User Manual

SeaBat Sonar UI

Version 1.4.12

October 2019

Teledyne RESON B.V.
Stuttgartstraat 42- 44
3047 AS Rotterdam
The Netherlands

Tel.: +31 (0)10 245 15 00
www.teledyne-reson.com

Amendment Record Sheet

Rev.	Date	Reason for Modifications
1.4.12	01/10/2019	Chapter: Operation: Display: Update text about the Active Sonar Targets layer. Screens: Wedge: Update text about adding sonar contacts.

Contents

1 Introduction

1.1 SeaBat Sonar UI

This manual is the new manual for the RESON SeaBat Sonar UI.

The chapter brief explanation discusses how to set up the Sonar UI and to start the sonar (see page 3).

The chapter general information discusses how the panes work and what options are available in the toolbar (see page 5).

The chapter Operation discusses the operation mode of the Sonar UI. The different panes that can be used in conjunction with the screens are explained in detail (see page 21).

The last chapter Service discusses how to check the status of the complete sonar system by viewing the system diagram and BITE information (see page 79).

Appendix Dual head configuration discusses the dual head configuration in more detail (see page 89)

Appendix 'Raw Data Recording' discusses logging of data records for different RESON configuration schemes in more detail (see page 95).

Appendix '3001 Contact Output record' describes the 7k format 3001 Contact Output record (see page 113).

This manual is also available as a help file in the Sonar UI. Use F1 or  in the toolbar of the Sonar UI to open the help file.

2 Quick Guide

2.1 Introduction

This chapter will give a brief explanation how to start the Sonar UI, what is needed for using the Sonar and how to improve the performance after the sonar is pinging.

The Sonar UI requires OpenGL version 3.30 or higher to function properly (check the specification of the used video card).

2.2 Steps

a. Before the Sonar UI is started a valid license has to be installed in the 7KControlCenter to have certain features available. When the license is not yet installed, a valid license file can be dragged and dropped at the 7k Control Center or at the Sonar UI. See the Operation Manual of the sonar for more details.

b. It is possible to open the Sonar UI (sonar type depended) from:

- The 7KcontrolCenter
  Select in the 7KControlCenter the option New Sonar UI and click on the *Start* button to open the Sonar UI.

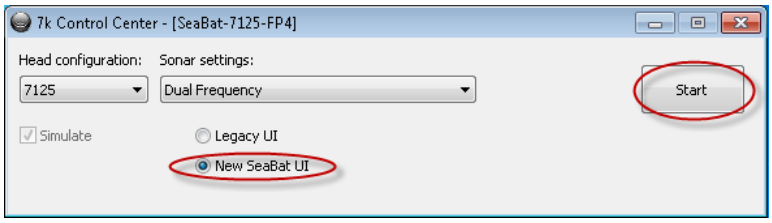


Figure 2-1 Selection and Start of New Sonar UI

- Opening the desktop Sonar UI shortcut
  The shortcut is created if the Sonar UI was successfully installed on the computer.

Figure 2-2 Sonar UI shortcut

c. For some sonar types (T-series) a dialog box opens to specify the transmit cable length.

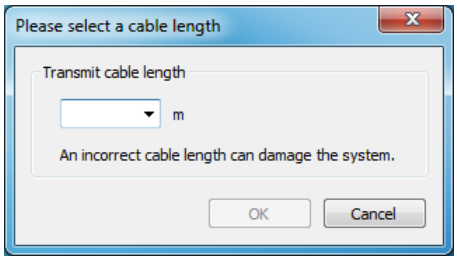


Figure 2-3 Cable length dialog box.

It is essential the correct cable length is specified. A wrong cable length can damage the system!

d. The Sonar UI opens in the Operation mode with screens displayed and a normalization process runs indicated by a progress bar.

   If the SUI runs on another computer as the sonar processor then the IP address of the sonar processor is selected from the sonar UI toolbar. (The address is listed in the drop down list when the 7kCenter is detected).

e. The external clock with 1PPS and the sound velocity probe have to be interfaced with the system. This can be done in the IO Module (see page 35).

f. For roll and/or pitch stabilization the motion sensor has to be interfaced to the right port on the sonar system.
   In the hardware the roll stabilization must enabled and the correct settings selected (see page 52).

g. Check the 1PPS is received and the roll / pitch stabilization is working.

h. Open the Main pane to start the sonar (see page 23). Set the power and the gain to start the sonar pinging. Change the range so the data is properly displayed in the wedge (see page 23).

i. Select the right frequency, pulse type and beam mode in the Advanced pane (see page 27)

j. When the sonar is pinging then in Service can be monitored if the complete sonar system is working (see page 79).

k. To get a better bottom detection, select the Depth, Range or Adaptive gate in the Main pane. (See page 25)

l. Set the Tracker on to get a fully automated mode of the operation (see page 17).

m. Before the recording of the sonar data can be started the record selection and the path for the recorded files have to set in the Recording pane (see page 48).

n. Use the Display pane to set the right settings for the screens (see page 45).

3 General Information

3.1 Introduction

To setup and operate the Sonar in the Sonar UI, use:

- The Panes. (see the next section)
- The Sonar UI Toolbar (see page 12).
- The screen toolbar and a Context menu**.** (see page 18)

3.2 Arranging the Panes

The Sonar UI uses tabs on the right side and at the bottom to open the settings panes, the control panes and the messages pane of the Sonar UI.

3.2.1 Panes

The settings panes on the right side are:

- Display
- Detection
- Recording
- Hardware
- IO Module
- Pipe

The three panes (control and messages) at the bottom are:

- Main
- Advanced
- Messages
- Playback

This section will explain how to open, dock, drag and hide the panes.

See the chapter Operation on page 21 for more information about the functions of the different panes.

3.2.1.1 Opening and hiding Panes

1. Move the cursor over a tab on the right side or at the bottom of the view.

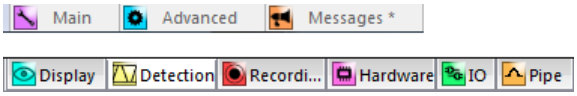


Figure 3-1 Tabs

2. Click the tab to open a pane.
3. Click the tab again, or move the cursor outside the pane and click to hide the pane again.

3.2.1.2 Docking

It is also possible to use the context menu of the pane to switch between Auto Hide and Docking modes (see page 11).

1. Click on the pin at the upper right corner of the pane to keep the pane from auto-hiding. The pin will change to , the pane is now in Docking mode (pinned) and will stay open even when clicking outside the pane.
2. Click on to undock the pane.

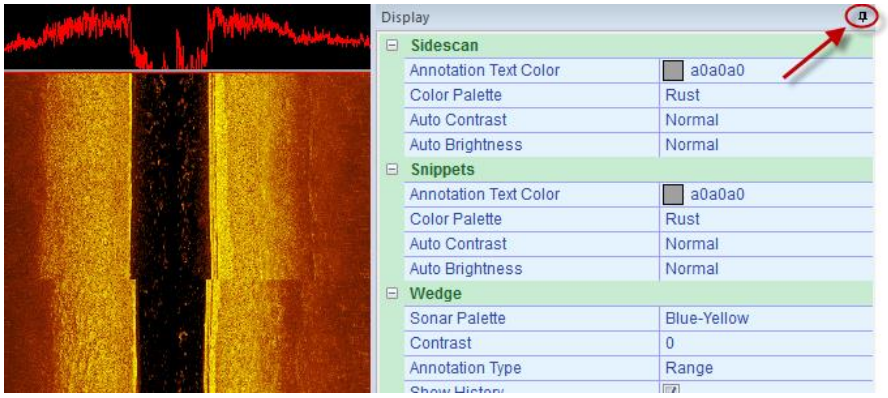


Figure 3-2 Display pane in Docking mode

3.2.1.3 Floating

It is also possible to use the context menu of the pane to switch between Docking Floating (see page 11).

1. With the pane in docking mode, double click on its title bar to make it a floating window (the pane is now in Floating mode).
2. It is possible to drag the pane across the display or outside the frame of the Sonar UI.
3. The pane can easily be docked at the original right side of the display, as guide diamonds are visible when the window is dragged. See Figure 3-3. The guide diamonds help dock floating panes to their original – default – location on the display. The settings panes are docked on the right side of the display. The bottom panes are docked at the bottom of the display.

   Drag the floating window to one of the two guide diamonds. When the cursor is over a guide diamond, a temporary placeholder will appear to indicate the selected location of the pane. See Figure 3-4.

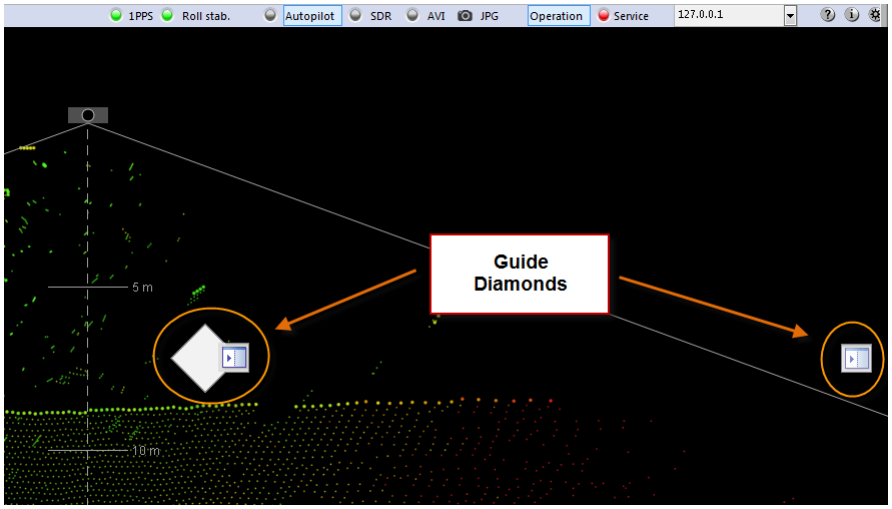


Figure 3-3 Guide diamonds

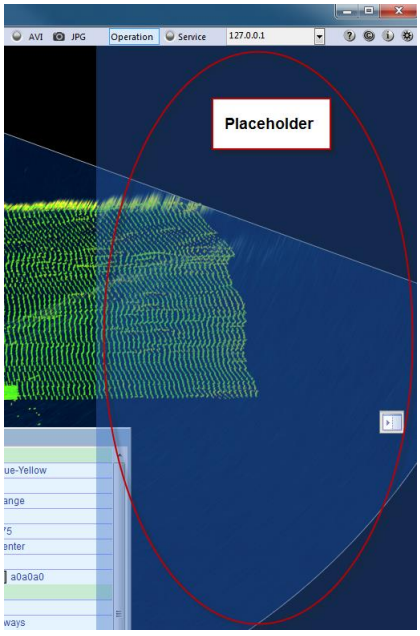


Figure 3-4 Placeholder

Re-docking settings panes:

See Figure 3-5.

1 Drag the floating settings pane to the center guide diamond.

2 When dropping the pane, it will be placed at the right side of the display as indicated by a placeholder.

3 The settings pane will be placed above an opened bottom pane.

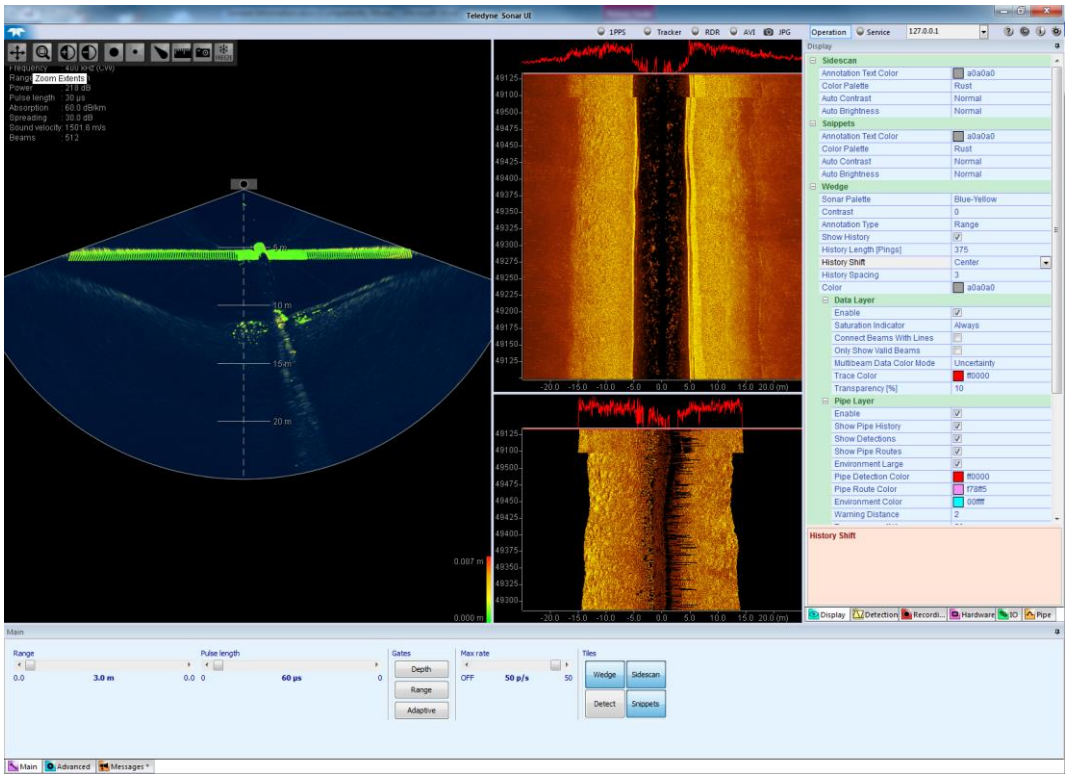


Figure 3-5 Re-dock settings pane placed above bottom pane

When dragging a settings pane to the guide diamond on the right side of the display then:

1 The settings pane will be placed on the right side of the display.

2 An opened bottom pane will be shifted to the left.

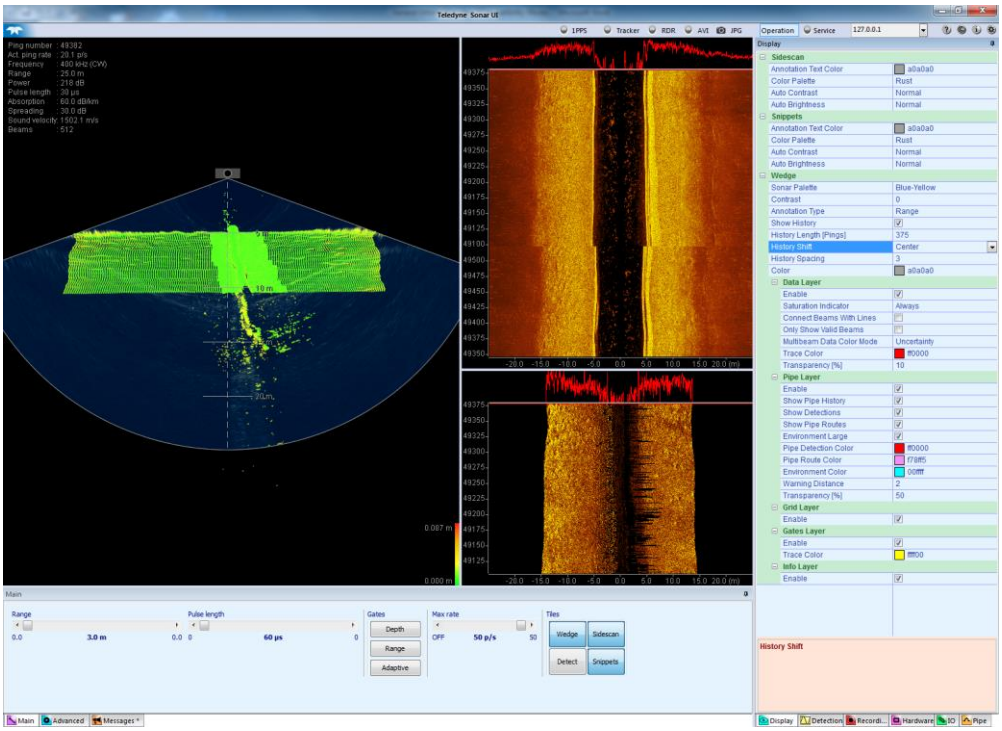


Figure 3-6 Re-docked settings pane placed from right guide diamond

Re-docking bottom panes:

See Figure 3-7.

1 Drag the floating bottom pane to the center guide diamond.

2 When dropping the pane, it will be placed at the bottom of the display as indicated by a placeholder.

3 The bottom pane will be shifted to the left when a Settings pane is open.

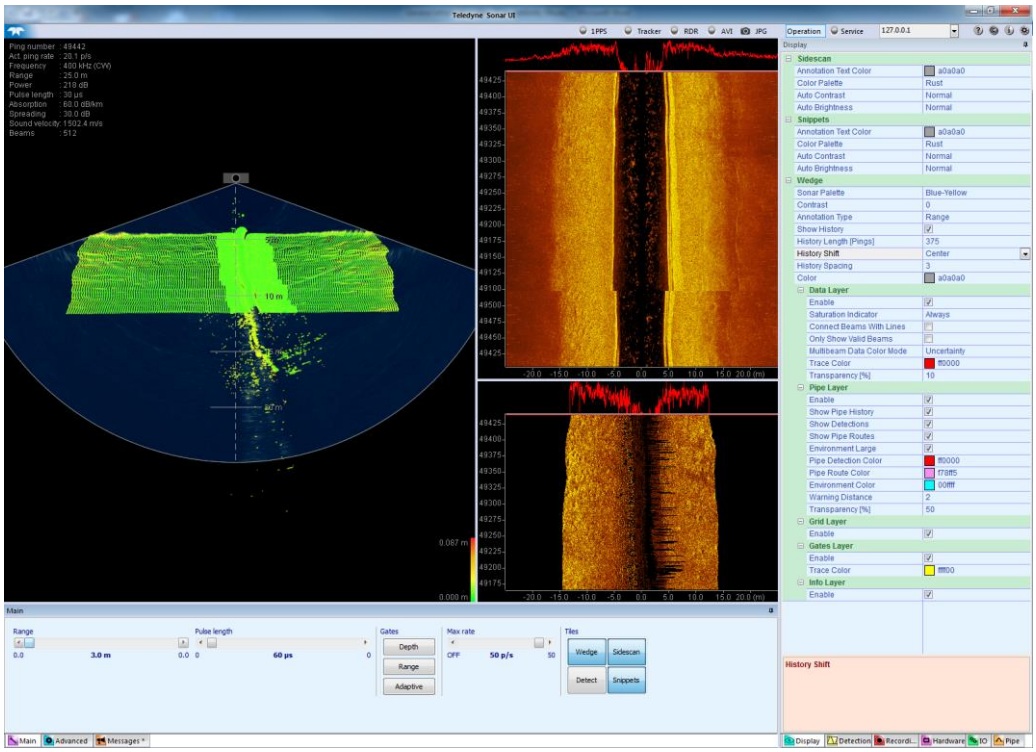


Figure 3-7 Re-docked bottom pane with the center guide diamond

When dragging a bottom pane to the lower guide diamond, while a settings pane is opened then:

1 The bottom pane will be placed at the bottom of the display.

2 The settings pane will be shifted to the top.

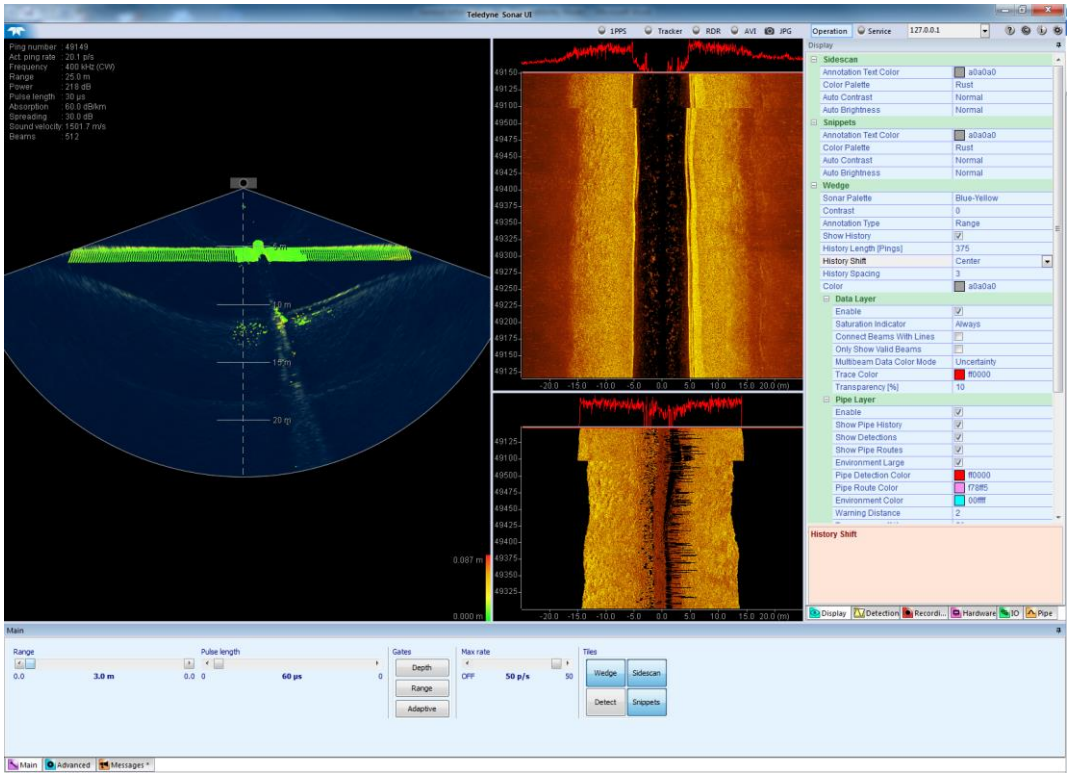


Figure 3-8 Re-dock bottom pane from the bottom guidance diamond and an opened settings pane

3.2.1.4 Tabs

The tabs are fixed to a floating pane.

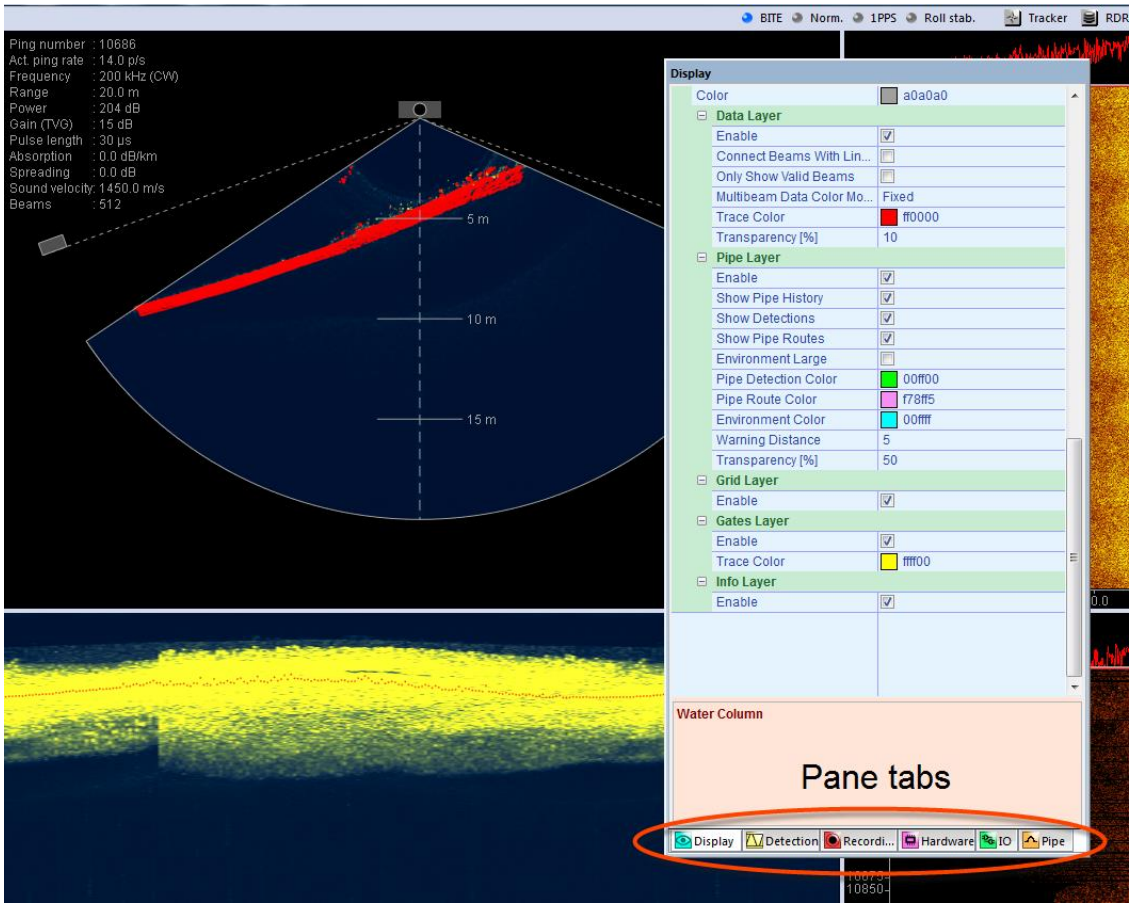


Figure 3-9 Settings pane with tabs.

When a pane is placed on a new location and a different pane tab is selected, this pane will be displayed on this location. It is not possible to display more than one settings pane or bottom pane on a location other than the default (on the right or at the bottom, respectively).

3.2.1.5 Context Menu

The different modes for the panes are also selectable from a context menu. Right-click in the pane to open the context menu.

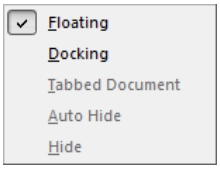


Figure 3-10 Context menu

3.3 Sonar UI Toolbar

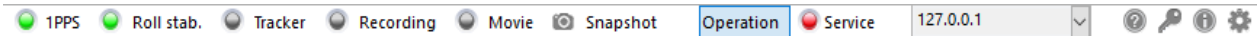


Figure 3-11 Toolbar of the Sonar UI

The Sonar UI has on top a toolbar with several options.

3.3.1 Application Settings Dialog

Click on ⚙ to open the application settings dialog.

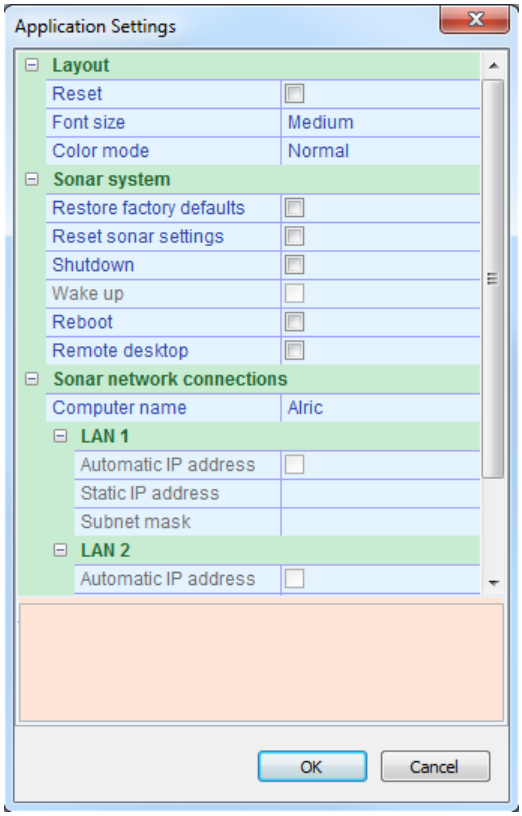


Figure 3-12 Application settings dialog

3.3.1.1 Lay-out

Reset:
When the layout is disturbed, select the check box to reset the layout and font size of the Sonar UI.

Font size:
It is possible to set the font size to *Small*, *Medium*, and *Big*.
This only applies to the font in the panes.

Color mode:
With the color mode the light conditions for the screen(s) are modified for better viewing conditions on an individual basis. The four different color modes are:

- **Normal**
  Standard light conditions.

- **Night**
  Less contrast and brightness; recommended for use during the night.
- **Twilight**
  Less contrast; recommended for use during twilight.
- **Bright**
  Extra contrast and brightness; recommended for use in bright sunshine.

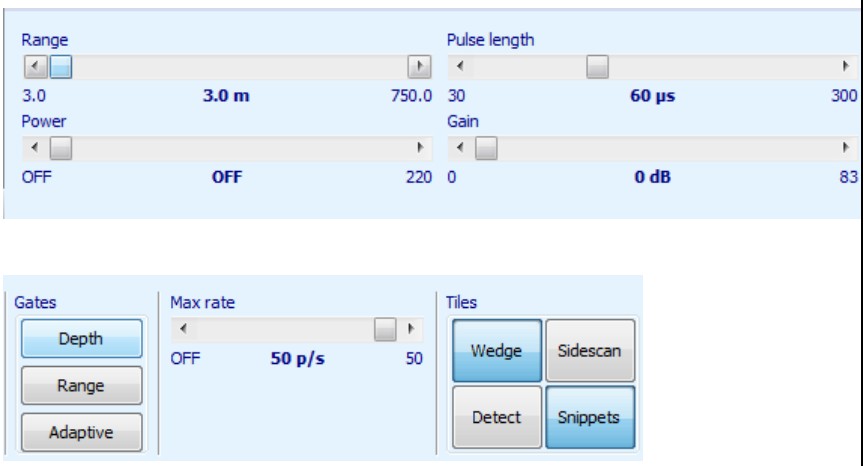
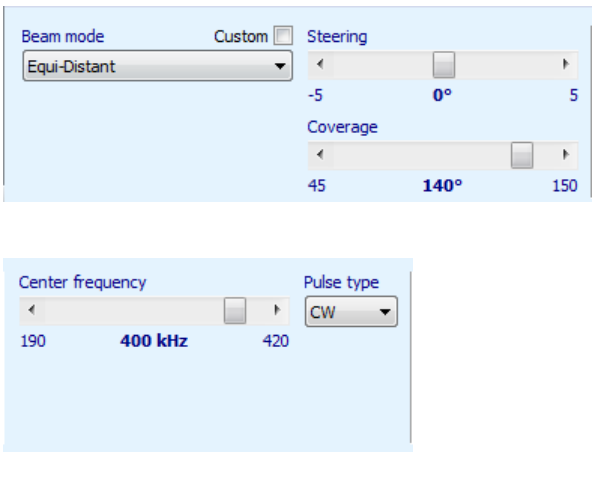
The different color modes are working fine in the Windows Classic Theme. In the Windows 7 Basic and Windows 7 Themes not all the items on the screen will be supported.

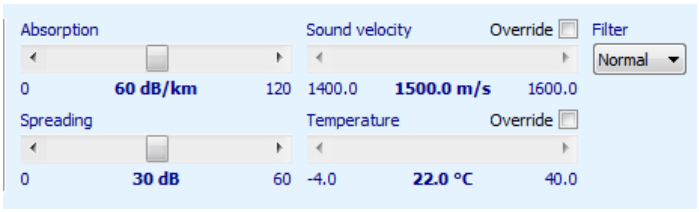
3.3.1.2 Sonar System

Restore factory settings:.
Select this checkbox to restore the factory settings of the sonar. This also includes settings for the I/O module and network connections IP settings.

Reset Sonar settings:
Select this checkbox to reset only the sonar settings to the defaults..

The next table lists the default sonar main and advanced settings.

Main

Advanced




Shutdown.
The software and firmware will be halted followed by a power shutdown

Wake up:
The SUI remembers the five most recent connections, and shows them as 'offline in the hardware pane's sonar address combo box. After selecting such an offline system from this address combo box and checking the 'Wake up' checkbox the selected sonar will wake up. Even when the power of the particular system is switched off. (Of course the network connection should be present.)

Reboot:
Reset the software and firmware.

Remote desktop:
Start a Microsoft Remote Desktop session with the sonar computer.

3.3.1.3 Sonar Network Connections

This feature is only available for T20 and T50 sonars.
With the sonar network connections a connection with a sonar could be established.

LAN1 and LAN2 refer to the processor network port.

A T-series processor (PSP) LAN1 port has a default setting of 10.11.10.1 and LAN2 a default setting of 10.11.10.2 with subnet mask 255.255.255.0 for both ports.

Select the 'Restore factory settings' checkbox in the Application Settings dialog box to set the default settings for the ports.

Automatic IP address:
Select the 'automatic IP address' checkbox when a DHCP network is available. The processor will acquire an IP address from the DHCP server. (This checkbox is by default unchecked).

Static IP address:
For LAN 1 any IP address could be set.

For LAN 2 the IP address is fixed between the range of 10.11.10.2 and 10.11.10.9 An IP address must be set in this range.

The user is always able to make a connection by LAN 2 because the IP address of LAN 2 is fixed. Only the user computer must be set in the same LAN2 IP address range (10.11.10.xx).

By the computer name also a connection could be established. This is only for advanced trouble shooting.

All changes made in this dialog have effect after OK is pressed.

3.3.2 About Dialog

Click on ⓘ to open the about dialog.

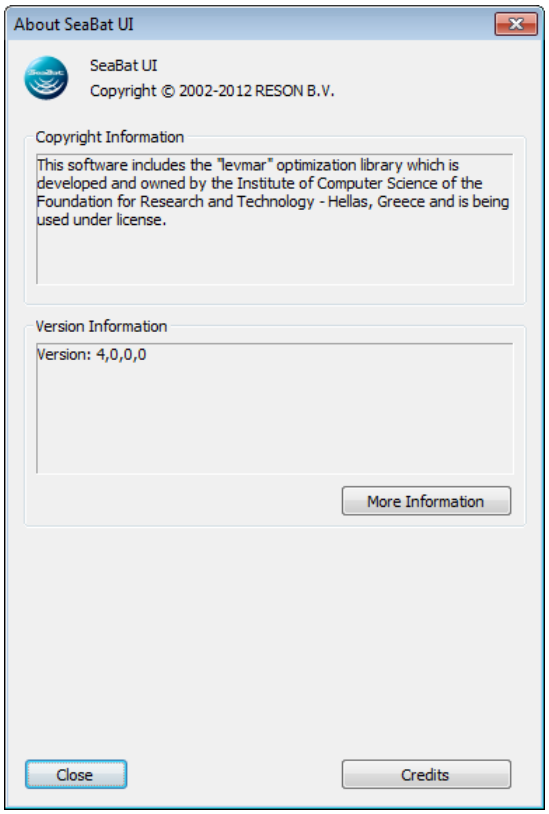


Figure 3-13 About Sonar UI dialog

3.3.3 Licensed Features Dialog

Click on © to open the dialog.

Figure 3-14 Licensed Features dialog

The Licensed Features dialog displays the licenses of the feature packages as purchased by the user. New license files are dragged and dropped at the Sonar UI and installed automatically.

3.3.4 Help File

Click on to open the help file. The help file is also opened with F1.

The help file is a copy of this Sonar UI Manual.

3.3.5 Sonar Address

Select from the drop down list 127.0.0.1 the sonar IP address on the local network that is valid for the sonar. The sonar address is automatically listed when a sonar 7kCenter is detected. From the drop down list IP addresses, the computer description as set in the Windows system settings is displayed for each detected sonar address.

It is also possible to set the address manually.

3.3.6 Service Mode

Click on Service Service to open the view with the BITE system information. See for more information the chapter Service on page 79.

The LED indicator inside the service button will indicate if the BITE information gives errors in the Service (see page 79). The different colors are:

- Blue – When the Sonar UI is started the BITE information is not yet available.
- Green – No errors in the BITE information, all components are working.
- Red – Error level – Errors, warnings or timeouts in one or more components. Check the diagram in the Service for more information (see page 80).

3.3.7 Operation Mode

Click on Operation Operation to open the view with the sonar data. See for more information the chapter Operation on page 21.

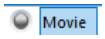
3.3.8 Save JPG Screen Snapshot

Click on Snapshot Snapshot to create an image of the application window.

The snapshot will be stored as a JPG with the filename yyyymmdd_hhmmss.jpg in the location as is defined in the Recording pane (see page 48).

The Save Snapshot option gives a proper screen shot in the Windows Classic Theme and in the Windows 7 Basic Theme. In the Windows 7 Theme the option does not give a good screen shot in the Operation mode.

3.3.9 Start Record AVI

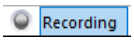
Click on Movie  to start the AVI recording of the application window. During the recording the LED indicator is changed to a green LED indicator.

The recording will be stored as a AVI with the filename yyyymmdd_hhmmss.avi in the location as is defined in the Recording pane (see page 48).

Click on the highlighted AVI button  to stop the AVI recording and the green LED indicator turns off again.

The AVI recording gives a good AVI in the Windows Classic Theme and in the Windows 7 Basic Theme. In the Windows 7 Theme the option does not support the screens from the Operation mode.

3.3.10 Start Record RDR

Click on Recording  to start the logging of the raw data. During the recording the LED indicator is changed to a green LED indicator.

The log file will be stored as a S7K file with the filename yyyymmdd_hhmmss.s7k in the location as defined in the Recording pane. (see page 48) Also in this pane the records can be selected which have to be recorded.

Click on the highlighted text 'RDR' to stop the logging and the green LED indicator becomes a yellow/orange LED, indicating that the logging will stop but that a small buffer is still logging to get all the information. The LED will turn off after the buffer has finished logging.

3.3.11 Start the Tracker

Click on Tracker  to start the Tracker. When in tracker mode the button is highlighted.

The Tracker is a fully automated mode of operation. In the Detection pane the tracker parameters can be selected. These parameters, including swath width are set by the system on the basis of the quality of the collected data. Once the Tracker has been selected, no further operator input is required. When no tracker parameters are selected in the detection pane the tracker LED indicator is grey colored.

Click on the highlighted text 'Tracker' to stop the Tracker. The green LED indicator turns off.

3.3.12 Pitch Stabilization

The pitch stabilization is only available in the toolbar when it is defined in the xml file.

The LED indicator will show the status of the pitch stabilization Be aware the status of the LED is an indication related to the last received ping. This means when the sonar does not ping the status of the LED is not updated.

The different colors are:

- Blue – When the Sonar UI is started the pitch stabilization is not yet initialized.
- Grey – The pitch stabilization is initialized but disabled in the Hardware Settings.
- Green – The pitch stabilization is enabled and working.

- Red – Error level – Possible error is : no attitude data received.

The pitch stabilization is enabled, disabled and set up in the Harware pane. See Motion Stabilization on page 52.

3.3.13 Roll Stabilization

Click on the Roll stabilization button Roll stab. to turn the roll stabilization on or off. It is also possible to turn it on or off from the hardware pane. See Motion Stabilization on page 52.

The roll stabilization is only available in the toolbar when it is defined in the xml file.

The LED indicator will show the status of the roll stabilization. Be aware the status of the LED is an indication related to the last received ping. This means when the sonar does not ping the status of the LED is not updated.

The different colors are:

- Blue – When the Sonar UI is started the roll stabilization is not yet initialized.
- Grey – The roll stabilization is turned off.
- Green – The roll stabilization is enabled and working.
- Yellow/Orange – Warning level – The roll stabilization receives a roll value that exceeds ±15°.
- Red – Error level – Possible errors are : no attitude data received, roll value exceeds ±35° or change rate > 10° per second.

3.3.14 1PPS

The LED indicator will indicate if the 1PPS is received or not. Be aware the status of the LED is an indication related to the last received ping. This means when the sonar does not ping the status of the LED is not updated

The different colors are:

- Blue – When the Sonar UI is started the 1PPS is not yet initialized.
- Green – The 1PPS is working.
- Yellow/Orange – Warning level – No 1PPS received for a couple of seconds.
- Red – Error level – No 1PPS received anymore.

3.4 Screen Toolbar and Context Menu

When the cursor is moved to the top left side of each individual screen a toolbar will automatically pop up. The toolbar automatically hides when the cursor is moved away.

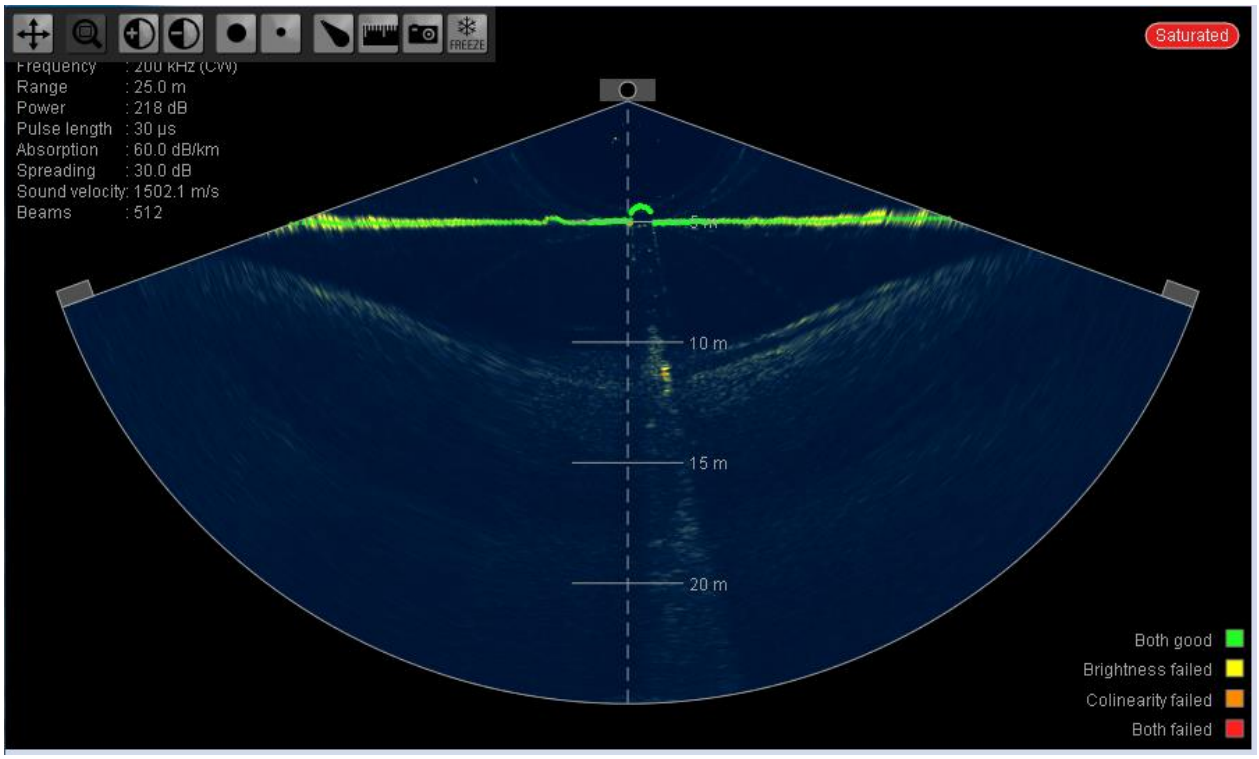


Figure 3-15 Toolbar in one of the views pops up automatically.

The screen toolbar options are also available in a context menu. Right-click the screen to open the context menu. The toolbar and context menu are used to adjust the screen properties. For more details, see the chapter Operation on page 21 .

4 Operation

4.1 Introduction

Depending of the sonar type the Sonar UI opens with a dialog box to specify the transmit cable length.

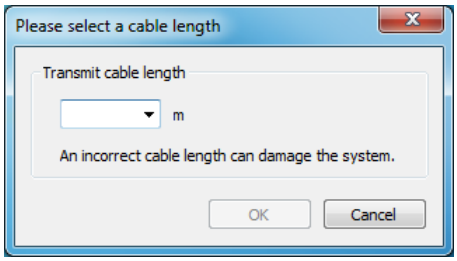


Figure 4-1 Cable length dialog box.

It is essential the correct cable length is specified. A wrong cable length can damage the system!

When the Sonar UI is started, it will open in the Operation mode with four screens or the number of screens that were open when the Sonar UI was closed before.

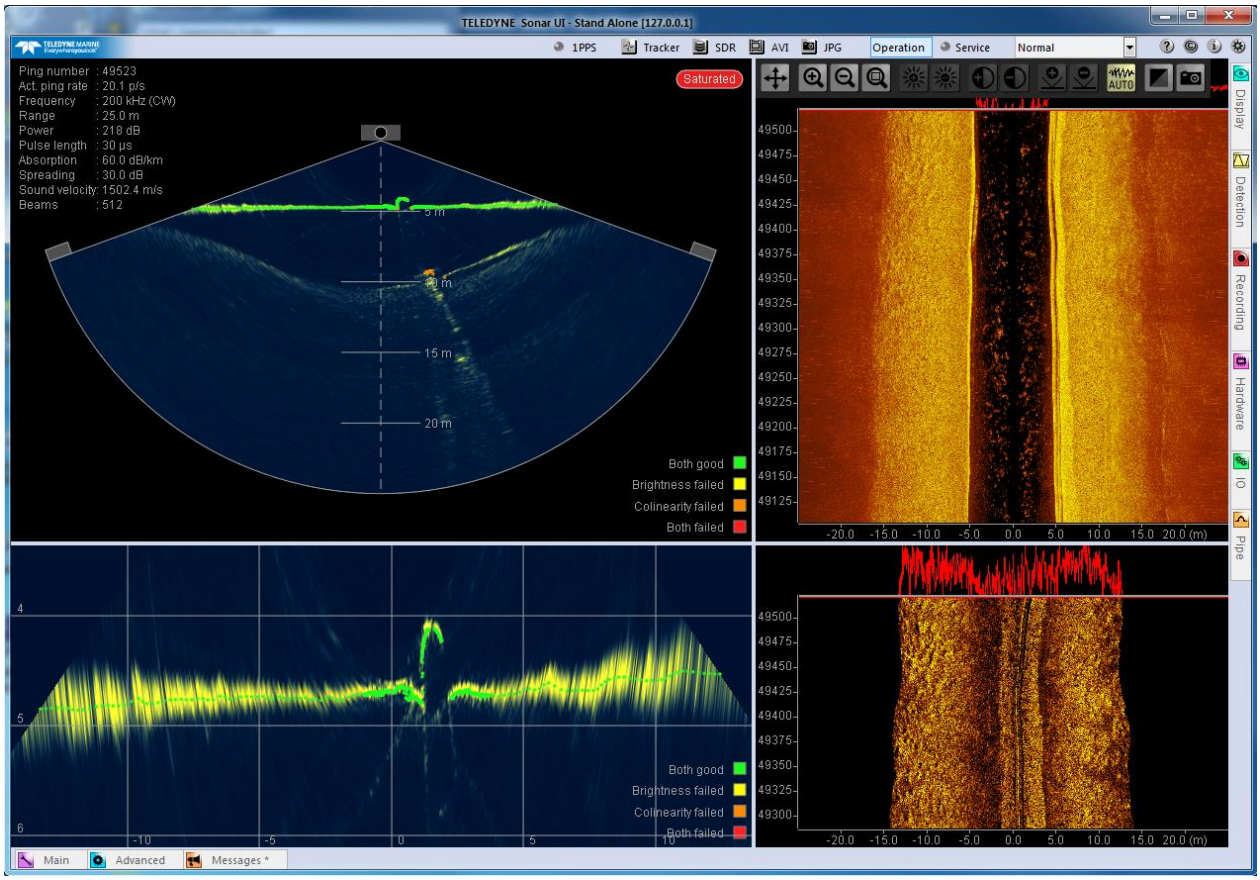


Figure 4-2 Sonar UI with four screens.

In this chapter the different panes and the four screens will be discussed.

The Main and Advanced panes (at the bottom of the Sonar UI) provide sonar control and the various settings panes (at the right side of the SUI) provide options for presenting the sonar data.

The different panes are:

- **Main** (see below)
  With the Main pane the operator controls the sonar and selects what screens to view during operation.
- **Messages** (see page 34)
  The Messages pane displays the error message as they are received in the Sonar UI.
- **Advanced** (see page 27)
  In the Advanced pane the operator can set advanced sonar settings.
- **IO Module** (see page 35)
  In the IO Module the sensor data can be selected and interfaced into the 7K system.
- **Detection** (see page 39)
  In the Detection pane operator sets the Absolute and Adaptive gate settings for the bottom detection process.
- **Display** (see page 45)
  In the Display pane the operator can customize the visual properties of the screens of the Operation.

- **Recording** (see page 48)
  In the Recording pane the operator selects what data is recorded and the recording information is displayed.
- **Hardware** (see page 51)
  In the Hardware pane the operator sets up the roll and/or pitch stabilization and a dual head system (if applicable).
- **Pipe** (see page 60) In the pipe pane the operator can setup the settings for the pipe detection and tracking.

How the tabs can be opened and how the panes can be moved in the application is explained in chapter Arranging the Panes on page 5.

The different screens are:

- **Wedge** (see page 70)
- **Water Column** (see page 74)
- **Detect** (see page 75)
- **Sidescan** (see page 75)
- **Snippets** (see page 76)
- **Helmsman** (see page 77)

4.2 Main

The Main pane is for general control of the sonar. The choice of screens (Wedge, Sidescan/Helmsman, Water Column/Detect and Snippets) allows the operator to customize the display layout in Operation mode.

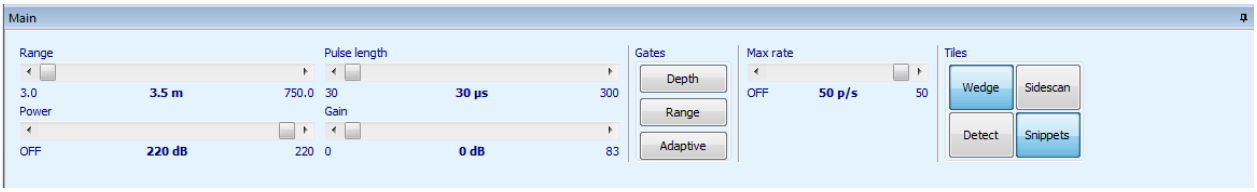


Figure 4-3 Main Pane with Control and Tile settings.

4.2.1 Range

The range setting allows the operator to select how far the Sonar will ‘see’.

Figure 4-4 Range

Select the appropriate range scale to keep the image of the bottom detection at or above the widest part of the sonar wedge

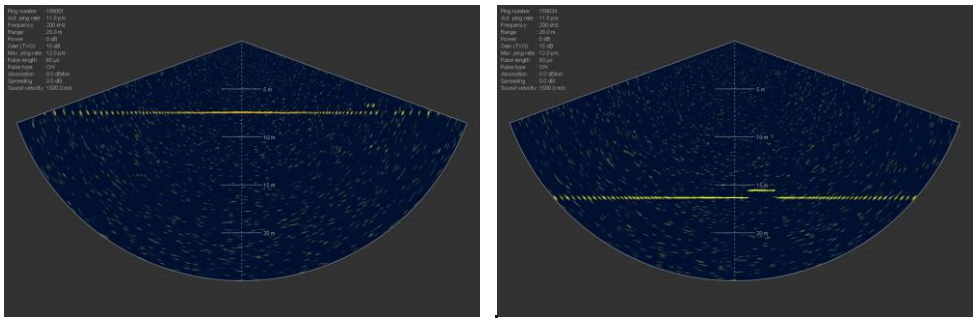


Figure 4-3 Left is a proper range setting and right an incorrect range setting

4.2.2 Power

The power setting allows the operator to increase or decrease the amount of power (acoustic energy) that is transmitted into the water.

Figure 4-5 Power

If the power is set to OFF, the system will not ping, but it will continue to receive data provided that the (ping) rate is not set to 0. The sonar system will act as a passive sonar by only receiving data. This is a feature that is very useful for monitoring the ambient noise and interference from the vessel itself.

4.2.3 Gain

The gain setting allows the operator to select the amount of receiver gain that is applied to the returned sonar signal, in addition to the calculated gain. The gain is applied throughout the range as a fixed gain value.

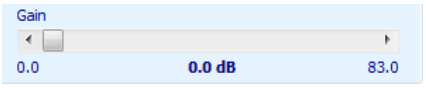


Figure 4-6 Gain

The sonar system utilizes a Time-Varied Gain (TVG) by applying a variable gain to the signal, based upon the formula :

$$\textbf{Receiver Gain} = 2\,\alpha\,R_{km} + Sp \log R_m + G$$

Where:
α = Absorption loss in dB/km
Sp = Spreading loss coefficient
R_{km} = Range in kilometers
R_m = Range in meters
G = Extra gain as set in the Control pane

See Absorption (page 32) and Spreading (page 33) for more information about this formula.

For some sonar systems the gain can be switched to Fixed mode. Fixed mode can be used for very short ranges (<10m). The default mode is TVG.

4.2.4 Pulse Length

The pulse length setting allows the operator to change the pulse length of the transmitted signal.

Figure 4-7 Pulse Length

For a given power setting, a narrower pulse length will provide a higher resolution at a shorter range. A wider pulse length will provide better range but a lower resolution image.

In certain conditions, for example in turbid waters, the narrower pulse length may not operate well. In such circumstances, the wider pulse length may give better short-range performance. This may also be achieved by changing from higher to lower frequency operation.

4.2.5 Gate

The operator is able to enable/disable the required gate mode(s). By default they are disabled. When enabled, the Gate mode button is highlighted.

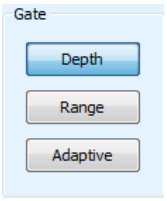


Figure 4-8 Gate modes with Depth gate selected (highlighted)

Settings for the different gate modes are set in the Detection pane. (See page 39)39

4.2.6 (Ping) Max Rate

The max (ping) rate setting allows the operator to set the number of pings per seconds. The actual number of pings depends on the current range setting.

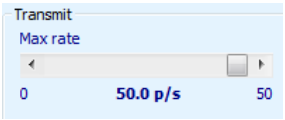


Figure 4-9 (Ping) Max Rate

The recommended value is the maximum rate to ensure that the highest possible ping rate, depending on the range setting, can always be achieved

In some instances it may be beneficial to force a lower ping rate than the normal rate associated with a particular range. Examples of this would be instances when the vessel is moving at a very slow rate, and the operator wants to reduce the quantity of data that is generated; or when the sonar

is operating in a high-reverb environment where echoes of the previous ping are contaminating the current ping.

4.2.7 Tile

In the Tile – Screen box the different screens can be switched on/off. By default all four the screens are on. When a screen is on the button is highlighted.

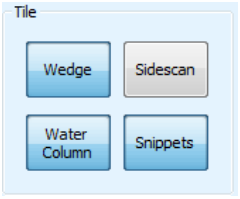


Figure 4-10 Tile with Wedge, Water Column and snippets screen switched on (button highlited) but Sidescan screen off (button greyed)

The Wedge and Water Column/Detect screens are always on the left side of the SUI and the Sidescan/Helsman and Snippets always on the right side. If only one of the two screens on one side is open, then that screen will use the complete left or right side of the view.

The Water Column/Detect button has three functions: switching on the Water Column screen, switching on the Detect screen or switching off both.

The Sidescan/Helsman button has three functions: switching on the Sidescan screen, switching on the Helsman screen or switching both off.

When a screen is disable, no historical data will be logged. This means that a screen will start empty if it is enabled during operation.

The screens can be resized by dragging the horizontal or vertical divider up/down or left/right. To drag the divider move the cursor over the divider and the cursor becomes a double – horizontal or vertical – arrow.

The horizontal divider can be moved up/down separately for the left and the right sides of the Sonar UI. Double-click on the horizontal divider for the left or right side and the other half of the horizontal divider will jump to the same level.

The crossing of the horizontal and vertical dividers can be moved by dragging the crossing dividers. To drag the dividers move the cursor over the crossing and the cursor becomes a cross arrow.

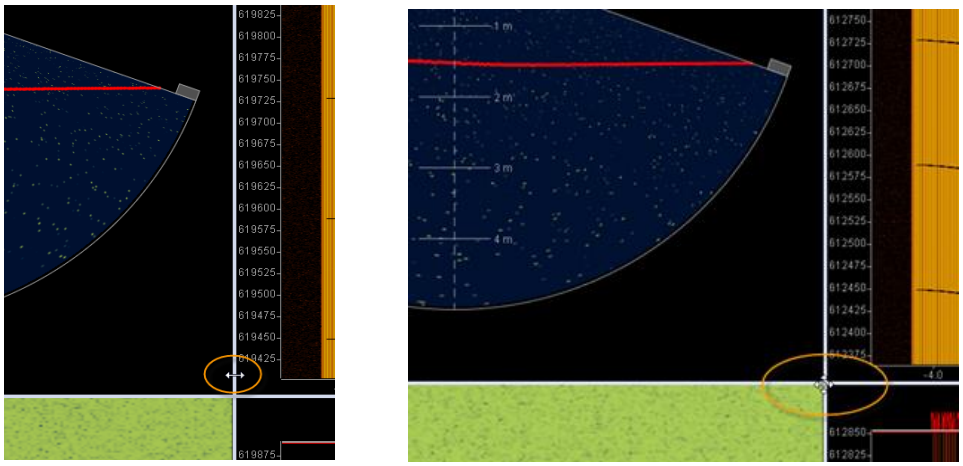


Figure 4-11 Double arrow and cross to resize screens

4.3 Advanced

The Advanced pane is for the advanced settings of sonar transmit and receive functions.

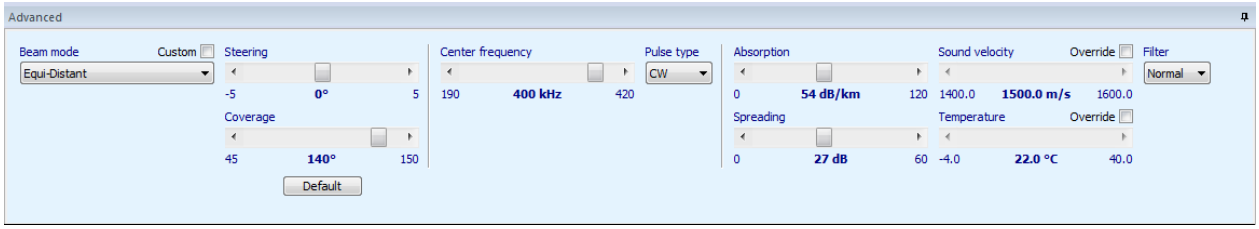


Figure 4-12 Advanced Controls

4.3.1 Beam Mode

Beam modes available depends on the license purchased.

The beam mode can be switched on the fly. For the beam mode the following modes can be selected:

4.3.1.1 Equi-Angle

In equi-Angle mode the spacing between the beams is equiangular. The beam center-center angular spacing is constant across the swath.

In areas of significant relief and in particular when surveying features such as wrecks and vertical structures such as harbor walls, Equi-Angle should be used in preference to Equi-distant (see also section ‘Equi-distant’).

The default for Equi-Angle is the minimum number of beams for 100% ensonification**.**

The number of beams can be set by the operator with the slider. This allows the operator to be able to capture the highest detail using the highest beam density needed. In very shallow water fewer beams can be used to reduce data volumes.

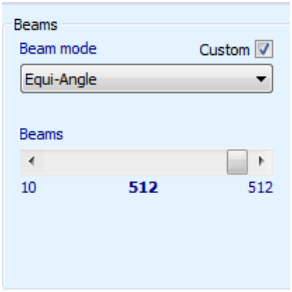


Figure 4-13 Custom checkbox ticked to set the number of beams

4.3.1.2 Intermediate

Intermediate is made for a general purpose survey operations and provides high-density soundings over the entire swath using the maximum number of beams. The number of beams can be set with the slider when the 'Custom' checkbox is ticked.

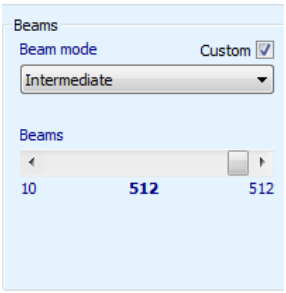


Figure 4-14 Custom checkbox ticked to set the number of beams

4.3.1.3 Equi-Distant

Equi-Distant gives equally spaced soundings across the entire swath using the maximum number of beams.

The spacing between the beams is equidistant. With Equi-Distant the spacing is modified to maintain an equal horizontal distance between soundings on the seafloor assuming a flat bottom.

It is recommended that Equi-Distant be used for general survey applications where the requirement to achieve a specific number of sounding per cell in the across-track is critical, or where the seafloor is generally flat.

In extreme conditions, using Equi-Distant over complex structures can cause magnified artifacts due to the large overlap between beams towards the edge of the sector. When the 'custom' checkbox is selected the number of beams can be set with the slider

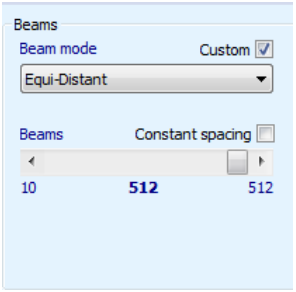


Figure 4-15 Custom checkbox ticked to set the number of beams

The spacing distance between de beams can be set when additional to the custom checkbox the ‘Constant spacing’ checkbox is selected.

When the constant spacing checkbox is enabled the shape of the bottom is followed. With the ‘Maintain swath coverage’ checkbox it is possible to specify what will happen when there are to less beams to maintain the specified spacing. By enabling the ‘Maintain swath coverage’ checkbox the spacing becomes the normal Equi-distant spacing mode. When the ‘Maintain swath coverage’ checkbox is not selected the specified spacing is maintained but the coverage will be reduced when there are to less beams to maintain the spacing.

4.3.1.4 Flexmode

Flexmode gives a combination of a high density of beams on and around the object location and a reduced density of soundings for the rest of the swath.

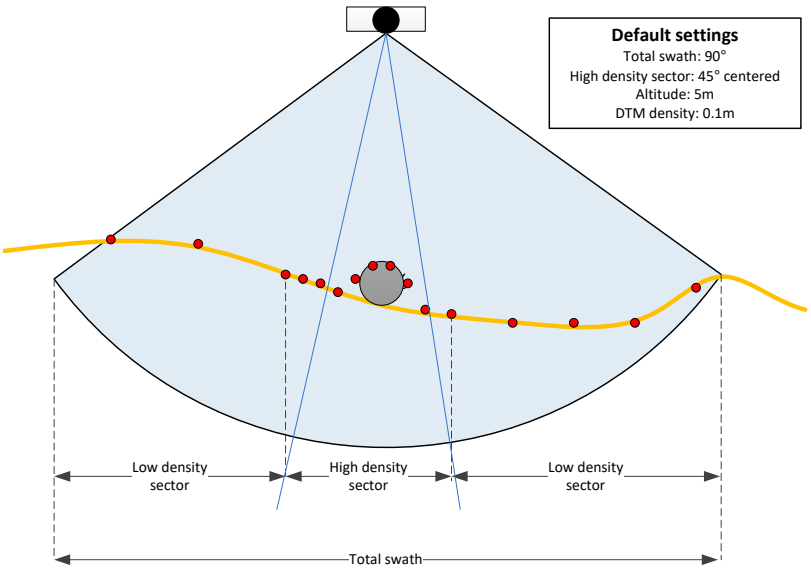


Figure 4-16 Illustration of the flexmode

The low density spacing distance between the beams is defined by the operator by setting the outside spacing with the slide bar (see below)

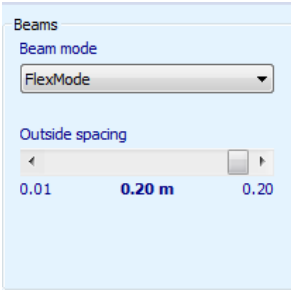


Figure 4-17 Setting the Outside spacing

The high density spacing is set by the slides in the wedge. This slides become visible in the wedge when the Flexmode is selected. Drag the slides and the high density spacing changes.

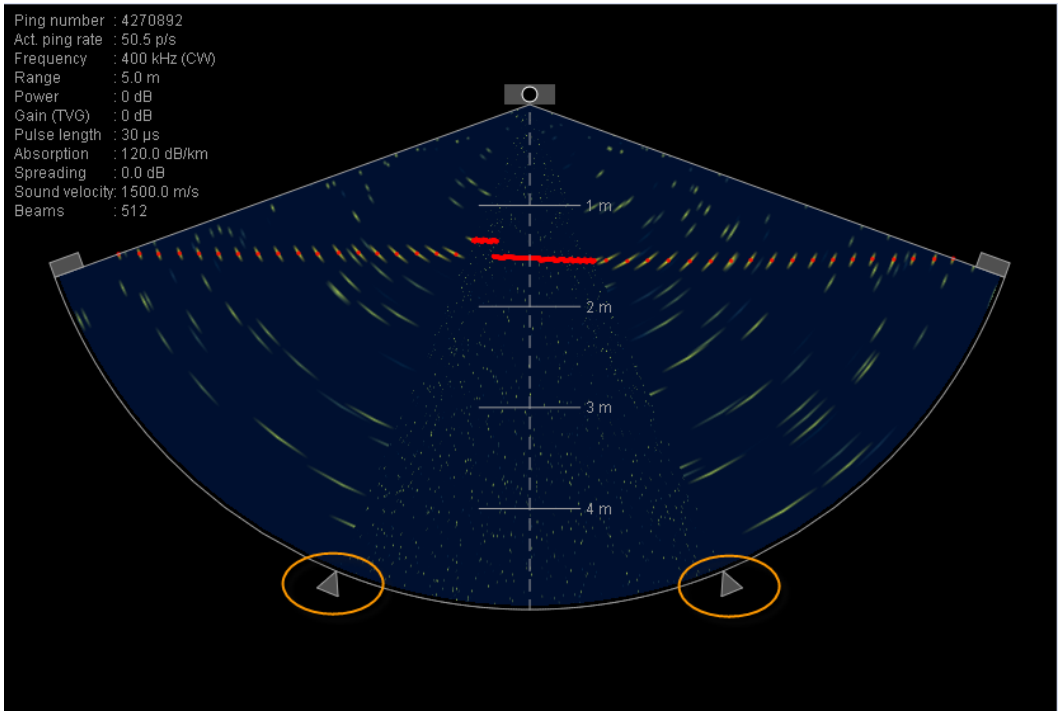


Figure 4-18 Slides in the wedge to change the high density spacing

4.3.2 (Horizontal) Steering

Figure 4-19 Steering

To achieve a correct beam steering in equidistance mode the sonar needs an up-to-date online sound velocity measurement.

The (horizontal) steering setting allows the operator to steer the swath electronically.

The achievable steering depends on the selected coverage angle (see Coverage angle on page 31).

The default button Default resets the steering to 0. (The coverage angle will also reset.)

The extent of the steering is determined by the coverage angle selected. The limitation is that the outer beam cannot be steered past 5° from the

horizontal. When the swath is steered this way, the individual beam widths increase with the steering angle. A beam steered at 60° is twice the width of a beam steered at 0°.

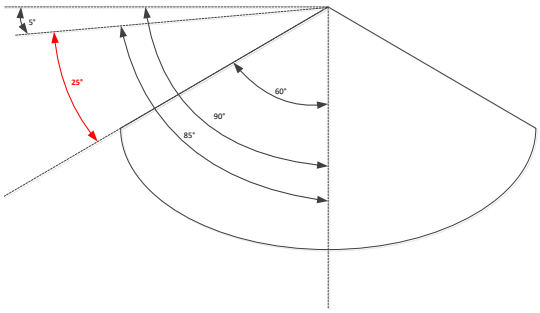


Figure 4-20 With a swath of 120° the maximum steering is ±25° (85°-(120°/2))

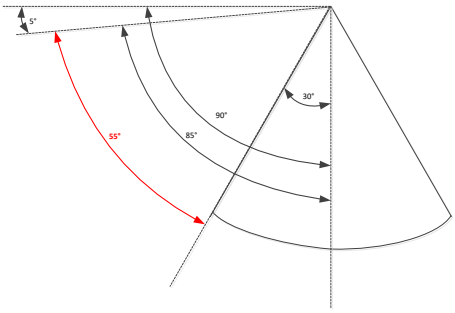
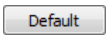


Figure 4-21 With a swath of 60° the maximum steering is ±55° (85°-(60°/2))

4.3.3 Coverage Angle

The (coverage) angle allows the operator to change the swath width.

Figure 4-22 Coverage Angle

The Default button 

resets the coverage angle to the maximum angle depending on the selected beam mode. (The horizontal steering will also be reset.)

4.3.4 Frequency

For a dual-frequency system, the frequency setting allows the operator to switch the frequency on the fly without restarting the 7K Center. All sonar controls will then be dedicated to the selected frequency.

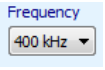


Figure 4-23 Frequency

Lower frequency provide a long-range functionality and the higher frequency a high-resolution functionality with a shorter range.

For the T-Series sonars (T20-P, T20-S etc.) the frequency is controlled by a slider.

Figure 4-24 Frequency slider

4.3.5 Beam width

For some sonar types (e.g. the 7160) it is possible to change the along track width of the beam.

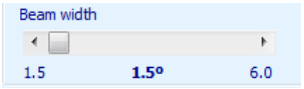


Figure 4-25 Beam Width

4.3.6 Pulse Type

The pulse type setting allows the operator to choose between CW (Continuous Wave) and FM (Frequency Modulation).

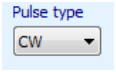


Figure 4-26 Pulse type

The option to choose CW or FM depends on the sonar system type.

The pulse type CW uses a frequency with a continuous wave centered around the selected frequency.

The pulse type FM uses a frequency modulation within a frequency range that is for instance for 200kHz 185-215kHz and for 400kHz 381-411kHz. The system will search for the frequency to use that have the least disturbance.

An echo sounder with a frequency of 210kHz will disturb the sonar signal with a pulse type CW at 200kHz, while the pulse type FM has no or very little disturbance from the echo sounder.

4.3.7 Absorption

The absorption slider allows the operator to set the amount of loss that is expected through the ambient water medium. The absorption loss is proportional with the salinity of the water and the sound frequency: the higher the salinity or frequency, the greater the loss. Also an increased temperature will increase the absorption loss.

If the exact absorption loss value is not known, a value of 110dB/km for salt water and 70dB/km for fresh water is recommended for a 400kHz operation, and a value of 50dB/km for salt water and 20dB/km for fresh water is recommended for a 200kHz operation.

This value is used in conjunction with the spreading loss coefficient (see ‘Spreading’) to compute the TVG (time varied gain) curve that is applied to the returned signal (see Gain on page 24).

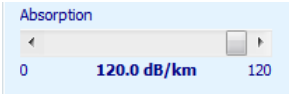


Figure 4-27 Absorption

4.3.8 Spreading

The spreading allows the operator to enter the amount of cylindrical and spherical spreading loss that is expected through the ambient water medium. Spreading of sound through water may be the greatest contributor to the loss of sound. As sound moves away from its source in all directions, the acoustic pressures will decrease with the range.

This value is used in conjunction with the absorption loss value (see above) to compute the TVG (time varied gain) curve that is applied to the returned signal (see Gain on page 24).

In practical situations the transmission loss will lie between 20 and 40dB; in other words, the spreading loss will neither be perfectly spherical nor perfectly cylindrical. Finally, if the sonar operates very close to the seabed or very close to objects in general, near-field effects may yield a transmission loss less than 20dB.

If the exact spreading loss value is not known, an initial value of 30dB is recommended.

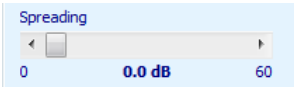


Figure 4-28 Spreading

4.3.9 Sound Velocity

When the override checkbox is checked, the sound velocity slider allows the operator to enter a value for speed of sound in the water.

When a sound velocity sensor is interfaced and the override checkbox is not checked the sound velocity value as displayed will be the value as received from the sensor.

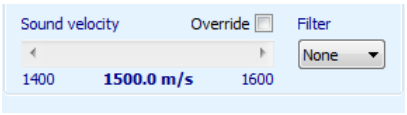


Figure 4-29 Sound velocity with Override checkbox

An online sound velocity must be used for providing up-to-date velocities to ensure optimum performance. A manual velocity may be entered instead but care should be taken to ensure the value entered is representative of the real velocity.

4.3.10 SVP Filter

The sonar used the value from the sound velocity probe to present the data in the wedge. When there are spikes in the data from the sound velocity probe the display of the sonar data will be disturbed. The SVP filter will filter these spikes out of the data. From a light filter (option Light) to normal and a strong filter (option Wizard).

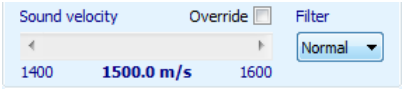


Figure 4-30 Sound velocity with Filter set to Normal

4.3.11 Temperature

This parameter is only available for T50 sonars with the licensed calibrated backscatter feature.

The T50 sonar uses the temperature together with the sound velocity and frequency to calculate a more accurate absorption value. This absorption value is used for the (licensed) calibrated backscatter feature.

Select the override checkbox to use the temperature as set by the slider.

Figure 4-31 Temperature

4.4 Messages

In the Messages pane the operator can see the error messages related to the sensor interfacing.

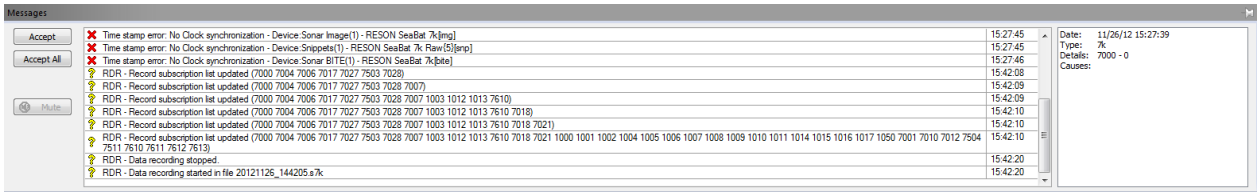


Figure 4-32 Messages

All the error messages will be displayed in the Messages list. By accepting an error message it will be removed from the list. This will not mean that the error is solved, but that only the message is removed.

Select an error message and click on Accept to remove the selected error message from the list. Click on Accept All to remove all error messages.

4.5 Playback

Select in the Playback pane s7k file to play back.

Press the Play button to start the replay.

Control the speed of the playback by pressing the 1x 2x buttons.

The progress of the playback is indicated in the bar.

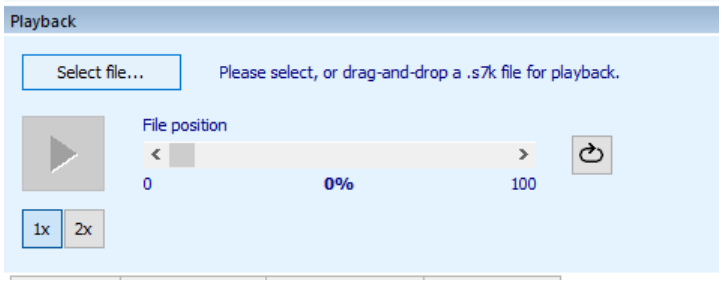


Figure 4-33 Playback

Select from the toolbar the sonar address (see page 16) to connect again with the sonar.

4.6 IO Module

In the IO Module pane the different sensors (such as the sound velocity probe and the external clock) can be interfaced with the IO Module. The data acquired by the IO Module is routed to the Sonar in real time to allow for accurate time stamping and Beamforming.

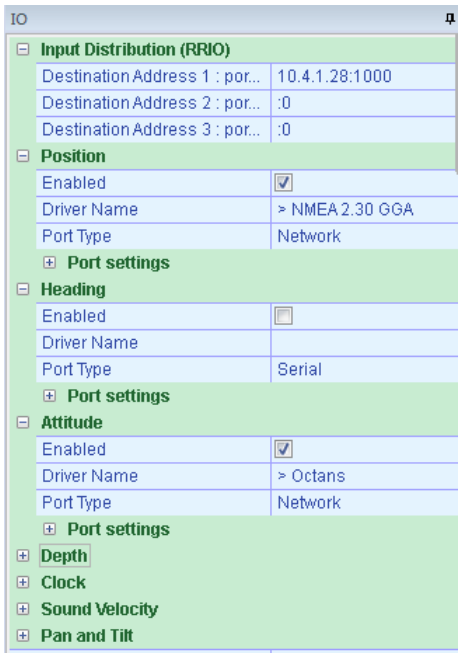


Figure 4-34 IO Module pane

Accuracy of the bathymetric data depends entirely on a valid time sync and sound velocity input from the IO Module. In the absence of time sync, a software time stamp is employed. However, this usually results in poor data quality, as the time stamp is applied AFTER the last sample is received. In the absence of online sound velocity input, the input as set in the Advanced Control (see page 33) is used instead.

If data has to be logged in the S7K file, it is advisable to log the position, heading and attitude as well. This can be done by interfacing these sensors in the IO Module. If Teledyne PDS is used as acquisition system select in Teledyne PDS the 'R7k-IOmodule' driver as output and Teledyne PDS outputs the data to the IO Module. The advantage of using Teledyne PDS is then that the operator doesn't have to select the position, heading and attitude in the IO Module Settings pane, the interfacing is done automatically and is not visible in the IO Module.

To setup or make changes, click in front of the device the ⊞ symbol to make the setup page of the device visible. Click in a field (eg 'Driver Name') to make a drop-down list active. Press the arrow ▼ at the end of the field to make a list displayed. Click on the required field to select the applicable driver or parameter.

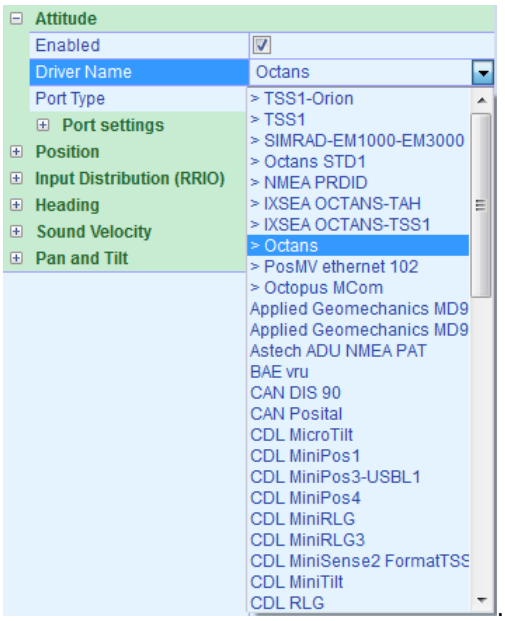


Figure 4-35 Clicked in the 'Driver Name' field of the Attitude device to have the attitude driver list available

In the I/O pane also the Input distribution (RRIO) is listed. This is not a device as the other listed items are. The 'Input distribution (Reson Remote I/O)' can be used when the operator wants to send one of the this different device data to another system, like an acquisition computer,

Enter as Destination Address the IP Address or computer name followed with ':' and a port number; for instance: '10.4.1.28:1000'.

The port number is the base port and offset of the base port, depending of the source of the message. Currently this is for:

- VRU Base port (e.g. 2020)
- Position System. Base port + 2 (e.g. 2022)
- Compass Base. port + 4 (e.g. 2024)
- Sound Velocity. Base port + 6 (e.g. 2026)
- External Clock. Base port + 8 (e.g. 2028)
- Pan and Tilt. Base port + 10 (e.g. 2030)

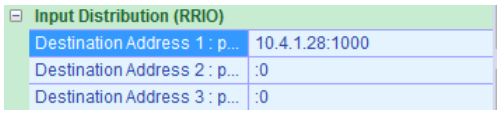


Figure 4-36 Input Distribution

Do not use a port number between 6990 and 7000 as otherwise port conflicts may occur with the 7kCenter.

4.6.1 Sound Velocity

To achieve correct beam steering in equidistant mode, the sonar needs to have an up-to-date online sound velocity measurement from the water in the area of the sonar head. The sound velocity ***must always*** be selected in the IO Module, even if Teledyne PDS or a different acquisition system is used. Set the associated settings for the connected sound velocity device.

4.6.2 Clock

To achieve correct time stamping of transmitted pulses it is necessary to send time to the sonar processor. The Sonar uses the GPS PPS system to achieve this. From the GPS receiver, the Sonar needs the TTL 1PPS pulse and the qualifying time message (normally ZDA). The clock synchronization must always be entered in the IO Module.

If the 1PPS is not detected during the sonar operation, the led indicator in the toolbar changes from green to yellow/orange to red and in the Service page in the Status tab the error is displayed. Set the associated settings for the connected external clock device.

4.6.3 Attitude

Select the associated settings for the attitude sensor when connected to the Sonar Processor.

Use the Hardware Pane (see Hardware on page 51) to setup the attitude sensor used for the motion stabilization of the sonar.

4.6.4 Depth

Select the associated settings for the depth sensor when connected to the Sonar processor.

4.6.5 Position

Select the associated settings for the GPS position sensor when connected to the Sonar processor.

4.6.6 Heading

Select the associated settings for the heading sensor when connected to the Sonar processor

4.6.7 Pan and Tilt

Select the associated settings for the Pan and tilt sensor when connected to the Sonar Processor.

Pan and tilt is used when the mounting angles of the sonar can be changed mechanically These angles can be interfaced to the Sonar.

4.7 Detection

In the Detection pane the parameters for the gates enabled/disabled in the Main pane (see Main pane on page 23) are defined.

The gate modes are:

- Depth gate
- Range gate
- Adaptive gate

Other parameters can be defined for the

- Tracker
- Coverage angle
- Snippets
- And Multi-detect mode

Figure 4-37 Detection pane

The minimum difference between the minimum and maximum gate value is defined on 2m. When one of the gate values is set closer than 2m from the other gate value, the other gate value will change to get a difference of 2m again. This is also valid when one of the gate values is dragged in the Wedge screen. (See Figure 4-40)

4.7.1 Depth Gate

The depth gate will use the minimum and maximum depth values as entered. Only the bottom returns which are within these depth limits will be used in the bottom detection process. Additional a depth gate tilt value can be set

Depth gate	
Min depth [m]	1.0
Max depth [m]	3.3
Depth gate tilt [°]	0

Figure 4-38 Depth gate

The minimum and maximum gate values can also manually be moved in the Wedge screen by dragging them with the mouse.

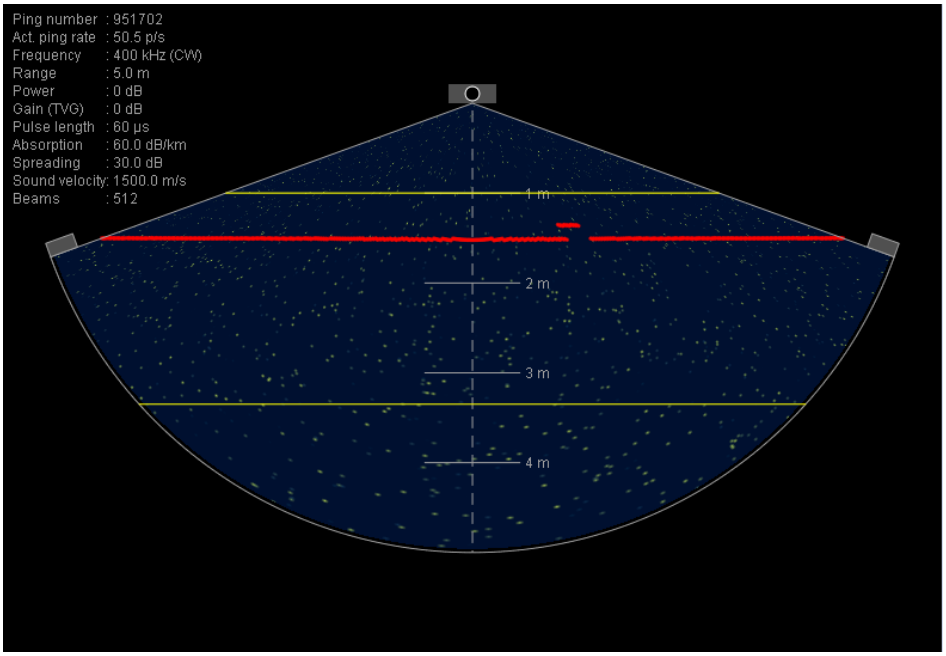


Figure 4-39 Wedge with depth gates displayed.

When the maximum depth gate is out of range of the wedge and therefore not displayed it is most easy to move the pointer at the outer nadir range of the wedge, click (pointer becomes a double arrow) and drag it inside the wedge. On this way the maximum depth gate is moved inside the range of the wedge as illustrated in Figure 4-40.

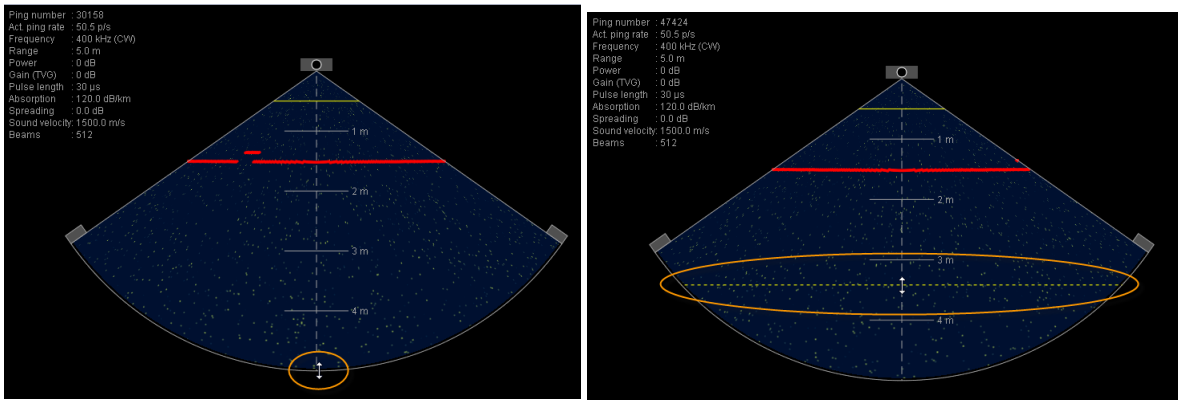


Figure 4-40 Wedge with maximum depth gate not displayed. Pointer moved to Nadir outer range of wedge and maximum depth gate dragged back into the wedge.

In case a maximum gate is dragged outside of the wedge range the gate will get the maximum value (for the depth gate 400m).

Use of a motion sensor is required to rotate the depth gates with the rolling motion of the vessel to ensure soundings are not clipped as the seabed rotates with respect to the sonar.

The depth gate tilt can be used when the seafloor is tilting. Click on the value and use the slider to rotate the depth gate to match with the tilt of the seafloor. It is also possible to right click on the depth gate and moving the mouse to rotate the depth gate.

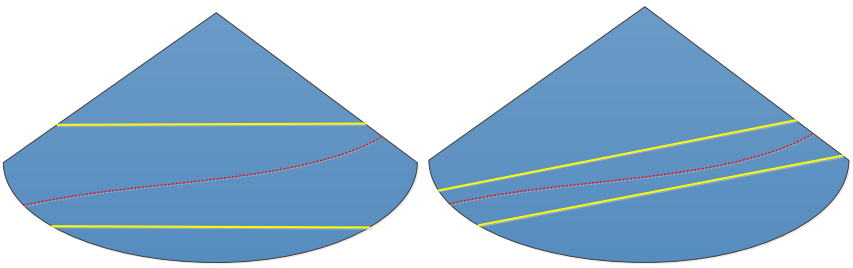


Figure 4-41 Depth gate with a depth gate tilt of 0° (left) and 15° (right)

4.7.2 Range Gate

Range gate	
Min range [m]	1.0
Max range [m]	5.0

Figure 4-42 Range Gate

The range gate will use the minimum and maximum range values as entered. Only the bottom returns which are within these limits will be used in the bottom detection process.

The minimum and maximum gate values can also manually be moved in the Wedge screen by dragging them with the mouse as the depth gate. (See Depth Gate)

4.7.3 Adaptive Gate

Adaptive gate	
Min search depth [m]	3.0
Max search depth [m]	6.5
Follow seafloor	☑
Window size [5-100%]	25

Figure 4-43 Adaptive gate parameters

The adaptive gate will use the minimum and maximum nadir depth values as entered. It will search for the strongest bottom return from the nadir beam based on the window size.

When the Follow seafloor checkbox is ticked and the minimum or maximum nadir depth values approach the nadir search limits, the nadir search gate will automatically center the nadir search on the detected seafloor

The nadir search limits can manually be moved in the Wedge screen by dragging them with the mouse.

The window size is used to define the gate limits around the detected seafloor. The distance between the limits and the detected seafloor is the percentage of the detected bottom depth value. The percentage is the value as entered as window size. Increasing the window size will make

the search area bigger so the chance of noise increases. Decreasing the window size with a non-flat seabed will result in a degraded performance.

4.7.4 Tracker

The Tracker function is enabled or disabled in the Sonar UI toolbar. (See page 12)

Figure 4-44 Tracker

With the tracker the sonar can set based on the quality of the collected data automatically the:

- Range
- Power, gain and absorption
- Pulse length
- Coverage Angle

By selecting the associated checkboxes it is defined which setting(s) is set by the tracker.

4.7.4.1 Coverage angle

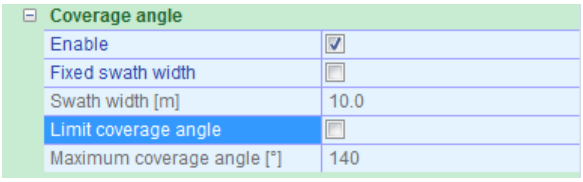


Figure 4-45 Coverage angle

Select the Coverage angle Enable checkbox to set the coverage angle of the sonar automatically by the tracker.

Select the 'fixed swath width' checkbox, to maintain the swath width as specified in the Swath width field independent if the depth or other circumstances changes.

Select the 'Limit coverage angle' checkbox to limit the coverage angle to the specified maximum.

4.7.5 Snippets

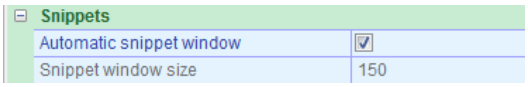


Figure 4-46 Snippets

The snippets window is the number of samples on each site of the bottom detection point. By default the snippet window is set to automatic. Uncheck the checkbox and a number of samples could be set manually (Minimum of 10 and maximum of 300).

4.7.6 Multi-detect

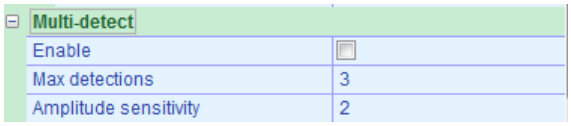


Figure 4-47 Multi-detect

The Multi-detect is an algorithm for real time detection of objects in the water column as well as the seafloor beneath.

More details from complex targets and improved data in a multipath environment (like a quay wall) could be achieved.

For this algorithm three parameters are defined:

- Max detections per beam. (minimum 1 – maximum 5)
- Amplitude sensitivity. When increasing this value causes more objects be detected.

4.7.7 Vernier Parameters

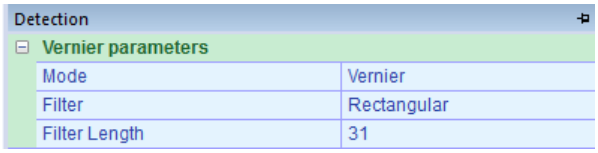


Figure 4-48 Vernier parameters

Vernier parameters are only available from the detection pane when a multi-ping forward looking sonar system (e.g. 7130) is used.

Three parameters are set:

- Mode:
  -Vernier
  -Triple array Mag & Phase

  The mode settings allow the operator to switch between forward-looking bathymetry (normal mode) and imagery when operating the 7130 at 200kHz. The imagery mode can be useful for object analysis based on acoustic shadow for example.
- Filter:
  -None
  -Rectangular
  -Hamming

  The filter settings lets the operator choose whether a FIR (Finite Impulse Response) low-pass filter is applied to the raw signal prior to elevation computation by Vernier processing. For bathymetry, a typical setting would be a rectangular filter of 19 taps. The longer the filter the smoother the output. For target detection, a short filter or no filter is the preferred setting. The Hanning filter favors the samples close to the center of the filter window. For a given length it will have less effect than a rectangular filter.

- Filter length

The filter length from 1 (no filter) to 63 (longest filter that can be implemented) determine the degree of smoothing performed on the raw data.

4.8 Display

In the Display pane the operator can customize the visual properties for the four screens in the Operation.

Only the selected screen(s) as set in the main pane are displayed in the display pane.

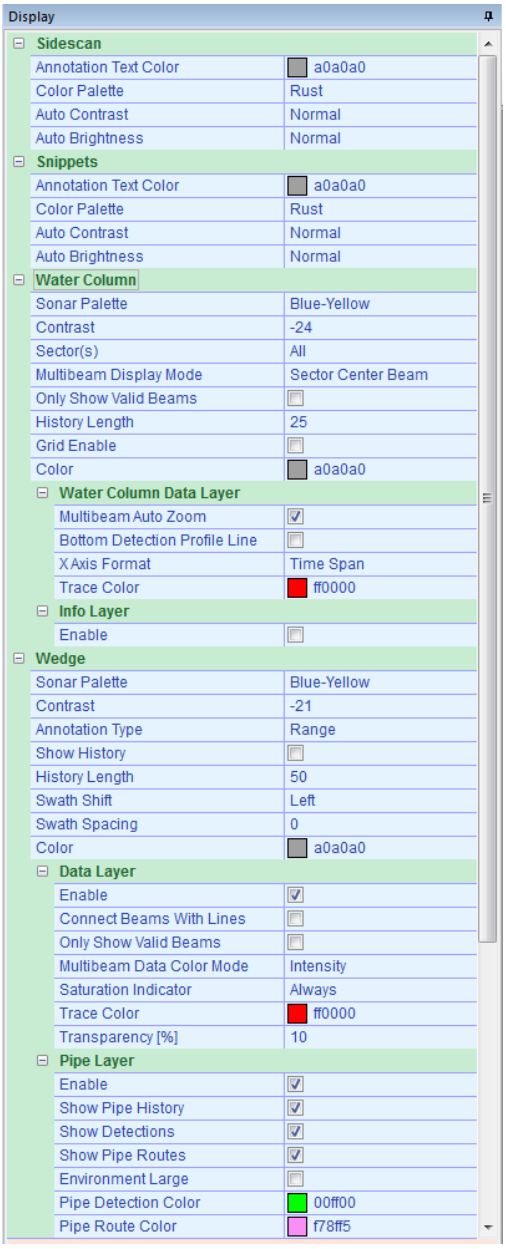


Figure 4-49 Display pane

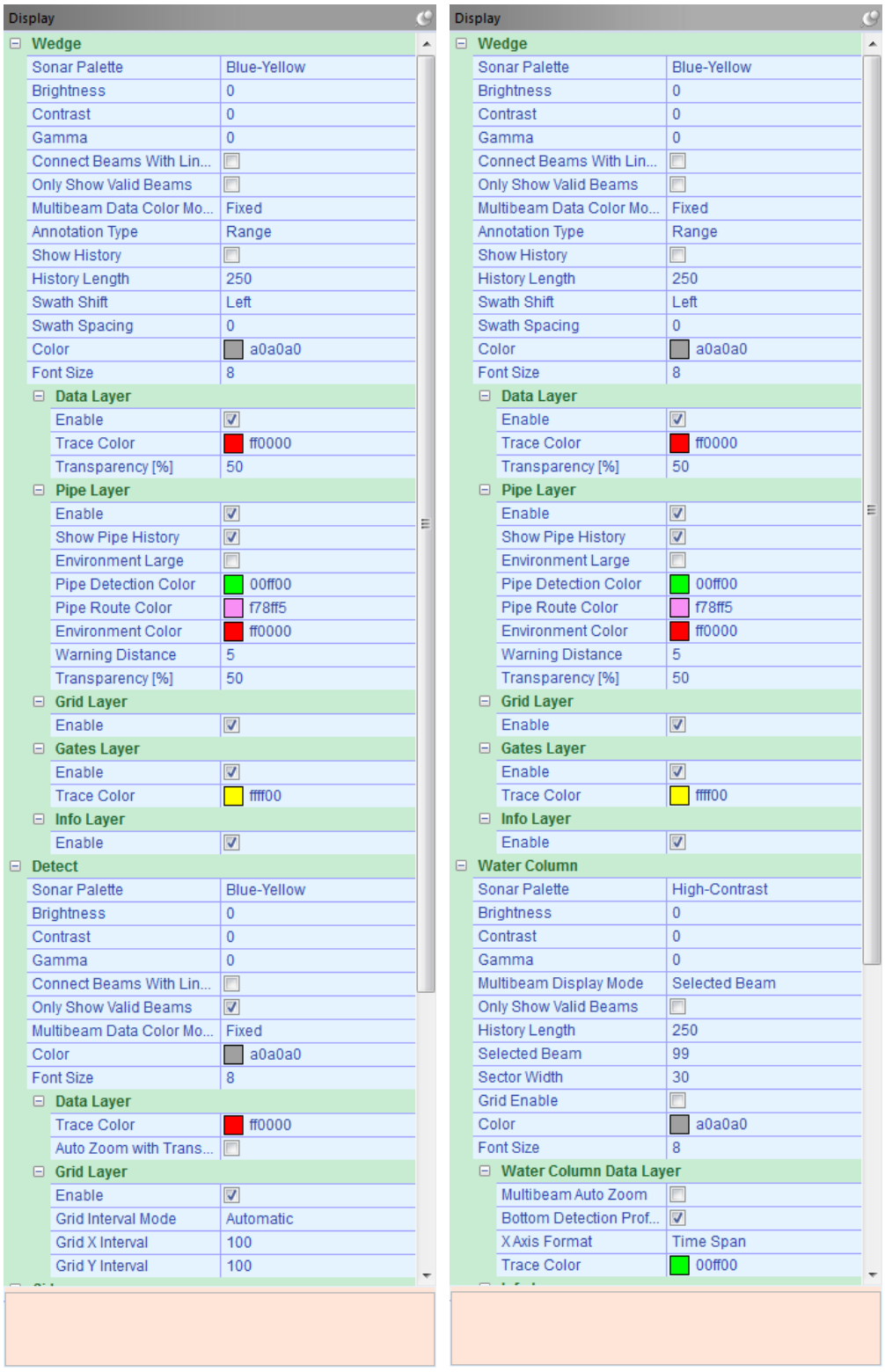


Figure 4-50 Display pane with Detect and Water Column settings

The Display pane contains settings for each screen. For the Wedge, Water Column and Detect screen most of the settings are also available in the context menus (see also Screens on page 65).

The Wedge, Water Column and Detect screen have in addition to the general settings several “layer” settings with various features which can

be displayed in the screen. Each of these layers can be switched on/off and have their own settings for color and font size.

For the Wedge screen it is possible to set the multibeam data color mode of the data layer to:

- Fixed
- Quality
- Detection Process
- Uncertainty
- Intensity
- Multi-Detect

The data colors of these modes are pre-defined and indicated in the wedge right lower corner.

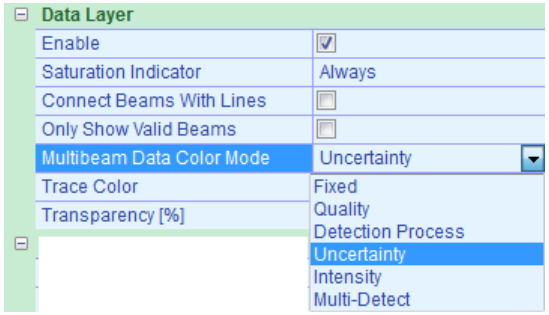


Figure 4-51 Multibeam Data Color Mode

The Active Sonar Targets Layer is only available if a forward looker sonar is connected to the SUI.

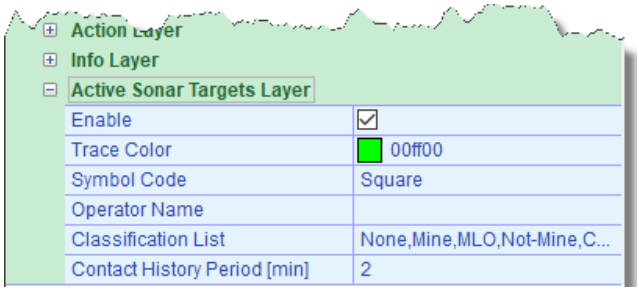


Figure 4-52 Active Sonar Targets Layer

In the Active Sonar Targets layer the user can set the trace color of the contact, the symbol of the contact, the name of the operator, and the classification.

The classification is a comma separated field. The user can add a classification. The default classification list is loaded when all classifications in the field are deleted.

A 7k 3001 record is sent from the 7kCenter and recorded in the 7k log file (.s7k) if a contact is created. The specified operator name and classification is included in the 3001 record and s7k log file.

See for more information about creating contacts chapter Sonar Contacts on page 72.

The Contact History period is the time the contacts will vanish if there is no navigation received in the 7k IO. Otherwise all the contacts remain visible in the Wedge since the contacts do not move with the vessel movement.

4.9 Recording

In the Recording pane the operator set the raw data recording, image and movie recording parameters.

Click on the appropriate button in the SUI toolbar to start raw data recording, start AVI screen recording, or to save a snapshot. (See also Sonar UI toolbar on page 12)

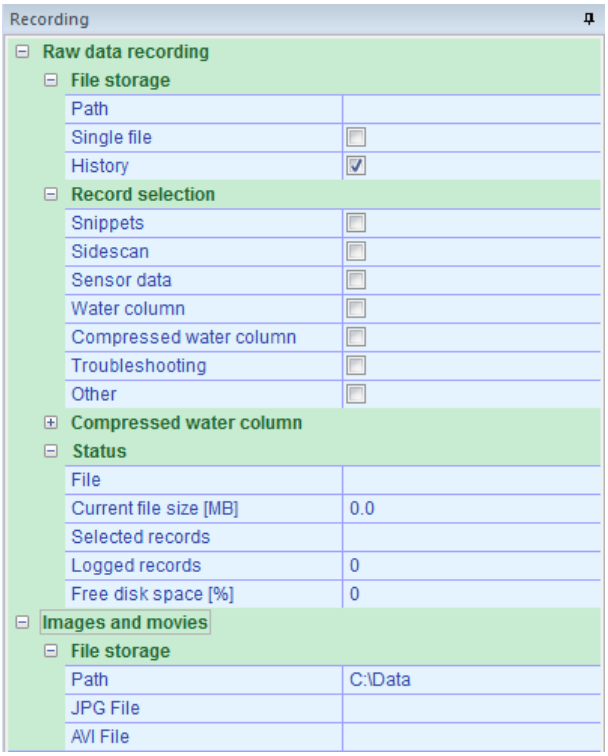


Figure 4-53 Recording pane

4.9.1 Raw Data Recording

In the raw data recording folder the operator selects what data to record and specify the parameters for the raw data recording.

4.9.1.1 File storage

When the Single file check box is enabled, a single log file is created. Otherwise the log file will be broken up into smaller parts.

When the History check box is enabled, each file will start with data from the buffered history (currently 10 seconds of data, defined by the XML file).

Click on 'Path' (it becomes blue), and then on '…' See Figure 4-54 to open a folder dialog box. Browse to the folder where the data are to be saved.

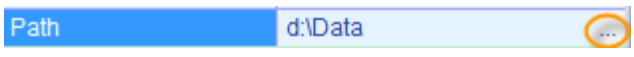


Figure 4-54 Set path for the file.

When starting a recording the filename will be displayed. The file name has the format ‘yyyymmdd_hhmmss.xxx’; with xxx is s7k.

Refer to Appendix ‘Raw Data Recording’ on page 95 for a full description of how to setup RDR properly for different schemes.

4.9.1.2 Record Selection

Figure 4-55 Record selection

Next to the standard data records additional data records can be recorded.

Standard data records are always included in the recording:

- 7000 – Ping settings
- 7002 – Match filter
- 7004 – Beam geometry
- 7021 – BITE Data
- 7027 – Bathymetry (RAW)
- 7503 – Sonar settings
- 7504 – Common system settings

The Hydrosweep sonar system includes in the recording additionally:

- 7014 – Adaptive gate settings
- 7047 – Segmented raw detection data

Operator selectable records are: (Select the associated check boxes.)

Snippets:

- 7028 – Snippets data

Side scan:

- 7007 – Backscatter data

Sensor data (motion, position, heading, etc.):

- 1003 – Position
- 1012 – Attitude (Roll, Pitch and Heave)
- 1013 – Heading
- 7610 – Sound Velocity

Watercolumn (includes sensor data):

- 7018 – Full Magnitude & Phase data

Compressed water column:

- 7042 – Compressed water column data

Other:

- All other available records.
  When the checkbox is ticked the record numbers will be displayed at the bottom of the pane in the info box.

The sensor data can only be recorded when these sensors are interfaced with the sonar system. This can be done in the IO Module. An alternative is that the position, attitude and heading are send by Teledyne PDS to the IO Module. Then only the external clock with 1PPS and the sound velocity has to be interface in the IO Module.

4.9.1.3 Compressed Water Column

It is possible to reduce the amount of recorded Water Column Data.by enabling the filter(s):

- Remove phase Data
- Compress to 8 bits
- Remove beyond detection point

Furthermore it is possible to reduce the record data size by selecting a downsampling type and a corresponding downsampling factor.

Downsampling" means that only 1 of N mag/phase samples are kept. Where 'N' is the "downsampling factor" value. The "downsampling type" controls how that 1 value is determined.

It is possible to select three types of downsampling:

1 Middle of window:
The 1 sample value kept is the middle one in each "window" (e.g. if N = 5, then sample 3, 8, 13, 18, …are kept).

2 Peak:
The 1 sample value kept is the largest of each "window" of N samples.

3 Average:
The 1 sample value kept is the average of all N samples in each "window".

For example, if the "Remove phase data" option and the Downsampling option (with factor 5) are selected, then the resulting compressed watercolumn record will be 1/2 * 1/5 = 1/10 the size of corresponding 7018 mag+phase watercolumn record.

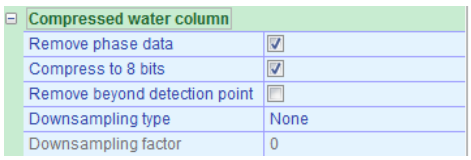


Figure 4-56 Compressed Water Column

4.9.1.4 Status

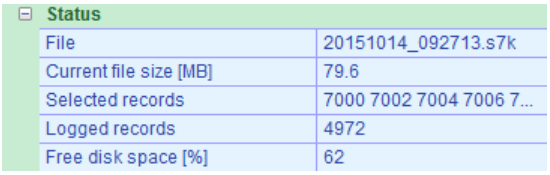


Figure 4-57 Status raw data recording

The Status box lists the status of the Raw Data Recording with the current file name, size of the recording file, records logged, the number of records that are added to the recording file, and the percentage of free disk space.

With increased range and/or ping rates, the recording files will become quickly very large. It is best to monitor the file sizes and ensure that 10% of the disk space is always left available for system operation. Therefore it is advisable to record the data on a separate hard disk and not on C:\.

4.9.2 Images and Movies

In the Images and movies folder the folder is set where the snapshot or AVI screen recording are saved.

Refer to raw data recording file storage on page 48 with a description how to set a folder path.

When starting a recording the file name will be displayed. For all recording options the file name has the format 'yyyymmdd_hhmmss.xxx'. The format is avi for the screen recording, and jpg for the snapshot.

4.10 Hardware

In the Hardware the operator can setup the following:

- Deck Mode
- Motion Stabilization (see page 52)
- PPS Configuration (see page 53)
- Trigger Configuration (see page 54)
- Ping Settings (see page 54)
- Bracket (see page 57)
- Normalization details (see page 58)
- Dual Head (see page 55)

4.10.1 Deck Mode

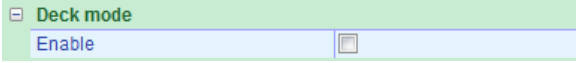


Figure 4-58 Deck mode

Currently only the RESON T20-S has the Deck mode option.

Selecting deck mode will disable the electronics to avoid the electronics will overheat while the data files are transferred from the system.

4.10.2 Motion Stabilization

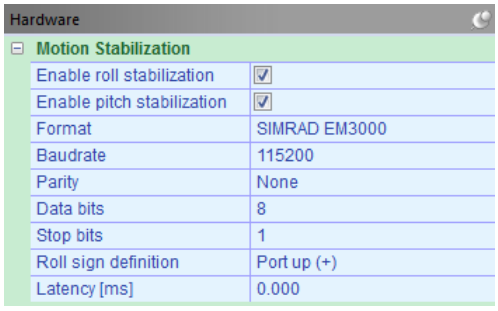


Figure 4-59 Hardware part for the Motion Stabilization

The roll and pitch stabilization is only available when it is defined in the xml file of the sonar. It is possible that only the roll or pitch stabilization is available in the hardware settings. This depends on the type of the sonar.

It is recommended that the motion sensor data update rate is at least 50Hz and preferably 100Hz. Baud rate and protocol details can be set in the Motion Stabilization, but it should be ensured that the baud rate is sufficient to allow the desired update rate. The motion sensor data for the motion stabilization is read directly from the FPGA, so no port has to be selected.

4.10.2.1 Roll Stabilization

Roll stabilization is an important feature related directly to system efficiency which allows the swath width on the seafloor to be maximized, thus increasing line spacing and reducing vessel time.

Under zero roll conditions, the swath is vertical and the center of the swath is directly below the vessel.

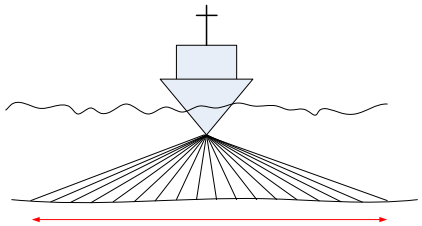


Figure 4-60 Swath under zero roll conditions

When the vessel rolls the swath is rotated and the projected swath on the seafloor is laterally displaced.

Figure 4-61 Laterally displaced swaths under roll conditions

This has the effect of reducing the usable swath width due to the distortions on the edge.

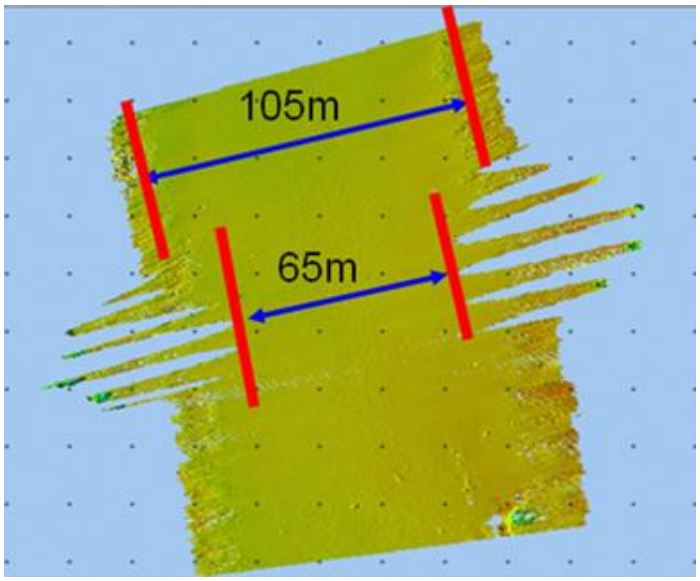


Figure 4-62 Reduced usable swath width

With the input from a motion sensor (and roll stabilization enabled) to steer each receive beam dynamically for every sample, the swath stays vertical irrespective of vessel motion thereby maximizing swath.

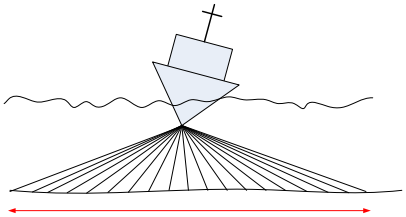


Figure 4-63 Swath under roll stabilization

4.10.2.2 Pitch Stabilization

Pitch stabilization is a feature which allows the swaths to look vertical when the vessel is pitching.

Under zero pitch conditions, the swath is vertical and directly below the vessel. With a pitch the swath is moved forwards/backward relative to the vertical. It is possible that the swath projection on the seafloor is not in order anymore.

To solve this problem the transmitted beam can be dynamically steered so the swath stays vertical.

It depends on the type of sonar if the pitch stabilization is available.

4.10.3 PPS Configuration

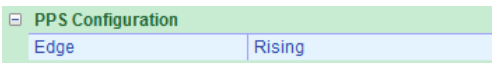


Figure 4-64 Hardware part for the PPS Configuration

By default the Sonar system accepts positively polarized (Rising edge) 1PPS pulses to perform accurate time stamping.

Select Falling when a negative polarized 1PPS is used.

4.10.4 Trigger Configuration

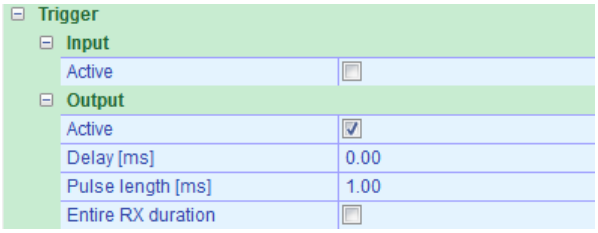


Figure 4-65 Hardware part for the Trigger Configuration

The Trigger Configuration allows the operator to control the pulse length and delay characteristics.

When the trigger input is enabled (Active) the ping will occur upon receipt of the input trigger pulse. If the trigger pulse rate exceeds the sonar's actual maximum ping rate for that range setting, some trigger input pulses may be dropped.
When the trigger input is disabled the sonar will return to ping at the rate dictated by the settings in the main and advanced Control pane.

By default the trigger output is enable (Active). This means that a pulse will be generated in conjunction with the sonar ping.

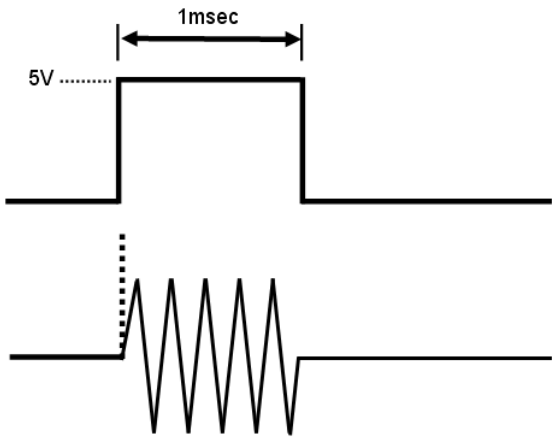


Figure 4-66 Example of trigger output with Delay = 0 and Pulse length = 1

The Delay allows the operator to specify how many milliseconds after the sonar ping the output pulse will be sent.

The Pulse length allows the operator to change the pulse length of the transmitted output signal.

When the checkbox 'Entire RX duration' is checked the trigger out is enabled for the entire RX duration.

4.10.5 Advanced Settings

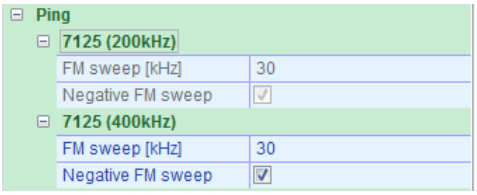


Figure 4-67 Hardware part for the Ping Settings

The Advanced Settings will give the sweep frequency for the pulse type FM.

Settings can only be changed when the pulse type FM is selected in the advanced pane.

4.10.6 Dual Head

There are two dual head configurations distinguished:

- Dual head configuration by using two sonar systems in a master / slave setup.
- Integrated dual head system.

4.10.6.1 Dual head using two sonar systems (Master – Slave)

See Appendix ‘Dual head’ on page 89 for a description of the dual head configuration in the SUI by using two sonar systems.

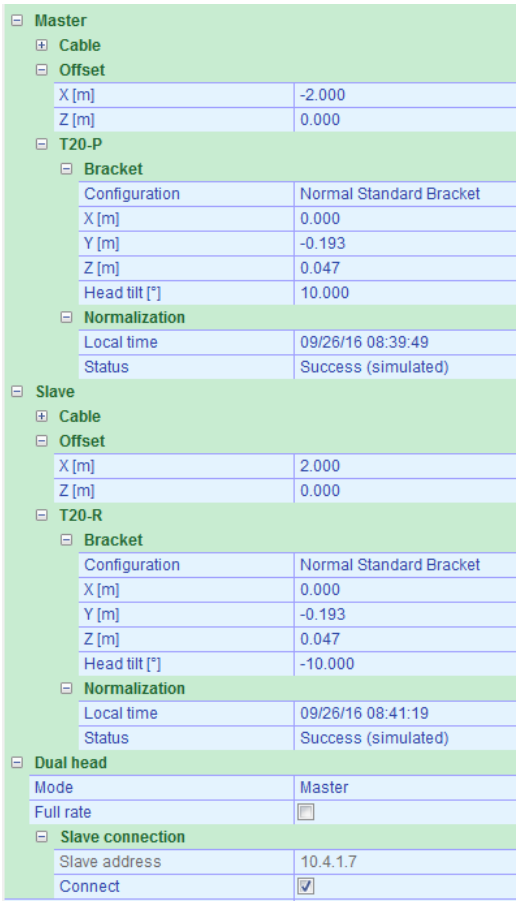


Figure 4-68 Hardware pane with dual head (Master-Slave)

In this configuration two sonar systems are used to increase the coverage. One is designated ‘Master’ and the other ‘Slave’.

The master processor dictates when the slave sonar will cycle. Most of the sonar settings from the ‘Master’ are mirrored on the ‘Slave’. This is achieved through a network connection. (See Appendix ‘Dual head’ on page 89)

Select for the ‘Slave address’ an IP number which is in range with one of the local area connections. Make a network connection between the two ports and tick the ‘Connect’ checkbox to establish a connection with the slave.

Figure 4-69 Connect checkbox ticked

The 7K system which enables the connection becomes the ‘Master’ and the other system automatically becomes the ‘Slave’.

When the system is in ‘Slave’ mode then the Tracker button is disabled.

The master and slave X, Z offset must be entered with respect to the vessel reference point.

In normal mode the heads ping in turn (ping-pong mode). The maximum ping rate is half of a single head system.

Optionally the heads can ping simultaneously at a high ping rate. This is the Full Rate Dual Head mode (FRDH). In FRDH mode the ‘Master’ system trigger the ‘Slave’ system. For this purpose a trigger cable is connected between both systems. This cable is connected between the Master system Trigger Out port and the Slave system Trigger In port.

It is possible to run 2 Sonar UI’s on the same (‘Master’) system. The second Sonar UI that is started will be automatically the Sonar UI for the ‘Slave’. In the second Sonar UI the ‘Slave’ system can be controlled (accept the Range and Max Rate) and the IO Module for the ‘Slave’ system can be setup or modified. The 7KCentre should run on the ‘Slave’ before data becomes visible in the second Sonar UI.

When the SUI runs on the ‘Master’ system then both sonar wedges (master and slave) can be monitored in the Wedge screen (see page 70).

4.10.6.2 Integrated Dual head

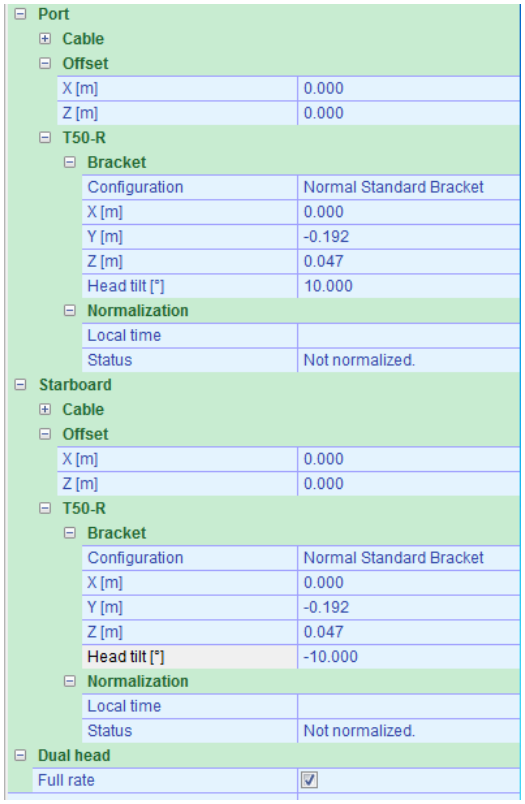


Figure 4-70 Integrated dual head properties from Harware pane

For an integrated dual head system are two sonar heads connected to a single sonar processor.

The port and starboard X, Z offset must be entered with respect to the vessel reference point.

In normal mode the heads ping in turn (ping-pong mode). The maximum ping rate is half of a single head system.

Optionally the heads can ping simultaneously at full rate. This is the Full Rate Dual Head mode (FRDH.

4.10.7 Bracket

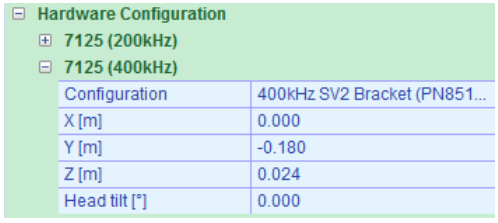


Figure 4-71 Hardware Configuration for the active frequency

The Bracket Configuration controls the one-time transmit array and projector offset settings. These settings should be set to reflect the initial installation of the system and should not require a modification unless the physical installation changes.

Select for the active frequency the right configuration.

The configuration is selected by a drop down-list after clicking in the configuration field.

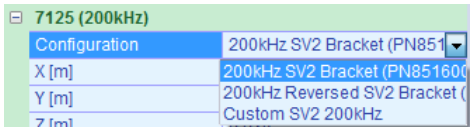


Figure 4-72 Bracket configuration drop-down list

Only for the custom configuration the operator can set the X, Y and Z offsets.

When using the reversed bracket then the beams are reverted therby normalizing the image and the generated data output again.

See also the Sonar Operate Manual for more bracket details.

A wrong bracket configuration may adversely affect data quality.

4.10.8 Normalization

Figure 4-73 Normalization Details for the active frequency

The normalization process starts automatically on initial power up of the system, but may also be initiated at any time by the operator.

The channel normalization feature provides a method for correcting the output of each analogue receiver channel for minor variations in amplitude and phase prior to input to the beamformer to improve data quality. This is achieved by injecting a highly stable calibration tone into each analogue receiver channel and comparing the output of each channel to the average values for all the channels. This produces a much ‘cleaner’ input to the beamformer thereby reducing side lobes and improving performance.

The data output is suspended while the normalization process is running (yellow light indicator). In certain conditions the normalization may fail due to excessive noise or out-of-tolerance channels.

Only for the active frequency the normalization can be started by clicking the Sonar UI toolbar Normalization ribbon button. The time and the status of the normalization is displayed. During the normalization the led indicator in the Sonar UI toolbar will turn yellow, when the normalization is finished and the process was successful the led indicator becomes green again.

4.10.9 AUV

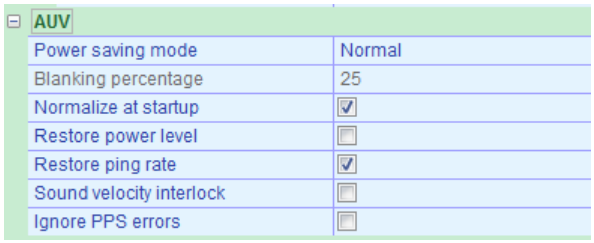


Figure 4-74 AUV

These settings are available for sonars used at an autonomous underwater vehicle (AUV) such as a RESON T20-S.

- Power saving mode:
  - Normal: System produces data but saves power by going idle in parts of the system where it has no impact for the user.
  - Range blank: Same as 'Normal' but additionally the system produces no backscatter (water column) data up to the range R. (Blanking percentage)

  Refer to the sonar user manual for more details.
- Blanking percentage: Range percentage used for the 'Range blank' power mode.
- Normalization at startup: Select, to perform the normalization process when starting up the system.
- Restore power level: Power level will be restored when the system is initialized.
- Restore ping rate: Ping rate will be restored when the system is initialized.
- Sound velocity interlock: The system stops when the sound velocity has a value lower as 1400 m/s.
- Ignore PPS errors: System PPS errors will be ignored.

Additional to above settings, AUV users may switch off all the screens in the Main pane – Tile screen box. (See page 26.) This is recommended for AUV pipe detection applications to save processor load.

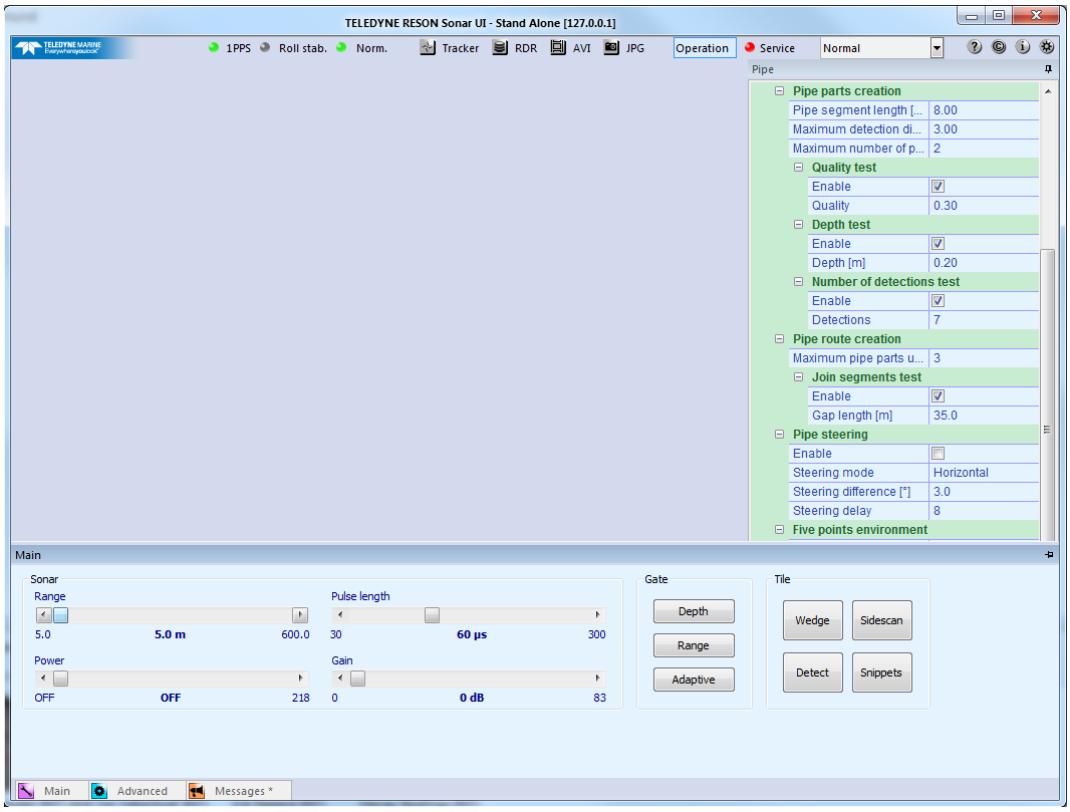


Figure 4-75 All screens disabled

The pipe detection settings are set on the Pipe pane. (See section 4.11).

4.10.10 Cable

The cable length is used to adjust the transmitter TVR curve.

It is essential the correct cable length is specified. A wrong cable length can damage the system!

4.11 Pipe

In the Pipe pane the operator can set the settings for the pipe detection and tracking. The following section are available:

- Pipe in sway detections (see page 61)
- Pipe parts creation (see page 62)
- Pipe route creation (see page 63)
- Pipe steering (see page 63)
- Five points environment (see page 64)

On top of the Pipe pane the pipe detection can be switched on/off by checking or unchecking the Enable checkbox.

The pipe gating can be switched on/off by checking or unchecking the Pipe gating checkbox.

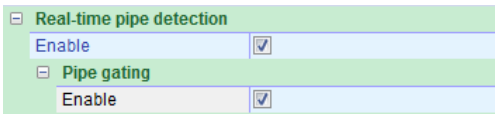


Figure 4-76 Checkboxes for enable/disable pipe detection and tracking.

4.11.1 Survey Settings

Set the speed of the vessel to aid the along track distance estimation. (Can now be calculated.) This improves the pipe detection algorithm.

4.11.2 Pipe in Sway Detections

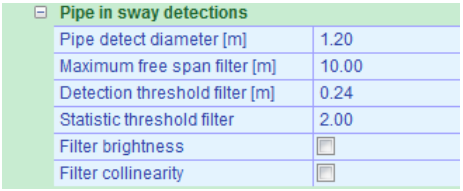


Figure 4-77 Pipe in sway detections parameters

The detections in a sway are done in a pipe window that goes from beam to beam through the sway data. The pipe window is a window with the width of the pipe diameter plus a margin that is placed over the ping to find the best detection.

With the pipe detection parameters, beams will be discarded as noise and from the beams in the sway that are not discarded the best detection will become the pipe detection in the sway.

4.11.2.1 Pipe detect diameter

The diameter of the pipe that has to be detected.
If more pipes have to be detected it is better to enter the pipe diameter of the biggest pipe to be sure that this pipe can be detected. When the other pipe is 10-20% smaller it will still be detected.

4.11.2.2 Maximum free span filter

Detections that are higher than the 'Maximum Free Span Filter' above the seafloor are discarded as noise.

4.11.2.3 Detection threshold filter

Detections that are lower than the 'Detected threshold filter' above the seafloor are discarded as noise.
With an irregular seafloor and a small 'Detected threshold filter' more detections will be found that have no relation to a pipe route, but it also can result in that more detections are found on the pipe.
With a good value for the 'Detected threshold filter' almost all the detections are on the pipe.
When the value becomes too small also a lot of detections are found that are not on the pipe. This can result in that also pipe parts are found that actually are not pipes.

4.11.2.4 Statistic threshold filter

In the pipe window a mean Z is calculated with a standard deviation.
For each beam a ΔZ (= Mean Z – Beam Z) is calculated. The beams in

the pipe window with a smaller ΔZ than the 'Statistic threshold filter' * 'Standard Deviation Pipe Window' are discarded as noise.
This is a pipe detection confidence level as a numerical value corresponding with a procentual discard level; 1 means 68% of the beams in the pipe window are discarded as noise, 2 means 95%.

4.11.2.5 Filter brightness

When checked the multibeam data with poor brightness will be ignored for the pipe detection.

4.11.2.6 Filter colinearity

When checked the multibeam data with poor colinearity will be ignored for the pipe detection.

4.11.3 Pipe Parts Creation

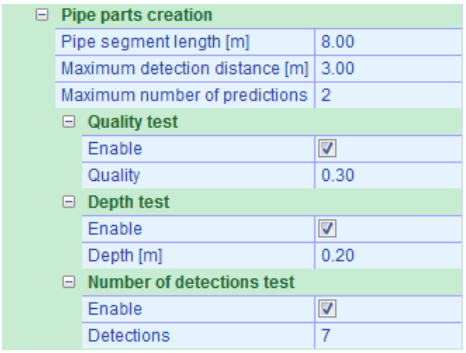


Figure 4-78 Pipe parts creation parameters

Pipe parts are pipe detections in a patch of 25 pings that will be joined together as a possible part of the pipe.

4.11.3.1 Pipe segment length

The pipe segment length defines how many points will be outputted to the pipe route. For each pipe segment one output point. E.g. when the pipe segment length is set to 5meter, each 5 meter a point is output to the pipe route.

When a pipe segment is the start, the end or next to a gap of the pipe route an additional point will be added to the route.

4.11.3.2 Maximum detection distance

When the detection is further away from the last detection/prediction than the 'Maximum detection distance', the detection will not be added to the pipe part.
Increasing this value allows detections further away, from the already tracked pipe part, to be added to the pipe part.
'Maximum detection distance' should not be taken literal. This value is combined with the distance between pings and the local distance between beams on a ping to limit adding detections which are too far away from the tracked pipe part.

4.11.3.3 Maximum number of predictions

This value defines how many predictions are allowed to be added sequential to a tracked pipe part.
Increasing this value allows pipe tracking to pass over more pings which do not have detections that fit the tracked pipe part.

4.11.3.4 Quality test

The detection quality is related to the number of detections in the pipe part. The more detections the better the quality of the pipe part, the more predictions the worse the quality of the pipe part. The Quality is a number between 0 and 1, where 0 is bad to 1 is good (only detections).

Also the ratio predictions/detections is part of the quality figure.

4.11.3.5 Depth test

When a tracked pipe part has an average distance to the sea floor smaller than this 'Depth' value it will not be used in pipe routing.

4.11.3.6 Number of detections test

When the number of detections, in a tracked pipe part, is less than this 'Detections' value, the pipe part will not be used for the pipe routing.
The maximum value to enter is the patch size (=25 pings).

4.11.4 Pipe Route Creation

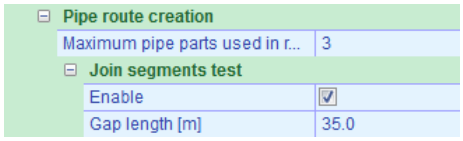


Figure 4-79 Pipe route creation parameters

From the found pipe parts a pipe route can be generated.

4.11.4.1 Maximum pipe parts used in routing

Maximum valid pipe parts that will pass to the pipe routing.
When a patch (25 pings) is processed several pipe parts are tracked, qualified and filtered. When for example 6 valid pipe parts are detected in a patch and 'Maximum pipe parts used in routing' is set to 3 only the best three pipe parts are passed to the pipe routing computation.

4.11.4.2 Join segments test

When the distance between two pipe routes is shorter than the 'Gap length' the two pipe routes will become one pipe route.

4.11.5 Pipe Steering

Figure 4-80 Pipe steering parameters

At the start the **Steering mode** has to be set, *Horizontal* or *Flex* steering. The settings for the steering will not be changed during the time of the **Steering delay**. This delay is defined as the number of patches of 25 pings. At the moment the size of the patch cannot be modified. For instance, if the 'Steering delay' is set on 5 then the Sonar UI will wait until the 5*25 pings is surveyed before, if necessary, the settings for the horizontal or flex steering are changed.

The setting for the steering is changed by the Sonar UI when the difference (in degrees) between the horizontal steering or angle of the flex steering and the angle of the detected pipe in Teledyne PDS is more than the **Steering difference**.

When more pipes or pipe parts are detected the Sonar UI will take an average of the pipe (parts) positions to calculate a steering angle. The pipe with the best quality of detections will have a bigger weight in the average calculation. With this situation it is possible that the steering is not always on the main pipe which has to be tracked.

When horizontal steering is selected the Sonar UI will change the horizon steering in the RESON Sonar 7k sonar when the Sonar UI calculates that it is needed.

The Flex mode has to be selected in the RESON Sonar 7k, before the flex steering can work.

When flex steering is selected the Sonar UI will change the angle of the center beam of the flex mode in the RESON Sonar 7k sonar when the Sonar UI calculates that it is needed. The width of the flex mode and the settings of the flex mode will not be changed.

4.11.6 Five Points Environment

Five points environment	
Environment sample width [m]	1.0
Maximum sample offset [m]	10.0

Figure 4-81 Five points environment settings

When the pipe is detected 5 point on and around the pipe will be computed and outputted to generate a basic profile of the seafloor with the pipe.

The five points are the top of pipe, the seafloor on both sides of the pipe (as close as possible to the pipe) and the seafloor on both sides further away from the pipe (maximum sample offset). The five point information is output on each segment length. See section 4.11.3.1.

4.11.6.1 Environment sample width

This is a window over the multibeam data in which an average is computed for the seafloor detections.

4.11.6.2 Maximum sample offset

This is the distance from the top of the pipe to the seafloor detection away from the pipe.

4.11.7 Pipe Detection Considerations

Follow the sequence of the pane:

1. Enable in the display pane the correct pipe layer settings.
2. Set the pipe in sway parameters to have good detections. Set pipe gating to improve the detections.

3. Set the pipe parts creation parameters to create pipe parts. The pipe parts are created from the detections as set in step 1.
4. Set the parameters for the pipe route creation. The pipe route is created from the pipe parts as set in step 2.
5. Set the pipe segment length to define the number of output points. For each set segment length one output point. (May be different in corners or end of pipe routes)

4.11.8 Dual Head Pipe Detection Considerations

It is possible to use a dual head system for pipe detection and tracking. Refer to appendix A Dual head on page 89 how to configure a dual head system in the Sonar UI.

It is essential the correct offsets and head tilt parameters are defined in the hardware pane.

- Define the estimated speed of the vessel on which the pipe survey will be accomplished. This value improves the along track distance estimation.
- The master and slave individually controls the pipe steering (horizontal or flex).
- Disable real time pipe detection of the slave when the master is used for the pipe detection. Set in this case the correct pipe parameters in the master.
- Note when ping pong mode is used the pings as indicated in the wedge view, for the master and slave are shifted. In full rate mode they lay on each other.

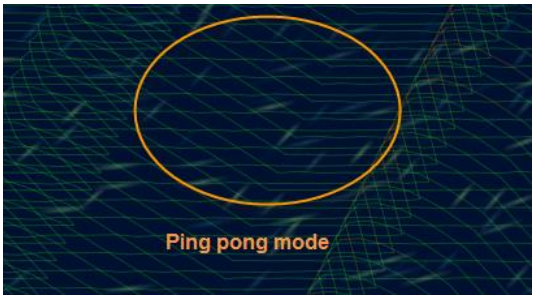


Figure 4-82 Pings

4.12 Screens

It is possible in the Operation mode to display four different screens:

- The wedge
- The Detect or Water column
- Sidescan
- Snippets

The screens are switched on/off in the Main pane (see page 23).

When a screen is disabled then no historical data will be logged. This means when enabling a view during acquisition the associated view(s) will start empty.

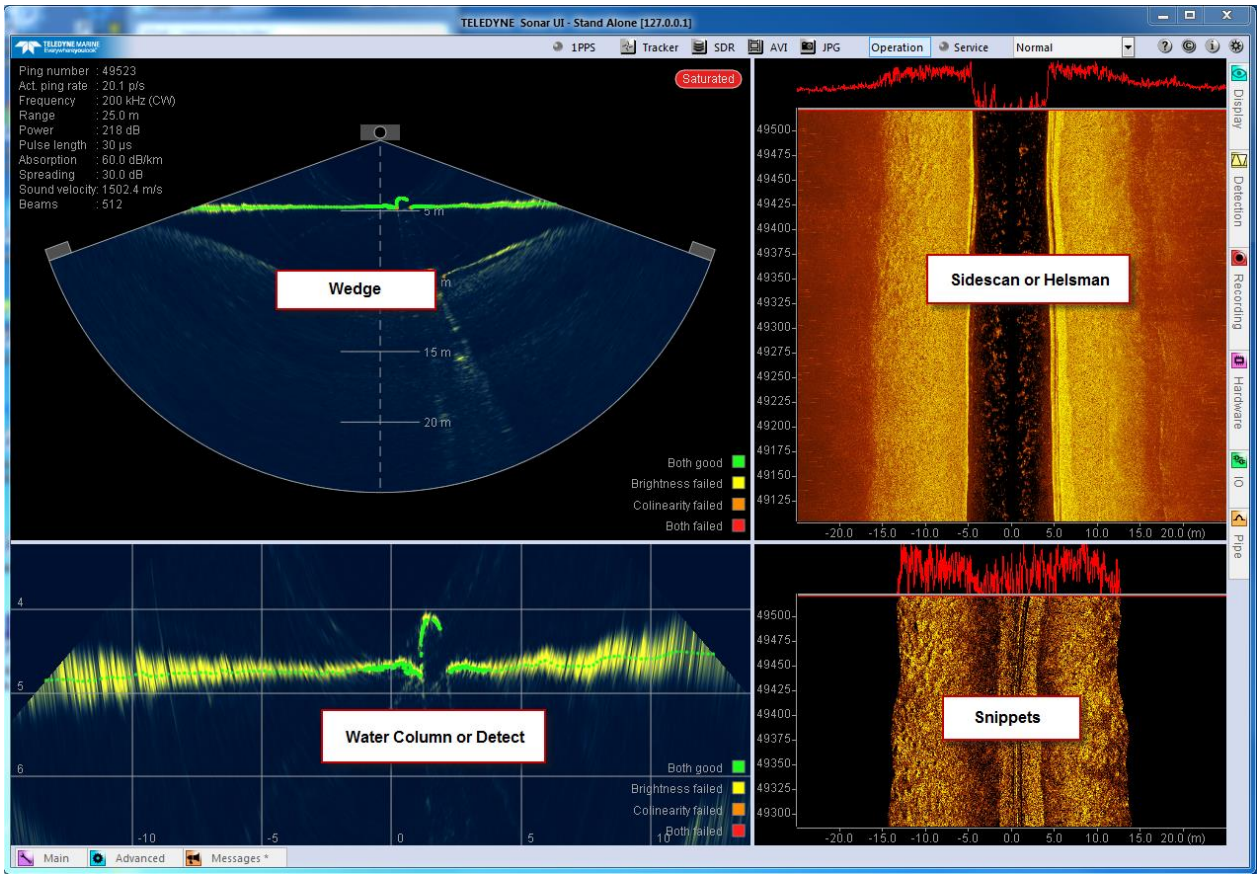


Figure 4-83 Screens.

4.12.1 Screen Toolbar

All four screens have a toolbar that becomes visible when the cursor is moved over the top left part of each screen. When a screen is too narrow for the toolbar, move over the left side of the screen and the toolbar will be displayed at the left side.

Figure 4-84 Toolbar for Wedge screen

Figure 4-85 Toolbar for Snippets screen

With the toolbar quickly screen related parameters can be set by the operator as also done in the Display pane.

Table 1 summarizes the toolbar buttons for the Wedge, Detect and Water column screen.

Table 1: Toolbar buttons: Wedge, Detect, Water column screens

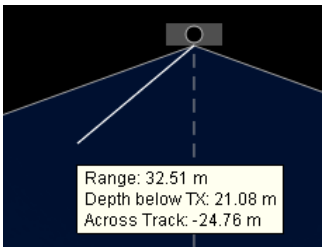
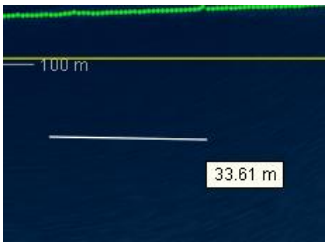
Function	Description
	Full screen. Switches the view to a full screen size.
	Zoom extent.
	Increase and decrease contrast. The contrast level is indicated in the lower left corner of the screen.
	Increase and decrease the point size of the detection.
	Beam selector.
	Measure. Two measurements can be made. Measure from the head.  Or measure in the wedge.  (Right click to disable the measurement function)
	Save a snapshot.
	Freeze the view.

Table 2 summarizes the functions of the toolbar for the Snippets display.

Table 2: Toolbar buttons: Snippets display

Function	Description
	Full screen. Switches the view to a full screen size.
	Zoom in and Zoom out.
	Zoom extent.
	Increase and decrease threshold.
	Increase and decrease gain.
	Increase and decrease TVG.
	Auto scaling. The TVG, gain and threshold will be set automatically.
	Auto scaling. The TVG, Gain, and Threshold will be set automatically
	Lambert's law correction.
	Invert colors.
	Save a snapshot.

4.12.2 Screen Context Menu

The screen toolbar options are also available in the context menus of each screen. The context menus contain extra options in addition to the toolbar options.

Right-clicking opens the context menu.

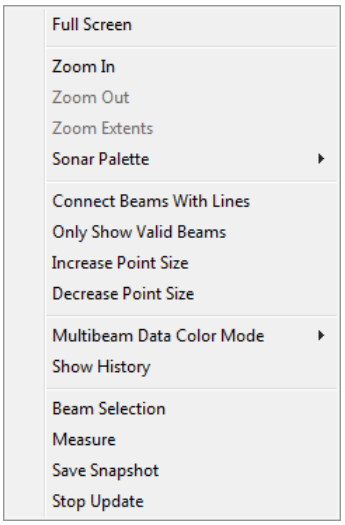


Figure 4-86 Context menu Wedge screen

Some of the context menu options are also available in the Display pane (see page 45).

4.12.3 Zoom Functions

There are several ways to zoom in and out in the Sonar UI:

- The mouse wheel. Roll the mouse wheel to employ the Zoom Extent feature.
- The screen Toolbars
  (Zoom extent is only available in Wedge and Water column/Detect screens)
- The Context menus.
- The numeric keypad of the keyboard '+' and '-' keys.

4.12.4 Wedge

The wedge screen shows the bathymetry data as a complete swath illuminated by a single transmitted ping.

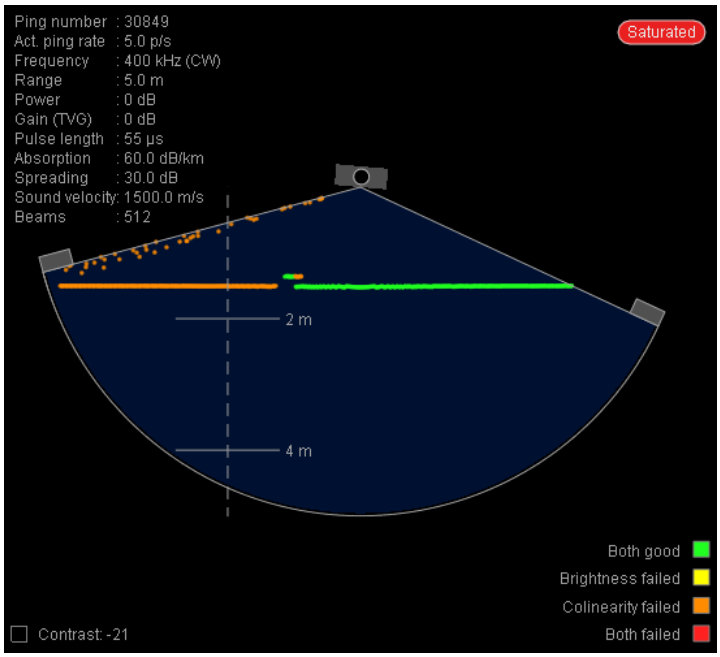


Figure 4-87 Wedge screen with beam data color mode on Quality

4.12.4.1 Info Layer

Current information of the sonar data is shown in the upper left corner of the screen. This information can be switched off by disabling the Info Layer check box in the Display pane (See Figure 4-49).

4.12.4.2 Saturation indicator

The itensity of the beams is shown in the top right corner of the screen. It turns red when the itensity of the beams is saturated.The indicator can be switched off in the display pane Data Layer.

4.12.4.3 Multibeam Data Color Mode

The legend for the Multibeam Data Color Mode (*Fixed*, *Quality*, *Detection Process,* or *Uncertainty*) is shown in the lower right corner of the screen. This legend can also be switched off in the Display pane under Data Layer (see Figure 4-49).

4.12.4.4 Contrast

At the lower left corner the current level for the contrast is indicated.

4.12.4.5 Show History

The history of the multibeam data can be displayed in the Wedge screen by enabling Show History under Wedge in the Display pane (see Figure 4-49).

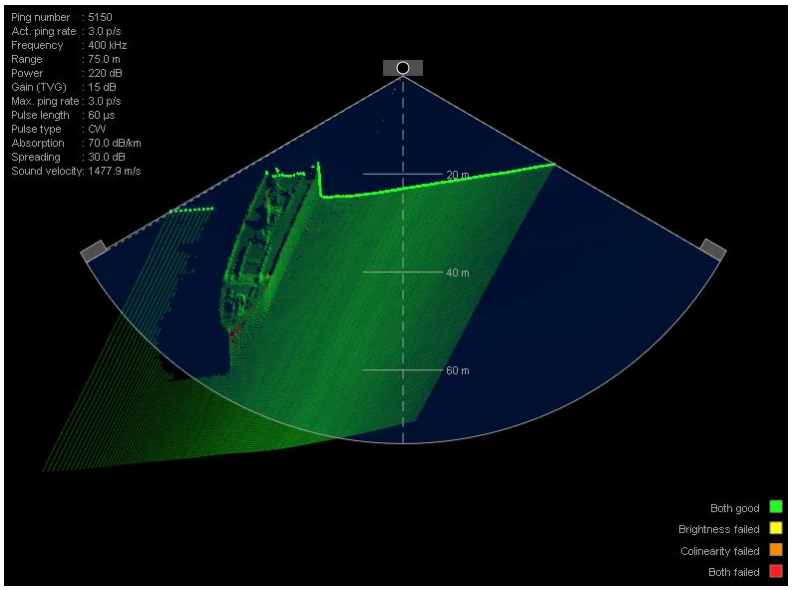


Figure 4-88 Wedge screen with history, swath shift left and swath spacing 0

Define in the Display pane how the history is displayed in the Wedge by setting:

- History Length: the length of the history in pings.
- Swath Shift: the direction of the history in the display.
- Swath Spacing: the distance between the swaths.

Both sonar wedges can be displayed for sonars in dual head mode

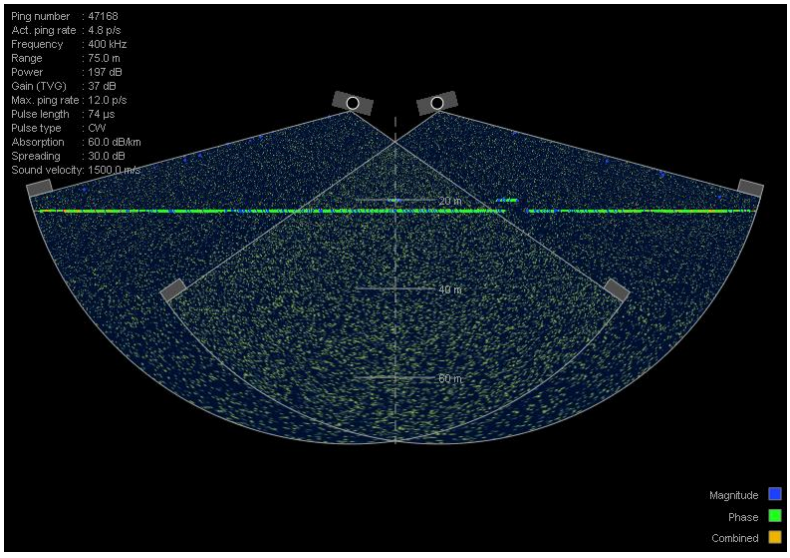


Figure 4-89 Wedge screen with 2 sonars in dual head mode

4.12.4.6 Measurement

When pressing ‘M’ on the keyboard a distance measurement function becomes active. Click in the wedge and drag the cursor to a point to measure the distance between the two points.

Deactivate the measurement function by pressing ‘M’ again.

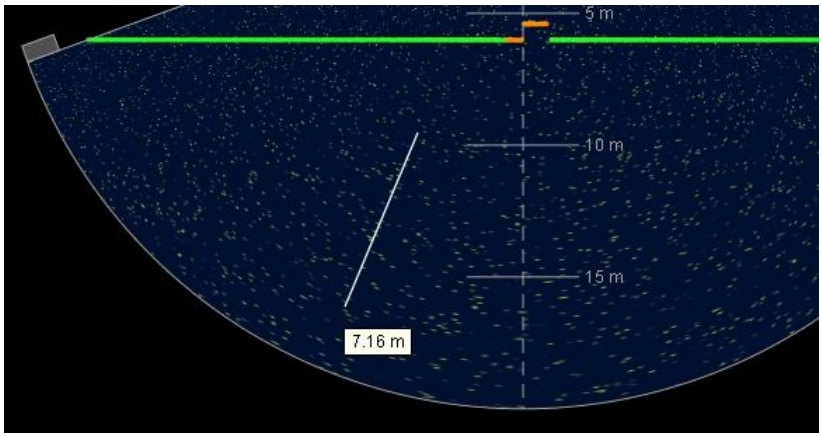


Figure 4-90 Distance Measurement function.

4.12.4.7 Sonar Contacts

The Sonar Contacts feature is only available if a forward looker sonar is connected to the Sonar UI.

A sonar contact is created from the wedge context menu. Right click in the Wedge to open the context menu and select:

- Continuous contact mode
  To create a contact each time you click in the wedge on the objects of interests. Right click to disable the continuous contact mode.
- Create Sonar Contact
  Click in the wedge on the object of interest to create the contact.
- Delete All sonar Targets/Contacts
  To delete all the sonar contacts. The contacts are also deleted if the SUI is closed.

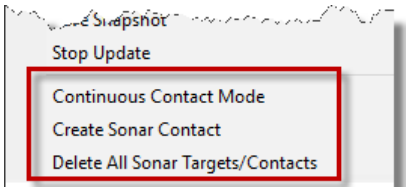


Figure 4-91 Contact options in context menu

A contact can only be created in the Wedge not outside the Wedge.

If a contact is created then a dialog opens to enter a description of the created contact. Enter a description and click Apply.

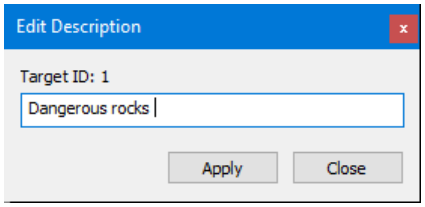


Figure 4-92 Description dialog

In the Active Sonar Targets Layer of the Display pane the sonar contact attributes can be configured. In this layer the operator name can be entered also. See chapter Display on page 45.

Double click on a created sonar contact to edit the description.

Right click on the contact to open the contact context menu.

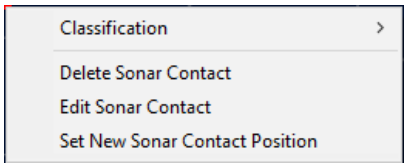


Figure 4-93 Contact context menu

- Classification
  Change the classification of the contact. Classification types can be added in the Display pane, the Active Sonar Targets layer.
- Delete Sonar Contact
  To delete the sonar contact.
- Edit Sonar Contact
  To edit the sonar description.
- Set New Sonar Contact Position
  Click in the wedge on the new location. The contact is moved to this position.

The contacts are dynamically displayed in the Wedge if navigation data is connected and setup in the 7k IO module.

Set in the Hardware pane the Offsets and the Head Mounting angles. Measure the offset from the Vessel Reference point to the Sonar Reference point.

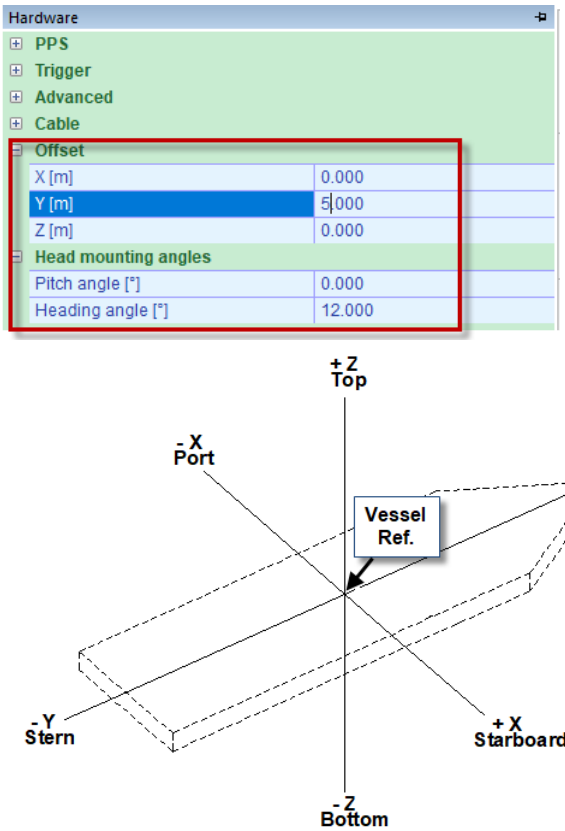


Figure 4-94 Offsets and convention

The 7kcenter will send a 3001 Contact Output record each time a sonar contact is created, contact information is edited or when the contact is

moved to another location. The 3001 contact record is logged in the s7k file if in the Recording pane, of the Record Selection attribute, the 'Other' option is enabled.

See appendix 7k DFD 3001 – Contact output record for the description of the 3001 format. The 3001 Contact Output record contains the range and the bearing from the sonar to the contact. The latitude and longitude is only available in the 3001 record if navigation data is connected to the IO module. When navigation data is used then set in the Hardware pane the offsets and the head mounting angles (in the vessel frame).

4.12.5 Water Column

The Water Column screen shows the complete water column for the selected beam.

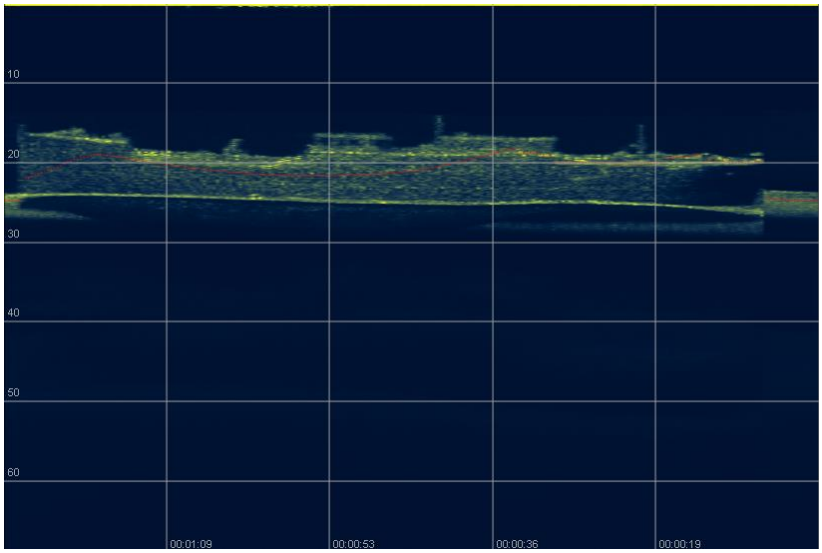


Figure 4-95 Water Column screen with the selected beam over a wreck

The beam can be selected with the  from the toolbar in the Wedge screen (see Table 1) or in the Display pane under Water Column (see page 45).

4.12.6 Detect

The Detect screen shows the bathymetry data of a single swath with different beam data color modes. The swath is displayed in Zoom Extent mode; the vertical scale is enlarged to enhance the details of the swath.

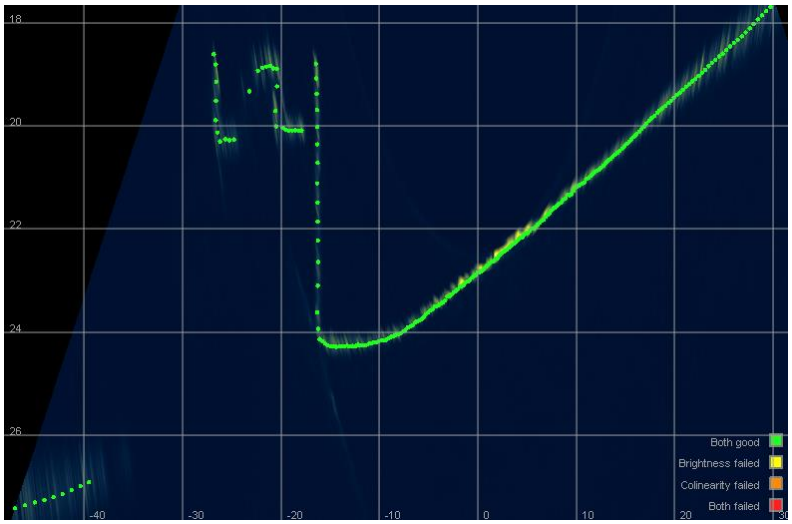


Figure 4-96 Detect screen with one swath

The legend for the multibeam data color mode(*Fixed*, *Quality*, *Detection Process* and *Uncertainty*) is shown in the lower right corner of the screen. This legend (Data Layer) cannot be switched off in the Display.

The grid lines (Grid Layer) can be switched on/off in the Display pane (see Figure 4-50).

4.12.7 Sidescan

The Sidescan screen shows an image of the seafloor which can be used to locate and identify features and bottom conditions. Each sonar ping is used to generate a line of data. Each line contains a series of amplitudes representing the signal return versus time or range. When a series of these lines is combined and displayed as the vessel moves along the track, a two-dimensional image is formed, providing a detailed picture of the bottom along either side of the vessel.

The sidescan data can be viewed on a waterfall display representing the results of a peak-detect search through the left and right beams of the swath.

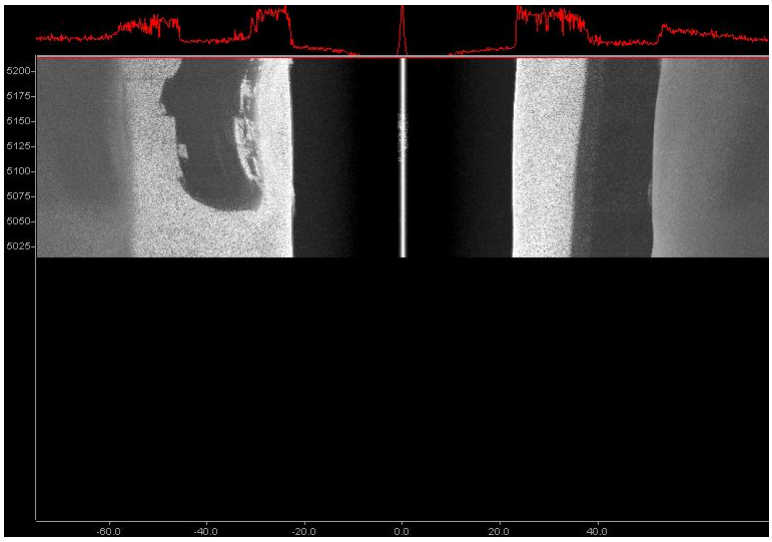


Figure 4-97 Sidescan screen

By default the scaling of the data is set on Auto Scaling. Deactivate the Auto button in the toolbar and the operator can manually set the threshold, gain and TVG for the picture in the Sidescan screen.

The waterfall data is automatically adjusts to the ranges in the history.

Side-scan cannot be used to accurately measure true depths, but it can provide a more detailed picture of the seafloor. This image can be used together with bathymetry to identify features and to help ensure that the survey does not miss any small but significant targets.

For integrated dual head systems only the side scan data of the port head is showed.

4.12.8 Snippets

The Snippets screen shows the backscatter data in a waterfall display.

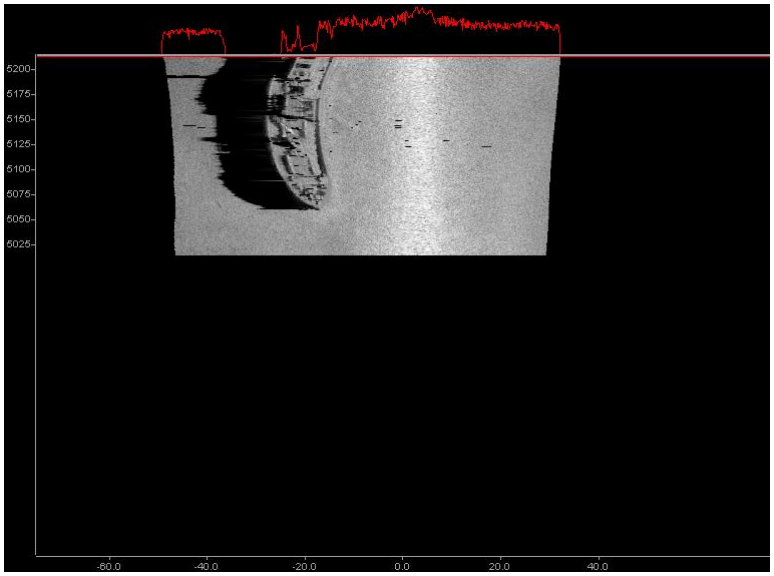


Figure 4-98 Snippets screen

By default the scaling of the data is set to Auto Scaling. Deactivate the Auto button  from the toolbar to set manually the Threshold, Gain, and TVG for the image in the Snippets screen.

A snippets data sample contains corrected backscatter data from the 'footprint' on the seabed illuminated by a single sonar ping. The number of snippets in a swath is a function of the number of sonar beams. The length of each snippet depends on the operating mode, beam number, and depth. The snippets window can also be set manually.

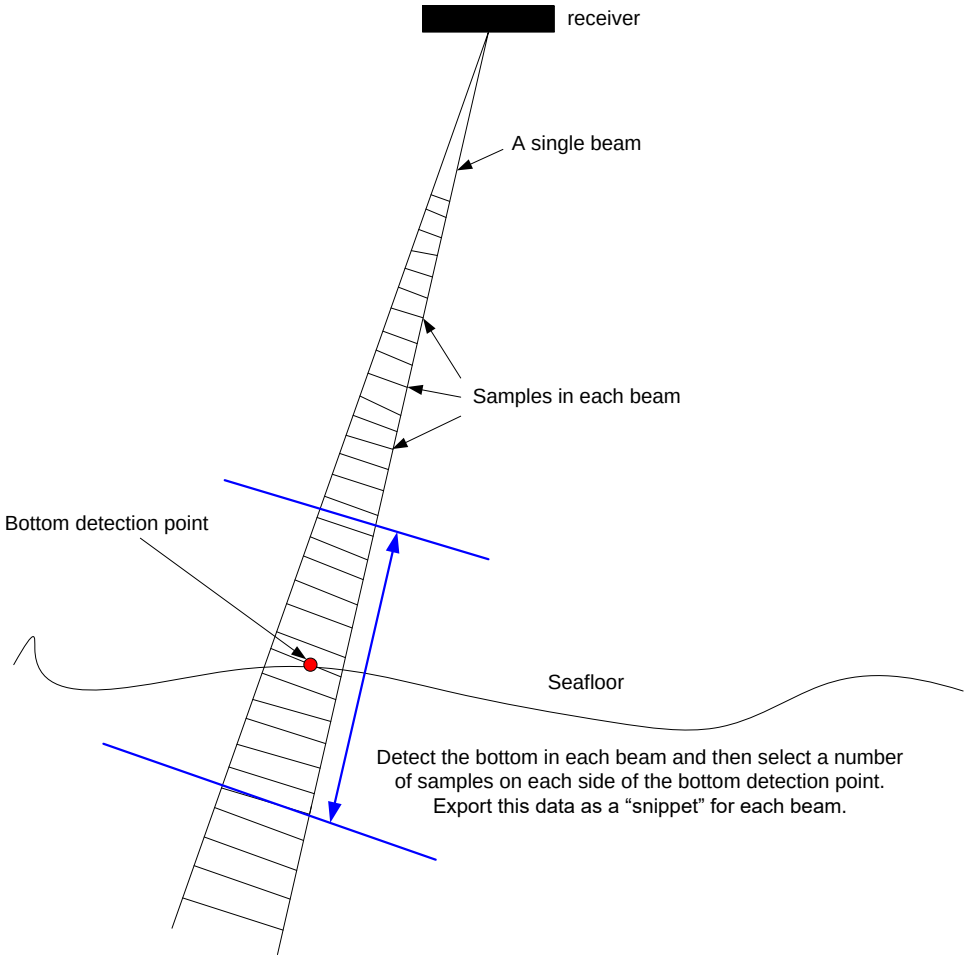


Figure 4-99 Snippets data

Each snippets data packet contains pertinent information such as time stamp, sequential ping number, sample rate, sound velocity, and operator settings such as power, gain, absorption, and range scale.

The waterfall data is automatically adjusts to the ranges in the history.

For dual head systems; the snippets view shows always the combined data of the two heads. This data is normalized if the normalize backscatter license is activated.

4.12.9 Helmsman

The helmsman screen is used in combination with the pipe detection functionality as navigation guidance for the operator (e.g. ROV pilot). It displays the pipe detection and the pipe route relative to the the position

of the sonar. Properties of the Helmsman layer are set in the Display pane.

A warning distance can be set in the Display pane to generate an indicator when the distance between the sonar and the pipe detection exceeds the warning distance as set.

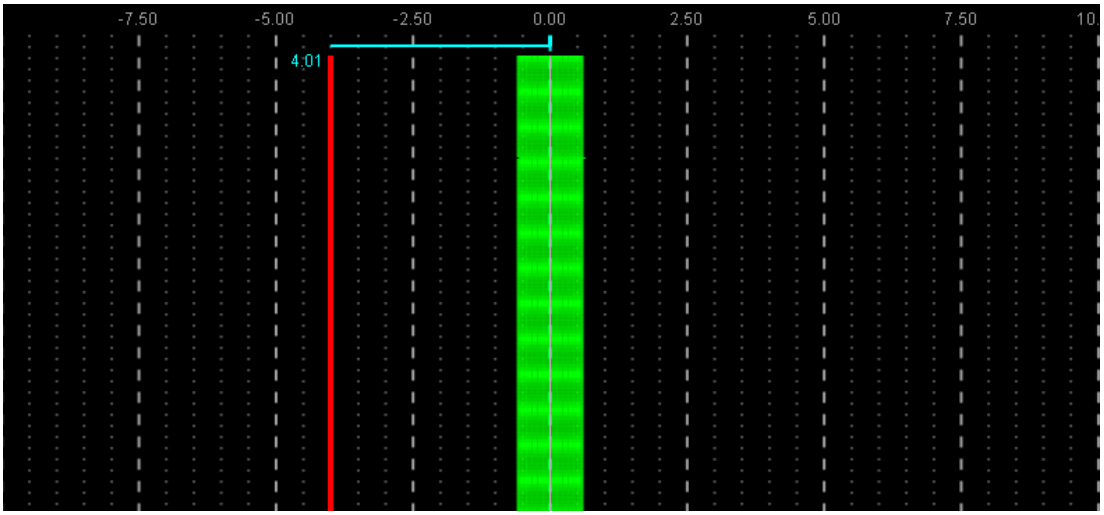


Figure 4-100 Helmsman screen with warning distance indication (In this example when the distance exceeds 4 meters)

5 Service

5.1 Introduction

The Service view in the Sonar UI monitors the status of the complete sonar system; the temperature, voltage, communication status and other parameters.

With the diagram of the sonar system together with the related BITE (Built-In Test Environment) information, it is easy to check if each part of the system is working fine. It is quickly apparent, for instance, if a component, wire, or pin is the cause of an error or warning. A BITE snapshot can be saved in HTML format.

The Service mode is selected in the Sonar UI Toolbar (see Service Mode on page 16).

This chapter will explain how the user can go through the different options to monitor the system or, if necessary, find the reason for the error.

5.2 Diagram

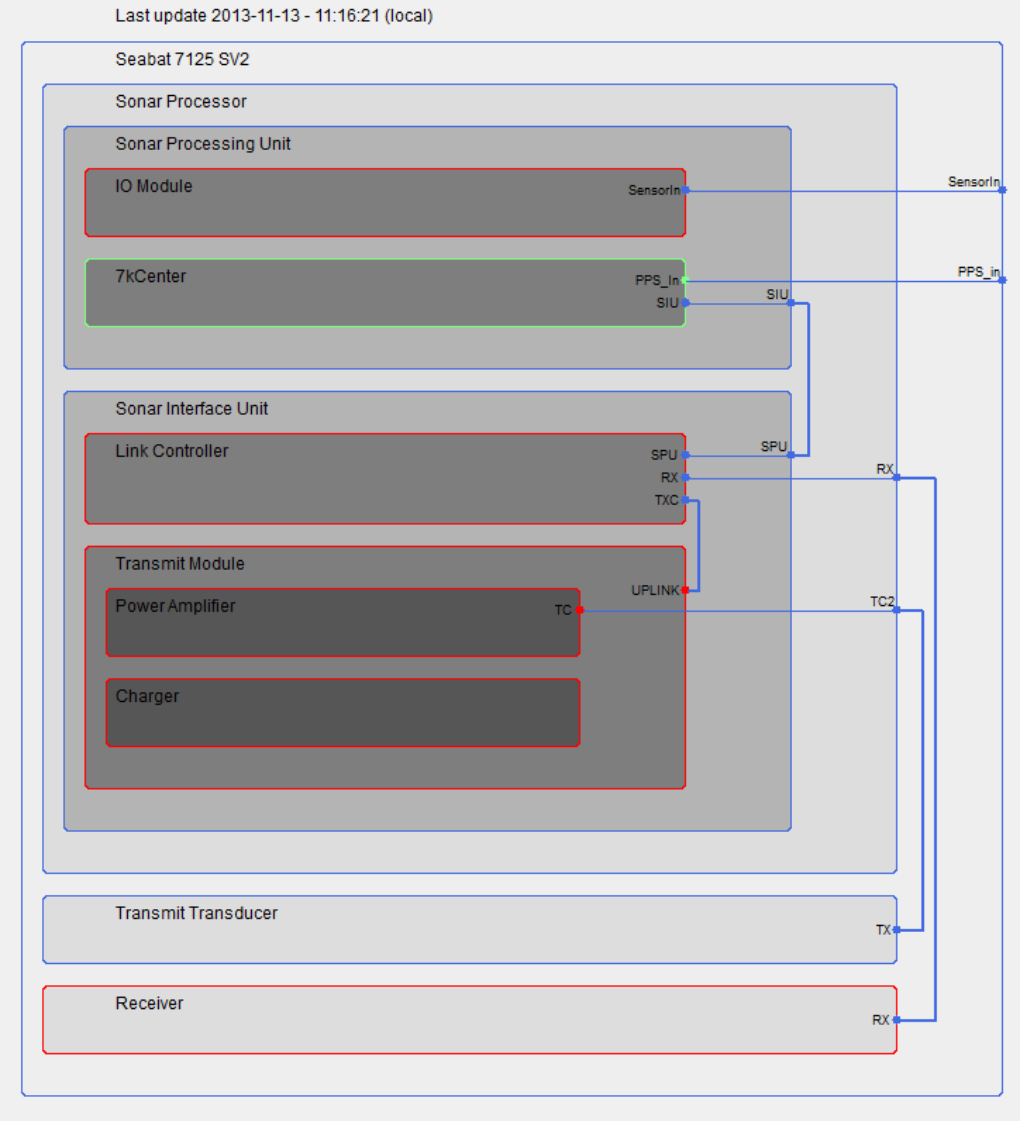


Figure 5-1 Diagram in the Service of a Sonar SV2

When the Service mode is selected in the Sonar UI toolbar a diagram is displayed. In the diagram the operator can see directly if the complete sonar system is working fine. All components, wires, and pins should be in blue or green. BITE information is available for the green (and red) components and pins.

Click on the item in the diagram to display the available information on the right side on the Details tab (see page 83).

A green component or pin will turn red, if an error is detected.

A green component will turn orange, if a warning is detected.

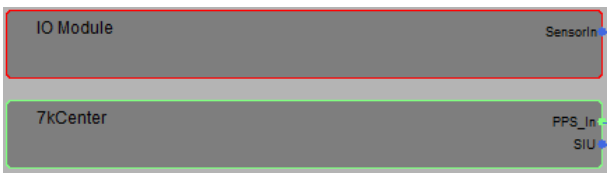


Figure 5-2 Module in error (red), 7KCenter correct (green)

Error messages are displayed on the Status tab (see 5.3.1). When the error is a timeout the component will be red, but no information will be displayed on the Status tab.

5.3 Information

The available information of the sonar system is displayed on the right side in the Service. The different types of information will be ordered under several tabs:

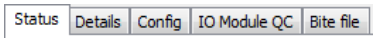


Figure 5-3 Service tabs

- **Status** (see next section)
  On the Status page the errors with the relevant information are displayed.
- **Details** (see page 83)
  On the Details page the BITE information of the selected component, wire or pin in the diagram is displayed.
- **Config**
  On the Config page the preconfigured settings and the serial/version numbers for the software and firmware of the installed sonar system is displayed.
- **IO Module QC** (see page 85)
  In the IO Module QC page the different devices that are interfaced through the IO Module pane will be displayed.
- **BITE File**
  On the BITE File tab the contents of the BITE file is displayed. This page is only available after pressing ‘Ctrl+B’ on the keyboard.

With ‘Ctrl+B’ extra BITE information of the selected item becomes available in the Details and Config page.

5.3.1 Status

On the Status tab the errors or warning of the system are displayed. When no error or warning occurs this page will be empty.

A message will be displayed on the Status tab for each part of the sonar system in error.

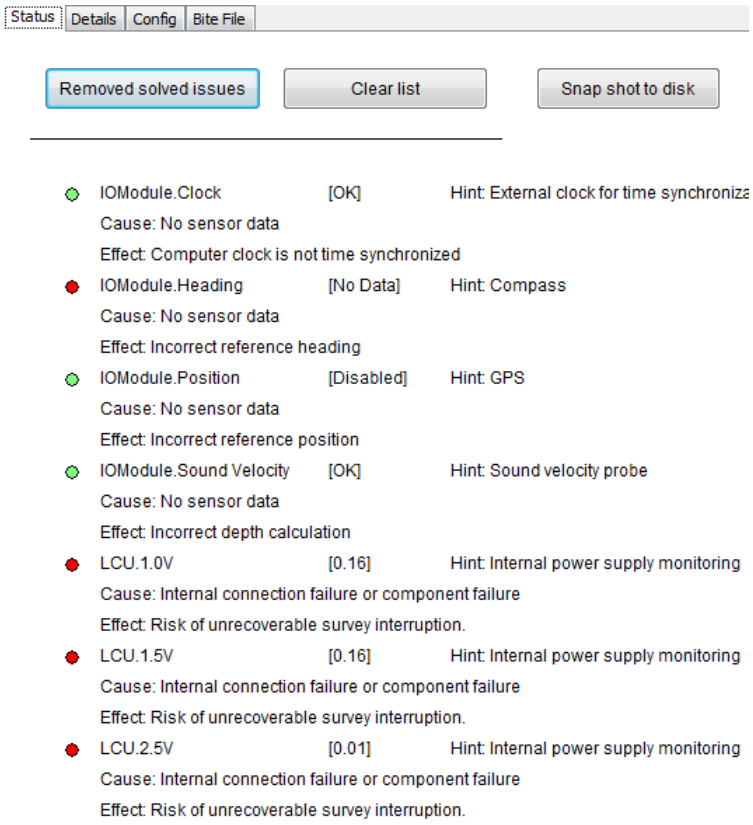
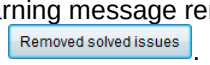


Figure 5-4 Example of error messages in the Status page

Status tab messages are color coded.

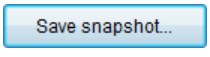
- Red LED: error
- Yellow LED: warning
- Green LED: error/warning solved.
  The solved error/warning message remains in the list until removed by clicking 

.

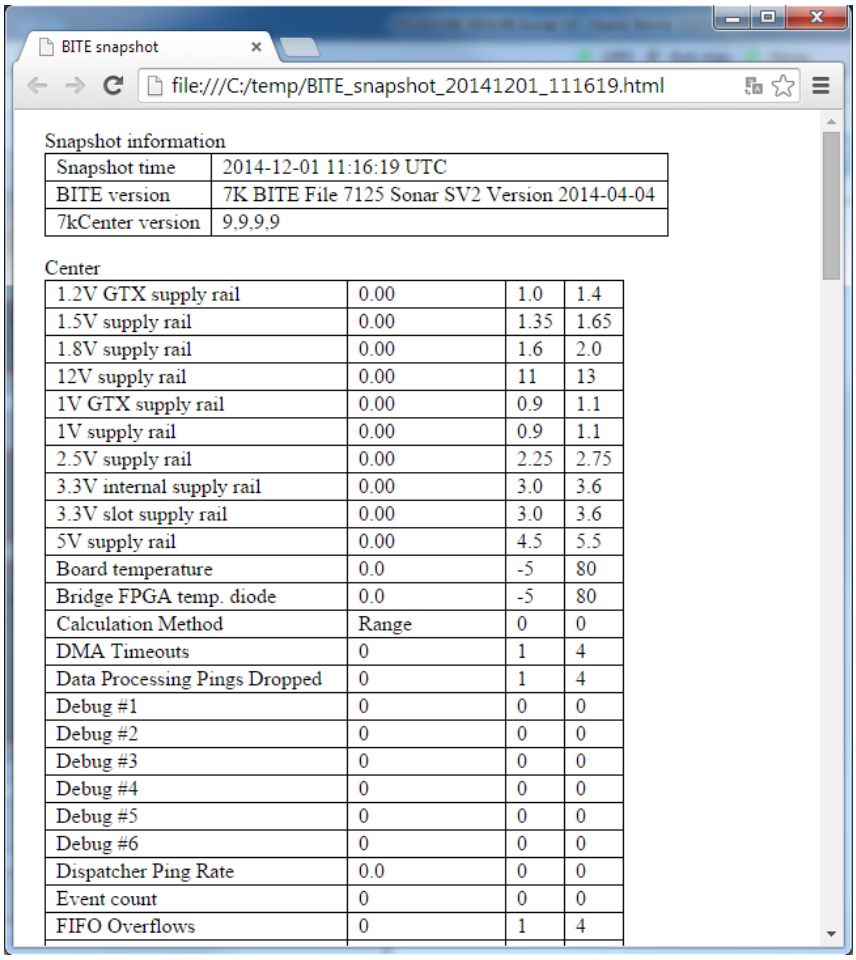
The error or warning message will also be displayed in the related BITE information on the Details tab (see 5.3.2 below).

In addition to the error/warning itself, the message contains information to assist the operator solve the problem:

- The possible cause of the error/warning.
- The effect of the problem on the system.
- A hint for the operator to understand the problem.

Use 

to save all information of all tabs to a HTML file. The name of the file will contain the timestamp so successive files won't overwrite each other.



Snapshot information

Snapshot time	2014-12-01 11:16:19 UTC
BITE version	7K BITE File 7125 Sonar SV2 Version 2014-04-04
7kCenter version	9.9.9.9

Center

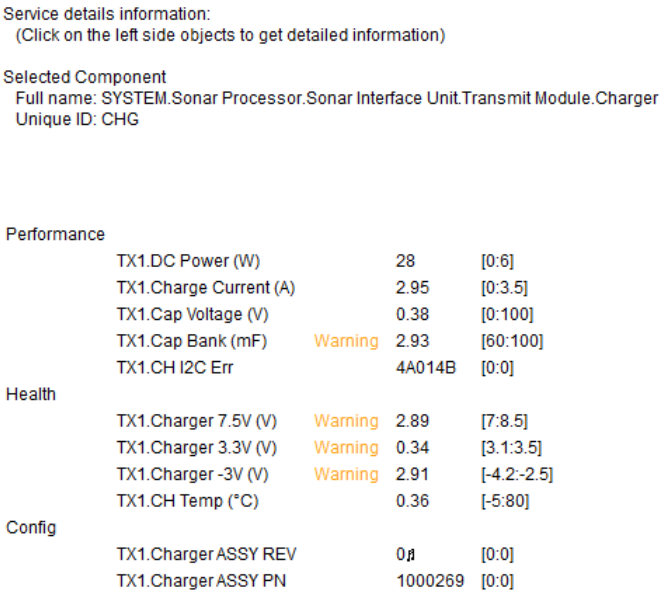
1.2V GTX supply rail	0.00	1.0	1.4
1.5V supply rail	0.00	1.35	1.65
1.8V supply rail	0.00	1.6	2.0
12V supply rail	0.00	11	13
1V GTX supply rail	0.00	0.9	1.1
1V supply rail	0.00	0.9	1.1
2.5V supply rail	0.00	2.25	2.75
3.3V internal supply rail	0.00	3.0	3.6
3.3V slot supply rail	0.00	3.0	3.6
5V supply rail	0.00	4.5	5.5
Board temperature	0.0	-5	80
Bridge FPGA temp. diode	0.0	-5	80
Calculation Method	Range	0	0
DMA Timeouts	0	1	4
Data Processing Pings Dropped	0	1	4
Debug #1	0	0	0
Debug #2	0	0	0
Debug #3	0	0	0
Debug #4	0	0	0
Debug #5	0	0	0
Debug #6	0	0	0
Dispatcher Ping Rate	0.0	0	0
Event count	0	0	0
FIFO Overflows	0	1	4

Figure 5-5 Example of part of the HTML file

5.3.2 Details

In the Details tab the BITE information of the selected component, wire, or pin in the diagram will be displayed. Press Ctrl+B on the keyboard to access more information for some items in the diagram.

At the top the name and unique ID of the selected component, wire, or pin is given. Below this the available BITE information is displayed with the actual value or status for each item. The accepted range for each item is displayed between brackets.



Service details information:
(Click on the left side objects to get detailed information)

Selected Component
Full name: SYSTEM.Sonar Processor.Sonar Interface Unit.Transmit Module.Charger
Unique ID: CHG

Performance				
	TX1.DC Power (W)		28	[0:6]
	TX1.Charge Current (A)		2.95	[0:3.5]
	TX1.Cap Voltage (V)		0.38	[0:100]
	TX1.Cap Bank (mF)	Warning	2.93	[60:100]
	TX1.CH I2C Err		4A014B	[0:0]
Health				
	TX1.Charger 7.5V (V)	Warning	2.89	[7:8.5]
	TX1.Charger 3.3V (V)	Warning	0.34	[3.1:3.5]
	TX1.Charger -3V (V)	Warning	2.91	[-4.2:-2.5]
	TX1.CH Temp (°C)		0.36	[-5:80]
Config				
	TX1.Charger ASSY REV		0	[0:0]
	TX1.Charger ASSY PN		1000269	[0:0]

Figure 5-6 Example of BITE information on the Details tab

When an error or warning occurs for one of these items a message will be displayed on the Status tab (see 5.3.1 above). On the Details tab the information is also updated as shown in Figure 5-5.

Errors and warnings occur when an item exceeds a specified minimum or maximum level and/or exceeds a specified time limit.
The error status for each item has an internal error status which is incremented when there is an error and decreased if not. When there are many errors close to each other in time, the error status will increment above 1 and the status goes to ‘Error’. After a while with few or no errors the error status will crawl down and come below 1, the status goes back to ‘Ok’. The tolerance to the errors and the time errors are remembered are controlled by the ‘min’ and ‘max’. So for the error counters the min and max are not just limits used for comparison.

This means that for example an error message occurs when the head FPGA exceeds a certain temperature (level) but also when the PPS pulses are not received (exceed a time limit).

Service details information:
(Click on the left side objects to get detailed information)

Selected Component
Full name: SYSTEM.Sonar Processor.Sonar Interface Unit.Transmit Module.Charger
Unique ID: CHG

Performance				
	TX1.DC Power (W)	Timed out	28	[0:6]
	TX1.Charge Current (A)	Timed out	2.95	[0:3.5]
	TX1.Cap Voltage (V)	Timed out	0.38	[0:100]
	TX1.Cap Bank (mF)	Timed out	2.93	[60:100]
	TX1.CH I2C Err	Timed out	4A014B	[0:0]
Health				
	TX1.Charger 7.5V (V)	Timed out	2.89	[7:8.5]
	TX1.Charger 3.3V (V)	Timed out	0.34	[3.1:3.5]
	TX1.Charger -3V (V)	Timed out	2.91	[-4.2:-2.5]
	TX1.CH Temp (°C)	Timed out	0.36	[-5:80]
Config				
	TX1.Charger ASSY REV	Timed out	0	[0:0]
	TX1.Charger ASSY PN	Timed out	1000269	[0:0]

Figure 5-7 Example of timed outs in the Charger

When the error message is a time out it means that for a specific number of seconds no information is received from the system.

The BITE file for all the information displayed in the Details page is made for the Virtex6 hardware. Therefore the Virtex6 items in the Details page will all be zero when Virtex2 hardware is used. **The operator should ignore the Virtex6 information when Virtex2 hardware is used.**

5.3.3 IO Module QC

In the IO Module QC tab, the data from the different devices interfaced and set up in the IO Module, are displayed.

For each device the data string is unpacked and the data is displayed as it is received from the 7k center through the IO Module. See Figure 5-8.

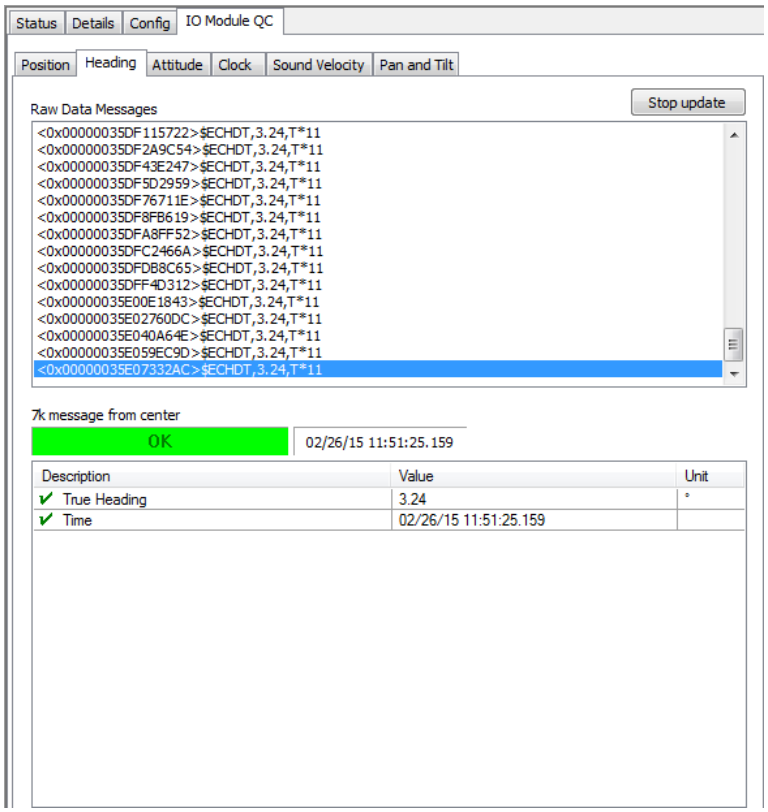


Figure 5-8 IO Module QC page with good heading data

When the message is received correctly, this is indicated by a green colored ‘ok’ status box. See Figure 5-8.

If data from one of the devices is not received properly it is indicated by a red colored ‘time out’ box. See Figure 5-9.

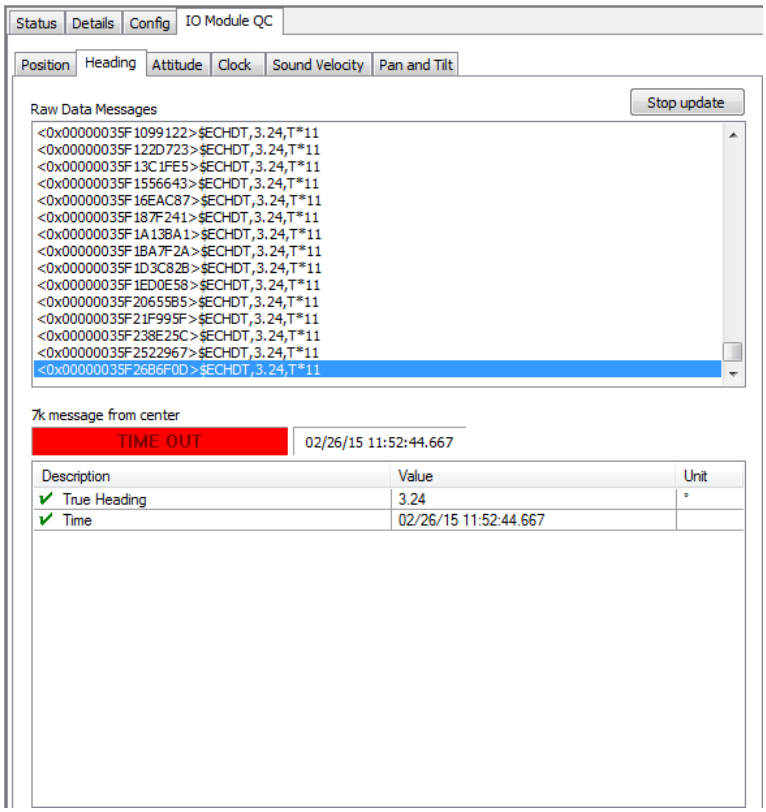


Figure 5-9 IO Module QC page with a timeout on the heading data

The BITE LED on the Sonar UI Toolbar will also turn red. See Sonar UI Toolbar on page 12.

The status of the message fields are indicated by symbols:

- ✔ : All items ok
- : No data in datablock. (Some device drivers expect a certain data field while it is not outputted by the connected device. It is still possible to use this driver as long the required data field is available.)
- : Invalid data; one or more items failed to unpack.

The status indication is with respect to the last received data block. This means the field can still marked as ok while the status box indicates time out. (As it was received previously correct.) See Figure 5-10.

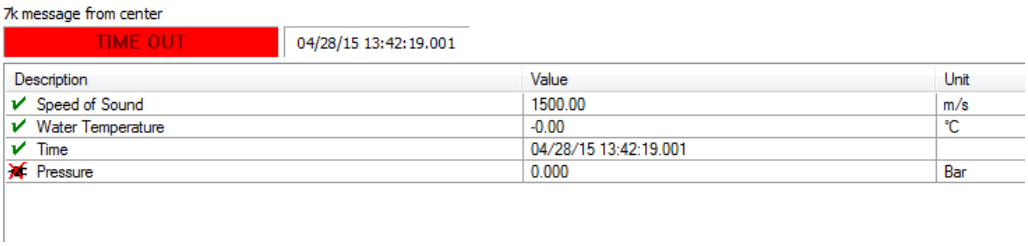


Figure 5-10 Status indication

The raw data as received from the IO Module is displayed. These are the data strings of all the data that is received on the different ports. When in the IO Module pane for the 'Input Distribution' an destination address is

entered (see page 36) all the data as displayed in the Raw Data Messages will be outputted.

6 Appendix Dual head (Master – Slave)

6.1 Introduction

This section highlights the dual head configuration in the SUI when two systems (sonar heads) are used. One system is designated as a Master and the other as Slave system.

6.2 Setup

The sonars must be connected and interfaced as described in the RESON user manual.

The Master and the Slave Processors must have, within their range, a different IP number (E.g. 10.11.10.1 and 10.11.10.2)

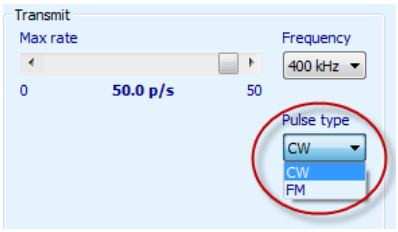
There are two modes for a Dual head system a 'ping pong mode' (The Sonars ping in turn) or Full Rate Dual Head mode (FRDH). (Sonars ping in a maximum possible rate.) The full rate mode is an option.

For a Full Rate Dual Head configuration (FRDH) the processors must be triggered. For this purpose a cable must be connected from the 'Master' processor trigger out socket to the trigger input socket of the 'Slave' processor.

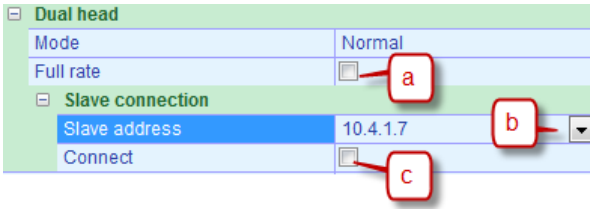
For a Full Rate Dual Head configuration the transmit pulse type must set in FM for **both** the Master and the Slave. For feature packs higher as version 4 (FP4) the pulse mode will set automatically into FM mode when full rate is selected.

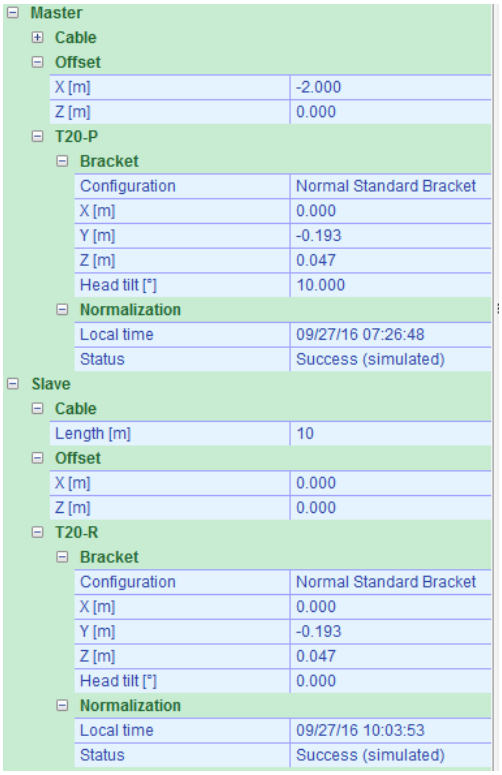
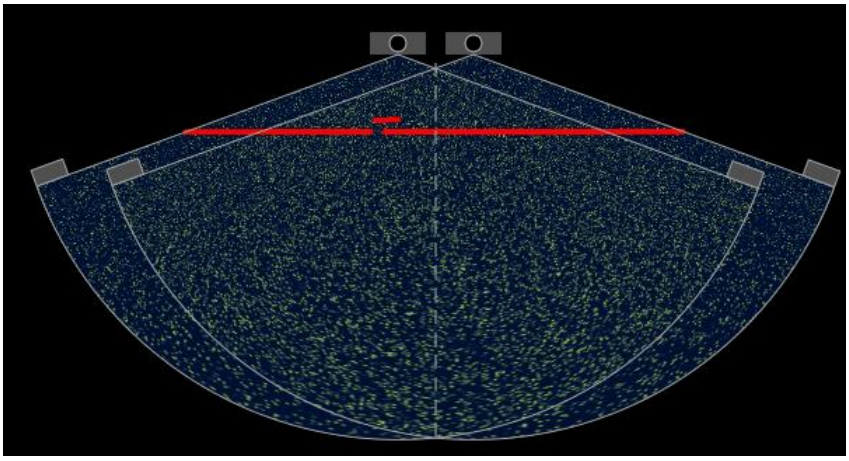
The following table lists the steps to select FM as pulse type in the SUI. It is only necessary to change the setting in the Master. The setting is mirrored to the Slave.

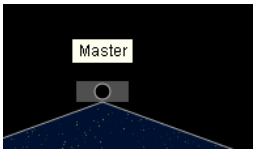
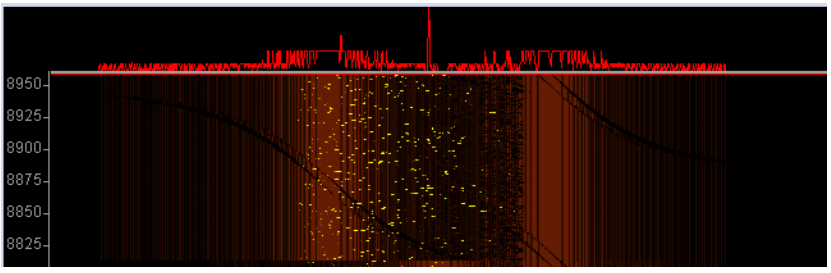
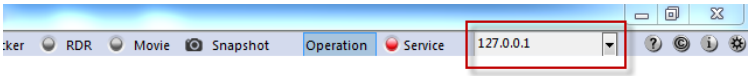
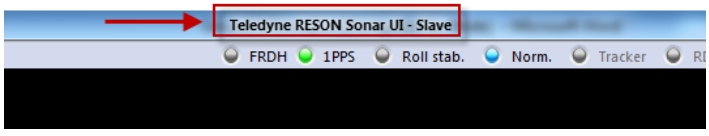
Step	Action
1	Select the Advanced pane
2	Set in the Transmit features the Pulse type to FM.



The connection with the slave is set from the SUI. The following table lists the steps to connect with a slave system.

Step	Action
1	Select the hardware pane .
2	Open the Dual Head branch (node).  The Properties are listed: 
3	In the properties:  a. Select the Dual head mode: Tick the checkbox for full rate mode, untick the check box for normal 'ping-pong' mode. In the normal mode the ping delay could be set. This delay is inserted before the other head pings to avoid interference with the slave head. b. Click the arrow key for a drop down list, and select the slave processor's IP address. (A proper network connection between the two processors is required before the slave IP address is listed.) c. Tick the 'Connect' checkbox. The master will be connected with the Slave.

Step	Action
4	The dual head properties will extend after a successful connection with the slave.  Enter the Master and Slave sonar offset with respect to the vessel's Centre Reference Point (CRP). The offsets are from the sonars acoustic center to the CRP of the vessel. On the moment of writing it is only for proper indication of the wedge and therefore doesn't need to be set very accurate. Enter when applicable the correct head tilt.
Two wedges appear at the master SUI. One for the Master and one for the Slave sonar. 	

Step	Action
	Hover with the cursor over the head for a Master/Slave indication text box.  When double clicked at a head indication then the corresponding wedge becomes hidden. Double click again at the same head indication to have it displayed again.
	Both master and slave snippets data (when available) will be displayed as well in the master snippets screen. 
4	It is possible to display and access the Slave Sonar from the Master. Select from the Sonar address in the SUI toolbar the slave IP address.  It is indicated in the top bar of the display, which sonar is displayed at the screen. 
5	Repeat Step 4 and select the Master IP address. This is the major display as the Master controls the Slave.

6.3 Control

As the Master dictates when the slave sonar will cycle, most functions in the Slave Sonar are mirrored from the master, and therefore not possible to change in the Slave.

The following table summarizes the enabled functions when a dual head system is used. An enabled function means the operator is able to change the setting.

Enabled=✓

Disabled=X

Function✓	Master	Slave	Notes
Main Pane			
All functions	✓	X	
Advanced Pane			
Beam mode	✓	X	
Steering	✓	✓	The steering value could be changed at the slave. But as soon the master steering value is changed, this will set the slave steering value with the master setting.
Coverage	✓	✓	The coverage value could be changed at the slave. But as soon the master coverage value is changed, this will set the slave steering value with the master setting.
Max Rate	✓	X	
Frequency	X	X	
Pulse type	X	X	
Absorption	✓	X	
Spreading	✓	X	
Sound velocity	✓	X	
Detection Pane			
Depth gate	✓	X	
Range gate	✓	X	
Adaptive gate	✓	X	
Tracker	✓	X	The Tracker mode is enabled from the Master. The master will control the Slave settings except the power and gain; these are controlled by the slave. It is however not possible to enable the tracker conditions as power and gain from the slave. This is done by the master.
Coverage angle	✓	X	
Multi-detect	✓	X	

Pipe Pane			
All functions	✓	✓	
Hardware Pane			
All functions	✓	X	All slave parameters are set by the master except the bracket and trigger out parameters. The slave's roll stab parameters are set by the master. However the slave processor must be interfaced with the motion sensor.
IO pane			
All functions	✓	X	The Master IO data is echoed from the master 7K Center to the slave 7K Center. The IO page could therefore not be modified from the slave and also notice the IO could not be monitored by the slave IO module.

6.4 BITE

The BITE LED indicates the (Alarm) status both for the Master and Slave system. A red BITE indicates an error in the Slave or in the Master. To access and check the service menu for the Slave it is necessary to open the Slave by the slave sonar address as discussed in the 'Setup' section above. When in the Slave, access the service menu for fault finding the Slave system.

7 Appendix Raw Data Recording (RDR)

7.1 Introduction

As described in the section ‘Recording’ on page 48 it is possible to store selectable records created by a RESON multibeam: the Raw Data Records (RDR). RDR is a feature of the 7K Control Center (not from the SUI). Storage of records could be locally on the RESON processor, but could also be on an external device as another computer, or a Network Attached Storage (NAS) drive.

For some configurations, Windows settings needs to be configured (e.g. file sharing, creating a workgroup etc.). For this document the necessary Windows 7 operating system settings are described.

This document discusses the setup for RDR but is also applicable for AVI recording.

7.2 Scenarios

For this document we define five scenarios:

For a common 7K Gx (where x is a generation number) processor:

- RDR on a Gx processor.
- RDR on an external (customer) computer.
- RDR on a Network Attached Storage (NAS) drive.

For a T20 processor:

- RDR on a connected computer in a local network (E.g. workgroup).
- RDR to a connected computer in a domain.

7.2.1 RDR on a Gx processor

In this scenario on a 7K Gx processor the 7K Center, the SUI and the acquisition software runs. RDR will be logged on the local hard drive or an external connected storage device.

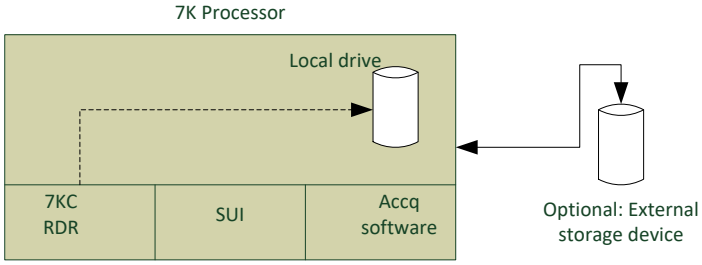


Figure 7-1 RDR on the Gx Processor and optional a connected storage device.

Records and folder path could be set in the SUI Record page. See section ‘SUI record and file path selection’ on page 109 for the procedure.

7.2.2 RDR on an external (customer) computer

In this scheme the RDR will be logged on an external computer or to an external storage drive connected to this computer. This external computer is connected to the processor by a network. A network needs to be setup for this purpose. The SUI runs on the 7K Processor.

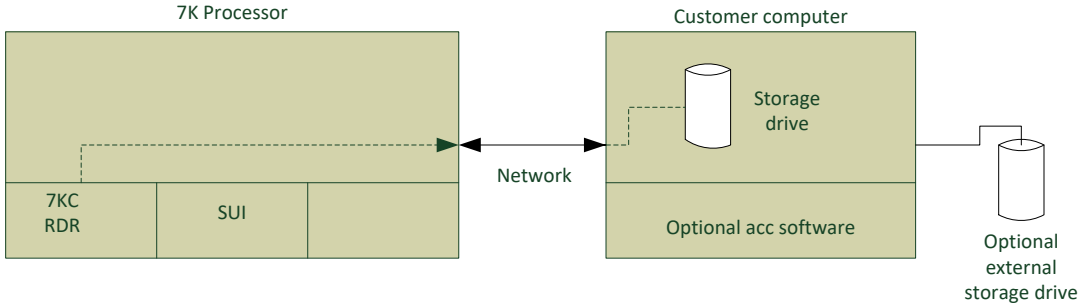


Figure 7-2 RDR on external (customer) computer.

Four steps are to be followed for correct configuration of the RDR:

1. Setup a correct IP address and Subnet mask for the 7K Processor and the external /customer computer. They should be in the same IP range. See section ‘Setup correct IP address and Subnet mask’ on page 102.
2. Create a workgroup. The workgroup must be the same for the processor as for the computer. See section ‘Create a workgroup’ on page 100.for the procedure to create a new or change an existing workgroup.
3. Share the folder on which the RDR is logged. See section ‘File sharing’ on page 104.for the procedure.
4. Select the records to be logged and the created shared folder in the SUI’s recording pane. See section ‘SUI record and file path selection’ on page 109 for more details.

7.2.3 RDR on a Network Attached Storage device

In this scheme the 7K processor is connected to a network attached storage (NAS) device or optional to a device connected to this NAS.

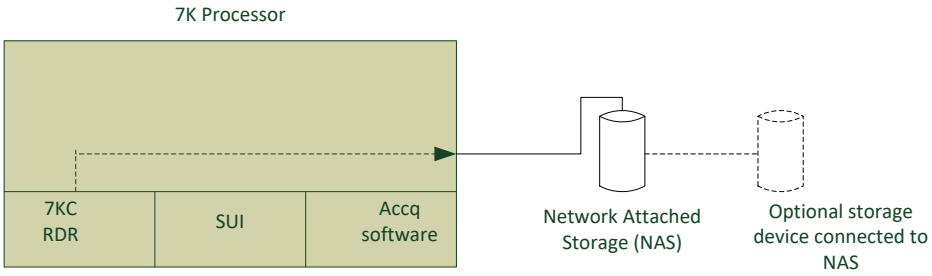


Figure 7-3 RDR to Network attached Storage (NAS)

A Network Attached Storage device could be simply seen as a computer.

Two steps needs to be performed for correct configuration of RDR:

1. Setup the Network access storage device. Refer to the manufacture supplied documentation for installation and configuration instructions.

   In common created folders on the NAS are already shared and accessible.

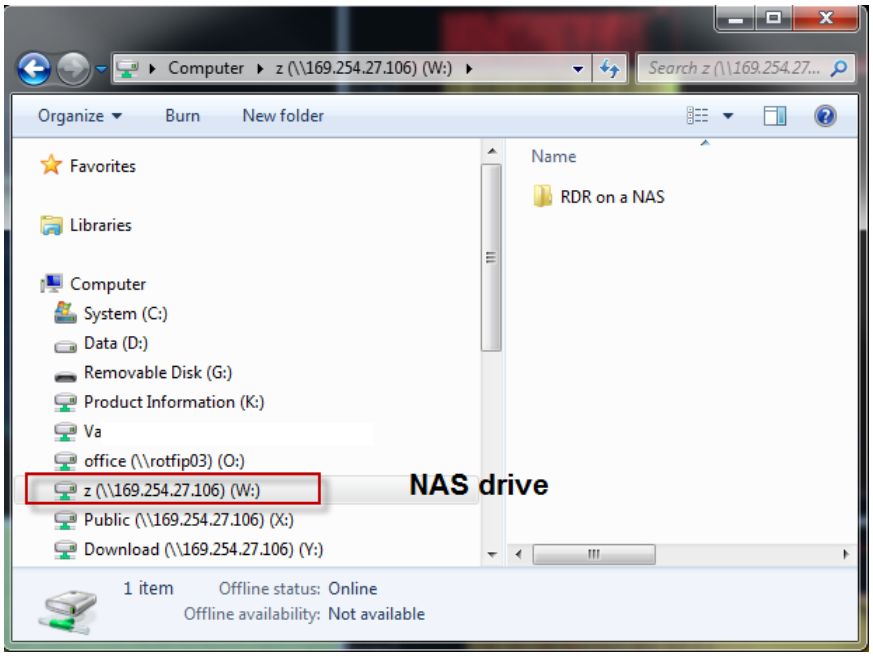


Figure 7-4 Windows Explorer with NAS drive listed.

2. Select the records to be logged and the shared folder in the SUI's recording pane. See section 'SUI record and file path selection' on page 109 for more details.

7.2.4 T20 RDR on an external computer in a local network (E.g. Workgroup)

The processor for the T20 is named Portable Sonar Processor (PSP).The PSP has no connection for a monitor, keyboard/mouse. Configuration of the PSP could be done by a remote desktop connection from an external computer. The SUI needs also to be run from an external computer. The external computer is connected by an Ethernet connection to the PSP. In this discussed scheme the RDR will also be on this external computer.

The PSP is set up to acquire a DHCP IP address (Dynamic Host Configuration Protocol). If no DHCP server is found after several minutes of searching on the network the two Ethernet ports of the T20-P will be by default select the static IP addresses 10.11.10.1 (Ethernet port 1) and 10.11.10.2 (Ethernet port 2).

It is therefore recommended to set up the external computer in the 10.11.10.x range.

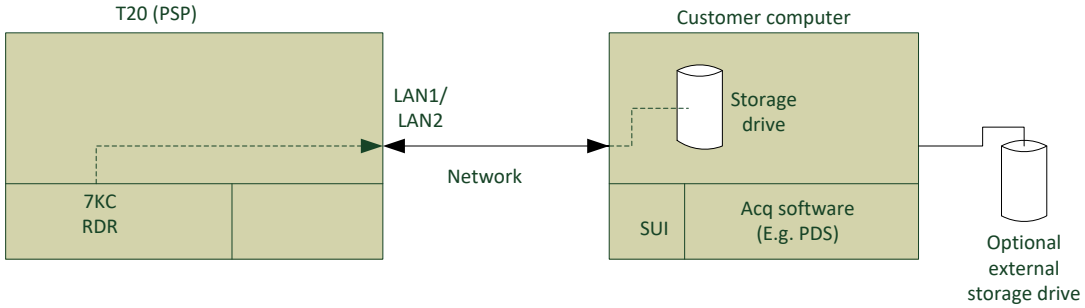


Figure 7-5 T20 RDR to external computer.

Four steps needs to perform to configure the RDR:

1. Set the IP number of the computer in the 10.11.10.x range. (Do not use 10.11.10.1 and 10.11.10.2 as these are used by the PSP.) See section ‘Setup correct IP address and Subnet mask’ on page 102.
2. Create a workgroup. The workgroup of the PSP is default ‘RESON’. It is not really needed to set up a workgroup, but computer names in the network are possibly not listed when not done. See section ‘Create a workgroup’ on page 100.for the procedure to create a new or change an existing workgroup.
3. Share the external computer folder on which the RDR needs to log. See section ‘File sharing’ on page 104.for the procedure.
4. Select the records to be logged and select the created shared folder in the SUI’s recording pane. See section ‘SUI record and file path selection’ on page 109 for more details.

When an additional storage device is connected to the external computer, it is just a matter to make also this device accessible by sharing it in the network. (Same procedure as for the external computer)

7.2.5 T20 RDR to external computer in a Domain

This scheme is quite similar as the scheme when the T20 is in a local network but due to domain restrictions some additional actions are needed.

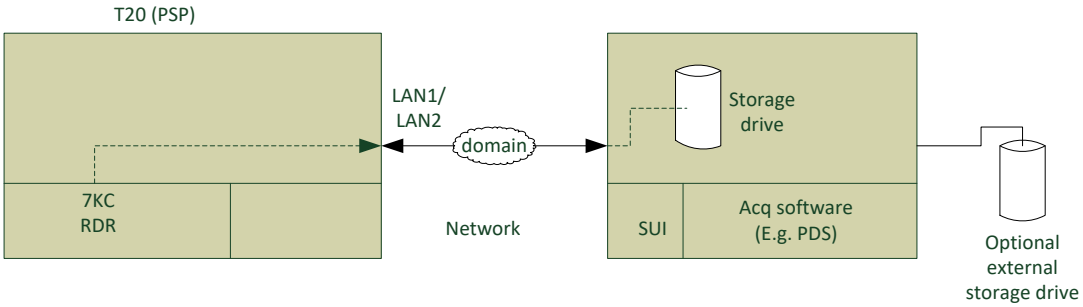


Figure 7-6 T20 RDR to external computer in a domain

The follow steps needs to perform

1. Share the external computer's folder on which the RDR needs to log. See section 'File sharing' on page 104.for the procedure.
2. Establish a remote connection with the PSP. See section 'Remote connection' on page 109 for the procedure.
3. Start on the PSP the Windows Explorer, and browse to the shared folder on the external computer. As it is a domain the external computer's username and password is requested to enter.

Figure 7-7 Windows Security username and password dialog.

4. Select the records to be logged and select the external computer's created shared folder in the SUI's recording pane. See section 'SUI record and file path selection' on page 109 for more details.

7.2.5.1 Additional notes

In the windows explorer's network connection the computer name of the connected computer must be listed otherwise it is also not listed in the SUI's recording file path.

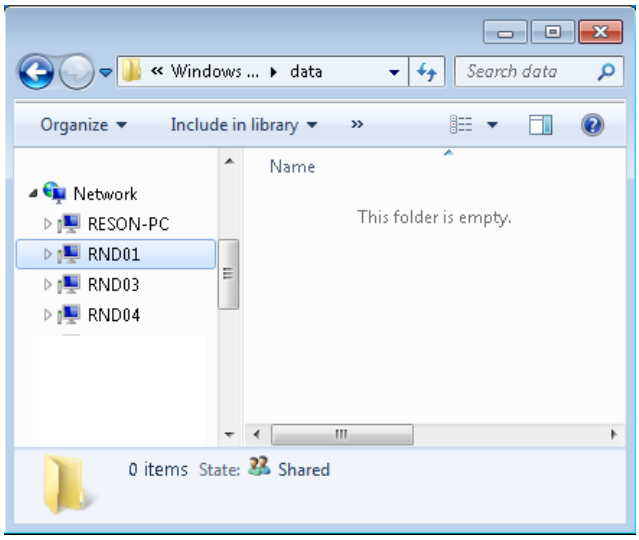


Figure 7-8 Computer names available in the windows explorer network list.

It could be necessary to enable 'Network discovery' in the advanced sharing settings. See section 'file sharing' on page 104 how to access the advanced sharing settings.

It could be necessary to have Home group network file sharing selected.

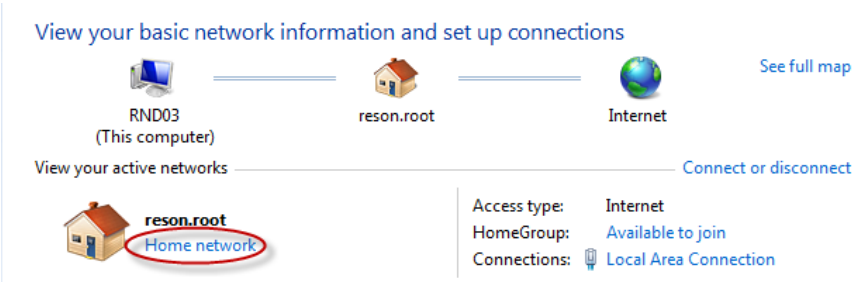


Figure 7-9 Home network

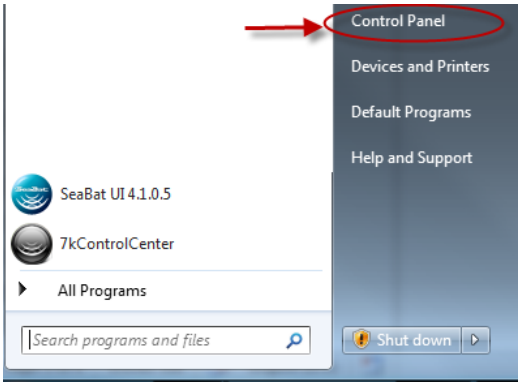
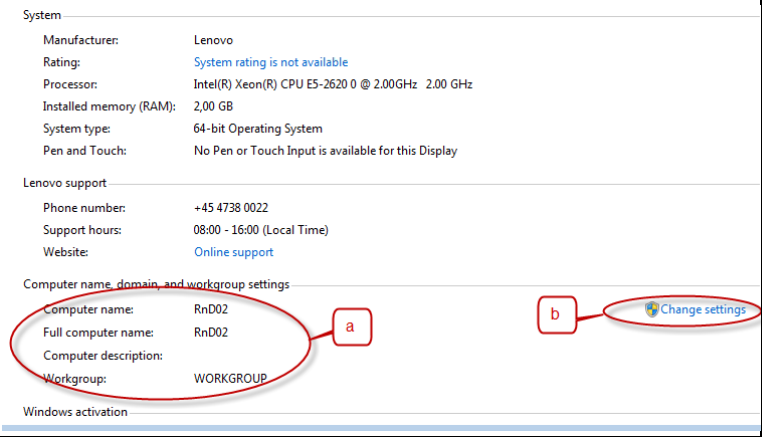
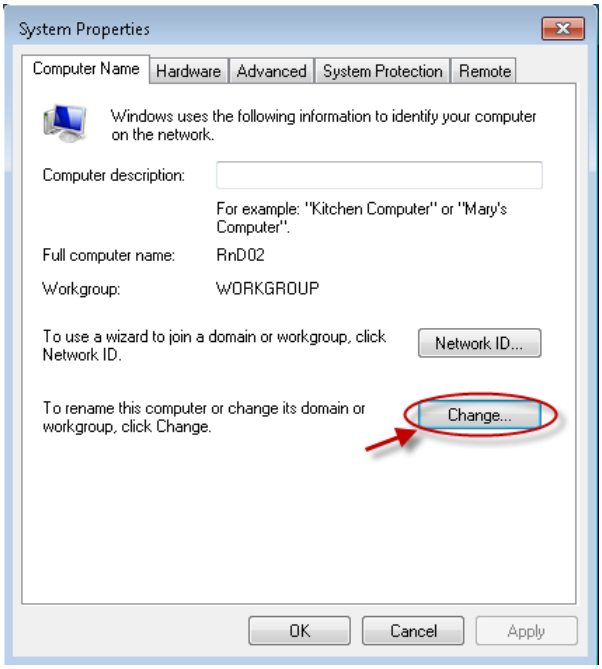
Contact your administrator in case of issues.

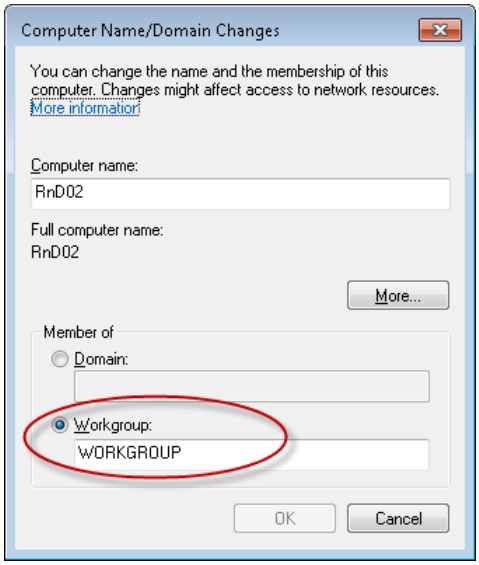
7.3 Creating a workgroup

The connected computers/processors must be in the same workgroup.

The table below summarizes the procedure.

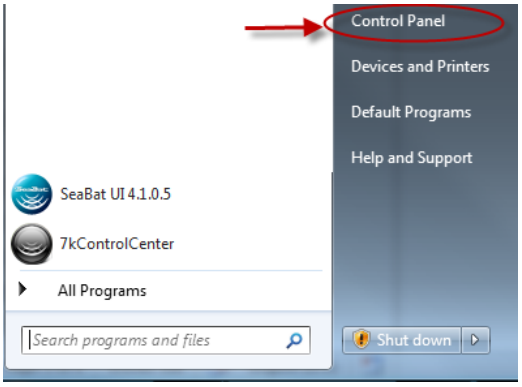
Step	Action
1	Open the windows start menu. 

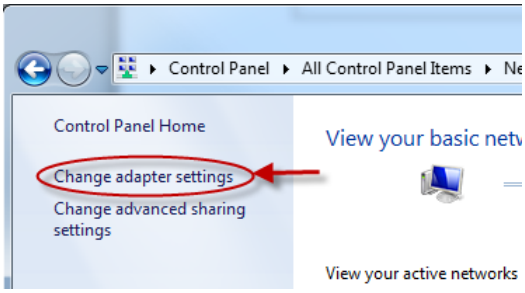
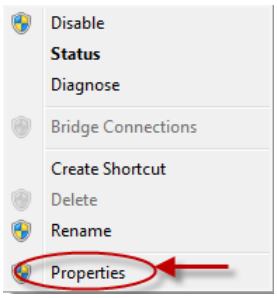
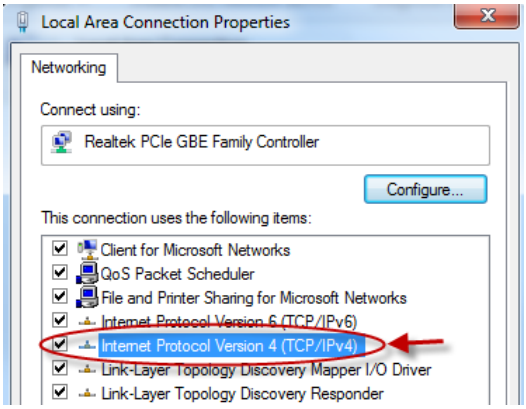
Step	Action
2	Open the windows Control panel. 
3	Open 'System' System
4	a. A overview is listed with the computer name and current Workgroup(name). b. Click 'Change settings' to modify. 
5	Followed by clicking 'Change'. 

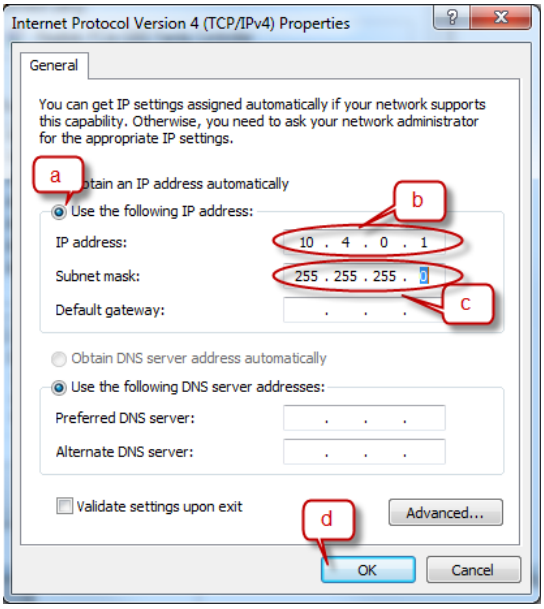
Step	Action
6	Tick the checkbox ‘workgroup’ and give the workgroup a name. (Default Windows name is WORKGROUP, for the T20 PSP this is default RESON). The workgroup must be equal as the other connected computers/processors. 
7	Click ‘OK’ when finished.

7.4 Setup correct IP address and Subnet mask.

The table below summarizes the procedure to setup an IP address.and a subnet mask. Computers/processors connected to each other must be in the same range with a unique last digit. (E.g. Processor 10.4.0.1 and PC1: 10.4.0.2)

Step	Action
1	Open the windows start menu. 
2	Open the windows Control panel 
3	Open the ‘Network and Sharing Center’. 

Step	Action
4	Click ‘Change adapter settings’. 
5	An overview will be listed with available ports. A Local Area connection should be listed with status ‘Connected’. Check the network connection cable between the processor/computer when status is ‘disconnected’. Right click at this ‘local area connections’ icon. 
6	Open the ‘Properties’ from the context menu. 
7	Double click ‘Internet Protocol Version 4 (TCP/Ipv4)’. 

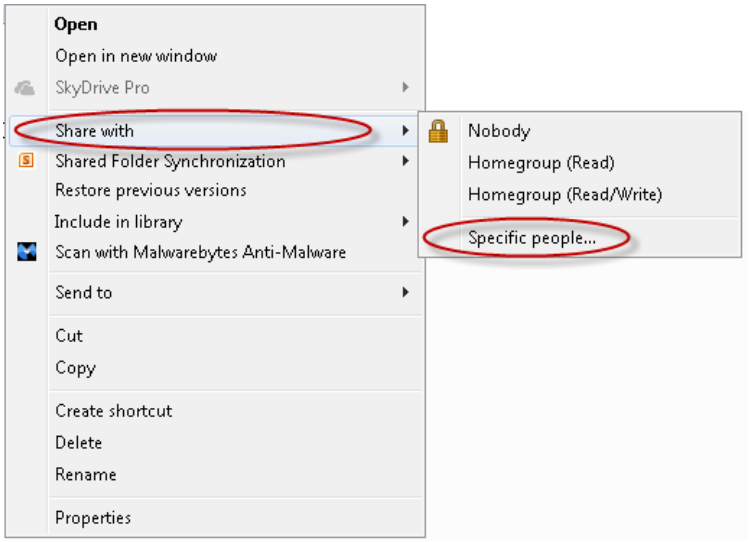
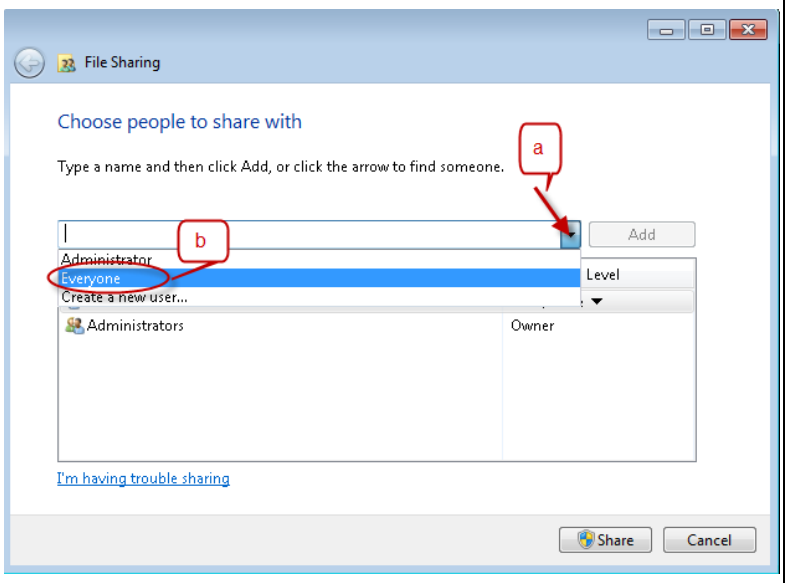
Step	Action
8	a. Tick the checkbox ‘use the following IP address’. b. Enter the IP address. (In this example 10.4.0.1). c. Enter subnet mask 255.255.255.0 d. Click ‘OK’. 

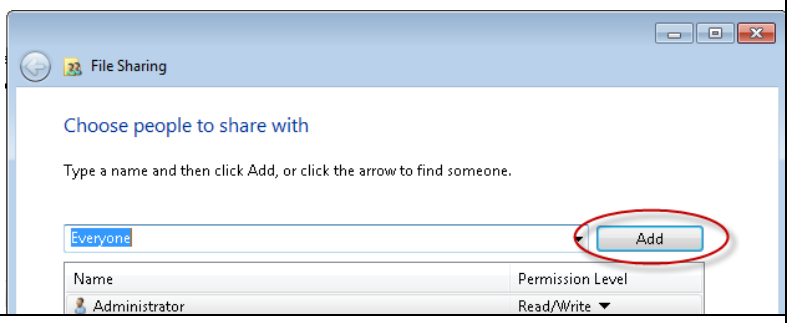
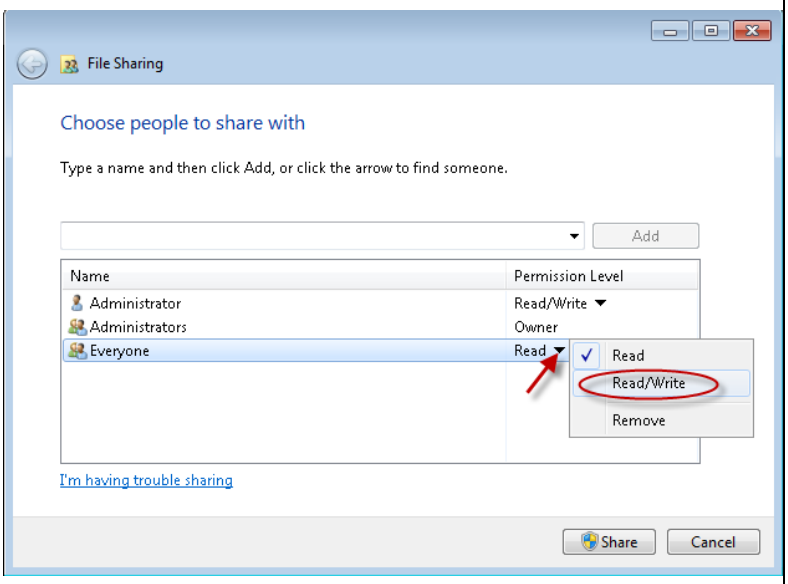
7.5 File sharing

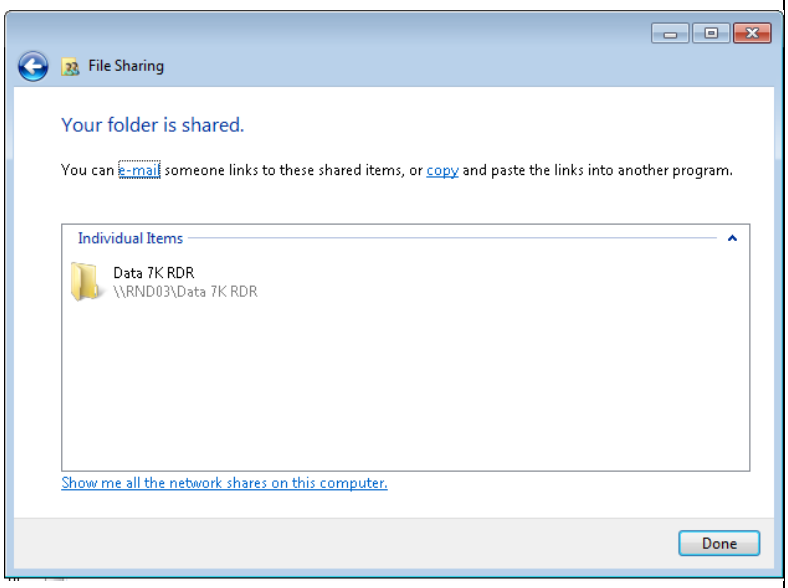
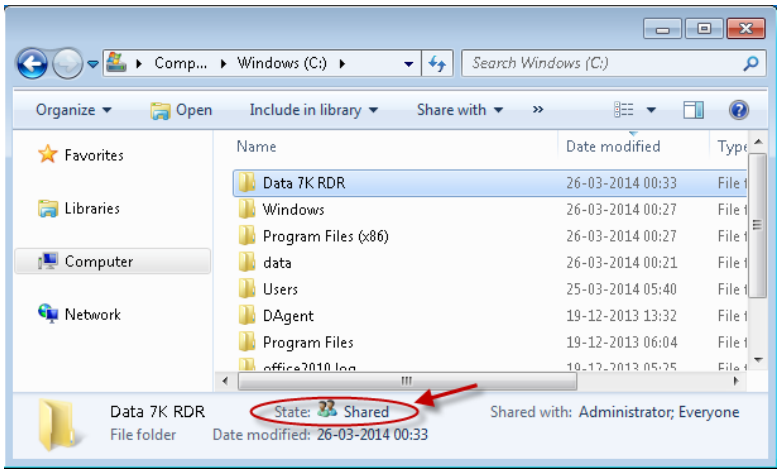
The folder to store the RDR needs to be shared.

The table below summarizes the procedure.

Step	Action
1	Open Windows Explorer.
2	Make or create a new folder to be shared.

Step	Action
3	Right click on this folder and click ‘Share with’ from the context menu, followed by ‘Specific people.’ 
4	In the file sharing dialog box. a. Click the arrow for a drop down box. b. Select ‘Everyone’. If Everyone is not listed you can also just type the word ‘everyone’ in the field. 

Step	Action
5	Click ‘Add’. 
6	Click the arrow to change the Permission Level from ‘Read’ into ‘Read/Write’.  Click the ‘Share’ button  to share the folder.

Step	Action
7	The folder is shared. 
8	In the details pane of windows explorer it is indicated if a folder is shared with its properties. 

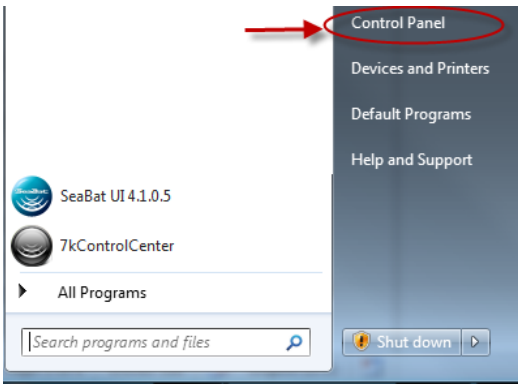
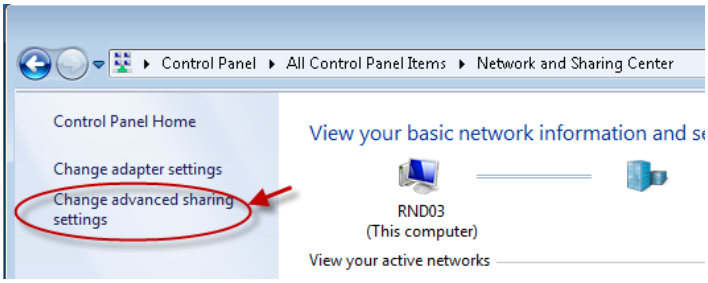
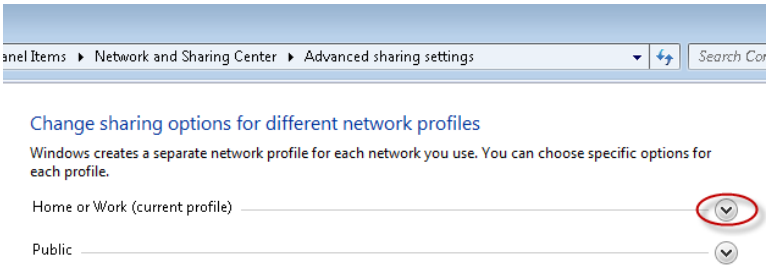
7.5.1.1 Additional settings

In order to share folders it could be necessary to setup additional settings.

These settings could be done in the Control panel, Network and Sharing Center.

The following table summarizes the procedure.

Step	Action
1	Open the windows start menu. 

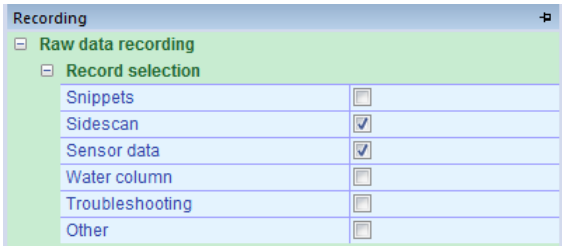
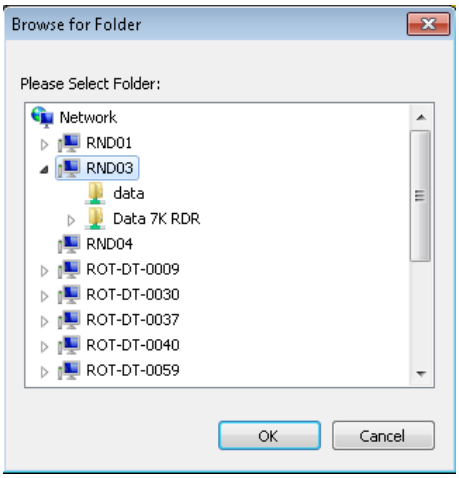
Step	Action
2	Open the windows Control panel. 
3	Open the 'Network and Sharing Center'. 
4	Click 'Change advanced sharing settings'. 
5	Click the chevron to see the network settings. Be aware to select the correct profile. 
6	All kind of advanced settings are listed. A setting which could cause problems is the 'password protected sharing'. Turn this password protection off. 

Step	Action

7.6 SUI record and file path selection

The correct folder in the SUI should be selected.

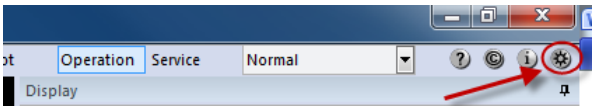
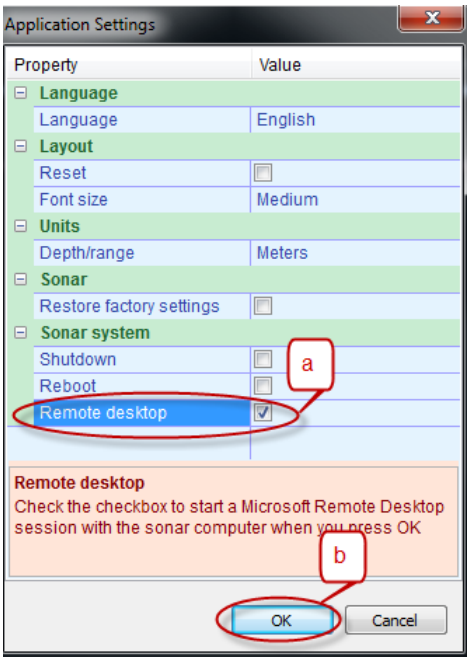
The table below summarizes the procedure.

Step	Action
1	In the SUI, open the Recording pane.
2	Select the required records by ticking the checkbox(es) 
3	Double click the file storage path field. 
4	Browse to the folder. When the folder is on an external computer, browse to 'Network' and the computer name of this external computer followed by the associated (shared) folder. 

7.7 Remote connection

The T20 Portable sonar Processor is accessible by a remote desktop connection from an external computer.

The table below summarizes the procedure to setup a remote desktop connection to a T20 PSP.

Step	Action
1	Open the SUI's Application Setting Dialog box. 
2	a. Tick the 'Remote desktop' icon. b. Click 'Ok'. 
3	Enter in the windows security dialog box the PSP's username and password. Username: RESON Password: *Contact Teledyne-RESON for the password as a remote connection is used for advanced trouble shooting or setup.

Note: when logged in a domain it is necessary to enter for the username the PSP's IP address followed by RESON. (E.g. 10.4.1.1\RESON)

7.8 Start RDR

Click in the SUI's toolbar at RDR to start the logging.

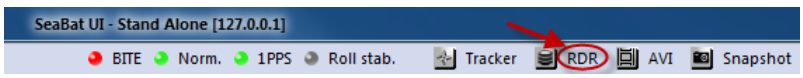


Figure 7-10 Click 'RDR' to start the logging.

When the logging runs this is indicated by green LED.

Figure 7-11 green LED

See Figure 7-12.

a. The file name.

b. And the file size is indicated in the SUI's recording pane.

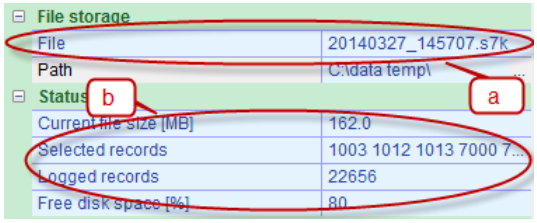


Figure 7-12 File storage data

Click in the SUI's toolbar RDR again to stop the logging.

8 Appendix C – 3001 Contact Output record

8.1 Introduction

The 7k 3001 – Contact output record is created by the 7kCenter if a sonar contact is created / modified or deleted in the sonar UI.

Sonar Contacts can only be created if a forward looker sonar is connected to the sonar UI

See for more information about the 7k format the document 'DATA FORMAT DEFINITION - 7k Data Format'.

Name	Size	Description
Target ID	u32	Contact unique ID
Ping number	u32	Sequential number
Operation time	7kTIME (u8 * 10)	Time of contact state operation applied to contact
Operator name	utf8 * 128	Optional textual name of the operator
Contact state	u32	0 – Created 1 – Modified 2 – Deleted
Range	f32	Range from sonar to contact in meters
Bearing	f32	The bearing from sonar center to contact in +/- radians
Information flags	u32	BIT FIELD: Bit 0: Set to 1 if Latitude and Longitude fields contain valid values Bit 1: Set to 1 if Azimuth field contains a valid value Bit 2: Set to 1 if Contact length field contains a valid value Bit 3: Set to 1 if Contact width field contains a valid value

Name	Size	Description
Latitude	f64	Latitude of contact in radians -π/2 to π /2, south negative
Longitude	f64	Longitude of contact in radians -π to π, west negative
Azimuth	f32	Optional azimuth of contact in radians
Contact length	f32	Optional length of contact in meters
Contact width	f32	Optional width of contact in meters
Classification	utf * 128	Optional textual classification given by the operator
Description	utf * 128	Optional textual description given by the operator

9 Appendix Copyright Information

9.1 Glew

THE POSSIBILITY OF SUCH DAMAGE.

TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE MATERIALS OR THE USE OR OTHER DEALINGS IN THE MATERIALS.

10 Amendment Record Sheet

Rev.	Date	Reason for Modifications
1.4.11	27/08/2019	Chapter: Operation: Display: Add Active Sonar Targets layer. Screens: Wedge: Add Sonar Contacts.t
1.4.10	21/06/2019	Update toolbar buttons. Add description Playback pane.
1.4.9	29/04/2019	Operate: Modified list with available data records recording. Amendment record sheet moved to the back of the manual. Only the last amendment is listed after the Title page.
1.4.8.	12/03/2019	Minor textual changes.
1.4.7.	02/06/2017	Quick Guide: Add text to set IP sonar processor on SUI. Operation: Add text to rotate depth gate. Add text Sidescan and Snippets waterfall data range.
1.4.6	20/10/2016	Operation – Screen - Sidescan: Text modified. Operation – Screen - Detect: Text modified.
1.4.5	27/09/2016	Operation - Dual head: Text modified. Appendix A Dual head (master slave): Text modified. Quick guide: OpenGL requirement added.
1.4.4	02/02/2016	Appendix Copyright information added.
1.4.3	13/11/2015	Operation: Figure Snippets data modified.
1.4.2	11/11/2015	Operation: Text modified ‘Vernier parameters’.
1.4.1	19/10/2015	Operation: Section added “Vernier parameters”.
1.4.0	16/10/2015	Quick Guide: Text modified. General information: Text modified. New functions SUI panes added. Operation: Text modified. New functions SUI panes added.
1.3.5	24/08/2015	Operation: Text added ‘Maintain swath coverage’.
1.3.4	28/04/2015	Service: Text added.
1.3.3	08/04/2015	Quick Guide: Text modified. Operation: Text modified.
1.3.2	25/03/2015	Operation: AUV text added.
1.3.1	26/02/2015	Operation: Record text modified. Service:figures modified.
1.3.0	19/02/2015	Manual updated after review
1.2.1	14/01/2015	General information: Added text Wake up. Operation:Text modified leds toolba.r
1.2.0	11/12/2014	SeaBat User interface becomes Sonar User interface as different sonar. types will use the SUI.

1.1.9	27/05/2014	Text modified ‘Restore factory settings’ .
1.1.8	22/05/2014	Text modified sonar network connections..
1.1.7	22/05/2014	TT10530. Text modified remote desktop.
1.1.6	13/05/2014	Section ‘General Information’ text ‘Application settings dialog’ modified.
1.1.5	30/04/2014	Appendix ‘Dual Head’ text modified. Section ‘Operation’ text modified.
1.1.4	25/04/2014	Appendix ‘Dual Head’ text modified. Dual head: Ping delay. Text added.
1.1.3	07/04/2014	Snippet window added in section ‘Operation’.
1.1.2	28/03/2014	Appendix ‘RDR’ added.
1.1.1	07/03/2014	Text modified section ‘Equi-Angle’ Appendix ‘Dual Head’ added.
1.1.0	15/11/2013	Major update to SeaBat UI version 4.1.0.5
1.0.6	14/03/2013	Updated to SeaBat UI version 4.0.0.10
1.0.5	12/10/2012	Updated to SeaBat UI version 4.0.0.8
1.0.4	05/07/2012	Updated to SeaBat UI version 4.0.0.4
1.0.3	04/06/2012	Minor updates
1.0.2	24/05/2012	Updated to the latest SeaBat UI version
1.0.1	14/05/2012	New items added to the SeaBat UI User Manual.
1.0.0	26/04/2012	First version of the SeaBat UI User Manual.

Index