User Manual for VDR Explorer

For DM100/DM200/DM300 S-VDR and DM100/DM400/DM500 VDR

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1.1	December 2006	Documentation for VDR explorer Version 1.1. Support for extraction to database discontinued. Alarm display added. Other minor changes.
1.2	April 2007	Minor revision. Description of Remote Backup has been removed from this manual.
1.3	March 2008	Documentation for VDR Explorer 1.31. (Vista support and improved Modbus support).
1.4	August 2008	References to DM200 and DM400 included.
1.5	September 2008	Documentation for VDR explorer 1.4 (improved tool for data export).
1.6	September 2010	Description of IMO (IEC61996-1/2) mode for data export tool. Description of Azimuth Thruster object included.
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3.1	June 2014	Minor revision
3.4	February 2017	Description of changes related to version 3.42 including description of new calibration feature and interface for creating data processor configuration for the VRI

Contents

REVISION RECORD 2

1 SCOPE AND PURPOSE 8
1.1 References 8
1.2 Terms and Abbreviations 8

2 SYSTEM OVERVIEW 9
2.1 Connecting a PC to a MK4 fixed capsule 10
2.2 Connection a PC to MK1 float free 10
2.3 Connecting the PC to a MK2 and MK3 fixed capsule 10
2.4 Connecting the PC to a VDR data disk (DM300/DM500) 11

3 GUI DESCRIPTION 12
3.1 After startup 12
3.1.1 Tool bar 14
3.1.2 VDR Explorer status bar 14
3.1.3 VDR Explorer play control area 14

4 REPLAY OF DATA, SHORT GUIDE 15
4.1.1 Play control 16
4.1.2 Tracks 16

5 CONFIGURATION 17
5.1 Creating a new configuration 17
5.2 Adding new tab pages 17
5.2.1 Tab page organizer 18
5.3 Importing tab pages 19
5.4 Creating and moving graphical objects 20
5.4.1 Creating and moving panels 20
5.5 Configuration of graphical objects 20
5.5.1 Copy/paste of graphical object configuration 21
5.6 Configuration of Gauges 22
5.6.1 Dial meter 22
5.6.2 Vertical bar 24
5.6.3 Horizontal bar 25
5.6.4 Compass dial 26
5.6.5 Horizontal ruler 27
5.6.6 Doppler log 28
5.6.7 Rudder indicator 29
5.6.8 Graph 30
5.6.9 Roll and pitch indicator 31
5.6.10 Azimuth Thruster 32
5.7 Numeric data display 34
5.7.1 General 34

5.7.2 Colors 34
5.7.3 Concatenation 34
5.8 Paper strip 35
5.8.1 Data format 35
5.8.2 Channel 35
5.8.3 Source 35
5.8.4 Output only changes 35
5.9 Configuration of data sources for objects 36
5.9.1 Source 36
5.9.2 Display format (alphanumeric data field - use value and analog data) 37
5.9.3 Display format (alphanumeric data field - digital data) 38
5.9.4 Field colors (alphanumeric data field only) 38
5.9.5 Decoding (serial data only) 39
5.9.6 Alarm display tab 41
5.9.7 Calibration tab 41
5.9.8 OPT format tab 41
5.9.9 Telemetry tab 41
5.10 Default color definition 42
5.11 Formatter syntax 43

6 CALIBRATION OF DATA 44
6.1 VDR Explorer calibration mode 45
6.2 Manually calibration using the configuration for an object 48
6.2.1 Calibration tab for analog data and value from serial data 48
6.2.2 Calibration tab for digital data (gauge only) 49

7 OPT OPERATIONAL PERFORMANCE TEST 50

8 AIS DATA DISPLAY 52
8.1 AIS display tab 52
8.2 Selecting data source 53
8.3 Using a AIS display tab 54
8.4 Symbols for Targets 54
8.5 Supported messages 55

9 DISPLAY OF DATA FROM VESSEL'S ALERT MANAGEMENT SYSTEM 56
9.1 Alert List object 56
9.2 Alert event log object 57
9.3 Selecting data sources 57

10 OBJECTS RELATED TO IMAGES RECEIVED OVER IEC 61162-450 58
10.1 Object for showing "status and information text" 58
10.2 Object for showing "display source information" 58

11 VDR AND VDR EXPLORER CONFIGURATION MANAGEMENT 59
11.1 VDR configuration management 59

11.2 VDR Explorer configuration management 59

12 CONNECT DIALOG BOX 61
12.1 Capsule 61
12.2 Backup 62
12.3 VDR extraction 62
12.4 Live 62

13 DECODER LIBRARY 63
13.1 Properties for NMEA decoders 63
13.2 NMEA decoder library window 64
13.2.1 Drop down menus 64
13.2.2 Decoder library tree 65
13.2.3 Decoder description 65
13.3 NMEA Decoder Editor 66
13.3.1 Drop down menus 66
13.3.2 Tool bar 67
13.3.3 General buttons 67
13.3.4 Decoder information 67
13.3.5 Editor window 68
13.3.6 Decoder test 68

14 EXTRACTOR 69
14.1.1 Track information 69

15 DATA EXPORT TOOL 71
15.1.1 Export raw serial data 72

16 AUDIO SETTINGS TOOL 73
16.1 Password protected audio 73

17 DATA LOG 74
17.1 Configuration of data log 74
17.1.1 Direct creations of columns 74
17.1.2 Indirect creations of columns 76
17.1.3 Organizing columns 77
17.1.4 Maximum number of columns 77
17.2 Saving log data to a file 78
17.2.1 Max file size 78
17.2.2 Sample interval 78
17.3 Preferences 78
17.3.1 Directory path for log files 78
17.3.2 Disable data logging at connect 78

18 ALARM PANEL 79
18.1.1 Easy localization of alarms-source 80

18.2 Default setting for alarm panel 80
18.3 Configuration of objects for alarms....81

19 RELAY OF SERIAL OUTPUT TO OTHER APPLICATIONS 82
19.1 Output port settings....82
19.2 Configuration of serial output 83
19.2.1 Merging of data....83
19.3 Enable/Disable output....83
19.4 Overflow on serial port 84
19.5 Serial output and step 84

20 SPECIAL FEATURES 85
20.1 Floating windows....85
20.1.1 “Windows” dropdown menu 85
20.2 Support for PCs with lower screen resolution 85
20.3 Vessel information....85
20.4 Play control 85
20.5 Full screen radar image 85
20.6 Full screen graph object....85
20.7 Full AIS display 86

21 NMEA SENTENCE FORMATTING SCRIPT LANGUAGE V3.0 87
21.1 Purpose....87
21.2 Language introduction....87
21.3 Language example....87
21.4 Bit function examples 88
21.5 Operators and reserved words....88
21.5.1 Operators....88
21.5.2 Reserved words 89
21.6 Field Identifier....93
21.7 The Index Identifier 94
21.8 Strings....95
21.9 Decoding of Modbus 96
21.9.1 Data format for VDR configured as Modbus slave 96
21.9.2 Data format for VDR configured as Modbus master 98
21.9.3 Modbus functions....98
21.9.4 Overlap between input/holding registers and coils/discrete input....101
21.10 Other functions 101
21.10.1 Last function 101

22 CREATION OF DATA PROCESSOR CONFIGURATIONS FOR THE VRI 103
22.1 Destination for report....104
22.2 Creating of data processor configurations....105

APPENDIX A: DM100 VDR/S-VDR CONNING DISPLAY DEFAULT CONFIGURATION 107

APPENDIX B: VDR EXPLORER FUNCTIONAL MODES 108

1 Scope and purpose

User manual for VDR Explorer

1.1 References

DBS10956 Installation Manual for the DM100 VDR
DBS10885 Installation Manual for the DM100 S-VDR
DBS00238 Installation Manual for DM200/DM300 S-VDR and DM400/DM500 VDR
MAN11841 Manual for Installation manual for Vessel Remote Server, VRS 002

1.2 Terms and Abbreviations

OPT Operational Performance Test

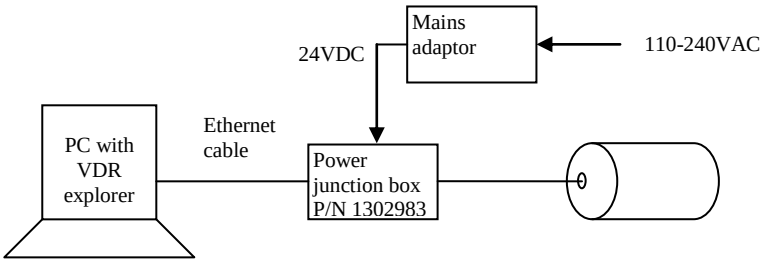
2 System overview

The VDR Explorer is an application designed for XP or Windows 7. The VDR Explorer is able to replay data recorded by a DM100, DM200, DM300 S-VDR and DM100, DM400, DM500 VDR. The VDR Explorer can read data from the following sources:

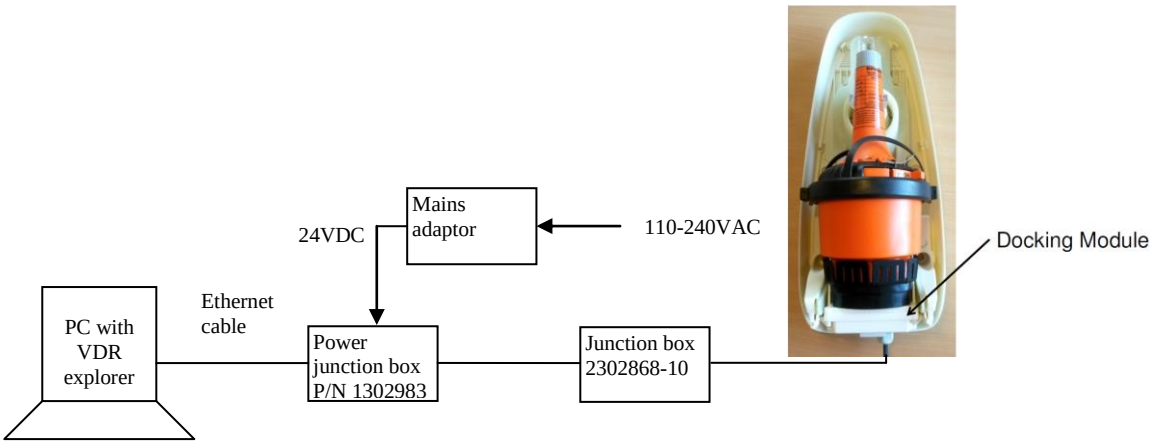
Source	Description	Hardware required
Fixed capsule MK2 and MK3 (capsules with Firewire interface)	Data from the capsule which has been removed from the VDR	- A PC with Firewire port. - Firewire repeater with CAT 5 interface - A mains to 12V DC adapter for the repeater is needed if a portable PC with 4-pin i/f is used
Fixed MK4 capsule and float-free MK1 (capsules with Ethernet interface)	Data from the capsule which has been removed from the VDR	- A PC with an Ethernet port. - A mains to 12V DC adapter - Power junction box p/n 1302983
DM300/DM500 VDR data disk (the removable hard drive)	Data from a backup disk that has been removed from the VDR (Note 1)	- A stationary PC with a 6-pin Firewire port. - A Firewire repeater and a mains to 12V adapter is needed when a portable PC with a 4-pin Firewire port is used
DM200/DM400 USB VDR data disk	Data from a USB backup disk that has been removed from the VDR (Note 1)	- A PC with a USB port
Data from External Extended backup (NAS)		- A PC with an Ethernet port
VDR Extraction	A file with VDR data downloaded from the VDR, capsule or a backup disk. It may also be a selection of data from another extraction	
Live	Data transferred live from the VDR while recording.	PC with an Ethernet port (10/100baseT)

Note 1) Data can be retrieved from a functional VDR with the VDR data disk in place utilizing the web extractor utility and a PC with an Internet browser/Ethernet port. This is the simplest way of getting access to the VDR data.

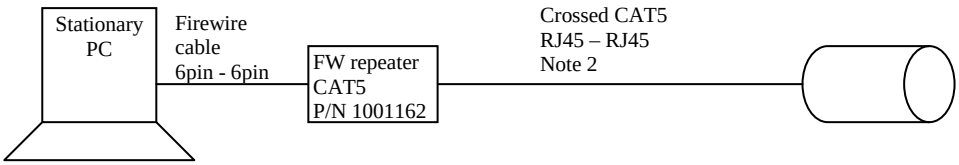
2.1 Connecting a PC to a MK4 fixed capsule



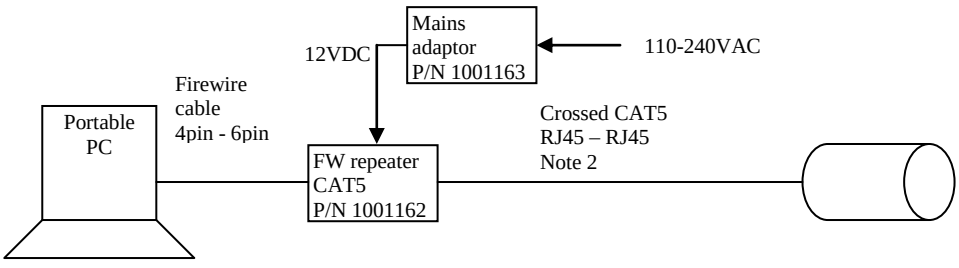
2.2 Connection a PC to MK1 float free



2.3 Connecting the PC to a MK2 and MK3 fixed capsule

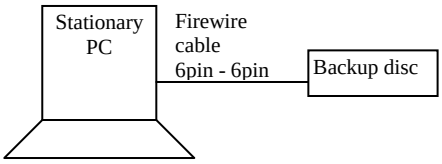


Note 2) if the original cable is attached to the capsule, then use a straight CAT5 cable and a RJ45 coupler.

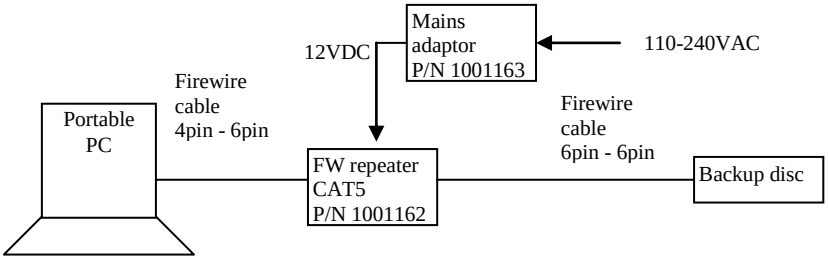


Note 2) if the original cable is attached to the capsule, then use a straight CAT5 cable and a RJ45 coupler.

2.4 Connecting the PC to a VDR data disk (DM300/DM500)



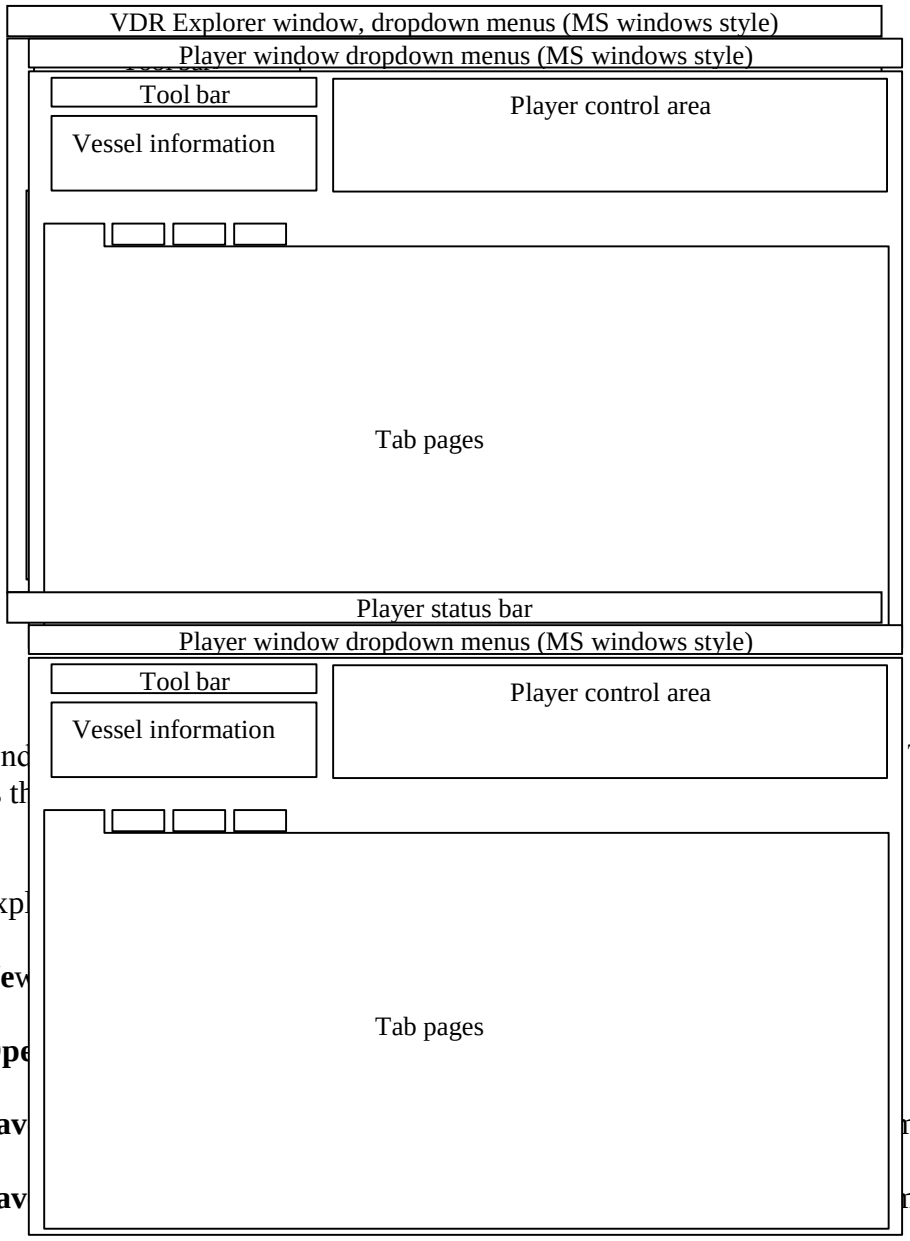
Note) if the PC is unable to power the disc then use a repeater with a mains adaptor, see below.



3 GUI description

3.1 After startup

The VDR Explorer will, after startup, use the default configuration.



The “wind The window title bar displays th

VDR Expl

File->New

File->Ope

File->Sav ne

File->Sav ne

File->Recent files: Short cuts to the 4 most recent configurations which have been opened or saved on the disk. Any configuration which has been temporarily downloaded, e.g. from a VDR while playing live, will not be included on the list.

File->Exit: Exits the VDR Explorer program.

View->Play control: Displays or hides the play control area.

View->Vessel information: Displays or hides the additional vessel information.

Tools->Log: Displays the log for the VDR Explorer program. This is only used for troubleshooting.

Tools->Audio: Opens the audio settings dialog box.

Tools->Alarm Display: Opens the alarm display window see section 18

Tools->Connect: Opens the "connect" dialog box. The "connect" dialog box is used to select a data source for the VDR Explorer see section 12.

Tools->Disconnect: Disconnects the VDR Explorer from the data source.

Tools->VDR config management: The VDR Explorer is able to use information from VDR configuration object labels see section 11.1.

Tools->VDR Explorer config management: The VDR Explorer is able to store its configuration together with source data and later retrieve this information see section 11.2

Tools->Decoder library: Opens the NMEA decoder library, see section 13.

Tools->Extractor: Opens the Extractor dialog box, see section 14.

Tools->Export Data: Opens the Export Data dialog box, see section 15.

Tools->Setup Serial Output: Opens a dialog box for selecting data to be outputted to other applications, see section 19. (This is only selectable when VDR Explorer is in configuration mode.)

Tools->Setup AIS Data Input: Opens a dialog box for selecting the common data source for the AIS display objects, see section 8.2. (This is only selectable when VDR Explorer is in configuration mode.)

Tools->Setup Alert Management Input: Opens a dialog box for selecting the data sources for the objects related to showing Bridge Alert Management data, see section 9

Tools->Download from Ethernet capsule / float-free: Tools for downloading data from the MK4 fixed capsule and the MK1 float-free i.e. the capsules utilized with the DM100 VDR or DM100 S-VDR.

Tools->VDR Data Download: Tool for downloading data from the VDR. VDR username/password for "superuser" or "svdr" can be used. In addition see Options->Preferences ->Download settings. The destination directory is defined under Options->Preferences->Directory settings-> Select VDR extractions folder.

Options->Color Definitions: Opens the definitions dialog box, see section 5.10.

Options->Preferences: Opens the dialog box for setting the program preferences.

Mode->Configuration mode - On: Sets the VDR Explorer to configuration mode.

Mode->Configuration mode - Off: Exits the VDR Explorer from configuration mode.

Monitor: Queue monitor used for troubleshooting only.

3.1.1 Tool bar

The tool bar contains short cuts (presented as icons) to the most common tools and functions.

3.1.2 VDR Explorer status bar

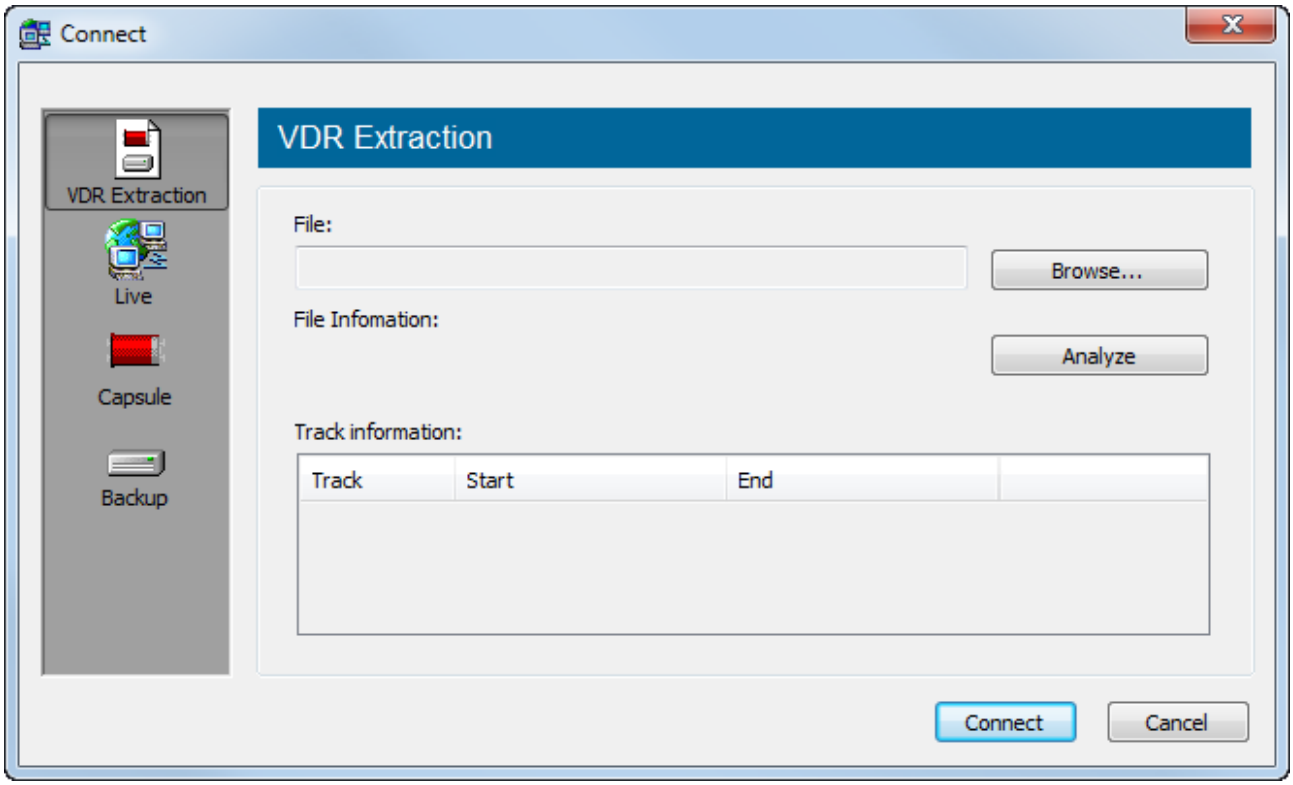
The VDR Explorer status bar contains information regarding the current status of the VDR Explorer. Additional information regarding an object selected by the cursor ("on hover") may be displayed to the left.

3.1.3 VDR Explorer play control area

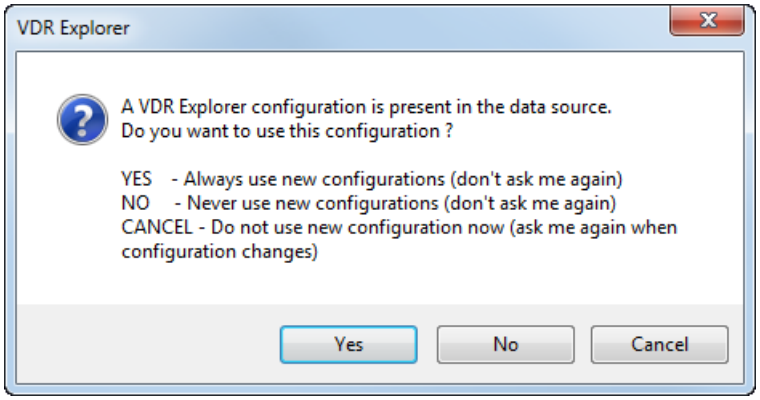
The VDR Explorer play control area contains the main controls; i.e. play, stop and pause. Some of the controls will be grayed out depending on the data source for the VDR Explorer. See also section 4.1.1

4 Replay of data, short guide

The VDR Explorer automatically displays the “Connect” dialog box when the program is started. This dialog is used for selecting a data source.



To select a data source press “Connect”, consult section 12 for more details.

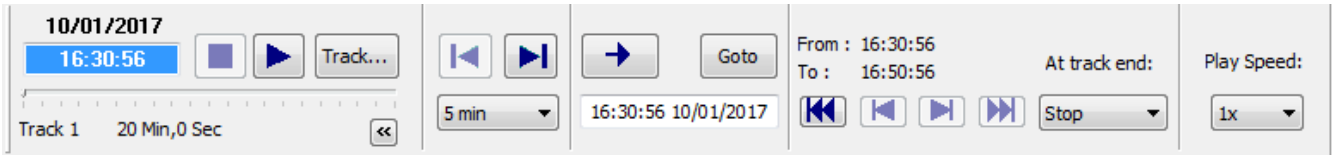


A VDR explorer configuration which matches the VDR data must be uploaded to the VDR when the VDR is installed. This will enable any PC with the VDR Explorer installed to replay data without any configuration work. If this dialog box appears then select, “Yes”.

4.1.1 Play control

The play control area contains the functions needed for replaying data. Two views are available, simple and advanced.

Simple play control



Advanced play control

A tool tip with helpful information appears if the cursor hovers over a bottom for short period. Note) The tool tip is not available for disabled functions (buttons with gray symbols).

4.1.2 Tracks

A track is defined as an uninterrupted recording session. The VDR will create a new track if it is restarted. VDR data retrieved from a normally operating VDR will only contain one track. Please note that the VDR Explorer will split a track downloaded from the VDR if a bad section of data is detected and for a DM100 VDR, if the VDR was reconfigured during the recording of the track.

4.1.2.1 Goto button

The “Goto” button will, if activated, set the slider to the position indicated in the input field below the button. A new value may be entered into the input field. The field will become red if the entered value is illegal or out of range. The icon to left of the “Goto” button may be used to update the input field with the current position of the slider. This function may be used while the VDR Explorer is replaying data. If you want to set a “mark” at an event you want to return to, do the following. First click on the icon (to the left of the “Goto” button) to set the “mark”, later you may click on the Goto button and then “Play”.

4.1.2.2 Action at end of track

It is possible to do one of the following when the end of the track is reached.

Stop	Stop playing
Continue	Continue to next track if present
Repeat 1	Repeat current track
Repeat All	Continue to next track if present or replay track 1.

5 Configuration

The VDR Explorer must be in configuration mode
"Mode->Configuration Mode - On" before any change of configuration can be made.

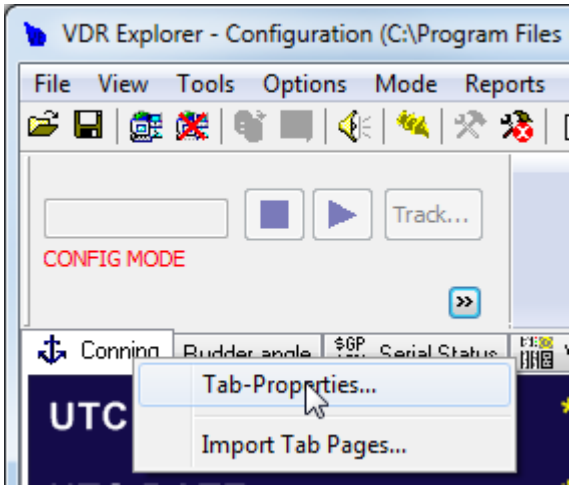
5.1 Creating a new configuration

File->New
Creates a new "empty" configuration.

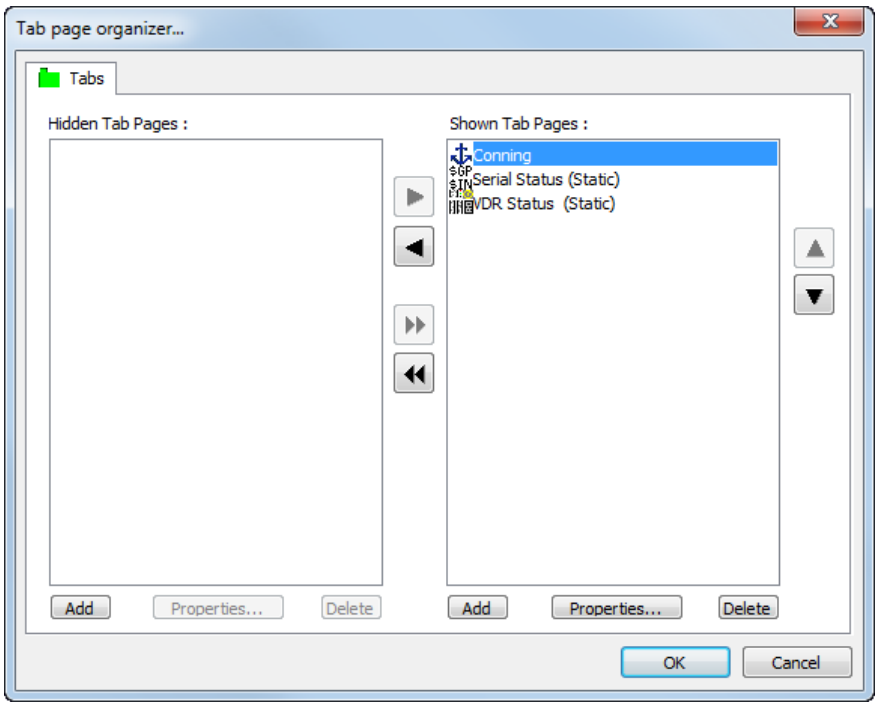
File->Open
Opens an existing configuration, e.g. a template. Use "File-Save as" to store the new configuration under another name.

5.2 Adding new tab pages

Right click on a tab for an existing page and then click on "Tab properties" and "Tab page organizer" will appear.



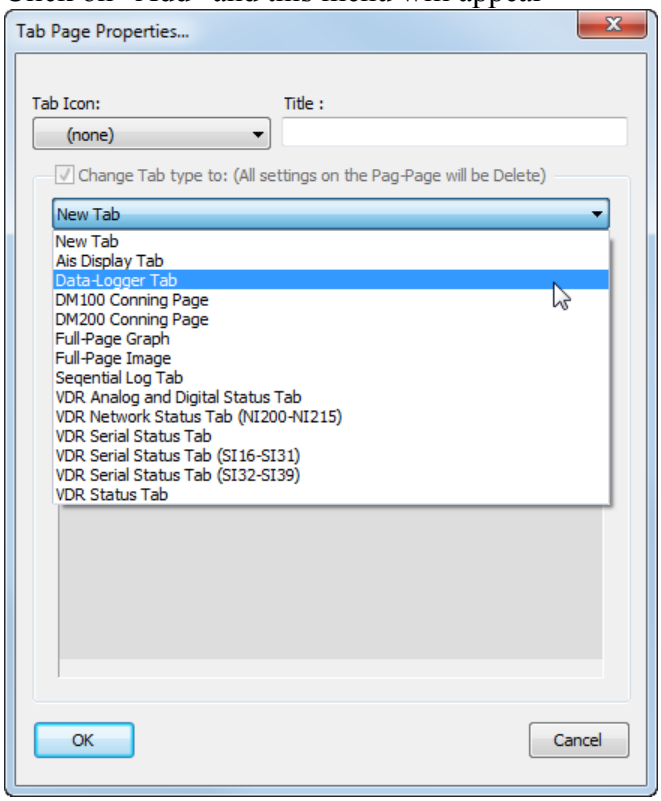
5.2.1 Tab page organizer



The Tab page organizer

The "Tab page organizer" is a tool for creating, deleting, naming, hiding and sorting the tab pages.

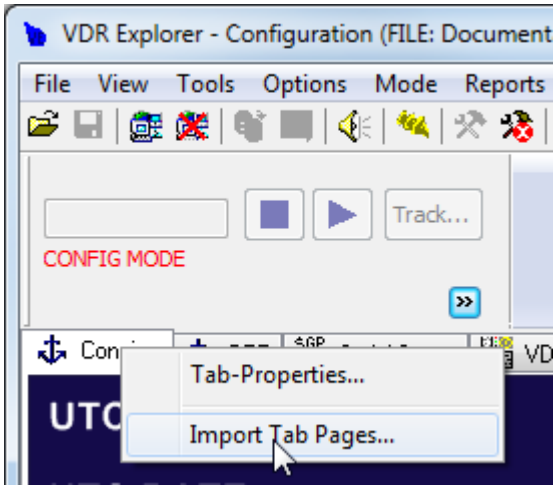
Click on "Add" and this menu will appear



Type in the title for the new tab page, select a template from the list box and click on "OK".

5.3 Importing tab pages

Right click on a tab for an existing page and then click on “Import Tab Pages”. This function is typically used for importing tab pages generated by the “VDR Explorer Configuration Creator” tool. It will import all tab pages from a VDR Explorer configuration into the current configuration.



5.4 Creating and moving graphical objects

The graphical objects on a tab page are organized into panels (columns). A graphical object often contains many elements known as “gauges”.

A proper tab page must be created before any graphical object can be created. Templates with one to four panels and one example have been made. (Right click on any tab for a tab page and then select ”Tab properties” to open the ”Tab Page Organizer” see section 5.2.

A new graphical object is created on a panel by right-clicking on a panel, and then “Insert Object”. More objects within a panel will form a column.

The position of an object within a panel may be moved up or down: Right click on the object and then click on “Object…-> Move up” or “Object…->Move down”

A graphical object cannot be moved to another panel on the left or right. However, there is a way around this:

1. Create a new instance of the object in the other panel.
2. Copy the configuration from the original object and paste it onto the new object (see section 5.5.1).
3. Delete the original object.

5.4.1 Creating and moving panels

Right-clicking on an existing panel and selecting “Insert Panel” will create an additional panel. More features for manipulating panels are found by right clicking on an existing panel and then selecting “Panel Properties”

5.5 Configuration of graphical objects

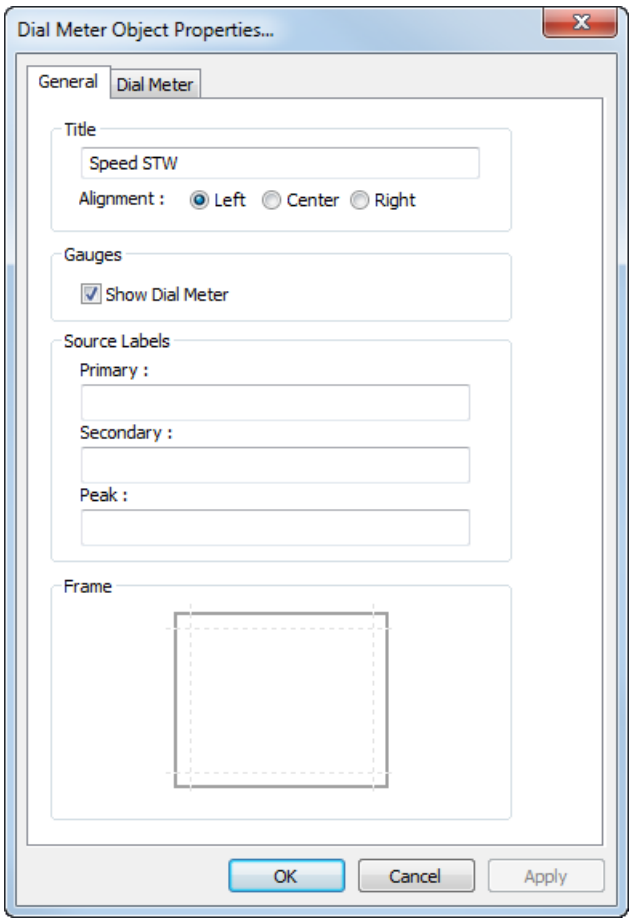
A graphical object contains one or more gauges for displaying data. The only exceptions are the “Numeric data display”, which contains 3 “objects” for displaying data in numerical form or as text, and the Paper strip object that is able to display serial data as text.

The following graphical objects have been defined (consult section 8 for objects related to AIS data display and section 9 for object related to bridge alert management):

- Dial meter
- Dual dial meter
- Four Vertical bars
- Two Horizontal bars
- Compass dial
- Horizontal ruler
- Doppler log indicator
- Dual Rudder indicator
- Graph
- Roll and Pitch indicator
- Azimuth thruster
- Numeric data display

- Small numeric data display
- Extra small numeric data display
- Paper strip
- Display source information
- Image data
- Image data with meta data

Right-clicking on the object while the VDR Explorer is in configuration mode opens the object property dialog box.



The first tab page called "General" contains the most common parameters for a graphical object. This page is slightly different for the "Numeric data display" see section 5.7.

Title: Text that is common for the gauges displayed by the graphical object.

Gauges: Checkboxes for enabling/disabling the display of gauges defined for that graphical object.

Frame: The boundary of a graphical object is indicated (default) with four thin lines. A number of graphical objects may be grouped by removing the adjacent lines. This is purely a visual effect. A line may be disabled /enabled by double-clicking on its position on the squared symbol located in this section.

Source labels: (dial meter object only):
The label for the fields that displays the data in numeric form

The remaining tab pages are used for configuring the gauges defined for the graphical object.

5.5.1 Copy/paste of graphical object configuration

The configuration from a graphical object may be copied and pasted onto another identical graphical object.

Copy configuration:
Right-click on the object and then click on "Copy Config".

Paste Configuration:
Right-click on the other object, and then click on "Paste Configuration". Note that both graphical objects must be identical.

5.6 Configuration of Gauges

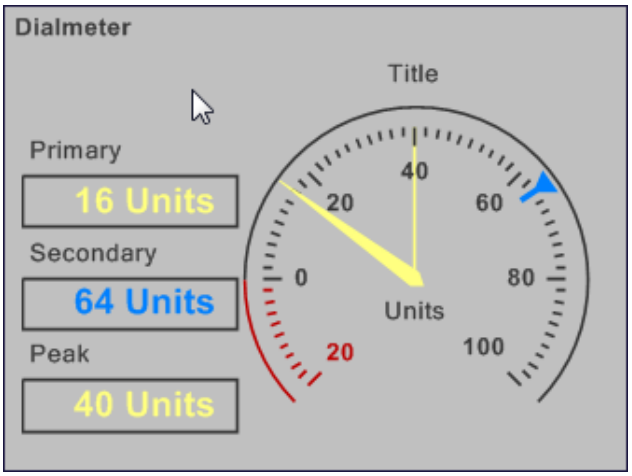
5.6.1 Dial meter

5.6.1.1 Labels

Dial Title: Text located above the dial meter.

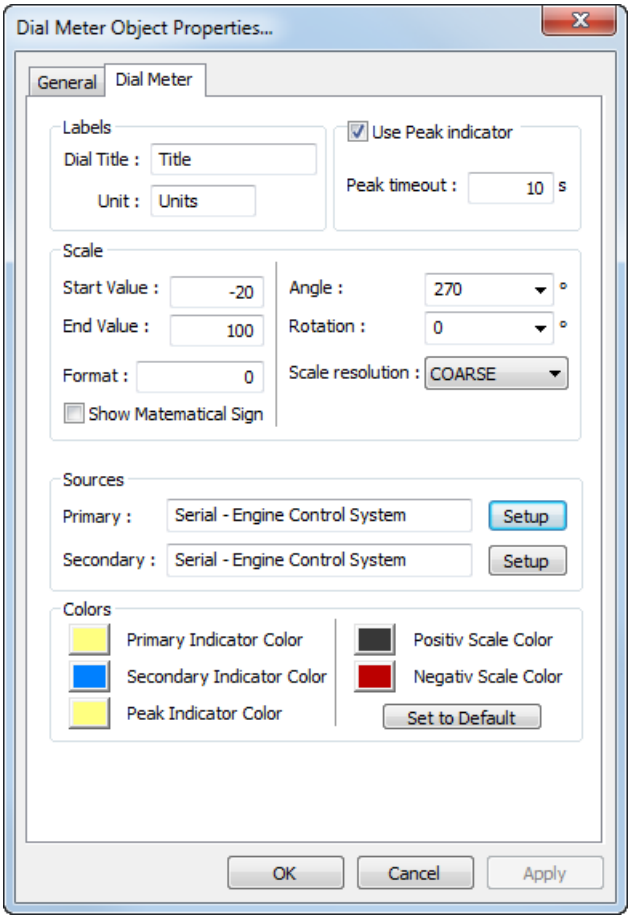
Unit: Text located inside the dial.

Use Peak indicator and Peak timeout:
The peak indicator shows the maximum reading for a specified time (peak timeout). This is useful when measuring wind speed for example.



5.6.1.2 Scale

This section contain the parameters for controlling the geometry and resolution of the dial
Start value: The start value is the most counterclockwise point on the dial.
End value: The end value is the most clockwise point on the dial.

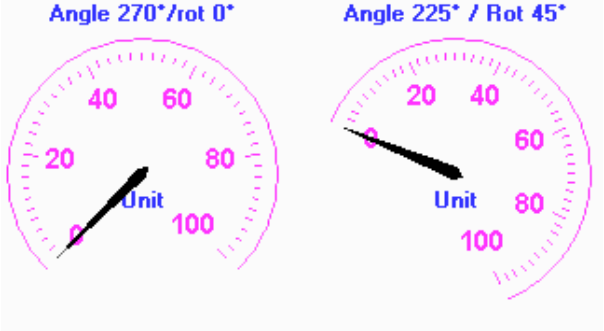


Format:
This defines the format of the figures on the dial, see section 5.11.

Show Mathematical Sign:
This controls whether figures on the dial are displayed with a mathematical sign.

Angle:
Defines the extent of the dial.

Rotation:
The dial will by default (value “0”) be similar to a typical speedometer. The rotation may be changed by entering a value other than “0” in this field.



Resolution:
This controls the resolution of the dial.

5.6.1.3 Sources

Primary: Input to the pointer for the dial meter.

Secondary: Input to the secondary indicator for the dial meter. The secondary indicator is shown as a small triangle. The secondary indicator is typically used for displaying the "commanded value" while the main indicator shows the actual value.

The "setup" button opens a dial box where the source data can be defined, see section 5.9

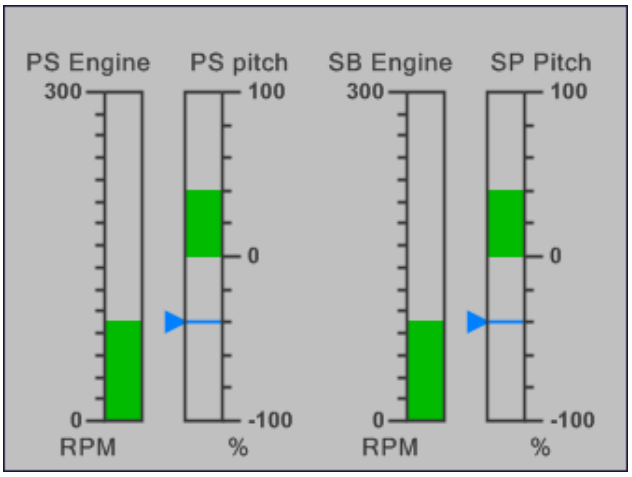
5.6.1.4 Colors

This controls the appearance of the dial meter. The "set to default" button resets all the colors to the default settings (see section 5.10)

5.6.2 Vertical bar

5.6.2.1 Labels

A vertical bar has two labels at each end. One of them is typically used as a description while the other is for unit of measurement.



5.6.2.2 Scale

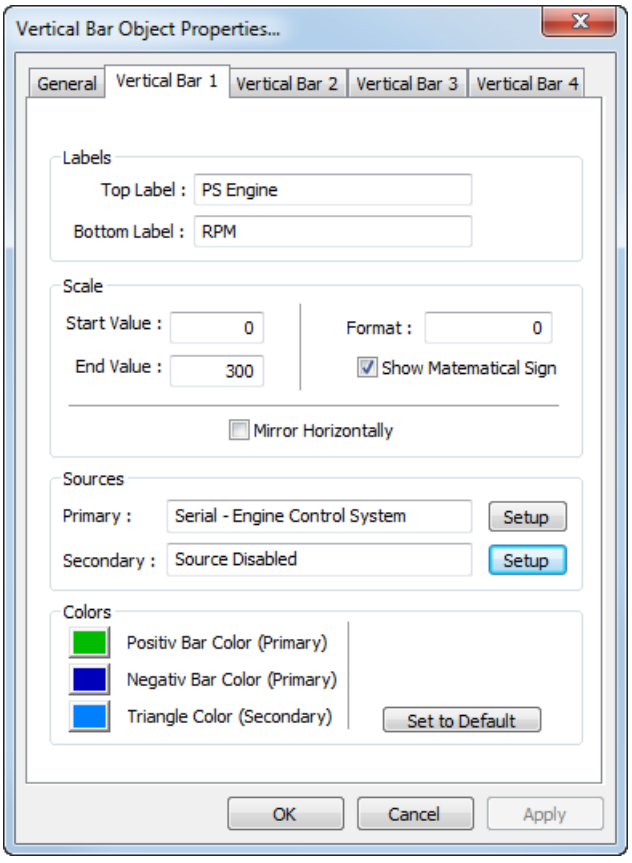
Start Value:
The start value is at the bottom of the bar.

End Value:
The end value is at the top of the bar.

Mirror Horizontally:
Two adjacent bars are (default) symmetrical instances i.e. bar 1, 2 and 3, 4 form pairs. This may be changed by checking "Mirror Horizontally" for bars with e.g. odd number.

Format:
Defines the format of the figures for the bar, see section 5.11.

Show Mathematical Sign:
This controls whether the figures for the scale are displayed with a mathematical sign.



5.6.2.3 Sources

Primary:
Input to the main indicator for the bar.

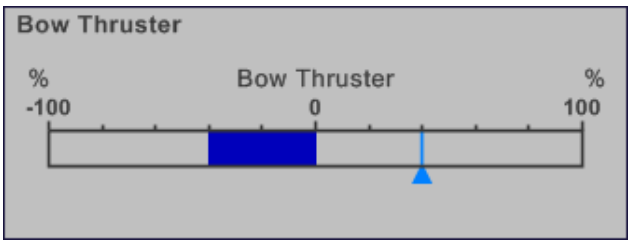
Secondary:
Input to the secondary indicator for the object. The secondary indicator is shown as a small triangle. The secondary indicator is typically used for displaying the "commanded value", while the bar shows the actual value

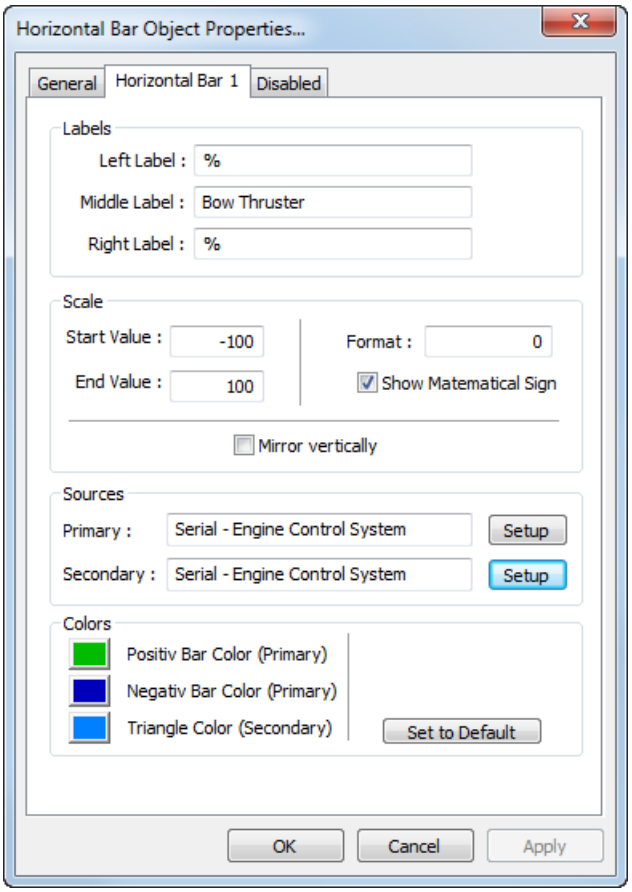
5.6.2.4 Colors

This controls the appearance of the bar object. The "set to default" button resets all the colors to the default settings (see section 5.10)

5.6.3 Horizontal bar

The parameters for the horizontal bar correspond to the parameters for the vertical bar. An extra label (middle) has been added.



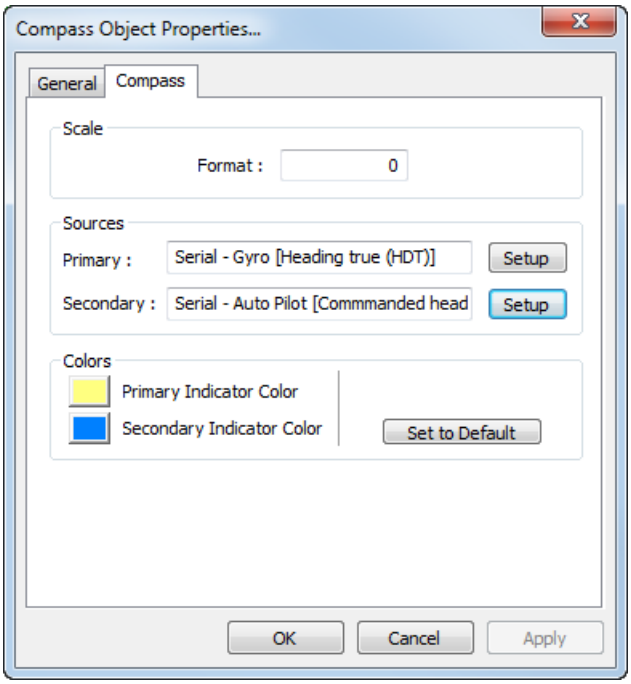


5.6.4 Compass dial

5.6.4.1 Scale

Format:
This defines the format of the figures on the compass dial, see section 5.11.

5.6.4.2 Sources



Primary:
The primary data source controls the rotation of the compass dial. The typical input is “Heading”.

Secondary:
The secondary (optional) data source controls a small triangle circling the compass dial. The typical secondary input is “Commanded Heading”.

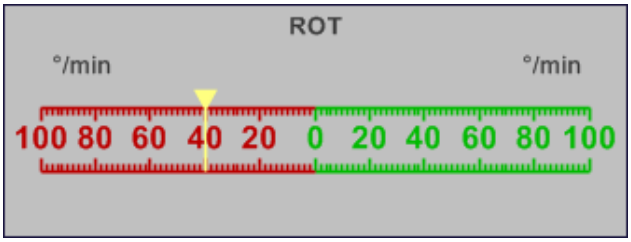
5.6.4.3 Colors

This controls the appearance of the compass dial. The “set default” button resets all the colors to the default settings (see section 5.10)

5.6.5 Horizontal ruler

5.6.5.1 Labels

A vertical bar has 6 labels.



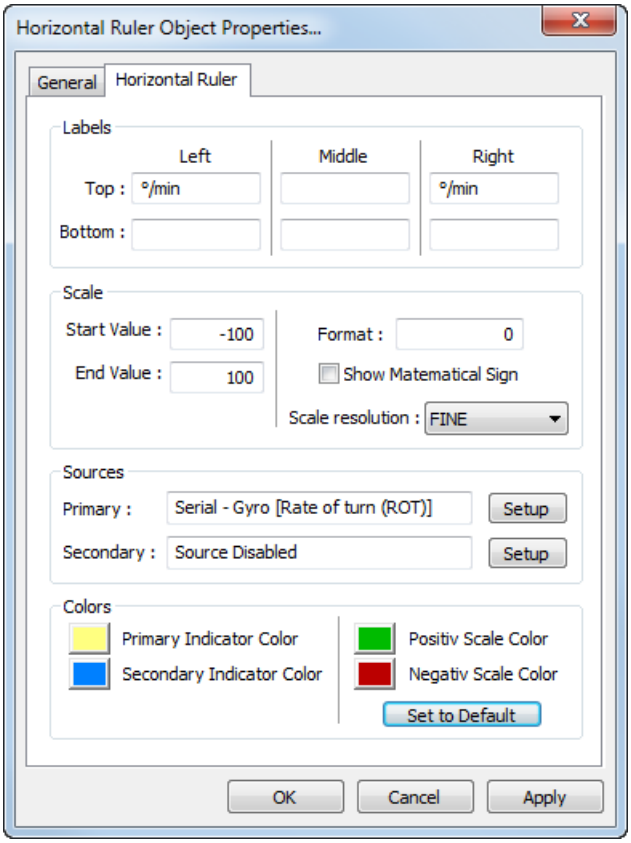
5.6.5.2 Scale

Star value:
The start value is the far left point of the ruler.

End value:
The end value is the far right point of the ruler.

Format:
This defines the format of the figures on the ruler, see section 5.11.

Show Mathematical Sign:
This controls whether the figures on the ruler are displayed with mathematical sign



5.6.5.3 Sources

Primary:
Input to the primary indicator for the ruler. The main indicator is shown as a triangle above the ruler.

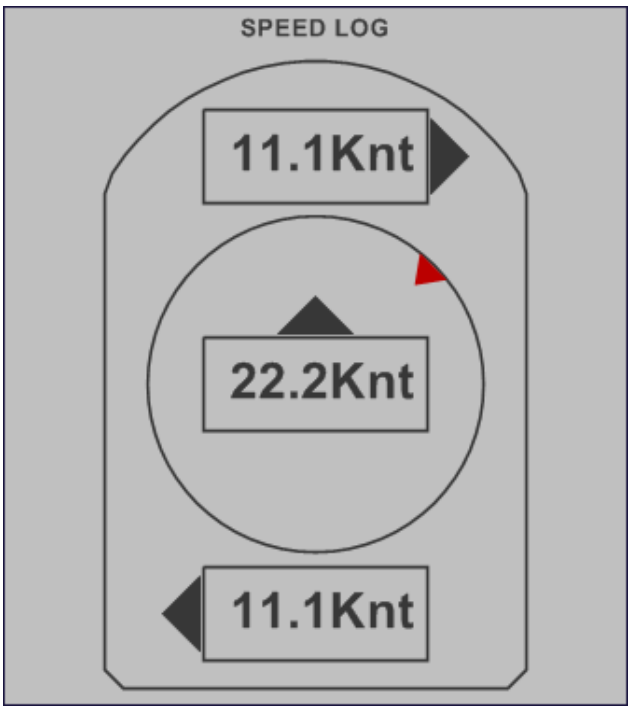
Secondary:
Input to the secondary indicator for the ruler. The secondary indicator is shown as a triangle below the ruler. The secondary indicator is typically used for displaying the “commanded value” while the primary indicator shows the actual value.

5.6.5.4 Colors

This controls the appearance of the ruler. The “set to default” button resets all the colors to the default settings (see section 5.10)

5.6.6 Doppler log

5.6.6.1 Numeric Output



Unit:
Text displayed after numeric outputs e.g. Knt.

Format:
This defines the format of the numeric outputs, see section 5.11.

Show Mathematical Sign:
This controls whether the numeric outputs are displayed with a mathematical sign.

5.6.6.2 Sources

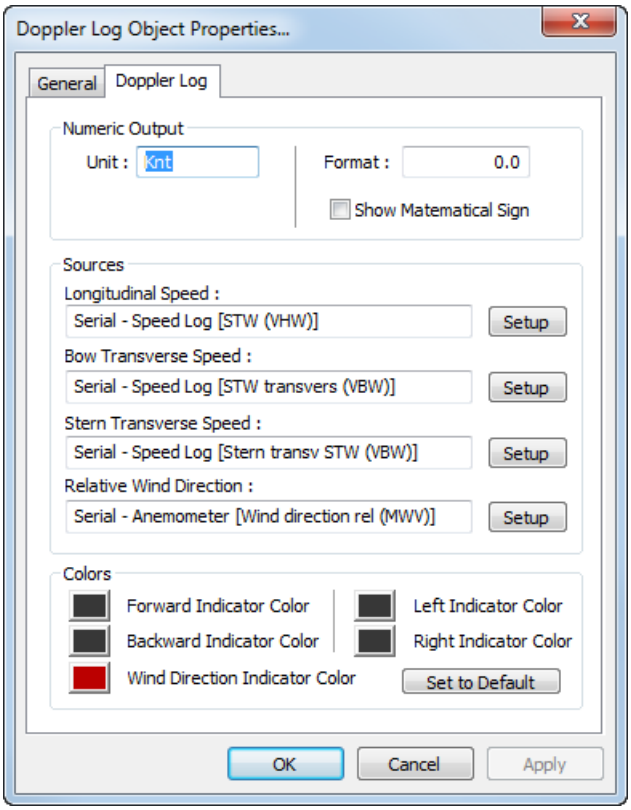
4 inputs may be applied to the Doppler log object:

Longitudinal Speed:
Is shown as numeric data in the center of the object

Stern Transverse Speed:
Is shown as numeric data at top of the object.

Aft Transverse speed:
Is shown as numeric data at bottom of the object.

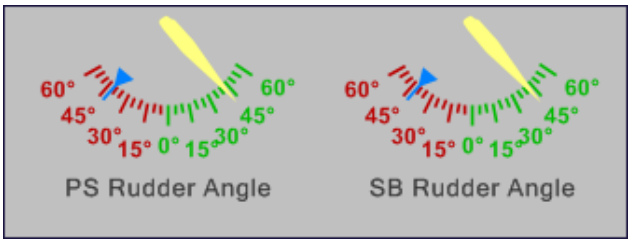
Relative Wind Direction:
Is shown as a triangle circling the center of the object.



5.6.6.3 Colors

This controls the appearance of the object. The “set to default” button resets all the colors to the default settings (see section 5.10)

5.6.7 Rudder indicator



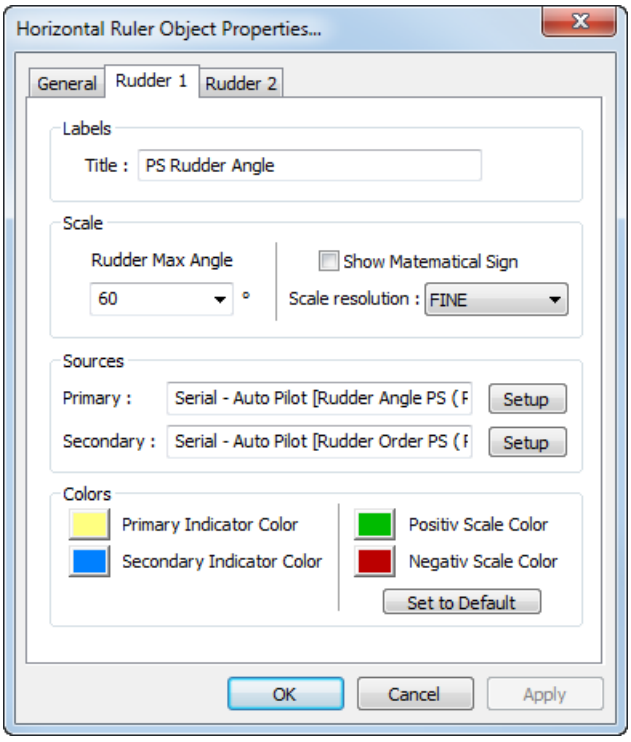
5.6.7.1 Labels

Title:
Text shown beneath the rudder indicator.

5.6.7.2 Scale

Rudder Max Angle:
This controls the extent of the dial for the rudder indicator. It is recommended that a value equal to the maximum rudder angle for the vessel is used.

Show Mathematical Sign:
This controls whether figures on the dial are displayed with a mathematical sign.



5.6.7.3 Sources

Primary:
The primary data source controls the pointer; the typical input is data from the rudder angle sensor.

Secondary:
The secondary (optional) data source controls a small triangle circling the dial. The typical secondary input is “Commanded rudder angle”.

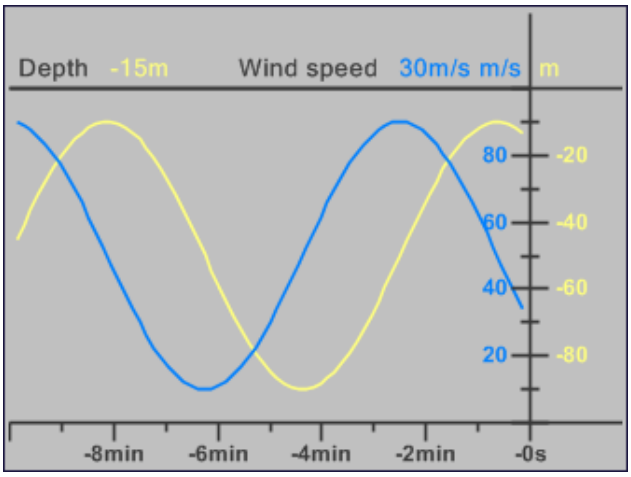
5.6.7.4 Colors

This controls the appearance of the rudder indicator. The “set to default” button resets all the colors to the default settings (see section 5.10)

5.6.8 Graph

5.6.8.1 Graph type

This section defines the input to the X-coordinate for the graph object.

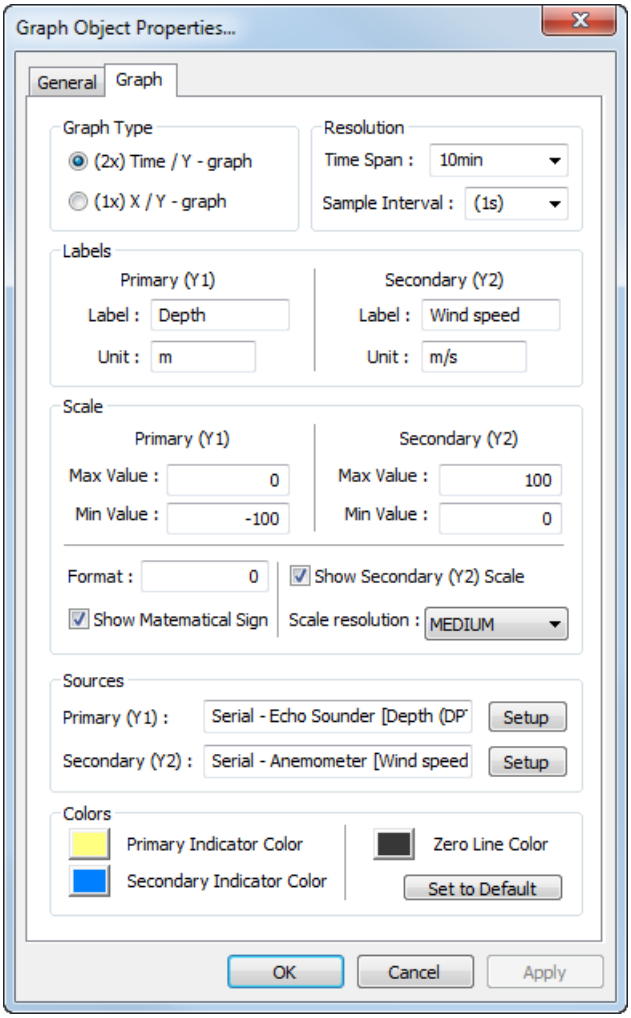


Time/Y graphs:
The primary and secondary inputs are used for Y-coordinates for two independent graphs. Time is used as X-coordinate for both graphs.

X/Y graph: The primary input is used for the X-coordinate and the secondary for the Y-coordinate.

5.6.8.2 Resolution

This defines the resolution of the graph(s). Small values for “Time Span” and “Sample Interval” give a graph with high resolution while high values give a graph that covers a large time span.



5.6.8.3 Labels

Label:
Labels for the numeric outputs.

Unit:
Text displayed after the numeric output and as unit for the corresponding axis

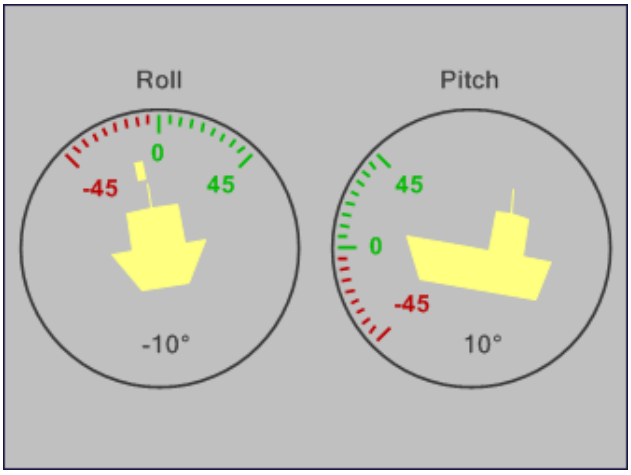
5.6.8.4 Scale

This defines resolution and format of figures for the corresponding axis.

5.6.8.5 Colors

This controls the colors of the graph. The “set to default” button resets all the colors to the default settings (see section 5.10)

5.6.9 Roll and pitch indicator



5.6.9.1 Gauge

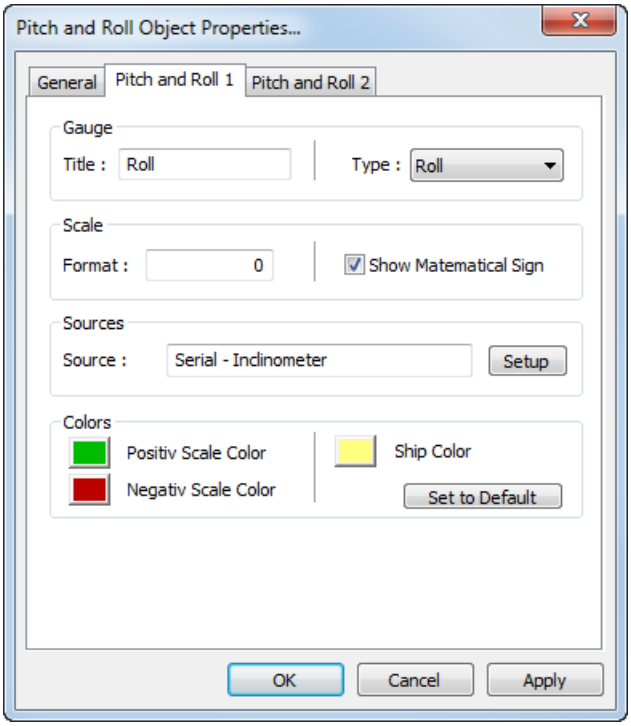
Title:
Text shown above the gauge.

Type:
Used to select the gauge type (roll or pitch). Roll is default for gauge 1 and pitch is default for gauge 2

5.6.9.2 Scale

Format:
This defines the format of the numeric outputs, see section 5.11.

Show Mathematical Sign:
This controls whether the figures on the dial are displayed with mathematical sign



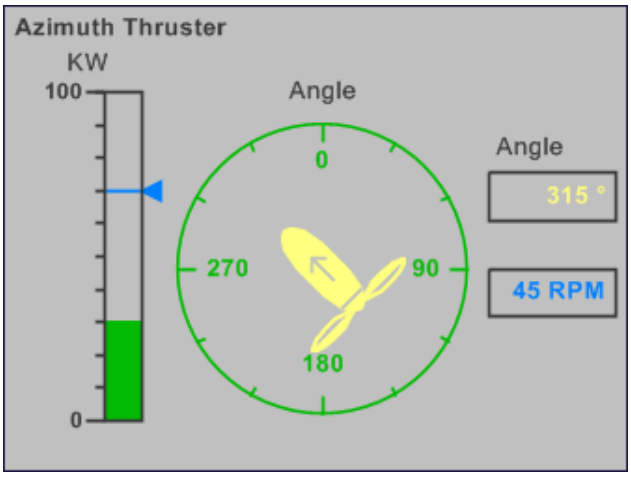
5.6.9.3 Source

The data source controls the rotation of the ship-shaped indicator in the middle of the gauge; the typical input is data from the roll and pitch sensor respectively.

5.6.9.4 Colors

This controls the appearance of the object. The “Set to Default” button resets all the colors to the default settings (see section 5.10)

5.6.10 Azimuth Thruster



5.6.10.1 Parameters for vertical bar

The azimuth thruster object includes a vertical bar to the left. The parameters for this gauge are described in section 5.6.2

5.6.10.2 Thruster

Title: Text located over the dial and the alpha numeric field located top right.

Unit:
Unit for the alpha numeric field located top right.

Use Sin/Cos input:
Mark the checkbox if the thruster utilizes a sine/cosine interface for signaling the angle of thrust

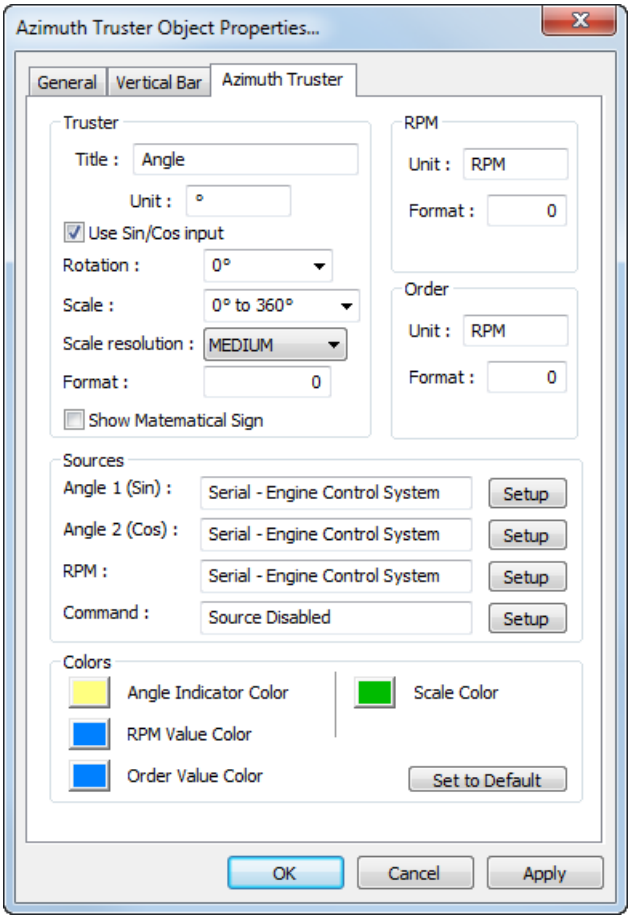
Rotation:
Controls the orientation of the dial

Scale:
Scale may be set to either 0-360º or -180º to 180º.

Scale resolution:
This controls the resolution of the dial.

Format:
This defines the format of the figures in the alpha numeric field located top right, see section 5.11.

Show Mathematical Sign:
This controls whether figures on the dial are displayed with a mathematical sign.



5.6.10.3 RPM

This contains the parameters for the alpha numeric field located left center.

5.6.10.4 Order

This contains the parameters for the alpha numeric field located left bottom.

5.6.10.5 Sources

This defines the input(s) to the thruster symbol and the two alpha numeric fields “RPM” and “Command”.

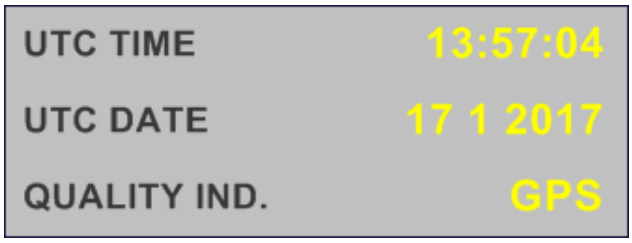
5.6.10.6 Colors

This controls the appearance of the thruster symbol and the two alpha numeric fields “RPM” and “Command”. The “Set to Default” button resets all the colors to the default settings (see section 5.10)

5.7 Numeric data display

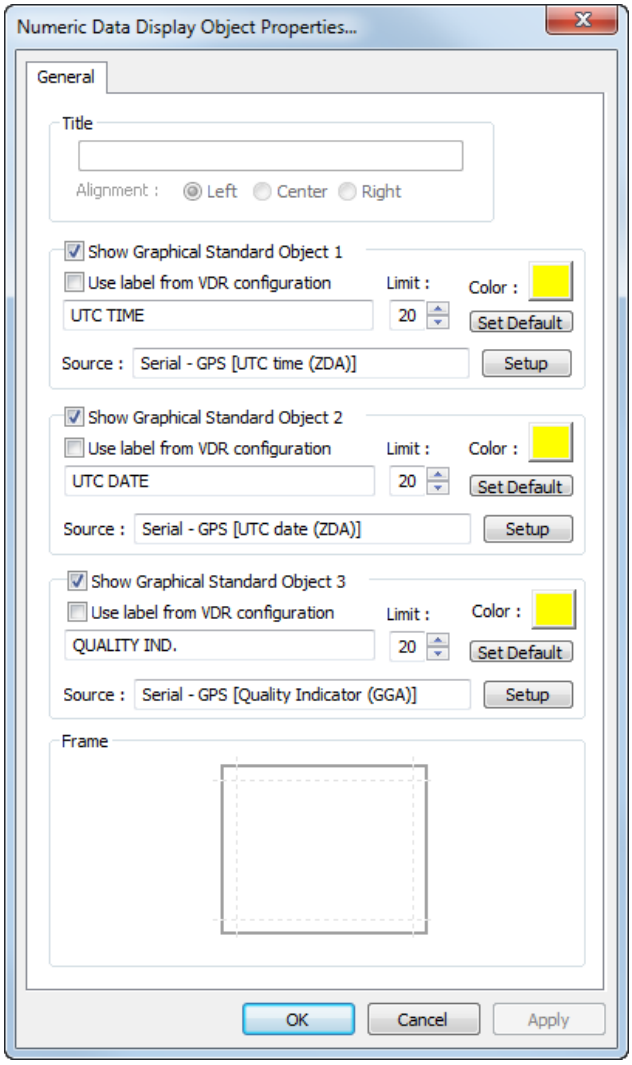
5.7.1 General

The Numeric Data Display does not display any gauges. Three smaller “objects” for displaying numeric data or text are displayed instead. These smaller “objects” are called “Alphanumeric data fields. Two sizes exist (large and small).



5.7.2 Colors

The color of the label text for a “Numeric data display” is determined by the default color definition (Text/Outline Color) see section 5.10. The “Primary indicator color” is used as color for the displayed data.

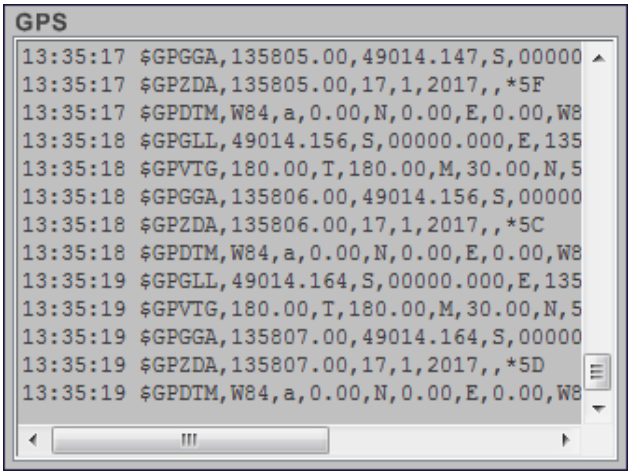


5.7.3 Concatenation

A number of Numeric Data Displays may be concatenated by removing adjacent lines (see section 5.5).

5.8 Paper strip

The Paper strip object displays serial data as text e.g. data that is sent to a line printer. It can also be used to monitor NMEA data.

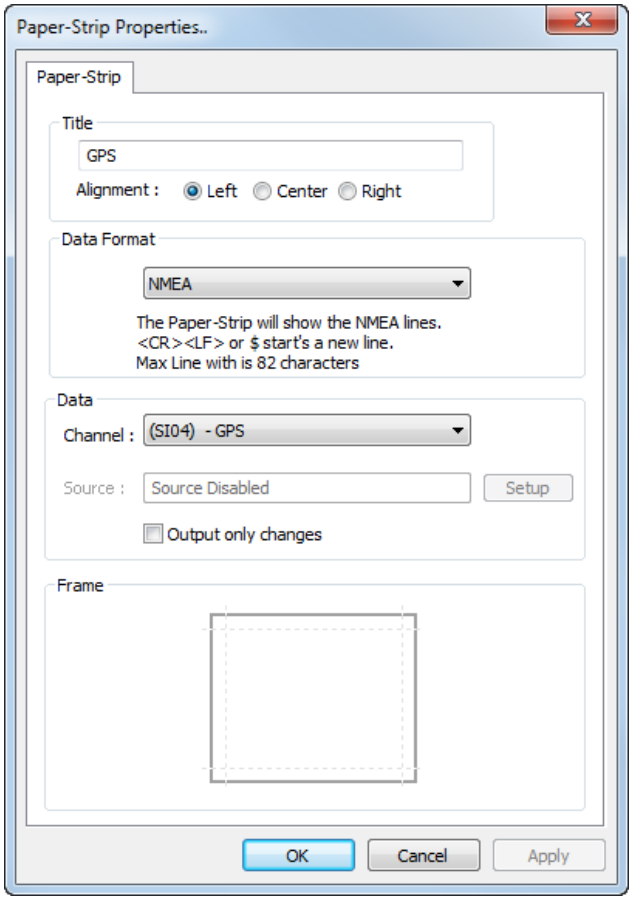


5.8.1 Data format

The object displays data using four different formats:

- ASCII
- NMEA
- Binary. Binary is displayed as "hexadecimal"
- Processed data

"Processed data" in this context is typically data derived from NMEA strings using a decoder, for example vessel's position.



5.8.2 Channel

This field is used for specifying the input to the paper strip object when data format is set to ASCII, NMEA or Binary.

5.8.3 Source

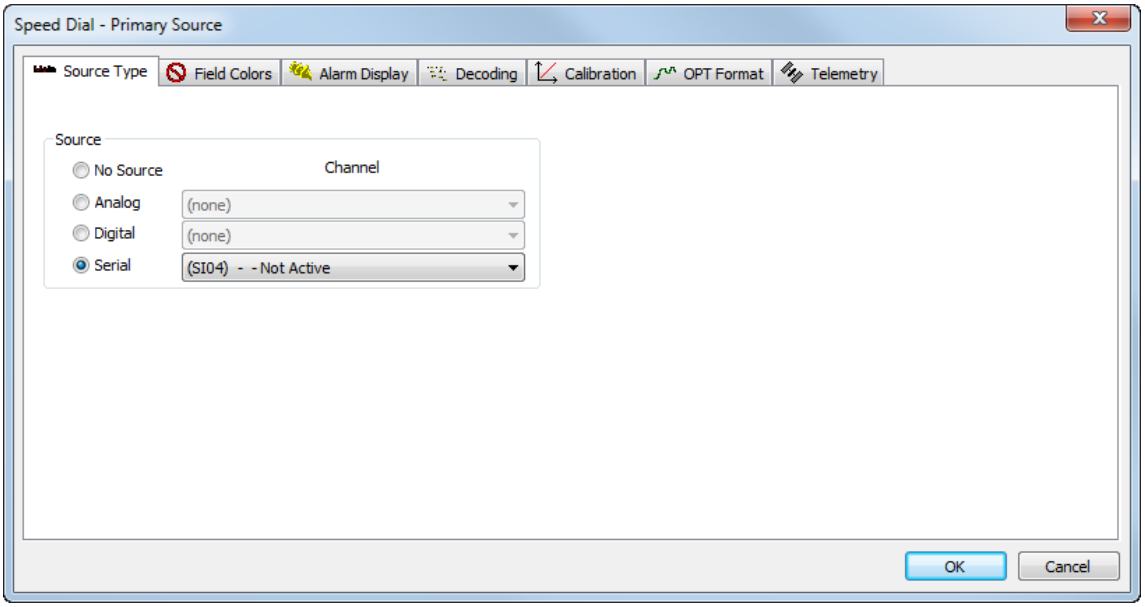
This field is used for specifying the input to the paper strip object when data format is set to "Processed data". See section 5.9 for details.

5.8.4 Output only changes

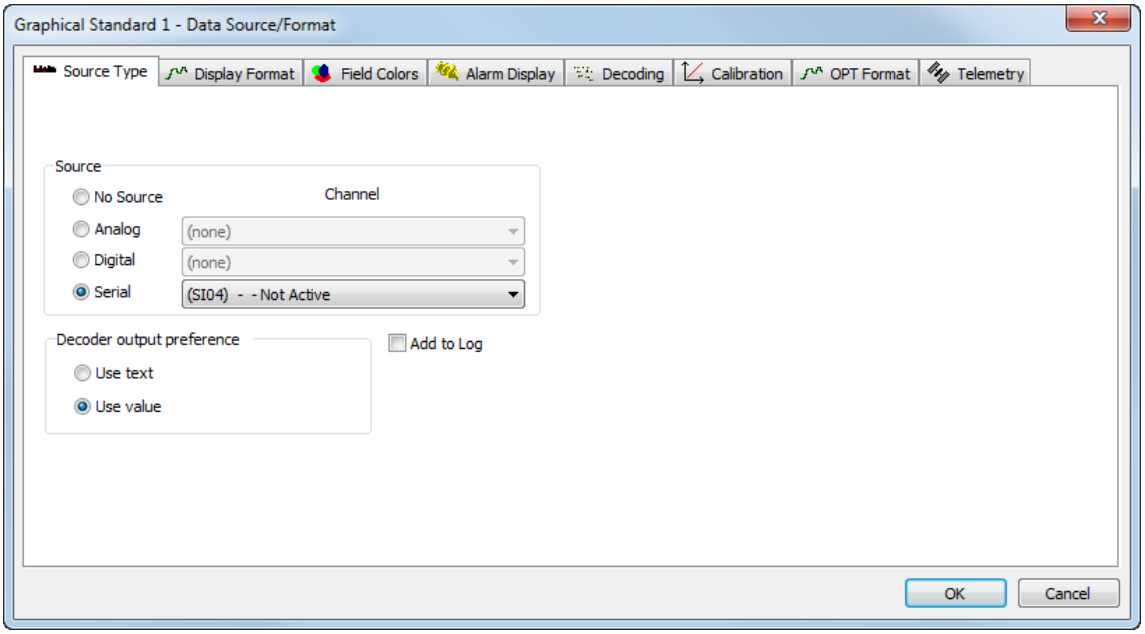
A new line will not be printed unless data changes if the box is checked.

5.9 Configuration of data sources for objects

This dialog box is common for all gauges and for the alphanumeric data display with a few exceptions. This box is opened by clicking on the “Setup” button in the “Source” section on the property pages for an object.



Dialog for gauges



Dialog for alphanumeric data display, use value

5.9.1 Source

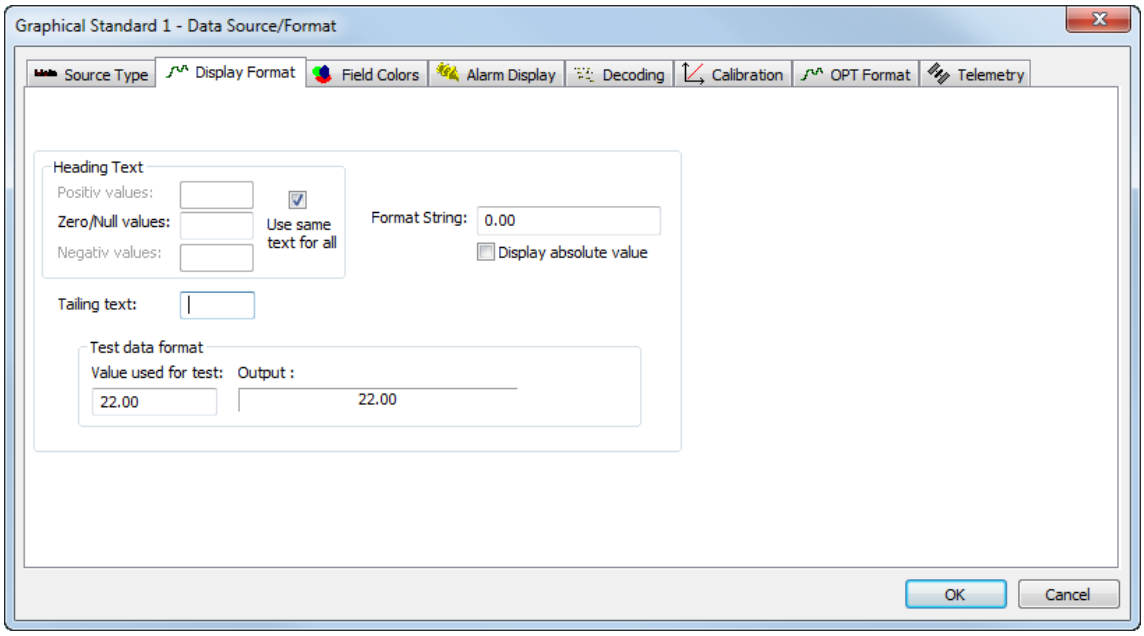
Used for selecting a source for the gauge. A gauge/data field may be disabled by selecting “No Source” but the other parameters will not be forgotten if already configured.

For an "alphanumeric data field" the decoder output preference may be selected i.e. whether the output value or the text output must be used and displayed. The dialog will change accordingly. It is for example not possible to make calculation on the text output.

5.9.1.1 Add to log (alphanumeric data field only)

The information displayed in the data field will also be added to the log if this box is checked (see section 17).

5.9.2 Display format (alphanumeric data field - use value and analog data)



The parameters on this tab are used for formatting analog data or the value output from a decoder.

5.9.2.1 Heading and trailing text:

Heading and trailing text may be configured to change according to the numeric value of the data.

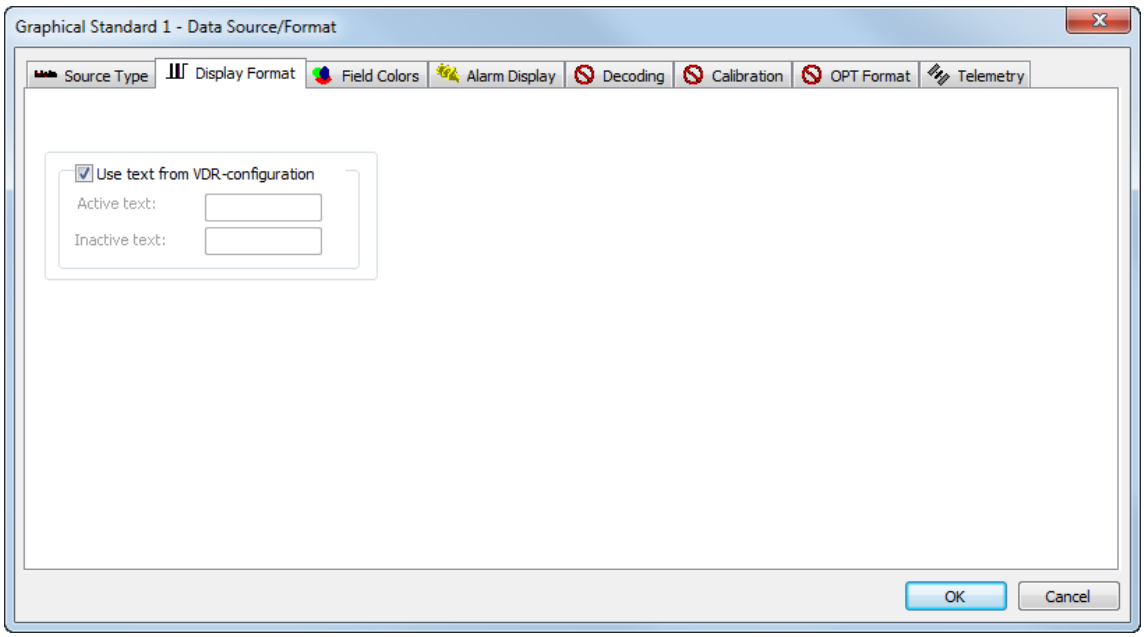
5.9.2.2 Formatter string

See section 5.11.

5.9.2.3 Test data format

A "test utility" is located beneath the configuration fields.

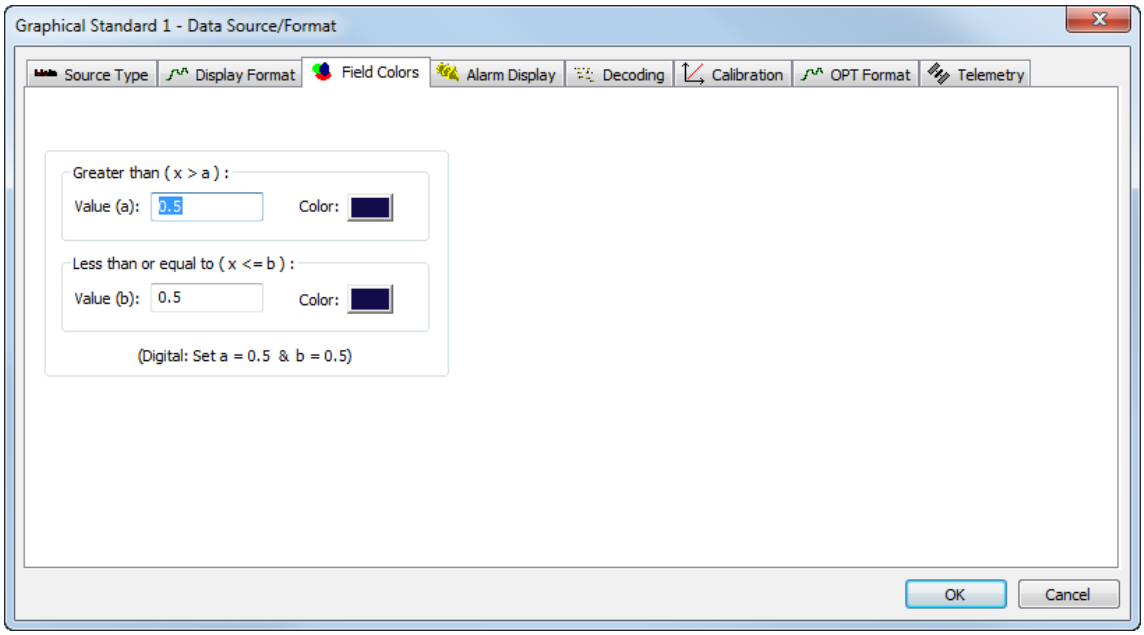
5.9.3 Display format (alphanumeric data field - digital data)



5.9.3.1 Use text from VDR configuration

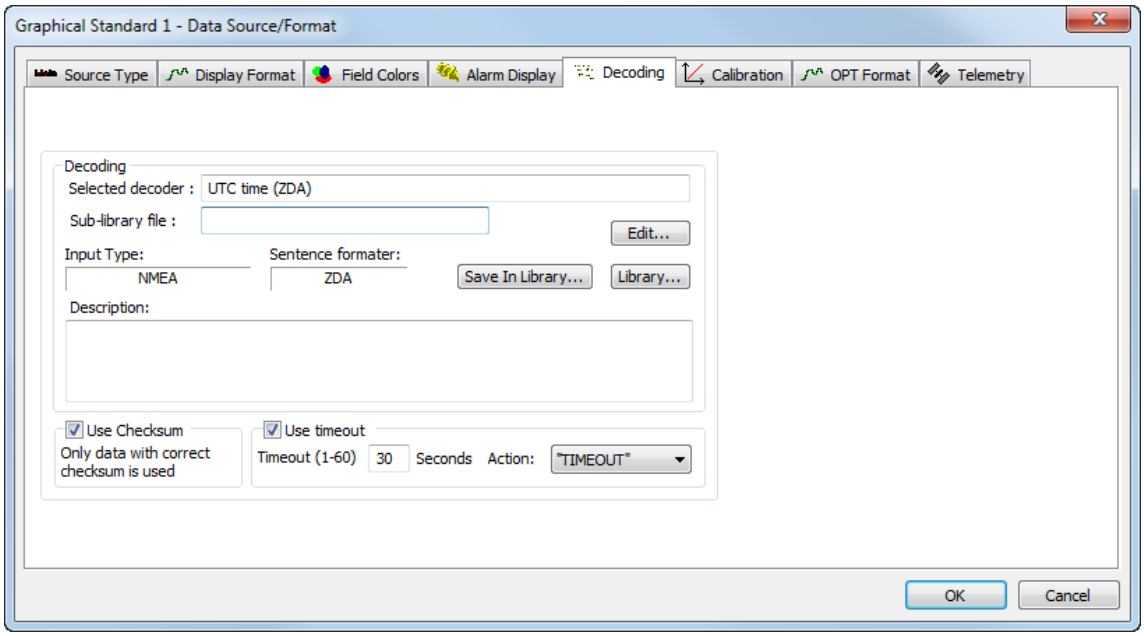
This defines what text is associated to active and inactive state e.g. “Open” and “Closed”. This information is normally available from the VDR configuration and can be used by the VDR Explorer as it is.

5.9.4 Field colors (alphanumeric data field only)



Background color for an alphanumeric data field may be configured to change depending on the displayed value, for example green for indicating SB and red for indication PS.

5.9.5 Decoding (serial data only)



Edit: Open the decoder script editor, see section 13.3. The editor is used for creating a new decoder script or for editing the currently selected one. It is strongly recommended that an edited decoder always be given a new name and that the modification is described.

Save in library:
Saves the decoder script in the library if it has been changed. See section 5.9.5.1

Library:
Opens the decoder script library from where the most commonly used decoder scripts can be selected. See section 13.

Use checksum:
NMEA strings not containing correct checksum information will be ignored if this box is checked.

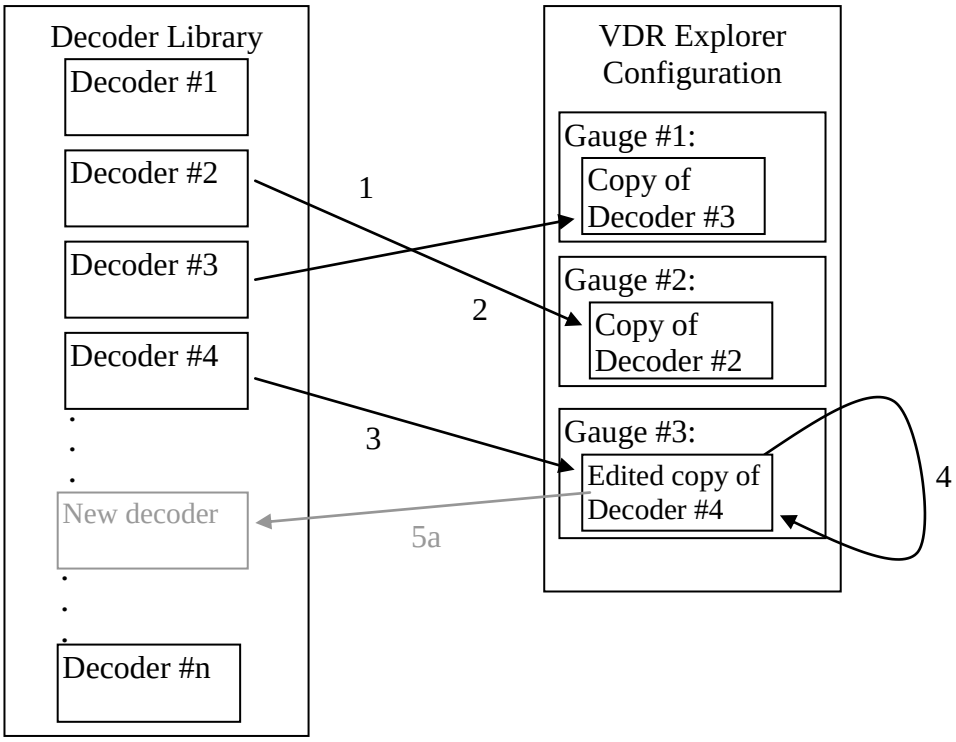
Use timeout:
If this box is checked, the appearance of gauge/data field will be affected when no new data is received within a specified time period.

- For gauges:
The indicator will disappear.

- For alphanumeric data field:
An additional menu “Action” is displayed for an alphanumeric data field.
The following actions are implemented:

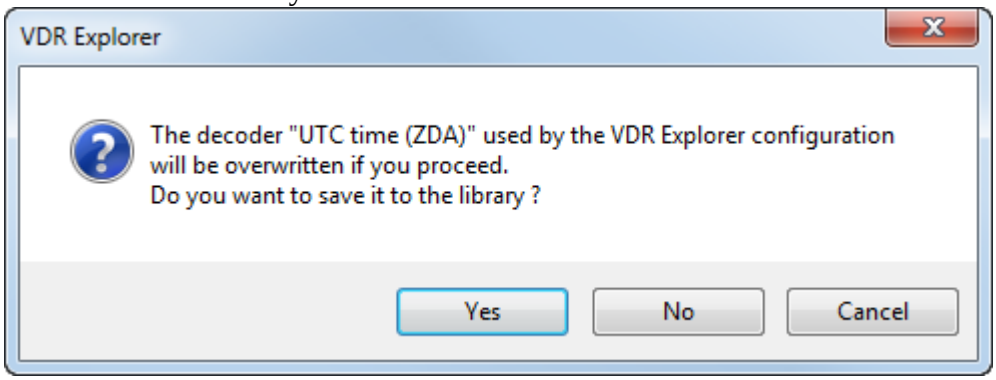
- Delete data: The data field is blanked
- Dimming: Dimming of the text in the data field
- Timeout: “Timeout” will be displayed in the data field

5.9.5.1 Relation between decoders stored in the library and the configuration



Step 1) Decoder #2 is selected for Gauge #1
Step 2) Decoder #3 is selected for Gauge #2
Step 3) Decoder #4 is selected for Gauge #3
Step 4) the decoder for gauge #3 is modified for some reason.
There are now two options:
Step 5a) Store the new decoder under a new name in the library; i.e. use the “Save library” function see section 5.9.5
Step 5b) leave as it is; i.e. a new decoder is created but is not stored in the library.

This message will appear if attempting to replace a decoder in a VDR Explorer configuration that is not stored in the library.



5.9.6 Alarm display tab

See section 18.3.

5.9.7 Calibration tab

See section 6.

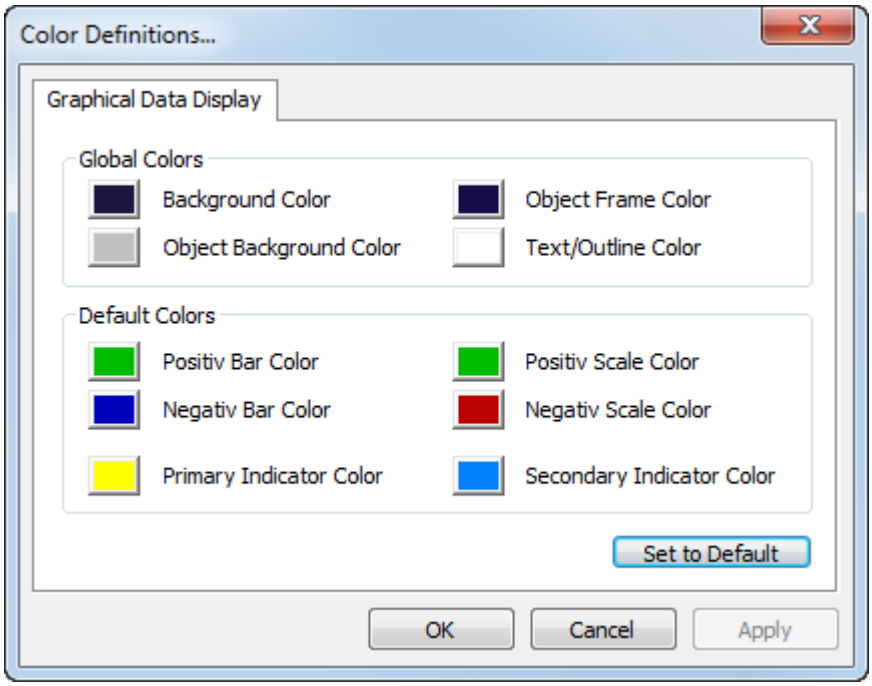
5.9.8 OPT format tab

See section 7.

5.9.9 Telemetry tab

See section 22.

5.10 Default color definition



The global colors define the overall color-scheme used for the graphical data display(s).

- The background color is the color of the window used for graphical data display. The background color will be visible because there is a small space between objects (unless they are merged).
- The Object Frame Color is the border of an object.
- Object background Color is the background color used for objects.
- “Text/outline color” is the color for static text (e.g. labels) and for the outline of most gauges.

Changes to Global color take effect immediately after “OK” or “Apply” is selected, even when the VDR Explorer is not in configuration mode.

The default colors are the colors of dynamic elements in a graphical data display, e.g. the indicator for a dial meter. Changes to default colors will only take effect for new objects. The colors for an existing object may be set to new default colors by right-clicking on the object (in configuration mode) and select Object->Set to Default Colors.

5.11 Formatter syntax

Figures displayed in an alphanumeric data field may be formatted; i.e. the number of digits after the decimal point and leading zeros may be defined.

The formatter syntax is identical to the syntax defined for formatting output from a NMEA decoder.

E.g.: The figures 7.5 and 10 will be displayed as below, depending on the formatter.

Formatter	7.5	10
0	7	10
0.0	7.5	10.0
000	007	010

6 Calibration of data

Analog data and values derived from NMEA sentences/Modbus may have to be calibrated before the data are meaningful. For example, rudder angle must be displayed as an angle corresponding to the angle of the rudder and not a value ranging from, for example, 0-4095.

The requirements for calibrating data are described in the VDR standard. Data must be meaningful when replaying data and when examining the result of an OPT.

Data may be calibrated in four different ways:

- Analog data captured using a SIU may be calibrated via the VDR's configuration interface. Until the release of VDR Explorer 3.42 this was the only option and the APT tool would list and error data was calibrated using this method. APT tool version 1.60 will just issue a warning since another option for calibrating data exist.

- A value derived from an NMEA sentence/Modbus may be calibrated by including calculations in the decoder script (using the Calc statement).

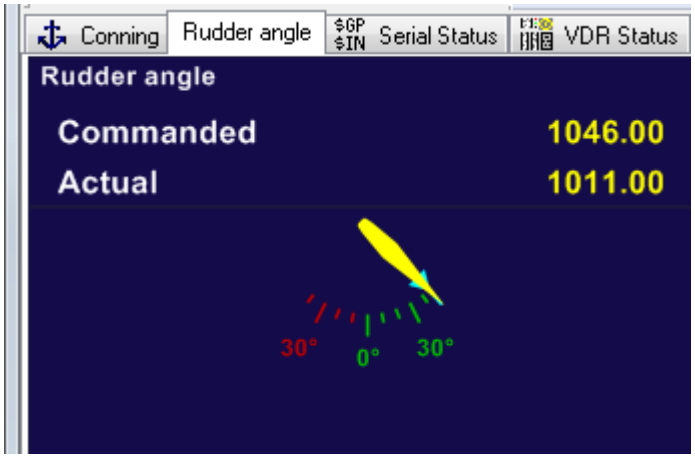
- A calibration may be included in the configuration for an object (Use Factor Offset)

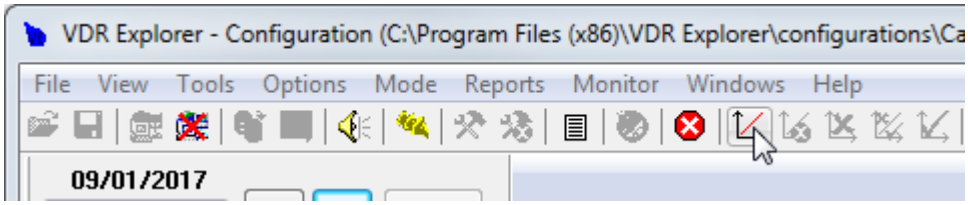
- A two point calibration made using the GUI of the VDR explorer. This way of calibration the data will be described in this section.

6.1 VDR Explorer calibration mode

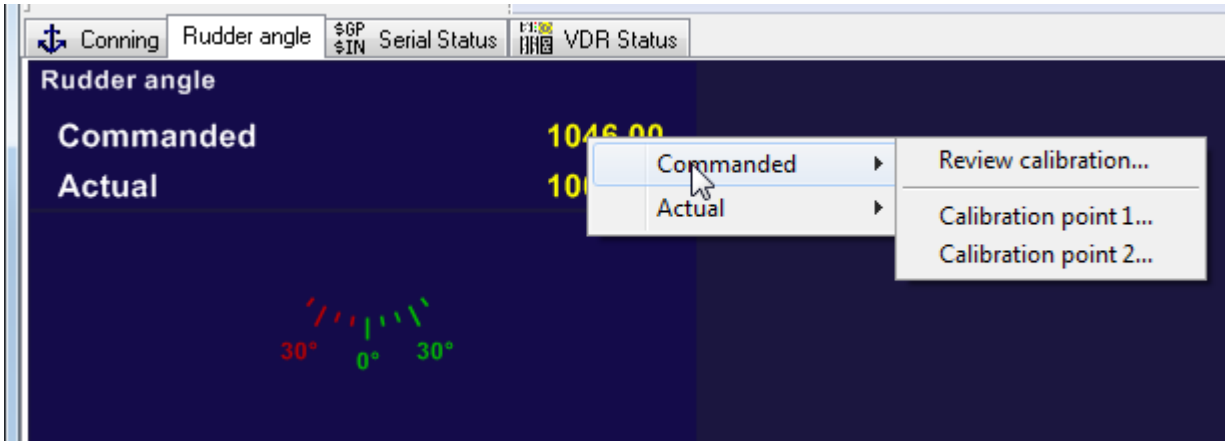
In the example below calibration of a rudder system is shown:

1) Create the required objects and decoder script and start playing live data.
2) Turn the rudder 20 degrees to STP

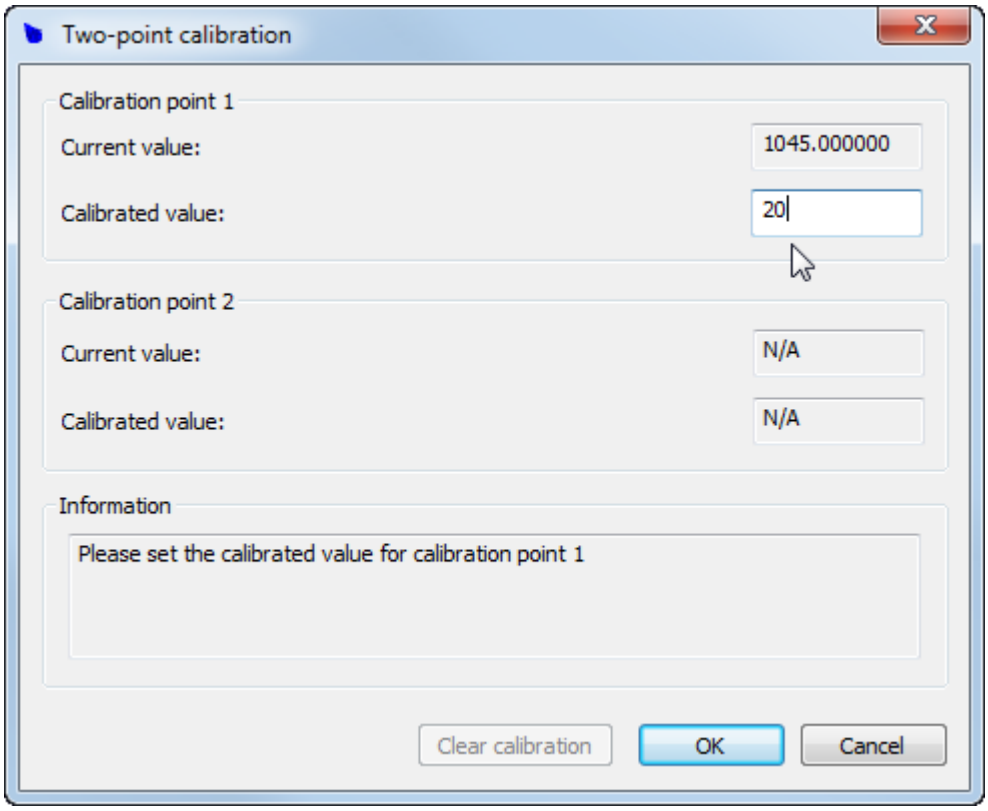




Enter calibartion mode

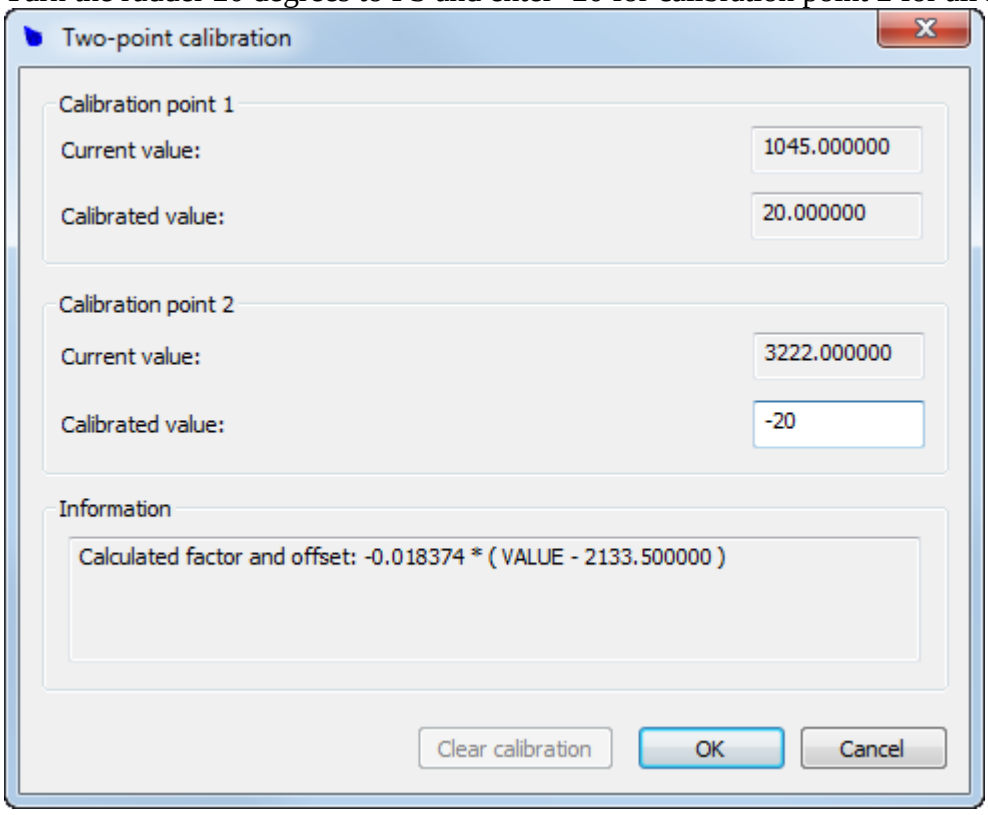


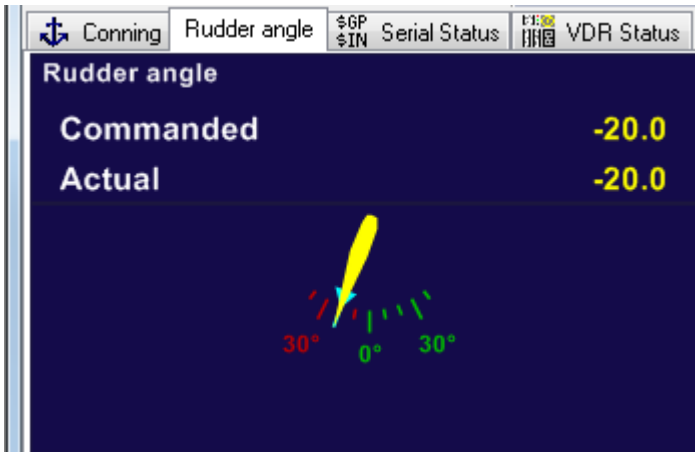
Right click on object and select an item to calibrate and click “Calibration point 1”



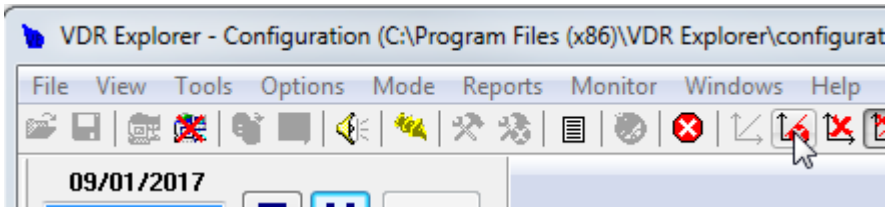
Enter the value 20 (since the rudder was turned 20 degrees).
Repeat that for the remaining three items.

Turn the rudder 20 degrees to PS and enter -20 for calibration point 2 for all items





Check that the rudder angle is displayed correctly.

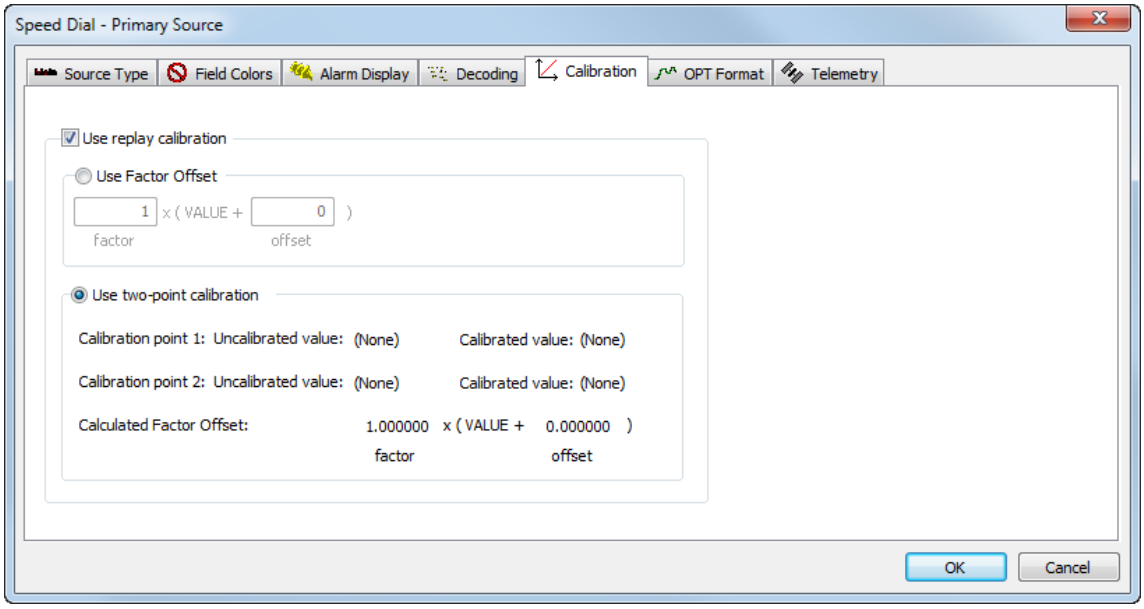


Exit calibration mode and save the configuration.

6.2 Manually calibration using the configuration for an object

Calibration data may be included in the configuration for an object.

6.2.1 Calibration tab for analog data and value from serial data



6.2.1.1 Use replay calibration

The object will display the “raw” data if the check box is unchecked

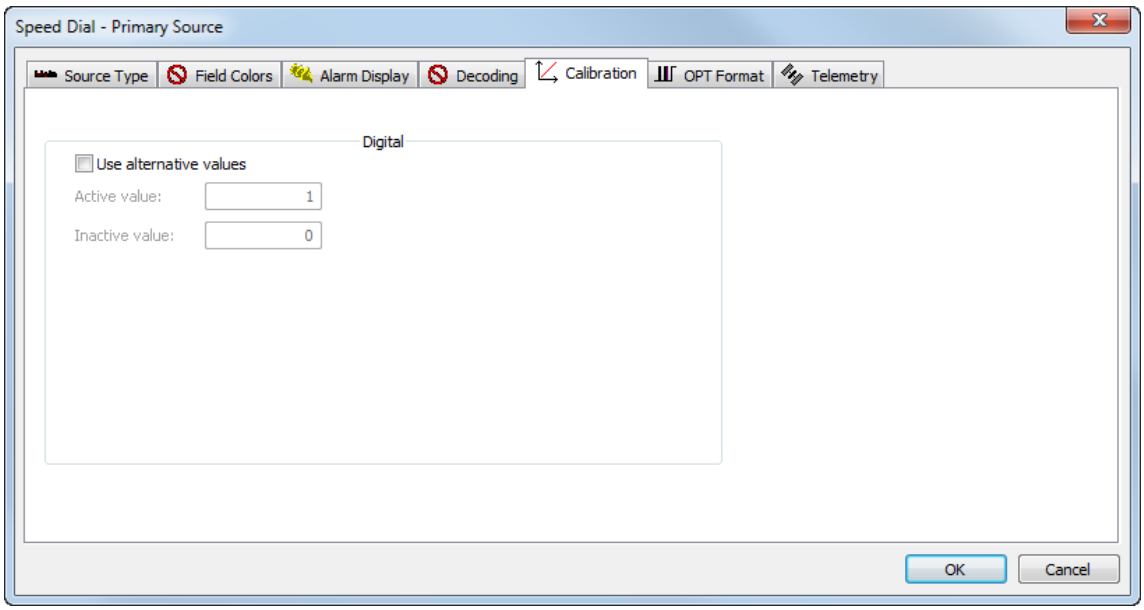
6.2.1.2 Use factor offset

A factor (multiplier) and offset may be applied to the original data. E.g. knots may be converted to m/s.

6.2.1.3 Used two-point calibration

Data may be calibrated using the GUI as described in section 6.1.

6.2.2 Calibration tab for digital data (gauge only)



6.2.2.1 Use alternative values (gauge only)

Used to define alternative numeric values for active and inactive state, default (if box is unchecked) is 1 and 0.

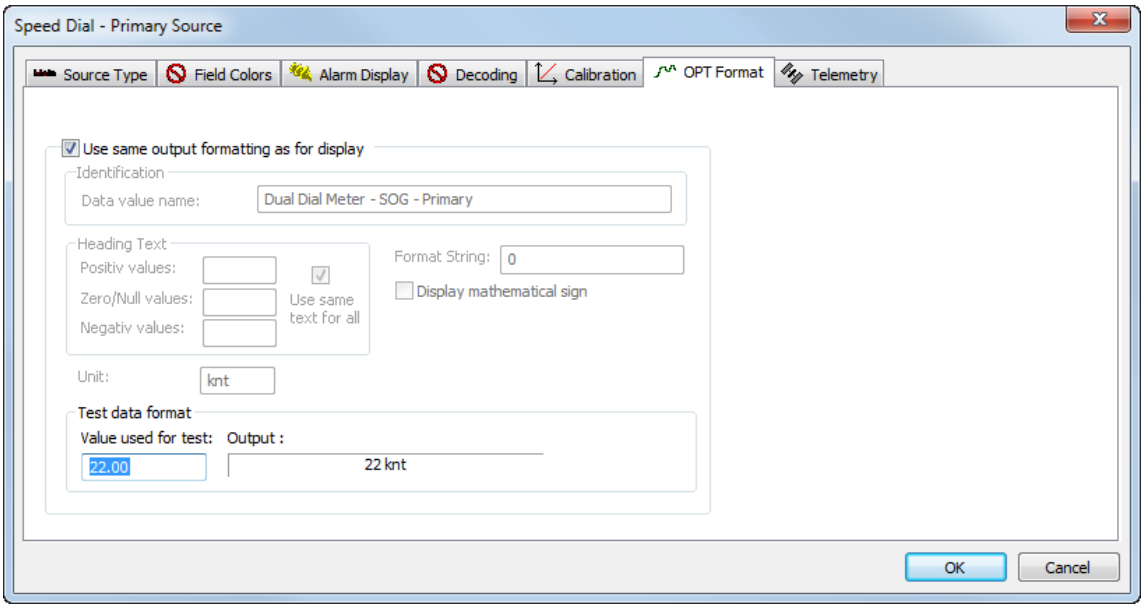
7 OPT Operational Performance Test

It is a requirement of the VDR standard that data must be meaningful (calibrated values with engineering units) when replaying data and when examining the result of an OPT.

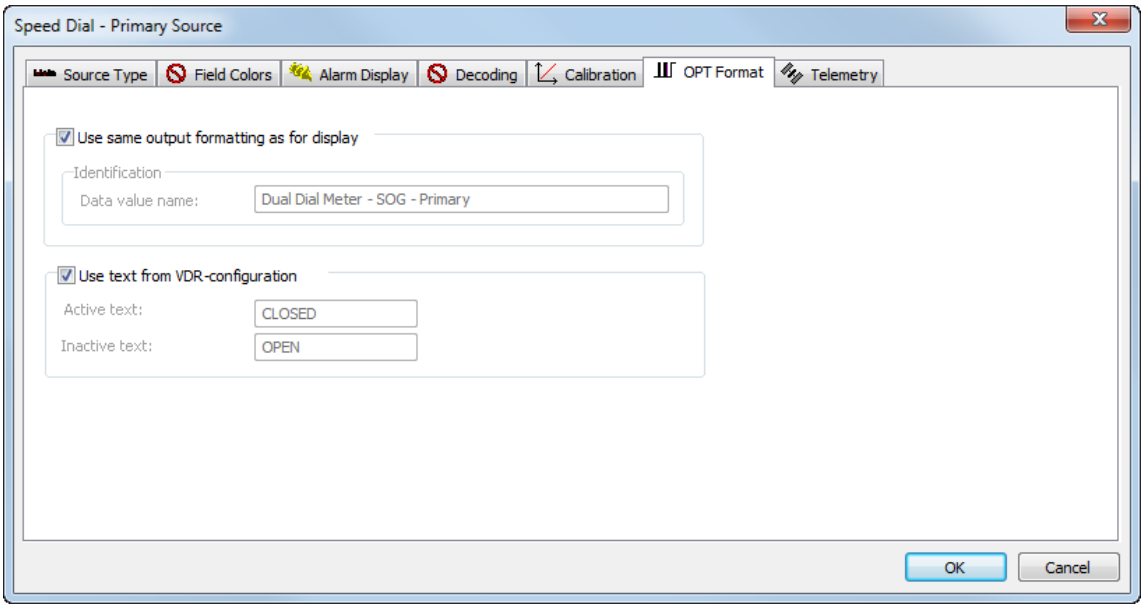
An OPT must be carried out regularly be the crew. An OPT is initiated from the BCP and the result is displayed on the BCP also. A complete VDR Explorer configuration must contain the configuration for both the OPT and for replaying data.

A VDR Explorer configuration for replying data are with few exceptions also adequate for the OPT. The differences are primarily related to the fact that the BCP cannot show gauges but only alphanumeric text.

The OPT format tab on the page for setting the parameters for a source (see section 5.9) may be used for formatting the text in the OPT report. The VDR Explorer can in most cases format the text based on other parameters for the object. It will do that if "Use same output formatting as for display" is check-marked.



OPT format tab for analog data and serial data, use value



OPT format tab for digital data (gauge only)

8 AIS data display

There are eight objects for displaying AIS data:

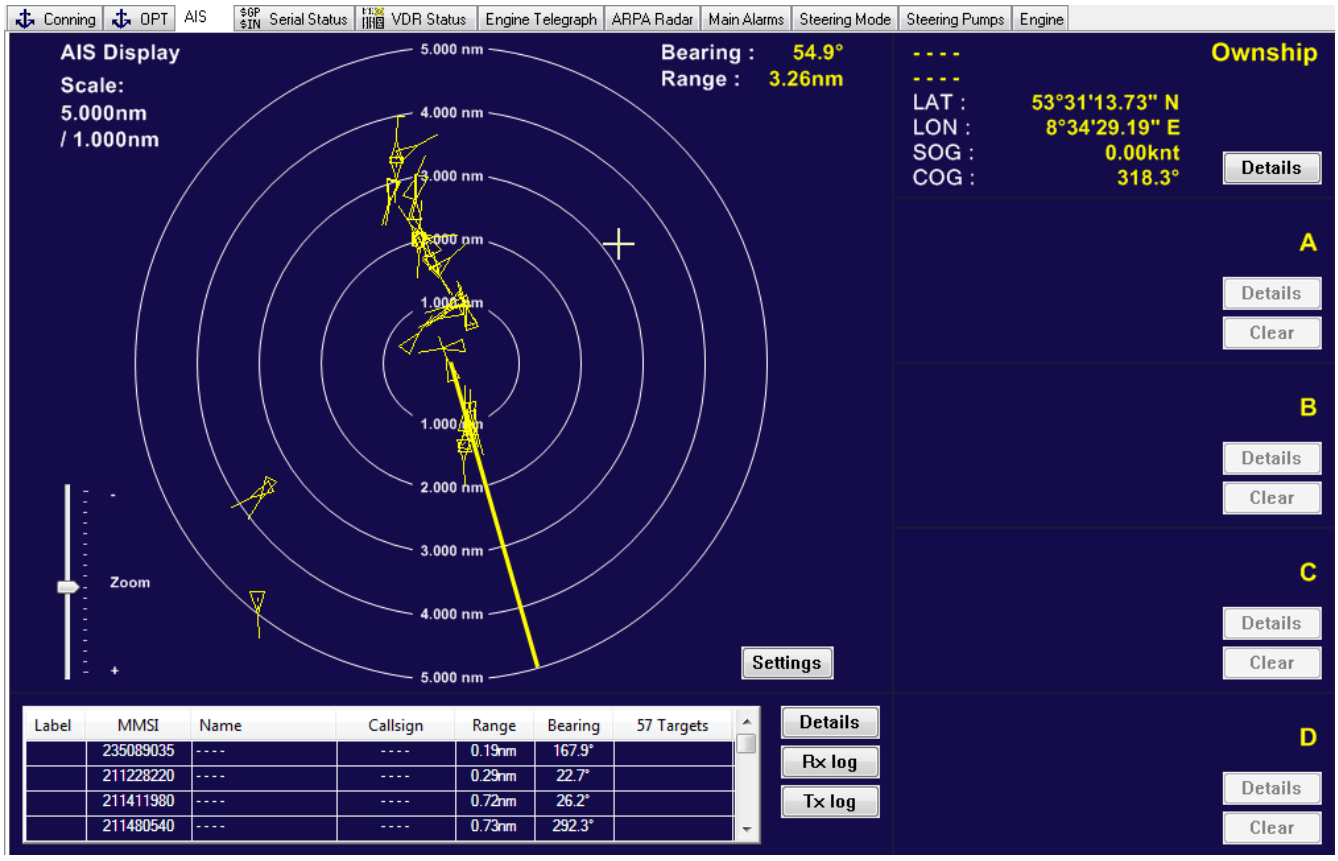
- AIS display
- AIS display (small)
- AIS own ship info
- AIS target info
- AIS target list (1x0.5)
- AIS target list (2x0.5)
- AIS target list (1x1)
- AIS target list (2x1)

The figures following an “AIS target list” refer to the size of the object where 1x1 is the typical size of a graphical object.

Note that AIS data display object may be mixed with other objects on a tab page.

8.1 AIS display tab

A default AIS data display contains a useful combination of AIS objects. This tab page is created like any other tab page, see section 5.2.

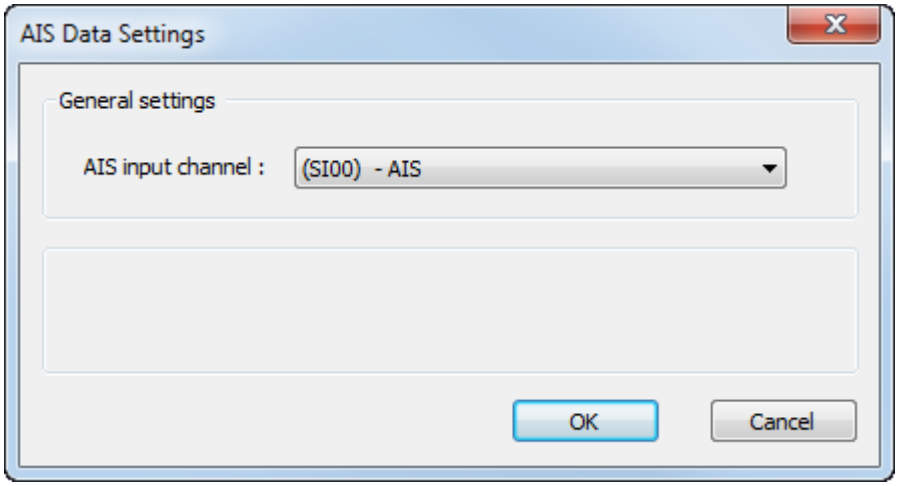


The AIS tab page is composed of the following objects:

- One AIS display
- One AIS Own ship info
- Four AIS target Info
- One AIS target list (2x0.5)

8.2 Selecting data source

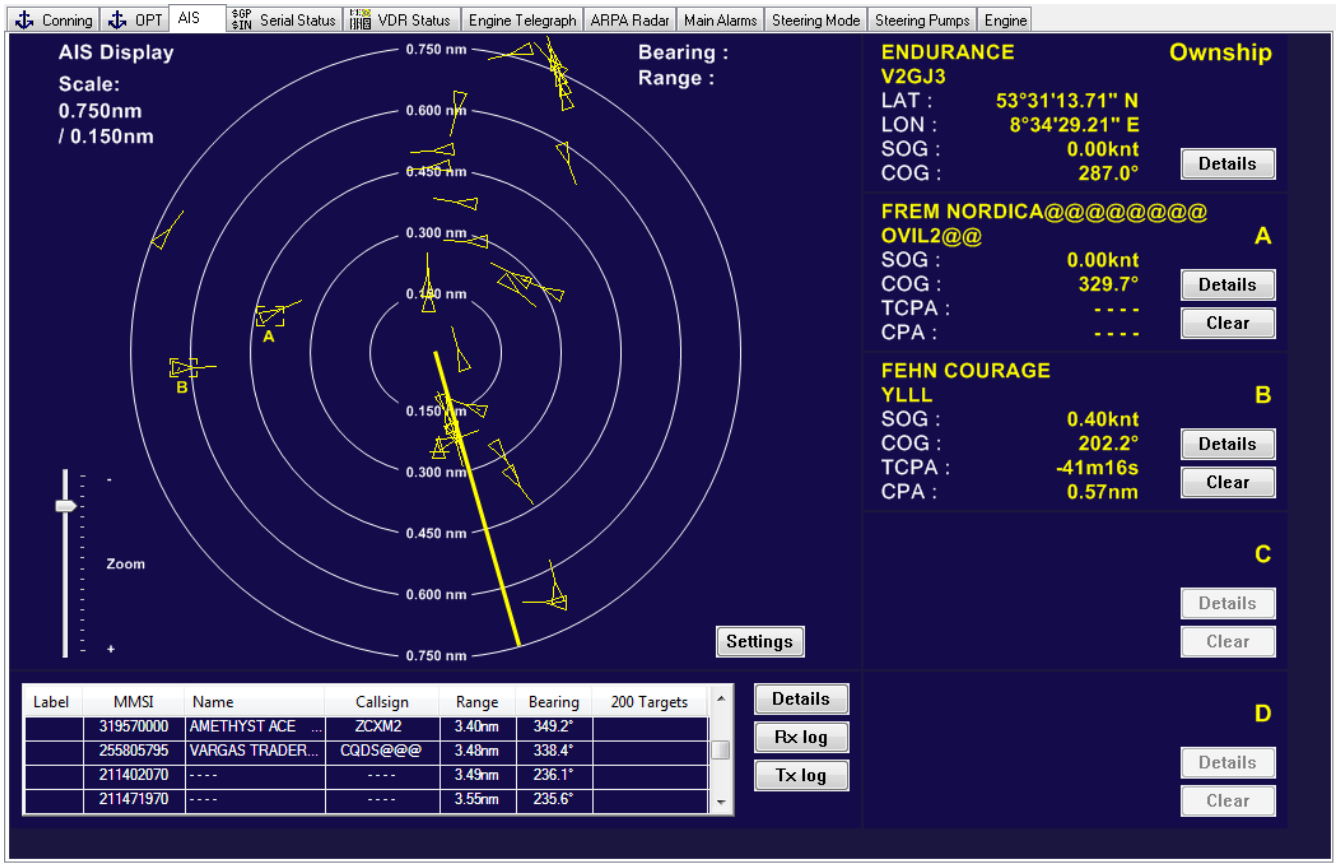
"Tools->Setup AIS Data Input" opens the "AIS data settings" tool.



AIS data settings

Select the serial or network channel to which the AIS data is received from.

8.3 Using a AIS display tab



The most important feature of the AIS data display is the ability to assign a label to and get information about a target of interest. This is done by clicking either directly on the target on the AIS display or on the label field for the target in the AIS target list. An AIS target info object will be assigned to the target when this is done.

E.g.: On the AIS display tab shown above, targets “A” and “B” have been selected.

A target may be deselected by clicking on the target again.

8.4 Symbols for Targets

AIS Standard target:

Base station:

Aids to navigation: 

Aircraft: 

8.5 Supported messages

1 - Position report
2 - Position report
3 - Position report
4 - Base station report
5 - Static and voyage related data
6 - Binary addressed message
8 - Binary broadcast message
9 - Standard SAR aircraft position report
12 - Addressed safety related message
14 - Safety related broadcast message
18 - Standard Class B equipment position report
19 - Extended Class B equipment position report
21 - Aids-to-navigation report
22 - Channel management
24 - Class B "CS" static data report

9 Display of data from vessel's Alert Management System

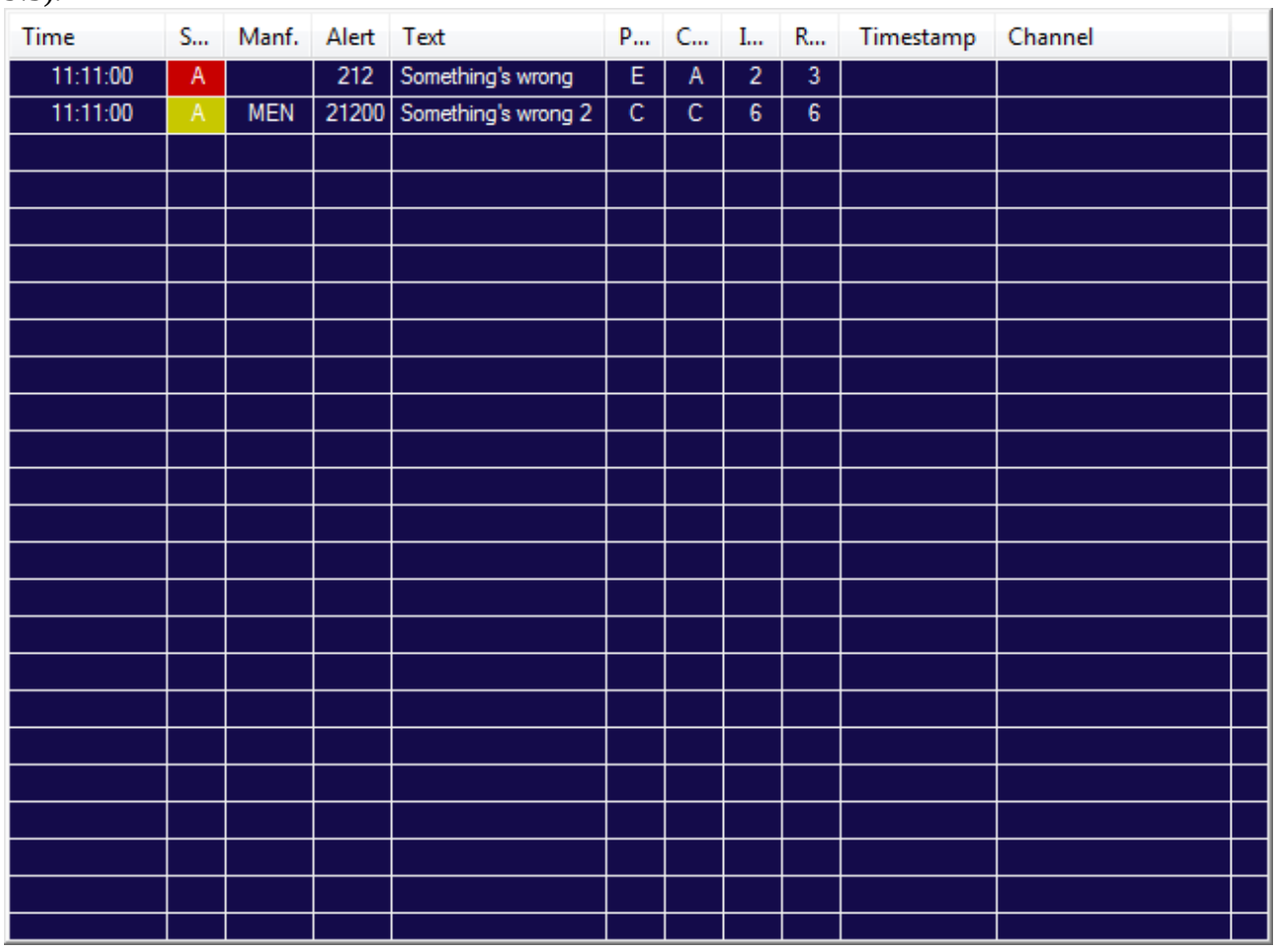
There are six objects for displaying bridge alert management data.

Alert list (1x1)
Alert list (2x1)
Alert list (1x2)
Alert list (2x2)
Alert event log (1x1)
Alert event log (2x1)

The objects have been designed for showing data from an integrated bridge alert management system but may be used to display ALR messages in general.

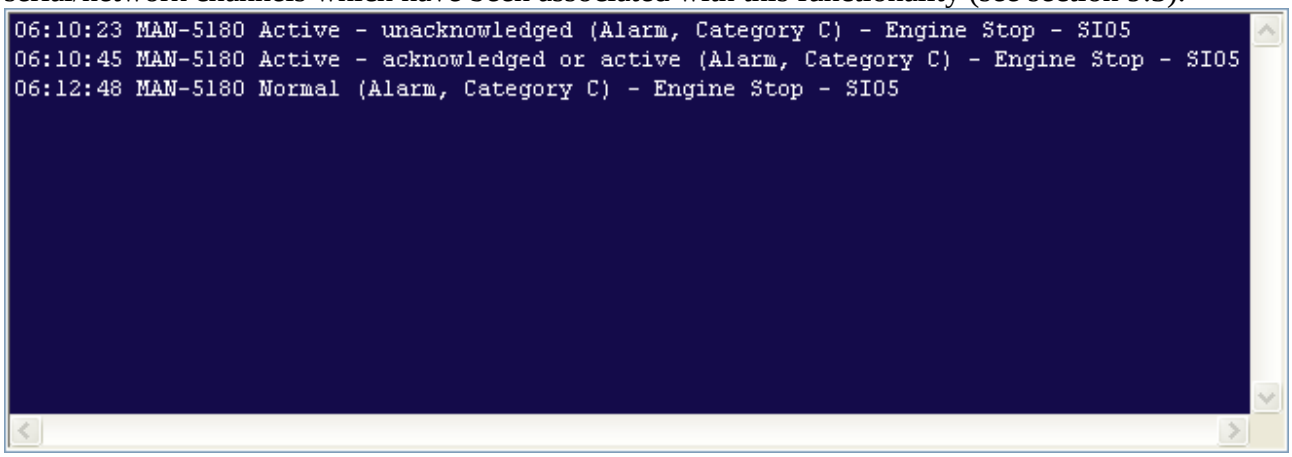
9.1 Alert List object

An alert list object displays the status of the alerts which are currently active based on data received from the serial/network channels which have been associated with this functionality (see section 9.3).



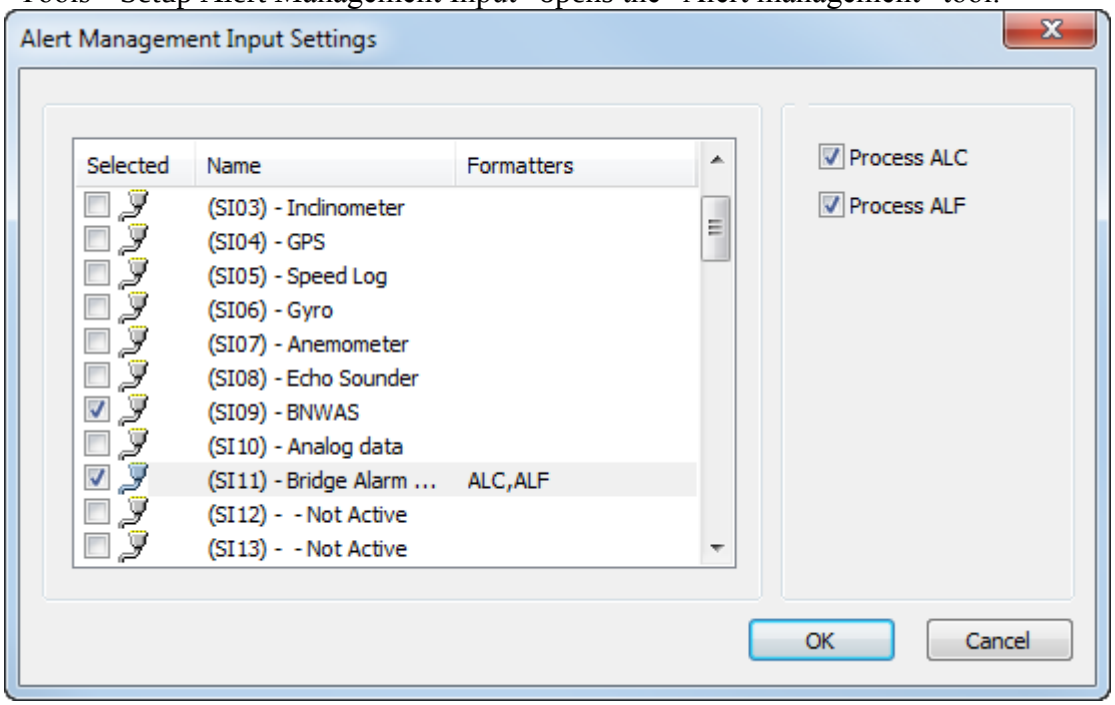
9.2 Alert event log object

An alert event log object displays all events related to alarm message received from the serial/network channels which have been associated with this functionality (see section 9.3).



9.3 Selecting data sources

"Tools->Setup Alert Management Input" opens the "Alert management" tool.



10 Objects related to images received over IEC 61162-450

The section is only relevant for the DM100 VDR.

10.1 Object for showing “status and information text”

Additional data, so-called “status and information text” are transmitted with images sent to the VDR using the IEC 61162-450 protocol. These data may be displayed using the “image data with meta data object” rather the normal “image data object”

10.2 Object for showing “display source information”

An ECDIS for example must, according the VDR standard, send “display source information” at a minimum every 10 minutes to the VDR. For example, information about which chart is currently in use.

A “Display source information object” may be used to show these data.

11 VDR and VDR Explorer configuration management

The VDR Explorer uses information from both the VDR configuration (if available) and a VDR Explorer configuration. The VDR configuration contains useful information about what is connected to the VDR. Information from the VDR configuration may, for example, enable the VDR Explorer to use the name "SI02 Input from GPS" for serial input port #2 rather than just the default name "SI02".
These functions are normally not needed except for "Tools->VDR Explorer config management-> Save VDR Explorer-configuration to source". This function is used for storing the final VDR Explorer configurations in the capsule. This will enable any PC with the VDR Explorer installed to replay data from that VDR correctly. In addition, the saved VDR Explorer-configuration is prerequisite for being able to perform an OPT.

11.1 VDR configuration management

Tools->VDR config management->Load VDR configuration from file
Facilitates load of an alternative VDR configuration from a file.

Tools->VDR config management->Load VDR configuration from source
Reloads the original VDR configuration from the source.

Tools->VDR config management->Set VDR configuration to default
Restores the VDR configuration to default; i.e. all labels will then correspond to what is printed on the data interface modules e.g. "SI02".

Tools->VDR config management->Save VDR configuration from source to file
Saves the VDR configuration present on the source to a file.

Tools->VDR config management->Save VDR configuration from source to HTML file
Saves the VDR configuration present on the source to an HTML file.

Tools->VDR config management->Display VDR configuration from source
Displays the VDR configuration found at the source to which the
VDR Explorer is currently connected.

11.2 VDR Explorer configuration management

A few special commands related to VDR Explorer configuration management are included here. Commonly used commands like Open, Save etc. are included in the "File" dropdown menu.

Tools->VDR Explorer config management-> Load VDR Explorer-configuration from source
Tool for reloading of a VDR Explorer configuration from the data source
1) VDR (live playing): The configuration stored in the capsule will be loaded.
2) Capsule/backup disk: The configuration stored in the capsule/on the backup disk will be loaded.
3) Extracted data: A dialog box enables the user to load the original.

Tools->VDR Explorer config management-> Save VDR Explorer-configuration to source
Tool for saving the VDR Explorer configuration at the data source.

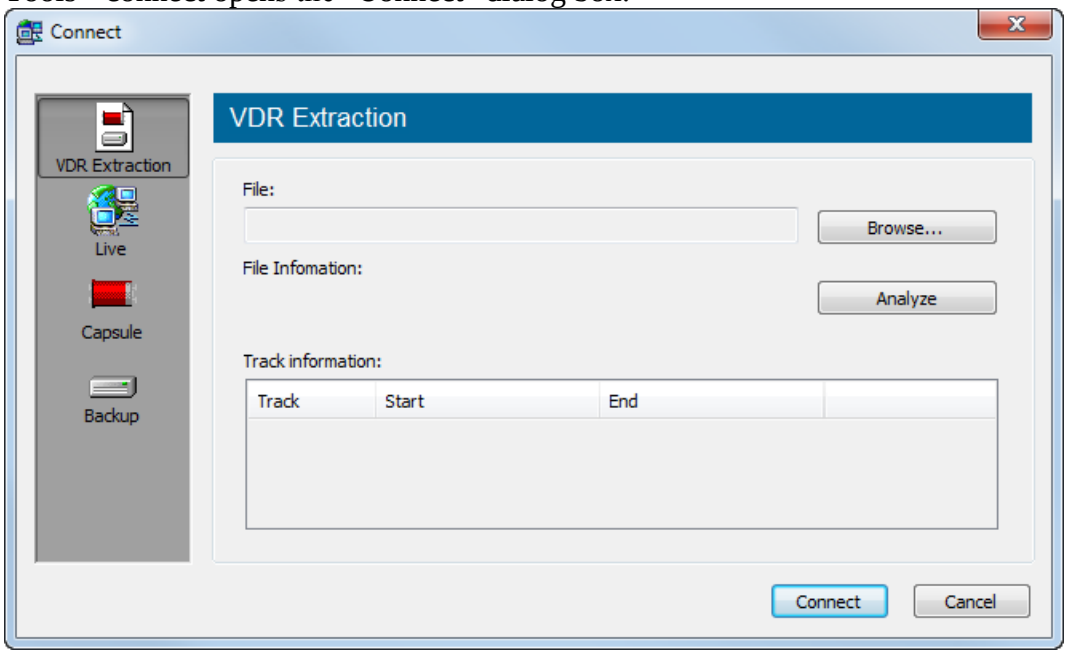
1) VDR (live playing): The current VDR Explorer configuration is stored in the capsule and on the backup disk via the VDR. The VDR Explorer must be connected as “Master”.

2) Capsule/backup disk: The VDR Explorer is not able to write to a capsule/backup disk and is consequently not able to save the VDR Explorer configuration at the source if data source is a capsule/backup disk

3) Extracted data: The VDR Explorer is not able to write to an extraction is consequently not able to save the VDR Explorer configuration at the source if data source is an extraction.

12 Connect dialog box

Tools->connect opens the “Connect” dialog box.



The “Connect” dialog box is used for connecting the VDR Explorer to a data source. Four types of data sources are supported:

- VDR extraction
- Live from a VDR
- A capsule (only MK2 and MK3) *
- A backup disk

The connect dialog box changes according to the selected type of data source.
* Data from MK4 and MK1 float-free must be downloaded using Tools-> Download from Ethernet capsule / float-free

12.1 Capsule

“Capsules online” window:
The “Capsules online” window displays a small symbol for each capsule which is physically connected to the VDR Explorer PC via the Firewire interface. A capsule is selected by left -clicking on its symbol. (Note: It is unusual to connect more the one capsule, but up to three capsules may be connected simultaneous if necessary)

“Refresh” button:
Forces the VDR Explorer to scan the Firewire for capsules and update the window.

“Analyze” button and “track information” window:
The selected capsule may be analyzed for its content. The result is displayed in the “track information window”. For more information about tracks, consult section 14.1.1

"Connect" button:
Establishes a connection from the VDR Explorer software to the selected capsule. This may take a few seconds.

"Cancel"
Closes the window.

12.2 Backup

A disk that has been removed from a VDR

The dialog for connecting a Backup Disk corresponds to the dialog for connecting a capsule, described in section 12.1.

12.3 VDR extraction

"Browse" button:
Opens a standard file browser dialog box, which is used to locate and open a file containing a VDR extraction (file extension is .vee).

"Analyze" button and "track information" window:
The selected file may be analyzed for its content. The result is displayed in the "track information window". For more information about tracks consult section 14.1.1.

"Connect" button:
Connects the VDR Explorer to the selected database.

"Cancel" button:
Closes the "Connect dialog" window.

12.4 Live

"Connect to IP" field:
The IP address of the VDR must be entered here.

"Get information" button:
Tests the connection to the VDR with the IP address displayed in the "Connect to IP" field. Status information from the VDR will (if the tested VDR is online) be displayed in the VDR "Information field".

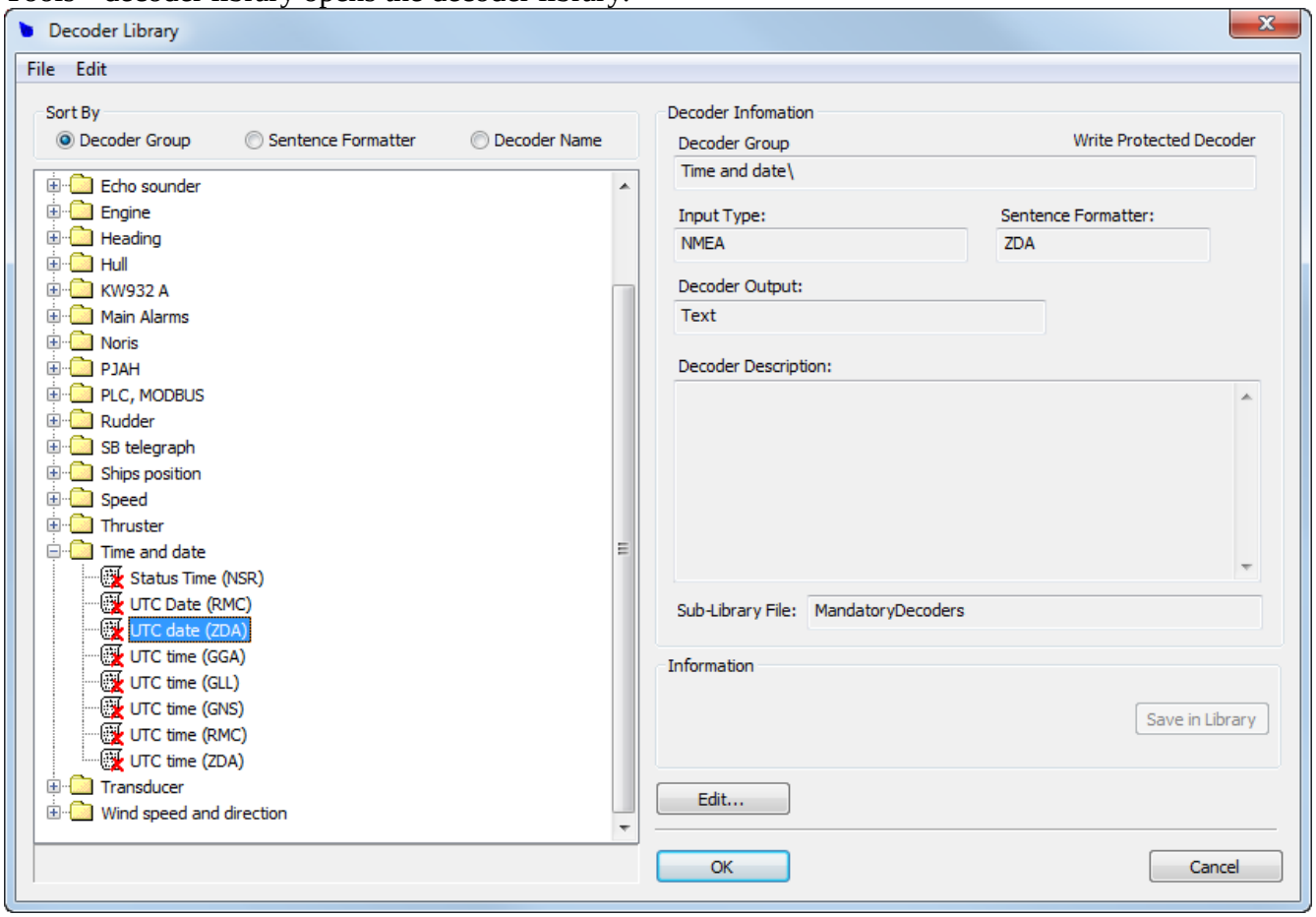
"Connect" button:
Connects the VDR Explorer to a VDR with the IP address displayed in the "Connect to IP" field.

"Cancel" button:
Closes the "Connect dialog" window.

13 Decoder library

The NMEA decoder library is used to organize the NMEA decoders. A NMEA decoder is a small script which describes how information is being decoded and retrieved from a specific NMEA sentence. The syntax for the script language is described in section 21. A short description is available under “Help->Help Topics” in the decoder editor.

Tools->decoder library opens the decoder library.



13.1 Properties for NMEA decoders

Sentence formatter:
An NMEA decoder is only able to retrieve information from one specific NMEA sentence.
A typical NMEA decoder is only able to retrieve information from one field in an NMEA sentence. Most NMEA sentences contain many fields; so a number of decoders may be needed for retrieving all the information from one sentence.

Decoder group:
An NMEA decoder belongs to a group; all decoders in the same group are stored in the same folder. Groups have been defined corresponding to the data items to be recorded (IEC 61996 section 4.6), e.g. speed (4.6.3) or heading (4.6.4). The user may establish new groups.

Decoder name:
A decoder must be assigned a name. The name must be unique within the decoder group.

(Write) protected decoders:
A number of standard decoders (protected decoders) have been defined. These decoders are write-protected and cannot be changed or deleted. However it is possible to use one of these decoders as a template for a new decoder.

Sub-library file:
The VDR Explorer at startup "compiles" the library from a number of library files each containing a number of decoders. The standard decoders are stored in one file and another file is used to store the user-defined decoders. More library files for specific purposes may be added.

Decoder output:
The output from a decoder may behave like analog data, digital data or a text string. This information may be described for a decoder. However, this information is only informative and will not be used by the VDR Explorer.

13.2 NMEA decoder library window

13.2.1 Drop down menus

File->import:
Imports decoders from an external file. The imported decoders will be added to the user-defined sub library file.

File->export:
Exports decoders to an external file.

File->Save in library:
Saves decoder in library.

File->Close:
Closes the window. Corresponds to cancel.

Edit->New decoder:
Adds a new decoder to the library.

Edit->New folder:
Adds a new folder to the library.

Edit->Copy:
Makes a copy of the selected decoder.

Edit->Edit:
Opens the decoder edit window.

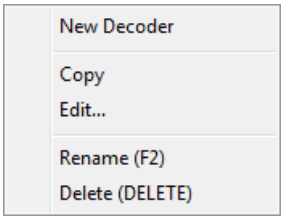
Edit->Rename:
Renames the selected decoder or folder.

Edit->Delete:
Deletes the selected decoder or folder.

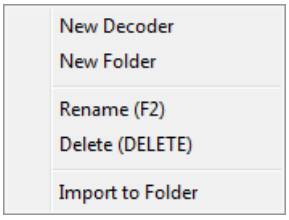
13.2.2 Decoder library tree

The decoder library tree is shown to the left. The "radio buttons" at the top are used to define how the library is organized.

A pop up menu appears if the you right click on a folder or a decoder. This menu enables you to add, rename, copy and delete folders and decoders.
For "Import to Folder" consult section 13.2.1
Note: It is only possible to create a new "root folder" by right-clicking on the empty space beneath the "library tree".



Pop up for decoder



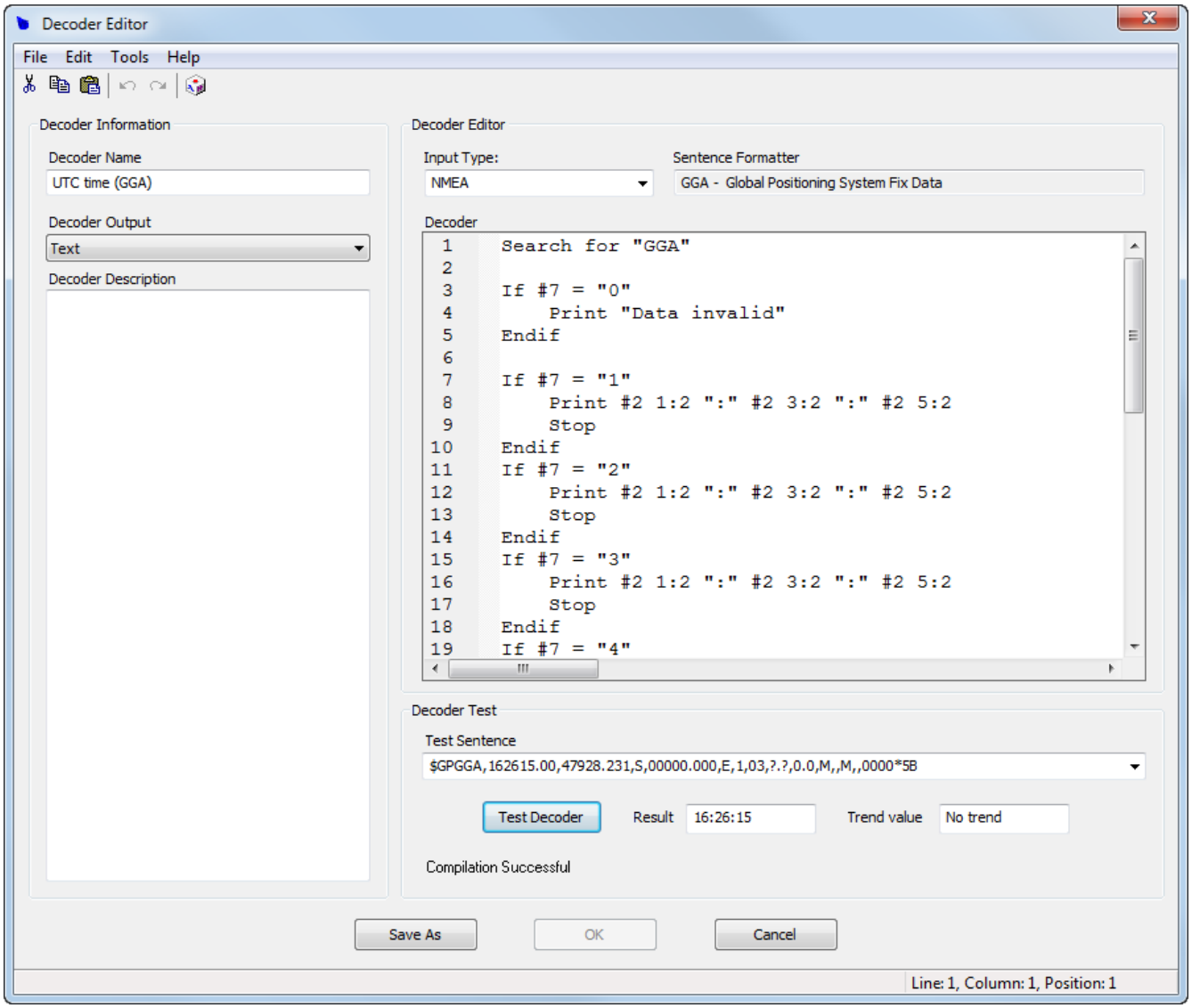
Pop up for folder

13.2.3 Decoder description

The properties for the selected decoder are shown in decoder description located to the right in the NMEA decoder library window. Consult section 13.1 for more details.

13.3 NMEA Decoder Editor

The NMEA decoder editor may either be opened from the decoder library or from the settings menu for a gauge/alphanumeric data field.



13.3.1 Drop down menus

File->Save as
Closes the editor window and opens the NMEA decoder library window where the new name and folder (group) may be defined. This item is only present if the editor is called from the NMEA decoder library.

File->Close
Closes the editor window. The user will be prompted for unsaved changes.

Edit->Undo
Edit->Redo
Edit->Cut
Edit->Copy
Edit->Paste
Edit->Delete
Commands for the Editor

Tools->Insert symbol
A menu with symbols normally not found on a keyboard will be displayed.

Help->Help topics
A description of the decoder script language will be displayed.

13.3.2 Tool bar

A tool bar is located below the drop down menus. The tool bar contains short cuts (icons) to the most commonly used items from the drop down menus.

13.3.3 General buttons

"OK" button:
Changes made will be stored; the editor window is then closed. The previous version of the decoder is overwritten. It is not possible to overwrite the decoders that are supplied with the VDR Explorer.

"Cancel" button:
Closes the editor window. Any changes made will be ignored and lost.

"Save As" button:
The editor window will close. Changes may be saved using a new name/folder while maintaining the previous version of the decoder.
The "Save As" button is only enabled if the editor window is opened from the library (i.e. disabled when opened from the GUI configurator).

13.3.4 Decoder information

Decoder name:
See section 13.1

Decoder output:
See section 13.1

Decoder description:
A description of the decoder may be included (recommended).

13.3.5 Editor window

A script defining the decoder must be entered in the NMEA decoder window. The "sentence formatter field" derives information from the "search for" statement in the decoder script. The full name for the NMEA sentence will be displayed if the sentence formatter is known.

"Help->Help topics" shows a short description of the script language. Section 21 contains an extensive description of the script language.

13.3.6 Decoder test

A decoder may be tested against an NMEA sentence if the test decoder button is activated. Two things happen when the test button is activated:

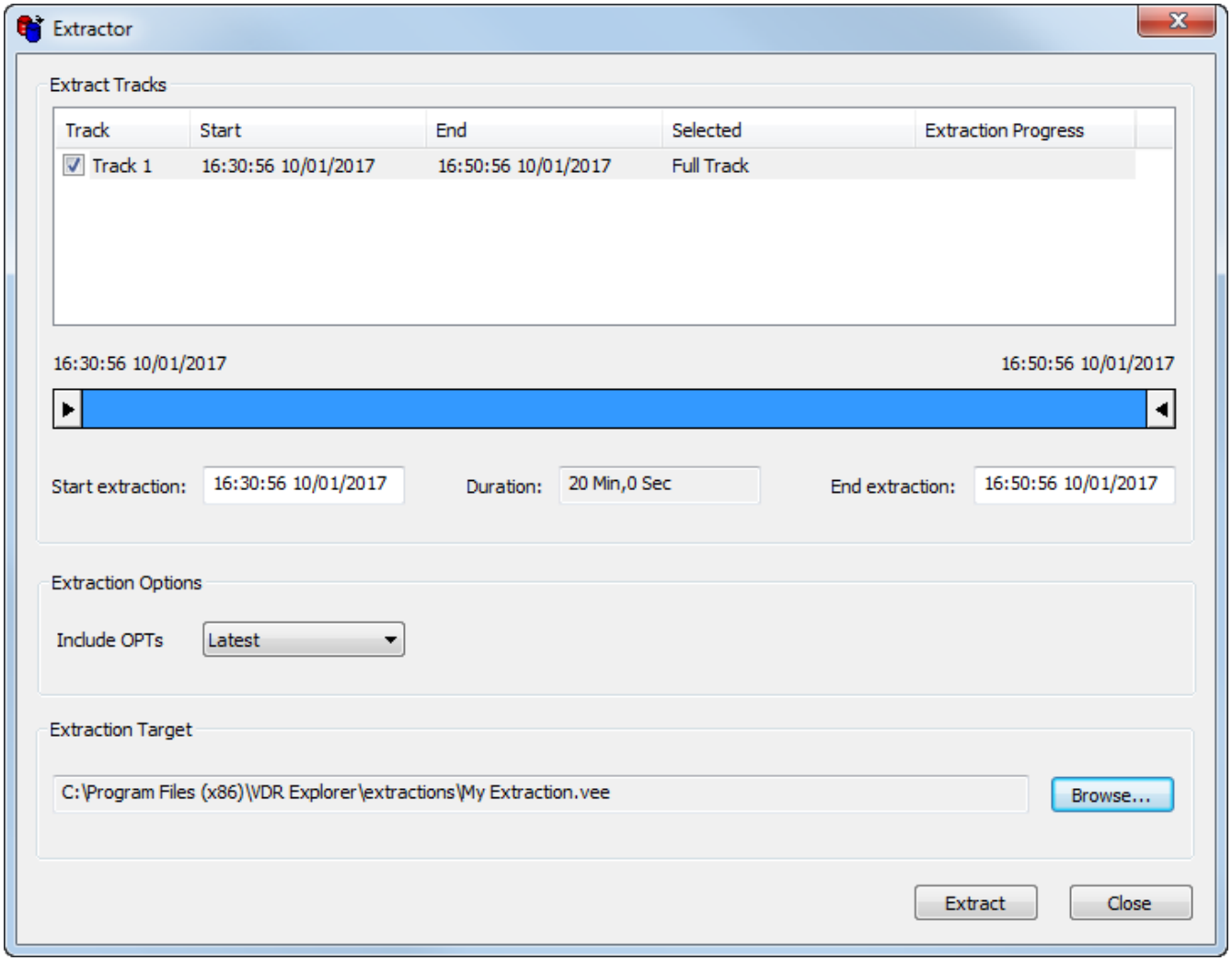
1. The script will be compiled; i.e. the syntax is checked. The text in the "NMEA test sentence" field will not influence this. The test will only continue if the compilation is successful.
2. The NMEA decoder will decode the NMEA sentence shown in "NMEA test sentence" field. This is, of course, only meaningful if the NMEA sentence formatter in the test sentence matches the NMEA sentence formatter in the decoder's "search for" statement. The data output and the trend output will be displayed upon a successful test.

13.3.6.1 "NMEA test sentence" field

A test sentence may be entered in this field. Copy/paste from, e.g. the serial monitor, may be used. The ten most recent test sentences will be saved.

14 Extractor

The Extractor is used to retrieve data from a data source to a file. The VDR Explorer must be connected to a data source (not live from a VDR) before the Extractor tool can be opened.



14.1.1 Track information

The track information for the currently selected capsule or backup disk is displayed in this window. A track is defined as an uninterrupted recording session. This typically corresponds to a time period where the VDR was not interrupted, e.g. by a restart. However, other events may divide a recording into two tracks, e.g. a bad record (checksum error) on the disk or a VDR configuration change.

One or more tracks must be selected before the extraction process can start. The sliders on the blue bar may be used to reduce the amount of data used from the selected track.

Extraction options
Only relevant for a DM100 VDR. Used for specifying how OPT data will be handled.

Extraction target:
Displays the currently selected (if any) target file for the extraction.

"Extract" button:
Starts the extraction process.

"Close" button:
Closes the window.

Overview for the extraction process step by step:

1. Connect to a capsule or backup disk using the connect tool.
2. Open the extractor tool.
3. Select and optionally shorten the duration of tracks to be extracted.
4. Select how OPT data is to be handled (only DM100 VDR).
5. Select (Browse) the target file for the extraction.
6. Start extraction process using the "Extract" button.

Extracting all data from a capsule takes approximately from 20 minutes to 2 hours depending on the size of the capsule.

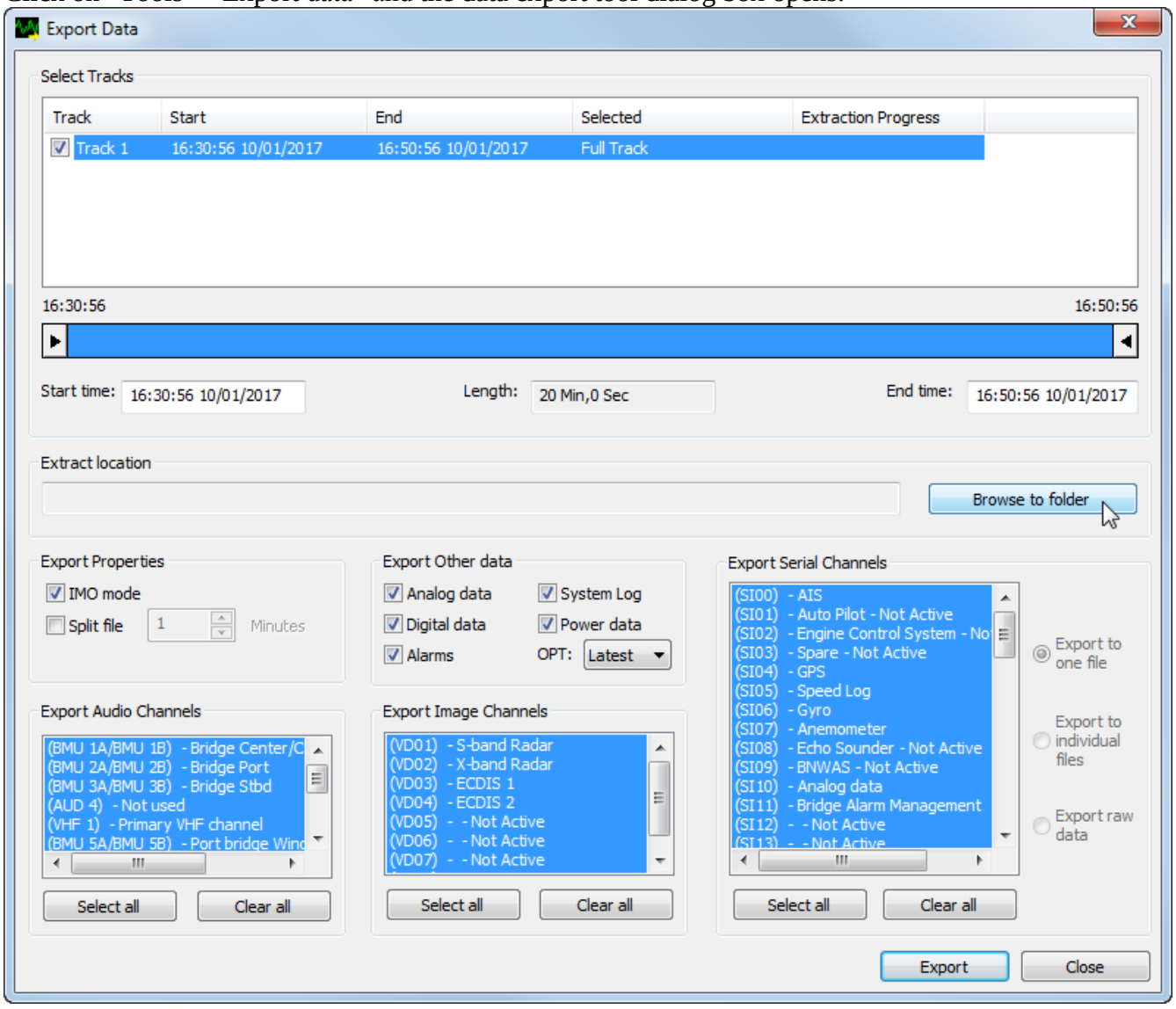
15 Data Export Tool

The "Data Export Tool" may be used for exporting the VDR data into either an IEC61996-1/2 compatible format or an open industry format.

Data	IEC61996-1/2 format	Open industry format	
Audio	Wave files (*.wav)	Wave files (*.wav)	
Images	Bitmap (*.bmp)/PNG(*.png)	Compressed Tiff (*.tif) PNG(*.png)	
Serial data	One comma separated data file (*.txt)	Text files (*.txt)	
Analog and Digital data		Comma separated files (*.csv)	Note 1
Power status		Comma separated files (*.csv)	Note 1
Alarms		Text files (*.txt)	
System log	Text files (*.txt)	Text files (*.txt)	
Configuration	HTML file (*.htm)	HTML file (*.htm)	

Note 1) The separator will be "," or ";" depending on the regional settings for the VDR Explorer (Options -> Preferences -> Regional Settings)

A data source must be selected before opening the export tool (see section 12).
Click on “Tools -> Export data” and the data export tool dialog box opens.



Select the data to be exported (checkmark all boxes if all data is to be exported).
Select a folder for the data (Click on “Browse to folder”).

Select whether the export format should be IEC61996-1/2 (“IMO mode” checked) or an alternative open industry (“IMO mode” not checked). For IMO mode is it possible to split the audio files, data file and the system log into smaller handier files, each covering a user-definable time span.

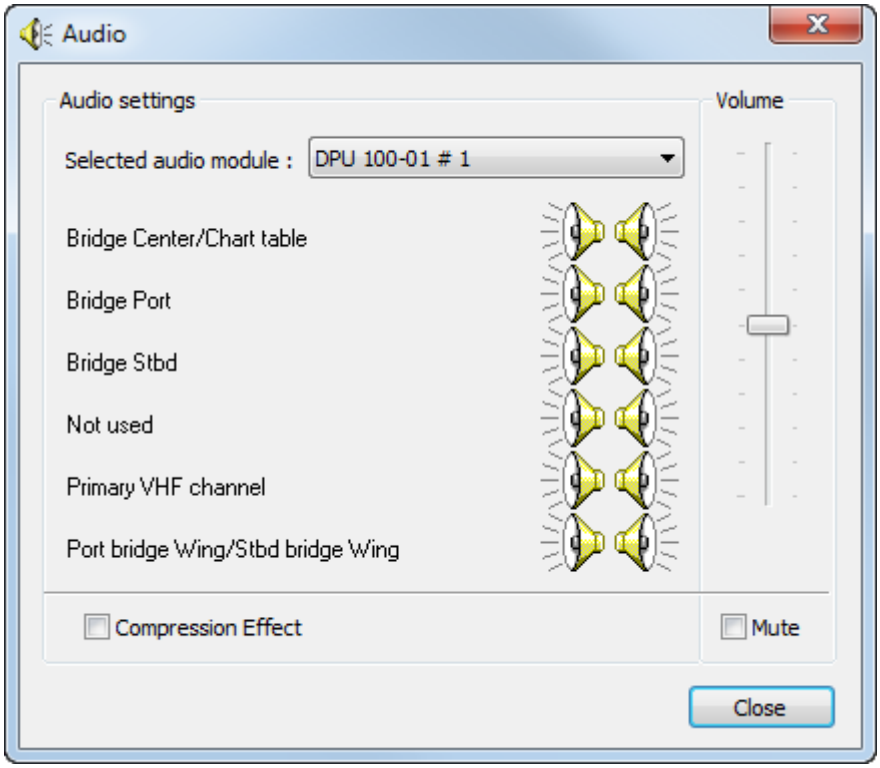
Click on “Export”.

15.1.1 Export raw serial data

Time stamps for serial data will be omitted if “Export raw data” is selected (radio button to the right). Data from each serial channel will be exported to an individual file.

16 Audio settings tool

Go to “Tools->Audio”



The speaker symbols may be used (by left-clicking on them) for selecting and directing audio channels to the left or right speaker channel on the PC used for replaying.

A master volume control is located to the right.

The compression effect is useful when listening to recordings with a high dynamic range.

16.1 Password protected audio

Audio may be password protected i.e. replay of audio disabled unless the correct password is entered. Audio replay may be enabled by opening the Audio Settings Tool and entering the correct password when prompted.

The password is defined by the configuration for the VDR.

17 Data Log

The data log function is able to log data from selected objects into a CSV file. The data log function is associated with a special tab page. The data log tab page is created as any other tab page.

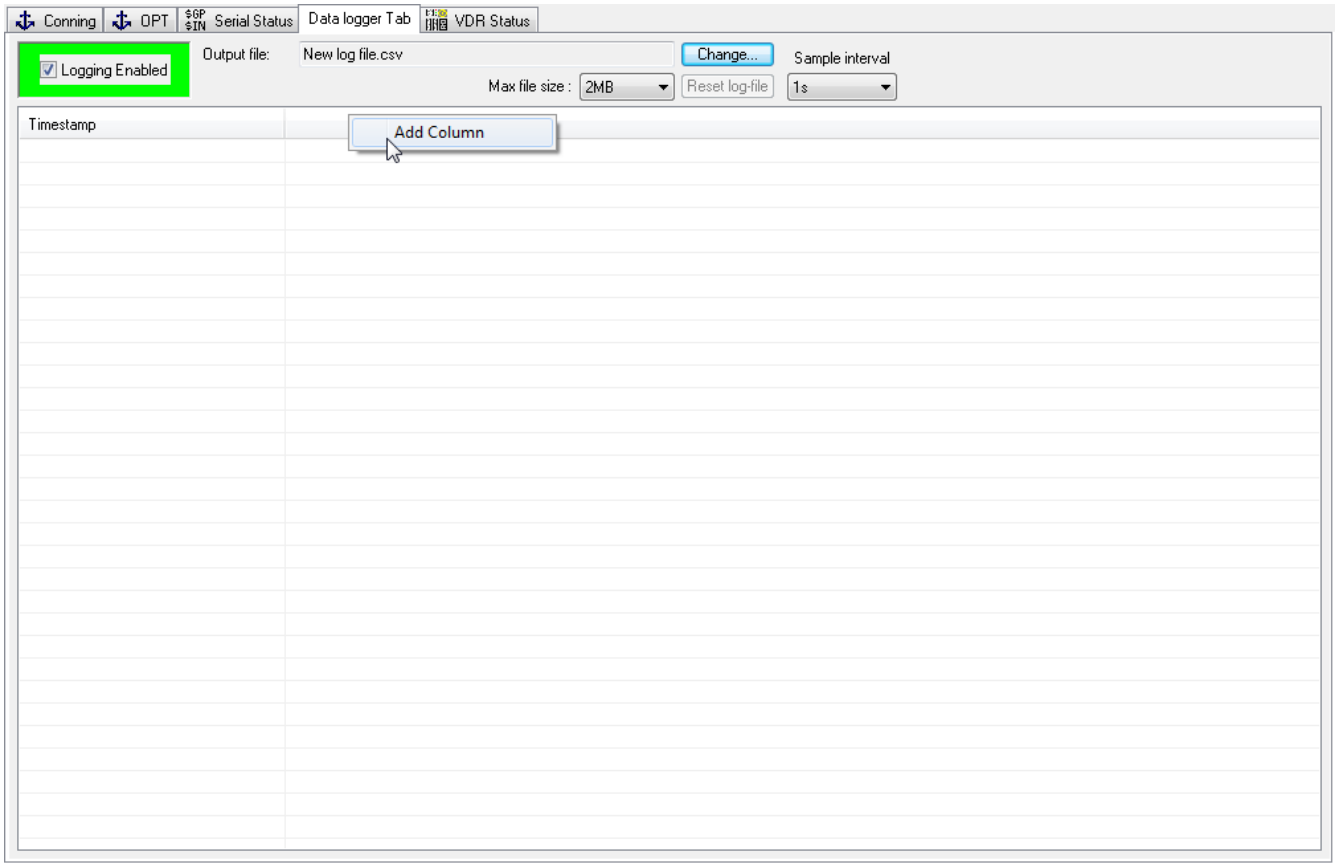
- The VDR Explorer must be set in configuration mode.
- Right click on a tab for a tab page and then select “tab properties”. This opens the “tab page organizer”.
- Click on “add” and select the “Data Logger Tab”.

17.1 Configuration of data log

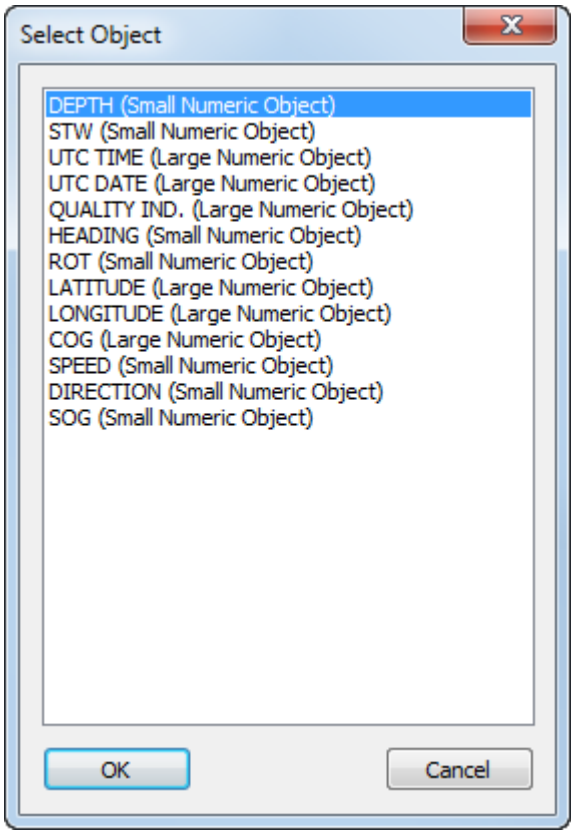
Columns may be created by two methods.

17.1.1 Direct creations of columns

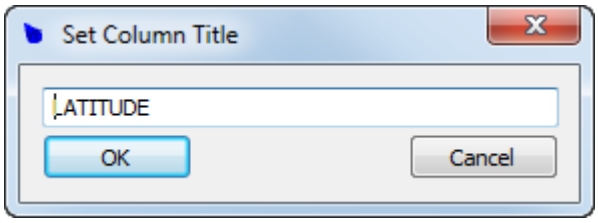
- The VDR Explorer must be in configuration mode.
- Right-click on the title bar for the columns next to “Timestamp”.



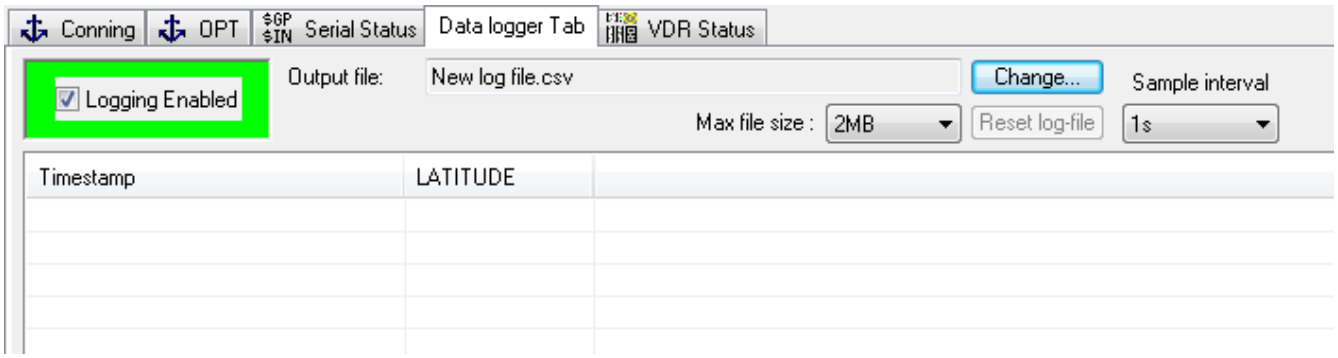
- Click on “add column” and a list of relevant objects appear.



- Select an object and click on OK

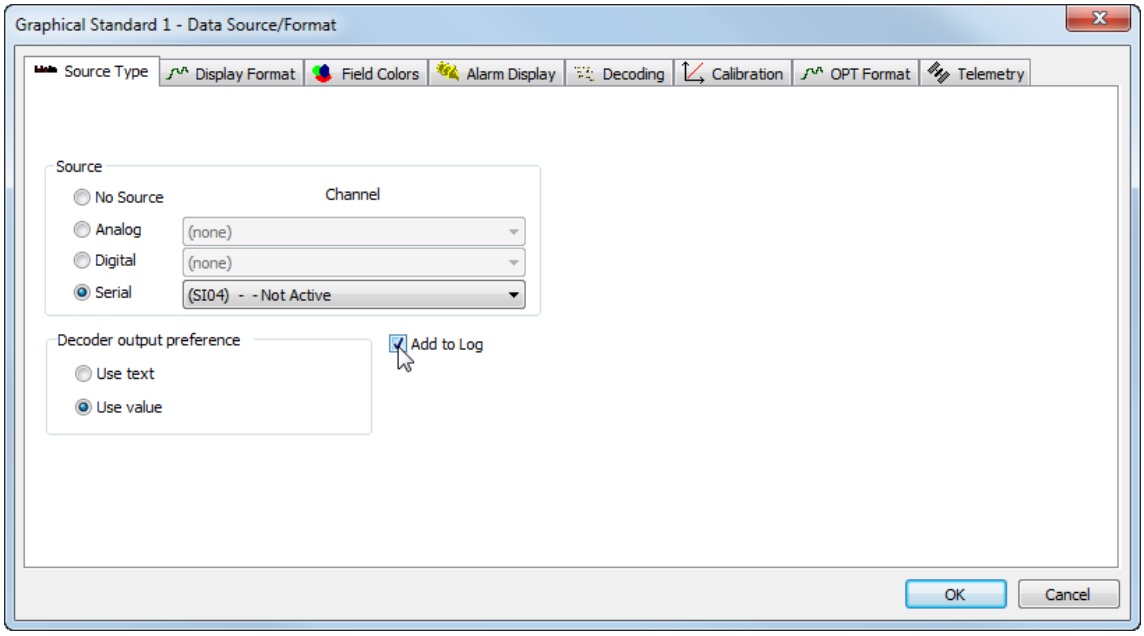


- Enter the title, click ok and a new column is created.

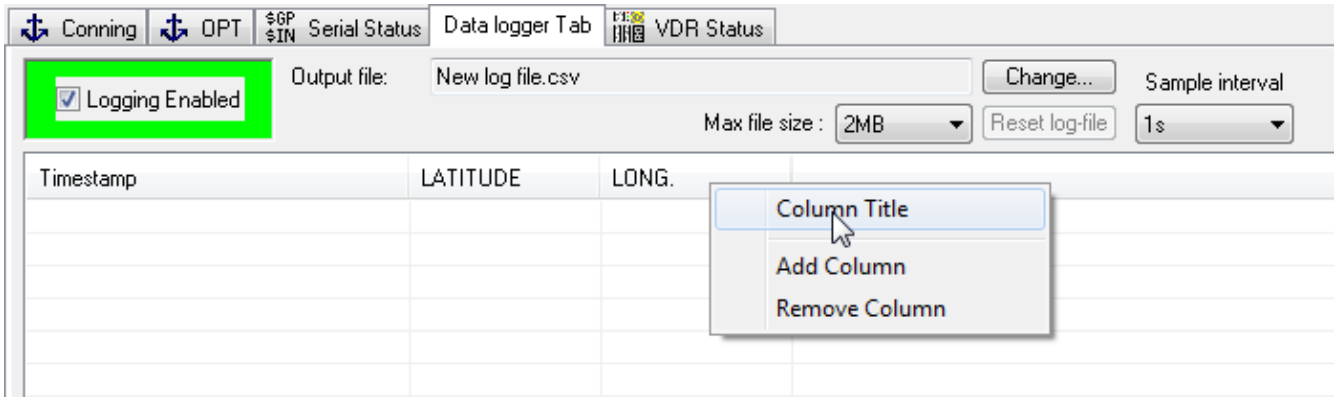


17.1.2 Indirect creations of columns

- The VDR Explorer must be in configuration mode.
- Open the properties dialog for an object that is able to input data to the data log (short standard object and standard object)



- Check “Add to log” and a new column is created.



- Change the title if needed. Right-click on the column title, select “Column Title” and enter a new title.

17.1.3 Organizing columns

The VDR Explorer must be (with a few exceptions) in configuration mode.

Right-clicking on the title for column opens a menu with miscellaneous commands.

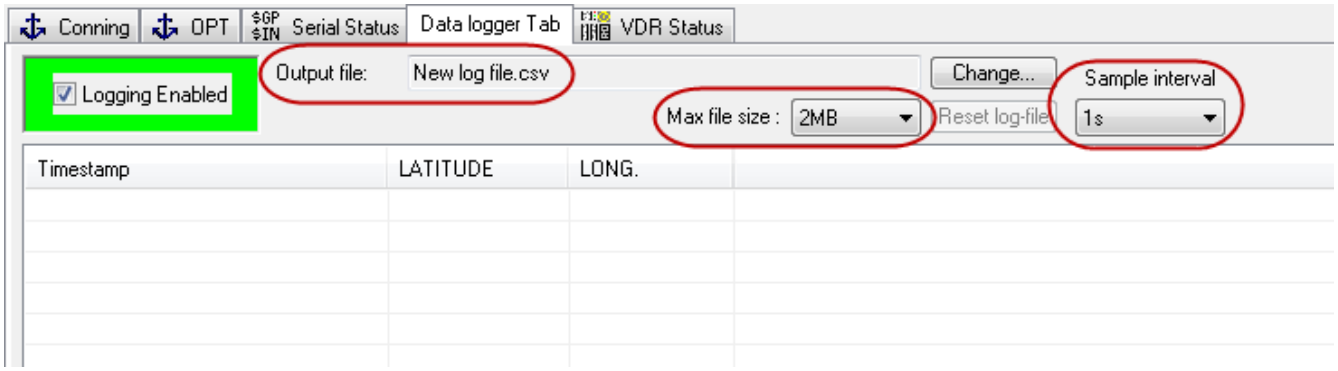
In general the width and order of the column can be changed in the same manner as for many other Windows programs, e.g. using “click, drag and drop” on the column title can be used to rearrange columns.

17.1.4 Maximum number of columns

The maximum number of columns that can be handled depends on the PC. A PC that meets the general requirements for the VDR Explorer will be able to handle 25 columns without any noticeable performance degradation.

17.2 Saving log data to a file

The program will store the data to a user-defined output file.



The library path for the log files is defined by the preferences for the VDR Explorer. See section 17.3

17.2.1 Max file size

Maximum file size is user-defined. Data logging will stop when the file is full. The file may then be reset (or renamed/moved using Windows Explorer).

17.2.2 Sample interval

The sample interval is user-defined. Fast sampling (small intervals) requires lot of disk space.

17.3 Preferences

17.3.1 Directory path for log files

The library path for the log files is defined by the preferences for the VDR Explorer (VDR Explorer main window, Options->Preferences->Directory settings).

17.3.2 Disable data logging at connect

Data logging without explicit acceptance can be restricted (VDR Explorer main window: Options->Preferences->Data Logger).

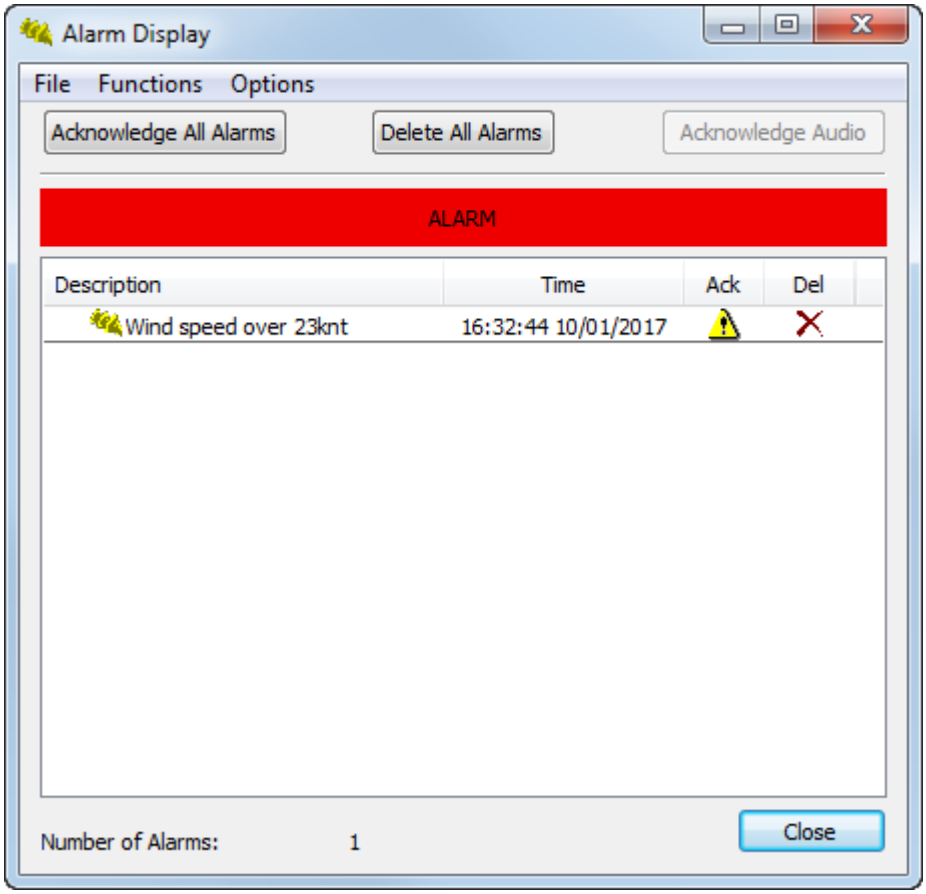
On:	Data logging must be started manually even if a VDR Explorer configuration with “data logger enable” is loaded.
Off:	Data logging will start automatically if a VDR Explorer configuration with “data logger enable” is loaded.
Prompt:	(Default) the user will be prompted for acceptance of data logging.

18 Alarm panel

The Alarm panel is a tool which can be used for analyzing recorded and live data. It can be configure to generate an alarm if a specific event happens.

Please notice, that the Alarm panel is not related to the objects for displaying data from the vessel's alert management system (described in section 9).

Selecting "Tools->Alarm Display" or clicking on the icon on the Player window tool bar will activate the alarm window.



Acknowledge all alarms:
This function acknowledges all alarms on the list. An alarm may be acknowledged individually by clicking on the icon for that alarm.

Delete all alarms:
The function deletes all alarms from the list. An alarm may be deleted individually by clicking on the icon for that alarm.

Acknowledge audio:
This function mutes the audio until a new alarm is generated.

Options->Disable sound:
This option mutes the audio related to the alarms panel completely.

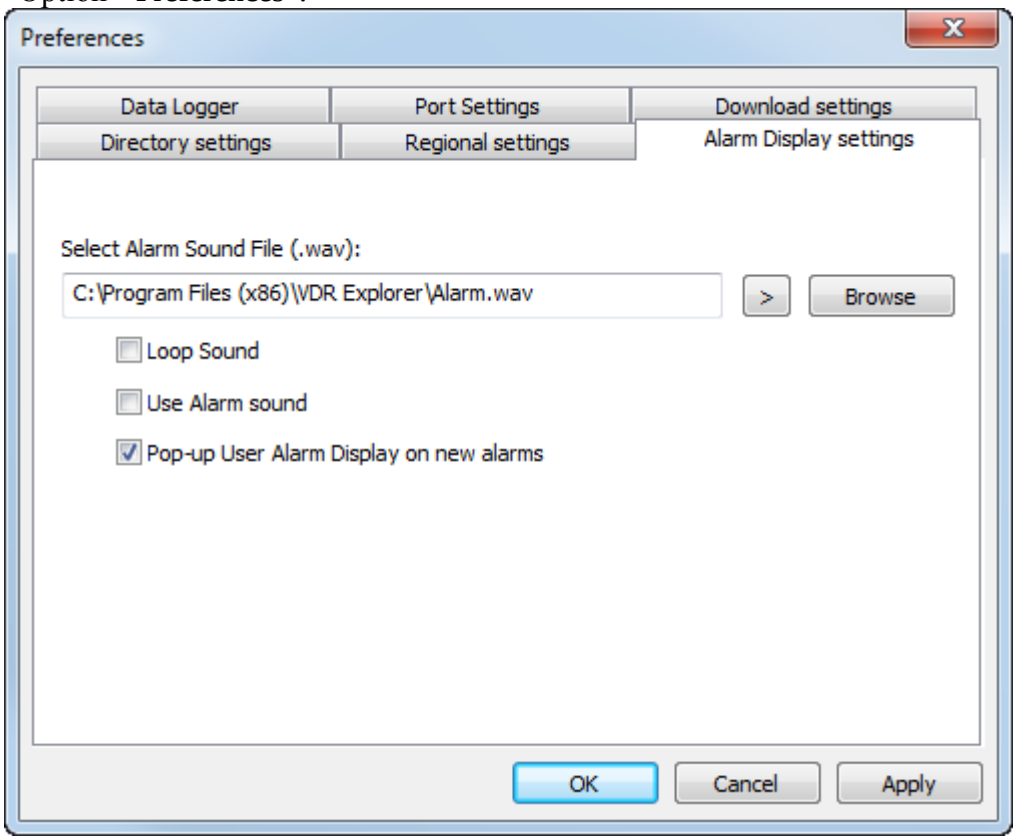
Options->Disable popup:
This option prevents the alarm window from popping up when a new alarm is generated.

18.1.1 Easy localization of alarms-source

Double-clicking on the text for an alarm brings the tab page from where the alarm is generated to the front.

18.2 Default setting for alarm panel

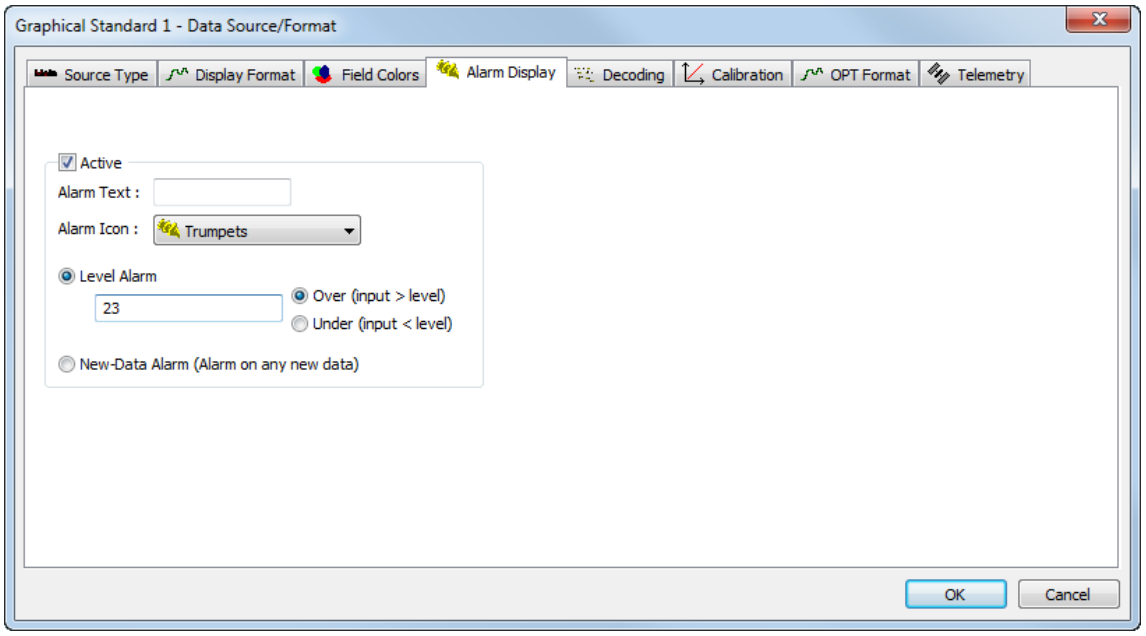
The default settings for the alarm panel may be set from the Player's main window by selecting "Option->Preferences".



18.3 Configuration of objects for alarms

Most objects can generate an alarm to the alarm panel.

The parameters for generating alarms are located together with the other parameters related to a data source see section 5.9.



The example above shows how an alarm will be generated if, for example, the wind speed is above 23kts.

Active:
The object will only generate alarms if this box is checked.

Alarm text:
The text that will be written in the alarm window.

Level Alarm:
An alarm will be generated if the output is above or alternatively under a specific level.
For serial communication, please note that the trend output from an NMEA decoder is used for the alarm system.

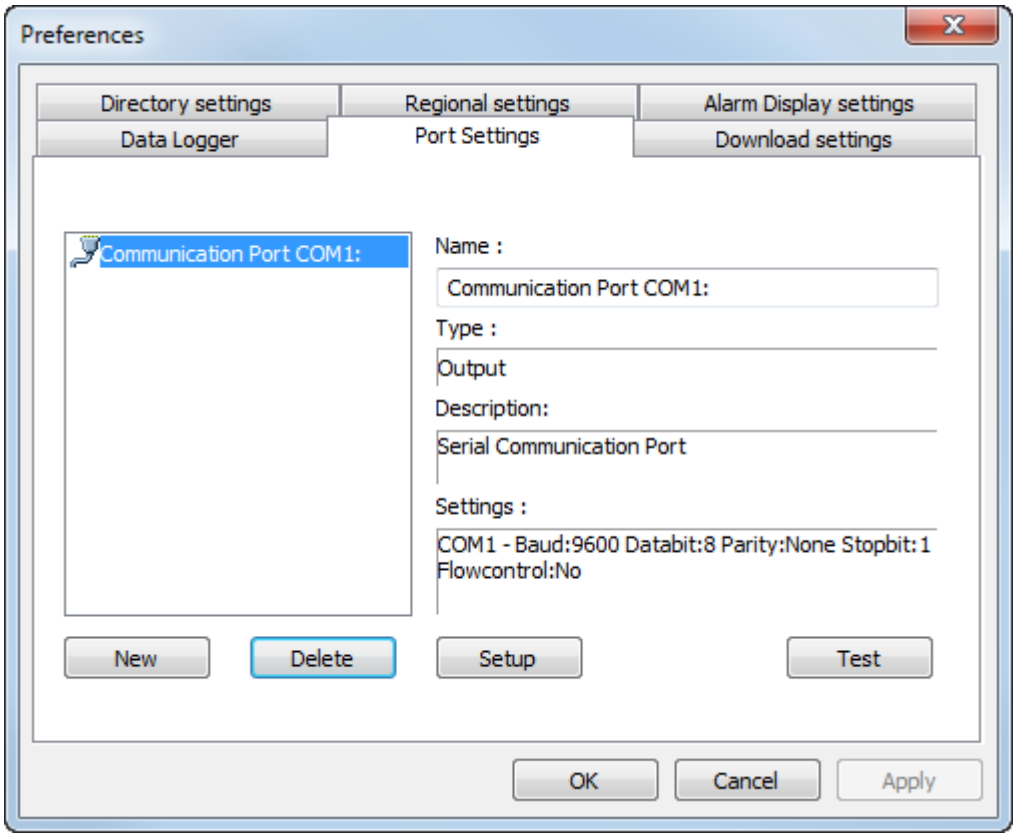
Alarm on new data:
An alarm will be generated every time data is received (only applicable for serial data).

19 Relay of serial output to other applications

The VDR Explorer is able to relay serial data to other applications.

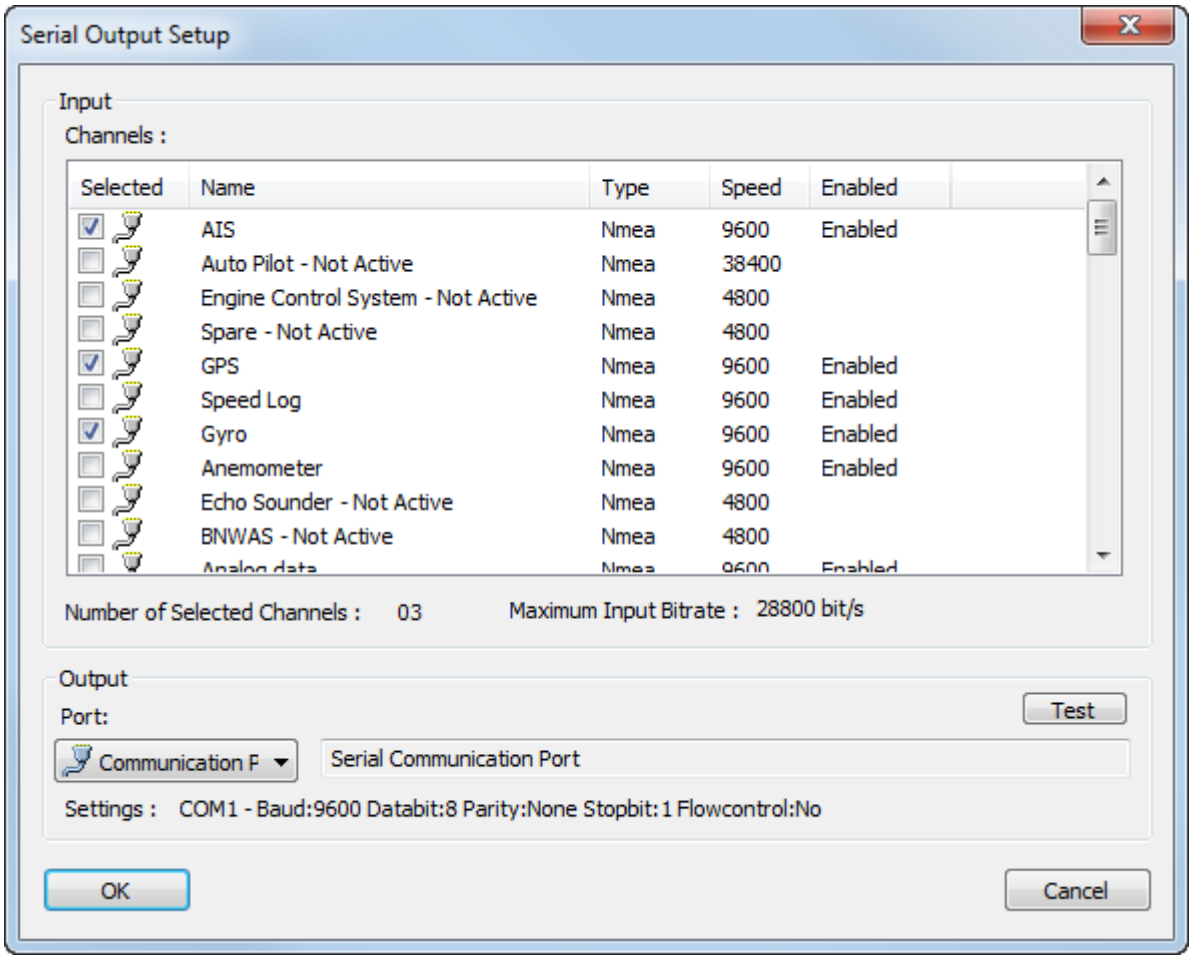
19.1 Output port settings

An output port on the PC for the serial data is needed and must be configured. These parameters are included in the VDR Explorer's preferences (Options->Preference->Port Settings).



19.2 Configuration of serial output

The VDR Explorer must be in configuration mode.
A click on “Tools->Setup Serial Output” opens the tool for configuring the sources of the serial output.



The number of data sources and the output port may be selected.

19.2.1 Merging of data

The program is designed to handle NMEA sentences; i.e. two sentences will not be interleaved but sent one at a time. The program may fail to relay ASCII or binary data correctly depending on the properties of the data.

19.3 Enable/Disable output

An icon  on the VDR Explorer tool bar can be used to enable/disable the serial output. This can be done while the VDR Explorer is playing/replaying data.

19.4 Overflow on serial port

The serial output port may overflow if the combined inputs exceed the capacity of the output port. The warning may be displayed if this happens. It is possible to suppress the message. This will be in force until output is disabled and then enabled.

19.5 Serial output and step

The VDR Explorer is able to generate serial output while stepping. However the output port may be congested and steps may take very long time to process.

20 Special features

20.1 Floating windows

Note: This new feature has been designed for experienced users. Using floating windows in configuration mode may be confusing.

A tab page may be detached from the VDR Explorer's main window. This is either done by "click, drag and drop" or double-clicking on the tab for a tab page.

Right-clicking on the top bar for a floating window opens a menu with items for manipulating the window, e.g. making it full screen.

Double-clicking on the top bar for a floating window reverts the window to a tab page. A floating window will also revert to a tab page if the corner of the window is aligned with the corner of the first tab in the VDR Explorer's main window.

20.1.1 "Windows" dropdown menu

A dropdown menu (Windows) has been added to the menu bar for the VDR Explorer's main window. The window selected from this menu will be brought to the front.

20.2 Support for PCs with lower screen resolution

The VDR Explorer is designed for 1280x1024 and above, however a PC with lower screen resolution may be used with minor inconvenience.

20.3 Vessel information

Complete vessel information is normally not displayed. "View->Vessel information" may be used to open/close a window for displaying complete vessel information.
One "data item" related to Vessel information (vessel name is default) is displayed next to the tool bar for the VDR Explorer's main window.

20.4 Play control

"View->Play Control" may be used to hide/show the Play Control. The Play Control may also be moved around (click, drag and drop).

20.5 Full screen radar image

Full-screen radar image is entered and exited by double-clicking on the image.

20.6 Full screen graph object

A double-click on a graph object expands it to full-screen. A full-screen graph will return to normal size upon a double-click.

20.7 Full AIS display

A double-click on an AIS display object expands it to full-screen. A full-screen AIS display object will return to normal size upon a double-click.

21 NMEA sentence formatting script language V3.0

21.1 Purpose

The purpose of this language is to easily match a given NMEA sentence and format it to human-readable text. This implies that both pattern matching ability and string formatting ability must be a part of the language. The resulting human-readable text will have a value associated with it. This value is used for the trend indicator and is most likely taken from the NMEA sentence.

21.2 Language introduction

Matching and formatting an NMEA sentence consists of applying a small compiled program to an NMEA sentence. The output from this program will be a formatted string and an optional value. In this context, a program is a compiled set of statements in the NMEA sentence formatting language. The source for a program in this language consists of a sequence of statements. Each statement will be executed in the order they are written; i.e. the language is a straight-line language. If a statement fails, the program will exit.

21.3 Language example

The syntax and semantics of the language is best shown by use of an example.

The following NMEA sentence is to be formatted:

```
Field no: |  1  |    2    |3|    4     |5|    6    | 7
Sentence: $GPGLL,5536.1234,N,01244.1234,E,123456.78,A*1B
```

into the following result: "`N 55°36.123`" and the associated trend value "5536.1234" . Running the following program does this:

```
// This is a comment and have no effect on the program
Search for "GLL"
If #7 <> "A"
   print "GPS failed"
   Stop
EndIf
Print #3
Print " "
Print #2 1:2
Print "°"
Print #2 3:6 F00.000
Trend #2
```

The first line is a comment and has no effect on the program, but can be a useful aid when developing decoders in the formatting language. The second line "`Search for "GLL"`" identifies which NMEA id this program is valid for. The third line uses an "`if`" construct to test if field 7 contains the text "A". If this is the case, the text "GPS failed" is printed and the program stops. If

not, the program continues onto line three. The next few lines consist of "print" statements on field identifiers and strings. The hash mark "#" indicates a field identifier:

```
#field [range] [format]
```

Where "field" indicates the field number, "range" the range of characters to use and "format" how the number should be formatted.

Continuous "print" operations can be concatenated into one "print" sentence resulting in a more compact program:

```
Search for "GLL"
If #7 <> "A"
  print "GPS failed"
  Stop
EndIf
Print #3 " " #2 1:2 "°" #2 3:6 F00.000
Trend #2
```

The last line identifies the field which will be used as the trend value.

21.4 Bit function examples

The following fictive NMEA sentence is used:

```
Field no: |  1  |    2     |3| 4
Sentence: $XXYYY,DEADBEEF01,N,A*1B
```

```
search for "YYY"

if bit(#2,2) = 1
    print "bit 2"
    stop
endif

if bit(#2,1) = 1
    print "bit 1"
endif
```

The output of this program applied to the above NMEA sentence is: "bit 1" since bit 2 is not set. Bit number is counted from the right hand side and begins at position 1. Hence bit 24-28 is the "B".

21.5 Operators and reserved words

21.5.1 Operators

The following operators are valid in "if" statements:

Operator	Meaning	Valid types on the right side of operator
=	Equality	Strings, integers and real numbers

<>	Inequality	Strings, integers and real numbers
<=	Greater or equal	Integers and real numbers
>=	Less or equal	Integers and real numbers
<	Less than	Integers and real numbers
>	Greater than	Integers and real numbers

The left side of an operator must be a field.

21.5.2 Reserved words

Reserved word	Meaning
Print	Sets the result of a text based object.
Search for	Identifies the NMEA sentence the decoder is valid for
If	Beginning of an "`if`" statement. "`if`" statement cannot be nested.
EndIf	Identifies that the "`if`" statement ends here
Stop	Stops the program return result
Break	Cancels the program return with no result
Value	Sets the result of a number based object (e.g. a gauge).
Trend	Alternative keyword for Value. Trend should not be used in new decoders and is kept for backwards compatibility only.
Add(Field1, Field2)	Adds two fields to each other (Field1 + Field2) and returns the result
Sub(Field1, Field2)	Subtracts the two fields from each other (Field1 - Field2) and returns the result.
Bit(Field, Bit no.)	Returns 1 if a bit is set in Field, 0 if not. Field must be a hex string. If bit does not exist, it returns –1.
Cbit(Field, Bit no.)	Returns 1 if a bit is set in Field, 0 if not. Field must be a character and Cbit checks the binary representation of the character's ASCII value. Range may be used to select the specific character. Please refer to "Range and Format Specifiers" below for more information. Only the leftmost character is used if the field or range contains multiple characters. Bit no. must have a value of 1 through 8. Example: Assume that field #1 has the value "ABC".

	Cbit(#1, 1) will then be "1" as the character "A" has the ASCII value 65 (decimal) = 01000001 (binary) whose bit number 1 (rightmost or least significant bit) is "1".
Dbit(Field, Bit no.)	Returns 1 if a bit is set in Field, 0 if not. Field must be a decimal value between 0 and 9999999999. Bit no. must have a value of 1 through 34.
Cmask(Field, Mask)	Applies a binary mask to the ASCII value of a character in Field. The result is a value between 0 and 255. Range may be used to select the specific character. Please refer to "Range and Format Specifiers" below for more information. Only the leftmost character is used if the field or range contains multiple characters. Mask must have a value between 0 to 255. Example: Assume that field #1 has the value "ABC". Cmask(#1, 192) will then be "64" as the character "A" has the ASCII value 65 (decimal) = 01000001 (binary) and when applying a mask of 192 (decimal) = 11000000 (binary) the result is 01000000 (binary) = 64 (decimal).
Mbit(Field, bit no.)	Returns 1 if a bit is set in a Modbus field, 0 if not. Field must be a Modbus string. If bit does not exist, it returns –1.
Mreg(Field, Reg no. [, Factor [, Offset]])	Returns Modbus register if the register exists in the Modbus field. Field must be a Modbus string. If the register does not exists it returns –1. Specifying Factor and Offset can be used to return the following calculation: Factor * (Modbus register + Offset) Specifying Factor and Offset is optional. If omitted a default value of 1 is used for Factor and 0 is used for Offset.
MregBit(Field, reg no., bit no)	Returns the value of a bit in a Modbus register if the register exists in the Modbus field. Field must be a Modbus string. If register does not exist, it returns –1. Generates a compile-time error if bit no. is not within 0..15
Msreg(Field, Reg no. [, Factor [, Offset]])	Returns a signed Modbus register if the register exists in the Modbus field. Field must be a Modbus string. If register does not exists it returns 0. Specifying Factor and Offset can be used to return the following

	calculation: Factor * (Modbus register + Offset) Specifying Factor and Offset is optional. If omitted a default value of 1 is used for Factor and 0 is used for Offset. Use Mreg to check for the register existence.
Mdwreg(Field, Reg no. [, Byte order [, Factor [, Offset]]])	Converts the double word starting at Reg no. to an unsigned double word. Input: Field: Indicating NMEA string field number (usually 2). Reg no.: Number of first register to convert. Byte order: Byte ordering performed before conversion (described below). Factor: Factor for calculation (Same as for Mreg). Offset: Offset for calculation (Same as for Mreg). Returns: Reg no. and Reg no. + 1 converted to unsigned double word according to Byte order. Return value is -1 if Reg no. and Reg no. + 1 does not exist.
Msdwreg(Field, Reg no. [, Byte order [, Factor [, Offset]]])	Converts the double word starting at Reg no. to a signed double word. Input: Field: Indicating NMEA string field number (usually 2). Reg no.: Number of first register to convert. Byte order: Byte ordering performed before conversion (described below). Factor: Factor for calculation (Same as for Mreg). Offset: Offset for calculation (Same as for Mreg). Returns: Reg no. and Reg no. + 1 converted to signed double word according to Byte order. Return value is undefined if Mdwreg(Field, Reg no.) < 0.
Mdwfreg(Field, Reg no. [, Encoding])	Converts the double word starting at Reg no. to a floating point. Input: Field: Indicating NMEA string field number (usually 2). Reg no.: Number of first register to convert. Encoding: Encoding used for conversion (described below).

	Returns: Reg no. and Reg no. + 1 converted to floating point according to Encoding. Return value is undefined if Mdwreg(Field, Reg no.) < 0.
DETime(Field)	Returns a double encoded timestamp in Field converted to the format "YYYY-MM-DD hh:mm:ss". Double encoded timestamps are used by e.g. Martec.
HexDec(Field)	Returns a hexadecimal number in Field as decimal. A maximum of 8 hexadecimal characters can be converted. Refer to [range] in the section "The NMEA field Identifier" below to convert a part of a field.
Find(Index, First Field, Modulus, Reference String [, First Character])	This function compares a Reference String with the data in specific fields in a sentence. The return value is 1 if a match is found and 0 if not. If a match is found the position of the matching field is stored in Index. First Field: The position of the first data field to be checked. Modulus: The offset to the next data field to be checked. First Character: First character in the specified data fields to be compared with the first character in "Reference String" (from left). Specifying "First Character" is optional - if omitted a default value of 1 is used. (A "null" Reference String matches the contents of any field. The command `Find(%Index_id, n, 1, "")` can therefore be used to check whether field "n" exists in a sentence.) Example: $BWDXDR,S,0,,WD.4.13,S,1,,WD.4.12*76 `Print Find(%6, 5, 4, ".4.12", 3)` Looks for ".4.12" starting from data field #5 and then every 4th data field. The comparison with the "Reference String" starts at the 3rd character in each field. The result is that "9" is stored in index number 6 and "1" is printed because the "Find" succeeded. Please refer to the section "The Index Identifier" below for more information.
FieldAt(Index [, Offset])	Returns the value of a field relative to the field referenced by Index. The Offset can be both negative and positive in order to specify a field respectively before and after the field referenced by Index. Specifying Offset is optional. A default value of 0 is used if Offset is omitted, effectively returning the value of the field referenced by Index.

	The function generates a runtime error if the number stored in Index plus Offset points to a non-existing field. Please refer to the section "The Index Identifier" below for more information.
Calc(Index, Factor, Offset)	Performs a calculation on the value of a field and returns the result. The performed calculation is: Factor * (Fieldvalue + Offset)
Last(Field, Count)	Returns the last n characters of a field, where n = count

21.5.2.1 Encoding and byte order for Mdwreg, Msdwreg, Mdwfreg

Encoding:
0: IEEE - No Swapping ("ABCD" => "ABCD") before conversion (default)
1: IEEE - Byte Swapping ("ABCD" => "BADC") before conversion
2: IEEE - Word Swapping ("ABCD" => "CDAB") before conversion
3: IEEE - Byte and Word Swapping ("ABCD" => "DCBA") before conversion

Byte order:
0: No Swapping ("ABCD" => "ABCD") before conversion (default)
1: Byte Swapping ("ABCD" => "BADC") before conversion
2: Word Swapping ("ABCD" => "CDAB") before conversion
3: Byte and Word Swapping ("ABCD" => "DCBA") before conversion

21.6 Field Identifier

The hash mark "`#`" indicates a field identifier:

```
#field [range] [format]
```

Where "`field`" indicates the field number beginning from 1.

The "`range`" is optional and identifies the range of characters to use. The syntax is "`x:y`" where "`x`" is the first character to use (unless "y" is negative) and "`y`" is the number of characters. If "x" is out of range then the program is terminated and an error is printed. If "y" is out of range then the program will print to the end of the field.

If "y" is negative then the characters are selected from left. First to be printed is "x-y+1" and last character to be printer is "x"
Example:

```
Field no: |  1  |    2     |3| 4
Sentence: $XXYYY,123456,N,A*1B
```

```
search for "YYY"

print #2 3:-2
```

The printed result will be “23”.

If “x” is negative then the first character to print is selected from the right. Example:

```
Field no: |  1  |    2     |3| 4
Sentence: $XXYYY,123456,N,A*1B
```

```
search for "YYY"

print #2 -4:3
```

This printed result will be “345”.

To print everything but the last two characters of field 2:

```
Field no: |  1  |    2     |3| 4
Sentence: $XXYYY,123456,N,A*1B
```

```
search for "YYY"

print #2 -3:-99
```

Will print “1234”

The “`format`” field is optional and similar to the one used in Visual Basic. The maximum length of a formatter is limited to 10 characters, including the decimal point.

E.g.:

Formatter	Data to display			
-	14.75	0.336	-17	278
F0	14	0	-17	278
F00.00	14.75	00.34	-17.00	278.00
F0.000	14.750	0.336	-17.000	278.000
F000.0	014.8	000.3	-017.0	278.0
A000.0	014.8	000.3	017.0	278.0
N000.0	-014.8	-000.3	017.0	-278.0

By replacing the “F” with an “A” the result will be formatted into an absolute value. The following syntaxes are not allowed: “F0.” and “F.0”

21.7 The Index Identifier

The percentage sign “%” indicates an index identifier:

```
%Index_id
```

where "Index_id" is a number between 1 and 9.

An Index is used by the "Find command" to store a pointer/reference to a field in a sentence.
`%Index_id` may be used as parameter for If, Print, Trend and Value commands (the value is a reference (number) to a field in a sentence).
Use the FieldAt command to get the value (content) of the field referenced by an index.

Examples:

$BWDXDR,S,0,,WD.4.13,S,1,,WD.4.12*76

```
Find(%2, 5, 4, "WD.4.12")     // Stores "9" in index number 2 ("%2")
Print %2                      // Prints "9" (the field number found above)
Print FieldAt(%2)             // Prints "WD.4.12" (the value of field number 9)
Print FieldAt(%2, -2)         // Prints "1" (the value of field number 9 + (-2) =
7)
```

$PSM1,KA,DO06115,DO04411,9E

```
Find(%5, 3, 1, "06115", 3)    // Stores "3" in index number 5 ("%5")
Print %5                      // Prints "3" (the field number found above)
Print FieldAt(%5)             // Prints "DO06115" (the value of field number 3)
Print FieldAt(%5, 1)          // Prints "DO04411" (the value of field number 3 +
1 = 4)
```

21.8 Strings

Strings must be enclosed in quotes. If a string contains quotes itself, then these quotes must be prefixed with a backslash ("\").

Example:

$PSM1,KA,En33022S,En"DET-33.022.T,Fn61051,E7

```
If #4 = "En\"DET-33.022.T"
   Print "Ok!"
Endif
```

21.9 Decoding of Modbus

The VDR is able to record Modbus communication (this requires VDR software version 2.05 or newer).
The VDR can operate as Modbus slave or master. The format of the data and the corresponding decoders depend on this.

The Modbus data will be encapsulated as NMEA strings before they are stored by the VDR.
The sentence formatter is: PMTM<PDU main group><Master flag>

PMTM: Common prefix for all NMEA strings related to Modbus encapsulation
PDU group: Modbus defines a number of different commands for read/write of bits and registers. These have been compiled into four groups:
- RDB: Read bit
- WRB: Write bit
- RDR: Read Register
- WRR Write Register

Master flag: Sentence formatter is terminated by "M" if the string contains data sent to the master; i.e. the NMEA string contains a Modbus response

21.9.1 Data format for VDR configured as Modbus slave

The control system (master) sends data to the VDR on a regular basis. Both requests from and answers to the control system will be recorded by the VDR. The requests from the control system contain the data of interest, while the answers to the control system are informational only.
The control system will in this case use different forms of Modbus write commands; i.e. the decoder scripts must search for PMTMWRB and PMTMWRR
Do not make scripts for the responses to the control system if the VDR is configured as Modbus slave; i.e. do not search for sentence formatter terminated with an "M"

Function code	Sentence formatter for Master request	Sentence formatter for Response from VDR	Modbus Request Format	Modbus Response Format	Recorded response
0x01: READ COILS	RDB	RDBM	2: Address 2: #Coils	1: #Bytes, N N: Data	2: Address 2: #Coils 1: #Bytes, N N: Data
0x02: READ DISCRETE IMPUTS	as above	as above	as above	as above	as above
0x03: READ HOLDING REGISTERS	RDR	RDRM	2: Address 2: #Reg.	1: #Bytes, N N: Data	2: Address 2: #Reg. 1: #Bytes, N N: Data
0x04: READ INPUT REGISTERS	as above	as above	as above	as above	as above
0x05: WRITE SINGLE COIL	WRB	WRBM	2: Address 2: Data	2: Address 2: Data	2: Address 2: Data
0x06: WRITE SINGLE REGISTER	WRR	WRRM	as above	as above	as above
0x07, 0x08, 0x0B, 0x0C, 0x11, 0x2B: Various diagnostics	DIA	DIAM			As received Not decodable by Player
0x0F: WRITE MULTIPLE COILS	WRB	WRBM	2: Address 2: #Coils 1: #Bytes, N N: Data	2: Address 2: #Coils	2: Address 2: #Coils
0x10: WRITE MULTIPLE REGISTERS	WRR	WRRM	2: Address 2: #Reg. 1: #Bytes, N N: Data	2: Address 2: #Reg.	2: Address 2: #Reg.
0x17: READ/WRITE MULTIPLE REGISTERS	WRR	RDRM	2: Read Addr 2: #Read reg. 2: Write Addr 2: #Write reg. 1: #Bytes, M M: Write Data	1: #Bytes, N N: Read Data	2: Read Addr 2: #Read reg. 1: #Bytes, N N: Read data
OTHERS EXCEPTION	OTH EXP	OTHM EXCM			As received Not decodable by Player

21.9.2 Data format for VDR configured as Modbus master

The VDR polls the control system (slave) on a regular basis. Both requests to and answers from the control system will be recorded by the VDR. The answers from the control system contain the data of interest, while the requests to the control system are informational only.
The control system will in this case respond to different forms of Modbus read request; i.e. the decoder scripts must search for PMTMRDBM and PMTMRDRM
Do not make scripts for the request to the control system if the VDR is configured as Modbus master; i.e. search only for sentence formatter terminated with an "M".

Function code	Sentence formatter for VDR Master request	Sentence formatter for Response to VDR Master	Modbus Request Format	Modbus Response Format	Recorded response
0x01: READ COILS	RDB	RDBM	2: Address 2: #Coils	1: #Bytes, N N: Data	2: Address 2: #Coils 1: #Bytes, N N: Data
0x02: READ DISCRETE IMPUTS	as above	as above	as above	as above	as above
0x03: READ HOLDING REGISTERS	RDR	RDRM	2: Address 2: #Reg.	1: #Bytes, N N: Data	2: Address 2: #Reg. 1: #Bytes, N N: Data
0x04: READ INPUT REGISTERS	as above	as above	as above	as above	as above

21.9.3 Modbus functions

These functions are only relevant when decoding Modbus data.

MBIT(#<field no.> , <bit no.>)

Field number: Always equal to 2 with the current encoding
Bit no.: 0x01 to 0x10000

Purpose: Used for testing the value for a bit in a "write multiple/single coils" command PDU.
Returns 1 if the bit is 1
Returns 0 if the bit is 0
Returns -1 if the bit is not present.

Used as a function in IF and PRINT statements:

```
SEARCH FOR "PMTMWRB"  //(or "PMTMRDBM" if VDR is master)
```

```
IF MBIT(#2,0x0021) < 0
  // No bit so break without result
  BREAK
ENDIF

IF MBIT(#2, 0x0021) = 0
  PRINT "off"
  TREND 0
ENDIF

IF MBIT(#2, 0x0021) = 1
  PRINT "on"
  TREND 1
ENDIF
```

Used on the following Modbus sentence:

Multiple Coil (write) : $PMTMWRB,010F002000100255551A2F,A*70

Gives the result "on" and trend "1".

Description:
The specified field must contain a complete Modbus command coded as ASCII characters.
- The function code must be equal to "0F", "05", "01", "02" (character 3:2).

Read or Write single bit:
The address for the bit must match the "output address", character 5:4.

Read or Write multiple bits:
- The bit must be within the addressed range; i.e. "starting address" to ("starting address" + "quantity of outputs" –1). "Starting address" is character 5:4 and "quantity of outputs" is character 9:4

MREGBIT(#<field no.>,<register no.>,<bit no.>)

Used as an operator in IF and PRINT statements.

Field number: Always equal to 2 with the current encoding.
Register no.: 0x01 to 0x10000
Bit no.: 0 to 15

Purpose: Used for reading one bit in a register from a write multiple/single register command PDU.
Returns the value of the bit in the register if present in the PDU
Returns –1 if the register value is not present
Generates a compile-time error if bit no. is not within 0 to 15

MREG(#<field no.>,<register no.>)

Purpose: Used for reading a register from a read/write multiple/single register command PDU.

Returns the value from the register if present in the PDU
Returns –1 if the register value is not present

Used as a function in PRINT and IF statements:

```
SEARCH FOR "PMTMWRR" //(or "PMTMRDRM" if VDR is master)

IF MREG(#2,0x9c42) < 0
  // No register so break without result
  BREAK
ENDIF

PRINT "Register : " MREG(#2, 0x9c42)
TREND MREG(#2, 0x9c42)
```

Used on the following Modbus sentence:

Multiple Reg (write) : $PMTMWRR,01109C41000306111122223333 7616,A*6E

Gives the result "Register : 4369" and trend "4369". (4369 = 0x1111).

Description:
The specified field must contain a complete Modbus command coded as ASCII HEX.
- The function code must be equal to "06", "10", "17", "03" or "04" (character 3:2).

Read or Write register:
The address for the specified register must match the "register address", character 5:4.

Read or Write multiple registers:
- The specified register must be within the addressed range; i.e. "starting address" to ("starting address" + "quantity of registers" –1). "Starting address" is character 5:4 and "quantity of registers" is character 9:4

Read/write multiple registers (0x17):
- The specified register must be within the addressed range; i.e. "starting address" to ("starting address" + "quantity of registers" –1). "Starting address" is character 13:4 and "quantity of registers" is character 17:4

MSREG(#<field no.>,<register no.>)

Purpose: Used for reading a register from a write multiple/single register command PDU. The MSREG function returns a signed value (two's complement) while MREG returns the binary value.
Returns the value from the register if present in the PDU.
Returns 0 if the register value is not present or if the value is 0. Use MREG to test for register existence.

Used as a function in PRINT and IF statements:

```
SEARCH FOR "PMTMWRR" //(or "PMTMRDRM" if VDR is master)
```

```
IF MREG(#2,0x9c42) < 0
  // No register so break without result
  BREAK
ENDIF

PRINT "Register : " MSREG(#2, 0x9c42)
TREND MSREG(#2, 0x9c42)
```

Used on the following Modbus sentence:

Multiple Reg (write) : $PMTMWRR,01109C41000306FFFF222233337616,A*6E

Gives the result "Register : -1" and trend "-1". (-1 = 0xFFFF).

Description: See description for MREG

21.9.4 Overlap between input/holding registers and coils/discrete input

It is not possible to distinguish between input/holding registers and coils/discrete input just using the sentence formatter. The Modbus function code must be decoded for a system that has address overlap for the input/holding registers or coils/discrete input. (This problem is only relevant if the VDR is configured as master)

```
SSEARCH FOR "PMTMRDRM"
IF MREG(#2,0x9c42) < 0
  // No register so break without result
  BREAK
ENDIF
IF #2 3:2 <> "04"  // Test for read of input registers
  // This is not a read of input register so break without result
  BREAK
ENDIF

PRINT "Register : " MREG(#2, 0x9c42)
TREND MREG(#2, 0x9c42)
```

21.10Other functions

21.10.1 Last function

The last function returns the last characters of a field.

The following fictive NMEA sentence is used:

```
Field no: |  1  |    2     |3| 4
Sentence: $XXYYY,DEADBEEF01,N,A*1B
```

```
search for "YYY"

if last(#2,3) = "F01"
    print last(#2,3)
           trend last(#2,1)
    stop
endif
```

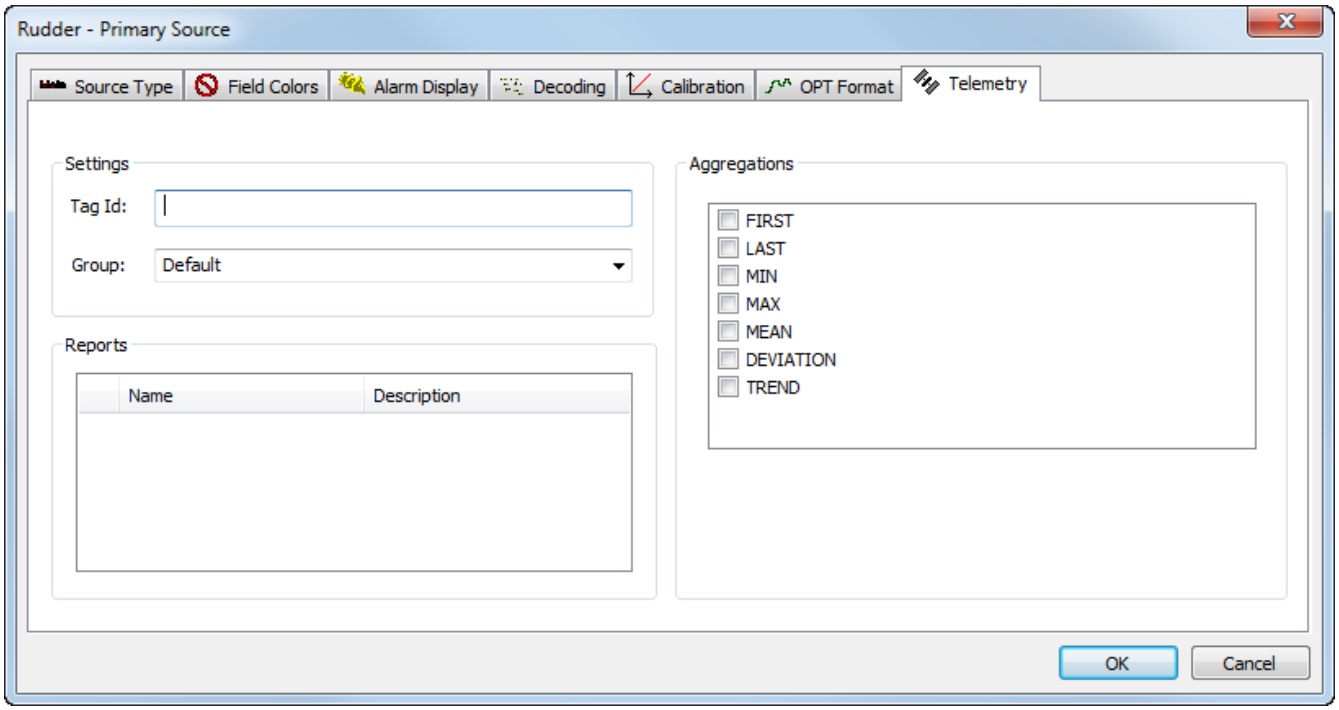
The printed result will be "F01" and the trend value 1.

22 Creation of data processor configurations for the VRI

The VDR Explorer may be used for creating data processor configuration for the VRI. A data processor is an application in the VRI which is able to send telemetry reports to servers on shore and on board the vessel.

For a detailed description on how to configure a data processor, see MAN11841 “Manual for Installation manual for Vessel Remote Management, VRI 002”.

The parameters for data to be included in telemetry report must be configured on the Telemetry tab



Tag ID:
Each data item must be given a unique tag which will be used as ID in the telemetry reports.

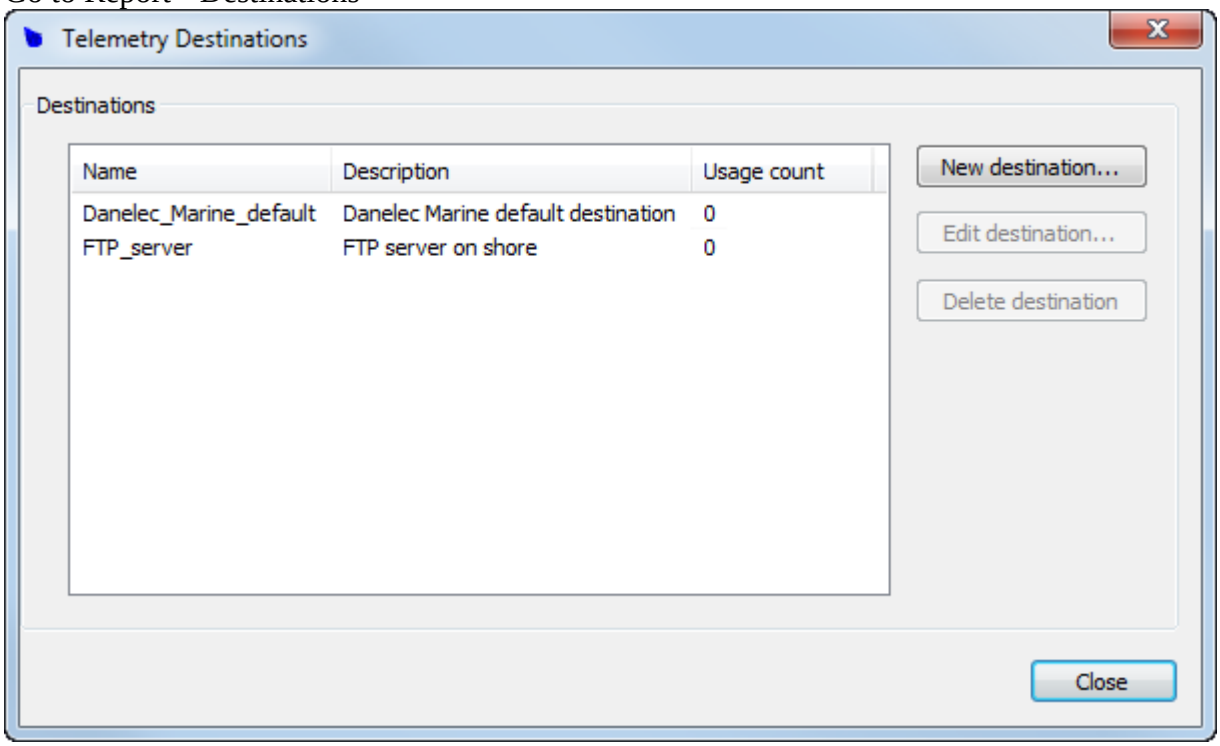
Group:
The “Tag IDs” may be organized in groups.

Reports:
When a tag is assigned to a report the name of the report will appear in this window.

Aggregations:
The VRI may perform calculations on the data. Note that a report contains values which are sampled over some time, for example 5 minutes. So in addition to sending the last sampled value, mean, deviation etc. is typically useful.

22.1 Destination for report

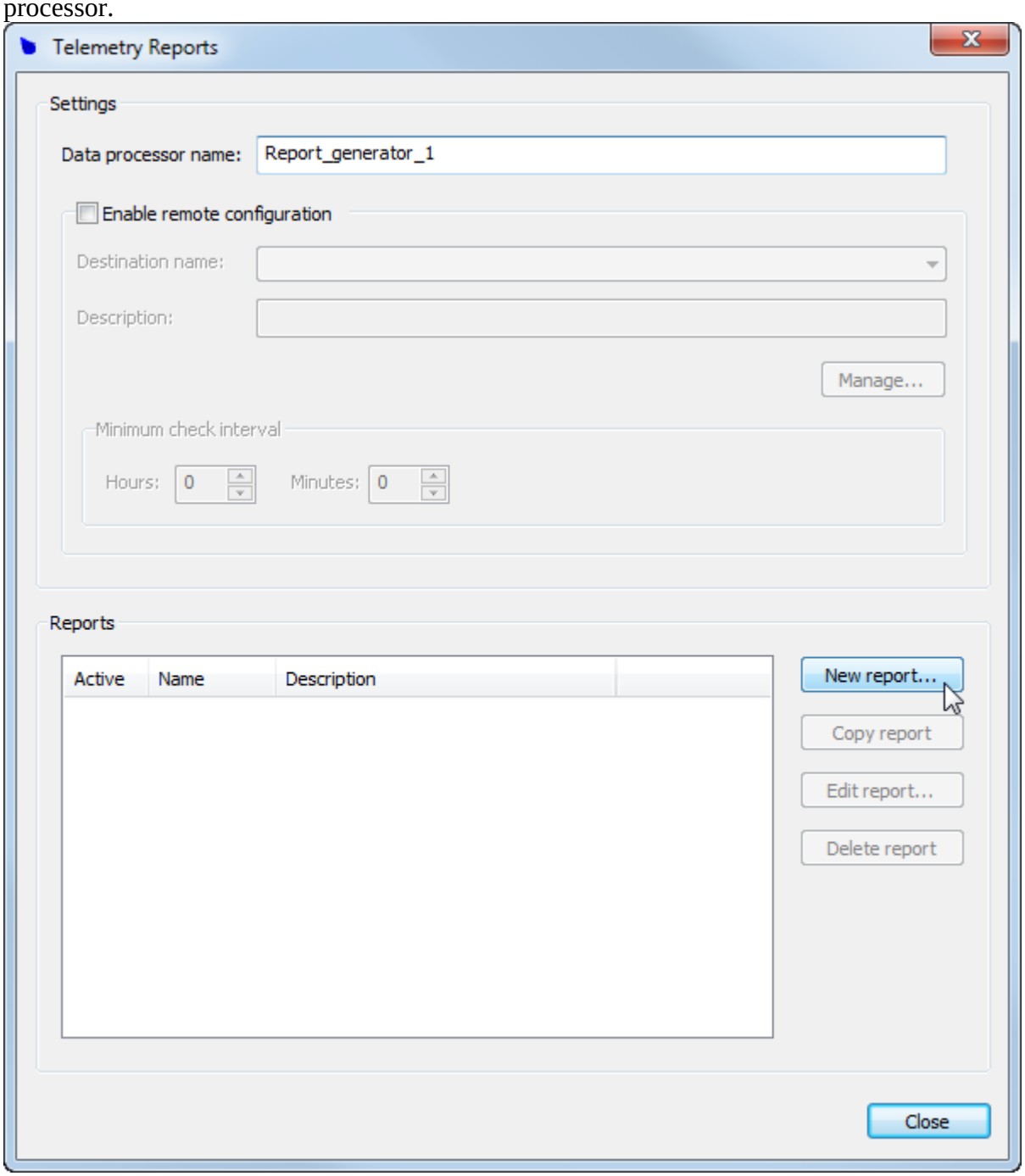
Go to Report->Destinations



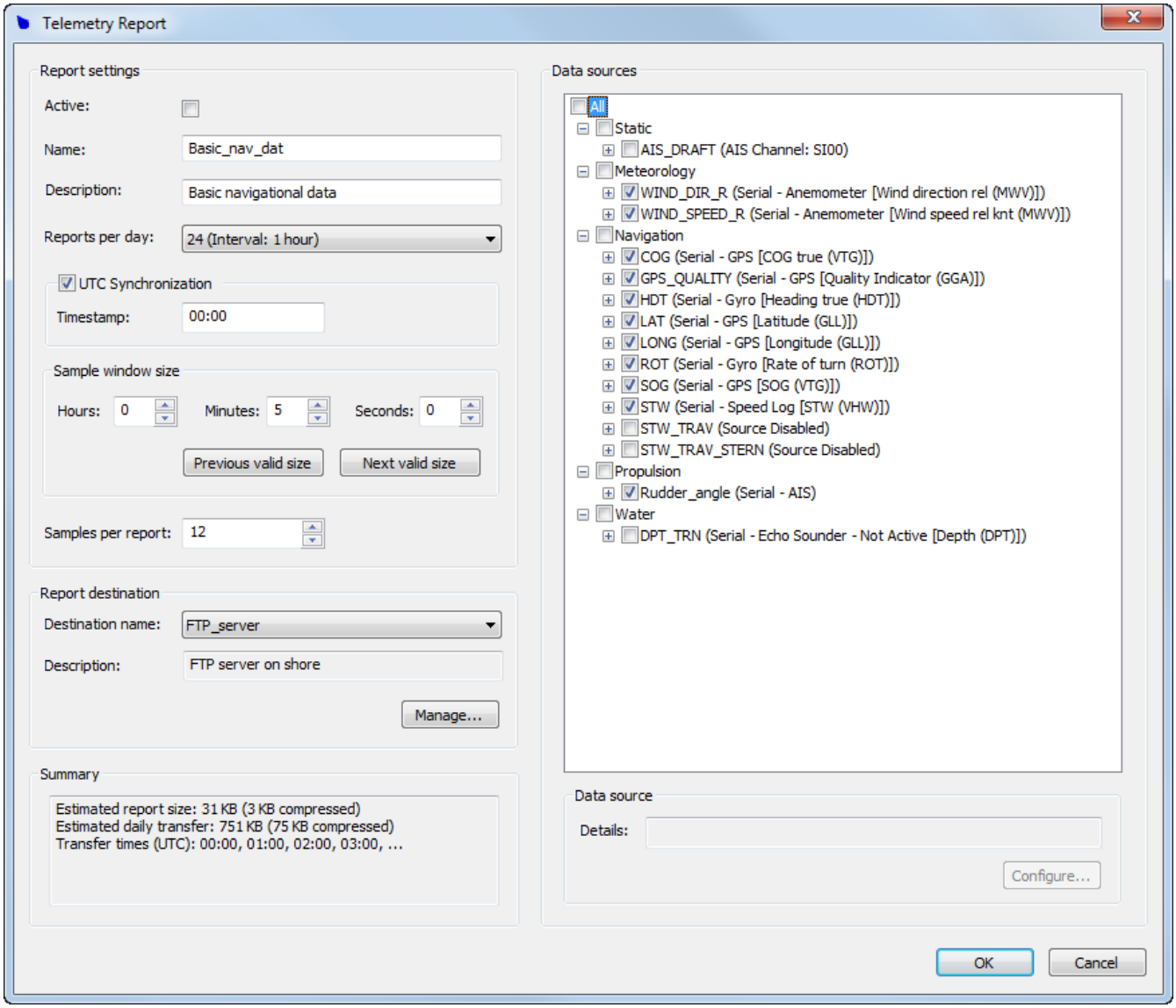
This is a list of possible destinations for reports. The parameters for a destination are configured in the VRI(s), for example the name and IP address. Common references (names) to the destinations between the VDR Explorer and the VRI(s) are necessary. The list in the VDR Explorer must be populated manually.

22.2 Creating of data processor configurations

In the VDR Explorer, go to “Reports -> Reports” and configure the main parameters for a data processor.



Click on “New report” to create a report configuration.



The content of the report and the transmission interval may be configured here.

For details, see MAN11841 “Manual for Installation manual for Vessel Remote Management, VRI 002”.

Appendix A: DM100 VDR/S-VDR conning display default configuration

Object	Title and Indicator	Input	Enabled/ Disabled	Pre-configured decoder script	Alternative Decoder scripts
Numeric data display, left	UTC Time Object 1	SI04	Enabled	UTC time (ZDA)	UTC time (GGA) UTC time (GLL) UTC time (GNS) UTC time (RMC)
	UTC Date Object 2	SI04	Enabled	UTC date (ZDA)	Date (RMC)
	Quality ind. Object 3	SI04	Enabled	Quality Indicator (GGA)	
Numeric data display, right	Latitude Object 1	SI04	Enabled	Latitude (GLL)	Latitude (GGA) Latitude (GNS) Latitude (RMC)
	Longitude Object 2	SI04	Enabled	Longitude (GLL)	Longitude (GGA) Longitude (GNS) Longitude (RMC)
	COG Object 3	SI04	Enabled	COG true (VTG)	COG (RMC)
Doppler log indicator	n/a Longitudinal speed	SI05	Enabled	STW (VHW)	STW Longitudinal (VBW)
	n/a Bow transverse speed	SI05	Disabled	STW transverse (VBW)	
	n/a Stern transverse speed	SI05	Disabled	Stern transv STW (VBW)	
	n/a Relative wind	SI07	Enabled	Wind direction rel (MWV)	
Dual dial meter	SOG Dial Meter 1 Primary	SI04	Enabled	Speed (VTG)	Speed (RMC) SOG Longitudinal (VBW)
	STW Dial Meter 2 Primary	SI05	Enabled	STW (VHW)	STW Longitudinal (VBW)
Horizontal ruler	R.O.T. Primary	SI06	Enabled	Rate of turn (ROT)	
Compass dial	Heading Primary	SI06	Enabled	Heading true (HDT)	
Anemometer Graph	Wind speed r Primary	SI07	Enabled	Wind speed rel kt (MWV) note 1	
	Wind dir r Secondary	SI07	Enabled	Wind direction rel (MWV)	
Echo sounder Graph	Depth Primary	SI08	Enabled	Depth (DPT)	
	Range Secondary	SI08	Disabled	Range (DPT)	

Note 1) Decoders for other measuring units are available in the library.

Appendix B: VDR Explorer functional modes

The VDR Explorer may be started in three different modes. Links to the all three mode exist in the "VDR Explorer" folder under "All Programs" for the PC.

VDR Explorer (normal mode):
All functionality is enabled. The PC user must have administrator rights.

VDR Explorer – No admin rights:
All functionality is enabled except for that it is not possible to access a capsule or a backup media directly.

VDR Explorer – Safe Mode:
Most functionality is disabled except for that it is possible replay recorded data.