

Sales Introduction

S-VDR & G2VDR



Danelec Marine

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1. Introduction

Danelec Marine is proud and pleased to introduce the new and 2nd generation of VDR products, which offers state-of-the-art technology, and is designed with a high focus on reliability and flexibility.

The DM300 S-VDR and DM500 G2VDR solutions are extremely compact and light weight solutions, as well as simple and cost-effective to install and maintain.

The systems meets the requirement of IMO performance standard MSC.163(78) and complies IEC Standards IEC 61996-1/2 and IEC 60945.

Finally the products are composed of a modular expandable design, where the DM500 G2VDR benefits from the flexible and low cost architecture.

Danelec Marine aim to maintain its strong position by constantly upgrading its products to the highest quality and best price/performance to meet the demands from our customers.

2. Danelec Information

Danelec Marine was founded in 1982, and is a Danish company that is owned partly by three major financial investors, Dansk Erhvervsinvestering (www.dan-erhv.dk), Industri Udvikling (www.industriudvikling.dk), AMS Group (www.amsgroup.dk) and the management of Danelec Marine.

The company is located in Birkerød, which is just north of Copenhagen.



For many years has Danelec Marine been closely related to the Royal Danish Navy (RDN) as both supplier of industrial computer systems, as well as partner in several larger computer based simulation projects. In 2001 the RDN chose Danelec Marine as designer and supplier of several computer based products and as a part of an upgrade to 31 major vessels, where the “Navy VDR” was an integrated part.

The real “break-thru” came in 2002, when Danelec Marine made an agreement of development and manufacturing with Furuno Electric Co. for their 1st generation VDR. Our products are supported by our world wide sales and service network. For further information please visit our homepage www.danelec-marine.com or contact sales@danelec-marine.com.

Having a solid background in the maritime industry, longstanding employees with great experiences and a dynamic team, Danelec Marine values good quality and outstanding support.

3. Market

The Danelec DM300 S-VDR will be serving the international retrofit market for vessels above 3000 gross tons constructed before July 1st, 2002.

The new rules, which stipulate that existing cargo ships on international voyages, shall be fitted with an S-VDR as follows:

| IMO regulations (implementation) | Start date | Deadline |
|----------------------------------|----------------|----------------|
| 20K GT and upwards | July 1st, 2006 | July 1st 2009 |
| 3K to 20K GT | July 1st, 2007 | July 1st, 2010 |

- Existing cargo ships, engaged in international voyages and constructed before 2002.
- Must retrofit S-VDR during 1st scheduled dry-dock during the above periods.
- Can be exempted from S-VDR if vessel will be taken permanently out of service within 2 years.

The DM500 G2VDR will be serving the new building market for vessels above 3000 gross tonnage as well as the market for passenger vessels.

4. Unique features

- **2 unit solution - complete S-VDR system consist of DAU (Data Acquisition Unit) and Capsule.**

- = Easy and cost-effective installation.

- **Small and lightweight solution - total weight 52 kg.**

- DAU – 27 kg & Capsule – 25 kg

- **The DAU can be wall-mounted, which will ease the installation and increase the potential installation locations.**

- **Modular and expandable design of DAU.**

- Makes the system very service friendly, as modules can be easily replaced.

- **Hot Swap**

- Modules can be replaced for service, while system is running and in operation.

- **Up to 100 meters DAU and capsule**

- Using standard CAT5 Ethernet cables
- Zero-Halogen cable supplied as standard (50 meters)

- **Standard Ethernet cable (up to 100 meters) between Radar and DAU**

- When using External Radar Interface

- **The DM500 G2VDR benefits from the flexible and low cost architecture**

- **Configuration via Ethernet/HTTP (Browser)**

5. Product description & information

5.1. DM300 S-VDR functionality

The DM300 S-VDR will store, in a secure and retrievable form, information concerning the position, movement, physical status, command and control of the vessel over the period up to and following an incident. This information is for use during any subsequent investigation to identify the cause(s) of the incident.

The DM300 S-VDR consists Data Acquisition Unit (DAU) including a super rugged industrial maritime computer platform approved in accordance with IEC 60945 and a protective data capsule. The DAU is usually placed on the bridge or in rooms nearby with other computer based equipment. The protective capsule must be externally mounted on the upper part of the vessel.

The DM300 S-VDR has a number of inputs e.g. the primary navigation sensors, radar display signals, two VHF radios as well as a number (up to six) dedicated microphones placed on the bridge. Also a separate Bridge Alarm Panel (BAP) is placed on the bridge and connected to the S-VDR to give alarms in case of abnormal situations like malfunctions as loss of signals or power sources.

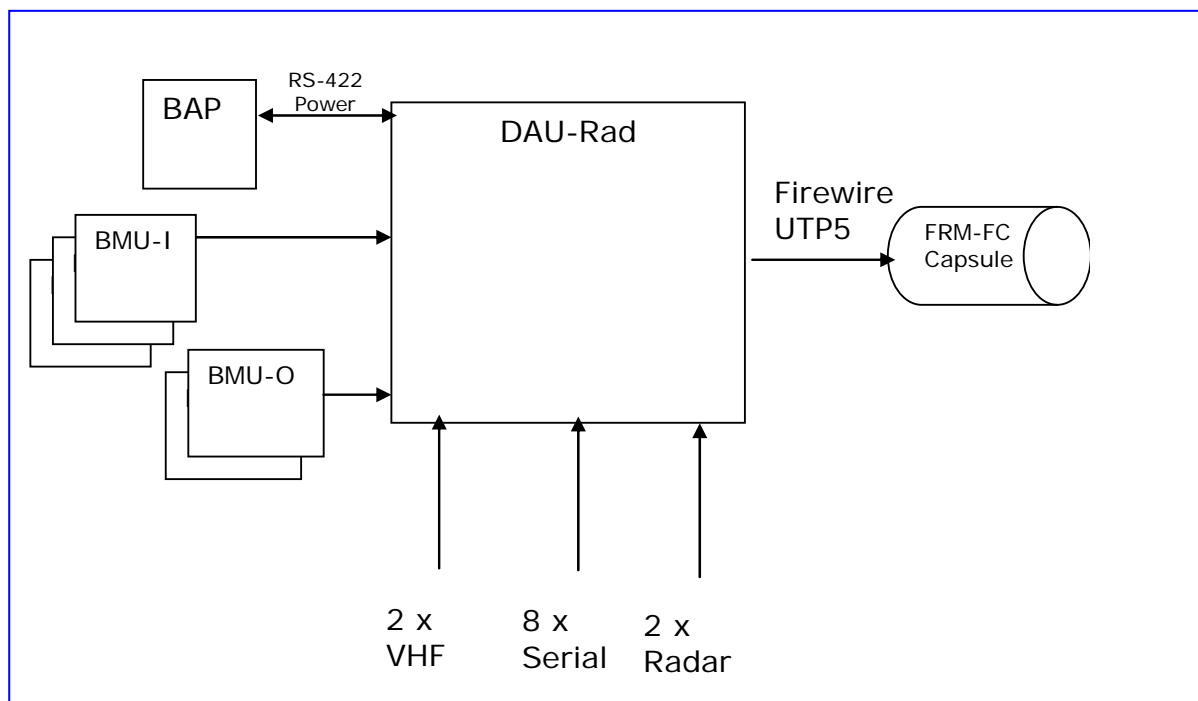
To save the 12 hours of data a highly secure protective capsule is connected to the DAU with a single cable. The protective capsule is able to withstand extreme temperatures, pressure, shocks and vibration in accordance with the requirements of resolution A.694(17) and international standards acceptable by the International Maritime Organization (IMO).

The data recorded in the protected capsule can be replayed with the VDR Explorer, either for incident investigation or for training and education purposes. The VDR Explorer is a software application that is included in the system as standard.

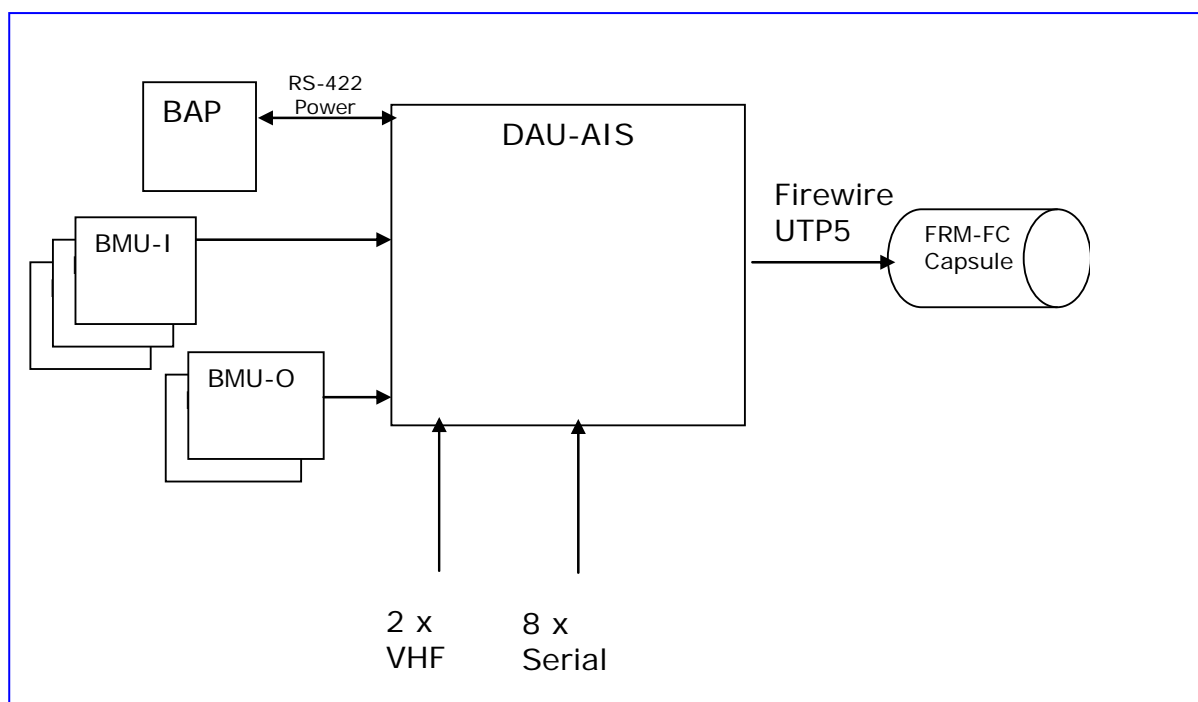
In addition to the above the data can be transferred to a separate MS Windows based computer via a standard Ethernet cable for storage, replay or live play.



5.2. Typical DM300 S-VDR system.

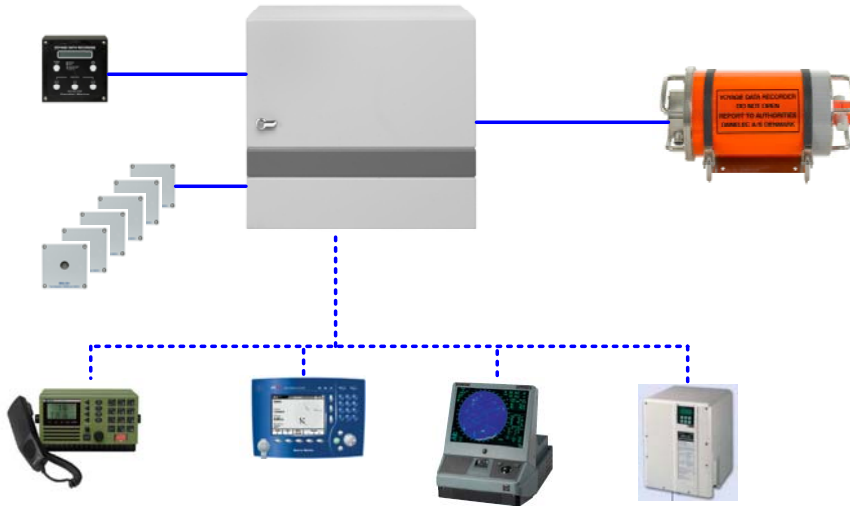


Standard configuration with internal radar interface

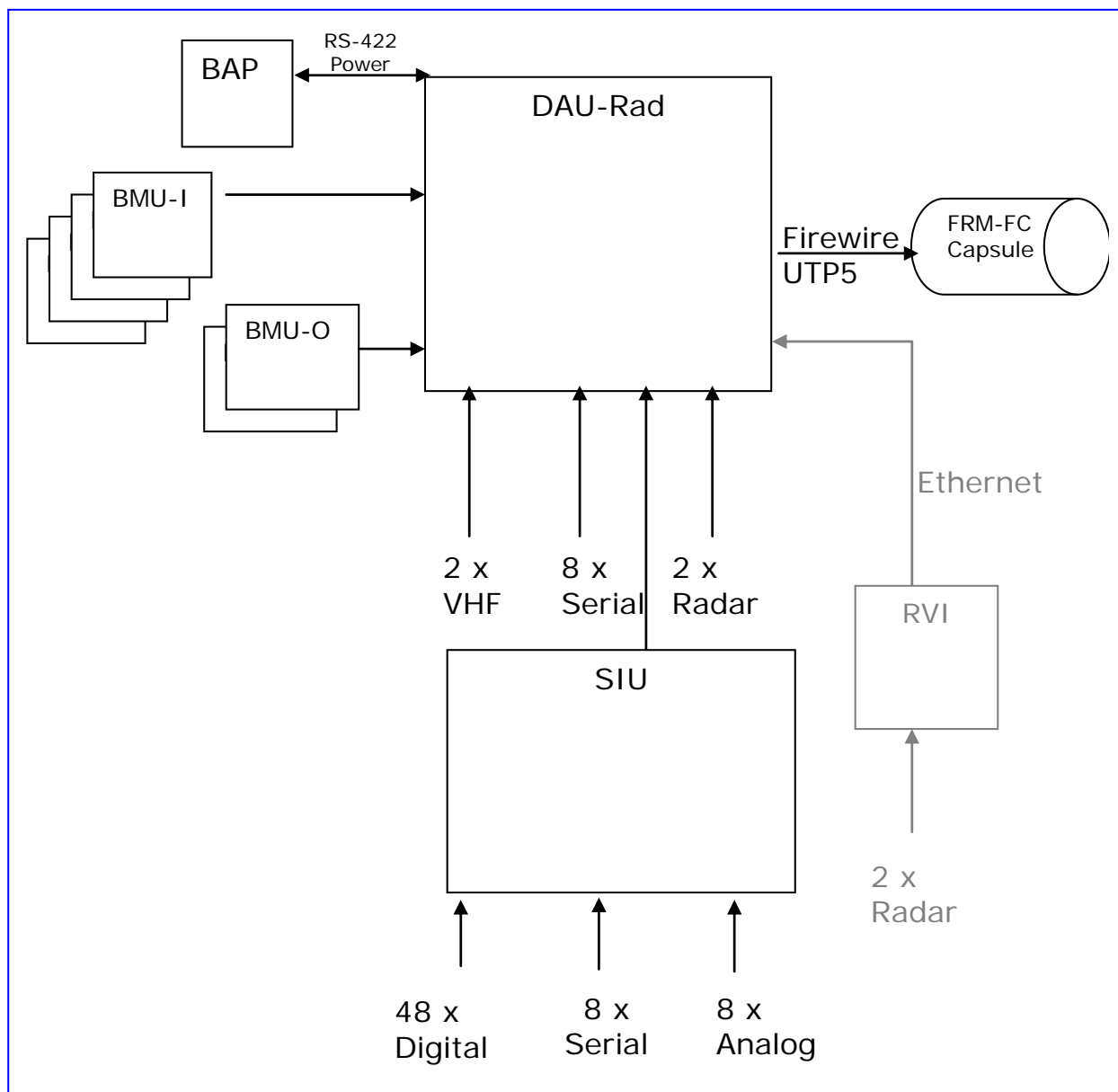


Standard configuration with internal radar interface

Typical DM300 Installation



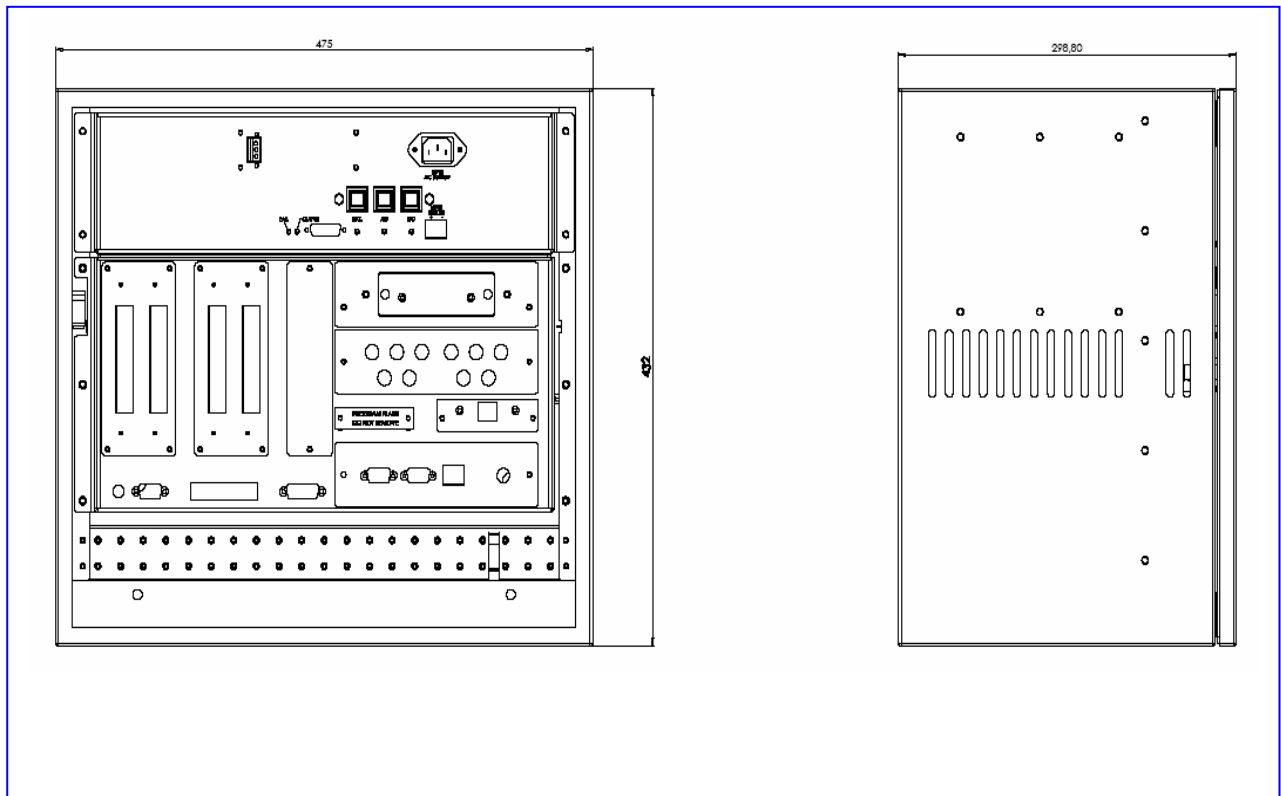
5.3. Typical DM500 G2VDR system



Standard DM500 configuration

5.4. DAU Data Acquisition Unit

| Part no. | Name |
|------------------------------------|---|
| 1000714 | DAU-Rad Data Acquisition Unit with INTERNAL Radar Interface. |
| 1000715 | DAU-AIS Data Acquisition Unit WITHOUT Radar Interface. |
| Description | DAU is used in a S-VDR system. However, a DAU and a SIU can be regarded a full spec VDR system. |
| Mechanical size (w x h x d) | 475mm x 430mm x 300mm Weight 27Kg |
| Electrical interfaces | <p>Power: AC power (90V-240V, 50-60Hz, max. 150 W) DC power (18V-32V, max. 120W)</p> <p>For data acquisition 8 audio channels (6 x BMU, 2 x VHF) 8 serial channels (2 x 61162-2, 6 x 61162-2) 2 video (only in part no 1000714)</p> <p>Other interfaces: BAU: RS-422 and power 4 x Ethernet: Replay, configuration, optional SIU and video I/F etc. VGA: service only Keyboard: service only Service console: RS-232 IAS: NO or NC according to IEC61996 section 4.4.3</p> <p>Free slots: ½ slot in DAU</p> |
| Software interfaces | <p>Configuration via Ethernet/HTTP Replay and monitoring via Ethernet Service console port. System overview on VGA Display.</p> |
| Visible interface | <p>LCD and LEDs on BAP 7-segments and LED on DPU Power status on PSU</p> |



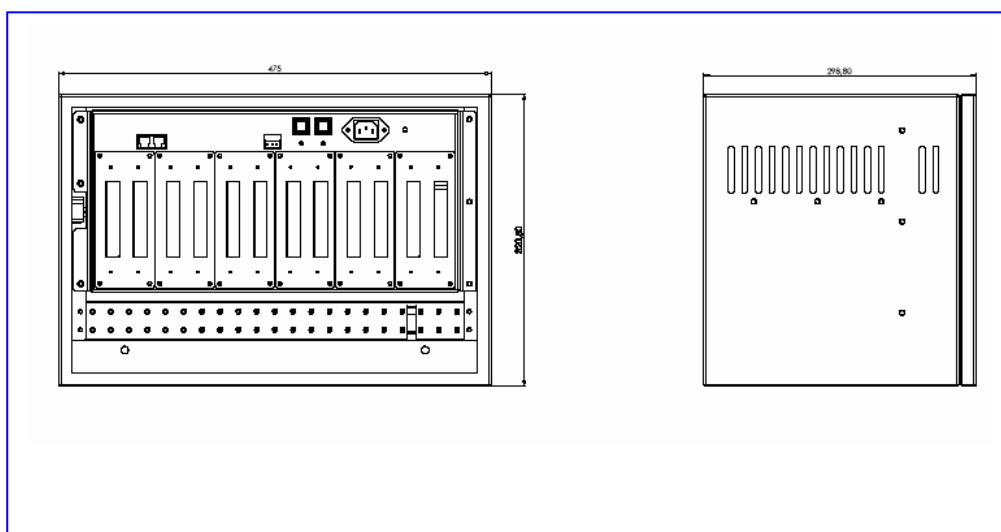
DAU outline (door removed on left drawing)



5.5. Sensor Interface Unit

| Part no. | Name |
|------------------------------------|--|
| 1000717 | SIU Sensor interface Unit for standard DM500 configurations Power: AC (110-240V) For data acquisition 48 digital channels (3 slots) 8 serial channels (1 slot) (2 x 61162-2, 6 x 61162-2) 8 analogue channels (1 slot) 2 Ethernet |
| Mechanical size (w x h x d) | 475mm x 320mm x 300mm Weight 24 kg |
| Slots | 6 full size slot for data interfaces (not audio/video) |
| Electrical interfaces | 1 x Ethernet connection to DAU 1 x Ethernet for future use (t.b.d.) |
| Software interfaces | - |
| Visible interface | link to DAU, Slot 1-6 link indication |

Note: The SUI is supplied as standard with the above mentioned interfaces.
 The SIU have one (1) empty slot that can be occupied with one additional module either digital (16 channels) or analogue (8 channels).



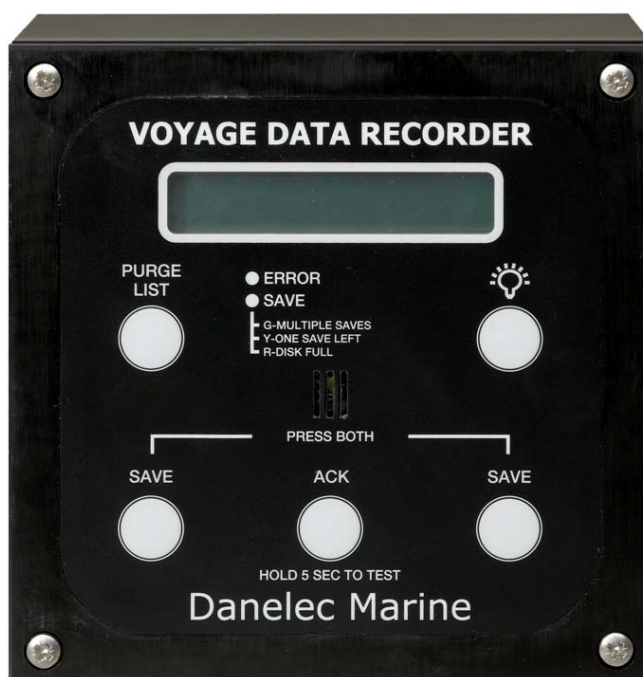
5.6. FRM-FC Final Recording Medium (Capsule)

| Part no. | Name |
|------------------------------------|---|
| 1000718 | Protective (fixed) capsule (with cradle, beacon and cable) Supplied w/ 50 meter (zero-halogen) cable – terminated in the capsule. |
| Description | The protective capsule is the capsule placed on external deck. It is used to store data for at least 12h |
| Mechanical size (w x h x d) | (Without cradle) 500 mm x 250mm x 250mm 25Kg |
| Electrical interfaces | Firewire over CAT 5 |
| Software interfaces | |
| Visible interface | Marked "Do not open. Report to authorities". Orange. |
| Parts list | |



5.7. BAP Bridge Alarm Panel

| | |
|------------------------------------|---|
| Part no. | Name |
| 1000720 | BAP (Bridge Alarm Panel) |
| Description | The BAP is mounted on the bridge. It provides basic information to the ship personnel. It includes a LCD display, a buzzer and keys. Alarms and warnings are indicated and can be acknowledged pressing the ACK key. A "SAVE" (do not overwrite the last 6 hours) can be initiated using the SAVE key. |
| Mechanical size (w x h x d) | 144 mm x 144 mm x 50mm Panel cutout 100x100mm. |
| Electrical interfaces | Serial RS-422 and power. Connected to comm. module in DPU |
| Software interfaces | - |
| Visible interface | LCD display. Keys ACK, SAVE, PURGE LIST and a brightness key. Buzzer. |



5.8. BMU Bridge Microphone Unit

| Part no. | Name | |
|------------------------------------|---|-------|
| 1000721 1000722 | BMU-I (Bridge Microphone Unit) indoor BMU-O (Bridge Microphone Unit) outdoor (IP65) | |
| Description | The microphone records audio (speech) on the bridge. The microphones has a buzzer, which is used for self-testing the microphone. The buzzer is shortly activated every 12 hours. | |
| Mechanical size (w x h x d) | 52 mm x 72 mm x 35 mm weight 100g | |
| Electrical interfaces | Differential microphone output to AUDIO interface module (0,775V@75dB). Powered from AUDIO interface module. | |
| Software interfaces | - | |
| Visible interface | | |
| Parts list | | None. |

BMU-I Indoor version



BMU-O Outdoor version



5.9. RVI Remote Video Interface

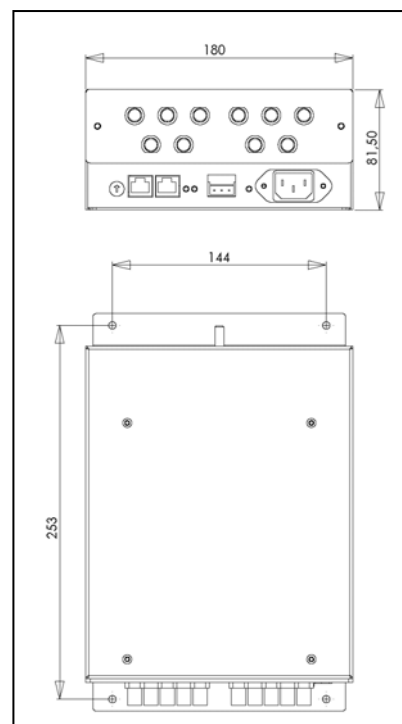
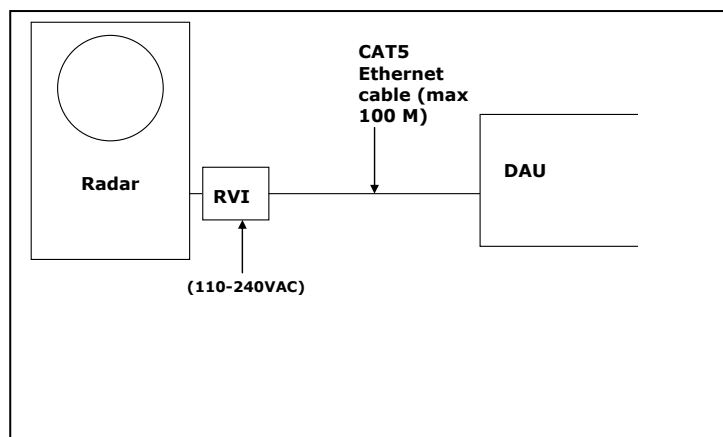
The RVI is the Video/Radar acquisition module built into separate box, and can be installed either in the radar console or nearby.

Cable between RVI and DAU can be up to 100 meters, and is therefore suitable for installations where the radar is located a long distance from the DAU.

Power Requirements: AC (110-240VAC)

Part no. : 1000723 RVI including Video/radar acquisition module

2000754 RVI box w/o video/radar acquisition module



5.10. Replay software - VDR Explorer

Danelec offers a configurable yet user friendly data analysis and replay program - for standard MS Windows based computers. The purpose is first of all to investigate the cause(s) of an incident but the software is also very well suited for training purposes.

The **VDR Explorer** can replay the acquired data "in live" or in play back from the removable disk or the protective capsule. Normally the crew will only analyze data "in live" or from the removable disk - the capsule data are exclusively analyzed by the authorities (e.g. the annual inspection).

Live - or play back from recorded data

The acquired analog, digital and serial data from the sensors are together with the radar picture, displayed by means of a standard MS Windows based PC or Laptop - also used to control the listening of the audio from the individual microphones and VHF radios.

In case of "in live" analysis the data are transferred through standard LAN to one or more PCs.

When data from the removable disk are analyzed it can be done by physically removing and installing the disk on the PC; however the data can also be transferred through the LAN to the PC, where it might be stored for later play back analysis.



6. Installation

The DM300 S-VDR and DM500 G2VDR are designed to be easily wall mounted. All necessary connectors and relevant parts are easy accessible and sufficient space provided for fastening of cables.

The units may be installed in a non air-conditioned room.

6.1. Standard DM300 S-VDR Configurations

DM300 for Radar installations - Standard system includes:

| Part no. | Name |
|----------|---|
| 1000712 | (1) DAU-Rad Data Acquisition Unit (1) FRM-FC Capsule incl. 50 meter cable (3) BMU-I Bridge Microphone Unit (Indoor) (2) BMU-O Bridge Microphone Unit (Outdoor) (1) BAP Bridge Alarm Panel (1) Replay software - VDR Explorer (CD+man) (1) Manuals – Operation, Installation & Inspect. (1) CF S-VDR programme (1) Installation Kit |

Cables required, but not supplied in standard configuration from Danelec:

| Description | Type |
|------------------------------|---|
| DCU-BAP | 3x twisted pair |
| DCU- BMU | 2x twisted pair |
| Power cable | Min 0,75mm² AC /min 1,5 mm² DC |
| VHF interface cable | 1x Twisted pair |
| Radar/Video interface | RG59 (75Ω) |

DM300 for AIS installations - Standard system includes:

| Part no. | Name |
|-----------------|---|
| 1300432 | (1) DAU-AIS Data Acquisition Unit (1) FRM-FC Capsule incl. 50 meter cable (3) BMU-I Bridge Microphone Unit (Indoor) (2) BMU-O Bridge Microphone Unit (Outdoor) (1) BAP Bridge Alarm Panel (1) Replay software - VDR Explorer (CD+man) (1) Manuals – Operation, Installation & Inspect. (1) CF S-VDR programme (1) Installation Kit |

Cables required, but not supplied in standard configuration from Danelec:

| Description | Type |
|----------------------------|--|
| DCU-BAP | 3x twisted pair |
| DCU- BMU | 2x twisted pair |
| Power cable | Min 0,75mm² AC / min 1,5 mm² DC |
| VHF interface cable | 1x Twisted pair |

6.2. Standard DM500 G2VDR Configuration

Standard system includes:

| Part no. | Name |
|----------|--|
| 1000713 | <p>(1) S-VDR DM300 (1000712) (Complete as described above)</p> <p>(1) VDR upgrade kit (1300362) Consisting of:</p> <ul style="list-style-type: none"> (1) SIU Sensor Interface unit (1) BMU-I Bridge Microphone Unit (Indoor) (1) CF VDR Programme (1) Manuals DM500 (1) Installation Kit |

Cables required, but not supplied in standard configuration from Danelec:

| Description | Type |
|------------------------------|---|
| DCU-BAP | 3x twisted pair |
| DCU- BMU | 2x twisted pair |
| Power cable | Min 0,75mm² AC /min 1,5 mm² DC |
| VHF interface cable | 1x Twisted pair |
| Radar/Video interface | RG59 (75Ω) |

7. Service & Maintenance

The Danelec products are supported by a world-wide network of qualified and skilled technical distributors. The normal service interval for the DM300 S-VDR and DM500 G2VDR is during normal operation condition 4 years. High temperature NiCad batteries are used for power backup instead of lead acid batteries.

All parts in the DM300 S-VDR and DM500 G2VDR system are designed to fully comply with IEC60945 and all other relevant standards. The DM300 S-VDR and DM500 G2VDR have ability to withstand vibration and other environmental stress exceeding what is required by IEC60945. This ensures trouble free operation for many years.

Any part of the S-VDR/G2VDR can be replaced within minutes without violating the integrity of the wiring.

8. Warranty

The S-VDR & G2VDR products are supplied with an 18 months warranty as standard. Additional warranty can be offered. Please refer to the Pricelist and the General Terms of Sales and Delivery.

9. Approvals

The DM300 S-VDR and DM500 VDR have received BSH (Bundesamt für Seeschifffahrt und Hydrographie) Q4/2005 and the DM500 G2VDR is expected to receive BSH approval Q1/2006.

Certificates can be downloaded at www.danelec-marine.com

Other local and relevant approvals will be handled on a case-by-case basis

10. Abbreviations

| | |
|--------|--|
| S-VDR | Simplified Voyage Data recorder |
| TBD | To Be Determined |
| VDR | Voyage Data Recorder |
| DAU | Data Collecting Unit |
| SIU | Sensor Interface Unit |
| BMU | Bridge Microphone Unit |
| BAP | Bridge Alarm Panel |
| G2VDR | 2 nd Generation VDR |
| IAS | Integrated Alarm System |
| IMO | International Maritime Organization |
| FRM-FC | Final Recording Medium – Fixed Capsule |
| PSU | Power Supply Unit |