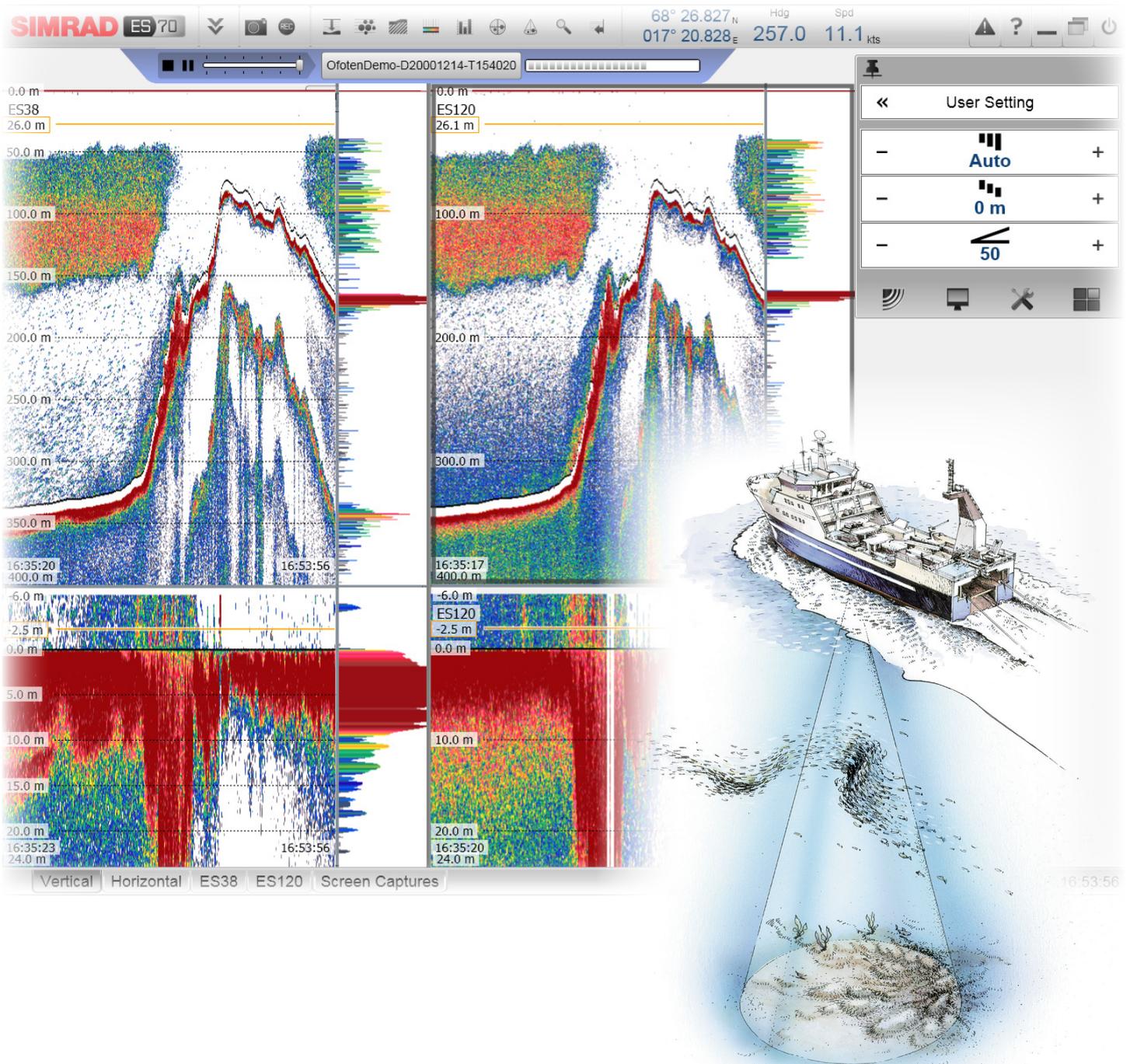# Reference manual

Simrad ES70
Fish finding echo sounder

Simrad ES70
Fish finding echo sounder

Reference manual

Release 1.0.0

This manual provides you with reference information required to operate and fully understand the commands, menus, operational modes, options and interfaces provided by the Simrad ES70 Fish finding echo sounder. The contents of this reference manual is also available as context sensitive on-line help on the echo sounder system. For user information in brief, refer to the *Simrad ES70 Operator manual*.

Revision status

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Rev.A	03.02.2010	First version.

License information

When you have obtained the necessary licenses to operate the ES70, we strongly advice that you write down the hardware ID and the license codes on this page.

Function	Purpose	Code
Hardware ID:	N/A	
License code		
License code		
License code		

Table of contents

About this manual

The purpose of 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 Simrad ES70 Fish finding echo sounder system, as well as a thorough understanding of the system parameters and adjustments.

Click "Help"!

Installed on your Simrad ES70 Fish finding echo sounder you will find a comprehensive on-line help system. You may not find it in your language, but everything you can read in the *ES70 Reference manual* can also be found in the context sensitive on-line help. To access this information click **[?]** on the **Title Bar**, or the **[?]** button in one of the dialogs. Note that when you open the help system it will place itself on the top of the echogram!

Software version

This manual complies to echo sounder software version 1.0.0.

Note _____

Windows NT, Windows 2000, Windows XP, Windows Vista, Windows 7 and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

References

The following user manuals have been provided for the Simrad ES70 Fish finding echo sounder. English manuals are provided with the ES70 when it is shipped. Manuals in other languages may be downloaded from www.simrad.com.

• Simrad ES70 Reference manual [338106]
• Simrad ES70 Operator manual [343522]
• Simrad ES70 Installation manual [343539]

Simrad ES70

The purpose of this chapter is to provide an overall description of the ES70 Fish finding echo sounder system and its main features.

Topics

- *Important* on page 10
- *System overview* on page 11
- *Wave propagation* on page 14
- *Bottom echo* on page 15
- *Split-beam operation* on page 16
- *Observation range* on page 17

Important

As with all other advanced instruments, there are a few important things that you must be aware of.

When the echo sounder is not used

When you do not use the ES70, switch off the display and the computer. You may switch of the transceiver too.

When docking your vessel

It is very important that no one tries to use the ES70 when the vessel is in dry dock. If the transducer is activated when out of water it may be damaged beyond repair. To ensure that this can not happen, remove the power supply to the either the computer or the transceiver - or both! You may also remove circuit breakers. Do this before the vessel is placed in the dry dock!

If something breaks down

If you believe that something has broken down, contact your local dealer. He will be able to assist.

When you switch off the echo sounder

You must NEVER switch off the echo sounder by means of the on/off switch on the computer. You must ALWAYS exit the ES70 application by clicking the **Exit** button on the **Title Bar**. If you power down the sounder by means of the computer switch you may damage the ES70 application and the electronic interface parameters for the external devices.

System overview

This section provides the key facts about the ES70 Fish finding echo sounder system, as well as a brief introduction to the main units.

Key facts

The Simrad ES70 Fish finding echo sounder is designed for the professional fishery community implementing the latest innovations. Echo sounders ranging from relatively low-cost single beam to large multi-frequency systems containing several split-beam channels can be realised.

- The Simrad ES70 Fish finding echo sounder system is flexible and easy to set up due to its modular design.
- Menus and dialogs are operated using a standard computer mouse or a trackball.
- Additional user input can be facilitated using a standard computer keyboard.
- The ES70 supports large colour display monitors.
- The ES70 uses the Microsoft Windows® operating system. It complies to Windows XP® and Windows 7®.
- The ES70 provides you with an award winning user interface. Menu system, dialogs and structure have been created using innovative design, and in close cooperation with customers.
- A store/replay function reduces the need for echogram printout on paper. The unprocessed transducer signal is recorded on the internal hard disk. During replay, this signal is injected into the ES70 processing software as if it arrived directly from the transceiver.

Main units

The basic ES70 Fish finding echo sounder consists of:

- Display
- Computer (The ES70 Marine Computer may be provided)
- One or more General Purpose Transceiver (GPT) units
- One or more standard single beam transducers
- One or more split-beam transducers

Colour display

A standard commercial colour display is used. The display unit is normally not provided by Simrad. Several commercial types and sizes are available.

ES70 Marine Computer

Simrad can supply the **ES70 Marine Computer** for the ES70 Fish finding echo sounder system.

Figure 1   ES70 Marine Computer

A commercial computer may also be used. It must comply to the requirement specifications laid out by Microsoft for their operating systems. It must also provide the necessary interface facilities (serial lines and Ethernet connections) that your system will need to communicate with external sensors (measuring devices) and peripheral systems.

General Purpose Transceiver (GPT)

The General Purpose Transceiver (GPT) contains transmitter and receiver electronics. The receivers are designed for low noise, and they can handle input signals spanning a very large instantaneous dynamic amplitude range of 150 dB. All targets are correctly measured and displayed.

Figure 2   General Purpose Transceiver (GPT)

A twisted pair Ethernet cable connects the General Purpose Transceiver (GPT) to the computer. The distance between the computer and the General Purpose Transceiver can be extended up to maximum 100 meters.

If more than one transceiver is used, a small Ethernet switch is required to connect the General Purpose Transceivers to the computer.

Standard single beam transducer

The ES70 must be connected to one or more transducers.

A wide range of operational frequencies are available.

For more information about the single beam transducers provided by Simrad, consult www.simrad.com.

Split–beam transducer

The ES70 can be used with Simrad's advanced split-beam transducers. These transducers are available at frequencies ranging from 18 to 200 kHz.

For more information about the split–beam transducers provided by Simrad, consult www.simrad.com.

Simplified system diagrams

The system diagrams provided show examples on how a ES70 system may be set up.

Figure 3   System diagram with a single General Purpose Transceiver
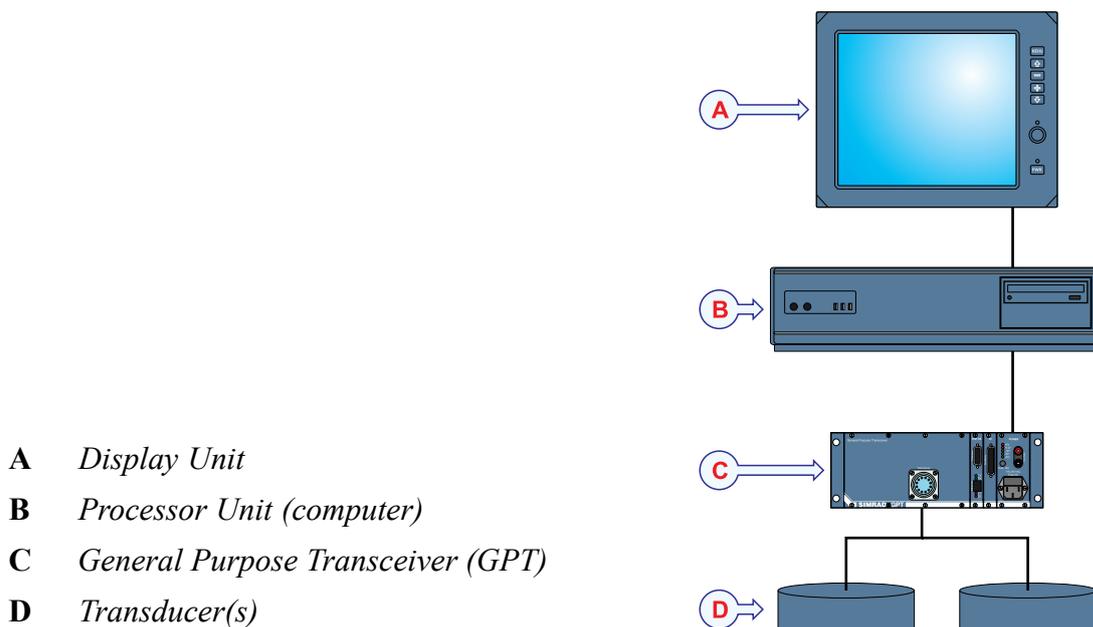
A   *Display Unit*

B   *Processor Unit (computer)*

C   *General Purpose Transceiver (GPT)*

D   *Transducer(s)*

Figure 4   System diagram with two General Purpose Transceivers

A   *Display Unit*

B   *Processor Unit (computer)*

C   *General Purpose Transceiver
       (GPT)*

D   *Transducer(s)*

E   *Ethernet switch*
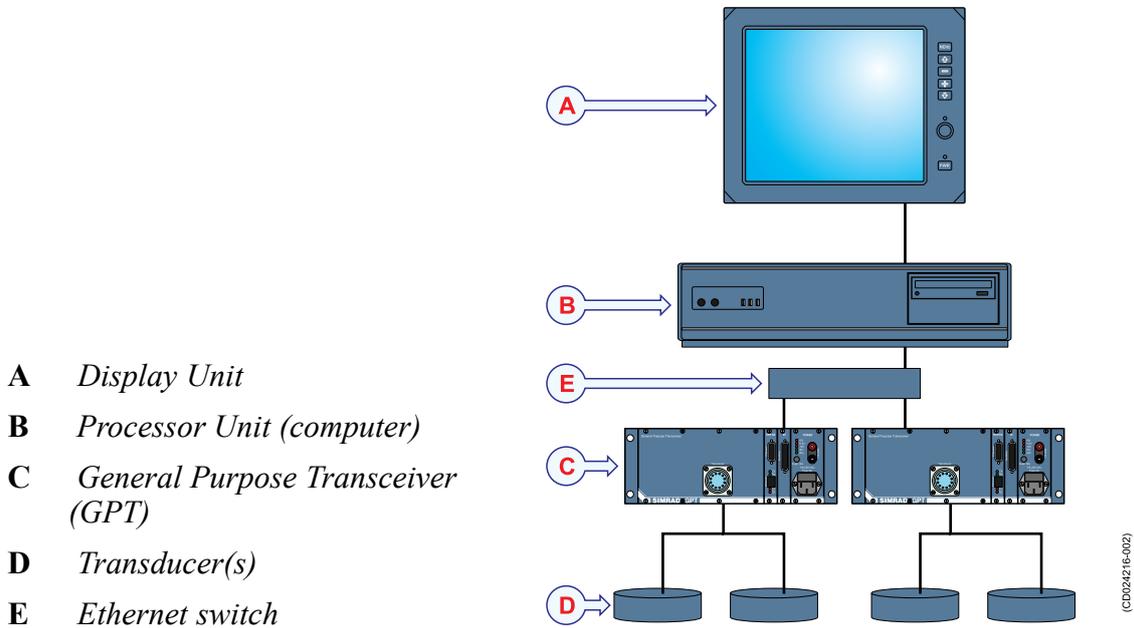
Wave propagation

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.

A good average value to be used in the **Environment** dialog is 1470 m/s.

Figure 5   Wave propagation from a flat bottom
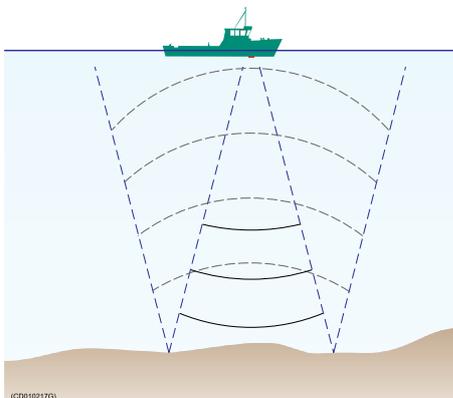
The ES70 transmits high energy sound wave pulses into the sea. A flat bottom reflects the transmitted wave as if it were a mirror. The propagating energy is spread over a larger and larger area as it travels down to the bottom and up again. The energy is spread over a four times larger area every time the travel distance doubles.

A large school of fish reflects sound waves similarly. This type of spreading is referred to as *square-law* or *20 log TVG (Time Varying Gain)* spreading.

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* spreading.

In the echo sounder's **Echogram** dialog 20 log TVG spreading is called *School Gain* and *Bottom Gain*, while 40 log TVG spreading is called *Fish Gain*.

Figure 6   Wave propagation from a fish
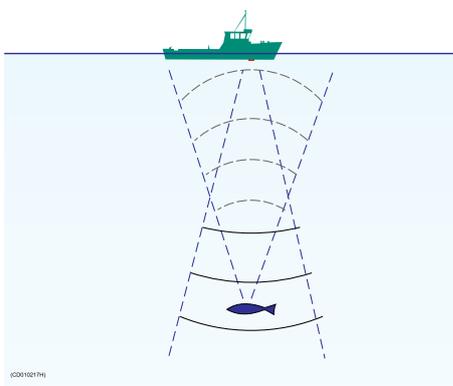
Propagation losses due to absorption are much higher in sea water than in fresh water. Absorption also increases with frequency. At 38 kHz the absorption is 0.5 dB/km in fresh water and 10 dB/km in sea water. At 200 kHz the absorption is 10 dB/km in fresh water and 50 dB/km in salt water. The echo sounder 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.

Related topics

- *About TVG gain* on page 205
- *Echogram* on page 158
- *Environment* on page 149

Bottom echo

A hard flat bottom reflects the transmitted signal as if it were 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.

Figure 7   Bottom echo principles
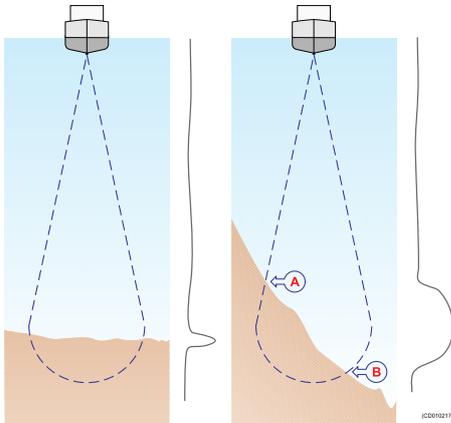
The received echo signal is basically an attenuated copy of the short transmit pulse. The echo signal from a sloped bottom is characterised by having a longer duration and a slower rise and fall time. The transmitted pulse first hits the slope at point (**A**), and as time elapses the reflection point 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 on the echo sounder display.

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 output. 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 ES70 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 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.

Split-beam operation

The ES70 uses the split-beam technique for assessment of the size distribution of individual fish. A split-beam transducer is electrically divided into four quadrants. All four quadrants are excited in parallel during transmission. However, the received signal from each quadrant is separately amplified in a four-channel matched receiver allowing the direction of arrival of an echo to be determined.

Figure 8   Split beam principles
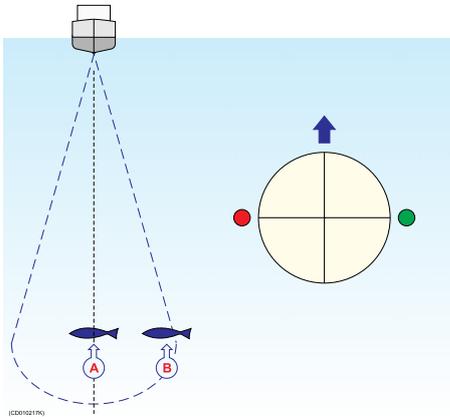
An acoustic wave front propagating towards the transducer arrives at the four quadrants at different times causing the phase angle of the electrical output signal from the quadrants to differ. The fore-and-aft angle is determined from the electrical phase difference between the fore and the aft transducer halves, and the athwartships angle is determined from the starboard and port signals.

Fish A is positioned along the transducer axis where the transducer has its maximum sensitivity, while **Fish B** is positioned towards the edge of the beam where the sensitivity is lower. Evidently, the echo signal from **Fish A** will be stronger than the signal from **Fish B** even though they are of the same size and at the same depth. Hence, determining fish size from the received echo strength alone will not be too successful. A split-beam echo sounder measures the position of the fish within the beam. The sounder corrects for the difference in transducer sensitivity and computes the true size of the fish.

The split-beam measurement technique only works for echoes originating from one single fish since the electrical phase will be random if echoes from multiple individuals at different positions in the beam are received simultaneously.

Consequently, measurement of fish size inside a school of fish tends to be unreliable.

Observation range

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.

Typical observation ranges are shown in the table. Using the **Simrad ES38B** transducer (38 kHz, 7x7 degrees, 2000 W) you can observe a 60 centimetre cod down to 950 meters, and bottom detection works down to 2800 meters. However, with the **Simrad ES200–7C** transducer (200 kHz, 7x7 degrees, 1000 W) you can only observe that same cod down to 270 meters, and bottom detection becomes unreliable below 500 meters.

Table 1   Maximum detection depth, single beam transducers

Transducer	Frequency (kHz)	Pulse duration (ms)	Bandwidth (hz)	Tx power (W)	Range fish (m)	Range bottom (m)
12–16	12	16,4	193	2000	850	10000
27–26	27	8,18	387	3000	1100	4400

Table 1   Maximum detection depth, single beam transducers (cont'd.)

Transducer	Frequency (kHz)	Pulse duration (ms)	Bandwidth (hz)	Tx power (W)	Range fish (m)	Range bottom (m)
38/200D	38	4,09	766	1000	500	2100
38–9	38	4,09	766	1500	800	2600
38–7	38	4,09	766	2000	950	2800
50/200D	50	2,05	1493	1000	500	1500
50–7	50	2,05	1493	2000	700	1900
120–25	120	1,02	3026	1000	390	800
50/200D	200	1,02	3088	1000	280	550

Table 2   Maximum detection depth, split beam transducers

Transducer	Frequency (kHz)	Pulse duration (ms)	Bandwidth (hz)	Tx power (W)	Range fish (m)	Range bottom (m)
ES18–11	18	8,21	382	2000	1100	7000
ES38B	38	4,09	766	2000	950	2800
ES70–11	70	2,05	1526	800	450	1100
ES120–7C	120	1,02	3026	1000	440	850
ES200–7C	200	1,02	3088	1000	270	550

These range calculations assume a normal sea water salinity (3.5 ppt) and temperature (+10 degrees Celcius), an average bottom (surface backscattering strength = -20 dB) and a noise level typical for a moving vessel.

Getting started

This chapter describes how to get started with the basic operation of the ES70 Fish finding echo sounder.

Note

This chapter assumes that the ES70 Fish finding echo sounder has at least one frequency channel (transceiver and transducer) readily connected. If this is not the case, observe the procedure.

→ *How to install a frequency channel on page 82*

Topics

- *Power On/Off procedures* on page 19
- *Using the trackball* on page 21
- *Starting normal operation* on page 21
- *Echo sounder presentations* on page 28
- *Title Bar* on page 30
- *Taskbar* on page 31
- *The menu system* on page 31

Power On/Off procedures

Note

Make sure that you have sufficient water below the hull under you power up the echo sounder . If you start the echo sounder with the transducer in air, you may damage it beyond repair!

How to power up the ES70 echo sounder

1 Power up the General Purpose Transceiver (GPT) unit.

2 Power up the computer and the display.

3 Wait until the ES70 program starts on the computer.

When the ES70 starts, you may see a dialog requesting permission to upgrade the firmware on the transceiver. This happens if the firmware on the transceiver is older than the firmware provided as a part of the ES70 software. Since functionality on the ES70 may depend on the firmware in the transceiver, click **Yes** to upgrade the transceiver.

During the program initialisation, a dialog appears to let you choose from the current user settings available on the ES70. The dialog is only visible a few seconds. You do not need to make a choice here. You can select user setting at any time by means of the **User Setting** dialog on the **Main** menu.

4   Choose operational mode:

    a   Observe the **Main** menu on the right hand side of the ES70 presentation.

    b   Click the **Operation** menu icon to open the **Operation** menu.

    c   Click the **Operation** button, and select *Normal*.

5   On the **Ping** button, click the symbol on the right hand side to start pinging.

6   Observe that the ES70 starts.

- The ES70 starts up using the same operational parameters as the last time you used it. If these parameters are acceptable, continue operation. If you wish to alter basic operational parameters, see section *Starting normal operation* on page 21.

- When the ES70 starts, it is very important that it detects the bottom correctly. In most cases this will take place automatically. However, we have experienced that large schools of fish or difficult bottom conditions have deceived the ES70 to display the wrong depth. In these cases the sounder may display the bottom at 0,0 meters, or with any other abnormal value. In order to aid the ES70 to locate the correct depth, observe the dedicated procedure. See *How to define maximum and minimum depth* on page 76.

How to power off the ES70 echo sounder

Note _____

You must NEVER switch off the echo sounder only by means of the on/off switch on the computer. This may damage the software or the interface parameters for external devices. You must ALWAYS use this procedure.

_____

1   Click the **Exit** button on the **Title Bar** in the top right corner of the ES70 presentation.

2   Observe that the ES70 application closes down.

3   If the computer does not switch itself off automatically, use the functionality provided by the operating system to switch it off manually.

4   Switch off the power to the display and to the transceiver(s).

Using the trackball

All ES70 functions are controlled with the trackball. This trackball is connected to the computer, and by means of the buttons and the wheel you can control all the dialogs and parameter settings. A standard computer mouse can also be used. If you wish to use a mouse, we recommend that you find one equipped with a control wheel.

A   *Control wheel*

B   *Trackball*

C   *Right mouse button*

D   *Left mouse button*

Starting normal operation

Once you have powered up the ES70 and the display, you are ready to start the actual operation. When you have chosen operational mode, the echo sounder starts using its previous setup parameters.

Note ───

If these parameters are acceptable you do not need to carry out the remaining procedures in this section.

These procedure below assumes that the ES70 Fish finding echo sounder has at least one frequency channel (transceiver and transducer) readily connected. If this is not the case, observe the procedure.

───

1   Choose operational mode

2   Check the transceiver and transducer settings

3   Check the bottom detector settings

4   Check the colour scale settings

5   Check the size distribution and fish position settings

6   Check the echogram settings

7   Check the range settings

How to choose operational mode

1   Observe the **Main** menu on the right hand side of the ES70 presentation.

2   Click the **Operation** menu icon to open the **Operation** menu.

3   Click the **Operation** button, and select *Normal*.

How to check the transceiver and transducer settings

1   Observe that the currently connected transducer(s) are shown as tabs on the **Taskbar**. Each transducer name also identifies the operational frequency.

2   Click the **Setup** icon to open the **Setup** menu.

→ *Setup menu* on page 108

3   On the **Setup** menu, click **Installation**, and then **Transceiver Installation**.

Observe that the **Transceiver Installation** dialog opens. This dialog is used to control the communication between the ES70 computer and the transceiver(s) and transducer(s).

→ *Transceiver Installation* on page 153

4   Check that all applicable transceivers and transducers are connected and operational. For each transceiver, this is indicated by the green label with text "Installed".

5   Click **OK** to save the settings and close the dialog.

6   Click the **Operation** icon to open the **Operation** menu.

→ *Operation menu* on page 106

7   On the **Operation** menu, click **Normal Operation**.
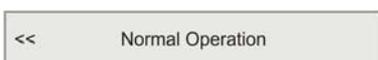
Observe that the **Normal Operation** dialog opens. This dialog is used to define various parameters associated with the transceiver. These settings include transceiver mode, the depth of the transducer surface, the transmit power, and the pulse duration. Note that this dialog is not available in *Replay* mode.

→ *Normal Operation* on page 121

8 For each channel (transceiver/transducer combination):

a Set **Mode** to *Active*.

b Set **Pulse Length** to *Auto*.

The ES70 will automatically choose the best pulse duration to fit the operational frequency, mode and current depth. The pulse duration defines the resolution.

→ *About pulse duration* on page 207

c Set **Power** to maximum.

d Check that the **Depth** value is set correctly.

This is the depth of the transducer face relative to the water surface. A positive value of for example 5 meters means that the transducer is located 5 meters below the sea surface. For accurate depth readings, this **Depth** value must be set up correctly.

9 Click **OK** to save the settings and close the dialog.

How to check the bottom detector settings

1 Click the **Active** icon to open the **Active** menu.

→ *Active menu* on page 109

2 On the **Active** menu, click **Bottom Detector**.

Observe that the **Bottom Detector** dialog opens. This dialog is used to define various parameters associated with the bottom detection. These include the depth range, where the ES70 searches for the bottom.

→ *Bottom Detector* on page 167

3 Set **Minimum Depth** and **Maximum Depth** to values fit for the depth at your current location.

Note _____

Setting both Minimum Depth and Maximum Depth to 0 m will turn off bottom detection.

_____

4 Click **OK** to save the settings and close the dialog.

How to check the colour scale settings

1   Click the **Colour Scale** icon on the **Title Bar** to open the **Colour Scale** information pane.

→ *Colour Scale information pane* on page 53

2   Observe that the current colour scale is shown.

You can filter out the weakest echoes by manually modifying the colour threshold.

a   Click the **Colour Scale** icon on the **Title Bar** to open the **Colour Scale** information pane.

b   Move the cursor to the left side of the colour scale.

Observe that the cursor changes shape to a dual arrow line.

c   Click on the left edge of the colour scale, and drag the edge towards right.

d   Observe that the weakest colours are removed from the colour scale, and thus also the weakest echoes from the echogram presentation.

3   Click the **Display** icon to open the **Display** menu.

→ *Display menu* on page 107

4   On the **Display** menu, click **Colour Setup**.

Observe that the **Colour Setup** dialog opens. This dialog is used to define which colour scale to use on the ES70 presentations. You can test the options by making a selection, and clicking **Apply**. The resulting colour scale is immediately shown in the **Colour Scale** information pane.

When the colour scale uses 12 colours, each colour always represents a 3 dB value range. Using 12 colours thus enables mapping of a 36 dB value range to colours.

→ *Colour Setup* on page 125

5   Click **OK** to accept the default settings and close the dialog.

How to check the size distribution and fish position settings

Note _____

Size distribution and fish position information panes are only available if you use a split beam echo sounder system!
_____

1   Click the **Size Distribution** icon on the **Title Bar** to open the **Size Distribution** information pane.

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The **Size Distribution** information pane shows a histogram of the single fish echoes detected in the echogram. For an accurate x-axis value, place the cursor on a vertical bar in the histogram, and read the value from the label. The abbreviation TS is commonly used. It means "Target Strength", and this is a measure of how strong echo the individual fishes in the current echogram generate. The echo strength indicates the size of the fishes. The **Size Distribution** information pane thus provides a mathematical estimate of the sizes of all the chosen fish species in the echogram.

→ *Size Distribution information pane* on page 54

To change the fish species, use the **Fish Select** dialog opened on the **Setup** menu.

→ *Fish Select* on page 139

2   In the **Size Distribution** information pane, click the **Setup** icon in the top right corner to open the **Size Distribution** dialog.

The **Size Distribution** dialog allows you to shape the size distribution histogram to your own requirements. You can set up the mode, the upper and lower limits, the accuracy, and the vertical resolution.

→ *Size Distribution* on page 166

3   Click **OK** to save the settings and close the dialog.

4   Click the **Fish Position** icon on the **Title Bar** to open the **Fish Position** information pane.

The **Fish Position** information pane shows the position within the beam of the detected single echoes for the current ping (largest circles) and the three previous ping (smaller circles). The colours indicate the echo strength.

→ *Fish Position information pane* on page 55

How to check the echogram settings

1   Observe the ES70 echogram.

If you have two or more channels (transducers/frequencies), observe the tabs on the **Taskbar**.

→ *Display organisation* on page 34

2   Click one of the transducer tabs. Observe that only the echogram from the selected frequency channel is shown.

By default, two echograms are shown for each frequency channel. The top echogram is surface related, while the bottom echogram is bottom related. Several echogram types are provided.

- **Surface**: The echogram is related to the sea surface. Start depth (upper echogram boundary) and vertical range (across echogram) are manually selected by the **Start Depth** and **Range** buttons on the **Main** menu.

  → *Start Range* on page 114

  → *Range* on page 113

- **Bottom**: The echogram is related to the detected bottom. Stop depth (lower echogram boundary) and vertical range are manually selected by the **Start Depth** and **Range** buttons on the **Main** menu. The echogram is only drawn for pings having a successful bottom detection.

- **Pelagic**: This echogram is nearly identical to the **Surface** echogram. However, the biomass calculations are not restricted by the bottom detection. This means that the bottom echo will be included in calculations if it appears within the chosen range.

  Example: If you are investigating a large school of pelagic fish, set the **Start Range** and **Range** to enclose the school. If the school is large enough, a Surface echogram may mistake it for bottom, and the biomass readings will be wrong. The **Pelagic** echogram will however disregard the bottom detection, and give a correct estimate of the biomass.

- **Trawl**: Trawl sensor systems communicate headrope depth and headrope-to-footrope distance to the ES70 at regular intervals. The echogram covers the vertical opening of the trawl including a small margin at each side. The headrope and footrope margins are identical. The biomass calculations are not restricted by the bottom detection.

  Their size is selected in the **Trawl** dialog. The headrope-to-footrope distance can be manually set in the **Trawl** dialog for trawl sensor systems not measuring the trawl opening, or when the measured headrope-to-footrope distance is unreliable. The echogram is only drawn when trawl position information is available.

  → *Trawl* on page 145

3   Move the cursor over the echogram.

Observe that a rectangular "tooltip" label is shown. It provides information about the echoes at the cursor's present position. Which information to include in the label is defined in the **Display Options** dialog.

→ *Display Options* on page 130

4   Click the **Horizontal** tab. Observe that the echogram channels are shown horizontally.

5   Click the **Vertical** tab. Observe that the echogram channels are shown vertically.

6   Click on one of the echograms.

Observe that the echogram then appears with a thick border line. The echogram you have selected is now the "active" echogram. Any changes made in the **Echogram** dialog will by default only apply to this echogram.

→ *Echograms* on page 44

7   On the **Active** menu, click **Echogram**.
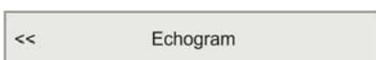
<<	Echogram

Observe that the **Echogram** dialog opens. This dialog is used to control the appearance of the active echogram.

→ *Echogram* on page 158

8   In the **Echogram** dialog, check that the **Lines** tab is shown.

The **Lines** tab in the **Echogram** dialog allows you to change the appearance of the bottom line. You can add an extra bottom line, and in addition to this you can enable either a white line or a hardness indicator line. The tab offers several horizontal information lines, and you can choose the vertical scale of the echogram. Finally, the **Lines** tab offers time or distance markers, and you can enable annotations.

9   Click **Bottom line** and **White line** to enable these. Observe the changes on the echogram.

10   Click the **Echogram** tab.

The **Echogram** tab in the **Echogram** dialog allows you to select which TVG curve to use for the echogram. You can choose from several standard curves, or make your own. The tab also allows you to choose which type of echogram you wish to display.

→ *About TVG gain* on page 205

11   Change the **Echogram Type** to see the variations.

12   Click the **Horizontal Axis** tab.

The **Horizontal Axis** tab in the **Echogram** dialog allows you to choose the horizontal scale of the echogram. This controls how "fast" the echogram moves from right towards left across the display.

13   Try the various options to see the variations on the echogram.

14   Click **OK** to save the current settings and close the dialog.

How to check the range settings

1   Observe the vertical range of the echograms.

Note that the vertical range is set up differently depending on the echogram type.

2   Click in a surface related echogram to make it "active".

3   Observe the **Range** button on the **Main** menu.

The **Range** function allows you to specify the vertical range of the water column covered by the echogram. The range is defined from a selected start range, and down to a value beneath the current bottom depth. The value shown and selected is by default applied only to the currently selected echogram.

4   Observe the **Start Range** button on the **Main** menu.

Start Range allows you to specify the start depth of the echogram, that is from which depth in the water column the presentation shall start. The value shown and selected is applied to the currently selected echogram type.

Example: In a surface echogram, set the **Start Range** value to 0 meters. 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 meters. The echogram will now show the area from the sea surface and down to 20 meters "below" the bottom. The bottom contour is easily detected when the depth changes.

Example: 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.

5   Set **Range** to *Auto*, and set **Start Range** to *0*.

Observe the changes made to the surface related echogram.

6   Click in a bottom related echogram to make it "active".

7   Observe the **Range** and **Start Range** buttons on the **Main** menu.

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

8   Set **Range** to *15*, and set **Start Range** to *5*.

Observe the changes made to the bottom related echogram.

Echo sounder presentations

This section describes the overall layout of the presentation provided by the ES70 echo sounder.
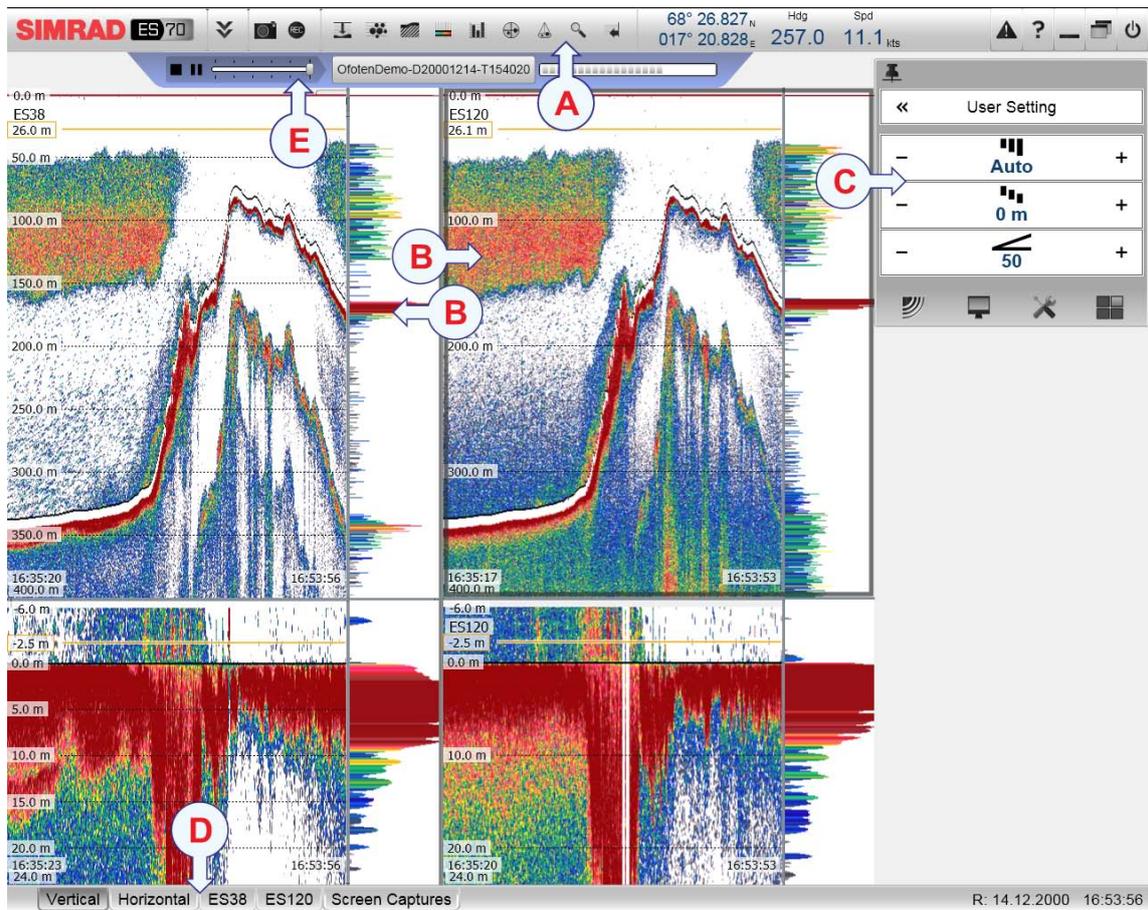
The example shows a dual frequency echo sounder using two split-beam transducers (38 and 120 kHz). The screen capture has been made while in *Replay* mode.

A   Title Bar

> The **Title Bar** contains icons to open the various information panes, as well as buttons to initiate specific functions.

B   Echogram(s)

> One or more *Echogram* is displayed using the largest portion of the screen. The presentation layout is controlled by the function buttons on the **Status bar**. You can display individual echograms for each frequency in use, or you can lay out the presentation of all frequencies either horizontally or vertically.

> Additional information panes may be selected on the **Title Bar** using the relevant icons.

C   Main menu

> The menu system is by default located at the right side of the display presentation. The main menu is always visible, but may be hidden from view. To open a sub-menu, click one of the icons at the bottom of the main menu.

D   Taskbar

The **Taskbar** stretches across the entire presentation width at the bottom of the display. On the left side, dedicated function buttons allows you to control the presentation layout.

E   Replay bar

The **Replay bar** controls the playback when in *Replay* mode. It is only visible in this mode.

For a more detailed description of the echogram presentations and the display views, see *Display views* on page 34.

Title Bar

The ES70 **Title Bar** is located on the top of the display presentation, and it is stretched from the far left to the far right side.

A   *Brand and product name identification*

B   *Operation button; Menu*

C   *Operation buttons; Screen capture and Record*

D   *Icons to open information panes*

E   *Navigational information*

F   *Function buttons (Messages, Help and operating system functions)*

Title Bar elements

- **Brand and product name**: This element identifies the manufacturer and the product.

  → *Logo and product name* on page 37

- **Operation**: These buttons are used to control basic operational functions.

  → *Operation buttons* on page 37

- **Information panes**: The icons are used to open and close dedicated information panes.

  → *Information pane icons* on page 38

- **Navigation**: These are not buttons, but information fields providing current data related to the vessel movements.

  → *Navigational information* on page 40

- **Function**: These buttons are used to control basic functions such as screen captures, help, menu appearance

  → *Function buttons* on page 42

For more detailed information about the **Title Bar**, see *Title Bar* on page 36.

Taskbar

The **Taskbar** is located at the bottom of the display . The **Taskbar** contains tabs to control the echogram presentations, as well as time and date information.

A *Echogram browser*

B *Presentation format*

C *Transducer/echogram presentation*

D *Date*

E *Time*

For more information, see *Taskbar* on page 58.

The menu system

This section provides a short introduction to the menu system, and explains the basic use of the ES70 menu buttons.

For more information about the menu system, see *The menu system* on page 102.

Menu hierarchy

The menu system on the ES70 is by default placed on the right hand side of the display presentation. You can however easily move the menu to the left side using the **Display Options** dialog, or hide it from view with the **Menu** button on the **Title Bar**. The main menu is short, and the four sub-menus are opened by clicking on the four icons.
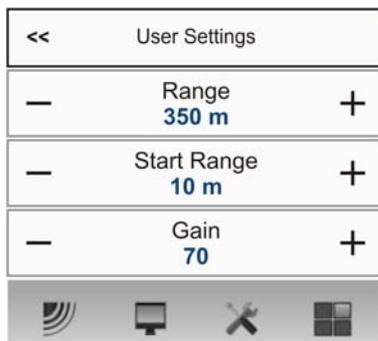
The main menu provides a limited number of key functions, while the sub-menus offer a wider range of parameters.

Menu hierarchy

1 The **Main** menu provides the parameters most frequently used during normal operation.

2 The **Operation** menu controls the main operational parameters.

3 The **Display** menu controls the visual aspects of the system, such as parameters related to the display presentation.

4 The **Setup** menu allows you to control the configuration of the signal processing, as well as system installation and maintenance, and the interfaces to peripheral devices.

5 The **Active** menu has its content linked to the current active item (view or object). Use it to access special features available for the selected item.

Menu buttons

Each menu contains several command buttons. Each button shows the function of the button, some of them also displays the current parameter setting. The majority of the buttons in each menu field have these functions:

- You can increase and decrease parameter values by clicking the button.
- You can change parameter values by moving the cursor sideways.
- You can change parameter values by means of the scroll wheel on the mouse or trackball.
- You can enter parameter values from the keyboard (if you have one).
- You can select parameter value from the button's sub-menu.
- You can open a dedicated dialog.

How to select a numerical parameter using the +/- buttons

| — | Transparency 30% | + |

1 Move the cursor to either side of the button, and observe that the background colour changes.

    a Click on the <u>left</u> side of the button to decrease the numerical value.

    b Click on the <u>right</u> side of the button to increase the numerical value.

How to select a numerical parameter by moving the cursor horizontally

| — | 350 m | + |

1 Place the cursor on the middle of the button.

2 Click and hold the left mouse button depressed.

3 Move the cursor horizontally: left to decrease the parameter value, or right to increase it.

4 Release the mouse button when the requested value is shown.

How to select a numerical parameter by means of the scroll wheel

| — | 350 m | + |

1 Place the cursor on the middle of the button.

2   Spin the scroll wheel in either direction to increase or decrease the parameter value.

3   Release the scroll wheel when the requested value is shown.

How to select a numerical parameter using the keyboard

1   Click the middle section of the button to open a text field.

2   Enter the numerical value into the text field.

    If the numerical value exceeds the permitted range for the parameter, the frame in the text field will be red. You will then not be able to enter the value.

3   Press the **Enter** key.

How to select a parameter using a sub-menu

1   Click the middle section of the button to open a sub-menu, then click the requested parameter value.

    The chosen value is applied, and the sub-menu is automatically closed.

2   Whenever applicable, you can also access the sub-menu by clicking the left and right side of the button, but this method will not show you the menu choices.

    a   Click on the <u>left</u> side of the button to select a lower sub-menu choice.

    b   Click on the <u>right</u> side of the button to select a higher sub-menu choice.

How to select parameters using a dialog

1   Click anywhere on the button to open a separate dialog.

Display views

This chapter provides a brief overview of the information displayed by the ES70 Fish finding echo sounder, and how it is organised.

Topics

Display organisation

A typical ES70 Fish finding echo sounder display presentation is shown.

A   Title Bar

The **Title Bar** identifies the logo, and provides several cons and buttons. These are used to hide or retrieve the menu system and the information panes, and to enable basic system functions.

B   Echogram(/s)

The **Echogram(s)** takes up the largest part of the echo sounder window.

By default, you will have two echograms for each frequency channel (transducer). These can be presented horizontally with one over the other, or next to each other, by means of the tabs on the **Taskbar** (D).

You can modify the size of the echograms by moving the boundary lines between the echograms. Click on a boundary line, hold the button depressed, and move the line horizontally or vertically.

If you click in an echogram, the echogram is selected to be "active". The "active" echogram is identified with a thick border. If you change parameters related to the echogram, these are by default only applied to the "active" echogram.

C   **Main** menu

The **Main** menu is by default located on the right hand side of the echo sounder presentation. To open any of the sub-menus, click the icons. To hide or retrieve the **Main** menu, click the **Menu** button on the **Title Bar**.

→ *Main menu* on page 43
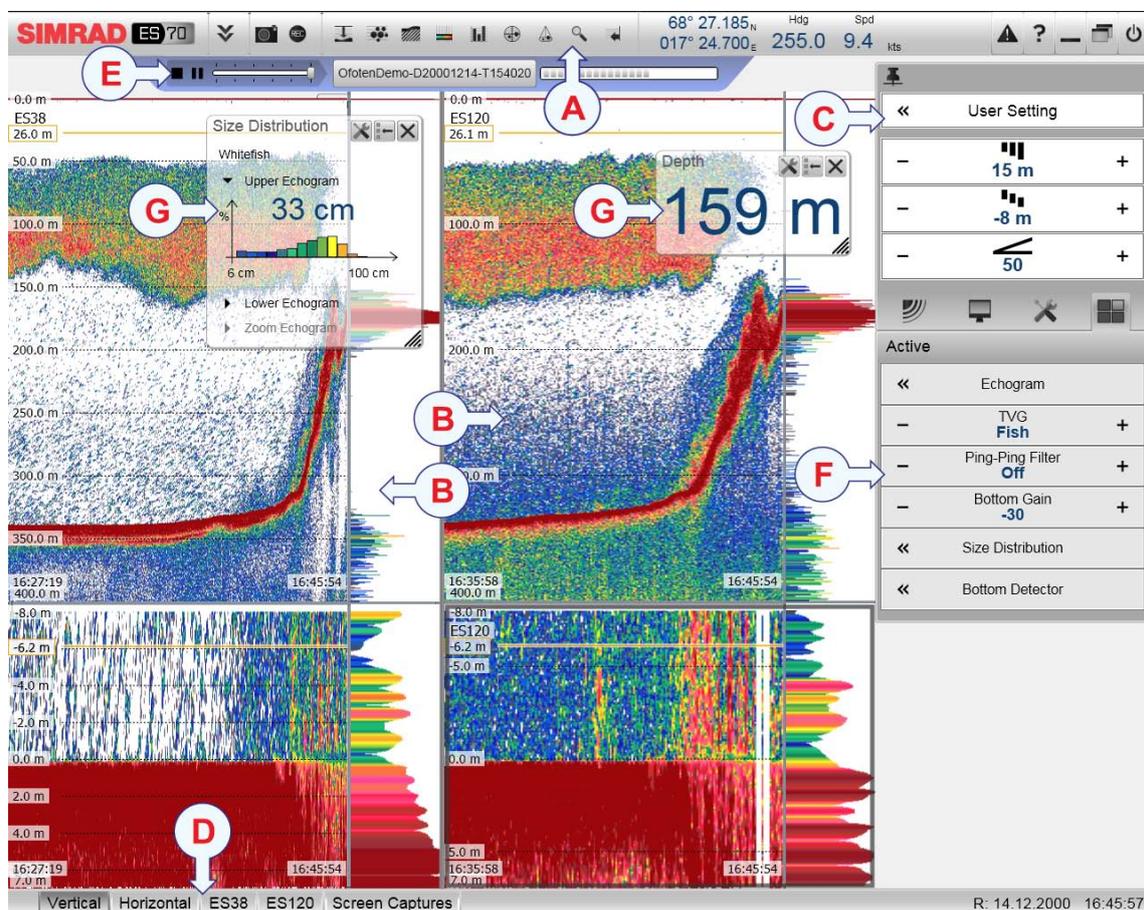
D   **Taskbar**

The **Taskbar** is located at the bottom of the echo sounder presentation.

→ *Taskbar* on page 58

E   **Replay bar**

During replay a dedicated **Replay bar** is shown below the **Title Bar**. The **Replay bar** allows you to retrieve saved files, and to control the playback.

→ *Replay bar* on page 43.

F   Sub-menus

Four sub-menus may be opened from the four icons in the bottom of the **Main** menu.

→ *Main menu* on page 43

G   Information panes

You can choose from several **Information panes** to provide you with additional data. These panes are selected from the buttons on the **Title Bar**. The panes can be moved around on the echogram presentation, and you can change their sizes. The panes are transparent, so echogram information displayed behind them are not lost.

→ *Information panes* on page 50

Title Bar

The ES70 **Title Bar** is located on the top of the display presentation, and it is stretched from the far left to the far right side.

A   *Brand and product name identification*

B   *Operation button; Menu*

C   *Operation buttons; Screen capture and Record*

D   *Icons to open information panes*

E   *Navigational information*

F   *Function buttons (Messages, Help and operating system functions)*

Title Bar elements

• **Brand and product name**: This element identifies the manufacturer and the product.

→ *Logo and product name* on page 37

• **Operation**: These buttons are used to control basic operational functions.

→ *Operation buttons* on page 37

• **Information panes**: The icons are used to open and close dedicated information panes.

→ *Information pane icons* on page 38

• **Navigation**: These are not buttons, but information fields providing current data related to the vessel movements.

→ *Navigational information* on page 40

- **Function**: These buttons are used to control basic functions such as screen captures, help, menu appearance

  → *Function buttons* on page 42

Logo and product name

The Simrad logo and the product name (ES70) is shown.

Double-click the Simrad logo to reduce the size of the ES70 presentation. Double-click one more time to restore the original size.

Operation buttons

Menu button

Click once on the **Menu** button to hide the menu, and one more time to bring it back again. When the menu is hidden, it will temporarily be shown on the left and right hand side of the display if you move the cursor to that position.

→ *Main menu* on page 43

→ *The menu system* on page 102

Screen capture button

Click this button once to create a screen capture of the current echogram presentation. To view the recorded image, click **Screen Capture** on the **Taskbar** to open the image browser.

→ *How to save an echogram* on page 64

→ *Screen captures* on page 59

Record button

Click this button to start and stop recording.

The recording function is set up using the parameters available on the **Record** button on the **Operation** menu.

→ *How to save raw echogram data* on page 66

→ *Record* on page 123

Information pane icons

The Simrad ES70 offers several information panes to provide additional and detailed data from the echogram. The panes are opened and closed using the pane buttons on the **Title Bar**.

In order to open an information pane, you must first click in an echogram presentation to make it "active". By doing this you select frequency channel (transducer). In most cases, the data in the information pane you open will only be valid for the selected echogram.

Note _____

Some of the information panes are optional. They are thus not available for use unless a licence code is available. In order to obtain a licence, consult your local dealer.

_____

Depth

Click this button to open and close the **Depth** information pane. This pane provides the current depth as measured by the selected transducer.

→ *Depth information pane* on page 51

Biomass

Click this button to open and close the **Biomass** information pane. This pane provides the current biomass as calculated by the echo sounder based on the current echogram.[1]

→ *Biomass information pane* on page 51

Bottom Hardness

_____

1. Biomass is an optional function. In order to activate the **Biomass** information pane, you must obtain a licence.

Click this button to open and close the **Bottom Hardness** information pane. This pane provides the bottom hardness in the current echogram.[2]

→ *Bottom Hardness information pane* on page 52

Colour Scale

Click this button to open and close the **Colour Scale** information pane. This pane shows you the colours you are presently using in your echogram presentation. You can also manually modify the colour scale to filter out weak echoes.

→ *Colour Scale information pane* on page 53

Size Distribution

Click this button to open and close the **Size Distribution** information pane. This pane shows you the colours you are presently using in your echogram presentation.[3]

→ *Size Distribution information pane* on page 54.

Fish Position

Click this button to open and close the **Fish Position** information pane. This pane shows you the position within the beam of the detected single echoes.[4]

→ *Fish Position information pane* on page 55

Echo Position

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2. Bottom hardness is an optional function. In order to activate the **Bottom Hardness** information pane, you must obtain a licence.
3. The **Size Distribution** information pane is only available if your ES70 is equipped with one or more split beam transceivers.
4. The **Fish Position** information pane is only available if your ES70 is equipped with one or more split beam transceivers.

Click this button to open and close the **Echo Position** information pane. This pane shows you the position within the beam of the detected single echoes.[5]

→ *Echo Position information pane* on page 56

Zoom

Click this button to open and close the **Zoom** information pane. This pane allows you to zoom in on a selected area of the current echogram.

→ *Zoom information pane* on page 57

History

Click this button to open and close the **History** pane. This pane allows you to view the previously saved echograms for the currently active echogram.

→ *History information pane* on page 58

Navigational information

These are not buttons, but fields providing useful information related to the vessel movements. You can choose which information to be displayed if you open the **Display Options** dialog from the **Display** sub-menu.
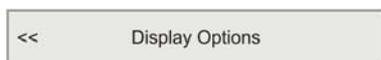
Note ───

This navigational information on the Title Bar must not be used for navigation!

──

→ *Display Options* on page 130

Geographical location

Provided that a GPS system is connected to the ES70, this field on the **Title Bar** will display the vessel's geographical position in longitude and latitude.

──

5. The **Echo Position** information pane is only available if your ES70 is equipped with one or more split beam transceivers.

The communication with the external GPS system is set up using the **Navigation** button on the **Setup** menu.

→ *Navigation; Position tab* on page 141

Vessel heading

Hdg
278.0.

Provided that a GPS or compass system is connected to the ES70, this field on the **Title Bar** will display the vessel's current heading.

The communication with the external GPS system, heading sensor or gyro compass is set up using the **Navigation** button on the **Setup** menu.

→ *Navigation; Heading tab* on page 144

Vessel speed

Spd
7.4 kts

Provided that a GPS or speed log system is connected to the ES70, this field on the **Title Bar** will display the vessel's current speed.

The communication with the external GPS system or speed sensor is set up using the **Navigation** button on the **Setup** menu.

→ *Navigation; Speed tab* on page 142

Water temperature

Temp
10.0 °C

Provided that a temperature sensor is connected to the ES70, this field on the **Title Bar** will display the water temperature.

Note _____

This functionality is not implemented in SW version 1.0.0.

Depth

Depth 120 kHz
79.3 m

The current depth for each of the transducers connected to the ES70 can be shown.

Function buttons

The five function buttons are located on the far right side of the **Title Bar**.

Message button

This **Message** button will indicate when the ES70 system has issued a message. Click the button to open the **Message** dialog. If you hold the mouse cursor over the button, a tooltip rectangle will provide a list of the messages that you have not acknowledged.

→ *Messages* on page 176

Help button

Click this button to open the ES70 context sensitive on-line help. The button opens the help system on its start page.

Minimize button

Click this button to minimize the ES70 display presentation. This is an operating system function.

Resize button

Click this button to change the size of the ES70 display presentation. This is an operating system function.
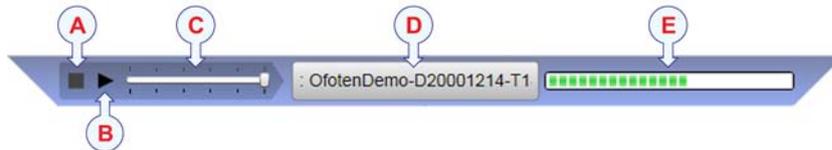
Exit button

Click this button to close the ES70 program.

→ *Power On/Off procedures* on page 19

Replay bar

The **Replay Bar** is automatically activated once you select **Replay** mode. The bar is positioned directly below the **Title Bar**.

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

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

C   **Replay speed**: Click this slider to adjust the replay speed.

D   **File select**: This button shows which file you are currently playing, Click the button to open the **Replay** dialog.

→ *Replay File* on page 177

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 indicators will start from left every time the start of the file appears.

Main menu

The main menu is by default located on the right hand side of the echo sounder presentation.
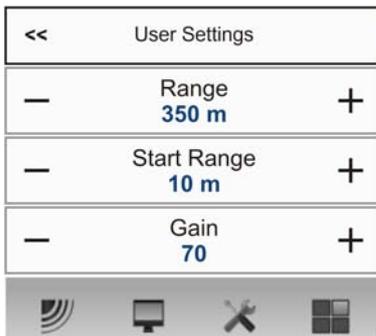
The main menu provides a limited number of key functions, while the sub-menus offer a wider range of parameters.

You can hide the menu by clicking the **Menu** button on the **Title Bar**.

You can place the menu on the left side of the ES70 presentation by means of the **Menu on the right side** option in the **Display Options** dialog.

→ *Display Options* on page 130

Menu hierarchy

1   The **Main** menu provides the parameters most frequently used during normal operation.

**2**   The **Operation** menu controls the main operational parameters.

3   The **Display** menu controls the visual aspects of the system, such as parameters related to the display presentation.

4   The **Setup** menu allows you to control the configuration of the signal processing, as well as system installation and maintenance, and the interfaces to peripheral devices.

5   The **Active** menu has its content linked to the current active item (view or object). Use it to access special features available for the selected item.

For more information about the menu system, see *The menu system* on page 102.

Echograms

Surface echogram

This echogram is related to the sea surface. Start depth (upper echogram boundary) and vertical range (across echogram) are manually selected by the **Start Depth** and **Range** buttons on the **Main** menu.
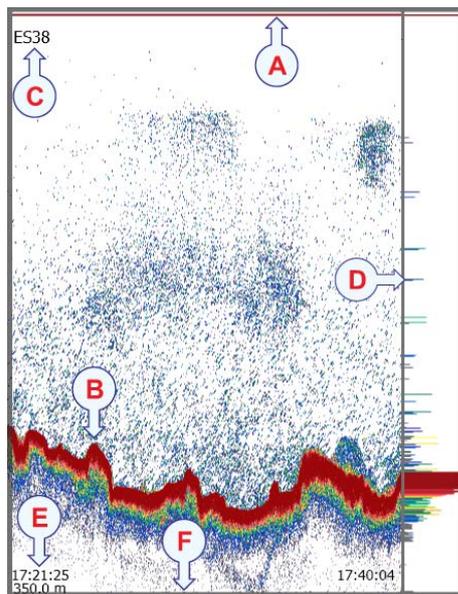
A   This is the start depth of the echogram.

In a surface echogram it is normally set up with **Start Range** = *0*, or to a small value to start the echogram immediately under the keel.

B   This is the bottom.

The total echogram range (A) to (F) is defined with the **Range** button on the **Main** menu. Unless specific conditions apply, or you wish to control the range manually, use **Range** = *Auto*.

Example: In a surface echogram, set the **Start Range** value to 0 meters. 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 meters. The echogram will now show the area from the sea surface and down to 20 meters "below" the bottom. The bottom contour is easily detected when the depth changes.

C   This text identifies the transducer used to create the echogram.

D   This is the scope view.

This view presents individual colour lines. The colour and length of each line reflects the received echo amplitude.

E By default, the "ping time" and the depth range is shown in the bottom left side of the echogram. In the bottom right corner, the "ping time" is the same as current. This information can be changed using the options on the **Horizontal Axis** tab in the **Echogram** dialog.

F This is the lower end of the depth range. It is normally a few meters below the bottom contour, depending on the chosen range.

Related topics

- *Start Range* on page 114
- *Range* on page 113
- *Echogram* on page 158

Bottom echogram

This echogram is related to the detected bottom. Stop depth (lower echogram boundary) and vertical range are manually selected by the **Start Depth** and **Range** buttons on the **Main** menu. The echogram is only drawn for pings having a successful bottom detection.
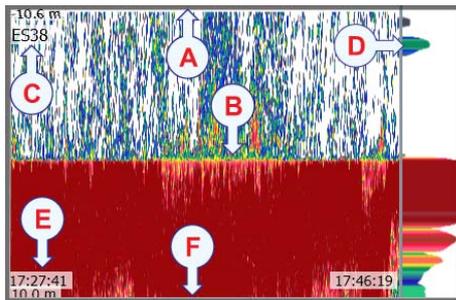
A This is the start depth of the echogram.

In a bottom echogram it is normally it is set up with **Start Range** set to a relative small negative value. The value defines how many meter above the bottom the echogram will start.

B This is the bottom.

Since the echogram is related to this bottom, it appears to be flat. Fishes close to the bottom is then easy to see.

The range from the start depth above the bottom and down to some distance below the actual bottom is defined with the **Range** button on the **Main** menu.

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

C This text identifies the transducer used to create the echogram.

D This is the scope view.

This view presents individual colour lines. The colour and length of each line reflects the received echo amplitude.

E   By default, the "ping time" and the depth range is shown in the bottom left side of the echogram. In the bottom right corner, the "ping time" is the same as current. This information can be changed using the options on the **Horizontal Axis** tab in the **Echogram** dialog.

F   This is the lower end of the depth range. It is normally a few meters below the bottom contour, depending on the chosen range.

Related topics

- *Start Range* on page 114

- *Range* on page 113

- *Echogram* on page 158

Pelagic echogram

The pelagic echogram appears very similar to the surface echogram. However, the biomass calculations are not limited by the bottom detection.

Example: In a pelagic echogram, set the **Start Range** value to 20 meters. This will make the echogram start from 20 meters below the sea surface (provided that the transducer offset has been defined). Set **Range** to 40 meters. The echogram will now show the area from 20 meters below the sea surface, and down to 60 meters below the transducer. Provided that the depth is larger than 60 meters, the bottom contour is not shown.

Related topics

- *Start Range* on page 114

- *Range* on page 113

- *Echogram* on page 158

Trawl echogram

Trawl sensor systems communicate headrope depth and headrope-to-footrope distance to the ES70 at regular intervals. The echogram covers the vertical opening of the trawl including a small margin at each side. The headrope and footrope margins are identical. Their size is selected in the **Trawl** dialog. The headrope-to-footrope distance can be manually set in the **Trawl** dialog for trawl sensor systems not measuring the trawl opening, or when the measured headrope-to-footrope distance is unreliable. The echogram is only drawn when trawl position information is available. The biomass calculations are not limited by the bottom detection.

Related topics

- *Start Range* on page 114

- *Range* on page 113

- *Echogram* on page 158

Lines, markers and annotations in the echograms

The echograms provided by the ES70 may contain additional information.

Bottom line

The bottom contour may be enhanced by adding a bottom line. This is done in the **Echogram** dialog on the **Active** menu.
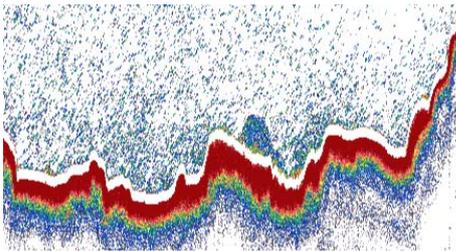
<<	Echogram

→ *How to establish horizontal markers* on page 71

→ *Bottom line* on page 211
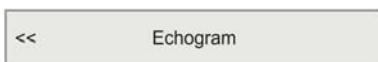
→ *Echogram; Lines tab* on page 159

White line

The bottom contour may also be enhanced by adding a white line.

The white line is an extra thick white line that is added to just below the bottom. The white line will not remove information, it will simply "push" the information further down in order to make the bottom easier to see.

The white line is enabled in the **Echogram** dialog on the **Active** menu. It can not be used simultaneously with the hardness line.
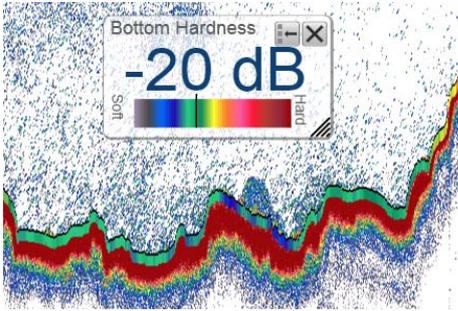
<<	Echogram

→ *How to establish horizontal markers* on page 71

→ *White line* on page 212

→ *Echogram; Lines tab* on page 159

Hardness line

The bottom hardness may be monitored using the hardness line.

The hardness line is an extra thick colour coded line that is added to just below the bottom. The line will not remove information, it will simply "push" the information further down in order to make the bottom easier to see. The colour coding contains the hardness information.

The hardness line can not be used simultaneously with the white line.

The hardness line is enabled in the **Echogram** dialog.

→ *Bottom Hardness information pane* on page 52

→ *How to establish horizontal markers* on page 71

→ *Hardness line* on page 212

→ *Echogram; Lines tab* on page 159

Trawl line

Whenever available and connected, trawl systems (PI and ITI) communicate headrope depth and/or headrope-to-footrope distance to the ES70 at regular intervals. The information from these sensors are drawn as horizontal lines on the ES70 echogram.
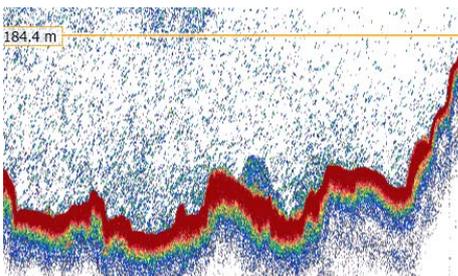
The trawl line is enabled in the **Echogram** dialog on the **Active** menu.

→ *How to establish horizontal markers* on page 71
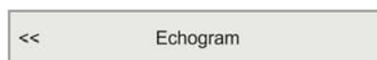
→ *Echogram; Lines tab* on page 159

Variable Depth line

When enabled a horizontal depth line is placed wherever you click in the echogram. This is typically used to measure the water depth, the depth of a school, or even single fish.

You can click on the line, and then drag it up or down.

The variable depth line is enabled in the **Echogram** dialog on the **Active** menu.
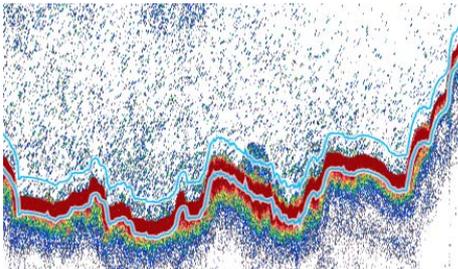
Range Other lines

This feature is used when you set up your ES70 with both a surface related and bottom related echogram shown simultaneously.

When enabled, two horizontal lines in the surface echogram indicate the range selected in the bottom echogram.

The range other lines function is enabled in the **Echogram** dialog on the **Active** menu.

Biomass line

The biomass may be monitored using the biomass line.
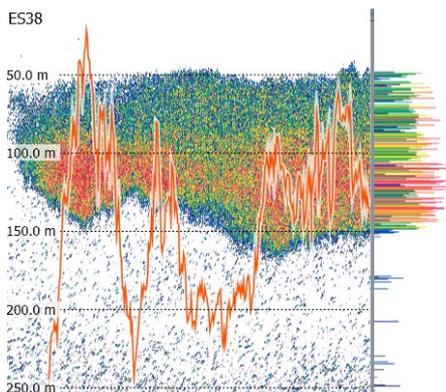
The biomass line is an extra thick brightly coloured line that is added to the echogram. The line will identify the variations in biomass. To adjust the view, use the scale.

The biomass line is enabled in the **Echogram** dialog.

Range scales
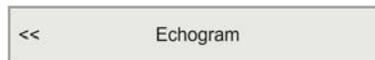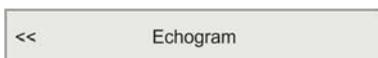
Range scales in the echogram can be enabled in the **Echogram** dialog.

→ *How to establish horizontal markers* on page 71

→ *Echogram; Lines tab* on page 159

Vertical ticks

When enabled in the **Echogram** dialog, this function places vertical markers on the echogram.

- **Time**: This option places a short vertical line is drawn in the upper part of the echogram once every specified number of minutes.

- **Distance**: This option inserts a short vertical line is drawn in the upper part of the echogram once every specified number of nautical miles.

```
<<          Echogram
```

→ *Echogram; Lines tab* on page 159

Annotations

Annotations may be added to the echogram to pinpoint special echoes, special events, etc. **Annotation** can be entered manually using the Annotation dialog, or they can be imported from peripheral devices.

In order to see the annotations on the echogram, they must be enabled in the **Echogram** dialog.

→ *Annotations* on page 137

→ *Echogram; Lines tab* on page 159

Information panes

The Simrad ES70 offers several information panes to provide additional and detailed data from the echogram. The panes are opened and closed using the pane buttons on the **Title Bar**.

Note ──────────────────────────────

Some of the information panes are optional. They are thus not available for use unless a licence code is available. In order to obtain a licence, consult your local dealer.

────────────────────────────────────

About information panes

In order to open an information pane, you must first click in an echogram presentation to make it "active". By doing this you select frequency channel (transducer). In most cases, the data in the information pane you open will only be valid for the selected echogram.

You can change the size of the information pane to suit your preferences, and you can move it within the echogram presentation it is valid for. To change its size, click on the shaded area in the bottom right corner, hold the mouse button depressed, and drag to requested size. To move an information pane, just click inside it, hold the mouse button depressed, and move it to requested position.

The information panes are transparent, so you can safely place a pane on top of the echogram without losing the information behind it. The degree of transparency is controlled by the **Transparency** button on the **Display** menu.

All information panes are provided with small buttons in the top right corner.

- The top right button closes the information pane. Note that you can also close the pane if you click one more time on its button on the **Title Bar**.

- The other button will restore the information pane to its original size and location.

- Some of the information panes are provided with a "tool" button. This buttons opens a dialog relevant to the information shown in the pane.

Depth information pane

The **Depth** information pane displays the current depth for the chosen transducer and frequency.

The **Tool** in the information pane button opens the **Bottom Detector** dialog. This dialog is also available from the **Active** menu.

→ *Bottom Detector* on page 167

To open this information pane, click the **Depth** icon on the **Title Bar**.
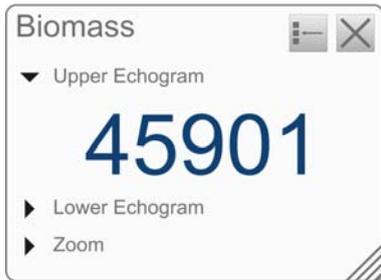

Biomass information pane

The **Biomass** information pane displays the current biomass calculated for the current set of echogram. Only the biomass calculated for the current transducer frequency is shown.

Note _____

*Biomass is an optional function. In order to activate the **Biomass** information pane, you must obtain a licence.*

_____

Echogram: You can see biomass from three different sources.

- **Upper Echogram**: This biomass value is calculated from the fish echoes from the top echogram for the chosen channel. By default, this is a surface echogram.

- **Lower Echogram**: This biomass value is calculated from the fish echoes from the bottom echogram for the chosen channel. By default, this is a bottom echogram.

- **Zoom**: This biomass value is calculated from the fish echoes from the currently zoomed area.

To open this information pane, click the **Biomass** icon on the **Title Bar**.

Related topics
- *Biomass line* on page 49
- *How to monitor the current biomass* on page 78
- *About biomass* on page 204

Bottom Hardness information pane

The **Bottom Hardness** information pane displays the current bottom hardness calculated using the bottom echo strength in the current echogram.

Note _____

*Bottom hardness is an optional function. In order to activate the **Bottom Hardness** information pane, you must obtain a licence.*

_____

The vertical line in the hardness colour scale positions the current ping. The hardness of the current ping is also shown with the numerical value.

The bottom hardness can also be indicated by enabling the bottom hardness line in the **Echogram** dialog.

This line uses the same colour coding as the information pane, but places this as a thick line immediately under the bottom line in the echogram.
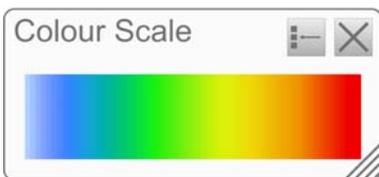
→ *Hardness line* on page 212

→ *Echogram; Lines tab* on page 159

To open this information pane, click the **Bottom Hardness** icon on the **Title Bar**.

Colour Scale information pane

The **Colour Scale** pane displays the current colour scale you are using for the echogram presentation.

To change the colour scale, click **Colour Setup** on the **Display** menu.

To open this information pane, click the **Colour Scale** icon on the **Title Bar**.

You can filter out the weakest echoes by manually modifying the colour threshold.

1   Click the **Colour Scale** icon on the **Title Bar** to open the **Colour Scale** information pane.

2   Move the cursor to the left side of the colour scale.

Observe that the cursor changes shape to a dual arrow line.

3   Click on the left edge of the colour scale, and drag the edge towards right.

4   Observe that the weakest colours are removed from the colour scale, and thus also the weakest echoes from the echogram presentation.

Figure 9   Colour scales using 12 and 64 colours

12 colours

64 colours, Echosounder

64 colours, Sonar
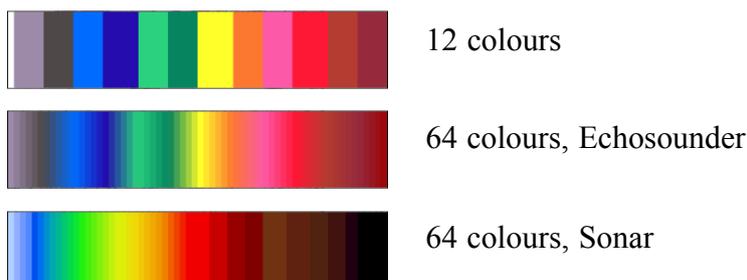
64 colours, Greyscale

64 colours, BI500 colours

Related topics

- *How to change the colour scale and presentation palette* on page 69
- *How to change the number of colours in the echogram* on page 70
- *Colour Setup* on page 125

Size Distribution information pane

The **Size Distribution** pane provides a visual indication on how large the fishes in the echogram are. Only the fishes detected by the current transducer frequency are shown.

Note

*The **Size Distribution** information pane is only available if your ES70 is equipped with one or more split beam transceivers.*
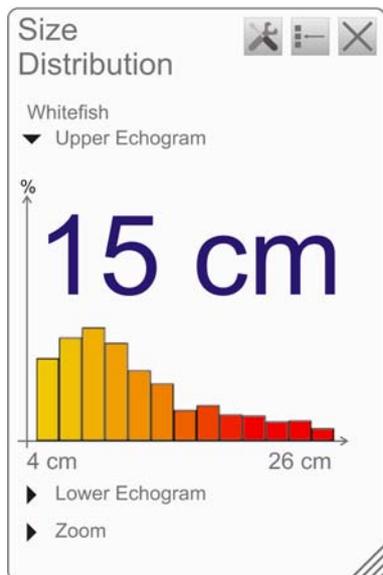
To open this information pane, click the **Size Distribution** icon on the **Title Bar**.

The **Size Distribution** information pane shows a histogram of the single fish echoes detected in the echogram. For an accurate x-axis value, place the cursor on a vertical bar in the histogram, and read the value from the label. The abbreviation TS is commonly used. It means "Target Strength", and this is a measure of how strong echo the individual fishes in the current echogram generate. The echo strength indicates the size of the fishes. The **Size Distribution** information pane thus provides a mathematical estimate of the sizes of all the chosen fish species in the echogram.

→ *Size Distribution information pane* on page 54

To change the fish species, use the **Fish Select** dialog opened on the **Setup** menu.

The following information is provided in the **Size Distribution** information pane.

- **Fish species**: The current fish species, as selected in the **Fish Select** dialog, is shown.

  → *Fish Select* on page 139

- **Echogram**: You can see size distribution histograms from three different sources.

  – **Upper Echogram**: This histogram is created based on fish echoes from the top echogram for the chosen channel.

    By default, this is a surface echogram.

  – **Lower Echogram**: This histogram is created based on fish echoes from the bottom echogram for the chosen channel.

    By default, this is a bottom echogram.

    If you have selected only a small vertical range close to bottom, the histogram may be empty. This because the fish volume is small due to the limited range selected, and because the target strength algorithm must take into consideration other bottom echoes than fish.

  – **Zoom Echogram**: This histogram is created based on fish echoes from the currently zoomed area.

- **Mean value**: The large number above each histogram is the mean value from the tallest bar. The unit reflects the mode chosen in the **Size Distribution** dialog.

  → *Size Distribution* on page 166

To change the settings in the histogram, click **Size Distribution** on the **Active** menu.

<<	Size Distribution

**Related topics**

- *How to monitor the fish size distribution* on page 77
- *Size Distribution* on page 166
- *Fish Select* on page 139

Fish Position information pane

The **Fish Position** information pane shows the position within the beam of the detected single echoes for the current ping (largest circles) and the three previous ping (smaller circles). The colours indicate the echo strength.
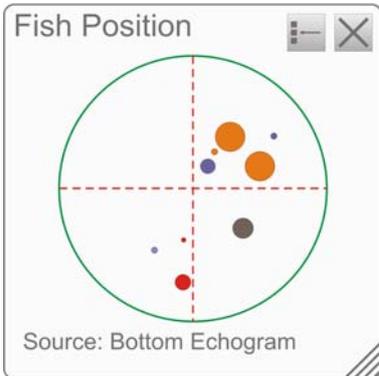
Note ————————————————————

 *The **Fish Position** information pane is only available if your ES70 is equipped with one or more split beam transceivers.*
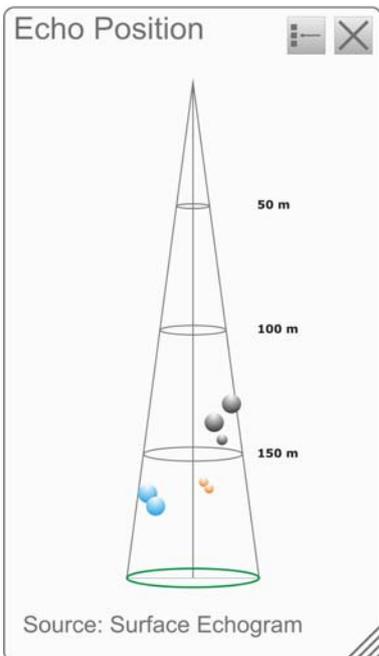
Source: This is the source of the fish position information. In the example, the surface echogram is used to determine the latest fish positions.

To open this information pane, click the **Fish Position** icon on the **Title Bar**.

Echo Position information pane

The **Echo Position** pane shows the position within the beam of the detected single echoes for the current ping (largest circles) and the three previous ping (smaller circles).

Note ————————————————————

 *The **Echo Position** information pane is only available if your ES70 is equipped with one or more split beam transceivers.*

To open this information pane, click the **Echo Position** icon on the **Title Bar**.


This is basically the same view as the **Fish Position**, however the echoes are here viewed from the side and not from above.

Source: This is the source of the echo position information. In the example, the surface echogram is used to determine the latest echo positions.

Zoom information pane

The **Zoom** information pane allows you to zoom in on a chosen area on the current echogram.
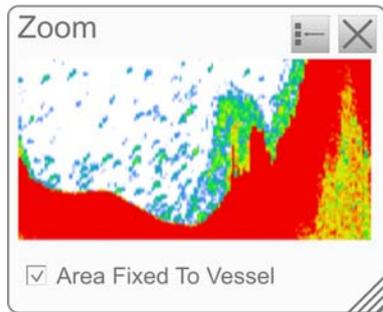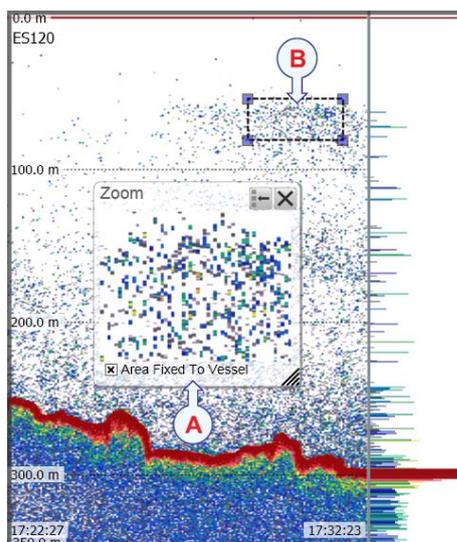

Once the **Zoom** information pane is opened, the zoomed area is visible as a dotted rectangle on the echogram. You can change this zoomed area to any size and shape, the echoes inside the zoomed area will always be shown in the **Zoom** information pane.

Area Fixed To Vessel: 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 will then run through the area, and thus also through the **Zoom** information pane.

To open this information pane, click the **Zoom** icon on the **Title Bar**.

Figure 10   Zoom example

A   **Zoom** information pane

B   Zoomed area rectangle

In this example, the zoomed area rectangle is positioned directly above the **Zoom** information pane. If you click on any of the four corners of the rectangle, you can drag it to any size and shape.

History information pane

The **History** information pane does not use the same presentation method as the other panes. The function allows you to view previously recorded echogram sequences. In order to do this, the current "active" echogram is split in two, and the left side is used to display the recorded history.
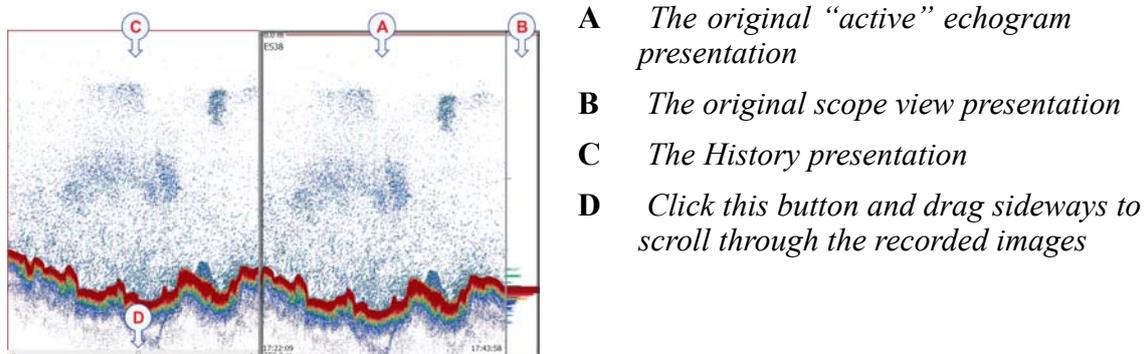
Click the **History** icon on the **Title Bar** to enable this function.

This function is used to store echograms on bitmap format. The ES70 will continuously save echogram pictures to its internal hard disk. These can be recalled on the display. The information in the **History** presentation is the same as on the original echogram presentation.

The number of history files is limited. After reaching the maximum number of files, the newest echogram picture overwrites the oldest one. The history function still allows you to quickly look through echogram pictures covering several hours.

Figure 11   History presentation

A   *The original "active" echogram presentation*

B   *The original scope view presentation*

C   *The History presentation*

D   *Click this button and drag sideways to scroll through the recorded images*

The horizontal width of the history presentation can be adjusted by clicking the right border, and dragging it sideways.

Taskbar

 The **Taskbar** is located at the bottom of the display . The **Taskbar** contains tabs to control the echogram presentations, as well as time and date information.

The **Taskbar** contains the following information:

A   **Screen Captures**: This tab hides the current "live" echograms from view, and allows you to see the echogram images you have previously saved using the **Screen Capture** button on the **Title Bar**. The echograms are presented in a graphic browser. You can open any of the images for a closer study, or you can access the files directly by clicking the **Open Image Folder** button.

→ *Operation buttons* on page 37

→ *Screen captures* on page 59

B   **Presentation format** If only one active frequency channel is in use, you will have only one echogram. These tabs are then not shown.

- **Vertical**: This tab places your current echograms next to each other in a vertical presentation.

- **Horizontal**: This tab places your current echograms on top of each other in a horizontal presentation.

C   **Transducer presentation** These tabs will reflect the actual transducers used by the echo sounder. The two transducers shown here are just an example. If only one transducer is in use, you will have only one echogram. These tabs are then not shown.

- **ES38**: This tab allocates the echo sounder presentation to only show the echogram from this transducer.

- **ES120**: This tab allocates the echo sounder presentation to only show the echogram from this transducer.

D   **Date**: This field on the status bar presents the current date. Note that during replay, the date of the replay file is shown. An "R" is displayed in front of the date to identify this.

E   **Time**: This field on the status bar presents the current time. Note that during replay, the times in the replay file is shown.
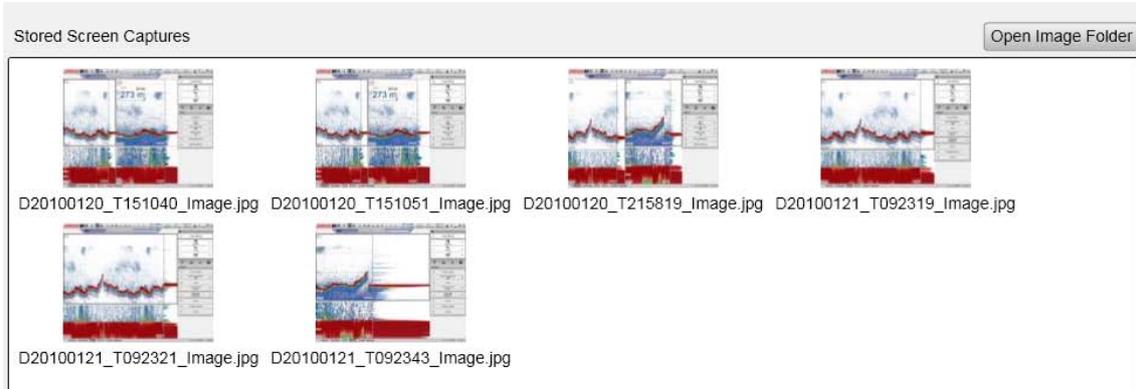
Related topics

- *How to select presentation layout* on page 69

Screen captures

The ES70 provides a built-in screen capture function, and a browser to view the saved images.

Figure 12   Screen capture browser

To save an echogram, click the **Screen Capture** button on the **Title Bar**.

To view the recorded image, click **Screen Capture** on the **Taskbar** to open the image browser.

Click **Open Image Folder** to open the operating system folder containing the files. This folder offers operating system functionality to provide renaming, copying, printing and deleting files.

Operational procedures

This chapter contains several operational procedures explaining how you can put your ES70 Fish finding echo sounder to use.

Note _____

These procedures assume that you are fairly familiar with the Microsoft Windows operating system. Phrases and terminology are consistent with the Microsoft style guide. The procedures also assume that you operate the echo sounder with a mouse or trackball.

_____

Topics

- **Test and maintenance**
  - *Receiver test* on page 97
  - *GPT power recycle* on page 98
  - *Access to log files* on page 99
  - *Rules for transducer handling* on page 99
  - *Rules for transducer maintenance* on page 100
  - *Approved anti-fouling paints for transducers* on page 101

Are there any procedures missing? Are you performing an operation that we have not explained? Write an e-mail to simrad.support@simrad.com and ask. We may then include the procedure in the next version of this manual.

Operation

These procedures are related to the basic use of the echo sounder.

How to change the ping rate

The **Ping rate** is the parameter that controls how often the echo sounder shall transmit acoustic energy (a "ping") into the water.

If you observe a pelagic echo on the sounder, and it seems to follow the bottom contour, it may in fact be a false echo from the previous transmission ("ping"). The only way to remove this false echo is to reduce the ping rate. If you do this, all the echoes from the previous ping will have disappeared before you transmit the next. On old paper based echo sounders the pen spent a long time on the rear side of the paper tray, and that reduced the ping rate. The ES70 is a <u>lot</u> faster, and you may send out a ping even before the energy from the previous ping has disappeared.

1 Click the **Operation** icon under the **Main** menu to open the **Operation** sub-menu.

2 Click **Ping**, and select *On*.

The two icons provided by this button can also be used to enable or disable transmission.

- The left icon (dark rectangle) is "Off".
- The right icon is "On". It is also used to initiate single pings when *Single Step* mode is selected.

→ *Ping* on page 118

3 How to choose maximum ping rate:

    a   Click **Ping Mode**, and select *Maximum*.

Ping Mode
Maximum

Single Step
Interval
Maximum

       This will make the ES70 ping with maximum speed. The time between each ping is automatically determined by the current depth and pulse duration.

    → *Ping Mode* on page 119

4   How to define a ping interval:

    a   Click **Ping Mode**, and select *Interval*.

    b   Click **Ping Interval**, and select the time (in milliseconds) between each ping.

—   Ping Interval
    1270 ms   +

    → *Ping Interval* on page 120

5   How to transmit single pings:

    a   Click **Ping Mode**, and select *Single Step*.

    b   To initiate a single ping, click once on the right hand icon on the **Ping** button.

How to save an echogram

Two ways to save echograms

- You can use the **Screen Capture** button on the **Title Bar**. Every time you click this button the current echogram is saved as a JPG file.

  The advantage with this method is that the files are small individual images and easy to scroll through. However, the images are fixed, what was recorded in the first place can not be altered.

- You can use the **Record** button on the **Title Bar**, or on the **Display** menu, to save raw data sequences.

  Every time you initiate this function you start a recording process which saves the sequence of raw data from the transceiver. This sequence can be replayed later.

  The advantage with this function – saving raw data sequences – is that all the information presented during the recording are saved. This means that you can change parameters like TVG, range, etc. during the playback. However, the files are large, and playback may be a time consuming task.

  → *How to save raw echogram data* on page 66

How to save single echograms

1   Click the **Screen Capture** button on the **Title Bar** to save the current echogram.

How to retrieve a saved echogram

1 On the **Taskbar**, click **Screen Captures**.

Observe that the built-in image browser starts. All the currently saved echogram images are shown as miniatures.

→ *Operation buttons* on page 37

2 Double-click on the miniature you wish to see.

3 Click **Return To Browser** to close the image.
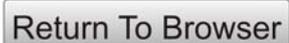
How to copy and delete echogram files

1 On the **Taskbar**, click **Screen Captures**.

Observe that the built-in image browser starts. All the currently saved echogram images are shown as miniatures.

→ *Operation buttons* on page 37

2 In the image browser, click **Open Image Folder**.

3 To copy a file:

   a Connect a USB memory device to one of the computer's USB sockets.

   b Select the file.

   c Right-click to open the short-cut menu.

   d Click **Send to** and select the memory device.

4 To delete a file:

   a Select the file.

   b Right-click to open the short-cut menu.

   c Click **Delete**.

5 To print a file:

   a Select the file.

   b Right-click to open the short-cut menu.

   c Click **Print**.

Note that this function will send the image to the default printer using default print parameters. If you wish to apply more control to the printing process, you must copy the echogram image to another computer, and open it with a suitable editor.

How to save raw echogram data

Two ways to save echograms

- You can use the **Screen Capture** button on the **Title Bar**. Every time you click this button the current echogram is saved as a JPG file.

  The advantage with this method is that the files are small individual images and easy to scroll through. However, the images are fixed, what was recorded in the first place can not be altered.

- You can use the **Record** button on the **Title Bar**, or on the **Display** menu, to save raw data sequences.

  Every time you initiate this function you start a recording process which saves the sequence of raw data from the transceiver. This sequence can be replayed later.

  The advantage with this function – saving raw data sequences – is that all the information presented during the recording are saved. This means that you can change parameters like TVG, range, etc. during the playback. However, the files are large, and playback may be a time consuming task.

This procedure explains how to store raw echogram data. Each sequence of raw data – often regarded as a "line" during a survey – contains a set of echogram data saved on digital format. Once saved, you can play back this data just as if it was "normal" echogram data.

Procedure

Note _____

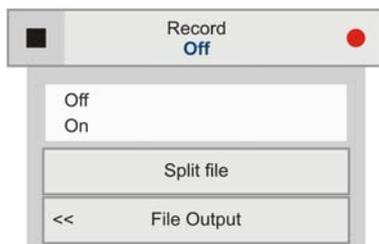*Raw data files are very large. If you wish to record large amounts of echogram raw data, make sure that you have enough space on you hard disk.*

_____

1   Click the **Operation** icon under the **Main** menu to open the **Operation** sub-menu.

2   Click **Record** to open the sub-menu.

3   Click **File Output** to open the **File Output** dialog.

4   In the **File Output** dialog;

    a   On the **Directory** tab, define the file output directory.

    b   On the **Raw Data** tab, click **Save Raw Data** to enable this export.

        Raw data are the echo data received directly from the output of the transceiver. The data can later be replayed on the ES70. The data contain sample data, echo sounder configuration data, navigation data (NMEA format) and annotations (if any).

    c   Define any other parameters to fit your requirements.

    → *File Output* on page 178

5   Click **OK** to save the current settings and close the dialog.

6   To start recording, you have two choices:

    a   In the **Record** button, select *On*.

    b   On the **Title Bar**, click the **Record** button.

        When activated, the **Record** button is red.

    → *Operation buttons* on page 37

7   To stop recording, you have two choices:

    a   In the **Record** button, select *Off.*

    b   On the **Title Bar**, click the **Record** button.

        When not activated, the **Record** button is black.

    → *Operation buttons* on page 37

How to play back echogram sequences

You can save echograms i two ways. Bitmap images are saved continuously, and these can be recalled by means of the **Screen Capture** button on the **Taskbar**. Echogram sequences are recorded using the **Record** function on the **Operation** menu. These sequences are played back by placing the ES70 in *Replay* mode.

1   Click the **Operation** icon under the **Main** menu to open the **Operation** sub-menu.
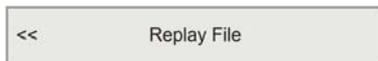

2   Click the **Operation** button to open its sub-menu.

→ *Operation* on page 117

3   Click **Replay File** to open the **Replay File** dialog.

The **Replay** dialog is used to find the files to be replayed. The file names are generated automatically, and each file is identified with the time and date it was made.

If you wish to run the replay continuously, click **Loop** in the **Replay File** dialog.

→ *Replay File* on page 177

4   In the **Operation** sub-menu, click **Replay** to select the function.

Observe that the **Replay bar** opens.

→ *Replay bar* on page 43

5   Click the start button in the **Replay bar** to start the playback.

6   To stop the playback, click the stop button in the **Replay bar**, or go back to *Normal* mode.

Views

These procedures explain how to control the presentations on the display.

Related topics

How to change the size of the presentation fields

You can modify the size of each individual field in the echo sounder presentation. The content in a field that changes size will automatically adjust to take full advantage of the space available. By means of this functionality you can for example increase the character size of the depth value.

1   Move the cursor to the border line between two fields. Observe that the marker changes form; it will appear as two parallel lines with arrows pointing out.

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

3   Move the mouse – or roll the control wheel – and observe that the border line moves.

4   Release the mouse button.

How to select presentation layout

You echo sounder may be set up with one or more frequencies (channels). The **Layout** dialog and the **Taskbar** allows you to control which channels you can see on the display, and how they are presented.

1   Click the **Display** icon under the **Main** menu to open the **Display** sub-menu.

2   Click **Layout** to open the **Layout** dialog.

The **Layout** dialog lists all your active channels, You can enable or disable the presentation of individual channels.

→ *Layout* on page 130

3   In order to control the horizontal or vertical presentation when you have two or more echograms, use the buttons on the **Taskbar**.

• **Horizontal** for a horizontal presentation

• **Vertical** for a vertical presentation

• **[Transducer name]** to see only the echogram for the chosen transducer

→ *Taskbar* on page 58

How to change the colour scale and presentation palette

By default you have 64 or 12 colours available to present the echograms, and a selection of palettes. The colour scale can be retrieved any time by clicking the **Colour Scale** icon on the **Title Bar**.

Which colour scale to use is defined in the **Colour Setup** dialog on the **Display** sub-menu.

→ *Title Bar* on page 36

→ *Colour Scale information pane* on page 53

→ *Colour Setup* on page 125

1   Click the **Display** icon under the **Main** menu to open the **Display** sub-menu.

2   Click **Colour Setup** to open the **Colour Setup** dialog.

3   Select palette and echogram colours to suit your requirements

4   Click **OK** to save the current settings and close the dialog.

How to change the number of colours in the echogram

By default you have 64 or 12 colours available to present the echograms, and a selection of palettes. The colour scale can be retrieved any time by clicking the **Colour Scale** icon on the **Title Bar**.

Which colour scale to use is defined in the **Colour Setup** dialog on the **Display** sub-menu.

→ *Title Bar* on page 36

→ *Colour Scale information pane* on page 53

→ *Colour Setup* on page 125

You can filter out the weakest echoes by manually modifying the colour threshold.

1 Click the **Colour Scale** icon on the **Title Bar** to open the **Colour Scale** information pane.

2 Move the cursor to the left side of the colour scale.

Observe that the cursor changes shape to a dual arrow line.

3 Click on the left edge of the colour scale, and drag the edge towards right.

4 Observe that the weakest colours are removed from the colour scale, and thus also the weakest echoes from the echogram presentation.

Echogram

These procedures explain the various parameters controlling the echogram.

 Related topics

• *About range selection* on page 210

• *About dynamic range and display presentation* on page 206

• *About bottom slopes* on page 209

• *About TVG gain* on page 205

• *About bottom lines* on page 211

How to select echogram presentation

On the ES70 you can choose from several echogram presentations.

1 Click the **Active** icon under the **Main** menu to open the **Active** sub-menu.

2 Click **Echogram** to open the **Echogram** dialog.

→ *Echogram* on page 158

3   On the **Echogram** tab, choose **Echogram Type**.

The following echogram types are available:

- **Surface**: The echogram is related to the sea surface. Start depth (upper echogram boundary) and vertical range (across echogram) are manually selected by the **Start Depth** and **Range** buttons on the **Main** menu.

  → *Start Range* on page 114

  → *Range* on page 113

- **Bottom**: The echogram is related to the detected bottom. Stop depth (lower echogram boundary) and vertical range are manually selected by the **Start Depth** and **Range** buttons on the **Main** menu. The echogram is only drawn for pings having a successful bottom detection.

- **Pelagic**: This echogram is nearly identical to the **Surface** echogram. However, the biomass calculations are not restricted by the bottom detection. This means that the bottom echo will be included in calculations if it appears within the chosen range.

  Example: If you are investigating a large school of pelagic fish, set the **Start Range** and **Range** to enclose the school. If the school is large enough, a Surface echogram may mistake it for bottom, and the biomass readings will be wrong. The **Pelagic** echogram will however disregard the bottom detection, and give a correct estimate of the biomass.

- **Trawl**: Trawl sensor systems communicate headrope depth and headrope-to-footrope distance to the ES70 at regular intervals. The echogram covers the vertical opening of the trawl including a small margin at each side. The headrope and footrope margins are identical. The biomass calculations are not restricted by the bottom detection.

  Their size is selected in the **Trawl** dialog. The headrope-to-footrope distance can be manually set in the **Trawl** dialog for trawl sensor systems not measuring the trawl opening, or when the measured headrope-to-footrope distance is unreliable. The echogram is only drawn when trawl position information is available.

  → *Trawl* on page 145

Note _____

*The chosen echogram type will only apply to the currently selected "active" echogram. If you wish the changes to apply to all similar echograms, click **Apply To All**.*

_____

4   Click **OK** to save the current settings and close the dialog.

How to establish horizontal markers

A range of horizontal markers can be enabled or disabled.

1   Click the **Active** icon under the **Main** menu to open the **Active** sub-menu.

2 Click **Echogram** to open the **Echogram** dialog.

→ *Echogram* on page 158

3 On the **Lines** tab, observe the various markers that can be enabled.

- Bottom Line
- White Line
- Hardness Line
- Trawl Lines
- Variable Depth line
- Range Other lines
- Biomass line
- Scale lines

→ *Lines, markers and annotations in the echograms* on page 47

→ *Echogram; Lines tab* on page 159

4 Enable the lines you wish to see.

Note that the White Line and the Hardness Line can not be used simultaneously.

5 Click **OK** to save the current settings and close the dialog.

How to establish vertical markers

A range of vertical markers can be enabled or disabled.

1 Click the **Active** icon under the **Main** menu to open the **Active** sub-menu.

2 Click **Echogram** to open the **Echogram** dialog.

→ *Echogram* on page 158

3 On the **Lines** tab, observe the various vertical markers that can be enabled.

- Time
- Distance
- Annotations

  The annotations are controlled on the **Annotation** dialog, but to place the annotations on the echogram, you must enable them in the **Echogram** dialog.

→ *Lines, markers and annotations in the echograms* on page 47

→ *Echogram; Lines tab* on page 159

→ *Annotations* on page 137

4 Enable the vertical markers you wish to see.

5 Click **OK** to save the current settings and close the dialog.

How to select TVG gain

In the **Echogram** dialog you can choose which TVG gain you wish to use.

The TVG can be chosen using the **Echogram** dialog (described here), or with the **TVG** button on the **Active** sub-menu.

→ *How to adjust the TVG gain* on page 80.

1   Click the **Active** icon under the **Main** menu to open the **Active** sub-menu.

2   Click **Echogram** to open the **Echogram** dialog.

→ *Echogram* on page 158

3   On the **Echogram** tab, observe the various TVG settings that can be applied.

- **Power (No TVG)**: TVG gain is not implemented. This setting is hardly ever used.

- **School (20 log TVG)**: This gain setting provides the largest amplification close to the bottom. It has been designed to provide the best echoes from schools.

- **Fish (40 log TVG)**: This gain setting provides lower amplification close to the bottom. It has been designed to provide the best echoes from single fish.

- **Targets (40 log TVG)**: Basically, this setting uses the same TVG amplification as **Fish**, but additional filtering is implemented. Only echoes detected and interpreted as single fish are shown. The echoes are compensated for their physical position in the beam (beam compensation). This means that fish in the outer region of the beam are adjusted to correct size even though their echoes are weaker.[6]

- **Target Mix (40 log TVG)**: Basically, this setting uses the same TVG amplification as **Fish**, but additional beam compensation is implemented. Echoes detected and interpreted as single fish are adjusted to their correct size according to their physical position in the beam.[7]

- **User (Variable TVG)**: This setting allows you to define your own TVG setting.

→ *About TVG gain* on page 205

→ *Echogram; Echogram tab* on page 161

4   Choose your TVG setting.

Note that the changes made in this tab will be default only be applied to the currently selected "active" echogram (identified with a thick border). If you wish to apply the changes to all the other echograms of the same type (for example all bottom related echograms, click **Apply To All**.

5   Click **OK** to save the current settings and close the dialog.

---

6.   Note that this **Targets (40 log TVG)** setting is only functional with split beam transducers.
7.   Note that this **Target Mix (40 log TVG)** setting is only functional with split beam transducers.

How to remove interference and vessel's own noise from the echograms

The **Active** sub–menu offers a dedicated filter to remove interference and noise from your own vessel. This filter has been developed for our sonars, and has proven to be very useful.

1   Click the **Active** icon under the **Main** menu to open the **Active** sub-menu.

2   Click **Ping-Ping Filter**, and make the adjustments to fit your requirements.

- **Off**: No filtering

- **2 of 3**: For the current echo pixel to be shown, the echo pixel from at least one of the two previous pings must have a colour value different from the background.

- **2 of 2**: For the current echo pixel to be shown, the echo pixel from the previous ping must have a colour value different from the background to be shown.

- **3 of 3**: For the current echo pixel to be shown, the echo pixel from the two previous pings must have a colour value different from the background to be shown.

→ *Ping-Ping Filter* on page 165

How to easier identify the bottom

The **Echogram** dialog allows you to enable *bottom line* or *white line* to easier identify the bottom.

1   Click the **Active** icon under the **Main** menu to open the **Active** sub-menu.

2   Click **Echogram** to open the **Echogram** dialog.

→ *Echogram* on page 158

3   On the **Lines** tab, observe the various lines that can be applied.

→ *About bottom lines* on page 211

→ *Echogram; Lines tab* on page 159

4   Click **OK** to save the current settings and close the dialog.

Ranges

These procedures explain how to change the vertical range, that is how to control the depth to be shown by the echogram.

Related topics

How to choose the vertical range

The vertical range is controlled by the **Range** button on the **Main** menu.

For example settings, see *How to choose the start range* on page 75.

1 Method 1:

    a Click [+] or [-] to adjust the range manually.

2 Method 2:

    a Click the middle of the button to open it.

    b Click any range value (including *Auto* when available) to select it.

How to choose the start range

The vertical start range is controlled by the **Start Range** button on the **Main** menu.

1 Method 1:

    a Click [+] or [-] to adjust the start range manually.

2 Method 2:

    a Click the middle of the button, hold the mouse button depressed, and drag sideways.

3 Method 3 can only be used if you have a keyboard:

    a Click the middle of the button to open it.

b Enter any value from the keyboard.

Bottom detection

These procedures explain how you can control the bottom detection.

 Related topics

How to define maximum and minimum depth

When you use the ES70 it is very important that the echo sounder detects and "locks" on the correct depth. Normally this will happen automatically, but certain sea or bottom conditions, or the appearance of large schools of fish, may "fool" the sounder. When the bottom is undetected you will read 0.00 meters depth, or any other erroneous value. In order to guide the ES70 to locate the correct depth, you may some times find it useful to follow this procedure.

1 Click the **Active** icon under the **Main** menu to open the **Active** sub-menu.

2 Click **Bottom Detector** to open the **Bottom Detector** dialog.

3 Enter a **Minimum Depth**.

This setting eliminates all unwanted bottom detections from the transducer surface and down to the defined depth. A false bottom detection within this area would cause erroneous depth read-out and incorrect bottom expansion.

4 Enter a **Maximum Depth**.

Set this depth to approximately 50% more than the expected depth. If the echo sounder should loose bottom detection due to air or other disturbances, it will try to relocate the depth within the minimum and maximum depths you have defined. Do not exaggerate. If you for example enter 5000 meters and the bottom track is lost, the echo sounder will search the entire depth for new bottom lock. This will take a lot of time, and a lot of information will be lost during the search, especially during rough sea conditions with air being forced under the hull.

5   Click **OK** to save the current settings and close the dialog.

 If you set maximum depth to a value identical or smaller than the minimum value, the bottom detection algorithm will be disabled. The echo sounder will then not be able to detect the bottom at all, and the displayed depth will be 0.00m

Size distribution, biomass and fish density

If you use a "split beam" transducer on your ES70 the echo sounder will you provide you with information about the size distribution and density of the fish beneath the hull.

 Related topics

- *About biomass* on page 204

How to monitor the fish size distribution

The size distribution is presented using the **Size Distribution** information pane.

→ *Size Distribution information pane* on page 54

1   Click the **Size Distribution** icon on the **Title Bar** to open the information bar.

2   To change the size of the information pane, click in the bottom right corner, hold the mouse button depressed, and drag.

3   Click on the histogram titles to see the relevant presentations.

4   To change the presentation parameters:

a   Click the tool button in the top right corner of the information pane to open the **Size Distribution** dialog.

The dialog can also be opened from the **Active** sub-menu.

→ *Size Distribution* on page 166

b   Make the necessary adjustments.

c   Click **OK** to save the current settings and close the dialog.

5   To change the fish species:

a   Click the **Setup** icon under the **Main** menu to open the **Setup** sub-menu.

b   Click **Fish Select** to open the **Fish Select** dialog.
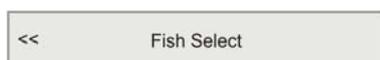
→ *Fish Select* on page 139

c   Make the necessary adjustments.

d   Click **OK** to save the current settings and close the dialog.

How to adjust the fish length for correct calculations

The ES70 measures and records the target strength (TS). The researchers at the Norwegian Institute for Fishery Research have compiled a set of algorithms based on extensive testing with the various species, and these are used by the ES70 to calculate the length of the fish based on its target strength. However, the target strength differs between the various species. If you find out that the length of the fish you have caught differs from the initial presentation, you can adjust the algorithms used to calculate the length.

1   Click the **Setup** icon under the **Main** menu to open the **Setup** sub-menu.

2   Click **Fish Select** to open the **Fish Select** dialog.

3   Make the necessary adjustments.

4   Click **OK** to save the current settings and close the dialog.

Note ──

Pay special attention to mackerel, as this fish has a very low target strength. Mackerel can often be mistaken for small bait. If you fish for mackerel, we recommend that you use 120 kHz or 200 kHz echo sounder frequencies, as the mackerel shows largest echo strength for these frequencies.

How to monitor the current biomass

The biomass is presented using the **Size Distribution** information pane, and/or enabling the biomass line in the echogram presentation.

Information pane

1   Click the **Size Distribution** icon on the **Title Bar** to open the information bar.

2   To change the size of the information pane, click in the bottom right corner, hold the mouse button depressed, and drag.

3   Click on the histogram titles to see the relevant presentations.

Biomass line

1   Click the **Active** icon under the **Main** menu to open the **Active** sub-menu.

2   Click **Echogram** to open the **Echogram** dialog.

→ *Echogram* on page 158

3   On the **Lines** tab, observe that the biomass can be enabled or disabled, and that you can define a scale for it.

4   Make the necessary adjustments.

5   Click **OK** to save the current settings and close the dialog.

Gain

These procedures explain how you can adjust the gain in the echo sounder. This controls how "powerful" the echoes are shown in the echogram. The ES70 uses two principles for gain; *signal amplification* and *time varied gain (TVG)*.

• *How to adjust the signal gain* on page 79

• *How to adjust the TVG gain* on page 80

Related topics

• *About TVG gain* on page 205

• *About dynamic range and display presentation* on page 206

How to adjust the signal gain

1   Observe the **Gain** button on the **Main** menu.

→ *Gain* on page 115

2   Method 1:

a   Click [+] or [-] to choose gain.

3   Method 2:

a   Click the middle of the **Gain** button, hold the mouse button depressed.

b   drag the cursor left or right to increase or decrease the gain.

4   Method 3 can only be used if you have a keyboard:

a   Click the middle of the **Gain** button to open the sub-menu.

b Enter the requested gain value between 20 and 120.

How to adjust the TVG gain

TVG means *Time Varied Gain*. The whole idea with TVG is that echoes from fish shall have the same echo level (colour) independent of their depths. The ES70 has a TVG range down to 15 000 meters, which for all practical purposes is unlimited. The ES70 does not have a TVG compensated receiver like most other echo sounders. In the ES70 the TVG is implemented in software after the echoes from the receiver(s) have been converted to digital format. In order to make this work the receiver must have very large dynamic range.

The TVG can be chosen using the **Echogram** dialog, or with the **TVG** button on the **Active** sub-menu (described here).

→ *How to select TVG gain* on page 73

1 Click the **Active** icon under the **Main** menu to open the **Active** sub-menu.

2 Locate the **TVG** button.

3 Method 1:

a Click [+] or [-] to choose TVG setting.

4 Method 2:

a Click the middle of the **TVG** button to open the sub-menu.

b Click on any TVG setting to select it.

Power and pulse duration

These procedures explain how to control the echo sounder's output power and transmission pulse duration.

 Related topics

- *About output power* on page 207
- *About pulse duration* on page 207

How to choose passive mode

In order to check how much noise the echo sounder is receiving, set it to passive mode. This means that the echo sounder is not transmitting sound pulses into the water, it is only "listening".

1 Click the **Operation** icon under the **Main** menu to open the **Operation** sub-menu.

2 Click **Normal Operation** to open the **Normal Operation** dialog.
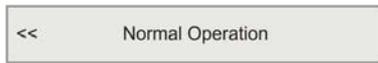
→ *Normal Operation* on page 121

3 For the relevant transducer channel, set **Mode** to *Passive*.

4 Click **OK** to save the current settings and close the dialog.

Note

*The **Test** mode is only provided for troubleshooting and test purposes.*

How to change the output power

From time to time it may be useful to reduce the echo sounder's output power. A reduced power output may prove beneficial if you are looking for single fishes or schools near the surface, if you work in very shallow waters, if you are bothered with false echoes due to reverberation, or if you simply feel that the echoes are too strong.

1 Click the **Operation** icon under the **Main** menu to open the **Operation** sub-menu.

2 Click **Normal Operation** to open the **Normal Operation** dialog.
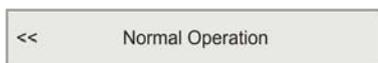
→ *Normal Operation* on page 121

3   For the relevant transducer channel, set **Power [W]** to requested value.

→ *About output power* on page 207

4   Click **OK** to save the current settings and close the dialog.

Note _____

If you increase the output power, make sure that you do not choose more power than your transducer can handle. With a correct setup with the transducer registered in the echo sounder software you are safeguarded against this. However, if you use a third party transducer that is not known by the echo sounder software, you may inflict permanent damage if you increase the output to beyond the transducer's capabilities.

How to adjust the pulse duration

The length of your transmitted pulse is very important to how you can detect fish. A short pulse duration gives you a very fine vertical resolution. This allows you to detect scattered fish, and you can find those that move near the bottom. A long pulse duration throws a lot more energy into the water, and the digital filters used by the receiver are narrower. These filters will reduce the ES70's sensitivity for noise, but the length of the transmitted pulse will give you stronger echoes. With the filters, a longer pulse duration will provide longer range, but reduced vertical resolution.

1   Click the **Operation** icon under the **Main** menu to open the **Operation** sub-menu.

2   Click **Normal Operation** to open the **Normal Operation** dialog.
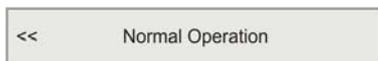
→ *Normal Operation* on page 121

3   For the relevant transducer channel, set **Pulse Length** to requested value.

For general use, we recommend that the pulse duration is set to *Auto*.

→ *About pulse duration* on page 207

4   Click **OK** to save the current settings and close the dialog.

Installation

These procedures explain how to install transceiver unit and new software versions. It also explains how to set up the external motion sensor.

How to install a frequency channel

1   Click the **Setup** icon under the **Main** menu to open the **Setup** sub-menu.

2 Click **Installation** to open the **Installation** sub-menu.

On the sub-menu, click **Transceiver Installation** to open the **Transceiver Installation** dialog.

→ *Transceiver Installation* on page 153

3 In the **Transceiver Installation** dialog, click **Browse**.

The ES70 will automatically search the network for available transceivers.

4 Observe that available frequency channels are listed in the dialog.

Each transceiver contains one or more frequency channels. The phrase is used to identify the combination of a transceiver, transducers and the frequencies offered. Split beam transceivers contain only one channel each. The upper part of the **Transceiver Installation** dialog displays a list of frequency channels which either are, or have been, installed on the ES70. For each channel, a status label is provided.

- **Busy**: The frequency channel is already in use, probably by another echo sounder on the same network. You can not connect to this channel.
- **Installed**: This frequency channel is connected to you ES70 system.
- **Lost**: This frequency channel can not be used.

5 Select a frequency channel that is available, and choose the correct transducer in the spin box.

Note _____

This is a critical task. You must ensure that the correct transducer is selected. If you connect the transceiver to a transducer that can not handle the power rating, it may be damaged beyond repair.

_____

6 Observe that the status for the relevant frequency channels changes to *Installed*.

7 Click **OK** to save the current settings and close the dialog.

How to disconnect a frequency channel

1 Click the **Setup** icon under the **Main** menu to open the **Setup** sub-menu.

2 Click **Installation** to open the **Installation** sub-menu.

On the sub-menu, click **Transceiver Installation** to open the **Transceiver Installation** dialog.

```
<<        Transceiver Installation
```

3   Observe that current frequency channels are listed in the dialog.

Each transceiver contains one or more frequency channels. The phrase is used to identify the combination of a transceiver, transducers and the frequencies offered. Split beam transceivers contain only one channel each. The upper part of the **Transceiver Installation** dialog displays a list of frequency channels which either are, or have been, installed on the ES70. For each channel, a status label is provided.

- **Busy**: The frequency channel is already in use, probably by another echo sounder on the same network. You can not connect to this channel.
- **Installed**: This frequency channel is connected to you ES70 system.
- **Lost**: This frequency channel can not be used.

4   On the frequency channel you wish to disconnect, set the transducer type to *None*.

5   Observe that the status for the relevant frequency channels changes to *Available*.

6   Click **OK** to save the current settings and close the dialog.

How to modify an IP address

The transceivers are provided by Simrad readily set up with a fixed Ethernet address and an IP address. If your ES70 uses two transceivers with identical frequencies, these will by default have different Ethernet addresses, but identical IP addresses. In order for your system to work, all transceivers must have unique IP addresses.

1   Click the **Setup** icon under the **Main** menu to open the **Setup** sub-menu.

2   Click **Installation** to open the **Installation** sub-menu.

```
        Installation
```

On the sub-menu, click **Transceiver Installation** to open the **Transceiver Installation** dialog.

```
<<        Transceiver Installation
```

3   Observe that the current frequency channels are listed in the dialog.

4   Click once on the frequency channel you wish to modify.

5   Observe that the relevant transceiver parameters are shown in the **Transceiver Information** field

6   Sett the transducer(s) to *None*, and click **Apply**.

7   Click **Change IP Address** to open the **IP Address** dialog.

Note _____

*If you have two Ethernet cables connected to your computer, you may need to disconnect the Ethernet cable to the ship's network before the **Change IP Address** is available.*

_____

8   Enter a new IP address

Tip _____

Change only the last digit in the IP address.

_____

    If you do have a keyboard connected to your ES70 system, click the **Keyboard** button at the bottom of the dialog to open an on-screen keyboard.

9   Click **OK** to save the current settings and close the dialog.

10   In the **Transceiver Installation** dialog, observe that the IP address for the chosen transceiver has changed.

11   Install the transducers for the channel with the new IP address.

Note _____

Make sure that you choose the correct transducer(s)!

_____

12   Click **OK** to save the current settings and close the dialog.

How to install and upgrade the software

The ES70 is initially delivered with all necessary software installed and configured. Software upgrades are useful if your ES70 fails, and you suspect a software error. An upgrade is also required whenever the ES70 software is modified.

To check which software version you have, observe the **About** dialog opened from the **Display** menu.

→ *About* on page 133

The computer will automatically detect the insertion of the CD-ROM and open the installation program's start-up dialog. If this is not the case, you must manually run the **Setup.exe** program on the CD-ROM's root directory.

When the ES70software is upgraded, the software will automatically detect the presence of transceiver(s), but you will need to check that the correct transducer(s) are enabled. Whenever new software is installed, you will also need to redefine all serial lines, transducer(s) and transceiver(s).

Note _____

If you experience problems during a software upgrade, write down the echo sounder's installation parameters (transducers, port settings etc.). Remove the echo sounder software entirely, then reinstall from scratch.

How to install the ES70 software

Use this procedure if you need to install the software on a new computer. Note that minimum hardware and software requirements must be met by the computer.

1   Power up the computer.
2   Insert the ES70 CD-ROM.
3   Observe that the installation program opens.

If the installation program does not start automatically, use a file manager to access the CD folder. Double-click on the **Setup.exe** file to start the installation.

4   Allow the ES70 installation to run. Follow the instructions provided.
5   Once the installation has been completed, double-click the ES70 icon on the desktop to start the application.

When the ES70 starts, you may see a dialog requesting permission to upgrade the firmware on the transceiver. This happens if the firmware on the transceiver is older than the firmware provided as a part of the ES70 software. Since functionality on the ES70 may depend on the firmware in the transceiver, click **Yes** to upgrade the transceiver.

6   If you use **Windows 7** operating system:

a   Observe that **Windows 7 Firewall** will open a dialog requesting information about the network.

b   Select *Public*, and click **Allow access**.

7   Observe the start-up procedure in the *Getting started* chapter.

→ *Power On/Off procedures* on page 19

How to obtain the ES70 license

The ES70 requires a valid license to operate. Without a license you will not be able to communicate with the transceiver.

Note _____

If you replace your computer, or if you replace major components inside your computer, you will need a new license code.

1   Double-click the ES70 icon on the desktop to start the application.
2   Click the **Setup** icon under the **Main** menu to open the **Setup** sub-menu.

3   Click **Installation** to open the **Installation** sub-menu.

On the sub-menu, click **Software License** to open the **Software License** dialog.

4 Write down the **Hardware ID** provided by the **Software License** dialog.

5 Contact your dealer to order the software license.

Your dealer will need the following information from you to place the order:

- Vessel name and call sign
- Vessel type (trawler, purse seiner, etc.)
- Vessel owner's name, address and contact information
- Serial number on all transceivers
- Hardware ID

6 When the software license is returned, start the ES70, open the **Software License** dialog, and click **Enter Licence String**.

7 Write down the code, and click **Ok**.

8 Click **OK** to save the current settings and close the dialog.

How to upgrade the ES70 software

Use this procedure if you wish to reinstall the software, or receive a new CD-ROM with a software upgrade.

1 Observe the procedure for software installation.

Unless you have made any hardware changes on your computer, the existing software license will be used.

How to remove the ES70 software

Use this procedure if you need to remove all the ES70 software from the computer. Note that all data in the ES70 directory will be erased.

1 Observe the operating system's functionality for software removal.

External interfaces

The following interfaces are set up to transmit and/or receive information by means of Ethernet and/or serial lines.

How to set up the Ethernet output interface

The ES70 can communicate with an external devices that can benefit from the processed data. Such devices include the **Olex** chart plotter system. This communication is controlled by the **Ethernet Output** dialog.

The following telegrams may be exported:

- Parameter
- Vessel log
- Navigation
- Motion sensor
- Depth
- Echogram
- Echo trace

The interface will require the absolute identity of the remote UDP port and the remote IP address.

The settings required for the Olex system are specified in the **EK500 Datagram** dialog description.

Wiring procedure

1   Locate the Ethernet port you wish to use.

2   If no Ethernet port is available, an Ethernet switch may be inserted between the computer and the transceiver.

3   If you connect an Ethernet cable directly between the ES70 computer and a remote computer, you must use a Ethernet cable. If you connect the other computer by means of an Ethernet switch, you must use "straight" Ethernet cables.

Setup procedure

1   Click the **Setup** icon under the **Main** menu to open the **Setup** sub-menu.

2   Click **Ethernet Output** to open the **Ethernet Output** dialog.

3   Define the **Remote Port**.

4   Define the **Remote IP Address** for the computer you wish to export the information to.

5   Set **Communication Mode** to *Broadcast*.

6   In the **Ethernet Output** dialog, click **EK500 Datagram** to open the **EK500 Datagram** dialog.

7   On the **Datagram** tab, define which datagrams you wish to export.

8   Click **OK** to save the current settings and close the dialog.

How to set up the Simrad ITI Trawl system interface

Communication with the Simrad ITI (Integrated Trawl Instrumentation) is based on NMEA and proprietary telegrams.

Supported telegram formats

- *DBS Depth below surface* on page 190
- *DBS Depth of trawl below surface* on page 198
- *HFB Trawl headrope to footrope and bottom* on page 199

Wiring procedure for serial communication

1   Locate a free RS-232 serial port that can be used to connect the ITI system.

2   On the ES70 computer, connect the receive signal **Rx** on pin 2, the transmit signal **Tx** on pin 3, and **ground** on pin 5.

3   On the ITI transceiver, use connector **Serial A**. Connect the receive signal **Rx** on pin 2, the transmit signal **Tx** on pin 3, and **ground** on pin 5.

4   Ensure that the length of the cable does not exceed approximately 50 meters. If a longer cable is required, you may need to use buffer amplifiers on the serial line.

Setup procedure

This procedure explains how the ES70 can be set up to receive ITI information on a serial port.

1   Click the **Setup** icon under the **Main** menu to open the **Setup** sub-menu.

2   Click **Installation** to open the **Installation** sub-menu.

On the sub-menu **I/O Setup** to open the **I/O Setup** dialog.

→ *I/O Setup* on page 150

3   In the **I/O Setup** dialog, select which serial line to use to accept ITI information.

4   Click on the chosen port to select it, then click the **Input** button to open the **Select Inputs** dialog.

5   In the **Select Inputs** dialog, locate the **ITI** on the left side, and click the [>] button to connect it.

- **ITI**: This setting allows you to communicate with the Simrad ITI system.

  Values for trawl opening and distance must be entered manually in the **Trawl** dialog.

  → *Trawl* on page 145

  The following proprietary telegram formats are supported:

  – *DBS Depth below surface* on page 190

  – *DBS Depth of trawl below surface* on page 198

  – *HFB Trawl headrope to footrope and bottom* on page 199

6   Click **OK** to save the current settings and close the dialog.

7   In the **I/O Setup** dialog, click on the chosen port to select it, then click the **Setup** button to open the **Serial Setup** dialog.

8   In the **Serial Setup** dialog, enter the relevant parameters to set up the port.

9   Click **OK** to save the current settings and close the dialog.

10   In the **I/O Setup** dialog, click on the chosen port to select it, then click the **Monitor** button to open the **Port Monitor** dialog.

In order to monitor the data flow, the ITI system must be active and transmitting information to the ES70.

11   If the data flow is operational, close all dialogs.

How to set up the Simrad PI Catch monitoring system interface

Communication with the Simrad PI Family catch monitoring systems is based on NMEA and proprietary telegrams.

Supported telegram formats

- *DBS Depth below surface* on page 190

- *PSIMP.D PI Sensor data* on page 199

Wiring procedure for serial communication

1   Locate a free RS-232 serial port that can be used to connect the PI system.

2   On the ES70 computer, connect the receive signal **Rx** on pin 2, the transmit signal **Tx** on pin 3, and **ground** on pin 5.

3   On PI44 and PI54, use either connector **NMEA1** or **NMEA2**. Connect the receive signal **Rx** on pin 8, the transmit signal **Tx** on pin 6, and **ground** on pins 7 and 9.

4   On PI30 and PI32, use connector **NMEA**. Connect the receive signal **Rx** on pin 3, the transmit signal **Tx** on pin 1, and **ground** on pins 2 and 4.

5   Ensure that the length of the cable does not exceed approximately 50 meters. If a longer cable is required, you may need to use buffer amplifiers on the serial line.

Setup procedure

This procedure explains how the ES70 can be set up to receive PI information on a serial port.

1   Click the **Setup** icon under the **Main** menu to open the **Setup** sub-menu.

2   Click **Installation** to open the **Installation** sub-menu.

On the sub-menu **I/O Setup** to open the **I/O Setup** dialog.

3   In the **I/O Setup** dialog, select which serial line to use to accept PI information.

4   Click on the chosen port to select it, then click the **Input** button to open the **Select Inputs** dialog.

5   In the **Select Inputs** dialog, locate the **PI50** on the left side, and click the [>] button to connect it.

   •   **PI**: This setting allows you to communicate with one of the Simrad PI systems. Values for trawl opening and distance are provided by the system. The following proprietary telegram formats are supported:

   –   *DBS Depth below surface* on page 190

   –   *PSIMP.D PI Sensor data* on page 199

6   Click **OK** to save the current settings and close the dialog.

7   In the **I/O Setup** dialog, click on the chosen port to select it, then click the **Setup** button to open the **Serial Setup** dialog.

8   In the **Serial Setup** dialog, enter the relevant parameters to set up the port.

9   Click **OK** to save the current settings and close the dialog.

10   In the **I/O Setup** dialog, click on the chosen port to select it, then click the **Monitor** button to open the **Port Monitor** dialog.

In order to monitor the data flow, the PI system must be active and transmitting information to the ES70.

11   If the data flow is operational, close all dialogs.

How to set up the sonar system interface

The current depth from a defined transceiver channel can be sent out on a serial line to a sonar system. You can only use the serial lines already set up to accept input from other peripherals.

Note that the depth information is normally also provided on the duplex interfaces to trawl instrumentation and catch monitoring systems.

Wiring procedure

1   Locate the RS-232 serial port that can be used to connect the sonar system.

2   On the ES70 computer, connect the transmit signal **Tx** on pin 3, and **ground** on pin 5.

3   Sonar:

   •   **Interface Unit**: Use one of the serial line connectors **TB1** through **TB7**. Connect the transmitted signal **Tx** from ES70 to pin 1, and **ground** on pin 5.

   •   **Processor Unit**: Connect the transmitted signal **Tx** from ES70 to pin 2, and **ground** on pin 5.

4   Ensure that the length of the cable does not exceed approximately 50 meters. If a longer cable is required, you may need to use buffer amplifiers on the serial line.

Setup procedure

1   Click the **Setup** icon under the **Main** menu to open the **Setup** sub-menu.

2   Click **Depth Output** to open the **Depth Output** dialog.

3   Select which port to use.

4   For the selected port, click **Setup** to define the communication parameters.

5   Select which telegram to send.

6   If applicable, define the Talker ID.

7   Select which transceiver and frequency you wish to export the depth information from.

   In most cases, the lowest frequency is used.

8   Click **OK** to save the current settings and close the dialog.

How to set up the navigation system interface

Most Global Positioning System (GPS) receivers provide NMEA 0183 telegrams containing speed, heading and sailed distance as well as geographical latitude and longitude.

Supported telegram formats for heading:

•   *HDG Heading, deviation and variation* on page 192

•   *HDT Heading, true* on page 193

•   *HDM Heading, magnetic* on page 192

•   *VHW Water speed and heading* on page 194

Supported telegram formats for distance

- *RMC Recommended minimum specific GNSS data* on page 193
- *VHW Water speed and heading* on page 194
- *VTG Course over ground & ground speed* on page 194

Supported telegram formats for positioning

- *GLL Geographical position latitude/longitude* on page 191
- *GGA Global positioning system fix data* on page 191
- *RMC Recommended minimum specific GNSS data* on page 193

Supported telegram formats for speed

- *RMC Recommended minimum specific GNSS data* on page 193
- *VHW Water speed and heading* on page 194
- *VTG Course over ground & ground speed* on page 194

Wiring procedure for serial communication

1 Locate a free RS-232 serial port that can be used to connect the navigation receiver.

2 On the ES70 computer, connect the receive signal **Rx** on pin 2, and **ground** on pin 5.

3 On the GPS system, wire as described in the relevant documentation.

4 Ensure that the length of the cable does not exceed approximately 50 meters. If a longer cable is required, you may need to use buffer amplifiers on the serial line.

Setup procedure

1 Click the **Setup** icon under the **Main** menu to open the **Setup** sub-menu.

2 Click **Navigation** to open the **Navigation** dialog.

3 For each tab:

a Select which port to use.

b Click **Setup** for the selected port to define the communication parameters.

c Select which **NMEA Sentence** to use.

If you choose *Auto*, the ES70 will automatically choose among the incoming information according to a predefined priority list.

d If applicable, define the **Talker ID**.

4 Click **OK** to save the current settings and close the dialog.

How to set up the motion sensor interface

The ES70 Fish finding echo sounder can accept inputs from both analogue and digital heave sensors. A sensor with an analogue output is connected directly to the **Auxiliary** connector on the General Purpose Transceiver, while a digital sensor is connected to one of the serial inputs using RS-232.

If more than one transceiver is used by the echo sounder system, the analogue sensor is connected to only one of them.

Supported telegram formats

- *Sounder/TSS1 Motion protocol* on page 201
- *Simrad EM Attitude 1000* on page 196
- *Simrad EM Attitude 3000* on page 197

Wiring procedure

1 Locate a free RS-232 serial port that can be used to connect the sensor.

2 On the ES70 computer, connect the receive signal **Rx** on pin 2, and **ground** on pin 5.

3 On the motion sensor, wire as described in the relevant documentation.

Setup procedure

This procedure explains how the ES70 can be set up to receive motion sensor information on a serial port.

1 Click the **Setup** icon under the **Main** menu to open the **Setup** sub-menu.

2 Click **Installation** to open the **Installation** sub-menu.

On the sub-menu **I/O Setup** to open the **I/O Setup** dialog.

→ *I/O Setup* on page 150

3 In the **I/O Setup** dialog, select which serial line to use to accept motion sensor information.

4 Click on the chosen port to select it, then click the **Input** button to open the **Select Inputs** dialog.

5 In the **Select Inputs** dialog, locate the **AML** on the left side, and click the [>] button to connect it.

This setting allows you to communicate with the motion sensor system.

The following proprietary telegram formats are supported:

- *Sounder/TSS1 Motion protocol* on page 201

- *Simrad EM Attitude 1000* on page 196
- *Simrad EM Attitude 3000* on page 197

6 Click **OK** to save the current settings and close the dialog.

7 In the **I/O Setup** dialog, click on the chosen port to select it, then click the **Setup** button to open the **Serial Setup** dialog.

8 In the **Serial Setup** dialog, enter the relevant parameters to set up the port.

9 Click **OK** to save the current settings and close the dialog.

10 In the **I/O Setup** dialog, click on the chosen port to select it, then click the **Monitor** button to open the **Port Monitor** dialog.

In order to monitor the data flow, the motion sensor system must be active and transmitting information to the ES70.

11 If the data flow is operational, close all dialogs.

How to set up the depth output

The ES70 Fish finding echo sounder will output depth information on several different formats.

Supported telegram formats
- *DBS Depth below surface* on page 190
- *DBT Depth below transducer* on page 190
- *DPT Depth* on page 190
- *Simrad EK500 Depth* on page 195
- *Atlas depth telegram* on page 203
- *PSIMDHB Bottom hardness and biomass* on page 200

Wiring procedure for serial communication
1 Locate which RS-232 port you wish to use.
2 The ES70 Fish finding echo sounder, connect the transmit signal **Tx** on pin 3, and **ground** on pin 5.
3 On the remote system, wire as described in the relevant documentation.
4 Ensure that the length of the cable does not exceed approximately 50 meters. If a longer cable is required, you may need to use buffer amplifiers on the serial line.

Setup procedure
1 Click the **Setup** icon under the **Main** menu to open the **Setup** sub-menu.

2 Click **Depth Output** to open the **Depth Output** dialog.

3   Select which port to use.

4   For the selected port, click **Setup** to define the communication parameters.

5   Select which telegram to send.

6   If applicable, define the Talker ID.

7   Select which transceiver and frequency you wish to export the depth information from.

In most cases, the lowest frequency is used.

8   Click **OK** to save the current settings and close the dialog.

How to set up the annotation interface

The ES70 Fish finding echo sounder can accept annotation (text) input from an external system.

Supported telegram formats

- *Simrad ATS Annotation* on page 202

Wiring procedure for serial communication

Note _____

The ASCII datagram with the external annotation must be connected to the same serial line as the navigation system.

_____

1   Locate a free RS-232 serial port that can be used to connect the external system.

2   On the ES70 computer, connect the receive signal **Rx** on pin 2, and **ground** on pin 5.

3   On the external system, wire as described in the relevant documentation.

4   Ensure that the length of the cable does not exceed approximately 50 meters. If a longer cable is required, you may need to use buffer amplifiers on the serial line.

Setup procedure

1   Click the **Setup** icon under the **Main** menu to open the **Setup** sub-menu.

2   Click **Annotations** to open the **Annotations** dialog.

3   Click **Port** so select communication port.

4   Click **Setup** so define the communication parameters.

5   Click **OK** to save the current settings and close the dialog.

Test and maintenance

These procedures are provided for test and maintenance of the Simrad ES70 Fish finding echo sounder.

Note ───

Neither the computer nor the transceiver(s) contain any user replaceable parts. If you suspect that your system is not working properly, contact your dealer for assistance.

───

Receiver test

The ES70 transceiver provides a built-in test signal. This signal can be used to check that the receiver system is operational.

1   Click the **Display** icon under the **Main** menu to open the **Display** sub-menu.

2   Click **Display Options** to open the **Display Options** dialog.
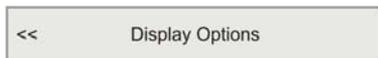
→ *Display Options* on page 130

3   On the **Tooltip** tab, verify that **Scatter Value** is enabled.

4   Click **OK** to save the current settings and close the dialog.

5   Click the **Active** icon under the **Main** menu to open the **Active** sub-menu.

6   Click **Echogram** to open the **Echogram** dialog.

→ *Echogram* on page 158

7   On the **Echogram** tab:

   a   Set **TVG** to *Power (No TVG)*

   b   Set **Echogram Type** to *Surface*

8   Click **OK** to save the current settings and close the dialog.

9   Click the **Operation** icon under the **Main** menu to open the **Operation** sub-menu.

10   Click **Normal Operation** to open the **Normal Operation** dialog.
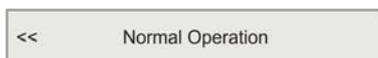
→ *Normal Operation* on page 121

11 In the **Normal Operation** dialog, set **Mode** to *Test*.

12 Click **OK** to save the current settings and close the dialog.

13 On the **Main** menu:

    a Set **Range** to *100 m*

    b Set **Gain** to *130*

14 Move the cursor over the echo in the echogram, and observe the tooltip information.

For operational frequencies <u>below</u> 120 kHz, verify the following results:

- Split-beam GPT with more than 1 kW output: −64 dB ±1 dB

- Single beam GPT with 1 kW output or less: −67 dB ±1 dB

For operational frequencies <u>above</u> 120 kHz, verify the following results:

- Split-beam GPT with more than 1 kW output: −120 dB ±1 dB

- Single beam GPT with 1 kW output or less: −130 dB ±1 dB

15 Reverse this procedure to restore normal operation, or select factory settings in the **User Setting** dialog.

Related topics

- *Display Options* on page 130
- *Echogram* on page 158
- *Normal Operation* on page 121

GPT power recycle

The ES70 computer may be subjected to sudden and unfortunate incidents during operation. Typical incidents include power loss, software crash, or operating system instability. These incidents may cause the communication with the transceiver to malfunction.

1 Click the **Setup** icon under the **Main** menu to open the **Setup** sub-menu.

2 Click **Installation** to open the **Installation** sub-menu.

On the sub-menu, click **Transceiver Installation** to open the **Transceiver Installation** dialog.

→ *Transceiver Installation* on page 153

3 In the **Transceiver Installation** dialog, click **Browse** in an attempt to reconnect to the transceiver.

4 If this attempt is unsuccessful, recycle the power to the transceiver by unplugging the power cord.

5 Click **Browse** one more time, and reconnect as described in the referenced procedure.

→ *How to install a frequency channel* on page 82

Access to log files

Whenever the ES70 issues a message, it is shown in the **Messages** dialog. Simultaneously, the messages are stored in a number of logging files on the hard disk. If you experience abnormal behaviour, and wish to consult your dealer and/or Simrad, these logging files are very useful. The following procedure explains how to access these files.

1 On the **Status Bar**, click the **Screen Captures** tab to open the browser.

2 In the browser, click **Open Image Folder** to open an operating system folder.

By default, the folder name is

```
 c:\documents and settings\All Users\Application
data\Simrad\ES70\Screen Dumps
```

3 In the folder, go one step "back" to:

```
 c:\documents and settings\All Users\Application
data\Simrad\ES70
```

4 Observe that a folder named **Log** is now visible.

5 Open the **Log** folder.

The folder contains all recent log files containing the ES70 messages.

6 Using the functionality provided by the operating system, copy the log files to a USB memory stick.

7 Whenever possible, send the files to your dealer.

Related topics

- *Messages* on page 176

Rules for transducer handling

Note ──────────────────────────────────

Do not *lift the transducer by the cable.*

Do not *expose the transducer to direct sunlight.*

Do not *expose the transducer to excessive heat.*

───

Transport protection

Some transducers are delivered with a cover plate on the face for protection during transport. Let this plate stay on as long as possible, but do not forget to remove it before the vessel goes into the sea.

Painting the transducer face

An anti-fouling paint may be applied to the transducer face. Because some paint types may be aggressive to the polyurethane in the transducer face, please consult Simrad's list of approved paints. See *Approved anti-fouling paints for transducers* on page 101.

Cleaning the transducer face

Whenever opportunity arise, for example when the vessel is dry docked, the transducer face may be cleaned for shells and other marine fouling. Be careful not to make cuts in the transducer face. Use a piece of soft wood or a very fine grade emery paper.

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.

Note _____

Do not use strong solvents.

Do not attempt to scrape of marine growth with sheets of metal, screwdrivers or other metallic tools.

Do not use high pressure water to clean the transducer.

_____

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 Simrad's list of approved paints.

→ *Approved anti-fouling paints for transducers* on page 101

1

Approved anti-fouling paints for transducers

This is Simrad's list of approved antifouling paints on polyurethane transducer housing.

Jotun

Head office address: P.O.Box 2021, N-3248 Sandefjord, Norway

Website: www.jotun.com.

1 Racing

2 Non-stop

3 Safeguard Universal primer (125 micron) with Antifouling SeaQuantum Ultra (125 micron)

4 Antifouling Seaguardian

International Marine Coatings

Address: World-wide offices

Website: www.international-marine.com.

1 Intersleek tie coat + 425 FCS

- BXA386/BXA390/BXA391 Grey

- HKA563/HKA570/HKA571 Yellow

- Mix BXA386, BXA390 and BXA391 first, then apply. When dry, mix HKA563, HKA570 and HKA571, apply.

2 Intersmooth 360 Ecoloflex SPC

3 Micron Extra

Hempel IFA Coatings

Head office address: Hempel A/S, Lundtoftevej 150, Kgs. Lyngby, DK-2800 Copenhagen, Denmark

Website: www.hempel.com.

1 Hempel A/F Classic 76550

Note ───────────────────────────────────

Refer to the manufacturer's documentation and data sheets for a complete procedure.

The menu system

Menu navigation employed by ES70 Fish finding echo sounder system is similar to the other Kongsberg Maritime applications which follow the new user interface standards developed by Kongsberg Maritime. The main menu is by default located at the right side of the screen. By means of dedicated icons at the bottom of the main menu, you can open the relevant sub-menus. Menu choices shown in dark colours are not available for the current operation or operational mode.

 Topics

About menus and buttons

The operational navigation on the ES70 is designed by means of menus and command buttons.

Menu hierarchy

1   The **Main** menu provides the parameters most frequently used during normal operation.

2   The **Operation** menu controls the main operational parameters.

3   The **Display** menu controls the visual aspects of the system, such as parameters related to the display presentation.

4   The **Setup** menu allows you to control the configuration of the signal processing, as well as system installation and maintenance, and the interfaces to peripheral devices.

5   The **Active** menu has its content linked to the current active item (view or object). Use it to access special features available for the selected item.

Figure 13   The sub-menu icons

Sub-menu icons (from left)

- **Operation** menu

- **Display** menu

- **Setup** menu

- **Active** menu

Button types

 Each menu contains several command buttons. Each button shows the function of the button, some of them also displays the current parameter setting. The majority of the buttons in each menu field have these functions:

- You can increase and decrease parameter values by clicking the button.
- You can change parameter values by moving the cursor sideways.
- You can change parameter values by means of the scroll wheel on the mouse or trackball.
- You can enter parameter values from the keyboard (if you have one).
- You can select parameter value from the button's sub-menu.
- You can open a dedicated dialog.

How to select a numerical parameter using the +/- buttons

1   Move the cursor to either side of the button, and observe that the background colour changes.

    a   Click on the <u>left</u> side of the button to decrease the numerical value.

    b   Click on the <u>right</u> side of the button to increase the numerical value.

How to select a numerical parameter by moving the cursor horizontally

1   Place the cursor on the middle of the button.

2   Click and hold the left mouse button depressed.

3   Move the cursor horizontally: left to decrease the parameter value, or right to increase it.

4 Release the mouse button when the requested value is shown.

How to select a numerical parameter by means of the scroll wheel

1 Place the cursor on the middle of the button.

2 Spin the scroll wheel in either direction to increase or decrease the parameter value.

3 Release the scroll wheel when the requested value is shown.

How to select a numerical parameter using the keyboard

1 Click the middle section of the button to open a text field.

2 Enter the numerical value into the text field.

If the numerical value exceeds the permitted range for the parameter, the frame in the text field will be red. You will then not be able to enter the value.

3 Press the **Enter** key.

How to select a parameter using a sub-menu

1 Click the middle section of the button to open a sub-menu, then click the requested parameter value.

The chosen value is applied, and the sub-menu is automatically closed.

2 Whenever applicable, you can also access the sub-menu by clicking the left and right side of the button, but this method will not show you the menu choices.

a Click on the <u>left</u> side of the button to select a lower sub-menu choice.

b Click on the <u>right</u> side of the button to select a higher sub-menu choice.

How to select parameters using a dialog

1 Click anywhere on the button to open a separate dialog.

Main menu

The following functions and parameters are available from the **Main** menu.

The bottom of the **Main** menu holds the icons for the sub-menus. Click on one of these icons to open the requested sub-menu. Note that the menu system may be hidden from view if you click the **Menu** button on the **Task bar**.

- The **User Settings** dialog allows you to save the current user settings (parameter selections), and to retrieve previously saved factory or user settings.

  → *User Settings* on page 111

- The **Range** function allows you to specify the vertical range of the water column covered by the echogram. The range is defined from a selected start range, and down to a value beneath the current bottom depth. The value shown and selected is by default applied only to the currently selected echogram.

  → *Range* on page 113

- **Start Range** allows you to specify the start depth of the echogram, that is from which depth in the water column the presentation shall start. The value shown and selected is applied to the currently selected echogram type.

  → *Start Range* on page 114

- The purpose of the **Gain** function is to adjust the echo level in the echogram presentations.

  → *Gain* on page 115

**Menu button**

Click once on the **Menu** button to hide the menu, and one more time to bring it back again. When the menu is hidden, it will temporarily be shown on the left and right hand side of the display if you move the cursor to that position.

Operation menu

The following functions and parameters are available from the **Operation** menu.

Operation
Normal

How to open the Operation menu

1 Click once on the icon under the **Main** menu to open the **Operation** menu

2 Click one more time on the icon to close the menu.

- The purpose of the **Operation** function is to control the operational mode of the ES70. You can set it to *Normal*, *Replay* or *Inactive*.

  → *Operation* on page 117

- The purpose of the **Ping** function is to enable or disable the ES70 audio transmissions into the water ("pinging").

  → *Ping* on page 118

- The **Ping Mode** function is used to control how often the ES70 shall transmits its energy into the water.

  → *Ping Mode* on page 119

- Use the **Ping Interval** function to choose the time (in milliseconds) between each transmission (ping) when **Ping Mode** is set to *Interval*.

  → *Ping Interval* on page 120

- The purpose of the **Normal Operation** dialog is to provide an overview of the current transceiver parameters, and to provide you with the ability to change them.

  → *Normal Operation* on page 121

- The **Record** function allows you to record the unprocessed transducer signals, and save them on the internal hard disk. The files can later be copied or moved to other recordable media.

  → *Record* on page 123

Display menu

The following functions and parameters are available from the **Display** menu.

<<	Colour Setup
—	Screen Brightness **100** +
<<	Units
—	Transparency **30%** +
—	Language **English** +
<<	Layout
<<	Display Options
<<	About

How to open the Display menu

1 Click once on the icon under the **Main** menu to open the **Display** menu

2 Click one more time on the icon to close the menu.

- The purpose of the **Colour Setup** dialog is to control the presentation colours used by the ES70.

  → *Colour Setup* on page 125

- The purpose of the **Screen Brightness** function is to adjust the intensity of the light given off by the display.

  → *Screen Brightness* on page 127

- The purpose of the **Units** dialog is to control the unit of measurements used by the ES70.

  → *Units* on page 128

- The purpose of the **Transparency** function is to adjust how much you are able to see through the information panes.

  → *Transparency* on page 129

- The purpose of the **Language** function is to select the language to be used on the menus.

  → *Language* on page 129

- The purpose of the **Layout** dialog is to arrange the location of the echograms on the presentation, or to temporarily hide any of them.

  → *Layout* on page 130

- The purpose of the **Display Options** dialog is to control the location of the menu, which information to be provided on the title bar and the taskbar, and which tooltips to display.

  → *Display Options* on page 130

- The purpose of the **About** dialog is show the current software version.

  → *About* on page 133

Setup menu

The following functions and parameters are available from the **Setup** menu.

<<	Synchronization
<<	Annotations
<<	Fish Select
<<	Navigation
<<	Trawl
<<	Ethernet Output
<<	Depth Output
	Installation

How to open the Setup menu

1 Click once on the icon under the **Main** menu to open the **Setup** menu

2 Click one more time on the icon to close the menu.

- The purpose of the **Synchronization** dialog is to set up the ES70 to operate alone, or as a master or slave in a synchronized system. Synchronization is required in order to avoid interference if the ES70 is used simultaneously with other hydroacoustic instruments within the same frequency range.

  → *Synchronization* on page 136

- The purpose of the **Annotation** dialog is to allow you to enter comments and annotations into the echograms.

  → *Annotations* on page 137

- The parameters in the **Fish Select** dialog allows you to modify the fish size distribution manually.

  → *Fish Select* on page 139

- The **Navigation** dialog controls how the ES70 receives information from external sensors.

  → *Navigation* on page 140

- The **Trawl** dialog allows you to enter the main parameters related to the trawl. Trawl information is used for display of upper and lower trawl line in the echogram. All received speed data are stored to file when recording of raw data to file is enabled.

  → *Trawl* on page 145

- The purpose of the **Ethernet Output** dialog is define communication parameters for the EK500 datagram output on the Ethernet port.

  → *Ethernet Output* on page 146

- The **Depth Output** dialog is used to set up the output of depth data from the ES70 to a dedicated communication port on a specified format.

  → *Depth Output* on page 147

- The **Installation** button opens a sub-menu with four choices. You can define environment parameters related to the sea conditions, set up the inputs and outputs from an to peripheral devices, set up the transceiver, and administrate the software licenses.

  → *Installation* on page 149

Active menu

The following functions and parameters are available from the **Active** menu.

<<	Echogram	
—	TVG **User**	+
—	Ping-Ping Filter **Off**	+
—	Bottom Gain **5**	+
<<	Size Distribution	
<<	Bottom Detector	

How to open the Active menu

1 Click once on the icon under the **Main** menu to open the **Active** menu

2 Click one more time on the icon to close the menu.

- The **Echogram** dialog allows you to set up the parameters controlling the echogram presentation. The three tabs control the horizontal lines, the echogram type with applied TVG, and how fast the echogram moves across the display.

 → *Echogram* on page 158

- The purpose of the **TVG** button is to allow you to change the TVG curve for the received echoes.

 → *TVG* on page 164

- The **Ping-Ping Filter** reduces unwanted noise and echoes from the echogram presentation.

 → *Ping-Ping Filter* on page 165

- The **Bottom Gain** setting controls the gain <u>below</u> the detected bottom depth.

 → *Bottom Gain* on page 165

- The **Size Distribution** dialog allows you to set up the parameters for the histogram presented in the **Size Distribution** information pane.

 → *Size Distribution* on page 166

- The purpose of the **Bottom Detector** dialog is used to define the upper and lower depth limits most likely to be used during the ES70 operation.

 → *Bottom Detector* on page 167

Functions and dialogs

This chapter provides reference information about the functions, dialogs and parameters used to set up and control the ES70 Fish finding echo sounder.

 Topics

- *Main menu; functions and dialogs* on page 111
- *Operation menu; functions and dialogs* on page 117
- *Display menu; functions and dialogs* on page 125
- *Setup menu; functions and dialogs* on page 135
- *Active menu; functions and dialogs* on page 158
- *Other dialogs and functions* on page 169

Main menu; functions and dialogs

The following functions and parameters are available from the **Main** menu.

The bottom of the **Main** menu holds the icons for the sub-menus. Click on one of these icons to open the requested sub-menu. Note that the menu system may be hidden from view if you click the **Menu** button on the **Task bar**.

• The **User Settings** dialog allows you to save the current user settings (parameter selections), and to retrieve previously saved factory or user settings.

→ *User Settings* on page 111

• The **Range** function allows you to specify the vertical range of the water column covered by the echogram. The range is defined from a selected start range, and down to a value beneath the current bottom depth. The value shown and selected is by default applied only to the currently selected echogram.

→ *Range* on page 113

• **Start Range** allows you to specify the start depth of the echogram, that is from which depth in the water column the presentation shall start. The value shown and selected is applied to the currently selected echogram type.

→ *Start Range* on page 114

• The purpose of the **Gain** function is to adjust the echo level in the echogram presentations.

→ *Gain* on page 115

User Settings

The **User Settings** dialog is available by clicking the **User Settings** button on the **Main** menu.

Purpose

The **User Settings** dialog allows you to save the current user settings (parameter selections), and to retrieve previously saved factory or user settings.
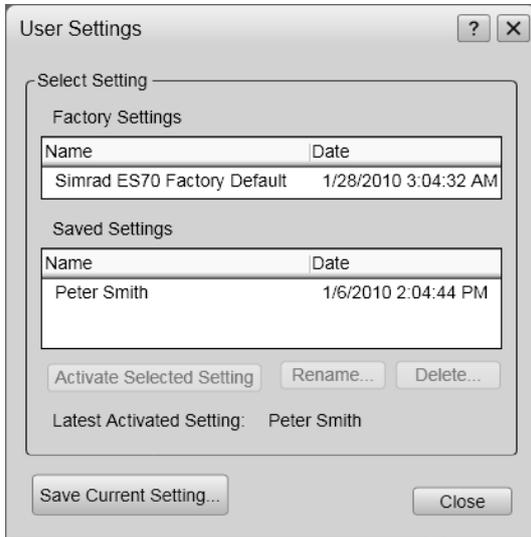
Description

This dialog is used to store the ES70 settings for different type of fisheries, or individual user related settings. You can create as many user profiles as you like, and you can give them any type of name.

Parameters

- **Factory Settings**: These settings are those provided by the manufacturer. These settings may be put to use if you are uncertain of which parameters to use, as they offer "best practice" for typical use. The factory settings can not be altered.

- **Saved Settings**: These settings are those created and saved by the various ES70 users. Each setting is identified by a name, and the time and date it was created. These settings may be deleted or renamed.

- **Activate Selected Setting**: This button is used to activate the setting you wish to use.

  To activate either a factory or a saved setting, click the setting name in one of the lists, then click this button.

- **Rename**: This button is used to rename one of the saved settings.

  To rename a setting, click the setting name, and then this button. A dedicated dialog opens to accept the new name.

  If you do have a keyboard connected to your ES70 system, click the **Keyboard** button at the bottom of the dialog to open an on-screen keyboard.

  The factory setting(s) can not be renamed.

- **Delete**: This button is used to delete one of the saved settings.

  To delete a setting, click the setting name, and then this button. A dedicated dialog opens to verify your choice.

  The factory setting(s) can not be deleted.

- **Save Current Setting**: This button is used to save the currently applied ES70 settings.

  To save the settings, click this button. A dedicated dialog opens to record the name of the new settings.

  If you do have a keyboard connected to your ES70 system, click the **Keyboard** button at the bottom of the dialog to open an on-screen keyboard.

  You can only add settings to the **Saved Settings** list.

Range

The **Range** function is available by clicking the **Range** button on the **Main** menu.

Purpose

The **Range** function allows you to specify the vertical range of the water column covered by the echogram. The range is defined from a selected start range, and down to a value beneath the current bottom depth. The value shown and selected is by default applied only to the currently selected echogram.
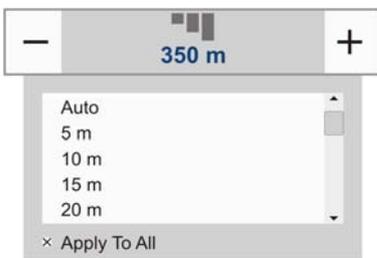
Description

This setting applies to the currently selected echogram (identified with a thick border). Several echogram types are available, these are selected in the **Echogram** dialog.

Parameters

- **Auto**: This selection allows the ES70 to automatically adjust the range according to the detect depth.

- **Range**: This parameter controls the displayed depth range in the echogram view.

  The start depth for the vertical range shown on the display will always be the value defined by the **Start Range** depth parameter. The echogram type is selected in the **Echogram** dialog. For more information, see *Start Range* on page 114 and *Echogram* on page 158.

  Example: In a surface echogram, set the **Start Range** value to 0 meters. 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 meters. The echogram will now show the area from the sea surface and down to 20 meters "below" the bottom. The bottom contour is easily detected when the depth changes.

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

- **Apply to all**: Check this box to apply the new range setting to all current echograms of the same type.

  Example: If you have selected a bottom echogram when you changed the range setting, the setting will also be applied to all the other bottom echograms. A similar functionality applies to the other echogram types.

Related topics

- *How to choose the vertical range* on page 75
- *Start Range* on page 114
- *Echogram* on page 158

Start Range

The **Start Range** function is available by clicking the **Start Range** button on the **Main** menu.

Purpose

Start Range allows you to specify the start depth of the echogram, that is from which depth in the water column the presentation shall start. The value shown and selected is applied to the currently selected echogram type.

Description

If you open this menu button, you will only be able to enter a value if a keyboard is connected to your ES70. Note however, that you can click the button, and while holding the mouse button depressed, and moving the mouse sideways, you can change the start range value. You can also adjust the gain setting by clicking and holding either the [+] or [-] buttons. The setting applies to the currently selected echogram (identified with a thick border). Several echogram types are available, these are selected in the **Echogram** dialog.

Parameters

- **Start Range**: This parameter controls the start depth of your echogram.

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

  Example: 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.

Example: In a pelagic echogram, set the **Start Range** value to 20 meters. This will make the echogram start from 20 meters below the sea surface (provided that the transducer offset has been defined). Set **Range** to 40 meters. The echogram will now show the area from 20 meters below the sea surface, and down to 60 meters below the transducer. Provided that the depth is larger than 60 meters, the bottom contour is not shown.

- **Apply to all**: Check this box to apply the new start range setting to all current echograms of the same type.

  If you have selected a surface echogram when you changed the start range setting, the setting will automatically be applied to all the other surface echograms too. Similar functionality applies to the other echogram types.

Related topics

Gain

The **Gain** function is available by clicking the **Gain** button on the **Main** menu.

Purpose

The purpose of the **Gain** function is to adjust the echo level in the echogram presentations.
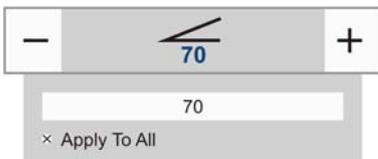
Description

If you open this menu button, you will only be able to enter a value if a keyboard is connected to your ES70. Note however, that you can click the button, and while holding the mouse button depressed, and moving the mouse sideways, you can change the gain value. You can also adjust the gain setting by clicking and holding either the [+] or [-] buttons. The gain setting applies to the currently selected echogram (identified with a thick border). Several echogram types are available, these are selected in the **Echogram** dialog.

Parameters

- **Gain**: The scale allows you to change the gain from 20 to 120.

- **Apply to all**: Check this box to apply the new gain setting to all current echograms of the same type.

  If you have selected a surface echogram when you changed the gain, the setting will automatically be applied to all the other surface echograms too. A similar functionality applies to the other echogram types.

Related topics

- *How to adjust the signal gain* on page 79
- *Echogram* on page 158

Operation menu; functions and dialogs

The following functions and parameters are available from the **Operation** menu.

Operation
Normal

| ■ | Ping **On** | ·)) |

| Ping Mode **Maximum** |

| — | Ping Interval **1270 ms** | + |

| << | Normal Operation |

| ■ | Record **Off** | ● |

How to open the Operation menu

1 Click once on the icon under the **Main** menu to open the **Operation** menu

2 Click one more time on the icon to close the menu.

- The purpose of the **Operation** function is to control the operational mode of the ES70. You can set it to *Normal*, *Replay* or *Inactive*.

  → *Operation* on page 117

- The purpose of the **Ping** function is to enable or disable the ES70 audio transmissions into the water ("pinging").

  → *Ping* on page 118

- The **Ping Mode** function is used to control how often the ES70 shall transmits its energy into the water.

  → *Ping Mode* on page 119

- Use the **Ping Interval** function to choose the time (in milliseconds) between each transmission (ping) when **Ping Mode** is set to *Interval*.

  → *Ping Interval* on page 120

- The purpose of the **Normal Operation** dialog is to provide an overview of the current transceiver parameters, and to provide you with the ability to change them.

  → *Normal Operation* on page 121

- The **Record** function allows you to record the unprocessed transducer signals, and save them on the internal hard disk. The files can later be copied or moved to other recordable media.

  → *Record* on page 123

Operation

The **Operation** function is available by clicking the **Operation** button on the **Operation** menu.

Operation
Normal

Purpose

The purpose of the **Operation** function is to control the operational mode of the ES70. You can set it to *Normal*, *Replay* or *Inactive*.

Description

The ES70 will during normal operation display the echo signal received at the transducer. Using this **Operation** function, it may also be set up to play back a previously recorded echo signal. If you do not wish to use the echo sounder for a short period, you can set the ES70 to inactive. Click the middle of the button to open the sub-menu.

Parameters

*   **Inactive**: Click to this option disable the ES70 operation. Neither transmission nor reception will take place.

    When the ES70 has been disabled using this function, it will stop. The current echogram is removed from the screen.

*   **Normal**: Click this option to enter normal operational mode.

    If you wish to establish a passive system (transmission switched off, but normal reception), click the **Normal Operation** button, and select *Passive* mode in the dialog.

    → *Normal Operation* on page 121.

*   **Replay**: Click to this option to choose playback mode.

    In order to select which recording to play back, click **Replay File** to open the **Replay File** dialog. See *Replay File* on page 177 for further information.

Related topics

*   *How to play back echogram sequences* on page 67
*   *Normal Operation* on page 121
*   *Replay File* on page 177

Ping

The **Ping** function is available by clicking the **Ping** button on the **Operation** menu.

Purpose

The purpose of the **Ping** function is to enable or disable the ES70 audio transmissions into the water ("pinging").

Description

The audio transmission ("pinging") from the ES70 can be switched off or on. Click the middle of the button to open the sub-menu, 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. See *Ping Mode* on page 119 more information.

Parameters

- **On**: The ES70 "pings" (transmits audio energy into the water).

  The ping mode if controlled by the **Ping Mode** and **Ping Interval** parameters.

  → *Ping Mode* on page 119

  → *Ping Interval* on page 120

- **Off**: The ES70 does not "ping".

  When the audio transmission has been disabled using this function, the ES70 will stop with the current echogram shown on the screen.

Related topics

- *How to change the ping rate* on page 63
- *Ping Mode* on page 119.
- *Ping Interval* on page 120.

Ping Mode

The **Ping Mode** function is available by clicking the **Ping Mode** button on the **Operation** menu.

Purpose

The **Ping Mode** function is used to control how often the ES70 shall transmits its energy into the water.
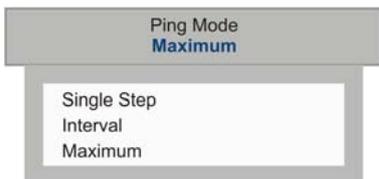
Description

This function allows you to control the behaviour of the transmission ("pinging"). If you choose *Single Step*, you can transmit single pings by clicking the ping symbol on the **Ping** button. If you choose *Interval*, you must define the interval using the **Ping Interval** function. See *Ping* on page 118 and *Ping Interval* on page 120 for details.

Parameters

- **Single step**: This option allows the ES70 to transmit single pings.

    To transmit a single ping, click the ping symbol on the right side of the **Ping** button. See *Ping* on page 118 for more information.

- **Interval**: This option allows the ES70 to transmit once every chosen time interval.

    The time interval (in milliseconds) is chosen with the **Ping Interval** function. For more information, see *Ping Interval* on page 120.

- **Maximum**: This option allows the ES70 to transmit at maximum speed.

    The ping interval is basically only limited by the maximum depth range. However, it will also be dependant on hardware issues. This may be, for example, how fast your computer can handle the information from each ping.

Related topics

- *How to change the ping rate* on page 63
- *Ping* on page 118
- *Ping Interval* on page 120

Ping Interval

The **Ping Interval** function is available by clicking the **Ping Interval** button on the **Operation** menu. The button is only available when **Ping Mode** is set to *Interval*.

Purpose

Use the **Ping Interval** function to choose the time (in milliseconds) between each transmission (ping) when **Ping Mode** is set to *Interval*.

Description

When **Ping Mode** is set to *Interval*, the ES70 will transmit once every few seconds. The time between each ping is controlled using this function. You can choose any value from 10 ms and upwards.

Parameters

- **Interval time**: Time (in milliseconds) between each transmission (ping).

Related topics

- *How to change the ping rate* on page 63
- *Ping* on page 118.
- *Ping Mode* on page 119.

Normal Operation

The **Normal Operation** dialog is opened from the **Normal Operation** button on the **Operation** menu.
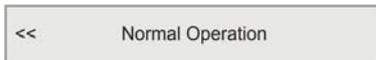
<<	Normal Operation

Purpose

The purpose of the **Normal Operation** dialog is to provide an overview of the current transceiver parameters, and to provide you with the ability to change them.

Description

The **Normal Operation** dialog lists all the main parameters for the transceiver. The dialog provides one row (line) for each transceiver in use. You are permitted to change the parameters.
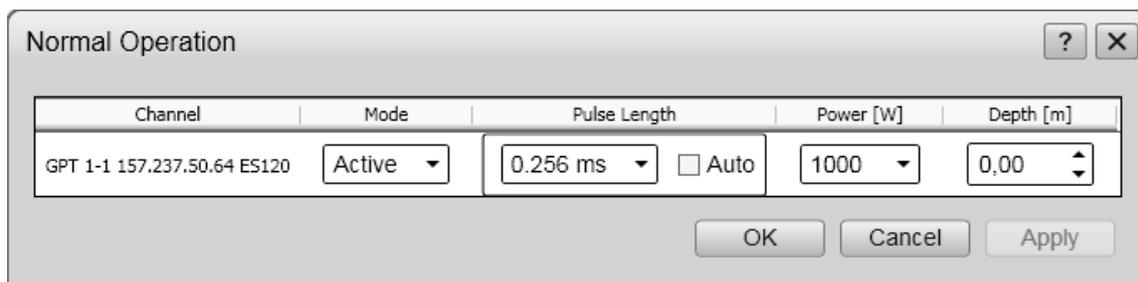
Parameters

- **Channel**: This column specifies which transceiver you are using. The text string provides the following information:
    - Transceiver ID
    - Transceiver's IP address
    - Transducer name
- **Mode**: This column specifies the current operational mode. You can manually select a different mode. The following modes are available:
    - **Active**: The transmitter and receiver are both active (normal operation).

      This will make the ES70 operate as specified by the **Operation** function. See *Operation* on page 117 for a list of operational modes.
    - **Passive**: The transmitter is passive while the receiver is active.

      The ES70 will receive and compute the echoes detected by the transducer. This mode is thus useful for test purposes, and when you wish to measure the ambient background noise in the sea.
    - **Test**: The transmitter is passive while the receiver is active.

      Each General Purpose Transceiver (GPT) board includes a signal generator injecting a weak test signal (-70.0 dBW) into the receiver's input circuitry. The nominal power reading at the display is -70.0 dBW for channels using one

transceiver board (1 kW single beam) and -64.0 dBW for channels using four boards (4 kW single beam, 4 kW split beam).

This mode is not designed for operational use of the ES70.

- **Pulse Length**: This column specifies the current duration of the transmitted pulse. You can manually select a different duration.

  If you click **Auto**, the ES70 will automatically select the best pulse duration for the current operational mode, depth and bottom conditions.

  The length of your transmitted pulse is very important to how you can detect fish. A short pulse duration gives you a very fine vertical resolution. This allows you to detect scattered fish, and you can find those that move near the bottom. A long pulse duration throws a lot more energy into the water, and the digital filters used by the receiver are narrower. These filters will reduce the ES70's sensitivity for noise, but the length of the transmitted pulse will give you stronger echoes. With the filters, a longer pulse duration will provide longer range, but reduced vertical resolution.

Table 3   Available pulse durations for given frequencies

	64	128	256	512	1024	2048	4096	8192	16384
12 kHz					x	x	x	x	x
18 kHz				x	x	x	x	x	
27 kHz				x	x	x	x	x	
38 kHz			x	x	x	x	x		
50 kHz		x	x	x	x	x			
70 kHz		x	x	x	x	x			
120 kHz	x	x	x	x	x				
333 kHz	x	x	x	x	x				
710 kHz	x	x	x	x	x				
The X-axis shows pulse durations in μS while the Y-axis shows frequency in kHz. "x" means that the pulse duration is available for the given frequency.									

- **Power**: This parameter displays and controls the transmitter's output power. Output power is limited either to the maximum rating of the transducer, or the maximum rating of the transmitter, whichever is the smallest.

- **Depth**: This is the depth of the transducer face relative to the water surface.

  In order to measure correct water depth, the ES70 needs to know the vertical distance between the vessel's water line and the transducer face. Enter this depth as a positive number. For example, if the distance from the water line and down to the transducer face is 3,5 meters, enter +3,5 m.

Passive mode

If you wish to investigate the ambient noise, choose *Passive* mode in the **Normal Operation** dialog. 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 hydrographic systems on your own vessel, or on other vessels in the vicinity.

Related topics

- *How to choose passive mode* on page 81
- *How to change the output power* on page 81
- *How to adjust the pulse duration* on page 82
- *Receiver test* on page 97
- *Operation* on page 117.
- *About output power* on page 207
- *About pulse duration* on page 207

Record

The **Record** function is opened from the **Record** button on the **Operation** menu.

Purpose

The **Record** function allows you to record the unprocessed transducer signals, and save them on the internal hard disk. The files can later be copied or moved to other recordable media.
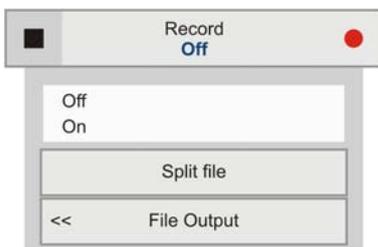
Description

You can set up the ES70 to record the unprocessed transducer signals on the internal hard disk, or other recordable media. This recorded signal may later be injected into the ES70's processing software as if it arrived directly from the transceiver. These replay files may be kept for future references, or you can use them to experiment with ES70 settings to gain more experience. The **Record** sub-menu 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, and stop it by clicking the left rectangle.

Note ——————————————————————————————————————

Raw data files are very large. If you wish to record large amounts of echogram raw data, make sure that you have enough space on you hard disk.

Parameters

- **On/Off**: You can use these options on the sub-menu to start and stop recording.

  For faster control of the recording, you can also click the red circle on the right side of the **Record** button to start recording. To stop recording, click the left rectangle.

- **Split File**: During recording, you can click this command at regular intervals. Every time you do, the current recording file will be terminated, and a new file will be started. In this way you can manually control the size of the recorded file.

- **File Output**: This command opens the **File Output** dialog. The parameters provided by this dialog allows you to control the data recording.

  For more information, see *File Output* on page 178.

Related topics

- *How to save raw echogram data* on page 66
- *File Output* on page 178.

Display menu; functions and dialogs

The following functions and parameters are available from the **Display** menu.

<<	Colour Setup
−	Screen Brightness **100** +
<<	Units
−	Transparency **30%** +
−	Language **English** +
<<	Layout
<<	Display Options
<<	About

How to open the Display menu

1   Click once on the icon under the **Main** menu to open the **Display** menu

2   Click one more time on the icon to close the menu.

- The purpose of the **Colour Setup** dialog is to control the presentation colours used by the ES70.

  → *Colour Setup* on page 125

- The purpose of the **Screen Brightness** function is to adjust the intensity of the light given off by the display.

  → *Screen Brightness* on page 127

- The purpose of the **Units** dialog is to control the unit of measurements used by the ES70.

  → *Units* on page 128

- The purpose of the **Transparency** function is to adjust how much you are able to see through the information panes.

  → *Transparency* on page 129

- The purpose of the **Language** function is to select the language to be used on the menus.

  → *Language* on page 129

- The purpose of the **Layout** dialog is to arrange the location of the echograms on the presentation, or to temporarily hide any of them.

  → *Layout* on page 130

- The purpose of the **Display Options** dialog is to control the location of the menu, which information to be provided on the title bar and the taskbar, and which tooltips to display.

  → *Display Options* on page 130

- The purpose of the **About** dialog is show the current software version.

  → *About* on page 133

Colour Setup

The **Colour Setup** dialog is opened from the **Colour Setup** button on the **Display** menu.

<<	Colour Setup

Purpose

The purpose of the **Colour Setup** dialog is to control the presentation colours used by the ES70.
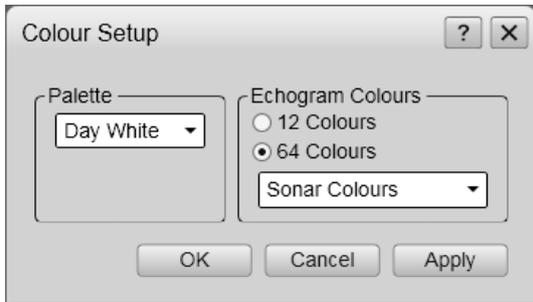
Description

The **Colour Setup** dialog provides two fields. The **Palette** field is used to select the overall colour theme used by the ES70 presentation. The **Echogram Colours** field allows you to choose how many colours to use, and which colour scale. The resulting colours can bee seen in the **Colour Scale** information pane. See *Colour Scale information pane* on page 53 for more information.

Figure 14   Colour scales using 12 and 64 colours

12 colours

64 colours, Echosounder

64 colours, Sonar

64 colours, Greyscale

64 colours, BI500 colours
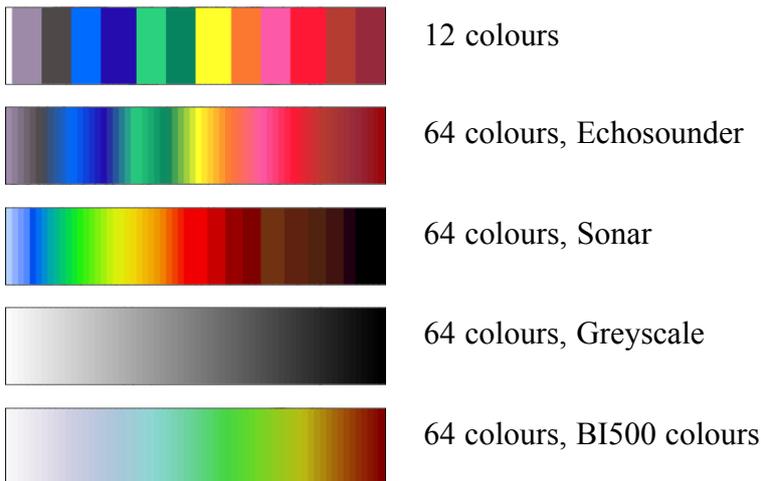
Parameters

- **Palette**: This function provides you with options for the colour scheme used on the display. Select the background colour and brightness to suit the ambient light conditions and your preferences.

  The options are:
  - Day Black
  - Bright Day
  - Day Blue
  - Day White
  - Dusk
  - Night
  - Night Unfiltered

- **Echogram Colours**:

    - **No of colours**: Set the number of colours to use in the display presentations, 12 or 64.

    - **Colour scale**: Select the desired colour scale to be used on the ES70 presentations. Note that all colour scales require that the number of colours is set to 64.

      The options are:

      * Sonar Colours

      * Echosounder Colours

      * Grayscale

      * BI500 Colours

      The *Echosounder Colours* are based on the standard 12–colour scale, but additional colours have been added between these to make smoother colour transitions.

Related topics

- *Colour Scale information pane* on page 53

- *How to change the colour scale and presentation palette* on page 69

Screen Brightness

The **Screen Brightness** function is available by clicking the **Screen Brightness** button on the **Display** menu.

Purpose

The purpose of the **Screen Brightness** function is to adjust the intensity of the light given off by the display.

Description

When the bridge is dark, the light emitted by the ES70 display can affect your night vision. In order to compensate for this, you can reduce the intensity. The **Screen Brightness** allows you to reduce the this brightness, and hence make the display darker.

Parameters

- **Brightness**: The intensity of light emitted by the display can be reduced from 100% to 0% in steps of 10.

Related topics

- *Colour Setup* on page 125.

Units

The **Units** dialog is opened from the **Units** button on the **Display** menu.
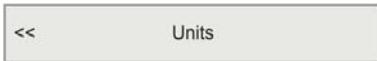
<<	Units

Purpose

The purpose of the **Units** dialog is to control the unit of measurements used by the ES70.
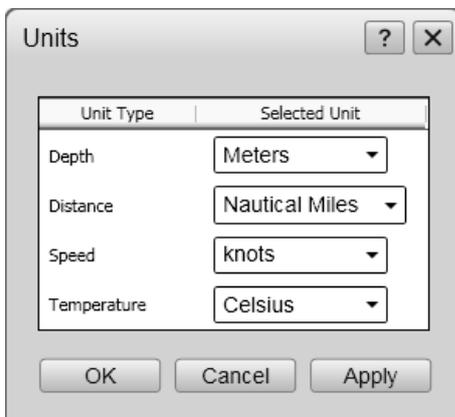
Description

Use this dialog to set up the units you wish to work with. Normally, you will only need to define these once to suit your requirements.

Parameters

- **Depth**: Choose the unit of measurement for depth. The options are:
  - Meters
  - Fathoms
  - Feet
  - Passi Braccio
- **Distance**: Choose the unit of measurement for distance. The options are:
  - Nautical Miles
  - Meters
  - Kilometers
- **Speed**: Choose the unit of measurement for speed. The options are:
  - m/s
  - knots
  - km/h
- **Temperature**: Choose the unit of measurement for temperature. The options are:
  - Celcius
  - Fahrenheit

Transparency

The **Transparency** function is available by clicking the **Transparency** button on the **Display** menu.

Purpose

The purpose of the **Transparency** function is to adjust how much you are able to see through the information panes.

Description

The information panes provided by the ES70 can be placed anywhere on top of the echogram. 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%.

Parameters

• **Transparency**: The amount of transparency in steps from 0 to 90%.

Related topics

• *Information panes* on page 50

Language

The **Language** function is available by clicking the **Language** button on the **Display** menu.

Purpose

The purpose of the **Language** function is to select the language to be used on the menus.

Description

The menu buttons on the ES70 can be provided in several different languages. Use this function to select the language you wish to use. Note that the on-line help may not be available for the language you choose.

Parameters

• **Language**: The chosen language will be used on menus and dialogs, but not necessarily on the on-line help.

Layout

The **Layout** function is available by clicking the **Layout** button on the **Display** menu.
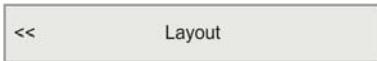
Purpose

The purpose of the **Layout** dialog is to arrange the location of the echograms on the presentation, or to temporarily hide any of them.
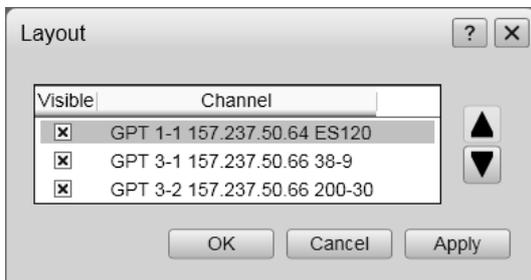
Description

When two or more echograms are shown, you can use the **Layout** function to decide in which order – from top to bottom or left to right – you wish to see the echogram channels. You can also hide an echogram from view. Remember that you can also hide or show echogram channels by clicking the tabs on the **Taskbar** at the bottom of the display. See *Taskbar* on page 58.

Parameters

- **Visible**: This box is used to hide or show an echogram channel.

  Echogram channels can also be hidden using the tabs on the **Taskbar** at the bottom of the display. See *Taskbar* on page 58.

- **Channel**: Each line represent an echogram channel; one frequency.

  Each channel is identified with its transceiver type and identity, the transceiver's IP address, and the transducer type

  To change the order when two or more frequency channels are shown, click the channel, and then click one of the two arrow buttons on the right side.

Related topics

- *How to select presentation layout* on page 69
- *Taskbar* on page 58

Display Options

The **Display Options** dialog is opened from the **Display Options** button on the **Display** menu.
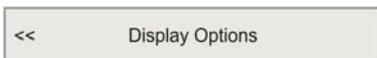
Purpose

The purpose of the **Display Options** dialog is to control the location of the menu, which information to be provided on the title bar and the taskbar, and which tooltips to display.

Description

The **Display Options** dialog provides two tabs.

- **General**: This tab is used to control the menu parameters, and the information provided on the title bar and taskbar.

- **Tooltip**: This tab lists all the available tooltips, and allows you to disable or enable each of them.

Display Options; General tab

This dialog page controls menu parameters, title bar information, and the time display on the taskbar.
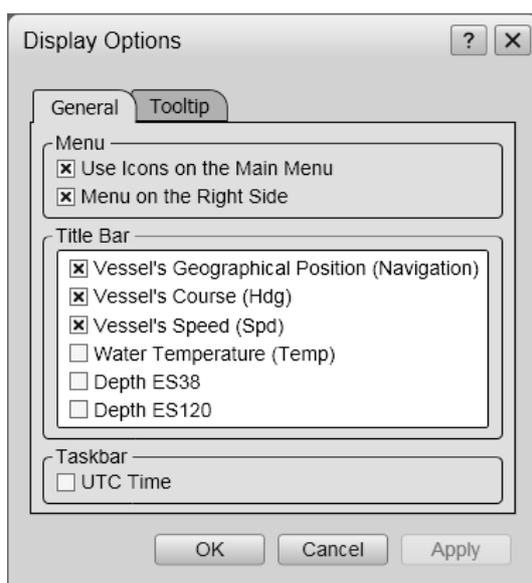
Parameters

- **Use Icons on the Main Menu**: This options allows you to choose between text and icons on the **Main** menu buttons.

- **Menu on the Right Side**: Click this option to place the menu on the right hand side of the display presentation.

- **Title Bar**:

  – **Vessel's Geographical Position**: Click this option to display the current geographical position on the **Title Bar**. The information must be provided by a navigation system connected to the ES70.

Note

*The navigational information provided on the ES70 **Title Bar** must not be used for vessel navigation!*

- **Vessel's Course**: Click this option to display the vessel's current course on the **Title Bar**. The information must be provided by a course gyro or a navigation system connected to the ES70.

Hdg
278.0°

- **Vessel's Speed**: Click this option to display the vessel's current speed on the **Title Bar**. The information must be provided by a speed log or a navigation system connected to the ES70.

Spd
7.4 kts

- **Water Temperature**: Click this option to display the current water temperature on the **Title Bar**. The information must be provided by an external sensor connected to the ES70.

Temp
10.0 °C

Note ─────────────────────────────

Presently, the ES70 does not support this functionality.

───────────────────────────────────

- **Depth**: Click this option to display the current depth measured by the active transducers connected to the ES70.

Depth 120 kHz
79.3 m

• **UTC Time**: Click this option to see UTC time.[8] time at the bottom right corner of the display presentation.

---

8. Coordinated Universal Time (UTC) is a time standard based on International Atomic Time (TAI) with leap seconds added at irregular intervals to compensate for the Earth's slowing rotation. Leap seconds are used to allow UTC to closely track UT1, which is mean solar time at the Royal Observatory, Greenwich. The difference between UTC and UT1 is not allowed to exceed 0.9 seconds, so if high precision is not required the general term Universal Time (UT) may be used. In casual use, Greenwich Mean Time (GMT) can be considered equivalent to UTC or UT1 when fractions of a second are not important. (*http://en.wikipedia.org/wiki/UTC 16 Oct 2009*)

Display Options; Tooltip tab
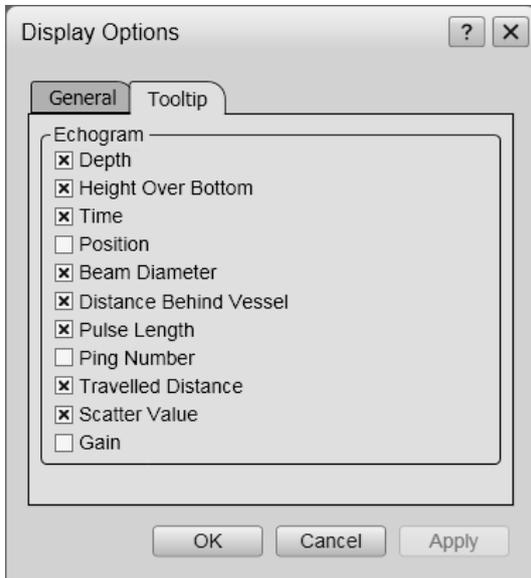
Parameters

- **Tooltips**: These tooltips are shown on the echogram, and they follow the cursor location as a small rectangle with information. Each tooltip represent a specific piece of information, and they are listed separately. Click each box to activate or deactivate the tooltip information.

About

The **About** dialog is opened from the **About** button on the **Display** menu.

Purpose

The purpose of the **About** dialog is show the current software version.
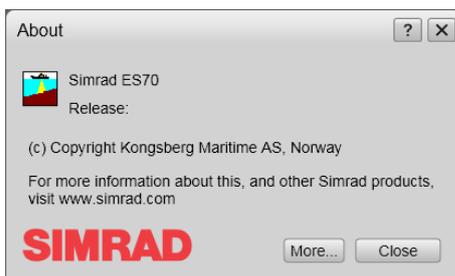
Description

Every ES70 software release is identified with a unique version and date. This information is provided by the **About** dialog. The dialog also provides access to a separate list of all the ES70 software modules and their versions. This information is not intended for operational use.

Parameters

- **Software version**: This is the current software version of the ES70 running on your computer.

- **Release**: This is the date the software version was released.

- **More**: This option opens a dedicated dialog to investigate the software versions of the various modules used by the ES70 application. The information is only provided for maintenance and software debugging purposes.

Related topics

- *How to install and upgrade the software* on page 85

Setup menu; functions and dialogs

The following functions and parameters are available from the **Setup** menu.

<<	Synchronization
<<	Annotations
<<	Fish Select
<<	Navigation
<<	Trawl
<<	Ethernet Output
<<	Depth Output
	Installation

How to open the Setup menu

1 Click once on the icon under the **Main** menu to open the **Setup** menu

2 Click one more time on the icon to close the menu.

- The purpose of the **Synchronization** dialog is to set up the ES70 to operate alone, or as a master or slave in a synchronized system. Synchronization is required in order to avoid interference if the ES70 is used simultaneously with other hydroacoustic instruments within the same frequency range.

  → *Synchronization* on page 136

- The purpose of the **Annotation** dialog is to allow you to enter comments and annotations into the echograms.

  → *Annotations* on page 137

- The parameters in the **Fish Select** dialog allows you to modify the fish size distribution manually.

  → *Fish Select* on page 139

- The **Navigation** dialog controls how the ES70 receives information from external sensors.

  → *Navigation* on page 140

- The **Trawl** dialog allows you to enter the main parameters related to the trawl. Trawl information is used for display of upper and lower trawl line in the echogram. All received speed data are stored to file when recording of raw data to file is enabled.

  → *Trawl* on page 145

- The purpose of the **Ethernet Output** dialog is define communication parameters for the EK500 datagram output on the Ethernet port.

  → *Ethernet Output* on page 146

- The **Depth Output** dialog is used to set up the output of depth data from the ES70 to a dedicated communication port on a specified format.

  → *Depth Output* on page 147

- The **Installation** button opens a sub-menu with four choices. You can define environment parameters related to the sea conditions, set up the inputs and outputs from an to peripheral devices, set up the transceiver, and administrate the software licenses.

  → *Installation* on page 149

Synchronization

The **Synchronization** dialog is opened from the **Synchronization** button on the **Setup** menu.
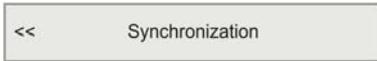
```
<<          Synchronization
```

Purpose

The purpose of the **Synchronization** dialog is to set up the ES70 to operate alone, or as a master or slave in a synchronized system. Synchronization is required in order to avoid interference if the ES70 is used simultaneously with other hydroacoustic instruments within the same frequency range.
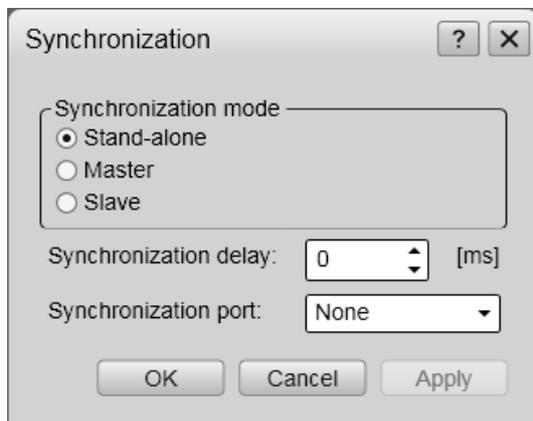
Description

Whenever more than one hydroacoustic system is installed on a vessel, interference may occur. To avoid this, the systems may either be connected to a common synchronization system, or one of the acoustic systems may be defined as a "master", and control the transmission on the other system(s). The ES70 includes interface for remote transmit synchronisation. It can be set up to operate in either *Master* or *Slave* mode in relation to an external synchronization or hydroacoustic systems

Parameters

- **Synchronization mode**: Three different synchronization modes are available.

  Note _____

  Simultaneous transmission of more than one system can only take place if the systems operate with different frequencies!
  _____

  – *Stand-alone* mode is used if the ES70 is working by itself, and no synchronization is required. This is the default setting. The system will operate using its internal ping interval parameters, independent on signals arriving on the synchronization port.

  – *Master* mode is used if the ES70 shall act as a master in a synchronized system. The peripheral hydroacoustic system will then only be permitted to transmit when enabled by the ES70. The system will run using its internal ping interval parameters, and transmit external trigger signals to the peripheral system(s) on the synchronization port.

  – *Slave* mode is used if the ES70 shall transmit only when permitted by the peripheral system. The system will wait for an external trigger on the synchronization port, before each ping.

- **Synchronization delay**: This delay parameter is used differently depending on the chosen mode.

  – *Stand-alone*: Not used.

  – *Slave*: The system will wait for the delay time after the external trigger signal has arrived before transmitting the ping. (Post-trigger)

  – *Master*: The system will wait for the delay time after the external trigger signal has been sent to the slaves before transmitting the ping. (Pre-trigger)

  Note that this delay will only work when the synchronization is set up using a serial port.

- **Synchronization port**: This is the interface port currently used to transmit or receive synchronization signals.

  You can select one of the following ports:

  – None

  – Serial Port 1

  – GPT Auxiliary Port

Annotations

The **Annotation** dialog is opened from the **Annotation** button on the **Setup** menu.

<<	Annotations

Purpose

The purpose of the **Annotation** dialog is to allow you to enter comments and annotations into the echograms.
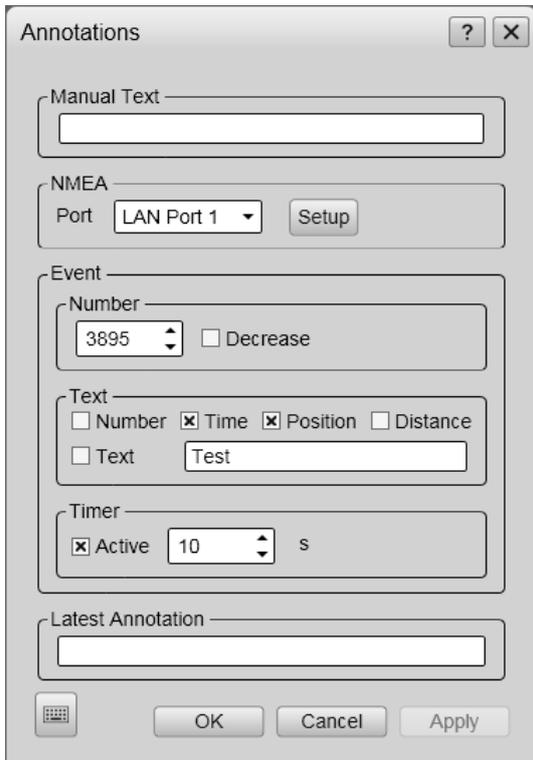
Description

Several different annotation types may be added to the echogram. The annotations defined are stored with the raw data as annotation datagrams. They are displayed on the echogram if this feature is enabled in the **Echogram** dialog. Annotations can only be added during normal operation. See *Echogram* on page 158 for more information.

Parameters

- **Manual Text**: Enter a free text string. The text is written to the echogram once you click **Ok** or **Apply** at the bottom of the dialog.

  If you do have a keyboard connected to your ES70 system, click the **Keyboard** button at the bottom of the dialog to open an on-screen keyboard.

- **NMEA**: This function enables NMEA Annotation datagrams to be imported on the chosen port.

  In the **Port** box, select interface port for the datagrams. Note that this selection must match the actual wiring made during the system installation.

  Click **Setup** to set up the communication parameters for the chosen port. Depending on the port you have chosen, the **LAN Port Setup** or **Serial Port Setup** dialog will open.

  For information on port setup, see *LAN Port Setup* on page 169 and *Serial Port Setup* on page 170.

- **Event**: This function initiates annotations whenever an event occur. Events may be triggered by external devices, set by a timer, or initiated by clicking the Event icon on the toolbar.
  - **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 this feature 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 have a keyboard connected to your ES70 system, click the **Keyboard** button at the bottom of the dialog to open an on-screen keyboard.
  - **Timer**: Set a time period for automatic generation of events.

  Triggering from external devices are made using pins 10 and 19 on the **Auxiliary** connector on the General Purpose Transceiver (GPT). Refer to the *ES70 Installation Manual*.
- **Latest Annotation**: This text box automatically displays the latest annotation text entered.

Related topics

- *LAN Port Setup* on page 169
- *Serial Port Setup* on page 170

Fish Select

The **Fish Select** dialog is opened from the **Fish Select** button on the **Setup** menu.

Purpose

The parameters in the **Fish Select** dialog allows you to modify the fish size distribution manually.

Description

If the information in the **Size Distribution** information pane appears to be inaccurate, or the information does not correspond with the actual catch, the values can be modified. Select the fish type you are catching or looking for, then adjust the size. For more information about the biomass presentation, see .

Parameters

- **[Species]**: Select the species you wish to modify, click the ruler, and drag it sideways to increase or decrease the fish size.

Related topics

- *Biomass information pane* on page 51
- *How to monitor the fish size distribution* on page 77

Navigation

The **Navigation** dialog is opened from the **Navigationt** button on the **Setup** menu.

Purpose

The **Navigation** dialog controls how the ES70 receives information from external sensors.

Description

Several external sensors may be connected to the ES70 to provide information of the vessel's speed. position, heading and sailed distance. The ES70 must be set up to receive this information. The interface ports must be defined, and the format of the information must be selected. The **Navigation** dialog provides several tabs to set up these parameters.

- **Position**: Set up interface port and parameters for input from positioning system (typically a GPS system).
- **Speed**: Set up interface port and parameters for input from speed log.
- **Distance**: Set up interface port and parameters for input from distance log.
- **Heading**: Set up interface port and parameters for input from a heading sensor, for example a gyro compass.

Related topics

- *LAN Port Setup* on page 169
- *Serial Port Setup* on page 170
- *About the NMEA telegram format* on page 189
- *Telegram formats* on page 188

Navigation; Position tab
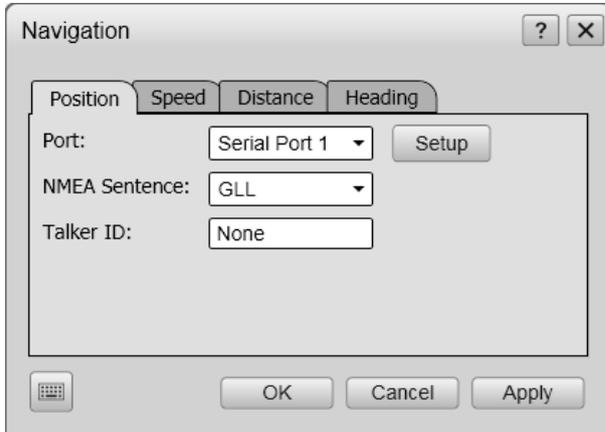
Parameters

- **Port**: Select which serial or Ethernet port to use for this communication.

- **Setup**: Once you have selected a serial or Ethernet communication port, click this button to set up the applicable port parameters. The relevant port setup dialog opens.

  → *Serial Port Setup* on page 170

  → *LAN Port Setup* on page 169

- **NMEA Sentence**: Select which NMEA sentence to be used for the communication.

  – **Auto**: The ES70 will read all relevant telegrams. If the specified information is provided to the system on more than one telegram format, a built-in priority list will be used.

  – **GLL**: This telegram is used to transfer latitude and longitude of vessel position, time of position fix and status from a global positioning system (GPS).

    → *GLL Geographical position latitude/longitude* on page 191

  – **GGA**: This telegram contains time, position and fix related data from a global positioning system (GPS).

    → *GGA Global positioning system fix data* on page 191

  – **RMC**: This telegram contains time, date, position, course and speed data provided by a global navigation satellite system (GNSS) receiver.

    → *RMC Recommended minimum specific GNSS data* on page 193

- **Talker ID**: If you wish to specify a dedicated **Talker ID** on the telegram format, it can be entered here.

  The **Talker ID** is the first two characters in the NMEA sentence. Select *None* to accept all talker identifiers.

  Note that you need to a keyboard to enter the **Talker ID**. If you do have one, click the **Keyboard** button at the bottom of the dialog to open an on-screen keyboard.

  → *About the NMEA telegram format* on page 189

  → *Telegram formats* on page 188.

Navigation; Speed tab

Parameters

- **Port**: Select which serial or Ethernet port to use for this communication.

- **Setup**: Once you have selected a serial or Ethernet communication port, click this button to set up the applicable port parameters. The relevant port setup dialog opens.

  → *Serial Port Setup* on page 170

  → *LAN Port Setup* on page 169

- **NMEA Sentence**: Select which NMEA sentence to be used for the communication.

  - **Auto**: The ES70 will read all relevant telegrams. If the specified information is provided to the system on more than one telegram format, a built-in priority list will be used.

  - **VHW**: This telegram contains the compass heading to which the vessel points and the speed of the vessel relative to the water.

    → *VHW Water speed and heading* on page 194

  - **VTG**: This telegram contains the actual course and speed relative to the ground.

    → *VTG Course over ground & ground speed* on page 194

  - **RMC**: This telegram contains time, date, position, course and speed data provided by a global navigation satellite system (GNSS) receiver.

    → *RMC Recommended minimum specific GNSS data* on page 193

  - **Talker ID**: If you wish to specify a dedicated **Talker ID** on the telegram format, it can be entered here.

    The **Talker ID** is the first two characters in the NMEA sentence. Select *None* to accept all talker identifiers.

    Note that you need to a keyboard to enter the **Talker ID**. If you do have one, click the **Keyboard** button at the bottom of the dialog to open an on-screen keyboard.

    → *About the NMEA telegram format* on page 189

    → *Telegram formats* on page 188.

- **Manual speed**: If you do not have input from a speed sensor, or if you wish to enter the vessel's speed manually, you can click this box. When it is enabled, you can enter the speed manually using the spin box.

Navigation; Distance tab

Parameters

- **Port**: Select which serial or Ethernet port to use for this communication.

- **Setup**: Once you have selected a serial or Ethernet communication port, click this button to set up the applicable port parameters. The relevant port setup dialog opens.

  → *Serial Port Setup* on page 170

  → *LAN Port Setup* on page 169

- **Source**: Select the source for the distance information.

  – **None**: No distance information is accepted.

  – **Calculated from Speed**: The distance information is calculated using the speed information received by the echo sounder. If will always start with the previously calculated distance. If you need to reset this to zero (or any other value), use the **Distance** parameter.

  – **Sensor Input**: The distance information is received using appropriate datagram(s) from an external source.

  – **Pulse each 0,1 nmi**: The distance information is received using contact pulses connected to a serial port, or to the transceiver. The pulse rate is fixed to one pulse for every 0,1 nautical mile.

- **NMEA Sentence**: Select which NMEA sentence to be used for the communication.

  – **VLW**: This telegram contains the distance travelled relative to the water and over the ground.

    → *VLW Dual ground/water distance* on page 194

- **Talker ID**: If you wish to specify a dedicated **Talker ID** on the telegram format, it can be entered here.

  The **Talker ID** is the first two characters in the NMEA sentence. Select *None* to accept all talker identifiers.

  Note that you need to a keyboard to enter the **Talker ID**. If you do have one, click the **Keyboard** button at the bottom of the dialog to open an on-screen keyboard.

  → *About the NMEA telegram format* on page 189

  → *Telegram formats* on page 188.

- **Distance**: The current vessel distance can be set manually using the spin box.

  This parameter is not available if **Source** is set to *Sensor Input*.

Navigation; Heading tab
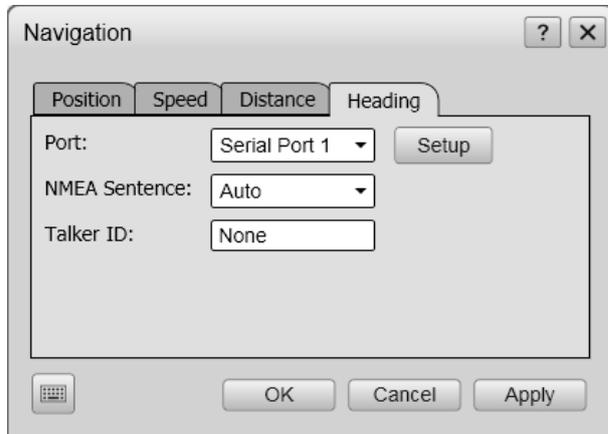
Parameters

- **Port**: Select which serial or Ethernet port to use for this communication.

- **Setup**: Once you have selected a serial or Ethernet communication port, click this button to set up the applicable port parameters. The relevant port setup dialog opens.

  → *Serial Port Setup* on page 170

  → *LAN Port Setup* on page 169

- **NMEA Sentence**: Select which NMEA standard to be used for the communication.

  – **Auto**: The ES70 will read all relevant telegrams. If the specified information is provided to the system on more than one telegram format, a built-in priority list will be used.

  – **HDT**: This telegram is used to transfer heading information from a gyro.

    → *HDT Heading, true* on page 193

  – **HDM**: This telegram contains vessel heading in degrees magnetic.

    → *HDM Heading, magnetic* on page 192

  – **HDG**: This telegram contains the heading from a magnetic sensor, which if corrected for deviation will produce magnetic heading, which if offset by variation will provide true heading.

    → *HDG Heading, deviation and variation* on page 192

  – **VHW**: This telegram contains the compass heading to which the vessel points and the speed of the vessel relative to the water.

    → *VHW Water speed and heading* on page 194

- **Talker ID**: If you wish to specify a dedicated **Talker ID** on the telegram format, it can be entered here.

  The **Talker ID** is the first two characters in the NMEA sentence. Select *None* to accept all talker identifiers.

  Note that you need to a keyboard to enter the **Talker ID**. If you do have one, click the **Keyboard** button at the bottom of the dialog to open an on-screen keyboard.

  → *About the NMEA telegram format* on page 189

  → *Telegram formats* on page 188.

Trawl

The **Trawl** dialog is opened from the **Trawl** button on the **Setup** menu.

<<	Trawl

Purpose

The **Trawl** dialog allows you to enter the main parameters related to the trawl. Trawl information is used for display of upper and lower trawl line in the echogram. All received speed data are stored to file when recording of raw data to file is enabled.
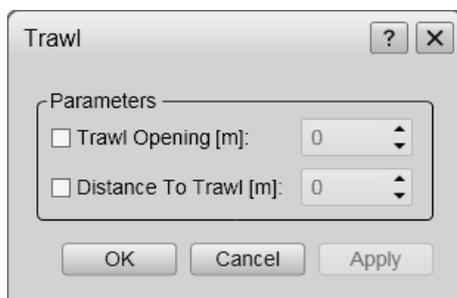
Description

A Simrad ITI (Integrated Trawl Instrumentation) system can be connected to the ES70. Communication with the ITI system is based on NMEA telegrams, and all necessary parameters are automatically defined. If another trawl or catch monitoring system is used, and this system does not provide the trawl opening and/or trawl distance automatically, the values must be entered manually.

To set up the interface parameters between the trawl or catch monitoring system and the ES70, use the **Port Management** dialog. For more information, see *I/O Setup* on page 150.

Note _____

*You may wish to include trawl lines in the echograms. If the distance from the vessel to the trawl is either manually set different from 0 (zero) in the **Trawl** dialog, or the trawl datagram contains a distance different from 0, you will need to enable the distance counter on the Distance tab in the **Navigation** dialog. See Navigation; Distance tab on page 143.*

Parameters

- **Trawl Opening**: A fixed headrope-to-footrope distance can be manually entered. This is used for sensor systems not measuring the trawl opening, or when the measured headrope-to-footrope distance is unreliable.

- **Distance To Trawl**: A fixed distance between the vessel and the trawl opening can be manually entered. For highest accuracy, set the distance between the echo sounder transducer's physical location and the trawl.

  In order to enter this distance, the Distance counter on the **Distance** tab in the **Navigation** dialog must be enabled.

  → *Navigation; Distance tab* on page 143

Related topics

- *I/O Setup* on page 150
- *Navigation; Distance tab* on page 143

Ethernet Output

The **Ethernet Output** dialog is opened from the **Ethernet Output** button on the **Setup** menu.

<<	Ethernet Output

Purpose

The purpose of the **Ethernet Output** dialog is define communication parameters for the EK500 datagram output on the Ethernet port.
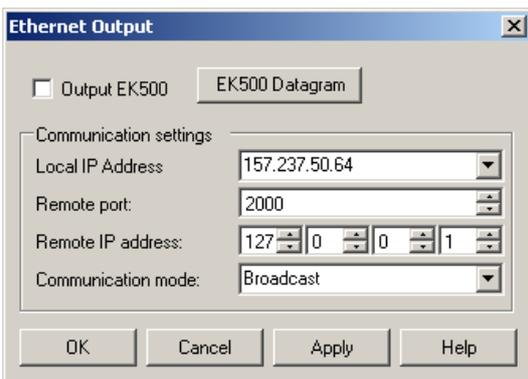
Description

To support programs which use data from the Simrad EK500 echo sounder, the ES70 can output a subset of the EK500 defined datagrams. This dialog allows you to enable or disable the EK500 datagram output to the Ethernet port. This output port is not managed by the **I/O Setup** dialog, but handled separately from this dialog.

Tip _____

If you wish to send data to the **Olex** system, use **Remote port** = *2020*. Verify the communication parameters in the documentation provided with the **Olex** system.

Parameters

- **Output EK500**: Click this box to enable or disable the EK500 datagram output.

  Note _____

  In order to disable EK500 datagram output, you must also open the EK500 Datagram dialog and clear all data format check boxes.

  → *EK500 Datagram* on page 181

- **EK500 Datagram**: Click the button to open the **EK500 Datagram** dialog. In this dialog, you can set up the individual datagrams to be exported.

  → *EK500 Datagram* on page 181

- **Local IP Address**: This is the Internet Protocol (IP) address of the local Ethernet interface board. In most cases, each Ethernet board has a unique IP address, even when an interface board supports multiple sockets. If you have more than one interface board, you are provided with a list of the available addresses.

- **Remote port**: Specify local network port. The ES70 uses this network port to <u>transmit</u> information. The application on the remote computer will "listen" to this port number.

- **Remote IP Address**: Select the Internet Protocol (IP) address for the remote computer. If the data communication is set up to receive data only, this parameter is not required. If you wish to set up an output for broadcast, define IP address `255.255.255.255`. This is the default setting.

  If you set the **Communication Mode** to *Point-to-Point*, you need to enter the remote IP address manually.

- **Communication mode**: Choose *Broadcast* or *Point-to-Point*.

Related topics

- *EK500 Datagram* on page 181
- *I/O Setup* on page 150

Depth Output

The **Annotation** dialog is opened from the **Annotation** button on the **Setup** menu.

<<	Depth Output

Purpose

The **Depth Output** dialog is used to set up the output of depth data from the ES70 to a dedicated communication port on a specified format.
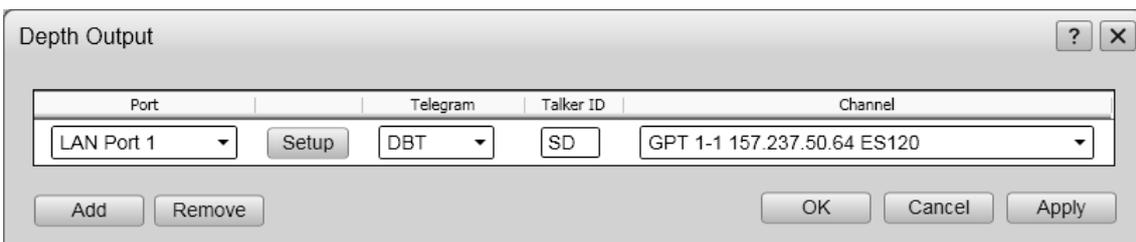
Description

The ES70 will output the current depth on several NMEA datagram formats. This dialog allows you to define which port (serial or Ethernet) to use for such output, and which format to use.

Parameters

- **Port**: Select which serial or Ethernet port to use for this communication.

- **Setup**: Once you have selected a serial or Ethernet communication port, click this button to set up the applicable port parameters. The relevant port setup dialog opens.

  → *Serial Port Setup* on page 170

  → *LAN Port Setup* on page 169

- **Telegram**: Select which NMEA telegram to be used for the depth output information.

  – **None**: The ES70 will not export any depth telegrams.

  – **DBS**: This telegram contains the actual depth below the surface.

    → *DBS Depth below surface* on page 190

  – **DBT**: This telegram contains the actual depth below the transducer face.

    → *DBT Depth below transducer* on page 190

  – **DPT**: This telegram contains the actual depth.

    → *DPT Depth* on page 190

  – **Simrad**: This proprietary Simrad telegram contains the current depth from three channels.

    → *Simrad EK500 Depth* on page 195

  – **Atlas**: This proprietary Atlas telegram contains the current depth from two channels.

    → *Atlas depth telegram* on page 203.

  – **PSIMDHB**: This proprietary telegram contains biomass and bottom hardness.

    → *PSIMDHB Bottom hardness and biomass* on page 200

- **Talker ID**: If you wish to specify a dedicated **Talker ID** on the telegram format, it can be entered here.

  The **Talker ID** is the first two characters in the NMEA sentence.

  → *Telegram formats* on page 188

  → *About the NMEA telegram format* on page 189

- **Channel**: This column specifies which transceiver you are using as source for the depth information. The text string provides the following information:

  – Transceiver ID

  – Transceiver's IP address

  – Transducer name

- **Add**: Click this button to add a new serial or Ethernet port for depth data export.

- **Remove**: Click this button to remove the currently selected serial or Ethernet depth output port.

Related topics

- *LAN Port Setup* on page 169
- *Serial Port Setup* on page 170
- *Telegram formats* on page 188
- *About the NMEA telegram format* on page 189

Installation

The **Installation** menu is opened from the **Installation** button on the **Setup** menu.

Installation

The **Installation** menu provides the following options:

<< Environment

<< I/O Setup

<< Transceiver Installation

<< Software License

- The purpose of the **Environment** dialog is to adjust the parameters related to salinity and sound speed.

  → *Environment* on page 149

- The **I/O Setup** dialog allows you to control the properties of each of the available communication channels on the ES70 computer.

  → *I/O Setup* on page 150

- The purpose of the **Transceiver Installation** dialog is to set up the necessary parameters to connect the ES70 computer to the transceiver(s) and the transducer(s).

  → *Transceiver Installation* on page 153

- The purpose of the **Software License** dialog is to allow you to enter license codes (text strings) to unlock ES70 functionality. In order to obtain the license codes required, contact your dealer.

  → *Software License* on page 156

Environment

The **Environment** dialog is opened from the **Environment** button on the **Installation** sub-menu. The **Installation** sub-menu is in turn found on the **Setup** menu.

<< Environment

Purpose

The purpose of the **Environment** dialog is to adjust the parameters related to salinity and sound speed.
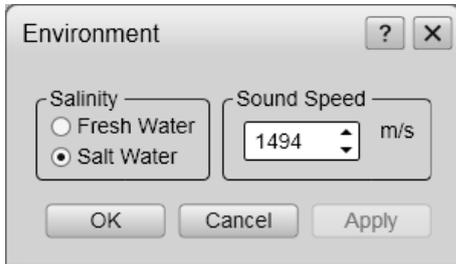
Description

In order to obtain accurate depth readings and fish echoes, it is very important that the sound's speed through the water is set correctly. In the **Environment** dialog, you must define if you work in salt or fresh water. If the sound speed is unknown, use the default setting 1494 m/s, as this is a typical mean value.

Parameters

- **Salinity**: Click to select fresh or salt water.
- **Sound Speed**: Set the current sound speed.

I/O Setup

The **I/O Setup** dialog is opened from the **I/O Setup** button on the **Installation** sub-menu. The **Installation** sub-menu is in turn found on the **Setup** menu.

Purpose

The **I/O Setup** dialog allows you to control the properties of each of the available communication channels on the ES70 computer.
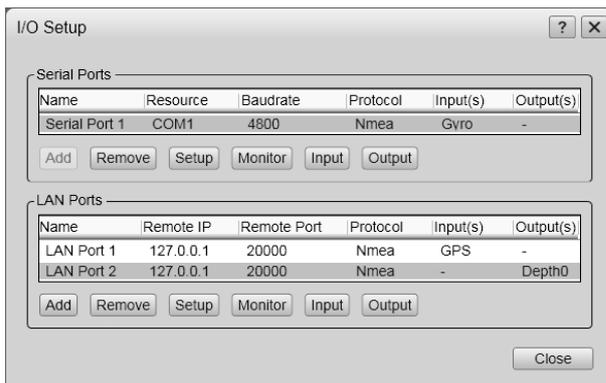
Description

The ES70 software automatically scans the computer to locate and identify Ethernet (LAN) and serial line interfaces. Once the software has established a list of valid interfaces, you can set up and control the parameters. The **I/O Setup** dialog provides two lists, one for serial ports and one for Ethernet (LAN) ports.

Related topics

- *Add Serial Port* on page 171
- *Serial Port Setup* on page 170
- *LAN Port Setup* on page 169
- *Port Monitor* on page 171
- *Select Inputs* on page 172

• *Select Outputs* on page 175

I/O Setup; Serial ports

Parameters

• **Serial Ports**: This list displays the available serial ports on the computer. The list is automatically populated the first time the **Port Management** dialog is opened after a ES70 software installation, and will then reflect the initial number of serial ports available on the computer. If you later add interface hardware to your computer, you must click the **Add** button to add the new ports to the list.

• **Name**: This is the given identity of the serial port. By default, the serial ports are numbered.

• **Resource**: This is the communication port on the ES70 computer.

• **Baudrate**: This shows the current baudrate specified for the serial line. Standard baudrate defined for NMEA communication is 4800 baud.

• **Protocol**: This is the current protocol specified for the serial line. Each serial line can receive multiple telegrams simultaneously, provided that the telegrams all use the same protocol. However, only one peripheral device may be physically connected to the port. If you wish to connect several peripheral devices to a single serial port, you must route these through a "mixer". This can be a hardware unit or computer collecting and streaming the telegrams.

• **Input(s)**: This column is used to identify the external sensor (measuring device) currently connected to the port.

  To choose what type of external sensor to import data from, click the **Input** button.

• **Outputs(s)**: This column is used to identify the data that are exported on the port.

  To choose which data to export, click the **Output** button.

• **Add**: Click this button to add a new serial port. This is required if you have added new hardware to the computer, for example by installing an extra interface circuit board. If you have previously released an unused serial port, but wish to bring it back to ES70 use, you must also click this button. The button is disabled if the computer has no more serial communication ports to offer. If ports are available, a dialog is opened to choose port.

  → *Add Serial Port* on page 171

• **Remove**: Once the ES70 has identified and listed all the available serial lines on the computer, these can not be used by any other software applications on the same computer. However, if the ES70 does not need a specific serial line, it can be released for other use. Click on the applicable port to select it, then click the **Remove** button to delete the port from the list. Note that no acknowledgement is required, the port is removed instantly.

• **Setup**: In order to use a serial line to receive or transmit information, its communication parameters must be set up to match the peripheral device. Click one of the listed ports to select it, then click the **Setup** button to set up the port parameters. A dedicated dialog is provided.

  → *Serial Port Setup* on page 170

- **Monitor**: If you suspect that the communication on the port is ineffective, faulty or missing, you can monitor the flow of telegrams. Click one of the listed ports to select it, then click the **Monitor** button to observe the data communication on the selected port. A dedicated dialog is provided.

  → *Port Monitor* on page 171

- **Inputs**: When you add a new port, you must define the source of the input data. Click the port to select it, then click the **Inputs** button to define which external sensor (measuring device) you wish to import data from. A dedicated dialog is provided.

  → *Select Inputs* on page 172

- **Output**: When you set up a port to export data, you must define the type of data to be sent out. Click the port to select it, then click the **Output** button to define what kind of data you wish to export. A dedicated dialog is provided.

  → *Select Outputs* on page 175

I/O Setup; LAN (Ethernet) ports

Parameters

- **LAN Ports**: This list displays the available Ethernet LAN (Local Area Network) ports on the computer. Each Ethernet interface board on the computer supports any number of network ports. To add a new port, you must click the **Add** button to add the new ports to the list.

- **Name**: This is the given identity of the LAN port. By default, the LAN ports are numbered.

- **Remote IP**: This is the Internet Protocol (IP) address of a remote computer. If you wish to export information to another computer, you must either define this IP address, or enter IP broadcast address `255.255.255.255`. The broadcast address will allow all computers connected to the network to receive the information. If only you wish to receive information on the LAN port, you do not need to define this address.

- **Remote port**: If you wish 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 the remote computer. To find this port number, consult the documentation for software utility to be used on the remote computer.

- **Protocol**: This is the current protocol specified for the LAN port. Each LAN port can receive multiple telegrams simultaneously, provided that the telegrams all use the same protocol.

- **Input(s)**: This column is used to identify the external sensor (measuring device) currently connected to the port.

  To choose what type of external sensor to import data from, click the **Input** button.

- **Outputs(s)**: This column is used to identify the data that are exported on the port.

  To choose which data to export, click the **Output** button.

- **Add**: Click this button to add a new LAN port. This is required if you have added new hardware to the computer, for example by installing an extra Ethernet interface board. If you have previously released an unused LAN port, but wish to bring it back to ES70 use, you must also click this button.

- **Remove**: Once the ES70 has identified and listed all the available LAN ports on the computer, these can not be used by any other software applications on the same computer. However, if the ES70 does not need a specific LAN port, it can be released for other use. Click on the applicable port to select it, then click the **Remove** button to delete the port from the list. Note that no acknowledgement is required, the port is removed instantly.

- **Setup**: In order to use a LAN port to receive or transmit information, its communication parameters must be set up to match the peripheral device. Click one of the listed ports to select it, then click the **Setup** button to set up the port parameters. A dedicated dialog is provided.

- **Monitor**: If you suspect that the communication on the port is ineffective, faulty or missing, you can monitor the flow of telegrams. Click one of the listed ports to select it, then click the **Monitor** button to observe the data communication on the selected port. A dedicated dialog is provided.

- **Inputs**: When you add a new port, you must define the source of the input data. Click the port to select it, then click the **Inputs** button to define which external sensor (measuring device) you wish to import data from. A dedicated dialog is provided.

- **Output**: When you set up a port to export data, you must define the type of data to be sent out. Click the port to select it, then click the **Output** button to define what kind of data you wish to export. A dedicated dialog is provided.

Transceiver Installation

The **Transceiver Installation** dialog is opened from the **Transceiver Installation** button on the **Installation** sub-menu. The **Installation** sub-menu is in turn found on the **Setup** menu.

Purpose

The purpose of the **Transceiver Installation** dialog is to set up the necessary parameters to connect the ES70 computer to the transceiver(s) and the transducer(s).

Tip _____

On the ES70, the parameters related to transmission and transducer depth are controlled in the **Normal Operation** dialog.
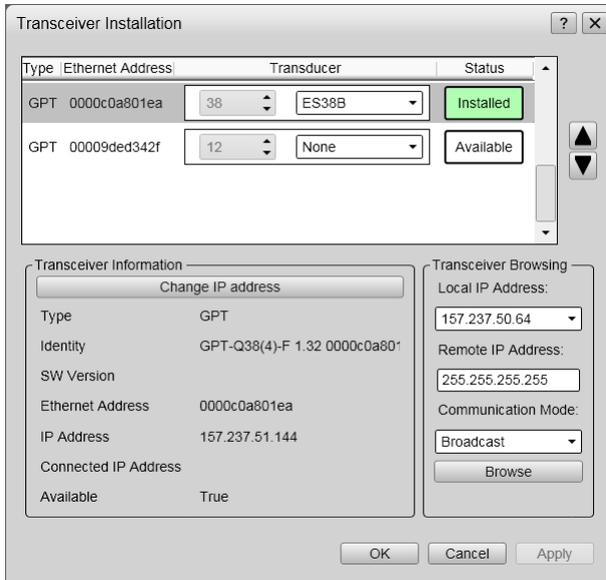
Description

This dialog controls installation and disconnection of transceivers. Every time this dialog is opened, the ES70 software automatically performs a search on the Ethernet network for transceivers. You can also initiate a search by clicking the **Browse** button. To connect to an available frequency channel, select the correct transducer on an available channel.

Note

It is very important that you set up the ES70 to operate with the correct transducer(s).

Related topics
- *How to install a frequency channel* on page 82
- *How to modify an IP address* on page 84

Frequency channels

Each transceiver contains one or more <u>frequency channels</u>. The phrase is used to identify the combination of a transceiver, transducers and the frequencies offered. Split beam transceivers contain only one channel each. The upper part of the **Transceiver Installation** dialog displays a list of frequency channels which either are, or have been, installed on the ES70. For each channel, a status label is provided.

- **Busy**: The frequency channel is already in use, probably by another echo sounder on the same network. You can not connect to this channel.

- **Installed**: This frequency channel is connected to you ES70 system.

- **Lost**: This frequency channel can not be used.

Transceiver Installation; Channel list

- **Type**: This is the type of transceiver currently available on the network.

  GPT means General Purpose Transceiver.

  If you click on a frequency channel to select it, additional information about the channel and the transceiver is provided in the **Transceiver Information** field below the channel list.

- **Ethernet Address**: This is the Ethernet address of the transceiver.

  This address is fixed, and it can not be changed.

- **Transducer**: This column holds the frequency and the transducer type connected.

  The left spin box is not used on the GPT transceivers.

  The right spin-box is used to select transducer. The transducer must be registered in the ES70 software to appear on this list. If you can not find your transducer on the list, contact you dealer to upgrade the relevant software component on the ES70.

- **Status**: This is the current status of the frequency channel.

  - **Busy**: The frequency channel is already in use, probably by another echo sounder on the same network. You can not connect to this channel.

  - **Installed**: This frequency channel is connected to you ES70 system.

  - **Lost**: This frequency channel can not be used.

Transceiver Installation; Browsing

The **Browser** parameters are used when you wish to start an automatic search for transceivers on the network. The communication is made between your computer (identified with its **Local IP Address**) and one or more transceivers. If you only have one transceiver, you may use *Point-to-Point* communication mode, and enter the transceiver's **Remote IP Address** manually before you click **Browse**. If you wish to search the network for all available transceivers, choose *Broadcast* mode, and use the default **Remote IP Address**.

- **Local IP Address**: This is the Internet Protocol (IP) address of the local Ethernet interface board. In most cases, each Ethernet board has a unique IP address, even when an interface board supports multiple sockets. If you have more than one interface board, you are provided with a list of the available addresses.

- **Remote IP Address**: Select the Internet Protocol (IP) address for the remote computer. If the data communication is set up to receive data only, this parameter is not required. If you wish to set up an output for broadcast, define IP address 255.255.255.255. This is the default setting.

  If you set the **Communication Mode** to *Point-to-Point*, you need to enter the remote IP address manually.

- **Communication mode**: Choose *Broadcast* or *Point-to-Point*.

- **Browse**: This button initiates a search on the network for available transceivers.

Transceiver Installation; Information

If you click one of the frequency channels in the channel list, additional information about the relevant transceiver is provided. This information is not required for operational use.

- **Change IP Address**: Use this feature to change the IP address on the transceiver.

  The transceivers are provided by Simrad readily set up with a fixed Ethernet address and an IP address. If your ES70 uses two transceivers with identical frequencies, these will by default have different Ethernet addresses, but identical IP addresses. In order for your system to work, all transceivers must have unique IP addresses.

  The button opens the **IP Address** dialog to accept the new address.

  → *How to modify an IP address* on page 84

- **Type**: This is the type of transceiver currently selected on the channel list.

  GPT means General Purpose Transceiver.

- **Version**: This is the identification of the transceiver currently selected on the channel list.

- **SW Version**: This is the software version running on the transceiver currently selected on the channel list.

- **Ethernet Address**: This is the Ethernet address of the transceiver.

  This address is fixed, and it can not be changed.

- **IP Address**: This is the IP address of the transceiver currently selected on the channel list.

  If you use more than one transceiver with the same frequency, you must set up these transceivers to provide different IP addresses.

- **Connected IP Address**: This is the IP address of the computer currently connected to the transceiver.

  Normally, this is the IP address of your computer.

- **Available**: This parameter identifies if the selected frequency channel is currently available for use with the ES70. If it is available, the status is identified as *True*.

Software License

The **Software License** dialog is opened from the **Software License** button on the **Installation** sub-menu. The **Installation** sub-menu is in turn found on the **Setup** menu.

<<	Software License

Purpose

The purpose of the **Software License** dialog is to allow you to enter license codes (text strings) to unlock ES70 functionality. In order to obtain the license codes required, contact your dealer.
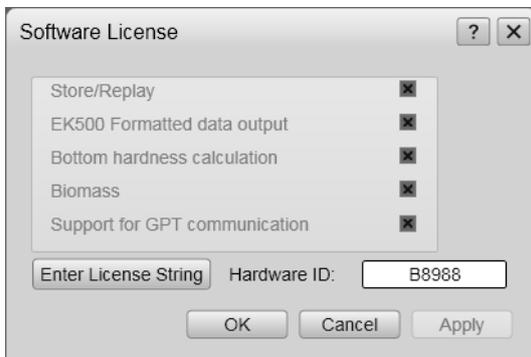
Description

The ES70 provides several advanced functions. Some of these require a separate license key to be activated. To order an optional function, contact your dealer, and provide him with the hardware identification provided by the **Software License** dialog. When the license key is returned, open the dialog one more time. Click the **Enter License String** button, and type the text string into the dialog that appears. The licence key will automatically unlock the requested functionality.

Parameters

- **List of optional functions**: This list presents the optional functionality that you can obtain for you ES70 system. Functions already available are identified with a dark cross in the right column.

- **Hardware ID**: This field presents a unique identification of the computer.

  Note that the license key(s) obtained are connected to this hardware identification. If the ES70 software is moved to another computer, this second will have a different hardware identification, and any optional functions will not be operational.

- **Enter License String**: Click this button to enter a license string.

  A dedicated dialog opens to accept the license string.

  If you do have a keyboard connected to your ES70 system, click the **Keyboard** button at the bottom of the dialog to open an on-screen keyboard.

Active menu; functions and dialogs

The following functions and parameters are available from the **Active** menu.

<<	Echogram
—	TVG **User** +
—	Ping-Ping Filter **Off** +
—	Bottom Gain **5** +
<<	Size Distribution
<<	Bottom Detector

How to open the Active menu

1 Click once on the icon under the **Main** menu to open the **Active** menu

2 Click one more time on the icon to close the menu.

- The **Echogram** dialog allows you to set up the parameters controlling the echogram presentation. The three tabs control the horizontal lines, the echogram type with applied TVG, and how fast the echogram moves across the display.

  → *Echogram* on page 158

- The purpose of the **TVG** button is to allow you to change the TVG curve for the received echoes.

  → *TVG* on page 164

- The **Ping-Ping Filter** reduces unwanted noise and echoes from the echogram presentation.

  → *Ping-Ping Filter* on page 165

- The **Bottom Gain** setting controls the gain <u>below</u> the detected bottom depth.

  → *Bottom Gain* on page 165

- The **Size Distribution** dialog allows you to set up the parameters for the histogram presented in the **Size Distribution** information pane.

  → *Size Distribution* on page 166

- The purpose of the **Bottom Detector** dialog is used to define the upper and lower depth limits most likely to be used during the ES70 operation.

  → *Bottom Detector* on page 167

Echogram

The **Echogram** dialog is opened from the **Echogram** button on the **Active** menu.
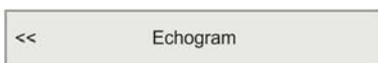
<<	Echogram

Purpose

The **Echogram** dialog allows you to set up the parameters controlling the echogram presentation. The three tabs control the horizontal lines, the echogram type with applied TVG, and how fast the echogram moves across the display.

Description

The **Echogram** dialog is the main source for all echogram presentation choices. The dialog is provided with three tabs to set up the parameters.

- The **Lines** tab allows you to set up the appearance of the bottom line, horizontal information lines, scale, distance or time markers, and annotations.

- The **Echogram** tab allows you to set up the echogram type and the TVG.

- The **Horizontal Axis** tab allows you to set up the horizontal scale of the echogram.

Related topics

Echogram; Lines tab

The **Lines** tab in the **Echogram** dialog allows you to change the appearance of the bottom line. You can add an extra bottom line, and in addition to this you can enable either a white line or a hardness indicator line. The tab offers several horizontal information lines, and you can choose the vertical scale of the echogram. Finally, the **Lines** tab offers time or distance markers, and you can enable annotations.

Note that the changes made in this tab will be default only be applied to the currently selected "active" echogram (identified with a thick border). If you wish to apply the changes to all the other echograms of the same type (for example all bottom related echograms, click **Apply To All**.

Parameters

- **Bottom**: The bottom line can be switched off or on. In addition, you can enable either white line or bottom hardness information.

  - **Bottom Line**: When enabled, the detected bottom depth is shown as a thin line in the echogram. The line is drawn in the current foreground colour.

  - **None**: Neither white line nor hardness information is shown.

  - **White Line**: A band in the current background colour is drawn below the detected bottom depth.

  - **Hardness**: The current hardness of the bottom is shown below the detected bottom depth, using a colour code.

- **Lines**: This field allows you to enable or disable other horizontal lines on the echogram.

  - **Trawl**: Whenever available and connected, trawl systems (PI and ITI) communicate headrope depth and/or headrope-to-footrope distance to the ES70 at regular intervals.

    Manual trawl parameters can be entered using the **Trawl** dialog. This is useful for trawl sensor systems not measuring the trawl opening, or when the measured headrope-to-footrope distance is unreliable.

    If you have a Simrad PI system connected, you can monitor the depth of the applicable sensors. The information from these sensors are drawn as horizontal lines on the ES70 echogram.

    If you have an Simrad ITI system connected, you can monitor the depth of the relevant ITI sensor(s). The information from these sensors are drawn as horizontal lines on the ES70 echogram.

    To set up an interface port to communicate with the PI and ITI system(s), use the **I/O Setup** dialog.

    The echogram is only drawn when trawl position information is available.

  - **Variable Depth**: When enabled a horizontal depth line is placed wherever you click in the echogram. This is typically used to measure the water depth, the depth of a school, or even single fish.

    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.

  - **Range Other**: This feature is used when you set up your ES70 with both a surface related and bottom related echogram shown simultaneously. When enabled, two horizontal lines in the surface echogram indicate the range selected in the bottom echogram.

  - **Biomass**: This option writes a curve on the echogram indicating the measured biomass for each individual ping.

    You can change the scale of the curve to fit the vertical space available on the echogram.

- **Scale**: 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 drawn. No scale lines are drawn when the scale line count is set to zero.

- **Ticks**: When enabled, this function places vertical markers on the echogram.

  – **Time**: This option places a short vertical line is drawn in the upper part of the echogram once every specified number of minutes.

  – **Distance**: This option inserts a short vertical line is drawn in the upper part of the echogram once every specified number of nautical miles.

- **Annotations**: Select *Text* or *Line* to allow annotations to be displayed in the Echogram view.

  If you select *Line*, the text annotation will be followed by a vertical line for improved visibility.

  The annotations are controlled by the **Annotations** dialog.

- **Apply to all**: Click this button if you wish to implement your changes to all the echograms presently in use on the ES70.

Echogram; Echogram tab
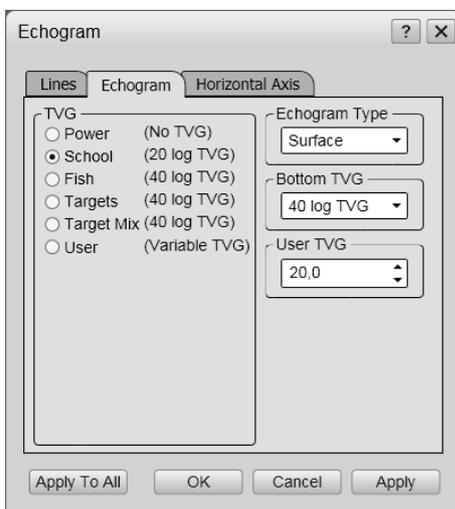
The **Echogram** tab in the **Echogram** dialog allows you to select which TVG curve to use for the echogram. You can choose from several standard curves, or make your own. The tab also allows you to choose which type of echogram you wish to display.

Note that the changes made in this tab will be default only be applied to the currently selected "active" echogram (identified with a thick border). If you wish to apply the changes to all the other echograms of the same type (for example all bottom related echograms, click **Apply To All**.

Parameters

- **TVG**: This field allows you to define the Time Variable Gain (TVG) curve applied to the received echoes.

  - **Power (No TVG)**: TVG gain is not implemented. This setting is hardly ever used.

  - **School (20 log TVG)**: This gain setting provides the largest amplification close to the bottom. It has been designed to provide the best echoes from schools.

  - **Fish (40 log TVG)**: This gain setting provides lower amplification close to the bottom. It has been designed to provide the best echoes from single fish.

  - **Targets (40 log TVG)**: Basically, this setting uses the same TVG amplification as **Fish**, but additional filtering is implemented. Only echoes detected and interpreted as single fish are shown. The echoes are compensated for their physical position in the beam (beam compensation). This means that fish in the outer region of the beam are adjusted to correct size even though their echoes are weaker.[9]

  - **Target Mix (40 log TVG)**: Basically, this setting uses the same TVG amplification as **Fish**, but additional beam compensation is implemented. Echoes detected and interpreted as single fish are adjusted to their correct size according to their physical position in the beam.[10]

  - **User (Variable TVG)**: This setting allows you to define your own TVG setting.

- **Echogram Type**: Use this field to select what kind of echogram you wish to see.

  - **Surface**: The echogram is related to the sea surface. Start depth (upper echogram boundary) and vertical range (across echogram) are manually selected by the **Start Depth** and **Range** buttons on the **Main** menu.

    → *Start Range* on page 114

    → *Range* on page 113

  - **Bottom**: The echogram is related to the detected bottom. Stop depth (lower echogram boundary) and vertical range are manually selected by the **Start Depth** and **Range** buttons on the **Main** menu. The echogram is only drawn for pings having a successful bottom detection.

  - **Pelagic**: This echogram is nearly identical to the **Surface** echogram. However, the biomass calculations are not restricted by the bottom detection. This means that the bottom echo will be included in calculations if it appears within the chosen range.

    Example: If you are investigating a large school of pelagic fish, set the **Start Range** and **Range** to enclose the school. If the school is large enough, a Surface echogram may mistake it for bottom, and the biomass readings will be wrong. The **Pelagic** echogram will however disregard the bottom detection, and give a correct estimate of the biomass.

  - **Trawl**: Trawl sensor systems communicate headrope depth and headrope-to-footrope distance to the ES70 at regular intervals. The echogram covers the vertical opening of the trawl including a small margin at each side. The headrope and footrope margins are identical. The biomass calculations are not restricted by the bottom detection.

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9. Note that this **Targets (40 log TVG)** setting is only functional with split beam transducers.
10. Note that this **Target Mix (40 log TVG)** setting is only functional with split beam transducers.

Their size is selected in the **Trawl** dialog. The headrope-to-footrope distance can be manually set in the **Trawl** dialog for trawl sensor systems not measuring the trawl opening, or when the measured headrope-to-footrope distance is unreliable. The echogram is only drawn when trawl position information is available.

→ *Trawl* on page 145

Note that you can also select TVG by means of the TVG button on the Active menu. See *TVG* on page 164 for more information.

- **Bottom TVG**: Use this field to set up the TVG for the bottom detector.

- **User TVG**: Use this spin box to define your own TVG curve.

- **Apply to all**: Click this button if you wish to implement your changes to all the echograms presently in use on the ES70.

Echogram; Horizontal Axis tab
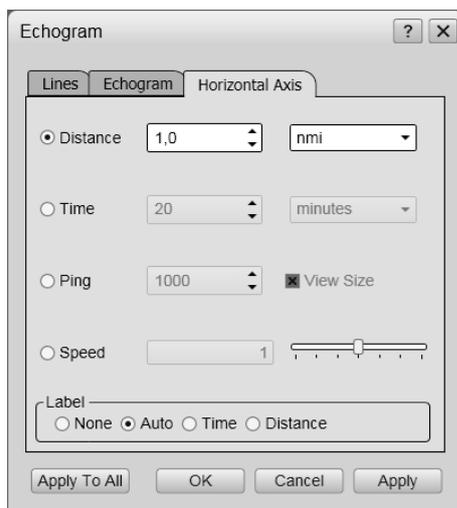
The **Horizontal Axis** tab in the **Echogram** dialog allows you to choose the horizontal scale of the echogram. This controls how "fast" the echogram moves from right towards left across the display.

Note that the changes made in this tab will be default only be applied to the currently selected "active" echogram (identified with a thick border). If you wish to apply the changes to all the other echograms of the same type (for example all bottom related echograms, click **Apply To All**.

Parameters

- **Horizontal Axis**: You can set up the horizontal speed based on four parameters.

  - **Distance**: The horizontal scale of the echogram is based on sailed distance. Choose resolution and units with the spin boxes provided.

  - **Time**: The horizontal scale of the echogram is based on time. Choose resolution and units with the spin boxes provided.

  - **Ping**: The horizontal scale of the echogram is based on the number of pings (transmissions) made. Choose resolution and units with the spin boxes provided. Check the **View Size** box to specify that the number of horizontal pixels shall define the number of displayed horizontal pings (One ping per pixel).

  - **Speed**: The horizontal scale of the echogram is based on the speed you choose. Choose speed with the ruler provided.

- **Label**: These choices control the information label in the bottom left corner of the echogram. This label is used to identify the axis.

- **Apply to all**: Click this button if you wish to implement your changes to all the echograms presently in use on the ES70.

TVG

The **TVG** function is opened from the **TVG** button on the **Active** menu.

Purpose

The purpose of the **TVG** button is to allow you to change the TVG curve for the received echoes.

Description

The selection made using the TVG button is the same as in the **Echogram** dialog. See *Echogram; Echogram tab* on page 161

Parameters

- **TVG**: Choose one of the following settings:
  - **Power (No TVG)**: TVG gain is not implemented. This setting is hardly ever used.
  - **School (20 log TVG)**: This gain setting provides the largest amplification close to the bottom. It has been designed to provide the best echoes from schools.
  - **Fish (40 log TVG)**: This gain setting provides lower amplification close to the bottom. It has been designed to provide the best echoes from single fish.
  - **Targets (40 log TVG)**: Basically, this setting uses the same TVG amplification as **Fish**, but additional filtering is implemented. Only echoes detected and interpreted as single fish are shown. The echoes are compensated for their physical position in the beam (beam compensation). This means that fish in the outer region of the beam are adjusted to correct size even though their echoes are weaker.[11]
  - **Target Mix (40 log TVG)**: Basically, this setting uses the same TVG amplification as **Fish**, but additional beam compensation is implemented. Echoes detected and interpreted as single fish are adjusted to their correct size according to their physical position in the beam.[12]
  - **User (Variable TVG)**: This setting allows you to define your own TVG setting.
- **Apply to all**: Click this button if you wish to implement your changes to all the echograms presently in use on the ES70.

---

11. Note that this **Targets (40 log TVG)** setting is only functional with split beam transducers.
12. Note that this **Target Mix (40 log TVG)** setting is only functional with split beam transducers.

Related topics

- *Echogram; Echogram tab* on page 161

Ping-Ping Filter

The **Ping-Ping Filter** function is opened from the **Ping-Ping Filter** button on the **Active** menu.

Purpose

The **Ping-Ping Filter** reduces unwanted noise and echoes from the echogram presentation.

Description

The filter has three different strengths. As the ping-to-ping filter compares the echoes from the last ES70, it will take this selected amounts of transmissions ("pings") to make a stable presentation when changing most of the ES70 parameters. The filtering routine takes the vessel's movements into consideration when comparing the echoes from ping to ping. The filter works by comparing each separate pixel colour from the previous pings.

Parameters

- **Ping-Ping Filter**: Choose one of the following settings:
  - **Off**: No filtering
  - **2 of 3**: For the current echo pixel to be shown, the echo pixel from at least one of the two previous pings must have a colour value different from the background.
  - **2 of 2**: For the current echo pixel to be shown, the echo pixel from the previous ping must have a colour value different from the background to be shown.
  - **3 of 3**: For the current echo pixel to be shown, the echo pixel from the two previous pings must have a colour value different from the background to be shown.
- **Apply to all**: Click this button if you wish to implement your changes to all the echograms presently in use on the ES70.

Related topics

- *How to remove interference and vessel's own noise from the echograms* on page 74

Bottom Gain

The **Bottom Gain** function is opened from the **Bottom Gain** button on the **Active** menu.

Purpose

The **Bottom Gain** setting controls the gain <u>below</u> the detected bottom depth.
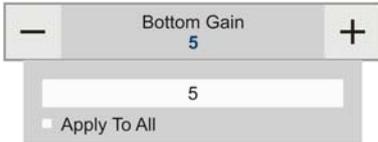
Description

The bottom gain can be adjusted between –30 dB and +30 dB.

Parameters

- **[Value]**: Choose a value between -30 and +30.

- **Apply to all**: Click this button if you wish to implement your changes to all the echograms presently in use on the ES70.

Size Distribution

The **Size Distribution** dialog is opened from the **Size Distribution** button on the **Active** menu. You can also open the dialog from the **Setup** button in the **Size Distribution** information pane

Purpose

The **Size Distribution** dialog allows you to set up the parameters for the histogram presented in the **Size Distribution** information pane.
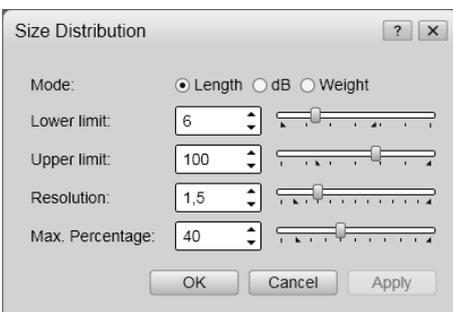
Description

The **Size Distribution** dialog allows you to shape the size distribution histogram to your own requirements. You can set up the mode, the upper and lower limits, the accuracy, and the vertical resolution.

Parameters

- **Mode**: This function specifies if the histogram shall display the size distribution based on the fish size, echo strength, or fish weight.

  – **Length**: The histogram shows the size distribution as a length in metric units.

  – **dB**: The histogram shows the size distribution as a echo strength value i dB.

  – **Weight**: The histogram shows the size distribution as a weight in metric units.

- **Lower limit**: This function specifies the lower limit of the **Size Distribution** histogram.

  Example: If you have chosen a *Length* mode, and specifies *10* in this spin box, fishes shorter than 10 cm will not be shown in the **Size Distribution** histogram.

- **Upper limit**: This function specifies the upper limit of the **Size Distribution** histogram.

  Example: If you have chosen a *Weight* mode, and specifies *7000* in this spin box, fishes heavier than 7 kg will not be shown in the **Size Distribution** histogram.

- **Resolution**: This function specifies accuracy of the **Size Distribution** histogram; how many vertical bars that are used.

- **Max(imum) percentage**: This function controls the vertical resolution of the **Size Distribution** histogram.

Related topics

- *Size Distribution information pane* on page 54

- *How to monitor the fish size distribution* on page 77

Bottom Detector

The **Bottom Detector** dialog is opened from the **Bottom Detector** button on the **Active** menu.

Purpose

The purpose of the **Bottom Detector** dialog is used to define the upper and lower depth limits most likely to be used during the ES70 operation.
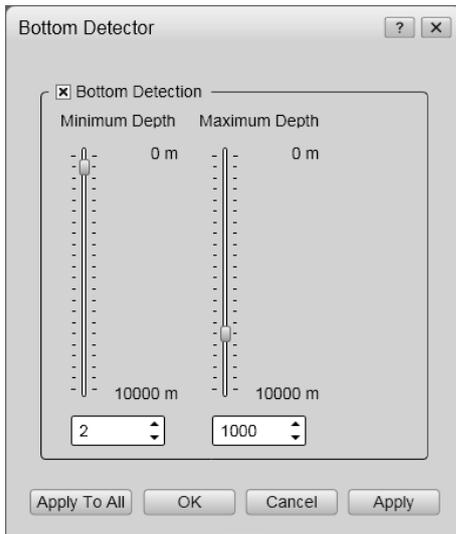
Description

The **Bottom Detector** dialog provides separate limits for minimum and maximum depth. These limits may be used to obtain "bottom lock" on the depth when the echo sounder is pinging. The sounder needs this lock to locate the correct depth, and to stay on it during the operation, even though the depth changes continuously.

Parameters

- **Bottom Detection**: This function allows you to switch bottom detection on and off. Click to activate it.

- **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.

  You can enter the desired **Minimum Depth** value by dragging the slider up or down, or by means of the spin box.

- **Maximum Depth**: The search for the bottom echo extends down to this depth whenever bottom track is lost. Enter a slightly larger depth value than the deepest spot you expect to visit in order to avoid annoyingly long ping intervals every time bottom track is lost. A depth value of either 0 or less than the minimum depth disables the bottom detector.

  You can enter the desired **Maximum Depth** value by dragging the slider up or down, or by means of the spin box.

Related topics

- *How to define maximum and minimum depth* on page 76

Other dialogs and functions

"Other functions" are secondary dialogs and functions opened from other buttons in the user interface, or from within any of the dialogs, to provide special parameters.

Topics

LAN Port Setup

The **LAN Port Setup** dialog is opened from the **LAN Port Setup** button in the following dialogs:

Purpose

The **LAN Port Setup** dialog allows you to define the parameters for Ethernet communication with external sensors (measuring devices) or peripheral systems.

Description

Ethernet (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 to work, it must be set up properly.

Parameters

- **Local IP Address**: This is the Internet Protocol (IP) address of the local Ethernet interface board. In most cases, each Ethernet board has a unique IP address, even when an interface board supports multiple sockets. If you have more than one interface board, you are provided with a list of the available addresses.

- **Local port**: This port is important if you wish to receive information. It must match the port number on the remote computer. To find the port number on the remote computer, consult the documentation for the software utility to be used. If the data communication is set up to only transmit information from the ES70, this parameter is not required.

- **Remote IP Address**: Select the Internet Protocol (IP) address for the remote computer. If the data communication is set up to receive data only, this parameter is not required. If you wish to set up an output for broadcast, define IP address 255.255.255.255. This is the default setting.

  If you set the **Communication Mode** to *Point-to-Point*, you need to enter the remote IP address manually.

- **Remote port**: Specify local network port. The ES70 uses this network port to transmit information. The application on the remote computer will "listen" to this port number.

Serial Port Setup

The **Serial Port Setup** dialog is opened from the **Serial Port Setup** button in the following dialogs:

- *Annotations* on page 137
- *Navigation* on page 140
- *Depth Output* on page 147
- *I/O Setup* on page 150

Purpose

The **Serial Port Setup** dialog allows you to define the parameters for serial communication.
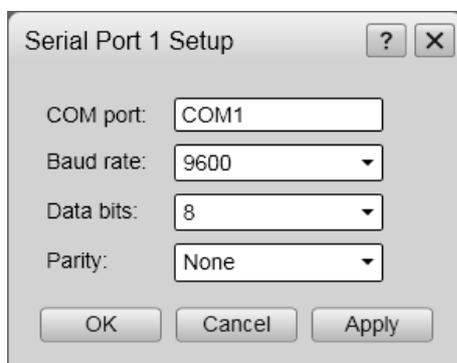
Description

Serial ports are still a very common method for interface between maritime systems. The NMEA[13] standard for serial communication defines standard parameters for such interfaces. It is very important that a serial line between the ES70 an any external system is setup up correctly at both ends.

13. NMEA means National Marine Electronics Association. See http://www.nmea.org for more information.

Parameters

- **COM port**: This text fields identifies the current communication port on the computer. You can not change this information.

- **Baud rate**: Specify the baudrate for the serial communication. Standard baudrate defined for NMEA communication is *4800 baud*.

- **Data bits**: Specify the number of data bits for the serial communication. Standard number of data bits defined for NMEA communication is *8*.

- **Parity**: Specify the parity for the serial communication. Standard parity defined for NMEA communication is *None*.

Add Serial Port

The **Add Serial Port** dialog is opened from the **Add** button in the **Port Management** dialog.

Purpose

The purpose of the **Add Serial Port** dialog is to allow you to put a free serial port (COM port) on the ES70 computer to use for interface purposes.
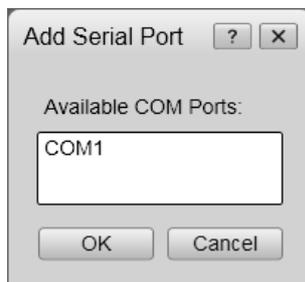
Description

The **Add Serial Port** automatically searches the ES70 computer to find available serial ports. Those found are listed. To select a port, click once on its name, and then click **OK**.

Related topics

- *I/O Setup* on page 150

Port Monitor

The **Port Monitor** dialog is opened from the **Port Monitor** button in the **Port Management** dialog.

Purpose

The **Port Monitor** dialog allows you to study the communication stream on the chosen serial or LAN port.
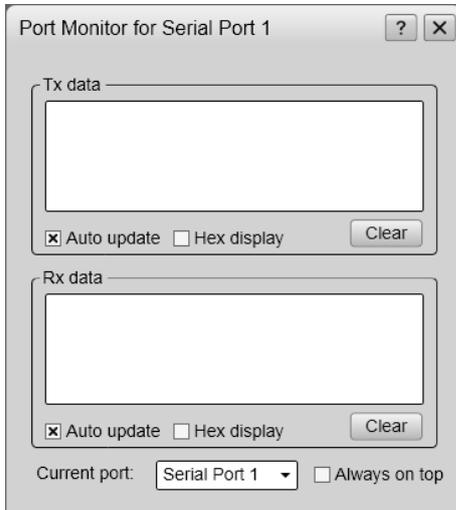
Description

The **Port Monitor** dialog provides one text field for incoming messages (**Rx data**), and one for outgoing (**Tx data**). Use these fields and your own knowledge of the data communication to investigate the telegrams.

Note

*The **Port Monitor** dialog is a tool for debugging purposes. It is neither required nor intended for normal operation of the ES70.*

Parameters

- **Tx data**: The text window displays the data communication transmitted <u>out</u> from the ES70.

- **Rx data**: The text window is used to display the data communication received by the ES70 from external sensors (measuring devices) or peripheral systems.

- **Auto update**: When this box is selected, the field is constantly updated with new information. If you wish to freeze the information for further investigation, deselect to disable the automatic update.

- **Hex display**: When this box is selected, the information in the text field is shown in hexadecimal format.

- **Clear**: This button clears the text field to allow a fresh stream of communication data.

- **Current port**: 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 the **Port Management** dialog.

- **Always on top**: This function places the **Port Monitor** dialog on the top of all other dialogs and system presentations on your desktop.

Related topics

- *I/O Setup* on page 150

Select Inputs

The **Select Inputs** dialog is opened from the **Input** button in the **Port Management** dialog.

Purpose

The **Select Inputs** dialog allows you to select information from external sensors (measuring devices) or systems, and connect them to the chosen ES70 Ethernet (LAN) or serial line input.
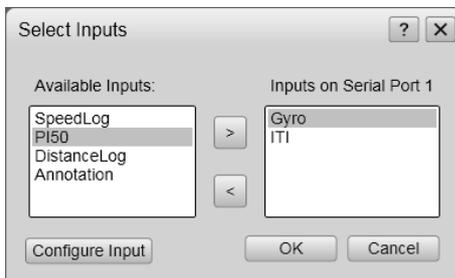
Description

In the **Select Inputs** dialog, all available input signals are listed in the left text field. To add an input, click on it in the left column to select it, and then click the [>] button. If the input's communication parameters can be set up, click the input sensor to select it, and then click the **Configure Input** button. If applicable, the relevant dialog will open.

Note _____

The dialog allows you to add more than one input signal to a serial port. You must be familiar with the type of input signals before you do this. If an input port is set up to receive NMEA serial messages, the same input port can not be used to receive ASCII messages simultaneously.

Parameters

• **Available Inputs**: This field lists the available input signals.

  The available sources are defined in a configuration file on the ES70, and reflects the input sources and file formats the ES70 can support.

  – **GPS**: Global Positioning System

  The following telegram formats are supported:

  * *GLL Geographical position latitude/longitude* on page 191

  * *GGA Global positioning system fix data* on page 191

  * *RMC Recommended minimum specific GNSS data* on page 193

  – **AML**: Motion sensor

  The following telegram formats are supported:

  * *Sounder/TSS1 Motion protocol* on page 201

  * *Simrad EM Attitude 1000* on page 196

  * *Simrad EM Attitude 3000* on page 197

  – **MotionBinary**: Motion sensor

  The following telegram formats are supported:

  * *Sounder/TSS1 Motion protocol* on page 201

  * *Simrad EM Attitude 1000* on page 196

  * *Simrad EM Attitude 3000* on page 197

  – **MotionAscii**: Motion sensor

  The following telegram formats are supported:

  * *Sounder/TSS1 Motion protocol* on page 201

  * *Simrad EM Attitude 1000* on page 196

    * *Simrad EM Attitude 3000* on page 197

  – **Speed Log**: This is input from a speed log.

   The following telegram formats are supported:

    * *RMC Recommended minimum specific GNSS data* on page 193

    * *VHW Water speed and heading* on page 194

    * *VTG Course over ground & ground speed* on page 194

  – **ITI**: This is input from the Simrad ITI catch monitoring system.

   The following telegram formats are supported:

    * *DBS Depth below surface* on page 190

    * *DBS Depth of trawl below surface* on page 198

    * *HFB Trawl headrope to footrope and bottom* on page 199

  – **PI50**: This is input from the Simrad PI44, PI54 and PI50 catch monitoring systems.

   The following telegram formats are supported:

    * *DBS Depth below surface* on page 190

    * *PSIMP.D PI Sensor data* on page 199

  – **DistanceLog**: This is input from a peripheral system providing information about sailed distance.

   The following telegram formats are supported:

    * *RMC Recommended minimum specific GNSS data* on page 193

    * *VHW Water speed and heading* on page 194

    * *VTG Course over ground & ground speed* on page 194

  – **Annotation**: This is input from a peripheral system providing annotations.

   The following telegram formats are supported:

    * *Simrad ATS Annotation* on page 202

  – **Gyro**: This is input from a peripheral system providing heading information.

   The following telegram formats are supported:

    * *HDG Heading, deviation and variation* on page 192

    * *HDT Heading, true* on page 193

    * *HDM Heading, magnetic* on page 192

    * *VHW Water speed and heading* on page 194

• **Selected Inputs**: This field lists the selected input signals to the relevant communication port.

• **Configure Input**: Some of the inputs may be set up by the ES70. To do this, click on the input name, and then this button. When applicable, the relevant setup dialog will open.

Related topics

• *Navigation* on page 140

• *Trawl* on page 145

Select Outputs

The **Select Inputs** dialog is opened from the **Input** button in the **Port Management** dialog.

Purpose

The **Select Outputs** dialog allows you to select information to be exported to peripheral systems on the chosen Ethernet (LAN) or serial line output.
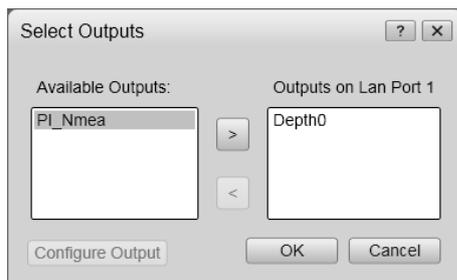
Description

In the **Select Outputs** dialog, all available output signals are listed in the left text field. To enable an output, click on it in the left column to select it, and then click the [>] button. If the output's communication parameters can be set up, click the signal name to select it, and then click the **Configure Output** button. If applicable, the relevant dialog will open.

Parameters

- **Available Outputs**: This field lists the available output signals.

  The available sources are defined in a configuration file on the ES70, and reflects the export data and file formats the ES70 can support.

  - **Depth**: Depth output

    The following telegram formats are supported:

    * *DBS Depth below surface* on page 190
    * *DBT Depth below transducer* on page 190
    * *DPT Depth* on page 190
    * *Simrad EK500 Depth* on page 195
    * *Atlas depth telegram* on page 203
    * *PSIMDHB Bottom hardness and biomass* on page 200

    → *Depth Output* on page 147

  - **Sync**: Synchronization

    → *Synchronization* on page 136

  - **PI NMEA**: Information from Simrad PI catch monitoring system relayed by the ES70

    → *PI Data Output* on page 186

- **Selected Outputs**: This field lists the selected output signals to the relevant communication port.

- **Configure Output**: Some of the outputs may be set up by the ES70. To do this, click on the output name, and then this button. When applicable, the relevant setup dialog will open.

Related topics

Messages

The **Messages** dialog is opened from the **Messages** icon on the **Taskbar** menu. When a message is issued by the ES70, this icon will flash.

Purpose

The **Messages** allows you to read and acknowledge messages from the ES70.
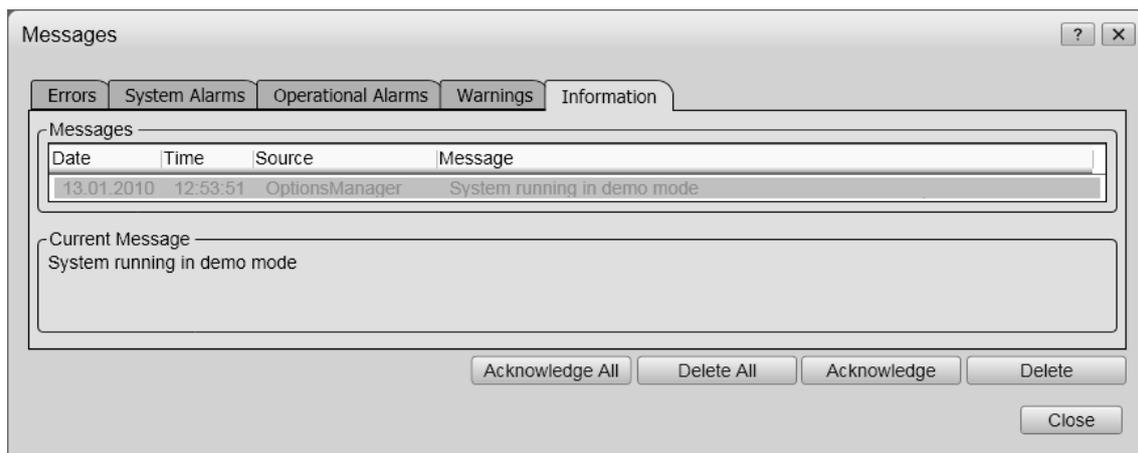
Description

The ES70 will issue messages if an error occurs to the system. This could be any type of hardware or software error, and even events related to operational conditions. A new message is flagged by means of the **Message** icon on the taskbar. The messages are divided into five types related to their importance. These five types are:

- Errors
- System alarms
- Operational alarms
- Warnings
- Information

The **Messages** dialog will display all messages from the system, and you will be able to read, acknowledge and delete them.

All messages provided by the ES70 system are stored in logging files on the hard disk. If you experience abnormal behaviour, these files may prove useful for Simrad's support organisation. Observe the procedure provided to copy these logging files to a USB memory stick.

→ *Access to log files* on page 99

Parameters

- **Tab**: There are five tabs on the **Messages** dialog, one for each message type. Click on the tab to see the applicable messages.

- **Current Message**: the text in a message may be longer than the message listing may show. To read the complete message, click on it. The text will be copied into the **Current Message** field.

- **Acknowledge All**: Click to acknowledge all new messages in the current list (tab).

- **Delete All**: Click to delete all the messages in the current list (tab).

- **Acknowledge**: Click to acknowledge the currently selected message.

- **Delete**: Click to delete the currently selected message.

Replay File

The **Replay File** dialog is opened from the **Replay File** button on the **Operation** sub-menu. The **Operation** button is located on the **Operation** menu.
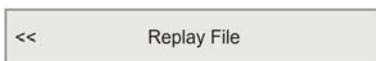
Purpose

The purpose of the **Replay File** dialog is to choose the file(s) to be used for echogram playback.
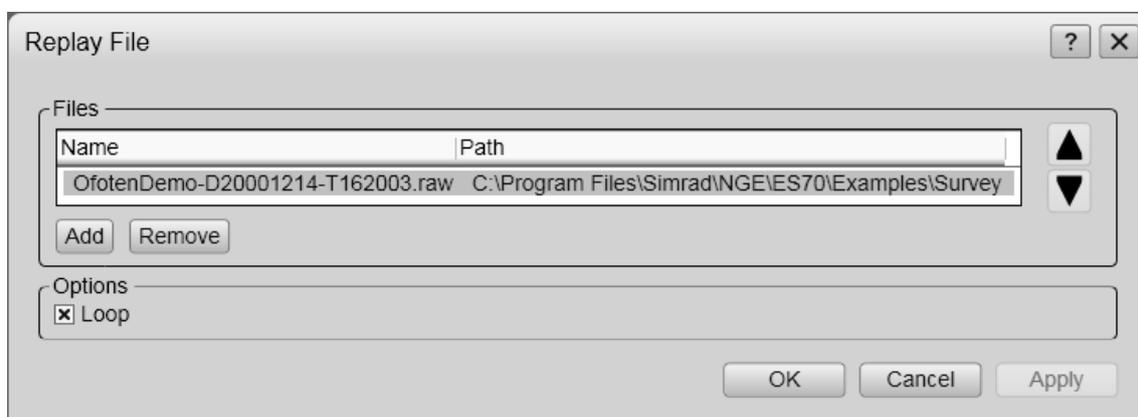
Description

The ES70 is provided with a few example files for playback. You can also create files by means of the recording function on the ES70. In order to play back these files, you must first choose playback mode on the **Operation** menu, and then click the **Replay File** button to open the **Replay File** dialog. The dialog allows you to add one or more files to a the list of active files for playback. You can click **Loop** to have a continuous playback with the file(s) you have chosen. To delete a file from the playback list, simply click the file name, and then the **Remove** button. The file is removed from the list, but <u>not</u> from the hard disk.

Parameters

- **Files**: This list displays the currently selected echogram files installed for playback.

- **Add**: Click this button to add additional file(s) to the playback list. A standard operating system dialog opens to choose files.

- **Remove**: Click on a file in the playback list, then click this button to remove the file from the list. The file is removed from the list, but <u>not</u> from the hard disk. If you wish to remove a playback file from your hard disk, you need to use an operating system file utility.

  The file system on the ES70 computer can be opened if you click the **Screen Captures** tab at the bottom of the display presentation, and then click the **Open Image Folder** button.

- **Loop**: Check this box if you want the ES70 program to loop through the currently selected replay files without stopping.

Related topics

- *How to play back echogram sequences* on page 67
- *Operation* on page 117

File Output

The **File Output** dialog is opened from the **File Output** button in the **Record** button on the **Operation** menu.

Purpose

The **File Output** dialog is used to specify which output you wish to save to a data file, and in which disk directory the data file(s) shall be placed.

Description

The **File Output** dialog provides you with three tabs to set up the output parameters:

- **Directory**: Specify where the data files shall be stored.

- **Raw Data**: Save raw data files, control their sizes, and specify automatic start of the recording

- **Processed Data**: Set up to export EK500 datagrams to file.

Related topics

- *How to save raw echogram data* on page 66
- *Record* on page 123
- *Replay File* on page 177
- *EK500 Datagram* on page 181

File Output; Directory tab
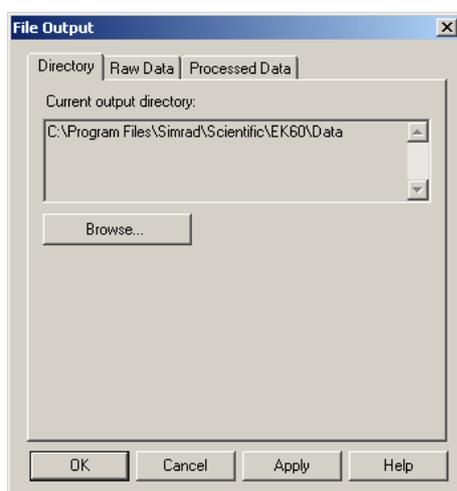
Parameters

- **Current output directory**: This field displays the file path currently selected to store the data files.

- **Browse**: Click this button to select a different output directory (folder) to store the files. A standard operating system dialog is used. You are also permitted to create a new folder.

File Output; Raw Data tab

Use this tab to save raw data files, to control their sizes, and to specify automatic start of the recording. Raw data files can be recorded by the ES70 and stored to file. These raw data files can later be replayed by the ES70 for further analysis.

→ *Replay File* on page 177

Each raw data file name has the following format:

```
 PREFIX
DYYYYMMDD
THHMMSS
```
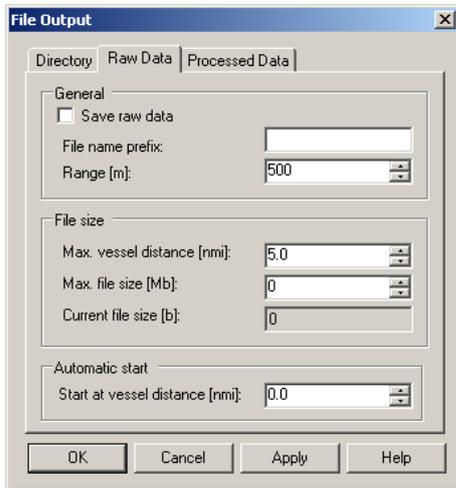
Parameters

- **General**

  - **Save Raw Data**: Check this box to save raw data to file.

  - **File Name Prefix**: Type any name into the text box. The chosen name will be used as prefix in all the raw data file names.

  - **Range**: Use this spin box to define which range to collect echo sounder data from.

- **File Size**

  - **Max(imum) Vessel Distance**: Use this spin box to define a limit (in nautical miles) for the maximum distance to be contained in one file. A value of 0 means no limit.

  - **Max(imum) File Size**: Use this spin box to define a limit for the maximum amount of bytes to be contained in one raw data file. A value of 0 means no limit.

  - **Current File Size**: When recording raw data is in progress the current file size is displayed.

- **Automatic Start**

  Raw data output can be set to start automatically after a predefined sailing distance.

  - **Start at vessel distance**: Select required sailing distance (in nautical miles) before raw data output is initiated.

File Output; Processed Data tab

Data processed by the ES70 data can also be exported to a file.

To support programs using data from the Simrad EK500 echo sounder, the ES70 can output EK500 defined datagrams on an Ethernet (LAN) output. These datagrams can also be recorded onto a file.
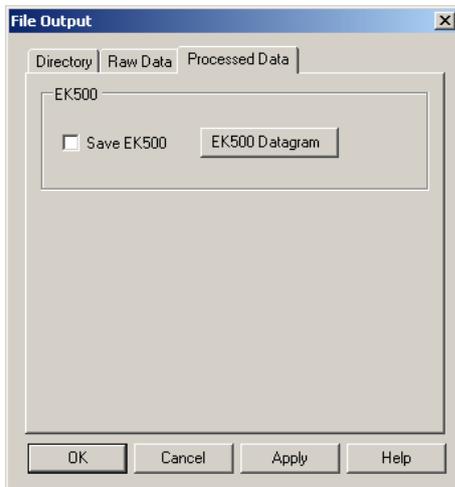
Parameters

- **Save EK500**: Check this box to choose to save EK500 datagrams to file.

  Note _____

  In order to disable this function, and to stop the echo sounder from saving EK500 datagrams to file, you must first clear this check box, and then restart the ES70 echo sounder application.

  _____

- **EK500 Datagrams**: Click this button to open the **EK500 Datagram** dialog to set up the individual datagrams.

  For more information, see *EK500 Datagram* on page 181.

EK500 Datagram

The **EK500 Datagram** dialog is opened from the **EK500 Datagram** button in the **File Output** and **Ethernet Output** dialogs.

Purpose

This dialog is used to specify which EK500 datagrams to output. Note that changes made in this dialog will have effects on both Ethernet and file output of EK500 data.

Description

The **EK500 Datagram** dialog is mainly provided to set up export data to the **Olex** system. The dialog offers three tabs to set up the parameters.

- **Datagram**: Specify which datagrams to output.

- **Range**: Specify the range for the Echogram, Echo Trace and Sample Data datagrams.

- **Echogram**: Specify the number of surface and bottom values for the Echogram datagrams.

Related topics

- *File Output* on page 178
- *Ethernet Output* on page 146

EK500 Datagram; Datagram

Use this tab to specify which datagrams to output.
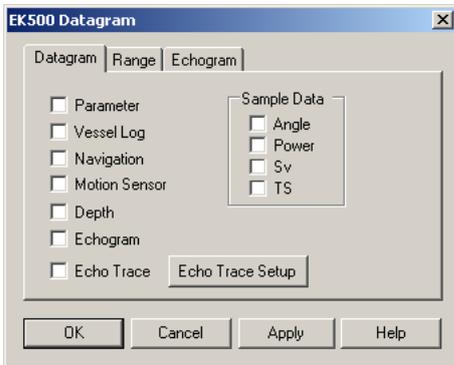
Parameters

*   **Datagram**: A list of all available output datagrams are listed. Click to enable individual outputs.

    For correct output to the **Olex** system, the following datagrams must be enabled:

    − Parameter
    − Echogram

*   **Sample Data**: Click to include angle, power, sound velocity and target strength data.

*   **Echo Trace Setup**: Click this button to specify parameters for the **Echo Trace** datagram. The button opens the **Single Target Detection** dialog.

    → *Single Target Detection* on page 185.

EK500 Datagram; Range

Use this tab to specify the range for the **Echogram**, **Echo Trace** and **Sample Data** datagrams.
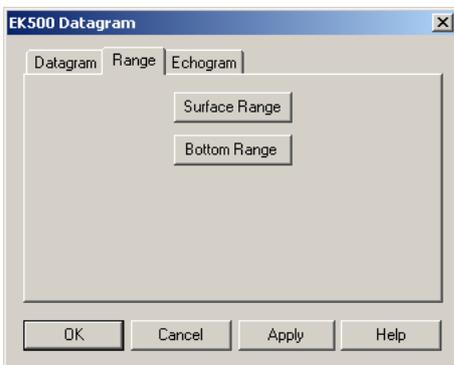
Parameters

*   **Surface Range**: Click this button to choose the surface range for the datagrams. The button opens the **Surface Range** dialog.

    → *Surface Range* on page 184.

*   **Bottom Range**: Click this button to choose the bottom range for the datagrams. The button opens the **Bottom Range** dialog.

    → *Bottom Range* on page 183.

EK500 Datagram; Echogram

Use this tab to specify the number of surface and bottom values for the Echogram datagrams.
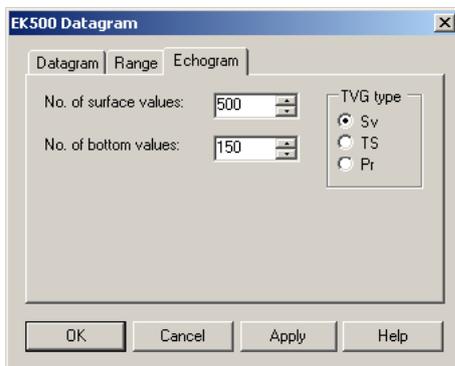
Parameters

- **No. of Surface Values**: Select the number of echogram samples to export in the pelagic part of the datagram.

  For correct output to the **Olex** system, set this parameter to *500*.

- **No. of Bottom Values**: Select the number of echogram samples to export in the bottom part of the echogram.

  For correct output to the **Olex** system, set this parameter to *200*.

- **TVG Type**: Specify the TVG type for the data in the **Echogram** datagram.

Bottom Range

The **Bottom Range** dialog is opened from the **Bottom Range** button in the **EK500 Datagram** dialog.

Purpose

This dialog is used to specify the vertical depth range for bottom related echogram data exported to peripheral devices, or saved to file.
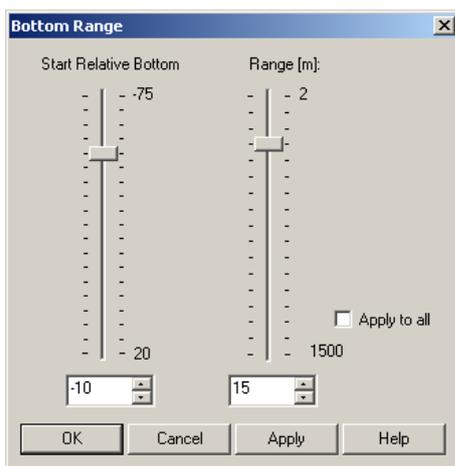
Description

The parameters defined in this dialog are only implemented for bottom related echogram data exported by the ES70. Similar parameters for the echogram view are defined by the **Range** and **Start Range** buttons on the **Main** menu.

Parameters

- **Start Relative Bottom**: This parameter controls the start depth when the echogram is <u>bottom related</u>.

  The start depth for the echogram shown on the display is defined by the **Start Range** parameter on the **Main** menu. The echogram type is selected in the **Echogram** dialog.

  → *Start Range* on page 114

  → *Echogram* on page 158

- **Range**: This parameter controls the depth range.

  The range for the echogram shown on the display is defined by the **Range** parameters on the **Main** menu.

  → *Range* on page 113

- **Apply to all**: Check this box to apply the new range setting to all current echograms of the same type.

  Example: If you have selected a bottom echogram when you changed the range setting, the setting will also be applied to all the other bottom echograms. A similar functionality applies to the other echogram types.

Related topics

- *Range* on page 113
- *Start Range* on page 114
- *Echogram* on page 158
- *EK500 Datagram* on page 181

Surface Range

The **Surface Range** dialog is opened from the **Surface Range** button in the **EK500 Datagram** dialog.

Purpose

This dialog is used to specify the vertical depth range for surface related echogram data exported to peripheral devices, or saved to file.
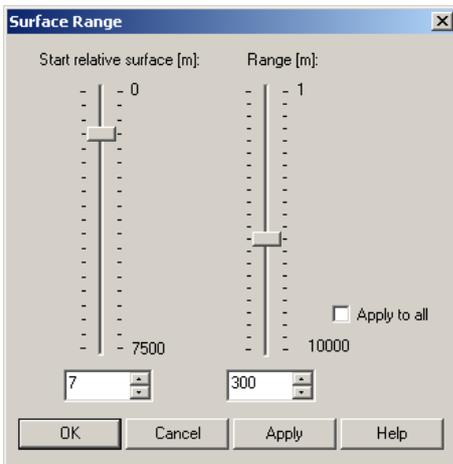
Description

The parameters defined in this dialog are only implemented for surface related echogram data exported by the ES70. Similar parameters for the echogram view are defined by the **Range** and **Start Range** buttons on the **Main** menu.

Parameters

- **Start Relative Surface**: This parameter controls the start depth when the echogram is surface related.

  The start depth for the echogram shown on the display is defined by the **Start Range** parameter on the **Main** menu. The echogram type is selected in the **Echogram** dialog.

  → *Start Range* on page 114

  → *Echogram* on page 158

- **Range**: This parameter controls the depth range.

  The range for the echogram shown on the display is defined by the **Range** parameters on the **Main** menu.

  → *Range* on page 113

- **Apply to all**: Check this box to apply the new range setting to all current echograms of the same type.

  Example: If you have selected a bottom echogram when you changed the range setting, the setting will also be applied to all the other bottom echograms. A similar functionality applies to the other echogram types.

Related topics

- *Range* on page 113
- *Start Range* on page 114
- *Echogram* on page 158
- *EK500 Datagram* on page 181

Single Target Detection

The **Single Target Detection** dialog is opened from the **Echo Trace Setup** button in the **EK500 Datagram** dialog.

Purpose

This dialog is used to set the operational parameters for detecting single targets.
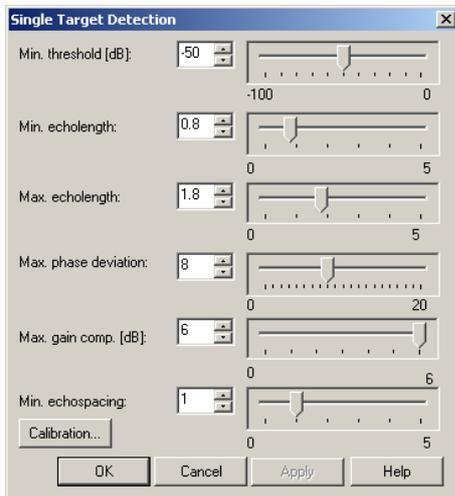
Parameters

- **Min. Threshold (dB)**: The target strength for a single target must exceed this threshold to be accepted.

- **Min. Echo Length**: For a single target detection to occur the normalized echo length (echo length between the 6 dB points relative to the peak value divided by the duration of the transmitted pulse) must exceed this parameter.

- **Max. Echo Length**: A single target detection requires the normalized echo length to be less than the maximum echo length setting.

- **Max. Phase Deviation**: Average electrical phase jitter between samples inside an echo from a single target must not exceed the maximum phase deviation setting where maximum phase deviation is set in units of phase steps (128 phase steps = 180 electrical degrees). Recommended setting is 2 to 3 for normal conditions. For weak echoes in noisy conditions you should allow for more jitter (4 to 10).

- **Max. Gain Compensation**: The correction value returned from the transducer gain model must not exceed the maximum gain compensation setting. (This is the one-way maximum gain compensation. The two-way maximum compensation will be 12 dB). All single targets outside the angle corresponding to the chosen gain compensation are skipped. Thus you can reduce the sample volume (beam angle) by choosing a lower value for maximum gain compensation.

- **Min. Echo Spacing**: The is the minimum spacing between two single echoes required for acceptance.

PI Data Output

The **PI Data Output** dialog is opened from the **Configure Output** button in the **Select Outputs** dialog.

Purpose

The **PI Data Output** dialog is used to define which of the received PI telegrams that are relayed to the peripheral system(s).
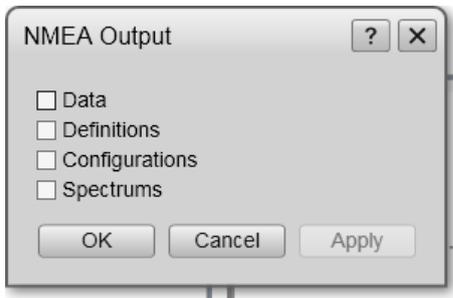
Description

If a Simrad PI system is connected to the ES70 the telegrams received from the PI can be relayed through the ES70 and exported to other systems. Four different telegrams are currently supported.

Parameters

- **Data**: Click to allow the PI data telegram to be exported.

- **Definitions**: Click to allow the PI definition telegram to be exported.

- **Configurations**: Click to allow the PI configuration telegram to be exported.

- **Spectrums**: Click to allow the PI spectrum telegram to be exported.

Telegram formats

This chapter describes the external NMEA and proprietary telegram interfaces supported by the ES70 Fish finding echo sounder. The chapter includes information about the telegram formats used to communicate with external peripherals and other computer systems.

Topics

Related topics

NMEA telegrams

The following NMEA telegrams are supported by the ES70 Fish finding echo sounder.

Topics

- *VTG Course over ground & ground speed* on page 194

Related topics

- *Navigation* on page 140
- *Depth Output* on page 147

About the NMEA telegram format

The Simrad ES70 can send and receive information to and from several different peripherals. All transmissions take place as **telegrams** with data sentences. Each telegram 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 start with a "$" delimiter, and represent 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.

The following provides a summary explanation of the approved parametric sentence structure.

```
$aaccc,c—c*hh<CR><LF>
```

For more information about the NMEA standard, the format and the data sentences, refer to their official publications. Their document *NMEA 1083 - Standard for interfacing marine electronic devices* explains the formats in detail. The document can be obtained from http://www.nmea.org.

Note _____

In some telegrams received from other Kongsberg Maritime equipments, the $ character is replaced by the @ character. The checksum field may then not be in use.

_____

1 **"$"**: *Start of sentence* (Hex: 24).

2 **aaccc**: *Address field*. The first two characters (**aa**) identifies 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 **","**: *Field delimiter* (Hex: 2C). 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 no data in the field.

4 **c—c**: *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 lengths, and they are preceded by the *Field delimiter*.

5 **"*"**: *Checksum delimiter* (Hex: 2A). This delimiter follows the last field of the sentence, and indicates that the following two alphanumerical characters contain the checksum.

6 **hh**: *Checksum*

7 **<CR><LF>**: *Terminates sentence*

DBS Depth below surface

This telegram contains vessel heading in degrees magnetic. The telegram is no longer recommended for use in new designs.

It is often replaced by the **DPT** telegram.

Format

`$--DBS,x.x,f,y.y,M,z.z,F*hh<CR><LF>`

Format description

1   – – = talker identifier

2   **DBS** = telegram identifier

3   **x.x,f** = depth below surface in feet

4   **y.y,M** = depth below surface in meters

5   **z.z,F** = depth below surface in fathoms

Related topics

• *I/O Setup* on page 150

DBT Depth below transducer

This telegram provides the water depth referenced to the transducer.

Format

`$--DBT,x.x,f,y.y,M,z.z,F*hh<CR><LF>`

Format description

1   – – = talker identifier

2   **DBT** = telegram identifier

3   **x.x,f** = water depth in feet

4   **y.y,M** = water depth in meters

5   **z.z,F** = water depth in fathoms

DPT Depth

This telegram contains water depth relative to the transducer and offset of the measuring 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.

For additional details, refer to the NMEA standard.

Format

`$--DPT,x.x,y.y,z.z*hh<CR><LF>`

Format description

1   – – = talker identifier

2   **DPT** = telegram identifier

3   **x.x** = water depth, in meters, relative to the transducer

4   **y.y** = offset, in meters, from the transducer

5   **z.z** = maximum range scale in use

GGA Global positioning system fix data

This telegram contains 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<CR><LF>
```

Format description

1   – – = talker identifier

2   **GGA** = telegram identifier

3   **hhmmss.ss** = coordinated universal time (UTC) of position

4   **llll.ll,a** = latitude north/south, position in degrees, minutes and hundredths. Characters **N** (North) or **S** (South) identifies the bearing.

5   **yyyyy.yy,a** = longitude east/west, position in degrees, minutes and hundredths. Characters **W** (West) or **E** (East) identifies the bearing.

6   **x** = GPS quality indicator (refer to the NMEA standard for further details)

7   **zz** = number of satellites in use, 00 to 12, may be different from the number in view

8   **d.d** = horizontal dilution of precision

9   **a.a,M** = altitude related to mean sea level (geoid) in meters

10   **g.g,M** = geoidal separation in meters

11   **r.r** = age of differential GPS data

12   **cccc** = differential reference station identification, 0000 to 1023

GLL Geographical position latitude/longitude

This telegram is used to transfer latitude and longitude of vessel position, time of position fix and status from a global positioning system (GPS).

Format

```
$--GLL,llll.ll,a,yyyyy.yy,a,
hhmmss.ss,A,a*hh<CR><LF>
```

Format description

1 – – = talker identifier

2 **GLL** = telegram identifier.

3 **llll.ll,a** = latitude north/south, position in degrees, minutes and hundredths. Characters **N** (North) or **S** (South) identifies the bearing.

4 **yyyyy.yy,a** = longitude east/west, position in degrees, minutes and hundredths. Characters **W** (West) or **E** (East) identifies the bearing.

5 **hhmmss.ss** = coordinated universal time (UTC) of position.

6 **A** = status, characters **A** (data valid) or **V** (data not valid) are used.

7 **a** = mode indicator.

HDG Heading, deviation and variation

This telegram contains the heading from a magnetic sensor, which if corrected for deviation will produce magnetic heading, which if offset by variation will provide true heading.

Format

```
$--HDG,x.x,z.z,a,r.r,a*hh<CR><LF>
```

Heading conversions

- To obtain magnetic heading: Add easterly deviation (E) to magnetic sensor reading, or subtract westerly deviation (W) from magnetic sensor reading.

- To obtain true heading: Add easterly variation (E) to magnetic heading, or subtract westerly variation (W) from magnetic heading.

Format description

1 – – = talker identifier

2 **HDG** = telegram identifier

3 **x.x** = magnetic sensor heading, degrees

4 **z.z,a** = magnetic deviation, degrees east/west

5 **r.r,a** = magnetic variation, degrees east/west

HDM Heading, magnetic

This telegram contains vessel heading in degrees magnetic. The telegram is no longer recommended for use in new designs.

It is often replaced by the **HDG** telegram.

Format

```
$--HDM,x.x,M*hh<CR><LF>
```

Format description

1   – – = talker identifier

2   **HDM** = telegram identifier

3   **x.x** = heading in degrees, magnetic

HDT Heading, true

This telegram is used to transfer heading information from a gyro.

Format

```
$--HDT,x.x,T*hh<CR><LF>
```

Format description

1   – – = talker identifier

2   **HDT** = telegram identifier

3   **x.x,T** = heading, degrees true

RMC Recommended minimum specific GNSS data

This telegram contains time, date, position, course and speed data provided by 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<CR><LF>
```

Format description

1   – – = talker identifier

2   **RMC** = telegram identifier

3   **hhmmss.ss** = coordinated universal time (UTC) of position fix

4   **A** = status, characters **A** (data valid) or **V** (Navigation receiver warning) are used.

5   **llll.ll,a** = latitude nort/south. Characters **N** (North) or **S** (South) identifies the bearing.

6   **yyyyy.yy.a** = longitude east/west. Characters **E** (East) or **W** (West) identifies the bearing.

7   **x.x** = speed over ground, knots

8   **z.z** = course over ground, degrees true

9   **ddmmyy** = date

10   **r.r,a** = magnetic variation, degrees east/west. Characters **E** (East) or **W** (West) identifies the bearing.

11   **a** = mode indicator

VHW Water speed and heading

This telegram contains the compass heading to which the vessel points and the speed of the vessel relative to the water.

Format

```
$--VHW,x.x,T,x.x,M,x.x,N,x.x,K*hh<CR><LF>
```

Format description

1   – – = talker identifier

2   **VHW** = telegram identifier

3   **x.x,T** = heading, degrees true

4   **x.x,M** = heading, degrees magnetic

5   **x.x,N** = speed relative to water, knots, resolution 0.1

6   **x.x,K** = speed relative to water, km/hr, resolution 0.1

VLW Dual ground/water distance

This telegram contains the distance travelled relative to the water and over the ground.

Format

```
$--VLW,x.x,N,y.y,N,z.z,N,g.g,N*hh<CR><LF>
```

Format description

1   – – = talker identifier

2   **VLW** = telegram identifier

3   **x.x,N** = total cumulative water distance, nautical miles.

4   **y.y,N** = water distance since reset, nautical miles.

5   **z.z,N** = total cumulative ground distance, nautical miles.

6   **g.g,N** = ground distance since reset, nautical miles.

VTG Course over ground & ground speed

This telegram 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>
```

Format description

1   – – = talker identifier

2   **VTG** = telegram 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, resolution 0.1

6   **g.g,K** = speed over ground, km/hr, resolution 0.1

7   **a** = mode indicator

Proprietary telegrams and formats

The following proprietary Simrad telegrams are supported by the ES70 Fish finding echo sounder.

Topics

Related topics

Simrad EK500 Depth

This proprietary Kongsberg Maritime telegram was defined for the EK500 scientific echo sounder. It provides the current depth from three channels, as well as the bottom surface backscattering strength and the athwartships bottom slope. This telegram has be defined for output on either a serial line or a local area network Ethernet connection.

Serial line format

```
D#,hhmmsstt,x.x,y.y,t,s.s<CR><LF>
```

Serial line format description

1   **D#** = identifier, can be **D1**, **D2** or **D3** for channels 1, 2 or 3.

2   **hhmmsstt** = current time; hour, minute, second and hundredth of second

3   **x.x** = detected bottom depth in meters

4   **y.y** = bottom surface backscattering strength in dB

5   **t** = transducer number

6   **s,s** = athwartships bottom slope in degrees

Ethernet format

The Ethernet line output is specified using a "C" programming language structure. 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 Separator1[2];
  float Depth[4];
  float Ss[4];
  long TransducerNumber[4];
  float AthwartShips;
};
```

Ethernet format description

1   **Header#** = can be **D1**, **D2** or **D3** for channels 1, 2 or 3.

2   **Separator** = ","

3   **Time** = current time; hour, minute, second and hundredth of second

4   **Depth** = detected bottom depth in meters

5   **Ss** = bottom surface backscattering strength in dB

6   **TransducerNumber** = transducer number

7   **AthwartShips** = athwartships bottom slope in degrees

Simrad EM Attitude 1000

This proprietary **Kongsberg EM Attitude 1000** binary telegram consists of a fixed length message with 10 bytes.

It is defined as follows:

- Byte 1: Sync byte 1 = 00h
- Byte 2: Sync byte 2 = 90h
- Byte 3: Roll LSB
- Byte 4: Roll MSB
- Byte 5: Pitch LSB
- Byte 6: Pitch MSB
- Byte 7: Heave LSB
- Byte 8: Heave MSB
- Byte 9: Heading LSB
- Byte 10: Heading MSB

LSB = least significant byte, MSB = most significant byte.

1   All data are in 2's complement binary, with 0.01° resolution for roll, pitch and heading, and 1 cm resolution for heave.

- Roll is positive with port side up with ±179.99° valid range

- Pitch is positive with bow up with ±179.99° valid range
- Heave is positive up with ±9.99 m valid range
- Heading is positive clockwise with 0 to 359.99° valid range

2 Non-valid data are assumed when a value is outside the valid range.

3 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/MV documentation) is used inside the system in all data displays and in logged data (a transformation is applied if the roll is given with respect to the horizontal).

4 Note that heave is displayed and logged as positive downwards (the sign is changed) including roll and pitch induced lever arm translation to the system's transmit transducer.

5 This format was originally designed for use with the EM 950 and the EM 1000 multibeam echo sounders with the first synchronisation byte always assumed to be zero. The sensor manufacturers was then requested to include sensor status in the format using the first synchronisation byte for this purpose. With this additional information added, the datagram format is known as **Kongsberg EM Attitude 3000**.

Related topics

- *I/O Setup* on page 150
- *Select Inputs* on page 172

Simrad EM Attitude 3000

This proprietary Kongsberg binary telegram consists of a fixed length 10-bytes message.

It is defined as follows:
- Byte 1: Sync byte 1 = 00h, or Sensor status = 90h-AFh
- Byte 2: Sync byte 2 = 90h
- Byte 3: Roll LSB
- Byte 4: Roll MSB
- Byte 5: Pitch LSB
- Byte 6: Pitch MSB
- Byte 7: Heave LSB
- Byte 8: Heave MSB
- Byte 9: Heading LSB
- Byte 10: Heading MSB

LSB = least significant byte, MSB = most significant byte.

1 All data are in 2's complement binary, with 0.01° resolution for roll, pitch and heading, and 1 cm resolution for heave.

- Roll is positive with port side up with ±179.99° valid range

- Pitch is positive with bow up with ±179.99° valid range
- Heave is positive up with ±9.99 m valid range
- Heading is positive clockwise with 0 to 359.99° valid range

Non-valid data are assumed when a value is outside the valid range.

2 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/MV* documentation) is used inside the system in all data displays and in logged data (a transformation is applied if the roll is given with respect to the horizontal).

3 Note that heave is displayed and logged as positive downwards (the sign is changed) including roll and pitch induced lever arm translation to the system's transmit transducer.

4 This format has previously been used with the EM 950 and the EM 1000 with the first synchronisation byte always assumed to be zero (Datagram "Kongsberg EM Attitude 1000"). The sensor manufacturers have been requested to include sensor status in the format using the first synchronisation byte for this purpose.

It is thus assumed that:

- **90h** in the first byte indicates a valid measurement 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)
- and any value from **A0h** to **AFh** indicates a sensor error status

Related topics

- *I/O Setup* on page 150
- *Select Inputs* on page 172

DBS Depth of trawl below surface

This proprietary Simrad telegram contains the depth of the trawl sensor.

Format

```
@IIDBS,,,x.x,M,,<CR><LF>
```

Format description

1   **II** = talker identifier (mandatory)

2   **DBS** = telegram identifier

3   **x.x,M** = depth in meters (0 to 2000)

Related topics

- *I/O Setup* on page 150

- *Select Inputs* on page 172

HFB Trawl headrope to footrope and bottom

This proprietary Simrad telegram contains the distance from the headrope to the footrope, and from the footrope to the bottom.

Format

```
@IIHFB,x.x,M,y.y,M<CR><LF>
```

Format description

1   **II** = talker identifier (mandatory)

2   **HFB** = telegram identifier

3   **x.x,M** = distance from headrope to footrope, meters

4   **y.y, M** = distance from footrope to bottom, meters

Related topics

- *I/O Setup* on page 150

PSIMP.D PI Sensor data

This proprietary Simrad telegram contains the type and configuration of PS and PI sensors used by the external PI catch monitoring system.

Format

```
$PSIMP,D,tt,dd,measure,unit,
source,chan,val,crate,qual,infe,siglev,
nlev,gain,cable, error*chksum<CR><LF>
```

Format description

1   **PS** = talker identifier (mandatory)

2   **IMP** = telegram identifier

3   **D** = Sentence specifier

4   **tt** = time of day

5   **dd** = current date

6   **measure** = measurement type:

- D = Depth
- T = Temperature
- C = Catch
- B = Bottom
- N = No sensor
- M = Marker

7   **unit** = unit – M, f or F for depth measurements, C or F for temperature measurements

8   **source** = source – number (1, 2 or 3) of the sensor providing the current data values

9   **chan** = channel – the number (1 to 30) of the communication channel for the current data source

10   **val** = value – the magnitude of the current sensor measurement

11   **crate** = change rate – the magnitude of the current depth or temperature measurement

12   **qual** = quality:

- 0 = No connection between the sensor and the receiver
- 1 = One or two telemetry pulses are lost, current value is predicted
- 2 = The current data value is reliable

13   **infe** = interference:

- 0 = No interference
- 1 = Interference detected

14   **siglev** = signal level – the signal level of the telemetry pulse, measured in dB // 1 μPa

15   **nlev** = noise level – the average noise level of the current channel, measured in dB // 1 μPa

16   **gain** = the current gain; 0, 20 or 40 dB.

17   **cable** = cable quality:

- 0 = cable is not connected
- 1 = cable is OK
- 2 = a short circuit, or the hydrophone current is too large

18   **error** = error detected – 0 when no error is detected, a number >0 indicates an error condition

19   **chksum** = The checksum field consists of a "*" and two hex digits representing the exclusive OR of all characters between, but not including, the "$" and "*" characters

Related topics

- *I/O Setup* on page 150
- *Select Inputs* on page 172

PSIMDHB Bottom hardness and biomass

This proprietary Simrad telegram contains the bottom hardness and biomass as calculated by an echo sounder.

Format

```
$PSIMDHB,hhmmss.ss,t,f,KHZ,x.x,M,y.y,DB,z.z,,,<CR><LF>
```

Format description

1   **$P** = talker identifier (mandatory)

2   **SIM** = Simrad talker ID

3   **DHB** = coordinated universal time (UTC)

4   **hhmmss.ss** = time

5   **t** = transducer number

6   **f,KHZ** = echo sounder frequency in kHz

7   **x.x,M** = detected bottom depth in meters. Given as DBS (depth below surface), assuming proper transducer draft has been entered.

8   **y.y,DB** = bottom surface hardness in dB

9   **z.z** = relative biomass density in m^2/nmi^2 (NASC) (s_A)

NASC means Nautical Area Scattering Coefficient. This is the format (s_A m^2/nmi^2) we provide the biomass data.

10   **spare1** = spare for future expansions

11   **spare2** = spare for future expansions

Related topics

- *Depth Output* on page 147
- *Select Outputs* on page 175
- *I/O Setup* on page 150

Sounder/TSS1 Motion protocol

This proprietary **Simrad Sounder/TSS1** protocol may be the most common interface 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. However, baud rate and output rate may be adjusted to fit your needs. The format is based on ASCII characters, the datagrams have fixed length, and it is terminated with a carriage return and line feed.

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:

$$\text{Roll}_{echosounder} = \arcsin\left[\sin(\text{Roll}_{Euler}) \cdot \cos(\text{Pitch}_{Euler})\right]$$

Format

```
:aabbbb shhhhxsrrrr spppp<cr><lf>
```

Format description

1   **aa** = sway – two characters hex number with sway acceleration, in 0.03835 m/ss units

2   **bbbb** = heave – four characters hex number with heave acceleration, in 0.000625 m/ss units

3   **s** = a single character providing a "space" character if the value is positive, or a "–" character if it is negative

4   **hhhh** = heave – four characters decimal number with heave position in centimetres, positive up

5   **x** = status character:

*   **U** = Unaided mode and stable data. The sensor operates without external input data.

*   **u** = Unaided mode but unstable data. The sensor is without external input data, but the data from the sensor is unstable. A probable cause for this is the lack of alignment after the sensor has been switched on restarted. The alignment period from a power recycle is normally approximately five minutes.

*   **G** = Speed aided mode and stable data. The sensor operates with external input of speed data.

*   **g** = Speed aided mode but unstable data. The sensor operates with external input of speed data, but the data from the sensor is unstable. A probable cause for this is the lack of alignment after the sensor has been switched on restarted, or a failure in the speed data input.

*   **H** = Heading aided mode and stable data. The sensor operates with external input of heading data.

*   **h** = Heading aided mode but unstable data. The sensor operates with external input of heading data, but the data from the sensor is unstable. A probable cause for this is the lack of alignment after the sensor has been switched on restarted, or a failure in the heading data input.

*   **F** = Full aided mode and stable data. The sensor operates with external input of both speed and heading data.

*   **f** = Full aided mode but unstable data. The sensor operates with external input of heading and speed data, but the data from the sensor is unstable. A probable cause for this is the lack of alignment after the sensor has been switched on restarted, or a failure in the heading and/or speed data input.

6   **s** = a single character providing a "space" character if the value is positive, or a "–" character if it is negative

7   **rrrr** = roll – four character decimal number with roll angle in hundreds of a degree

8   **s** = a single character providing a "space" character if the value is positive, or a "–" character if it is negative

9   **pppp** = pitch – four character decimal number with pitch angle in hundreds of a degree

Related topics

*   *I/O Setup* on page 150
*   *Select Inputs* on page 172

Simrad ATS Annotation

This proprietary Kongsberg Maritime telegram contains a text string to be used for annotation purposes.

Format

```
$??ATS,tttt<CR><LF>
```

Format description

1   **??** = Talker identifier

2   **ATS** = telegram identifier

3   **tttt** = free text string

Proprietary third party telegrams and formats

The following proprietary third party telegrams are supported by the ES70 Fish finding echo sounder.

Topics

- *Atlas depth telegram* on page 203

Related topics

- *Navigation* on page 140

- *Depth Output* on page 147

Atlas depth telegram

This proprietary Atlas telegram contains the current depth from two channels.

Format

```
Dyxxxxx.xxm
```

Format description

1   **Dy** = Channel number; **DA** is channel number 1, **DB** is channel number 2.

2   **xxxxx.xx** = depth in meters

3   **m** = meters

Echo sounder theory

When you use an echo sounder there are some basic knowledge that you may find it useful to possess.

Topics

About biomass

Provided that you use an ES70 with a split beam transducer, or have a valid biomass license on a single beam transceiver, you will have access to the **Biomass** information pane.

This biomass value is an indicator to how much fish you currently have in the current echogram, or in the zoomed area. Every single fish will emit an echo, and the sum of all these registered echoes are presented as a number. Smaller organisms such as plankton will also emit echoes, but these are so weak that they will hardly influence on the total biomass.

ES70 records all the targets from the smallest plankton to the largest whale, and provides these findings as a number. For all practical purposes this number will provide you with information about the fish abundance to allow you to decide if it pays off to start fishing. You must also consider if this number is a result of large amounts of plankton or bait, or if there is real fish below the keel. The number provided to display fish abundance is relative, and after some use your experience will be a valuable factor when the decision is made.

The biomass value is also used by the researches to calculate how much fish there is in the ocean. The final result is by far the value provided solely by the echo sounder, as the numbers are subject to numerous calculations and adjustments made by experienced scientists. Other means to establish the final result are trawling and catch data from the fishery community. You may have seen that this biomass value can be very large.

Note _____

*If you have other echo sounders or sonar running asynchronous with the ES70, the ES70 will also measure the transmit pulse from the secondary system. That will effectively ruin the biomass calculations. You can remove the interference using the **Ping Filter** function in the **Echogram** dialog, but the ES70 receiver will still pick up the transmit pulse and implement it in the calculations. A full synchronization of the various acoustic instruments is required. If your own vessel produces excessive noise this will also be taken into the biomass calculations and provide you with inaccurate information.*

Related topics

- *Biomass information pane* on page 51

About TVG gain

TVG means *Time Varied Gain*. When TVG is used in an echo sounder, we also some times refer to it as *depth variable gain*.

Because the strength of the echoes will become weaker with increasing depth, the echo sounder will automatically amplify the deepest echoes more than the shallower echoes. In fact, the gain will increase proportional to how long the echo sounder "waits" for the echoes. When you choose the TVG setting you can either switch it off (which we do NOT recommended), or you can choose settings **School Gain (20 log R)** or **Fish Gain (40 log R)**.

The various settings control the gain algorithms, how much gain to be applied when the depth increases. When you choose the **Fish Gain (40 log R)** setting, you will apply more gain than if you choose the **School Gain (20 log R)** setting. This is simply because individual fishes emit smaller echoes than a school, and this makes them more difficult to detect. In the equation the character **R** means "Range".
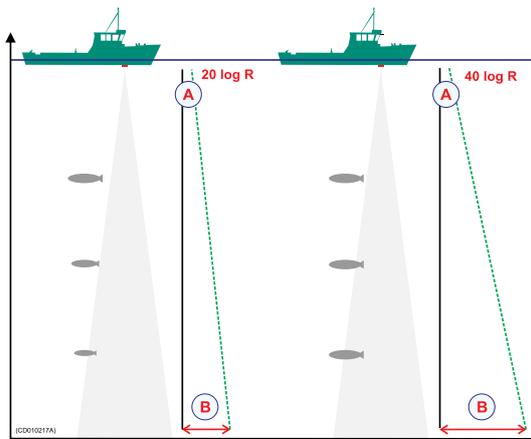
The illustration shows how the gain close to the bottom (B) is larger than just below the transducer (A). The echoes from the fish close to the bottom will then be shown with the same strength as echoes from pelagic The left vessel uses the **School Gain (20 log R)** setting. This will cause single fishes to be shown smaller and smaller with increasing depth, even though they may be of identical size. The right vessel uses the **Fish Gain (40 log R)** setting, and that will make identical sized fish to appear with identical size independent of the size.

When you are looking for schools these will fill the entire beam, just as the bottom normally does. A lot of gain is then not necessary. The **School Gain (20 log R)** setting will provide an acceptable echo strength. When you use the **Fish Gain (40 log R)** setting you will see that the bottom echo is very strong. The presentation will use stronger colours with increasing depth.

About dynamic range and display presentation

The ES70 echo sounder has a dynamic range of 140 dB. This means that the sounder can receive both very strong and very weak echoes. Actually, the ES70 will detect echoes from plankton to whales, bottom on all depths, and present the information free from distortion. As a comparison, our old echo sounders ES380 and ET100 had a dynamic range of approximately 65 dB.

Naturally, we can not present all these echoes on the display simultaneously, as this would create a mess of colours.

When 12 colours are used, we create a 36 dB section and give each colour a 3 dB strength. Every colour (3 dB) the represent a doubling of the echo strength. With the 12 colours (A) this will be a 36 dB colour range from grey to brown. Grey is used for the weakest echoes, while the strongest echoes are brown. All echoes stronger than brown will still be brown, while echoes weaker than grey will not be shown. The old paper sounders had a dynamic range of 12 dB in their printouts using the "colours" from light grey to black. The dynamic range in the ES70 colour presentation is thus a lot larger; 24 dB or 250 times.

About output power

The echo sounder's transducer converts the electrical input power to acoustic energy transmitted into the water. In the majority of the transducers manufactured by Simrad the transducer's *power efficiency* is between 50 and 75%. This means that between 50 and 75% of the input power is transmitted as acoustic energy. Transducers from other manufacturers may have as low as 15% power efficiency. Naturally, it is very important that you check this parameter when you wish to purchase a transducer.

The echo sounder's *output power* is a measurement on how much current the amplifier can send down to the transducer. The maximum power is limited by the transducer you have, and how much power it may accept from the transmitter for conversion to acoustic energy. If you send too much power into the transducer, you may inflict permanent and unrepairable damage.

The *source level (SL)* is a measurement on how much acoustic energy that is in fact sent out by the transducer, how high "volume" it will emit. The source level is measured as "sound pressure" one meter below the transducer face, and it is given i *dB re. 1μPa*.

In order to know how much power you can use you must know what kind of transducer you are using. Provided that the echo sounder has been installed with a Simrad transducer, and you know what type it is, this is no problem. All necessary parameters about the transducer are then known by the echo sounder, and the software in the sounder will ensure that you do not output too much power. If you use a third party transducer you must manually check that the output power does not exceed the power rating.

If the transducer receives too much power from the echo sounder, it will also *cavitate*. This is a physical phenomenon causing the appearance of gas bubbles immediately below the transducer face. When this happens hardly any energy is sent into the water. The cavitation depends on the power applied and the physical size of the transducer face. Transducers with a large face can accept more power.

Related topics

- *How to change the output power* on page 81
- *Normal Operation* on page 121

About pulse duration

The echo sounder's *pulse duration* is a measurement for how long the acoustic pulse lasts.

The pulse duration can be adjusted according to the current depth and what kind of fish you are looking for. The deeper you wish to see, the longer pulse duration should be used. Remember that in ES70 echo sounder, the pulse duration and the bandwidth is mutually dependant.

- Long pulse - lots of acoustic energy - narrow bandwidth - less sensitive for noise from own vessel and environment

- Short pulse - less acoustic energy - wide bandwidth - more sensitive for noise from own vessel and environment
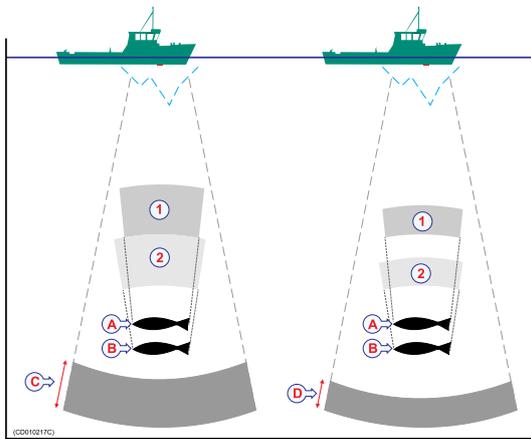
A pulse duration of 1 mS covers 1,5 meters in the water, and this corresponds to a target separation of approximately 75 cm. This is a typical pulse duration that you may well use down to 250 to 300 meters. If you work in deeper waters use a longer pulse duration, if it is shallower, use a shorter pulse duration. Try out different values, and seek out the pulse duration that provides you with the clearest echo presentation with minimum noise, but with maximum fish detection and separation.

The left vessel uses a long pulse duration (C). As you can see, this causes the echoes from the two fishes (A) and (B) to merge. The right vessel uses a shorter pulse duration, and the two fishes will then appear as two separate echoes on the echogram. Thus, short pulses will provide the best resolution and separation of individual fishes, but the echo sounder is more sensitive to noise.

The speed of sound in water is approximately 1500 m/s. The length of a 1 mS sound pulse will thus be approximately 1,5 meter. With the echo sounder you can then adjust the sound pulse from 7,5 cm (0.05 mS) to 24 m (16 mS) depending of the operational frequency. This is an important factor for the appearance of single fishes.

- When the vertical distance between to fishes, or the distance between a fish and the bottom, is more than the distance covered by a half pulse duration, the echoes will be presented as two separate echoes. The fish above the bottom will be identified.

- If the distance between two individual fishes, or the distance between a single fish and the bottom, is less than the distance covered by a half pulse duration, the echo will be presented as one echo. The echo from the fish close to the bottom will be merged with the bottom echo.

All operational frequencies have different pulse durations. The difference between for example a 50 kHz and a 38 kHz transducer is however not large:

- A 50 kHz transducer can be used with pulse durations from 0,12 mS to 2 mS

- A 38 kHz transducer can be used with pulse durations from 0,26 mS to 4 mS.

Basically, both these frequencies will provide you with the same detection ability. A 50 kHz transducer may provide better resolution in shallow waters, while the 38 kHz transducer may provide longer range on deeper waters. On the 38 kHz transducer the shortest pulse duration is 0,26 mS. This results in a 40 cm sound pulse and a 20 cm fish separation.

Related topics

- *How to adjust the pulse duration* on page 82
- *Normal Operation* on page 121

About bottom slopes

"Bottom slopes" is a well known phenomenon with echo sounders.
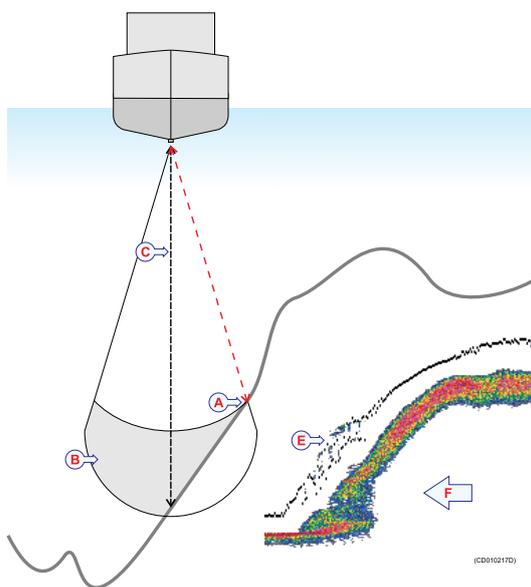
The edge of the beam (A) hits the bottom first, and starts to give an echo. The bottom detector in the echo sounder measures the strongest echo, detects what it thinks is the bottom, and starts the white line (C). The area above the bottom detection (B) will be masked off, and even though it may contain fish these will not be visible because the echo from the bottom is stronger than those from the fish. The estimated depth (C) will be shown.

On the echo sounder the phenomenon will appear by causing the bottom line (E) to be distorted. All the echoes above the white line here are really a part of the bottom.

To minimize this phenomenon on the ES70 you can open the **Bottom Detector** dialog by right-clicking the depth presentation, and then change the setting for **Backstep Minimum Level**. By increasing the number (more negative!) the bottom detector will become more sensitive, and the bottom will be detected earlier. On the echogram the white line will "climb" up the slope. Make sure that you do not increase the sensitivity too much, as this will have an effect on the fish detection on a flat bottom. Our experience show that a sensitivity of approximately -75 dB can be used safely.

An other method for minimizing this phenomenon is to use a transducer with narrow beam, or to increase the pulse duration.

About range selection
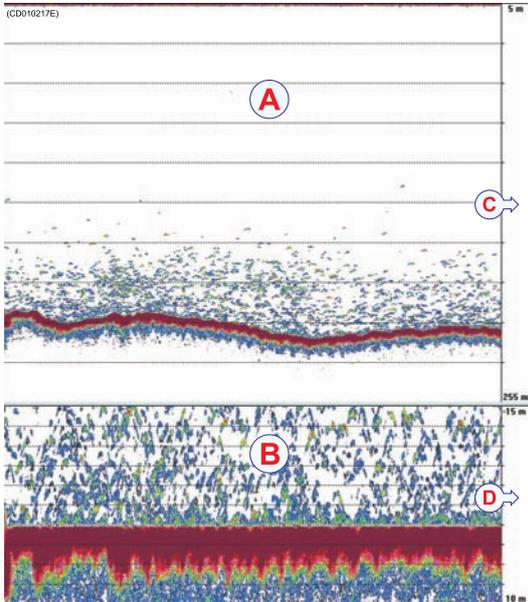
For every frequency (channel) you wish to present on the echo sounder display, you are provided with two echograms. Normally, the upper echogram (A) will show the entire depth range from the sea surface and down to the bottom, while the lower echogram (B) shows a bottom expansion. This is a magnification of the area just above and below the bottom.

You are free to choose any presentation you want in any of the echograms.

To do this, open the **Echogram** dialog on the **Active** menu.

Upper echogram: Surface

When you need to establish a vertical depth range, why not let the echo sounder choose it for you. On the main menu, set **Range** to *Auto*.

You can also define your own depth range. To establish a depth range from the surface and down to the bottom, set **Range** to a suitable depth, and **Start Range** to 0 (zero) meters.

A *phased area* may also be established. This is used when you wish to concentrate on a certain and limited depth range If you for example finds a school of fish 150 meters below the surface, you can set up the echo sounder to show this school without also provided information from the water column over and under it. To set this up, set **Start Range** to a few meters above the school, and **Range** to a few meters below it.

If you are bothered by interference from a sonar using the same operational frequency, try to set **Start Range** to 10 to 20 meters. You will then avoid the noise when both systems transmit simultaneously.

Lower echogram: Bottom expansion

The majority of our users prefer to use the lower echogram (B) for bottom expansion. This is the default setting.

When you use bottom expansion, the water surface is not the reference any longer, but the bottom is. It is always 0. That means that the bottom in this echogram will always be flat, even though it may vary in the upper echogram. To choose a vertical depth range for the bottom expansion, set **Range** to a positive value. This is the total vertical range of

the echogram. Then, set **Start Range** to a negative value. This is the echogram's start height above the bottom. In this echogram positive depth is below the bottom, while negative depth is above.

Typical settings may be:

* Range = 15 m

* Start range = –10 m

This provides you with a 15 meters high phased area starting at 10 meters above the bottom to 5 meters below it.

About bottom lines

It is very important that the echo sounder detects and recognizes the bottom. This is because the bottom is used as reference for all measurements and presentations. and also for everyone looking for bottom fish.

When you wish to study the bottom expansion you may add an extra bottom line or a white line.

To investigate the bottom hardness, you can enable the hardness line. This hardness line can not be used simultaneously with the white line.

 Related topics

* *Lines, markers and annotations in the echograms* on page 47

* *How to easier identify the bottom* on page 74

Bottom line

The bottom line is a dark line that is added just above the bottom to make it easier to see.

The bottom line is enabled in the **Echogram** dialog.

→ *Echogram; Lines tab* on page 159
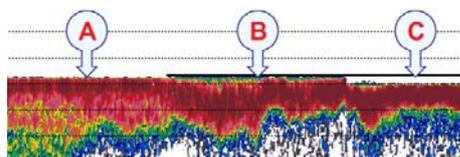
A   *Bottom line and white line switched off*

B   *Bottom line is activated*

C   *White line is activated*

White line

The white line is an extra thick white line that is added to just below the bottom. The white line will not remove information, it will simply "push" the information further down in order to make the bottom easier to see.

Most users find it practical to use the white line all the time. If the echo sounder should loose bottom track – for example due to the appearance of a large school of fish – you will immediately see this on the white line.

The white line is enabled in the **Echogram** dialog.

→ *Echogram; Lines tab* on page 159

Hardness line

The hardness line is an extra thick colour coded line that is added to just below the bottom. The line will not remove information, it will simply "push" the information further down in order to make the bottom easier to see.
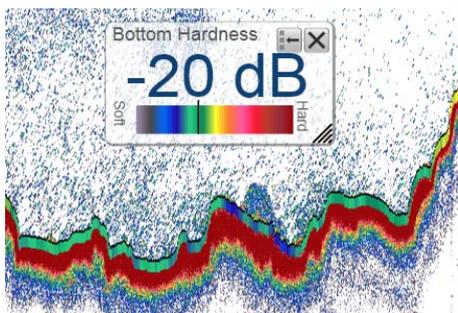
The colour coding contains the information about the bottom hardness. The colour scale used is the same as in the **Bottom Hardness** information pane.

→ *Bottom Hardness information pane* on page 52

The white line is enabled in the **Echogram** dialog.

→ *Echogram; Lines tab* on page 159

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