

Operators Manual

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

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Revision record

Version	Date	Description
1.0	September 2006	Original issue of document
1.2	March 2007	Minor errors corrected
2.0	July 2008	Information related to DM200 S-VDR and DM400 VDR included in this manual.
3.0	June 2011	Updated system overview and list of error codes to reflect changes to V3.1 of the S-VDR/VDR program code. Description of the VDR Verifier utility
3.1	August 2012	The list of spare parts is updated

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1 Scope and purpose

Operators Manual for DM200/DM300 S-VDR and DM400/DM500 VDR.

1.1 References

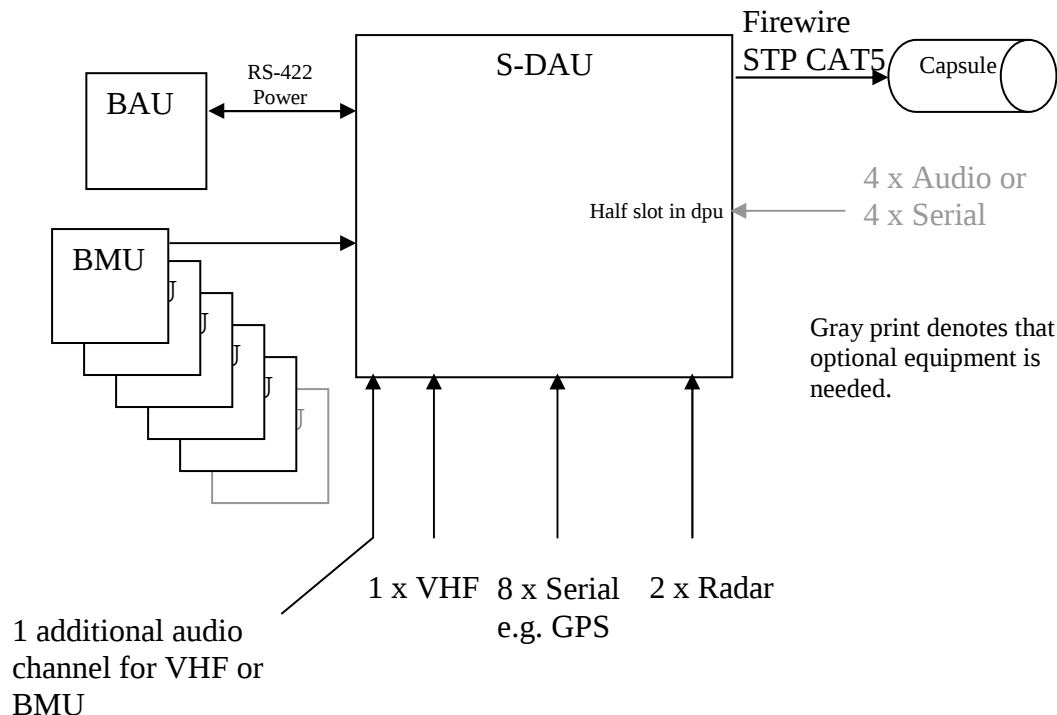
9200238	Installation Manual for DM200/DM300 S-VDR and DM400/DM500 VDR
9200327	Installation Manual for DM400/DM500 VDR Sensor Interface Unit
9200331	Installation Manual for Remote Video Interface for DM200, DM300, DM400, DM500
9200343	Inspectors and Authorities Manual for DM200/DM300 S-VDR and DM400/DM500 VDR

1.2 Terms and Abbreviations

BAU	Bridge Alarm Unit
BMU	Bridge Microphone Unit
DAU	Data Acquisition Unit
DPU	Data Processing Unit (located inside the DAU)
SIU	Sensor interface unit
RVI	Remote Video Interface
NAS	Network attached storage (option used for external extended backup)

2 System overview

2.1 System overview for S-VDR



S-VDR system overview

2.1.1 Data Acquisition Unit

The Data Acquisition Unit contains the Data Processor Unit (DPU) and the Power Supply Unit (PSU). The PSU is integrated into the DPU for a DM200 DAU. The DAU must be installed indoors near the bridge.

2.1.2 Bridge Alarm Unit (BAU)

The BAU must be installed on the bridge either in a console or mounted on a bulkhead. System errors will generate a visual and audible alarm.

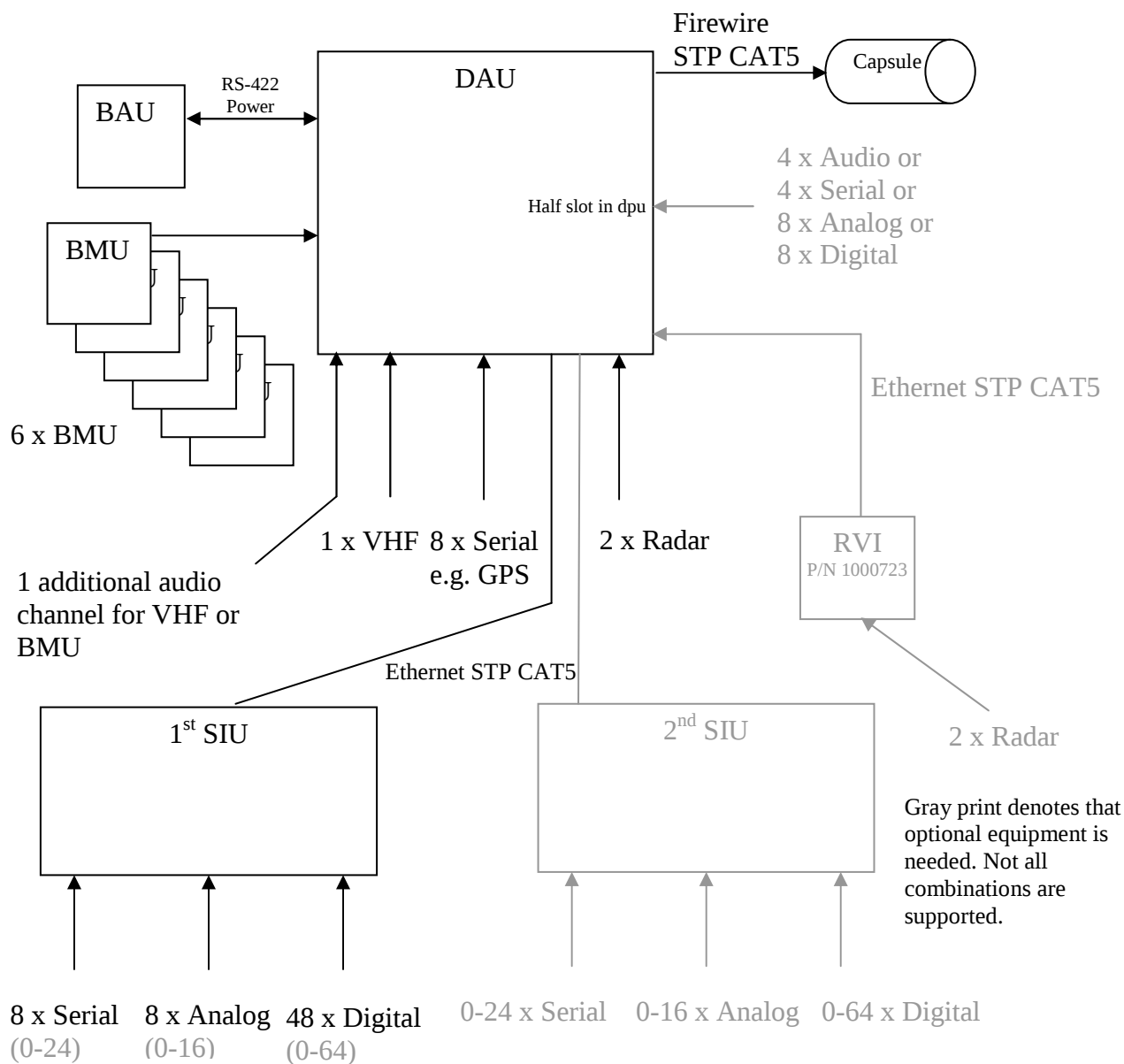
2.1.3 Bridge Microphone Units

A number of BMUs must be installed on the bridge (console, ceiling or bulkhead mounted). Watertight outdoor BMUs for the bridge wings are available.

2.1.4 Data Capsule

The data capsule (“the orange box”) must be installed on an “external deck close to the vessels center line” typically on the external deck above the bridge.

2.2 System overview for a VDR



VDR System overview

2.2.1 Sensor Interface Unit (SIU)

The Sensor Interface Unit is not part of an S-VDR system. The SIU contains additional serial, analog and digital interfaces. The SIU is needed for most VDR systems since more data has to be recorded. The SIU must be installed indoors and must be connected to the DAU with a cable up to 100m long.

2.2.2 Remote video interface (RVI)

The optional Remote Video Interface extends the number of video interfaces from 2 to 4. The RVI must be installed indoors and must be connected to the DAU with a cable up to 100m long.

3 Operation

3.1 Bridge alarm Unit

The BAU is the primary user interface for an installed operational VDR. It serves two purposes:

- Alarm display
- Interface for initiating backup on the VDR data disc

3.1.1 Alarm display

The VDR will generate an alarm message if a system error is detected. The alarm messages will be displayed on the BAU. An audible alarm will be generated with each new alarm and the error LED will start flashing. Pressing ACK will mute the audible alarm. The error LED will be illuminated as long as there is any error in the system, the cause of the error(s) will be displayed in the LCD display.

3.1.1.1 Protection against intermittent errors

Intermittent errors can be very annoying. The VDR will regard a system component or a data source which fails 3 times within 12 hours as permanently failed i.e. that system component/data source will not be able to generate more audible alarms. A permanent visual alarm will be displayed instead and the VDR will still try to recover from the problem e.g. record data even if they contain many errors. Repetitive alarms are marked with an “R” after the error code.

The “repetitive” error status for a failed system component/data source will be automatically reset if no error is generated for 12 hours. The “Purge List” button on the BAU will force reset “repetitive” error status for all system components/data sources.

3.1.1.2 Warnings

Warnings look like alarms but with a “W” after the error code. See section 8.3

3.1.1.3 Dimming

The button with the light bulb symbol may be used to alter the luminance of the keyboard, error LEDs and the LCD display simultaneously.

3.1.2 Means for initiating a backup on the VDR data disc

The VDR system is only guaranteed to record data for twelve hours i.e. important data may be overwritten after twelve hours unless a backup of data is made following an incident.

The crew on the bridge must initiate the backup procedure shortly after the ship has been involved in an incident or if an incident involving other vessels is observed.

The backup procedure is started when the two “Save” buttons are pressed simultaneously. The VDR is capable of making the backup within seconds.

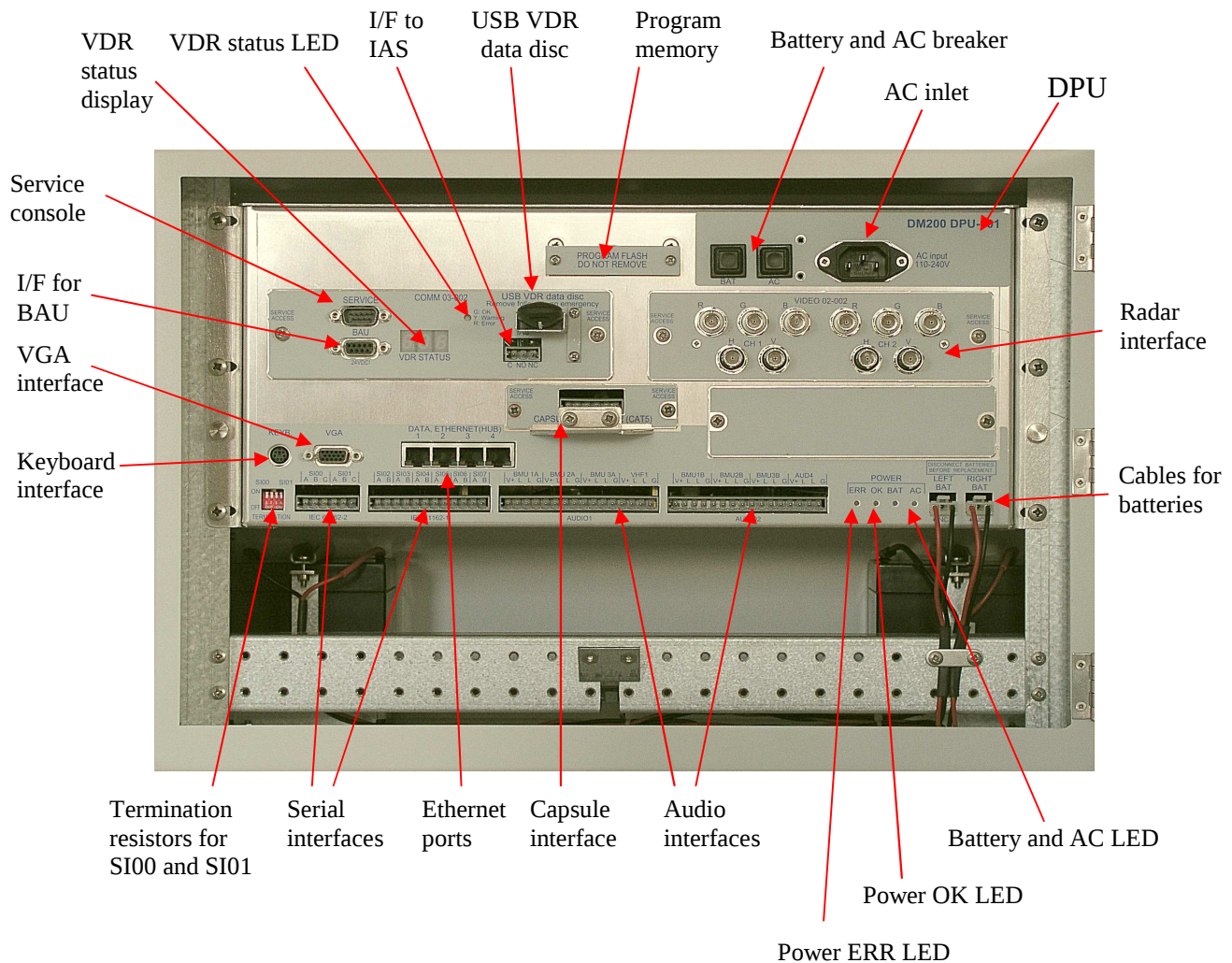
The system is capable of storing three incidents. The “Save” LED indicates when there is multiple, one or no save opportunity left (disk full). A backup will be protected for 30 days after which the space on the disc will be released automatically.

This VDR data disc must be replaced if it becomes full (which is unlikely under normal circumstances). Alternatively, data from the disc must be transferred to another media and space on the disc can be manually released. This requires proper authorization and cannot be done from the BAU.

The VDR data disc, which is easily removed from the DAU, must be retrieved if the vessel is abandoned after a serious incident.

4 Operation DM200/DM400 DAU

The door to the DAU must be locked after the VDR is installed and operating normally. This section of the manual is only relevant during installation and service or if the VDR data disc has to be removed following a serious incident



4.1 DPU

The DPU is the main computer in the system. It is basically a PC, but it has been designed from scratch in a completely different manner to withstand environmental stress that far exceeds what an ordinary industrial PC can sustain.

4.1.1 Power LEDs

BAT LED (blue)

Steady light	Battery fully charged	OK
Blinking	Charging battery	OK
Off (short flash every 10 seconds)	Battery is disconnected or has failed	Error

AC LED (blue)

Steady light	AC power OK	OK
Off	AC power failed	Error

ERR LED (red)

Steady light	The internal PSU has failed	Error
Flashing 2,5Hz	There is an internal short-circuit or no load is detected.	Error
Off	The PSU is operating	OK

OK LED (blue)

Steady light	Power to DPU present	OK
Off	No power to the DPU	Error (note 1)

Note 1) will be off for a few seconds after power on.

4.1.2 Battery and AC breaker

The Battery AC breaker is a combination of a fuse and a manually operated switch, i.e. they can be used to manually switch off power sources but they will also pop out automatically if too much current is drawn from a power source. The internal power supply is protected by sophisticated electronic circuits and fuses, which serve as secondary protection.

Warning: Both breakers must be released (popped out) to switch the unit fully off

4.1.3 AC inlet

The main power source for the VDR is ships AC (110V-240V).

4.1.4 VDR status display and VDR status LED

The status of the system is displayed using three digit codes on the VDR status display. The VDR status LED shows the severity of the codes. All information which is displayed on the VDR status display will also be displayed on the BAU after the system is booted and if the BAU is operational. The BAU is able to display an additional text message in conjunction with the status codes since the BAU features an alphanumeric LCD display. There is no reason to consult the VDR status display if the BAU is operational.

VDR status LED (tri color)

Steady Green	The information displayed is just information	OK
Steady Yellow	The information displayed is warnings The system is still fully operational but may fail soon. Service is needed.	(OK)
Steady Red	The information displayed contains information about system errors which prevent normal operation. Service is needed immediately.	Error

4.1.5 VDR status display Error codes

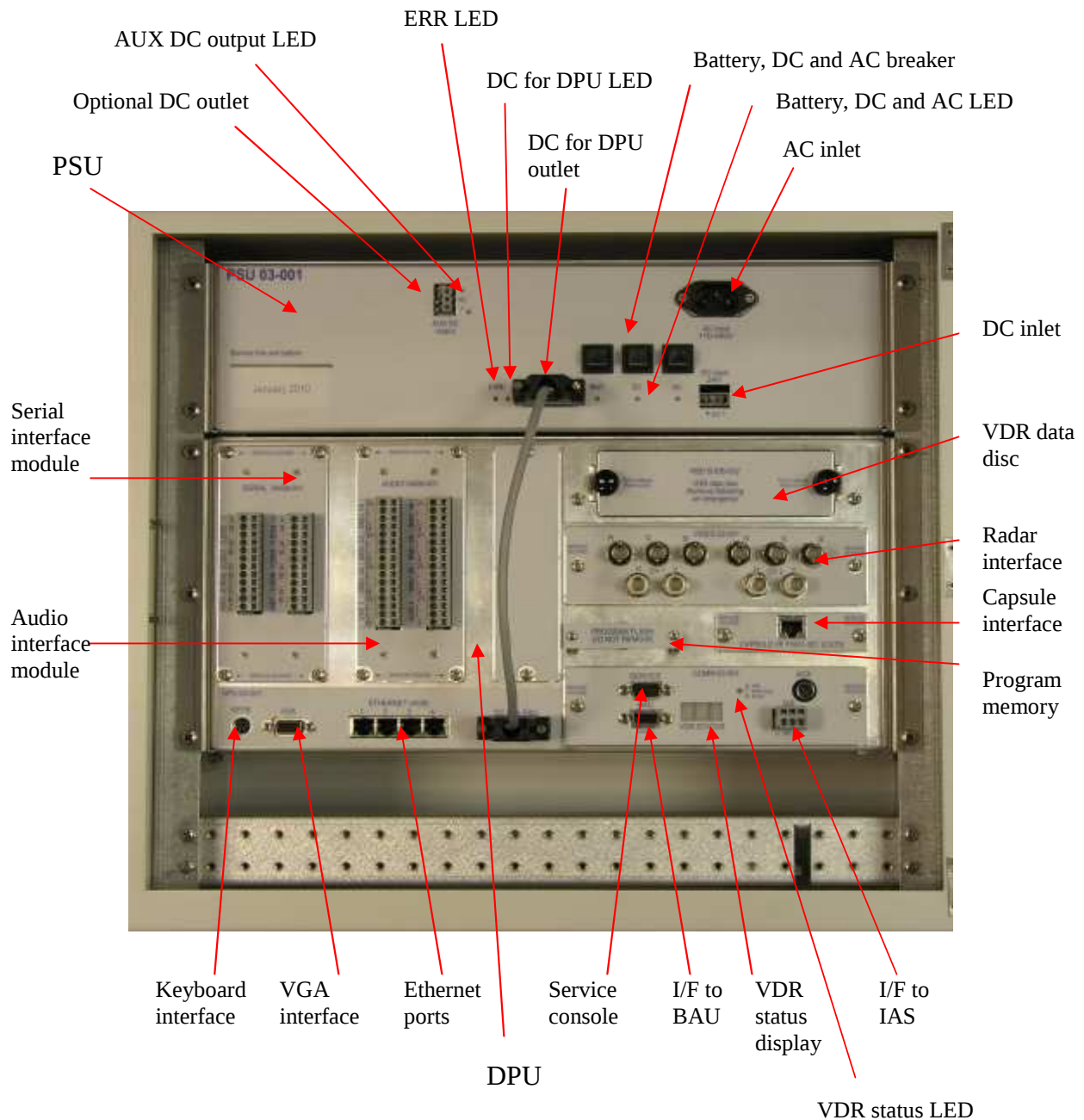
See section 0

4.1.6 LEDs in the Ethernet connectors

Two LEDs are integrated into each Ethernet connect. The left LED (yellow) will be illuminated when a communication link is established. The right LED (green) will flicker depending on the traffic load.

5 Operation DM300/DM500 DAU

The door to the DAU must be locked after the VDR is installed and operating normally. This section of the manual is only relevant during installation and service or if the VDR data disc has to be removed following a serious incident.



Data Acquisition Unit (DAU)

5.1 LEDS on PSU

BAT LED (blue)

Steady light	Battery fully charged	OK
Blinking	Charging battery	OK
Off (short flash every 10 seconds)	Battery is disconnected or has failed	Error

AC LED (blue)

Steady light	AC power OK	OK
Off	AC power failed	Error

DC LED (blue)

Steady light	DC power OK	OK
Off	DC power failed	Error

ERR LED (red)

Steady light	The PSU has failed	Error
Flashing 2,5Hz	An output has been short-circuited or no load on the "DC for DPU" output is detected. The PSU may remain in this state for up to one minute after the problem has been fixed.	Error
Off	The PSU is operating	OK

DC for DPU LED (blue)

Steady light	Power to DPU present	OK
Off	No power to the DPU	Error (note 1)

AUX DC output LED (blue)

Steady light	Optional DC present	(Note 2)
Off	No optional DC present	(Note 2)

Note 1) will be off for a few seconds after power on.

Note 2) the optional DC output is disabled and this led will therefore be off.

5.1.1 Battery, DC and AC breaker

The Battery, DC and AC breaker is a combination of a fuse and a manually operated switch, i.e. they can be used to manually switch off power sources but they will also pop out automatically if too much current is drawn from a power source. The PSU is protected by sophisticated electronic circuits and fuses, which serve as secondary protection.

Warning: All three breakers must be released (popped out) to switch the PSU fully off

5.1.2 AC inlet

The main power source for the VDR is ships AC (110V-240V).

5.1.3 DC inlet

The VDR must be connected to the ships emergency power source (24VDC) if the emergency power system is based on DC.

5.1.4 DC to DPU

The PSU and the DPU is connected with a cable. DC is supplied to the DPU through this cable. This cable also carries bi-directional communication between the PSU and the DPU.

Warning: The cable between the DPU and PSU must NOT be connected or disconnected while the PSU is on i.e. all power sources must be switched off and the blue “DC for DPU” LED must be off.

5.2 DPU

The DPU is the main computer in the system. It is basically a PC, but it has been designed from scratch in a completely different manner to withstand environmental stress which far exceeds what an ordinary industrial PC can sustain.

5.2.1 VDR status display and VDR status LED

The status of the system is displayed using three digit codes on the VDR status display. The VDR status LED shows the severity of the codes. All information which is displayed on the VDR status display will also be displayed on the BAU after the system is booted and if the BAU is operational. The BAU is able to display an additional text message in conjunction with the status codes since the BAU features an alphanumeric LCD display. There is no reason to consult the VDR status display if the BAU is operational.

VDR status LED (tri color)

Steady Green	The information displayed is just information	OK
Steady Yellow	The information displayed is warnings The system is still fully operational but may fail soon. Service is needed.	(OK)
Steady Red	The information displayed contains information about system errors which prevent normal operation. Service is needed immediately.	Error

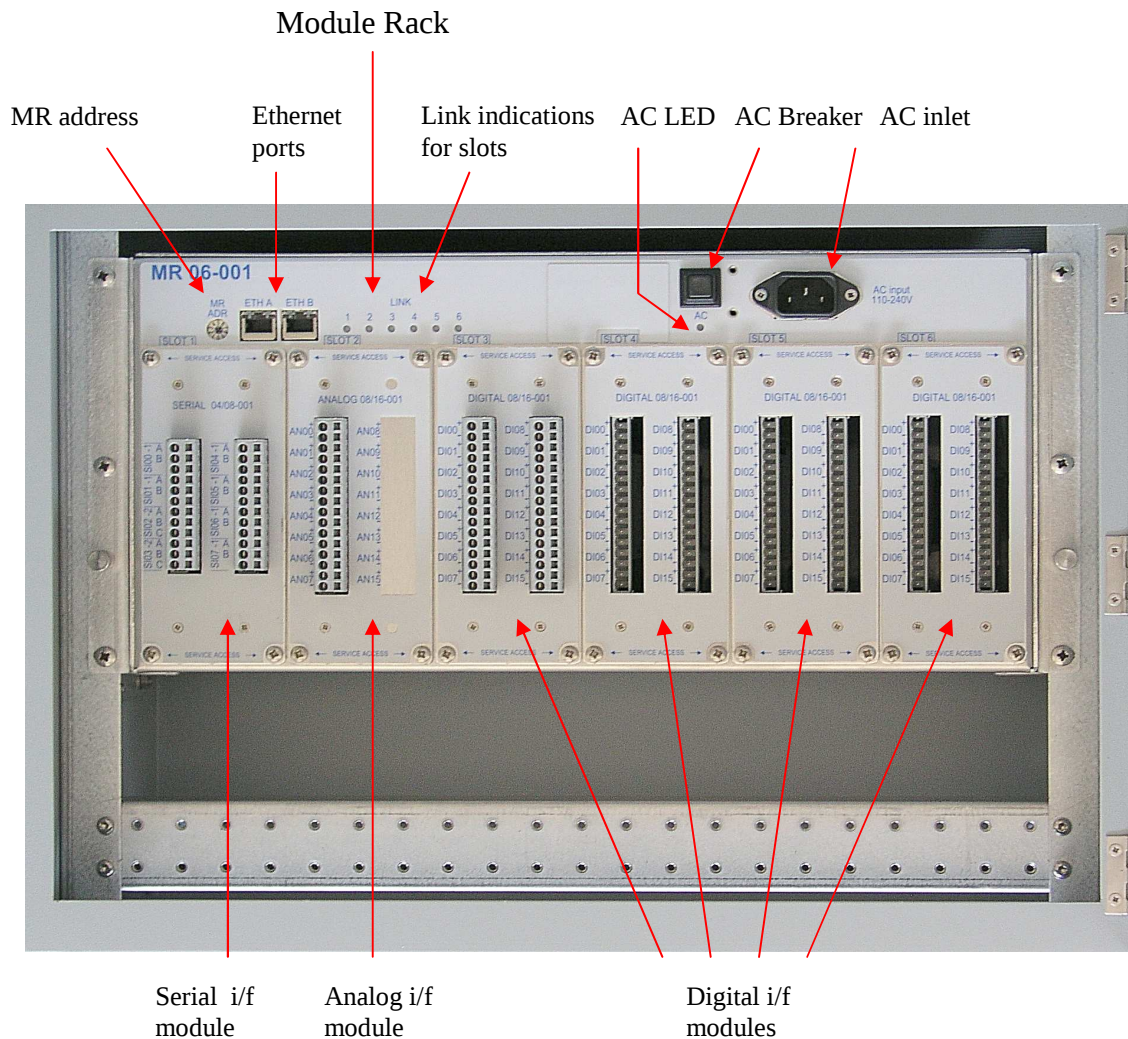
5.2.2 VDR status display Error codes

See section 0

5.2.3 LEDs in the Ethernet connectors

Two LEDs are integrated into each Ethernet connect. The left LED (yellow) will be illuminated when a communication link is established. The right LED (green) will flicker depending on the traffic load.

6 Operation of SIU



Module Rack with six modules

6.1 LEDs on Module Rack

6.1.1 AC LED

Indicates the power (AC) is present.

6.1.2 Link indications

Indicates that the Module Rack has detected a module in this slot.

6.1.3 AC breaker

The AC breaker is a combination of a fuse and a manually operated switch, i.e. it can be used to manually switch off the power source but it will also pop out automatically if too much current is drawn from the power source.

6.1.4 LEDs in the Ethernet connector

Two LEDs are integrated into each Ethernet connect. The right LED (yellow) will be illuminated when a communication link is established to the DAU. The LED will flicker depending on the traffic load. The left LED is not used. Please notice that the behavior of the LEDs is different on other parts of the system e.g. the DAU.

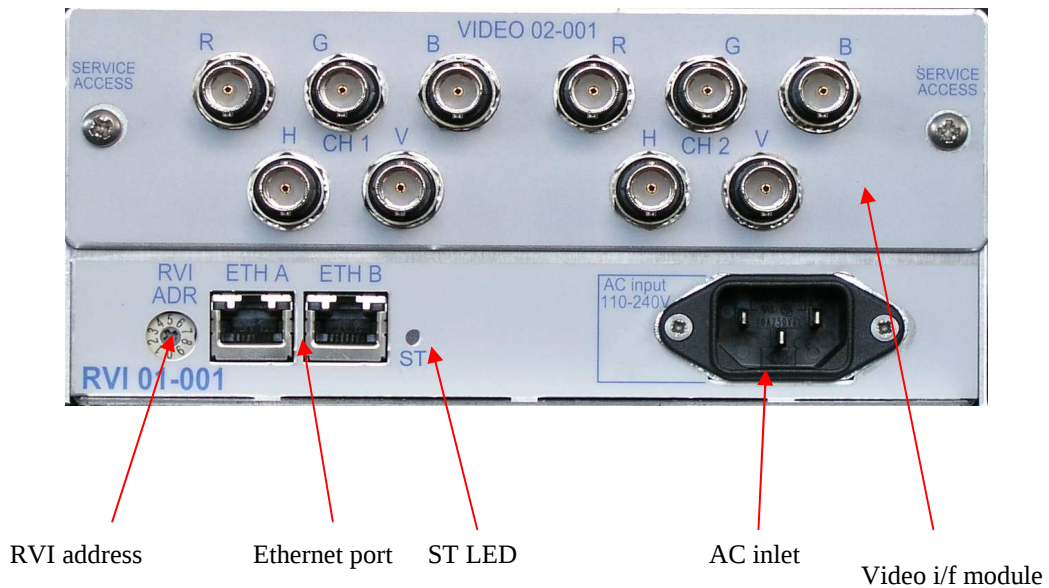
6.1.5 Allocation of system labels for digital interfaces

	Card number in VDR configuration	Interface number in VDR configuration and VDR Explorer
Digital I/F module in Slot 3	1	DI00 – DI15
Digital I/F module in Slot 4	2	DI16 – DI31
Digital I/F module in Slot 5	3	DI32 – DI47
Digital I/F module in Slot 6	4	DI48 – DI63

6.1.6 MR address

Must be set to “0” or “1” for an additional second SIU.

7 Operation of RVI



7.1.1 RVI address

Must be set to "0".

7.1.2 Ethernet ports

ETH A must be connected to the DAU. Notice that the LEDs in the Ethernet connectors (RJ45) are inactive for this unit.

7.1.3 ST LED

The Status LED (Yellow) will flash (1Hz) after power on and then become steady if a communication link is established to the DAU. The LED will always be switched off after one minute.

8 Error codes

Error codes and messages will be displayed by the BAU and VDR status display when errors are detected. An “R” after the error code denotes a repetitive alarm, see section 3.1.1.1. A “W” after the error code denotes a warning, see section 8.3

8.1 General Error code for S-VDR and G2VDR

004	SYSTEM FATAL ERROR	The VDR has encountered an unrecoverable system error. Reboot the system. If the error persists call for assistance. The most probable cause is a faulty CPU board or system RAM
018	STORAGE Storage failure	Internal software error. Reboot the system. If the error persists call for assistance.
030	BAU Communication error	The DPU is unable to communicate with the BAU. Check the cable from the DPU to the BAU. Reboot the system. If the error persists call for assistance. The most probable cause is a faulty cable, BAU or COMM module in the DPU.
031	BAU #1 Communication error	Only relevant for dual BAU installations. The DPU is unable to communicate with BAU #1 of 2. Check the cable from the DPU to the BAU. Reboot system. Also check switch settings on BAU #1: Switch 1 should be ON, switch 2 OFF. If the error persists call for assistance. The most probable cause is faulty cable, BAU or COMM module in the DPU.
032	BAU #2 Communication error	Only relevant for dual BAU installations. The DPU is unable to communicate with BAU #2 of 2. Check the cable from the DPU to the BAU. Reboot system. Also check switch settings on BAU #2: Switch 1 should be OFF, switch 2 ON. If the error persists call for assistance. The most probable cause is faulty cable, BAU or COMM module in the DPU.
036	CONFIG Unable to save	The VDR was unable to save the configuration. Please retry. This error is only expected to occur during configuration (installation) of the system.
042	CONFIG Configuration failed	The VDR is unable to find any configuration at all. Replace the boot compact flash in the DPU (a properly made boot flash contains a default configuration from which the system can start). Restore a backup of the configuration.
054	ALARM Running on battery	The system is running on battery. Both the main power and the emergency power are absent. If there is a general power failure on the ship then ignore (ACK) this message else check the power supply in the DAU. Consult section 5.1 for details.
056	AUDIO Microphones failed	The microphone test failed. Force a microphone test (this is a feature in the VDR configurator under AUDIO settings). This test will reveal which microphone causes the problem. Check that the “BMU active” checkbox is unchecked for non-existing microphones. Check the cable to microphones reported as faulty. Test the inputs on the audio interface module with a spare microphone. Replace microphones which are reported faulty if no

		other error is discovered.
060	STATUS UTC timeout	The system receives no UTC from the GPS. Check that GPS is on. Check the signal from the GPS (use serial monitor in VDR explorer, WEB status or VGA status display). If no signal is present check cable else check that configuration is made correctly.
062	STATUS Display enabled	The Status-display update is enabled Turn it off after completing the installation/configuration.
070	PSU Communication failed	The communication between the power supply and DPU is interrupted. Check the cable between the PSU and the DPU (DM300 only). If the error persists call for assistance. The most probable cause is a problem with the cable or a faulty serial transceiver in the DPU or PSU.
072	(Not displayed on BAU)	Self-test failed. This error is only displayed on the VDR status display. The ETX board is faulty and must be replaced.
074	SERIAL module 1 Missing (SI00-07)	The serial data interface module cannot be detected. If the error persists call for assistance. The most probable cause is that the internal cable is disconnected or that the serial interface module is defective.
076	VIDEO module 1 Missing (VD01-02)	The video data interface module cannot be detected. If the error persists call for assistance. The most probable cause is that the internal cable is disconnected or that the video interface module is defective.
078	AUDIO module 1 Missing (MIC1-AUD4)	The audio data interface module cannot be detected. If the error persists call for assistance. The most probable cause is that the internal cable is disconnected or that the audio interface module is defective.
080 082 084 086	VIDEO VD0n no input	There is no input from the radar. Check the radar and the cable. Enter the video calibration menu for that channel and examine the image. Unused video channels must be configured inactive (the Active parameter must be unchecked).
088 090 092 094	VIDEO VD0n image too big	The radar image exceeds the allocated space in the capsule and the system is therefore unable to record for 12 hours. Check the radar image for noise. Check the calibration of the video channel. Reduce the number "color mask bits" if needed.
089 091 093 095	VIDEO VD0n wrong size	The radar image has not the size as defined in the configuration. Check the size of the image from the radar. If correct check calibration and settings for the video channel.
096	Not configured Configure VDR	The VDR has started on the default configuration. Configure the system correctly. The VDR is unable to operate correctly on the default configuration since at least the GPS antenna position and vessel ID must be entered.
102	VIDEO module 1 Power failure	The Video Interface module in the DPU is using too much power. The module is probably faulty and must be replaced.
104	AUDIO module 1 Power failure	The Audio Interface module in the DPU is using too much power. The module is probably faulty and must be replaced.
105	AUDIO module 2 Power failure	The optional Audio Interface module 2 (half slot) in the DPU is using too much power. The module is probably faulty and must be

		replaced.
106	SERIAL module 1 Power failure	The Serial Interface module in the DPU is using too much power. The module is probably faulty and must be replaced.
108	VIDEO module 1 Not started	The Video Interface module in the DPU did not start. Wait three minutes; maybe the VDR is able to recover by restarting the interface else try to reboot the system. If the error persists the module is faulty (or wrong type) and must be replaced.
110	AUDIO module 1 Not started	The Audio Interface module in the DPU did not start. Try to reboot system if the error persists the module is faulty (or wrong type) and must be replaced.
112	SERIAL module 1 Not started	The Serial Interface module in the DPU did not start. Try to reboot system. If the error persists the module is faulty (or wrong type) and must be replaced.
118	PSU battery Not present	The power supply is unable to detect the battery pack. Check that the fuse/breaker on the PSU named "BAT" is pushed; see section 5.1.1. If the error persists for 5 minutes then call for assistance.
120	PSU battery Could not be charged	The PSU was unable to fully charge the battery within a specified time. Release the fuse/breaker on the PSU named "BAT" for 15 seconds, then push it in again see section 5.1.1. If the error returns (this may take 18hours) call for assistance i.e. the battery pack is defective and needs replacement.
122	PSU battery Temp. sensor missing	A temperature sensor for the battery pack is disconnected or broken. Call for assistance, the PSU needs repair.
123	(Never displayed on BAU)	Alarm system under initialization. Displayed shortly after system startup.
124	PSU Low output voltage	The output voltage from the PSU has dropped below 19V. This message will appear shortly before the battery is discharged when operating from the internal battery only. This message will not appear if the battery is new and was fully charged since the VDR will power down automatically after two hours when operating from the batteries (well before the voltage drops below 19V). If AC power or DC power is present (and the AC and DC fuse/breaker are pushed) while this error is displayed call for assistance, the PSU needs to be repaired.
126	PSU Error	Call for assistance, the PSU needs to be repaired.
128	AUDIO module 2 Missing (AUD5)	This will only happen if audio channel 5 is enabled in the configuration. The optional Audio Interface module 2 (half slot) is defective or internally disconnected (check cable) inside DPU.
130 132 134	xxxxxx Module duplicate	xxxxxx = SERIAL, VIDEO, AUDIO Two modules with identical system locations have been detected. Restart the system. If the error persists call for assistance.
136 138 140 142	xxxxxx Wrong rack type	xxxxxx = SERIAL, ANALOG, DIGITAL, VIDEO, AUDIO A module is located in a rack (DPU, SIU or RVI) where it is not supposed to be. Check the installation. Call for assistance if no error is found.

144		
146	AUDIO module 2 Not started	The optional Audio Interface module 2 (half slot) did not start. If it is not installed, audio channel 5 in the configuration must be disabled or else check the cable from the baseboard in the DPU to the module. Restart the system; if the error persists replace the module.
148	SERIAL Module in wrong slot	The serial module must be located in slot 1 in the DPU. Check the position of the module or that the internal cables in the DPU are not crossed.
150	AUDIO Module in wrong slot	The Audio Interface module must be located in DPU slot 2 (DM300) and the optional Audio Interface module 2 (half slot), if present, in DPU slot 3. Check the position of the modules or that the cables for the modules inside the DPU are not crossed.
152	VIDEO Module in wrong slot	The video module must be located in slot 4 (the horizontal slot). Check that the cables for the modules inside the DPU are connected straight.
160	EXTERNAL BACKUP Not recording	The system is unable to record data to the extended external backup disc (NAS). If no other relevant errors e.g. #162 is displayed call for assistance.
162	EXTERNAL BACKUP Can not find	The communication to the extended external backup disc (NAS) is interrupted. Check that the extended external backup disc is installed correctly (e.g. is the LAN cable connected to DPU). Reboot system. If the error persists call for assistance. The most probable cause is a defective/misconfigured extended external backup disc.
300- 307	SERIAL Timeout on S1xx	A mandatory serial signal has disappeared. Check that the source is on. Check the signal from the source (serial monitor in VDR explorer, WEB status or VGA status display). If no signal is present check the cable or that the configuration is correct.
400- 549	Error codes related to a VDR only	See Section 8.2
550	STORAGE Dataset incomplete	One or more types of data are not recorded. If the error persists then restart the VDR and report this error if it still persists.
560	BACKUP INCIDENTS Backupdisk too small	The capacity of the VDR data disc is too small for the configured incident record size. Change the VDR data disc or reduce the incident record size.
561	BACKUP INCIDENTS Incident too small	The configured incident record size on the VDR data disc is too small for storing the capsule data. Change the incident type to large incident or replace the capsule with one with lower capacity.
562	INTERNAL BACKUP Backupdisk too small	The capacity of the VDR data disc is too small for internal extended backup. Change the VDR data disc or disable this feature.
608	STORAGE (Warning) Device reset	The VDR has detected that the capsule or VDR data disc has been disconnected and/or connected during the first 24h hours after system restart, see section 8.3
609	STORAGE Device resets	The VDR has detected that the capsule and /or VDR data disc has been disconnected and/or connected too many times within a given

		interval
611	CAPSULE Not recording	The VDR is unable to record data to the capsule. Another error explaining why (e.g. #612 CAPSULE Can not find) is normally displayed in advance. Try to fix the preceding error else reboot system. If the error persists call for assistance.
612	CAPSULE Can not find	The VDR is unable to detect a capsule. Check that the capsule is connected correctly. If the error persists call for assistance.
613	CAPSULE Can not access	The VDR has detected a capsule but is unable to get access. The most likely cause is that the capsule is not initialized (formatted) correctly. A trained service technical can fix this.
614	CAPSULE WR errors level 1	Too many write-errors (writing to the capsule) have occurred within a given interval. Retrying to write data fixed the problem. The most likely cause is communication problems. The capsule is not taken out of service and data is still recorded.
615	CAPSULE WR errors level 2	Too many write-errors (writing to the capsule) have occurred within a given interval. More sophisticated measures than just retrying to write data were needed in order to fix the problem. The most likely cause is serious communication problems or a defective capsule. The capsule is not taken out of service and data is still recorded.
616	CAPSULE WR errors level 3	Too many write-errors (writing to the capsule) have occurred within a given interval. The VDR was unable to write data despite several attempts. The most likely cause is serious communication problems or a defective capsule. The capsule is taken out of service and data is temporarily not recorded. The VDR will attempt to recover from this problem.
617	CAPSULE Can not write log	The VDR is unable to write log messages to the capsule
618	CAPSULE Record-data too big	The amount of data received by the VDR exceeds the capacity of the capsule. The most probable cause is that the VDR is unable to compress the radar images due to noise or other errors, or that the VDR is configured to record images from multiple high resolution radars.
619	CAPSULE (Warning) WR error level 1	A write-error (writing to the capsule) has occurred during the first 24 hours of operation. Retrying to write data fixed the problem. The most likely cause is communication problems. See section 8.3
620	CAPSULE (Warning) WR error level 2	A write-error (writing to the capsule) has occurred during the first 24 hours of operation. More sophisticated measures than just retrying to write data were needed in order to fix the problem. The most likely cause is a temporarily disruption of communication from the VDR to capsule or a defective capsule. See section 8.3
621	CAPSULE (Warning) WR error level 3	A write-error (writing to the capsule) has occurred during the first 24 hours of operation. More sophisticated measures than just retrying to write data did not fix the problem. The most likely cause is a temporarily disruption of communication from the VDR to capsule or a defective capsule.

		See section 8.3
622	CAPSULE Read back failed	The VDR was unable read back data from the capsule too many times within a given interval.
623	CAPSULE Verification failed	The VDR found too many data errors within a given interval when checking the data written to the capsule.
624	CAPSULE (Warning) Read back error	The VDR was unable read back data from the capsule during the first 24 hours after system restart. See section 8.3
625	CAPSULE (Warning) Verification error	The VDR found an error while checking the data written to the capsule during the first 24 hours after system restart. See section 8.3
631	BACKUP Not recording	The VDR is unable to record data to the VDR data disc. Another error explaining why (e.g. #632 BACKUP Can not find) is normally displayed in advance. Try to fix the preceding error else reboot system. If the error persists call for assistance.
632	BACKUP Can not find	The VDR is unable to detect a VDR data disc. Check that the VDR data disc is connected correctly. If the error persists call for assistance.
633	BACKUP Can not access	The VDR has detected a VDR data disc but is unable to get access. The most likely cause is that the VDR data disc is not initialized (formatted) correctly. A trained service technical can fix this.
634	BACKUP WR errors level 1	Too many write-errors (writing to the VDR data disc) have occurred within a given interval. Retrying to write data fixed the problem. The most likely cause is communication problems. The VDR data disc is not taken out of service and data is still recorded.
635	BACKUP WR errors level 2	Too many write-errors (writing to the VDR data disc) have occurred within a given interval. More sophisticated measures than just retrying to write data were needed in order to fix the problem. The most likely cause is serious communication problems or a defective VDR data disc. The VDR data disc is not taken out of service and data is still recorded.
636	BACKUP WR errors level 3	Too many write-errors (writing to the VDR data disc) have occurred within a given interval. The VDR was unable to write data despite several attempts. The most likely cause is serious communication problems or a defective VDR data disc. The VDR data disc is taken out of service and data is temporarily not recorded. The VDR will attempt to recover from this problem.
637	BACKUP Can not write log	The VDR is unable to write log messages to the VDR data disc
638	BACKUP Record-data too big	The amount of data received by the VDR exceeds the capacity of the VDR data disc. The most probable cause is that the VDR is unable to compress the radar images due to noise or other errors, or that the VDR is configured to record images from multiple high resolution radars.
639	BACKUP (Warning) WR error level 1	A write-error (writing to the VDR data disc) has occurred during the first 24 hours of operation. Retrying to write data fixed the problem. The most likely cause is communication problems. See section 8.3
640	BACKUP (Warning)	A write-error (writing to the VDR data disc) has occurred during

	WR error level 2	the first 24 hours of operation. More sophisticated measures than just retrying to write data were needed in order to fix the problem. The most likely cause is a temporarily disruption of communication from the VDR to VDR data disc or a defective VDR data disc. See section 8.3
641	BACKUP (Warning) WR error level 3	A write-error (writing to the VDR data disc) has occurred during the first 24 hours of operation. More sophisticated measures than just retrying to write data did not fix the problem. The most likely cause is a temporarily disruption of communication from the VDR to VDR data disc or a defective VDR data disc. See section 8.3
651	INTERNAL BACKUP Not recording	The VDR is unable utilize VDR data disc for extended back. Another error explaining why (e.g. #652 INTERNAL BACKUP Can not find) is normally displayed in advance. Try to fix the preceding error else reboot system. If the error persists call for assistance.
652	INTERNAL BACKUP Can not find	The VDR is unable to detect a VDR data disc or utilize the VDR data disc for extended backup. Check that the VDR data disc is connected correctly. If the error persists call for assistance.
653	INTERNAL BACKUP Can not access	The VDR has detected a VDR data disc but is unable to get access. The most likely cause is that the VDR data disc is not initialized (formatted) correctly. A trained service technical can fix this.
654	INTERNAL BACKUP WR errors level 1	Too many write-errors (writing to the VDR data disc) have occurred within a given interval. Retrying to write data fixed the problem. The most likely cause is communication problems. The VDR data disc is not taken out of service and data is still recorded.
655	INTERNAL BACKUP WR errors level 2	Too many write-errors (writing to the VDR data disc) have occurred within a given interval. More sophisticated measures than just retrying to write data were needed in order to fix the problem. The most likely cause is serious communication problems or a defective VDR data disc. The VDR data disc is not taken out of service and data is still recorded.
656	INTERNAL BACKUP WR errors level 3	Too many write-errors (writing to the VDR data disc) have occurred within a given interval. The VDR was unable to write data despite several attempts. The most likely cause is serious communication problems or a defective VDR data disc. The VDR data disc is taken out of service and data is temporarily not recorded. The VDR will attempt to recover from this problem.
659	INTERNAL BACKUP (Warning) WR error level 1	A write-error (writing to the VDR data disc) has occurred during the first 24 hours of operation. Retrying to write data fixed the problem. The most likely cause is communication problems. See section 8.3
660	INTERNAL BACKUP (Warning) WR error level 2	A write-error (writing to the VDR data disc) has occurred during the first 24 hours of operation. More sophisticated measures than just retrying to write data were needed in order to fix the problem. The most likely cause is a temporarily disruption of communication from the VDR to VDR data disc or a defective VDR data disc. See section 8.3

661	INTERNAL BACKUP (Warning) WR error level 3	A write-error (writing to the VDR data disc) has occurred during the first 24 hours of operation. More sophisticated measures than just retrying to write data did not fix the problem. The most likely cause is a temporarily disruption of communication from the VDR to VDR data disc or a defective VDR data disc. See section 8.3
901-923	SYSTEM FAILURE ERROR 901-923	The software is not working properly. Restart the VDR and report this error if it is repeated.
980	BAU and DPU not compatible	The software in BAU is incompatible with the software in the DPU.
981	No communication to DPU	The BAU has never been able to communicate with the DPU. The most probable cause is a defective cable or that the VDR did not boot correctly.
982	No communication to DPU	Initial communication was ok but the communication has failed later. The most probable cause is that the VDR encountered a fatal error and completely stopped. Restart the system, if the error persists then call for assistance.
999	(Never displayed on the BAU)	The system is booting the VDR application from the boot flash.
---	Time, VDR	No errors detected

8.2 Additional Error codes for G2VDR installations

400-423	SERIAL Timeout on SIxx	A mandatory serial signal has disappeared. Check that the source is on. Check the signal from the source (serial monitor in VDR explorer, WEB status or VGA status display). If no signal is present check the cable or that the configuration is correct.
441	SERIAL module 2 Missing (SI08-15)	If only one module is affected: A module has been removed or has failed. Check that the module is installed correctly. If installed in a SIU the blue “link” LED for the module must be illuminated. If the LED is already illuminated switch the power to the SIU off and on. If the error persists replace the module. If all modules in a SIU are affected: Check the power to the SIU Check the cable from the SIU to the DAU and link status, see section 5.2.3 and 6.1.4. If no error is found, try to restart both the DAU and the SIU (power off and the on) If the error persists, call for assistance, the DPU or the Module rack is probably defective.
442	ANALOG module 1 Missing (AN00-15)	
443	DIGITAL module 1 Missing (DI00-15)	
444	DIGITAL module 2 Missing (DI16-31)	
445	DIGITAL module 3 Missing (DI32-47)	
446	DIGITAL module 4 Missing (DI48-64)	
450-452	SIU xxxxxxxx Module in wrong slot	xxxxxxx = SERIAL, ANALOG, DIGITAL A module has been misplaced. Modules must be installed according to the VDR configuration.
460-462	SIU xxxxxxxx Wrong MR address	xxxxxxx = SERIAL, ANALOG, DIGITAL A SIU with the wrong Module Rack address has been detected. Set the MR address to 0 or 1. See section 6.1.6
470-472	SIU xxxxxxxx Module duplicate	xxxxxxx = SERIAL, ANALOG, DIGITAL The VDR had detected two different modules with the same MR address, and slot number. This may occur if two SIUs are connected to the DAU, with the same address.
480	VIDEO Illegal settings	Recording of radar images to the capsule has been disabled which is unacceptable for a VDR installation. The system configuration must be changed, consult the Installation Manual.
482	RVI VIDEO Module missing	The VDR is unable to detect the second video module (which is located in the RVI). Check the connection between the DPU and the RVI. Check the RVI, the Video Acquisition Module and the internal cable between the RVI baseboard and the Video Acquisition Module.
484	RVI VIDEO Wrong RVI address	The RVI address is wrong. Set the address to “0”. The RVI address is determined by the small rotary switch on front of the RVI, see section 0
500	ANALOG module 2 Missing (AN16-31)	If only one module is affected: A module has been removed or has failed. Check that the module is installed correctly. If installed in a SIU the blue “link” LED for the module must be illuminated. If the LED is already illuminated switch the power to the SIU off and on. If the error persists replace the
501	DIGITAL module 5 Missing (DI64-79)	
502	DIGITAL module 6 Missing (DI80-95)	
503	DIGITAL module 7	

	Missing (DI96-111)	module.
504	DIGITAL module 8 Missing (DI112-127)	If all modules in a SIU are affected: Check the power to the SIU Check the cable from the SIU to the DAU and link status, see section 5.2.3 and 6.1.4. If no error is found, try to restart both the DAU and the SIU (power off and the on) If the error persists, call for assistance, the DPU or the Module rack is probably defective.
505	SERIAL module 3 Missing (SI16-23)	
506	SERIAL module 4 Missing (SI24-31)	

8.3 Description of warnings issued during the first 24h of operation

The VDR is able to recover from a numbers of problems typically related to communication problems caused by electrical noise and issues related to the memory for the capsule/VDR data disc. The system recovery is very effective and makes it difficult for a service technician to determine whether a system is installed and operating correctly. Warnings, which are primarily intended for a service technical, are therefore issued during the first 24 hours of operation if system recovery takes place.

A system which is installed and operating correctly will in general be able to operate for 24 hours without having to recover from errors however there is always a chance that a problem is detected within the first 24 hours of operation even if the error rate is very low e.g. one per year. The simplest test if a warning is issued is to restart the VDR and check that is does not happen again alternatively let the VDR operate for e.g. 24 hours and then analyze the log.

Please notice that all activity related to system recovery will be logged and the log must be analyzed as part of the APT in order to check the integrity of the VDR.

9 Service and maintenance

The VDR requires an annual inspection carried out by a certified service organization. Please refer to “Installation Manual for DM200/DM300 S-VDR and DM400/DM500 VDR” for further details.

9.1 Verification of the VDR functionality following service on any sensor

It is required in the (S)-VDR standard that the functionality of the VDR is verified followed service on any sensor (e.g. the GPS) connected to the VDR.

The bridge alarm panel will display oblivious errors if e.g. signal from a sensor sending NMEA sentences is missing completely. However, it is required that recorded data is retrieved and checked to a certain extent. A tool for doing that is stored on the VDR and may be downloaded via a web browser to in PC.

The following steps is needed

- Setting the IP address of the PC to match the VDR
- Connecting the PC to the VDR
- Running the VDRverifier program
- Examine the report

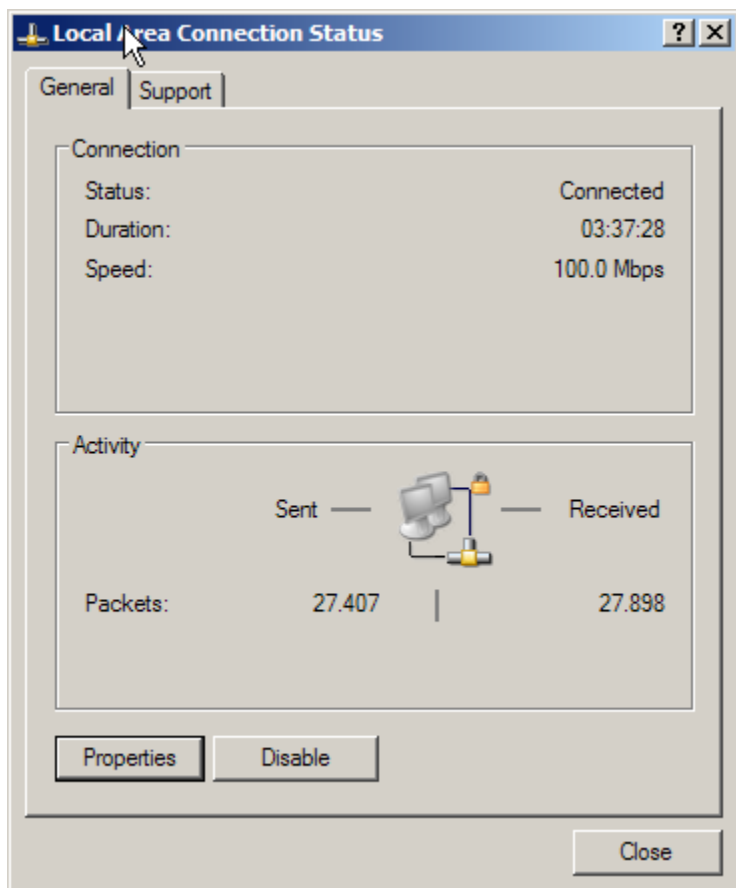
9.2 Setting the IP address of the PC

The default IP address of the VDR is 10.0.0.100 (255.0.0.0). The PC must use an IP address within the same range.

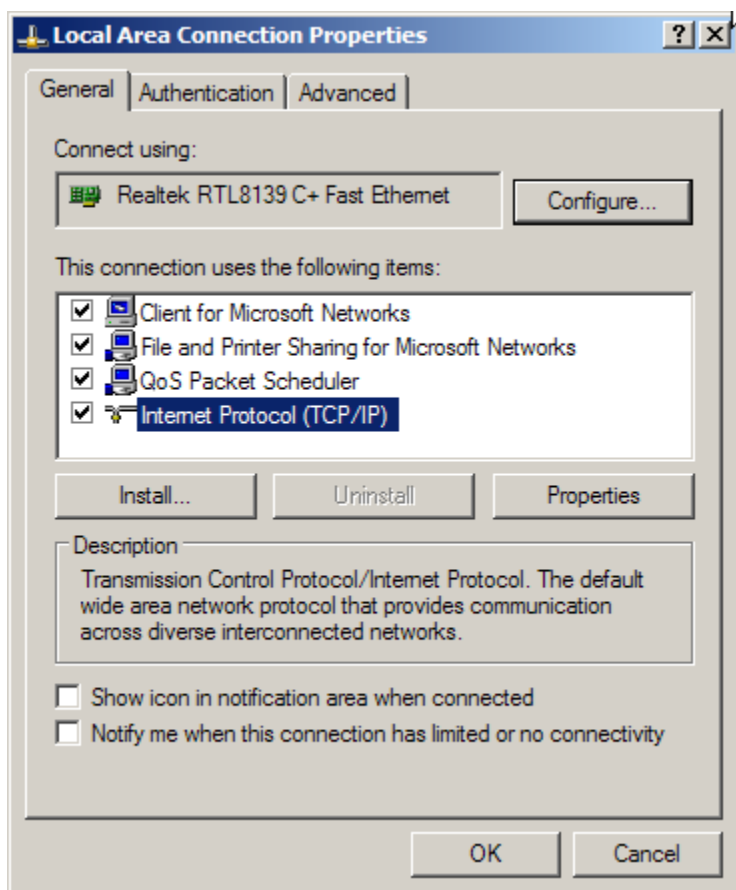
The following description covers how to change the IP address for Windows XP. The scheme for Windows 2000P is almost identical.

Note: The operator may have changed the IP address for the VDR. This must be documented in the “Inspectors and Authorities Manual for DM200/DM300 S-VDR and DM400/DM500 VDR”.

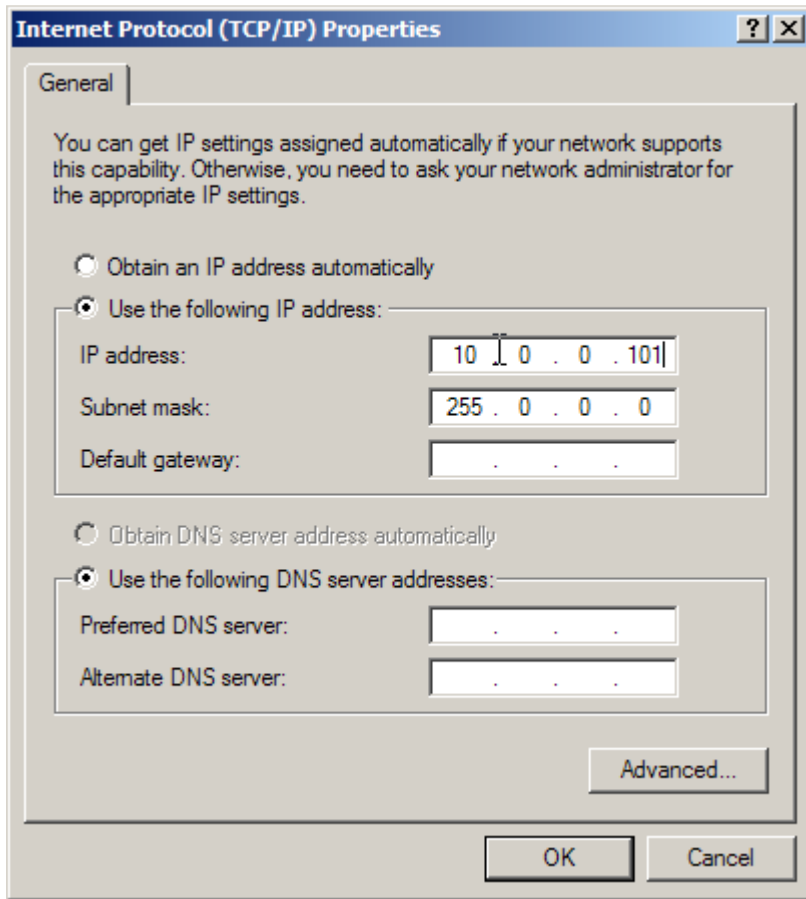
Click on Start->Settings->Network connections->Local area connection.



Click on "Properties".



Select Internet Protocol (TCP/IP) and click on Properties.

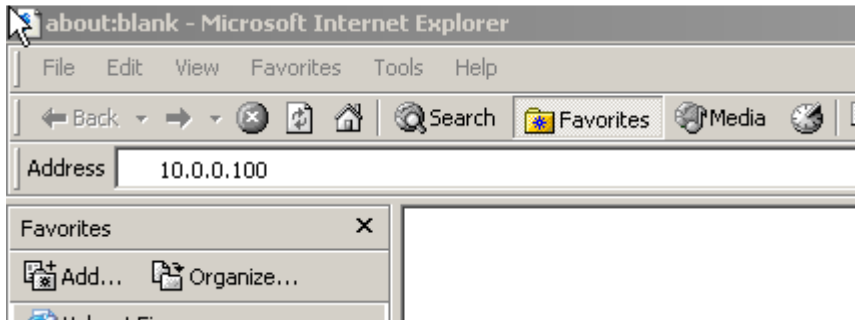


Click on the radio button "Use the following IP address".
Type in an IP address within the range 10.0.0.101 to 10.0.0.254
Type in subnet mask equal to 255.0.0.0
Click on OK.

9.3 Connect the PC to the VDR

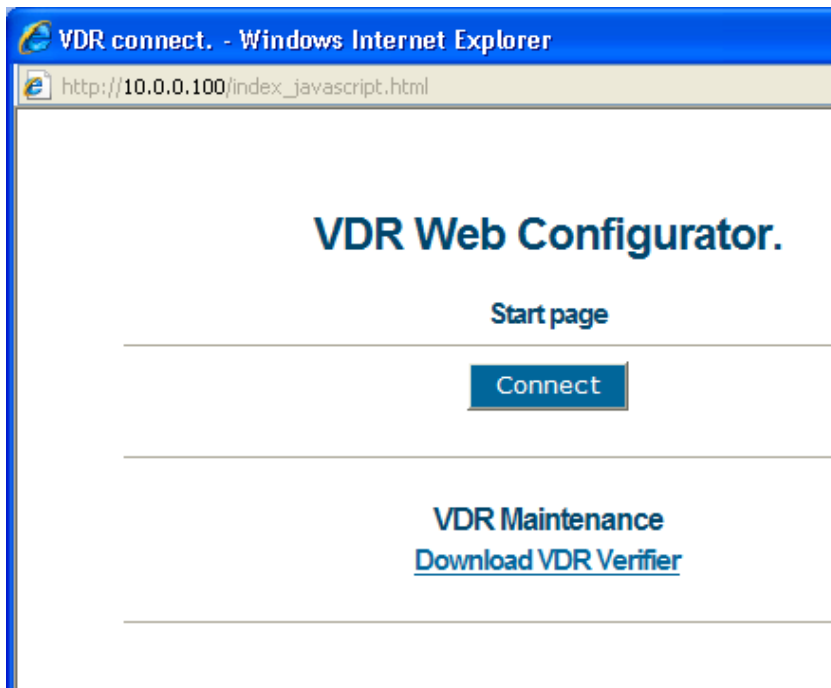
Connect the PC the VDR using a standard CAT5 path cable.

Open an Internet browser on the PC

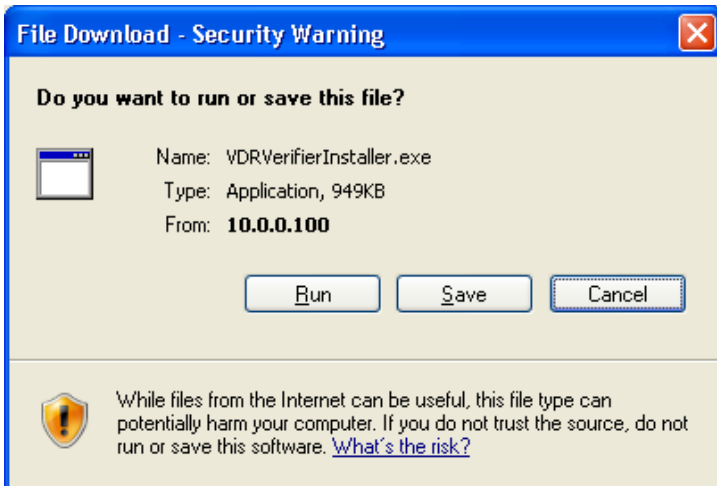


Type in the IP address of the VDR in the browser address field. The IP address of the VDR is 10.0.0.100 (default).

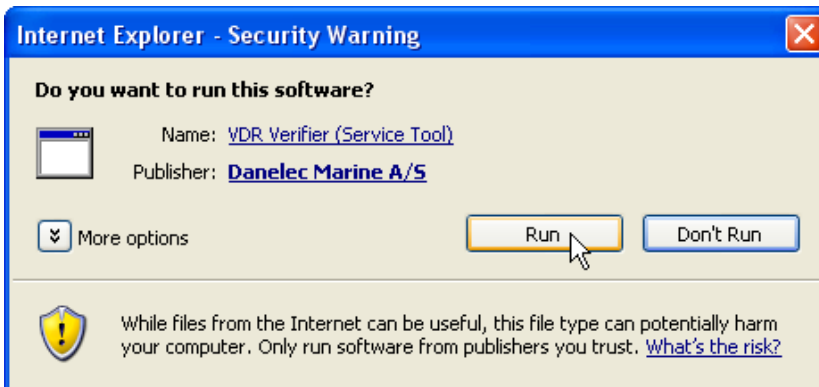
9.3.1 Run the VDRverifier program



Click on the "Download VDR Verifier" link.

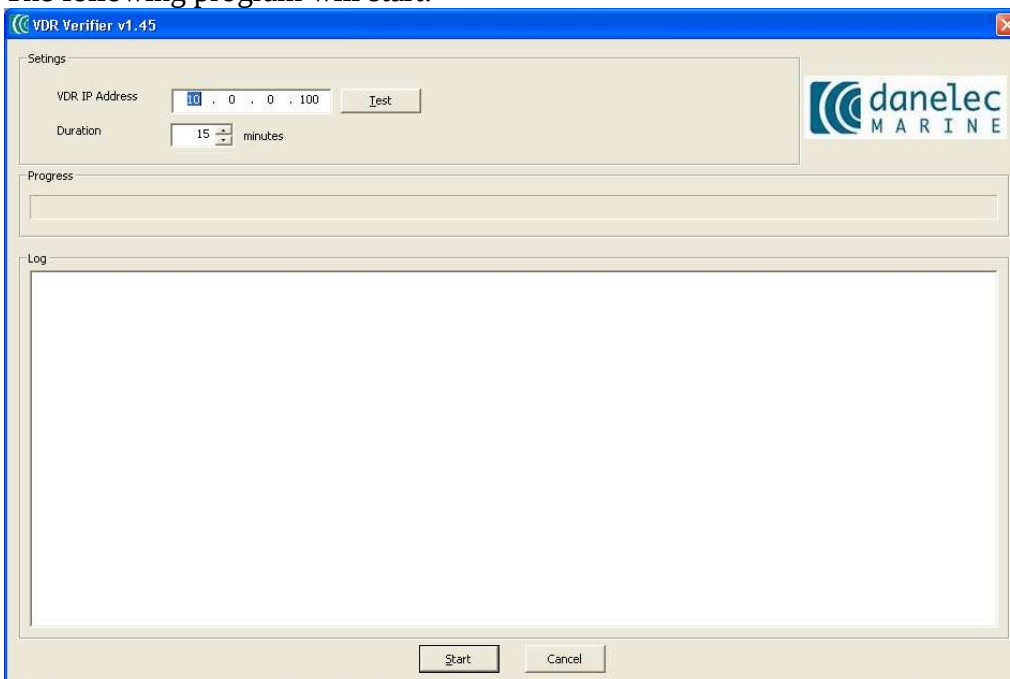


Click "Run" to start the program.



Click "Run" as this program is safe.

The following program will start:

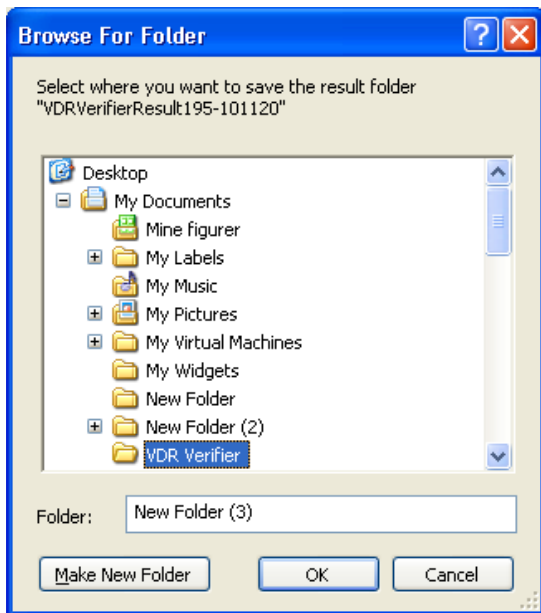


If needed change the IP address, the default IP address is set to the default at program start. Pressing “Test” will verify that a connection can be made to VDR.

Select the duration of the recording to be verified. Duration can be set from 15min to 720min. Please notice that duration is limited to the time since last restart of the VDR and that only the radar images recorded to capsule will be checked. The best result is obtained if the data to be verified were recorded during a voyage.

Verification of 15 minutes of recording takes approximately 3min.

Click “Start” to begin the verification process.



Select a folder for the report and data files.
Wait for the verification to finish.



Press “Yes” to open report in a web-browser.

9.3.2 Examination of the report

The following tests are made. The report starts with a summary.

```
-----
                        (S)VDR Verification
-----

VDR Verifier Version   : 1.49
Data Time Start       : 09:42:55.5
Data Time End        : 09:57:55.5
Verification Duration  : 00:15:00
Verification Date     : 10:03:03 24/06/2011

SVDR Information:

    System Version      : 3.10.00
    System Model        : DM200/DM300
    Type approval ref.  : BSH

Vessel Information:

    IMO Vessel Id       : M/S TEST
    IMO Vessel No       : UNDEFINED
    MMSI Vessel No      : UNDEFINED
    Vessel Flag         : UNDEFINED
    Approval Of Auth    : UNDEFINED

(S)VDR Unit : _____

-----
VERIFICATION OVERVIEW                                     RESULT
-----
Pretest - Microphone                                     PASSED
Analog                                                    PASSED
Digital                                                  PASSED
Audio (SEE NOTES) WARNINGS
Serial (SEE NOTES) ERRORS
Video                                                    PASSED
Power                                                    PASSED
Alarms                                                  PASSED

-----
VERIFICATION RESULT                                     FAILED
-----
```

9.3.2.1 Verification of microphone functionality

The self test in the microphones is activated and the result is printed in the report – either passed or failed

Microphone Test:

```
BMU 1A is enabled and did pass the test (level=315)
BMU 1B is disabled
BMU 2A is disabled
BMU 2B is disabled
BMU 3A is disabled
BMU 3A is disabled
AUD 4 is disabled
BMU 5A is disabled
BMU 5B is disabled
BMU 5C is disabled
BMU 5D is disabled
```

9.3.2.2 Verification of analog data

The data on each enabled input is analyzed and the result is printed in the report

Analog:

```
Warning : AN00 - Engine : Value has changed zero times, the value was -
0.65 RPM (time 07:37:06 12/08/2010)
Passed : AN01 - Rudder angle : Value has changed 2 times, Minimum value was -
0.16 Deg (time 07:37:07 12/08/2010), Maximum value was 19.07 Deg (time 07:44:15 12/08/2010)
```

Failed: The input is not calibrated

Warning: The input was steady – the current value is printed and must be checked – e.g. if vessel at harbor SOG should close to 0

Passed: The input has changed during the verification – the maximum and minimum value is printed and must be checked.

9.3.2.3 Verification of digital data

The data on each enabled input is analyzed and the result is printed in the report.

Digital:

```
Warning : DC00 - Firedoor #1 : OPEN/CLOSED has changed 0 times, last value was CLOSED
Passed : DC01 - Firedoor #2 : OPEN/CLOSED has changed 2 times, last value was CLOSED
```

Warning: The input was steady – the current value is printed and must be checked.

Passed: The input changed during the verification – the current value is printed and must be checked.

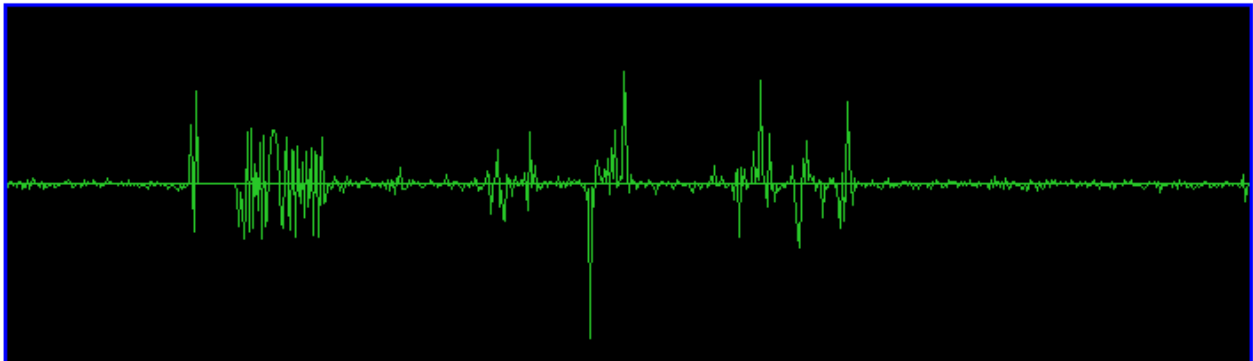
9.3.2.4 Verification of data on the audio tracks

It is recommended that someone speaks on the bridge for the first 100 seconds after the verification program is started – i.e. during the microphone test and until download of data starts. If possible also use the VHF radio.

Audio:

```
Passed : BMU 1A/BMU 1B - Bridge Center/Bridge Stbd : Audio level OK
Warning : VHF 1 - Primary VHF channel : No audio detected or audio level very low
Warning : AUD 4 - (AUD 4) : No audio detected or audio level very low
```

The last 60 seconds of audio



AUDIO CH0 20110624 123040.wav

Passed: The level of recorded audio was normal.

Warning: The level of the recoded audio was very low.

The last 60 seconds of audio from each track* is stored and must be checked before a conclusion is made. A graphical representation of data from each track is shown as additional information.

* Data for tracks with no active microphones which is not configured to record VHF radio communication is omitted.

9.3.2.5 Verification of serial data

The data on each enabled input is analyzed and the result is printed in the report i.e. the list of NMEA formatters defined in the VDR configuration is compared with what was received.

Serial:

```
Passed : SI02 - GPS :          Detected NMEA formatters : GPDTM, GPGGA, GPZDA, GPGLL
Error  : SI03 - Speed log :    The following NMEA formatters has not been detected : VBW
```

Error: The received data did not contain the NMEA formatters defined in the VDR configuration or list of defined NMEA formatters was empty. Other kind of errors may be displayed e.g. detection of CRC errors.

Passed: The received data contained the NMEA formatters defined in the VDR configuration

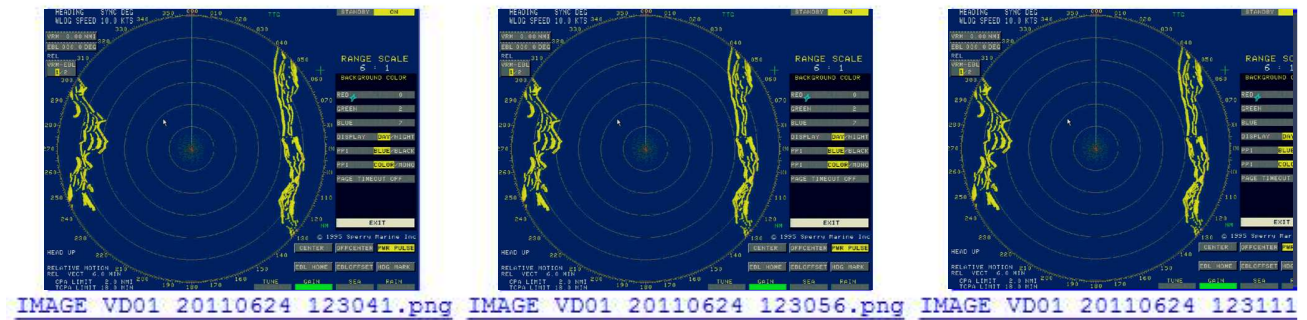
9.3.2.6 Verification of video data

It is recommended that the radar(s) are switched on before and after the verification tool is started.

Video:

Passed : VD01 - (VD01) : Images are OK

The last 60 seconds of images



Passed: The image contains information.

Error: The image contains little or no information.

The last four images from each active input are saved and must be checked before a conclusion is made.

9.3.2.7 Verification of power sources

The presence of AC mains, the battery and optionally DC is checked

9.3.2.8 Verification of alarm status

A list of VDR alarms which were present while the data was recorded will be displayed.

9.4 List of spare parts

Major Parts

BMU (MIC) indoor	1000721
BMU (MIC) outdoor	1000722
Bridge Alarm Unit	1000720
Fixed Capsule, MK3	1300712
Installation kit DM300	2000736
Installation kit DM200	2300944
S-VDR program on CF flash	7000751
VDR Explorer on CD	7000735
Manuals	9000737

Boxes in DAU

DM300 DPU	1000610
DM300 PSU	1000611
DM200 DPU	1300687

Modules in DPU

Serial 08-001	2000621
Audio 08-001	2000627
Video 02-004	2301955
Video 02-004D	2301902
RBD 80GB-003	2301873
USB Backup Drive for DM200	2302123
COMM 03-001 (DM300)	2000649
COMM 03-004 (DM200)	3300608
FW 01-001 (DM300 older versions, w. RJ45)	2000650
FW 01-002	2301064

Miscellaneous parts

Beacon replacement kit	3000671
Clamps and cover for beacon	2301127
Cradle for capsule MK2	2000673
Cradle for capsule MK3	2300562
Cable from PSU to DPU - DM300	3000674
DM300 Spare DPU with no modules (baseboard and all cables included)	2000680
Battery pack for DM300 PSU p/n 1000611	2000685
Battery pack for DM200 (DAU)	2301377
Spare ETX base board with ETX module mounted for DM300 DPU 04-00x	2300605
Spare ETX base board with ETX module mounted for DM200 DPU 200-01	2300961
Serial, Audio, Power (SAP) board for DM200 DPU 200-01	2300384
Internal cable set for DM300 DPU (spare parts)	2000687
Fan (80x80x25) for DPU right side	2000688
Fan for DM300 PSU	2000689
Fan (92x92x25) for DM200 DPU top	2300962
New lock for DAU and SIU	2000690

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Empty compact flash (64M)	2000691
Capsule MK2 wo. cradle and beacon	2000693
Capsule MK3 wo. cradle and beacon	2300945
Straps for capsule release mechanism	4300013

Parts for the DM200 are also applicable for the DM400
Parts for the DM300 are also applicable for the DM500