- **Resource**

  The Operator Station may have several serial ports. This is the communication port identification. The ports are normally named COM1, COM2, etc.

- **Baud Rate**

  This is the current baud rate specified for the serial line. The communication parameters defined for **NMEA 0183** are:

  – **Baud Rate**: 4800 b/s

  – **Data Bits**: 8

  – **Parity**: None

  – **Stop Bits**: 1

  Some instruments may offer other parameters and/or options. You must always check the relevant documentation provided by the manufacturer.

- **Protocol**

  This is the current protocol specified for the port. Each port can receive multiple datagrams simultaneously, provided that they all use the same protocol. However, only one peripheral device can be physically connected to the port. If you want to connect several peripheral devices to a single serial port, you must route them through a "mixer". This can be a hardware unit or a computer (with relevant software) collecting and streaming the datagrams.

LAN Ports

This table shows the available Ethernet (LAN) ports on the Operator Station. Each Ethernet adapter on your Operator Station supports any number of network ports. To add a new port, select **Add** under the table.

Ports that have not been initiated correctly have a red background colour.

- **Name**

  This is the given identity of the network (LAN) port. By default, the ports are numbered.

- **Remote IP Address**

  This is the Internet Protocol (IP) address for a peripheral device. If the data communication between your Operator Station and the peripheral device is set up to only import data from the device, the remote IP address is not required. If you want to export information from the Operator Station to one or more peripheral devices (*broadcast*), set **Remote IP Address** to 255.255.255.255. This is the default setting. If you use *point-to-point* communication in a closed network, you need to set the remote IP address manually.

- **Remote Port**

  The **Remote Port** is important if you want to export information from the Operator Station to a peripheral device on the local area network (LAN). The application on the peripheral device will "listen" to this port number.

If you want to establish point-to-point communication for data import from a peripheral device on the network, you may need to define the network port on this device.

To find the port number, consult the documentation for the device, and/or the application to be used on it. In most cases, this peripheral device is another computer on a local area network.

- **Protocol**

  This is the current protocol specified for the port. Each port can receive multiple datagrams simultaneously, provided that they all use the same protocol.

Add

Select this button to add a new port. This is required if you have added new hardware to the Operator Station, for example by installing an extra interface adapter. If you have previously released an unused port, but want to bring it back to EA440 use, you must also select this button.

If you try to add a serial port, the button will be disabled if your Operator Station has no more serial ports. If one or more serial ports are available, you can select a port in the dialog box that opens.

Remove

Select this button to delete a port.

Once the EA440 has identified and listed all the available serial ports and LAN ports on the Operator Station, they cannot be used by any other software. If the EA440 does not need a specific port, it can be released for other use. Click the applicable port to select it, then select **Remove** to delete the port from the list.

Note

No acknowledgement is required; the port is removed instantly.

Setup

In order to use a serial port or LAN (Ethernet) port to receive or transmit information, its communication parameters must be set up to match the peripheral device. Select one of the listed ports and then **Setup** under the table to set up the port parameters. A dedicated dialog box opens for you to change or accept the settings.

The communication parameters defined for **NMEA 0183** are:

- **Baud Rate**: 4800 b/s
- **Data Bits**: 8
- **Parity**: None
- **Stop Bits**: 1

Some instruments may offer other parameters and/or options. You must always check the relevant documentation provided by the manufacturer.

Monitor

If you suspect that a serial port or LAN port is ineffective, faulty or missing, you can monitor the flow of datagrams. Select one of the listed ports and then **Monitor** to observe the data communication. The **Port Monitor** dialog box opens.

Return to...

Installation dialog box, page 300

Output dialog box, page 260

Related topics

Depth Output page, page 272

Relay Output page, page 275

Water Column page, page 297

Installation dialog box, page 300

LAN Port Setup dialog box, page 361

Serial Port Setup dialog box, page 363

Add Serial Port dialog box, page 365

Port Monitor dialog box, page 366

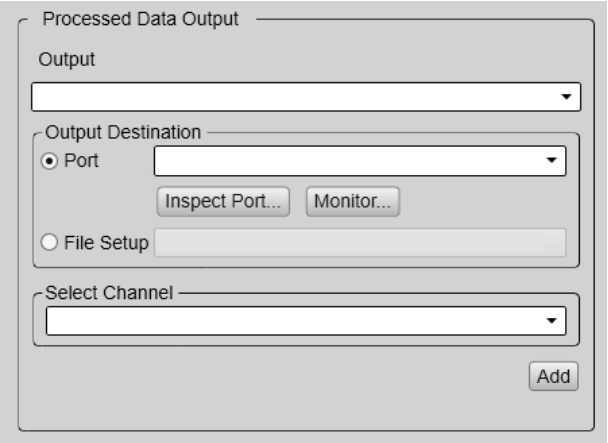
Processed Data Output page

The purpose of the **Processed Data Output** page is to define which processed data formats to export, and whereto place the files.

How to open

This page is located in the **Output** dialog box. To open, select it on the **Operation** menu.

Description



Several output formats are available. Select the output type from the list, select where to send the information, and which channel to export the data from. Select **Add** to save your choices.

Note

Raw data files will normally become very large. If you wish to record large amounts of EA440 data, make sure that you have enough space on your hard disk. Unless your Operator Station is equipped with a very large disk, we recommend that you save the data to an external storage device.

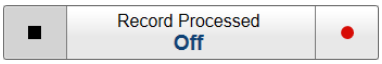
Once an output type has been defined, it is listed in the **Installed Outputs** box on the left side of the page. To remove or edit an output type, select it in the **Installed Outputs** box. Select **Edit** to change the settings. Select **Remove** to delete the output.

Tip

You can export several output types simultaneously. Each is saved in a separate file.

Starting and stopping recording processed data

To start and stop recording of processed data, use the **Record Processed** function on the **Operation** menu.



Details

Installed Outputs

The **Installed Outputs** box lists all the currently selected outputs. To remove or edit an output type, select it in the **Installed Outputs** box.

- Select **Remove** to delete the output.
- Select **Edit** to change the settings.
- Select **New** to add a new output.

Output

Select which datagram format to export. Several formats are available.

- **XTF**

  XTF means *eXtended Triton Format*. This is a file format for recording various types of hydrographic survey data. The source systems include sidescan sonar, shallow seismic and multibeam bathymetry, as well as associated position and altitude information. Note that a navigation input must be available.

- **SEGY**

  The SEGY (sometimes abbreviated "SEG-Y") file format is one of several standards developed by the *Society of Exploration Geophysicists (SEG)* for storing geophysical data. It is an open standard, and is controlled by the SEG Technical Standards Committee. For more information, see http://community.seg.org. Note that a navigation input must be available.

- **XYZ**

  This is processed and interpolated "xyz" data in ASCII format. Note that a navigation input must be available.

- **Echogram**

  This is the proprietary **EK500** datagram format. The datagrams consists of user defined excerpts of the processed sample data (pixel data), ie the backscatter value of the targets. The echograms are stored as time tagged datagrams in separate files.

- **EA400**

  This is the proprietary format that was originally created for the EA400 echo sounder.

- **SILAS**

  This is a proprietary format that was created for the SILAS software.

- **Out**

  This is a proprietary format.

- **TIFF**

  The Tagged Image File Format output creates an image every 1000 pings. If you stop recording before 1000 pings you will still get an image.

Output Destination

This field shows you the chosen export folder for the data files. You are not permitted to change the disk or folder here. If you need to change the disk and/or folder location, select **File Setup** in the **Output** dialog box.

The Echogram, EA400 and SILAS output formats allow you to select a serial or LAN port as the destination.

Select Vertical Channel for depth value

Select from which channel you wish to export the data from. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

The text string identifies the channel using the following information:

- Transducer name
- Transducer serial number

Add

Select **Add** to start export of the chosen data format. Once an output type has been defined, it is listed in the **Installed Outputs** box on the left side of the page.

Remove

Once an output type has been defined, it is listed in the **Installed Outputs** box on the left side of the page. To remove the output, select the relevant format in the **Installed Outputs** box, and then select **Remove**.

Edit

Once an output type has been defined, it is listed in the **Installed Outputs** box on the left side of the page. To edit the settings of a specific output, select it in the **Installed Outputs** box, and then select **Edit**.

Once you have finished editing the output settings, select **Save** to keep the changes.

Save

Once you have finished editing the output settings, select **Save** to keep the changes.

Return to...

Output dialog box, page 260

Related topics

Record Processed function, page 258

File Setup page, page 262

Depth Output page

The EA440 can export depth information on a dedicated communication port (serial or Ethernet) The **Depth Output** page is used to set up the output parameters.

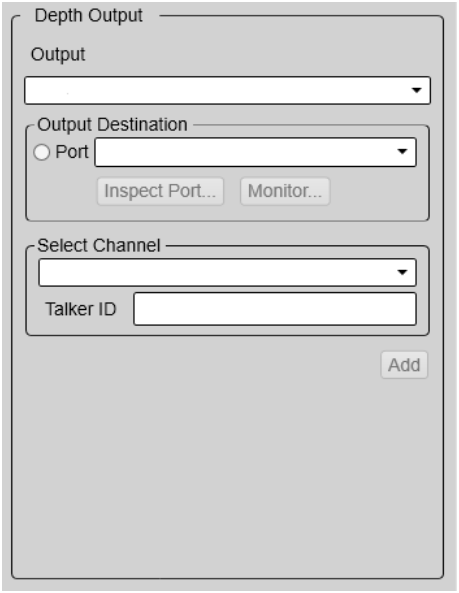
Prerequisites

The **Output** dialog box is not available when your EA440 is set to *Inactive* mode.

How to open

This page is located in the **Output** dialog box. To open, select it on the **Operation** menu.

Description



The **Depth Output** settings allow you to define which port (serial or Ethernet) to use when exporting depth information. You must specify which datagram format(s) to use. The EA440 can export the depth information on more than one communication port.

The EA440 can export the depth information on several NMEA datagram formats. Proprietary formats are also supported. You can export several depth formats simultaneously, as each of them is handled independently.

Once an output type has been defined, it is listed in the **Installed Outputs** box on the left side of the page. To remove or edit an output type, select it in the **Installed Outputs** box. Select **Edit** to change the settings. Select **Remove** to delete the output.

Note

You can not define the communication port parameters here. If you need to adjust these, you must select **I/O Setup** *after you have defined the data output parameters. The* **I/O Setup** *page is located in the* **Installation** *and* **Output** *dialog boxes.*

Details

Installed Outputs

The **Installed Outputs** box lists all the currently selected outputs. To remove or edit an output type, select it in the **Installed Outputs** box.

- Select **Remove** to delete the output.
- Select **Edit** to change the settings.
- Select **New** to add a new output.

Output

Select which datagram format to export.

Output Destination

You can export the data on a communication port (serial or LAN) on the Operator Station.

- **Port**: Select **Port** if you wish to send the information to a communication port on your Operator Station. Select which serial or LAN port to use for the output data.

- **Inspect Port**: Once you have selected a serial or Ethernet communication port, select **Inspect Port** to inspect the current port parameters. The relevant port setup dialog box opens. You are not permitted to make any changes.

  You can not define the communication port parameters here. If you need to adjust these, you must select **I/O Setup** after you have defined the data output parameters. The **I/O Setup** page is located in the **Installation** and **Output** dialog boxes.

- **Monitor**: Select **Monitor** to open the **Port Monitor** dialog box. The **Port Monitor** dialog box allows you to study the communication stream on the chosen serial line or LAN port.

Select Channel

Select from which channel you wish to export the data from. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

Talker ID

If you want to specify a dedicated Talker ID on the datagram format, it can be defined here.

Example

```
$ESDBT,x.x,f,y.y,M,z.z,F*hh<CR><LF>
```

In this NMEA depth datagram, the Talker ID is "ES", which means "echo sounder".

Tip

If you do not have a computer keyboard connected to your EA440 system, select the **Keyboard** *button to open an on-screen keyboard.*

Add

Select **Add** to start export of the chosen data format. Once an output type has been defined, it is listed in the **Installed Outputs** box on the left side of the page.

Remove

Once an output type has been defined, it is listed in the **Installed Outputs** box on the left side of the page. To remove the output, select the relevant format in the **Installed Outputs** box, and then select **Remove**.

Edit

Once an output type has been defined, it is listed in the **Installed Outputs** box on the left side of the page. To edit the settings of a specific output, select it in the **Installed Outputs** box, and then select **Edit**.

Once you have finished editing the output settings, select **Save** to keep the changes.

Save

Once you have finished editing the output settings, select **Save** to keep the changes.

Return to...

Output dialog box, page 260

Related topics

File Setup page, page 262

I/O Setup page, page 265

Relay Output page

The EA440 allows you to export the same sensor data that was originally imported. This can "reuse" the same information on other systems. The **Relay Output** page is used to set up and control this export functionality.

Prerequisites

The **Output** dialog box is not available when your EA440 is set to *Inactive* mode.

How to open

This page is located in the **Output** dialog box. To open, select it on the **Operation** menu.

Description

The information imported to the EA440 from various sensors can also be useful for other systems on board your vessel. The EA440 allows you to "re-export" this sensor information. When activated, the selected sensor information is sent out on the chosen communication port (serial or LAN) on the Operator Station.

The following sensor data can be exported:

- Navigation
- Motion sensor

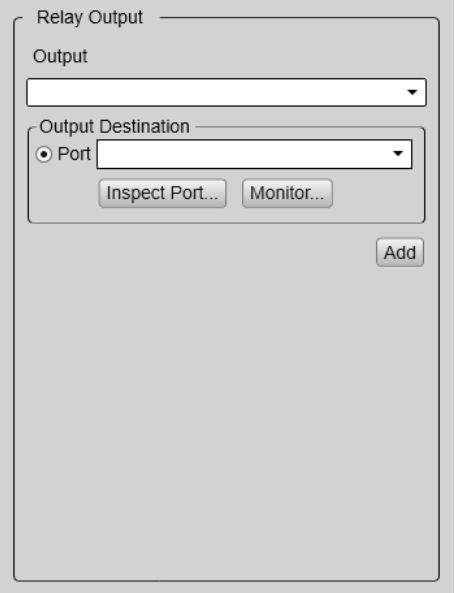
Once an output type has been defined, it is listed in the **Installed Outputs** box on the left side of the page. To remove or edit an output type, select it in the **Installed Outputs** box. Select **Edit** to change the settings. Select **Remove** to delete the output.

Note

In this context, the phrase "sensor" is used to describe an external device providing information that is useful or essential for EA440 operation. Typical sensors are those providing navigational information (heading, speed or geographical position) or vessel movements in the sea (motion sensors).

You can not define the communication port parameters here. If you need to adjust these, you must select **I/O Setup** after you have defined the data output parameters. The **I/O Setup** page is located in the **Installation** and **Output** dialog boxes.

Details



Installed Outputs

The **Installed Outputs** box lists all the currently selected outputs. To remove or edit an output type, select it in the **Installed Outputs** box.

- Select **Remove** to delete the output.
- Select **Edit** to change the settings.
- Select **New** to add a new output.

Output

Select which information to export. The following sensor data can be exported:

- Navigation
- Motion sensor

Output Destination

You can export the data on a communication port (serial or LAN) on the Operator Station.

- **Port**: Select **Port** if you wish to send the information to a communication port on your Operator Station. Select which serial or LAN port to use for the output data.
- **Inspect Port**: Once you have selected a serial or Ethernet communication port, select **Inspect Port** to inspect the current port parameters. The relevant port setup dialog box opens. You are not permitted to make any changes.

  You can not define the communication port parameters here. If you need to adjust these, you must select **I/O Setup** after you have defined the data output parameters. The **I/O Setup** page is located in the **Installation** and **Output** dialog boxes.
- **Monitor**: Select **Monitor** to open the **Port Monitor** dialog box. The **Port Monitor** dialog box allows you to study the communication stream on the chosen serial line or LAN port.

Add

Select **Add** to start export of the chosen data format. Once an output type has been defined, it is listed in the **Installed Outputs** box on the left side of the page.

Remove

Once an output type has been defined, it is listed in the **Installed Outputs** box on the left side of the page. To remove the output, select the relevant format in the **Installed Outputs** box, and then select **Remove**.

Edit

Once an output type has been defined, it is listed in the **Installed Outputs** box on the left side of the page. To edit the settings of a specific output, select it in the **Installed Outputs** box, and then select **Edit**. Once you have finished editing the output settings, select **Save** to keep the changes.

Save

Once you have finished editing the output settings, select **Save** to keep the changes.

Return to...

Output dialog box, page 260

Related tasks

Exporting sensor data to a peripheral system, page 145

Interfacing peripheral equipment, page 135

Related topics

I/O Setup page, page 265

Marker output page

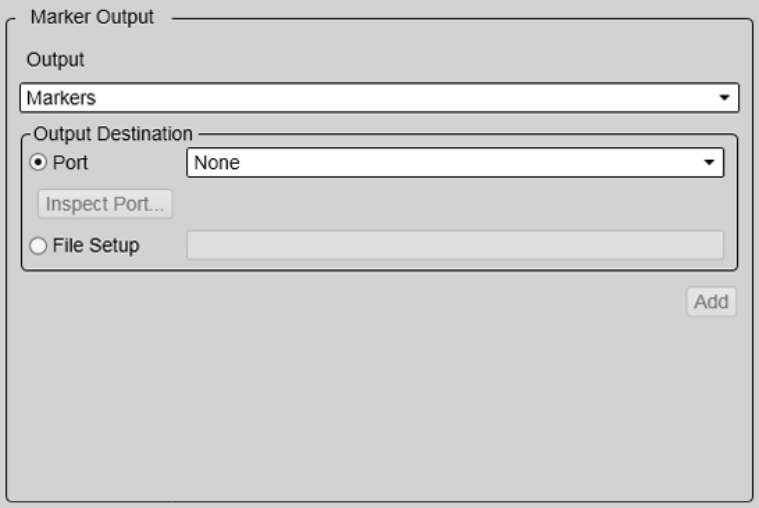
The parameters on the **Marker output** page allow you to export the current geographical reference markers to a communication port or a file.

Prerequisites

The **Output** dialog box is not available when your EA440 is set to *Inactive* mode.

How to open

This page is located in the **Output** dialog box. To open, select it on the **Operation** menu.



Description

The EA440 allows you to define markers on the echogram.

Details

Installed Outputs

The **Installed Outputs** area lists all the currently installed outputs. Select the installed output to edit the properties or to remove it. Select **New** to add an output.

Output

Select which marker type to export.

Output Destination

You can export the data on a communication port (serial or LAN) on the Operator Station.

- **Port**

  Select **Port** if you wish to send the information to a communication port on your Operator Station. Select which serial or LAN port to use for the output data.

- **Inspect Port**

  Once you have selected a serial or Ethernet communication port, select **Inspect Port** to inspect the current port parameters. The relevant port setup dialog box opens. You are not permitted to make any changes.

  You can not define the communication port parameters here. If you need to adjust these, you must select **I/O Setup** after you have defined the data output parameters. The **I/O Setup** page is located in the **Installation** and **Output** dialog boxes.

- **File Setup**

  Select **File Setup** if you wish to send the information to a file. You are not permitted to change the folder here.

Tip

If you need to change the disk and/or folder location, select **File Setup** *in the* **Outputs** *dialog box.*

Add

Select to enable export of the chosen marker type.

Edit

Information that has been defined for export is listed in the **Installed Outputs** area. To see the relevant output parameters, select the menu entry. Select **Edit** to change the settings.

Remove

Information that has been defined for export is listed in the installed outputs area. To see the relevant output parameters, click the menu entry. The **Remove** button will stop the current information from being exported.

Return to...

Output dialog box, page 260

Related tasks

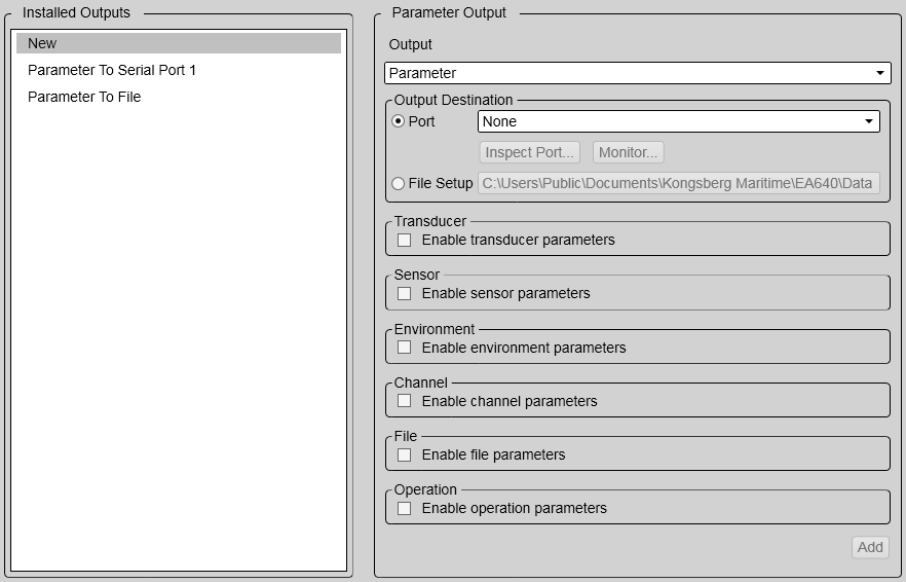
Adding comments and annotations to the echograms, page 101

Parameter Output page

The parameters can be sent to a file or directly to a port. Select which parameters you want update on.

How to open

This page is located in the **Output** dialog box. To open, select it on the **Operation** menu.



Description

Use this page to select which output type to log.

When you open the exported file, you might see that some parameters have a gray background. This indicates that these parameters just have changed.

Details

Installed Outputs

The **Installed Outputs** area lists all the currently installed outputs. Select the installed output to edit the properties or to remove it. Select **New** to add an output.

Output Destination

You can export the data on a communication port (serial or LAN) on the Operator Station.

- **Port**

  Select **Port** if you wish to send the information to a communication port on your Operator Station. Select which serial or LAN port to use for the output data.

- **Inspect Port**

  Once you have selected a serial or Ethernet communication port, select **Inspect Port** to inspect the current port parameters. The relevant port setup dialog box opens. You are not permitted to make any changes.

  You can not define the communication port parameters here. If you need to adjust these, you must select **I/O Setup** after you have defined the data output parameters. The **I/O Setup** page is located in the **Installation** and **Output** dialog boxes.

- **File Setup**

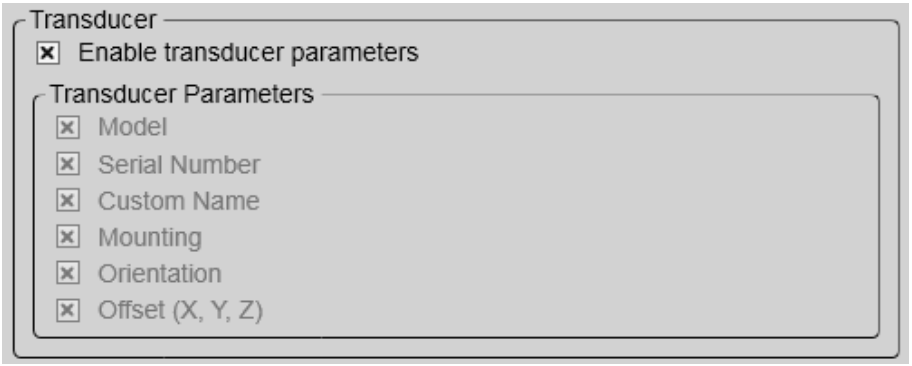
Select **File Setup** if you wish to send the information to a file. You are not permitted to change the folder here.

Tip

If you need to change the disk and/or folder location, select **File Setup** *in the* **Outputs** *dialog box.*

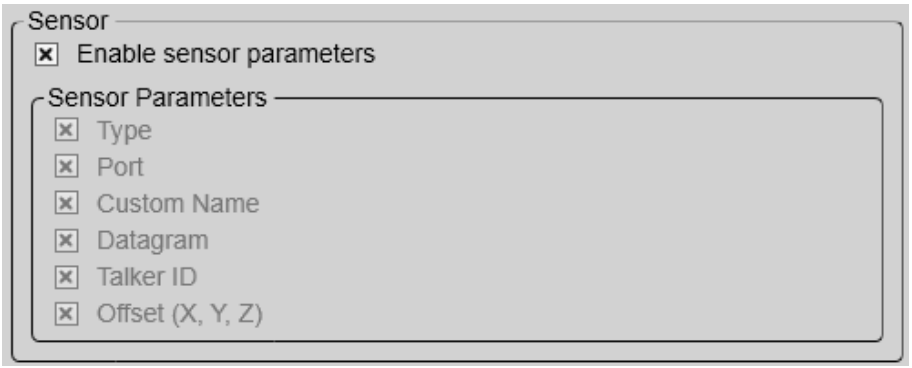
Transducer

Select **Transducer** to log these parameters.



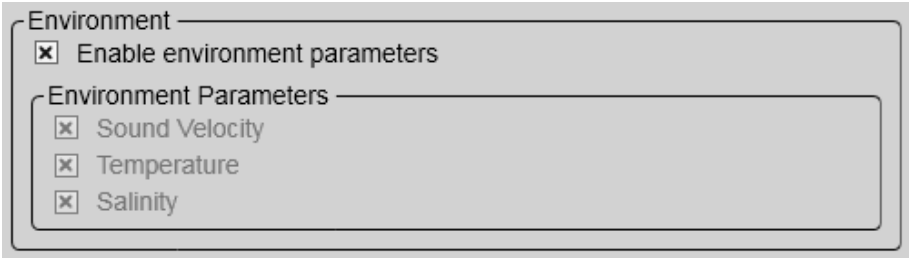
Sensor

Select **Sensor** to log these parameters.



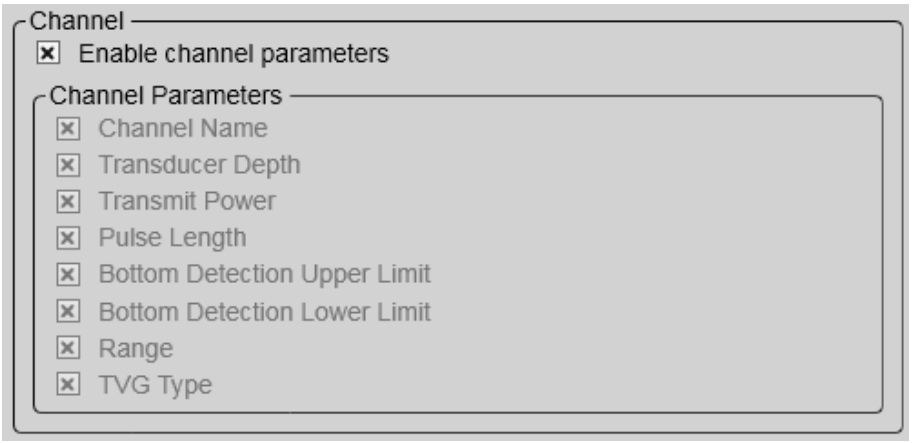
Environment

Select **Environment** to log these parameters.



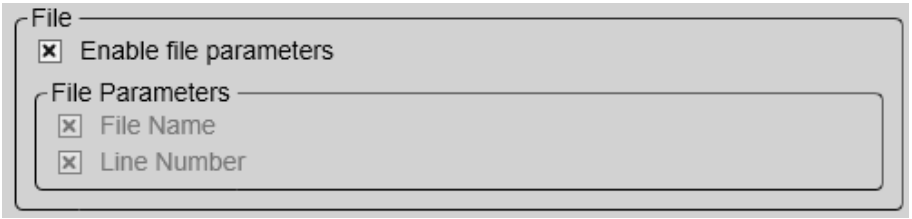
Channel

Select **Channel** to log these parameters.



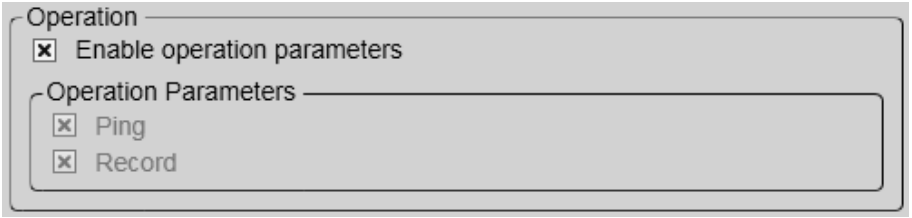
File

Select **File** to log these parameters.



Operation

Select **Operation** to log these parameters.



Add

Select **Add** to enable export of the parameters.

Remove

Once an output type has been defined, it is listed in the **Installed Outputs** box on the left side of the page. To remove the output, select the relevant format in the **Installed Outputs** box, and then select **Remove**.

Output

Select the output parameter.

Edit

Information that has been defined for export is listed in the **Installed Outputs** area. To see the relevant output parameters, select the menu entry. Select **Edit** to change the settings.

Return to...

Output dialog box, page 260

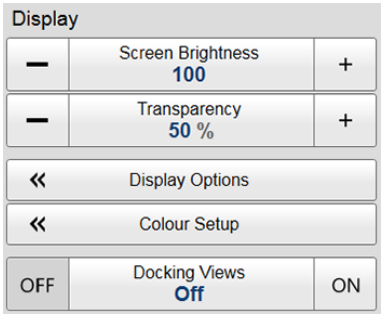
Display menu; Functions and dialog boxes

The **Display** menu provides basic functions related to the screen behaviour and presentation of EA440 data.

How to open

Select the **Display** icon.

The icon is located under the **Main** menu. Select the icon one more time to close the menu.



Topics

Screen Brightness function, page 284

Transparency function, page 285

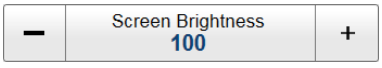
Display Options dialog box, page 286

Colour Setup dialog box, page 291

Docking Views function, page 293

Screen Brightness function

The intensity of the light given off by the EA440 presentation can be adjusted. You can use this function to increase or decrease the light from the screen to match the ambient light.



How to open

This function is opened from the **Display** menu.

Description

When the bridge is dark, the light emitted by the EA440 display can affect your night vision. In order to compensate for this, you can reduce the intensity The **Screen Brightness** function allows you to reduce the brightness, and hence make the presentation darker. The intensity of light emitted by the display can be reduced from 100% to 0% in steps of 10.

Note

If you wish to adjust the colour intensity and/or colour scheme of the EA440 presentation, you can also try the **Palette** *function in the* **Colour Setup** *dialog box.*

To change the setting, move the cursor to either side of the button, and observe that the background colour changes. Select [—] on the left side to decrease the value, or select [+] on the right side to increase the value. Select the middle of the button to open it.If you have a keyboard connected to the EA440, you can type the requested value in the text box.

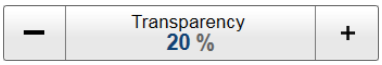
Related tasks

Reducing the light emitted from the display presentation, page 118

Increasing the visibility of the information panes, page 119

Transparency function

When you open an information pane, you will see that it is transparent. This transparency allows you to see the echograms data behind the pane, but it may also reduce the visibility of the information in it. The transparency can be adjusted.



How to open

This function is opened from the **Display** menu.

Description

The information panes provided by the EA440 can be placed anywhere on top of the views in the presentation.

In order not to loose information, the panes have been designed so you can see through them. The degree of transparency can be controlled with this **Transparency** function. You can adjust the setting from 0% (no transparency) to 90% (almost full transparency) in steps of 10%.

To change the setting, move the cursor to either side of the button, and observe that the background colour changes. Select [—] on the left side to decrease the value, or select [+] on the right side to increase the value. Select the middle of the button to open it.If you have a keyboard connected to the EA440, you can type the requested value in the text box.

Related tasks

Reducing the light emitted from the display presentation, page 118

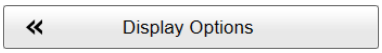
Increasing the visibility of the information panes, page 119

Related topics

Information panes overview, page 181

Display Options dialog box

The top bar gives you fast access to key functionality and navigational information. It provides buttons to hide or show the menu, to monitor data recording, to open the **Messages** dialog box, and to open the context sensitive on-line help. Which navigational elements to see on the top bar is selected in the **Display Options** dialog box. It controls the location of the menu. You can also select which tooltips to appear when you move the cursor over the echograms.



How to open

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

Description

The following tabs are provided. Each opens a dedicated page.

- **General**

  The **General** page in the **Display Options** dialog box controls the location of the menu. You can select which navigational information to be shown on the top bar. You can also choose to see Coordinated Universal Time (UTC) at the bottom of the presentation.

  For more information: General page, page 287

- **Tooltip**

  When you move the cursor over the echograms in the EA440 presentation, small "tooltips" are shown to provide additional information. The **Tooltip** page controls which tooltips that are shown.

  For more information: Tooltip page, page 290

Note

The choices you make in the **Display Options** *dialog box have no effect on the overall performance of the EA440. The information shown on the EA440 top bar must not be used for vessel navigation.*

Related tasks

Enabling Coordinated Universal Time (UTC) on the bottom bar, page 121

Selecting the navigational information to appear on the top bar, page 119

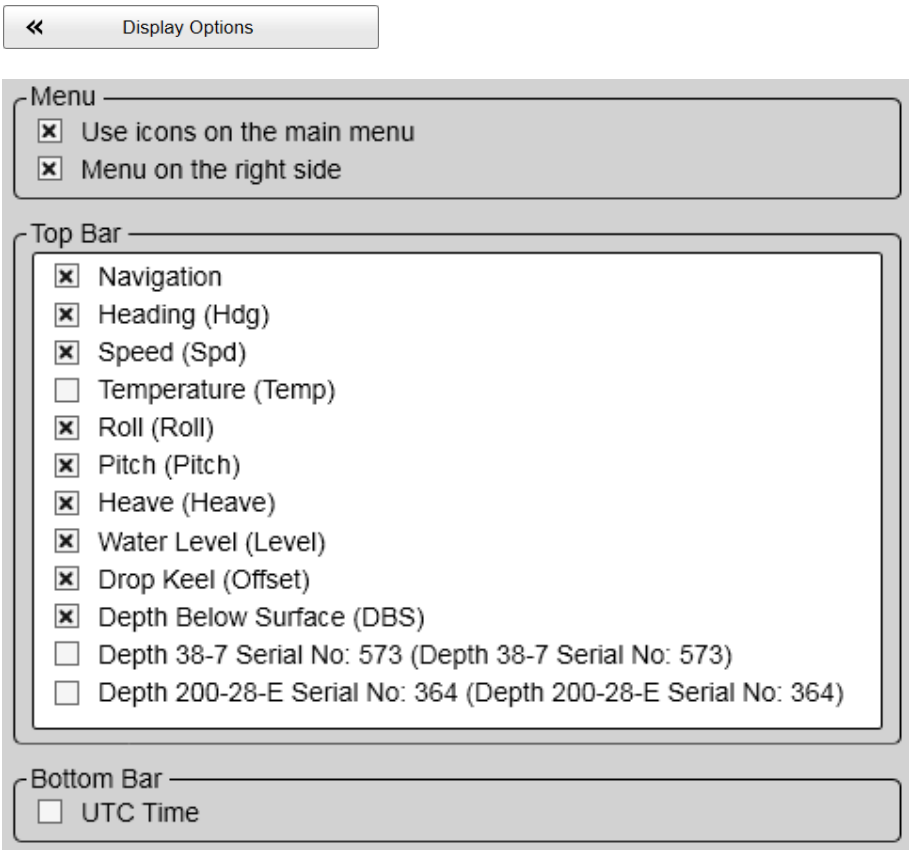
Selecting which tooltips to appear in the user interface, page 120

General page

The **General** page in the **Display Options** dialog box controls the location of the menu. You can select which navigational information to be shown on the top bar. You can also choose to see Coordinated Universal Time (UTC) at the bottom of the presentation.

How to open

This page is located in the **Display Options** dialog box. The **Display Options** dialog box is located on the **Display** menu.



Description

The **General** page offers a range of "on/off switches". You use them to enable or disable the relevant functions.

Note

The information shown on the EA440 top bar must not be used for vessel navigation.

Details

Use icons on the main menu

Select this function to have icons instead of text on the main menu.

Menu on the right side

Select this function to place the menu system on the right side of the EA440 presentation.

Top Bar

The EA440 top bar is located at the top of the display presentation and stretches from the far left to the far right. By means of these check boxes, you can select which elements to be shown at the top of the EA440 presentation.

For each option, the text in brackets is the identification used on the top bar. The text used to identify the depth option reflects the information you added as **Custom Name** when you installed the transducer on the **Transducer Installation** page in the **Installation** dialog box.

For more information: Transducer Installation page, page 311

- **Navigation**

  Select this check box to see the vessel's current geographical position on the top bar. The position information must be provided by an external navigation system connected to the EA440.

- **Heading**

  Select this check box to see the vessel's current heading on the top bar. The heading information must be provided by an external positioning system, or by a heading sensor or gyro compass connected to the EA440.

- **Speed**

  Select this check box to see the vessel's current speed on the top bar. The information must be provided by an external speed log or a navigation system connected to the EA440.

- **Temperature**

  Select this check box to see the current temperature on the top bar. The information must be provided by an external temperature sensor connected to the EA440.

- **Roll**

  Select this check box to see the vessel's current roll movements on the top bar. The information must be provided by an external motion sensor (motion reference unit) connected to the EA440.

- **Pitch**

  Select this check box to see the vessel's current pitch movements on the top bar. The information must be provided by an external motion sensor (motion reference unit) connected to the EA440.

- **Heave**

  Select this check box to see the vessel's current heave movements on the top bar. The information must be provided by an external motion sensor (motion reference unit) connected to the EA440.

- **Water Level**

  Select this check box to see the vessel's current water level on the top bar. The information must be provided by an external water level sensor connected to the EA440.

- **Drop Keel Offset**

  Select this check box to see the vessel's current drop keel offset on the top bar. The information must be provided by a drop keel sensor connected to the EA440.

- **Depth below surface**

  Select this check box to see the current water depth from an external sensor on the top bar. The information must be provided by an external depth sensor connected to the EA440.

- **Depth**

  Select this check box to see the current water depth on the top bar. The information is taken from the chosen transducer. The text used to identify the depth option reflects the information you added as **Custom Name** when you installed the transducer on the **Transducer Installation** page in the **Installation** dialog box.

UTC Time

Select this check box to enable Coordinated Universal Time (UTC). The time is shown on the bottom bar of the EA440 presentation. When disabled, the software will use local time.

> Coordinated Universal Time (French: Temps Universel Coordonné, UTC) is the primary time standard by which the world regulates clocks and time. It is one of several closely related successors to Greenwich Mean Time (GMT). For most purposes, UTC is used interchangeably with GMT, but GMT is no longer precisely defined by the scientific community. [...]
>
> The current version of UTC is defined by International Telecommunications Union Recommendation (ITU-R TF.460-6), Standard-frequency and time-signal emissions and is based on International Atomic Time (TAI) with leap seconds added at irregular intervals to compensate for the slowing of Earth's rotation. Leap seconds keep UTC within 0.9 seconds of universal time, UT1.
>
> *Wikipedia, June 2014*

Related tasks

Enabling Coordinated Universal Time (UTC) on the bottom bar, page 121

Selecting the navigational information to appear on the top bar, page 119

Return to...

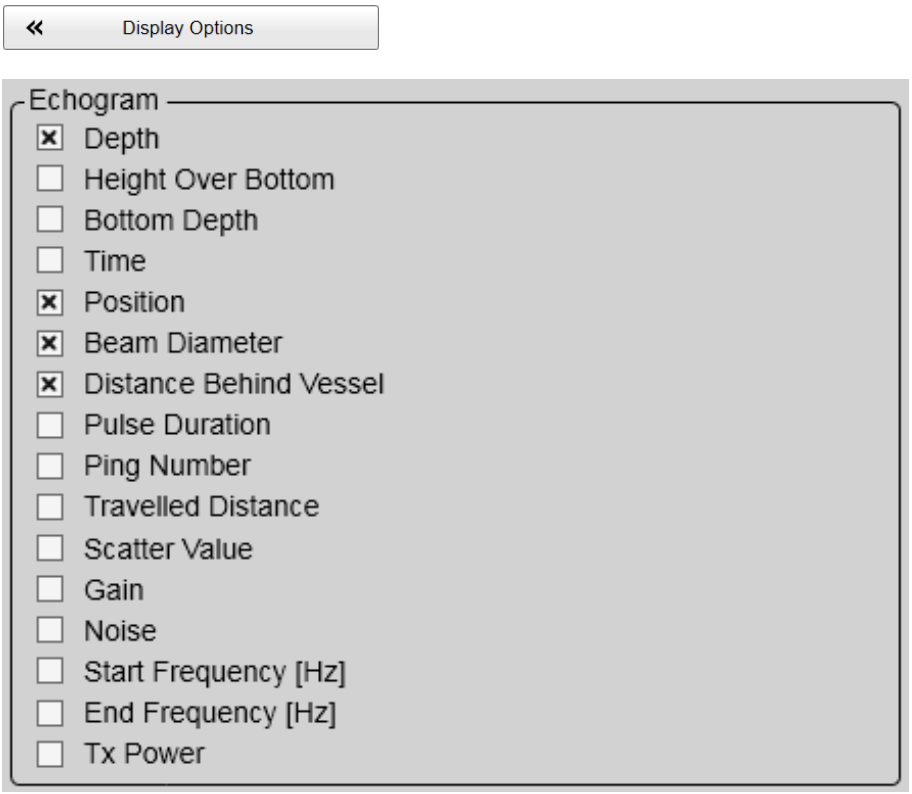
Display Options dialog box, page 286

Tooltip page

When you move the cursor over the echograms in the EA440 presentation, small "tooltips" are shown to provide additional information. The **Tooltip** page controls which tooltips that are shown.

How to open

This page is located in the **Display Options** dialog box. The **Display Options** dialog box is located on the **Display** menu.



Description

The **Tooltip** page offers a range of "on/off switches". Each tooltip is presented in the list, and you can enable or disable each of them independently.

Details

Tooltip

Several tooltips can be shown in the EA440 presentation. When a tooltip is enabled, the cursor location is detected and a small information box is shown. By default, the information is related to the exact position of the cursor. Each tooltip represents a specific piece of information, and they are listed separately.

Select an item to activate or deactivate the corresponding tooltip.

Note

The information provided for **Noise** *shows you the noise reading for the latest ping independent of the cursor's location.*

Related tasks

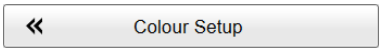
Selecting which tooltips to appear in the user interface, page 120

Return to...

Display Options dialog box, page 286

Colour Setup dialog box

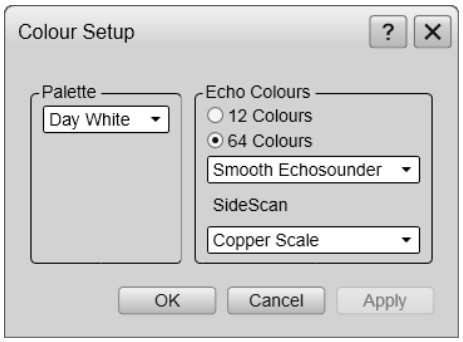
The **Colour Setup** dialog box controls the presentation colours used by the EA440. This includes the palette ("skin"), the number of colours in use, and the colour scale.



How to open

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

Description



The settings in the **Colour Setup** dialog box are organized in two groups.

- The **Palette** function is used to select the overall colour theme ("skin") used in the EA440 presentation.
- Under **Echo Colours**, choose how many colours you wish to use in the presentations, and which colour scale. Dedicated colours are provided for the sidescan view. The chosen colours are shown at the bottom of the EA440 presentation.

Which colour scale to use is mainly a personal preference based on ambient light conditions, the nature of the echoes and your own experience.

Keep in mind that in the basic scale with 12 colours, each discrete colour represents a 3 dB range of echo signal strength. This implies that the next colour is selected every time the echo strength is doubled.

Tip

By default you have 64 or 12 colours available to present the echoes, and a selection of palettes. The colour scale can be retrieved any time by selecting **Colour Scale** *on the top bar. The chosen colours are shown at the bottom of the EA440 presentation.*

If you choose to use many colours, the resolution of the EA440 presentation is greatly improved. It is then easier to distinguish the difference between the various echoes of different size and/or target strength.

Tip

You can adjust the echo level range by means of the **Colour Scale** *settings. These are opened from the Colour Scale information pane. You can find the same settings in the* **Information Pane Options** *dialog box on the* **Active** *menu.*

Colour Scale information pane description, page 193

Colour Scale page, page 355

The following colour scales are available.

12 colours | Sonar colours | Smooth ES | Grayscale | BI500 colours

The **Smooth Echosounder** scale is based on the standard 12-colour scale. Additional colours have been added between them to make smoother colour transitions.

Details

Palette

Select a palette to suit the ambient light conditions and your personal preferences. The choice you make does not have any effect on the EA440 performance. The following options are available:

- **Day White** is intended for daytime use.
- **Day Black** is intended for use during dusk and dawn.
- **Night**: intended for night-time use.

Echo Colours

Set the number of colours to use in the EA440 presentations; 12 or 64.

Note

The additional colour scale can only be used if you choose 64 colours.

Colour Scale

When 64 colours are selected, you can select the desired colour scale to be used on the EA440 presentations.

Related tasks

Choosing the colours used to present the echograms, page 92

Related topics

Colour Scale information pane description, page 193

Colour Scale page, page 355

Docking Views function

The echograms take up the largest part of the EA440 presentation. The information from each channel is shown in a separate view. The **Docking Views** function provided by the EA440 allows you to rearrange the physical positions of the views, and change their sizes.

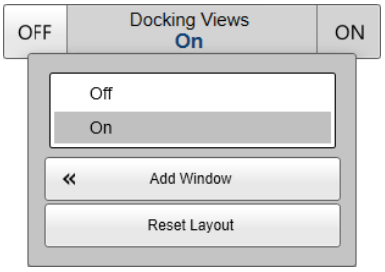
How to open

This function is opened from the **Display** menu.

Description

Once the **Docking Views** function is activated, the EA440 views are placed in named windows, and docking positions are shown. The docking positions show you where to drag and drop the selected view. Any view can selected, and then repositioned as indicated by the docking positions.

When a complete reorganisation of the view positions and sizes have been completed , you may wish to restore the EA440 presentation to what it was *before* you changed it. The **Reset layout** function restores all the views to their default positions.



Tip

You can use the **User Settings** *dialog box and functions to switch between your favourite view settings.*

Related tasks

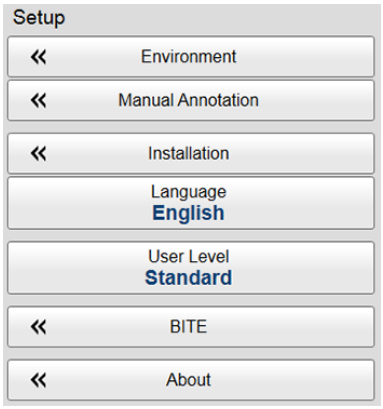
Rearranging the layout of the EA440 presentation, page 122

Moving a view to another display, page 123

Restoring the locations and sizes of the views, page 124

Setup menu; Functions and dialog boxes

The **Setup** menu provides basic functions related to the EA440 installation parameters and its communication with peripheral systems.



How to open

Select the **Setup** icon.

The icon is located under the **Main** menu. Select the icon one more time to close the menu.

Topics

Environment dialog box

Environmental parameters such as salinity, sound speed and water temperature all play an important part to present accurate echo data. Use the **Environment** parameters to define these values. Depending on the current sea and weather conditions, you may need to change these values frequently.

How to open

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

Description

In order to obtain accurate depth readings, it is very important that the sound speed through the water is set correctly. Several parameters are required to calculate the correct sound speed value. If these parameters are not known to you, use the default value 1494 m/s. This is a typical mean value for sound speed.

The following pages are provided.

- **Water Column**

  Fill in the water related parameters to get the most accurate sound speed.

  For more information: Water Column page, page 297

- **Absorption**

  The absorption curve is calculated using the parameters provided on the **Water Column** page.

  For more information: Absorption page, page 298

- **Sound Velocity Profile**

  This page shows the sound speed profile as a curve with sound speed versus depth below the surface.

  For more information: Sound Velocity Profile page, page 298

Topics

Water Column page, page 297

Absorption page, page 298

Sound Velocity Profile page, page 298

Water Column page

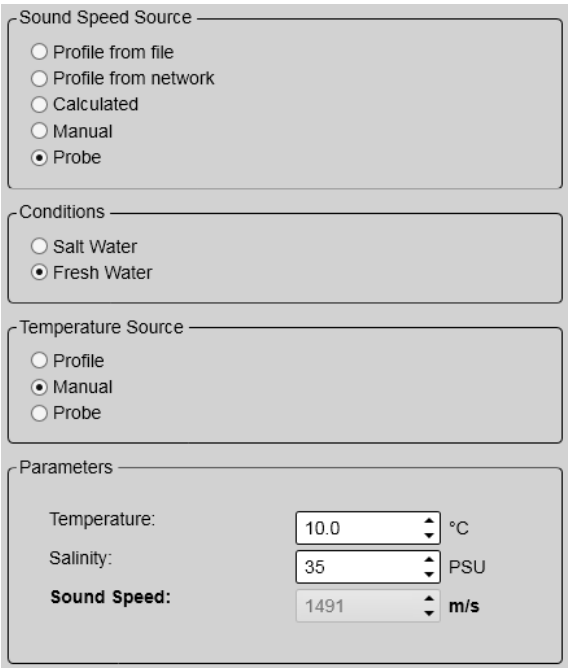
In order to achieve correct echo information, the current environmental parameters must be known to the EA440. The **Water Column** page collects these parameters. These must be defined to match the current conditions.

How to open

This page is opened from the **Environment** dialog box. The **Environment** dialog box is opened from the **Setup** menu.

Description

In order to obtain accurate depth readings and fish echoes, it is very important that the sound speed through the water is set correctly. Several parameters are required to calculate the correct sound speed value. If these parameters are not known to you, use the default value 1494 m/s. This is a typical mean value for sound speed.



Details

Sound Speed Source

In order to obtain accurate depth readings and fish echoes, it is very important that the sound speed through the water is set correctly.

- Select **Profile from file** to find the profile from a file.
- Select **Profile from network** to have the profile sent over the network.
- Select **Calculated** to allow the EA440 to calculate the sound speed and the absorption based on the parameters you have supplied.
- Select **Manual** to select your own sound speed value.
- Select **Probe** to use the measurements from a sound speed sensor.

Conditions

Sound travels with different speeds in salt and fresh water. For this reason, it is important that the EA440 knows your water profile.

Temperature Source

Use these parameters to define from where the temperature information shall be obtained.

Parameters

Provide the values for the parameters not calculated or obtained by probe. Only the parameters you have selected for manual values are available.

Return to...

Environment dialog box, page 296

Absorption page

The **Absorption** page shows you the current theoretical absorption curve based on the values you have given. You can not change any settings on this page. The curve is for information only.

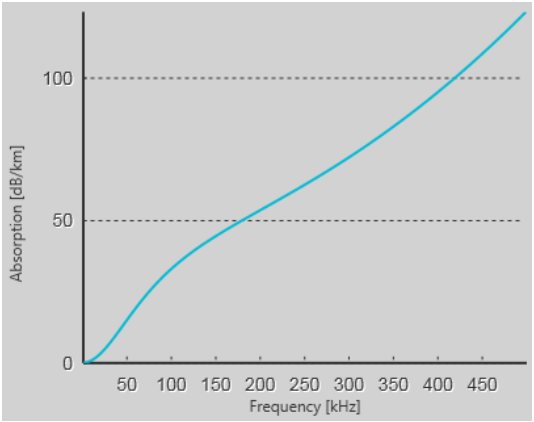
How to open

This page is opened from the **Environment** dialog box. The **Environment** dialog box is opened from the **Setup** menu.

« Environment

Return to...

Environment dialog box, page 296



Sound Velocity Profile page

The **Sound Speed Profile** page shows the current sound speed profile.

How to open

This page is opened from the **Environment** dialog box. The **Environment** dialog box is opened from the **Setup** menu.

« Environment

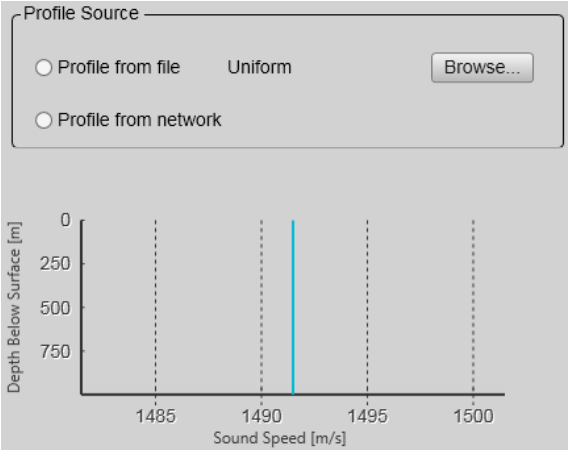
Description

Select **Profile from file** to find the profile from a file. Select Browse to choose which file.

Select **Profile from network** to have the profile sent over the network. Select Sound Velocity AML CALC on the Sensor Installation page in the Installation dialog box.

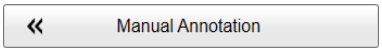
Return to...

Environment dialog box, page 296



Manual Annotation dialog box

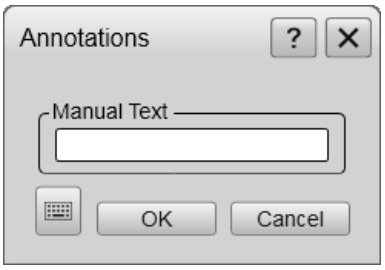
Sometimes it can be useful to place a single written comment on the echogram. The **Manual Annotation** dialog box offers that function. Type a text string. Select **OK** in the dialog box to add the text to your echogram.



How to open

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

Description



Type any text into the box. The size of the box will adjust to the length of your text.

If you do not have a computer keyboard connected to your EA440 system, select the **Keyboard** button to open an on-screen keyboard.

The dialog box may be opened during replay, but you will not be able to place text annotations on a pre-recorded echogram.

Tip

Several different annotation types may be added to the echogram. Annotations can only be added to the echogram while in Normal operational mode. Use the **Annotations** *page to type comments and insert annotations into the echograms. The* **Annotations** *page is located in the* **Installation** *dialog box.*

Related topics

Annotations page, page 324

Related tasks

Adding a single text comment to the echogram, page 102

Adding comments and annotations to the echograms, page 101

Installation dialog box

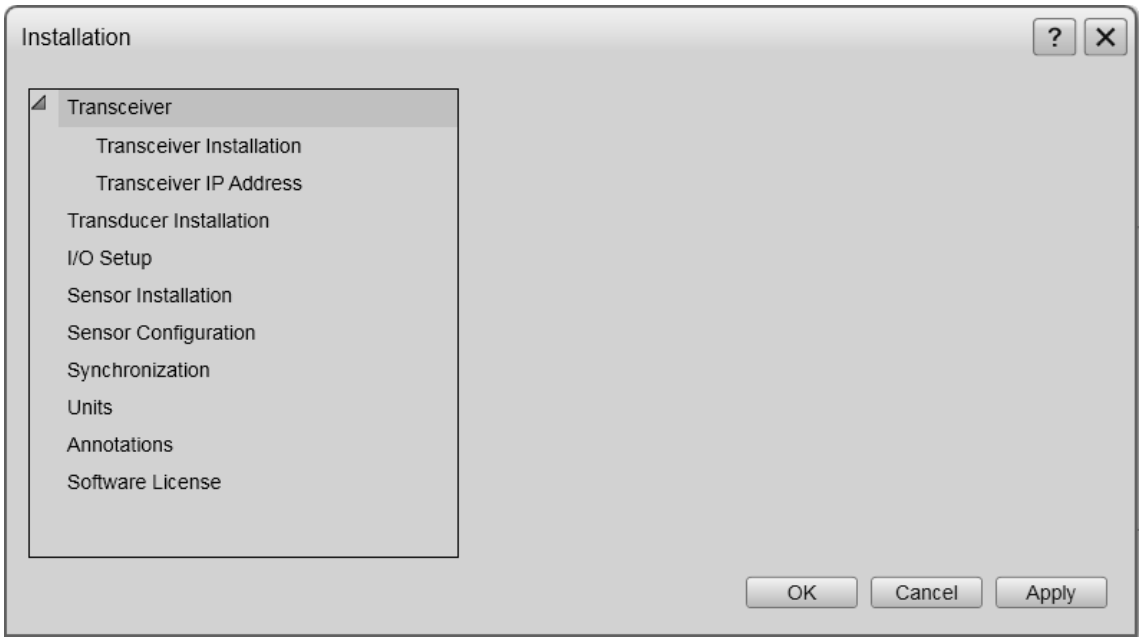
Prior to use, the EA440 must be set up to communicate with the relevant peripherals. This includes the transducer(s). The **Installation** dialog box collects all relevant peripherals on individual pages, and allows you to set up the basic parameters related to installation and operation. In most cases, you only need to do this once.

Prerequisites

The **Installation** dialog box is not available when your EA440 is set to *Replay* mode.

How to open

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



Description

The **Installation** dialog box offers a menu on the left side, and several pages for parameters on the right side. When transducers and sensors are added to the EA440 configuration, these are added as collapsible items on the menu.

Tip

The **I/O Setup** *page can also be opened from the* **Output** *dialog box. The* **Output** *dialog box is located on the* **Operation** *menu.*

Important

Just making changes and selecting **OK** at the bottom of the page will not install anything. Select what to install, define the relevant parameters, and then select **Add**.

The following pages are provided.

- **Transceiver**

  The **Transceiver** pages are used to define the settings necessary to connect the Operator Station to each transceiver. In turn, each transceiver is assigned one or more transducers. Two pages are used. The **Transceiver Installation** page shows you a list of the available transceivers, and allows you to make the connections to the Operator Station, and to the transducers you have installed. The **Transceiver IP Address** page allows you to control the Internet Protocol (IP) Addresses used by the Operator Station to communicate with the transceivers.

  For more information: Transceiver pages, page 302

- **Transducer Installation**

  The transducers you wish to use with the EA440 must be "installed" as a part of the software configuration. Which transducers to use depends on the number of transceivers in your system, and the licenses you have for these. Unless you replace a broken transducer, or add a new, you only need to do this once.

  For more information: Transducer Installation page, page 311

- **I/O Setup**

  In order to communicate with peripheral devices, the Operator Station offers several serial and/or Ethernet (LAN) ports. The number of communication ports depends on how your Operator Station is set up and configured. The **I/O Setup** settings allow you to define which information is imported by the Operator Station.For each port, you can set up the communication parameters, and monitor the data flow.

  For more information: I/O Setup page, page 265

- **Sensor Installation**

  The **Sensor Installation** page allows your EA440 to communicate with external sensors and systems. The parameters are organized in groups.

  For more information: Sensor Installation page, page 314

- **Sensor Configuration**

  Several sensor are provided on the **Sensor Configuration** page, one for each type of information. For each type, you can define a priority sensor by rearranging the datagrams in a list.

  For more information: Sensor Configuration page, page 319

- **Synchronization**

  The purpose of the **Synchronization** parameters is to set up the EA440 to operate alone, or as a master or slave in a synchronized system. Synchronization is required in order to avoid interference if the EA440 is used simultaneously with other hydroacoustic instruments within the same frequency range.

  For more information: Synchronization page, page 321

- **Units**

  The EA440 user interface presents many measurements. These measurements are for example related to depth, range and distance. From the **Units** page you control which units of measurements that are used.

  For more information: Units page, page 323

- **Annotations**

  When you study an echogram, it is often useful to add personal comments to it. Comments can be used to identify specific events such as specific echoes, unusual bottom conditions, or simply for keeping track of time or distance. The **Annotations** choices allow you to type comments and annotations into the echograms. The comments are automatically saved when you enable raw data recording.

  For more information: Annotations page, page 324

- **Software License**

  The EA440 needs one or more software licenses to work. Each software license code "unlocks" one WBT for operational use with a set of predefined properties. The **Software License** settings allow you to type a license code (text string) to unlock the EA440 functionality.

  For more information: Software License page, page 326

Transceiver pages

The **Transceiver** pages are used to define the settings necessary to connect the Operator Station to each transceiver. In turn, each transceiver is assigned one or more transducers. Two pages are used. The **Transceiver Installation** page shows you a list of the available transceivers, and allows you to make the connections to the Operator Station, and to the transducers you have installed. The **Transceiver IP Address** page allows you to control the Internet Protocol (IP) Addresses used by the Operator Station to communicate with the transceivers.

Prerequisites

The **Installation** dialog box is not available when your EA440 is set to *Replay* mode.

How to open

This page is located in the **Installation** dialog box. To open, select it on the **Setup** menu.

Description

The **Transceiver** pages are used to define the settings necessary to connect the Operator Station to each transceiver. Two pages are used.

- **Transceiver Installation page**

  The **Transceiver Installation** parameters control the installation and disconnection of transceivers. Every time the page is opened, the EA440 software automatically performs a search on the Ethernet network for transceivers. An overview of the available transceivers is shown. As permitted by the software license, you can assign any transducer to any WBT.

  For more information: Transceiver Installation page, page 303

- **Transceiver IP Address page**

  If you have several transceivers in a large system, it may be useful to control the IP Addresses used to communicate with each transceiver. These IP Addresses are defined by a BOOTP server in the Operator Station, and assigned to each WBT. This functionality is provided for advanced users. We assume that you are familiar with Ethernet communication and the relevant parameters.

  For more information: Transceiver IP Address page, page 309

Return to...

Installation dialog box, page 300

Topics

Transceiver Installation page, page 303

Transceiver IP Address page, page 309

Transceiver Installation page

The **Transceiver Installation** parameters control the installation and disconnection of transceivers. Every time the page is opened, the EA440 software automatically performs a search on the Ethernet network for transceivers. An overview of the available transceivers is shown. As permitted by the software license, you can assign any transducer to any WBT.

Description

The **Transceiver Installation** page uses these groups to collect the parameters.

- **Frequency Channels**

  The list in the upper part on the **Transceiver Installation** page shows you an overview of the transceivers and channels that are currently available. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency. Each channel is identified by the transceiver type and serial number and the transducer(s) in use. The current status for each channel is also provided. If you have many transceivers connected you can change the size of the **Installation** dialog box, or you can use the two arrows on the right hand side of the list to scroll up and down.

- **Transceiver Information**

  The **Transceiver Information** group shows you the technical parameters for the WBT that is used on the chosen frequency channel. Select one of the items in the **Frequency Channels** list to see the information about the relevant WBT.

  The information provided under **Transceiver Information** is not required for operational use.

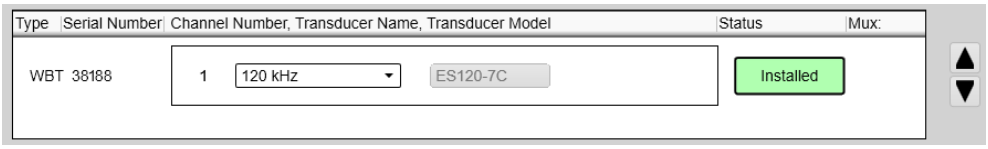
  The **Download Transceiver Software** function allows you to upgrade the software on the WBT. Software updates are only available if and when distributed with the EA440 operational software.

- **Transceiver Browsing**

  The **Transceiver Browsing** parameters are used when you wish to start an automatic search for transceivers on the network.

  The communication is made between the Operator Station (identified with its Local IP Address) and one or more transceivers. To search your network for transceivers, check that the correct IP address of the Ethernet board in the Operator Station is shown, then click the **Browse** button. All transceivers connected to the Operator Station through the network are automatically listed in the **Frequency Channels** list. Each transceiver is identified with its applicable status label.

  At the bottom of the **Transceiver Browsing** field, you can set up the EA440 to automatically scan for new software versions for the transceiver. Software updates are only available if and when distributed with the EA440 operational software.



Details

Frequency Channels

The list in the upper part on the **Transceiver Installation** page shows you an overview of the transceivers and channels that are currently available. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

Type (of transceiver)

This column identifies the type of transceiver in use and/or currently available for the EA440.

- "GPT" identifies the "General Purpose Transceiver"
- "WBT" identifies the "Wide Band Transceiver"
- "SBT" identifies the "Single Band Transceiver"

Serial number

This is the serial number of the transceiver. This number is fixed and cannot be changed.

Channel number

Each transceiver may have one or more transducers connected. This digit identifies each of these transceiver/transducer channels. You can not change this information. If you use split-beam transducers, you will only have one transducer on each transceiver. The channel number will then always be one -1-.

Transducer name

This column identifies the transducer that is connected to the transceiver. The name shown is the **Custom name** you defined when you added the transducer to the EA440 configuration using the **Transducer Installation** page.

When you set up the EA440 for use, select the transducer from the list.

Note

You can only select from the transducers that you have previously installed on the **Transducer Installation** *page.*

Transducer model

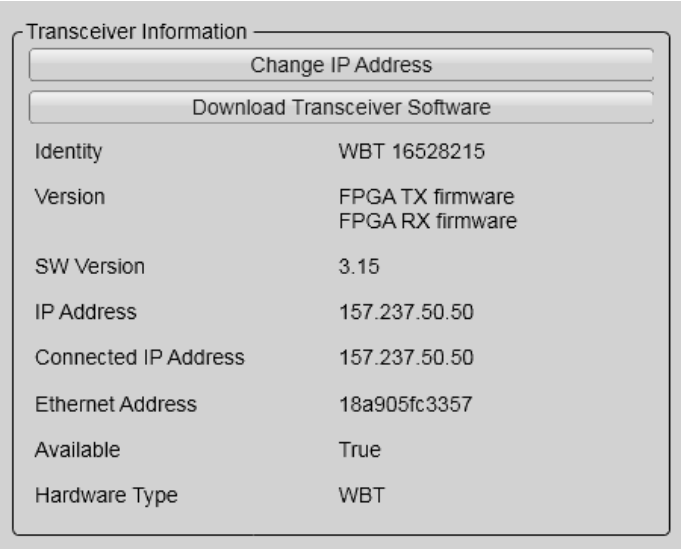
The transducer model is identified. In most cases, this is the actual product name of the transducer. You are not able to change this information.

Status

The current status of the channel is shown.

- **Busy**: The channel is already in use, probably by another echo sounder on the same network. You cannot connect to this channel.
- **Installed**: This channel is connected to your EA440 system.
- **Lost**: This channel cannot be used.
- **Available**: This channel is vacant and ready for use.

Transceiver Information



The **Transceiver Information** group shows you the technical parameters for the WBT that is used on the chosen frequency channel. Select one of the items in the **Frequency Channels** list to see the information about the relevant WBT. The information provided under **Transceiver Information** is not required for operational use.

Change IP Address

Each Wide Band Transceiver (WBT) is provided with a unique IP addresses created by the BOOTP server in the Operator Station software. In most cases, this button is not used on the EA440.

However, if you are using a system with older General Purpose Transceiver (GPT) units, this function may be useful. The GPT units are provided from the factory with fixed Ethernet and IP addresses. If your EA440 uses two (or more) GPT units with identical frequencies, these will by default have different Ethernet addresses, but identical IP addresses. In order for your system to work, all GPT units must have unique IP addresses. The button opens the **IP Address** dialog box to accept the new address.

Download Transceiver Software

It is possible to update the software in the WBT. This update is only necessary if new functionality in the EA440 software requires a newer software version. Software updates are only available if and when distributed with the EA440 operational software. The software release note provided will then include the necessary instructions.

Identity

This information reflects the type of transceiver connected. It also shows you the transceiver's unique Ethernet address.

- "GPT" identifies the "General Purpose Transceiver"
- "WBT" identifies the "Wide Band Transceiver"
- "SBT" identifies the "Single Band Transceiver"

Version

This information includes the unique version parameters provided by the transceiver. Codes identifying frequency, serial number and firmware are shown.

SW Version

This is the software version currently running on the transceiver.

IP Address

This is the transceiver's current IP Address.

Connected IP Address

The Operator Station holds an Ethernet adapter that is used to communicate with the transceiver(s). This is the IP address of that Ethernet adapter.

Ethernet Address

This is the Ethernet address (also known as the "media access control" address (MAC)) of the transceiver. This address is fixed, and it can not be changed.

Tip

Do not confuse "Ethernet address" (or MAC address) with "IP address".

A MAC address is a unique identifier assigned to network interfaces for communication on the physical network segment. MAC addresses are used as a network address for most IEEE 802 network technologies, including Ethernet.

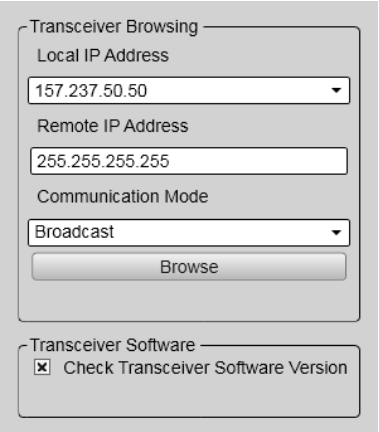
An Internet Protocol address (also known as an IP address) is a numerical label assigned to each device (e.g., computer, printer) participating in a computer network that uses the Internet Protocol for communication. An IP address serves two principal functions: host or network interface identification and location addressing. Its role has been characterized as follows: "A name indicates what we seek. An address indicates where it is. A route indicates how to get there."

- Wikipedia, July 2014

Available

This parameter identifies if the selected frequency channel is currently available for use with the EA440. If it is available, the status is identified as *True*.

Transceiver Browsing



The **Transceiver Browsing** parameters are used when you wish to start an automatic search for transceivers on the network.

The communication is made between the Operator Station (identified with its Local IP Address) and one or more transceivers. To search your network for transceivers, check that the correct IP address of the Ethernet board in the Operator Station is shown, then click the **Browse** button. All transceivers connected to the Operator Station through the network are automatically listed in the **Frequency Channels** list. Each transceiver is identified with its applicable status label.

Local IP Address

This is the Internet Protocol (IP) address of the Ethernet interface adapter located in your Operator Station. In most cases, each Ethernet adapter has a unique IP address, even when it supports multiple sockets. If you have more than one Ethernet adapter, you are provided with a list of the available addresses.

If you have more than one Ethernet adapter in your Operator Station:

- Set up one adapter to communicate with the transceiver(s) using the IP address and Subnet mask shown.
- Set up one adapter to communicate with the local area network (LAN).

Communication Mode

You can select *Broadcast* or *Point-to-point*.

Broadcast mode enables data to be sent from the EA440 to any number of "remote devices". Data is only transmitted to these devices. *Point-to-point* mode implies that the EA440 Operator Station is physically connected only to one single remote device. A complete two-way communication system is then established.

This peripheral device is the transceiver.

Use *Broadcast* if you do not know the Internet Protocol (IP) Address of the transceiver you are trying to locate.

Use *Point-to-Point* if you know the Internet Protocol (IP) Address of the transceiver. You must then type the this IP Address into the **Remote IP Address** box.

Browse

This button initiates a search on the network for available transceivers. The transceivers that are found are automatically listed in the **Frequency Channels** with their appropriate status indicators.

Transceiver Software

At the bottom of the **Transceiver Browsing** field, you can set up the EA440 to automatically scan for new software versions for the transceiver. Software updates

are only available if and when distributed with the EA440 operational software. The software release note provided will then include the necessary instructions.

Return to...

Installation dialog box, page 300

Related tasks

Disconnecting transceiver channels, page 160

Installing transceiver channels, page 158

Transceiver IP Address page

The **Transceiver Installation** parameters control the installation and disconnection of transceivers. If you have several transceivers in a large system, it may be useful to control the IP Addresses used to communicate with each transceiver. These IP Addresses are defined by a BOOTP server in the Operator Station, and assigned to each WBT.

Description

In order to establish communication between the Operator Station and the transceiver(s), each transceiver must have unique Internet Protocol (IP) Address. The software in the Operator Station includes a function ("Bootp server") that automatically defines and assigns one IP address to each transceiver.

Tip

The IP address of the Operator Station can either be fixed, or automatically obtained from a network.

To control this, open the **Control Panel**. *Select* **Network and Sharing Center**, *and then* **Change Adapter Settings**. *Right-click on the connection, and change the TCP/IP4 properties in the* **Local Area Connection Properties** *dialog box.*

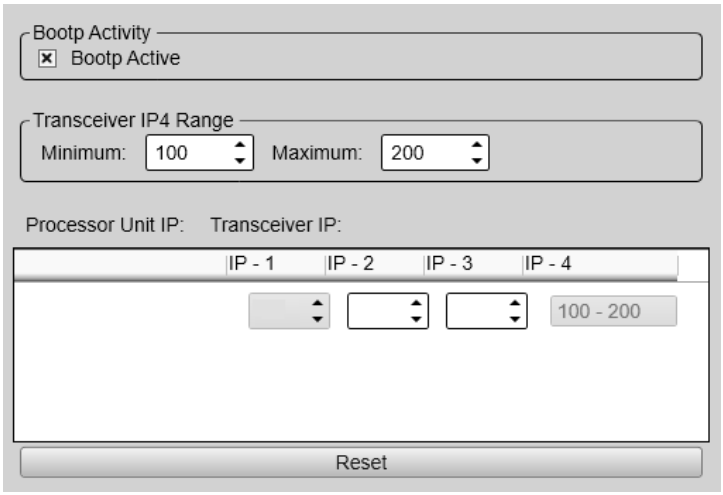
If you wish to have your Operator Station connected both to the ship's network and to a number of transceivers, we strongly advice you to use two Ethernet adapters. Use one for the ship's network, and allow it to obtain its IP Address automatically. Use the other Ethernet adapter to communicate with the transceiver(s), and define your own IP Address.

The IP Address assigned to each transceiver will automatically use the same address range as the address given to the Operator Station. If you are an advanced user, you can use the parameters provided to control these addresses.

Example

If you have set up your Operator Station IP Address to 157.237.52.100, the IP Address(es) to the transceiver(s) will always start with 157.237. The **IP3** and **IP4** elements are chosen automatically within the ranges defined. If you have three transceivers, they may be provided with IP Addresses 157.237.52.101, 157.237.52.102 and 157.237.52.103.

Details



Bootp Activity

The Wide Band Transceiver (WBT) is not provided with a fixed IP Address for Ethernet communication. This happens automatically when the transceiver is connected, since the Operator Station software includes a Bootp configuration server. If you have several transceivers connected to your Operator Station, each transceiver will automatically be assigned a unique IP Address.

Note

This automatic assignment of an IP Address to the transceiver will only work when **Bootp Active** *is enabled.*

> The Bootstrap Protocol (BOOTP) is a computer networking protocol used in Internet Protocol networks to automatically assign an IP address to network devices from a configuration server. [...]
>
> When a computer that is connected to a network is powered up and boots its operating system, the system software broadcasts BOOTP messages onto the network to request an IP address assignment. A BOOTP configuration server assigns an IP address based on the request from a pool of addresses configured by an administrator.
>
> BOOTP is implemented using the User Datagram Protocol (UDP) as transport protocol, port number 67 is used by the server to receive client requests and port number 68 is used by the client to receive server responses. BOOTP operates only on IPv4 networks.
>
> *Wikipedia (https://en.wikipedia.org/wiki/Bootstrap_Protocol), April 2016*

Transceiver IP4 Range

On large networks, you may wish to limit the range of the IP Address(es) provided to the individual transceiver(s). The **Transceiver IP4 Range** parameters allows

you to define upper and lower limits for the fourth element in the IP Address(es). When you make a selection using the spin boxes, observe that the chosen limits are shown in **IP4** column in the table.

Note

This functionality is provided for advanced users. We assume that you are familiar with Ethernet communication and the relevant parameters.

IP Address table

Use this table to define the IP address(es) provided to the transceiver(s).

- **IP-1** and **IP-2** are provided by the Operator Station, and reflects the choices you made when you set up the Ethernet adapter.
- **IP-3** is chosen using the box.
- The **IP-4** range is selected using the **Transceiver IP4 Range** boxes.

Note

This functionality is provided for advanced users. We assume that you are familiar with Ethernet communication and the relevant parameters.

Reset

Use this **Reset** function to restore all IP Address settings to their default values.

Return to...

Installation dialog box, page 300

Related tasks

Disconnecting transceiver channels, page 160

Installing transceiver channels, page 158

Transducer Installation page

The transducers you wish to use with the EA440 must be "installed" as a part of the software configuration. Which transducers to use depends on the number of transceivers in your system, and the licenses you have for these. Unless you replace a broken transducer, or add a new, you only need to do this once.

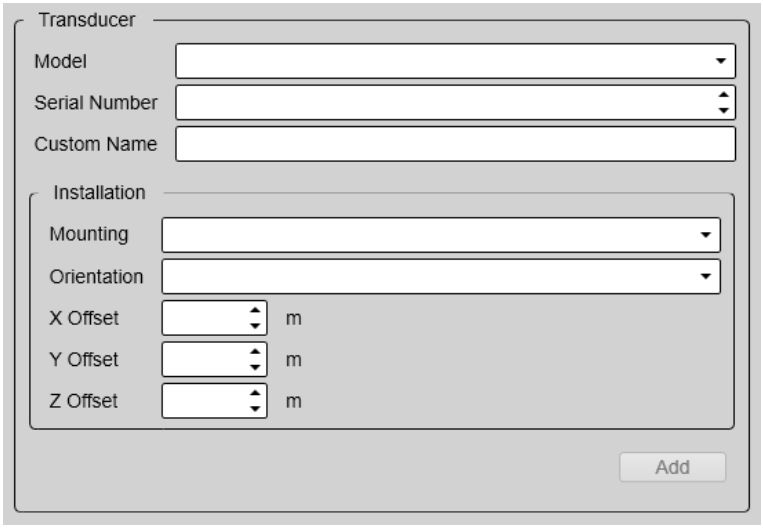
Prerequisites

The **Installation** dialog box is not available when your EA440 is set to *Replay* mode.

How to open

This page is located in the **Installation** dialog box. To open, select it on the **Setup** menu.

Description



Each transducer to be added to the EA440 configuration must be selected and identified individually.

You can only choose a transducer from the **Model** list. When the transducer is selected, you must provide its serial number, and type a name that you choose yourself. Once a transducer has been installed, it is listed in the **Installed Transducers** box. To see the information you have collected about the transducer, select the relevant transducer in the list.

Tip

Just making changes and selecting **OK** *at the bottom of the page will not install anything. Select what to install, define the relevant parameters, and then select* **Add**.

Details

Installed Transducers

The **Installed Transducers** box lists all the transducers that are currently installed on the EA440. Select a transducer on the list to edit its properties, or to remove it. Select **New** on the list to add a new transducer to the EA440.

Model

When you add a new transducer, you can only choose a transducer from the list.

The list is generated from a system file on your Operator Station. It contains all the transducers that are compatible with the WBT, but since the software is common for several systems there may also be non-compatible transducers in the list. The list also includes technical specifications for each transducer. You can not see this information, but it is used by the EA440 to set up the operational parameters. This allows the WBT to optimize its performance for the individual transducer models.

If you cannot find your transducer in the list, contact you dealer, agent or Kongsberg Maritime to upgrade the relevant software component in the EA440.

Serial Number

Use this box to insert the transducer's serial number.

Some new Kongsberg transducers with built-in "intelligence" will automatically provide this serial number.

Custom Name

You can also type in a custom name or keep the model and serial number. It is not used in the echo data that you export.

Tip

If you do not have a computer keyboard connected to your EA440 system, select the **Keyboard** *button to open an on-screen keyboard.*

Mounting

Use this function to specify where the transducer is installed.

Orientation

Use this function to specify the orientation of the transducer beam.

Example

If the transducer has been installed with the transducer face in a horizontal position, the beam is pointing straight down. You must then select *Vertical* orientation.

Offset

The physical location of the EA440 transducer is important for the EA440 data accuracy.

Use the centre of the transducer face as reference, and define the offset values related to the *Ship Origin*. The installation angles relevant for the transducer must also be defined. These values were recorded during the transducer installation, and they define the direction of the transducer face.

Note

It is very important that the transducer installation angles are measured and recorded accurately during the installation, and that they are defined accurately in the software. Incorrect angles will greatly reduce the data accuracy.

- **X Offset [m]**

  Select the offset value on the X axis (fore-and-aft direction) from the *Ship Origin*. Adjust with a positive value for X if the transducer is located ahead of the ship origin.

- **Y Offset [m]**

Select the offset value on the Y axis (athwartship) from the *Ship Origin*. Adjust with a positive value for Y if the transducer is located on the starboard side of the ship origin.

- **Z Offset [m]**

  Select the offset value on the Z axis (vertical) from the *Ship Origin*. Adjust with a positive value for Z if the transducer is located under the ship origin.

Add

When you are adding a new transducer to the EA440 configuration, select **Add** to finalize to process. The transducer you have added is placed in the **Installed Transducers** list.

Edit

The **Edit** functionality on the **Transducer Installation** page makes it possible to change the information you have provided for the transducer. You cannot change the model identification and the serial number. Select **Edit** to make the relevant changes. Select **Apply Changes** to save the changes you have made.

Remove

The **Remove** functionality on the **Transducer Installation** page makes it possible to delete the information you have provided for the transducer.

Note

There is no "undo" functionality.

Return to...

Installation dialog box, page 300

Related tasks

Installing one or more transducers, page 156

Sensor Installation page

For the EA440 to use and offer correct navigational information, one or more external sensors must be connected. Typical sensors are those that provide speed, heading and geographical position. On the **Sensor Installation** page you define which external sensors your EA440 will import information from. You must also decide which datagram formats that will be accepted. Once a sensor has been chosen, you must select the offset values that define the sensor's physical location relative to your vessel's coordinate system.

Prerequisites

The **Installation** dialog box is not available when your EA440 is set to *Replay* mode.

How to open

This page is located in the **Installation** dialog box. To open, select it on the **Setup** menu.

Description

The **Sensor Installation** page allows your EA440 to communicate with external sensors and systems. The parameters are organized in groups.

- **Installed Sensors**

  The **Installed Sensors** list contains all the sensors that are currently installed on the EA440. Select a sensor in the list to edit its interface properties, or to remove it. Select **New** in the list to add a new sensor interface to the EA440.

- **Sensor**

  In the **Sensor** group you select which type of sensor you want to receive information from. You must specify which communication port to use (LAN (Local Area Network) or serial port). You can type a custom name to identify the sensor import. Select **Inspect Port** to verify that the communication parameters of the chosen port have been set up correctly.

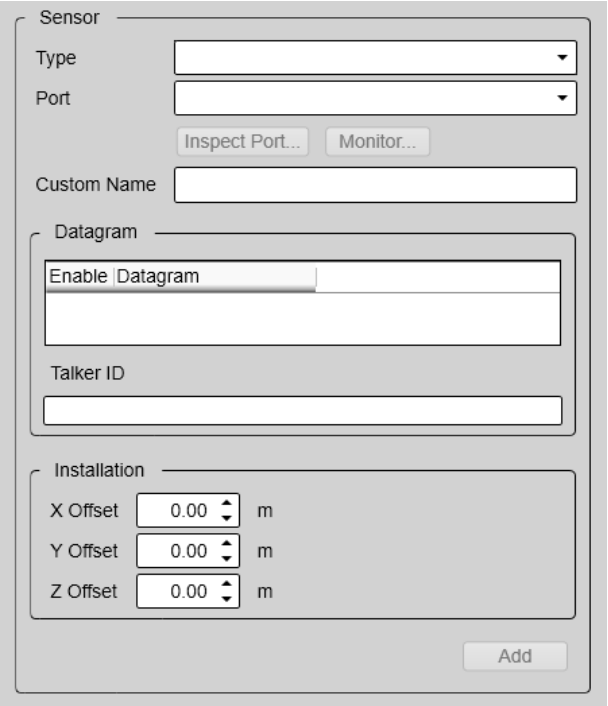
- **Datagram**

  In the list of valid datagram formats, select the format(s) to be accepted by the EA440. If necessary, you can also specify a specific **Talker ID**.

- **Installation**

  Most sensors are physically mounted somewhere on your vessel. For accurate measurements, these locations - referenced to the vessel's coordinate system - must be known to the EA440.

Details



Installed Sensors

The **Installed Sensors** list contains all the sensors that are currently installed on the EA440. Select a sensor in the list to edit its interface properties, or to remove it. Select **New** in the list to add a new sensor interface to the EA440.

Type (of sensor)

The EA440 can communicate with several different sensor types. Use this list to select the sensor type you want to receive information from.

Port

In order to import the data from the chosen sensor, you need to define an input port. This may be any available Local Area Network (LAN) or serial line on your Operator Station.

Custom Name

For easier recognition of the sensor interface, you can type a custom name. This name is shown in other dialog boxes in the EA440 user interface. If you do not have a computer keyboard connected to your EA440 system, select the **Keyboard** button to open an on-screen keyboard.

Inspect Port

Once you have selected a serial or Ethernet communication port, select **Inspect Port** to inspect the current port parameters. The relevant port setup dialog box opens.

The communication parameters defined for **NMEA 0183** are:

- **Baud Rate**: 4800 b/s
- **Data Bits**: 8
- **Parity**: None
- **Stop Bits**: 1

Some instruments may offer other parameters and/or options. You must always check the relevant documentation provided by the manufacturer.

Note

*You are not permitted to make any changes. To change the communication parameters, use the **I/O Setup** page. The* **I/O Setup** *page is located in the* **Installation** *and* **Output** *dialog boxes.*

Monitor

This option is only available if you decided to edit the parameters of a previously installed sensor. Select **Monitor** to open the **Port Monitor** dialog box. The **Port Monitor** dialog box allows you to study the communication stream on the chosen serial line or LAN port.

Datagram

The list presents the available datagram formats for the chosen sensor type. Select the datagrams you want to import.

Talker ID

If you want to specify a dedicated Talker ID on the datagram format, it can be defined here.

Every NMEA datagram starts with a dollar sign. A "talker identifier" tag with two characters follows. This identifier is followed by three characters that define the type of message. The Talker ID identifies the system that sends the datagram. You may leave this box blank. This means that two blank characters are inserted into the datagram. You may also specify two characters that identifies the EA440 as the "sender". In most cases, you will only need to define a Talker ID if your receiving system needs it for specific purposes.

Example

`$ESDBT,x.x,f,y.y,M,z.z,F*hh<CR><LF>`

In this NMEA depth datagram, the Talker ID is "ES", which means "echo sounder".

Tip

If you do not have a computer keyboard connected to your EA440 system, select the **Keyboard** *button to open an on-screen keyboard.*

X, Y and Z Offset

The physical location of each sensor must be defined with reference to the vessel's coordinate system.

The position of certain sensors must be defined as an *offset* to the *Ship Origin* in the coordinate system to maximize performance. These offset values are all required to allow the EA440 to give you as accurate information as possible. The degree of accuracy offered by the EA440 is directly related to the accuracy of the information you enter on the **Installation Parameters** pages.

- **X Offset [m]**

  Select the offset value on the X axis (fore-and-aft direction) from the *Ship Origin*. Adjust with a positive value for X if the sensor is located ahead of the ship origin.

- **Y Offset [m]**

  Select the offset value on the Y axis (athwartship) from the *Ship Origin*. Adjust with a positive value for Y if the sensor is located on the starboard side of the ship origin.

- **Z Offset [m]**

  Select the offset value on the Z axis (vertical) from the *Ship Origin*. Adjust with a positive value for Z if the sensor is located under the ship origin.

Add (sensor)

When you have set the parameters for a new sensor interface, select **Add** to save it. Once a sensor has been added to the EA440 configuration, it appears in the **Installed Sensors** list.

Remove (sensor)

The **Installed Sensors** list contains all the sensors that are currently installed on the EA440. If you want to delete a sensor, select it in the list, and then select **Remove** at the bottom of the **Sensor Installation** page.

Note

You cannot undo this operation.

Edit (sensor)

The **Installed Sensors** list contains all the sensors that are currently installed on the EA440. If you want to edit the parameters of a previously installed sensor, select it in the list, and then select **Edit** at the bottom of the **Sensor Installation** page.

Return to...

Installation dialog box, page 300

Related tasks

Interfacing peripheral equipment, page 135

Sensor Configuration page

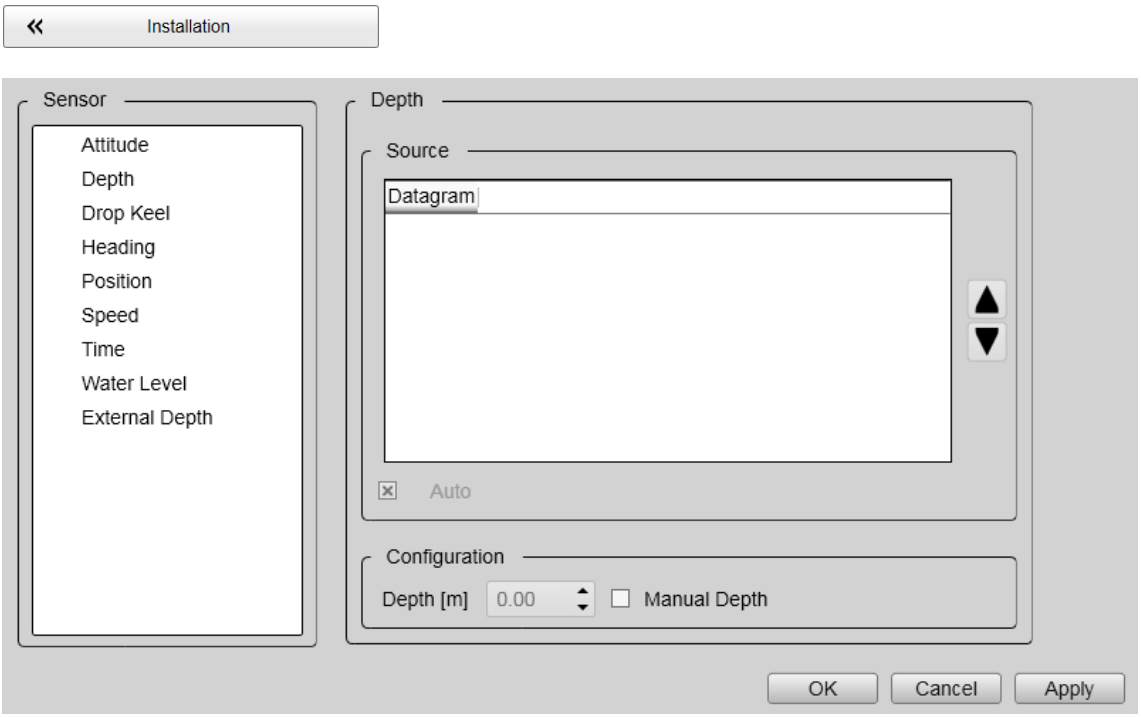
With several sensors connected to the EA440, many of them will provide the same datagrams. We cannot expect that the datagrams provide the same information. The **Sensor Configuration** page allows you to define a datagram priority, so that the information from the "most reliable" sensor is used by the EA440. You can also define manual values in case a sensor is unserviceable, or not installed.

Prerequisites

The **Installation** dialog box is not available when your EA440 is set to *Replay* mode.

How to open

This page is located in the **Installation** dialog box. To open, select it on the **Setup** menu.



Description

When the EA440 communicates with peripheral devices (for example navigation sensors), the information is contained in datagrams.

The term "datagram" has been defined as follows:

> A self-contained, independent entity of data carrying sufficient information to be routed from the source to the destination computer without reliance on earlier exchanges between this source and destination computer and the transporting network.
>
> *https://tools.ietf.org/html/rfc1594, April 2016*

The majority of the datagrams used by the EA440 are defined by the National Marine Electronics Association (NMEA). Other proprietary datagrams are defined by third-party organizations or by Kongsberg Maritime.

Any information in a datagram, for example the current depth, may be provided in different datagrams from several sensors. Due to a number of reasons (environmental conditions, installation, configuration, accuracy, etc.), the numerical values provided can be different from one sensor to another.

Several sensor are provided on the **Sensor Configuration** page, one for each type of information. For each type, you can define a priority sensor by rearranging the datagrams in a list. You can also define manual values in case a sensor is unserviceable, or not installed.

Tip

*The EA440 can communicate with several different sensor types. On the **Sensor Installation** page you define which external sensors your EA440 will import information from. You must also decide which datagram formats that will be accepted. Open the* **Sensor Installation** *page in the* **Installation** *dialog box.*

When you save echo data in RAW format, all sensor data are included.

Note

If you have two sensors providing the same information, but on different communication ports, certain limitations apply. During normal operation, you can easily decide which sensor you wish to use. During replay, you can only play back from one of these sensors. For this reason, only the information from the currently "active" sensor is saved.

Details

Source

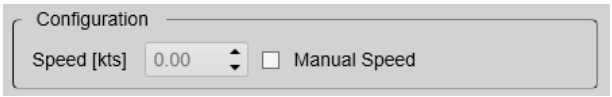
All the datagrams that have been selected for input data are shown in this list. There is one list on each page representing the type of information indicated by the page name. To change the priority for a given datagram, select it, and change its location on the list using the arrow buttons.

Auto

Select **Auto** to control the functionality.

- With **Auto** *enabled*, the priority list is used. Information is imported from the sensor at the top of the list. If the sensor fails to provide information for more than 20 seconds, data from the next sensor is used. For heading priorities, sensors with heading will always be selected before sensors with course.
- With **Auto** *disabled*, the priority list is not used. Information is imported from the sensor at the top of the list. All other sensors are ignored.

Configuration



On most of the pages you can specify a manual value. Use this function if a sensor is unserviceable or not installed. Click to enable this function, and select or type the requested value.

When you select the *Time* sensor, you can set the ZDA datagram to synchronize the internal clock in the Operator Station. To do this, you need administrative privileges on your Operator Station.

Return to...

Installation dialog box, page 300

Related tasks

Interfacing peripheral equipment, page 135

Synchronization page

The purpose of the **Synchronization** parameters is to set up the EA440 to operate alone, or as a master or slave in a synchronized system. Synchronization is required in order to avoid interference if the EA440 is used simultaneously with other hydroacoustic instruments within the same frequency range.

How to open

This page is located in the **Installation** dialog box. To open, select it on the **Setup** menu.

Description

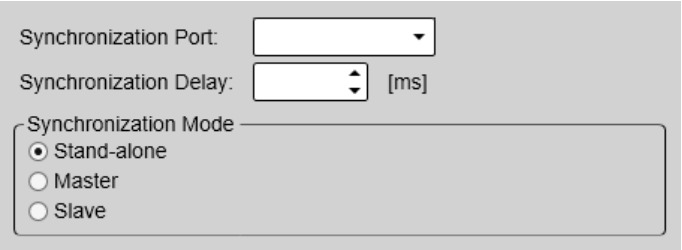
Whenever more than one hydroacoustic system is installed on a vessel, interference may occur. To avoid interference, you have these options:

- The systems are all connected to a common synchronization system.
- One of the acoustic systems is set up as "master", and controls the transmissions on the other systems.

The EA440 offers functionality for remote transmit synchronization. It can be set up to operate in either *Master* or *Slave* mode.

> In physics, interference is the phenomenon in which two waves superpose each other to form a resultant wave of greater or lower amplitude. Interference usually refers to the interaction of waves that are correlated or coherent with each other, either because they come from the same source or because they have the same or nearly the same frequency. Interference effects can be observed with all types of waves, for example, light, radio, acoustic, surface water waves or matter waves.
>
> *https://en.wikipedia.org/wiki/Interference_(wave_propagation), April 2016*

Details



Synchronization Mode

Choose which synchronization mode to use.

- **Stand-alone**

  Synchronization is turned off.This synchronization mode is used if the EA440 is working by itself and with no synchronization required. This is the default setting. The EA440 operates using its internal ping interval parameters, independent of any trigger signals arriving at the synchronization port.

  The **Synchronization Delay** setting is not applicable when synchronization is switched off.

- **Master**

  Master mode is used if the EA440 is going to act as the controlling unit in a synchronized system. The peripheral hydroacoustic system(s) are only permitted to transmit when enabled by the EA440. When *Master* mode is selected, the EA440 will run using its internal ping interval parameters and send trigger signals to the peripheral system(s).

- **Slave**

  Slave mode is used if the EA440 is going to transmit only when permitted by a peripheral system. When *Slave* mode is selected, the EA440 does not transmit ("ping") unless an external trigger appears on the chosen synchronization port. The peripheral system may be any other hydroacoustic product (for example an echo sounder or sonar), or even a dedicated synchronization system.

The synchronization mode is not fixed. It can be changed at any time during EA440 operation.

Note

Simultaneous transmission of more than one hydroacoustic system can only take place if the systems operate with different frequencies.

Synchronization Delay

This delay parameter is used differently depending on the chosen synchronization mode.

- **Stand-alone**

  The **Synchronization Delay** setting is not applicable when synchronization is switched off.

- **Master**

  In *Master* mode, the EA440 waits for the delay time after the external trigger signal has been sent to the slaves before transmitting the ping. This is often referred to as a *pre-trigger*.

  Note

  This delay will only work when the synchronization is set up using a serial port.

- **Slave**

  In *Slave* mode, the EA440 waits for the delay time after the external trigger signal has arrived before transmitting the ping. This is often referred to as a *post-trigger*.

Synchronization Port

This is the interface port currently used to transmit or receive synchronization signals. It can be a serial port or a connection using the AUXILIARY socket on the WBT. Since the synchronization function only uses the *Request To Send (RTS)* and *Clear To Send (CTS)* signals on a serial port, you can use a port that is already used for other purposes. For the same reason, you do not need to define any baud rate.

Related tasks

Setting up the EA440 in a synchronized system, page 148

Return to...

Installation dialog box, page 300

Units page

The EA440 user interface presents many measurements. These measurements are for example related to depth, range and distance. From the **Units** page you control which units of measurements that are used.

How to open

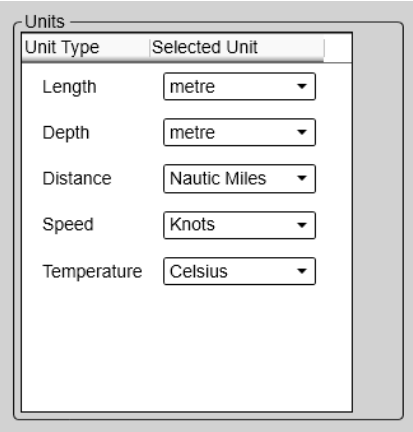
This page is located in the **Installation** dialog box. To open, select it on the **Setup** menu.

Description

The EA440 is prepared to work with several international standards for units of measurements.

Use the **Units** options to select the units of measurements you want to work with. The EA440 uses them in all presentations. You only need to define them once. Use the drop-down lists provided to make the selections.

Details



Length

Choose the unit of measurement for all the readouts related to range and distances in the EA440 user interface. This may for example be the cursor location.

Depth

Choose the unit of measurement for all the presentations of depth. This may for example be the current water depth.

Distance

Choose the unit of measurement for all presentations of sailed distance.

Speed

Choose the unit of measurement for all the presentations of vessel speed.

Temperature

Choose the unit of measurement for all the temperature readings. This may for example be the current water temperature, but only if you have a suitable sensor connected to the EA440.

Related tasks

Selecting measurement units, page 124

Return to...

Installation dialog box, page 300

Annotations page

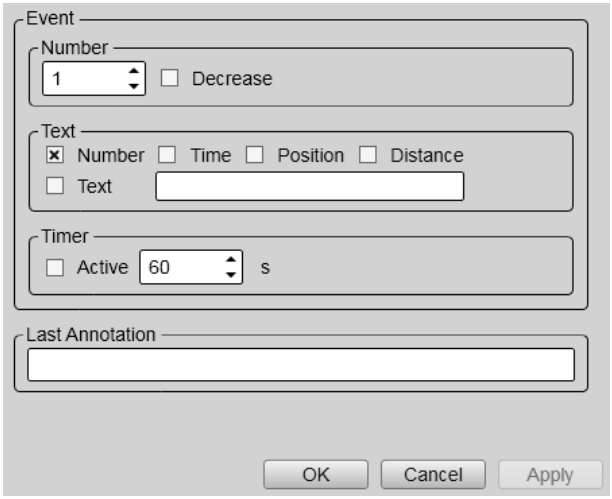
When you study an echogram, it is often useful to add personal comments to it. Comments can be used to identify specific events such as specific echoes, unusual bottom conditions, or simply for keeping track of time or distance. The **Annotations** choices allow you to type comments and annotations into the echograms. The comments are automatically saved when you enable raw data recording.

How to open

This page is located in the **Installation** dialog box. To open, select it on the **Setup** menu.

Description

Several different annotation types may be added to the echogram. They are displayed on the echogram if this feature is enabled in the **Echogram** dialog box. Annotations can only be added to the echogram while in *Normal* operational mode.



Details

Event

The **Event** parameters initiate annotations whenever something happens. Events may be triggered by external devices, set by a timer, or initiated by selecting the **Event** button on the top bar.

Number

All events are identified with a number. This number can be included in the annotation string.

Using this feature, you can manually select the next number to be used, and you can choose to have the number series decrease instead of increasing.

Text

Use the options in this group to select which items to be included in the event generated annotation string. You can also add a text string to be included at every event annotation.

If you do not have a computer keyboard connected to your EA440 system, select the **Keyboard** button to open an on-screen keyboard.

Timer

Set a time period for automatic generation of events.

Latest annotation

This text box automatically displays the latest annotation text that was typed.

Supported datagram formats for annotation data

The EA440 supports the following datagram format for annotations.

- **Simrad ATS datagram format**

  Simrad ATS is a proprietary datagram format created by Kongsberg Maritime. It allows you to import annotations from external devices.

Return to...

Installation dialog box, page 300

Related tasks

Adding comments and annotations to the echograms, page 101

Related topics

Manual Annotation dialog box, page 299

Software License page

The EA440 needs one or more software licenses to work. Each software license code "unlocks" one WBT for operational use with a set of predefined properties. The **Software License** settings allow you to type a license code (text string) to unlock the EA440 functionality.

Prerequisites

The **Installation** dialog box is not available when your EA440 is set to *Replay* mode.

How to open

This page is located in the **Installation** dialog box. To open, select it on the **Setup** menu.

Description

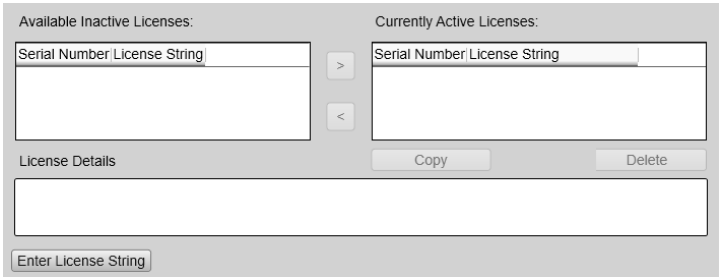
The software license is a 32 character hexadecimal string based on the transceiver's serial number. It defines several key parameters that control the functionality and behaviour of the transceiver(s) you use. Each software license code "unlocks" one WBT for operational use with a set of predefined properties.

The software license is not linked to the physical Operator Station. You can therefore easily move the software from one computer to another, just remember to make a copy of the license string.

Note

Once you receive your software license string(s), do not lose them. We suggest that you copy the information into a text file (for example Notepad), and add relevant information. Place the text file on the Operator Station desktop, and make sure that backup copies are made.

Details



Available Inactive Licenses

This list shows all the EA440 software licenses that you have typed in, but that your are not using. To activate one of the licenses, select it, and click the arrow button [>]. To see the operational parameters contained by a license, select it, and see the information in the **License Details** box.

Currently Active Licenses

This list shows you the EA440 software licenses that you have currently activated on your Operator Station. To deactivate a license, select it, and click the arrow button [<]. To see the operational parameters contained by a license, select it, and see the information in the **License Details** box.

Copy

Select a license code, and then click **Copy** to copy the code to the operating system's clipboard. From the clipboard you can paste the code into a text editor, for example Notepad.

Delete

Select a license code, and then click **Delete** to remove it from the Operator Station.

License Details

This list contains an overview of the functionality available with the currently selected license code. To see the operational parameters contained by a license, select it, and see the information in the **License Details** box.

Enter License String

Select **Enter License String** to open the dialog box. Type the license code.

You do not need to type the string manually. You can copy the code using the **Ctrl-C** and **Ctrl-V** keyboard combination, or right-click the mouse to use **Copy** and **Paste**.

Related tasks

Obtaining and installing the software license, page 151

Moving the software license from one Operator Station to another, page 153

Return to...

Installation dialog box, page 300

Language function

You may prefer to use the EA440 with a user interface in your own language. A selection of languages is provided. The **Language** function allows you to select the language to be used in the EA440 presentations, menus and dialog boxes.

How to open

This function is opened from the **Setup** menu.

Description

The text in the menu buttons on the EA440 can be provided in several different languages. Use the **Language** function to select the language you want to use. With a few exceptions, the chosen language will also be used for all other text on the EA440.

Note

The EA440 online help may not be available for the language you choose.

Related tasks

Selecting menu language, page 117

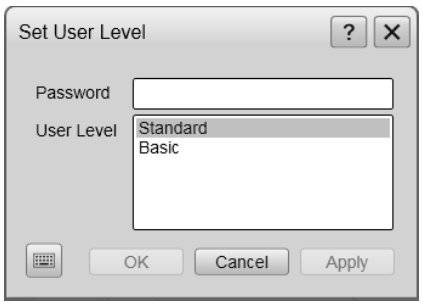
Set User Level dialog box

Set the user level to **Basic** to test the system without changing important settings.

How to open

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

Description



Use the Basic user level to test out functions in the system without changing important settings. The Basic user level does not have access to **Record Processed**, **Output**, **Environment** and **Installation**. The standard user level has access to all functions. The password for this function is Password.

- **Password**

  The password for this function is Password. It is set and can not be changed by the user.

- **User Level**

The user level can be set to either Standard or Basic. The standard user level has access to all functions. The basic user level does not have access to important settings.

Related tasks

Setting the user level, page 66

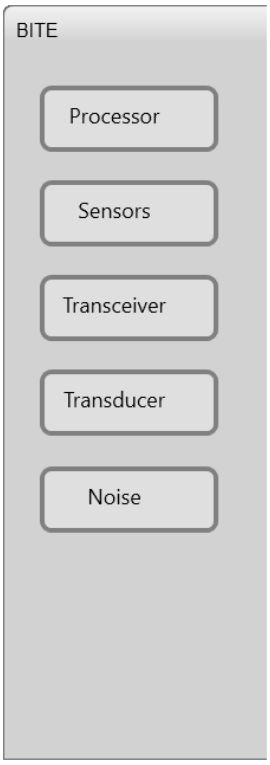
BITE (Built-In Test Equipment) dialog box

The EA440 is a computerized Hydrographic single beam echo sounder. There are hardly any analogue circuitry, and the possibility of traditional troubleshooting is limited. In order to rectify this, a built-in software application is available to offer test and maintenance functionality. The **BITE** (Built-In Test Equipment) dialog box controls the test and diagnose program that checks the performance of the EA440.

How to open

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

Description



By means of the **BITE** (Built-In Test Equipment) functionality, you can easily determine if the EA440 hardware is operational. And most important, you can make sure that all the transceivers channels and the transducer elements are functional.

To open the different pages in the **BITE** (Built-In Test Equipment) dialog box, use the large "buttons" on the left hand side. Each button provides a small colour coded indicator.

- **No indicator**: Status is OK. No actions are necessary.
- **Yellow**: This is a warning. A closer investigation is recommended.
- **Red**: This is an alarm. A closer investigation is required.
- **Grey**: No information is available.

The **BITE** (Built-In Test Equipment) dialog box offers these pages.

- **Processor**

  The **Processor** page offers an overview of the parameters related to software version, operation and network.

  BITE: Processor page, page 331

- **Sensors**

  The **Sensors** page presents a table with all the sensors currently connected to the EA440. For each sensor, the status is provided.

  BITE: Sensors page, page 332

- **Transceiver**

  The EA440 can be set up to work with one or more transceivers. The **Transceiver** page offers key information about each transceiver in use by the EA440.

  BITE: Transceiver page, page 334

- **Transducer**

  The EA440 can be set up to work with one or more transceivers. In turn, each transceiver is assigned one or more transducers. By means of the **Transducer** page, you can check the impedance of each transducer during normal operation. Any errors are then easily detected.

  BITE: Transducer page, page 335

- **Noise**

  The operational performance of the EA440 Hydrographic single beam echo sounder depends on the noise conditions. It is essential that the noise signature is as low as possible. The **Noise** page provides information about the current estimated noise, and the equivalent ambient noise. Your EA440 must be set to *Passive* mode.

  BITE: Noise page, page 338

Note

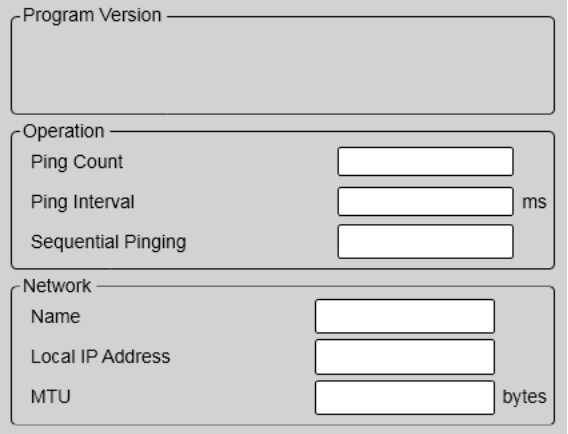
The **BITE** *(Built-In Test Equipment) dialog box and functionality is only provided for performance monitoring. The functionality is not required for normal use of the EA440. The* **BITE** *dialog box does not permit you to change any operational parameters.*

BITE: Processor page

The **Processor** page offers an overview of the parameters related to software version, operation and network.

How to open

This page is located in the **BITE** dialog box. You open the **BITE** dialog box from the **Setup** menu.



Description

The information on the **Processor Unit** page is offered in groups.

- **Program Version**

  This information is also found in the **About** dialog box.

- **Operation**

  This group offers generic information related to operational parameters.

- **Network**

  Some EA440 end users connect the Operator Station to their local area network (LAN). This group offers generic information about this network. If the Operator Station is not connected to a local network, these boxes are empty.

Details

Program version

The EA440 program is released with a specific software version. The version described in this Reference manual is 19.1. This information is also found in the **About** dialog box. The **About** dialog box is located on the **Setup** menu.

Operation

This group offers generic information related to operational parameters.

- **Ping Count**

  This function is simply a consecutive count of transmissions ("pings") since the EA440 was powered up and started.

- **Ping Interval**

  The *ping interval* (1/ping repetition frequency (PRF)) is the ping rate measured in time between each transmission.

  The phrase *ping rate* is used to describe the parameter that controls how often the EA440 can or shall transmit acoustic energy (a "ping") into the water. The ping rate is normally limited by the maximum range settings. It will also be dependant on hardware issues. This may be, for example, how fast your Operator Station can handle the information from each ping, how fast your system communicates with external peripherals, or how long time the system uses to save data.

Network

Some EA440 end users connect the Operator Station to their local area network (LAN). This group offers generic information about this network. If the Operator Station is not connected to a local network, these boxes are empty.

- **Name**

  This text box reflects the name of the local area network (LAN).

- **Local IP Address**

  This is the Internet Protocol (IP) address of the Ethernet interface adapter located in your Operator Station. In most cases, each Ethernet adapter has a unique IP address, even when it supports multiple sockets.

- **MTU (Maximum Transmission Unit)**

  This number reflects the maximum size of the data packets that can be transferred on the Ethernet line to and from the local area network (LAN).

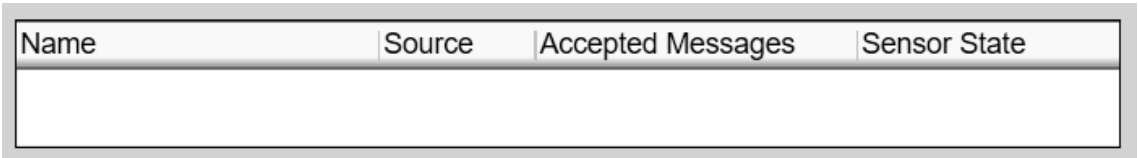
  > In computer networking, the *maximum transmission unit (MTU)* of a communications protocol of a layer is the size (in bytes or octets) of the largest protocol data unit that the layer can pass onwards. MTU parameters usually appear in association with a communications interface (NIC, serial port, etc.). Standards (Ethernet, for example) can fix the size of an MTU; or systems (such as point-to-point serial links) may decide MTU at connect time.
  >
  > *https://en.wikipedia.org/wiki/Maximum_transmission_unit (April 2016)*

BITE: Sensors page

The **Sensors** page presents a table with all the sensors currently connected to the EA440. For each sensor, the status is provided.

How to open

This page is located in the **BITE** dialog box. You open the **BITE** dialog box from the **Setup** menu.



Description

For the EA440 to use and offer correct navigational information, one or more external sensors must be connected. Typical sensors are those that provide speed, heading and geographical position. A motion sensor (motion reference unit) can also be connected.

Each sensor that is connected to the EA440 for input or output purposes is listed. All relevant status information is provided.

Tip

*On the **Sensor Installation** page you define which external sensors your EA440 will import information from. The* **Sensor Installation** *page is located in the* **Installation** *dialog box. The* **Installation** *dialog box is located on the* **Setup** *menu.*

The **Sensor Configuration** *page allows you to define a datagram priority, so that the information from the "most reliable" sensor is used by the EA440. You can also define manual values in case a sensor is unserviceable, or not installed. The* **Sensor Configuration** *page is located in the* **Installation** *dialog box.*

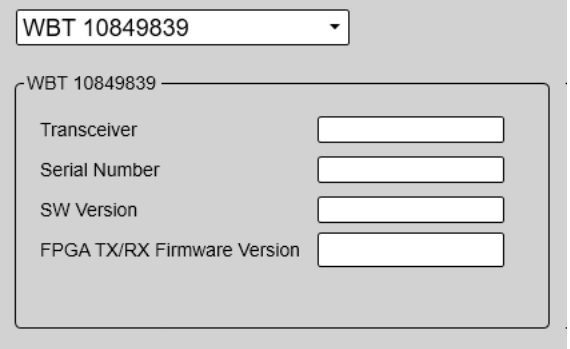
The **I/O Setup** *settings allow you to control the properties of each of the available communication ports. The* **I/O Setup** *page is located in the* **Installation** *and* **Output** *dialog boxes.*

BITE: Transceiver page

The EA440 can be set up to work with one or more transceivers. The **Transceiver** page offers key information about each transceiver in use by the EA440.

How to open

This page is located in the **BITE** dialog box. You open the **BITE** dialog box from the **Setup** menu.



Description

Each transceiver is identified by its serial number. Select transceiver from the list. Only static information is provided.

Tip

*The **Transceiver Installation** parameters control the installation and disconnection of transceivers. An overview of the available transceivers is shown. As permitted by the software license, you can assign any transducer to any WBT. The* **Transceiver Installation** *page is located in the* **Installation** *dialog box. The* **Installation** *dialog box is located on the* **Setup** *menu.*

The Transceiver Power Supply information pane shows you the current supply voltage provided to the transceiver.

Details

Select transceiver

Use the spin box to select which transceiver you wish to investigate.

Transceiver

This information reflects the type of transceiver connected.

- "GPT" identifies the "General Purpose Transceiver"
- "WBT" identifies the "Wide Band Transceiver"

Tip

This information is also found on the **Transceiver Installation** *page. The* **Transceiver Installation** *page is located in the* **Installation** *dialog box.The* **Installation** *dialog box is located on the* **Setup** *menu.*

Serial number

This is the serial number of the transceiver. This number is fixed and cannot be changed. This information is also found on the **Transceiver Installation** page.

SW Version

This is the software version currently running on the transceiver. This information is also found on the **Transceiver Installation** page.

FPGA TX/RX Firmware version

This information includes the unique version parameters provided by the transceiver. Codes identifying frequency, serial number and firmware are shown. This information is also found as **Version** on the **Transceiver Installation** page in the **Installation** dialog box.

A field-programmable gate array (FPGA) is an integrated circuit designed to be configured by a customer or a designer after manufacturing – hence "field-programmable". The FPGA configuration is generally specified using a hardware description language (HDL), similar to that used for an application-specific integrated circuit (ASIC).

FPGAs contain an array of programmable logic blocks, and a hierarchy of reconfigurable interconnects that allow the blocks to be "wired together", like many logic gates that can be inter-wired in different configurations. Logic blocks can be configured to perform complex combinational functions, or merely simple logic gates like AND and XOR.

In most FPGAs, logic blocks also include memory elements, which may be simple flip-flops or more complete blocks of memory.

https://en.wikipedia.org/wiki/Field-programmable_gate_array, August 2017

BITE: Transducer page

The EA440 can be set up to work with one or more transceivers. In turn, each transceiver is assigned one or more transducers. By means of the **Transducer** page, you can check the impedance of each transducer during normal operation. Any errors are then easily detected.

How to open

This page is located in the **BITE** dialog box. You open the **BITE** dialog box from the **Setup** menu.

Description

The transducer impedance is measured in real time during each transmission ("ping"). For CW transmissions, the impedance and phase values for each transducer sector are provided in a tabular format. For LFM transmissions, the results are shown in two plots.

An operational transducer element will have an impedance of approximately 75Ω ±40%. However, various transducers will have different values, and you need to check the relevant data sheet. Composite transducers have a relatively flat impedance curve. Older transducers with "ton-pilz" elements have a slightly higher impedance at the beginning of the ping. This is by design.

- If you measure ∞Ω (open circuit), you can assume that the transducer impedance transformer has broken, or that the cable is damaged.
- If you measure 0Ω (short), you can assume that either the transducer impedance transformer or the cable has shorted. You may also have a problem with salt water penetration.
- The transducer impedance is a complex value, and it has a phase. This phase should be as small as possible. A large phase means that you loose output power.

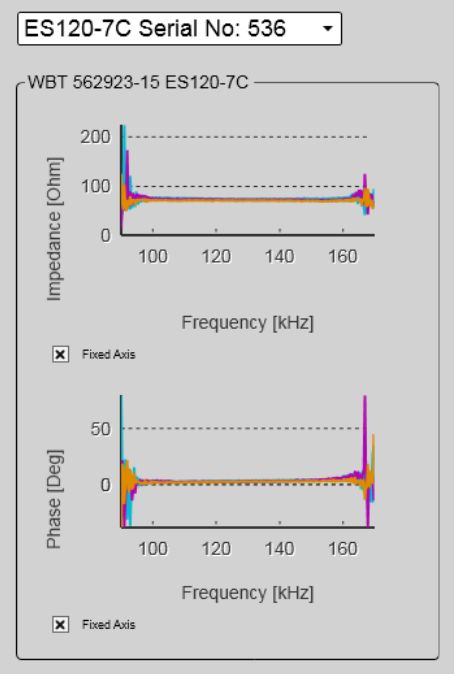
Tip

Each transducer is added using the **Transducer Installation** *page. The* **Transducer Installation** *page is located in the* **Installation** *dialog box. The* **Installation** *dialog box is located on the* **Setup** *menu.*

LFM transmissions

For LFM transmissions, the results are shown in two plots. One plot shows the impedance as a function of the frequency in one ping. The other plot shows the phase as a function of the frequency in the same ping.

In each plot, one coloured curve is provided for each transducer or transducer sector. A single beam transducer is shown with only one curve. A split beam transducer is shown with several curves, one for each sector.



Tip

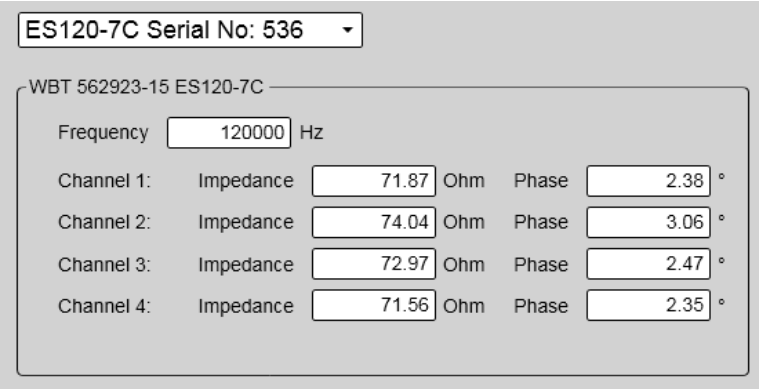
Select **Fixed Axis** *to make the curves easier to read. Pause the pinging to "freeze" the curves.*

If you wish to switch pulse type between CW and LFM, use the **Normal Operation** *dialog box. Before selecting LFM transmissions, make sure that your EA440 is provided with a compatible transducer!*

(The screen capture has been made while using a dummyload.)

CW transmissions

For CW transmissions, the impedance and phase values for each transducer sector are provided in a tabular format.



(The screen capture has been made while using a dummyload.)

Details

Select transducer

Use the spin box to select which transducer to study.

Frequency

This is the nominal centre frequency for the chosen transducer

Impedance

The transducer impedance is measured in real time during each transmission ("ping"). If you measure ∞Ω (open circuit), you can assume that the transducer impedance transformer has broken, or that the cable is damaged. If you measure 0Ω (short), you can assume that either the transducer impedance transformer or the cable has shorted. You may also have a problem with salt water penetration.

Phase

The transducer impedance is a complex value, and it has a phase. This phase should be as small as possible. A large phase means that you loose output power.

Fixed Axis

Select **Fixed Axis** to make the curves easier to read. Is is a visual function, it does not change the results from the measurements.

BITE: Noise page

The operational performance of the EA440 Hydrographic single beam echo sounder depends on the noise conditions. It is essential that the noise signature is as low as possible.

How to open

This page is located in the **BITE** dialog box. You open the **BITE** dialog box from the **Setup** menu.

Description

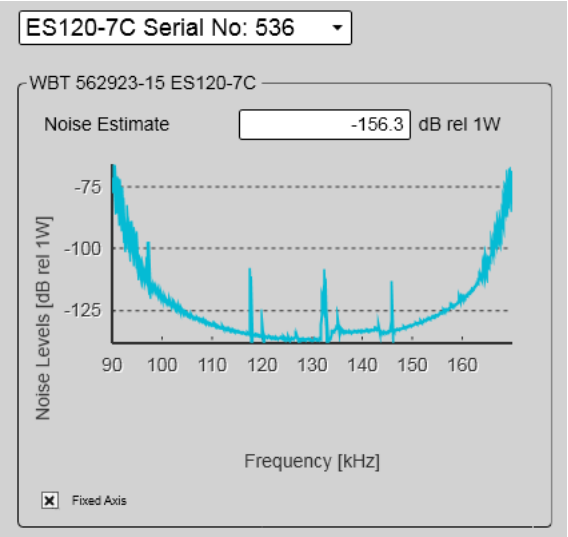
The **Noise** page provides information about the current estimated noise, and the equivalent ambient noise. Your EA440 must be set to *Passive* mode.

Tip

If you wish to switch to Passive mode, use the **Normal Operation** *dialog box. The* **Normal Operation** *dialog box is located on the* **Operation** *menu.*

LFM transmissions

When you work with LFM transmission, the noise is presented in a plot. The plot shows the noise level as a function of the transmission frequency. The noise estimated, in dB relative to 1W, is shown in a box.



Tip

Select **Fixed Axis** *to make the curves easier to read.*

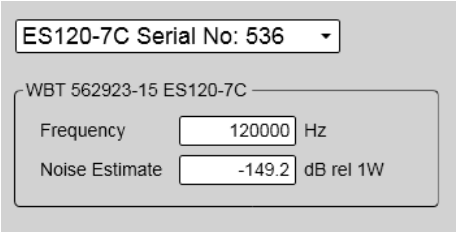
If you wish to switch pulse type between CW and LFM, use the **Normal Operation** *dialog box. Before selecting LFM transmissions, make sure that your EA440 is provided with a compatible transducer!*

(The screen capture has been made while using a dummyload.)

CW transmissions

When you work with CW transmissions, the noise is presented in text boxes.

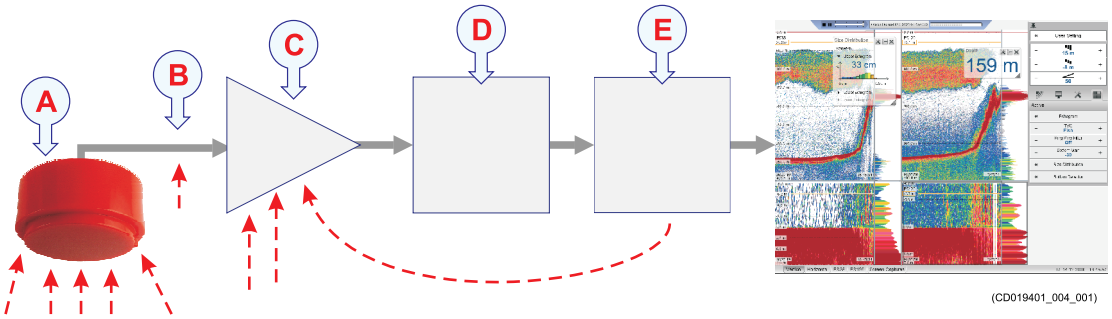
(The screen capture has been made while using a dummyload.)



About noise

The noise that contributes to the signal to noise ratio may be divided into the following types of noise:

- Self noise
- Ambient noise
- Electrical noise
- Reverberation



A The transducer can pick up noise from

- Biological disturbances
- Interference
- Cavitation
- Propeller noise
- Flow noise
- Acoustic noise from other hydroacoustic systems

B The transducer cable is long, and may pick up electric noise from generators, pumps, cooling systems and other electric or electromechanical devices.

C The preamplifiers are very sensitive, and they can easily pick up electrical noise from internal and external power supplies. The preamplifiers are also vulnerable for analogue noise created by their own electronic circuitry. Digital noise created by the converter and processing circuitry can also create problems.

D Converters transform the analogue echoes to digital format.

E Signal processing circuitry can create digital noise.

Details

Select channel

Use the spin box to select which channel to study. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

Noise estimate

For every transmission ("ping") the EA440 measures the echo levels along the chosen range. Typically, these measurements are made every five meters, even for long ranges.

All echoes and noise in the water are recorded. This includes noise generated by your own vessel (electric, propellers, machinery etc), water flow, cavitation and interference. Echoes from fish and other species, as well as from the bottom, are detected and added to the equations.

By comparing these measurements, the EA440 calculates a noise estimate.

Tip

If you set the EA440 to Passive mode, all echoes from the transmissions are removed from the equations. This gives you with better information about the actual noise.

This information is also shown on the **Extras** "menu".

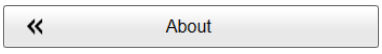
Equivalent ambient noise

The noise estimate provided by the EA440 includes all noises. This includes noise generated by your own vessel, for example electric noise, propellers, machinery and mechanical vibrations. By means of additional equations, the noise values are compensated for the bandwidth. The equivalent ambient noise value attempts to present the total noise as if it was all from ambient sources.

This information is also shown on the **Extras** "menu".

About dialog box

The EA440 program is released with a specific software version. The **About** dialog box displays the current version number. The version described in this Reference manual is 19.1.



How to open

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

Description

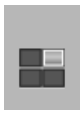
Every EA440 software release is uniquely identified. The **About** dialog box identifies the current EA440 software version with its release date.

Active menu; Functions and dialog boxes

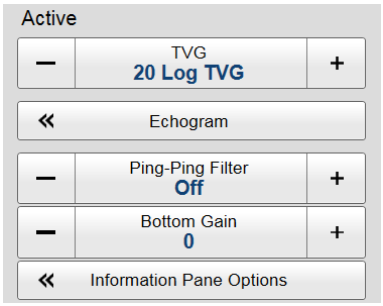
The **Active** menu offers parameters related to current views and data presentations shown by the EA440.

How to open

Select the **Active** icon.



The icon is located under the **Main** menu. Select the icon one more time to close the menu.



Topics

TVG function, page 342

Echogram dialog box, page 344

Ping-Ping Filter function, page 351

Bottom Gain function, page 352

Information Pane Options dialog box, page 353

TVG function

When an acoustic pulse is sent through the water, it will gradually lose its energy. The greater the distance between the transducer and the target(s), the greater the loss of energy. **TVG** (Time Variable Gain) compensates for the loss of acoustic energy due to geometric spread and absorption.

How to open

This function is opened from the **Active** menu.

Description

When an acoustic pulse is sent through the water, it will gradually lose its energy. The greater the distance between the transducer and the target(s), the greater the loss of energy. The loss of energy is explained with two factors.

- **Geometric spread**: Once transmitted, the acoustic energy will spread out to form a circular beam. The width of this beam increases with the physical distance to the target(s).

- **Absorption loss**: Depending on the salinity and temperature, the water will absorb some of the energy from the transmission. The absorption loss increases as the physical distance to the target(s) increases.

Both the geometric spread and the absorption will also have an effect on the returned echo signal. That is why we normally refer to these factors as the *two-way transmission loss*. TVG (Time Variable Gain) compensates for this loss of acoustic energy.

The TVG compensation is expressed as a logarithmic curve. You can choose from a selection of curves. Each curve has a different slope creating a different gain compensation. Each curve is identified with the equation *X log TVG*. The coefficient "*X*" is an integer. Typical values for "*X*" are 10 to 40.

Tip

You can select TVG using this function. You can also adjust the TVG setting in the **Echogram** *dialog box. The* **TVG** *function is located on the* **Echogram** *page.*

Details

TVG

Select the **TVG** setting you want to use. Several TVG compensation settings are available.

- **No TVG**

  TVG compensation is not implemented. This setting is hardly ever used.

- **20 Log TVG**

  Volume backscattering strength

- **40 Log TVG**

  Point backscattering strength

Note

The setting you choose will only be valid for the currently "active" echogram. The "active" echogram view is identified with a thicker border. Normally, you must first click in the chosen echogram to "activate" it, and then choose the setting you wish to use.

Apply to All

Select this box to use the chosen setting on all the echograms of the same type.

Related tasks

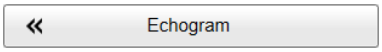
Adjusting the TVG (Time Variable Gain) setting, page 69

Related topics

Echogram page, page 347

Echogram dialog box

The **Echogram** dialog box allows you to set up the parameters controlling the echogram presentation. Two pages control the horizontal lines and the echogram type with applied TVG (time variable gain). One page controls how fast the echogram travels horizontally across the presentation.



How to open

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

Description

The **Echogram** dialog box is the main source for all echogram presentation choices.

Note

The setting you choose will only be valid for the currently "active" echogram. Click in any echogram view to make it "active". The "active" echogram view is identified with a thicker border. Select **Apply to All** *if you wish to use the chosen settings on all the echograms of the same type.*

The dialog box offers tabs to present the settings.

- **Lines**

  The **Lines** page in the **Echogram** dialog box allows you to control the horizontal and vertical lines used in the echogram presentation. You can make the bottom easier to see, and add lines that hold additional information. The vertical scale of the echogram presentation can be changed. If you wish to add annotations to your echogram, these are enabled on this page.

  For more information: Lines page, page 345

- **Echogram**

  The **Echogram** page allows you to choose which type of echogram you wish to display. You can also control the TVG (Time Variable Gain). The EA440 can work with several different TVG compensation settings. The TVG (Time Varible Gain) compensation is designed to counteract the natural phenomena of geometric spread and absorption loss.

  For more information: Echogram page, page 347

- **Horizontal Axis**

  The echograms travels from right towards left across the EA440 presentation. On the **Horizontal Axis** page you can choose the horizontal scale of the echogram. This controls the "speed" of the echogram.

  For more information: Horizontal Axis page, page 350

Tip

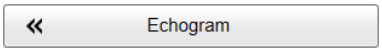
You can also select TVG setting with the **TVG** *function. The* **TVG** *(Time Varied Gain) function is located on the* **Active** *menu.*

Lines page

The **Lines** page in the **Echogram** dialog box allows you to control the horizontal and vertical lines used in the echogram presentation. You can make the bottom easier to see, and add lines that hold additional information. The vertical scale of the echogram presentation can be changed. If you wish to add annotations to your echogram, these are enabled on this page.

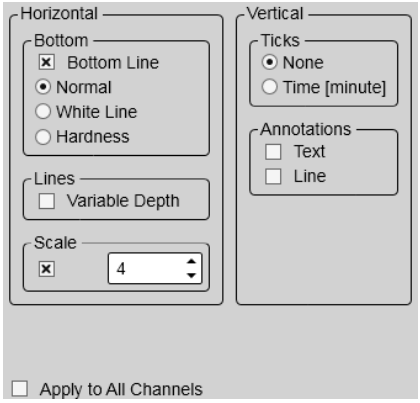
How to open

This page is located in the **Echogram** dialog box. To open, select the button on the **Active** menu.



Description

The settings on the **Lines** page are all related to visual appearance. The setting(s) you choose will only be valid for the currently "active" echogram. Click in any echogram view to make it "active". The "active" echogram view is identified with a thicker border. Select **Apply to All** if you wish to use the chosen settings on all the echograms of the same type.



Details

Bottom

The bottom line can be switched off or on.

- **Bottom Line**

  This is an "on/off" switch. Select the box to enable the function. The *Bottom Line* can be added to your echogram to enhance the visual bottom detection. Select from the list how you want the bottom line enhanced.

  Bottom Line description, page 210

- **Normal**

  The bottom line is drawn in the current foreground colour.

- **White Line**

  The *White Line* can be added to your echogram to enhance the visual bottom detection. It appears as thick line in the current background colour (normally white) that follows the bottom contour. This line will not remove information, it will simply "push" the echo information further down in order to make the bottom easier to see.

  White Line description, page 211

- **Hardness**

  The *Hardness Line* is a thick colour coded line that shows you the bottom reflectivity - that is how "hard" the bottom is.

  Hardness Line description, page 211

Lines

- **Variable Depth**

  When enabled, a horizontal depth line is placed in the echogram. This is typically used to measure the water depth or the depth of a specific target in the water column. To move the depth line, click on it, and drag it up or down. The depth of the line is displayed in a small box at the left side of the echogram.

  Variable Depth Line description, page 212

Scale

When enabled, equidistant horizontal scale lines are drawn inside the echogram in the current foreground colour; black during day and white during night. A maximum of 10 scale lines can be selected. No scale lines are drawn when the scale line count is set to 0 (zero).

Scale Lines description, page 213

Vertical

These options control vertical markers and annotations.

- **Ticks**

  This function places short vertical markers on the top of the echogram.

  Vertical Tick description, page 213

  – **None**: No vertical markers are shown.

  – **Time**: A short vertical line is drawn in the upper part of the echogram once every minute.

- **Annotations**

  Select *Text* or *Line* to allow *Annotation* markers to be shown in the echogram. If you select *Line*, each text annotation is followed by a vertical line for improved visibility. Annotations can be typed in manually, set up for automatic generation, or imported from an external device.

  Annotation markers description, page 214

  Tip

  Use the **Annotations** *page to type comments and insert annotations into the echograms. Several different annotation types may be added to the echogram. The* **Annotations** *page is located in the* **Installation** *dialog box.*

  Annotations page, page 324

  Several different annotation types may be added to the echogram. When you save raw data, the annotations you have defined are stored as annotation datagrams.

Apply to All

Select **Apply to All** if you wish to use the chosen settings on all the echograms of the same type.

Return to...

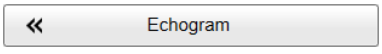
Echogram dialog box, page 344

Echogram page

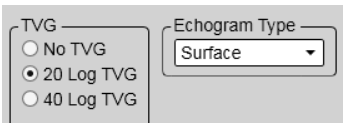
The **Echogram** page allows you to choose which type of echogram you wish to display. You can also control the TVG (Time Variable Gain). The EA440 can work with several different TVG compensation settings. The TVG (Time Varible Gain) compensation is designed to counteract the natural phenomena of geometric spread and absorption loss.

How to open

This page is located in the **Echogram** dialog box. To open, select the button on the **Active** menu.



Description



Each separate echogram view offered by the EA440 can show you a different echogram type. Which type to see is chosen on this **Echogram** page. The page also allows you to select which TVG curve to use for the chosen echogram.

The setting(s) you choose will only be valid for the currently "active" echogram. Click in any echogram view to make it "active". The "active" echogram view is identified

with a thicker border. Select **Apply to All** if you wish to use the chosen settings on all the echograms of the same type.

Tip

You can also select TVG setting with the **TVG** *function. The* **TVG** *(Time Varied Gain) function is located on the* **Active** *menu.*

Details

TVG

When an acoustic pulse is sent through the water, it will gradually lose its energy. The greater the distance between the transducer and the target(s), the greater the loss of energy.

The TVG (Time Varible Gain) compensation is designed to counteract the natural phenomena of geometric spread and absorption loss.

The TVG compensation is expressed as a logarithmic curve. You can choose from a selection of curves. Each curve has a different slope creating a different gain compensation. Each curve is identified with the equation *X log TVG*. The coefficient "*X*" is an integer. Typical values for "*X*" are 10 to 40.

Select the **TVG** setting you want to use. Several TVG compensation settings are available.

- **No TVG**

  TVG compensation is not implemented. This setting is hardly ever used.

- **20 Log TVG**

  Volume backscattering strength

- **40 Log TVG**

  Point backscattering strength

Echogram Type

Use this function to select what kind of echogram you wish to see in the current ("active") view.

- **Surface**

  A *Surface* echogram is mainly used when you wish to look at the entire water column starting from the sea surface and down to the sea bottom. Since this echogram is referenced to the sea surface, the sea bottom contour will vary with the actual depth. If you set up the **Start Range** and **Range** depths to place the sea bottom contour at the lower end of the echogram, you will have good opportunity to study the echoes from the water column.

  In the surface echogram, all calculations are made from the sea surface and down to the detected sea bottom. Use this echogram type to obtain correct calculation of the biomass. It will also provide valid data for the *Target Strength Histogram* information pane.

- **Bottom**

  A *Bottom* echogram is mainly used when you want to examine the echoes from fish close to the sea bottom. Since this echogram is referenced to the sea bottom, the sea surface will vary with the actual depth, while the bottom is drawn flat. This makes it easy to study the echoes from the sea bottom. You can investigate the sea bottom conditions and hardness, and detect fish.

  The echogram is only drawn for pings that have a successful bottom detection.

- **Sidescan**

  The *Sidescan echogram* shows the bottom as seen from the side of the vessel hull. The horizontal angle is determined by the physical angle of the transducer installation. You can select the start range (the depth from which the sidescan echo starts) and the horizontal range by means of the **Start Range** and **Range** settings on the **Main** menu.

- **Spectrogram**

  A *Spectrogram* echogram is used for hydrophone systems.

  Spectrogram echogram description, page 209

Apply to All

Select **Apply to All** if you wish to use the chosen settings on all the echograms of the same type.

Return to...

Echogram dialog box, page 344

Related topics

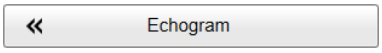
TVG function, page 342

Horizontal Axis page

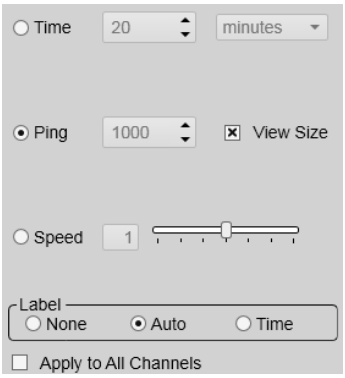
The echograms travels from right towards left across the EA440 presentation. On the **Horizontal Axis** page you can choose the horizontal scale of the echogram. This controls the "speed" of the echogram.

How to open

This page is located in the **Echogram** dialog box. To open, select the button on the **Active** menu.



Description



The horizontal scale controls how "fast" the echograms move from right towards left across the EA440 presentation. The setting(s) you choose will only be valid for the currently "active" echogram. Click in any echogram view to make it "active". The "active" echogram view is identified with a thicker border. Select **Apply to All** if you wish to use the chosen settings on all the echograms of the same type.

Details

Horizontal Axis

The echograms travels from right towards left across the EA440 presentation. On the **Horizontal Axis** page you can choose the horizontal scale of the echogram. This controls the "speed" of the echogram.

- **Time**

  The horizontal scale of the echogram is based on time. Select resolution and unit.

- **Ping**

  The horizontal scale of the echogram is based on the number of transmissions ("pings") made. Select **View Size** to specify that the number of horizontal pixels shall define the number of displayed horizontal pings using one ping per pixel.

- **Speed**

  The horizontal scale of the echogram is based on the relative speed you choose. Select speed with the ruler.

Label

Small labels are shown in the bottom left and right corners of the echogram. These labels can contain time or distance to identify the horizontal axis of the echogram. You can hide the labels from view.

Note that in sidescan echogram views, the labels are placed in the top and bottom corners of the view. This is because the sidescan echograms travel in vertical direction from the top to the bottom of the view.

Label markers description, page 215

- **None**: The labels are hidden
- **Auto**: The horizontal scale is set automatically
- **Time**: The horizontal scale is defined by time. The time shown in the bottom right corner of the echogram is then the current time (now).

Apply to All

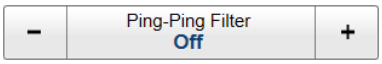
Select **Apply to All** if you wish to use the chosen settings on all the echograms of the same type.

Return to...

Echogram dialog box, page 344

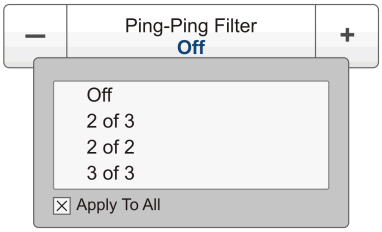
Ping-Ping Filter function

The **Ping-Ping Filter** analyses the historical information from previous consecutive pings in order to remove unwanted noise and interference from the EA440 presentation.



How to open

This function is opened from the **Active** menu.



Description

The **Ping-Ping Filter** offers three different strengths. The echo information from two, four or eight transmissions ("pings") are averaged to distinguish real echoes from noise and interference.

Details

Ping-Ping Filter

The following filter options are provided.

- **Off**

  The filter is disabled. The historical information from previous transmissions ("pings") are not used to remove noise and unwanted echoes.

- **2 of 3**

  For the current echo to be shown, the same echo must be present in at least *two* of the previous *three* pings.

- **2 of 2**

  For the current echo to be shown, the same echo must be present in *both* of the previous *two* pings.

- **3 of 3**

  For the current echo to be shown, the same echo must be present in *all* of the previous *three* pings.

Apply to All

Select this box to use the chosen setting on all the echograms of the same type.

Related tasks

Removing noise and false echoes from the echogram, page 95

Bottom Gain function

The **Bottom Gain** setting controls the gain below the detected bottom depth.

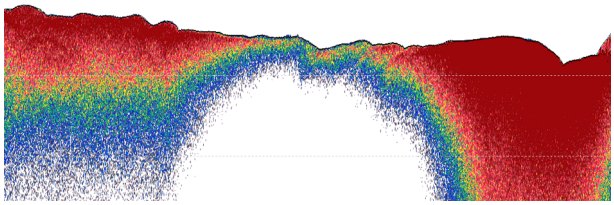
How to open

This function is opened from the **Active** menu.

Description

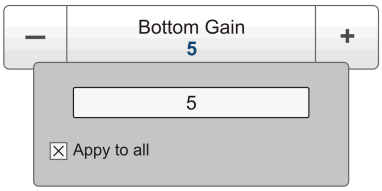
Different bottom conditions (rock, sand, mud etc) will result in different bottom echoes in the EA440 echograms. By changing the bottom gain, the presentation is changed depending on the bottom type. You can thus learn more about the bottom.

Example



*The typical effect of the **Bottom Gain** adjustment*

Details



Bottom Gain

Adjust the setting to fit your requirements.

Apply to All

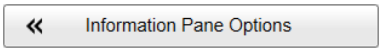
Select this box to use the chosen setting on all the echograms of the same type.

Related tasks

Investigating the sub-bottom conditions, page 110

Information Pane Options dialog box

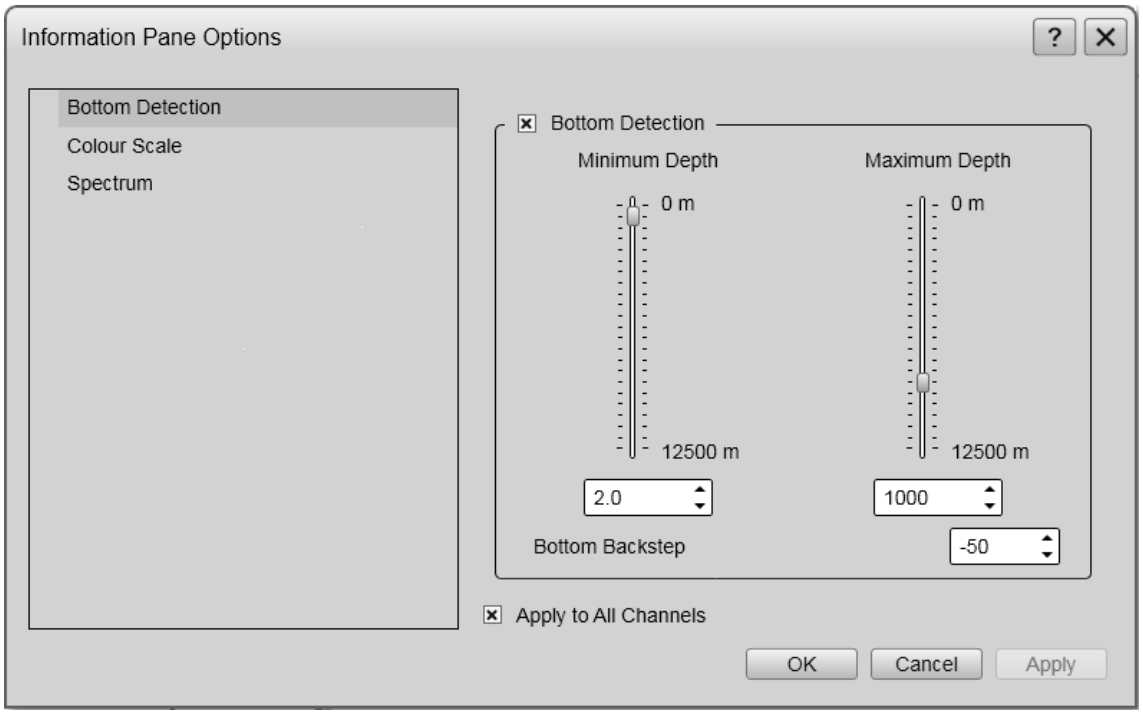
The EA440 offers several *information panes* to provide additional and detailed data from the EA440 presentation. The information panes are opened and closed using the buttons on the top bar. Several of the information panes are fitted with a **Setup** button. Select **Setup** to open the **Information Pane Options** dialog box. The **Information Pane Options** dialog box allows you to change the operational parameters used to present the data in the information panes.



How to open

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

You can also open the **Information Pane Options** dialog box by selecting **Setup** in selected information panes.



Description

The **Information Pane Options** dialog box offers a menu on the left side, and several pages for pane parameters on the right side.

The following pages are provided.

- **Bottom Detection**

  Locating the bottom is important for the EA440. The purpose of the **Bottom Detection** parameters are to define the upper and lower depth limits most likely to be used during the EA440 operation. You can also modify the setting for **Bottom Backstep** to change the bottom detection relative to the bottom echo.

  Bottom Detection page, page 357

- **Colour Scale**

  The colour scales used by the EA440 are designed to reflect the how strong the echoes are. The echo strength is measured in decibels (dB). Each colour in the scale represents an increase (or decrease) in the echo strength. In the basic colour scale with 12 colours, each colour represents a 3 dB step.

  Colour Scale page, page 355

- **Spectrum**

  Select the frequency band for the *Spectrum* information pane in the **Spectrum** page.

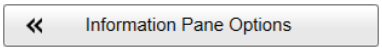
  Spectrum page, page 359

Colour Scale page

The colour scales used by the EA440 are designed to reflect the how strong the echoes are. The echo strength is measured in decibels (dB). Each colour in the scale represents an increase (or decrease) in the echo strength. In the basic colour scale with 12 colours, each colour represents a 3 dB step. The **Colour Scale** parameters allow you to change the echo strength range (in decibels) that each colour represent.

How to open

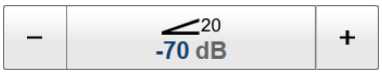
The page is opened in the **Information Pane Options** dialog box. To open the **Information Pane Options** dialog box, select the button on the **Active** menu.



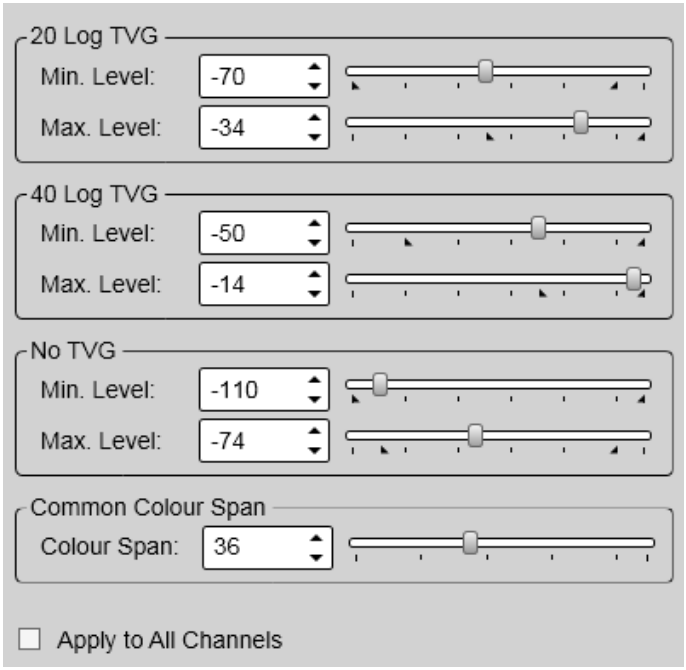
The **Colour Scale** page is also opened by selecting **Setup** in the *Colour Scale* information pane.

Description

When the **Colour Scale** page opens, it offers two adjustments for each TVG setting; minimum and maximum level. The minimum level chosen is also reflected on the relevant **Minimum Level** button on the **Main** menu.



The **Colour Setup** dialog box allows you to choose from several colour scales to use in the EA440 echo presentations. Which colour scale to use is mainly a personal preference based on ambient light conditions, the nature of the echoes and your own experience.



The following colour scales are available.

12 colours | Sonar colours | Smooth ES | Grayscale | BI500 colours

The **Smooth Echosounder** scale is based on the standard 12-colour scale. Additional colours have been added between them to make smoother colour transitions.

Keep in mind that in the basic scale with 12 colours, each discrete colour represents a 3 dB range of echo signal strength. This implies that the next colour is selected every time the echo strength is doubled.

Tip

By default you have 64 or 12 colours available to present the echoes, and a selection of palettes. The colour scale can be retrieved any time by selecting **Colour Scale** *on the top bar. The chosen colours are shown at the bottom of the EA440 presentation.*

If you choose to use many colours, the resolution of the EA440 presentation is greatly improved. It is then easier to distinguish the difference between the various echoes of different size and/or target strength.

Each end of the colour scale reflects a certain echo strength measured in decibels (dB), and these values can be read in the *Colour Scale* information pane. By means of the **Colour Scale** parameters you can adjust these echo strength values. This means that you can adjust the echo strength presented by each colour. The default 3 dB range in the 12 colours scale can thus be adjusted up and own to suit your preferences. When you use 64 colours, each colour can thus represent a chosen range of echo signal strength.

Example

If you set the minimum level to a larger negative value, the EA440 will present weaker echoes with the dark colours. If the colour span is not changed, the maximum level will be changed accordingly. The presentation will thus become for "sensitive" while keeping the same resolution.

If you change the colour span to a larger value you will increase the echo strength area presented, but each individual colour will present a larger area. This means the resolution will be decreased.

Your choice of colour scale has no effect on the minimum level settings. The colour scale only controls the visual presentation of the EA440 echo data.

Details

Min(imum) Level / Max(imum) Level

Set the lower and upper limits of the echo strength you wish the relevant colour scale to reflect. There is one level definition for each TVG setting.

To determine how many dB the echo strength increases for each colour, take the numerical difference between the upper and lower limits, and divide it with the number of colours in the scale.

Common Colour Span

Set the upper limit of the echo strength you wish the colour scaled to reflect.

Apply to All Channels

Select this box to apply the current selection to all the channels on your EA440. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

Return to...

Information Pane Options dialog box, page 353

Related topics

Colour Scale information pane description, page 193

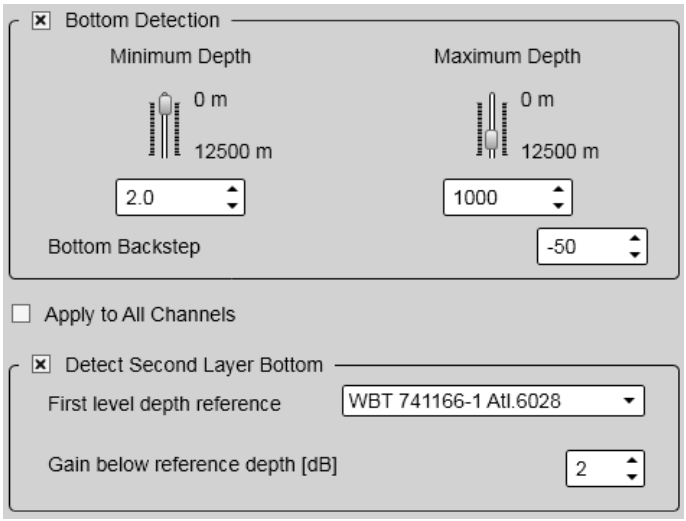
Bottom Detection page

Locating the bottom is important for the EA440. The purpose of the **Bottom Detection** parameters are to define the upper and lower depth limits most likely to be used during the EA440 operation. You can also modify the setting for **Bottom Backstep** to change the bottom detection relative to the bottom echo.

How to open

The page is opened in the **Information Pane Options** dialog box. To open the **Information Pane Options** dialog box, select the button on the **Active** menu. You can also select the **Setup** button in the relevant information pane.

Description



Occasionally, difficult environmental, water or bottom conditions may inhibit a *bottom lock*. The EA440 needs this *bottom lock* to locate the correct depth, and to stay on it during the operation, even if the depth changes continuously. The **Bottom Detection** parameters are provided to rectify this.

The **Bottom Detection** parameters provide separate limits for minimum and maximum depth. These limits may be used to obtain a *bottom lock* on the depth when the EA440 is transmitting.

The **Bottom Backstep** parameter allows you to manually modify where on the bottom echo the depth will be detected.

Tip

If you have problems with bottom detection, you may consider disabling it. This can be useful if you only wish to study targets in the water column.

It is also possible to detect the second layer under the bottom. For this you need an high frequency transducer for the second layer, and a lower frequency transducer for finding the actual bottom.

Details

Bottom Detection

This is an "on/off" switch. Select the box to enable the function.

Maximum Depth

The search for the bottom echo extends down to this depth whenever bottom track is lost.

Use a slightly larger depth value than the deepest spot you expect to visit. This will prevent annoyingly long ping intervals every time the bottom track is lost. A depth value of either 0 (zero) or less than the minimum depth disables the bottom detector.

Note

If you set maximum depth to a value identical or smaller than the minimum value, the bottom detection algorithm will be disabled. The EA440 will not detect the bottom at all, and the displayed depth will be 0.00 m.

Minimum Depth

The bottom detector starts the search for the bottom echo at this depth. The detector will fail in shallow water if you select a too large depth value, and the tail of the transmitting pulse may cause problems if a too small value is set.

Note

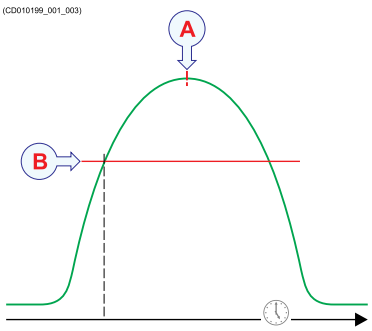
If you set maximum depth to a value identical or smaller than the minimum value, the bottom detection algorithm will be disabled. The EA440 will not detect the bottom at all, and the displayed depth will be 0.00 m.

Bottom Backstep

This parameter allows you to manually modify where on the bottom pulse the depth shall be detected. The setting does not have an effect on the ability to detect and track the bottom.

A *The peak of the bottom pulse*

B *-50 dB is the default bottom backstep level*



The bottom pulse basically identifies the bottom depth just prior to the peak of the pulse (A). However, this may not be the true bottom. For example, if the bottom pulse is generated by a rock bottom under a thick layer of mud, the actual depth is slightly shallower. For this reason, the EA440 is by default set up to give you a depth reading a few milliseconds before the peak of the pulse. This is done by setting the bottom backstep level to a default value of -50 dB (B).

The actual bottom will never appear at the peak of the bottom pulse (A), it will always be slightly before the peak. By changing the **Bottom Backstep** parameter you can detect the bottom earlier.

Apply to All Channels

Select this box to apply the current selection to all the channels on your EA440. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

Detect Second Layer Bottom

Select **Detect Second Layer Bottom** to start looking for the second layer. Apply to all channels must not be selected for this option to be available.

First level depth reference

Select the channel with the higher frequency to find the normal depth.

Gain below reference depth

Change the gain only below the normal depth, to see the second layer better. The Gain below reference depth is a linear gain function in dB per m.

Return to...

Information Pane Options dialog box, page 353

Related topics

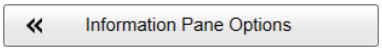
Depth information pane description, page 190

Spectrum page

Select the frequency band for the *Spectrum* information pane in the **Spectrum** page.

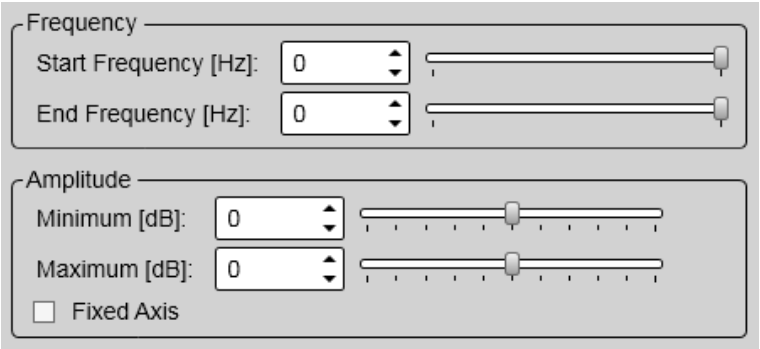
How to open

The page is opened in the **Information Pane Options** dialog box. To open the **Information Pane Options** dialog box, select the button on the **Active** menu.



The **Spectrum** page is also opened by selecting **Setup** in the *Spectrum* information pane.

Description



The *Spectrum* information pane is made for hydrophones. The **Spectrum** page is where you set up the *Spectrum* information pane. Select the frequency band you want to inspect. When you want a fixed axis, you select the minimum and maximum on the amplitude as well.

Details

Frequency

Enter the start and end frequencies.

Start frequency

Enter the start frequency in Hertz.

End frequency

Enter the end frequency in Hertz.

Amplitude

Enter the minimum and maximum amplitude.

Minimum

Enter the minimum amplitude in dB.

Maximum

Enter the maximum amplitude in dB.

Fixed Axis

Select fixed axis and enter the minimum and maximum amplitude.

Return to...

Information Pane Options dialog box, page 353

Secondary functions and dialog boxes

Topics

LAN Port Setup dialog box

The **LAN Port Setup** dialog box allows you to define the parameters for Ethernet (Local Area Network (LAN)) communication with external devices. External devices may for example be navigation sensors (speed, position, etc.) or peripheral systems.

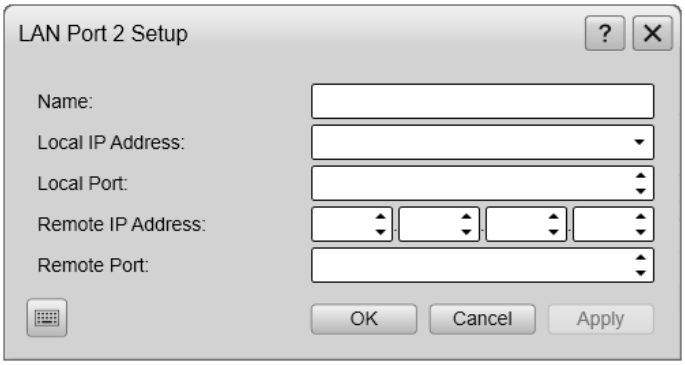
How to open

To open the **LAN Port Setup** dialog box, select a LAN port on the **I/O Setup** page, and select **Setup**.

The **I/O Setup** page is located in the **Installation** and **Output** dialog boxes. The **Installation** dialog box is located on the **Setup** menu. The **Output** dialog box is located on the **Operation** menu.

Description

Ethernet (Local Area Network (LAN)) communication is an efficient way to connect to external sensors, such as a global positioning system (GPS), to receive navigational data. In order for this communication port to work, the parameters must be set up properly.



Tip

The settings in the dialog box are only provided to define the actual communication parameters. You can not select which inputs or outputs to use. However, you must set up these communication parameters before you select input or output datagrams.

All navigation and motion sensors are connected using the **Sensor Installation** *page. You must also decide which datagram formats that will be accepted. The* **Sensor Installation** *page is located in the* **Installation** *dialog box. The* **Installation** *dialog box is located on the* **Setup** *menu.*

Details

Name

This is a text box. Type a suitable name for the communication port. If you do not have a computer keyboard connected to your Operator Station, select the **Keyboard** button to open an on-screen keyboard.

Local IP Address

This is the Internet Protocol (IP) address of the Ethernet interface adapter located in your Operator Station. In most cases, each Ethernet adapter has a unique IP address, even when it supports multiple sockets. If you have more than one Ethernet adapter, you are provided with a list of the available addresses.

Local Port

This port is important if you want to receive information on the Operator Station. The number you define here must match the port number on the peripheral device that is providing the information. This peripheral device is for example a sensor on the network, or another navigation or hydroacoustic system. To find the port number, consult the documentation for the device, and/or the application to be used on it.

If the data communication is set up to only export information from the EA440 Operator Station to a peripheral device, this **Local Port** parameter is not required.

Remote IP Address

This is the Internet Protocol (IP) address for a peripheral device. This peripheral device is for example a sensor on the network, or another navigation or hydroacoustic system. If the data communication between your Operator Station and the peripheral device is set up to only import data from the device, the remote IP address is not required.

If you want to export information from the Operator Station to one or more peripheral devices (*broadcast*), set **Remote IP Address** to 255.255.255.255. This is the default setting. If you use *point-to-point* communication in a closed network, you need to set the remote IP address manually.

Remote Port

The **Remote Port** is important if you want to export information from the Operator Station to a peripheral device on the local area network (LAN). This peripheral device is for example a sensor on the network, or another navigation or hydroacoustic system. The application on the peripheral device will "listen" to this port number.

If you want to establish point-to-point communication for data import from a peripheral device on the network, you may need to define the network port on this device.

To find the port number, consult the documentation for the device, and/or the application to be used on it.

Related topics

I/O Setup page, page 265

Serial Port Setup dialog box

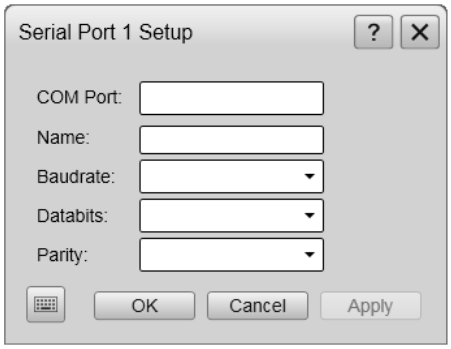
Serial line communication is important for EA440 operation. The information from external devices, such as navigation sensors, is based on serial line "datagrams". For most commercial devices, the formats of these datagrams are defined by NMEA (National Marine Electronics Association). The **Serial Port Setup** dialog box allows you to define the communication parameters for serial line ports. These ports are typically used to interface external devices, such as navigation sensors.

How to open

To open the **Serial Port Setup** dialog box, select a serial port on the **I/O Setup** page, and select **Setup**.

The **I/O Setup** page is located in the **Installation** and **Output** dialog boxes. The **Installation** dialog box is located on the **Setup** menu. The **Output** dialog box is located on the **Operation** menu.

Description



A serial port is a serial communication interface that is still very common between maritime systems. It is very important that any serial line between the EA440 and any external system is setup correctly with identical parameters at each end. The NMEA (National Marine Electronics Association) standard for serial communication defines standard parameters for such interfaces.

According to their web site, the National Marine Electronics Association (NMEA) is "the unifying force behind the entire marine electronics industry, bringing together all aspects of

the industry for the betterment of all in our business". For more information, see: http://www.nmea.org

Details

COM Port

This text box identifies the current communication port on the Operator Station. You can not change this information.

Name

This is a text box. Type a suitable name for the communication port.

Baud Rate

Use this setting to specify the baud rate ("speed") for the serial communication. The standard baud rate defined for NMEA serial line communication is 4800 baud.

In digital communications, *symbol rate*, also known as *baud rate* and *modulation rate*, is the number of symbol changes, waveform changes, or signalling events, across the transmission medium per time unit using a digitally modulated signal or a line code. The symbol rate is measured in *baud* (Bd) or symbols per second. In the case of a line code, the symbol rate is the pulse rate in pulses per second. Each symbol can represent or convey one or several bits of data. The symbol rate is related to the gross bit rate expressed in bits per second.

https://en.wikipedia.org/wiki/Symbol_rate

Data Bits

Use this function to specify the number of data bits for serial communication. The standard number of data bits defined for NMEA serial line communication is 8 (eight).

Parity

Use this function to specify the parity for serial communication. The standard parity defined for NMEA serial line communication is "None".

A *parity bit*, or *check bit* is a bit added to the end of a string of binary code that indicates whether the number of bits in the string with the value one is even or odd. Parity bits are used as the simplest form of error detecting code. [...] In serial data transmission, a common format is 7 data bits, an even parity bit, and one or two stop bits. This format neatly accommodates all the 7-bit ASCII characters in a convenient 8-bit byte. Other formats are possible; 8 bits of data plus a parity bit can convey all 8-bit byte values.

https://en.wikipedia.org/wiki/Parity_bit

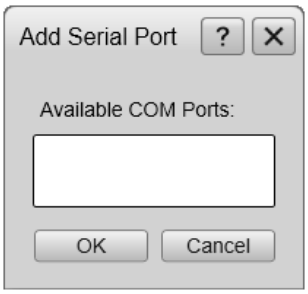
Related topics

I/O Setup page, page 265

Add Serial Port dialog box

Serial line communication is important for EA440 operation. The information from external devices, such as navigation sensors, is based on serial line "datagrams". For most commercial devices, the formats of these datagrams are defined by NMEA (National Marine Electronics Association). The **Add Serial Port** dialog box allows you to put a free serial port (COM port) on the Operator Station to use for interface purposes.

How to open



To open the **Add Serial Port** dialog box, select **Add** under the list of serial ports on the **I/O Setup** page.

The **I/O Setup** page is located in the **Installation** and **Output** dialog boxes. The **Installation** dialog box is located on the **Setup** menu. The **Output** dialog box is located on the **Operation** menu.

Description

The first time the Operator Station is powered up after a EA440 software installation, it will automatically do a search to find available serial ports.

- If the Operator Station was provided by Kongsberg Maritime as a part of the EA440 delivery, you can only use the ports that were fitted by the manufacturer.
- If the Operator Station was purchased locally, you may increase the number of serial ports by adding a serial adapter.

If you have added new hardware, you must also allow the EA440 to use the new port(s). Select **Add**, and use the **Add Serial Port** dialog box. Select the port in the list, and select **OK**.

Tip

You can give your new serial port a more descriptive name in the **Serial Port Setup** *dialog box.*

Related topics

I/O Setup page, page 265

Port Monitor dialog box

Communication with external devices is important for EA440 operation. The communication between the Operator Station and peripheral devices takes place using "datagrams". These datagrams are self-contained and independent entities of data carrying information. When setting up or maintaining the EA440, it is always useful to verify that the communication lines with external devices are operational. The **Port Monitor** dialog box allows you to study the communication stream on the chosen serial line or LAN port.

How to open

To open the **Port Monitor** dialog box, select a serial or LAN port on the **I/O Setup** page, and select **Monitor**.

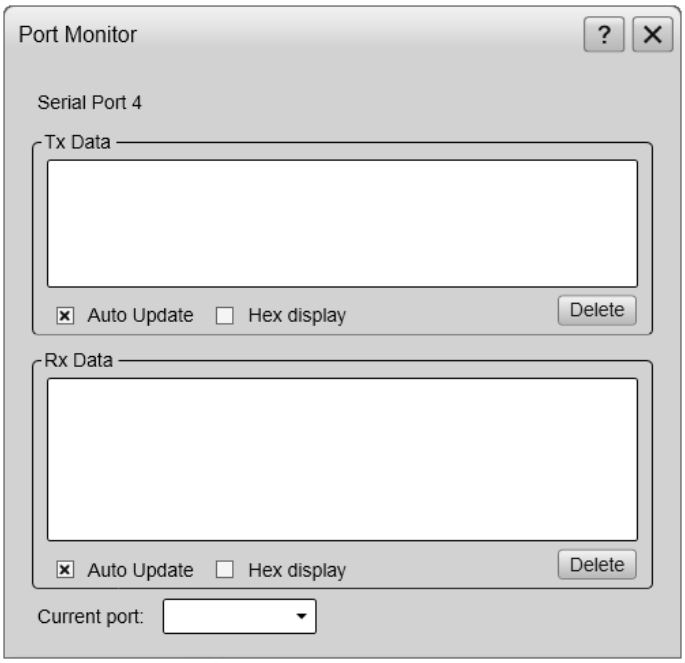
The **I/O Setup** page is located in the **Installation** and **Output** dialog boxes. The **Installation** dialog box is located on the **Setup** menu. The **Output** dialog box is located on the **Operation** menu.

Description

The **Port Monitor** dialog box provides one text box for incoming messages (**Rx Data**), and one for outgoing messages (**Tx Data**). Use these boxes and your knowledge of the data communication to investigate the datagrams.

Note

The **Port Monitor** *dialog box is a tool for debugging purposes. It is neither required nor intended for normal operation of the EA440.*



Details

Tx Data

This text box displays the data communication exported from the EA440 to external devices. If you have enabled **Auto Update**, the text box is continuously updated with new information.

Rx Data

This text box displays the data communication received by the EA440 from external devices. These external devices may for example be navigation sensors, motion reference units, or other hydroacoustic systems. If you have enabled **Auto Update**, the text box is continuously updated with new information.

Auto Update

When this function is activated, the relevant text box is continuously updated with new information. If you wish to "freeze" the information for further investigation, deactivate to disable the automatic update.

Hex display

Select this to show the information in the relevant text box in hexadecimal format.

Delete

This function clears the text box to allow a new stream of communication data to start on a blank page.

Current port

This box identifies the port you are currently monitoring.

Tip

If you wish to change your attention to a different serial or LAN port, you can choose the communication port here instead of returning to **I/O Setup**.

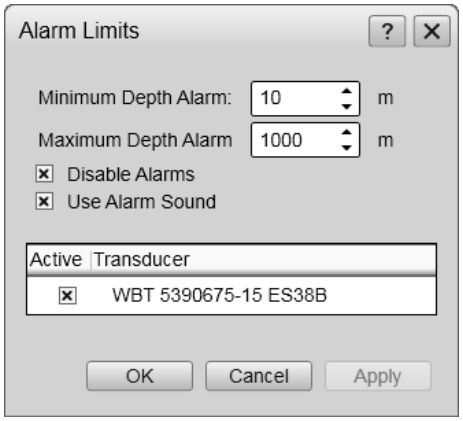
Related topics

I/O Setup page, page 265

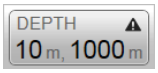
Alarm Limits dialog box

The **Depth Alarms** readout is located on the right hand side of the top bar. The depth alarms provided by the EA440 fulfils the requirements made by the International Maritime organization (IMO) for navigational purposes. If the current depth changes to exceed the limits you have chosen, the alarm is triggered. Use this dialog box to define the alarm limits for minimum and maximum depths.

How to open



To open the **Alarm Limits** dialog box, double-click **Depth Alarm** on the top bar.



Description

The **Alarm Limits** dialog box allows you to set up the operational properties for the depth alarm. In addition to the depth limits, you can disable the entire alarm, and control the alarm sound. You can also control from which channel the depth information shall be taken. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

An alarm is triggered if:

- The current depth is shallower than the minimum alarm depth you have chosen
- The current depth is deeper than the maximum alarm depth you have chosen

When the alarm is triggered, the **Depth Alarms** box changes background colour to red. The warning is also provided as a message and - if enabled - as an audio signal.

To acknowledge the alarm, double-click **Depth Alarms** to open the dialog box. Select **Disable Alarms**. You can acknowledge the alarm in the **Messages** dialog box, but without disabling the actual alarm, new messages will appear as long as the alarm limits are met.

Details

Shallow Water Alarm Limit

This setting allows you to set the minimum depth to trigger the alarm.

The following situation will set off the alarm: The current depth is shallower than the minimum alarm depth you have chosen

Deep Water Alarm Limit

This setting allows you to set the maximum depth to trigger the alarm.

The following situation will set off the alarm: The current depth is deeper than the maximum alarm depth you have chosen

Disable Alarms

This function allows you to disable both depth alarms simultaneously. The appearance and content of the **Depth Alarms** field on the top bar is then changed to reflect the new operational status.

Use Alarm Sound

The audible alarm signal can be controlled using this function; you can enable or disable an alarm tone.

Active / Transducer

The table presents the channels that may be used for the depth detection. This setting will not have any effect on the echograms. You only choose which channel to be used by the alarm system for bottom detection. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

If you deselect all frequency channels, the alarm system is disabled.

Related topics

Top bar overview, page 177

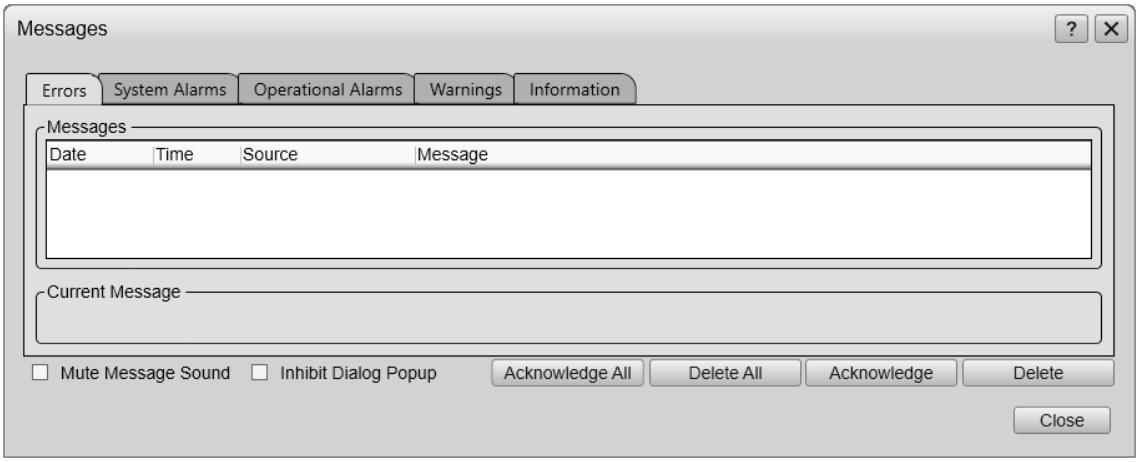
Messages dialog box

The **Messages** dialog box allows you to read and acknowledge the messages issued by the EA440.

How to open

To open the **Messages** dialog box, select **Messages** on the top bar.

When a new message is issued by the EA440, the button on the top bar flashes. The colour of the triangle reflects the severity of the most serious message. If you hold the cursor over the button, a short list of the current messages is shown.



Description

Messages from the EA440 can be related to any type of hardware or software errors. Messages also communicate events related to the operational performance and conditions. The messages are divided into different types related to their importance. Warnings are indicated with a yellow colour, while errors are indicated with a red colour.

The **Messages** dialog box shows you the relevant information, the source of the information, and the time of the message. You can select a message text to copy it to the larger text box under the table. This make abbreviated messages easier to read.

Several message types are used. The dialog box offers one page for each type.

Message types

- **Errors**

  These errors are fatal. Operation of the EA440 cannot continue. You need to turn off the EA440and attempt a restart.

- **System alarms**

  These are messages related to the EA440 operation, or to major software components. You can continue the operation, but note that the data provided by the EA440 may be inaccurate. A restart is recommended.

- **Operational alarms**

  These are messages related to environment conditions, interface or other non-software events. Depending of the message nature, check that all interfaces to the EA440 are operational. A system restart may be required.

- **Warnings**

  A warning is issued when an irregular event occurs. Depending on the nature of the message, check what is causing the warning. A restart is normally not required.

- **Information**

  An information messages is simply a notification of a minor operational event. No corrective actions are required.

Details

Messages

The messages are listed in a table. For each message, the date and time of issue is shown. The source of the information (for example a software function) is also provided. This information is provided for support and maintenance use.

Current Message

The text in a message may be longer than the tabular view shows you. To read the complete message, select it. The full text is then copied into the **Current Message** box.

Mute Message Sound

Messages can be presented using an audible sound. The sound is only provided if your Operator Station is equipped with a loudspeaker. Use this option to disable the audible signal.

Inhibit Dialog Popup

Select this option to prevent the **Messages** dialog box from opening automatically.

Note

When this option is enabled, you must keep an eye on the icon on the top bar, as new messages will only be flagged using this icon.

Delete / Delete All

Select **Delete** to remove the currently selected message, or **Delete All** to remove all messages of the current type.

Acknowledge / Acknowledge All

Select **Acknowledge** to accept the currently selected message, or **Acknowledge All** to accept all new messages of the current type.

Related topics

Messages button description, page 188

Replay File dialog box

The **Replay File** dialog box allows you to choose the echo data file(s) you wish to play back.

How to open

To open the **Replay File** dialog box, select **Operation**. The **Operation** function is located on the **Operation** menu. Select **Replay File**.

Tip

Once the playback has started, you can also open the **Replay File** *dialog box from the replay bar.*

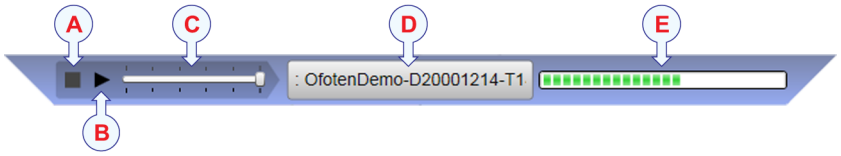
Description

A key function of the EA440 is it ability to record echo data. You can save to the Operator Station hard disk, or onto an external disk. The **Replay File** dialog box allows you to choose which file(s) to play back.

The **Replay File** dialog box allows you to add one or more files to a list of active files for playback.

Select **Loop** to establish continuous playback with all the file(s) you have chosen. To delete a file from the playback list, simply click the filename, and then the **Remove** button. The file is removed from the list, but not from the hard disk.

All playback is controlled by the replay bar. The replay bar opens automatically at the top of the EA440 presentation when you choose *Replay* mode.



A ***Stop****: Select this button to stop the playback.*

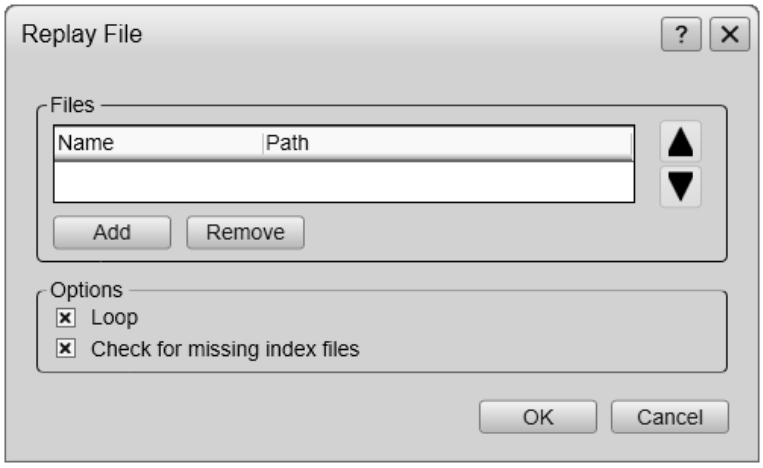
B ***Play/Pause****: Select this button to start the playback, or to pause it.*

C ***Replay speed****: Select this slider and move it sideways to adjust the replay speed.*

D ***Replay file****: This button shows which file you are currently playing.*

E ***Progress****: This bar shows you the replay progress of the current file.*

Details



Files

This list displays the files that are currently available for playback.

Add

Select **Add** to include additional file(s) in the **Files** list. A standard operating system dialog box is opened to let you choose files.

Remove

Select a file in **Files** list, then select **Remove**. The file is removed from the list, but not from the hard disk. If you wish to delete a file from your hard disk, you need to use a file manager program.

Loop

Select **Loop** if you want the EA440 to play back all the files in the **Files** list in an endless loop. The replay will run until you stop it in the replay bar, or choose a different operational mode.

Check for missing index files

During raw file recording, the EA440 automatically creates index files to allow for easier navigation in the replay files. On old files, however, these index files are not present. If you activate the **Check for missing index files** function, the index files are created on the selected files before playback starts.

Note

Creating index files can take a long time if you have many or/and large replay files, or if the files are stored on a network server.

Related tasks

Choosing which echo data file(s) to replay, page 79

Related functions

Operation function, page 247

Record RAW function, page 256

Concept descriptions

Topics

Observation range versus operational frequency

Absorption increases dramatically with frequency in salt water. For maximum observation range you should select a low operating frequency, a large transducer and the maximum transmit power.

The key facts related to observation range versus operational frequncy are:

- Observation range increases when the operational frequency is *reduced*.
- Resolution increases when the operational frequency is *increased*.

If you wish to work in deep waters, you need a low operational frequency.

Bottom detection can be expected to work down to 3000 meters when you use the *Simrad 38-7* transducer (38 kHz, 7x7 degrees, 2000 W). However, bottom detection becomes unreliable below 450 meters if you use the *Simrad 50/200D* transducer (200 kHz, 7x7 degrees, 1000 W)

Typical observation ranges are shown in the table.

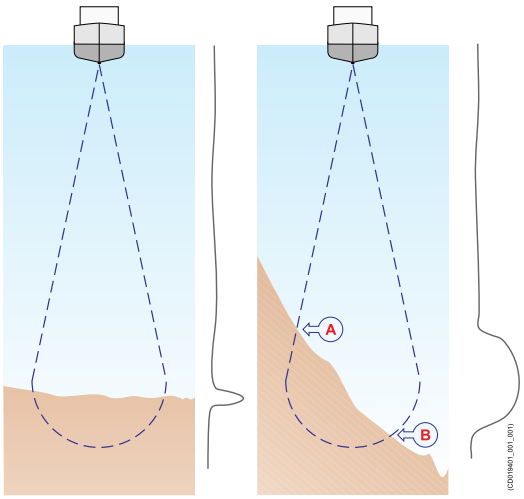
Maximum detection depth						
Trans-ducers	**Fre-quency (kHz)**	**Pulse duration (ms)**	**Beam angle (deg)**	**Band-width (Hz)**	**TX Power (W)**	**Range (m)**
38-7	38	4	7	766	2000	3000
38-9	38	4	9	766	1500	2600
38/200D	38	4	13x21	766	1000	2100
50/200D	50	2	10x16	1493	1000	1400
50-18	50	2	18	1526	500	1400
50-7	50	2	7	1493	2000	1900
120-15	120	1	10	3026	1000	800
200-7	200	1	7	3088	1000	500
710-36	710	1	2,8	3088	100	70
38/200	200	1	7	3026	1000	450
50/200	200	1	7	3088	1000	450

These range calculations assume a normal sea water salinity (3.5%) and temperature (+10°C), an average bottom (surface backscattering strength = -20 dB) and a noise level typical for a moving vessel.

About bottom echoes

A hard flat bottom reflects the transmitted signal as if it was a mirror. The transmitted pulse hits the illuminated bottom area at nearly the same instant, and the echo from different parts of this area arrive back at the surface also at nearly the same instant. A different situation arises when the bottom is not flat any longer.

The received echo signal is basically an attenuated copy of the transmit pulse. The echo signal from a sloped bottom is characterized by having a longer duration and a slower rise and fall time. The transmitted pulse first hits the slope at point (**A**), and as time elapses the reflection point travels along the slope towards point (**B**).



Many locations do not have a solid hard bottom. Frequently, the bottom is composed of layers of mud, clay and sand which can be observed as coloured bands in the EA440 echograms.

The bottom detection algorithm is implemented solely in software, and separate algorithms are run for each frequency channel. The algorithm is designed with emphasis on reliability in the sense that erroneous depth detections are never shown. Whenever the quality of a detection is questionable the algorithm outputs a depth of *0.00* to indicate that no reliable detection was obtained.

The EA440 algorithm is designed to handle a number of difficult situations. The algorithm maintains bottom lock for a discontinuous jump in bottom depth. It avoids false bottom detections on for example a dense school of fish. The algorithm chooses the upper boundary of the first layer when the bottom consists of layers.

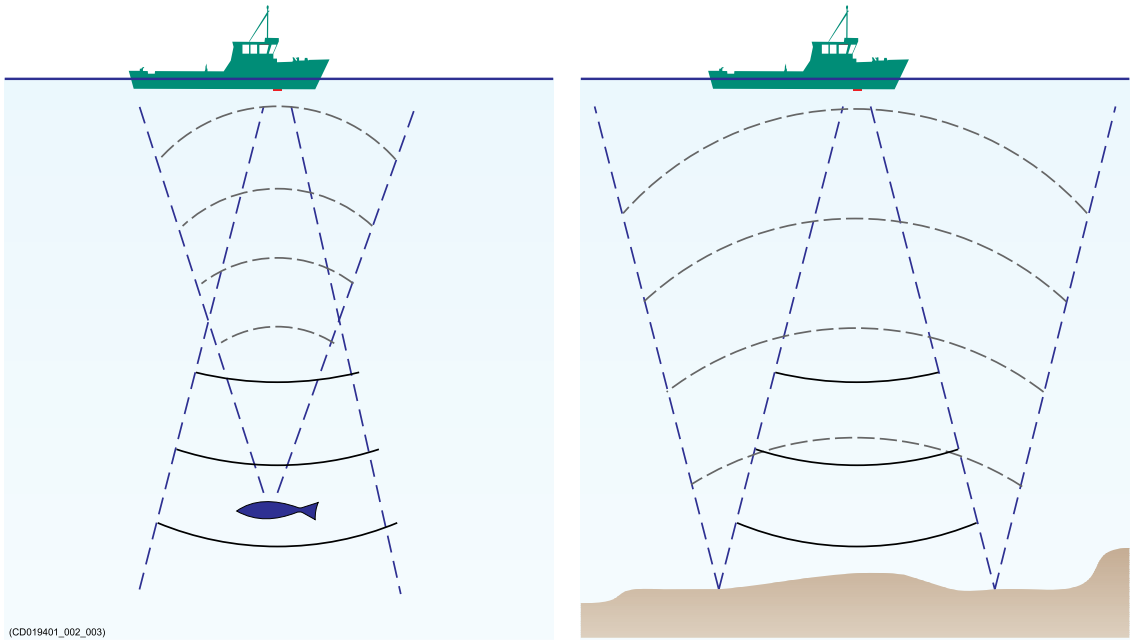
The bottom detection algorithm locks to the first good bottom return. The depth at point **A** rather than the depth along the transducer axis will be output for a sloped bottom. The detected depth value is always smaller than the depth along the transducer axis implying that a safety margin is automatically included.

About sound wave propagation

The velocity of sound wave propagation in the sea varies slightly with temperature, salinity and pressure.

The velocity varies between 1440 and 1520 m/s in shallow sea water, while a velocity around 1480 m/s can be expected at 1000 m depth. In shallow fresh water the velocity is approximately 1430 m/s. Unless you have a relevant sensor available, a good average sound speed value is 1500 m/s.

The EA440 transmits high energy sound wave pulses into the sea. A flat bottom reflects the transmitted wave as if it was a mirror. The propagating energy is spread over a larger and larger area as it travels down to the bottom and up again. The energy is spread over a four times larger area every time the travel distance doubles.



At the bottom there are many small targets. All targets within the beam angle will be reflected. The area which is covered by the beam will increase with the *square-law* or *20 log TVG* (Time Varying Gain) spreading. Bottom of the same type (same backscatter) will be displayed with the same colour independent of the depth.

The situation is slightly different when observing the echoes from individual fish.

The transmitted wave undergoes square-law spreading when travelling from the surface and down to the fish. The swim bladder of the fish scatters a small fraction of the arriving energy in all directions. Travelling from the fish and back towards the surface the scattered wave undergoes another square-law spreading.

The combined effect is referred to as *quad-law* or *40 log TVG* (Time Varying Gain).

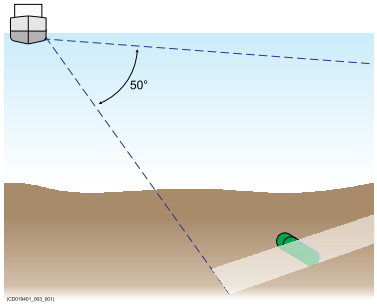
Propagation losses due to absorption are much higher in sea water than in fresh water. Absorption also increases with frequency. At 38 kHz the absorption is 0.5 dB/km in fresh water and 10 dB/km in sea water. At 200 kHz the absorption is 10 dB/km in fresh water and 50 dB/km in salt water. The EA440 must know which water type is present in order to compensate for these losses correctly.

The dB (decibel) unit has long traditions in underwater acoustics and other fields in physics. It is a logarithmic measure for the ratio between two quantities. In underwater acoustics the reference value is that of a plane wave of rms pressure 1 uPa measured at a distance of 1 m.

Sidescan concept description

Specially designed transducers for hull or over-the-side mounting are available from Kongsberg Maritime for sidescan operation. The operating frequency is 120, 200 or 500 kHz.

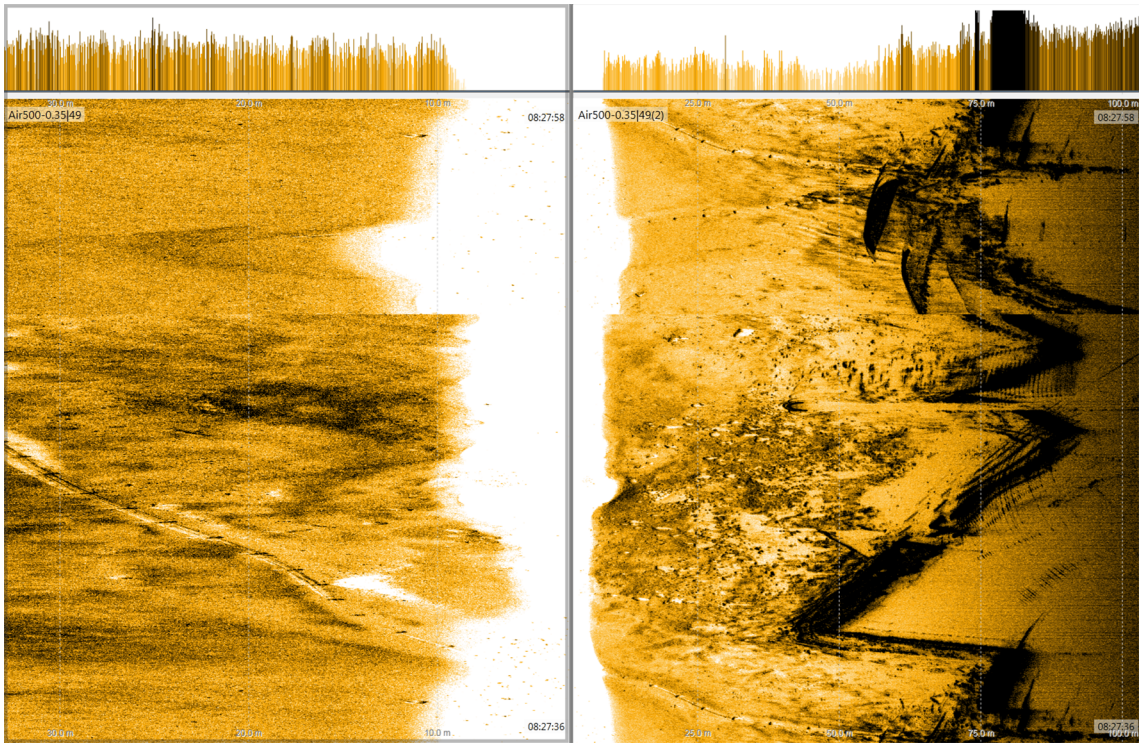
A "sonar side looking" type of image is generated in the EA440 presentation when pointing this transducer near horizontally.



With a beam width of 50 degrees vertically and only 0.5 or 2 degrees horizontally the scanning sector is narrow enough to resolve relatively small objects on the sea floor, but wide enough to allow higher survey speeds than with conventional side looking echo sounders. Bottom elevations and objects are immediately recognized in the EA440 echogram.

Sidescan operations are frequently used to search for wrecks, and for surveying shallow channels for obstacles that may prevent safe navigation. Sidescan is also used to monitor riverbanks, erosion, land slides and flow induced sediment deposits. In most cases, two channels are used with one sidescan transducer on each side of the vessel hull.

The software in the EA440 is prepared for dual sidescan operation and presentation. The sidescan data is captured and stored in a digital format. This allows for further data processing to a sidescan sonar mosaic image by combining data from a number of survey lines. It is even possible to allocate separate vertical channels for normal echo sounder operations while doing the dual acoustic imaging.



Note

Sidescan echograms scroll in vertical direction from the top of the presentation and down.

In the *Sidescan echogram* view, the **Range** setting controls the horizontal extent of the echogram. The **Start Range** value is used to control where the echogram starts, and this will depend on the current depth and the installation angle of the transducer(s).

Acoustic noise

Contributing factors

Several factors are contributing to the performance of the hydroacoustic equipment used on board a vessel.

Factors contributing to the performance of the hydroacoustic equipment used on board a vessel are:

- The quality and properties of the transmitted signal
- The quality of the receiving system
- The operational settings made during operation
- The properties of the target(s)
- The signal-to-noise ratio

The majority of these factors can neither be controlled nor improved by means of installation methods or transducer locations. The quality and properties of the transmitting and receiving systems are key factors during our product development, while our end user documentation aims to help the user to make the right filter settings during operation. As for the target properties, there is nothing any of us can do with those.

The *signal-to-noise ratio*, however, can be improved by making the correct choices during installation.

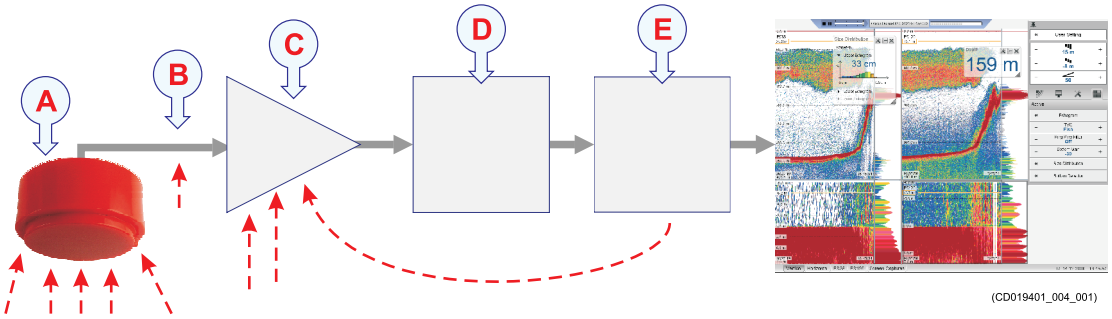
> Signal-to-noise ratio (often abbreviated SNR or S/N) is a measure used in science and engineering that compares the level of a desired signal to the level of background noise. It is defined as the ratio of signal power to the noise power, often expressed in decibels. A ratio higher than 1:1 (greater than 0 dB) indicates more signal than noise. While SNR is commonly quoted for electrical signals, it can be applied to any form of signal [...].
>
> *http://en.wikipedia.org/wiki/Signal_to_noise_ratio (September 2013)*

The *signal* is the echo that we want to know something about, while the *noise* is any unwanted signals or disturbances. The echo must be detected in the noise and therefore it

is necessary to keep the noise level is as low as possible in order to obtain long range and dependable interpretation.

The noise that contributes to the signal to noise ratio may be divided into the following types of noise:

- Self noise
- Ambient noise
- Electrical noise
- Reverberation



A The transducer can pick up noise from

- Biological disturbances
- Interference
- Cavitation
- Propeller noise
- Flow noise
- Acoustic noise from other hydroacoustic systems

B The transducer cable is long, and may pick up electric noise from generators, pumps, cooling systems and other electric or electromechanical devices.

C The preamplifiers are very sensitive, and they can easily pick up electrical noise from internal and external power supplies. The preamplifiers are also vulnerable for analogue noise created by their own electronic circuitry. Digital noise created by the converter and processing circuitry can also create problems.

D Converters transform the analogue echoes to digital format.

E Signal processing circuitry can create digital noise.

Self noise

Any vessel equipped with a hydroacoustic system (for example echo sounder or sonar) will produce more or less self noise.

There are many sources of such self noise. We will here go into some details in order to analyse the different sources of self noise on a vessel and how they may influence upon the noise level of the hydroacoustic instruments.

Machinery noise

The main contributor to machinery noise is usually the main engine on board the vessel. The contribution from auxiliary machinery may, however, be considerable, especially if it is in poor shape. The machinery noise can be transmitted to the transducer as:

- Structure-borne noise through the ship structure and the transducer mountings
- Water-borne noise through the hull into the water to the transducer

Electrical noise

Modern vessels are normally equipped with a lot of electric instruments such as hydroacoustic systems, radars, navigation systems, and communication equipment. Any electric instruments may in some cases cause electrical interference and noise. International regulations and certifications are used to control and reduce this, but even these are limited if the electrical systems are poorly installed and/or maintained.

Propeller noise

Propeller noise is often the main source of noise at higher vessel speeds. Variable pitch propellers or fast moving propellers usually make more noise than fixed propellers or slow moving propellers.

Propeller noise is usually water-borne. In some cases, however, shaft vibrations or vibrations in the hull near the propeller may be structure-borne to the transducer. If a propeller blade is damaged, this may increase the noise considerably.

Propeller cavitation is a severe source of noise. "Singing" propellers might be a source of noise, which interferes at discrete frequencies. In some cases static discharge from the rotating propeller shaft may be quite disturbing.

Cavitation

Cavitation is the formation of small air bubbles close to the transducer face. The bubbles appear because the local pressure becomes negative during parts of the acoustic pressure cycles. The cavitation threshold increases with the hydrostatic pressure. The noise is made when the bubbles implode.

Cavitation noise may appear near extruding objects at higher speeds, but more often it is

caused by the propellers. Propeller cavitation is a severe source of noise. The cavitation starts when the water flows in the same direction as the propeller blades. This is where the propeller blades move downwards.

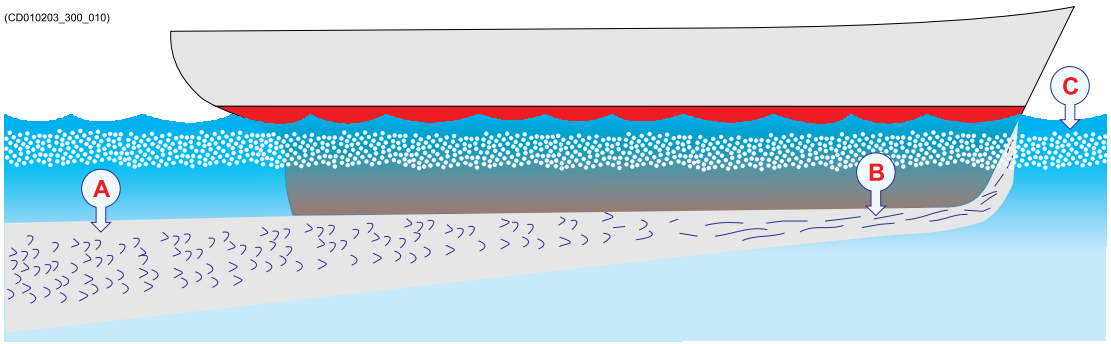
In some cases a resonant phenomenon is set up in a hole near the hull. This sound will have a discrete frequency, while all other flow noise will have a wide frequency spectrum.

(Image from U. S. Navy in the public domain.)

Flow noise

The upper water layers of the sea contain a myriad of small air bubbles created by the breaking waves. When the hull moves through water it will cause a disturbance, and this will generate friction. The friction zone is called the *flow boundary layer*. The flow in this boundary layer may be *laminar* or *turbulent*.

- The *laminar* flow is a nicely ordered, parallel movement of the water.
- The *turbulent* flow is a disorderly flow pattern, full of eddies.



A *Turbulent flow*

B *Laminar flow*

C *Air bubbles*

Air bubbles absorb and reflect the sound energy, and they may in worst cases block the sound transmission altogether.

The boundary layer increases in thickness when it becomes turbulent. The boundary layer is thin in the forward part of the vessel hull, and increases as it moves aft. The thickness depends on ships speed and on the roughness of the hull. All objects sticking out from the hull, or dents in the hull, will disturb the flow and will increase the thickness of the boundary layer. When the flow speed is high, the turbulence can be violent enough to destroy the integrity of the water. Small voids or cavities in the water will occur and this is called cavitation.

Rattle noise

Rattle noise may be caused by loose objects in the vicinity of the transducer, like fixing bolts. The rattle may also come from loose objects inside the hull.

Interference

Interference from other hydroacoustic equipment on board the same vessel may be an annoying source of disturbance. Unless the same frequency is used for more than one piece of equipment only the transmitted pulse will contribute to the interference.

> In physics, interference is the phenomenon in which two waves superpose each other to form a resultant wave of greater or lower amplitude. Interference usually refers to the interaction of waves that are correlated or coherent with each other, either because they come from the same source or because they have the same or nearly the same frequency. Interference effects can be observed with all types of waves, for example, light, radio, acoustic, surface water waves or matter waves.
>
> *https://en.wikipedia.org/wiki/Interference_(wave_propagation), April 2016*

Ambient noise

Ambient noise is usually not a limiting factor to the performance of sonars and echo sounders.

The ambient noise may be split up as follows:

- **Sea noise**: Air bubbles, seismic disturbances, waves, boundary turbulence, etc.
- **Biological noise**: Fish, mammals
- **Man made noise**: Other vessels, interference
- **Precipitation noise**: Heavy rain or hail

In some areas, where many vessels operate together, the engine and propeller noise from other vessels may be disturbing. Interference from hydroacoustic instruments located in other vessels may also be a limiting factor. The sea noise depends on the weather conditions. In bad weather the sea noise can be quite high due to the waves.

Electrical self noise

Electrical or electronic self noise is picked up or generated in any other part of the equipment than the transducer.

Hum picked up by the transducer cables or picked up from the power supply is usually the most common source of electrical self noise. At higher frequencies – where rather wide bandwidths are necessary – the noise from components, transistors or other analogue electronic may be a limiting factor.

Some means to reduce acoustic noise

Several factors are contributing to the performance of the hydroacoustic equipment used on board a vessel. Careful planning of the EA440 installation may reduce the acoustic noise.

Unfortunately, it is impossible to simply provide a number of specific procedures to reduce the noise.

An important factor is the physical location of the transducers. This depends on the vessel's design and construction, how the hull is shaped, and how the water runs along the hull. Other factors deal with other equipment mounted on board, and this will also be vessel dependant. At moderate ship speeds the machinery noise is usually dominant. At medium speeds the flow noise increases more rapidly and takes over, while at higher speed the propeller noise will be the main contributor.

Note

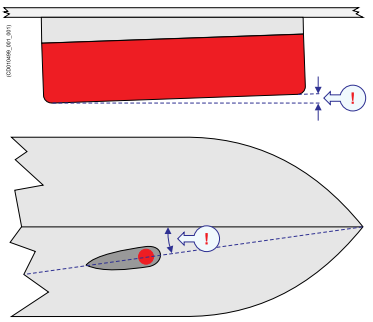
The information here must be considered as general advice. Each EA440 installation must be handled separately depending on the hull design and the other electrical and mechanical systems installed on the vessel.

Reducing flow noise

- The shape of the transducer (or dome around it) must be as streamlined as possible.
- The hull plating in front of the transducer must be as smooth as possible.

  Important

  Be especially aware of bilge keels and zinc alloy anodes. The keel must be rounded off without sharp edges. Neither extruding objects nor abrupt transitions must be present.



- Each transducer must be mounted with a small inclination angle (approximately 2 degrees).

Reducing machinery noise

- Each transducer must be installed as far away from the engine room as possible.
- The main engine and relevant auxiliary engines and equipment must be fixed to rigid foundations to avoid vibrations.
- Any hull structure that may vibrate should be damped or coated to reduce the vibrations.

The use of shock absorbers or floating rafts may sometimes reduce this noise. The structure-borne noise may be reduced by isolation, for example by providing vibration clamping between the transducer and the hull structure.

Reducing propeller noise

- Each transducer must be installed as far away from the propellers as possible.
- Sufficient clearance between the propellers and the hull, the rudder and the keel must be provided.
- Place the zinc alloy anodes in places where the water flow is the least disturbed.
- Ensure that the propellers blades are correctly designed and without damages.
- The use of a baffle between the propellers and the transducer may reduce noise appreciably.
- Static discharges caused by the rotating propeller shaft may be removed by proper grounding or by mounting a coal brush from the shaft to vessel ground.

Reducing rattle noise

Ensure that no parts near the transducers can rattle as a result of water flow or vibrations.

Reducing interference

Interference from the transmission pulses from other hydroacoustic instruments on board the vessel is difficult to avoid. The problem may be reduced by choosing the working frequencies carefully and to some extent by separating the different transducers. On vessels with a large number of separate hydroacoustic systems installed and in simultaneous use, a separate synchronizing system (for example the K-Sync) should be considered.

Reducing electrical noise

- Place the transducer cables in a metal conduit from the transducer to the WBT. Terminate the conduit as close to the transducers and WBT as possible.
- Make sure that all units are properly grounded, as this is important to avoid electrical noise.
- Use shielded cables with correct grounding.
- Separate EA440 cables from other cables with high voltages, large currents or transients. Place all high voltage power cables in metal conduits.

Datagram formats

Topics

About NMEA and standard datagram formats

Topics

NMEA

The National Marine Electronics Association (NMEA) has defined communication standards for maritime electronic equipment. The EA440 Hydrographic single beam echo sounder supports these standards for communication with external sensors and peripheral systems.

The most common standard is NMEA 0183. The National Marine Electronics Association describes it as follows:

> The NMEA 0183 Interface Standard defines electrical signal requirements, data transmission protocol and time, and specific sentence formats for a 4800-baud serial data bus. Each bus can have only one talker but many listeners.
>
> *National Marine Electronics Association*

For more information about the National Marine Electronics Association and the NMEA 0183 standard, refer to the organization's web site at:

- http://www.nmea.org

About the NMEA datagram formats

The EA440 can send and receive information to and from several different peripherals. All transmissions take place as **datagrams** with data sentences. Each datagram has a defined format and length.

The NMEA 0183 standard is the most common protocol used to receive and transmit data to and from peripheral sensors. A parametric sentence structure is used for all NMEA data.

The sentence starts with a “$” delimiter and represents the majority of approved sentences defined by the standard. This sentence structure with delimited and defined data files, is the preferred method for conveying information.

For more information about the NMEA standard, the format and the data sentences, refer to NMEA’s official publications. The *NMEA 1083 - Standard for Interfacing Marine*

Electronic Devices document explains the formats in detail. The document can be obtained from NMEA.

Note

The terms "Datagram" and "telegram" are generally used to describe the basic transfer unit associated with a packet-switched network. In this publication, we use the term "datagram".

NMEA sentence structure

A sentence structure is defined by NMEA to establish the communication between two units. Most other datagram formats are designed using the same, or a similar, structure.

The following provides a summary explanation of the approved parametric sentence structure:

`$aaccc,c-c*hh<CR><LF>`

1 `$`

This character (Hex: 24) is used to identify the start of a sentence.

2 `aaccc`

This is the address field. The first two characters (aa) identify the *talker ID*, while the last three characters are the *sentence formatter* mnemonic code identifying the data type and the string format of the successive fields.

3 `,`

The comma (Hex: 2C) is used as a *field delimiter*. This character starts each field except the address and checksum fields. If it is followed by a null field, it is all that remains to indicate that there are no data in the field.

4 `c-c`

This is the *data sentence block*. This is a series of data fields containing all the data to be transmitted. The data field sentence is fixed and identified by the sentence formatter in the address field. Data fields may be of variable length, and they are preceded by the field delimiter.

5 `*`

This character (Hex: 2A) is the *checksum delimiter*. This delimiter follows the last field of the sentence and indicates that the following two alphanumerical characters contain the checksum.

6 hh

This is the *checksum*.

7 `<CR><LF>`

The carriage return and line feed characters terminate the sentence.

Note

In some proprietary telegrams received from other Kongsberg Maritime equipment, the $ character is replaced by the @ character. The checksum field may then not be in use.

Standard NMEA 0183 communication parameters

The EA440 uses both NMEA and proprietary datagram formats to communicate with peripheral systems and sensors. The majority of the datagrams used by the EA440 are defined by the National Marine Electronics Association (NMEA). NMEA has defined a fixed set of transmission parameters.

The communication parameters defined for **NMEA 0183** are:

- **Baud Rate**: 4800 b/s
- **Data Bits**: 8
- **Parity**: None
- **Stop Bits**: 1

Some instruments may offer other parameters and/or options. You must always check the relevant documentation provided by the manufacturer.

NMEA datagram formats

Topics

NMEA DBK datagram

The NMEA DBK datagram contains depth below the keel in feet, meters and fathoms. The datagram is no longer recommended for use in new designs. It is frequently replaced by the NMEA DPT datagram.

Format

```
$--DBK,x.x,f,y.y,M,z.z,F*hh
```

Description

All depths are measured from below the keel.

1 **$—**: Talker identifier

2 **DBK**: Datagram identifier

3 **x.x,f**: Depth in feet

4 **y.y,M**: Depth in metres

5 **z.z,F**: Depth in fathoms

6 ***hh**: Checksum

Tip

If you need the depth below the surface, use the NMEA DBS datagram. If you need the depth below the transducer, use the NMEA DBT datagram.

NMEA DBS datagram

The NMEA DBS datagram provides the current depth from the surface. The datagram is no longer recommended for use in new designs. It is frequently replaced by the NMEA DPT datagram.

Format

```
$--DBS,x.x,f,y.y,M,z.z,F*hh<CR><LF>
```

Description

All depths are measured from below the sea surface.

1 **$—**: Talker identifier

2 **DBS**: Datagram identifier

3 **x.x,f**: Depth in feet

4 **y.y,M**: Depth in metres

5 **z.z,F**: Depth in fathoms

6 ***hh**: Checksum

Tip

If you need the depth below the keel, use the NMEA DBK datagram. If you need the depth below the transducer, use the NMEA DBT datagram.

NMEA DBT datagram

The NMEA DBT datagram provides the current depth under the transducer. In new designs, this datagram is frequently used to replace the DBK and DBS datagrams.

Format

```
$--DBT,x.x,f,y.y,M,z.z,F*hh<CR><LF>
```

Description

All depths are measured from below the transducer face.

1 **$—**: Talker identifier

2 **DBT**: Datagram identifier

3 **x.x,f**: Depth in feet

4 **y.y,M**: Depth in metres

5 **z.z,F**: Depth in fathoms

6 ***hh**: Checksum

Tip

If you need the depth below the keel, use the NMEA DBK datagram. If you need the depth below the surface, use the NMEA DBS datagram.

NMEA DPT datagram

The NMEA DPT datagram provides the water depth relative to the transducer, and the offset of the measuring transducer.

Format

```
$--DPT,x.x,y.y,z.z*hh<CR><LF>
```

Description

This description is not complete. For additional details, refer to the NMEA standard.

1 **$—**: Talker identifier

2 **DPT**: Datagram identifier

3 **x.x**: Depth (Metres), Relative to the transducer

4 **y.y**: Offset (Metres), Relative to the transducer

Positive offset numbers provide the distance from the transducer to the water line. Negative offset numbers provide the distance from the transducer to the part of the keel of interest.

5 **z.z**: Maximum range scale in use

6 ***hh**: Checksum

Tip

If you need the depth below the keel, use the NMEA DBK datagram. If you need the depth below the surface, use the NMEA DBS datagram. If you need the depth below the transducer, use the NMEA DBT datagram.

NMEA GGA datagram format

The NMEA GGA datagram transfers time-, position- and fix-related data from a global positioning system (GPS).

Format

```
$--GGA,hhmmss.ss,llll.ll,a,yyyyy.yy,a,x,zz,d.d,a.a,M,g.g,M,r.r,cccc*hh
```

Description

1 **$—**: Talker identifier

2 **GGA**: Datagram identifier

3 **hhmmss.ss**: Coordinated Universal Time (UTC) of the current position

4 **llll.ll,a**: Latitude North/South (Degrees, minutes and hundredths)

N = North

S = South

5 **yyyyy.yy,a**: Longitude East/West (Degrees, minutes and hundredths)

E = East

W = West

6 **x**: Quality indicator for the GPS (Global Positioning System)

Refer to the NMEA standard for further information about the GPS quality indicator.

7 **zz**: Number of satellites in use (00 - 12)

The number of satellites may be different from the number in view.

8 **d.d**: HDOP (Horizontal dilution of precision)

9 **a.a,M**: Altitude related to mean sea level (geoid) (Metres)

10 **g.g,M**: Geoidal separation (Metres)

11 **r.r**: Age of GPS (Global Positioning System) data

12 **cccc**: Differential reference station identification (0000 - 1023

13 ***hh**: Checksum

NMEA GLL datagram format

The NMEA GLL datagram transfers the latitude and longitude of vessel position, the time of the position fix and the current status from a global positioning system (GPS).

Format

```
$--GLL,llll.ll,a,yyyyy.yy,a,hhmmss.ss,A,a*hh<CR><LF>
```

Description

1 **$—**: Talker identifier

2 **GLL**: Datagram identifier

3 **llll.ll,a**: Latitude North/South (Degrees, minutes and hundredths)

N = North

S = South

4 **yyyyy.yy,a**: Longitude East/West (Degrees, minutes and hundredths)

E = East

W = West

5 **hhmmss.ss**: Coordinated Universal Time (UTC) of the current position

6 **A**: Status

A = The data are valid.

V = The data are not valid.

7 **a**: Mode indicator

8 ***hh**: Checksum

NMEA HDG datagram format

The NMEA HDG datagram provides heading from a magnetic sensor. If this reading is corrected for deviation, it produces the magnetic heading. If it is offset by variation, it provides the true heading.

Format

```
$--HDG,x.x,z.z,a,r.r,a*hh<CR><LF>
```

Description

1 **$—**: Talker identifier

2 **HDG**: Datagram identifier

3 **x.x**: Heading (Degrees Magnetic)

4 **z.z,a**: Deviation (Degrees Magnetic), East/West

E = East

W = West

5 **r.r,a** Variation (Degrees Magnetic), East/West

E = East

W = West

6 ***hh**: Checksum

NMEA HDM datagram format

The NMEA HDM datagram provides vessel heading in degrees magnetic. The datagram format is no longer recommended for use in new designs. It is often replaced by the NMEA HDG telegram.

Format

```
$--HDM,x.x,M*hh<CR><LF>
```

Description

1 **$—**: Talker identifier

2 **HDM**: Datagram identifier

3 **x.x,M**: Heading (Degrees Magnetic

4 ***hh**: Checksum

NMEA HDT datagram format

The NMEA HDT datagram provides the true vessel heading. The information is normally provided by a course gyro.

Format

```
$--HDT,x.x,T*hh<CR><LF>
```

Description

1 **$—**: Talker identifier

2 **HDT**: Datagram identifier

3 **x.x,T**: Heading (Degrees True)

4 ***hh**: Checksum

NMEA MTW datagram format

The NMEA MTW datagram provides the current water temperature.

Format

```
$--MTW,x.x,C*hh<CR><LF>
```

Description

1 **$—**: Talker identifier

2 **MTW**: Datagram identifier

3 **x.x,C**: Temperature (degrees Celcius)

4 ***hh**: Checksum

NMEA RMC datagram format

The NMEA RMC datagram transfers the time, date, position, course and speed data from a global navigation satellite system (GNSS) receiver.

Format

```
$--RMC,hhmmss.ss,A,llll.ll,a,yyyyy.yy,a,x.x,z.z,ddmmyy,r.r,a,a*hh
```

Description

1 **$—**: Talker identifier

2 **RMC**: Datagram identifier

3 **hhmmss.ss**: Coordinated Universal Time (UTC) of the current position

4 **A**: Status

A = The data are valid.

V = The data are not valid.

5 **llll.ll,a**: Latitude North/South (Degrees, minutes and hundredths)

N = North

S = South

6 **yyyyy.yy,a**: Longitude East/West (Degrees, minutes and hundredths)

W = West

E = East

7 **x.x**: Speed over ground (knots)

8 **z.z**: Course over ground (Degrees True)

9 **ddmmyy**: Date

10 **r.r,a**: Magnetic variation, East/West (Degrees)

E = East

W = West

11 **a**: Mode indicator

12 ***hh**: Checksum

NMEA THS datagram format

The NMEA THS datagram provides the true vessel heading. The datagram includes a mode indicator field providing critical safety-related information about the heading data. The THS datagram replaces the deprecated HDT.

Format

```
$--HETHS,x.xx,a*hh<CR><LF>
```

Description

1 **$—**: Talker identifier

2 **HETHS**: Datagram identifier

3 **x.xx**: Heading (Degrees True)

4 **a**: Mode

- **A**: Autonomous
- **V**: Data not valid

5 ***hh**: Checksum

NMEA VTG datagram format

The NMEA VTG datagram contains the actual course and speed relative to the ground.

Format

```
$--VTG,x.x,T,y.y,M,z.z,N,g.g,K,a*hh<CR><LF>
```

Description

1 **$—**: Talker identifier

2 **VTG**: Datagram identifier

3 **x.x,T**: Course over ground (Degrees True)

4 **y.y,M**: Course over ground (Degrees Magnetic)

5 **z.z,N**: Speed over ground (knots)

6 **g.g,K**: Speed over ground (km/hr)

7 **a**: Mode indicator

A = Autonomous

D = Differential

N = Data not valid

8 ***hh**: Checksum

NMEA ZDA datagram format

The NMEA ZDA datagram contains the universal time code (UTC), day, month, year and local time zone.

Format

```
$--ZDA,hhmmss.ss,xx,yy,zzzz,hh,mm*hh<CR><LF>
```

Description

This description is not complete. For additional details, refer to the NMEA standard.

1 **$—**: Talker identifier

2 **ZDA**: Datagram identifier

3 **hhmmss.ss**: Coordinated Universal Time (UTC) of the current position

4 **xx**: Day (01 - 31) (Part of UTC)

5 **yy**: Month (01 - 12) (Part of UTC)

6 **zzzz**: Year (Part of UTC)

7 **hh**: Local zone hours, (00 - ±13)

8 **mm**: Local zone minutes, (00 - 59)

9 ***hh**: Checksum

Proprietary datagram formats

Topics

Kongsberg OFS Drop keel datagram format

The proprietary OFS datagram contains the current length travelled by the drop keel. The information is required to establish the offset of the transducer face relative to the vessel origin. A custom-built sensor may be required for this measurement.

Format

```
$KMOFS,xx.xx, *hh
```

Description

The travelled length is measured as an offset value from the ship origin.

- **KM**: Talker identifier
- **OFS**: Datagram identifier
- **xx.xx**: Depth in metres
- ***hh**: Checksum

Kongsberg DFT Water level datagram format

The proprietary DFT datagram contains the current water level (draft). The information is required to establish the offset of the transducer face relative to the vessel origin. A custom-built sensor may be required for this measurement.

Format

```
$KMDFT,xx.xx,*hh
```

Description

The depth is measured relative to the vessel's origin.

- **KM**: Talker identifier
- **DFT**: Datagram identifier
- **xx.xx**: Water level in metres
- ***hh**: Checksum

Simrad depth datagram

Simrad depth is a proprietary datagram format created by Kongsberg. The datagram exports the detected water depth measured from the transducer face to the bottom backscatter value. The draft, frequency, sound velocity profile and transducer depth may be included. The output may be in ASCII or binary format.

Note

The depth output page has an option for removing the heave information from the depth. When this is active the depth output is the depth without any input from the MRU.

ASCII format

```
D#,hhmmsstt,xxxx.xx,zzz,TDN,ABS<CR><LF>
```

ASCII format description

A comma delimits all fields.

- **D#**: Channel identification
- **hhmmsstt**: current time; hour, minute, second and hundredth of second
- **x.x**: Depth in metres
- **y.y**: bottom surface backscattering strength in dB
- **TDN**: Channel identification
- **ABS**: athwartships bottom slope in degrees

ASCII format including frequency, transducer depth and sound velocity profile

```
D#,hhmmsstt,xxxx.xx,zzz,TDN,ABS,FFF,D.DD,SSSS.S<CR><LF>
```

ASCII format description including frequency, transducer depth and sound velocity profile

A comma delimits all fields.

- **D#**: Channel identification
- **hhmmsstt**: current time; hour, minute, second and hundredth of second
- **x.x**: Depth in metres
- **y.y**: bottom surface backscattering strength in dB
- **TDN**: Channel identification
- **ABS**: athwartships bottom slope in degrees
- **FFF**: add frequency
- **D.DD**: add water level
- **SSSS.S**: add sound velocity

Binary format

Note that this format does not include carriage return and line feed characters at the end of the telegram.

```
struct Depth {
  char Header[2];
  char Separator1[1];
  char Time[8];
  char Separator2[2];
  float Depth[4];
  float Reflectivity[4];
  long TransducerNumber[4];
  float AthwartShips;
};
```

Binary format description

1 **Header**: channel identifier, up to 4 channels are exported.

2 **Separator**: ","

3 **Time**: current time; hour, minute, second and hundredth of second

4 **Separator**: ","

5 **Depth**: detected bottom depth in m

6 **Reflectivity**: bottom surface backscattering strength in dB

7 **TransducerNumber**: transducer number, for future use

8 **AthwartShips**: athwartships bottom slope in degrees

Binary format including frequency, transducer depth and sound velocity profile

```
struct DeptExtrahDg {
  char Header[2];
  char Separator1[1];
  char Time[8];
  char Separator2[2];
  float Depth[4];
  float Reflectivity[4];
  long Frequency;
  float constantSvp;
  float transducerDepth;
};
```

Binary format description including frequency, transducer depth and sound velocity profile

1 **Header**: channel identifier, up to 4 channels are exported

2 **Separator**: ","

3 **Time**: current time; hour, minute, second and hundredth of second

4 **Separator**: ","

5 **Depth**: detected bottom depth in m

6 **Reflectivity**: bottom surface backscattering strength in dB

7 **Frequency**: the frequency used

8 **constantSvp**: the sound velocity

9 **transducerDepth**: the water level in m

The Parameter Output datagram

Parameter Output to Port sends information about any changes to the selected output port. When the application or a recording is started, an initial group of installation parameters are logged.

The event string contains the following fields:

Example

$EVENT;<DATE>;<TIME>;<USERNAME>;<APPLICATION>;<WORK-FLOW>;<EVENT TYPE>;<DATA><0D><0A>

A semicolon delimits all fields.

- **$EVENT**: Fixed starting characters
- **<DATE>**: dd.mm.yyyy
- **<TIME>**: hh:mm:ss
- **<USERNAME>**: The name of the user settings file.
- **<APPLICATION>**: e.g. EA440
- **<WORKFLOW>**: This is the name of the market segment, e.g Hydrography

- **<EVENT TYPE>**: Event type: Environment, transducer, sensor, channel or file name.
- **<DATA>**: The data collected.

Environment

When the environmental settings changes, the data are sent to the port.

Example

$EVENT;03.10.2016;01:49:20;EA440 Factory Default;EA440;Hydrography;Environment;1524.3,18.0,41<0D><0A>

A comma delimits all fields.

- **Sound Velocity value**: The sound velocity, here: 1524.3
- **Temperature value**: The temperature in degrees Celsius, here: 18.0
- **Salinity value**: The salinity value, here: 41

Transducer

When the transducer settings changes, the data are sent to the port.

Example

$EVENT;03.10.2016;01:49:20;EA440 Factory Default;EA440;Hydrography;Transducer;200-W,1,200-W Serial No: 1,HullMounted,Vertical,0.00 0.00 0.00<0D><0A>

A comma delimits all fields.

- **Model**: Which transducer model, here: 200-W
- **Serial number**: The serial number of the transducer, here: 1
- **Custom name**: The custom name of the transducer, here: 200-W Serial No: 1
- **Mounting type**: How the transducer is mounted, here: HullMounted
- **Orientation type**: Which way the transducer is mounted, here: Vertical
- **Offset values**: Where the transducer is mounted (x.xx y.yy z.zz), here: 0.00 0.00 0.00

Sensor

When the sensor settings changes, the data are sent to the port.

Example

$EVENT;03.10.2016;01:49:20;EA440 Factory Default;EA440;Hydrography;Sensor;GPS,Lan Port 2,GPS From LAN Port 2,GLL GGA GGK PTNLGGK RMC VTG ZDA,,0.00 0.00 0.00<0D><0A>

A comma delimits all fields.

- **Type**: Which sensor type, here: GPS
- **Port**: Which port the sensor is connected to, here: Lan Port 2
- **Custom name**: The custom name of the sensor, here: GPS From LAN Port 2
- **Datagram**: Which datagram the sensor sends, here: GLL GGA GGK PTNLGGK RMC VTG ZDA
- **Talker**: The set talker ID, here: None
- **Offset values**: Where the sensor is mounted (x.xx y.yy z.zz), here: 0.00 0.00 0.00

Channel

When the channel settings changes, the data are sent to the port.

Example

$EVENT;03.10.2016;01:49:20;EA440 Factory Default;EA440;Hydrography;Channel;WBT 5197648-1 200-W,0.00,250,0.512,2,1000,10, 0.0, 0.0,20 Log TVG<0D><0A>

A comma delimits all fields.

- **Channel name**: The name of the channel, here: WBT 5197648-1 200-W
- **Depth value**: The depth in m, here: 0.00
- **Power value**: The power in W, here: 250
- **Pulse length**: The pulse length in ms, here: 0.512
- **Bottom Detector Upper Value**: The set upper value, here: 2
- **Bottom Detector Lower Value**: The set lower value, here: 1000
- **Range value**: The set range, here: 10
- **TVG Log value**: The TVG Log value, here: 20 Log TVG

File name

When the file name changes, the data are sent to the port.

Example

$EVENT;03.10.2016;01:49:20;EA440 Factory Default;EA440;Hydrography;File;L0004-LochNess-D20161003,4<0D><0A>

A comma delimits all fields.

- **File name**: The file name, here: L0004-LochNess-D20161003
- **Line number**: The line number, here: 4

Teledyne/TSS1 datagram format

Teledyne/TSS1 is a proprietary datagram format created by Teledyne TSS Navigation Systems for heave, roll and pitch compensation. When you select this protocol, the number of sensor variables is fixed, and there is no token associated with it.

Format

```
:aabbbb shhhhx srrrr spppp<CR><LF>
```

Description

The format is based on ASCII characters, the datagram has a fixed length, and it is terminated with a carriage return and line feed. Baud rate and output rate may be adjusted to fit your needs. The definition of the attitude angles in this format is different from the *Euler* angles definition used elsewhere. The difference appears in the roll angle, where:

$$Roll_{echo\ sounder} = \arcsin [\sin(Roll_{Euler}) \times \cos(Pitch_{Euler})]$$

1 **aa**: Sway acceleration

This is a dual-character hex number. The value is provided as 0.03835 m/ss units.

2 **bbbb**:Heave acceleration

This is a four-character hex number. The value is provided as 0.000625 m/ss units.

3 **s**: This is a single character.

If the value is positive, a "space" character is provided.

If the value is negative, a "–" character is provided.

4 **hhhh**: Heave position

This is a four-character decimal number. The value is given in centimetres. Positive value is "up".

5 **x**: Status

- **U**: Unaided mode/Stable data

  The sensor operates without external input data.

- **u**: Unaided mode/Unstable data

  The sensor operates without external input data. However, the data from the sensor is unstable. A probable cause for this is the lack of alignment after the sensor has been switched on or restarted. The alignment period from a power recycle is normally approximately five minutes.

- **G**: Speed aided mode/Stable data

  The sensor operates with external input of speed data.

- **g**: Speed aided mode/Unstable data

  The sensor operates with external input of speed data. However, the data from the sensor is unstable. A probable cause for this is the lack of alignment after the sensor has been switched on or restarted. It can also be a failure in the data input.

- **H**: Heading aided mode/Stable data

  The sensor operates with external input of heading data.

- **h**: Heading aided mode/Unstable data

  The sensor operates with external input of heading data. However, the data from the sensor is unstable. A probable cause for this is the lack of alignment after the sensor has been switched on or restarted. It can also be a failure in the data input.

- **F**: Full aided mode/Stable data

  The sensor operates with external input of both speed and heading data.

- **f**: Full aided mode/Unstable data

  The sensor operates with external input of both speed and heading data. However, the data from the sensor is unstable. A probable cause for this is the lack of alignment after the sensor has been switched on or restarted. It can also be a failure in the data input.

6 **s**: This is a single character.

If the value is positive, a "space" character is provided.

If the value is negative, a "–" character is provided.

7 **rrrr**: Roll angle

This is a four-character decimal number. The value is given in hundredths of a degree.

8 **s**: This is a single character.

If the value is positive, a "space" character is provided.

If the value is negative, a "–" character is provided.

9 **pppp**: Pitch angle

This is a four-character decimal number. The value is given in hundredths of a degree.

Kongsberg EM Attitude 3000 datagram format

The EM Attitude 3000 is a proprietary datagram format created by Kongsberg Maritime for use with digital motion sensors. It holds roll, pitch, heave and heading information. The datagram contains a 10-byte message.

Format

Data description	Example	Format	Valid range
Sync byte 1 / Sensor status **[1]**	90h to Afh = sensor status	1U	00h, 90h to Afh
Sync byte 2	Always 90h	1U	144
Roll LSB **[2]**		1U	
Roll MSB **[2]**		1U	
Pitch LSB **[2]**		1U	
Pitch MSB **[2]**		1U	
Heave LSB **[2]**		1U	
Heave MSB **[2]**		1U	
Heading LSB **[2]**		1U	
Heading MSB **[2]**		1U	

Description

LSB = least significant byte

MSB = most significant byte.

1 **Sync byte 1 / Sensor status**

- **00h**: This value is sync byte 1.
- **90h**: This value indicates valid measurements with full accuracy.
- Any value from **91h** to **99h** indicates valid data with reduced accuracy (decreasing accuracy with increasing number).
- Any value from **9Ah** to **9Fh** indicates non-valid data but normal operation (for example configuration or calibration mode).
- Any value from **A0h** to **AFh** indicates a sensor error status.

2 **All data are in 2's complement binary.**

Resolution is 0.01 degrees for roll, pitch and heading, and 1 cm for heave.

- Roll is positive with port side up with valid range ±179.99 degrees.
- Pitch is positive with bow up with valid range ±179.99 degrees.
- Heave is positive up with valid range ±9.99 m.
- Heading is positive clockwise with valid range 0 to 359.99 degrees.

If a value is outside the valid range, it is assumed to be non-valid, and rejected.

Note

Heave is logged as positive downwards (the sign is changed) including roll and pitch induced lever arm translation to the transmit transducer.

You can define how roll is assumed to be measured, either with respect to the horizontal plane (the *Hippy 120* or *TSS* convention), or to the plane tilted by the given pitch angle (i.e. as a rotation angle around the pitch tilted forward pointing x-axis).

The latter convention (called *Tate-Bryant* in the POS/MVdocumentation) is used inside the system in all data displays and in the logged data. A transformation is applied if the roll is given with respect to the horizontal.

Note

This format was originally designed for use with the early multibeam echo sounders manufactured by Kongsberg Maritime. In the original version of the format (Kongsberg EM Attitude 1000), the first synchronisation byte was always assumed to be zero. The sensor manufacturers were then requested to include sensor status in the format using the first synchronisation byte for this purpose.

Kongsberg ATS datagram format

Annotation ATS is a proprietary datagram format created by Kongsberg Maritime. It allows you to import annotations from external devices.

Format

```
$??ATS,tttt<CR><LF>
```

Description

1 **??**: talker identifier

2 **ATS**: datagram identifier

3 **tttt**: free text

Kongsberg Maritime PE datagram

Simrad PE is a proprietary datagram format created by Kongsberg Maritime. The echo sounder can be remotely controlled by input through the network or on a serial line.

Format

```
PE,10504000,SYSTEM,F,LINENUMBER<CR><LF>
```

Description

- **PE**: Datagram used — PE
- **10504000**: For future expansions
- **SYSTEM**: For future expansions
- **F**: The possible functions
  - STARTLOGGING
  - STOPLOGGING
  - STARTPROCESSEDLOGGING
  - STOPPROCESSEDLOGGING
  - STARTPINGING
  - STOPPINGING
  - STARTHIST
  - STOPHIST
- **LINENUMBER**: This will change the line number in the **File Setup** page in the **Output** dialog box.

  Line number is optional, and will be ignored for the pinging and history functions.

Note

Always use capital letters.

Example

```
PE,10504000,SYSTEM,STARTPINGING,12<CR><LF>
```

Third-party datagram formats

Topics

Atlas Depth datagram

Atlas Depth is a proprietary datagram format created by Atlas Elektronik (http://www.atlas-elektronik.com) to provide the current depth from two channels.

Format

```
Dyxxxxx.xxm
```

Description

1 **Dy**: Channel number

- **DA**: Channel number 1
- **DB**: Channel number 2

2 **xxxxx.xxm**: Depth in metres

PTNL GGK (Time, position, type and dilution of precision) telegram specification

The **PTNL GGK** telegram is used to decode the time, position, type and dilution of precision of the current position.

Format

```
$PTNLGGK,hhmmss.ss,ddmmyy,dddnn.mmmmmmm,a,dddnn.mmmmmmm,a,x,zz,w.w,EHTaaa.bbb,M*hh
```

Format description

1 **$PTNL** = talker identifier

2 **GGK** = telegram identifier

3 **hhmmss.ss** = coordinated universal time (UTC) of position. Hours must be two numbers. For example, 8 must be shown as 08.

4 **ddmmyy** = UTC date of position fix (date, month, year). Day must be two numbers. For example, 8 must be shown as 08.

5 **dddnn.mmmmmmm** = latitude, in degrees and decimal minutes

6 **a** = Direction of latitude:

N: North

S: South

7 **dddnn.mmmmmmm** = longitude, in degrees and decimal minutes. Should contain three digits of ddd.

8 **a** = Direction of longitude:

E: East

W: West

9 **x** = GPS quality indicator

0: Fix not available or invalid

1: Autonomous GPS fix

2: RTK float solution

3: RTK fix solution

4: Differential, code phase only solution (DGPS)

5: SBAS solution – WAAS/EGNOS/MSAS

6: RTK float or RTK location 3D Network solution

7: RTK fixed 3D Network solution

8: RTK float or RTK location 2D in a Network solution

9: RTK fixed 2D Network solution

10: OmniSTAR HP/XP solution

11: OmniSTAR VBS solution

12: Location RTK solution

13: Beacon DGPS

10 **zz** = number of satellites in use, 00 to 12, may be different from the number in view

11 **w.w** = PDOP of fix (Position Dilution of Precision associated with the most recent position)

12 **EHTaaa.bbb** = ellipsoidal height of fix (antenna height above ellipsoid). Must start with "EHT".

13 **M** = ellipsoidal height is measured in meters

14 ***hh** = checksum

Note

The PTNL GGK message is longer than the NMEA-0183 standard of 80 characters.

Even if a user-defined geoid model, or an inclined plane is loaded into the receiver, then the height output in the NMEA GGK string is always an ellipsoid height, for example, EHT24.123.

File formats

Topics

The raw data file format

Each raw data file contains a set of *datagrams*. Some of these datagrams are in XML format, others are binary.The datagram sequence in the raw data file is not fixed. It depends on the number of installed frequency channels. In this context, the phrase *channel* is used as a common term to identify the combination of transceiver, transducer and operating frequency.

File header

Each raw data file always starts with the following datagram types:

1 **Configuration XML datagram**

This is an XML datagram. The type is `XML0`.

The Configuration XML datagram is the first datagram in the raw data file. It contains parameters that are not subject to change in the file.

2 **Filter binary datagram**

This is a binary datagram. The type is `FIL1`.

The Filter binary datagrams contains filter coefficients used for filtering the received signal. The number of Filter datagrams depends on the number of filter stages in the transceiver.

EA440 systems with the Wide Band Transceiver (WBT) (and similar) have two Filter datagrams. The first datagram contains the filter parameters from the transceiver, while the second datagram contains the filter parameters from the EA440 program. The two filter datagrams have the same structure. They are referred to as "Stage 1" and "Stage 2".

3 **Filter binary datagram**

4 **Environment XML datagram**

This is an XML datagram. The type is `XML0`.

The Environment XML datagram contains environment parameters. There may be one or more Environment datagrams in the file. The absorption coefficient and other related values are calculated using these parameters.

Note

If the environmental conditions change, the content of the datagram will reflect this. The existing raw data file is then automatically closed, and a new file is established with the new environmental data. This ensures that all the data in a single raw data file will always have consistent environmental information.

5 **NMEA text datagram**

This is a text (ASCII) datagram. The type is `NME0`.

An NMEA text (ASCII) datagram is inserted to the start of the raw data file to provide information about sailed distance (VLW information).

Sample data for each channel and ping

The first datagrams in the file header are followed by sample data with datagrams providing information from each channel and ping. The information in the datagrams are linked using the time stamp and the `Channel ID` information. These two datagrams will always be present to provide this information.

1 **Parameter XML datagram**

This is an XML datagram. The type is `XML0`.

The Parameter XML datagram contains information about parameters that may change from one transmission ("ping") to the next.

2 **Sample binary datagram**

This is a binary datagram. The type is `RAW3`.

The sample datagram contains sample data from each "ping". The datagram may have different size and contain different kinds of data, depending on the DataType parameter.

3 **Depth binary datagram**

This is a binary datagram. The type is `NMEA DPT`.

You can select to have a NMEA DPT datagram in the raw file on the **File Setup** page in the **Output** dialog box.

In-between or after the Parameter and Sample datagrams, additional datagrams may be inserted asynchronously.

1 **NMEA text datagram**

This is a binary datagram. The type is `NME0`.

The NMEA datagram contains the original NMEA 0183 input message line including carriage return(CR) and line feed (LF). The datagram is inserted whenever the information from one of the relevant sensors changes.

2 **Annotation text (ASCII) datagram**

This is a text (ASCII) datagram. The type is `TAG0`.

The Annotation text datagram contains comment text that you have typed, for example "Dangerous wreck". It will also contain automatic annotations generated by the EA440. The datagram is inserted whenever a new annotation is generated automatically or manually.

3 **Motion binary datagram**

This is a binary datagram. The type is `MRU0`.

The Motion binary datagram contains information from the motion reference unit (MRU) or a similar sensor. The datagram is inserted whenever the information from the motion sensor changes.

Raw data format summary for a EA440 system with a Wide Band Transceiver (WBT)

1 Configuration XML datagram
2 Filter binary datagram
3 Filter binary datagram(s)
4 Environment XML datagram
5 NMEA text datagram
6 *Sample data for each channel and ping merged with asynchronous data*:
   a Parameter XML datagram
   b Sample binary datagram
   c Depth binary datagram (*Optional*)
   d NMEA text datagram (*Asynchronously*)
   e Annotation text (ASCII) datagram (*Asynchronously*)
   f Motion binary datagram (*Asynchronously*)

Configuration XML datagram

The Configuration XML datagram is the first datagram in the raw data file. It contains parameters that are not subject to change in the file.

Format

The basic XML structure follows. The tags are shown without attributes.

```
<Configuration>
<Header/
<Transceivers>
     <Transceiver>
     <Channels>
     <Channel>
     <Transducer/>
     </Channel>
     </Channels>
     </Transceiver>
     <Transducers>
     <Transducer/>
     </Tranducers>
     <ConfiguredSensors>
     <Sensor/>
     </ConfiguredSensors>
</Configuration>
```

The <Header> tag

```
<Header
     Copyright="Copyright(c) Kongsberg Maritime AS, Norway"
     ApplicationName="EA440"
     Version="17.1"
     FileFormatVersion="1.20"
     TimeBias="-60"/>
```

The <Transceivers> tag can hold one or more <Transceiver> tags.

```
<Transceiver
     TransceiverName="WBT 5197648"
     EthernetAddress="009072085343"
     IPAddress="172.19.1.114"
     Version="[0] Ethernet:  00:90:72:08:53:43 [1]
     Parts-list:  WBT 371790/D [2]
      Product:  WBT
     IP Address:  169.254.236.100
     Subnet mask:  255.255.0.0
     Default gateway:  169.254.236.1
     Serial number:  545603
     Embedded software:  Rev.  1.70
     FPGA TX firmware:  Rev.  4
     FPGA RX firmware:  Rev.  7"
     TransceiverSoftwareVersion="1.70"
     TransceiverNumber="1"
     TransceiverType="WBT"
     SerialNumber="545603">
```

Each <Transceiver> tag holds one <Channels> tags.

```
<Channels>
```

These are the attributes in the <Channels> tag.

```
<Channel
     ChannelID="WBT 5197648-2 Air200-9G"
     ChannelIdShort="Air200-9G Drop Keel"
     ChannelNumber="1"
     MaxTxPowerTransceiver="500"
     PulseLength="6.4E-05;0.000128;0.000256;0.000512;0.001024"
     PulseDurationFM="0.000512;0.001024;0.002048;0.004096;0.008192"
     HWChannelConfiguration="2">
```

Each <Channel> tag holds one <Transducer> tag with attributes.

```
<Channel
<Transducer
     TransducerName="Air200-9G"
     SerialNumber="264"
     Frequency="200000"
     FrequencyMinimum="170000"
     FrequencyMaximum="230000"
     BeamType="0"
     EquivalentBeamAngle="18.5"
     Gain="21.6;22.9;23.1;23.1;23.1"
     SaCorrection="0.22;-0.43;-0.66;-0.75;-0.8"
     MaxTxPowerTransducer="500"
     BeamWidthAlongship="9"
     BeamWidthAthwartship="9"
     AngleSensitivityAlongship="0"
     AngleSensitivityAthwartship="0"
     AngleOffsetAlongship="0"
     AngleOffsetAthwartship="0"
     DirectivityDropAt2XBeamWidth="0"/>
</Channel>
```

The BeamType attribute may have the following values:

```
     BeamTypeSingle=0,
     BeamTypeSplit= 0x1,
     BeamTypeRef=0x2,
     BeamTypeRefB=0x4,
     BeamTypeSplit3=0x11,
     BeamTypeSplit2=0x21,
     BeamTypeSplit3C=0x31,
     BeamTypeSplit3CN=0x41,
     BeamTypeSplit3CW=0x51
```

The <Transducers> tag also includes one or more <Transducer/> tags, one for each transducer used on the EA440 system.

```
<Transducers>
<Transducer
     TransducerName="Air200-9G"
     TransducerMounting="Drop Keel"
     TransducerCustomName="Air200-9G Serial No:  264"
     TransducerSerialNumber="1"
     TransducerOrientation="Vertical"
```

```
      TransducerOffsetX="0"
      TransducerOffsetY="0"
      TransducerOffsetZ="0"
      TransducerAlphaX="0"
      TransducerAlphaY="0"
      TransducerAlphaZ="0" />
</Transducers>
```

The <ConfiguredSensors> tag contains one or more <Sensor> tags.

```
<ConfiguredSensors>
<Sensor
      Name="Temperature From LAN Port UDP0"
      Type="Temperature"
      Port="Lan Port 2"
      TalkerID=""
      X="0"
      Y="0"
      Z="0"
      AngleX="0"
      AngleY="0"
      AngleZ="0"
      Unique="0"
      Timeout="20">
```

Each <Sensor> tag can contain one or more <Telegram> tags.

```
<Telegram
     Name="MTW from Temperature From LAN Port UDP0">
     SensorType="Temperature"
     Type="MTW"
     SubscriptionPath="Temperature From LAN Port UDP0@Temperature.Wa-
     terTemperature"
     Enabled="1">
```

Each <Telegram> tag can contain one or more <Value> tags.

```
<Value
      Name="Temperature"
      Priority="1" />
      </Telegram>
</Sensor>
</ConfiguredSensors>
```

Description

The Configuration XML datagram is identified by the `<Configuration>` tag. The type is `XML0`. Information are contained in the specified attributes. The `<ChannelID>` attribute links data from different datagrams in the raw file to a specific frequency channel.

Filter binary datagram

The Filter binary datagrams contains filter coefficients used for filtering the received signal.

Format

```
struct FilterDatagram
     {
     DatagramHeaderDgHeader;
     short Stage;
     char Spare[2];
     char ChannelID[128];
     short NoOfCoefficients;
     short DecimationFactor;
     float Coefficients[];
     };
```

Description

- **DatagramHeaderDgHeader**: This is the binary datagram in use. The type is `FIL1`.
- **short Stage**: The is the filter stage number.
- **char Spare[2]**: For future expansions
- **char ChannelID[128]**: Channel identification
- **short NoOfCoefficients**: This is the number of complex filter coefficients.
- **short DecimationFactor**: This is the filter decimation factor.
- **float Coefficients[]**: These are the filter coefficients.

The filter coefficients in the Filter datagrams are used in combination with information of the transmitted signal to create the matched filter which can be used to create matched filter or pulse compressed echogram data.

The filter coefficients are complex values.

Thus, the number of values found in `Coefficients[]` are 2 x `NoOfCoefficients` since each complex filter coefficient consist of one real part and one imaginary part. The complex filter coefficients `F(n)` are arranged in `Coefficients[]` as:

```
real(F(1)), imag(F(1)), real(F(2)), imag(F(2)), ….  ,
```

Environment XML datagram

The Environment XML datagram contains environment parameters. The absorption coefficient and other related values are calculated using these parameters. This is an XML datagram. The type is `XML0`.

Note

If the environmental conditions change, the content of the datagram will reflect this. The existing raw data file is then automatically closed, and a new file is established with the new environmental data. This ensures that all the data in a single raw data file will always have consistent environmental information.

Format

These are the attributes in the `<Environment>` tag. The attribute values are only included as examples.

```
<Environment
      Depth="100"
      Acidity="8"
      Salinity="35"
      SoundSpeed="1491.435067861"
      Temperature="10"
      Latitude="45"
      SoundVelocityProfile="1.000000;1500.000000;1000.000000;1500.000000"
      SoundVelocitySource="Calculated"
      DropKeelOffset="0"
      DropKeelOffsetIsManual="0"
      WaterLevelDraft="0"
      WaterLevelDraftIsManual="0"
      >
      <Transducer
            TransducerName="Unknown"
            SoundSpeed="1490"
            />
</Environment>
```

Description

The Environment XML datagram is identified by the `<Environment>` tag. The `<Environment>` tag can hold one or more `<Transducer>` elements. The `<Transducer>` tag is provided for future use.

Record of changes

- **1.20** `<Environment>` Added:

- Latitude
- SoundVelocityProfile
- SoundVelocitySource
- DropKeelOffset
- DropKeelOffsetIsManual
- WaterLevelDraft
- WaterLevelDraftIsManual

Parameter XML datagram

The Parameter XML datagram contains information about parameters that may change from one transmission ("ping") to the next.

Format

Example:

```
<Parameter>
     <Channel
     ChannelID="WBT 545603-15 Air200-9G"
     ChannelMode="0"
     PulseForm="1"
     FrequencyStart="95000"
     FrequencyEnd="160000"
     BandWidth="3026.39148748301"
     SampleInterval="1.06666666666667E-05"
     TransmitPower="250"
     Slope="0.0102796052631579"
     />
</Parameter>
```

Description

The Parameter XML datagram is identified by the `<Parameter>` tag. The `<Parameter>` tags can hold one or more `<Channel>` tags.

Sample binary datagram

The sample datagram contains sample data from each "ping". The datagram may have different size and contain different kinds of data, depending on the DataType parameter.

Format

```
struct SampleDatagram
     {
     DatagramHeaderDgHeader;
     char ChannelID[128];
     short Datatype;
     char Spare[2];
     long Offset;
     long Count;
     byte Samples[];
     };
```

Description

- **DatagramHeader DgHeader**: This is the binary datagram in use. The type is `RAW3`.
- **char ChannelID[128]**: This is the channel identification.
- **short Datatype**:
  - Bit 0 = `Power`
  - Bit 1 = `Angle`
  - Bit 2 = `ComplexFloat16`
  - Bit 3 = `ComplexFloat32`
  - Bit 8 - 10 = `Number of Complex per Samples`
- **char Spare[2]**: For future expansions
- **long Offset**: This is the first sample number.
- **long Count**: This is the total number of samples.
- **byte Samples[]**: These are the received sample values.

The number of values in `Samples[]` depends on the value of `Count` and the `Datatype`.

We have a `DataType` decimal value of 1032.

The sample values S(i,n) are arranged as:

```
Real(S(1,1)), Imag(S(1,1)),
Real(S(2,1)), Imag(S(2,1)),
Real(S(3,1)), Imag(S(3,1)),
Real(S(4,1)), Imag(S(4,1)),
Real(S(1,2)), Imag(S(1,2)), ...
```

NMEA DPT datagram

The NMEA DPT datagram provides the water depth relative to the transducer, and the offset of the measuring transducer.

Format

```
$--DPT,x.x,y.y*hh<CR><LF>
```

Description

This description is not complete. For additional details, refer to the NMEA standard.

- **$--**: Talker identifier
- **DPT**: Datagram used — NMEA DPT
- **x.x**: Depth in metres, relative to the transducer
- **z.z**: Offset in metres, from the transducer
- ***hh**: Checksum

NMEA text datagram

The NMEA datagram contains the original NMEA 0183 input message line including carriage return(CR), line feed (LF) and port information.

Format

```
struct TextPortDatagram{
     DatagramHeader DgHeader
     char Port[32];
     char Text[256];
};
```

Description

- **DatagramHeader DgHeader**: Datagram used — NME1
- **char Port[32]**: Which port used, e.g. Lan Port 3
- **char Text[256]**: E.g. $GPGLL,5713.213,N,1041.458,E<cr><lf>, where $GPGLL is the Sentence ID

Annotation text (ASCII) datagram

The Annotation text datagram contains comment text that you have typed, for example "Dangerous wreck". It will also contain automatic annotations generated by the EA440. The datagram is inserted whenever a new annotation is generated automatically or manually. The type is `TAG0`.

Format

```
struct TextDatagram
     {
     DatagramHeader DgHeader;
     char Text[];
     };
```

Description

- **DatagramHeader DgHeader**: This is the text (ASCII) datagram in use. The type is `TAG0`.
- **char Text[]**: This is the text entered in the annotation.

The text string is zero terminated. The size of the complete datagram depends on the annotation length. The maximum annotation string is 80 characters.

Motion binary datagram

The Motion binary datagram contains information from the motion reference unit (MRU) or a similar sensor.

Format

```
struct MRUDatagram{
     DatagramHeaderDgHeader;
     float Heave;
     float Roll;
     float Pitch;
     float Heading;
};
```

Description

- **DatagramHeaderDgHeader**: Datagram used — MRU0

The .out data file format

The datagram sequence in an out data file is not fixed. It depends of the number of installed frequency channels.

The file may contain one or more of the following datagram types

- **Configuration**: This is a binary datagram. The type is `CON0`.
- **NMEA**: This is a binary datagram. The type is `NME0`.
- **Annotation**: This is a binary datagram. The type is `TAG0`.
- **Bottom depth**: This is a binary datagram.The type is `DEP0`.

Note

The information in the various datagrams are linked using the time stamp and the Channel ID information.

Configuration datagram

The transducer configuration is repeated for each channel. Up to 8 channels are documented in the .out file.

Format

```
struct ConfigurationDatagram {
  DatagramHeader DgHeader;
  ConfigurationTransducer Transducer[];
  };
struct DatagramHeader {
  uint lDatagramType;
  ulong ftTime;
  };
struct ConfigurationHeader {
  char SurveyName[128];
  char TransectName[128];
  char SounderName[128];
  float fMotionX;
  float fMotionY;
  float fMotionZ;
  char Spare[116];
  long TransducerCount;
  };
struct ConfigurationTransducer {
  char ChannelId[128];
  long BeamType;
  float Frequency;
  float Gain;
  float EquivalentBeamAngle;
  float BeamWidthAlongship;
  float BeamWidthAthwartship;
  float AngleSensitivityAlongship;
  float AngleSensitivityAthwartship;
  float AngleOffsetAlongship;
  float AngleOffsetAthwartship;
  float PosX;
  float PosY;
  float PosZ;
  float DirX;
  float DirY;
  float DirZ;
  char Spare2[8];
  };
```

Description

- **DatagramHeader DgHeader**: Datagram used — CON0
- **ConfigurationTransducer Transducer[]**: The channels used in the survey
- **uint lDatagramType**: Datagram used — CON0
- **ulong ftTime**: Date of the survey
- **char SurveyName[128]**: The name you gave the survey, e.g. "Loch Ness". Can contain up to 128 characters.
- **char TransectName[128]**: Line number, e.g. "L0123"
- **char SounderName[128]**: The name of the echo sounder, e.g. "EA440".
- **float fMotionX**: Position of the MRU in the X direction

- **float fMotionY**: Position of the MRU in the Y direction
- **float fMotionZ**: Position of the MRU in the Z direction
- **char Spare[116]**: For future use
- **long TransducerCount**: Number of transducers used when saving the file

The transducer configuration is repeated for each channel. Up to 8 channels are documented in the .out file.

- **char ChannelId[128]**: The channel ID
- **long BeamType**: 0 is Single beam and 1 is Split beam
- **float Frequency**: The main frequency of this channel in Hz
- **float Gain**: The **Gain** used on this channel
- **float EquivalentBeamAngle**: The transducers beam angle in dB
- **float BeamWidthAlongship**: The transducers beam width alongship in degrees
- **float BeamWidthAthwartship**: The transducers beam width athwartship in degrees
- **float AngleSensitivityAlongship**: The transducers angle sensitivity alongship – primarily for split beam systems
- **float AngleSensitivityAthwartship**: The transducers angle sensitivity athwartship – primarily for split beam systems
- **float AngleOffsetAlongship**: The transducers angle offset alongship – for future use
- **float AngleOffsetAthwartship**: The transducers angle offset athwartship – for future use
- **float PosX**: The position of the transducer in the X direction
- **float PosY**: The position of the transducer in the Y direction
- **float PosZ**: The position of the transducer in the Z direction
- **float DirX**: For future use
- **float DirY**: For future use
- **float DirZ**: For future use
- **char Spare2[8]**: For future use

NMEA text datagram

The NMEA datagram contains the original NMEA 0183 input message line including carriage return(CR) and line feed (LF).

Format

```
struct TextDatagram{
  DatagramHeader DgHeader
  char Text[256];
};
```

Description

- **DatagramHeader DgHeader**: Datagram used — NME0
- **char Text[256]**: E.g. $GPGLL,5713.213,N,1041.458,E<cr><lf>, where $GPGLL is the Sentence ID

Annotation text (ASCII) datagram

The Annotation text datagram contains comment text that you have typed, for example "Dangerous wreck". It will also contain automatic annotations generated by the EA440. The datagram is inserted whenever a new annotation is generated automatically or manually. The type is `TAG0`.

Format

```
struct TextDatagram
     {
     DatagramHeader DgHeader;
     char Text[];
     };
```

Description

- **DatagramHeader DgHeader**: This is the text (ASCII) datagram in use. The type is `TAG0`.
- **char Text[]**: This is the text entered in the annotation.

The text string is zero terminated. The size of the complete datagram depends on the annotation length. The maximum annotation string is 80 characters.

Bottom depth datagram

The detected depth is repeated for each channel. Up to 8 channels are documented in the .out file.

Format

```
struct BottomDepthDatagram{
 DatagramHeader DgHeader
 long TransducerCount,
 struct {
  float Depth;
  float Parameter1;
  float Parameter2;
 }Transducer[];
};
```

Description

- **DatagramHeader DgHeader**: Datagram used — DEP0
- **long TransducerCount**: Number of transducers used when saving the file
- **float Depth**: The depth found by this channel in m
- **float Parameter1**: Bottom Surface Backscattering strength in dB
- **float Parameter2**: For future use

Echogram datagram

The echogram datagram format is identical for both output to the network and for file storage.

Format

```
Q#,Time,TVG type,Depth,Pelagic Upper,Pelagic Lower,Pelagic Count,Bottom Upper,
Bottom Lower,Bottom Count,Data
```

- **Q#**: header with 2 characters, where # indicates the channel number
- **Time**: The time when the ping is transmitted in HHMMSSss
- **TVG type**: 0=No TVG, 2=40logR, 3=20logR and 4=30logR
- **Depth**: Depth in m
- **Pelagic upper**:
- **Pelagic lower**:
- **Pelagic Count**:
- **Bottom upper**:
- **Bottom lower**:
- **Bottom Count**:
- **Data**:

The .EA400 data file format

The EA400 files are the same as .raw files from the EA 400 and EA 600 systems. The datagram sequence in an EA400 file is not fixed.

The file may contain one or more of the following datagram types:

- **Configuration**: This is a binary datagram. The type is `CON0`.
- **Sample**: This is a binary datagram. The type is `RAW0`.

- **NMEA**: This is a binary datagram. The type is `NME0`.
- **Annotation**: This is a binary datagram. The type is `TAG0`.
- **Bottom depth**: This is a binary datagram.The type is `DEP0`.
- **SVP**: This is a binary datagram. The type is `SVP0`.

Configuration datagram

The transducer configuration is repeated for each channel.

Format

```
struct ConfigurationDatagram
     {
     DatagramHeader DgHeader;
     ConfigurationHeader ConfigHeader;
     ConfigurationTransducer Transducer[8];
     };

struct DatagramHeader
     {
     long lDatagramType;
     FILETIME ftTime;
     };

struct ConfigurationHeader
     {
     char SurveyName[128];
     char TransectName[128];
     char SounderName[128];
     float fMotionX;
     float fMotionY;
     float fMotionZ;
     char cSpare[116];
     long lTransducerCount;
     };

struct ConfigurationTransducer
     {
     char cChannelId[128];
     long lBeamType;
     float fFrequency;
     float fGain;
     float fEquivalentBeamAngle;
```

```
float fBeamWidthAlongship;
float fBeamWidthAthwartship;
float fAngleSensitivityAlongship;
float fAngleSensitivityAthwartship;
float fAngleOffsetAlongship;
float fAngleOffsetAthwartship;
float fPosX;
float fPosY;
float fPosZ;
float fDirX;
float fDirY;
float fDirZ;
char cSpare[128];
};
```

Description

- **DatagramHeader DgHeader**: Datagram used — CON0
- **ConfigurationTransducer Transducer[8]**: The channels used in the survey
- **long lDatagramType**: Datagram used — CON0
- **FILETIME ftTime**: Date of the survey
- **char SurveyName[128]**: The name you gave the survey, e.g. "Loch Ness". Can contain up to 128 characters.
- **char TransectName[128]**: Line number, e.g. "L0123"
- **char SounderName[128]**: The name of the echo sounder, e.g. "EA440".
- **float fMotionX**: Position of the MRU in the X direction
- **float fMotionY**: Position of the MRU in the Y direction
- **float fMotionZ**: Position of the MRU in the Z direction
- **char Spare[116]**: For future use
- **long TransducerCount**: Number of transducers used when saving the file

The transducer configuration is repeated for each channel. Up to 8 channels are documented in the .EA400 file.

- **char ChannelId[128]**: The channel ID
- **long BeamType**: 0 is Single beam and 1 is Split beam
- **float Frequency**: The main frequency of this channel in Hz
- **float Gain**: The **Gain** used on this channel in dB
- **float EquivalentBeamAngle**: The transducers beam angle in dB
- **float BeamWidthAlongship**: The transducers beam width alongship in degrees

- **float BeamWidthAthwartship**: The transducers beam width athwartship in degrees
- **float AngleSensitivityAlongship**: The transducers angle sensitivity alongship – primarily for split beam systems
- **float AngleSensitivityAthwartship**: The transducers angle sensitivity athwartship – primarily for split beam systems
- **float AngleOffsetAlongship**: The transducers angle offset alongship – for future use
- **float AngleOffsetAthwartship**: The transducers angle offset athwartship – for future use
- **float PosX**: The position of the transducer in the X direction
- **float PosY**: The position of the transducer in the Y direction
- **float PosZ**: The position of the transducer in the Z direction
- **float DirX**: For future use
- **float DirY**: For future use
- **float DirZ**: For future use
- **char Spare[128]**: For future use

Sample binary datagram

The sample datagram contains sample data from each "ping". The datagram may have different size and contain different kinds of data, depending on the DataType parameter.

Format

```
struct StructSampleDatagram
     {
     StructDatagramHeader DgHeader;
     StructSampleHeader SampleHeader;
     };

struct DatagramHeader
     {
     long lDatagramType;
     FILETIME ftTime;
     };

struct StructSampleHeader
     {
     short nChannel;
     short nMode;
     float fTransducerDepth;
     float fFrequency;
     float fTransmitPower;
```

```
float fPulseLength;
float fBandWidth;
float fSampleInterval;
float fSoundVelocity;
float fAbsorptionCoefficient;
float fHeave;
float fTxRoll;
float fTxPitch;
float fTemperature;
short spare1;
short spare2;
float fRxRoll;
float fRxPitch;
short nTrawlUpperDepthValid;
short nTrawlOpeningValid;
float fTrawlUpperDepth;
float fTrawlOpening;
long lOffset;
long lCount;
};
```

- **DatagramHeader DgHeader**: Datagram used — RAW0
- **StructSampleHeader SampleHeader**: The sample datagram
- **long lDatagramType**: Datagram used — RAW0
- **FILETIME ftTime**: Date of the survey
- **short nChannel**: Channel number
- **short nMode**: Data type: Bit0=Power, Bit1=Angle, Bit2=ComplexFloat16, Bit3=ComplexFloat32, Bit8–10=Number of Complex per samples
- **float fTransducerDepth**: Depth in metres, measured by the transducer
- **float fFrequency**: The main frequency of this channel in Hz
- **float fTransmitPower**: The transmitted power of this channel in W
- **float fPulseLength**: The pulse length of this channel in seconds
- **float fBandWidth**: The bandwidth of this channel in Hz
- **float fSampleInterval**: The sample interval of this channel in seconds
- **float fSoundVelocity**: The sound velocity used by this channel in m/s
- **float fAbsorptionCoefficient**: The absorption coefficient used by this channel in dB/m
- **float fHeave**: The heave in metres
- **float fTxRoll**: The roll in degrees
- **float fRxPitch**: The pitch in degrees

- **short nTrawlUpperDepthValid**: For trawl systems
- **short nTrawlOpeningValid**: For trawl systems
- **float fTrawlUpperDepth**: For trawl systems
- **float fTrawlOpening**: For trawl systems
- **long lOffset**: First sample
- **long lCount**: Number of samples

NMEA text datagram

The NMEA datagram contains the original NMEA 0183 input message line including carriage return(CR) and line feed (LF).

Format

```
struct TextDatagram{
  DatagramHeader DgHeader
  char Text[256];
};
```

Description

- **DatagramHeader DgHeader**: Datagram used — NME0
- **char Text[256]**: E.g. $GPGLL,5713.213,N,1041.458,E<cr><lf>, where $GPGLL is the Sentence ID

Annotation text (ASCII) datagram

The Annotation text datagram contains comment text that you have typed, for example "Dangerous wreck". It will also contain automatic annotations generated by the EA440. The datagram is inserted whenever a new annotation is generated automatically or manually. The type is `TAG0`.

Format

```
struct TextDatagram
     {
     DatagramHeader DgHeader;
     char Text[];
     };
```

Description

- **DatagramHeader DgHeader**: This is the text (ASCII) datagram in use. The type is `TAG0`.
- **char Text[]**: This is the text entered in the annotation.

The text string is zero terminated. The size of the complete datagram depends on the annotation length. The maximum annotation string is 80 characters.

Bottom depth datagram

The detected depth is repeated for each channel. Up to 8 channels are documented in the .out file.

Format

```
struct BottomDepthDatagram{
 DatagramHeader DgHeader
 long TransducerCount,
 struct {
  float Depth;
  float Parameter1;
  float Parameter2;
 }Transducer[];
};
```

Description

- **DatagramHeader DgHeader**: Datagram used — DEP0
- **long TransducerCount**: Number of transducers used when saving the file
- **float Depth**: The depth found by this channel in m
- **float Parameter1**: Bottom Surface Backscattering strength in dB
- **float Parameter2**: For future use

SVP datagram format

The sound velocity profile datagram lists the sound velocity profile used.

Format

```
struct StructSoundSpeedHeader
     {
     int iSvpType;
     };

struct StructSoundSpeedDatagram
     {
     StructDatagramHeader DgHeader;
     StructSoundSpeedHeader SvpHeader;
     char cText[25000];
     };
```

Description

- **struct StructSoundSpeedHeader**: Datagram used — SVP0
- **int iSvpType**: SVP type: 0=Constant, 1=Calculated, 2=Probe, 3=SVP file
- **DatagramHeader DgHeader**: Datagram used — SVP0
- **StructSoundSpeedHeader SvpHeader**: Datagram used — SVP0
- **char cText[25000]**: The sound velocity profile listed

The .XYZ data file format

The XYZ datagram is a navigational datagram showing the position and depth of a single channel.

Format

```
llll.ddmmhhh N/S,yyyy.ddmmhhh E/W,d.dd,ddMMyyyy,HHmmss.ff,t.ttt,<CR>
```

1 **llll.ddmmhhh N/S**: Latitude North/South (Degrees, minutes and hundredths)

N = North

S = South

2 **yyyy.ddmmhhh E/W**: Longitude East/West (Degrees, minutes and hundredths)

E = East

W = West

3 **d.dd**: Depth below surface (Metres)

4 **ddMMyyyy**: Date

5 **HHmmss.ff**: Time

6 **t.ttt**: Transducer offset (Metres)

Technical specifications

Topics

Performance specifications

These performance specifications summarize the main functional and operational characteristics of the EA440 Hydrographic single beam echo sounder.

Pulse lengths and maximum resolution

- **500 kHz**: CW 32 - 512 µs, FM, Resolution: 0.3 cm
- **200 kHz**: CW 64 - 1024 µs, Resolution: 0.6 cm
- **38 kHz**: CW 256 - 4096 µs, Resolution: 2.4 cm
- **18 kHz**: CW 512 - 8192 µs, Resolution: 4.9 cm
- **12 kHz**: CW: 1 - 16 ms, Resolution: 9.8 cm

Range

- **Operational range**: 1 to 12,500 m
- **Pulse bandwidth**: 10 to 500 kHz

Ping rate

- Maximum40 per second

Sound Speed

- Manual (1400 to 1700 m/s)
- Calculated from temperature and salinity
- Calculated from temperature sensor and salinity
- Read from sound speed probe

Interfaces

- WBT: Ethernet communication
- **Optional interfaces**:
  - Ethernet to ships' network
  - Sensors: GPS, gyro, motion, speed log, temperature, remote control, annotation, water level, drop keel, external depth and sound speed
- **Export file formats**: See *Interface specifications*
- **Depth output**: See *Interface specifications*
- **Remote control**: Remote start/stop logging available on serial or network

User interface

- **Operating system**: Microsoft® Windows® 10
- **Main control**: Mouse or touch on a comprehensive menu system

- **Menu languages**: English, French, Icelandic, Norwegian, Spanish, German

Interface specifications

The EA440 will interface with peripheral systems and sensors using standard and/or proprietary datagram formats.

Supported datagram formats for position information

The EA440 supports the following datagram formats for position information.

- **NMEA GLL**

  The NMEA GLL datagram transfers the latitude and longitude of vessel position, the time of the position fix and the current status from a global positioning system (GPS).

- **NMEA GGA**

  The NMEA GGA datagram transfers time-, position- and fix-related data from a global positioning system (GPS).

- **NMEA GGK**

  The NMEA GGK datagram is used to decode the PTNL, Time, Position, Type and DOP (Dilution of Precision) string of the NMEA 0183 output.

- **NMEA RMC**

  The NMEA RMC datagram transfers the time, date, position, course and speed data from a global navigation satellite system (GNSS) receiver.

- **NMEA VTG**

  The NMEA VTG datagram contains the actual course and speed relative to the ground.

- **NMEA ZDA**

  The NMEA ZDA datagram contains the universal time code (UTC), day, month, year and local time zone.

Supported datagram formats for speed log information

The EA440 supports the following datagram formats for speed information.

- **NMEA VTG**

  The NMEA VTG datagram contains the actual course and speed relative to the ground.

Supported datagram formats for temperature information

The EA440 supports the following datagram format for temperature information.

- **NMEA MTW**

  The NMEA MTW datagram provides the current water temperature.

Supported datagram formats for heading and gyro information

The EA440 supports the following datagram formats for vessel heading and/or gyro information.

- **NMEA HDT**

  The NMEA HDT datagram provides the true vessel heading. The information is normally provided by a course gyro.

- **NMEA HDM**

  The NMEA HDM datagram provides vessel heading in degrees magnetic. The datagram format is no longer recommended for use in new designs. It is often replaced by the NMEA HDG telegram.

- **NMEA HDG**

  The NMEA HDG datagram provides heading from a magnetic sensor. If this reading is corrected for deviation, it produces the magnetic heading. If it is offset by variation, it provides the true heading.

- **NMEA THS**

  The NMEA THS datagram provides the true vessel heading. The datagram includes a mode indicator field providing critical safety-related information about the heading data. The THS datagram replaces the deprecated HDT.

Supported datagram formats for motion information

The EA440 supports the following datagram formats from a motion sensor.

- **Kongsberg EM Attitude 3000**

  The EM Attitude 3000 is a proprietary datagram format created by Kongsberg Maritime for use with digital motion sensors.

- **Teledyne TSS1**

  Teledyne/TSS1 is a proprietary datagram format created by Teledyne TSS Navigation Systems for heave, roll and pitch compensation. When you select this protocol, the number of sensor variables is fixed, and there is no token associated with it.

Supported datagram formats for sound speed sensors

The EA440 supports the following datagram format from a sound speed sensor.

- **AML**

  This is a third-party proprietary datagram format created by AML Oceanographic for use with their sound speed sensors. The file format is ASCII with a five-line header plus a variable number of data lines. For more information, see http://www.amloceanographic.com.

Supported datagram formats for water level offset information

The EA440 supports the following datagram format for water level offset information.

- **Kongsberg DFT**

The proprietary DFT datagram contains the current water level (draft). The information is required to establish the offset of the transducer face relative to the vessel origin. A custom-built sensor may be required for this measurement.

Supported datagram formats for drop keel offset information

The EA440 supports the following datagram format for drop keel offset information.

- **Kongsberg OFS**

  The proprietary OFS datagram contains the current length travelled by the drop keel. The information is required to establish the offset of the transducer face relative to the vessel origin. A custom-built sensor may be required for this measurement.

Supported datagram formats for annotation data

The EA440 supports the following datagram format for annotations.

- **Simrad ATS datagram format**

  Simrad ATS is a proprietary datagram format created by Kongsberg Maritime. It allows you to import annotations from external devices.

Supported datagram formats for depth information

The EA440 supports the following datagram formats for depth output.

- **NMEA DBS**

  The NMEA DBS datagram provides the current depth from the surface. The datagram is no longer recommended for use in new designs. It is frequently replaced by the NMEA DPT datagram.

- **NMEA DBT**

  The NMEA DBT datagram provides the current depth under the transducer. In new designs, this datagram is frequently used to replace the DBK and DBS datagrams.

- **NMEA DPT**

  The NMEA DPT datagram provides the water depth relative to the transducer, and the offset of the measuring transducer.

- **Simrad depth**

  Simrad depth is a proprietary datagram format created by Kongsberg. The draft, frequency, sound velocity profile and transducer depth may be included.

- **Atlas Depth**

  Atlas Depth is a proprietary datagram format created by Atlas Elektronik (http://www.atlas-elektronik.com) to provide the current depth from two channels.

- Hymas

  Hymas is a third party proprietary datagram format.

Processed data formats

The following processed data output formats are available.

- **XTF**

  XTF means *eXtended Triton Format*. This is a file format for recording various types of hydrographic survey data. The source systems include sidescan sonar, shallow seismic and multibeam bathymetry, as well as associated position and altitude information.

- **SEGY**

  The SEGY (sometimes abbreviated "SEG-Y") file format is one of several standards developed by the *Society of Exploration Geophysicists (SEG)* for storing geophysical data. It is an open standard, and is controlled by the SEG Technical Standards Committee. For more information, see http://community.seg.org.

- **XYZ**

  This is processed and interpolated "xyz" data in ASCII format. Note that a navigation input must be available.

- **Echogram**

  This is the proprietary **EK500** datagram format. The datagrams consists of user defined excerpts of the processed sample data (pixel data), ie the backscatter value of the targets. The echograms are stored as time tagged datagrams in separate files.

- **SILAS**

  This is a proprietary format that was created for the SILAS software.

- **Out**

  Kongsberg Out file format. This is a proprietary format.

- **TIFF**

  TIFF file format. This is a picture format.

Weight and outline dimensions

These weights and outline dimension characteristics summarize the physical properties of the EA440 Hydrographic single beam echo sounder.

Operator Station

- **Make and model**: Hatteland Display JH 19T14 MMC
- **Outline dimensions**
  - **Depth**: 82 mm
  - **Width**: 483 mm
  - **Height**: 444 mm

- **Weight**: 11 kg (Approximately)

WBT

- **Make and model**: Kongsberg WBT
- **Outline dimensions**
  - **Depth**: 213 mm
  - **Width**: 438 mm
  - **Height**: 84 mm
- **Weight**: 5 kg (Approximately)

Power requirements

These power characteristics summarize the supply power requirements for the EA440 Hydrographic single beam echo sounder.

Operator Station

- **Make and model**: Hatteland Display JH 19T14 MMC
- **Voltage requirement**: 115/230 VAC / 50/60 Hz
- **Power consumption**: 100 W maximum

The technical specifications are those valid for the computer that provided by Kongsberg Maritime as a part of the EA440 delivery. For specifications related to a locally purchased computer, refer to the documentation provided with the unit.

WBT

- **Make and model**: Kongsberg WBT
- **Voltage requirement: 12 – 15 VDC, 5A**

  A suitable power supply is provided with the delivery.
- **Power supply:**
  - **Voltage requirement**115/230 VAC, 47 to 63 Hz, single phase, nominal
  - **Maximum voltage deviation**: 15%
  - **Maximum transient**: 20% of nominal voltage, recovery time 3 s
  - **Power consumption**: 100 VA (Approximately)

Environmental requirements

These environmental specifications summarize the temperature and humidity requirements for the EA440 Hydrographic single beam echo sounder.

Operator Station

- **Make and model**: Hatteland Display JH 19T14 MMC
- **Operational temperature**: -15 to 55 °C
- **Storage temperature**: -20 to 60 °C
- **Relative humidity**:95% maximum
- **Degree of protection**: IP66 front, IP20 rear

The technical specifications are those valid for the computer that may be ordered from Kongsberg Maritime as a part of the EA440 delivery. For specifications related to a locally purchased computer, refer to the documentation provided with the unit.

WBT

- **Make and model**: Kongsberg WBT
- **Operational temperature**: 0 to +50 °C
- **Storage temperature**: -40 to 70 °C
- **Relative humidity**: 5 to 95% relative, non-condensing

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