Operator Manual
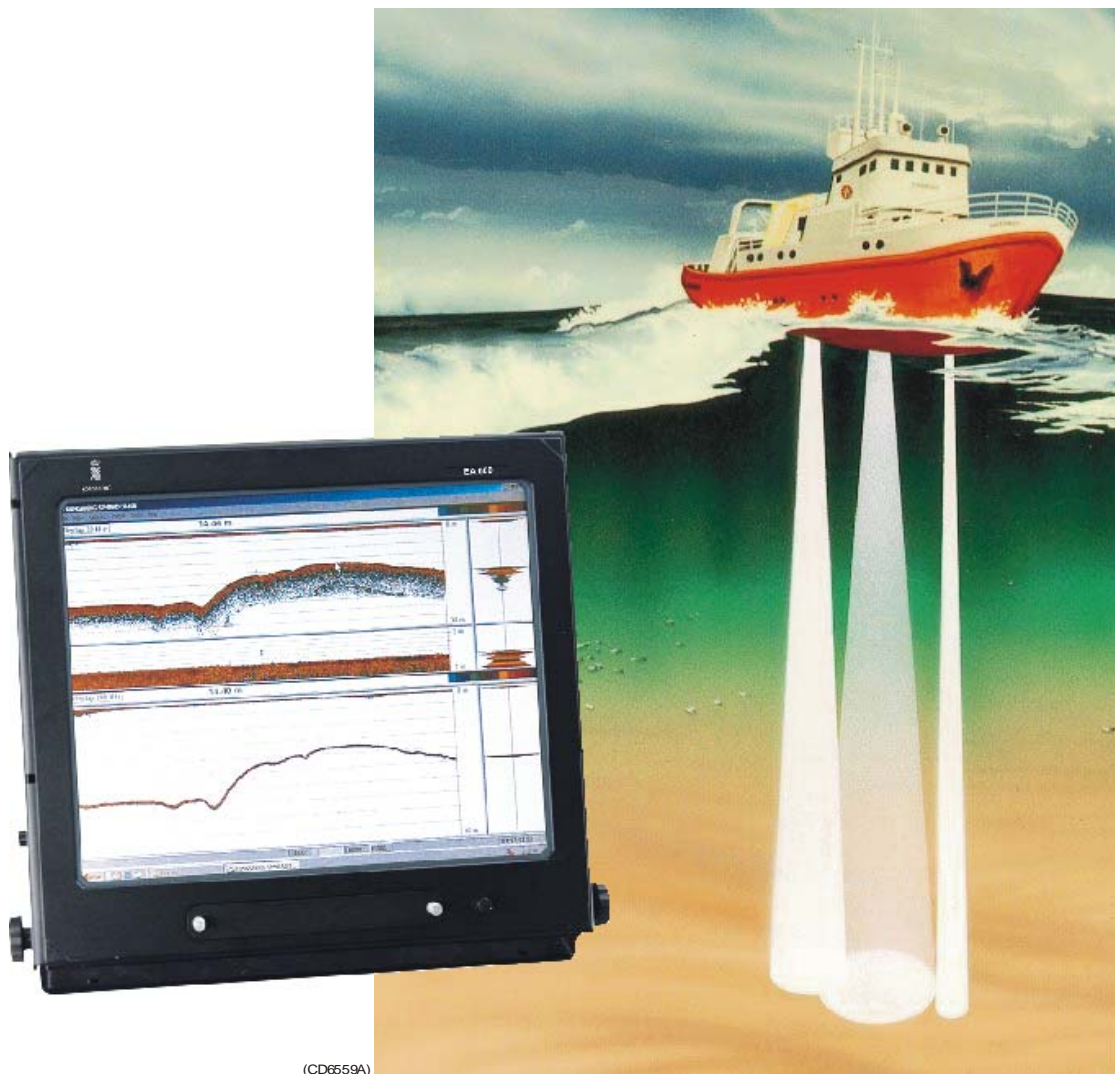
KONGSBERG

EA 600
Single beam hydrographic echo sounder

(CD6559A)

EA 600
Single beam hydrographic echo sounder

Operator manual

About this document

Rev	Date	Written by	Checked by	Approved by
F	19.12.06	ASM	TKj	TKj
	General updates. New software version 2.3.0.x implemented.			

Chapters

1 System description

This chapter presents a general description of the echo sounder system. Refer to page 1.

2 Display views

This chapter explains the layout of the echo sounder display presentation. Refer to page 25.

3 Getting started

This chapter provides an operational example to get you started with the operation. Refer to page 44.

4 Operational procedures

This chapter provides specific procedures for common tasks. Refer to page 55.

5 Reference guide

This chapter explains the menus and dialogue boxes in detail. Refer to page 88.

6 Sound Velocity Profile (SVP) Editor

This chapter describes how to use the sound velocity profile editor. Refer to page 185.

7 EA2Neptune

This chapter explains how to use the EA2Neptune conversion utility. Refer to page 194.

8 Data and telegram formats

This chapter explains the file and directory names, as well as the various input and output telegrams. Refer to page 196.

SYSTEM DESCRIPTION

Introduction

This chapter provides a brief introduction to the EA 600 hydrographic echosounder system.

Topics

Important notice

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

Echosounder software version

This manual complies to echo sounder software version 2.3.0.x.

System overview

Key facts

The EA 600 is a single or multi frequency echo sounder designed for the professional hydrography community. It can operate with maximum four frequency channels simultanously.

- The EA 600 system is flexible and easy to configure due to the modular design.

- The EA 600 is available in several versions. The standard EA 600 system uses a Hydrographic Operator Station (HOS) (combined display and computer). A system using a desktop computer is optionally available. For IP55 protection of the transceiver unit(s) a dedicated steel cabinet may be supplied.

- Echo sounders ranging from relatively low-cost single beam to large multi-frequency systems can be realised.

- Menus and dialogue boxes are operated with a standard computer mouse and keyboard.

- Large colour liquid crystal displays (LCD) are used. A standard computer mouse may be used.

- The EA 600 uses the Microsoft Windows® display interface. Operation is to a large extent self-explanatory. Getting started is easy if you are familiar with standard Microsoft Windows® programs.

- A store/replay function reduces the need for echogram printout on paper. The unprocessed transducer signal is recorded on the internal harddisk. During replay, this signal is injected into the EA 600 processing software as if it arrived directly from the transceiver.

Main units

The standard EA 600 hydrographic echo sounder consists of one or more transducers, a General Purpose Transceiver (GPT) and a Hydrographic Operator Station (HOS). When required for enhanced protection, the GPT unit(s) may be installed in a dedicated steel cabinet.

- Transducers are available at frequencies ranging from 12 to 710 kHz.

- The General Purpose Transceiver (GPT) contains transmitter and receiver electronics. It can be configured for single beam operation. The receivers are designed for low noise, and they can handle input signals spanning a very large instantaneous dynamic amplitude range of 160 dB. All targets are correctly measured and displayed. Output transmit power per frequency channel is maximum 2 kW per channel.

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

- If more than one transceiver is used, a small ethernet HUB or switch is used to connect the General Purpose Transceivers to the computer.

- Most of the echo sounder functions are implemented in software. The bottom detection algorithm is implemented solely in software with separate computation for each frequency channel.

- Interfaces are provided for depth telegram output as well as navigation data, temperature sensor and motion sensor inputs. An external push button may be connected for manually start and stop of the survey lines.

- An external push button may be added for manual control of the event triggering.

- Socket interface is included. To run the EA 600 software and other software (for example survey- or classification software) on the same computer, this socket interface is required for data transmission between the software packages.

System diagrams

The following system diagrams are provided:

- EA 600 with one transceiver
- EA 600 with two transceivers
- EA 600 with Hydrographic Operator Station (HOS) and two transceivers
- EA 600 with a Hydrographic Operator Station (HOS) and the GPT Cabinet.

System diagram with one transceiver

1) Display unit 2) Processor unit 3) General Purpose Transceiver (GPT) 4) Transducers
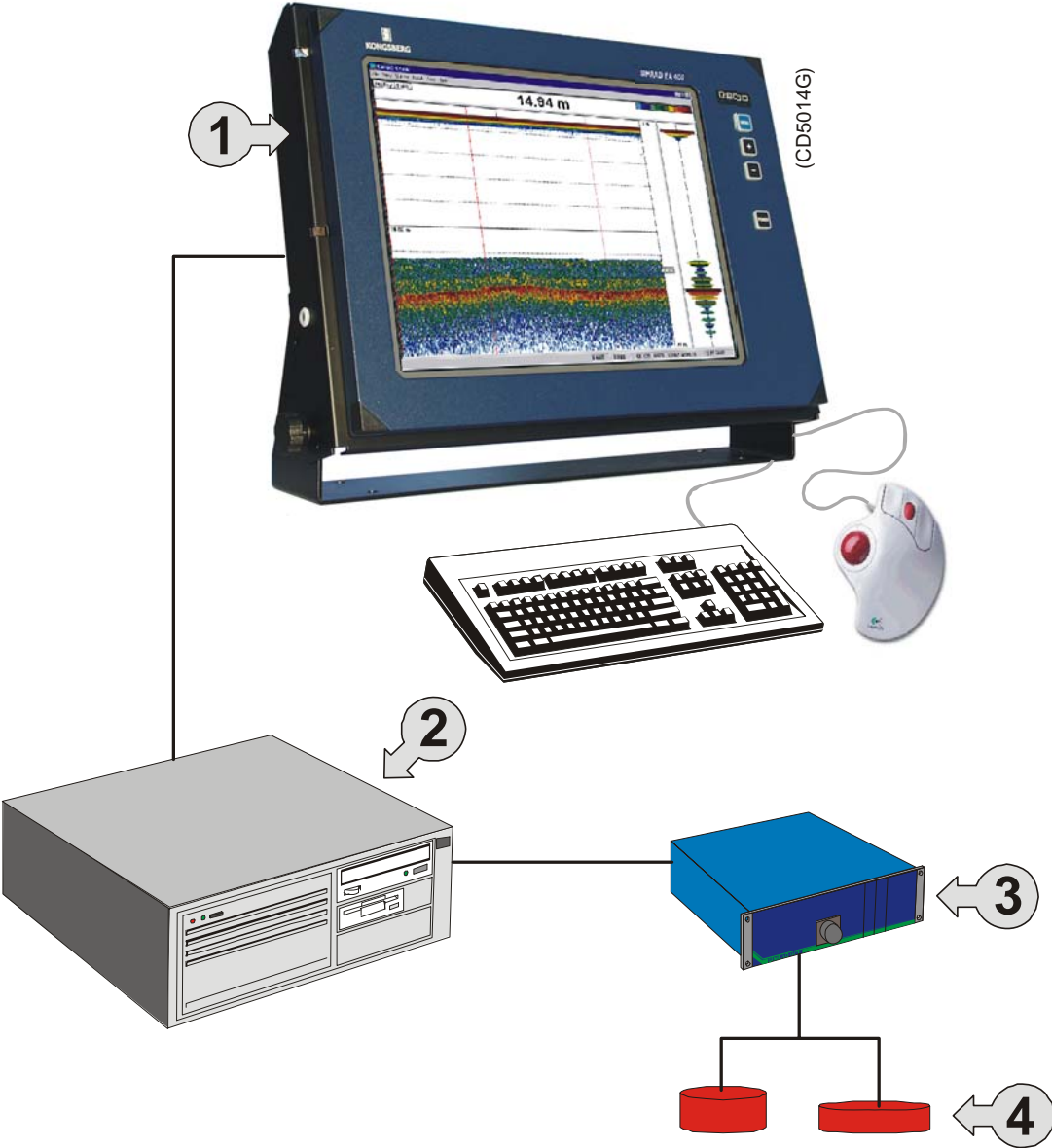
System diagram with two transceivers

1) Display unit 2) Processor unit 3) General Purpose Transceiver (GPT)
4) Transducers 5) Ethernet HUB or switch
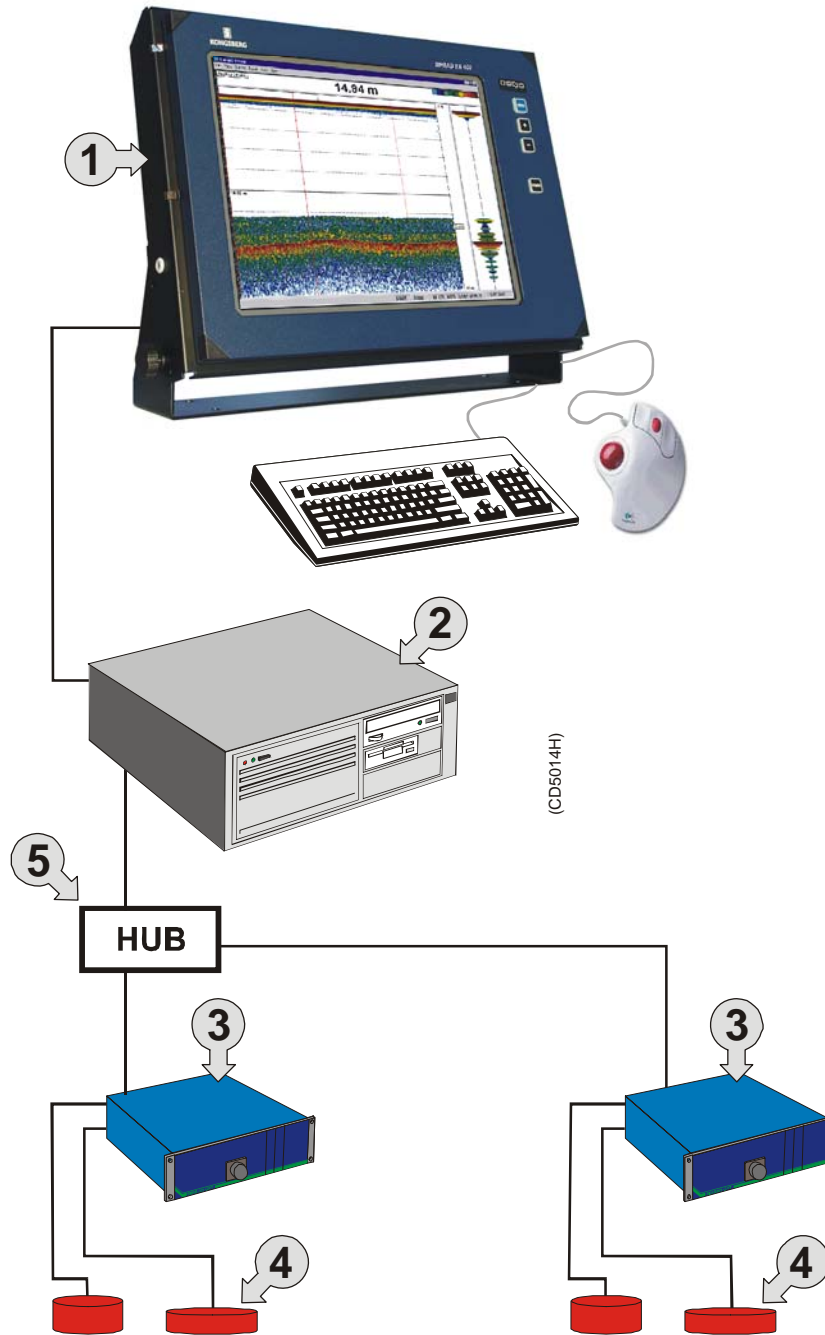
System diagram with Hydrographic Operator Station (HOS) and two transceivers

1) Hydrographic Operator Station (HOS) 2) General Purpose Transceiver (GPT)
3) Ethernet HUB or switch 4) Transducers A) Navigational data B) Motion sensor data

(CD5015I)
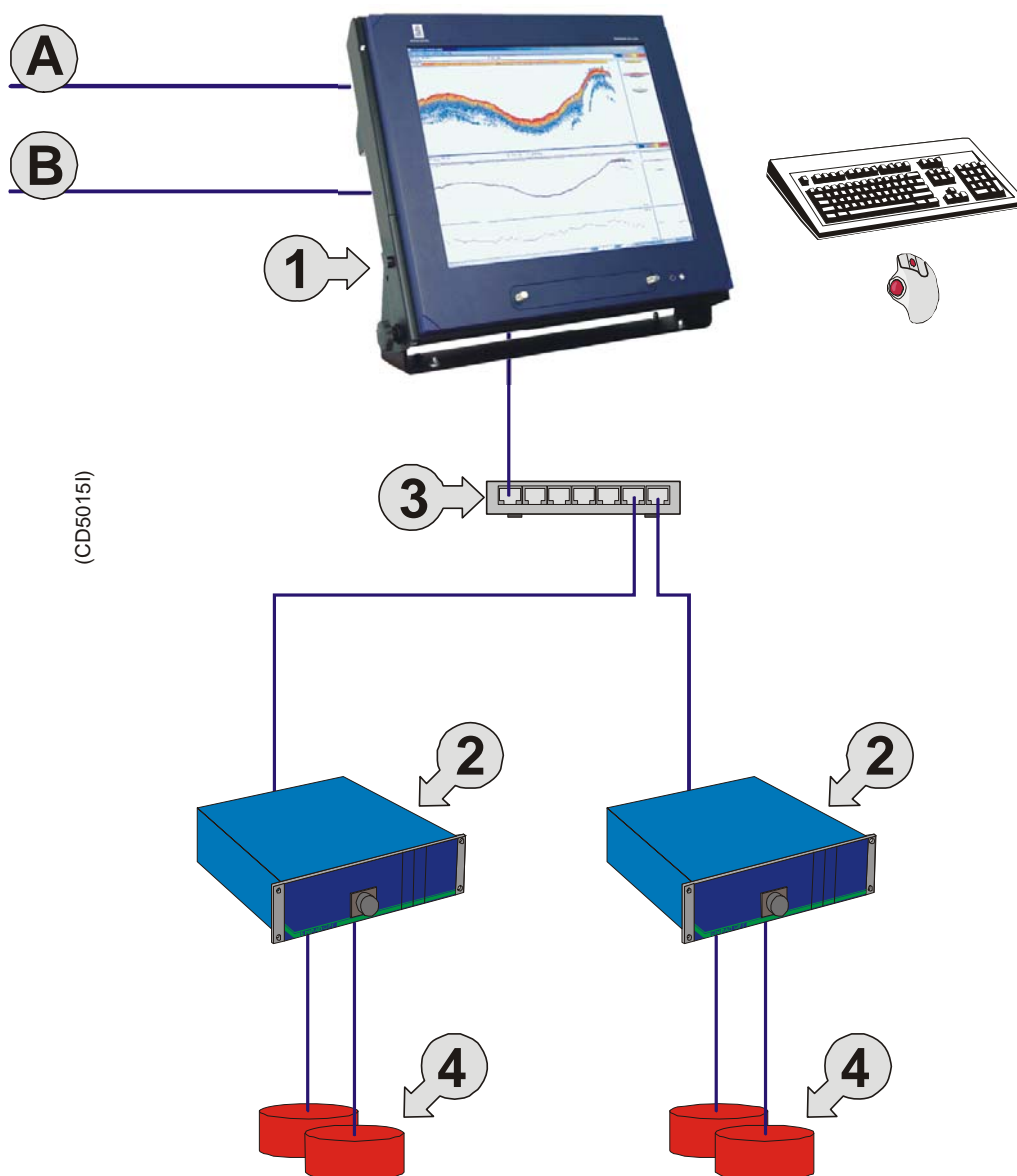
System diagram with Hydrographic Operator Station (HOS) and a GPT Cabinet

1) Hydrographic Operator Station (HOS) 2) GPT Cabinet with one or two General Purpose Transceivers (GPT) 3) Transducers

(CD5014E)

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** dialogue box is 1500 m/s.

Figure 1   The wave propagation principles
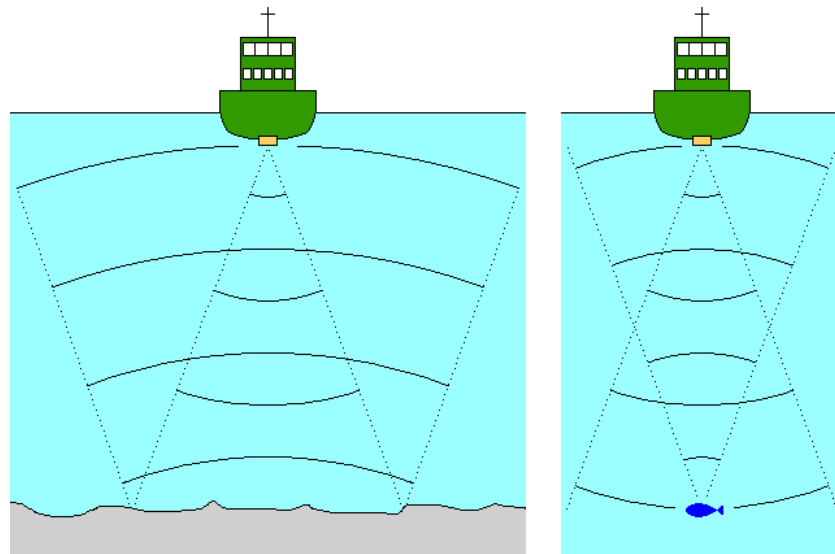
The EA 600 transmits high energy sound wave pulses into the sea. A flat bottom reflects the transmitted wave as if it were a mirror. The propagating energy is spread over a larger and larger area as it travels down to the bottom and up again. The energy is spread over a four times larger area every time the travel distance doubles.

At the bottom there are many small targets. All targets within the beam angle will be reflected. The area which is covered by the beam will increase with the **square-law** or **20 log TVG** (Time Varying Gain) spreading. Bottom of the same type (same backscatter) will be displayed with the same colour independent of the depth.

The situation is slightly different when observing the echoes from individual fish. The transmitted wave undergoes square-law spreading when travelling from the surface and down to the fish. The swim bladder of the fish scatters a small fraction of the arriving energy in all directions. Travelling from the fish and back towards the surface the scattered wave undergoes another square-law spreading. The combined effect is referred to as **quad-law** or **40 log TVG** spreading.

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

→   *Environment, page 120*

→   *Echogram, page 114*

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 2
Bottom echo
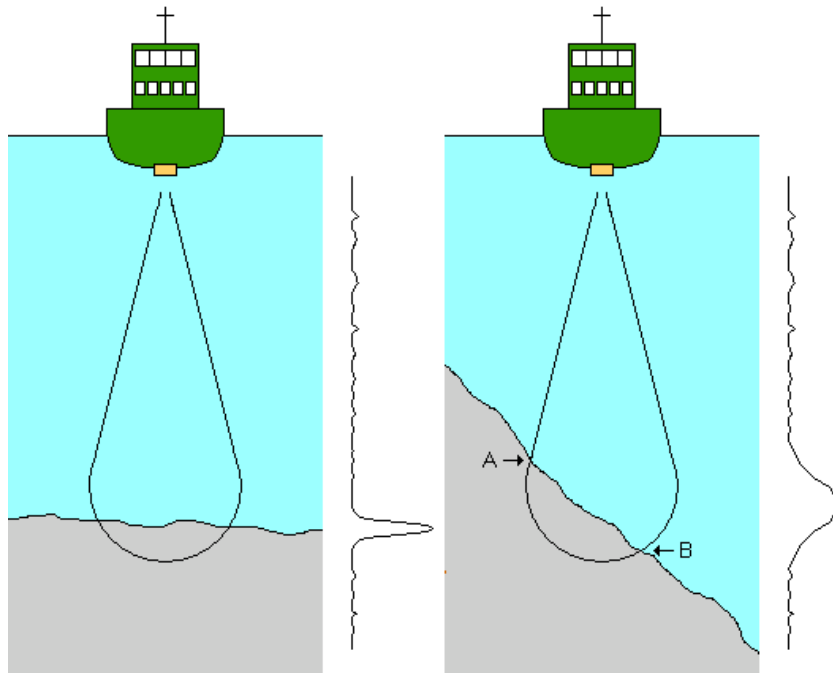
The received echo signal is basically an attenuated copy of the short transmit pulse. The echo signal from a sloped bottom is characterised by having a longer duration and a slower rise and fall time. The transmitted pulse first hits the slope at point **A**, and as time elapses the reflection point 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 EA 600 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.

Sidescan

Specially designed transducers for hull or over-the-side mounting are available from Kongsberg Maritime for sidescan operation. The operating frequency is 120 or 200 kHz.
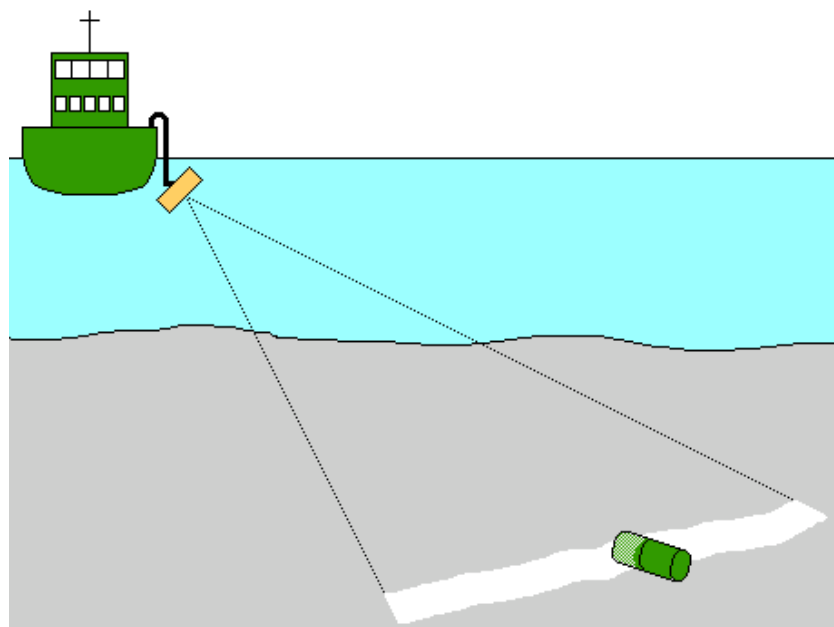
Figure 3   The sidescan principle

A sonar side looking type of image is generated on the echo sounder display when pointing this transducer near horizontally. With a beam width of 50 degrees vertically and only 0.5 or 2 degrees horizontally the scanning sector is narrow enough to resolve relatively small objects on the sea floor, but wide enough to allow higher survey speeds than with conventional side looking echo sounders. Bottom elevations and objects are immediately recognised on the echo sounder colour display. Side scan operation can be used for wreck searching and for surveying navigable channels for obstacles. Monitoring riverbanks, erosion, land slides and flow induced sediment deposits are other useful applications.

The software in the EA 600 is prepared for dual sidescan operation and presentation. The sidescan data is captured and stored in a digital format. This allows for further data processing to a sidescan sonar mosaic image by combining data from a number of survey lines. It is even possible to allocate one or two vertical channels for normal echo sounding while doing the dual acoustic imaging.

Multipulse

In deeper waters, most echo sounders will only provide a slow depth update, due to the time it takes for the sound pulse to travel from the transducer, down to the bottom, and then up again.

To counter this, and thus to ensure a higher accuracy, the EA 600 supports a "multipulse" mode. In short, the echo sounder will then send pulses into the water faster than the depth would normally allow.

The multipulse function is fully automatic. Once initiated, it will check the current depth, calculate the necessary ping rate, and synchronize itself.

A procedure and a more thorough theoretical description is provided in the *Operational procedures* chapter.

Related topics

Pinger mode

The EA 600 provides an advanced and synchronized passive mode for depth measurements using a pinger.
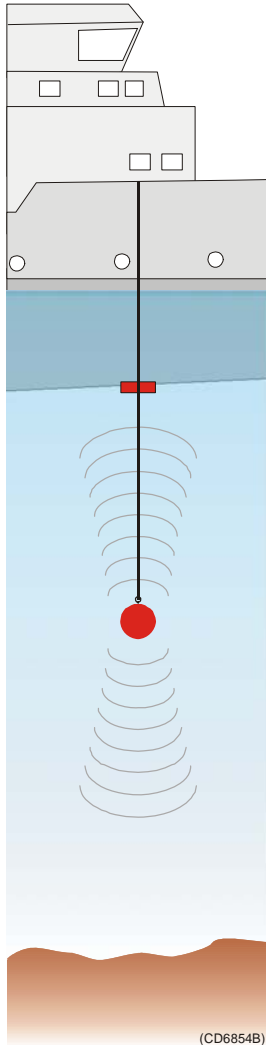
In this mode, the echo sounder will not transmit on the normal transducer(s). Instead, a pinger is lowered into the water below the hull. This pinger is normally attached to a device, and the purpose is to track and display the current depth of this device.

The pinger transmits two sound pulses into the water. One goes down towards the bottom, while the other is directed up towards the echo sounder transducer. The pulse going down will reflect from the bottom, and reach the transducer some time after the direct pulse. The echo sounder measures the time between these two pulses, and calculates how deep in the water the pinger sits.

The depth of the pinger is displayed as a red line on the echogram. If it is fastened to a sinking object, you will see the red line gradually falling towards right.

A more detailed description with display examples can be found in the Operational procedures chapter.

Related topics

→ *Using the pinger mode, page 83*

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.

Maximum detection depth

Transducer type	Frequency, kHz	Pulse duration, ms	Beam angle, degrees	Band width, Hz	Transmit power, W	Range bottom, m
12–16/60	12	16	16/60	193	2000	10000
18–11	18	8	11	382	2000	7000
27–26 (*)	27	8	10x11 / 10x20	387	2000	4000
38–7	38	4	7	766	2000	3000
38–9	38	4	9	766	1500	2600
38/200D	38	4	13x21	766	1000	2100
50/200D	50	2	10x16	1493	1000	1400
50–18	50	2	18	1526	500	1400
50–7	50	2	7	1493	2000	1900
120–25	120	1	10	3026	1000	800
200–7	200	1	7	3088	1000	500
38/200	200	1	7	3026	1000	450
50/200	200	1	7	3088	1000	450

Note (*) - Out of production as of January 1st 2005.

Typical observation ranges are shown in the table. Bottom detection can be expected to work down to 3000 meters when using the **Simrad 38-7** transducer (37 kHz, 7x7 degrees, 2000 W). However, bottom detection becomes unreliable below 450 meters if you use the **Simrad 50/200D** transducer (200 kHz, 7x7 degrees, 1000 W)

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

Processor Unit

The Processor Unit comprises a standard personal computer. It may be provided locally, but the following specifications are recommended:

- **Processor:** Pentium 400 MHz
  - Minimum requirement: Pentium 1 GHz
- **Memory capacity:**
  - Minimum requirement: 256 Mb
- **Hard disk capacity:**
  - Minimum requirment: 40 GB
- **Disk drives**
  - 1.44 Mb floppy
  - CD-ROM Read/Write
- **External interfaces**
  - Minimum 2 x RS-232 serial lines, recommended 4 x RS-232 serial lines
  - Parallel/USB port
  - 2x ethernet RJ-45
- **Operating systems**: MS Windows 2000 or XP
- **Additional software required:** Internet Explorer 5.0 (or later)
- **Operational temperature:** 0 to +40 deg C
- **Storage temperature:** -40 to +70 deg C
- **Humidity:** 5 to 95% relative non-condensing

Note   *Observe that the maximum total cable length used between the Processor Unit and the General Purpose Transceiver (GPT) is 100 meters using CAT5 STP 10 Mbit cable.*

Echosounder system

- **Frequency channels:** 1, 2, 3 or 4 channels
- **Operating frequencies:** 12, 18, 33, 38, 50, 120, 200, 210 and 710 kHz
- **Echogram types:**
  - Surface echogram
  - Bottom expansion
  - Alongtrack slope
  - Pinger mode
- **Gain function:** 20 log TVG, 30 log TVG, 40 log, TVG or None.
- **Ping rate:** Adjustable, maximum 20 pings per second.
- **Start depth and range:** 5 to 15,000 meters in Manual, Auto range or Auto start modes.
- **Scope presentation:** Displays the echo strength of the most recent ping.
- **Colour scale:** 12 colours (3 dB pr colour)
- **Bottom detector:** Software tracking algorithm, adjustable minimum and maximum depth

External interfaces

Numerous external interfaces are provided for the EA 600 echo sounder system.

Outputs

- Echogram printer (Centronics parallel)
- Depth data (NMEA, Simrad or Atlas)
- Echogram (only on Ethernet)
- Navigation
- Relay navigation
- Motion sensor
- Status messages
- Annotation
- Sound Velocity Profile applied
- Temperature sensor
- Remote display
- Raw data (only Ethernet) (Classification)
- GeoRef data (only network)

Inputs

- Navigation receiver (NMEA)
- Heading (NMEA)
- Motion sensor (Heave, roll and pitch)
- Analogue heave, roll and pitch (+/- 10 V)
- Annotation
- Sound Velocity Profile
- Real time SVP smart sensor
- Transmit synchronization
- Temperature sensor
- Remote On/Off logging
- Remote On/Off pinging
- Remote On/Off history

Remote control toggle switches

- Survey Line
- Event
- Remote power
- Transmit synchronization

General Purpose Transceiver (GPT)

- **Transmit power:** Max 2 kW (Single or Dual frequency transceiver)

- **Receiver noise figure:** 3 dB

- **Transducer impedance:** 60 ohms

- **Output protection:** Short circuit and open circuit protection

- **Receiver input range:** Instantaneous dynamic amplitude range -160 dBW to -20 dBW (dB relative to 1W)

- **Connectors**
  - **Transducer**: 12-pin female Amphenol, Shell MS3102A-24, Insert 24-19S
  - **AUI**: 15-pin female Delta
  - **Network**: 8-pin RJ-45 socket
  - **Auxiliary**: 25-pin female Delta

- **Physical dimensions**
  - **Width:** 284 mm
  - **Height:** 112 mm
  - **Depth:** 246 mm

- **Weights**
  - **With one TX board:** 2.7 kg
  - **With two TX boards:** 3.3 kg

- **Supply power and fuses**
  - **AC**: 95 to 265 Vac, 50-60 Hz, 50-100 W
  - **DC:** 11 to 15 Vdc, 50-100 W

- **Fuses**
  - **AC fuse:** Ø5x20 mm, 2 A slow
  - **DC fuse:** Ø5x20 mm, 10 A slow or fast

- **Operational temperature:** 0 to +55 deg C

- **Storage temperature:** -40 to +70 deg C

- **Humidity:** 5 to 95% relative non-condensing

GPT Cabinet (IP55)

- **Contents**
    - One or two General Purpose Transceivers (GPT)
    - Ethernet HUB
- **Physical dimensions**
    - **Width:** 400 mm
    - **Height:** 425 mm
    - **Depth:** 420 mm
- **Weights**
    - **With one GPT:** Approximately 30.5 kg
    - **With two GPTs:** Approximately 34.5 kg
- **Supply power and fuses**
    - The GPT Cabinet holds one or two General Purpose Transceivers, and one ethernet switch.
- **Operational temperature:** 0 to +55 deg C
- **Storage temperature:** -40 to +70 deg C
- **Humidity:** 5 to 95% relative non-condensing

Processor Unit

The Processor Unit comprises a standard personal computer. It may be provided locally, but the following specifications are recommended:

- **Processor:** Pentium 400 MHz
  - Minimum requirement: Pentium 1 GHz
- **Memory capacity:**
  - Minimum requirement: 256 Mb
- **Hard disk capacity:**
  - Minimum requirment: 40 GB
- **Disk drives**
  - 1.44 Mb floppy
  - CD-ROM Read/Write
- **External interfaces**
  - Minimum 2 x RS-232 serial lines, recommended 4 x RS-232 serial lines
  - Parallel/USB port
  - 2x ethernet RJ-45
- **Operating systems**: MS Windows 2000 or XP
- **Additional software required:** Internet Explorer 5.0 (or later)
- **Operational temperature:** 0 to +40 deg C
- **Storage temperature:** -40 to +70 deg C
- **Humidity:** 5 to 95% relative non-condensing

Note

Observe that the maximum total cable length used between the Processor Unit and the General Purpose Transceiver (GPT) is 100 meters using CAT5 STP 10 Mbit cable.

Operator Station

The EA 600 is supplied with the HOS 192 Operator Station This is a 19-inch display with a built-in computer. Optionally, the smaller HOS 152 can be supplied.

Earlier systems included the HOS 181 or HOS 151.

Refer to the applicable documentation provided with the unit for more information.

Ethernet HUB

When more than one General Purpose Transceiver is supplied, the EA 600 will be supplied with an Ethernet HUB. Several different switches are available. A standard commercial is HUB supplied with the echo sounder, unless a specific type is specified by the customer. Further specifications may be found in the documentation supplied with the unit.

Standard HUB/switch:

- **No. of ports:** 5
- **Network speed:** 10 Mbps
- **Interfaces**: RJ-45 Ethernet and BNC (optional)
- **External power supply:** 230 Vac
- **Power consumption:** Max 10 W
- **Power frequency:** 50 to 60 Hz
- **Operational temperature:** 0 to +40 deg C
- **Storage temperature:** -20 to +80 deg C
- **Humidity:** 5 to 80% relative non-condensing

DISPLAY VIEWS

Introduction

This chapter provides a brief overview of the information displayed by the EA 600, and how it is organised.

Related topics

Display organisation

Main view

The EA 600 display is organised as follows (from top):

- Menu bar
- For each transceiver channel:
    - One header view
    - Two echo frames
- Status bar

A single channel display is shown below as an example.

(CD5675A / BM300)
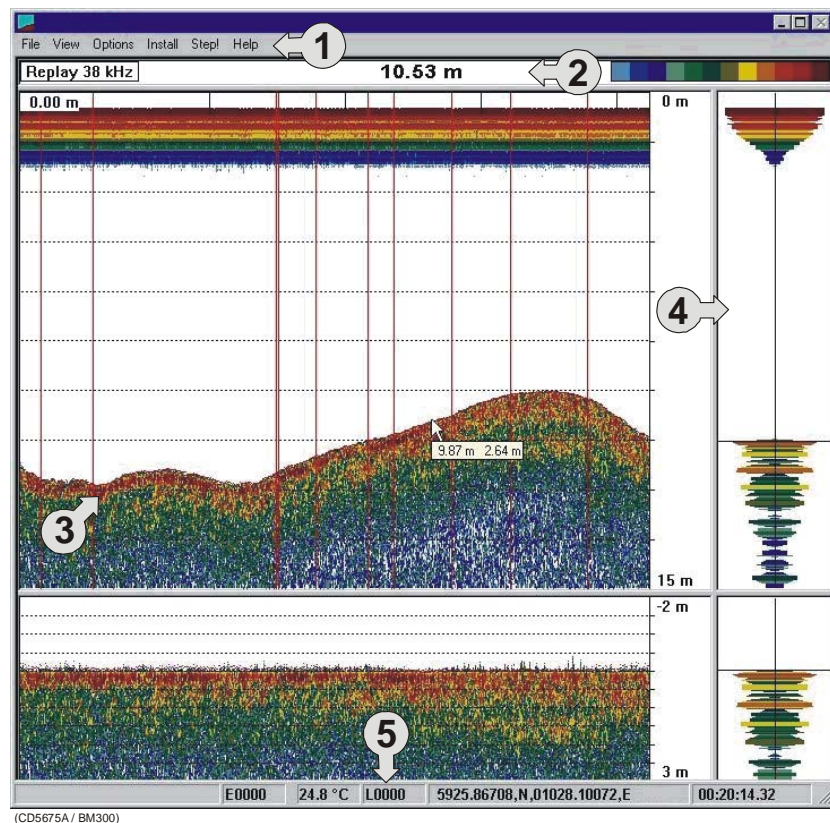
(1) Main menu   *(2) Header view*

(3) Echogram and range view   *(4) Scope view*

(5) Status bar

Menu

The **Menu bar** contains the echo sounder's main menu. A single click on one of the menu names will provide a new drop-down menu where additional choices can be made.

Header

For each channel, the **Header** view contains the current operational mode and frequency, the current depth, and the colour scale.

The **Header** view also displays the current slope angle.

Echo frames

The **Echo frame** takes up the largest part of the echo sounder window. Each **Echo frame** contains (from left) the **Echogram and Range** view and the **Scope** view.

When the **Slope Angle** view is enabled, this view will replace the **Echogram and Range** presentation.

The **Echo frame** view is are also described in more detail in the Getting started chapter.

Status bar

The **Status bar** presents the current event and line numbers, current time, and other information provided by the echo sounder.

Moving the boundary lines

You can modify the vertical size of the echograms by moving the horizontal boundary line between the two echograms.

To do this:

1   Position the cursor at the boundary line.

2   Press the left mouse button.

3   Drag the cursor up or down vertically while keeping the left mouse button pressed.

4   Release the left mouse button.

Using the same operation, you can modify other boundary lines on the display;

• The horizontal line between the upper **Echo frame** and the **Header** view

• The vertical line between the **Echogram and Range** view and the **Scope** view

Direct access to dialogue boxes

Several dialogue boxes are directly accessed from the various views on the display.

Position the cursor, and right-click on the...

- **Mode and frequency** information in the **Header** view to open the **Transceiver Settings** dialogue box.

- **Depth** value in the **Header** view to open the **Bottom Detector** dialogue box.

- **Colour scale** in the **Header** view to open the **Colour Scale** dialogue box.

- **Range** field in the **Echogram and Range** view to open one of the **Range** dialogue boxes, depending of the current echogram type.

- **Echogram** field in the **Echogram and Range** view to open the **Echogram** dialogue box.

- **Slope angle** value in the **Header** view to open the **Slope** dialogue box.

"Hidden views" overview

To present all hidden views in one main dialogue box:

- Position the cursor in the **Header** view.

- Press the <u>left</u> mouse button.

   - A list of the dialogue boxes described above will be displayed in one box, and you will have direct access to each of them.

```
Transceiver Settings...
Bottom Detector...
Colour Scale...
Surface Echogram...
Bottom Echogram...
Surface Range...
Bottom Range...
Status Window...
```

This pop-up menu also allows you access to the **Status window**, which provides abbreviated information of the current echo sounder parameters.

Related topics

- → *Menu bar, page 30*
- → *Header view, page 31*
- → *Echo frames, page 33*
- → *Status bar, page 38*
- → *Getting started; Operation, page 49*
- → *Bottom Detector, page 107*
- → *Colour Scale, page 110*
- → *Echogram, page 114*
- → *Bottom Range, page 109*
- → *Status window, page 168*
- → *Surface Range, page 175*
- → *Transceiver settings, page 182*
- → *Slope, page 166.*

Menu bar

The EA 600 **Menu bar** contains the **Main menu**.

(CD24214 / BM300B)

(1) The main menu

The main menu has the following options:

- File
- View
- Options
- Interfaces
- Install
- Step!
- Help

To operate, click on the menu name and observe the drop-down menu. Select a new item on the drop-down menu by clicking on the command. Commands shown with light grey colour are unavailable in the present configuration or operational mode.

The menus are all explained in the Reference Guide.

Related topics

→ *Main menu, page 89*

→ *Reference guide, page 88*

Header view

The EA 600 **Header** view is shown directly above the two Echo frames. The top **Header** view is thus located just below the **Menu** bar. The **Header** view contains the following information.
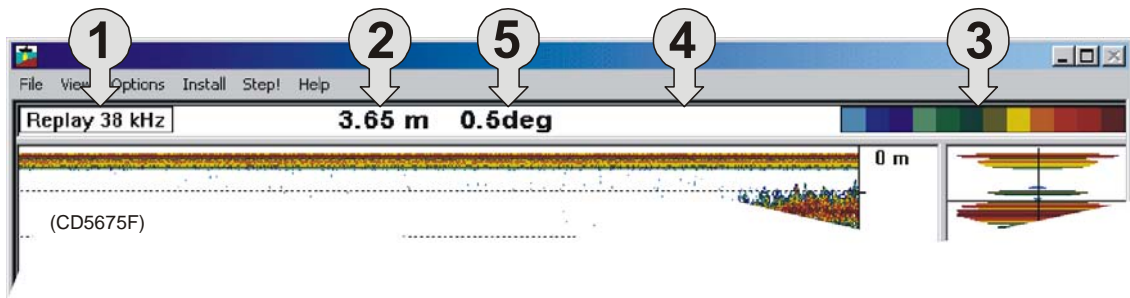
(1) Transceiver settings: Current mode and frequency

(2) Bottom detection: Current depth

(3) Colour Scale

(4) Action field for "hidden dialogue boxes"

(5) Slope measurement: Current slope angle

The **Header** view is a part of the channel. If more than one channel is displayed, the **Header** view is duplicated as well.

The **Header** view provides direct access to the following dialogue boxes:

* Right-click in the Transceiver settings field (on the **Mode** and **frequency** information) to open the **Transceiver Settings** dialogue box.

* Right-click in the Bottom detection field (on the **Depth** value) to open the **Bottom Detector** dialogue box.

* Right-click on the **Colour scale** to open the **Colour Scale** dialogue box.

* Left-click on the **Header view** to open all hidden dialogue boxes in one menu.

* Right-click on the Slope measurement field (on the **Slope angle**) to open the **Slope** dialogue box.

If the alongtrack slope has been enabled in the **Echogram** dialogue box, the slope value will also appear in the **Header** view. The information is then presented on the right side of the current depth. (Right-clicking on this information opens the **Slope** dialogue box.)

Related topics

→ *Transceiver Settings, page 182*

→ *Bottom Detector, page 107*

→ *Colour Scale, page 110*

→ *Slope, page 166*

Echo frames

Overview

The EA 600 **Echo frames** are the main information bearer on the echo sounder display. The **Echo frames** are usually presented in pairs with two echo frames for each channel.

The **Echo frame** contains the following views:

- Echogram and Range view

- Scope view

- Slope Measurement view (when enabled)

(CD6744D / BM300B)
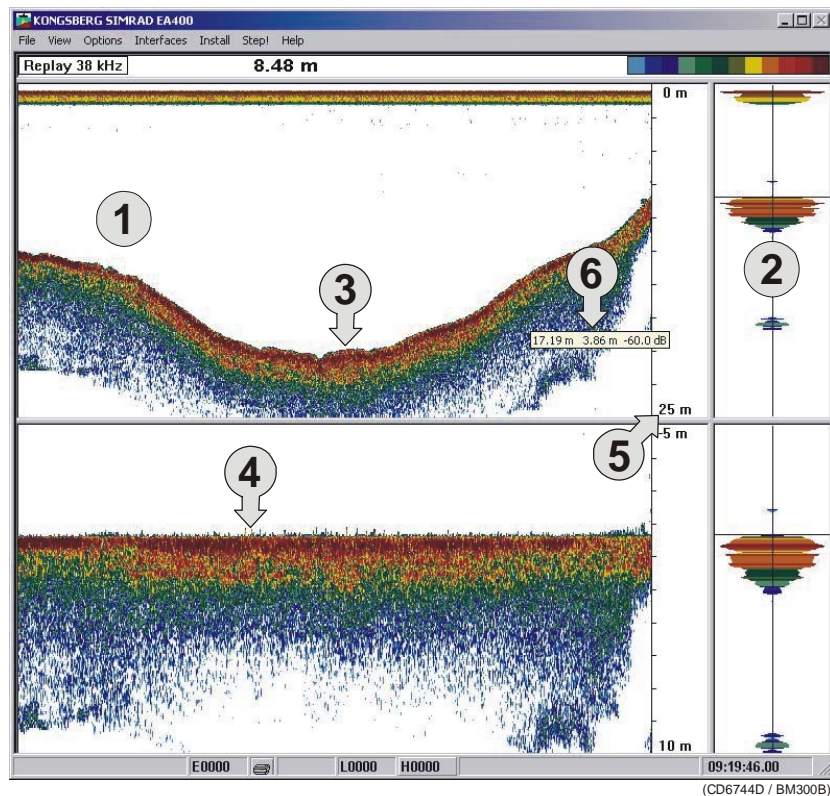
(1) Echogram   and range view

(2) Scope view

(3) Echogram

(4) Echogram with bottom expansion

(5) Range

(6) Depth, coverage and TVG at cursor's location

Echogram and Range

The **Echogram and Range** view consists of an **Echogram** field to the left and a **Range** field to the right. These are separated by the vertical range axis. The **Echogram** field contains information about the acoustical values, while the **Range** field is used for specifying the range used in the **Echogram** field. The settings in the **Colour Scale** is used to present the information.

In the echogram field, the presentation can be of different views. This can be selected in echogram dialogue bok as 1x, 3x, 5x, or all. Fore examle: If a 20 tranducer system; all selected, 20 echogram in the echogram filed.

When you place the cursor in the **Echogram** field, you can use the mouse wheel to modify the TVG value, and hence the display colour sensitivity. Each click of the wheel corresponds to a 1 dB change. The same colour sensitivity setting is available from the **Colour Scale** dialogue box.

Whenever the cursor is located within the **Echogram** field, a small yellow label is visible. The label provides the following information:

- **Left:** Depth at the cursor position
- **Middle:** Diameter coverage from the transducer beam
- **Right:** Current TVG value

Note

This information is only valid when #x echogram is selected.

To change the range, you can also use the mouse wheel. Place the cursor inside the **Range** field to do this:

- In a surface related echogram you will modify the range, while for a bottom related echogram, you will change the start range.

- If you press the left mouse button while you use the mouse wheel, the surface echogram will change its start value, while the bottom related echogram will change its range.

Related topics

Scope

The **Scope** view is the rightmost view and shows a oscilloscope view of the last ping corresponding to the settings in the **Echogram** view.

This view draws a range of horizontal symmetrical colour lines. The distance from the vertical centre axis and the line colour reflects the received echo amplitude. A black horizontal line across the view indicates the current bottom view.

If you press the <u>right</u> mouse button with the mouse pointer positioned in the **Scope** view, the graphic presentation will be replaced by a text based presentation of the data. The following information is provided:

Channel:

Test presentation for passive or test mode

Passive:

Background Noise: yyy.y dBW

Receiver Amplitude: xxx.x dBW

Sidescan

If the necessary transducers are available, the EA 600 can be set up as a "sidescan sonar" with only a few easy commands. Two echograms are used, but a third channel may be added to show the current depth, provided that suitable hardware is installed.

(1) Sidescan echograms

(2) Depth echogram

(3) Sidescan range

(4) Annotation / Position

(5) Distance information

(6) Vertical depth (ext. depth)

(CD2407B)
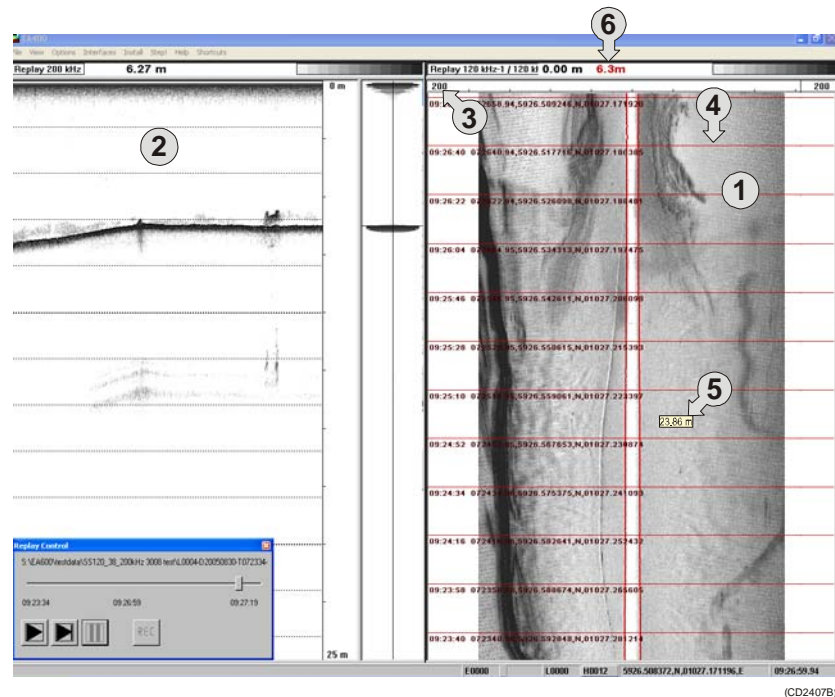
The illustration shows an excerpt from the echo sounder display. It shows a dual sidescan presentation in the upper frame, and a third channel in the lower frame providing current depth.

The sidescan echogram scrolls in its vertical direction.

To change the sidescan range, place the cursor inside the sidescan range field. Click the right mouse button to open the **Sidescan Range** dialogue.

When you place the cursor in the sidescan echogram, the distance from the transducer to the object is given at the cursor position.

To export the position of an object, click on the left mouse button in the side scan echogram view. The position will be displayed in the status bar (bottom left of the display). Simultaneously this position is also marked in the view by a red cross.

The position is exported on the network. The port is defined in the Network menu. This function will be carried out automatically, so no tag has to be activated.

A specific procedure in the *Operational Procedures* chapter explains how to set up the sidescan option.

Related topics

→   *Operational procedures, page 78*

→   *Sidescan Range dialogue, page 164*

Status bar

The EA 600 **Status bar** is located at the bottom of the display. It contains the following information:

Note that the water temperature read-out will only be available if a sensor is connected to the echo sounder. Also, navigational information requires that the applicable position information is connected to the echo sounder.

(CD6744E / BM300D)
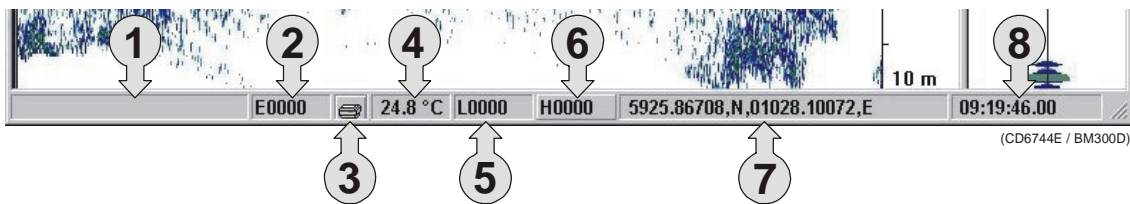
(1) Information applicable for the current operation

(2) Event number

(3) Printer logo (when printer is active)

(4) Current temperature

(5) Line number

(6) History file number

(7) Navigational information (latitude and longitude)

(8) Time

Related topics

→   *Status bar, page 97*

History and printer views

Overview

The echogram information provided on the display will differ slightly from the information provided on the printer and in the **History** files. This is because the annotation settings differ between the two media.

The annotations provided for display output are controlled by the **Annotations** dialogue box. When enabled in the **Prister and History** dialogue box, the annotations will also be sent to the printer and to the History files.

The **Printer and History** dialogue box also enables additional annotations to be printed.

Related topics

→   *History, page 129*

→   *Annotations, page 104*

→   *Printer and History, page 147*

Display example

The echogram shown on the display will contain a vertical red line for every annotation selected in the **Annotation** dialogue. The line is identified with free text entered in the dialogue box.
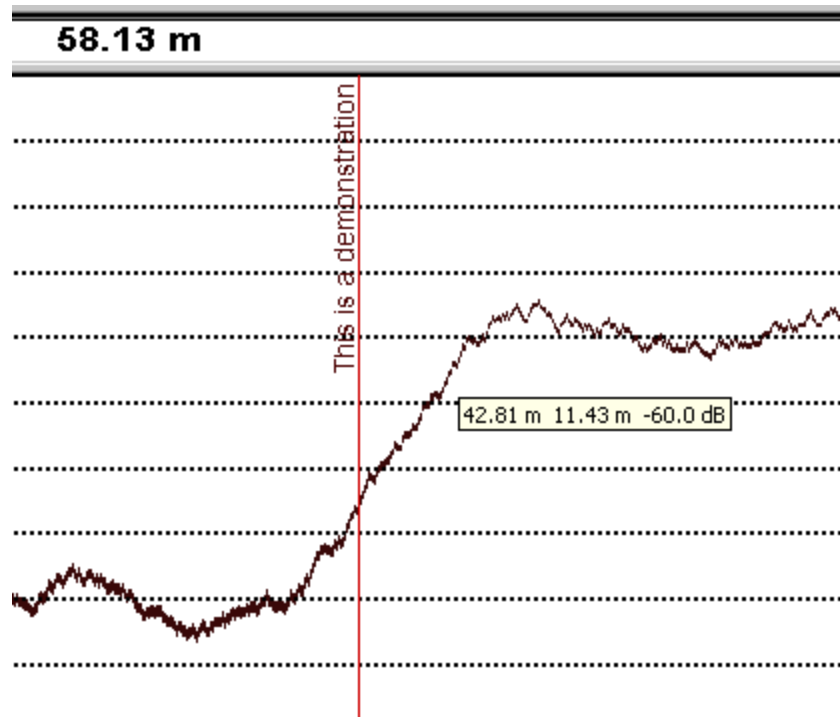
Figure 4   Display example with a single text annotation

Printer example

A printout from the echo sounder is shown below.
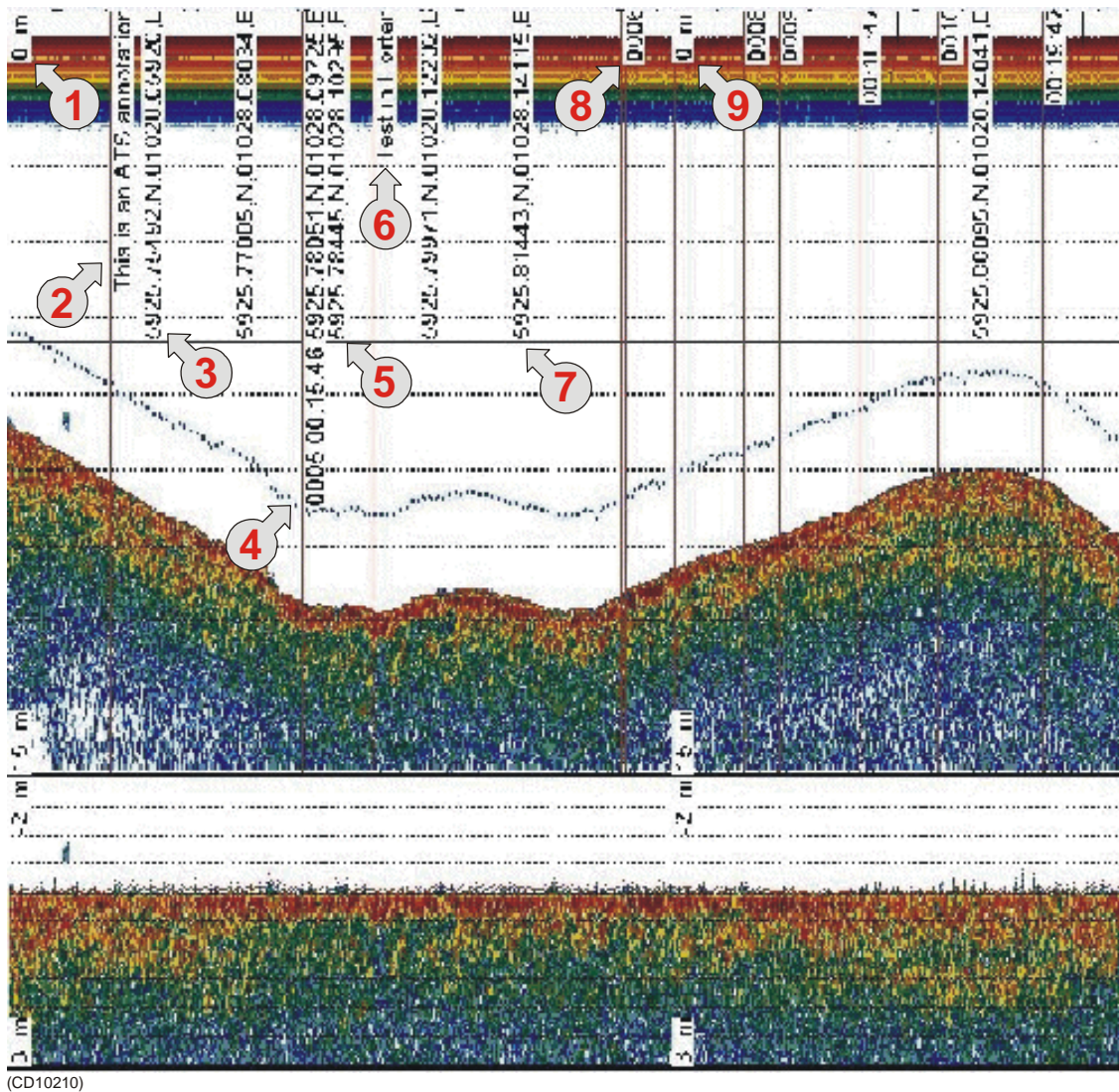
(CD10210)

Figure 5   History and printer presentation

From the top left corner, you can see the following annotations.

(1) A depth annotation. This information will automatically appear at regular intervals, and whenever you change the echo sounder's depth range.

(2) An external annotation with the text "This is an ATS annotation". This annotation has been imported on the serial line from the navigation system.

(3) Two annotations with navigational information. This information appears with regular intervals when enabled from the **Printer and History** dialogue box.

(4) One **Event** annotation with both navigational and time information added. This annotation is controlled by the parameters in the **Annotation** dialogue box. It will only appear on the printer output and in the History when you press the **Event number** in the **Status bar**.

(5) One annotation with navigational information. This is identical to item 3.

(6) One **Text** annotation with the text "Test in Horten". This text is entered in the **Annotation** dialogue box. You will need a keyboard connected to your echo sounder to do this.

(7) Two annotations with navigational information. This is identical to item 3.

(8) One **Event** annotation with no additional information added. The number shown ("0006") is the event number. The annotation appears on the printer output and in the History when you press the **Event number** in the **Status bar** .

(9) One depth annotation. This is similar to item (1).

(Others) Several other annotations to provide examples.

To add **Text**, **Time** and **Event** annotation, you must open the **Annotation** dialogue box. This box is accessed from the **File** menu.

Additional text to the printer and History window is controlled by the parameters in the **Printer and History** dialogue box. This box is accessed from the **File** menu.

Alongtrack slope

The EA 600 **Alongtrack slope** view is here shown in the top echo frame. The function is enabled in the **Echogram** dialogue box, while the parameters are defined in the **Slope Settings** dialogue box.
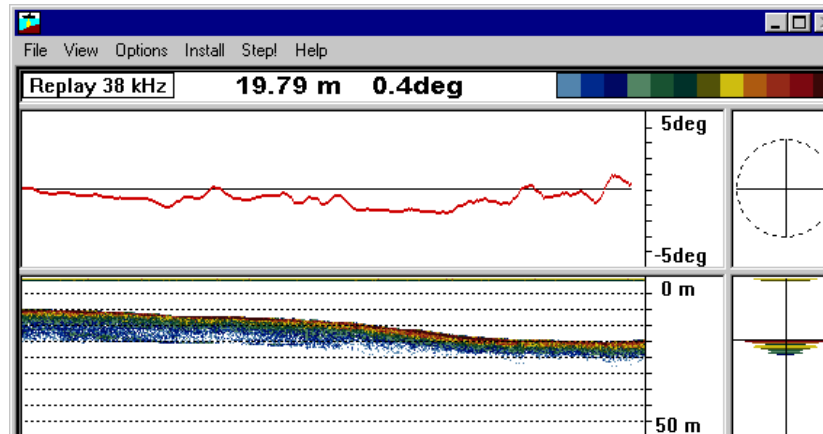
To open the **Slope Settings** dialogue box, right-click on the slope information in the **Header** view.

The **Slope measurement** view consists of a time series graph to the left, a degree marker in the middle and a slope angle indicator on the right.

The degree marker field is used to set up the scale of the view.

Whenever the cursor is located within the **Slope** view, a small yellow label is visible. The label provides information about the slope angle at the current cursor position.

Figure 7 Manual slope
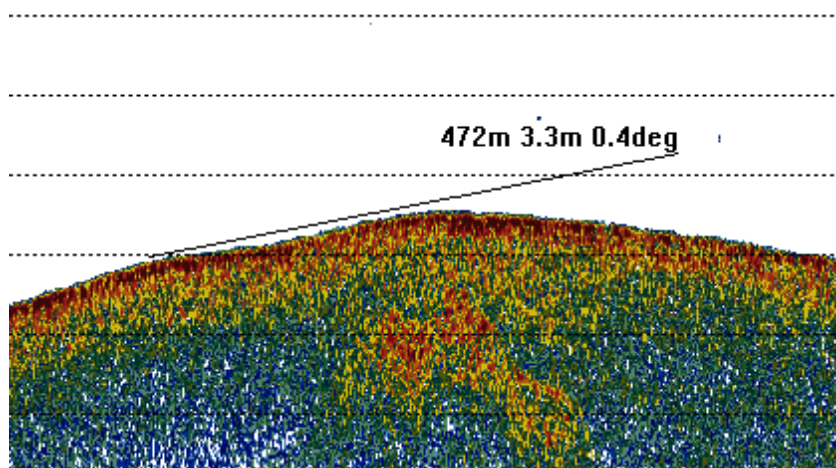
When manual slope is enabled, the slope may be measured in the **Echogram** view. Click the left mouse button while holding down the **Shift** button on the keyboard when the mouse pointer is placed in the **Ehogram** view. A drag line will follow the mouse cursor, slope measurements will show up together with the drag line.

Related topics

→   *Procedure, page 74*

→   *Echogram, page 114*

→   *Slope Settings, page 166*

GETTING STARTED

Introduction

This chapter will guide you through the main operations of the EA 600 by the use of an operational example. The intention with this chapter is to provide you with an overview of the main functions in the echo sounder, and to demonstrate how the EA 600 may be used in a realistic operational situation.

Topics

Before you start

Before you start the EA 600, make sure that the necessary hardware items are correctly installed and connected. The transducer(s) must also be defined in the EA 600 software on the computer.

Be aware that if the Windows Firewall is "on", the network communication can cause some problems. Turn it off or choose "UNBLOCK". Other type of security program can cause same problem.

Related topics

→   *Physical installation, see the Instruction Manual.*

Refer to the installation instructions in the paper manual for more information.

Licensing

Overview

The EA 600 echo sounder is a licenced product. It will not operate without the correct license code.

Start without valid licence

The EA 600 echo sounder will not start without the correct license code. An error message will appear.

Enter license code

To enter the EA 600 access code, perform the following procedure:

1   Press the **Start** button, select **Programs**, and observe the **Simrad** program group.

2   In this program group, select **License**.

3   Enter the licence code, press **OK**.

4   Restart the echo sounder.

License validation

When the license code has been entered, the EA 600 will perform a license validation. If this validation is unsuccessful, an error message will appear.

If this validation is unsuccessful, you will be prompted to verify.

Start-up

Overview

This chapter provides the basic procedure required to power up the echo sounder and start the pinging.

Power-up procedure

After these initial preparations you can open the EA 600 program on the computer. The "power on" procedure is described in detail in the *Operational procedures* chapter.

The menu system

The menu system is based on the Microsoft Windows® commercial standard interface. An overall explanation of the menu system with a description of the various views are presented in the *Display views* chapter.

Transceiver inspection

First, we need to check that the transceiver (or transceivers) are connected.

Open the **Install** menu, choose the **Transceiver** command to open the **Transceiver Installation Mode** dialogue box. In this dialogue, press the **Inspect** button to open the **Transceiver Settings** dialogue box.

You may now check that the transceivers are installed correctly. Active transceivers appear in green text in the **Frequency Channel Selection** box.

Click the **Cancel** button to finish.

If none of the transceivers listed appear in green text, check the connections and re-install the transceiver(s).

Environmental parameters

To obtain correct values for the various acoustical parameters calculated by the EA 600 program, it is important that you provide the EA 600 program with accurate parameters describing the environment; sea temperature, salinity and sound velocity.

These values are defined in the **Environment** dialogue box.

Open the **Install** menu, choose the **Environment** command to open the **Environment** dialogue box.

Unless the default values are acceptable, you must enter data for salinity, sound velocity and water temperature. These values are used for calculating depths and absorption coefficient. The values must be as accurate as possible!

Click **OK** when you have finished.

Navigation interface

To link acoustical data with navigational data the EA 600 must be able to receive data provided by a GPS or another positioning system. The **Navigation Interface** dialogue box is used to define the parameters to achieve this.

Open the **Install** menu, choose the **Navigation** command to open the **Navigation Interface** dialogue box.

Specify how the EA 600 will receive navigational data. Since the NMEA standard has been implemented, you only need to choose between NMEA or ASCII.

If ZDA clock is available, the PC system clock can automatic be synchronised with ZDA input. Then choose "Automatic Set Clock".

Click **OK** when you have made the setting.

Additional interfaces

Additional interfaces have been provided for other peripheral systems.

If you want to use a heave or a temperature sensor, choose the **Heave** and **Temperature** commands on the **Install** menu to specify these interfaces.

Related topics

Operation

Overview

This chapter describes a few of the most common functions used during normal operation.

Selecting operational mode

You are now ready to start the actual operation of the EA 600 echo sounder. The first thing to do is to choose operational mode.

Open the **File** menu, choose **Operation** to open the **Operation** dialogue box. In the **Mode** group, click **Normal** for normal mode.

(You may alternatively click **Replay** for replay mode, but you must then also click **Files** to choose a replay file. Note that operating in replay mode will restrict you from changing certain parameters during operation.)

Next, you need to define the ping rate. To do this, locate the **Ping Rate** group box, and set the ping rate to **Interval** for manual setting of the ping interval. For this exercise, set the ping interval time to 1 second, and click **OK** to finish.

The echo sounder will now start pinging, and after a few moments the echogram field on the display will present a new echo line. The various fields on the display are explained in detail in the *Display views* chapter.

Transceiver settings

The operational mode and the transceiver frequency are displayed to the far left in the **Header** view. A dedicated dialogue box - **Transceiver Settings** - 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 length.

To open this dialogue box, position the cursor over the mode and frequency information in the **Header** view, and click the right mouse button. Specify the estimated depth of the transducer surface, and set **Transmit Power** to its maximum value. Set the **Pulse Length** to a medium value of 1.024 ms (for 38 kHz), and click **OK** to accept the settings.

The chosen pulse length will result in an acceptable resolution of approximately 0.75 m, and acceptable signal-to-noise ratios at the depths considered in this example.

Note that if you operate in **Replay** mode, the transceiver settings can not be changed.

Additional information about the transceiver settings are available if you press the **Advanced** button in the **Transceiver Settings** dialogue box.

Bottom detector settings

The **Header** view on the display is also used to present the current depth. The **Bottom Detector** dialogue box is used to define various parameters associated with the bottom detection. These include the depth range, where the EA 600 searches for the bottom.

The EA 600 can also use the **Detect Second Layer Bottom** function when using depth from a high frequency transducer. This function is only used when the second layer is to be displayed. Do not use for hydrographic surveying.

To open the **Bottom Detector** dialogue box, position the cursor over the displayed depth in the **Header** view, and click the right mouse button.

In our example we will assume that the depth will vary between 30 and 200 meters. Therefore, set **Minimum Depth** to 30 m and **Maximum Depth** to 200 m. Click **OK** to accept the settings.

Note

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

Colour scale

The **Colour Scale** field is used to display the colour scale for mapping acoustical values. These colours are used in the **Echogram And Range** view. Each colour always represents a 3 dB value range. Using all 12 colours in the colour scale thus enables mapping of a 36 dB value range to colours.

Position the cursor over the colour scale, click the right mouse button to open the **Colour Scale** dialogue box. Accept the default settings and click **OK**.

Echogram and Range view

The **Echogram and Range view** consists of an **Echogram** field to the left and a **Range** field to the right. These are separated by the range axis. The **Echogram** field contains information about the acoustical values, while the **Range** field is used for specifying the range used in the **Echogram** field.

Echogram field

The **Echogram** field is used to display acoustical values for each ping. The settings in the **Colour Scale** are used to determine the colour sensitivity in the echogram.

Position the cursor in the **Echogram** field, and click the right mouse button to open the **Echogram** dialogue box.

The **Echogram** dialogue box allows you to define the area of interest for the echogram. Your choice will affect the meaning and the options in the **Range** field in the **Echogram** view. You can also choose the TVG function used to calculate the acoustical values.

In this example, choose **Surface – Manual** to enable a surface related echogram. Then, choose the **Bottom gain** TVG function for calculating s_V-values. Finally, click **OK** to accept the settings.

Range field

The **Range** field allows you to read and specify the range used in the **Echogram** field. The current range is displayed on the range axis. In the **Range** dialogue box you can define the area of interest for the echogram.

Position the cursor in the **Range** field, click the right mouse button. Observe a dialogue box referring to either **Surface** or **Bottom** depending on your choice in the **Echogram** dialogue box.

In this case, check that you have the **Surface Range** dialogue open.

Set **Range** to 200 m and **Start Relative Surface** to 0 m, then click **OK** to accept the settings.

Comments to the Echogram and Range view

Two echograms are shown for each **Channel**. The second echogram for the present **Channel** may be used in the current example to show the distribution of fish close to the bottom.

- Use the **Echogram** dialogue in the second **Echogram** view to set the **Echogram** to **Bottom** and choose the **20 log** TVG function for calculating S_V-values.

- Use the corresponding **Bottom Range** dialogue to set **Range** to 20 m and **Stop Relative Bottom** to 5 m for the echogram to show values calculated from 15 m above the detected bottom to 5 m below the bottom.

When you place the cursor in the **Echogram** field, you can use the mouse wheel to modify the receiver gain level, and hence the display colour sensitivity. Each click of the wheel corresponds to a 1 dB change. The same colour sensitivity setting is available from the **Color Scale** dialogue box.

Whenever the cursor is located within the **Echogram** field, a small yellow label is visible. The label provides the following information:

- **Left**: Depth at the cursor position
- **Middle**: Diameter coverage from the transducer beam
- **Right**: Current TVG range

To change the range, you can also use the mouse wheel. Place the cursor inside the **Range** field to do this:

- In a surface related echogram you will modify the range, while for a bottom related echogram, you will change the start range.

- If you press the left mouse button while using the mouse wheel, the surface echogram will change its start value, while the bottom related echogram will change its range.

Scope view

The **Scope** view is the rightmost view and shows a scope view of the last ping corresponding to the settings in the **Echogram** view.

This view draws a range of horizontal symmetrical colour lines. The distance from the vertical center axis and the line colour reflects the received echo amplitude. A black horizontal line across the view indicates the current bottom view.

Related topics

→   *Display views, introduction, page 25*

→   *Transceiver Settings, page 182*

→   *Advanced Transceiver, page 102*

→   *Bottom Detector, page 107*

→   *Colour Scale, page 110*

→   *Echogram, page 114*

→   *Surface Range, page 175*

Data storage

Overview

This chapter presents a brief description of the data storage functionality.

Define storage parameters

It will often be beneficial to store raw acoustical data recorded during a survey. This allows you to change certain parameter settings when operating in replay mode at a later time.

Open the **File** menu, choose **Store** to open the **Store** dialogue box.

Note

*Note that **Store** is not available when operating in **Replay** mode.*

The **Store** dialogue box allows you to set various parameters associated with data storage. You can define a specific directory, and limit the file sizes.

Click **Browse** in the **Survey** box. Browse to the desired directory for file storage, or enter the directory name directly into the text box. If the directory does not exists it will be created.

Default directory is EA 600\data\

Click the **Save Raw Data** check box to save raw data. Define maximum file sizes by entering the desired value in the **Max File Size** box, and click **OK** to accept the settings.

When **Save Raw Data** is checked, the raw unprocessed transceiver data containing amplitude and angle information for the split beam transducers will be recorded.

Start and stop data storage

To start and stop data storing, use the **Line field** in the **Status bar**. The **Line field** is marked **LXXXX** and shows the current survey line number.

Position the cursor over the **Line field** in the **Status bar** and click the <u>left</u> mouse button. Observe that the survey line number increments, and that the line colour changes from black to red.

To stop data recording click the **Line field** again.

The red colour indicates that data recording is active. When the recording stops, the colour is changed back to black. The file names used for the stored data are determined by the survey line number and the date and time when recording started. A new file is created for each new survey line number.

Note that the depth range used for data collection and data storing is determined from the maximum range settings in the **Echogram** view, the bottom detection settings, the settings for **Echogram Parameters**, and the settings in the **Network Interface** dialogue box.

Related topics

→   *Store, page 169.*

→   *Echogram Parameters, page 119.*

→   *Network Interface, page 138.*

OPERATIONAL PROCEDURES

Overview

This chapter contains a number of specific procedures to be used with your EA 600 echo sounder.

Topics

Power on/off

Use the following procedures to switch the EA 600 echo sounder on and off.

Power on

It is assumed that the echo sounder's hardware and software are properly installed and configured.

1 Switch power on.
    - The location of the power switches are individually assigned. The computer has its own power switch. The transceiver(s) must be connected to separate power supplies, and should have a remote power switch.

2 Observe the hardware test messages and operating system start-up messages.
    - It takes a couple of minutes before the echo sounder window appears on the display.

The echo sounder memorises all its settings when power is switched off.

If pinging does not start you must check the settings in the following dialogue boxes:

- Operation

- Layout

- Transceiver Settings

- Transceiver Installation

If you are not successful you should use this procedure:

1 Check the **Transceiver Installation** dialogue box.

2 All frequency channels must be properly installed.

3 Select **Factory settings** in the **Options** menu.

Power off

To switch off the EA 600 echo sounder, observe the following procedure.

1 Select **Exit** on the **File** menu.

2 Allow the computer to close all the EA 600 software applications.
    - If desired, EA 600 can now be restarted using the desktop icon.

3 Switch off the power on the General Purpose Transceiver and other peripherals (if any).

When the EA 600 software has closed down, you may wish to close down the computer as well.

1   Click on the **Start** button in the lower left corner of the display.

2   Exit the operating system in the normal manner.

3   When notified, switch off the power.

Related topics

→   *Operation, page 141*

→   *Layout, page 133*

→   *Transceiver Settings, page 182*

→   *Transceiver Installation, page 180*

→   *Options menu, page 92*

Basic operations

Overview

This chapter presents a number of common procedures frequently carried out on the EA 600 echo sounder.

Changing the echogram settings

To change the echogram settings:

1   Position the cursor in the **Echogram** field.

2   Click the <u>right</u> mouse button.

3   Observe the **Echogram** dialogue box.

4   Make the required changes.

or:

1   Left-click in the **Header** view, and select the required dialogue box from the pop-up menu.

2   Make the required changes.

Related topics

→   *Echogram, page 114*

Changing the range

To change the range:

1   Position the cursor in the **Range** field.

2   Click the right mouse button.

3   Observe the **Bottom Range**, **Surface Range** or **Slope Range** dialogue box.

4   Make the required changes

or:

1   Left-click in the **Header** view, and select the required dialogue box from the pop-up menu.

2   Make the required changes.

or:

1   Place the cursor in the **Range** field.

2   Use the mouse wheel to change the range.

Related topics

→   *Bottom Range, page 109*

→   *Surface Range, page 175*

→   *Slope Range, page 165.*

Changing the vertical resolution

The vertical resolution of the echogram increases with a shorter pulse length.

For example, a pulse length of 1.024 millisecond gives a vertical resolution of 19.2 cm, whereas a pulse length of 0.256 millisecond gives a vertical resolution of 4.8 cm. If the vertical distance between two echoes is less than this, the two echoes will be shown as one

To change the pulse length:

1 Position the cursor over the frequency information in the **Header** view, and click the <u>right</u> mouse button.

- The **Transceiver Settings** dialogue box opens.

2 Move the pulse length slider to the desired pulse length value.

3 Click **Ok**.

or:

1 Left-click in the **Header** view, and select the **Transceiver Settings** dialogue box from the pop-up menu.

2 Make the required changes.

A small value gives the best resolution, while larger values are mostly used for surveys in deep waters.

Related topics

→ *Header view, page 31*

→ *Transceiver Settings, page 182*

Changing the transmit power

To change the transmit power:

1 Position the cursor over the frequency information in the **Header** view, and click the <u>right</u> mouse button.

- The **Transceiver Settings** dialogue box opens.

2 Move the transmit power slider to the desired value.

3 Click **Ok**.

or:

1 Left-click in the **Header** view, and select the **Transceiver Settings** dialogue box from the pop-up menu.

2 Make the required changes.

Related topics

→ *Header view, page 31*

→ *Transceiver Settings, page 182*

Setting minimum and maximum depth

Setting the minimum and maximum depth controls where the echo sounder will search for bottom lock.

Note

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

1 Position the cursor over the depth information in the **Header** view, and click the <u>right</u> mouse button.
   - The **Bottom detector** dialogue box opens.
2 Set minimum and maximum depth to the desired values.
3 Click **Ok**.

or:

1 Left-click in the **Header** view, and select the **Bottom Detector** dialogue box from the pop-up menu.
2 Make the required changes.

Related topics

→ *Header view, page 31*
→ *Bottom Detector, page 107*

Enabling the depth alarms

You can set individual alarms for minimum and maximum depth. You can also enable an alarm to sound off if the bottom track is lost.

1 Position the cursor over the depth field in the **Header** view, and click the <u>right</u> mouse button.
   - The **Bottom detector** dialogue box opens.
2 Set the values for minimum and maximum depth alarm.
3 Enable the alarms by ticking the appropriate boxes.
4 Enable the **Bottom Lost Warning** if required.
5 Click **Ok**.

or:

1 Left-click in the **Header** view, and select the **Bottom Detector** dialogue box from the pop-up menu.
2 Make the required changes.

Related topics

→ *Header view, page 31*
→ *Bottom Detector, page 107*

Adding annotations

You can add several different annotations to the displayed and printed information. All annotations are automatically displayed, while you need to enable the annotations to be printed.

Enable annotations to be printed

1   Select **Print** on the **File** menu.

-    The **Printer and History** dialogue box opens.

2   Under **Text to printer**, click **Annotation**.

3   Click **OK** to exit.

The annotations will be printed until this procedure is repeated.

Enter annotations

Three different annotations may be controlled from the **Annotations** dialogue box.

1   Select **Annotation** on the **File** menu.

-    The **Annotation** dialogue box opens.

2   To enter a single text annotation to the display:

a   Enter the desired annotation text into the **Text** box

b   Click **OK**.

c   The text you entered is displayed immediately, but it will not be repeated.

3   To add the current time as an annotation:

a   Under **Time**, click **Active**.

b   Enter the desired interval (in seconds) between the annotations.

c   Click **OK**.

d   The annotation will be repeated at the chosen interval until it is switched off.

4   To add an event annotation:

a   Under **Event**, select a start number.

b   Click **Increase** or **Decrease** to count the Event number up or down.

c   Click **Add Time** if you wish the event annotation to include the current time.

d   Click **Add Navigation** if you wish the event annotation to include the current position.

e Click the **Event** button on the **Status bar** every time you wish the annotation to be added to the display and/or print.

Enable external annotations

The echo sounder will accept external text annotations when these are input on the serial line. This function is permanently enabled on the serial and ethernet inputs.

Related topics

→   *Annotation, page 104*

→   *Printer and History, page 147*

→   *Annotation format, page 105*

Transceiver installation

Overview

Use the following procedures to install, modify or delete frequency channels from the echo sounder set-up.

General Purpose Transceivers (GPT) physically connected to the echo sounder's Ethernet interface are identified automatically by the system. When you open the **Transceiver Installation** dialogue box from the **Install** menu, a list will be provided.

A single frequency transceiver occupies one entry in the list, and a dual frequency transceiver occupies two. Each entry is identified as a **frequency channel**, and the line displays the parameters for the channel. Entries in the frequency channel list are shown in **black**, **green** or **red** colour identifying its current status.

To install a channel

1   Select **Transceiver** on the **Install** menu.

2   Select **Modify** in the **Transceiver Installation Mode** dialogue box.

  -   The **Transceiver Installation** dialogue box opens, and you are allowed to make changes.

3   Click the desired entry (one of the black colour line alternatives) in the **Frequency Channel Selection** list.

4   Assign a transducer by selecting a transducer name in the **Transducer Selection** list.

5   Click **OK** to accept the choice and exit the dialogue box.

6   Restart the echo sounder as described below.

To uninstall a channel

1   Select **Transceiver** on the **Install** menu.

2   Select **Modify** in the **Transceiver Installation Mode** dialogue box.

  -   The **Transceiver Installation** dialogue box opens, and you are allowed to make changes.

3   Click the desired entry in the **Frequency Channel Selection** list.

4   Select the alternative NONE in the **Transducer Selection** list.

5   Click **OK** to accept the choice and exit the dialogue box.

6 Restart the echo sounder as described below.

To modify an IP address

This procedure allows you to modify the IP address of the currently selected General Purpose Transceiver (GPT).

1 Select **Transceiver** on the **Install** menu.

2 Select **Modify** in the **Transceiver Installation Mode** dialogue box.

- The **Transceiver Installation** dialogue box opens, and you are allowed to make changes.

3 Select the General Purpose Transceiver (GPT) you wish to modify.

4 Click the **Set New GPT IP Address** button.

- The **IP Address** dialogue box opens.

5 Enter the new IP address.

- The significance of the address numbers is described with the **IP Address** dialogue box.

6 Click **OK** to accept the choice and exit the dialogue box.

7 Click **OK** to exit the **Transceiver Installation** dialogue box.

8 Restart the echo sounder as described below.

Related topics

→ *Transceiver Installation, page 180*

→ *IP Address, page 130*

Restart the echo sounder

Whenever a change has been made to any of the frequency channels, you must restart the echo sounder.

1 Select **Operation** on the **File** menu.

- The **Operation** dialogue box opens.

2 Select **Normal** operation, and click **OK**.

Related topics

→ *Operation, page 141*

Record and playback

Overview

You can set up the echo sounder to record the unprocessed transducer signals on the internal harddisk or other recordable media. This recorded signal may later be injected into the echo sounder's processing software as if it arrived directly from the transceiver.

During this replay, you may experiment with some of the echo sounder settings.

This feature is useful during training and demonstration. It is also useful for memorising a particularly interesting observation from the survey.

You can also use the built-in **History** function to record echogram data.

Record

Preparations

The recording is prepared as follows.

1   Select **Store** on the **File** menu.
   - Observe the **Store** dialogue box appear.
2   Select the complete path of the survey directory.
   - The directory is selected when you click the **OK** button. Click the **Browse** button if you wish to navigate through the disk directories. A new directory is created if the requested does not exist.
3   Select if you wish to save raw data, output data, xyz data, echogram data, text data or feoref data:
   - **Raw data:** The unprocessed transceiver data are stored in standard computer files. These files contain all the necessary data for reconstruction of the situation during the real survey. Thus the data include amplitude, phase, navigation data, annotation input etc. The echo sounder program reads these files during replay.
   - **Output data:** This is the processed output data; navigational data, bottom detections, annotations etc
   - **xyz data:** This is processed and interpolated xyz data in ASCII format. Note that navigation input must be available.
   - **Echogram data:** This is user defined excerpts of the processed sample data (pixel data), ie the backscatter value of the targets. The echograms are stored as time tagged datagrams in separate files.

- **Text data:** This is stored depth data and raw navigation data in ASCII format.
- **Georef data:** This is the stored vessels interpolated position lat/long, heading across range and depth. In the vertical view, only lat/long and depth..

4 Enter the maximum size of the storage files.

5 Select the initial line number.

6 Enter the maximum size of each replay file.

7 Click **Ok**.

Start recording

Use the **Line** field in the **Status** bar to start the recording.

1 Position the cursor over the **Line** field.

2 Press the left mouse button.

The line number increments, and the **Line** field is presented with a red colour.

Stop recording

To stop the recording:

1 Click the **Line** field once again.
- The original colour is restored.

The recording may also be stopped from a remote position if this function has been made available.

Size of stored raw data

The total size of raw data files stored on disk during operation depends on several user selections. From these selections you may estimate approximately the total amount of raw data stored in a given time period for each installed channel using the following equation:

$\mathbf{X} = (\mathbf{B}$ bytes per sample$) \bullet ((8 \bullet \mathbf{R}) / (\mathbf{c} \bullet \mathbf{tau}$ samples per ping$)) \bullet (\mathbf{M}$ ping per sec$) \bullet 24 \bullet (3600$ sec per day$) \bullet (\mathbf{K}$ days$)$

Where:

$\mathbf{X}$ = Total amount of stored raw data in bytes for one channel

$\mathbf{B}$ = 2 (Given by the echo sounder)

$\mathbf{R}$ = Maximum range in meters (User set)

$\mathbf{c}$ = Sound speed in water in meters per sec (User set)

$\mathbf{tau}$ = Pulse duration in seconds (User set)

$\mathbf{M}$ = Ping rate in ping per seconds (User set)

K = Number of operating/storage days (User set)

Thus, you can affect the amount of stored raw data by changing e.g. the range, pulse duration, and ping rate settings.

Example:

With range = 10 m, pulse length = 256 µS, 15 pings per second and sound velocity = 1500 m/s, the storage requirement will be **45 Mb** per hour. If you increase the range to 80 m, and reduce the ping rate to 7 pings per second, the storage requirement will be **60 Mb** per hour.

Related topics

→   *Store, page 169*

→   *Status bar and Line field, page 97*

Playback

When replaying the recorded signal, the ping rate is not limited by the speed of sound in water. Hence, a higher ping rate is possible during replay than during normal operation.

The playback is started as follows:

1   Select **Operation** on the **File** menu.

-    Observe the **Operation** dialogue box appear.

2   Click **Replay**.

3   Click **Files...**

-    Observe the **Replay** dialogue box appear.

4   Select survey with the standard file selection dialogue.

5   Click on the file(s) you wish to replay.

-    Observe that the currently selected file(s) appear in the **Selected files** list box.

6   Click **Loop** if you wish the replay to loop through the selected file(s) endlessly.

7   Click **Save Data** if you wish to record the file(s) in processed format during playback.

8   Click **Change Installation** if you wish to change sensor setup values, x, y, z or draught.

9   Click **Change SVP Profile** if you wish to change the sound velocity profile during replay.

10   Click **OK** to return to the **Operation** dialogue box.

11   In the **Operation** dialogue box, click **OK** to start the playback.

If you do not select **Loop**, the replay is stopped when the last recorded ping has been processed.

Related topics

→ *Operation, page 141.*

→ *Replay, page 154.*

→ *Reprocess heave, page 157.*

History

The **History** function is used to store echograms on bitmap format. The echo sounder may continuously save echogram pictures to the internal harddisk or an other recordable media. These can later be recalled on the display. The information in the **History** window is the same as on the printer.

The horizontal width of each echogram picture roughly corresponds to the the half width of the display. The information is stored as separate data files on the harddisk, and only the disk size limits the space for History files. The history function allows you to quickly look through echogram pictures covering several hours.

Record

The **History** recording can either be started with the procedure described below, or simply be pressing the **History** button on the **Status bar**. The text in the **Status** shifts to red when the recording is active.

To start **History** recording:

1   Select **Operation** on the **File** menu.

   - Observe the **Operation** dialogue box appear.

2   Click **Browse** to select disk directory.

   - Default directory is EA 600\history\

3   Create a new directory if required.

4   Click **Save** in the **History** field, or

5   Optionally, click **Synchronize with logfile** in the **History** field.

   - The history files will switch as the data log files are switched.

6   Click **Ok** to start the recording.

   - The text in the History field on the **Status bar** is red while recording takes place.

Alternative method for **History** recording:

1   Select **Operation** on the **File** menu.

   - Observe the **Operation** dialogue box appear.

2   Optionally, click **Synchronize with logfile** in the **History** field.

   - The history files will switch as the data log files are switched.

3   Click **Browse** to select disk directory.

4   Click the **History** button on the **Status bar** to start the recording.

   - The text in the History field on the **Status bar** is red while recording takes place.

To stop **History** recording:

1   Select **Operation** on the **File** menu.

   - Observe the **Operation** dialogue box appear.

2   De-select **Save.**

3   Click **Ok**.

Alternative method to stop **History** recording:

1   Click the **History** button on the **Status bar** to stop the recording.

   - The text in the History field on the **Status bar** turns to black, indicating that the recording has stopped.

Playback

To view the information recorded by the **History** function:

1   Select **History** on the **View** menu.

2   Browse the information in the **History** dialogue box.

The information provided by the **History** view is presented in a separate window. The echo sounder will operate normally in the background. However, you will not have access to any of the menues as long as the **History** window is open. When you wish to focus on the echo sounder operation, close or minimize the **History** window.

Print the current History information

To print the current view in the **History** window:

1   Select **History** on the **View** menu.

2   Press the printer symbol in the bottom right corner to print a single history file.

   - Note that only the file presented on the display is printed.
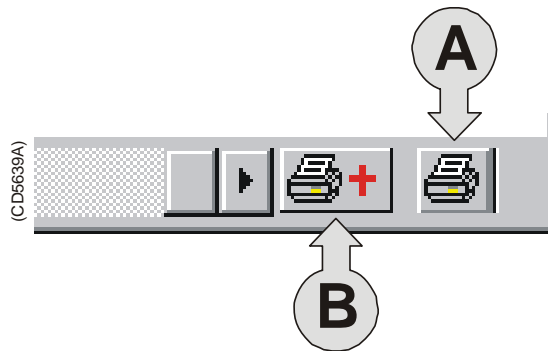
(A) Press to print current view

(B) Press to print multiple views

Print multiple History files

To print several images recorded by the **History** function, follow this procedure.

1 Select **History** on the **View** menu.

2 Browse the information in the **History** dialogue box until you find the images you wish to print.

3 Press the left printer icon (with the + sign) in the lower right corner of the **History** window.

4 Press the **Ctrl** key on the keyboard and the left mouse button simultanously to select the images to be printed.
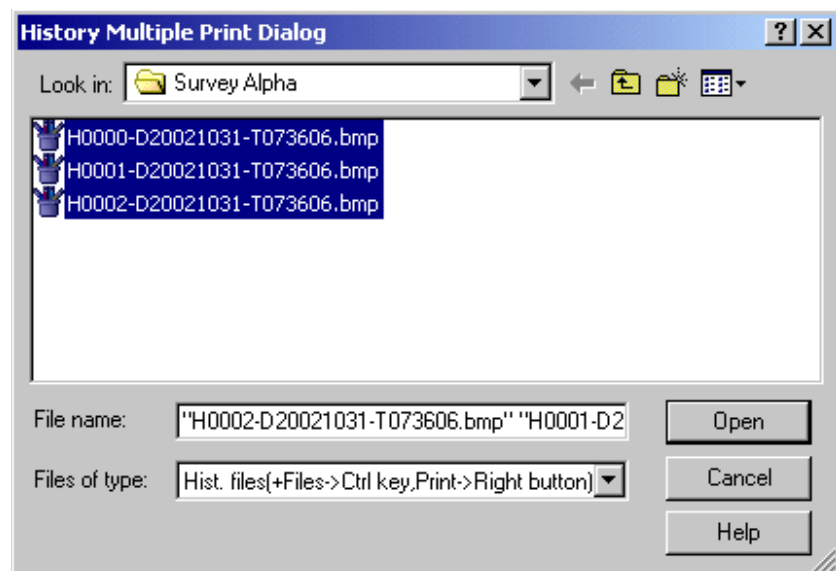
5 Press the <u>right</u> mouse button, observe the shortcut menu.

6 On the shortcut menu, select **Print**.

7 Press **Cancel** to close the dialogue box.

Related topics

→   *History window, page 39*

→   *History, page 129*

→   *Status bar; page 97*

→   *Operation; page 141*

Software installation and upgrades

Overview

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

The computer should automatically detect the insertion of the CD-ROM and open the **Installation program** dialogue box. If this is not the case, you must manually run the **Setup.exe** program on the CD-ROM's root directory.

When the echo sounder software is upgraded, the software will automatically detect the presence of General Purpose Transceiver(s), but you will need to check that the correct transducer(s) are enabled.

Whenever new echo sounder software is installed, you will need to define all serial lines, transducer(s) and transceiver(s).

Related topics

→ *Transceiver installation procedure, page 63.*

Software installation procedure

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 EA 600 CD-ROM.

3 Observe the **Installation program** dialogue box open.

4 Press **Complete installation**.

5 Enter the licence number.

6 Allow the echo sounder installation to run. Follow the instructions provided.

Do not remove the CD until the computer has powered up and rebooted after the installation.

Software upgrade procedure

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

1 Power up the computer, and allow the EA 600 to start.

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2 Close the EA 600 program by selecting **File** - **Exit**.

3 Insert the EA 600 CD-ROM.

4 Observe the **Installation program** dialogue box open.

5 Press **Update installation**.

6 Allow the echo sounder files to be copied from the CD-ROM to the computer's hard disk.

Do not remove the CD until the computer has powered up and rebooted after the installation.

Un-installation procedure

Use this procedure if you need to remove all the echo sounder software from the computer. Note that all data in the EA 600 directory will be erased.

1 Power up the computer.

2 Insert the EA 600 CD-ROM.

3 Observe the **Installation program** dialogue box open.

4 Press **Uninstall**.

5 Allow the echo sounder un-installation program to run. Follow the instructions provided.

Licence installation

After a complete installation, an update or when pressing the **Licence Installation** button, the **Licence** dialogue box will appear.

When performing a complete installation, the licence field will be blank, and you need to enter the licence string provided by Kongsberg Maritime. in the field and press **OK**. A licence validation will be performed before the licence is accepted. It is not possible to start an un-licenced version of the echo sounder. For further information, refer to *the Getting started* chapter.

Slope presentation

Overview

The EA 600 echo sounder provides you with the current bottom slope angle. To enable this function and to set up the display to show the slope values, observe this procedure.
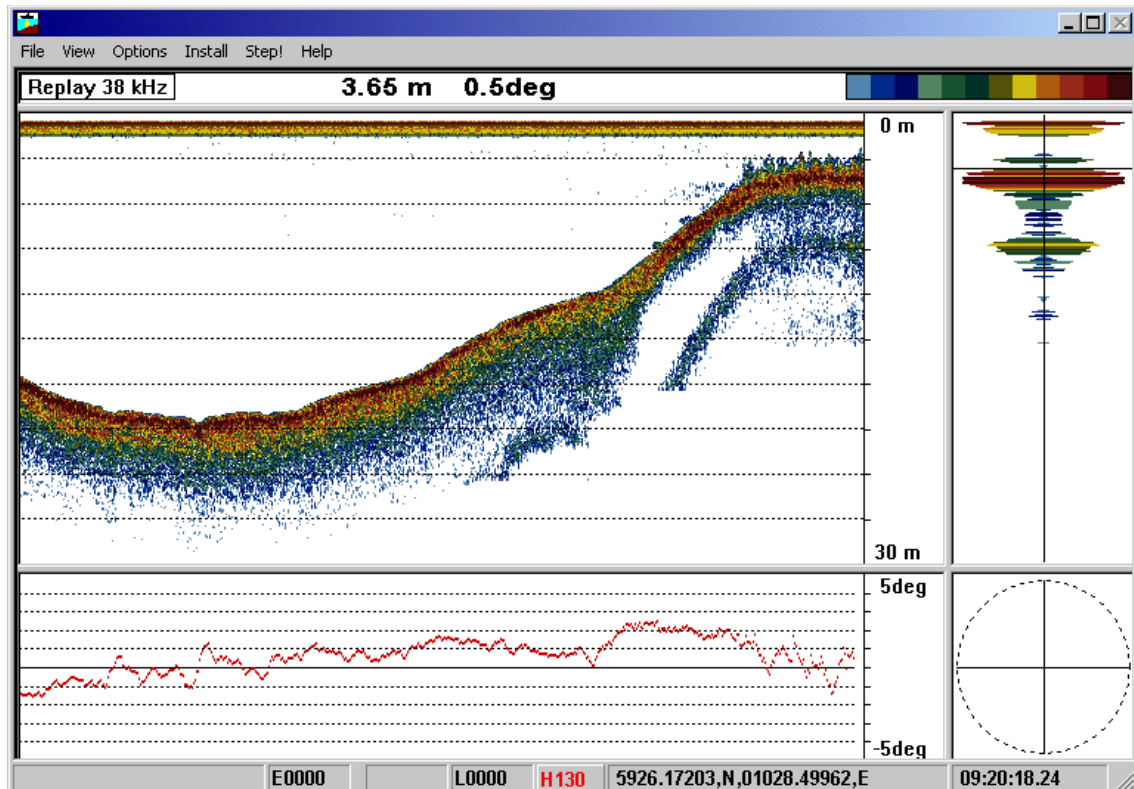
Figure 8   Display view with slope presentation in the bottom echo frame

Initialization

To enable the Slope presentation:

1   Right-click in the echo frame where you wish to place the slope information to open the **Echogram** dialogue box.

2   Select **Along Track Slope** in the Echogram field.

3   Click **Ok**.

4   Observe that the current slope angle of the bottom is represented as a time series graph default located under the echo frame, and that the current slope angle is shown in the **Header** view.

Whenever the cursor is located within the **Slope** view, a small yellow label is visible. The label provides information about the slope angle at the current cursor position.

Parameters

To change the Slope parameters:

1 <u>Right-click</u> on top of the current Slope value in the **Header** view to open the **Slope** dialogue box.

2 Switch the **Manual Slope** function on or off, and select the **Filter Size**.

3 Click **Ok**.

Figure 9
Manual slope
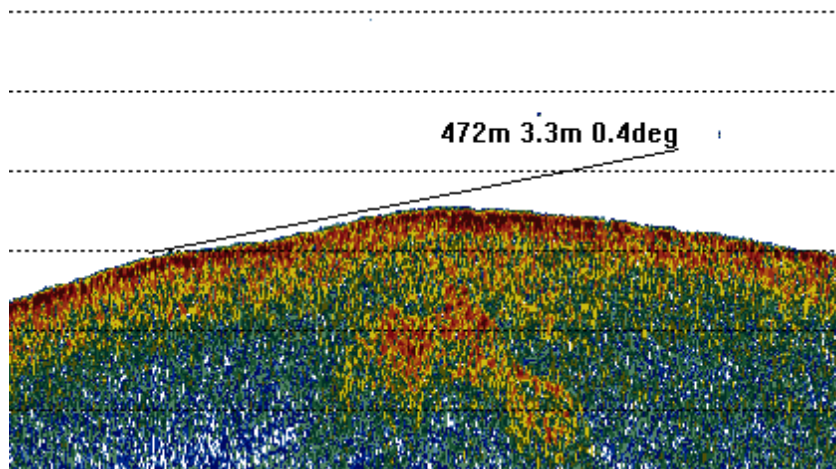
Manual slope

1 Access the **Slope** dialogue box, and set **Manual Slope** to On.

2 Right-click in the echogram to open the **Echogram** dialogue box, select one of the **Surface** echogram modes.

3 Click the <u>left</u> mouse button while holding down the <u>Shift</u> button on the keyboard when the mouse pointer is placed in the **Ehogram** view.

- Once the mouse button is depressed, the slope angle will connect to the bottom below the cursor position.

4 Observe that a drag line follows the mouse cursor. The current slope measurements appears at the end of the drag line.

- The end of the slope will display the **alongtrack distance**, **height over the bottom** and **angle**.

Related topics

→ *Slope display view, page 42*

→ *Slope, page 166*

→ *Echogram, page 114*

Sensor setup

Overview

In order to ensure that the data from the vessel's heave sensor are interpreted and used correctly by the echo sounder, you must position the heave sensor's location in respect to the transducer. Both locations are then referenced to the vessel's global **Reference point**.

Figure 10   The Vessel Coordinate system
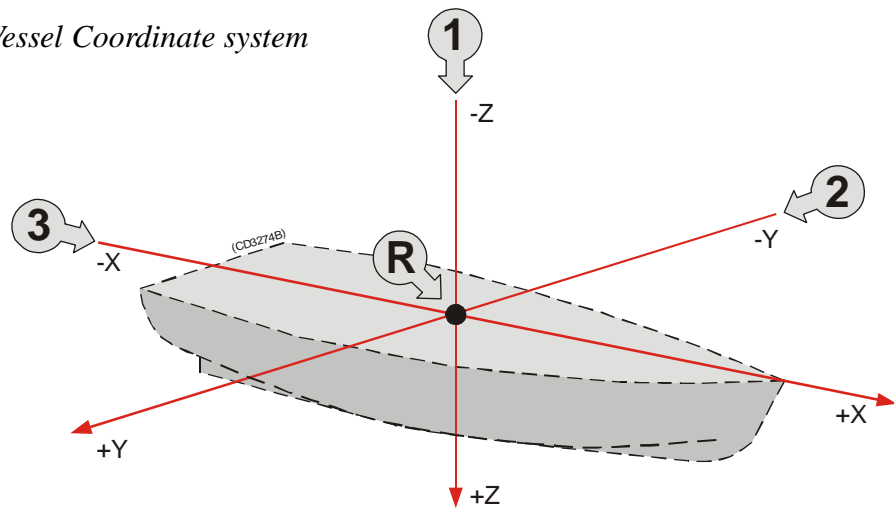
(1) Downwards   (2) Starboard (3) Forward
(R) Reference point

The theory

A main function of the parameters required for system installation is to inform the system of the relative positions between the various sensors and the angular orientation of the sensors with respect to the vessel. A reference point somewhere on the vessel has to be selected, and a Cartesian right-handed coordinate system - as shown in the figure below - must be defined with its origin in the reference point. The location of this reference point has no physical significance - it may be anywhere on the vessel. The placement of the various instruments must be identified with forward, starboard and downward coordinates in this coordinate system.

The forward axis (X) must be parallel to the vessel keel, and the downward axis (Z) must be vertical when the vessel is trimmed normally. The plane defined by the forward and starboard axes will then be horizontal, and the attitude sensor should then, if properly installed and calibrated, measure zero roll and pitch with a normally trimmed vessel lying still.

- **Forward position (X)** - Forward position is defined on the X-axis (refer to the illustration below). Locations further forward than the reference point are positive.

- **Downward position (Z)** - Downward position is defined on the Z-axis (refer to the illustration above). Locations below the reference point are positive.

- **Starboard position (Y)** - If a sensor location is on the starboard side of the reference point, the value will be positive.

Figure 11   Sensor locations (example)
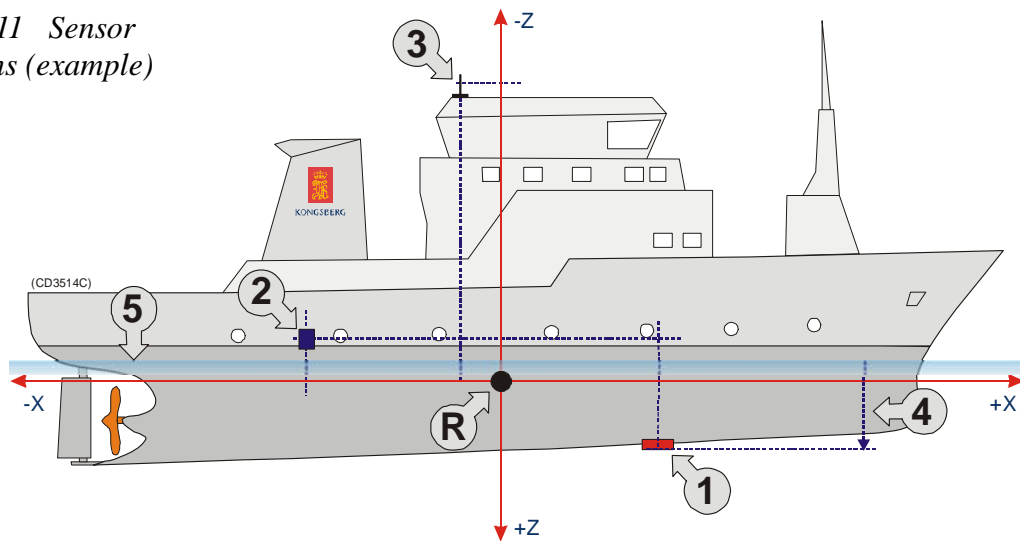
(1) Transducer   (2) Motion sensor   (3) GPS antenna
(4) Draught   (5) Water line   (R) Reference point

Procedure

1   Start the echo sounder, and make sure that normal operation is activated (not Replay).

2   Open the **Heave Sensor** dialogue box from the **Installation** menu.

3   Click the **Sensor setup** button, and observe the **Sensor Setup** dialogue box appear.

4   Enter the coordinate values.

5   Click OK in both dialogue boxes to save the settings.

Related topics

→   *Heave Sensor, page 126.*

→   *Sensor Setup, page 160.*

Sidescan

Overview

To use the **Sidescan** facility, you will need one or two extra transducers. If dedicated sidescan transducers are mounted, these must be installed facing sideways in a suitable angle. 120 and 200 kHz transducers have been specially designed for this purpose.

With only a few simple commands, you will turn your EA 600 into a "side looking sonar".
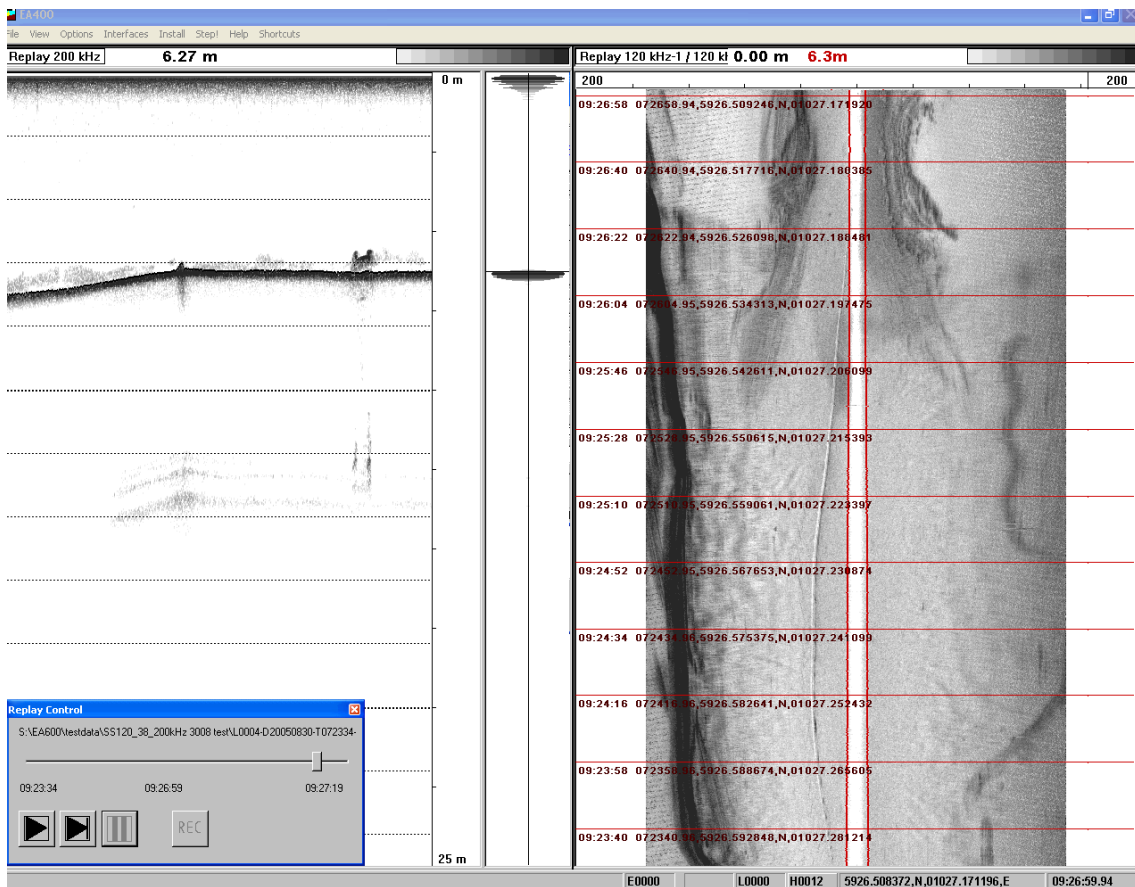
Figure 12   Typical dual sidescan view

Starting a sidescan survey

1 When starting a sidescan survey for the first time, both transducers are presented in views tiled horizontally. Hide the depth view of the lower sidescan display by moving the horizontal boundary line downwards.

2 Hide the scope view of the upper sidescan echogram by moving the vertical boundary towards right.

3 In the upper echogram, click the right mouse button to open the **Echogram** dialogue box.

4 Select **Sidescan**. The upper echogram will scroll vertically.

5 Identify whether the upper sidescan echogram displays the port or starboard transducer by selecting **Port** or **Starboard**.

6 For a dual system, import the lower echogram into the upper sidescan echogram. First select the second channel from the drop-down menu, then click the **Import** box.

7 Click Ok. Both sidescan echograms will now show side-by-side in the upper view.

8 In the upper echogram, click left mouse button over the depth readout in the **Header** view to open the **Bottom detector** dialogue box.

9 Set **Maximum depth** to zero, and click Ok.

10 Set **Maximum depth** to zero in the lower echogram as well.

11 Hide the second channel in the lower view. Select **Layout** in the **View** menu. Set up the echo sounder to allow only the first sidescan channel to be shown, and click Ok.

If you do any other changes to the echo sounder parameters, make sure that these parameters are set identical in both echogram views. All changes made to parameters and views will be stored when closing the EA 600.

You may wish to view the echograms using a grayscale presentation, as this will enhance the sidescan view.

Insert label name

1 In the sidescan echogram, click the right mouse button over the frequency in the **Header** view to open the **Transceiver Settings** dialogue box.

2 In the **Label** field, enter a suitable description, and click Ok.

Observe that the label is placed next to the frequency information in the **Header** view.

Superimpose the current depth

If your echosounder is equipped with a third (or fourth) channel and a transducer pointing straight down, you can superimpose the current depth into the sidescan view.

1   Click the right mouse button in one of the two echograms to open the **Echogram** dialogue box.

2   Enable **Ext.depth** (external depth), and select a transducer frequency from the drop-down list.

3   Select **Show annotation**.

4   Click Ok.

Observe a red line appear on the echogram. The annotation lines indicate the depth value. Additional in the header view, the current depht is displayed in red (external depth).

You can also set up a third echogram channel to observe the depth. This is done by selecting **Layout** on the **View** menu, and then enabling a third channel.

Finishing the sidescan survey

1   In the top echogram, click the left mouse button to open the **Echogram** dialogue box. De-select **Sidescan**, and click OK.

2   Restore the other echo sounder setting to suit your preferences.

Related topics

Multipulse

Overview

In deeper waters, the EA 600 echo sounder supports a multipulse function, which allows a higher ping rate - and thus better accuracy - than what would normally be possible. The basic function is described in the *System description* chapter.

Initialization

To enable the Multipulse mode:

1   Select **Operation** on the **File** menu.

2   Click to select **Multipulse** at the bottom of the dialogue.

3   Click OK.

Parameters

All Multipulse parameters are set automatically by the echo sounder.

Disable

To disable the Multipulse function, select another ping rate in the **Operation** dialogue.

If the water is too shallow for multipulse operation, or if the software looses bottom tracking, the echo sounder will automatically return to normal operational mode.

Then, if the depth increases, or bottom tracking is re-establised, the multipulse mode is automatically restarted.

The theory

In normal operation, two factors are important to define the ping rate:

• The depth

• The size of the logging window (the time it takes for the pulse to travel from the transducer, down to the seabed, and up again)

The Multipulse mode defines a fixed size on the logging window. Down to 4000 meters it will always be 0.27 seconds, which corresponds to 400 m. For depths below 4000 meters, the logging window will be set to 1/10 of the depth.

The fixed logging window will automatically be placed so that it can track the bottom. This means that other data in the water column will not be detected, and hence the top of echogram will be white.

Related topics

→   *Multipulse description, page 14*

→   *Operation, page 141*

Pinger mode

Overview

The EA 600 provides an advanced and synchronized passive mode for depth measurements using a pinger.

In this mode, the echo sounder will not transmit on the normal transducer(s). Instead, a pinger is lowered into the water below the hull. This pinger is normally attached to a device, and the purpose is to track and display the current depth of this device.

The basic function is described in the *System description* chapter, while the theory is explained in more detail below.

(1) Transducer

(2) Pinger

(A) Pinger's height above the seabed

(B) Pinger's depth
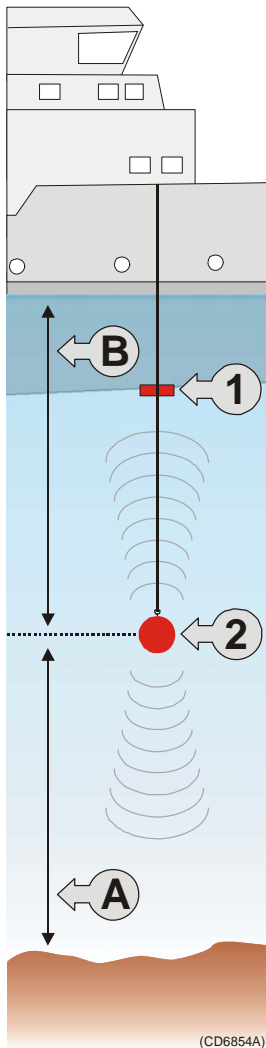
Related topics

→   *Pinger mode description, page 15.*

→   *Operation, page 141.*

→   *Pinger Mode, page 145.*

Initialization

To enable the Pinger mode:

1   The pinger must be deployed at an appropriate depth.

2   Right-click on the frequency information in the **Header** view to open the **Transceiver Settings** dialogue box.

3   Set the echo sounder's pulse length to maximum 50% of the pinger's pulse length.

- We recommend that you set the pinger's pulse length to maximum.
- Example: If the pinger has a 10 ms pulse length, set the echo sounder pulse length to 4 ms.

4   Press OK to close the dialogue box.

5   Select **Operation** on the **File** menu.

6   Click to select **Pinger mode** at the bottom of the dialogue.

7   Click OK.

8   Observe the **Pinger mode** dialogue box appears.

9   Set up the necessary parameters.

10   Press OK.

Parameters

All functional parameters are set in the **Pinger mode** dialogue box.

1 Select ping rate and pulse length.

- Both the ping rate and the pulse length are defined in the pinger's technical specifications, and these values must be entered correctly.

2 The <u>first time</u> you use a specific pinger, press the **Synchronize** button.

- This will correct minor deviations between the pinger and the echo sounder. The settings are stored by the echo sounder, and they are automatically retrieved the next time the function is activated.

3 Set the approximate current depth of the pinger, measured by the length of cable that has been used.

4 Set the approximate current water depth.

5 Press OK.

Disable

To exit **Pinger mode**, observe the following procedure.

1 Select **Operation** on the **File** menu.

2 Select any other operational mode.

3 Press OK.

4 Right-click on the **Frequency** information in the **Header** view to access the **Transceiver Settings** dialogue box.

5 Set **Transmit power** to desired effect.

- The transmit power is automatically switched off when you start the **Pinger mode**. In order to protect the transducers, you must manually switch the power back on.

The theory

The most common use of a pinger is to determine the current depth of equipmenet lowered from the surface. The pinger is then used with an echo sounder to determine the equipment's current height above the bottom.

The operational principle is quite simple. The pinger will simultaneously send an acoustic pulse both up and down. The pulse going up travels directly to the ship, while the pulse going down will travel to the seafloor, and then be reflected up to the ship. The difference in time between these to signals provides the height of the pinger above the seafloor. In many cases, a passive listening device is used to visualize and/or print the result. To use a pinger, you must set the sampling rate of the echo sounder equal to the pinger, normally 1 second.

There are however several operational challenges associated with this simple method. The position of the direct pulse in the echogram is random, and it may turn up at the end of the echogram, making it difficult to measure the height above the seafloor. Also, some echo sounders cannot log for the entire period between pings, effectively creating a "blind zone". The direct pulse may also move across the screen due to the pinger movement or the misalignment between the pinger's and the echo sounder's ping rate. In deep waters (below 750 meters), one would also encounter "false" bottom returns.

Using advanced software algorithms, the pinger option in the EA 600 tries to simplify the use of a pinger.

- *Active use of the doppler effect to track the movements and position of the pinger.* This method is implemented for depths below 750 meters. If the start depth of the pinger is known, the movement can be calculated using the ping rate deviations.

- *Automatic detection of the direct pulse.* An algorithm is developed in the software to recognize and locate the position of the direct pulse

- *Active use of the echo sounder's ping rate to keep the direct pulse at a fixed position in the logged echogram.* An echo sounder with a fixed ping rate will give inaccurate results. By actively controlling the ping rate, the EA 600 keeps the direct pulse close to the desired position, which is 100 meters after the start of the echogram.

- *Synchronization of pinger's and echo sounder's ping rate.* Experiments with different pingers have shown that they have a slight deviation from the specified 1 second ping rate. An accurate calibration is especially important when doppler tracking is used.

Example:

1) Pinger depth increasing as the pinger is lowered deeper into the water.

The bottom echo has been masked off. Doppler tracking is used to ensure the accuracy.

(CD6855b/BM1018)
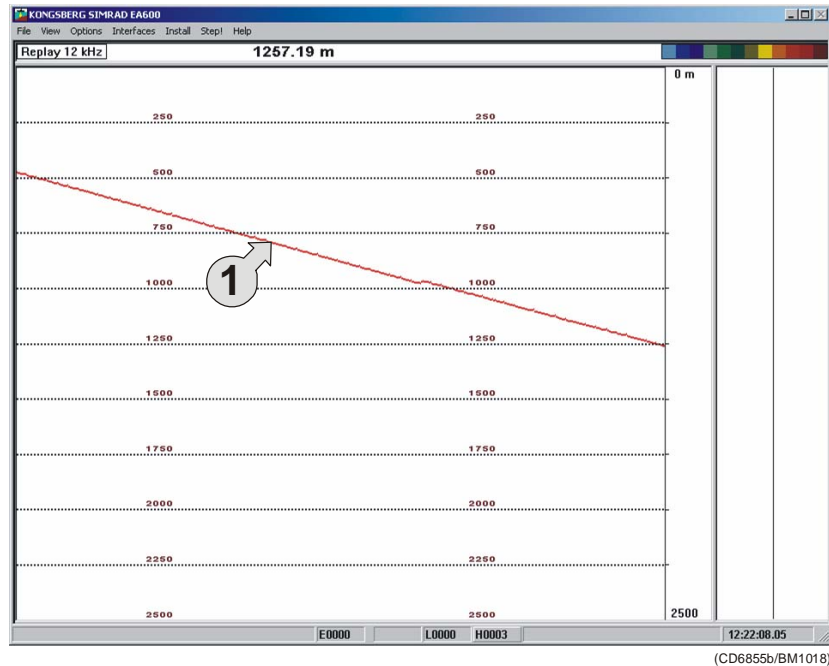
- *Switching between different views.* If the pinger's height above the seafloor is greater than 500 meters, only a red line indicating the distance from hull to the pinger is displayed. When the pinger approaches the seafloor, the logged echogram is shown with the pinger at zero meters. The height of the pinger above the seafloor can then easily be seen.

Example:

1) Bottom

2) Location of pinger

3) Manual depth marker

(CD6855A/BM1017)
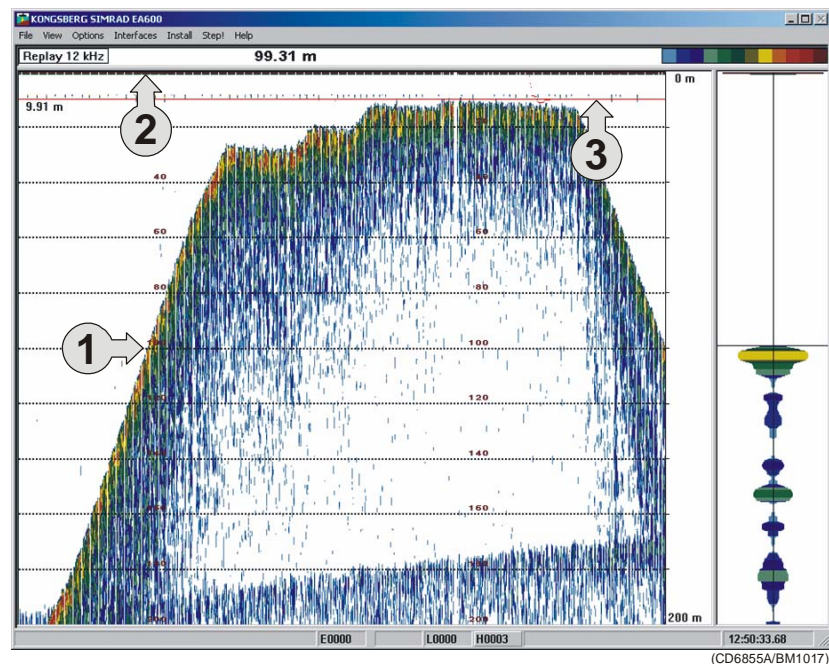
- *Choosing the correct pulse length.* Most pingers allows you to change the pulse length. A short pulse length is required to obtain good resolution with low power consumption, but longer pulses are much easier to detect. In general, the pulse length should increase with depth and/or external noise level. The pulse lengths chosen for the pinger must match the echo sounder's pulse length.

REFERENCE GUIDE

Overview

This chapter describes the menus and dialogue boxes in detail.

Related topics

→   *Echo sounder menus, page 89*

→   *Dialogue boxes, page 99*

→   *Status bar, page 97*

Menus

Main menu

The **Main** menu contains the following options:

→   *File, page 90*

→   *View, page 91*

→   *Options, page 92*

→   *Interfaces, page 94*

→   *Install, page 95*

→   *Help, page 96*

→   *Status Bar, page 97*

→   *Step, described below.*

Note that a number of dialogue boxes are accessed directly using right-click on certain display fields.

Step!

In single-step mode you command the echo sounder to perform one ping at a time by left-clicking the **Step** command. This command does not activate any separate menus or dialogue boxes.

You can also press **Alt**+**S** on the keyboard to make one ping.

See the **Operation** dialogue box for further details.

Related topics

→   *Direct access to dialogue boxes, page 28*

→   *Operation, page 141*

File menu

The following commands are available on the **File** menu**:**

→   *Operation, page 141*

→   *Store, page 169*

→   *Annotation, page 104*

→   *Print, page 147*

→   *Exit, page 90*

Operation

This command option opens the **Operation** dialogue box. Use these parameters to set echo sounder ping mode parameters; normal/replay, ping interval etc.

Store

This command option opens the **Store** dialogue box. Use this dialogue box to record data.

Annotation

This option opens the **Annotation** dialogue box. In this dialogue box you can enter an annotation text message to be printed on the echogram and/or saved to the current file.

Print

This command option opens the **Printer and History** dialogue box. Use it to set printer parameters controlling echogram printout on paper.

Exit

Select this command to terminate the echo sounder program.

Note   *You must always use this command before you turn off power!*

View menu

The **View** menu contains the following options:

→   *Layout, page 133*

→   *History, page 129*

Layout

This command opens the **Layout** dialogue box. Use it to modify the layout of frequency channels on the display.

History

This command opens the **History** dialogue box. This is used to activate a dialogue for viewing previously recorded echograms.

Options menu

The following commands are available on the **Options** menu:

→ *Language, page 132*

→ *Depth unit, see below*

→ *Temperature unit, see below*

→ *Palette, see below*

→ *Beeper, see below*

→ *Save settings, see below*

→ *Restore settings, see below*

→ *Factory Settings, page 124*

→ *Load User Settings, page 134*

→ *Store User Settings, page 173*

→ *Replay Control, page 156*

→ *Status Window, page 168*

Language

This entry opens the **Language** dialogue box for language selection.

Depth unit

All depth values are expressed in meters, English feet (1 ft = 0.3048 m), nautical fathoms (1 ftm = 1.852 m) or Italian Passi Braccia (1 pb = 1.65 m). The **Depth Unit** entry activates a submenu to select one of these alternatives.

Temperature unit

Water temperature is shown in degrees Celsius or degrees Fahrenheit on the **Status Bar**. The **Temperature Unit** entry activates a submenu to select one of the two alternatives.

Palette

Different light intensities on the display are provided according to IMO (International Maritime Organisation) recommendations. A bright display is required on a sunny summer day, and a low light intensity is required at night in order not to ruin the night vision of the crew at the bridge of the vessel. The **Palette** entry activates a submenu to select the display brightness.

Beeper

This entry activates a submenu to control when the audible warning signal is active to alert about status messages and alarms. No dialogues are provided.

Save settings

The echo sounder memorises all its parameter settings between power is turned off until it is turned on again at a later time. The **Save Settings** entry writes a snapshot of all parameter settings into static memory. No dialogues are provided.

Restore settings

This entry reads parameter settings from static memory into the echo sounder application. No dialogues are provided.

Factory settings

This entry copies the default factory settings back into the sounder. A proper clean-up of the complete menu system is sometimes required in order to escape from unintentional deadlocks. A dedicated dialogue box is used to acknowledge the function.

Load user settings

This entry allows you to load your previously stored personal settings. A dedicated dialogue box is provided.

Store user settings

This entry allows you to save your current settings to an identified file on the computer harddisk. A dedicated dialogue box is provided.

Replay control

This entry provides "cassette recorder" type control buttons to be used during replay. It is also used to scroll and store new .raw files.

Status window

This entry opens the **Status Window**, which provides current information about the echo sounder settings.

Interfaces menu

The following commands are available on the **Interfaces** menu:

→   *Network Interface, page 138*

→   *Serial Interface, page 161*

→   *Remote Display, page 152*

→   *Raw Data, page 151*

Network Interface

This command option opens the **Network Interface** dialogue box. The parameters in this dialogue box are used to define the network settings for the input and output of data.

Serial Interface

This command option opens the **Serial Interface** dialogue box. The parameters in this dialogue box are used to define the serial line settings for the input and output of data.

Remote Display

This command option opens the **Remote Display** dialogue box. The parameters in this dialogue box are used to define the use of a remote depth display.

Raw Data

This command option opens the **Raw Data** dialogue box. This dialogue box is used to export raw data to a EA Classification software.

Install menu

The following commands are available on the **Install** menu:

→ *Transceiver, page 180*

→ *Environment, page 120*

→ *Navigation, page 135*

→ *Heave, page 126*

→ *Temperature, page 179*

→ *Heading, page 125*

→ *SVP Dialog, page 177*

Transceiver

This command opens the **Transceiver Installation** dialogue box.
Use this to install a new transceiver, and to assign a transducer
to each frequency channel.

Environment

Select this command to open the **Environemnt** dialogue box.
The settings here are used to select water salinity, sound velocity
and water temperature.

Navigation

This command opens the **Navigation Interface** dialogue box. In
this box, you can select communication parameters for the
NMEA interface, and select input/output telegrams.

Heave

This command opens the **Heave Sensor** dialogue box. It is used
to select heave input source; analogue or RS-232.

Temperature

This command option opens the **Temperature Sensor** dialogue
box.

Heading

This command opens the **Heading** dialogue box. It is used to
select a heading input telegram.

SVP Dialog

This command opens the svp dialogue box. It is used to select
realtime svp input telegram.

Help menu

The **Help** menu contains the following options:

- Contents
- About the echo sounder

Contents

This command opens the on-line user manual. This user manual is an HTML based document compiled to the CHM format designed by Microsoft ™.

The content of the on-line user manual is identical to the content of the EA 600 *Operator Manual*.

The on-line manual is also accessed directly as context sensitive help from the various dialogue boxes used throughout the echo sounder software.

About the echo sounder

This command opens the **About** box. This box is for information only. It provides the current software version and the copyright information.

Status Bar

The **Status Bar** displays status messages, event number, printer active symbol, temperature, survey line number, navigational data, time of day and ping replay timer.

(CD6744E / BM300D)
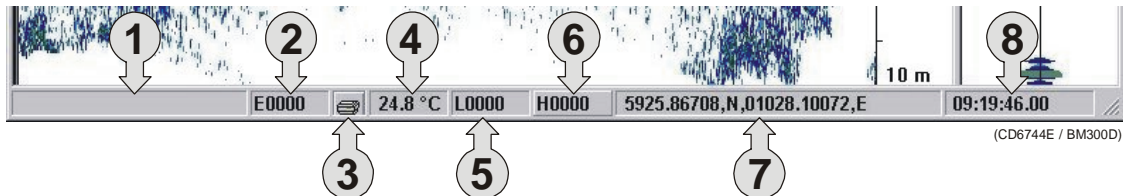
The following information is provided on the **Status bar**:

1   **Information -** Various messages are displayed in this field; warnings, status, information text.

2   **Event -** This field implements a push button for generating an annotation of the event type. The event number is automatically incremented or decremented by one for each new event. The current event number is displayed. An external **Event** toggle switch can also be physically connected to the General Purpose Transceiver (GPT).

3   **Printer -** A printer symbol is displayed whenever echogram printing is active. Printing is delayed until the echogram page has been completed.

4   **Temperature -** Water temperature is displayed in degrees Celsius or in degrees Fahrenheit provided a temperature sensor is connected to the system.

5   **Line -** This field acts as a toggle button. A left-click starts the recording of a new survey line, and another left-click terminates the recording of data. The survey line number is automatically incremented (or decremented) by one every second left-click. The current survey line number is displayed on the button face. This line number is shown with red colour during recording. The **Line** toggle button can also be activated from a remote position if this function was enabled during the installation.

6   **History -** This field is used to start and stop **History** recording. Press the field to start recording History files, and press again to stop,. The text is red when the recording is active.

7   **Navigational data -** Geographical latitude and longitude from the navigation receiver is displayed.

8 **Time -** Local time of day is displayed. A small popup window showing the current date appears when positioning the cursor inside the time field. During replay, this field is used as a timer.

Related topics

→ *Recording procedure, page 65*

→ *Store, page 169*

→ *Print and History, pages 147*

→ *Print Setup, page 149*

Dialogue boxes

Introduction

The following chapters describe in detail all the dialogue boxes used in the EA 600 echo sounder. The dialogue boxes are presented in alphabetical order.

Advanced Navigation

The **Advanced Navigation** dialogue box is accessed from the **Navigation Interface** dialogue box. The **Navigation Interface** dialogue box is in turn available from the **Install** menu.
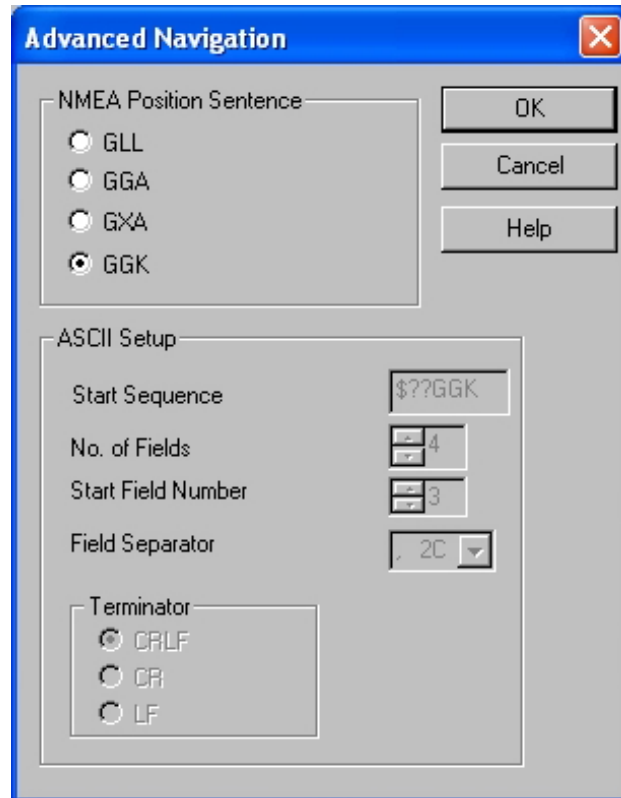
NMEA Position sentence

These boxes specify which type of NMEA navigation sentence should be automatically interpreted.

If **ASCII** has been chosen in the **Navigation Interface** dialogue box, these settings will be unavailable.

ASCII Setup

Use this protocol if you wish to receive data on ASCII format.

If **NMEA** has been chosen in the **Navigation Interface** dialogue box, these settings will be unavailable.

Decoding is based on a user specified datagram identification. The information substring within the datagram may be identified by specifying the position of the start field, the number of fields to be extracted and the field separator.

Start sequence - Maximum six characters used to identify the type of input. The question marks are used as "wild card" characters. You can enter any format you wish.

No. of fields - Identify the total number of fields in the ASCII message.

Start field - Identify which of the fields in the message is the start field.

Field separator - Identify which ASCII character is used to separate the fields in the message.

Terminator - Identify which character is used to terminate the message.

Related topics

→   *Navigation Interface, page 135*

→   *Data formats, page 211*

Advanced Transceiver

This dialogue box is accessed from the **Transceiver Settings** dialogue box. It displays detailed numeric information characterising the channel. This includes transducer parameters, exact transmit frequency and receiver processing parameters.

Parameters

The parameters shown in this dialogue box are determined during the transceiver installation procedure.

Frequency [Hz] - This is the nominal resonant frequency for the transducer.

Beam type - Three different transducer beam types are available: *Single*, *Split* and *Triple*. If your system is capable of operating a Split- or Triple beam transducer, it will also be able to measure the position of a target in the beam. The echo sounder can then compensate for the known beam pattern to obtain a true target strength.

Gain [dB] - The transducer gain presented by calculating the *directivity* multiplied with the *transducer's efficiency*. The value is obtained during system calibration. If no calibration takes place, the manufacturer's default setting is used.

Two-way beam angle [dB] - This is a key transducer parameter. The value describes the solid angle at the apex of the ideal conical beam.

Sa Correction [dB] - This parameter is not shown on the EA 600.

Absorption [dB/km] - This value describes the absorption of sound in the water. The default values are computed according to *Francois and Garrison, Journal of Acoustic Society, December 1982*. The most important environmental variable affecting this parameter is found in the **Environment** dialogue box.

Bandwidth [Hz] - This is the resulting system bandwidth of the analogue and digital filters in the echo sounder receiver. The bandwidth is a function of the selected pulselength at a given frequency.

Sound velocity [m/s] - The speed of the sound through the water varies with temperature, salinity and pressure. The soundings provided by the EA 600 are compensated for this.

Sample interval [m] - This value is always 1/4 of the current pulse length. In distance, the sample interval will be expressed as (*sound velocity* multiplied with *pulse length*) divided by *eight*.

Angle sensitivity - In order to convert the raw angle samples into mechanical degrees for fore-and-aft and athwartship directions, this parameter is required. It represents the ratio of electrical degrees to mechanical degrees for the current transducer. This ratio is not used with single beam transducers, and the value is set to 0.

3dB beam width [degrees] - This value presents the 3 dB beamwidth of the current transducer in the fore-and-aft and athwartship directions. The value is estimated during calibration. If no calibration takes place, the default value is used.

Angle offset [degrees] - This is the offset angle from the acoustical axis. The value is estimated during calibration. If no calibration takes place, the value 0 is used.

Related topics

→   *Transceiver Settings, page 182.*

Annotation

The **Annotation** dialogue box is opened from the **File** menu.
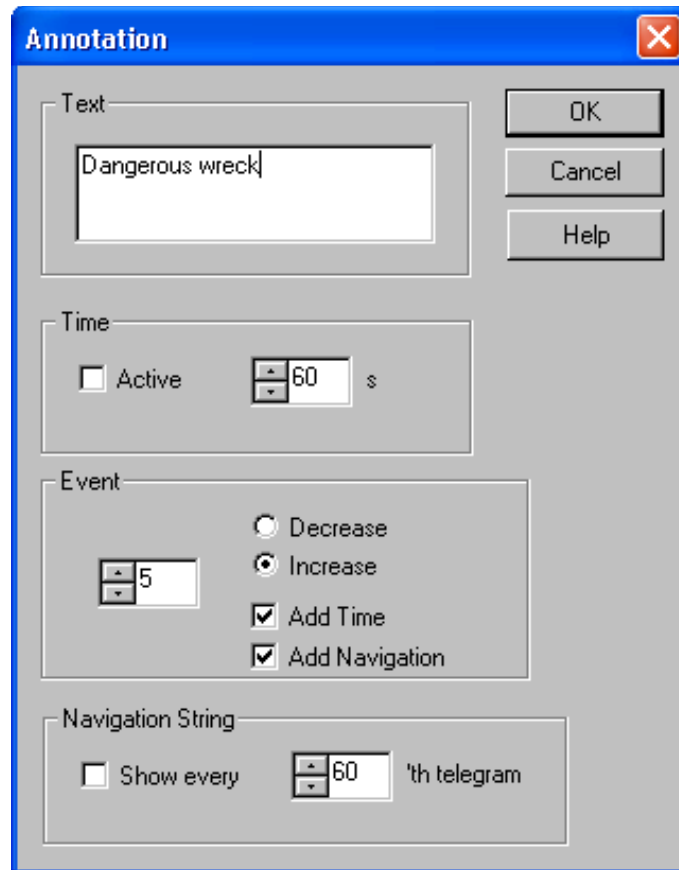
The EA 600 echo sounder supports these different types of annotation:

- **Text** - use this function to enter your own text.

- **Time** - use this annotation to automatically generate a time marker at specified intervals.

- **Event** - use this annotation to generate an event number with optional addition of time and/or navigation.

- **External** - this function allows automatic annotation from an external source.

- **Navigation string** - this function will automatically generate a text string with navigational information.

An annotation telegram is written into the replay data file and the output data file. The annotation message is shown inside the history window, on the echogram printout and on the screen if **Event** is activated in the **Echogram** dialogue box.

Text

The annotation text is entered here. Note that you need to have a keyboard connected to the echo sounder. The text can be entered freely, for example "Dangerous wreck". When you press the **OK** button the text is written into the echogram. The next time you open the **Annotation** dialogue box, the text is cleared, and you must enter new information.

Time

Click **Active** to activate automatic time annotation. Enter the desired time interval between the annotations. When activated, the sounder automatically generates annotations containing the current time at the chosen interval.

Event

Each event annotation is identified with an individual event number. The event annotation is then generated every time an event is generated. The event number is initially chosen here, and thereafter automatically incremented or decremented every time a new event is generated.

To generate an event, click **Event** in the **Status bar**.

The **Event** annotation can include current time and/or current longitude and latitude. Click applicable **Add Time** or **Add Navigation** to select. Without time or position data selected, the annotation message will simply contain the event number.

Navigation string

Click **Active** to enable an automatic text string with navigational information. The text string will appear on the display at every 'n'th telegram, as specified by the spin box.

Format:

Date / Position North / Position East

External events

External annotations may be input via the serial port for navigation as an NMEA telegram, or using the Ethernet interface with port 10183. The **Annotation** dialogue box does not support direct control of these functions.

The **Annotation** telegrams are described in the *Telegram formats* chapter.

Events may also be generated from an external source by toggling pin 9 on the **Auxiliary** connector on the General Purpose Transceiver (GPT). This event will use the same settings as for the **Event** toggle button on the **Status bar**.

Related topics

→   *Status Bar, page 97*

→   *Echogram, page 114*

→   *Telegram formats; Annotation, page 214*

Bottom Detector

The **Bottom Detector** dialogue box is opened when you right-click on the numeric depth value in the **Header** view on the display.
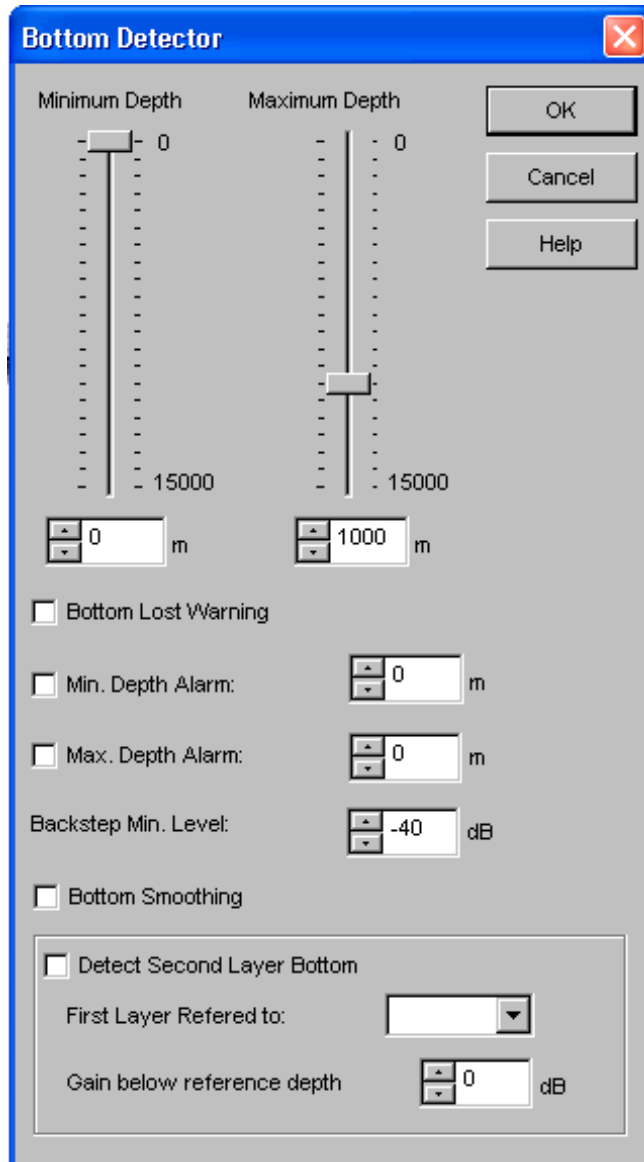
This dialogue box is used to define the upper and lower depth limits most likely to be used during the echo sounder operation. These limits may be used to obtain "bottom lock" on the depth when the echo sounder is pinging. The sounder needs this lock to locate the correct depth, and to stay on it during the operation, even though the depth changes continuously.

The dialogue box is also used to set alarms to notify you if maximum or minimum depths are exceeded.

Parameters

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.

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.

Bottom Lost Warning - A warning is activated whenever bottom track is lost. The warning is presented as a message in the **Status bar** and as an audio signal.

Min. Depth Alarm - An alarm is activated whenever the detected bottom depth is smaller than the chosen alarm threshold. The warning is presented as a pop-up message and as an audio signal. When the depth value is set to 0, this function is disabled.

Max. Depth Alarm - An alarm is activated whenever the detected bottom depth exceeds the alarm threshold The warning is presented as a message on the display and as an audio signal. When the depth value is set to 0, this function is disabled.

Backstep Min. Level - After the estimated depth of the bottom detector, the detected depth is automatically adjusted by stepping back according to the value of the setting you have chosen. This allows the EA 600 to verify that the correct bottom depth has been located. If the value you enter is too large (close to 0 dB) the adjustments will be very small.

The default value is -40 dB.

Bottom Smoothing - If bottom track is lost, the detected bottom depth is repeated for a maximum of three consecutive pings.

Detect Second Layer Bottom - When in the Bottom Detector dialogue for the lower frequency, select Detect Second Layer Bottom and then choose the high frequency channel you want to use as reference. This function is useful for detection of a second (hard) layer. It is not to be used for hydrographic surveying.

The Gain below reference depth is from the bottom detection depth algorithm and is a linear gain function. The number given is the increment in dB per meter

Bottom Range

The **Bottom Range** dialogue box opens if you click the <u>right</u> mouse button in the range field in the **Echogram and Range** view while operating with a **Bottom Range** echogram.

The dialogue box will also open when selected in the **Echogram Parameter**s, **Network Interface** and **Store** dialogue boxes.

The different echograms are explained in the **Echogram** dialogue box.
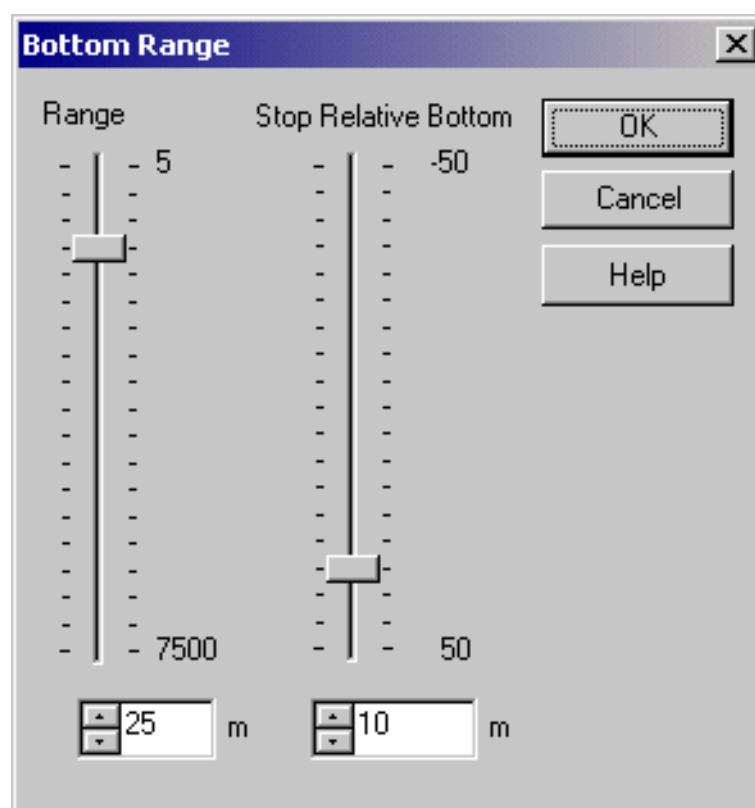
Range - This parameter controls the vertical depth range across the echogram.

Stop Relative Bottom - This parameter controls the depth offset at the lower boundary of the echogram relative to the detected bottom; positive values downwards.

Note that you can also change the range using the mouse wheel. This is described in the *Echo frames* chapter.

Related topics

→   *Echogram, page 114*
→   *Echogram Parameter, page 119*
→   *Network Interface, page 138*
→   *Store, page 169*

Colour Scale

The **Colour Scale** dialogue box is opened when you right-click on the colour scale in the **Header** view.

This dialogue controls the mapping of echo strength into one out of 12 colours, light blue for weak signals and dark brown for strong signals. Each discrete colour represents a 3 dB range of echo signal strength implying that the next colour is selected every time the echo strength doubles.
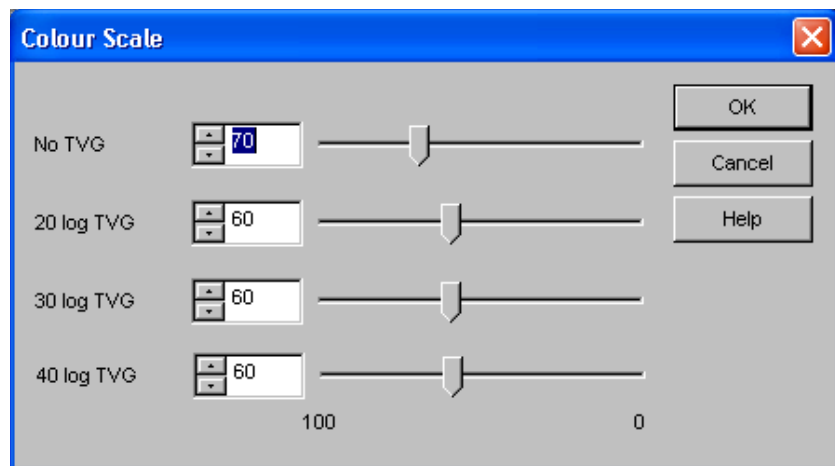
Parameters

A high numeric value displays weak echo signals properly while the stronger signals saturate into dark brown colour. A low numeric value displays strong echo signals properly. Weak signals below the lower limit of the colour scale are not displayed (the display background colour is used).

No TVG - This parameter controls the display sensitivity of the echo sounder when **No TVG** is selected in the **Echogram** dialogue box. A numeric value of **70** sets the lower limit of the echogram colour scale equal to a measured input level of -70 dB.

20 log TVG - This parameter controls the display sensitivity of the echo sounder when **20 log TVG** is selected in the **Echogram** dialogue box. A numeric value of **60** sets the lower limit of the echogram colour scale equal to a volume backscattering strength of -60 dB.

30 log TVG - This parameter controls the display sensitivity of the echo sounder when **30 log TVG** is selected in the **Echogram** dialogue box. A numeric value of **30** sets the lower limit of the echogram colour scale equal to a target strength of -30 dB.

40 log TVG - This parameter controls the display sensitivity of the echo sounder when **40 log TVG** is selected in the **Echogram** dialogue box. A numeric value of **20** sets the lower limit of the echogram colour scale equal to a target strength of -20 dB.

Removing colours

By left-clicking on the colours in the colour rectangle in the upper right-hand corner of the screen, the selected colour will become the weakest colour shown in the **Echogram** view.

To restore the colour range, click on the removed colour's position.

Note that this is a display function only. It does not have any effect on the sounder's performance. It will however affect the recordings made by the **History** function.

Related topics

Depth Output

The **Depth Output** dialogue box is called from the **Heave Sensor** and **Navigation Interface** dialogue boxes. These are in turn accessed from the **Install** menu.

It allows you to control the depth data output.
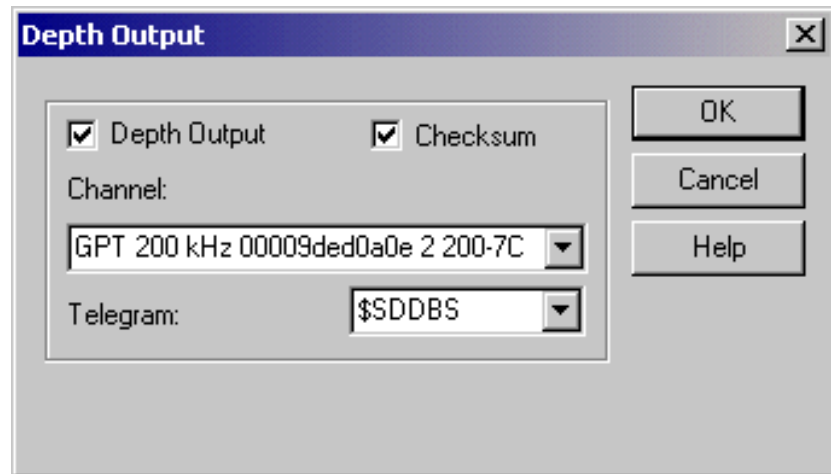
Parameters

Depth output - Check to enable the depth output.

Checksum - A checksum may optionally be appended to the NMEA output telegrams (according to the NMEA standard).

Channel - NMEA depth telegrams are only output from one channel at a time. Select channel from the list of installed frequency channels.

Each entry in the list contains transceiver type, operating frequency, unique identifier, channel number and transducer type.

Telegram - The echo sounder can output three different types of NMEA depth telegrams. However, only one telegram type at a time can be generated. You can select the telegram type here.

- The **$SDDBS** telegram contains the depth below the surface.

- The **$SDDBT** telegram contains the depth below the transducer.

- The **$SDDPT** telegram contains the depth below the transducer and the distance between the transducer and the waterline.

The EA 600 can also output the **EA 500/EK500** compatible depth telegrams; D1, D2 etc. Output for Atlas echo sounders are also provided.

More information about the NMEA datagrams can be found in the *Data formats* chapter.

Related topics

→   *Heace Sensor, page 126*

→   *Navigation Interface, page 135*

→   *NMEA datagrams, page 211*

Echogram

The **Echogram** dialogue box is opened by right-clicking on the echogram in the **Echogram and Range** view on the display. This dialogue is used to control the type and presentation of the echograms.

Echogram

Surface - Manual - The echogram is related to the sea surface. Start depth (at the upper echogram boundary) and vertical range (across the echogram) are manually selected in the **Surface Range** dialogue box.

Surface - Auto Range - The echogram is related to the sea surface. Start depth is manually selected in the **Surface Range** dialogue box. The EA 600 performs automatic adjustment of the vertical range keeping the bottom echo inside the visible echogram.

Surface - Auto Start - The echogram is related to the sea surface. Vertical range is manually selected in the **Surface Range** dialogue box. The EA 600 performs automatic adjustment of the start depth keeping the bottom echo inside the visible echogram.

Bottom - The echogram is related to the detected bottom. Stop depth (lower echogram boundary) and vertical range are manually selected in the **Bottom Range** dialogue box. The echogram is only drawn for pings having a successful bottom detection.

Sidescan - Select to start the Sidescan option. If adequate transducers have been installed, the echo sounder may be turned into a "side looking sonar". Normally the top echogram must be activated with this setting, either when running single or dual side looking. The echogram will scroll in its vertical direction. Refer to the description in the *Operational procedures* chapter.

→   *Sidescan procedure, page 78.*

Alongtrack Slope - The current slope angle of the bottom is represented as a time series graph. In the **Scope** view an angle indicator is drawn, while a numeric output of the current slope angle is printed in the **Header** view together with the current depth. The **Slope** dialogue box providing parameter definitions for the slope calculations is available by right-clicking on the slope angle value in the **Header** view.

Sidescan

Port/starboard - Define if the current sidescan transducer is mounted on the port or starboard side of the vessel.

Range view - The echogram will display both the water column and the bottom. Valid for both single and dual systems.

Across view - If a vertical transducer is available, the bottom echogram will expand (hiding the water column). The extent of expansion (in metres) is set by the vertical depth. Valid for both single and dual systems.

Import - It is possible to display both port and starboard sidescan echograms in the same view. When opening the echogram dialogue for one transducer channel, select the other transducer channel to be imported in the drop-down list, then click the Import box. This function is only valid for dual systems.

Horizontal Depth Lines

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 50 scale lines can be drawn. No scale lines are drawn when the scale line count is set to zero.

Show Annotation - A depth annotation will be written on each horizontal scale line. The first annotation will appear on the screen after a few seconds. The annotations are automatically updated when you change the range, but they will only appear on surface echograms.

Each echogram will be labeled with a number placed on the TX pulse in each channel.

Show echograms - In mode 1x to 5x the centre echograms can be chosen by selecting the transducer number in the waterfall view. Example: If 3x is chosen and echogram 5 is centre, the echograms 4 and 6 will be displayed in each side of echogram 5.

External depth - In the current echogram view it is possible to show the bottom detection line for one of the other avaliable echo sounder channels. A red line will represent the other channel in this view. The depth value will also be displayed in the Header view in red colour.

Bottom:

- **On -** The detected bottom depth is shown as a thin line in the echogram. The line is drawn in the current foreground colour; black during day and white during night.

- **Off -** The bottom line is switched off.

- **White Line -** A band in the current background colour is drawn below the detected bottom depth.

- **Contour Line** - The echogram presentation normally shown below the detected bottom will be inhibited, and only a white space will remain.

Variable Depth - When enabled a horizontal depth line is placed wherever you click in the **Echogram** view. The depth of the line is displayed at the left end of it. In the **History** diagram the depth for each ping is displayed individually.

Range other - Two horizontal lines indicate the range presented in the lower echo frame**.**

Bottom Detection Lines - Two horizontal lines indicates the minimum and the maximum bottom detection values and is drawn with green colours.

Vertical Markers

Event - A vertical line is drawn when a new event is generated.

Minute - A short vertical line is drawn in the upper part of the echogram once every minute.

New Range - A vertical line is drawn when the range is changed. The old range is written on the screen as an annotation.

New Svp - A vertical line is drawn on the echogram when a new sound velocity profile is applied. The value is written as an annotation.

TVG

No - No TVG is applied. The echogram displays the input power level at the transducer terminals. This echogram type is used for test and research purposes.

20 log - 20 log TVG is applied. The echogram displays volume backscattering strength and surface backscattering strength below the detected bottom. This echogram type is suitable when studying bottom properties.

30 log - 30 log TVG is applied. The echogram displays target strength. This echogram type is suitable for special operations.

40 log - 40 log TVG is applied. The echogram displays target strength and surface backscattering strength below the detected bottom. For sidescan operation, this echogram type is suitable when studying bottom properties.

Sub Bottom gain

From the bottom detection depth a linear gain function is applied. The number given is the increment in dB per meter.

Ping Filter

The ping-to-ping filter "cleans up" the echogram by removing random noise spikes with no correlation with the previous ping. The function will thus make echoes appear more stable.

Related topics

Echogram parameters

The **Echogram Parameters** dialogue box is opened by
left-clicking on **Echogram Storage** under the **Interfaces** menu.

Note

*This dialogue box is available for echo sounders with software
version up to 2.1.1.1.*

This dialogue is used to control the datagrams exported by the
echo sounder on the serial lines.
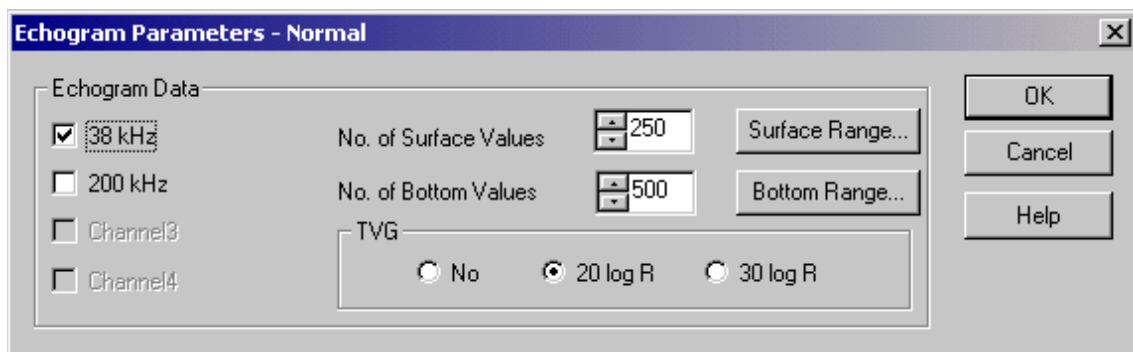
Echogram data

38 kHz - Select which frequency channel to output echogram
data from. The channels installed on the echo sounder are listed
by frequency.

No.of Surface Values - The number of echogram samples to
export in the pelagic part of the datagram.

No.of Bottom Values - The number of echogram samples to
export in the bottom part of the echogram.

Surface Range - This dialogue sets up the limits for extraction
of echogram values for the surface part of the echogram. The
Surface Range dialogue box opens to allow the modifications**.**

Surface Range - This dialogue sets up the limits for extraction
of echogram values for the surface part of the echogram. The
Surface Range dialogue box opens to allow the modifications**.**

TVG

Select one of the three TVG settings for the exported data.

Related topics

→   *Surface Range, page 175*
→   *Bottom Range, page 109*

Environment

The **Environment** dialogue box is available from the **Install** menu.

Many other echo sounders are calibrated to a sound velocity of 1500 m/s. If the EA 600 is used together with other sounders it is advantageous to adjust the sound velocity on the EA 600 as well, in order to have the same depth readings.
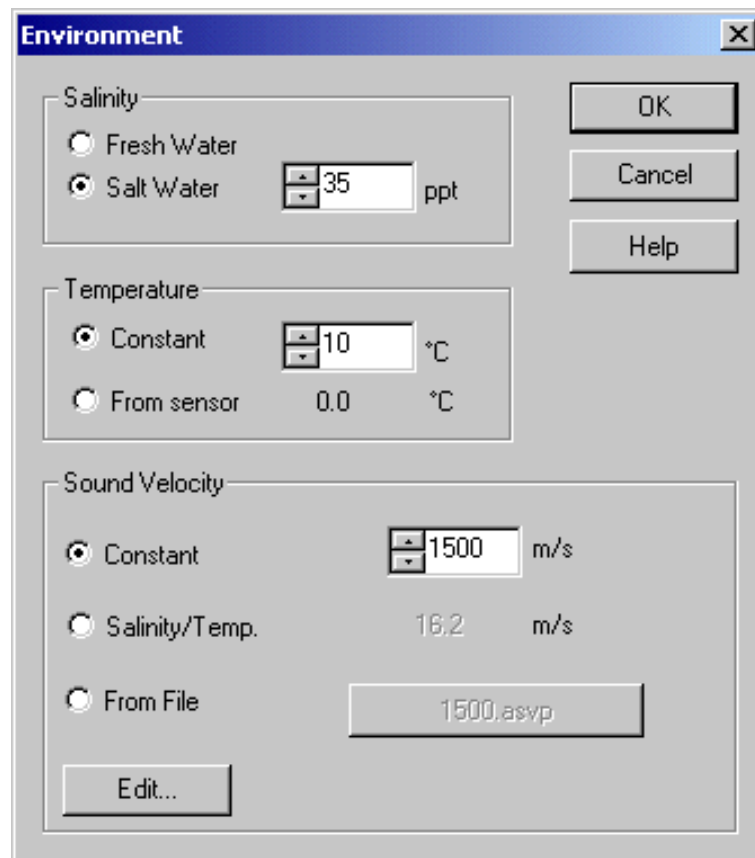
Salinity

Propagation losses due to absorption are much higher in sea water than in fresh water. Correct compensation for these losses therefore relies on the echo sounder knowing which water type is present.

Select **Fresh** or **Salt** water, enter the salt content as accurate as possible.

Temperature

Propagation losses due to absorption depend on the water temperature. Correct compensation for these losses therefore relies on the echo sounder knowing which water temperature is present.

Select and define a constant temperature, or select temperature reading from an external sensor. With an external sensor, the reading will be continuously updated. The update rate is then equal to the ping rate, and the reading in the dialogue box is refreshed every two seconds.

The default sound velocity value is 1500 m/s, while the temperature range is from -4 to +40°C.

Sound Velocity

For accurate measurement of depth the correct sound velocity must be known by the echo sounder. The value can be entered as a constant, taken from an ASVP file on the system, or received on a serial or Ethernet line. The profile may be manually edited.

The value can be entered as a constant, or taken from a file on the system. The file may initially contain profiles on AMl-CALC, Kongsberg Maritime SSP10 or Simrad-A format. Internally the sounder works with ASVP files. In other words, the other formats is converted on input, and the file is stored back as ASVP. A default file containing a constant 1500 m/s profile is found in the folder **c:\EA 600\data**.

The sound velocity profile can also be modified during replay, but only if the **Change SVP Profile** box in the **Replay** dialogue has been checked before the replay commence.

Constant - Check this box to use a constant value, and select the value in the spin box.

Salinity/Temp. - The salinity and temperature values currently entered in the dialogue box is used to compute a sound velocity.

• If a constant temperature has been entered, the computation will provide a fixed sound velocity profile.

• If temperature **From sensor** has been chosen, the sound velocity profile will change automatically, but only with temperature changes higher than 0,5°C.

Note that the computed sound velocity as applied as a constant. This means that it will have the same value for the entire water column.

From File - Check this box to retrieve the sound velocity information from a file. Click the button on the right side to open the file selection box.

Edit - Click to open the Sound Velocity Editor program.

To allow for serial or Ethernet input of the sound velocity profile, you need to enable the interfaces. The serial line interface is enabled using the **Serial Interface** dialogue box, while the Ethernet input is enabled in the **Network Interface** dialogue box.

Unless otherwise defined, the received file(s) will be stored in the following directory: c:\EA 600\data.

When a sound velocity profile is received by the EA 600, a pop-up dialogue box will inform you. In this dialogue, you must press **Ok** to use the profile as it is, or **Edit** if you wish to inspect and/or edit it using the **SVP Editor.**

Related topics

→ *Serial interface, page 161*

→ *Network Interface, page 138*

→ *SVP Editor, page 185*

→ *Replay, page 154*

Exit

The **Exit** command is available from the **File** menu.

Select this command to terminate the echo sounder program.

Note   *You must always use this command before you turn off power!*

Related topics

→   *File, page 90*

Factory settings

The **Factory Settings** dialogue box is accessed from the **Options** menu. It does not provide specific parameters, but simply allows you to acknowledge the chosen function.

Restoring factory settings is normally used only if you need to restore the echo sounder after long time use, or if you have made a number of incorrect selections in the menus or dialogue boxes and wish to correct these fast.
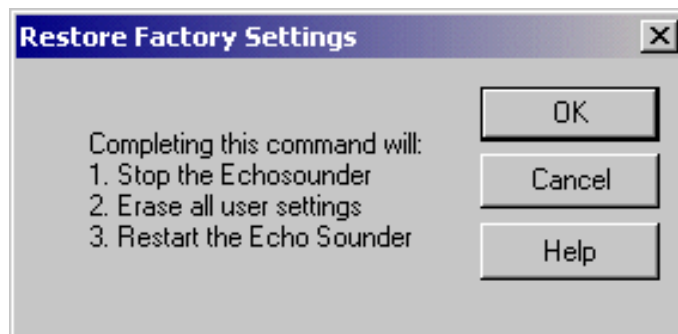
When selected, this function will first stop the echo sounder operation.

Second, all the personalized settings you have entered will be removed. These include all the parameters you have chosen for the operation, as well as changes you have made with the echo sounder screen layout. The settings made for communication (serial lines) and installation (transceivers and transducers) are not affected. The only way to restore the operational settings is to enter them all one more time.

Third, the echo sounder is restarted using the default settings chosen by Kongsberg Maritime. These are considered generic, and they are the same settings as when you first switched on the echo sounder.

Heading

The **Heading** dialogue box is accessed from the **Install** menu.

If you wish your echogram and detected bottom depth to be heading corrected, you need to connect the EA 600 to a heading sensor.
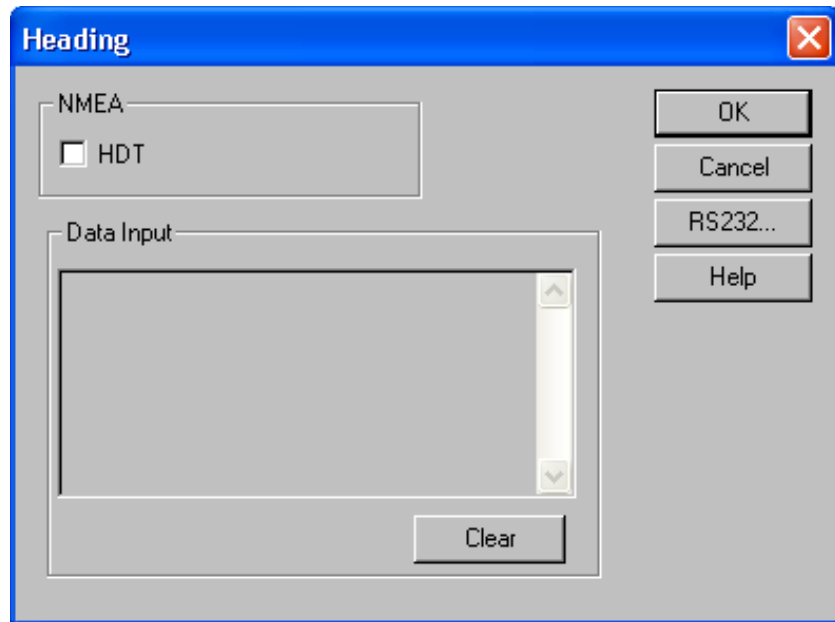
NMEA

HDT - Check this box to enable heading sensor datagrams in HDT format.

Data Input

The most recent input data is displayed in a list. This function is useful during installation and trouble shooting.

Clear - This button clears the input data list.

RS-232

This button activates the **RS-232 Setup** dialogue box. This box is used to define communication port, baud rate etc.

Related topics

→ *RS-232 Setup, page 159*

→ *NMEA data formats, page 196*

Heave Sensor

The **Heave Sensor** dialogue box is accessed from the **Install** menu.

If you wish your echogram and detected bottom depth to be heave corrected, you need to connect the EA 600 to a heave sensor.
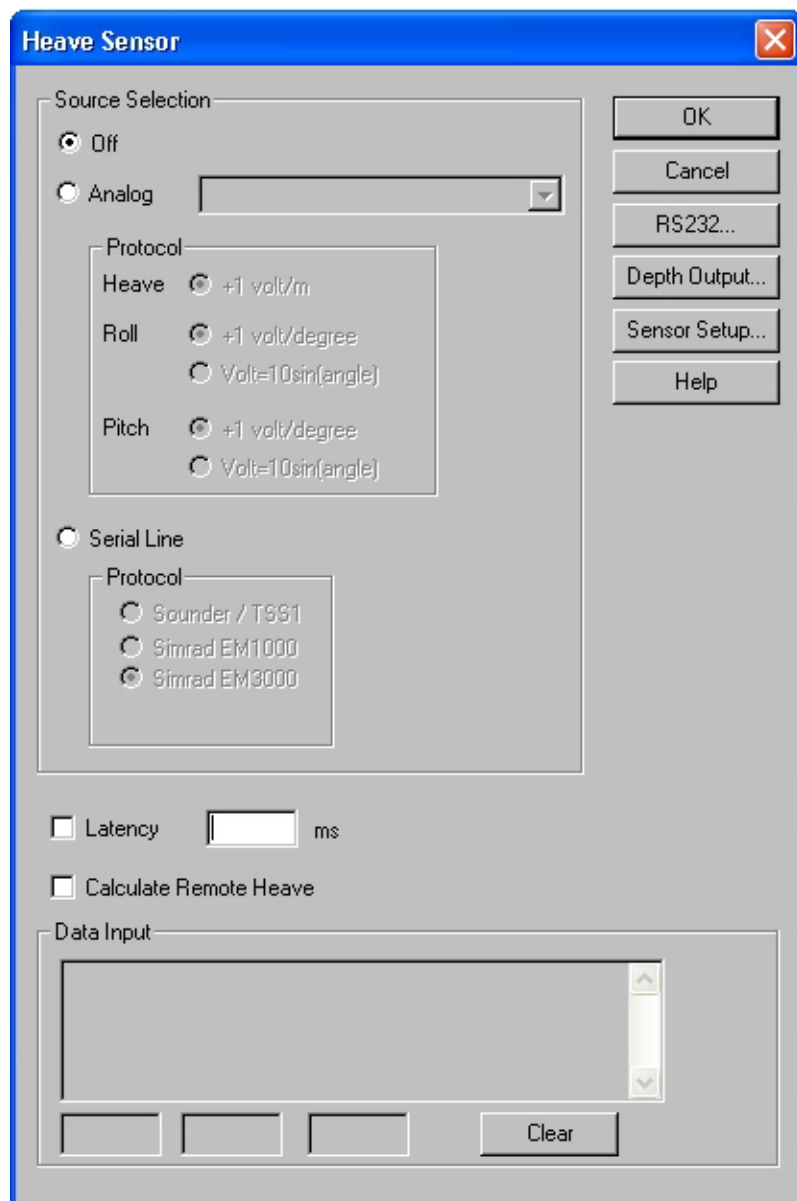
Source Selection

Off - Disregard all heave input.

Analog - Heave sensors with analogue outputs are connected directly to the **Auxiliary Connector** of the nearest General Purpose Transceiver (GPT). Select the appropriate transceiver from the list of installed transceivers. Each entry in the list contains transceiver type, operating frequency and unique identifier.

For each input, specific protocols may be chosen to accept heave, pitch and roll input formats from various sensors.

Serial Line - Heave sensors with a serial line output are connected to a RS-232 port at the rear of the echo sounder's processor unit.

Protocol - These options are only available when **Serial Line** has been chosen. Use these to select serial line input format. The echo sounder recognises one character based telegram (Sounder/TSS1) and two binary telegrams (EM 1000 and EM 3000).

More information about the datagrams can be found in the *Data formats* chapter.

Latency - Insert time for quoted accuracy (Ref. manual for external sensor system and internal latency if known.)

Calculate remote heave

Click this function to enable the software to calculate the correct heave. This calculation will include the heave values created by the the roll and pitch movements. Note that the heave sensor must have been properly positioned prior to this. Without this selection, only the vertical transition values will be used.

Data Input

The most recent input data is displayed in a list. With analogue input the input voltage and the computed heave value are displayed. With serial line input the telegram content is displayed. This function is useful during installation and trouble shooting. The current heave value is displayed in meters in the lower left corner of the dialogue box.

Clear - This button clears the input data list.

Depth Output

This opens the **Depth Output** dialogue box.

RS-232

This button activates the **RS-232 Setup** dialogue box. This box is used to define communication port, baud rate etc.

Sensor setup

This button opens the **Sensor Setup** dialogue box. This dialogue is used to establish the relative position of the heave sensor. A specific procedure is provided in the *Operational procedures* chapter.

Related topics

→ *Depth Output, page 112*

→ *RS-232 Setup, page 159*

→ *Sensor Setup, page 160*

→ *Positioning the heave sensor, page 76*

→ *NMEA data formats, page 196*

History

The **History** dialogue box is accessed from the **View** menu.

It displays echogram views previously saved during normal echo sounder operation. This function greatly reduces the need for echogram printout on paper. The presentation is made in a separate window, and the echo sounder operates normally in the background.
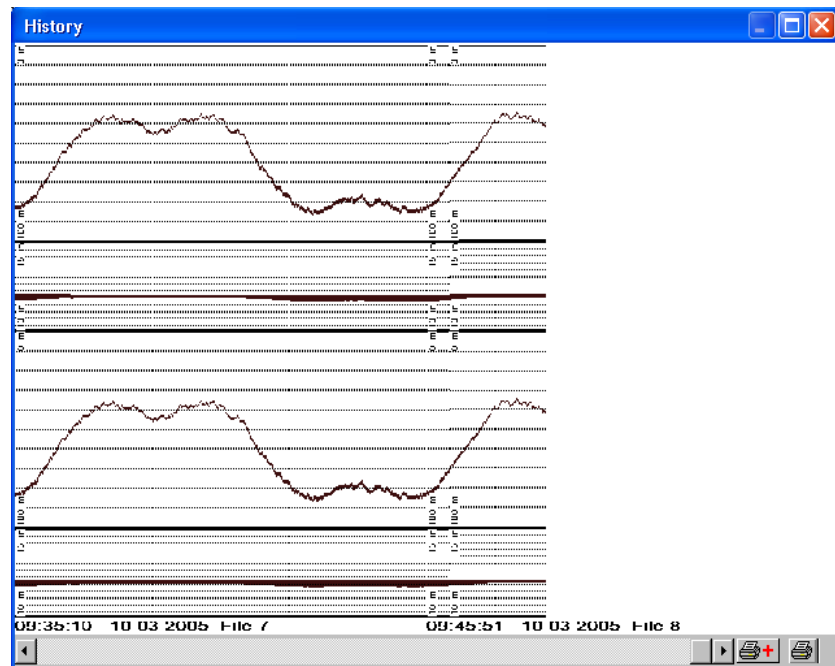
Echograms covering the past hours can be viewed by operating the scroll bar at the bottom of the dialogue; the oldest echogram view to the left, the newest echogram view to the right.

Click the button in the lower right corner if you wish to print the current view. If you wish to print a series of echograms click the button with the + sign.

The echograms stored in the history files are available on *.BMP format on the harddisk. A directory for these were created during the installation: **c:\EA 600\history**.

Recording, browsing and printing the history information is described in the *Operational procedures* chapter. More detailed information about the History window is provided in the *Display views* chapter.

Related topics

GPT IP Address

The **IP Address** dialogue box is used when you need to change the echo sounder's addressing.

Note that this operation is not required on a daily basis. You only need to modify the address if your echo sounder system shall be connected to an existing computer network on the vessel. As long as the EA 600 operates as a stand-alone system using the hardware supplied by Kongsberg Maritime, you will not need to change anything.

To access this dialogue box, open the **Transceiver Installation** dialogue box from the **Install** menu, select a transceiver, and click **Set new GPT IP Address**. The echo sounder will stop automatically.
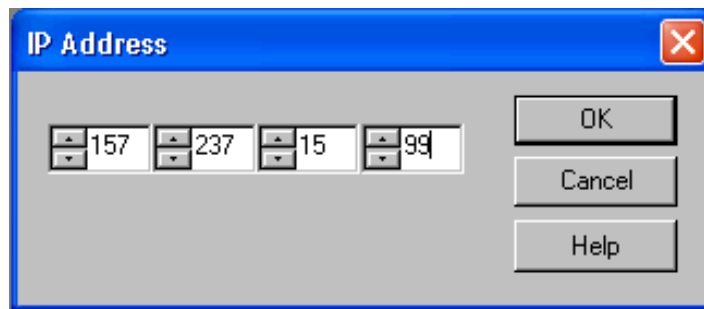
If you need to change the address, keep **157** and **237** as the two first bytes, as these are common for all Kongsberg Maritime equipment. The two remaining digits can be chosen freely, provided that no other Kongsberg Maritime equipment with the same address is connected to the same network. Thus, if you operate with more than one GPT, these must be set up with different IP addresses.

Default factory address

First GPT: 157.237.15.99

Second GPT: 157.237.15.98

Computer: 157.237.16.12

Background theory

IP addresses are shown as four decimal integer numbers, where each integer number corresponds to eight bits (or one byte) of the address.

An IP address consists of a *network* address and a *host* address. Three *address classes* are defined:

Class A used on large networks:

0NNNNNNN HHHHHHHH HHHHHHHH HHHHHHHH

Class B used on medium size networks:

10NNNNNN NNNNNNNN HHHHHHHH HHHHHHHH

Class C used on small networks:

11NNNNNN NNNNNNNN NNNNNNNN HHHHHHHH

The address class is determined from the high-order bits of the first byte.

- The first byte of a **Class A** address contains a zero and seven network bits. The next 24 bites identify the host.

- A **Class B** address contains a one, a zero, 14 network bits and 16 host bits.

- Finally, a **Class C** address contains a one, a one, 22 network bits and 8 host bits.

The echo sounder computer, GPT transceiver(s) and other computers that communicate on the Ethernet must reside on the same network. This requirement is met only if the host part of the address differs.

Related topics

→   *Transceiver Installation, page 180*

Language

The **Language** dialogue box is accessed from the **Options** menu. Use this dialogue to select operational language.
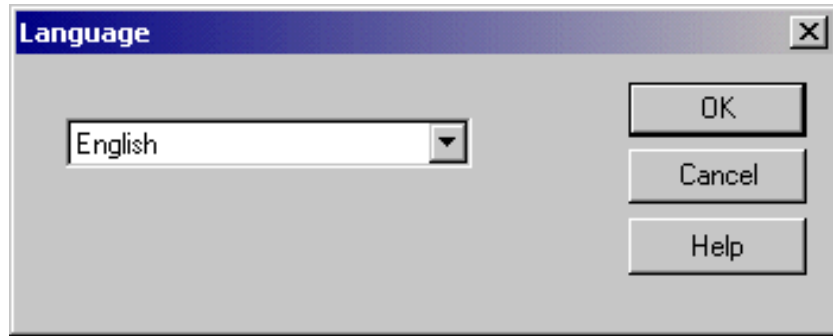
Layout

The **Layout** dialogue box is accessed from the **View** menu.

Installed frequency channels are visible on the display or hidden. This dialogue box controls how many frequency channels are visible and their layout on the display.
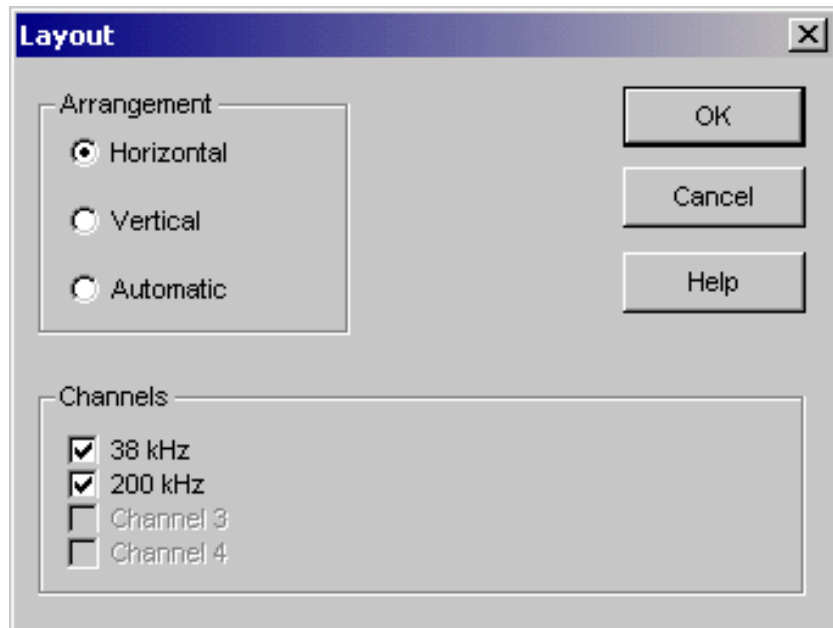
Arrangement

Visible frequency channels are vertically or horizontally arranged on the display. **Automatic** selection of layout is also provided.

Channels

The list of installed frequency channels is displayed; one channel per line. Each entry contains a check box with the operating frequency. Select visibility by checking the box.

Load user settings

The **Load user settings** dialogue box is accessed from the **Options** menu.
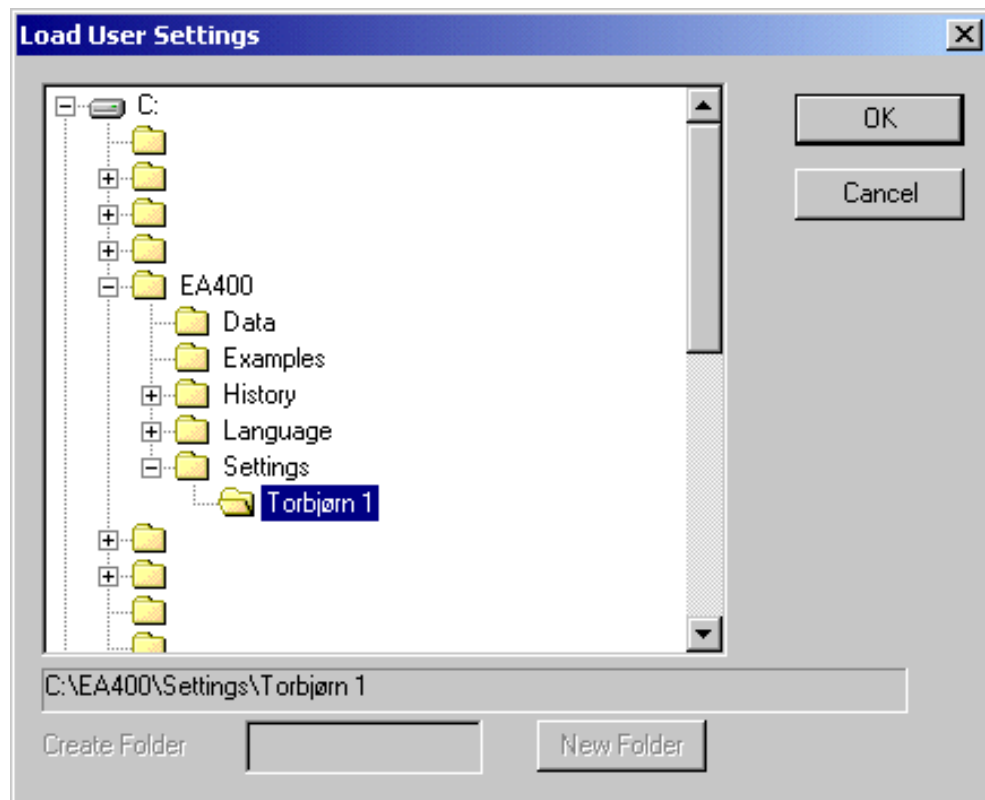
Use this dialogue to load previously saved settings.

To save settings, select **Store User Settings** on the **Options** menu.

The information and current echo sounder settings stored with this function are listed with the **Store user setting** dialogue box description.

Related topics

Navigation Interface

The **Navigation Interface** dialogue box is accessed from the **Install** menu.
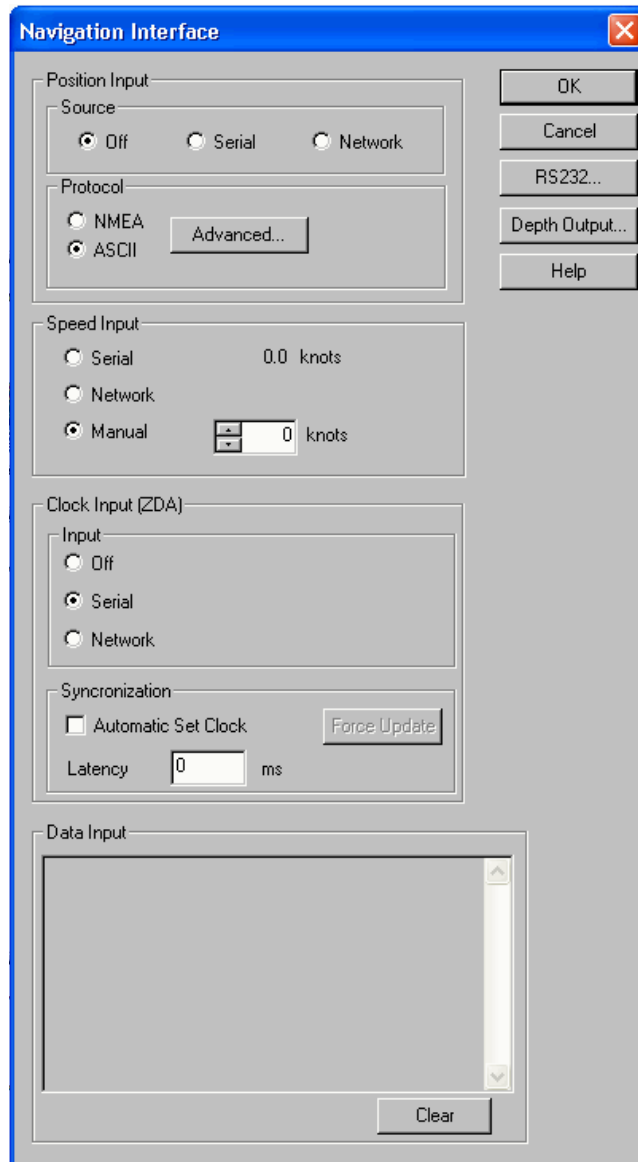
A navigation receiver or other navigational instrument can be connected to a RS-232 port of the EA 600 Processor Unit. The input may be either standard NMEA datagrams or user specific ASCII datagrams. Standard NMEA datagrams are automatically interpreted, like the **GGA** and **GLL** navigation sentences.

Special **$??ATS** or CS datagrams (defined by Kongsberg Maritime) may contain an external annotation message. See the **Annotation** dialogue box for further information about annotations.

Position input

Source - Tick any of these three options to select the input source for the position information. Selecting **Off** will disable the input. If you select **Serial**, you must press the **RS-232** button to select input port. When Network is selected, you must open the **Network Interface** dialogue box to define the local computer port for the reception of the input data.

Protocol - Tick for the appropriate input protocol; **ASCII** or **NMEA**. For setup of these protocols, see the **Advanced Navigation** dialogue box.

Advanced - Click this button to open the **Advanced Navigation** dialogue box. Use the settings in this dialogue to change the navigational parameters.

Speed input

Use these parameters to specify the vessel's speed.

Serial - to be used if navigational data is input on a serial line from an external source into the EA 600. The current vessel speed value is shown (when external speed input is selected).

Network - Select this option if you wish to retreive the speed information from the network When this option is selectedyou must open the **Network Interface** dialogue box to defined the local computer port for reception of the input data.

The telegram format **$--VTG,...** is used.

Manual - only to be used if external speed data is unavailable or unreliable.

Clock input (ZDA)

Use these parameters to set the clock.

Off - disables the input.

Serial - allows you to use navigational input on a serial line to provide the clock. The current time is shown in the dialogue box. The ZDA telegram format is used.

Network - provides clock input from devices on the network. In order to set up this interface, the settings in the **Network Interface** dialogue box must be used.

Data Input

Data Input - The most recent input data are displayed in a list. This function is useful during installation and troubleshooting.

Clear - This button clears the list of input telegrams.

Note that no information is displayed when the network interface (Ethernet) is used to accept the data.

Depth Output

This opens the **Depth Output** dialogue box.

RS-232

This button activates the **RS-232 Setup** dialogue box. This box is used to define communication port, baud rate etc. The NMEA standard specifies 4800 bits per second, 8 bits per character, 1 stop bit, no parity.

Related topics

→   *Annotation, page 104*

→   *Advanced Navigation, page 100*

→   *Depth Output, page 112*

→   *RS-232, page 159*

→   *NMEA Datagrams: page 211*

→   *"$--VTG,..." telegram format, page 212*

→   *Network Interface, page 138.*

Network Interface

The **Network Interface** dialogue box is opened from the **Interfaces** menu.

The dialogue box is used to:

- Identify the peripheral computer system the echo sounder shall communicate with

- Identify the local computer input port

- Define which datagrams the EA 600 shall export on the network

Depth output

The depth information from the echo sounder can be exported on two different formats; **Simrad** and **NMEA**. If required, both formats can be exported simultaneously. Maximum four frequency channels can be exported in Simrad format, while only one channel can be exported in NMEA format. Those channels installed on the echo sounder system are identified with their respective frequencies. Channels not installed are not selectable.

Tick the appropriate boxes to enable depth output on the two formats.

Add Frequency — Draft and SVP

Tick the box if frequency, Draft and SVP information is needed in the Simrad depth telegram.

Datagram output

Several datagrams may be exported from the echo sounder. Tick the boxes to choose which of the datagrams to use.

Echogram data

Tick the applicable frequency box to enable echogram output on the network interface.

TVG - Select the TVG setting for the echogram data.

No. of Surface Values - The number of echogram samples to export in the pelagic part of the datagram (max 500!).

No. of Bottom Values - The number of echogram samples to export in the bottom part of the echogram (max 200!)**.**

Surface Range - This dialogue sets up the limits for extraction of echogram values for the surface part of the echogram. The **Surface Range** dialogue box opens to allow the modifications.

Bottom Range - This dialogue sets up the limits for extraction of echogram values for the bottom part of the echogram. The **Bottom Range** dialogue box opens to allow the modifications.

Note

For network output, the maximum number of samples is limited to a total of 700 due to network protocol limitations.

If too many values are available for the given ranges a decimation will take place. On the other hand, if too few values are available in the given range compared to the wanted number of samples, "stretching" will occur. In this case sample values are filled in to fulfill the demand for samples.

Remote computer

The settings here are used to identify an external computer on the network to receive the datagrams exported by the echo sounder.

Local computer input

This is the network port that the echo sounder will "listen" on for reception of the different input datagrams.

On the EA 600 system, the port number must be set to **10183**.

Correct IP address and port number on the remote computer must also be provided.

The telegram formats accepted by the echo sounder is described in the *Telegram formats* section.

Related topics

→ *Datagram format descriptions, page 196*

→ *Surface Range, page 175*

→ *Bottom Range, page 109*

→ *Telegram formats, page 196*

Operation

The **Operation** dialogue box is accessed from the **File** menu.

This is the main dialogue box for operational control. You can select operational mode and ping rate, and you can initiate recording of the echo sounder information. The sounder has two functions to greatly reduce the need for echogram printout paper: **Store/Replay** and **History**.
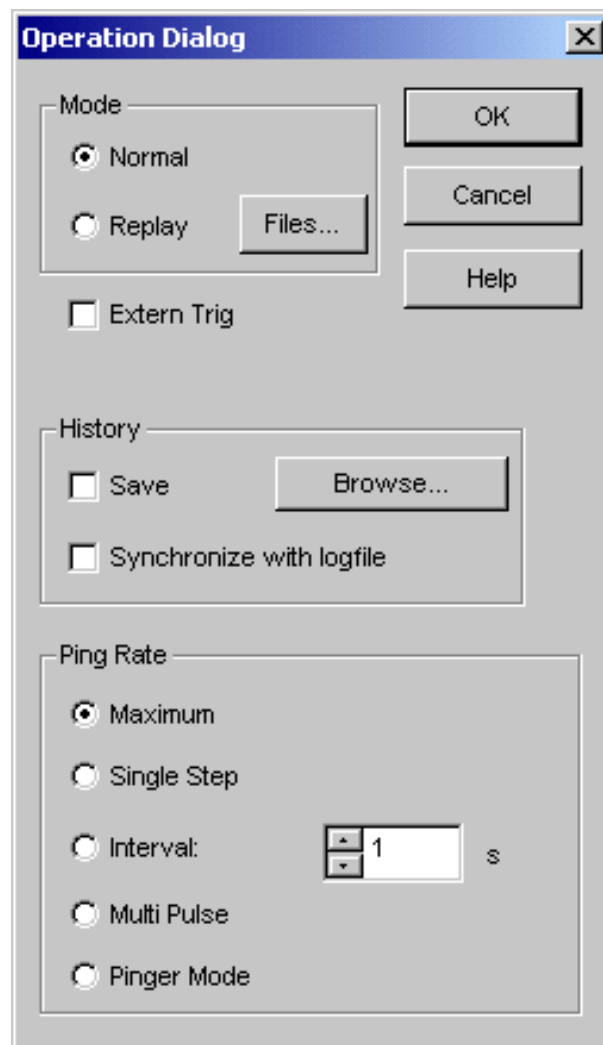
The **Store/Replay** function records the unprocessed transceiver data on the internal harddisk. These data are later injected into the echo sounder processing software as if it arrived directly from the transducer. When replaying the recorded signal, you are free to experiment with the echo sounder settings.

This feature is useful during training and demonstration. It is also useful for memorising a particularly interesting observation from the survey.

The **Store** dialogue box is available from the **File** menu. The **Replay** dialogue box is available from this dialogue box when you click on the **Files** button.

Recording the entire survey for later reprocessing is also feasible provided you have a large enough harddisk. Replaying the recorded signal is not limited by the speed of sound in water. Hence, a higher ping rate is possible during replay than during normal operation. The raw unprocessed transceiver data are stored in standard computer files. These data files contain all the necessary data for realistically reconstructing the situation during the real survey; transceiver data, navigation data, annotation input etc.

The **History** function is equivalent to the print function. The echo sounder continuously saves echogram "printouts" or echogram pictures to the internal harddisk. These can later can be recalled on the display.

The horizontal width of each echogram picture roughly corresponds to the width of the display. The history function allows you to quickly look through echogram pictures covering the past hours.

Mode

The echo sounder either pings normally displaying the echo signal received at the transducer, or it replays a previously recorded echo signal stored in one of the four Raw Data Memory locations.

Normal - Click the **Normal** button to enter Normal ping mode.

Replay - Select **Replay** for Replay (playback) mode.

Files - When selecting **Replay** mode, click the **Files** button to activate the **Replay** dialogue to select the replay file.

External trigger

The **Auxiliary** connector on the General Purpose Transceiver (GPT) includes a trigger input signal for transmit synchronisation with external equipment. Normally, the EA 600 transmits as soon as it is ready for the next ping. Transmission is delayed until a pulse is detected at the trigger input line when the **Extern Trig** entry is checked.

Click this option to enable the EA 600 to work in Slave mode. The echo sounder will then await the external trigger from the peripheral system, and the transmissions from the systems will be synchronized.

When this option is not checked, the EA 600 operates normally as a Master system.

The external triggering system is explained in more detail in the EA 600 instruction manual. Refer to the *Cable layout* chapter in the printed book.

Note

External transmit synchronisation is only active in Normal ping mode.

History

Echogram pictures are saved continuously to the harddisk when the **Save** box is checked.

Synchronize with logfile - When this box is checked the history file creation is synchronised with the survey log file creation. When a new survey log file is started, a new history log file is started, likewise when a survey log file is closed, the current history log file is closed.

To select folder for the saved files, click **Browse**.

Ping rate

These settings are used to define how fast the echo sounder shall transmit ("ping"). When the **Maximum** box is selected, the EA 600 transmits at maximum speed only limited by the speed of sound in water and/or processing delays.

Selecting **Single Step** allows the EA 600 to conduct just one ping cycle every time the **Step!** entry on the **Main** menu is clicked, or the keyboard combination Alt+E is pressed.

Selecting **Interval** sets the echo sounder to transmit once at every chosen time interval (in seconds).

Selecting **Multipulse** enables the dedicated function for deep water operation. This is described in more detail in the *Operational procedures* chapter.

Selecting **Pinger mode** enables this dedicated function for pinger operation. This is described in more detail in the *Operational procedures* chapter. Note that the **Pinger mode** dialogue box will appear immediately after you have press the OK button.

Related topics

→ *Store, page 169*

→ *Replay, page 154*

→ *Playback and recording procedure, page 65*

→ *History procedure, page 68*

→ *Multipulse, procedure, page 81.*

→ *Pinger mode, procedure, page 83*

→ *Pinger mode, page 145*

Pinger mode

The **Pinger Mode** dialogue box appears automatically when you have chosen Pinger mode in the **Operation** dialogue box.

The purpose of this dialogue box is to collect the parameters required to operate the pinger. This is described in more detail in the *Operational procedures* chapter.

Synchronize

Ping rate - Enter the ping rate of the pinger you will use. This information is found in the pinger's technical specifications.

Pulse length - Enter the pulse length of the pinger you will use. This information is also found in the pinger's technical specifications.

It is very important that you enter these values correctly. Failure to do so may result in a damaged pinger or echo sounder transceiver.

Synchronize - The <u>first time</u> you use a specific pinger, press the **Synchronize** button. This will correct minor deviations between the pinger and the echo sounder. The settings are stored by the echo sounder, and they are automatically retrieved the next time the function is activated.

Information

Cable length - Set the approximate current depth of the pinger, measured by the length of cable that has been used.

Depth - Set the approximate current water depth.

Related topics

→   *Procedure, page 83*

Printer and History

The **Printer and History** dialogue box allows you to control the output to the system's colour printer.

The dialogue is accessed by the **Print** command on the **File** menu.
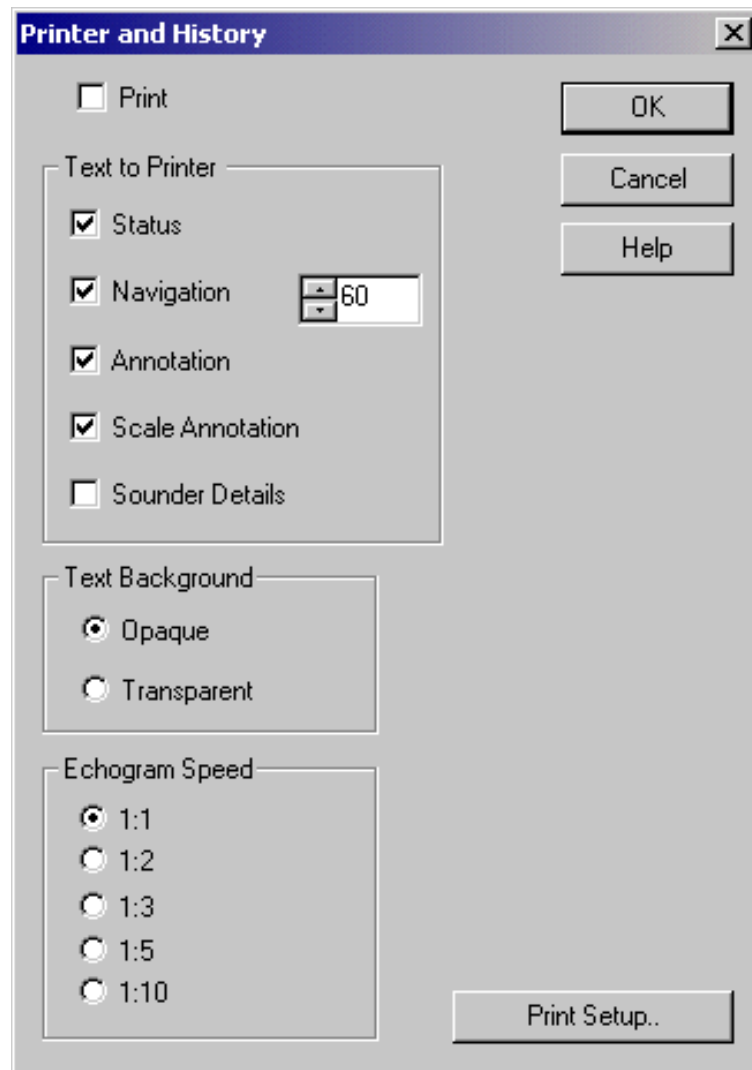
Print

Check this box if you want the echogram printing to be active. If the printer is switched on and active, a small printer symbol is shown inside the **Status bar**.

Text to Printer

Status - Check this box if you want status messages to be printed.

Navigation - Check this box if you want position strings to be printed. Navigation receivers typically output a new position fix every second, and it is not practical to print them all on top of the echogram. The count parameter in the spin box reduces the rate of printing of the position strings. Every tenth position fix is printed when this parameter is set to ten.

Annotation - Check this box if you want annotations to be printed.

Scale annotation - The depth information will be printed on the scale line. If the range is changed, the depth information will automatically be updated when printing.

Sounder details - This function allows the most important echo sounder parameters to be included on the print-out. This includes for example current operational frequency, output power, pulse length and TVG setting.

Text background

Click to select either opaque or transparent text background on the annotation printouts.

Echogram speed

Select any of these values to slow down the printout relative to the echo sounder speed. The ping rate will not be changed.

Print Setup

Click this button to access the **Print Setup** dialogue box.

Related topics

→   *Annotations, page 104*

→   *Print Setup, page 149*

Print Setup

The **Print Setup** dialogue box is accessed from the **Printer and History** dialogue box. Note that this dialogue box is a part of the operating system, and the language displayed is that of the operating system.

The EA 600 echo sounder uses the print mechanism of the Microsoft™ operating system when sending the echogram to a printer. Virtually any modern printer can be used. This **Print Setup** dialogue box controls the printing process. Installation of a new printer is done with the operating system's built-in dialogue boxes. This is not described in this documentation. Refer to the operating system's documentation.
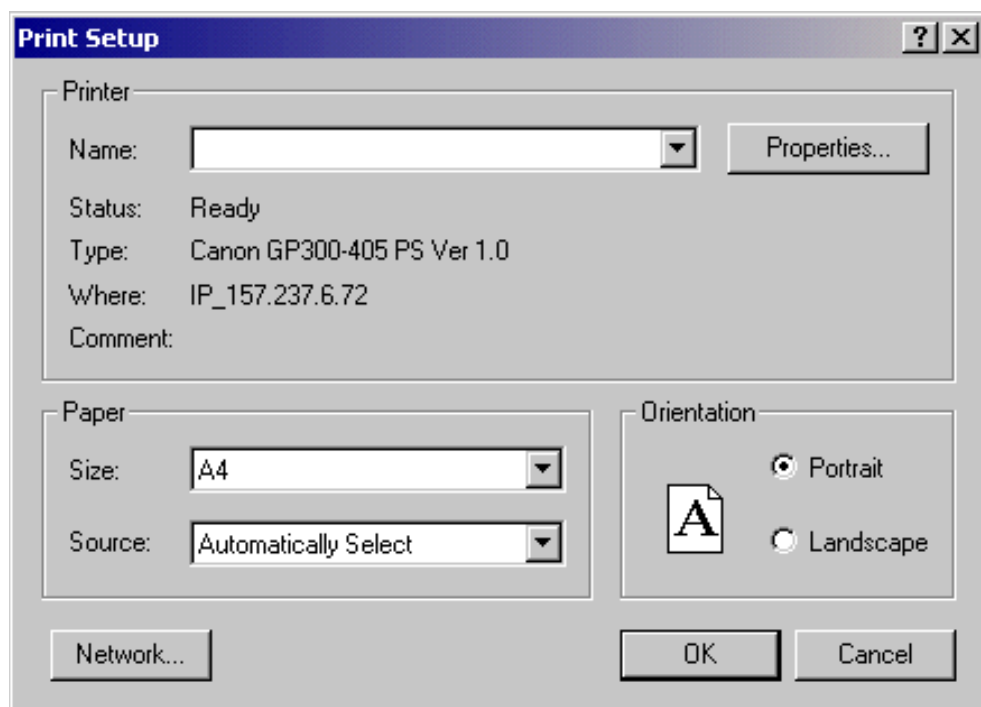
Printer

Name - This entry displays the logical name of the printer. A typical EA 600 will normally have only one printer installed. However, if you for some reason have more than one printer installed, the **Name** box controls which printer to use.

Status - This field displays the status of the printer: ready, busy etc.

Type - The type of printer is displayed.

Where - The name of the interface to the printer is displayed.

Comment - Any comment that was entered during the installation of the printer appears here.

Properties - This button activates the **Properties** dialogue box. This is a printer specific dialogue for entering special purpose printer parameters. You do not need to enter this dialogue box during normal operation of the echo sounder. The **Properties** dialogue box is part of the operating system. For further information about this dialogue box, refer to the operating system documentation.

Paper

Size - Modern printers support a variety of paper sizes. However, the sizes A4 or Letter are appropriate when printing echogram on paper.

Source - This setting tells advanced printers which paper tray to use. The setting **Automatic Select** works on most printers.

Orientation

Select **Portrait** or **Landscape**. Landscape orientation is recommended for echogram printing.

Network

This button activates the **Network** dialogue box. It is used to send print jobs to a remote printer on a data network.

The **Network** dialogue box is part of the operating system. For further information about this dialogue box, refer to the operating system documentation.

Related topics

→   *Printer and History, page 147*

Raw Data

The **Raw Data** dialogue box is accessed from the **Interfaces** menu.
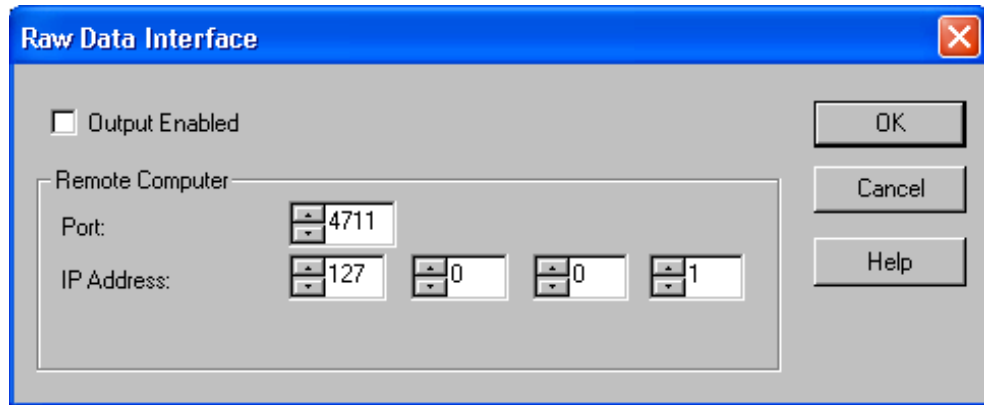
Output enable - If this output is actived (as shown), the raw data is sent to the specified port and IP address.

Remote computer

These settings identify the remote computer.

Remote Display

The **Remote Display** dialogue box is opened from the **Install** menu. The dialogue box controls the data flow to an external depth display (not a colour VGA display!)
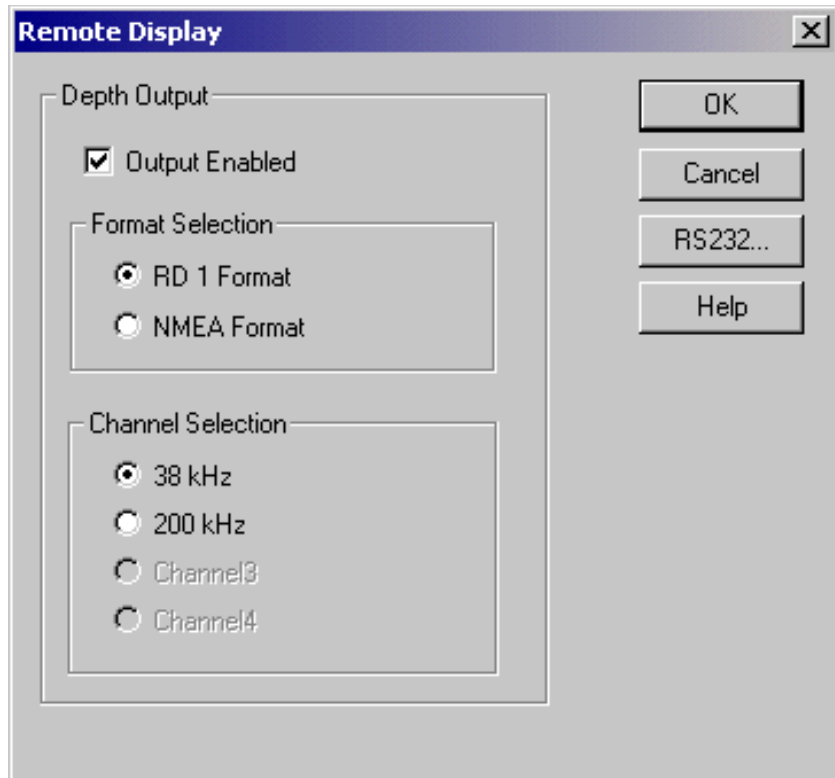
Depth output

The depth information from the echo sounder can be exported to a remote depth display. Use these settings to select which information is exported, and on which format.

Output Enabled - Click to enable the output.

Format Selection - The remote display may be able to receive the depth data on different formats. Two formats are provided; **RD1** and **NMEA**. Click to select the appropriate format. Note that the **RD1** format is only for the old **Simrad RD** display using a proprietary format.

Channel selection - The remote display can only accept depth data from one channel. Click here to select which channel to export data from.

RS232

This button activates the **RS-232 Setup** dialogue box. This box is used to define communication port, baud rate etc.

Related topics

→ *RS-232 Setup, page 159*

Replay

This **Replay** dialogue box is accessed from the **Operation** dialogue box by clicking on the **Files** button. The **Operation** dialogue is in turn opened on the **File** menu.

The **Store** function records the unprocessed transducer signal on the internal harddisk or an other recordable media. The recorded signal can later be injected into the echo sounder processing software as if it arrived directly from the transceiver (Replay).
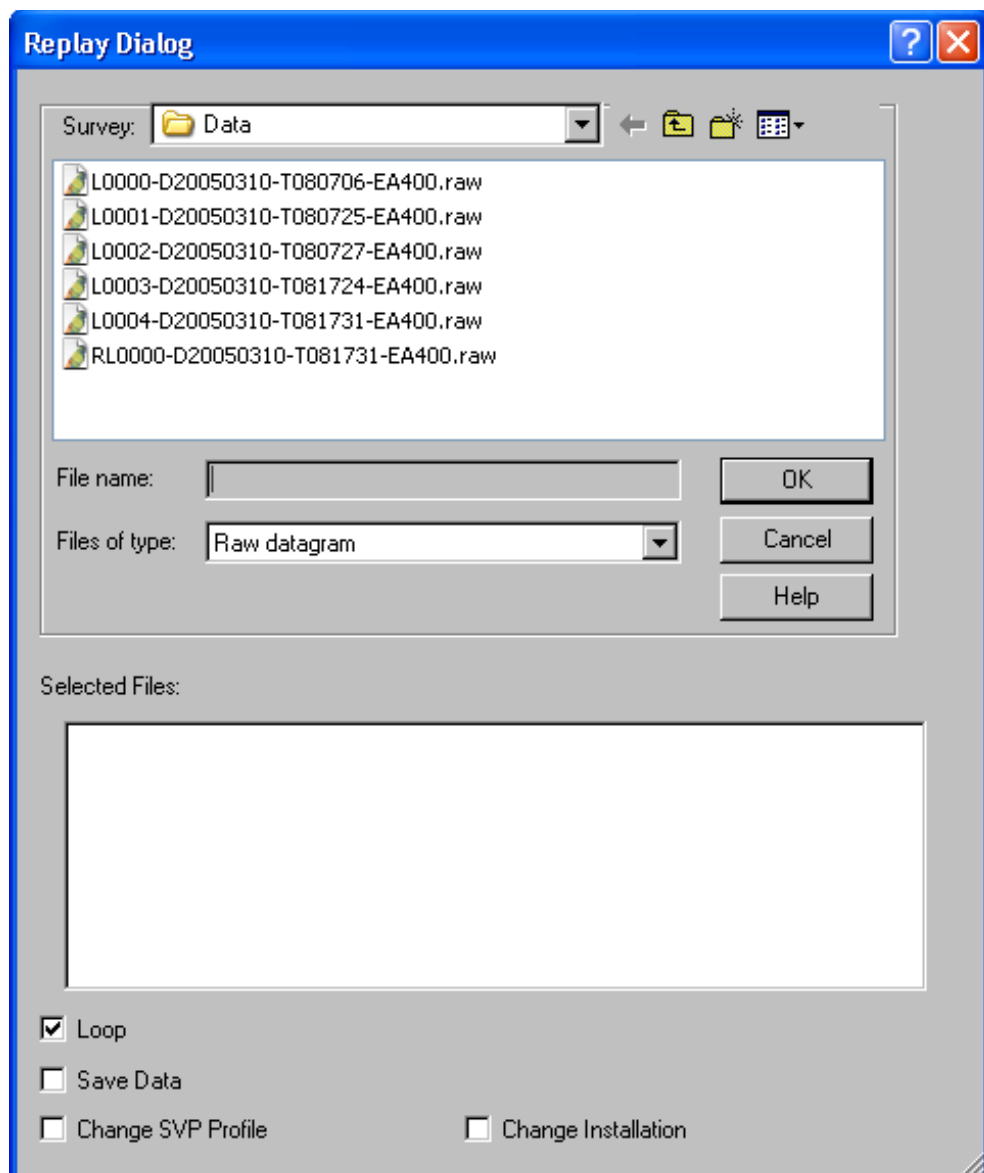
The **Store** dialogue box (also available from the **File** menu) controls the recording of the unprocessed signal on the harddisk, while this **Replay** dialogue controls the playback of this signal into the echo sounder processing software.

Survey (directory)

This is a standard file selector. Select survey directory first, and then one or more files to be replayed.

Selected Files

The currently selected files are displayed in this field.

Loop

Check this box if you want the EA 600 program to loop through the currently selected replay files without stopping.

Save Data

Check this box if you want to store processed output data. The Store dialogue box will appear on the screen. The data can be used by post-processing software when generating bottom contour maps.

In this version it is not posible to store **.out** and **.dg** files to harddisk.

Change SVP Profile

Check this box if you wish to apply a new SVP profile to the data at hand. The **Environment** dialogue box will appear when the box is checked.

Change Installation

This function allows you to replay one or all selected files with different settings for draught and motion sensor location. You can thus replay the file(s) without the heave information taken into consideration. When you tick this box, the **Reprocess heave** dialogue box will open automatically. Note that it will not upen until after you click **Ok** in the **Operation** dialogue box.

Related topics

→ *Store, page 169*

→ *Playback and recording procedure, page 65*

→ *Echogram parameters, page 119*

→ *Environment, page 120*

→ *Reprocess heave, page 157*

Replay control

The **Replay control** dialogue box is accessed from the **Options** menu.

This small dialogue allows you easier access to the replay function. The buttons work as follows:

Left arrow - Continuous playback.

Middle arrow - Stepped playback (ping by ping)

Right bars - Pause.

REC - Record. Use this button to record unprocessed transducer data. This is a toggle button, and it is hence used both to start and stop recording.

When starting a new recording, the file will be stored at the same location on the hard disk as the original raw file. The file name will be identical except that the time tag will be updated and that an "R" will be added at the beginning of the file name.

→   *An example is shown in the Replay dialogue, page 154*

The recording process is indicated by the REC text turning red.

Timeline - The slider represents the timeline of the replay. To start recording from a specific point in the replay, move the slider as requested, then press the REC button. The time of start will time-tag the stored file.

To close the dialogue, you must select **Replay control** once more from the **Options** menu. Note that it is only available during **Replay** mode.

It is also possible to close the dialogue using the exit button in the top right corner.

Reprocess heave

The **Reprocess heave** dialogue box appears automatically when **Change installation** has been selected in the **Replay** dialogue box, and then <u>after</u> you have exited the **Operation** dialogue. The values initially shown in the dialogue box are those saved with the original data file.

This dialogue box makes it possible for you to play back the recorded echo sounder data using different sensor setup values. The existing values will be shown when you access the dialogue. You can then enter any values for draught and for the physical position of the motion sensor for each frequency your echo sounder has installed. All distances are in meters.

Note that changes made in this dialogue box will not be reflected in the raw data files on the hard disk. These files will not be changed.

Reprocess heave - Run the playback with the values currently entered for x, y, z and draught. If you have manually changed any of the veave or draught values, these modified values will be used in the processing.

Apply to all files - If you have selected more than one file in the **Replay** dialogue box, the settings will be applied to all these files, and the playback will run continuously. If you do not check this box, the playback will stop for every new file, display this dialogue box, and ask for new values. If any of the replay files have been recorded with different transducers than what is currently used, the playback will stop anyway.

Apply heave - This box must be checked to run the playback with the initial heave values saved with the data file. If you deselect this option, you will reprocess the data file with no draught or heave values at all.

The use of the **Reprocess heave** function is related to the **Sensor setup** dialogue box, which is initially used to establish the relative position of the heave sensor with respect to the vessel's reference point.

Further description and a relevant procedure for this is provided in the *Operational procedures* chapter.

Related topics

→   *Operation, page 141*

→   *Replay, page 154*

→   *Procedure for sensor setup, page 76*

RS-232 Setup

The **RS-232 Setup** dialogue box is accessed from several other dialogue boxes. It specifies the RS-232 communication settings. Identical settings must be used at the opposite side of the RS-232 cable.
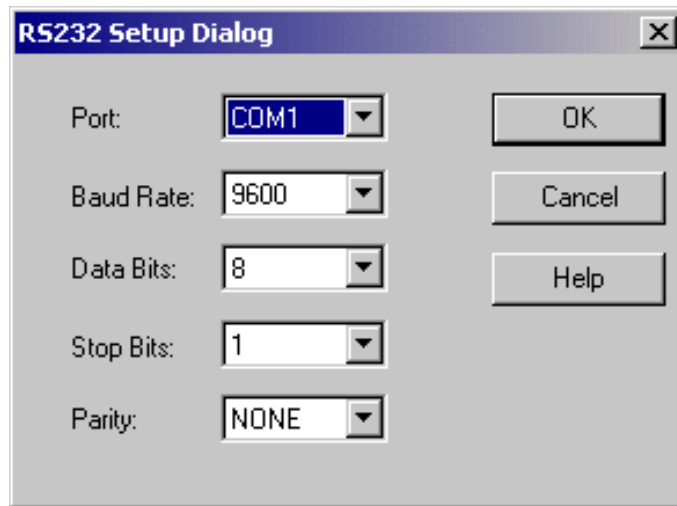
Parameters

Port - Which RS-232 port do you want to use?

Baud Rate - Select communication rate.

Data Bits - Do you want to use 7 or 8 data bits per character? Eight data bits per character are standard.

Stop Bits - One or two stop bits?

Parity - Do you want to use bit 8 for error checking?

Sensor setup

The **Sensor setup** dialogue box is accessed from the **Heave sensor** dialogue box. The **Heave sensor** dialogue is in turn accessed from the **Install** menu.
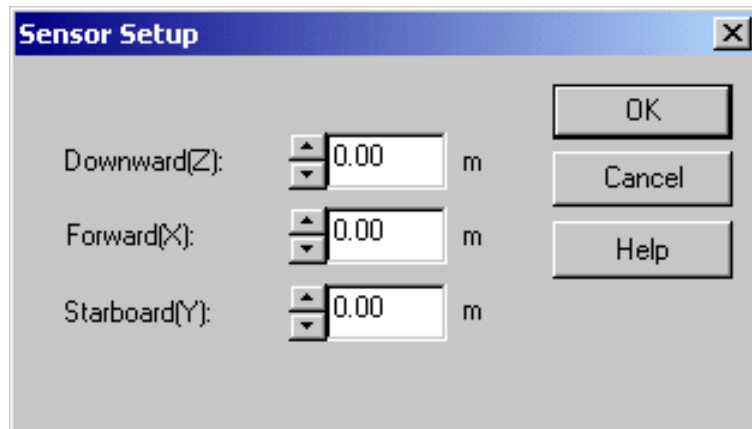
The purpose of the **Sensor setup** dialogue box is to establish the relative position of the heave sensor with respect to the vessel's reference point. If all the three values for X, Y and Z are set to 0, the motion sensor is physically located at the vessel's reference point.

Further description and a relevant procedure is provided in the *Operational procedures* chapter.

Related topics

→   *Heave sensor, page 126*

→   *Procedure, page 76*

Serial Interface

The **Serial Interface** dialogue box is opened from the **Interfaces** menu. This dialogue is used to control the datagrams and formats exported by the echo sounder on a serial line.
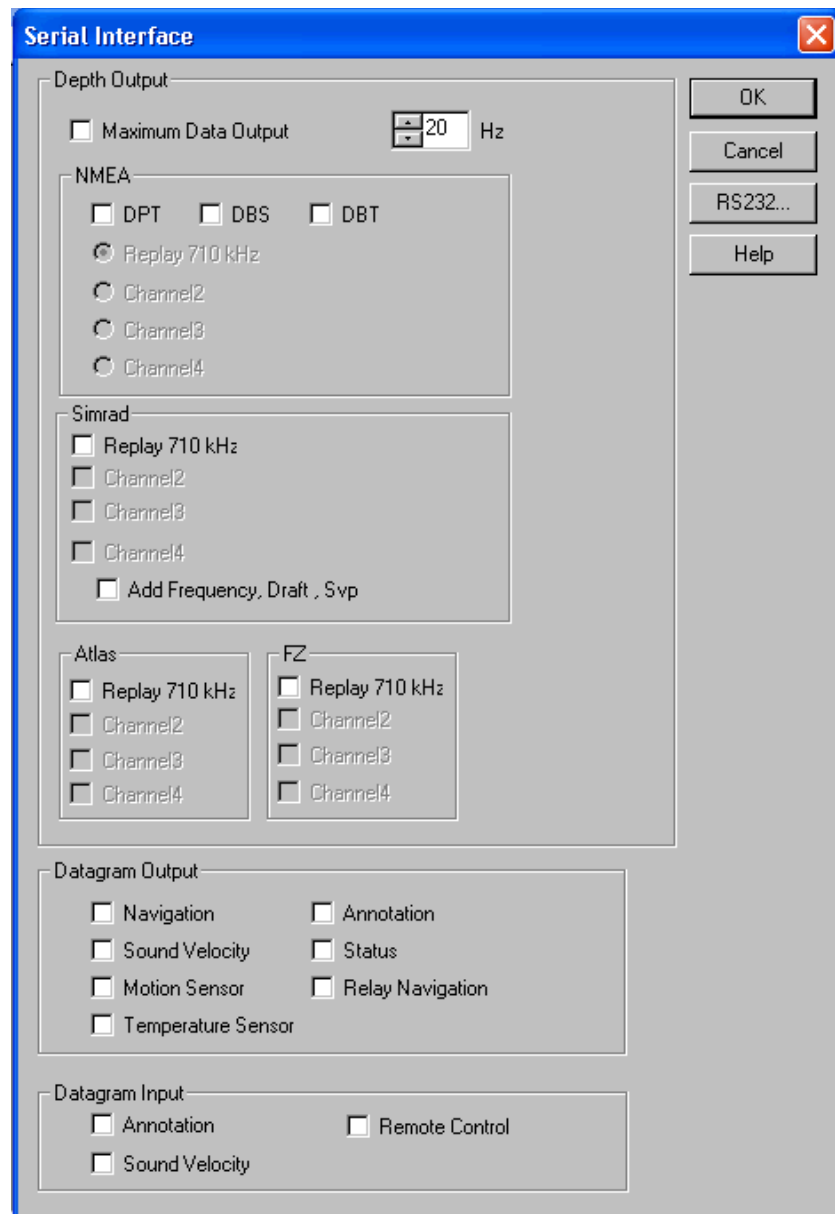
Depth Output

Maximum Data Output - Tick the box to enable maximum data output on the serial line. When selecting a data output frequency in the spin box, for example 20 Hz, depth data is then output by 20 Hz independent of the ping rate.

The depth information from the echo sounder can be exported on three different formats; **Simrad**, **NMEA** and **Atlas**. If required, all three formats can be exported simultanously.

NMEA - Tick the appropriate boxes to enable depth output from one selected frequency channel. The available channels will be listed.

Simrad - Tick the appropriate boxes to enable depth output on Simrad ASCII format from selected frequency channels.

HYMAS - Tick the appropriate box to enable all depths to be output. Default 20 depth will be exported independent of number of transducers/channels.

Atlas - Tick the appropriate boxes to enable depth output on Atlas format from selected frequency channels. Note that the Atlas format only supports two output strings. On a system with more than two operational frequencies, only two of them can be exported.

Datagram output

Several datagrams may be exported from the echo sounder. Tick the boxes to choose which of the datagrams to use.

Datagram input

Tick to select the information to be imported on the serial line.

Annotation - This data will provide annotations on the echograms. These annotations will appear on the display, in the history files and on the printouts. Note that the **Event** vertical marker must be enabled in the **Echogram** dialogue to display the annotations. The **$??ATS** and **CS** datagrams are accepted.

Sound Velocity - This setting allows import of sound speed data from an external sensor (computer). The accepted formats are **AML-CALC**, Kongsberg Simrad **SSP** and **Simrad-A**.

Remote Control - This setting allows import of remote control of logging and pinging on the serial input. The network is automatically on, but the port must be entered as 10183. Storage location must also be manually entered.

RS-232

This button activates the **RS-232 Setup** dialogue box. This box is used to define communication port, baud rate etc. The NMEA standard specifies 4800 bits per second, 8 bits per character, 1 stop bit, no parity.

Related topics

→   *Datagram formats, page 196*

→   *RS-232 Setup, page 159*
→   *Echogram, page 114*

Sidescan Range

The **Sidescan Range** dialogue box is opened by right-clicking on the echogram in the **Echogram and Range** view on the display (just below the Header view). This dialogue is used to set the sidescan range (in metres) for both port and starboard transducers.
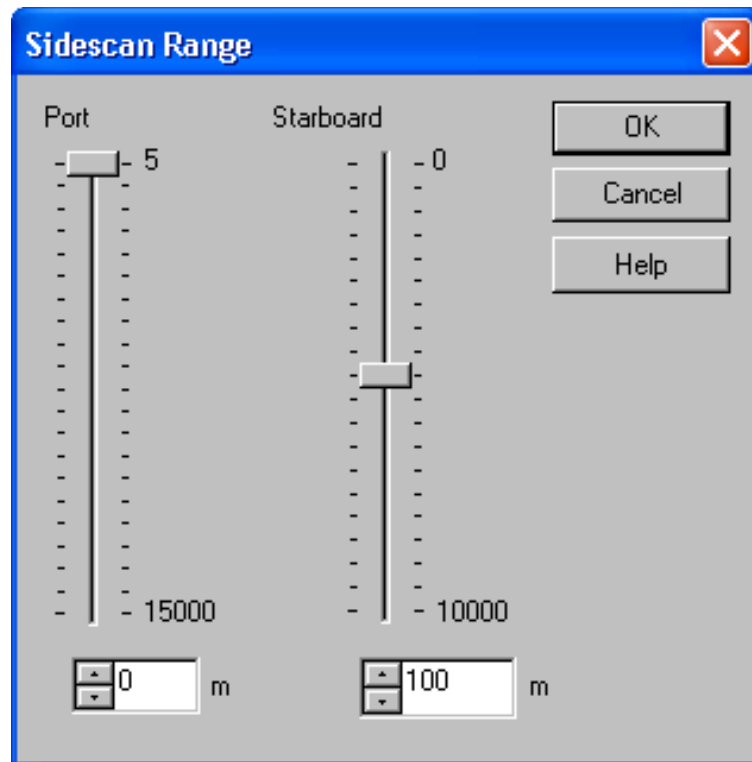
The sidescan range can be set for both port and starboard transducers in three different ways:

• By moving the slider

• By operating the arrows in the spin box

• By entering a range value directly in the text box

Related topics

→ *Sidescan procedure, page 78.*

Slope Range

The **Slope Range** dialogue box opens if you click the <u>right</u> mouse button inside the **Range** field of a **Slope** presentation.
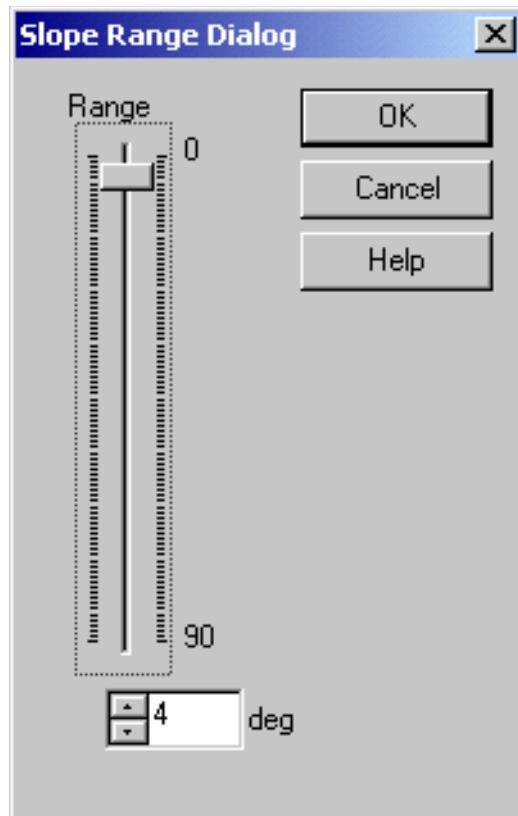
Range - This parameter controls the upper limits for the currently displayed slope angle. The value may set either by the ruler or in the numeric input field below.

In the dialogue box shown here the range value is set to 4 degrees. This implies that the graph will be presented in a window constrained by the limits -4 to +4 degrees.

Related topics

→ *Slope settings, page 166*

→ *Slope description, page 42*

→ *Procedure, page 74*

Slope settings

The **Slope Settings** dialogue box opens if you click the right mouse button on the slope value in the **Header** view. To enable the alongtrack slope function, open the **Echogram** dialogue box.

472m 3.3m 0.4deg
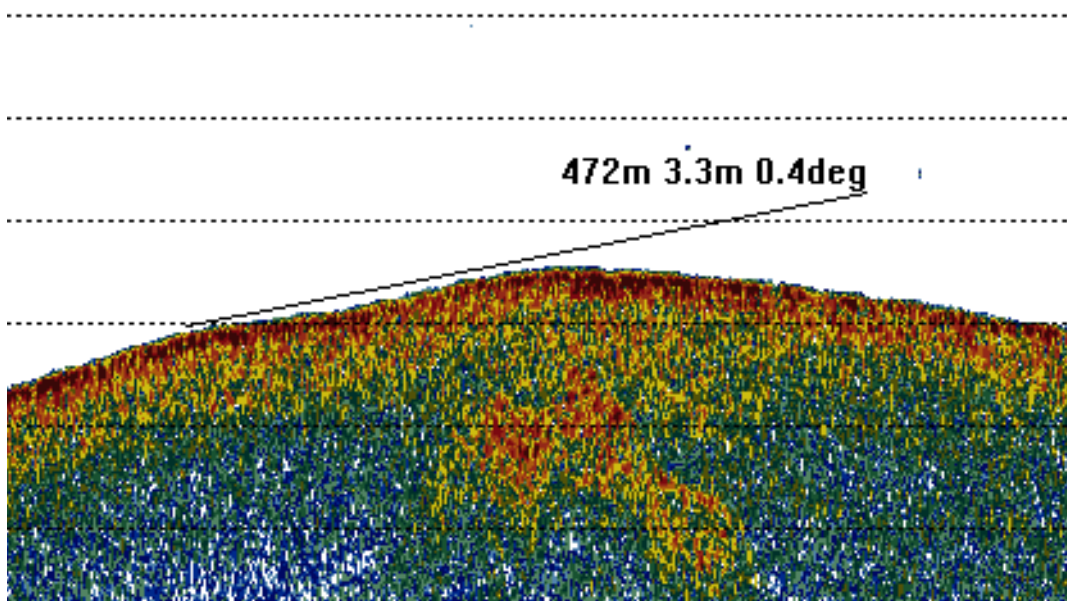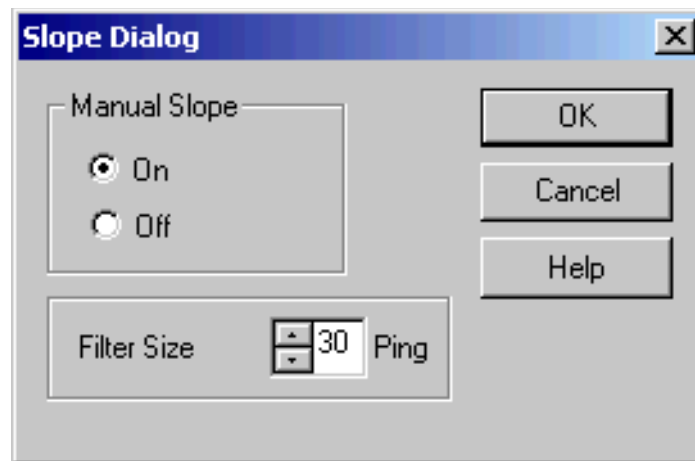
Manual Slope

On - When activated it is possible to manual slope measurements in the **Echogram** view. When on, the computer permforms a continous update of internal buffers for calculation of manual slope angles.

Off - No continous calculation is on.

Note that the manual slope must be on for a while to give access to correct measurements in the echogram time series.

A manual measurement is done by a left-click on the mouse while holding down the shift-button. A rubber band with the measured slope angle will stick to the mouse pointer.

Filter size
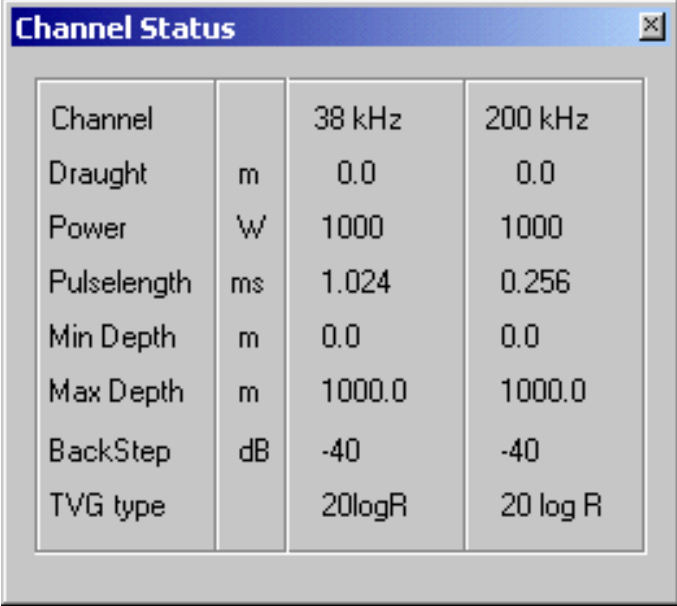
This is the number of soundings used to calculate the current slope angle. A large number of points will provide a smoother calculation, while a small number gives jumpy calculations.

Related topics

→ *Echogram, page 114*

→ *Slope range, page 165*

→ *Slope description, page 42*

→ *Procedure, page 74*

Status window

The **Status window** dialogue box is accessed from the pop-up menu available in the **Header** view. Left-click in the **Header** to view to open the short-cut menu, and select **Status window**.

Channel		38 kHz	200 kHz
Draught	m	0.0	0.0
Power	W	1000	1000
Pulselength	ms	1.024	0.256
Min Depth	m	0.0	0.0
Max Depth	m	1000.0	1000.0
BackStep	dB	-40	-40
TVG type		20logR	20 log R

This dialogue provides a quick overview of the current parameter settings in the echo sounder.

To close the dialogue, click the small cross in the top right corner.

Store

The **Store/Replay** function records the unprocessed transceiver data on the internal harddisk. The recorded signal can later be injected into the echo sounder processing software as if it arrived directly from the transducer.

The **Store** dialogue is accessed from the **File** menu. It controls the recording of the unprocessed signal on the harddisk. The **Replay** dialogue box (available from the **Operation** dialogue box) controls the playback. The **Store** dialogue opens automatically if enabling **Save Data** in the **Replay** dialogue box.

Survey

Enter the complete path name of the survey directory. A new directory is created if it does not exist. The new directory is created when you click the **OK** button. Click the **Browse** button if you wish to navigate through the disk directories.

Data formats

Save Raw Data - Check this box to save the unprocessed transceiver data on the internal harddisk. The unprocessed transceiver data is stored in standard computer files. These files contain all the necessary data for realistically reconstructing the situation during the real survey; transceiver data, navigation data, annotation input etc. The echo sounder program reads these files during replay.

Save Output Data - This field is used to save processed output data on the internal harddisk (position fixes, bottom detections, annotations). This data are used by the post-processing software when generating bottom contour maps. Check the appropriate box(es) to store all data in one file or to sort by frequency (channels).

Save XYZ Data - This field is used to save xyz data on the internal harddisk. These are interpolated values where x and y represent position and z depth. Check the appropriate box(es) to store all data in one file or to sort by frequency (channels).

Save Echogram Data - This field is used to save echogram data. Check the appropriate box(es) to store all data in one file or to sort by frequency (channels). Parameters for the data are explained below.

More information about the file formats can be found in the *Data formats* chapter.
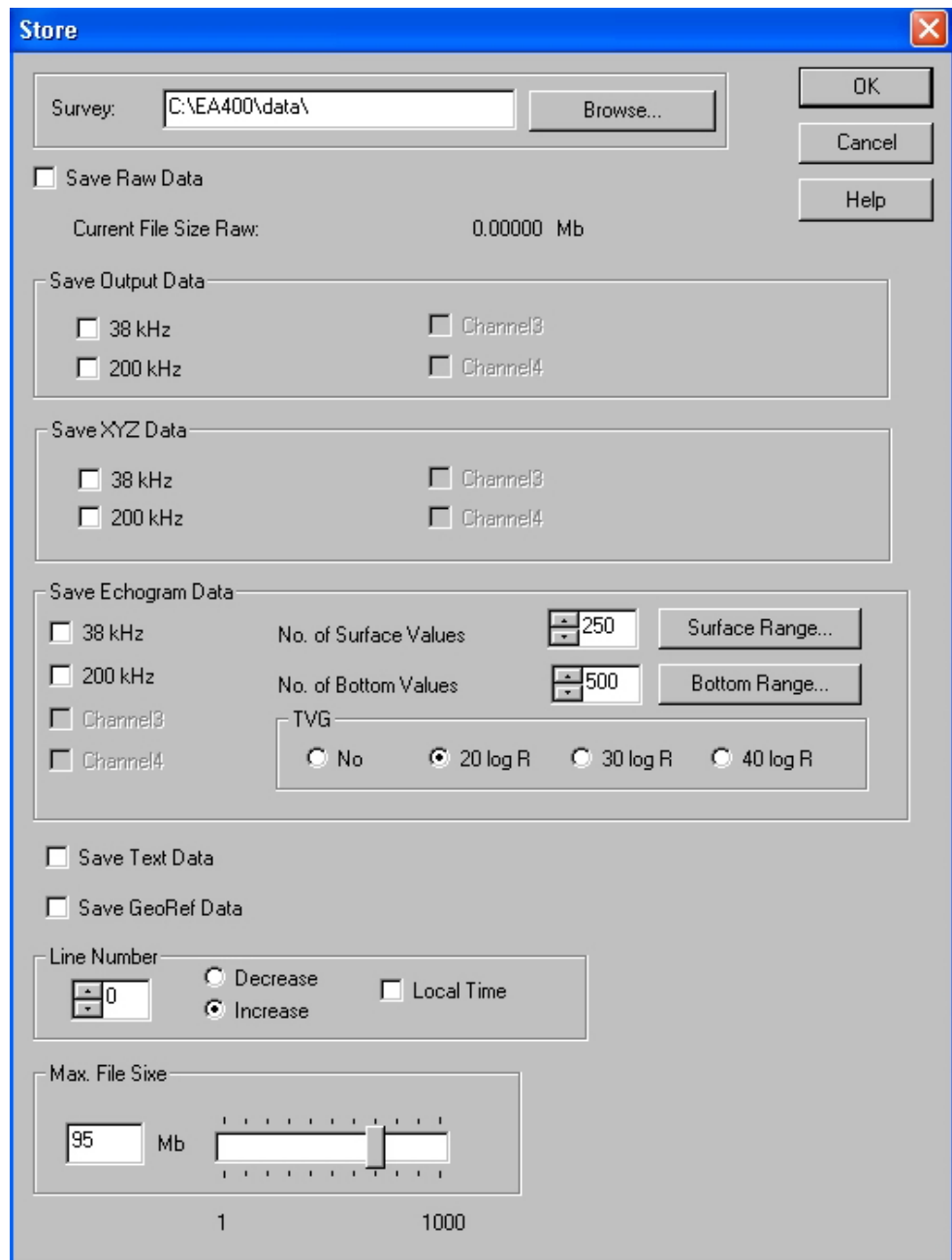
Line No.

Enter the initial survey line number. A toggle button inside the
Status bar on the display controls the start and stop of each
survey line. The line number is automatically incremented (or
decremented) by one for every new survey line. Click the box
and local time will be used in the file names, otherwise GMT is
used.

A new line number can also be initiated from an external button
connected to the General Purpose Transceiver (GPT) if this has
been implemented during system installation.

Sare GeoRef Data - This field is used to save GeoRef data on the internal hard-disk. These data can consist of two different formats: SSG and VGR. SSG is for side scan geoRef data and VGR is for vertical geoRef data.

Echogram Data

Tick the appropriate boxes to save echogram data. The parameters provided are identical to those in the **Echogram Parameters** dialogue box.

Channel - Select which frequency channel to output echogram data from. The channels installed on the echo sounder are listed by frequency.

No.of Surface Values - The number of echogram samples to export in the pelagic part of the datagram.

No.of Bottom Values - The number of echogram samples to export in the bottom part of the echogram.

Surface Range - This dialogue sets up the limits for extraction of echogram values for the surface part of the echogram. The **Surface Range** dialogue box opens to allow the modifications.

Bottom Range - This dialogue sets up the limits for extraction of echogram values for the bottom part of the echogram. The **Bottom Range** dialogue box opens to allow the modifications.

TVG - Select one of the three TVG settings for the exported data.

Max File Size

Enter the maximum size of each replay file. The replay file contains the unprocessed transceiver data. Several kilobytes of sample data is written into this file every ping. All sample data may be contained in just one file for short survey lines. However, the amount of data grows rapidly as the survey lines become longer, and it may be necessary to split the data into fragments which are stored in sequential replay files.

Related topics

→   *Operation, page 141*

→   *Replay, page 154*

→   *Playback and recording procedure, page 65*

→   *Size control, page 66*

→   *Data formats, page 211*

→   *Echogram Parameters, page 119*

→   *Surface Range, page 175*

Store user settings

The **Store user settings** dialogue box is accessed from the **Options** menu.
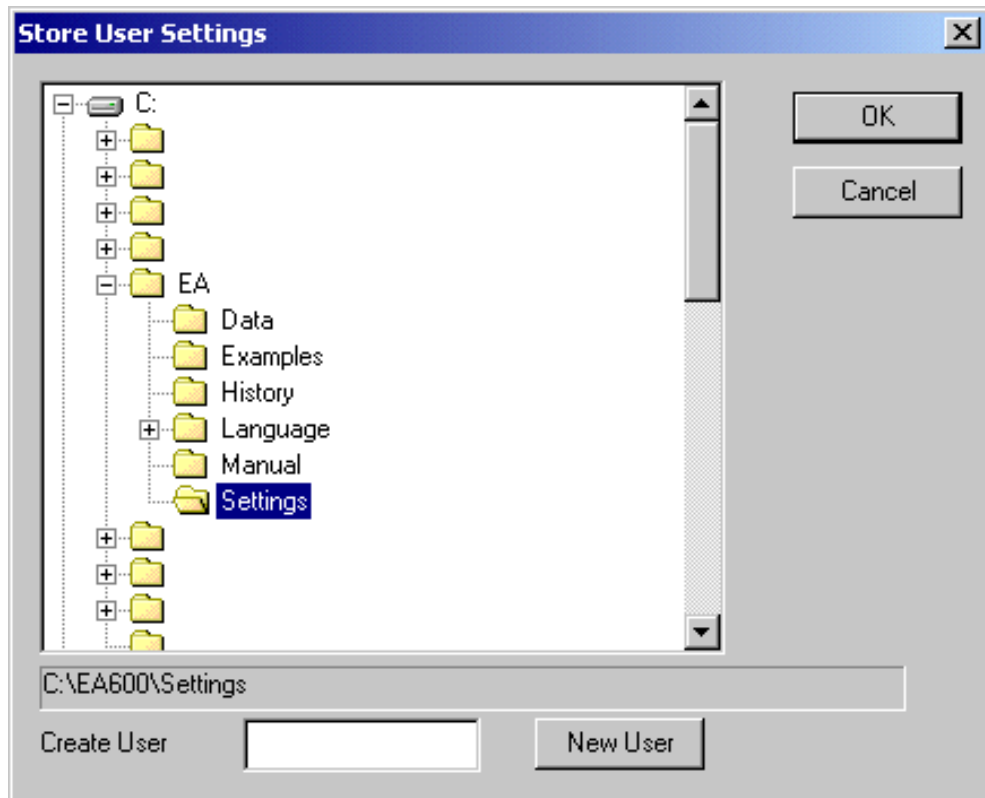
Use this dialogue to save your current settings. Fill in your name or initials in the **Create user** field, and press the **New user** button to create a new directory for the information. You can easily store different personal settings if so desired.

The following information and current echo sounder settings can be stored and retrieved using this functionality:

- Transmit power
- Pulse length
- Lable
- Echogram view
- Bottom detector settings
- Range settings
- Colour settings
- Operational settings in the Operation dialogue box.
- Transceiver Installation (for example starbord transducer(s), port transcucer(s) or both (all) transducers).

To load the settings, select **Load user settings** from the **Options** menu.

Related topics

→   *Load User Settings, page 134*

Surface Range

The **Surface Range** dialogue box opens if you click the right mouse button in the range field in the **Echogram and Range** view while operating with a **Surface Range** echogram.

The dialogue box will also open when selected in the **Echogram Parameters**, **Network Interface** or **Store** dialogue boxes.

The different echograms are explained in the **Echogram** dialogue box.
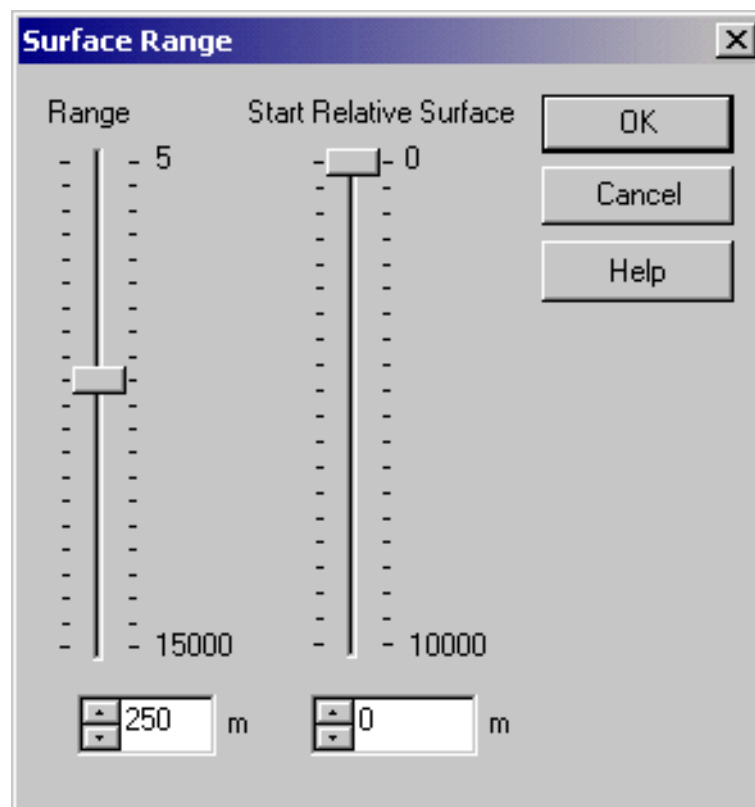
Parameters

Range - This parameter controls the vertical depth range across the echogram.

Start Relative Surface - This parameter controls the depth at the upper boundary of the echogram, relative the transducer face.

Note that you can also change the range using the mouse wheel. This is described in the *Echo frames* chapter.

Related topics

→ *Echogram, page 114*

→ *Echogram Parameter, page 119*

→ *Network Interface, page 138*

→ *Store, page 169*

Real time Sound Velocity Profile (SVP) smart sensor

This SVP dialogue box is opened from the Install menu. The dialogue box controls and store the data from the SVP smart sensor in real time. The real time reading is only for SVP smart sensor from Applied Microsystems Limited.

- Init Probe: This button start reading the sensor. Data will appear in the window after few seconds.

- Start Log: Start logging data to the harddisk. Default EA MCU32/data.

- Stop log: Stop logging data to the harddisk and close the file. Example of SVP file name: 20060508_144907.asvp

- Decimate SVP data: The input data will be decimated after following formula. $\Delta D > 0.2$ m and $\Delta s > 0.5$ m/s.

After stopped logging of SVP data, click button "OK". New dialogue box will appear. Answer YES if you want to use the new profile or NO for using existing sound velocity.
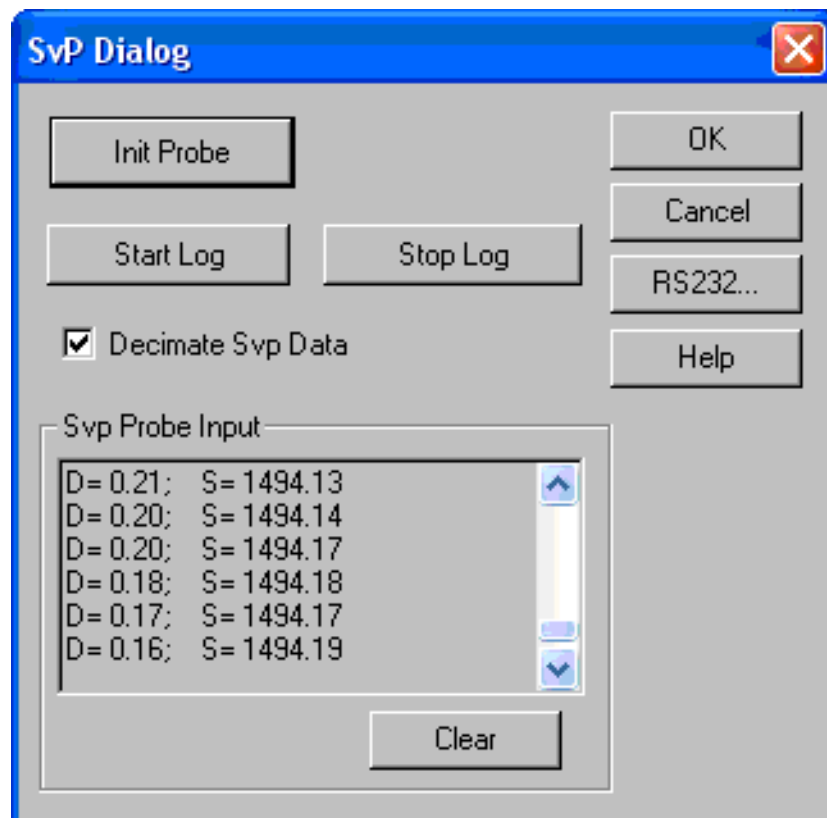
Related topics

→ *Envionment page 120*

Sound Velocity Profile (SVP) Editor

The **SVP Editor** dialogue box is accessed from the **Environment** dialogue box.
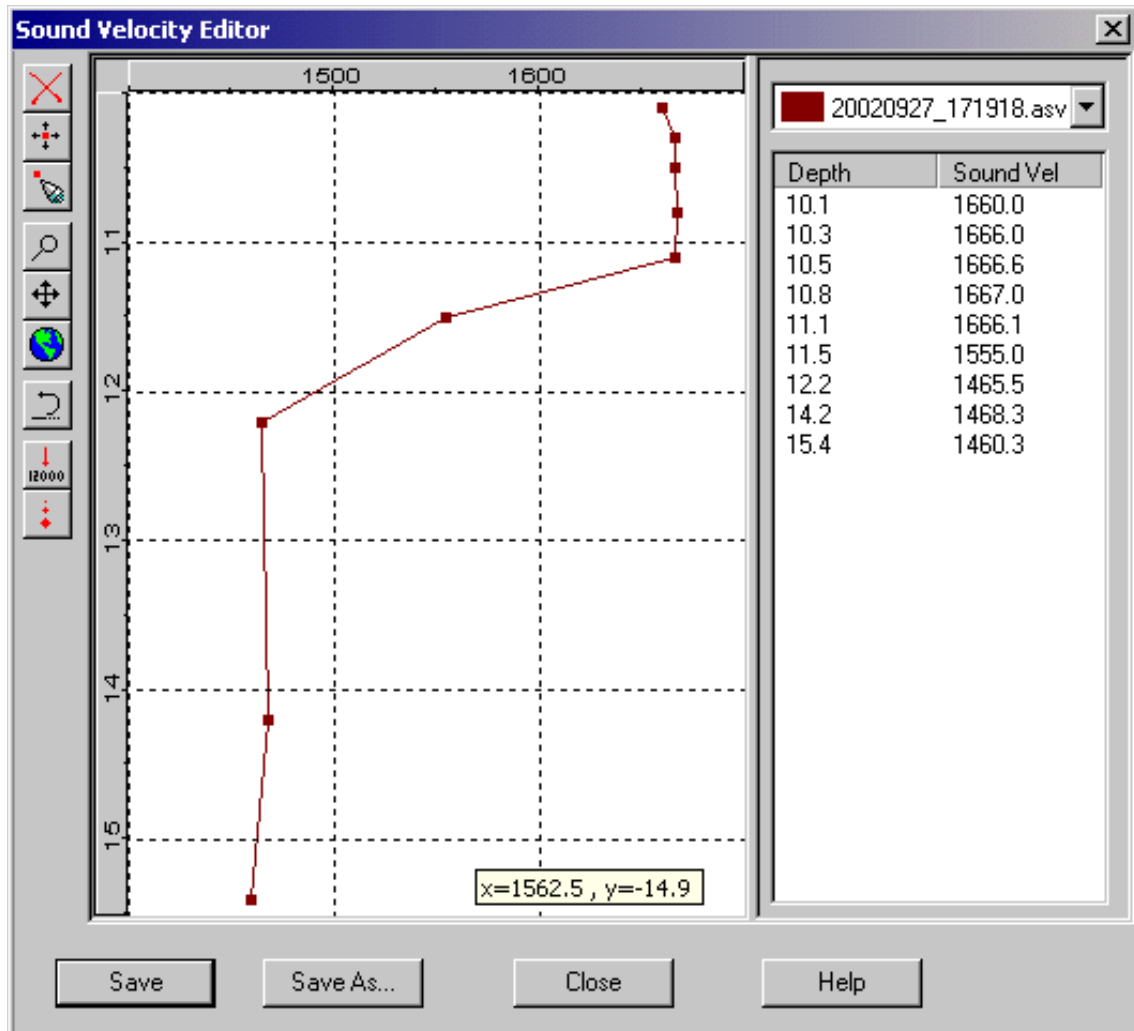
The **SVP Editor** is regarded as a separate program, and it is described in a dedicated chapter.

Related topics

→ *SVP Editor description, 186*

→ *SVP Editor operation, page 189*

→ *SVP Editor reference information, page 192*

→ *Environment, page 120*

Temperature Sensor

The **Temperature Sensor** dialogue box is accessed from the **Install** menu. Water temperature is shown on the echo sounder display provided a thermistor (temperature sensitive resistor, 10 kohm at 25 deg C) is interfaced to the system.

The thermistor wires are connected directly to the **Auxiliary** connector of the nearest transceiver.

The water temperature can be exported on NMEA format (MTW) on both the serial and Ethernet interfaces.
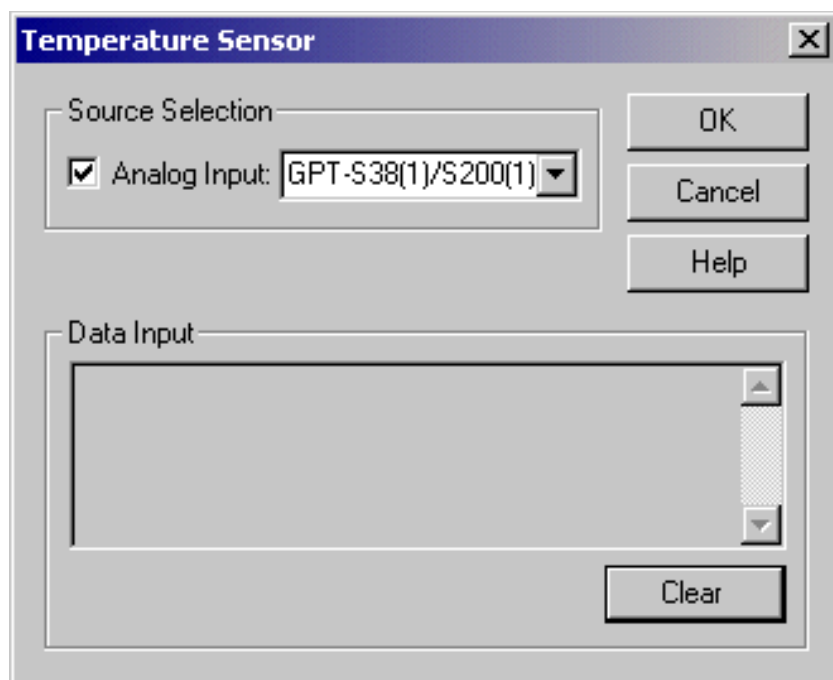
Analog Input - Select the appropriate transceiver from the list of installed transceivers. Each entry in the list contains transceiver type, operating frequency, unique identifier, channel number and transducer type. The GPT uses its Ethernet address for unique identification.

Data Input - The most recent input data are displayed in a list. Measured thermistor resistance and the computed temperature value are displayed. This function is useful during installation and troubleshooting.

Clear - This button clears the input data list.

Transceiver Installation

This dialogue box controls installation and un-installation of transceivers. The dialogue box is accessed from the **Install** menu. Prior to this, all echo sounder activity must be stopped. When accessed, an opening dialogue allows you to either:

- **Inspect** the transceiver installations
- **Modify** the transceiver installations
- **Cancel** the operation

Every time the **Transceiver Installation** dialogue appears on the display the echo sounder software performs a search for transceivers. General Purpose Transceivers (GPT) connected to the Ethernet interface are identified automatically before the complete transceiver list is displayed.
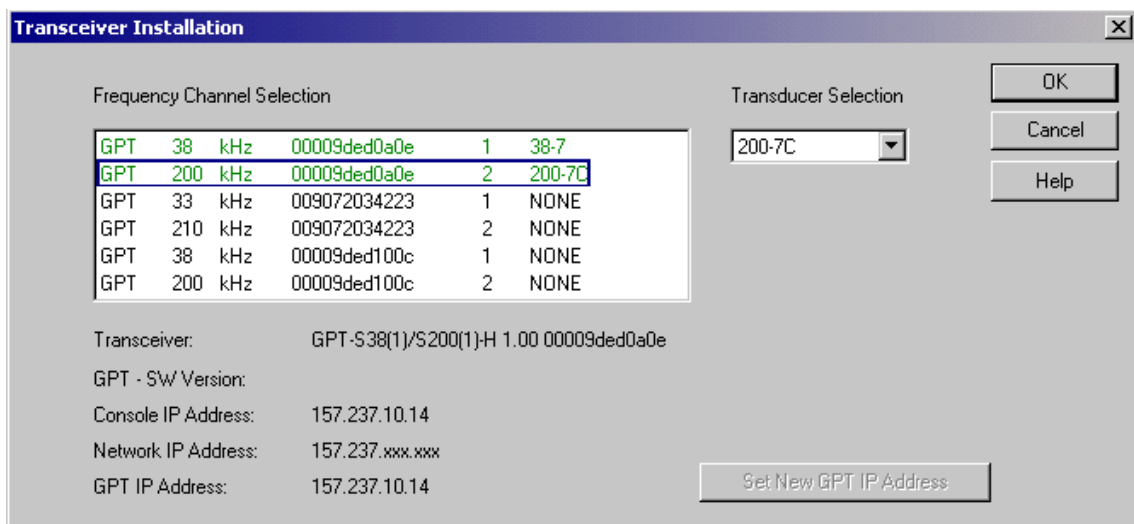
Transceiver list

A single frequency transceiver occupies one entry in the list, and a dual frequency transceiver occupies two. Each entry contains:

- Transceiver type
- Operating frequency
- Unique identifier
- Frequency channel number
- Transducer type

The General Purpose Transceivers use their Ethernet addresses for unique identification.

The frequency channel number identifies individual channels within a multi-frequency channel transceiver.

Frequency channels

Hence, the echo sounder system consists of a number of frequency channels. Entries in the frequency channel list are shown in **black**, **green** or **red** colour. Detected channels that are not installed are shown in **black**. The phrase NONE replaces the transducer type name for uninstalled channels. Detected channels that are installed are shown in green colour. Installed channels that were not detected during the search for transceivers are shown in red colour.

Each entry in the **Frequency Channel Selection** list belongs to a transceiver. The lower part of this dialogue box displays information about the currently selected transceiver. The first information line displays the transceiver personality string. Remaining lines display specific transceiver information.

Set new GPT IP Address

The communication on the Ethernet network between the echo sounder computer and the General Purpose Transceiver(s) complies to the TCP/IP (Transport Control Protocol / Internet Protocol) family of protocols. Every host (GPT or computer) connected to the network must have a unique 32-bit IP address.

To modify the GPT IP address, refer to the **IP Address** dialogue box.

Related topics

→ *To install or uninstall a channel, page 63*

→ *To modify an IP Address, page 64*

→ *IP Address, page 130*

Transceiver Settings

The **Transceiver Settings** dialogue box is accessed from the **Header** view on the display. Place the cursor on top of the mode and frequency information, and press the <u>right</u> mouse button.

This dialogue box controls transceiver and transducer parameters specific to the current frequency channel.

A text line at the top of the dialogue box identifies the frequency channel. This identification line contains:

- Transceiver type

- Operating frequency

- Unique identifier

- Channel number

- Transducer type

The channel number identifies individual channels within a multi-frequency channel transceiver.

A second text line appears in replay mode. This identifies the name of the replay file.

Mode

Active - The transmitter and receiver are active (normal operation).

Passive - The transmitter is passive while the receiver is active. This mode of operation is useful for test purposes, and when you wish to measure the ambient background noise in the sea.

Test - The transmitter is passive and the receiver is active. Each General Purpose Transceiver 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 or 2 kW).

Label

This function allows you to enter a text string to appear on the right hand side of the current frequency in the **Header** view.

Transmit Power

This parameter 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.

Pulse Length

This parameter controls the duration of the transmit pulse.

The table below shows the pulse lengths (given in µS) available for the different operational 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				
200 kHz	X	X	X	X	X				

Table 1   X-axis is pulse length in µS, Y-axis is frequency in kHz.
"x" means that the pulse length is available for the given frequency.

Transducer

Type - The transducer currently connected to the transceiver is identified.

Draft - In order to measure correct water depth, the echo sounder needs to know the vertical distance between the vessel's water line and the transducer face. Here, enter the depth of the transducer face relative the waterline.

Transducer parameters - The x, y and z parameters are relative positions between the defined reference point and the transducer. Parameters to Zero (default) will ignore the input values from the attitude sensor.

Real time draft - This parameter shows the real time value from the sensor and will be updated according to the sensor dataputput..

Advanced

This button opens up the **Advanced Transceiver** dialogue box containing detailed numeric information about the transducer and the channel.

Related topics

SVP EDITOR

Introduction

This chapter describes the SVP Editor (Sound Velocity Profile Editor).

Related topics

→   *Description, page 186*

→   *Procedures, page 189*

→   *References, page 193*

Description

Purpose

The purpose of the Sound Velocity Profile Editor is to:

- edit or inspect existing sound velocity profiles
- create a new profile

How to start the editor is explained in the operational procedures.

The editor contains the following elements:

(1) Toolbar
(2) Profile view
(3) Data view
(4) Filename
(5) Control bar
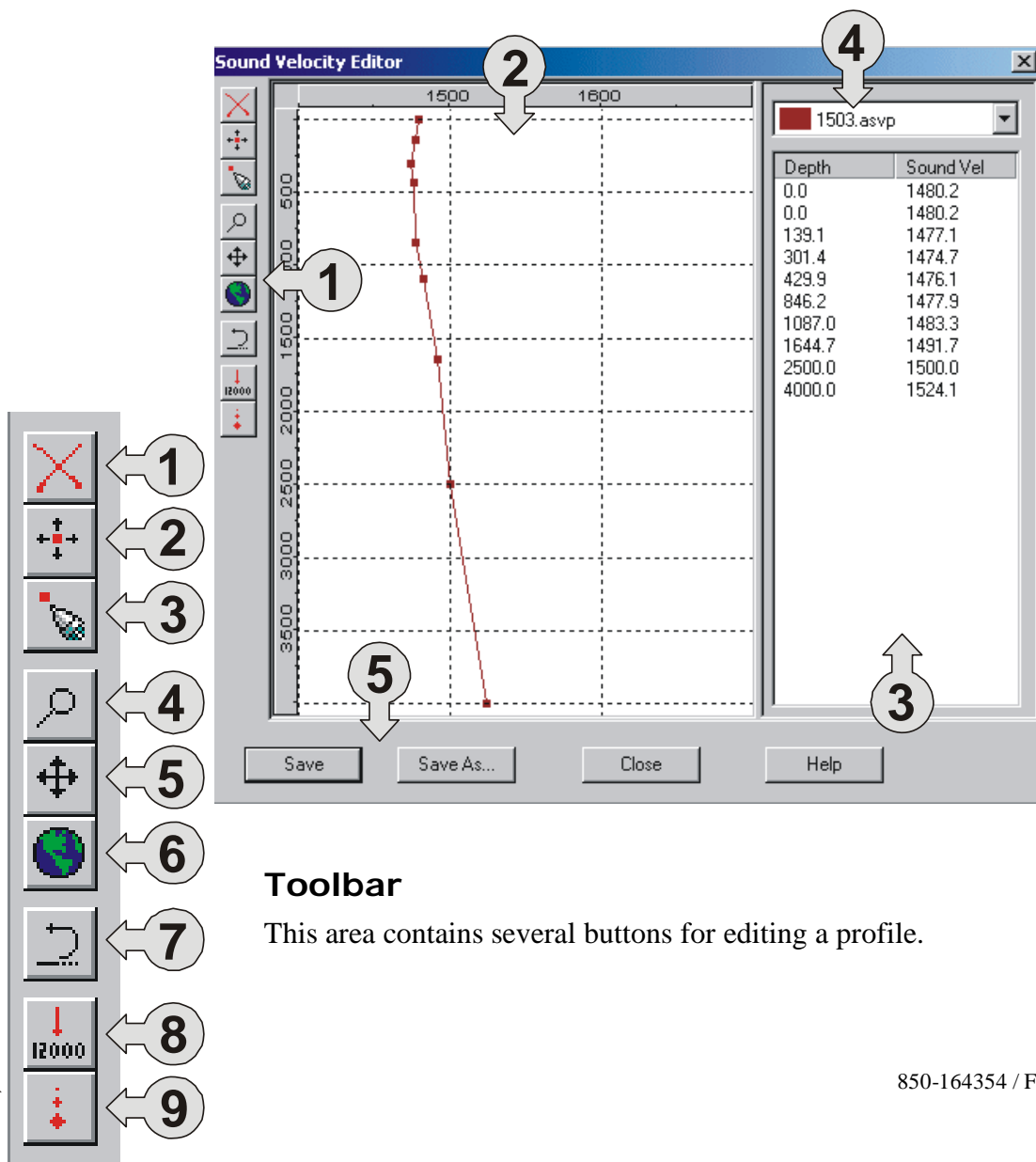
Toolbar

This area contains several buttons for editing a profile.

(CD6005)

From top, the buttons are:

1) Delete

2) Move

3) Add

4) Zoom

5) Pan

6) Zoom to contents

7) Undo

8) Extend profile

9) Sort

The buttons are explained in the *References* chapter.

Profile view

This is the large area at the middle of the window. It has two axes:

- Sound velocity: horizontal axis along the upper edge.

- Depth: vertical axis on the left hand side.

Each profile is a sequence of points. These have coordinates with increasing depth values. Straight lines connect the points. The points are emphasised as bullets on the curve.

Data view

This area has two columns. One contains the depth values, and the other one contains the sound velocity values. There is one depth value, and one sound velocity value for each point.

Profile name

The name of the profile is shown in this window.

Control bar

At the bottom of the editor there are four buttons. These are the **Save**, **SaveAs**, **Close** and **Help** button. The buttons are explained in the *References* chapter.

File formats

The editor operates on files, and accept the following file formats:

- Simrad-A
- AML-CALC
- Kongsberg SSP10

Related topics

→   *Procedures, page 189*

→   *References, page 193*

Procedures

Windows

The Sound Velocity Profile Editor operates with a single window. This window is referred to as the main window in this document. In this window, you can view the sound velocity profile.

Starting the editor

The editor is started as follows:

1   Select **Install** on the main menu bar.

2   Select **Environment** on the drop-down menu.

 -    The **Environment** dialogue box appears.

3   To open a profile, choose **From File**.

4   Choose which file to edit.

 -    The name of the last edited profile is displayed. If you wish to edit a different profile, click **From File**, choose the new file , and press **Open**.

5   Click the **Edit** button in the **Environment** dialogue box.

Exit

The editor is closed as follows:

1   Push the **Close** button on the bottom of the editor.

This will close the application without saving. There will be no warning about unsaved material.

Open existing profile

It is not possible to open an existing profile from within the editor. You must select a profile before you open the Sound Velocity Editor.

Create new profile

You cannot open the Sound Velocity Editor without using an old profile. Therefore you must:

1   Open an old file.

2   Make the necessary changes.

3   Use the **Save As** button, and save it with a new profile name.

Or:

1 Open an old file.

2 Use the **Save As** button, and save it with a new profile name.

3 Make the necessary changes.

4 Use the **Save** button.

Save profile

You can save a profile in the following manner:

If you have already named the profile:

1 Click the **Save** button on the bottom of the editor.

- This automatically saves the profile.

If you want to rename the profile:

1 Click the **Save As** button on the bottom of the editor.

2 Choose where to save the profile, and give it a name. Remember to provide it the correct file extension.

3 Click **OK** to save.

Modifying a profile

Move point

1 Select the **Move** button on the toolbar (second from top).

2 Place the mouse pointer on the point you want to move. Press the left mouse button and keep it pressed.

3 Drag the point to the new position.

4 Release the mouse button when the new location is reached.

Add point

1 Select the **Add** button on the toolbar (third from top).

2 Place the mouse pointer where you want to add the point, and click once with the left mouse button.

When you have added a point the curve will follow automatically, and include the new point.

Remove point

1 Select the **Delete** button (first from top).

2 Choose the point you want to delete and click on it once using the left mouse button.

The point is immediately deleted, and the profile will be redrawn without it.

Adjust the velocity or depth

1   Select the **Move** button on the toolbar (second from top).

2   Select the point you want to adjust, by using the left mouse button. Press the button and keep it pressed.

3   Drag it to the depth and/or the velocity you want.

4   Release the button.

Or:

1   Go to the Data view and select the point you want to edit, using the right mouse button.

2   Choose **Edit** from the menu.

3   Do the changes you want to do, by changing depth and/or velocity.

4   Press **OK**.

Zoom and pan

Zoom

1   Select the **Zoom** button on the toolbar.

2   Click on the left mouse button and keep it pressed.

3   Drag the mouse so that it covers the area you want to enlarge.

4   Release the mouse button.

Pan function

This button is used to "move" what you see in the Profile view. When you press down the left mouse button, you have to hold it in while moving it around.

1   Select the **Pan** button on the toolbar.

2   Click on the left mouse button and keep it pressed.

3   Drag the mouse and move it to the position you want.

4   Release the mouse button.

Zoom to contents

1   Click on the button that is number four from the bottom on the toolbar to the left. (Button is shown in the figure below).

Related topics

→   *Environment, page 120*

→   *References, page 193*

References

Note	*Each function is active until another function is selected.*

Toolbar, left

This area contains several buttons for editing a profile.
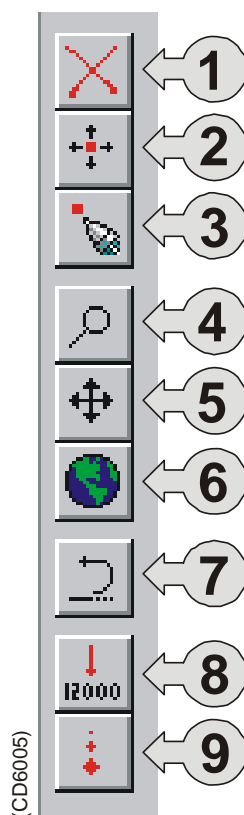
Delete

This button selects the delete function. Click once. Then click on each point to be deleted. As long as the **Delete** button is active, you can delete points by clicking on them.

Move

This button selects the move function. Click once. Then select the point to be moved. Click on it and hold it in while you move it to the desired position. Then release the button. You can move points as long as the **Move** button is active.

Add

This button select the add function. You can click anywhere in the Profile view, and a new point is added. The curve will follow immediately . You can add points as long as the **Add** button is active.

Zoom

This button selects the zoom function in the Edit area. The diagram is brought "closer" to you, and because of this, the parts near the edges disappear from the view. You can enlarge the diagram with this zoom-buttom X times.

To mark an area, press down the left mouse button while dragging. When this field covers the area you want to enlarge, drop the button.

Pan

This makes the profile "move", and you get to see other parts of the profile. Click somewhere in the profile area, and drag the mouse. The point you selected, will follow the mouse until you drop it.

Zoom to contents

If you want to view all the points at the same time, i.e. you want to look at the entire profile, you can use this button.

(CD6005)

Undo

This button is used to undo the last action made. If you wish to undo more than the last action, press the button as many times as desired.

Extend profile

There is an already existing "profile" that is used to fill out the rest of your profile, down to 12000 meters. This profile has been made especially for the Atlantic ocean, but can be used in similar waters. If you have made your own profile down to for example 2000 meters, you can use this button and you will extend the rest of the profile automatically.

Sort

This button is used to sort the points in ascending order. If you have moved points so that someone is "higher" than others, use this button to update the curve. The curve will be automatically updated.

Toolbar, bottom

Save

The editor will use the old profile name when you use the **Save** button.

SaveAs

When you click on the **SaveAs** button, you will see a standard save-window. This means that you can choose where to save the profile, and give the profile a new name. Click **OK** when finished.

Close

This closes the profile. It will not give any warnings about unsaved material.

Help

This brings you to the online help.

EA2NEPTUNE

Introduction

The **EA2Neptune** is a small software utility designed to reformat EA 600 *.out** data files to the ***.ea** format used by the **Neptune** post-processing suite.

To investigate the software version, rightclick in the blue title bar, and select **About.**
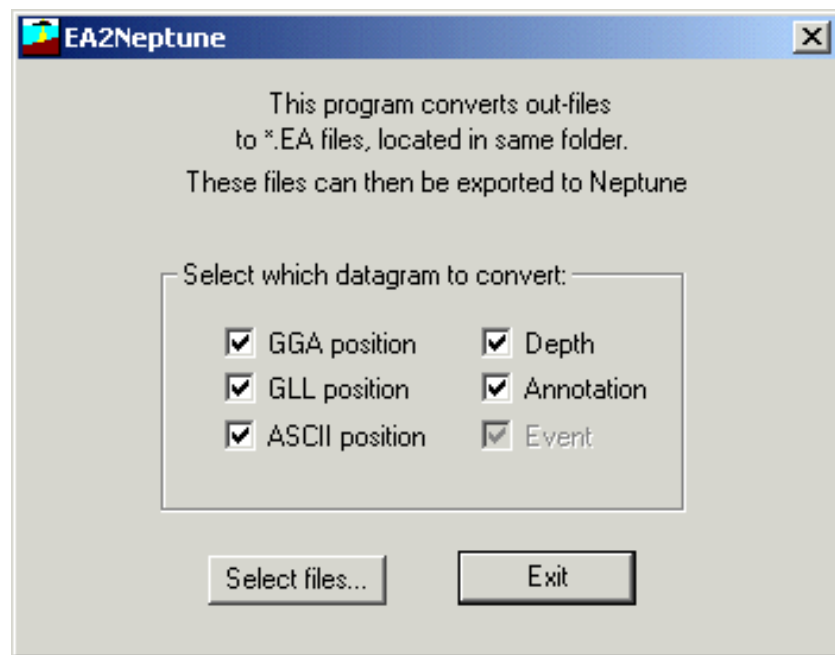
Use

1 Start the **EA2Neptune** utility directly from the computer's EA 600 directory..

  a Press the **Start** button in the lower left corner, and select **Run** on the menu.

  b Enter the phrase **C:\EA 600\ea2neptune.exe** in the **Open** field, and press **Ok**. (Replace "C" if the EA 600 is installed on a different drive.)

2 Select which datagrams to convert.

3 Press the **Select files** button to open the **Convert** dialogue box.

4 Choose the ***.out** files to be converted.

  - More than one file can be selected simultanously

5 Press **Open** to close the **Convert** dialogue box.

The convertion takes place automatically once the **Convert** dialogue box is closed. The ***.ea** files are placed in the same directory as the input ***.out** files.

Datagrams description

The datagrams you can convert from are described in the *Telegram and data formats* chapter.

For detailed information about the **Neptune** datagram formats, refer to the **Neptune** operator manual.

Related topics

→   *Telegram and data formats, page 205*

TELEGRAM AND DATA FORMATS

Overview

This chapter describes the external interfaces supported by the EA 600 echo sounder. The information includes information about the file formats used, as well as the telegram formats used to communicate with external peripherals and other computer systems.

General information

File formats

These chapters provide information about the various file formats used to store and communicate EA 600 data.

Datagram formats

These chapters provide information about the datagrams formats used to communicate echo sounder data to and from the EA 600 system.

Numeric presentation

In order to describe the file formats, common "C" structures are used to represent individual data blocks. The size of the various C types are:

- **char:** 8 bit integer
- **short:** 16 bit integer
- **long:** 32 bit integer
- **float:** 32 floating point (IEEE 754)

The native numeric representation of common computer types is shown in the table below.

Make	Byte order	Floating point format
IBM PC (Intel)	Little Endian	IEEE 754
Sun (Sparc)	Big Endian	IEEE 754
HP (PA)	Big Endian	IEEE 754
Silicon Graphics (MIPS)	Big Endian	IEEE 754
DEC (Alpha)	Little or Big Endian	IEEE 754 or VAX
Power PC (MPC)	Little or Big Endian	IEEE 754

Data encapsulation

A standard encapsulation scheme is used for all data files. Each datagram is preceded by a 4 byte length tag stating the datagram length in bytes. An identical length tag is appended at the end of the datagram.

```
long Length;
struct DatagramHeader
{
   long DatagramType;
   struct {
      long LowDateTime;
      long HighDateTime;
   } DateTime;
};
- -
< datagram content >
- -
long Length;
```

All datagrams use the same header. The datagram type field identifies the type of datagram. ASCII quadruples are used to ease human interpretation and long term maintenance; three characters identify the datagram type and one character identifies the version of the datagram. The DateTime structure contains a 64-bit integer value stating the number of 100-nanosecond intervals since January 1, 1601. This is the internal "filetime" used by the Windows NT operating system. The data part of the datagram contains any number of bytes, and its content is highly datagram dependent.

Common computers fall into two categories: Intel based computers write a multibyte number to file starting with the LSB (Least Significant Byte). HP, Sun and Motorola do the opposite. They write the MSB (Most Significant Byte) to file first. The byte order of the length tags and all binary fields within a datagram is always identical to the native byte order of the computer that writes the data file. It is the responsibility of the software that reads the file to perform byte swapping of all multibyte numbers within a datagram if required. Byte swapping is required whenever there is an apparent mismatch between the head and the tail length tags. Hence, the two length tags may be used to identify the byte order of the complete datagram.

The Intel processors allow a multibyte number to be located at any RAM address. However, this may be different on other processors; a short (2 byte) must be located at an even address, a long (4 byte) and a float (4 byte) must be located at addresses dividable by four. Hence, the numeric fields within a datagram is specified with this in mind.

File and directory names

File names

The echo sounder uses the standard Windows NT file system. Sample data, transceiver data etc. may be recorded in a ***.raw** file for later replay through the sounder. Processed output data may be stored in a separate ***.out** file. ASCII data, as xyz data, may be stored in a separate ***.xyz** file.

As an example, we will assume that we are conducting a hydrographic survey on Loch Ness. The following files are generated by the sounder during the survey:

```
..\LochNess\L0000-D19990821-T101354-EA 600.raw
..\LochNess\L0000-D19990821-T102114-EA 600.raw
..\LochNess\L0000-D19990821-T103255-EA 600.raw

..\LochNess\L0000-D19990821-T101354-EA 600.out
..\LochNess\L0001-D19990821-T105209-EA 600.out
..\LochNess\L0002-D19990821-T112021-EA 600.out

..\LochNess\L0002-D19990821-T112021-EA 600.xyz

..\LochNess\L0002-D19990821-T112021-EA 600.dg.
```

Directory

All the files reside in the "survey directory". The name and location of this directory (henceforth the Survey Name) is assigned by you. It typically states the survey area or the purpose of the survey. The file name consists of:

- a transect pre-fix (Lxxxx)
- the date (YYYYMMDD)
- the time (HHMMSS)
- instrument identifier
- file type extension

The transect pre-fix states the current transect line number, and a new file is opened for every new line. The transect pre-fix is generated by the EA 600 sounder. Please note that other Kongsberg Maritime sounders might use a different transect pre-fix.

Raw data file

The ***.raw** file is by far the largest of the two file types. All necessary data to perform a complete replay of the survey, is written into this file. For a very short transect line, all sample data may be contained in one file. However, the amount of data grows rapidly as the transect lines become longer. It is therefore practical to split the data into fragments which are stored in sequential files, each fragment containing a user specified amount of data.

Out data file

The ***.out** files contain less amount of data. Fragmentation is supported, but is normally not required. Typically, this file contains navigation data and bottom detections that may be used by post-processing software.

xyz data file

The ***.xyz** files contain position (Lat/Lon) and depth information in ASCII format. These files can be used by third party post-processing software.

Raw data format

Overview

Note

The described file format is a temporary format, valid for data files recorded with the software version 1.4. This file format is expected to change in future EA 600 versions and Kongsberg Maritime assumes no responsibilty for support on this format.

The ***.raw** file may contain one or more of the following datagram types:

- **CON0** - Echo sounder configuration datagram
- **NMEA** - Navigation input text datagram
- **TAG0** - Annotation datagram
- **RAW0** - Sample datagram

Every *.raw file begins with a configuration telegram. A second configuration datagram, within the file, is illegal. The data content of the configuration datagram of an already existing file cannot be altered from the echo sounder. NMEA, annotation and sample datagrams constitute the remaining file content. These datagrams are written to the *.raw file in the order that they are generated by the sounder.

Note that the information following the "//" sign are comments to that line.

Note

Strictly sequential time tags are not guaranteed.

Echo sounder configuration datagram

The echo sounder uses this datagram when creating channels during replay. All character strings are zero terminated.

```
    char SounderType[128]; // "EA600 3.17"

struct ConfigurationDatagram {
    DatagramHeader DgHeader // "CON0"
    ConfigurationHeader ConfigHeader;
    ConfigurationTransducer Transducer[];
    };
struct DatagramHeader {
    long DatagramType;
    FILETIME ftTime;
    };
```

```
struct ConfigurationHeader {
    char SurveyName[128]; // "Loch Ness"
    char TransectName[128]; // "L0123"
    char SounderName[128]; // "EA 600"
    float Motion x [m];
    float Motion y [m];
    float Motion z [m];
    char Spare[116]; // future use
    long TransducerCount; // 1,2,3,4
    };
struct ConfigurationTransducer {
    char ChannelId[128]; // Channel identification
    long BeamType; // 0=SINGLE, 1=SPLIT
    float Frequency; // [Hz]
    float Gain; // [dB] - See note below
    float EquivalentBeamAngle; // [dB]
    float BeamWidthAlongship; // [degree]
    float BeamWidthAthwartship; // [degree]
    float AngleSensitivityAlongship;
    float AngleSensitivityAthwartship;
    float AngleOffsetAlongship; // [degree]
    float AngleOffsetAthwartship; // [degree]
    float PosX; // future use
    float PosY; // future use
    float PosZ; // future use
    float DirX; // future use
    float DirY; // future use
    float DirZ; // future use
    char Spare[128]; // Future use
    };
```

float Gain: - The single *Gain* parameter was used actively in raw data files generated with software version 1.3. This was before *PulseLengthTable*, *GainTable*, and *SaCorrectionTable* were introduced in software version 1.4 to enable gain and Sa correction parameters for each pulse length.

NMEA datagram

This datagram contains the original NMEA 0183 input message line; carriage return, line feed and a terminating zero included.

```
struct TextDatagram{
  DatagramHeader DgHeader; // "NME0"
  char  Text[]; // "$GPGLL,5713.213,N......"
};
```

The size of the datagram depends on the message length. An example NMEA position message line is shown below:

$GPGLL,5713.213,N,1041.458,E<cr><lf>

The information contained in the VTG telegram is not used by the echo sounder, and this information is thus only written to the *.raw data file. (Format **$--VTG,**...)

An example NMEA speed message line is shown below:

$HUVTG,245.0,T,245.0,M,4.0,N,2.2,K<cr><lf>

Annotation datagram

The annotation datagram contains comment text that has been entered by the operator ("dangerous wreck").

```
struct TextDatagram{
  DatagramHeader DgHeader; // "TAG0"
  char  Text[]; // "Dangerous wreck"
};
```

The text string is zero terminated. The size of the complete datagram depends on the annotation length. The maximum annotation string is 80 characters.

Sample datagram

The sample datagram contains sample data from just one transducer channel. It can contain power sample data (Mode = 0), or it can contain both power and angle sample data (Mode = 1).

```
struct SampleDatagram
{
  DatagramHeaderDgHeader; // "RAW0"
  short Channel; // Channel number
  short Mode; // Datatype
  float TransducerDepth; // [m]
  float Frequency; // [Hz]
  float TransmitPower; // [W]
  float PulseLength; // [s]
  float BandWidth; // [Hz]
  float SampleInterval; // [s]
  float SoundVelocity; // [m/s]
  float AbsorptionCoefficient; // [dB/m]
  float Heave; // [m]
  float Tx Roll; // [deg]
  float Tx Pitch; // [deg]
  float Temperature; // [C]
  short Spare 1
  Short Spare 2
  float Rx Roll [Deg]
  float Rx Pitch [Deg]
  long  Offset; // First sample
  long  Count; // Number of samples
  short Power[]; // Compressed format – See below!
  short Angle[]; // See below!
};
```

The sample data datagram can contain more than 32 768 sample points.

Short Angle - The fore-and-aft (alongship) and athwartship electrical angles are output as one 16-bit word. The alongship angle is the most significant byte while the athwartship angle is the least significant byte. Angle data is expressed in 2's complement format, and the resolution is given in steps of 180/128 electrical degrees per unit. Positive numbers denotes the fore and starboard directions.

Short Power - The power data contained in the sample datagram is compressed. In order to restore the correct value(s), you must decompress the value according to the equation below.

$$y \;=\; x \; \frac{10 log \; 2}{256}$$

where:

x = power value derived from the datagram

y = converted value (in dB)

Out data file

Overview

The ***.out** file may contain one or more of the following
datagram types:

- **CON0** - Echo sounder configuration datagram
- **NME0** - Navigation input text datagram
- **TAG0** - Text annotation
- **DEP0** - Detected bottom depth
- **SVP0** - Sound Velocity Profile

→ *The SVP0 format is described on page 231.*

Every ***.out** file contains a single configuration datagram. This
datagram is always the very first datagram in the file. Depth,
navigation and annotation datagrams constitute the remaining
file content. These datagrams are written to the file in an
undetermined order. Accordingly, strictly sequential time tags
are not guaranteed.

The code used to create the program is shown. Note that the
information following the "//" sign are comments to that line.

Echo sounder configuration datagram

The code used to create the datagram is shown.

```
struct ConfigurationDatagram {
    DatagramHeader DgHeader // "CON0"
    ConfigurationHeader ConfigHeader;
    ConfigurationTransducer Transducer[];
    };
struct ConfigurationHeader {
    char SurveyName[128]; // "Loch Ness"
    char TransectName[128]; // "L0123"
    char SounderName[128]; // "EA 600"
    char Spare[128]; // future use
    long TransducerCount; // 1,2,3,4
    };
struct ConfigurationTransducer {
    char ChannelId[128]; // Channel identification
    long BeamType; // 0=SINGLE, 1=SPLIT
    float Frequency; // [Hz]
    float Gain; // [dB] - See note below!
    float EquivalentBeamAngle; // [dB]
    float BeamWidthAlongship; // [degree]
    float BeamWidthAthwartship; // [degree]
    float AngleSensitivityAlongship;
    float AngleSensitivityAthwartship;
    float AngleOffsetAlongship; // [degree]
    float AngleOffsetAthwartship; // [degree]
```

```
          float PosX; // future use
          float PosY; // future use
          float PosZ; // future use
          float DirX; // future use
          float DirY; // future use
          float DirZ; // future use
          float PulseLengthTable[5]; // Available pulse
          lengths for the channel [s]
          char Spare2[8]; // future use
          float GainTable[5]; // Gain for each pulse
          length in the PulseLengthTable [dB]
          char Spare3[8]; // future use
          float SaCorrectionTable[5]; // Sa correction
          for each pulse length in the PulseLengthTable
          [dB]
          char Spare4[52]; // future use
          };
```

float Gain: - The single *Gain* parameter was used actively in raw data files generated with software version 1.3. This was before *PulseLengthTable*, *GainTable*, and *SaCorrectionTable* were introduced in software version 1.4 to enable gain and Sa correction parameters for each pulse length.

Navigation datagram

The navigation datagram contains the original navigation input message, with any carriage return and/or line feed included.

```
struct TextDatagram{
   DatagramHeader DgHeader // "NME0"
   char Text[]; // "$GPGLL,5713.213,N......"
};
```

The size of the datagram depends on the message length. An example NMEA position message line is shown below:

$GPGLL,5713.213,N,1041.458,E<cr><lf>

Text annotation or event

The annotation datagram contains comment text that you have entered (example: "Dangerous wreck").

```
struct TextDatagram{
   DatagramHeader DgHeader // "TAG0"
   char Text[]; // "Dangerous wreck"
};
```

The text string is zero terminated. The size of the complete datagram depends on the annotation length. The maximum annotation string is 80 characters.

Detected bottom depth

The depth datagram contains depth that has been detected by the echo sounder.

```
struct BottomDepthDatagram{
   DatagramHeader DgHeader // "DEP0"
   long TransducerCount, // 1, 2, 3 ...
   struct {
      float Depth; // [m]
      float Parameter1; // See Note 1 below
      float Parameter2; // Future use
   } Transducer[];
};
```

Note 1: Used for Bottom Surface Backscattering strength (dB)

A zero depth value implies that no bottom detection has been made.

Note 2: When storing only one channel, the frequency will be written at the end of the file name. Example for 38 kHz system:

```
L0000-D20050408-T11303400-EA 600-38.out
```

If storing two or more channels, the data will be stored in a single file. Example:

```
L0000-D20050408-T11303400-EA 600-38-120.out
```

xyz data file

The **.xyz** file is an ASCII file datagram. It contains the following information:

- x: Latitude
- y: Longitude
- z: Depth (in metres)
- Date (ddmmyyy)
- Time (hhmmss.ss)

An example is shown below:

```
1028.355268   5926.137550   20.54...01092005...161727.65
1028.355758   5926.137919   20.90...01092005...161727.85
```

Note 1: When storing only one channel, the frequency will be written at the end of the file name. Example for 38 kHz system:

```
L0000-D20050408-T11303400-EA 600-38.xyz
```

If storing two or more channels, the data will be stored in a single file. Example:

```
L0000-D20050408-T11303400-EA 600-38-120.xyz
```

Text data file

The **.txt** file is an ASCII file datagram. It contains the following information:

- Complete raw navigation telegram (can include HDT)
- Depth (date, time, depth, frequency)

An example is shown below:

```
$GPGGA,082012.98,5926.13995,N,01028.35856,S,1,08, ... *67
28071998,101433.30,19.58,38
28071998,101433.30,19.55.200 (if dual system)
```

GeoRef data file

The **.geo** file is a text file datagram. It contains the following informateion:

- Header
- Time
- Position (Lat/Long)
- Heading, across (only side looking SSG)
- Depth
- Channel number (only VGR)

An example is shown below: (SSG with vertical depth)

SSG, 10124660, 5926.13995, N, 01028.35856, E, HDT 24.60, 48.90, 4.30

VGR, 10124660, 5926.13995, N, 01028.35856, E, 48.09.1

Echogram data file

Refer to page 221 for the format description.

Note 1: When storing only one channel, the frequency will be written at the end of the file name. Example for 38 kHz system:

```
L0000–D20050408–T11303400–EA 600–38.dg
```

If storing two or more channels, the data will be stored in a single file. Example:

```
L0000–D20050408–T11303400–EA 600–38–120.dg
```

NMEA datagrams

Overview

The following input datagram complies to the NMEA0183 protocol. The **GLL, GGA and GGK** datagrams are used for navigational data input. The port and the baudrate is chosen in the **RS-232 Setup** dialogue box.

GLL - Geographic position - latitude/longitude

Datagram format:

$--GLL,llll.ll,a,yyyyy.yy,a,hhmmss.ss,A,a*hh<CR><LF>

where (from left towards right):

Component	Contents
llll.ll,a	latitude, N/S
yyyyy.yy,a	longitude, E/W
hhmmss.ss	UTC of position
A	status: A=data valid, V=data not valid
a*hh	mode indicator

GXA - Transit position

Datagram format:

$--GXA,hhmmss.ss,llll.ll,a,yyyyy.yy,a,c--c,x*hh<CR><LF>

where (from left towards right):

Component	Contents
hhmmss.ss	UTC of position
llll.ll,a	latitude, N/S
yyyyy.yy,a	longitude, E/W
c--c	Waypoint identification
x	Satellite number

GGA - Global positioning system fix data

Datagram format:

$--GGA,hhmmss.ss,llll.ll,a,yyyyy.yy,a,x,zz,p.p,g.g,M, q.q,M,e.e,xxxx*hh<CR><LF>

where (from left towards right):

Component	Contents
hhmmss.ss	UTC of position
llll.ll,a	latitude, N/S
yyyyy.yy,a	longitude, E/W
x	GPS quality indicator
zz	Number of satellites in use, 00–12, may be different from the number in view
p.p	Horizontal dilution of precisison
g.g,M	Altitude re: mean–sea–level (geoid), meters
q.q,M	geoidal separation, meters
e.e	age of differential GPS data
xxxx*hh	differential reference station ID, 0000 to 1023

RTK / GGK format

The following formats will be read and used as navigation data input:

$--GGK, ...

$PTNL, GGK, ...

To be configured and entered in advanced navigation dialog box:

$GPLLQ, ...
11 ... +000, ... (default programmed, Leica Total station)

VTG - Course over ground and ground speed

Datagram format:

$--VTG,x.x,T,x.x,M,x.x,N,x.x,K,a*hh<CR><LF>

where (from left towards right):

Component	Contents
x.x,T	Course over ground in True degrees
x.x,M	Course over ground in Magnetic degrees
x.x,N	Speed over ground in knots
x.x,K	Speed over ground in km/hour

a*hh	mode indicator
Modes	
A	Autonomous mode
D	Differential mode
E	Estimated (dead reckoning) mode
M	Manual input mode
S	Simulator mode
N	Data not valid
The positioning system mode indicator shall not be a null field!	

ZDA - Time and date

Datagram format:

$--ZDA,hhmmss.ss,dd,mm,yyyy,zz,mm*hh<CR><LF>

where (from left towards right):

Component	Contents
hhmmss.ss	UTC of position
ss	Day, 01 to 31 (part of UTC)
mm	Month, 01 to 12 (part of UTC)
yyyy	Year (part of UTC)
zz	Local zone hours, 00 to +/– 13 hours
mm	Local zone minutes, 00 to +59

HDT - Heading

Datagram format:

$--HDT,x.x,T*hh<CR><LF>

where (from left towards right):

Component	Contents
x.x,T	Heading, degrees, True

Related topics

→ *RS-232 Setup, page 159*

Annotation datagram

Both datagrams are available on the serial port, and on the Ethernet interface provided that the local computer's input port is set to 10183, and that the correct IP address is used.

Annotation datagram 1

External annotations may be input via the Navigation serial port as an NMEA datagram. It has the following format:

$??ATS,text string<CR><LF>

where (from left towards right):

Component	Contents
??	identifier
ATS	NMEA identifier (Annotation text String)
Text string	free text string
<CR><LF>	Carriage return and Line feed

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

Annotation datagram 2

In addition to the **$--ATS** datagram, the old **EA 500** datagram is interpreted on input. For output the EA 500 version is used.

Datagram format:

CS,HHMMSShh Text string <CR><LF>

where (from left towards right):

Component	Contents
HHMMSShh	current time on computer
Text string	free text string
<CR><LF>	this sequence is only present on the serial line output

Example:

CS,10345561L1 Interesting object on bottom

Remote Control datagram

The echo sounder can be remotely controlled by input through the network or on a serial line. The following functions can be controlled:

- Start/stop logging

An example is shown below:

```
PE,10504000,SYSTEM,STARTLOGGING CRLF
PE,10504000,SYSTEM,STOPLOGGING CRLF
```

- Start/stop pinging

An example is shown below:

```
PE,10504000,SYSTEM,STARTPINGING CRLF
PE,10504000,SYSTEM,STOPPINGING CRLF
```

- Start/stop history

An example is shown below:

```
PE,10504000,SYSTEM,STARTHIST CRLF
PE,10504000,SYSTEM,STOPHIST CRLF
```

Note 1: Capital letters must be used.

Output datagrams

Overview

The EA 600 echo sounder can provide the following output datagrams:

- **DBT** - Depth below transducer
- **DPT** - Depth
- **DBS** - Depth below surface
- **Simrad** - Ping based ASCII datagram
- **Simrad** - Ping based binary datagram
- **Atlas** - Output telegram
- Echogram datagram

The NMEA datagrams can only provide depth information from one channel. Which channel to use is selected in the **Depth Output** dialogue box. The datagram type to be transmitted is selected in the same dialogue box.

Related topics

→   *Depth Output, page 112*

DBT - Depth below transducer

This datagram exports the water depth relative to the transducer.

$--DBT,x.x,f,y.y,M,z.z,F*hh<CR><LF>

where (from left towards right):

Component	Contents
–	don't care
x.x,f	water depth (in feet)
y.y,M	water depth (in Meters)
z.z,F	water depth (in fathoms)
hh	checksum

DPT - Depth

This datagram exports the water depth relative to the transducer and offset of the measuring transducer. Positive offset numbers provide the distance from the transducer to the waterline. Negative offset numbers provide the distance from the transducer to the part of the keel in interest. Note that the "positive" distance from the transducer to the water line reflects the distance from the transducer to the keel.

$--DPT,x.x,y.y,z.z*hh<CR><LF>

where (from left towards right):

Component	Contents
–	don't care
x.x	depth from transducer (in meters)
y.y	offset from transducer (in meters)
z.z	maximum range scale in use
hh	checksum

DBS - Depth below surface

This datagram exports the water depth referenced to the water surface (DBS).

$--DBS,x.x,f,y.y,M,z.z,F*hh<CR><LF>

where (from left towards right):

Component	Contents
–	don't care
x.x,f	water depth (in feet)
y.y,M	water depth (in meters)
z.z,F	water depth (in fathoms)
hh	checksum

Simrad - Ping based ASCII datagram (serial)

This ASCII datagram exports the detected water depth measured from the transducer face to the bottom backscatter value. The set draft is included. One datagram is exported from each echo sounder channel limited to four channels. The datagram has a fixed length.

D#,hhmmss.ss,xxxx.xx,zzz,TDN,ABS,\<CR>\<LF>

where (from left towards right):

Component	Contents
D	Header (always)
#	Channel number (1 characters)
hhmmss.ss	time when transmitted (computer's present time)
xxxx.xx	Depth (in meters)
zzz	Bottom surface backscattering strength (dB)
TDN	Transducer number (never used!)
ABS	Athwarthship bottom slope (in degrees) (Not used in EA 600)

New format with tag "Add Frequency, Draft, SvP" activated:

D#,hhmmss.ss,xxxx.xx,zzz,TDN,ABS,FFF,D.DD,SSSS.S cc\<CR>\<LF>

where (from left towards right):

Component	Contents
D	Header (always)
#	Channel number (1 characters)
hhmmss.ss	time when transmitted (computer's present time)
xxxx.xx	Depth (in meters)
zzz	Bottom surface backscattering strength (dB)
TDN	Transducer number (never used!)
ABS	Athwarthship bottom slope (in degrees) (Not used in EA 600)
FFF	Add Frequency
D.DD	Add draft
SSSS.S	Add SvP
cc	Checksum

Simrad - Ping based binary/ASCII datagram (network)

The network output is either binary or ASCII. The binary format is the same as for EA 500. The datagram has a fixed length.

**D#,HHMMSShh,
Depth,Reflectivity,Transducer no,Athwartships angle**

where (from left towards right):

Component	Contents
D#	header (2 characters), where # indicates the channel number
,	separator
HHMMSShh	8 bytes – time when ping is transmitted
,	1 character separator
Depth	4 bytes floating point number
Reflectivity	4 bytes floating point number
Transducer no	4 bytes integral number
Athwartships angle	4 bytes floating point number (Not used in EA 600)

New format with tag "Add Frequency, Draft, SvP" activated, binary:

D#,HHMMss.hh, Depth,Reflectivity, Frequency, TransducerDepth,ConstantSvP

Component	Contents
D#	header (2 characters), where # indicates the channel number
,	separator
HHMMSShh	8 bytes – time when ping is transmitted
,	1 character separator
Depth	4 bytes floating point number
Reflectivity	4 bytes floating point number
Transducer no	4 bytes integral number
Athwartships angle	4 bytes floating point number (Not used in EA 600)
Frequency	4 byte integral number
Transducer-Depth	4 byte floating point number (Draft)
ConstantSvP	4 byte floating point number (SvP)

New format with tag "Add Frequency, Draft, SvP" activated, ASCII:

D#,hhmmss.ss,xxxx.xx,zzz,TDN,ABS,FFF,D.DD.SSSS.S

Datagram specification, see Simrad-ping based ASCII datagram, serial output.

Atlas - Output datagram

This is a fixed length datagram exporting the water depth from two channels. The datagram has a fixed length of 14 characters. If two identical frequencies are used simultanously, the first frequency (identfied as xx kHz - 1) is submitted with header **DB**, while the other (xx kHz - 2) is submitted with header **DA**.

DBxxxxx.xxFM*

where (from left towards right):

Component	Contents
D	Always the character 'D'
B	'A' for high frequency, 'B' for low frequency
xxxx.xx	Depth data
F	'Space' or 'f''' (indicates Feet)
M	'm' for meteres, 'f' for feet
*	One character asterix (*)

Echogram datagram

The echogram datagram format is identical for both output to the network and for file storage.

Due to protocol limitations the number of output samples is limited to 700, while for file output the limit is 10000 samples.

Q#,HHMMSShh,TVG type,Depth,Pelagic Upper, Pelagic Lower,Pelagic Count,Bottom Upper, Bottom Lower,Bottom Count,Data

where (from left towards right):

Component	Contents
Q#	header with 2 characters, where # indicates the channel number
,	separator
HHMMSShh	8 bytes – time when ping is transmitted
,	1 character separator
TVG type	4 bytes integral number, 0=No TVG, 3=20logR, 4=30logR, 2=40logR
Depth	4 bytes floating point number
Pelagic Upper	4 bytes floating point number
Pelagic Lower	4 bytes floating point number
Pelagic Count	4 bytes integral number
Bottom Upper	4 bytes floating point number
Bottom Lower	4 bytes floating point number
Bottom Count	4 bytes integral number
Data	(Pelagic Count+Bottom Count)*2 bytes

$$y = x\frac{10\log(2)}{256}$$

where:

x = data (power value derived from the datagram)

y = converted value (in dB)

Status datagram

A copy of the messages shown on the **Status bar**:

ST,HHMMSShh, Text string<CR><LF>

where (from left towards right):

Component	Contents
ST	header with 2 characters
,	1 character separator
HHMMSShh	current time on computer
,	1 character separator
Text string	Free text string
<CR><LF>	this sequence is only present on the serial line output

Example:

ST,10345561, Cannot meet specified ping interval.

Note   *Max 20 depth output. Each depth is separated by ",".*

Georef Output datagram

Datagram format – side looking

SSG,HHMMSShh,xxxx.xxxxxxx,yyyy.yyyyyyy,type,hhh.hh,aaaa.aa,zzzz.zz

where (from left towards right):

Component	Contents
SSG	header with 3 characters
,	separator
HHMMSShh	8 bytes – time when ping is transmitted
,	1 character separator
xxxx.xxxxxxx	Latitude
,	1 character separator
yyyy.yyyyyyy	Longitude
type	HDT or VTG
hhh.hh	heading
aaaa.aa	across range
zzzz.zz	depht

Example:

SSG,10564020,5900.0177947,01000.0862086,HDT198.58,59.60,10.84
SSG,10564020,5900.0177947,01000.0862086,HDT198.58,59.60,0.0

Note

Telegram without vertical depth, i.e. only side looking transducers. The accross range will then only be range value.

In addition, the raw geographical reference datagram may be relayed to a network recipient.

Datagram format – verical

VGR, HHMMSS,hh,xxxx.xxxxxxx,yyyy.yyyyyyy,zzzz.zz

where (from left towards right):

Component	Contents
VGR	header with 3 characters
,	separator
HHMMSShh	8 bytes – time when ping is transmitted
,	1 character separator
xxxx.xxxxxxx	Latitude
,	1 character separator
yyyy.yyyyyyy	Longitude
,	1 character separator
zzzz.zz	Range to selected point

Navigation Output datagram

GL,HHMMSShh, Navigation string<CR><LF>

where (from left towards right):

Component	Contents
GL	header with 2 characters
,	1 character separator
HHMMSShh	current time on computer
,	1 character separator
Navigation string	Text string as set up in the navigation menu
<CR><LF>	this sequence is only present on the serial line output

Example:

GL,10345561,5925.08158,N,01028.34924,E

In addition, the relay navigation datagram output can be relayed over serial line or to a network recipient.

Datagram format

$xxHeader,HHMMSShh,Completete navigation string CRLF

Example:

$GPGGA,10345561,5925.08158,N,01028.34924,E, ... *,hh

If the navigation telegram include for example heading HDT and speed VTG, these data will be exported in addition.

If more than one NMEA, poition telegram input, all telegram will be exported, for ecample GGA, GGL, GGK.

Motion Sensor datagram

Network datagram

Network datagram is binary.

MS,HHMMSShh,Heave,Roll,Pitch

where (from left towards right):

Component	Contents
MS	header with 2 characters
,	1 character separator
HHMMSShh	8 bytes – time when ping is transmitted
,	1 character separator
Heave	4 bytes floating point number
Roll	4 bytes floating point number
Pitch	4 bytes floating point number

Serial line datagram

Serial interface datagram is ASCII.

MS,HHMMSShh,h.hh,r.rr,p.pp<CR><LF>

where (from left towards right):

Component	Contents
MS	header with 2 characters
,	1 character separator
HHMMSShh	8 bytes – time when ping is transmitted
,	1 character separator
h.hh	heave value
r.rr	roll value is 0.00
p.pp	pitch value is 0.00

Sound Speed datagrams

AML-CALC input

The AML CALC format is defined by Applied Microsystems Ltd (AML) for use with their sensors. The format is ASCII, and the datagram contains a five line header with a variable number of data lines. For more information about this datagram format, consult Applied Microsystems Ltd at their web site.

→   *www.appliedmicrosystems.com.*

1   **CALC,sn,date,depth incr,depth disp**

- where (from left towards right):

Component	Contents
CALC	identifier
sn	sensor serial number
date	current computer date
depth incr	logging depth increment
depth disp	depth display; depth units in meters or decibars

2   **AML SOUND VELOCITY PROFILER S/N: xxxx**

3   **DATE:xxxxxx TIME:xxxxxx**

- This line provides the julian date and time at the start of the sensor logging.

4   **DEPTH OFFSET (M):xxxx.x**

- This line provides the pressure offset at the sea level.

5   **ddd.d vvvv.v tt.t<LF>**

- A variable number of lines provide the sound speed and the temperature for different depths. Note that the values are separated by spaces.

Component	Contents
ddd.d	depth in meters
vvvv.v	velocity in meters pr second (m/s)
tt.tt	temperature in degrees Celcius

To terminate the datagram, the last line must contain three zeroes with two spaces between each zero.

Kongsberg SSP10

The new format is completely in ASCII and allows 9998 entries without limitations in resolution. In addition to depth and sound speed, it allows input of absorption coefficient, pressure, temperature and salinity or conductivity. The latter parameters may be used to calculate depth, sound speed and absorption coefficient. Use of a depth dependent absorption coefficient allows a more accurate determination of bottom backscatter strength. The format is:

$AA,Sxxx,yyyyy,nnnn,hhmmss,dd,mm,yyyy,
d.d,v.v,t.t,a.a,<CR><LF>
llll.ll,L,zzzzz.z,Z,p.p,text,*hh,\<CR><LF>

This format contains a fixed header (line 1 above), a repeated cycle (line 2) and a postfix (line 3). The repeat cycle appears "nnnn" times as defined in the header.

Component	Contents
$	Start identfier, always 24h
AA	Talker identifier, always AA
Sxx	Datagram identifier, 4 characters, valid range from S00 to S53. See notes 1 and 2.
yyyyy	Data set identifier, valid range from 00000 to 65535
nnnn	Number of measurements, max 9999
hhmmss	UTC time of data acquisition, valid range 000000 to 235959. See note 3.
dd	Day of data acquisition, 00 to 31. See note 3.
mm	Month of data acquisition, 00 to 12. See note 3.
yyyy	Year of data acquisition, 0000 to 9999. See note 3.
Start of repeat cycle, runs "nnnn" times. See note 4.	
d.d	Depth in meters from water level (valid range 0 to 12000.00), or Pressure in MPa (valid range 0 to 1.0000).
v.v	Sound velocity in m/s. Valid range 1400 to 1700.00
t.t	Temperature in degrees Celcius. Valid range –5 to 45.00
a.a	Salinity in parts per thousand (valid range 0 to 45.00) or Conductivity in S/m (valid range 0 to 7.000).
<CR><LF>	Carriage return and line feed to enad each of the "nnnn" lines in the repeat cycle.
End of repeat cycle	

Component	Contents
llll.ll	Latitude in degrees and minutes, plus optional decimal minutes. See note 5.
L	Latitude N/S, valid characters "N" or "S". See note 5.
zzzzz.zz	Longitude in degrees and minutes, plus optional decimal minutes. See note 5.
Z	Longitude E/W, valid characters "E" or "W". See note 5.
p.p	Atmospheric pressure in MPa. Valid range 0 to 1.0000. See note 5.
text	Comments provided by operator, variable length. See note 5.
*hh	Optional checksum. See note 6.
\<CR><LF>	Carriage return and Line feed to identify end of datagram. Hex value = 5Ch 0Dh 0Ah

Note 1 - The datagram identifier identifies what type of data is included. This is shown in the following table where D is depth, P is pressure, S is salinity, C is conductivity, c is sound speed, α is absorption coefficients, and L is latitude. The notation c(T,S) indicates for example that the sound speed is to be calculated from the temperature and salinity input data. When pressure is used, the atmospheric pressure must be given if the pressure is absolute, otherwise the pressure must be given re the sea level and the atmospheric pressure must be zero.

Identifier	Input data	Data to be used
S00	D, c	D, c
S10	D, c	D, c
S11	D, c, α	D, c, α
S12	D, c, T, S	D, c, α(D,T,S,L)
S20	D, T, S	D, c(D,T,S,L)
S21	D, T, S, α	D, c(D,T,S,L), α
S22	D, T, S	D, c(D,T,S,L), α(D,T,S,L)
S30	D, T, C	D, c(D,T,C,L)
S31	D, T, C, α	D, c(D,T,C,L), α
S32	D, T, C	D, c(D,T,C,L), α(D,T,C,L)
S40	P, T, S	D(P,T,S,L), c(P,T,S,L)
S41	P, T, S, α	D(P,T,S,L), c(P,T,S,L), α
S42	P, T, S	D(P,T,S,L), c(P,T,S,L), α(P,T,S,L)
S50	P, T, C	D(P,T,C,L), c(P,T,C,L)

Identifier	Input data	Data to be used
S51	P, T, C, α	D(P,T,C,L), c(P,T,C,L), α
S52	P, T, C	D(P,T,C,L), c(P,T,C,L) , α(P,T,C,L)

Note 2 - S00 is a special case because then the sound speed profile will be taken into use immediately without further operator intervention. The checksum is then mandatory and must be correct. Furthermore entries for zero depth and a deeper depth than expected during the survey must be included.

Note 3 - Note that these fields have fixed length and leading zeros must be used.

Note 4 - The depth or pressure field is always required while the other fields are optional except for those required by the datagram identifier. The field-delimiting commas must always be included even if the fields are empty.

Note 5 - The positions, atmospheric pressure and comment fields are optional. Note that the option field must not include a \. It is recommended to include sensor type in the comment field.

Note 6 - The checksum field is calculated between the $ and the * delimiters by exclusive OR'ing of all bytes. The checksum is required for datagram S00, but is optional for the others.

Simrad-A

When input is read, the **nnnn** number is used to convert the profile. The number of **m.mm** and **s.ss** pairs must correspond to this number to apply a complete profile. The format is:

SV,HHMMSShh,nnnn,m.mm,s.ss,m.mm,s.ss\<CR\>\<LF\>

where (from left towards right):

Component	Contents
SV	header with 2 characters
HHMMSShh	current time on computer
nnnn	number of pairs in profile **(NOTE!)**
Start of repeat cycle, runs "nnnn" times.	
m.mm	depth of sound speed pair
s.ss	sound speed
End of repeat cycle	

Optional sound speed sensors

The following sensors can also be read by the EA 600:

- AML SVPlus
- Sonar 2090

Refer to the manufacturer's documentation for the sensor's format description.

Sound speed output

The following data format is used.

SV,HHMMSShh,nnn,m.mm,s.ss<CR><LF>

where (from left towards right):

Component	Contents
SV	header with 2 characters
HHMMSShh	current time on computer
nnnn	number of pairs in profile **(NOTE!)**
Start of repeat cycle, runs "nnnn" times.	
m.mm	depth of sound speed pair
s.ss	sound speed
End of repeat cycle	

Attitude

Overview

The EA 600 echo sounder will accept attitude datagrams from external sensors on the following formats:

- Sounder

- Binary, EM 1000 and EM 950 compatible

- Binary, EM 3000 and HiPAP compatible

Sounder

The Sounder 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 (CR) and line feed (LF).

:aabbbb shhhhxsrrrr spppp<CR><LF>

where (from left towards right):

Component	Contents
aa	Sway: 2 characters hex number with sway acceleration, in 0.03835 m/ss units
bbbb	Heave: 4 characters hex number with heave acceleration, in 0.000625 m/ss units
hhhh	Heave: 4 characters decimal number with heave position in centimeters, positive up
s	1 character with a <space> value if positive, or <–> if negative
x	Status character, check the comments below.
rrrr	Roll: 4 character decimal number with roll angle in hundres of a degree
s	1 character with a <space> value if positive, or <–> if negative
pppp	Pitch: 4 character decimal number with pitch angle in hundres of a degree
s	1 character with a <space> value if positive, or <–> if negative

The definition of the attitude angles in this format is different from the *Euler* angles definition used elsewhere. The difference appears in the roll angle, where:

$$Roll_{echosounder} = \arcsin\left[\sin(Roll_{Euler})\cos(Pitch_{Euler})\right]$$

The various status characters have the following meaning:

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 sensorr 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.)

Binary EM 1000 / EM 950 compatible

This format consists of a fixed length message using single byte unsigned, 2-byte unsigned and 2-byte two-complement integer data elements. For the 2-byte elements, the least significant byte is transmitted first.

Element	Scaling	Format	Bytes	Value
Header	–	Unsigned	1	00 Hex
Header	–	Unsigned	1	90 Hex
Roll	0.01 deg	Integer	2	–999 to +999
Pitch	0.01 deg	Integer	2	–999 to +999
Heave	1 cm	Integer	2	–999 to +999
Heading	0.01 deg	Unsigned	2	0 to 35999

- Roll is positive with port side up.
- Pitch is positive with bow up.
- Heave is positive up.

Invalid data are indicated by values outside the specified ranges. The definition of the attitude angles in this format is different from the *Euler* angles definition used elsewhere.

Binary EM 3000 / HiPAP compatible

This format consists of a fixed length message using single byte unsigned, 2-byte unsigned and 2-byte two-complement integer data elements. For the 2-byte elements, the least significant byte is transmitted first.

Element	Scaling	Format	Bytes	Value
Status byte	–	Unsigned	1	See below
Header	–	Unsigned	1	90 Hex
Roll	0.01 deg	Integer	2	–999 to +999
Pitch	0.01 deg	Integer	2	–999 to +999
Heave	1 cm	Integer	2	–999 to +999
Heading	0.01 deg	Unsigned	2	0 to 35999

- Roll is positive with port side up.

- Pitch is positive with bow up.

- Heave is positive up.

The status byte may have the following values:

90 Hex = Normal

91 Hex = Reduced performance

A0 Hex = Invalid data

Invalid data are indicated by values outside the specified ranges. When the status is A0, the values within the specified ranges are valid, but may suffer from reduced quality.

Temperature sensor - output

The datagram format is:

$--MTW,x.x,C*hh<CR><LF>

where (from left towards right):

Component	Contents
MTW	Header
x.x	temperature in Degrees Celcius
C*hh	Checksum
<CR><LF>	Carriage return and Line feed terminates the data-gram.

KONGSBERG

EA 600
Operator manual

EA 600
Operator manual

EA 600
Operator manual

EA 600
Operator manual