



**SAL NAVIGATION**

# **User Guide**

## **SAL SVF-200**

*Voyage Data Recorder*

## **SAL SVS-200**

*Simplified  
Voyage Data Recorder*



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**VDR/S-VDR**  
*User information*  
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# 1 About this manual

## 1.1 General

The purpose of this manual is to give written instructions for every-day use and accident/incident procedures.

This manual contains all on-board relevant documents related to the Voyage Data Recorder (VDR) application.

*"Risk Assessment: We, as a manufacturer, evaluates that applicable standards cover all reasonably foreseeable risks."*



Note!

The setting up, installation and service procedure, which shall be performed by specially trained technicians, is described in separate manuals.



Danger!

Hazardous voltage!

Do not remove covers! Only authorized personnel are allowed to do so.

## 1.2 Symbols Used in the Manual



Danger!

Risk of serious or fatal injury to the user and/or severe damage to the product if the instructions are not followed.



Warning!

Risk of personal injury and/or damage to the product if the instructions are not followed.



Caution!

Risk of minor or moderate personal injury. Risk of equipment damage, loss of data, extra work or unexpected results if the instructions are not followed.



Note!

To alert about important facts and conditions.



Information!

To direct to specific instructions, such as where to find additional information and to tell how to perform a certain operation in an easier way.

## 2 VDR /S-VDR

### 2.1 Physical overview

The VDR consists of a Main unit and several subunits that together becomes a VDR. The Main unit contains the Power supply and backup batteries, a switch for all network connections, the central module with the VDR application, the Long-Term Storage Module (LTS) and optional signal converters for serial to network conversion.

### 2.2 VDR System overview

The VDR is a network based system with different units interconnected through a local network. On a functional level there are four major types of units.

**Central unit.** that manages the VDR operation and supervision of the system. The central unit is hosted in the main unit cabinet together with a power supply with 2 hour battery backup, network switch, the Long Term Storage unit and optional serial to network signal converters.

The central unit has an interface for alerts and a network data port for downloading of recorded data.

**Storage units** that stores the recorded data on a memory that is organized as a circular buffer with the latest 48 hours or 30 days of storage

**Remote Control unit** that is the user /operator interface and control unit. The Remote Control unit has a USB port that is used for maintenance and incident backup.

**Signal converter units**, that converts the input data from an external source to network data and sends the data to the VDR central.

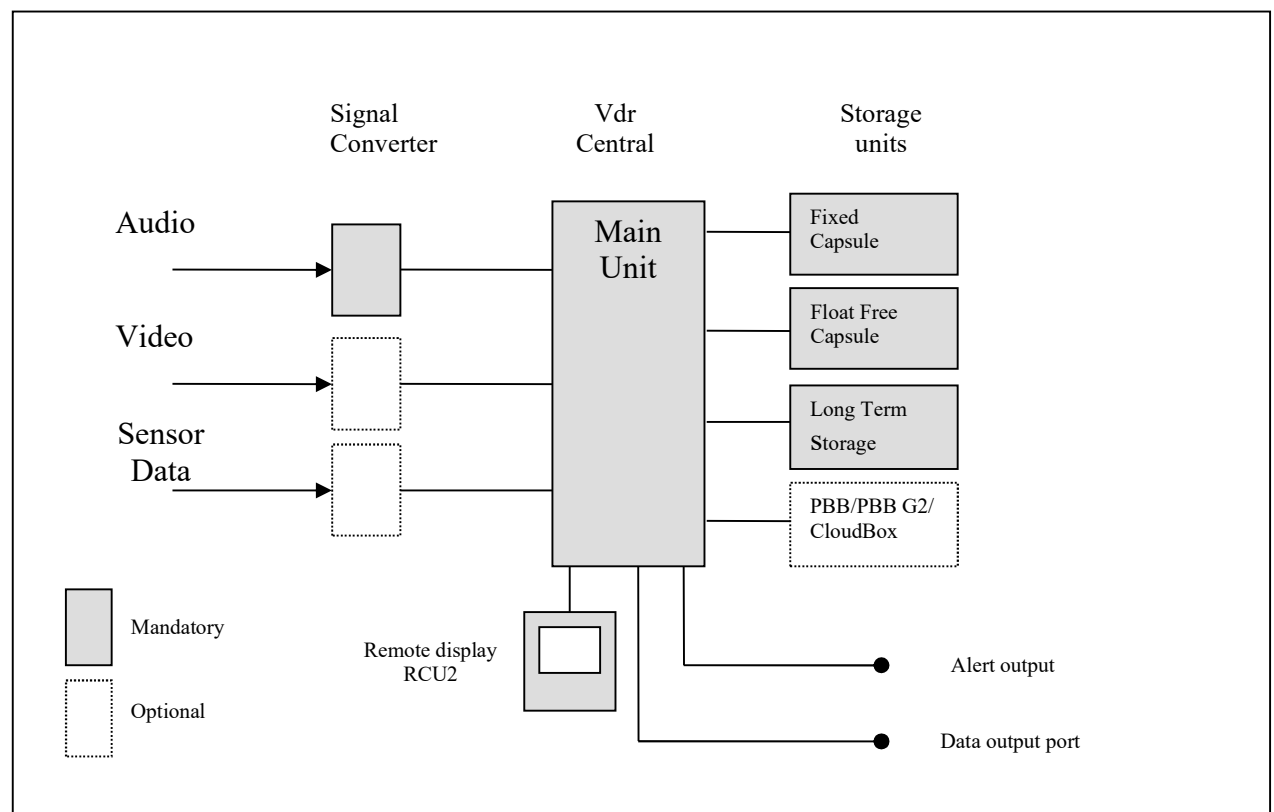


Figure 2-1

**VDR Main Unit**

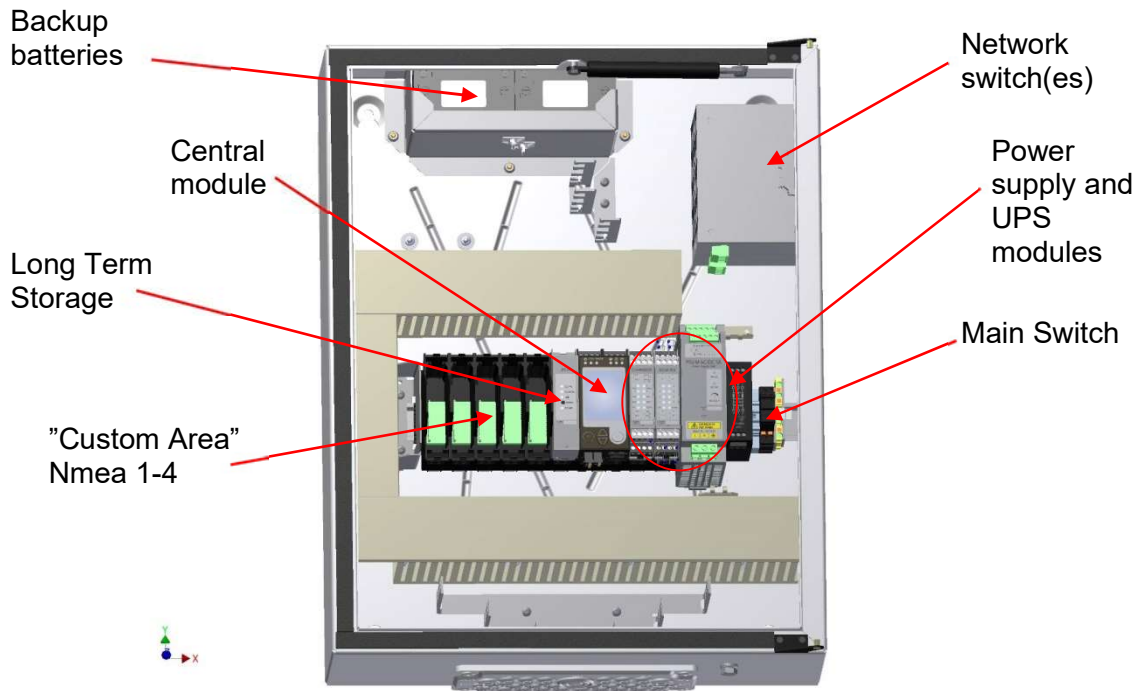


Figure 2-2 VDR Main Unit

**VDR system**

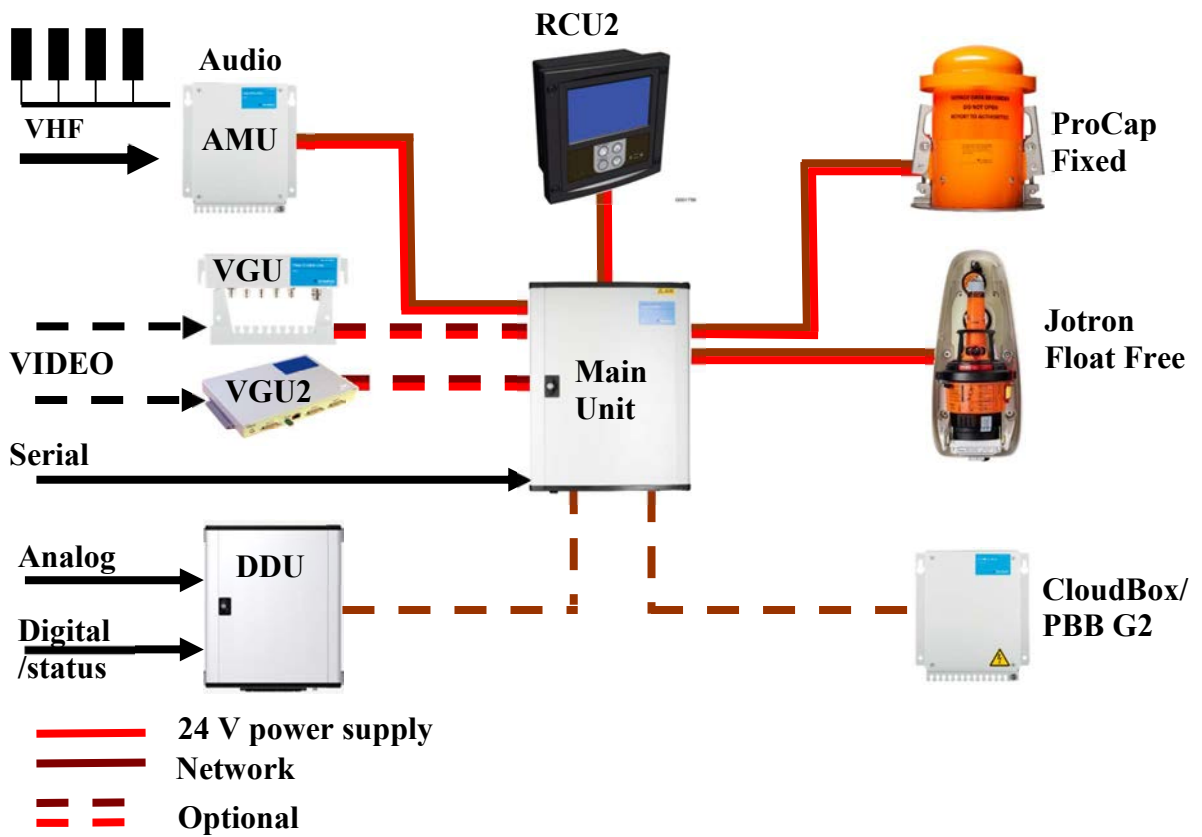


Figure 2-3 VDR System

## 2.3 S-VDR System overview

The S-VDR automatically records and stores data on the Capsule according to IMO, MSC.214(81) and IEC 61996-2. This means that data is stored in one storage unit, fixed or float free capsule, for a minimum of 12 hours.

## 3 Instructions on normal operation of the VDR

### 3.1 Normal operation

The VDR is a system that requires minimum of attention. However there is a good practice to check the system status on the remote control unit on a regular basis. If everything is OK the remote control unit is showing the default screen. On the top row the UTC clock is displayed, and the time shall be the same as the other UTC clocks on-board

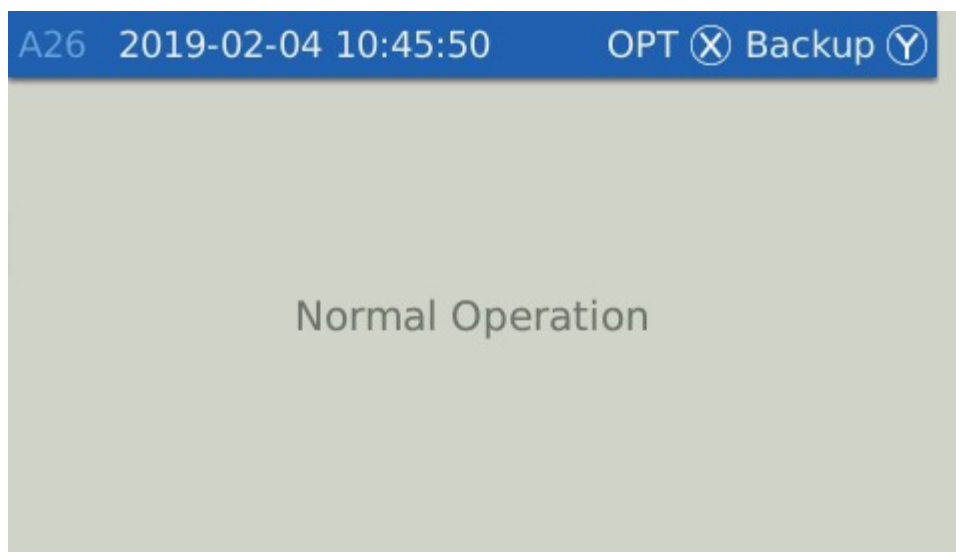


Figure 3-1 VDR display

### 3.2 The Remote Control Unit RCU2

The RCU2 is a standalone unit that is used to control the operation of the VDR. The RCU2 has 6 function buttons, a USB port for data backup to a USB drive and a 4.3 inch LCD display.



Figure 3-2 Remote Control Unit

### 3.3 The Menu system

The menu consists of a number of functions. The menu is controlled by the X- and Y button.

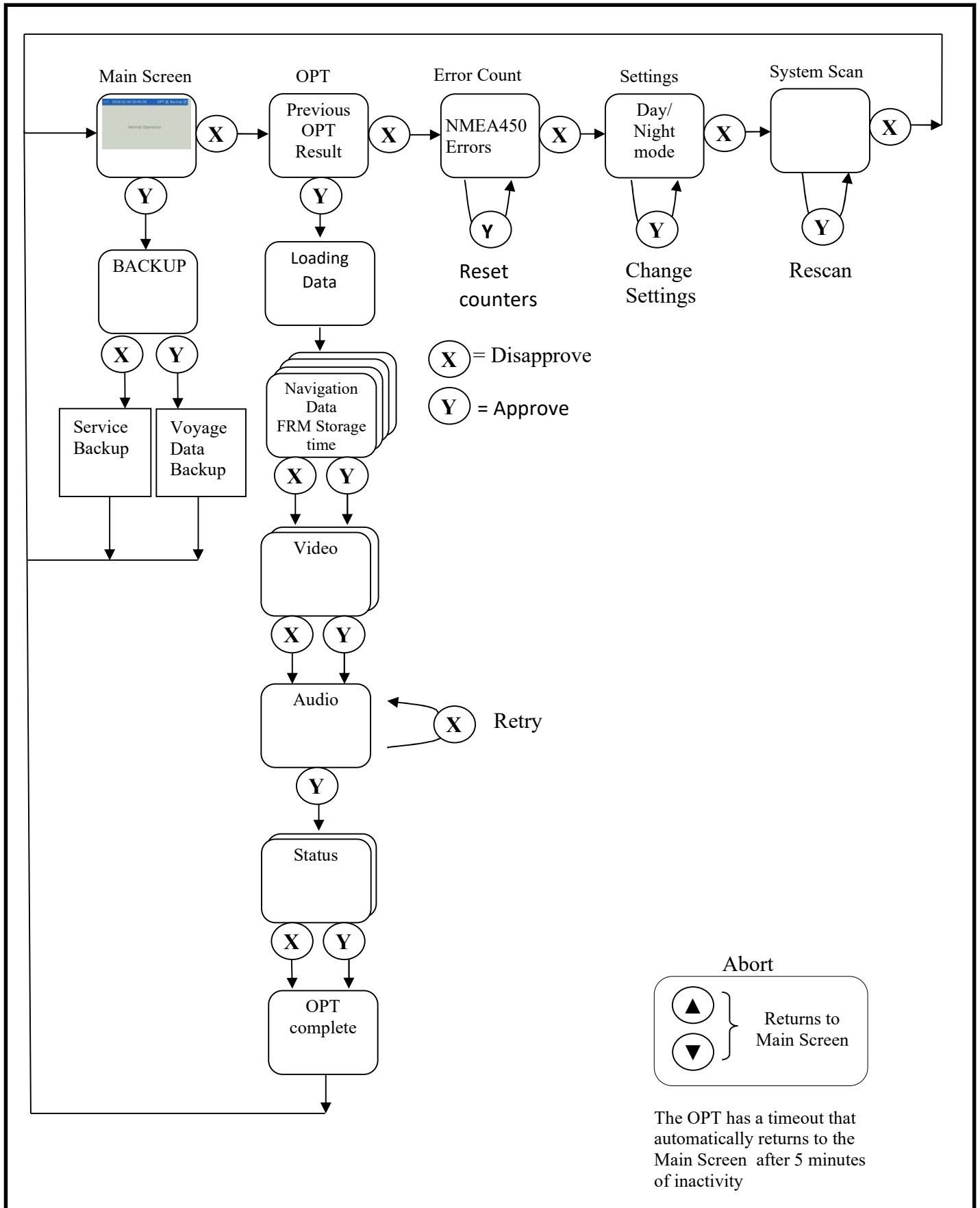


Figure 3-3 Menu System

### 3.4 Alert

The Alert menu is the default menu used to display an alert if there is any deviation in the VDR operation.

### 3.5 Operational performance test (OPT)

The purpose of the OPT is to verify that the VDR is recording the mandatory data correct. The test consists of several sections showing recorded data. Each section that is not automatically verified must be approved or disapproved by the operator. Records of the last 10 tests are stored on the FRM and the record list is also displayed when entering the test. The OPT sections are described below.

The OPT starts by Loading data for OPT. It takes 70 seconds to collect the data for OPT presentation. The data is therefore a few minutes old which should be considered when comparing to the values shown on the navigation instruments.

#### Navigation data (including propulsion and rudder info)

This test shows the actual value of the configured navigational and propulsion data. To verify, the values have to be compared with the actual value on the bridge display. The test is split up into three screens, see table below and a fourth screen showing the closest AIS targets. There is also one screen that shows time recorded for each storage unit. Each screen must be approved or disapproved.

Navigation 1	Navigation 2	Propulsion	
		Order/Command	Response
Date	Wind true direction	Engine (1) port rpm	Engine (1) port rpm
Position	Wind true speed	Propeller (1) port pitch	Propeller (1) port Pitch
SOG	Wind relative direction	Engine (2) stbd rpm	Engine (2) stbd rpm
STW	Wind relative speed	Propeller (2) stbd pitch	Propeller (2) stbd pitch
Distance ground (total)	Depth below keel Bow	Thruster (1) bow rpm	Thruster (1) bow rpm
Distance ground (trip)	Depth below transducer	Thruster (2) bow rpm	Thruster (2) bow rpm
Distance water (total)	Depth below surface	Thruster (3) bow rpm	Thruster (3) bow rpm
Distance water (trip)	Roll	Thruster (4) stern rpm	Thruster (4) stern rpm
COG	Pitch	Thruster (5) stern rpm	Thruster (5) stern rpm

HDT		Azipod (1) rpm	Azipod (1) rpm
Rate of turn		Azipod (1) direction	Azipod (1) direction
		Azipod (2) rpm	Azipod (2) rpm
		Azipod (2) direction	Azipod (2) direction
		Rudder (1) port	Rudder (1) port
		Rudder (2) stbd	Rudder (2) stbd

## Video test

An image of each configured video source is shown in the display. The initial image that is showed is reduced in size to fit the RCU2 display. As soon as any of the scroll buttons are used the image is resized back to 1:1 and the upper left corner is showed in the display.

If the image is OK then after approval the next image source is grabbed and displayed.

If the image can't be displayed the test is automatically disapproved and when acknowledged the next image source is grabbed and displayed. Since the grabbing of video is done with 15 seconds interval the time to get and display a new image can take a bit longer than 15 seconds.

## Audio test

The audio test is an automatic test of the microphones and the VHF recording. The built in microphone test is done for each microphone in turn that is configured and the result is displayed as either a green "ball" = OK or a yellow ball if the test fails.

The VHF test is performed in a different way. If there has been a signal activity/intensity above a certain level during the last 5 minutes before the test, the test is OK otherwise it fails. Therefor it is a good practice to use the VHF before an OPT is started.

## Alarms and status signal test

This part is also split up into six different screens that have to be approved or disapproved by the operator. The screens are a status list of

- Fire Doors
- Watertight doors
- Hull openings
- Alarms
- Modes
- Other



## 3.6 Error Count

The NMEA450 errors screen displays network transmission statistics according to the below IEC61162-450 clause.

### 4.3.3.1 Internal logging

Means shall be provided in each NF to record errors that occur in the NF itself as well as SF and SNGF using it. Subclauses 4.5.2, 7.1.2, 7.2.5 and 7.3.9 give minimum requirements as to what shall be logged.

NF = Network Function Block

SF = System Function Block

SNGF = Serial to Network Gateway Function Block

The NMEA450 errors screen displays network transmission statistics.

ERRORS	
Last reset: 2019-12-06T07:08:47	
IEC 61162-450 (LightWeightEthernet)	
Incoming datagrams	72349
Not for this	468
General errors	0
General header errors	0

Figure 3-4 Erros screen dispaly

Parameters in the list

IEC61162-450

Incoming binary datagrams	Total number of received datagrams
Not for this	Wrong SFI for this unit
General errors	Undefined error
General header errors	Unrecognized or unvalid header

IEC61162-450 Messages

Header errors	Error in message header
Tag errors	Error in message tag
Sentence errors	Error in message sentence

IEC61162-450 Binary files

Incoming bin datagrams	Number of incoming blocks where error occurs
Lost images	Lost images
Missing datagrams	Lost datagram or an error in the datagram
Unrecognized headers	Unrecognized or not valid General header, no "UdPbC", "RaUdP" or "RrUdP" in header
Header errors	Syntax error in header
Number of retries	Number of resent datagrams

### 3.7 Settings

The settings are used to set day/night mode of the display.

### 3.8 System scan

This is a maintenance function to retrieve a list of the actual hardware configuration and software versions.

## 4 Instructions and actions in case of an Alert from the VDR

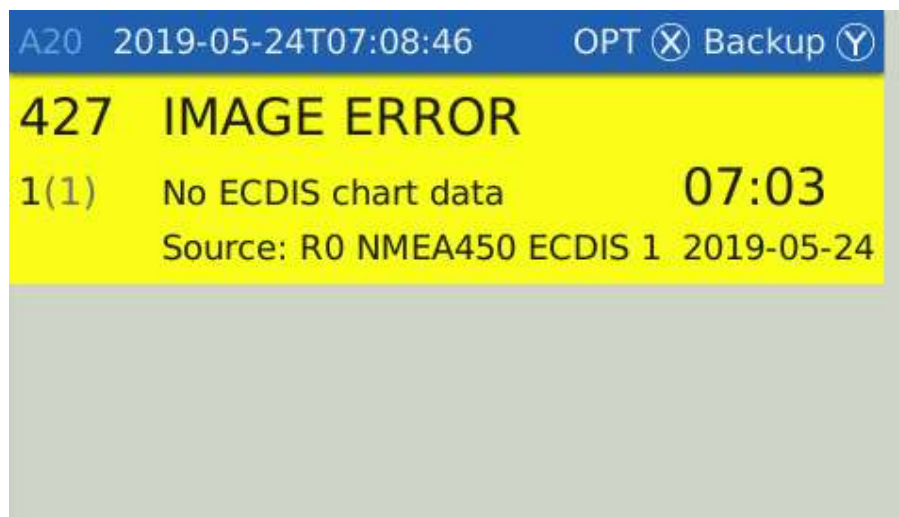
If there is a deviation in the operation of the VDR then an alert message is displayed on the screen. The type of deviation or alert can be put into three main categories. Depending on the category different types of actions must be taken.

### 4.1 Alerts caused by an external unit outside the VDR

These alerts are usually temporary such as a NMEA checksum errors or corrupt message errors. These kinds of alerts will not happen if the recording is network based. As long as the intensity of these kind of alerts are low no action has to be taken but if the intensity increases then there is a need to analyze the root cause. The most likely reason is bad connectivity or malfunction in the signal source.

The recording has normally a timeout set on each signal that is used to detect if the source stops to send data. A “Signal missing” alert is issued from the VDR, if the timeout is exceeded.

These kinds of failures can occur independently if the recording is serial or network. If this happens the signal source including the cable and the connection must be examined to find the problem.



*Figure 4-1 Alert display*

### 4.2 Alerts caused internally in the VDR

These kinds of errors are caused by VDR malfunction. It is either the electrical connection between the VDR units that fail or the unit itself that has stopped working.

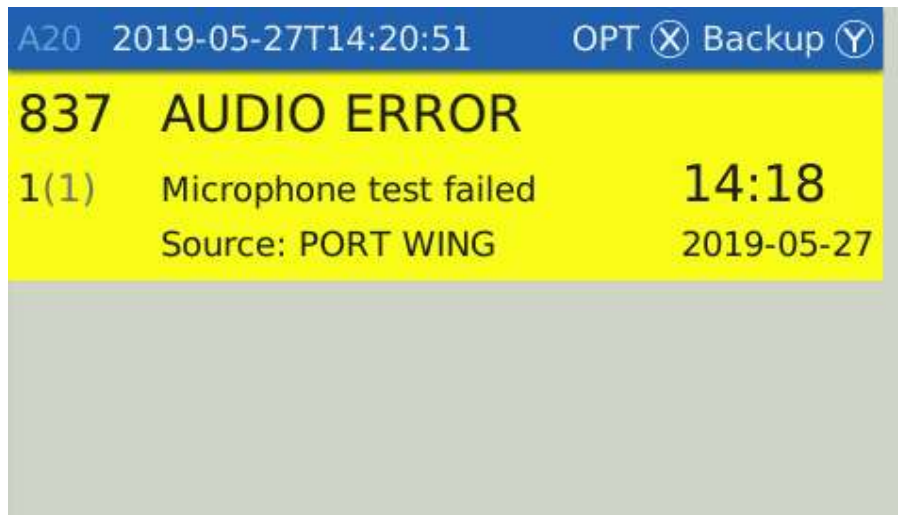


Figure 4-2 Alert display

These kinds of alerts are more serious since the VDR is not fully operable. The first thing to do is to restart the system, check the interconnection cables and connectors between the VDR units, but if this does not help then a service is probably required.

How to restart the system is described in section 7.2.

### 4.3 Alerts caused by capacity limitations

The storage capacity is specified for a “normal” data set to be recorded. The sensor data recorded is only 1-2 % of the total data. The audio data is always constant and about 25 % of the total data. The remaining data is the video data that varies a lot depending on the screen content. A screen filled with different objects, a lot of clutter, or noise on the radar screen are factors that increase the size of the recorded screen data. In rare situations the video data exceeds the limits and if this situation stays for a longer period the total amount of data is too large to fulfil the storage time requirements. If this happens then an alert is issued from the VDR. The action to be taken if possible is to adjust the screen content or more effectively put the unit in standby mode.

The actual storage time for each storage unit is displayed in the OPT on the remote display unit, as seen in Figure 3.3.

A complete set of the VDR alerts are found in section 10.

## 5 How to copy data from the VDR

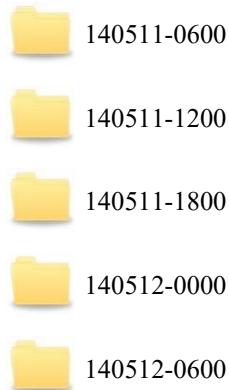
The VDR has three independent storage devices that contain VDR data. Each storage device can be accessed as a network disc. See the table below. Please note that the PC that you want to copy the data to must be set to an IP address in the range 10.2.1.220 to 10.2.1.229 before the storage devices can be accessed.

Name	Manufacturer	IP	Directory	Username	Password
PROCAP	SAL Navigation	10.2.1.60	usb	backup	backup
Tron	Jotron	10.2.1.110	vdr	backup	backup
LTS	SAL Navigation	10.2.1.10	usb	backup	backup
PBB/PBB G2 (optional)	SAL Navigation	10.2.1.160	vdrdata	vdr	vdr or consilium (depending on model)

Name	Manufacturer	IP	Directory	Username	Password
CloudBox (optional)	SAL Navigation	10.2.1.161	vdrdata	vdr	vdr

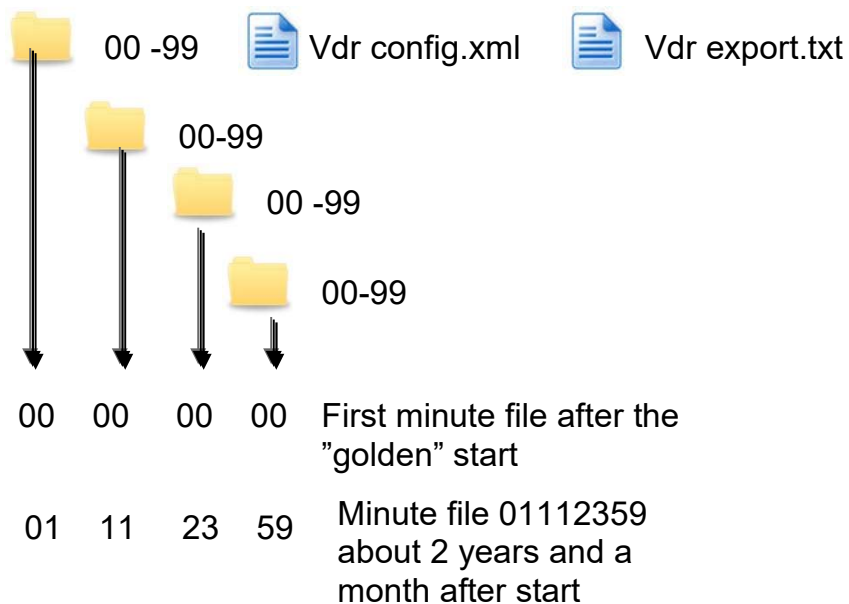
The recorded VDR data is stored in folders containing 6 hours of recorded data. The 6-hour folders are placed on the root directory.

## 5.1 VDR file structure



*Figure 5-1 VDR file structure*

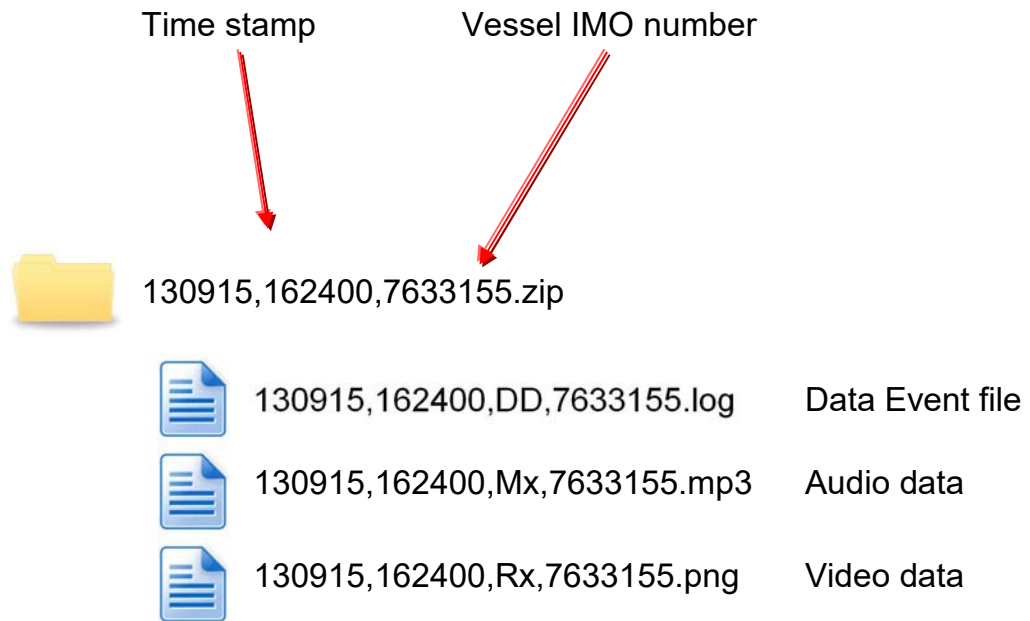
Each 6 hours data folder contains subfolders with one minute of recorded data. The subfolder minute number is a continuous series of numbers. Each 6 hours block has a copy of the actual configuration settings `vdrconfig.xml` and `vdrexport.txt`.



*Figure 5-2 Minute folders*

Each minute subfolder contains a zip file with the content below.

## MinuteFile\_structure



*Figure 5-3 Minute files*

### 5.2 Event log file structure

The event log file is a text file that contains the recorded data events together with data source and timing info. Each event causes a new row in the text file. The Event is a comma separated string.

- The first field identifies the type of event
- The second event is the time offset in milliseconds from minute start
- Field three and four identifies the source

The interpretation of the remaining fields depend on the event type but normally is the recorded NMEA sentence without the initial \$ and the ending \* and checksum.

## Event log data file

Below is an example of an event data file.

	0,39e2f410-dad8-11d2-9d34-00104b669e52
	1,1,4
	2,B,11.01,5410515-00
Event type	3,33
	4,7633155,Eckero
	5,0,2013,130915,162400.000
Event diff time	12,59,1350,1,130915,162400,M1,7633155.mp3
(ms)	12,59,1350,2,130915,162400,M2,7633155.mp3
	12,59,1350,3,130915,162400,M3,7633155.mp3
	12,59,1350,4,130915,162400,M4,7633155.mp3
Event source	12,59,1350,5,130915,162400,M5,7633155.mp3
	12,59,1350,6,130915,162400,M6,7633155.mp3
	13,59,99,2,P,ASVW,13.7,A
	13,117,8000,1,!AIVDO,1,1,,13uv9'0029QH3a@RJGu9pWn00P00,0
	13,119,99,1,VDVHW,,,,,11.9,N,22.1,K
Event data	13,199,99,1,VDVBW,+11.90,+01.10,A,,V,,V,,V
	13,280,99,2,IVHW,251.1,T,,M,,N,,K
	15,280,99,6,\$PRRS,6,0,60.6,0,91.8,1,56.9,0,0,0,0,0*20??
	13,316,7450,2012,VRXDR,S,0,,Unit-DIGIN-12
	13,316,7450,2013,VRXDR,S,1,,Unit-DIGIN-13
	13,316,7500,2001,VRXDR,S,1,,Unit-DIGIN-1
	13,316,7500,2002,VRXDR,S,1,,Unit-DIGIN-2

Figure 5-4 Data files

## 6 Instructions for verification of sensor data through playback

The VDR has a basic playback function in the RCU2. By running the Operational Performance Test (OPT) the actual value / status of the mandatory signals are displayed and can be compared with the values on the bridge instruments for verification. The OPT is described in section 3.5.

## 7 Instructions on maintenance

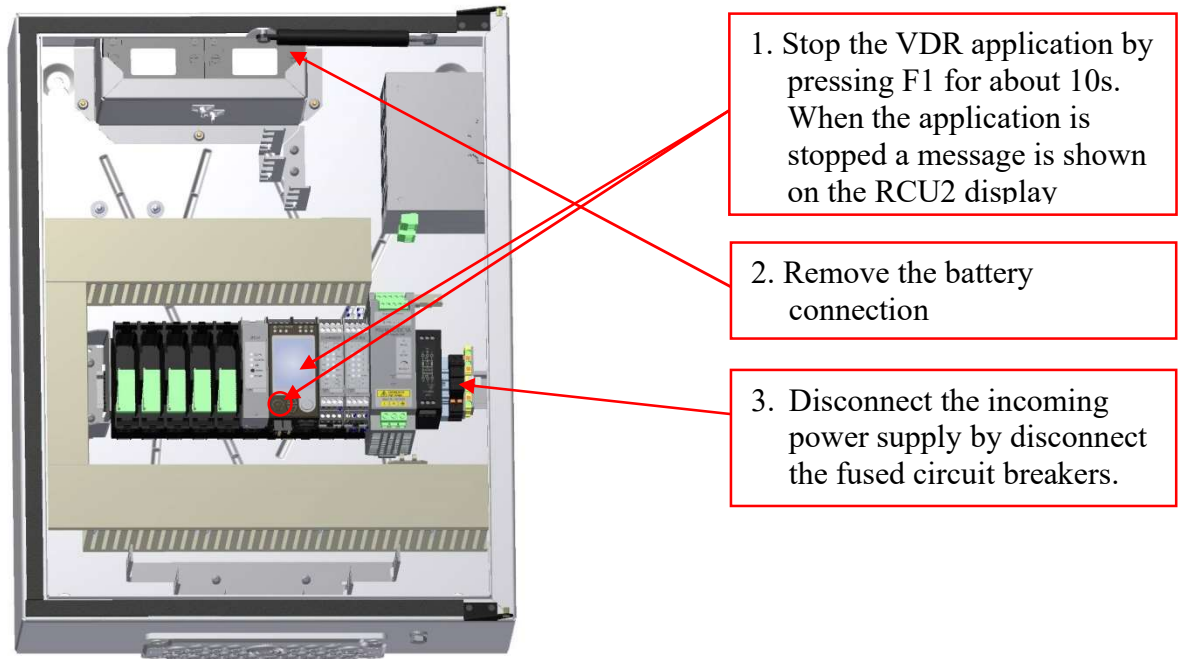
### 7.1 General maintenance

The VDR is a solid state system without any moving parts. The system is designed to operate without any interruption for several years. During the annual performance test (APT) the system is checked for wear-out parts as the backup batteries. However there is good practice to keep the different units clean.

## 7.2 How to restart the VDR

If the VDR must be restarted or powered off, then the procedure below is recommended to be followed. If the procedure is not followed the risk of damaged files on the storage devices is high, which in turn will cause long startup times because the file systems will be checked and maybe repaired.

### Power off the VDR



*Figure 7-1 VDR power off*

### Start the system

1. Reconnect the battery connections
2. Connect the fuses circuit breakers for incoming power supply
3. The system will start and after about 5 minutes normal operation is obtained.
4. Make sure that the RCU2 is not showing any alerts.

## 8 VDR Clock synchronization

The IEC61996 specification specifies:

### 4.6.1 Date and time

(See 6.2.1)

(MSC.333(90)/5.5.1) *Date and time, referenced to UTC, shall be obtained from a source external to the ship and an internal clock shall be synchronized with valid date and time data. During times of a loss of the external source, the internal clock shall be used. The recording shall indicate which source is in use. The recording method shall be such that the timing of all other recorded data items can be derived on playback with a resolution and continuity sufficient to reconstruct the history of the incident in detail.*

In VDR F2 the external UTC time is read from the NMEA --ZDA message.

The ZDA can either be recorded from a serial input port or via a network interface

### 8.1 Configuration

In case of serial recording NMEA input 1:1 must be used.

If the ZDA is received via network then the network input port must be configured with UTC sync enabled.



Be aware that UTC via network is only possible if NMEA 1:1 is NOT configured

### 8.2 UTC cautions

Caution	Condition	Display message
50	ZDA is missing	<b>UTC SOURCE ERROR</b> No UTC sync from GNSS
43+51	ZDA is corrupt	<b>NMEA INPUT ERROR</b> Bad ZDA (UTC) <b>BAD UTC FORMAT</b> Check UTC source (NMEA)
52	GGA mode = '0' or GNS mode = 'N' or GGA / GNS missing	<b>UTC SYNC INVALID</b> Check GNSS reception
42+50	ZDA checksum error	<b>NMEA INPUT ERROR</b> Invalid checksum <b>UTC SOURCE ERROR</b> No UTC sync from GNSS



### 8.3 Validity checking

The validity of the ZDA is checked by the status/mode flags in associated messages --GGA or --GNS

If none of GGA or GNS is received then the ZDA is interpreted as invalid

#### 1. ZDA and GGA (GPS)

#### GGA – Global positioning fix data

```

1      2      3      4 5      6 7 8 9      10 11 12 13 14
$--GGA,hhmmss.ss,l111.11,N,yyyyy.yy,E,x,xx,x.x,x.x,M, x.x,M, x.x,
15 16
xxxx*hh

```

Field #	Field Type	Definition	Note
1	Name	Global positioning fix data	Time, position and fix related data
2	hhmmss.ss	Time of position	UTC
3	l111.11	Latitude	
4	N	North / South	N / S
5	yyyyy.yy	Longitude	
6	E	East / West	E / W
7	x	Quality Indicator	<b>0=No fix</b> , 1=SPS, 2=Diff, 4=RTK, 5=Float RTK, 6=DR mode, 7=Manual, 8=Simulation
8	xx	Number of satellites in use	00 – 12
9	x.x	HDOP	
10	x.x	Altitude	
11	M	meters	
12	x.x	Geoidal separation	
13	M	meters	
14	x.x	Age of differential data	[s]
15	xxxx	Differential reference station ID	0000 – 1023
16	hh	Check sum	



#### Note!

The ZDA is not valid when the GPS quality indicator is = '0' as described in Note above.

## 2. ZDA and --GNS (GPS, GLONASS, Galileo)

**GNS - GNSS fix data, GPS and GLONASS**

```

1      2      3      4 5      6 7      8 9      10 11 12 13
$--GNS,hhmmss.ss,xxxx.xx,N,xxxxx.xx,E,C-C,xx,x.x,x.x,x.x,x.x,x.x
14
*hh<CR><LF>

```

Field #	Field Type	Definition	Note
1	Name	GNSS fix data	GP = GPS, GL = GLONASS, GN= Combined
2	hhmmss.ss	Time of position	UTC
3	xxxx.xx	Latitude	
4	N	North / South	N / S
5	xxxxx.xx	Longitude	
6	E	East / West	E / W
7	C-C	Mode indicator	First character = GPS Second character = GLONASS N=No fix, A=Autonomous, D=Differential, P=Precise, R=Real Time Kinematic, F=Float RTK, E=Estimated, M=Manual Input Mode, S=Simulated
8	x.x	Number of satellites in use	00 – 99
9	x.x	HDOP	
10	x.x	Antenna altitude	
11	x.x	Geoidal separation	
12	x.x	Age of differential data	
13	x.x	Differential reference station ID	
14	hh	Check sum	

In this case the "Mode indicator" field together with the talker ID is used to validate the ZDA message.

The mode indicator field is a variable length field and if:

Talker id is GP (GPS) then the first character is used.

Talker id is GL (GLONASS) the second character is used.

Talker id is GA (Galileo) then the third character is used.



Note!

The ZDA message is not valid if the character is 'N' as described in Note above.

## 8.4 UTC synchronization

### Time has never been set

When the system is started (power up) the time is default set to 2000-01-01-00:00:00. The time is then set when a valid ZDA is received or if a service Laptop is connected to the VDR and the configuration tool is started. The VDR sets the time once from the laptop and then uses the internal clock (RTC) until a valid ZDA is received.

### Valid ZDA is received

If the difference between ZDA and internal time is within +/-2 seconds the VDR adjusts its internal time with 1/100 of the difference for every received ZDA (deviation from UTC is corrected in small steps).

If the time difference is larger than +/- 2 seconds, an immediate “time jump” is made if no ZDA has been received before. If ZDA has been used earlier to sync the VDR for more than 20 minutes, then a 20 minutes time-out is first applied before a “time jump” is made. Every time jump is registered in the log file.

A time jump forward is handled easily by the VDR and the result is a gap in time on the next minute file. A time jump backwards generates a discontinuity in the 6 hours folder. The “new” minute files will be added to an earlier 6 hours folder but the minute folder numbering sequence will be kept. That way it is possible to track and recreate the recording.

### Invalid ZDA is received

If an invalid ZDA is received (GNSS dead-reckoning) then caution 52 “UTC SYNC INVALID” is issued. If the VDR has received a valid ZDA for more than 20 minutes prior to an invalid ZDA, then a 20 minute time-out will first be applied before a caution is issued. As soon as a valid ZDA is received the time-out is reset and the caution is removed.

## 9 Instructions after installation or repair of connected equipment

The VDR is during installation configured and commissioned with the external equipment available at the time. If any of these units are replaced or repaired the configuration has to change accordingly. This also applies when new equipment is added on the bridge that the VDR is supposed to record data from.

To change the configuration an approved technician is required. Contact SAL Navigation for further information.

In case of repair or exchange of existent equipment the VDR operation need to be checked.

This check is done in two steps

1. Check that there are no alerts on the RCU2 display.
2. Perform an OPT check to ensure that the recorded data are interpreted correctly.

## 10 VDR alert list

All alerts are displayed as alert level Caution.

Code	Title	Description	Action
4	STORAGE ERROR	Storage write failed	Contact
6	FILE ERROR	Write file error	Check network cable and other unit
10	BACKUP READY	USB stick ready to remove	Remove USB stick
11	NO USB STICK	Insert USB stick	Insert USB stick
12	BACKUP RUNNING	Do NOT remove USB stick	Do NOT remove USB stick
15	VDR STOPPED	System is stopped by user (config)	Start system
16	CONFIGFILE ERROR	Configuration file error	Check your configuration file
20	NETWORK ERROR	General network communication error	Check network cable and other unit
21	NETWORK ERROR	UNIT is not responding	Check network cable and other unit
22	STORAGE INFO	Less than minimum hours of data on storage	Contact SAL Navigation
26	SYSTEM ERROR	Memory overflow; data discarded	Contact SAL Navigation
27	SYSTEM ERROR	XML communication out of function	Contact SAL Navigation
40	NMEA INPUT ERROR	No data	Check NMEA cable and source unit
41	NMEA INPUT ERROR	Corrupt NMEA data	Check NMEA cable and source unit
42	NMEA INPUT ERROR	Invalid checksum	Check source unit
43	NMEA INPUT ERROR	Invalid ZDA (UTC)	Check source unit
44	NMEA INPUT ERROR	Bad RMC (UTC)	Check source (GPS)
50	UTC SOURCE ERROR	No UTC sync from GNSS	Check time source
51	BAD UTC FORMAT	Check UTC source (NMEA)	Check time source
52	UTC SYNC INVALID	Check GNSS reception	Check time source
53	ILLEGAL UTC SYNC	Check GPS	Check time source
54	UNSTABLE UTC	Check UTC source (GNSS)	Check time source
61	ProCAP FAILURE	ProCAP service required	Contact SAL Navigation
80	UDP INPUT ERROR	No data	Check UDP source
81	UDP INPUT ERROR	Corrupt data	Check UDP source
82	UDP INPUT ERROR	Invalid NMEA checksum	Check UDP source
86	RADAR ERROR	No images from radar over lan	Check radar
87	CCTV ERROR	AXIS video server communication error	Check video server
88	CCTV ERROR	AXIS video server - no video	Check video server

<b>90</b>	KMVIDEO ERROR	No image	Check video source
<b>92</b>	KMVIDEO ERROR	No radar image	Check radar video source
<b>93</b>	KMVIDEO ERROR	Corrupt data	Check radar video source
<b>95</b>	KMVIDEO ERROR	Radar ID collision	Check radar video source
<b>96</b>	KMVIDEO ERROR	No connection	Check radar video source
<b>282</b>	NMEA ERROR	Signal missing	Check connected equipment.
<b>307</b>	NMEA ERROR	Corrupt NMEA format	Check connected equipment
<b>308</b>	NMEA ERROR	Corrupt NMEA length	Check connected equipment
<b>309</b>	NMEA ERROR	Corrupt NMEA character	Check connected equipment
<b>310</b>	NMEA ERROR	Corrupt NMEA checksum	Check connected equipment
<b>400</b>	RADAR ERROR	No images	Check radar
<b>421</b>	RADAR ERROR	No image data	Check radar display
<b>425</b>	RADAR ERROR	Acquisition error reported	Check radar display
<b>427</b>	RADAR ERROR	No ECDIS chart data	Check ECDIS Setup
<b>450</b>	NMEA450 ERROR	No images	Check radar
<b>470</b>	NMEA450 ERROR	No NMEA450 XBand image	Check NMEA450 XBand source
<b>471</b>	NMEA450 ERROR	No NMEA450 SBand image	Check NMEA450 SBand source
<b>472</b>	NMEA450 ERROR	No NMEA450 ECDIS image	Check NMEA450 ECDIS source
<b>610</b>	VIDEO ERROR	Corrupt Video input signal	Check video cables and video source
<b>836</b>	AUDIO ERROR	Microphone test failed	Check cables
<b>837</b>	AUDIO ERROR	Microphone test failed	Check cables
<b>857</b>	POWER FAIL	Ext 24V fit	Contact SAL Navigation
<b>879</b>	CS4K ERROR	Fuse fit	Contact SAL Navigation
<b>880</b>	BATTERY ERROR	Battery voltage low	Contact SAL Navigation
<b>885</b>	BATTERY ERROR	Battery	Contact SAL Navigation
<b>886</b>	BATTERY ERROR	Charging loss	Contact SAL Navigation
<b>895</b>	POWER FAIL	Low pow in2	Contact SAL Navigation
<b>999</b>	UNKNOWN ERROR	Error code not found in file	Update vdrerrors.xml

*Intentionally blank*

**VDR / S-VDR**  
*Investigative Authority Guide*  
User Guide

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2012-04-25	B02	AOS/SGu	Added and corrected PDU settings / editorial.
2014-04-10	C01	AOS	Adopted for VDR F2, draft release
2014-08-12	C02	TE/STE	Tron password updated, generic player reference, F2 data download port figure
2018-09-10	C03	STE	Company details
2020-01-22	C04	HB	Updated according to TP19105 and TP19107
2020-02-17	C05	HB	Company details
2020-11-10	C06	HB	Company details
2023-01-26	C07	HB	Added PBB G2/CloudBox

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# 1 About this manual

## 1.1 General

The Investigative Authority Guide is mainly intended for use by an investigative body.

It contains information on how to download data from the VDR and necessary information about the downloaded data.

**Note!**

The setting up, installation and service procedure, which shall be performed by specially trained technicians, is described in separate manuals.

**Danger!**

Hazardous voltage!

Do not remove covers! Only authorized personnel are allowed to do so.

## 1.2 Symbols Used in the Manual

**Danger!**

Risk of serious or fatal injury to the user and/or severe damage to the product if the instructions are not followed.

**Warning!**

Risk of personal injury and/or damage to the product if the instructions are not followed.

**Caution!**

Risk of minor or moderate personal injury. Risk of equipment damage, loss of data, extra work or unexpected results if the instructions are not followed.

**Note!**

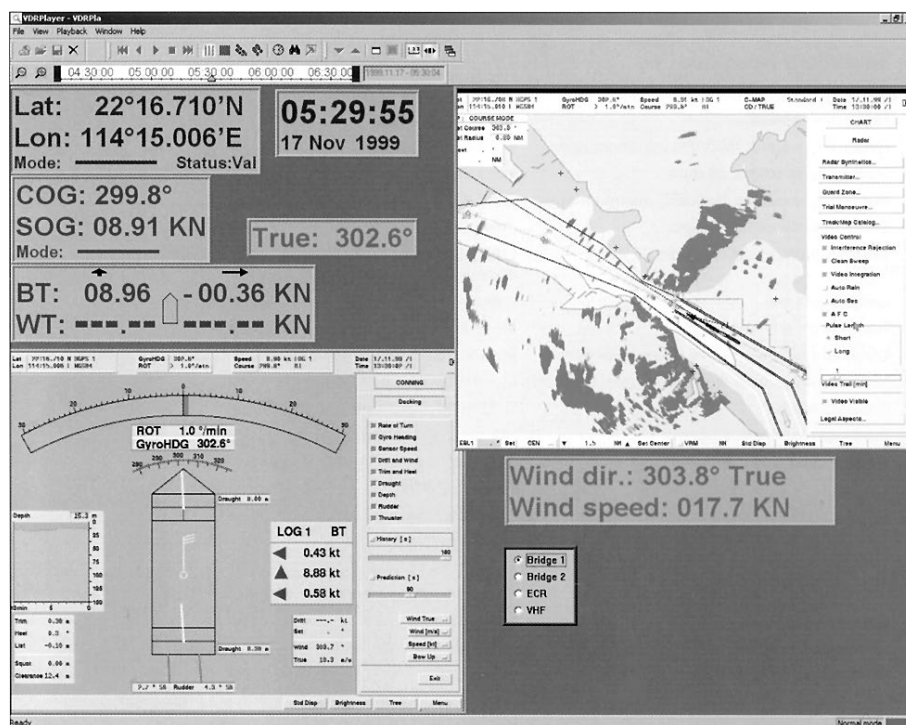
To alert about important facts and conditions.

**Information!**

To direct to specific instructions, such as where to find additional information and to tell how to perform a certain operation in an easier way.

### 1.3 Software for playback of recorded data

The Voyage Data Player (VDP) program provides an easy to use, interactive way of playing back voyage data from the VDR or a protective capsule on a PC (Laptop).



The information is presented in a user-friendly Windows interface, where different sensors are displayed in different windows. All information, including audio playback, is synchronized in time and simultaneously replayed.

With the VDP it is possible to locate an event or a time sequence of interest using various search methods. It is possible to run the playback in normal, reverse, fast or step mode. It is easy to access data by date and time (see chapter 3 for data structure).

The Voyage Data Player and Player guide can be downloaded from [www.salnavigation.com](http://www.salnavigation.com)

### 1.4 System Requirements

PC/laptop with minimum:

- Operating systems Windows XP, Windows 7 or Windows 10.
- 20 GB hard disk
- 21-inch monitor recommended

**Other equipment:**

- Standard Ethernet (CAT 5E) cable and passwords are needed.
- For L3 capsule: Software L3HVRReader.exe

The special software needed for replaying the data is available on the Investigator kit CD, or can be downloaded from [www.salnavigation.com/techdoc/](http://www.salnavigation.com/techdoc/).

## 1.5 VDR memory functions VDR F1 /S-VDR

The VDR automatically records and stores data on the Capsule according to IMO Resolution A.861(20), MSC.214(81) and IEC 61996-1 Ed. 1 for VDR and IEC 61996-2 for S-VDR. Such data is stored for 12 hours (optionally longer), and is then automatically over-written by new data. The VDR also records data to an USB memory stick placed behind the locked door in Main Unit. In order to safely remove the USB memory stick follow the Accident/Incident **Backup procedure** (see User Information). That data will be saved on the USB memory stick until it is removed and put back again.

Recorded and saved data can be downloaded to a PC (Laptop) in different ways:

1. Directly from the capsule itself, after capsule and/or data storing function has been exposed to a destroying accident (see 2.1).
2. By after a backup procedure removing the USB memory stick placed in the Main Unit and copying it (see 2.2).
3. From the capsule connected to the VDR Main Unit via an Ethernet output (see 2.3).
4. From USB stick via Ethernet output.

Optionally other connected input sources can also be recorded, i.e. other radar-, ECDIS-, conning-displays, ITV, etc. Such data are normally not stored on the capsule memory, but on other internal or external e.g. on a Portable Black Box (PBB).

## 1.6 VDR memory functions Full VDR

The Full VDR fulfills the new requirements defined in IMO resolution MSC.333(90) and IEC 61996-1 Ed 2.

The new requirement defines three mandatory storage units with extended storage time.

1. Fixed Capsule (ProCap) with minimum 48 h storage capacity.
2. Float Free Capsule (TRON 40VDR AIS) with minimum 48h storage capacity.
3. Long Term Storage (LTS) with minimum 720h (30 days) storage capacity.

Recorded data can be downloaded to a PC (Laptop) in different ways:

- Directly from one of the storage capsules itself, after capsule and/or data storing function has been exposed to a destroying accident (see 2.1).
- From the LTS memory placed in the VDR Main Unit via network (see 2.3).

## 2 How to download Data from the VDR

### 2.1 From a damaged Capsule

A capsule which has been exposed to shock, penetration, fire, deep-sea pressure and immersion must be treated by specialists before restoring data from its memory.



#### **Danger!**

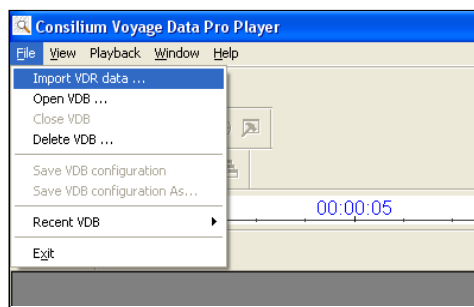
When there is a risk that a capsule has been exposed to such damage SAL Navigation AB must be contacted before trying to restore data from it.

#### **Danger!**

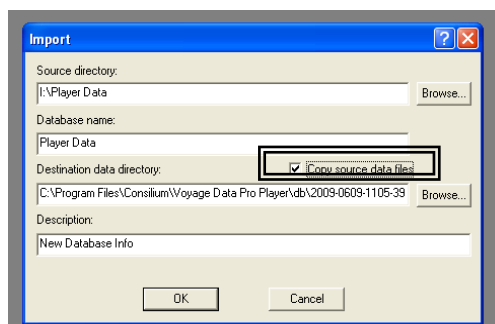
In case of a malfunctioning MU but a Capsule not exposed to damage, we do not recommend connecting the capsule to another MU as there is a risk of loss of data. SAL Navigation AB must be contacted.

### 2.2 From a USB memory stick

1. Save current capsule data on the USB memory stick (via a Backup procedure, see User information).
2. Remove USB memory stick and put it into an external PC (Laptop).
3. Install the Player (see Player guide) and enter activation code, username and password received in Investigator kit.
4. Start the Player.
5. Open File/Import VDR data...



6. Mark source directory, mark “Copy source data files” and set a destination for the data.



7. View the data in the Player (see Player guide).

**Note!**

Never run the Player data directly from the USB memory stick. Always copy the data to a PC (Laptop).

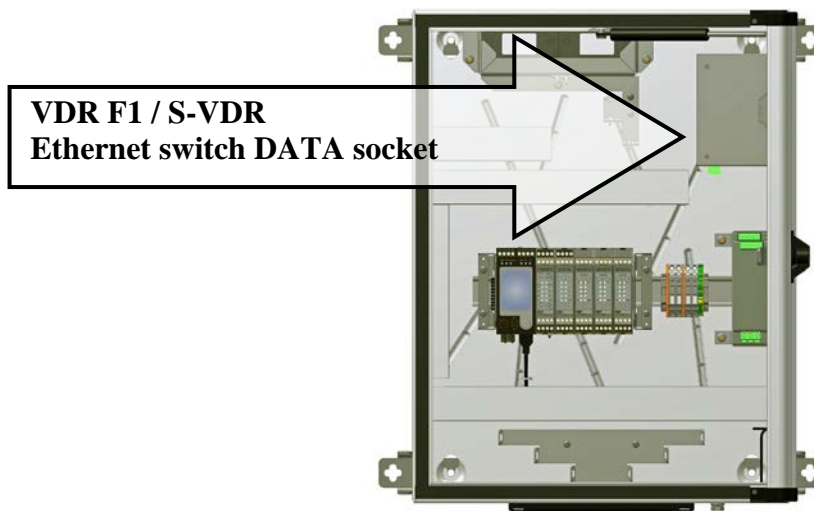
NOTE: The F1/S1 VDR records data to the USB memory stick. In order to safely remove the USB memory stick follow the Accident/Incident procedure. If the USB is removed from its holder in Main Unit without a previous Backup procedure, data might be missing or be corrupt.

**Note! F1/S1**

When the USB stick is put back into the VDR holder, the saving process of the capsule memory starts directly, and the previous data will be gradually removed from the USB stick.

### 2.3 From a Capsule connected to a VDR

To be able to download data from a storage unit it is necessary to create a network connection. Use socket market with DATA for Ethernet cable to PC (laptop), see figures below. Find what type of Capsule is installed on the vessel.





For Read access to storage units see table below.

**Capsules (see 2.3.1):**

Name	Manufacturer	IP address	Directory	Username	Password
PROCAP/ PROCAP S	SAL Navigation	10.2.1.60	usb	backup	backup
PDU/PDU-S	SAL Navigation	10.2.1.100	data	backup	backup
Tron 40VDR AIS	Jotron	10.2.1.110	vdr	backup	backup
LTS	SAL Navigation	10.2.1.10	usb	backup	backup

**Optional storage units**

PBB/PBB G2	SAL Navigation	10.2.1.160	vdrdata	vdr	vdr or Consilium
CloudBox	SAL Navigation	10.2.1.161	vdrdata	vdr	vdr

**Capsule L3 (see 2.3.3)**

HVR/SVR	L3	10.2.1.150	-	-	-
---------	----	------------	---	---	---

**Example:** IP address\directory, e.g. PROCAP = 10.2.1.60\usb

**2.3.1 Capsules PROCAP, PDU, LTS and Tron**

1. Connect the Ethernet cable to DATA socket in the VDR Ethernet switch.
2. Change the IP address of your computer to: "10.2.1.222 and Subnet mask: 255.255.255.0" (see Annex 4.1 - "Change IP").
3. Map the storage unit as a network drive (see Annex 4.2 - "Map Network Drive").
4. Select a free drive (e.g. Z:) and directory according to the table above.
5. When "Connected to local host" write in username and password from table above.

6. Download data as follows:
  - For a total capsule backup, copy all under drive to a prepared directory on the connected PC (Laptop).
  - If a selected time window shall be downloaded. Study the capsule file structure under 3.3 below and find the relevant sequence of sub directories corresponding to required time window.

### 2.3.2 PBB

Connect via FTP (ftp://10.2.1.160/vdrdata). User “vdr” has a read-only access to the PBB.

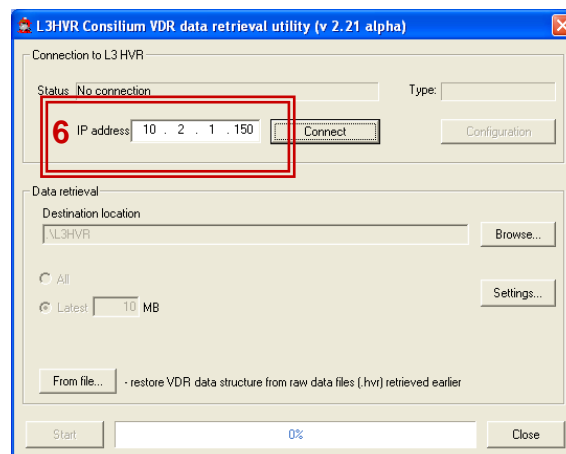
### 2.3.3 Capsules L3 HVR/SVR



#### Note!

Do not download data when VDR is recording to the capsule.

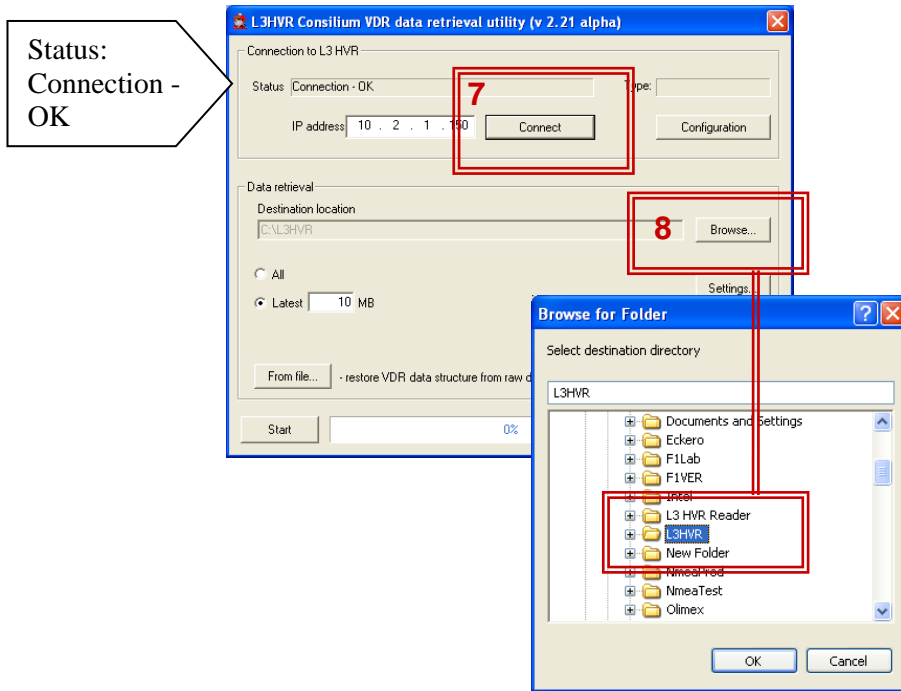
1. Connect the Ethernet cable to DATA socket in the VDR Ethernet switch.
2. Turn the VDR power on with the Power and Battery switches inside main unit (see User Guide, part User Information).
3. Change the IP address of your computer to: “10.2.1.222 and Subnet mask: 255.255.255.0” (see Annex 4.1 - “Change IP”).
4. Create a new folder placed in C:\ where to put the data. Make sure that the destination drive has enough of free space.
5. Install and start a separate data downloading software - L3CapsuleReader (versions 2.21 or later, available in e.g. Investigators kit).
6. Set the L3 capsule’s IP address (normally 10.2.1.150).



*L3HVR Reader*

7. Click “Connect”.  
Status field shall display “Connection – OK”.
8. Click “Browse” and select the created folder.



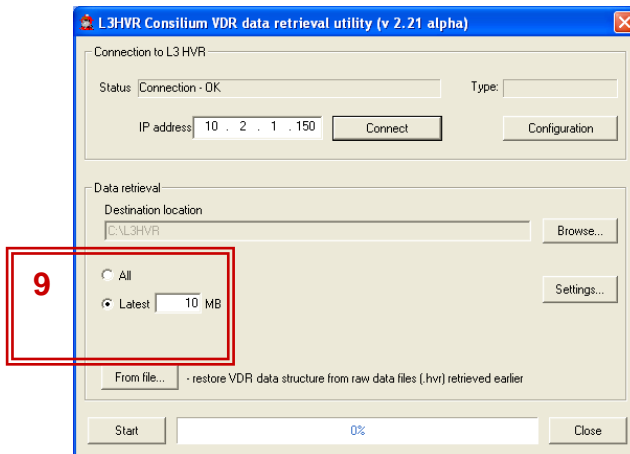


Status:  
Connection -  
OK

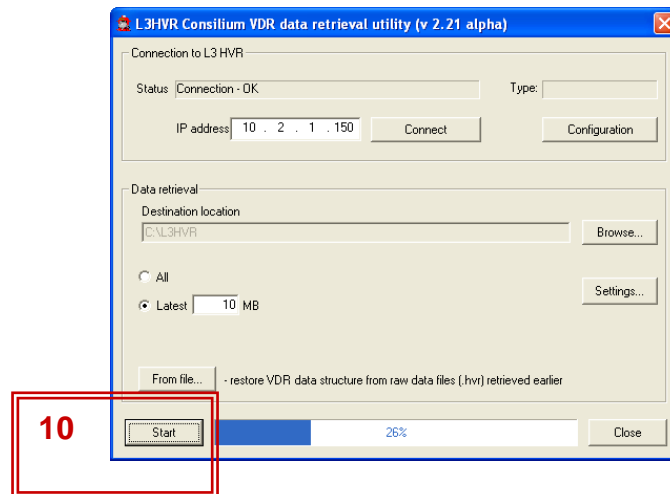


9. Select amount of latest data (in MB) to be retrieved.  
**Note!** Do not use option "All".

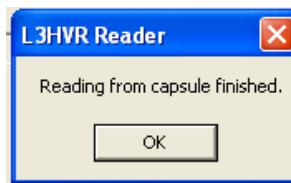
Do NOT use All



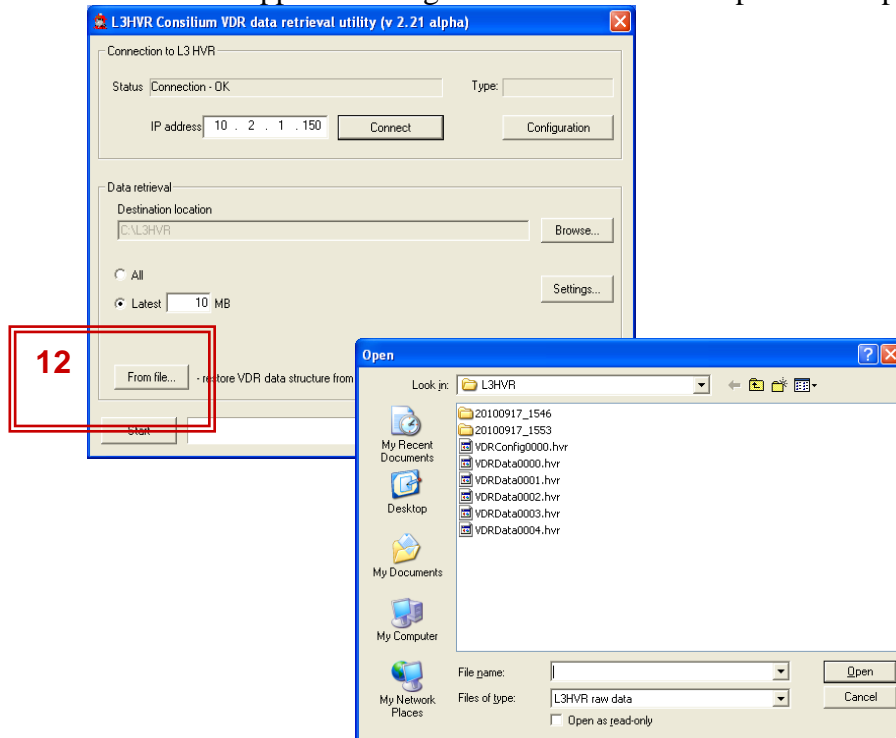
10. Click on “Start” to begin the downloading.



11. “Reading from capsule finished” will pop-up when downloading is ready. Click “OK”.



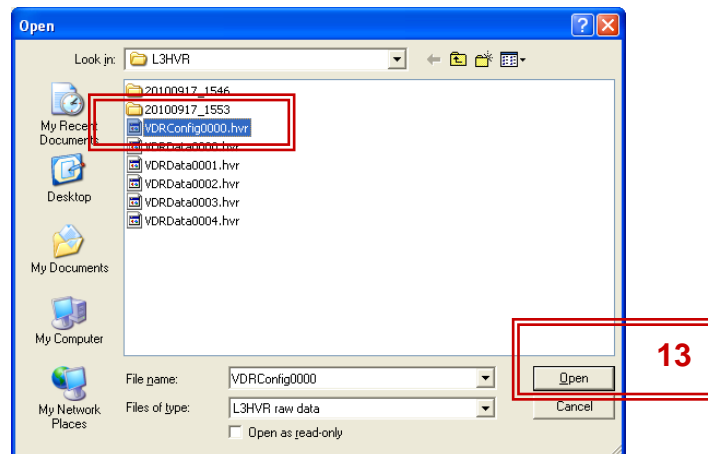
12. To restore VDR files from the downloaded raw data click “From file...”. A window will appear showing the files downloaded at previous step.



### 13. Configuration files:

To retrieve the configuration files select VDRConfig0000.hvr (or a file with other number) and click “Open”.

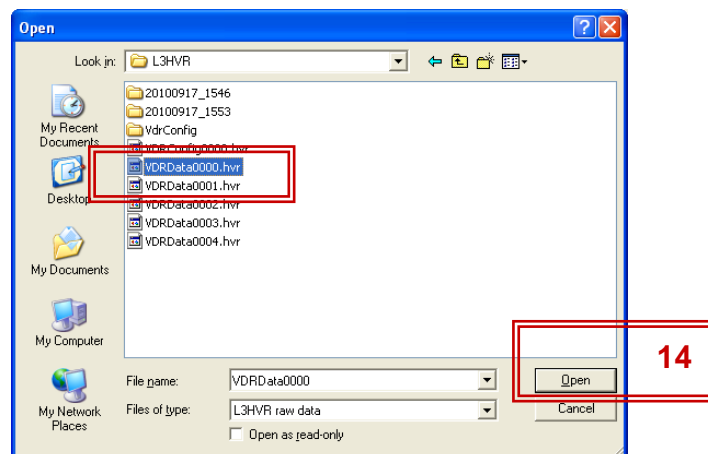
If the program finds a sequence of files (with higher numbers) it will ask whether to process them as well.



### 14. Data files:

To retrieve the recorded data select VDRData0000.hvr (or a file with other number) and click “Open”.

If the program finds a sequence of files (with higher numbers) it will ask whether to process them as well.



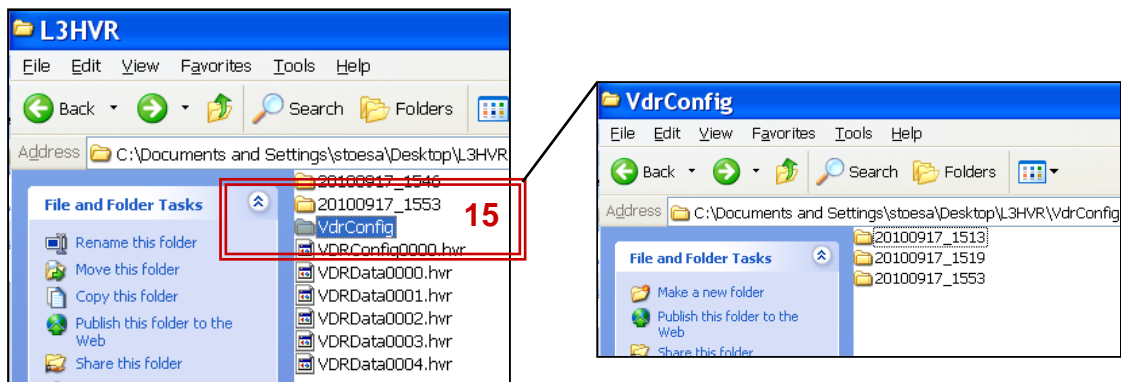
### 2.3.3.1 L3 HVR/SVR data for Player



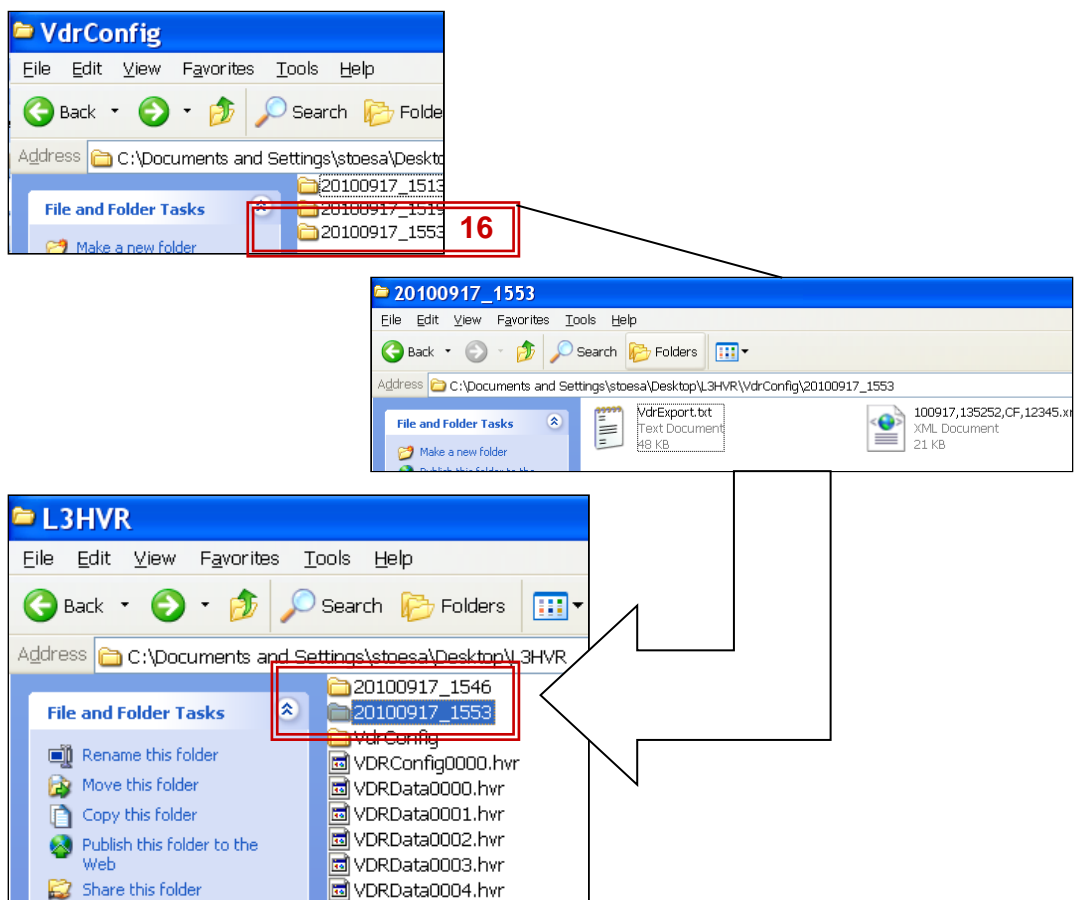
#### Note!

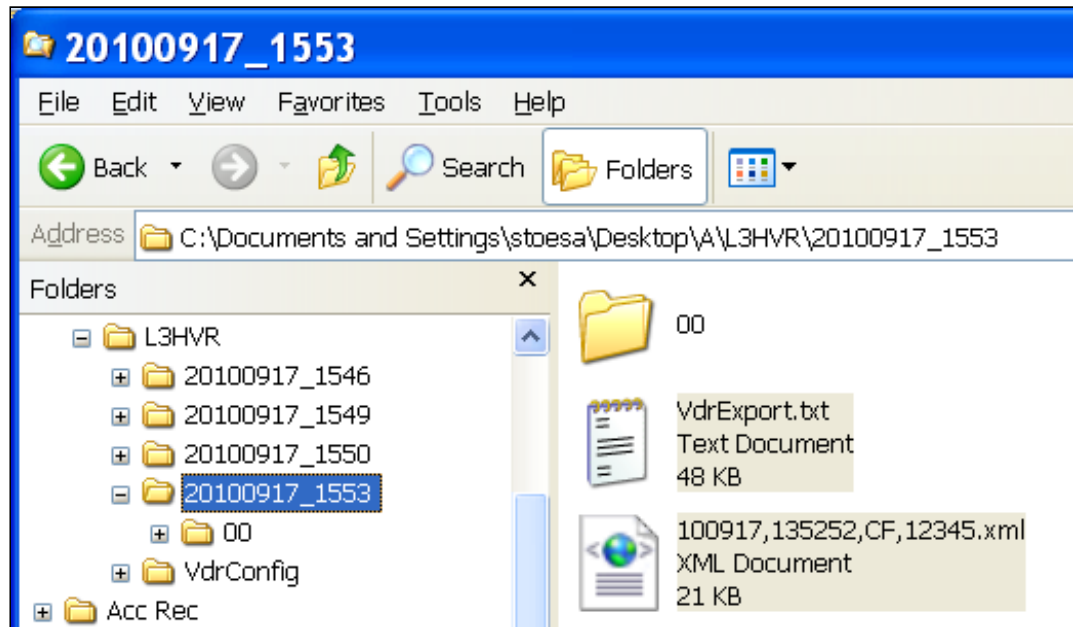
Before importing a data session in the Player, configuration files shall be unpacked and manually copied to the data session's folder. See instruction below.

15. Open your L3HVR folder. Open VdrConfig folder.



16. Open the folder most recent (in time) e.g. 20100917\_1553. Move the “VdrExport.txt” and the “.xml” files to the data session's folder. It is recommended to repeat this procedure with all VdrConfig folders.





17. This is a view of correct data session folder for the Player.

To analyze the data continue in Player guide.

**Additional info:**

- Approximate data size per minute is 3-6MB. Maximal data amount for a 4GB capsule is 3960MB.
- Number of files with the raw data depends on the requested data size and on the file size limit (default 4MB).
- File name consist of capsule's partition name and file number (four last characters). Numbering starts from 0 (0000). File type (extension) is .hvr
- Files with VDR configurations are named VDRConfigNNNN.hvr (L3CapsuleReader always reads 4MB from the capsule's configuration partition).

## 2.4 From a USB memory stick via Ethernet output

For special instruction contact SAL Navigation.

## 3 Data structure

### 3.1 File Types VDR F1/S1

All data is recorded when received or at preset intervals and stored in folders for each minute of the hour. All input data is written in the form of digital files. It takes the following form:

- **Navigational data, depth, speed, IEC 61162/NMEA-compatible data**, etc., is stored as **text files** once per minute. The VDR makes no attempt to decode the NMEA data, it just stores it. At viewing time, it is up to the player application to decode the NMEA protocol data and display it.
- **Sound information from microphones, VHF communications**, etc., is stored in the form of compressed **MPEG1 layer 2 sound files**, once per minute, one for each of the four mixer output channels.
- **Video from radar** and other high-resolution video sources is stored as **JPEG files** once every 15 seconds, in one file for each of the input channels.
- **Ship specific data** and configuration of the data needed for replaying are saved as **configuration text files** (VDR config).

### 3.2 File Types VDR /S-VDR

The names of files shall comply with the following syntax  
YYMMDD,hhmmss,NN,?????????.nnn

YYMMDD,hhmmss = UTC time  
NN = Data specific  
????????? = IMO number  
nnn = file type

- **Navigational data, depth, speed, IEC 61162/NMEA-compatible data**, etc., is stored as **text files** once per minute. ( NN = DD)  
140228,123100,DD,1234567.log
- **Sound information from microphones, VHF communications**, etc., is stored in the form of compressed **Mp3 sound files**, once per minute, one for each audio output channels.  
140228,123100,M1,1234567.mp3
- **Video from radar** and other high-resolution video sources is stored as **PNG files** once every 15 seconds, in one file for each of the input channels.  
140228,123100,R1,1234567.png

- **Ship specific data** and configuration of the data needed for replaying are saved as **configuration text files**  
VDR config NN = CF  
140228,123100,CF,1234567.xml  
Opertaion Performance Test NN = OP  
140228,123100,OP,1234567.txt

### 3.3 PBB/PBB G2/CloudBox data

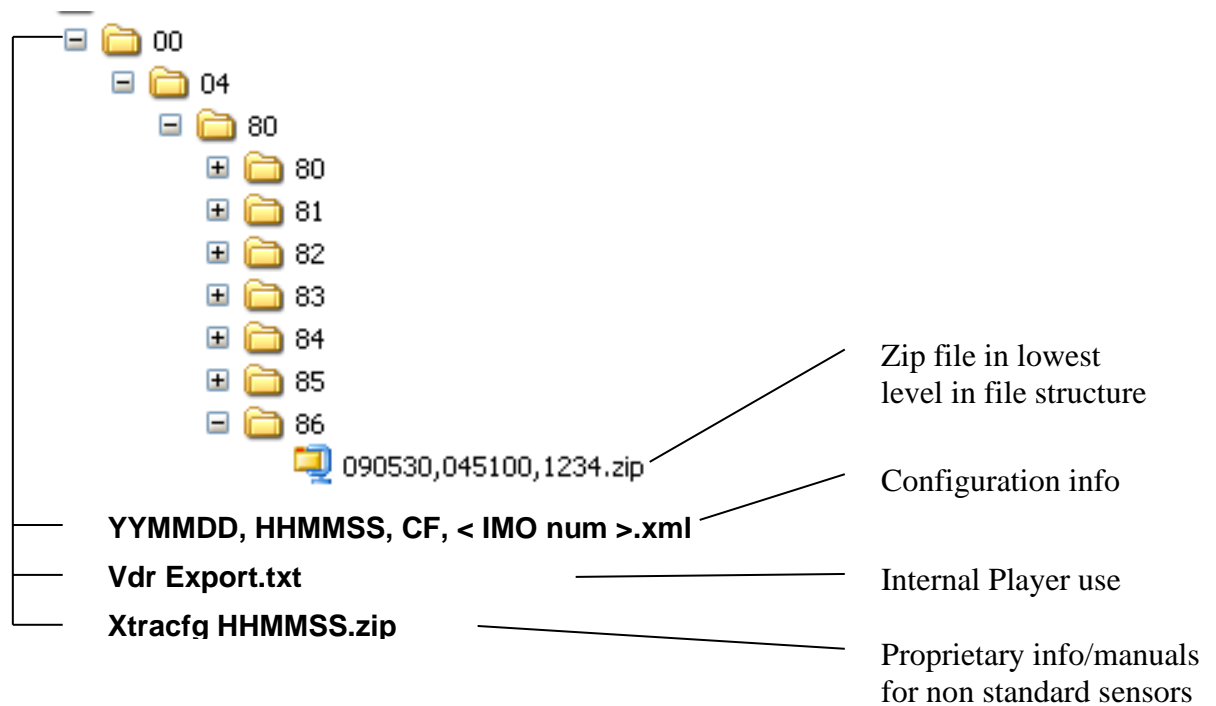
Data is stored divided into 6-hour portions starting from time 00:00 (00:00-05:59, 06:00-11.59, 12:00-17.59, 18:00-23:59). Each portion is stored in a separate directory named according to the time of its creation: YYMMDD-HHMM (e.g. 070320-0000, 070320-0600 etc.).

A new directory is also created when recording is started/restarted (so directories with arbitrary time in the names are possible: e.g. 070320-1739 followed by 070320-1800).

**Note!**

Time used for data division is a PBB time (synchronization with VDR time will be implemented in a later PBB software version).

### 3.4 File Structure



The lowest level in the file structure consists of a compressed folder named .zip.

All files are stored in a common directory structure on the hard disk consisting of: **One-minute** directories for each stored minute of information, containing the audio channel files, high-res, low-res video files, and the Data file containing text. 100 (00-99) **one-minute** directories put into hundred-minute directories.

- 100 (00-99) **hundred-minute** directories put into ten-thousand-minute directories
- 100 (00-99) **ten-thousand-minute** directories put into one-million-minute directories
- 100 (00-99) **one-million-minute** directories put into the main directory.

There is no way of telling the exact time that data was recorded by looking at the directory names. The time stamps are in the Data file of each minute directory. The interpretation of the data should be left to the Voyage Data Player. After 12 hours of data has been stored, the oldest data is removed as the next minute is recorded.

#### 3.4.1 VDR /S-VDR Directory structure

In VDR all data is organized in 6h blocks as for thePBB.

Each 6 h block is named as YYMMDD-hhmm  
example 140228-1800



### 3.4.2 File Names

All file names are according to IEC 61996-1 and -2.

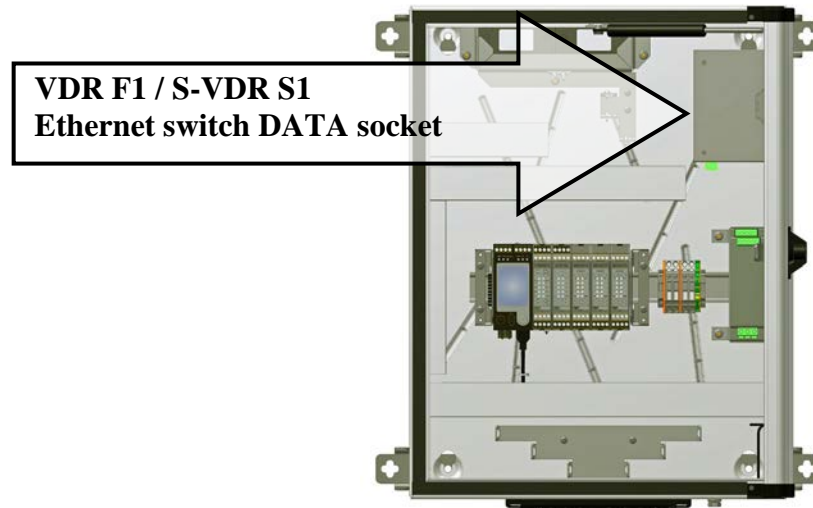
### 3.4.3 Sensor data format

Serial sensor data in IEC 61162-1 format is stored in the Data file. Data from the Signal converter interfaces are transformed into IEC 61162-1 format.

## 4 Appendix A – access VDR network

### 4.1 Change IP

Connect the PC to the Ethernet switch in the Main unit, see figures below.

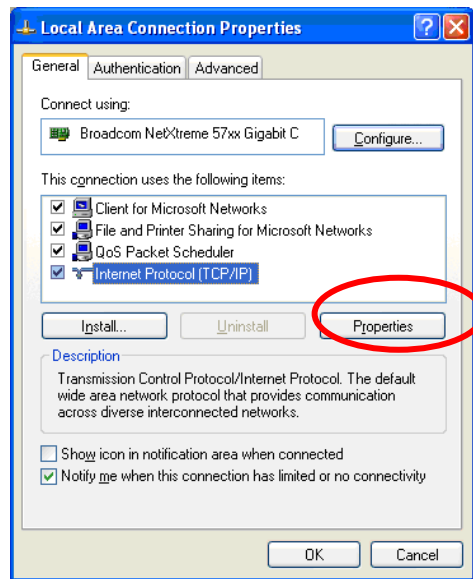
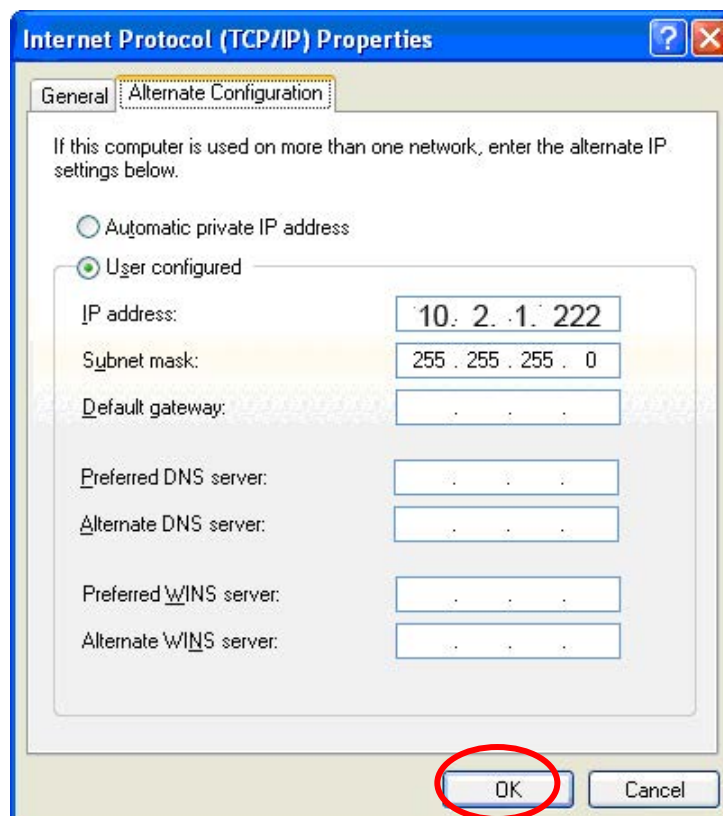


Make sure that Your PC TCP/IP settings are set as follows:

- Open your Networks connections from the Control Panel on your PC.

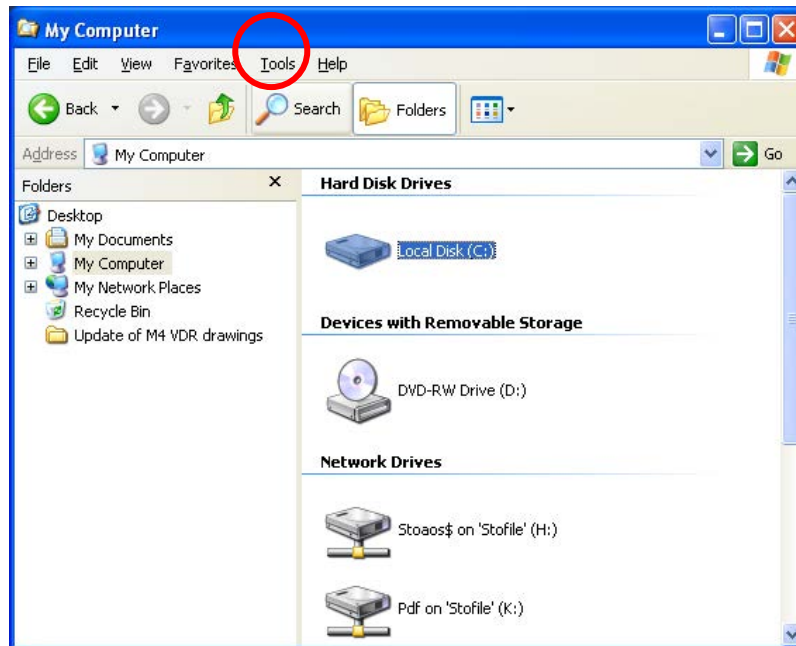
- **Right-click on Local Area Connection and select properties.**



**Select TCP/IP and select properties.****Make sure that your settings are correct. Click OK, OK.**

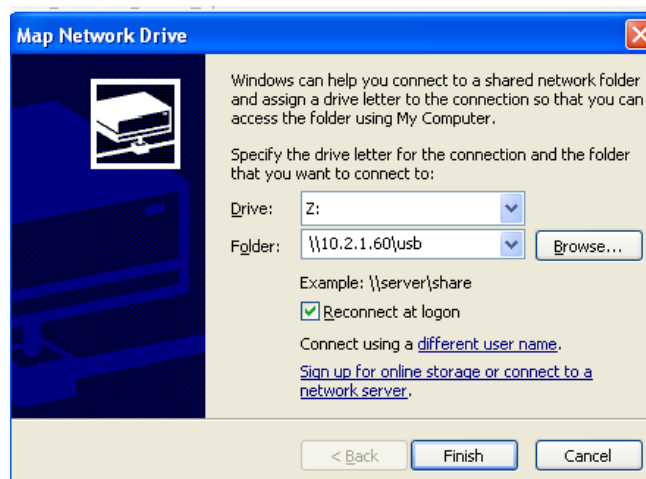
## 4.2 Map Network Drive

Open My Computer and select “Map Network Drive” under Tools. ▶



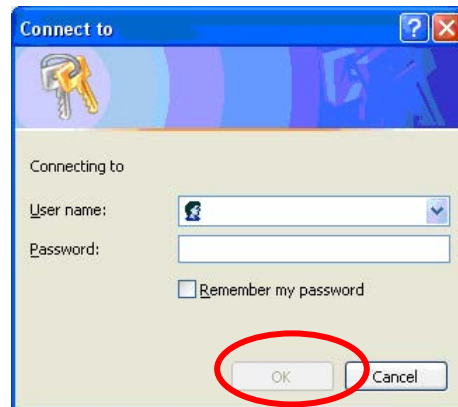
Select a drive letter (Z:) and type in the capsule’s IP address and directory according to the table on page 6, as follows:

- E.g. \\10.2.1.60\usb (for PROCAP)
- E.g. \\10.2.1.110\vdr (for Tron)
- E.g. \\10.2.1.100\data (for PDU)



Click Finish.

**Type in the appropriate User name and Password.  
Click OK.**



**You are mapped and ready to look into the data files.**

## 5 Appendix B – Convert audio files to WAV format

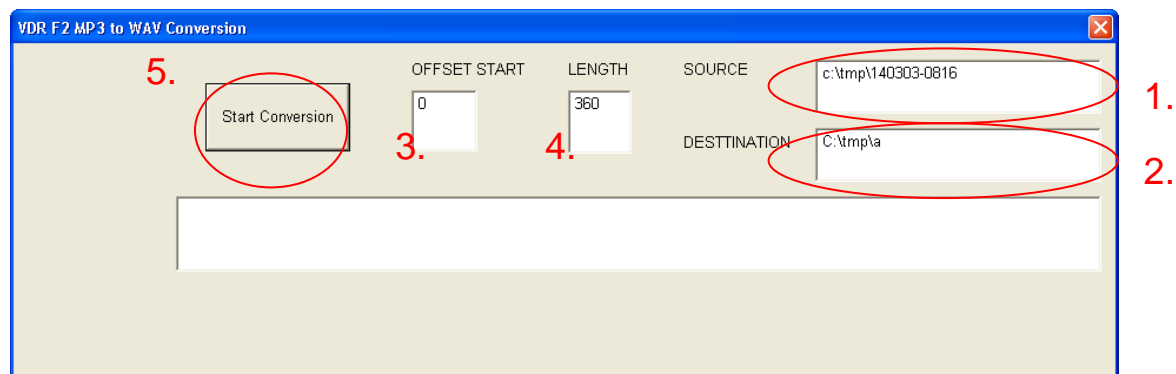
Copy the CONVERTER directory from the CD to your PC  
Open the directory and start the program by clicking on the Converter.exe file

Select Wav and Start



1. Fill in Source Directory [ SOURCE ] where the 6h VDR data is stored ( YYYYMMDD-0000 or YYYYMMDD-0600 or YYYYMMDD-1200 or YYYYMMDD-1800).
2. Fill in Destination Directory [ DESTINATION] where you want the .wav files to be stored.
3. Fill in [OFFSET START] if you don't want the conversion to start at the first minute in 6 h source directory.
4. Fill in length in minutes if you want to stop the conversion before the end of the 6 h directory

Please note that each channel converted wav file will be about 3.7 MB i.e. with 8 configured audio channels, each hour that is converted will require  $60 \times 8 \times 3.7 = 1.8$  GB of free disk space on the destination directory



5. Press the compare button and the conversion will start  
It will take about 5-10 seconds for each minute to convert i.e. one hour conversion will approx. take 5 -10 minutes

When ready close the window

## 6 Appendix C – Activate SMBv1 on Windows 10

### How to access the VDR storage units using SMBv1 on Windows 10

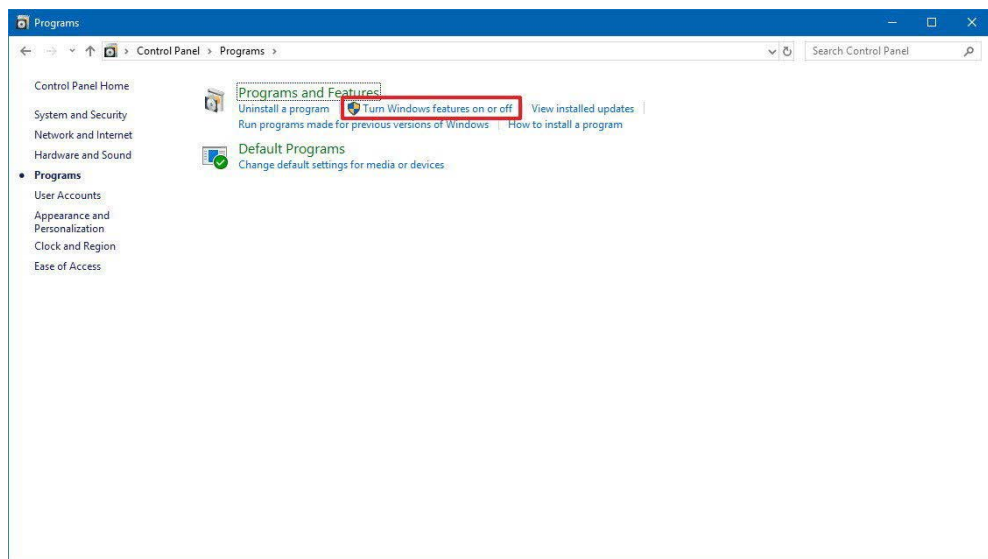
To access the files in the storage units we use SMB or Server Message Block Protocols to connect the service computer to the FRM. For access to all units the SMBv1 must be used.

Windows 10 no longer installs SMB v1 by default starting with the Fall Creators Update and April 2018 Update. As a result, you'll get error messages like "You can't connect to the file share because it's not secure;" "The specified network name is no longer available;" and "Unspecified error 0x80004005" when trying to access your files.

However, if you have a networking device, like the VDR storage units, that you can no longer access because of this issue, you can still temporarily enable the protocol.

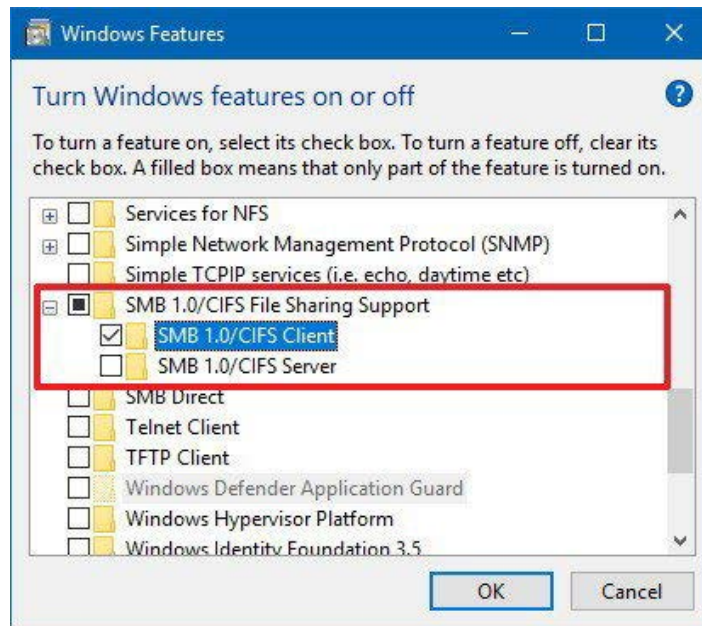
### How to re-enable the SMBv1 protocol on Windows 10

- Open **Control Panel**.
- Click on **Programs**.
- Click on **Turn Windows features on or off** link.



- Expand the **SMB 1.0/CIFS File Sharing Support** option.
- Check the **SMB 1.0/CIFS Client** option.





- Click the **OK** button.
- Click the **Restart now** button.

After completing these steps, you'll once again be able to see and connect to network devices running the old protocol on your local network from your Windows 10 computer.

Intentionally blank

**VDR / S-VDR**  
*Professional Player Guide*  
User Guide

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2018-09-10	C02	STE	Company details, correction playback bar
2020-01-22	C03	HB	Image update in 4.1
2020-02-17	C04	HB	Company details
2020-11-10	C05	HB	Company details

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# 1 About this manual

## 1.1 General

This manual describes the Voyage Data Pro Player, a program for playback of VDR data, recorded by any model of Voyage Data Recorder. It contains information on how to install the program, import data to the player and how to run the player.

**Note!**

The setting up, installation and service procedure, which shall be performed by specially trained technicians, is described in a separate manual.

**Danger!**

Hazardous voltage!

Do not remove covers! Only authorized personnel are allowed to do so.

## 1.2 Symbols Used in the Manual

**Danger!**

Risk of serious or fatal injury to the user, and/or severe damage to the product, if the instructions are not followed.

**Warning!**

Risk of personal injury and/or damage to the product if the instructions are not followed.

**Caution!**

Risk of minor or moderate personal injury. Risk of equipment damage, loss of data, extra work, or unexpected results, if the instructions are not followed.

**Note!**

Note symbols alert you to important facts and conditions.

**Information**

Tip symbols direct you to specific instructions, such as where to find additional information and tell you how to perform a certain operation in an easier way.

## 2 General Description

### 2.1 Voyage Data Pro Player

The Voyage Data Pro Player is a PC program for playback of VDR data, recorded by any model of Voyage Data Recorder.

The Voyage Data Pro Player is designed for replays where a general apprehension is needed of an accident or incident, in what order episodes has happened and actions has been taken etc. All recorded data can be presented as requested by IMO regulations for VDR and S-VDR.

All data, configuration files and event files in the VDR can easily be displayed in the program. Most information is presented in pictures, values or status corresponding to the value or status shown on the bridge. Some of them are shown on animated meters and displays like that on the bridge.

The presented information is split in the Player in following preset sections for easy overview, finding and comparison of essential data:

- Video                                      Radar(s) and other video displays if recorded
- Navigation/  
Maneuvering                                Position, Heading, Speed, Depth, Engine controls etc.
- Alarms/  
Indications                                 Bridge Main Alarms, Door indicators
- Composite/  
Animation                                 Presentation of data on displays and meters like on bridge

## 3 Installation

### 3.1 Install the program

The Voyage Data Pro Player is supplied on a CD or on an USB stick in a folder or as a zip file.

1. Unpack the zip file if available.
2. Double-click on Setup.exe
3. Follow the instructions on your computer screen.

After the installation is finished, there will be a Player icon on your desktop and a Consilium item on the Start menu.

### 3.2 Set password

The VDR Player is password protected. Two levels of access are provided:

- Limited access: excluding audio data. The audio indicator will not be shown.

- Full access: including audio data

### **First time start-up**

- 1 Enter a username
- 2 Enter an activation code      Activation information will be assigned to registered users only.
- 3 Enter a password              The password is used to define the access level for the current session.

If all entered information is correct the Player will start.

### **All subsequent start-ups**

- 1 Enter a password              The password is used to define the access level for the current session.

If the entered password is correct the Player will start.




## 4 Start the program

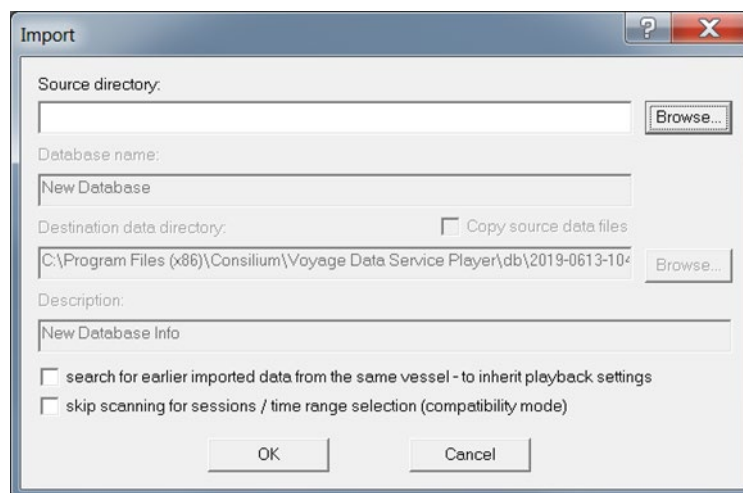
### 4.1 Import data to a Voyage Data Base



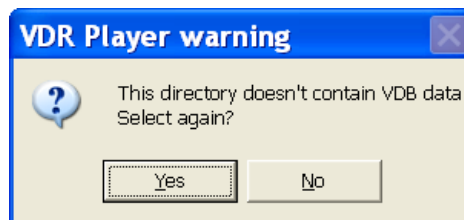
#### Note!

Always copy the recorded VDR files to your local hard drive before running the Player.

1. Make the recorded VDR files available from the same computer as the Player program.
2. Open the Player program by double clicking on the Player Icon: 
3. When the program opens, choose **File** on the menu bar and then **Import VDB** on the drop down menu.
4. Write the path in **Source Directory** box or use the Browse function to find the Voyage Data Base directory (VDB) which contains the recorded VDR files.



5. Click **OK**. If the directory does not contain recorded data following dialog box is shown:

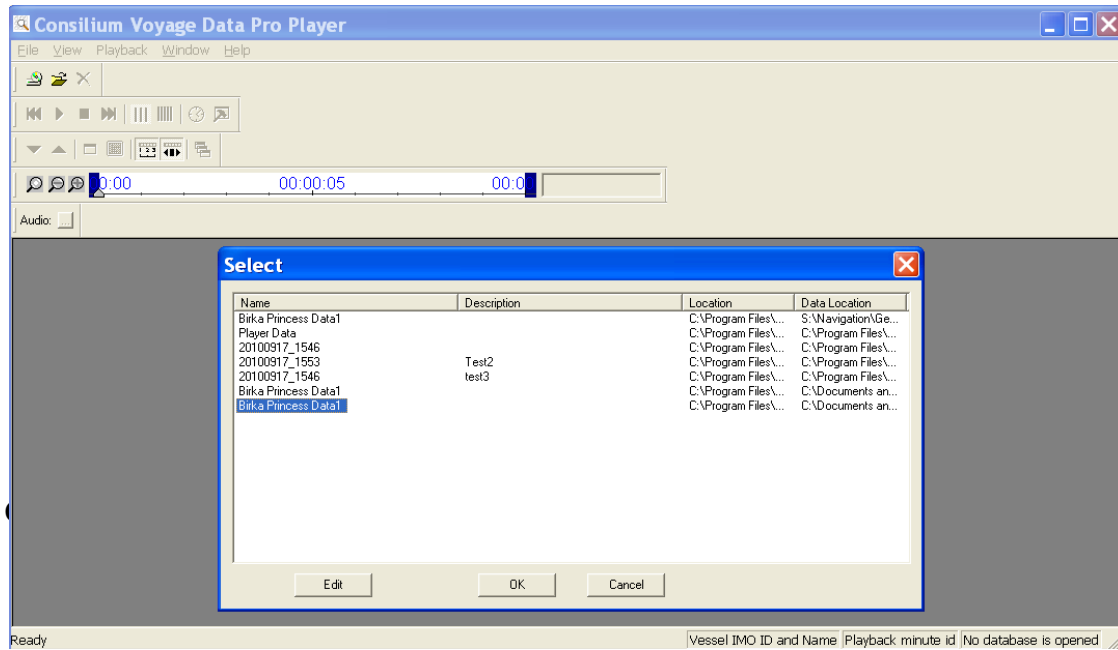


The VDB can be given a new “Data Base name”, e.g. the name of the vessel and/or incident and date. If the VDB is collected from a source outside the own computer memory (e.g. network, DVD, CD, USB stick) it can be copied to own computer by marking **Copy source files** and by defining “Destination data directory”. Further “Description”(notations) can be connected to the saved version (configuration) of the VDB.

## 4.2 Open an existing Voyage Data Base



1. Open the Player program by double clicking on the Player Icon:
2. When the program opens choose **File** on the menu bar and then Open VDB on the drop down menu.
3. Click OK. A list will be shown containing earlier imported VDB.

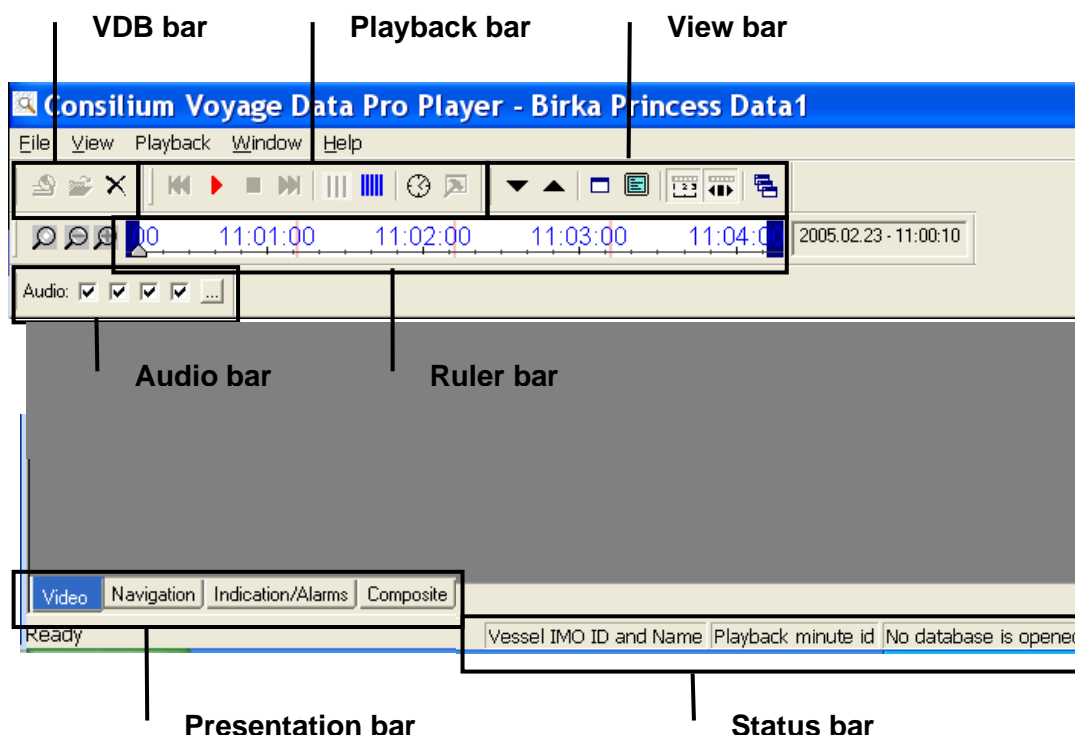


4. Choose one of the VDB and click **OK**.

## 5 Running the Player

### 5.1 Toolbars

#### 5.1.1 Overview



The caption of the Player at the top of the main window shows the type of Player and the name given to the replayed data (VDB) - normally the name of the ship, plus incident and date if needed.

The command interface has four toolbars controlling various functions of the Player. The toolbars may be docked below the menu bar or can be ripped off and used as free-floating objects.

All functions on the toolbars can be handled from the curtain menus at the menu bar. Several functions can also be handled by double or right clicking at actual window (see detailed instruction below).

The toolbars and their functions are:

### 5.1.2 VDB bar



1 2 3

1. Importing a new VDB
2. Opening an earlier imported VDB
3. Closing an opened VDB

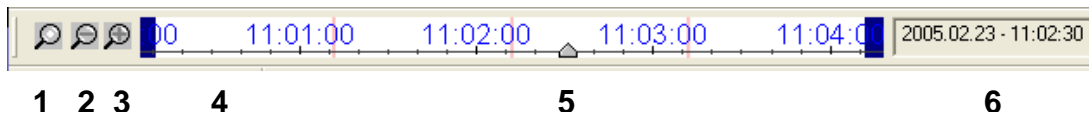
### 5.1.3 Playback bar



1 2 3 4 5 6 7 8

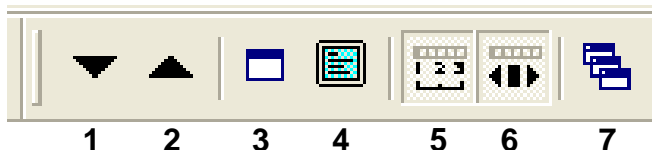
1. Rewind (Pan zoomed playback time range one step to the left)
2. Start playback
3. Stop playback
4. Forward (Pan zoomed playback time range one step to the right)
5. Normal playback speed. (Read actual speed mode at the status/foot-bar)
6. Faster/slower playback speed (choose from dialog box)
7. Enter precise position of inspection pointer (= playback starting time, UTC (Coordinated Universal Time))
8. Return to Speed initialization box, when in Fast/slow playback mode

### 5.1.4 Ruler bar



1. Reset to show full playback time range
2. Zoom out the playback time range
3. Zoom in the playback time range
4. Time ruler showing the playback time range (UTC). Brakes in recording are marked red on the time ruler
5. Inspection pointer showing actual playback time (UTC) on the time ruler. Left-click and drag to move left and right.
6. Actual playback date and time (UTC).

### 5.1.5 View bar



1. Shrink picture windows
2. Grow picture windows
3. Toggle selected window caption on/off (for saving space on the display)
4. Resize selected window to full screen
5. Toggle Ruler bar on/off (for saving space on the display)
6. Toggle Playback bar on/off
7. Open “Data windows” selection box

### 5.1.6 Audio bar



1. Each square representing one audio channel. Toggle sound on/off
2. Shows bridge microphones/audio zones dialog box

### 5.1.7 Presentation bar

The recorded data is assigned to four pages. There are four selectable pages (bottom left of the screen) showing:

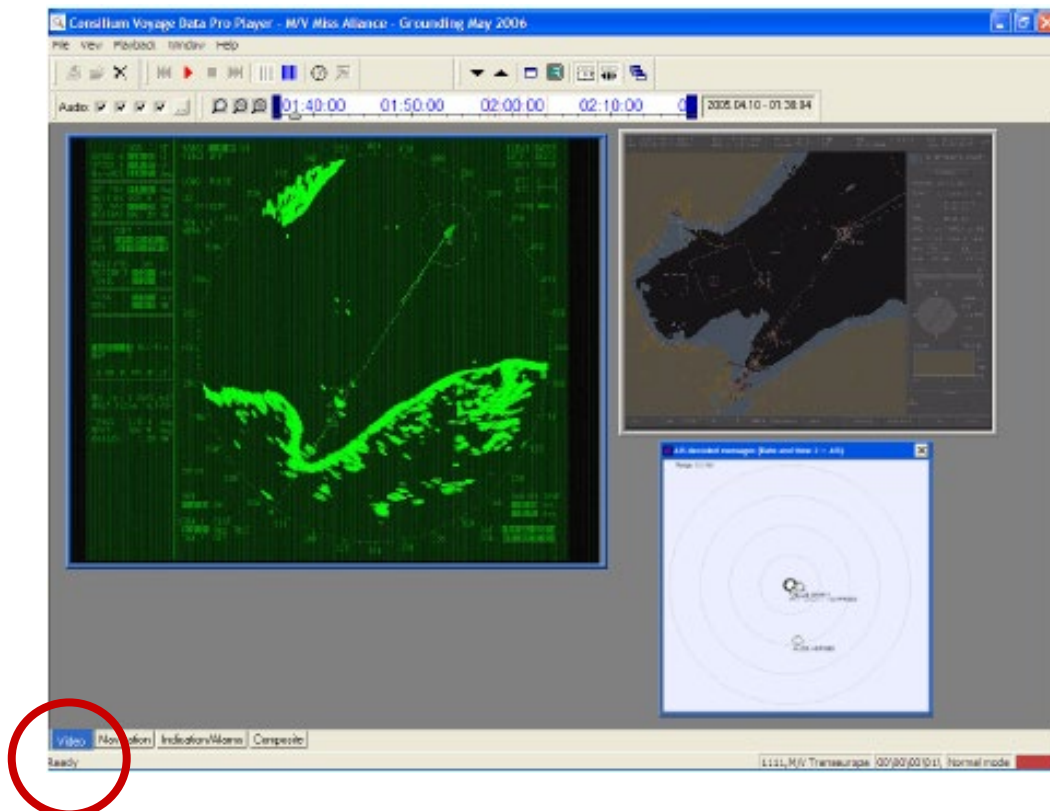


- |   |                    |  |
|---|--------------------|--|
| 1 | Video page         | Radar(s) and other video displays if recorded.   |
| 2 | Navigation page    | Position, Heading, Speed, Depth, Engine controls etc.  |
| 3 | Indications/Alarms | Bridge Main Alarms, Door indicators  |
| 4 | Composite          | Presentation of data on displays and meters like on bridge.<br>Composite display will show data only if prepared at VDR setup. |

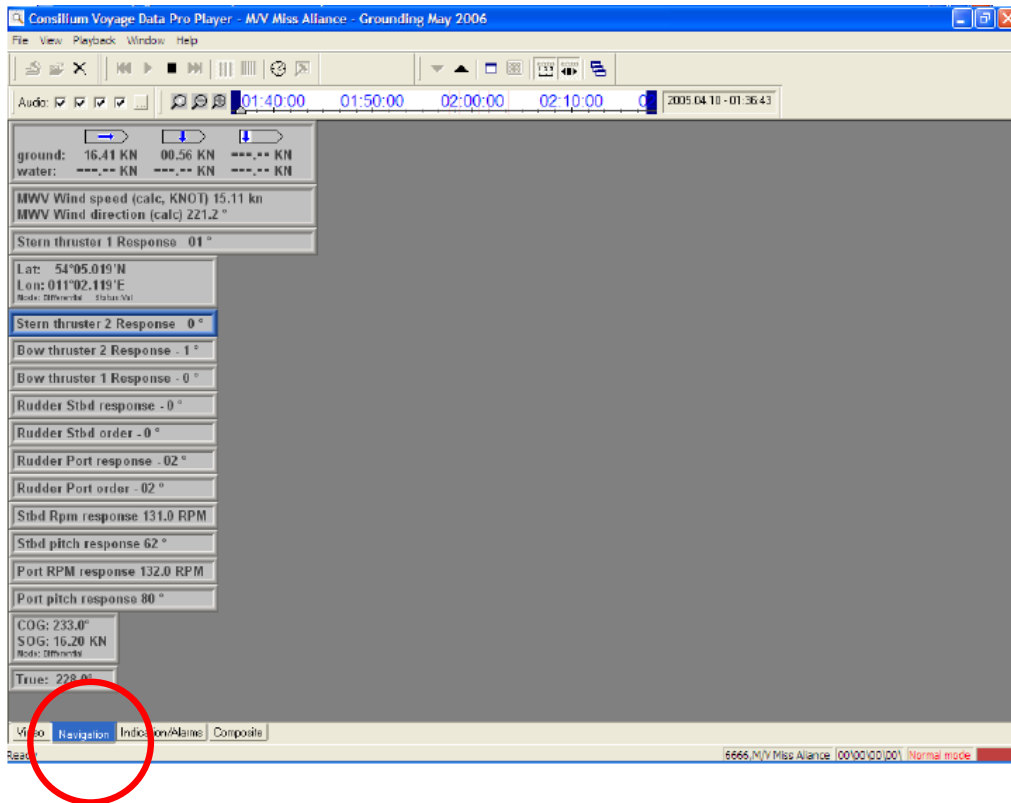
The page will change by clicking on the page tab at the left bottom of the screen.

Before starting the replay there are no values or pictures in the displayed windows. When stopping the replay all values/pictures will remain, corresponding to the time shown in the time window. When a new starting time is chosen all values will disappear until the replay is started again. See examples below.

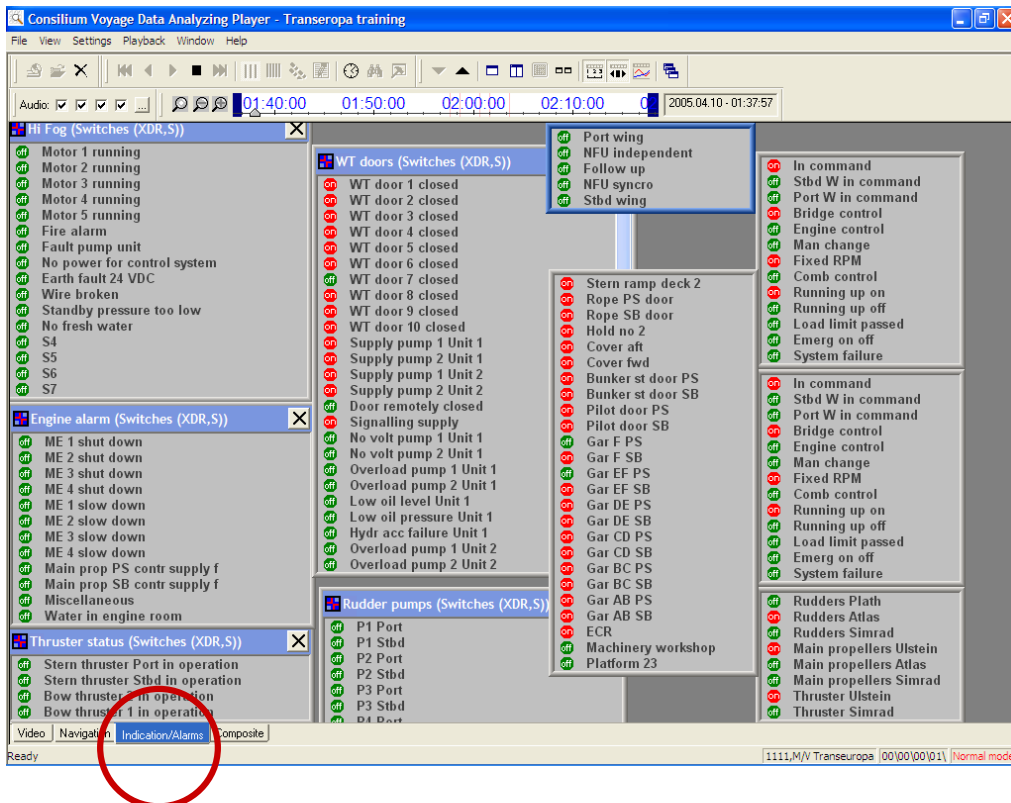
#### 5.1.7.1 VIDEO PAGE



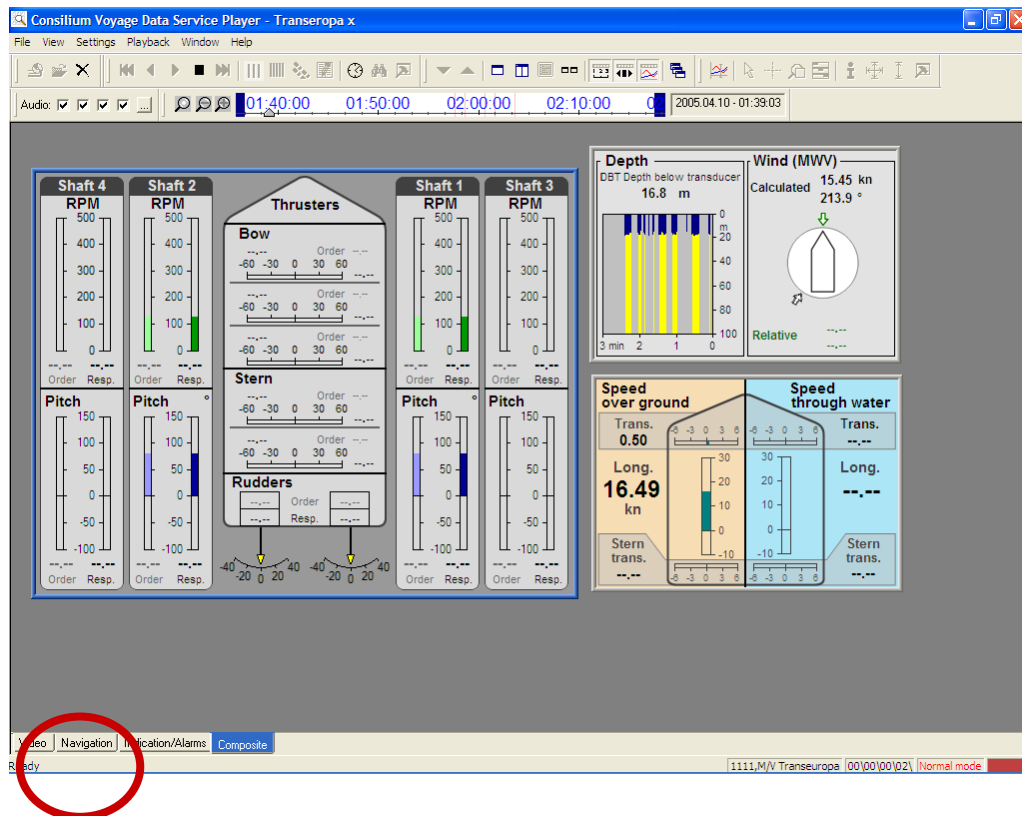
### 5.1.7.2 NAVIGATION PAGE



### 5.1.7.3 INDICATIONS/ALARMS PAGE

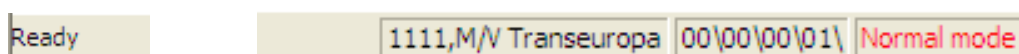


### 5.1.7.4 COMPOSITE PAGE



### 5.1.8 Status bar

The status bar is placed at the foot of the main window.



- 1 Message / progress pane showing running status, directory loaded, menu explanation, etc.
- 2 Vessel IMO ID and Name
- 3 Playback minute ID in VDB files
- 4 Mode indicator showing current playback mode



## 5.2 Choose which information to be displayed



Right click with the pointer on the grey background and choose Data Windows or click on the view bar (View menu: “Data Windows”).

The Data Windows box will show all channels and their status, selectable on the current page - visible (Yes/green) or not visible (No/red).

Shown	Name	Info	Source	Type	View
● Yes	Bow thruster 1 Respon...		[2100,3]	Angle (XDR,A)	Angle digit
● Yes	Bow thruster 2 Respon...		[2100,6]	Angle (XDR,A)	Angle digit
● Yes	Nacos (COG and SOG...		[200,1]	COG and SOG (VTG)	Course
● Yes	Nacos (Heading true [...		[200,1]	Heading true (HDT)	Heading (HDT format)
● Yes	Nacos (Position (GLL))		[200,1]	Position (GLL)	Coordinates (GLL format)
● Yes	Nacos (Speed (VBW))		[200,1]	Speed (VBW)	Speed extended
● Yes	Nacos (Wind (MWV))		[200,1]	Wind (MWV)	Digital data view
● Yes	Port RPM response (T...		[1750,3]	Tachometer (XDR,T)	Tachometer digit
● Yes	Port pitch response (A...		[1750,2]	Angle (XDR,A)	Angle digit
● Yes	Rudder Port order (Ang...		[1800,1]	Angle (XDR,A)	Angle digit
● Yes	Rudder Port response [...		[1800,2]	Angle (XDR,A)	Angle digit
● Yes	Rudder Stbd order (An...		[1800,3]	Angle (XDR,A)	Angle digit
● Yes	Rudder Stbd response ...		[1800,4]	Angle (XDR,A)	Angle digit
● Yes	Stbd Rpm response (T...		[1750,6]	Tachometer (XDR,T)	Tachometer digit
● Yes	Stbd pitch response (A...		[1750,5]	Angle (XDR,A)	Angle digit
● Yes	Stern thruster 1 Respo...		[2100,9]	Angle (XDR,A)	Angle digit
● Yes	Stern thruster 2 Respo...		[2100,12]	Angle (XDR,A)	Angle digit
● No	ZDA Channel (Ship's p...		[200,1]	ZDA Channel	HIDDEN

The Data Windows box

The display status of each channel can be changed by double-clicking on the **Yes/No** dot.

## 5.3 Arrange information on the screen



All information is displayed in own windows or grouped together in windows. Every window has a name (caption) which can be displayed and removed by double-clicking on the background of the window, or by using the caption icon on the view bar (View menu: “Caption”).



The size of the windows can be changed by clicking on two up/down arrows on the top bar: (View menu: “Grow/Shrink window”).



Video windows can be shown in full page format by clicking: (View menu: “Full screen”).

## 5.4 Start and stop the playback

The replay is started by clicking on the red play-arrow on the playback bar (Playback menu: "Start"):



Replay is stopped by clicking on the black square to the right. (Playback menu: "Stop")

The exact displayed date and time UTC is shown to the right on the time bar:



As default the total recorded playback range (UTC) is shown on the time ruler. The grey inspection pointer present actual playback time on the time ruler. The pointer can be moved to another time position by left-click and drag. (Playback mode: Set current playback time).

For easier handling a specific time sequence in a long recording, the playback time range on the time ruler can be changed by using the buttons on left side of the time bar:

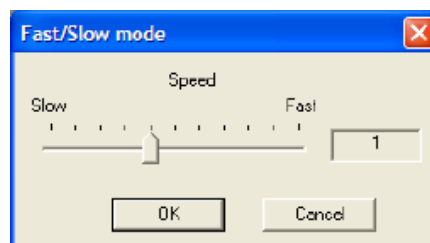


## 5.5 Change playback speed



The playback speed can be increased in fixed steps up to 100 times the normal speed, or decreased in fixed steps down to 1/20 of normal speed. The function can be selected by clicking on the blue speed icon on the playback menu.

Choose a new playback speed by moving the pointer to the left (decrease) or to the right (increase) in the **Fast/Slow mode** window:



Click on **OK**.



The selected playback speed remains at every start until changed by or set back to normal. The Fast mode initialization window is returned to by clicking on the hammer icon on the playback bar.



Normal playback speed is returned to by clicking on the other (now blue) speed icon on the playback bar.

## 5.6 Listen to the Audio

Microphones and VHF on the bridge are normally connected to four Channels. The microphone channels are often representing 3 audio zones on the bridge:

1. Bridge centre (cockpit/conning place).
2. Bridge wings.
3. Bridge aft (chart table, communication desk) and one VHF channel, but other combinations can occur.

The audio channels can be toggled on/off directly on the Audio bar, or from the Audio dialog box available from the button to the right on the Audio bar.



Each channel can be turned on/off separately or in any desired combination. Audio volume can be adjusted by the computer/Windows volume control.



### Note!

It is recommended to listen to one channel at a time since the sound might get distorted when listening to more than one channel.

## 6 Close the program

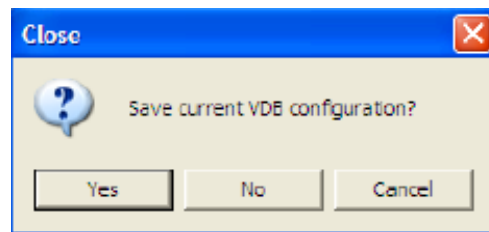
### 6.1 Save and close the VDB

**Note!**

To save and close the VDB, the playback must be stopped.

- 1 Close the VDB by pressing the **Close VDB**-button to the right on the VDB bar.  
(**File menu/Close VDB**)

All changes made in the Player e.g. Data windows turned on/off, resized or moved to different positions on screen, changed replay time range etc. can be saved. Next time that VDB is opened the Player pages will appear in the same way as when it was closed. Therefore there is a dialog box requesting to save the current VDB configuration each time the present VDB, or the complete Player, is closed.



The VDB configuration can also be saved while running the Player and not closing the VDB:

- 1 Select File menu/Save VDB configuration.

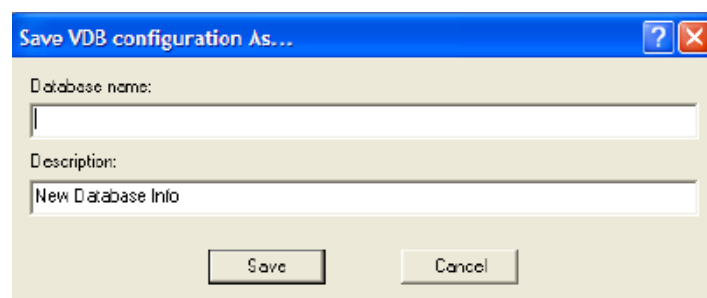
### 6.2 Rename the VDB

**Note!**

To rename the VDB, the playback must be stopped.

The current VDB can be saved with current settings as a new VDB.

- 1 Select **File menu/Save VDB configuration As.**
- 2 In the dialog box a new name can be given to the VDB as well as new Description/notations.



The new VDB will be added to the “Select database”-list when opening a VDB and the previous VDB will remain on the list as it was last time it was saved.

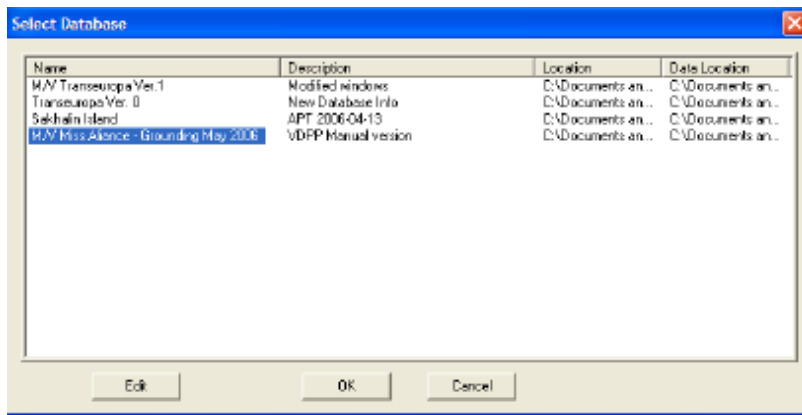
## 6.3 Rename an old VDB



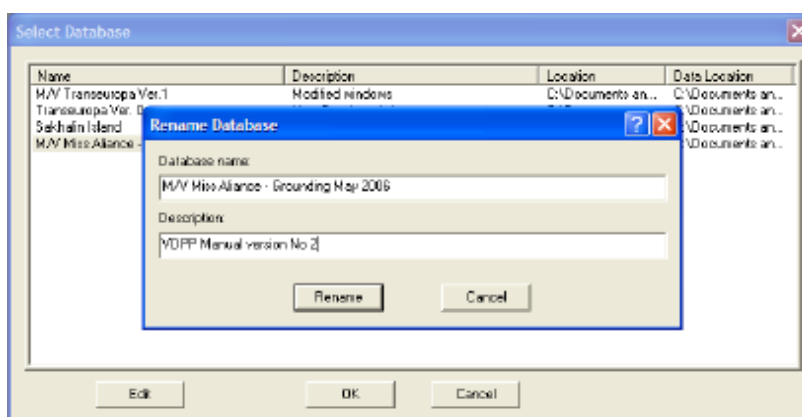
### Note!

To change the name and/or Descriptions of an earlier imported VDB on the “Select database”-list, the player must be started without any VDB selected.

- 1 Start the player without any VDB selected.
- 2 Select File menu Open VDB and click on the database to be renamed:



- 3 Press Edit button and make the changes in the new Rename database-box:



- 4 Press the Rename -button.
- 5 Close the window or open a VDB by selecting it and press **OK**.

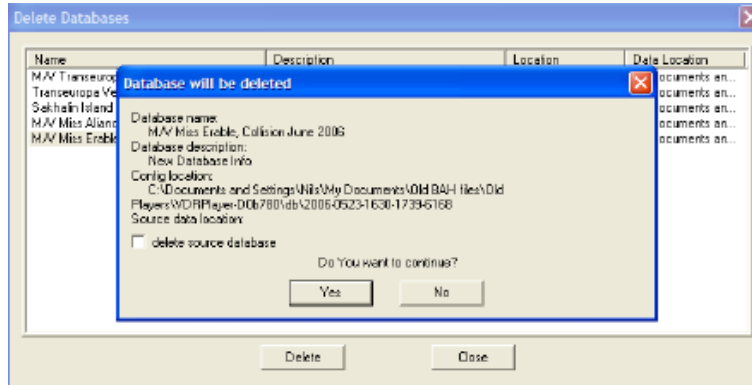
## 6.4 Delete a VDB



### Note!

To delete an earlier imported VDB on the “Select database”-list, the player must be started without any VDB selected.

- 1 Select File menu **Delete database** and click on the VDB to be deleted.



- 2 Press the **Delete**-button and then, in next dialog box, press **Yes**.

The actual version of the VDB with its configuration files will now be deleted.



### Note!

The source database is referred to in every VDB version, created from that imported source data. If that source data also shall be deleted, mark **delete source database** before pressing the Yes button. Another dialog box will now tell the location of the VDB directory to be deleted. If correct, press **Yes**.

# APPENDIX

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<b>Revisions:</b>			
<b>Date</b>	<b>Version</b>	<b>Issued by</b>	<b>Description</b>
2014-05-16	A01	STE	Created from 5410089
2020-02-12	A02	MNI	Updated Wheelmark with new Notified Body Number
2020-02-25	A03	MNI	Label placement adjustments
2020-03-05	A04	MNI	Label color and layout adjustments
2020-09-23	A05	MNI	Company name change on labels
2023-01-26	A06	HB	Replaced PBB with PBB G2/CloudBox
2023-09-13	A07	MC	Removed obsolete references

# 1 ANNEX I – ENERGY SAVING

## VDR UNITS AND MODULES

**VDR** Main Unit is using AC-supply powered from the ship's 230V AC emergency power supply. The Main Unit is then feeding other units with internal DC power providing protection against excessive voltage and interference.

**VDR** Units are developed in accordance with following guidelines:

- Modular platform design based on re-use of proven hardware architectures (ARM and Blackfin) yielding stability and reliability.
- Software running under Linux and dedicated signal processor operating system yielding stability and reliability during normal operation.
- Quality of selected material i.e. recognized brand name components.

The **VDR** uses low power dissipation components and is based on solid state technology without moving parts such as rotating storage media and cooling fans. This reduces wear and maintenance to a minimum.

## POWER CONSUMPTION CALCULATION

**NOTE:** Below mentioned calculation is given with a margin by a factor of two on power consumption. The reason for this is to calculate and select a proper power supply with additional power reserve for future possibility to expand the **VDR** system.

### VDR System, power consumption (example):

- 1.) **VDR Main Unit:** Power consumption ~ **0.8 A @ 230VAC ≤ 190 VA.**

This includes providing internal DC-supply to:

- **RCU2** (Remote Control Unit)
- **AMU** (Audio Mixer Unit)
- **VGU** (Video Grabber Unit)
- **FRM** (Capsules)

- 2.) Signal Converter **DDU** or **SIXNET:** Power consumption ~ **0.2 A @ 230VAC ≤ 50 VA.**

- 3.) Connection of optional **PBB G2/CloudBox:** Power consumption ~ **10 VA** from ship's 230V AC emergency power supply.

Total power supply needed: **190 (VDR MU) + 50 (DDU) + 10 (PBB G2/CloudBox) = 250 VA.**

Recommended power supply for the mentioned example: **230V AC, 250 VA.**



## 2 ANNEX II – EQUIPMENT LABELING

### EU MARK OF CONFORMITY (“WHEELMARK”)

Following component of the **VDR System** is labeled according to **EU DIRECTIVE ON MARINE EQUIPMENT** before delivery of the system to the Customer:



#### VDR Main Unit:

a). Placement of “Manufacturer’s Label” and “Wheelmark” label, inside the unit:



The Wheelmark label is placed immediately next to the Manufacturer’s Label.

b). “Manufacturer’s Label” example with the name and part number of the component:

Main Unit			
Part no. 80.31.01	Rev. A	Var. -	Serial/Batch no. 00001234567
Description SVF-200 Main Unit			Weight 19 kg
IP-class IP32	Comp. safe dist. 0.7 m	Voltage input 110-115/220-230 VAC	
SAL Navigation AB Sweden www.salnavigation.com			
DANGER – HIGH VOLTAGE			

Please note: The label contents may vary regarding name, description, part number and serial/batch number depending on the specific branding.

c). **“Wheelmark” label:**



**Note:** **“Wheelmark”** label shall indicate appropriate year, see example above.  
The first line with the number **0575** indicates the notified body (DNV GL).  
The second line with the number **2020** indicates year of production, system is assembled in 2020.

d). **“Branding Label” (if used) to be placed on front of the unit.**

