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## VDR-100G2/G2S Installation & Maintenance Manual

RUT-TD-02-001 Rev.2.1

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**Rutter Technologies Inc**  
**VDR-100G2/G2S Installation & Maintenance Manual**  
**Part List N° RT-2301**

RUT-TD-02-001 Rev.2.1

Revision Issue Date: 28 October 2008

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# Amendment Record

The details of any amendment made to this documentation should be recorded in the table below. These details should include the signature of the person responsible for inserting the latest amendment.

Description	Date Inserted	Initials/Sig.
Release Version	March 17, 2008	WK
Update ACR IP address	July 11, 2008	WK
Update <ul style="list-style-type: none"><li>• DPU mounting directions.</li><li>• Rutter-ACR Foat Free PS-100 mounting directions.</li></ul>	October 27, 2008	WK

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# Safety Precautions and Warnings

**High Voltage Warning!** High voltages are present in the Voyage Data Recorder. Only Rutter Technologies Certified Technicians should undertake work on the VDR-100G2/G2S.

## GENERAL

**Only** a Rutter Technologies Inc. Certified Technician should access the interior components of the VDR-100G2/G2S equipment.

To ensure compliance with the IMO standards, installation of the VDR-100G2/G2S **must** be performed by a Rutter Technologies Inc. approved installation technician.

The following precautions and warnings are general safety measures that personnel should understand and apply during installation, operation, and maintenance of all VDR-100G2/G2S system equipment.

Wear proper safety attire and use the proper equipment while handling the VDR during transport and installation.

## GROUNDING

All cable shields must be grounded to avoid interference from AC wiring, fluorescent lights, or other high magnetic or RF fields.

NMEA data cables should be grounded at the source. All other cables should be grounded at both ends. The equipment in the VDR-100G2/G2S Data Processing Unit (DPU) and Data Acquisition Unit (DAU) is grounded to the rack. All other peripheral equipment should be grounded.

## CABLING

The cable sizes and types recommended for use with the VDR-100G2/G2S must be utilized to ensure its proper operation.

## POWER SUPPLY

Prior to connecting the power supply of the VDR-100G2/G2S to the emergency ship power, ensure the emergency ship power breaker is switched off. **Always** shut down the system and turn off the power before removing or installing any equipment.

## LIFTING

Some VDR components are heavy; ensure you carry out proper lifting procedures while changing or transporting components.



## Electrostatic Discharge

Digital devices are susceptible to damage from electrostatic discharge (ESD); certain precautions **must** be taken when handling circuit cards, integrated circuits (ICs), and other sensitive devices.

The maintenance technician should conform to the following guidelines when handling ESD sensitive devices:

1. Always wear a static protection wristband prior to contact with any electrostatic sensitive device;
2. Ensure that the wristband cable clip is firmly attached to a grounding point;
3. Keep all sensitive components in their protective pouches until required.

## List of Abbreviations

The following abbreviations may be in common use throughout this document:

ADPCM – Adaptive Differential Pulse-Code Modulation

AIS – Automatic Identification Systems

BNC – Bayonet Neil-Concelman (or sometimes British Naval Connector)

CD-ROM – Compact Disc-Read Only Memory

COTS – Commercial Off-the-Shelf

CPU – Central Processing Unit

dB – Decibels

DAU – Data Acquisition Unit

DMM – Data Management Module

DPU – Data Processing Unit

ECDIS – Electronic Chart Display and Information System

ECS – Electronic Chart System

EPIRB – Emergency Positioning Indicating Radio Beacon

FRM – Final Recording Medium

g – Grams

GB – Gigabyte

GMT – Greenwich Mean Time

GPS – Geographical Positioning System

HBS – Horizontal Back Sync

HVR – Hardened Voyage Recorder

Hz - Hertz

IBS – Integrated Bridge System

IDEA – International Data Encryption Algorithm

IEC – International Electrotechnical Commission

IMO – International Maritime Organisation

kg – Kilogram

LCD – Liquid Crystal Display

LED – Light Emitting Diode

m – Metres

mA – milliamps

MB – Megabyte

mm – Millimetres

MMSI – Maritime Mobile Service Identity

NMEA – National Marine Electronics Association

OAU – Operation & Alarm Unit

O/S – Operating System

oz – Ounces

PC – Personal Computer

PMC – Protective Memory Capsule

QA – Quality Assurance

RGB – Red, Green, Blue

RMS – Root-Mean-Square

RPM – Revolutions Per Minute

ROV – Remotely Operated Vehicle

RSM – Remote Storage Module

SFRM – Simplified Final Recording Medium

SOLAS – International Convention for the Safety of Life at Sea

STP – Shielded Twisted Pair

SVDR – Simplified Voyage Data Recorder

TCP/IP – Transmission Control Protocol/Internet Protocol

TJB – Terminal Junction Box

UHF – Ultra High Frequency

UPS – Uninterruptible Power Supply

UTC – Coordinated universal Time

V – Volts

Vac – Volts AC

VDC – Volts DC

VDR – Voyage Data Recorder

VHF – Very High Frequency

## Specifications

IEC 61996:1999 Ship borne Voyage Data Recorder – Performance requirements – methods of testing and required test results.

IEC 60945:1996 Maritime navigation and radio communication equipment and systems – General requirements – methods of testing and required results

IEC 61162 Maritime navigation and radio communication equipment and systems – Digital interfaces

IEC 61996-2 Shipborne voyage data recorder (VDR) - Part 2:- Simplified voyage data recorder (S-VDR) Performance requirements - methods of testing and required test results

## Dimensions

Dimensions in this document are shown in **mm** (millimeters) unless otherwise stated.

## Software Note!

Software procedures in this manual are based upon a PC running a Windows XP operating system. There may be minor differences depending on the operating system and configuration in use on the Client PC.

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# 1 SYSTEM OVERVIEW

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## 1.1 VDR-100G2 System Components

The VDR-100G2 is a modular, Ethernet-based data acquisition and storage system. It is designed to collect and maintain a secure, retrievable record of information related to the position, movement, physical status, and command & control of a marine vessel.

While this manual references the VDR-100G2, it is also applicable to the Simplified Voyage Data Recorder (VDR-100G2S) unless otherwise stated.

There are three (3) types of information recorded by a Voyage Data Recorder (VDR):

1. Audio data acquired from microphones mounted in the immediate vicinity of a vessel's main bridge workstations and a primary VHF radio is required to be recorded. The VDR-100G2 has the capability to record public address systems, internal communications, additional radios, or other areas of the ship if necessary.
2. Video data can be captured at 15 second intervals from one (1) complete radar video frame screen via a dedicated buffered output port of the radar. The VDR-100G2 can record images captured from multiple Radars, electronic chart, or CCTV displays at various capture intervals. An SVDR is not required to capture video data.
3. ASCII serial data related to the position, heading, speed, wind, water depth, hull openings, bulkhead doors, alarm status, maneuvering commands, and responses can be recorded with the VDR-100G2. The standard format for this data is defined in the NMEA 0183/IEC 61162 standards; through the implementation of an interface module, non-standard data can be converted to this format.

For a complete list of data items to be recorded, refer to IEC 61996.

The VDR-100G2 is a fully IMO compliant VDR. The base system consists of the following components:

1. **Data Processing Unit (DPU)**, consisting of:
  - Data Management Module (DMM)
  - Power Supply Module
  - Power Control Module
  - 2 x 28Ah 12V batteries
  - Cooling Fan with thermostat
  - 4-Port Ethernet switch
  - 4GB Memory Stick
2. **Data Acquisition Unit (DAU) \***, consisting of:
  - 4-Channel Audio Module
  - 1-Channel Video Module
  - 8-Channel NMEA Module

\* The DAU is an optional component with the VDR-100G2S.

3. **Operation & Alarm Unit (OAU)**
4. **Final Recording Medium (FRM)**

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**Internal and External Microphone** Optionally, the VDR-100G2 can also be supplied with the following components:

1. 2 or 4 additional audio channels (to a maximum of 16 inputs)
2. 1, 2, or 3 additional video channels (to a maximum of 4)
3. 8 or 16 NMEA channels
4. Remote Storage Module (RSM) (implemented for long term archiving and/or additional data backup storage retrieval)
5. Data Interfaces (implemented for the conversion of non-standard signals to NMEA format). Interfaces include:

- DataAnalog
- DataDiscrete
- DataSynchro
- DataGyro
- DataProtocol

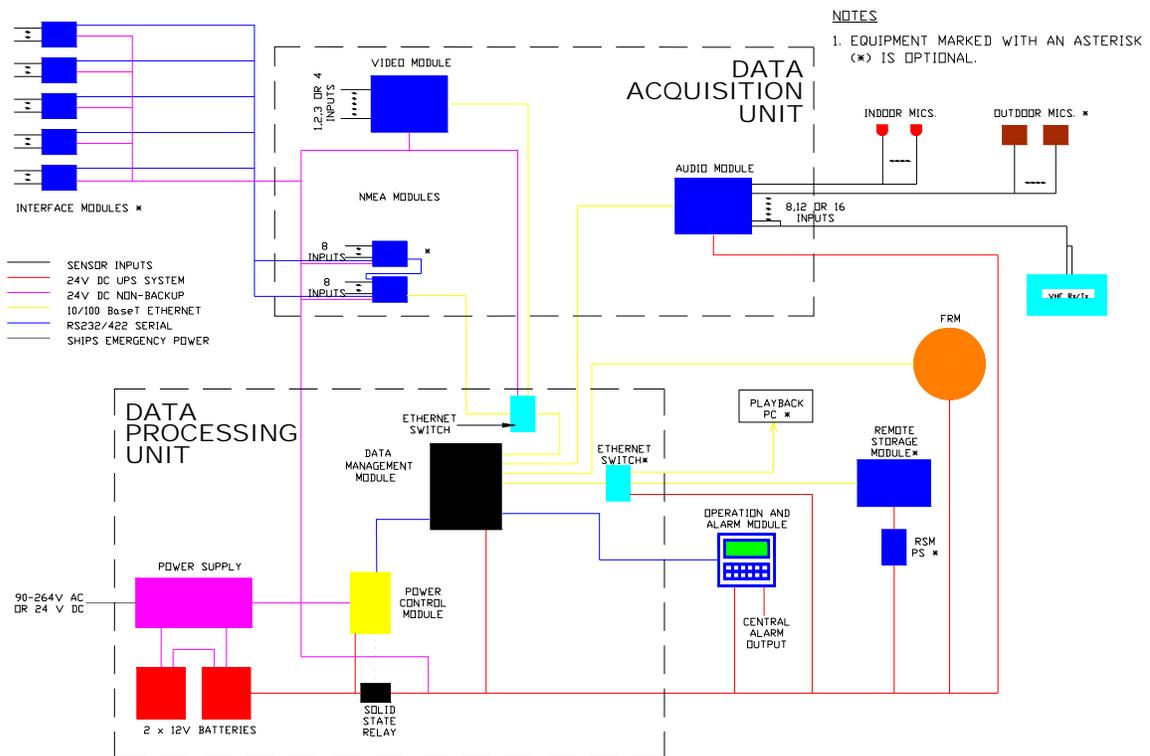


Figure 1-1 - VDR-100G2 Block Diagram

The VDR-100G2S has many similar components to the VDR-100G2, with the following differences:

- The Video Module is only required if the vessel's radar has an available COTS (commercial off-the-shelf) interface. Therefore, the recording of video data may not be applicable in some VDR-100G2S installations

## Chapter 1: System Overview

- The VDR-100G2S has an accompanying Simplified FRM (SFRM) capsule, as referenced in *Section **Error! Reference source not found.** - **Error! Reference source not found.***

### 1.1.1 Data Processing Unit (DPU)

The **Data Processing Unit** (DPU) receives and processes information provided from the various Audio, Video, and NMEA Input Modules. This information is processed in the Data Management Module (DMM) for archiving on the DMM's internal hard drive, the Final Recording Medium (FRM), and the optional Remote Storage Module (RSM).

The VDR-100G2 power system is housed in the DPU, and accepts universal AC or 24VDC from the ship's emergency power while providing 24VDC to the VDR-100G2 modules. The power system includes batteries to provide uninterrupted power to the audio recording system in the event of a blackout.

The DPU also contains an Ethernet switch (hub) which provides the ability to combine video and NMEA data into a single Ethernet link.

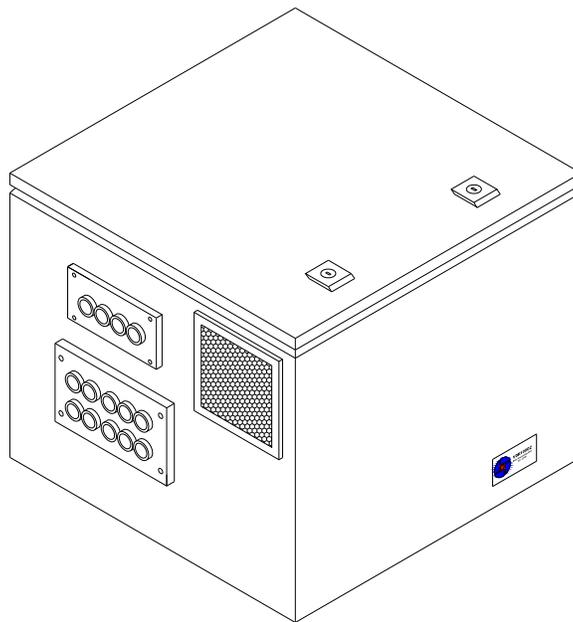


Figure 1-2 - Data Processing Unit

#### 1.1.1.1 Data Management Module

The **Data Management Module** (DMM) is a rugged, small form factor Pentium computer. It is equipped with four (4) Ethernet input ports, two (2) serial ports, two (2) USB ports, a high capacity hard disk drive, and a compact flash card containing an embedded Windows XP operating system.

The module compresses and stores data received from the acquisition modules and, simultaneously, outputs processed data to the FRM, optional Remote Storage Module (RSM), and optional Download/Playback PC (as described below).

## Chapter 1: System Overview

Communication with the Operation and Alarm Unit (OAU) and Power Control Module (PCM) occurs via the serial ports. Additionally, the DMM can be configured to provide data for real-time display via an Ethernet connection.

In addition to the most current data set, the base model DMM can store numerous previously recorded full data sets in a secure location. This secure location prevents previously recorded data sets from being overwritten.

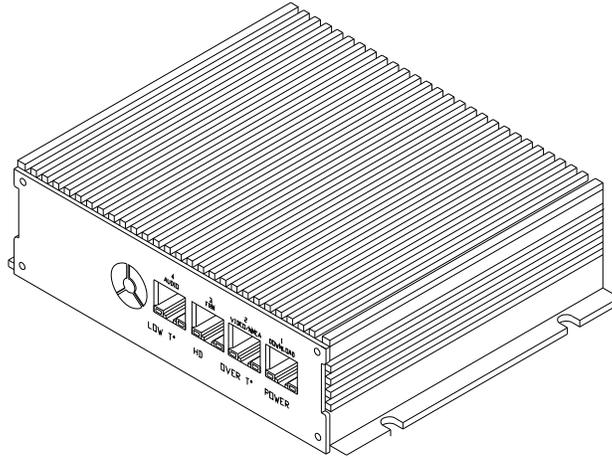


Figure 1-3 - Data Management Module (Rear View)

### 1.1.1.2 Power Supply Module

The VDR-100G2 has the option of being powered by either AC or DC supply (**must** be chosen at time of order as it is **not field configurable**):

- The AC input range is 85-264V, 47-63Hz.
- The DC input range is 19-28V.
- The output of both supplies is 27.6VDC, which is the normal operating voltage of the VDR.

The power supply also acts as a battery charger for re-charging low batteries or maintaining a full charge. The battery input is reverse polarity protected by a crossbar diode and a replaceable fuse.

There are two versions of the AC Power Supply Module (PSM) (as illustrated below). Version 2 is applicable from VDR Serial Number 20107XX0900 forward. There remains only one version (Version 1) of the DC PSM.

## Chapter 1: System Overview

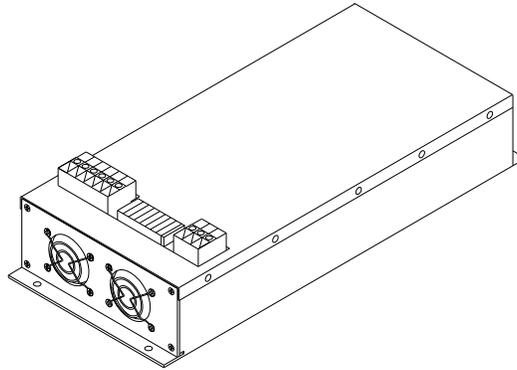


Figure 1-4 - Power Supply Module (Version 1 – AC and DC)

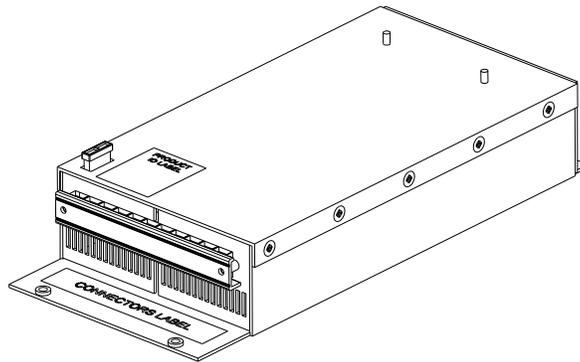


Figure 1-5 - Power Supply Module (Version 2 – AC Only)



**Note!** Changes to both the Power Control Module (PCM) and Power Supply Module (PSM) as described in this manual are only applicable to the AC power version of the VDR. The PCM and PSM in the DC power version are Version 1.

### 1.1.1.3 Power Control Module

The Power Control Module (PCM) monitors the power system and communicates the power system status information to the DMM. It also controls the switching circuitry to transfer the load from the power supply to the batteries.

There are two versions of the AC PCM (as illustrated below). Version 2 is applicable from VDR Serial Number 20107XX0900 forward. There remains only one version (Version 1) of the DC PCM.

## Chapter 1: System Overview

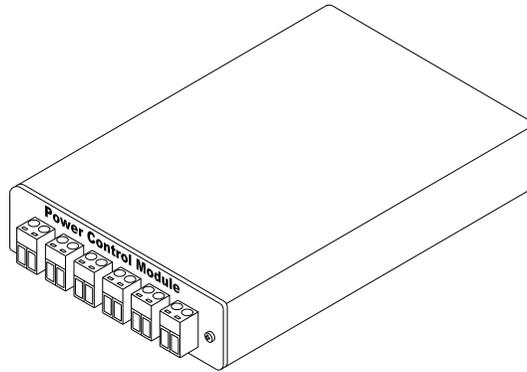


Figure 1-6 - Power Control Module (Version 1 – AC and DC)

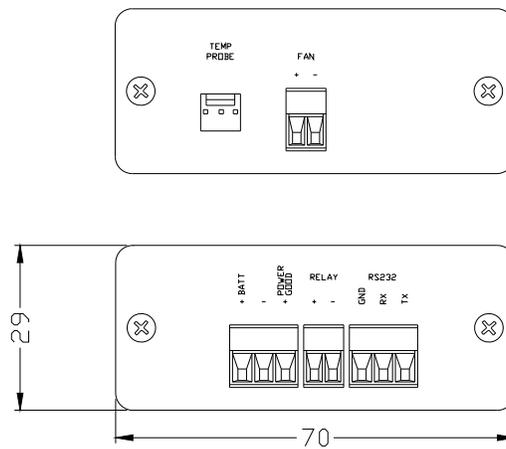


Figure 1-7 - Power Control Module (Version 2 – AC Only)

### 1.1.2 Data Acquisition Unit (DAU)

The **Data Acquisition Unit (DAU)** is an optional component that can house up to four (4) main data acquisition modules:

- Audio Module
- Video Module
- (2) NMEA Modules

These modules are used to capture ship information and output this acquired data through an Ethernet port, transmitting it to the DPU for processing and storage.

## Chapter 1: System Overview

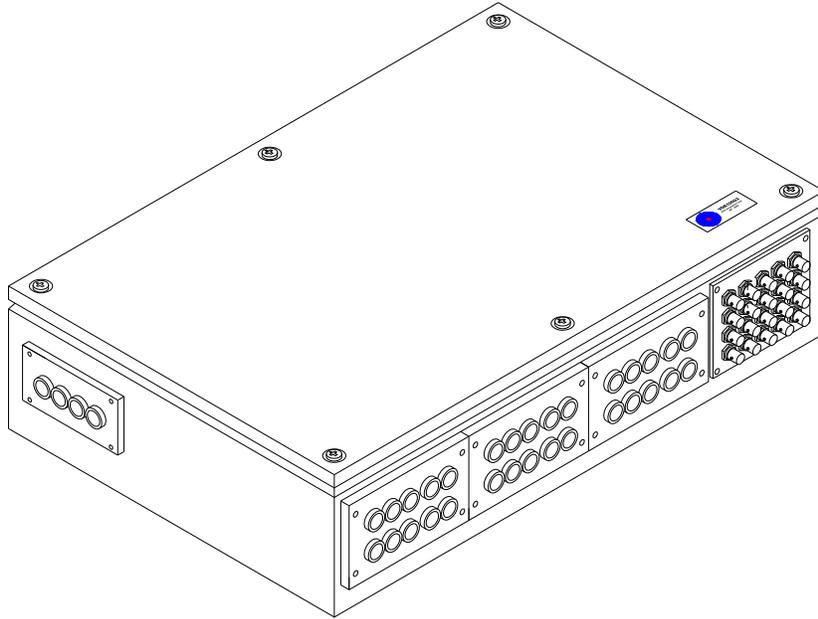


Figure 1-8 - Data Acquisition Unit

### 1.1.2.1 Audio Module

The **Audio Module** receives audio information from bridge microphones and vessel radios in accordance with the IEC 61996 standard. All audio data is routed to the DMM for processing, storage, and eventual retrieval. This module also controls the test buzzers used to verify the functionality of all microphones connected to the VDR-100G2.

The standard Audio Module is an autonomous audio capture and broadcast device with 8 input ports for capturing audio data from a combination of microphones or line level inputs. An example combination may be:

- 6 microphones
- Transmitted and received signals from the primary VHF radio.

The module combines pairs of input signals, digitizes the combined audio channels, and outputs the audio data through an Ethernet port. **Twelve** or **sixteen** input Audio Module units are also available for capturing audio data from **additional** microphones or other sources.

Additional specifications:

- The audio inputs are transformer coupled and can be configured on site as either microphone or line level connections.
- The 8, 12, or 16 audio inputs are mixed 2:1 (either LEFT/RIGHT for microphones, or TX/RX for VHF) to produce 4, 6, or 8 single-ended digital signal streams respectively.
- Separate level control potentiometers are located on the PCB, and can be adjusted using a screwdriver. These levels are **preset** during manufacturing.
- The audio signals are sampled to 12-bit resolution. The resulting digitized data stream is broadcast across an Ethernet cable for storage.
- The Audio Module Ethernet output is connected to a dedicated Ethernet port on the DMM.

## Chapter 1: System Overview

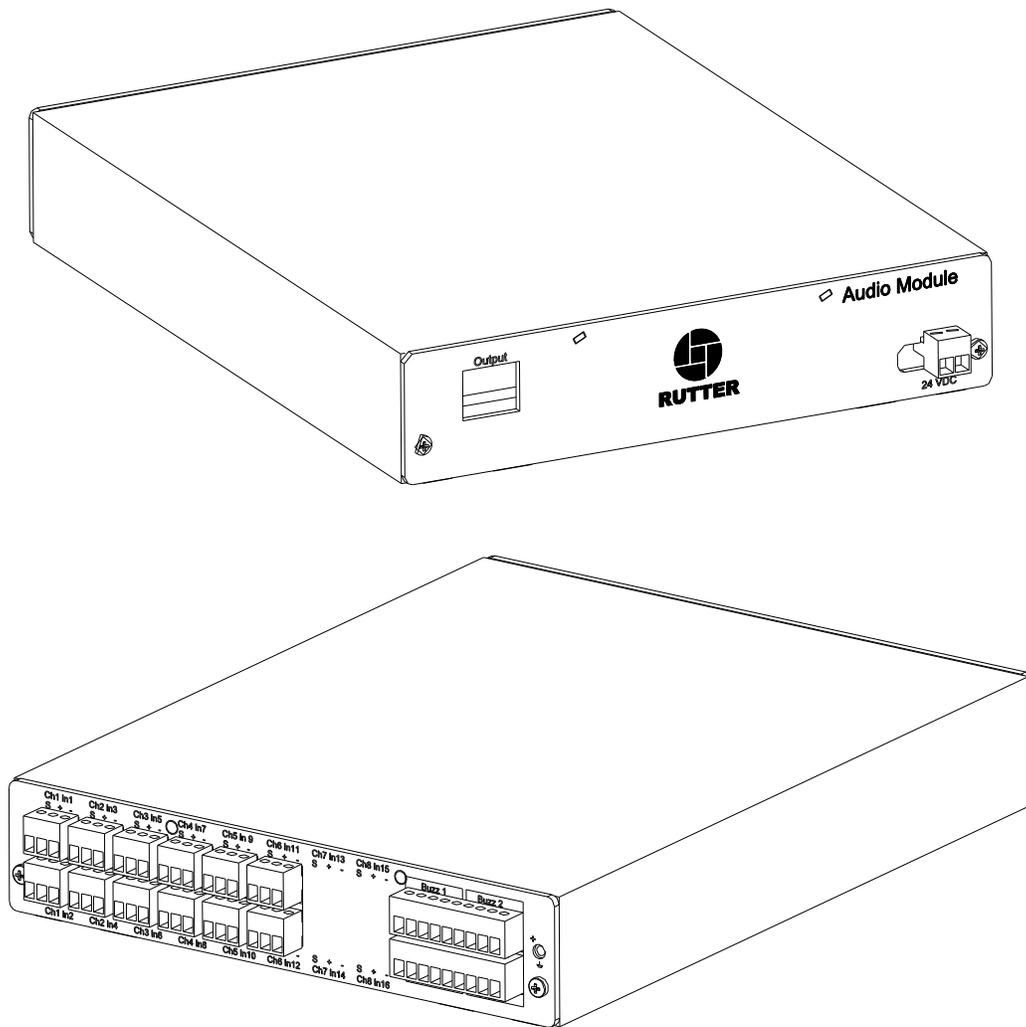


Figure 1-9 – 12-Input (6-Channel) Audio Module

There are 2 types of microphones available with the VDR-100G2:

- The indoor microphones are condenser style boundary microphones, ordinarily mounted to the ceiling in the bridge area, with a junction box mounted above the ceiling for cable connection;
- The outdoor (external) microphone has an externally mounted wiring junction box; and
- Both microphone assemblies include a microphone test buzzer.

## Chapter 1: System Overview

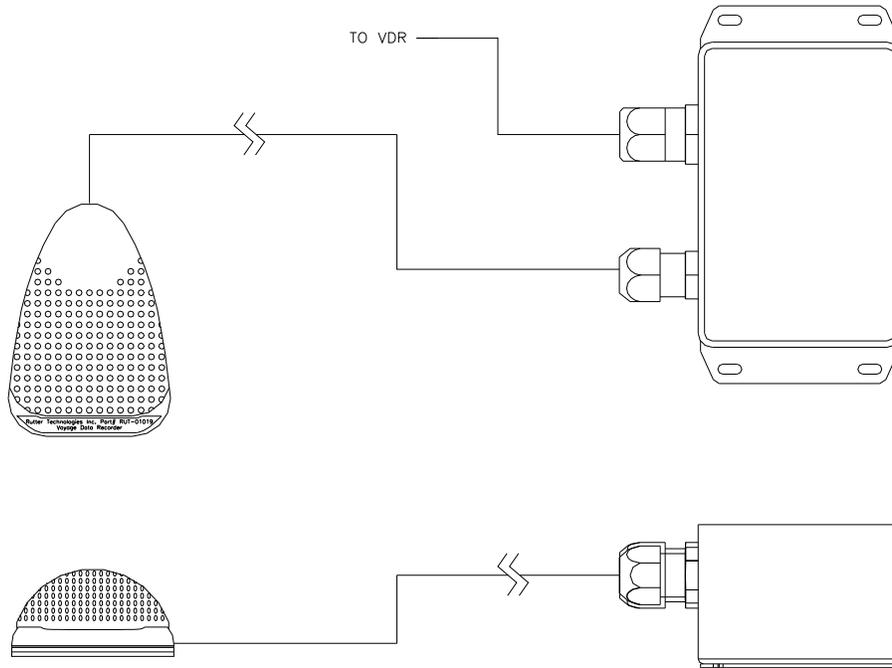


Figure 1-10 - Indoor Microphone

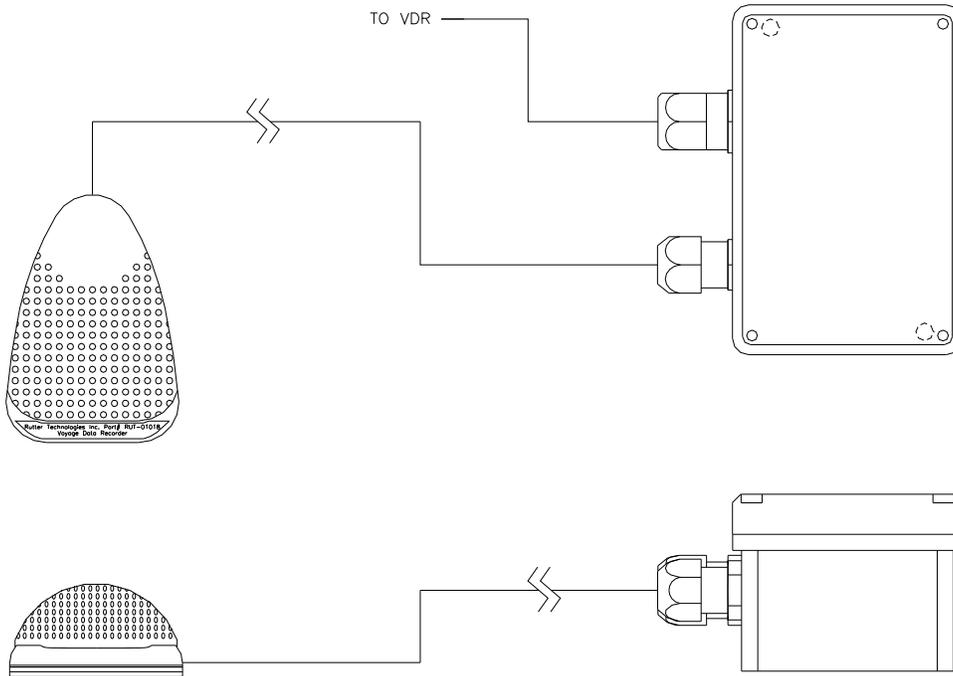


Figure 1-11 - Outdoor Microphone

## Chapter 1: System Overview

### 1.1.2.2 Video Module

The **Video Module** is an autonomous video capture and broadcast device. It has 1 input port for capturing images from a dedicated buffered output port of the primary radar. The module digitizes the video signals and outputs the video data through an Ethernet port. Video modules with up to 4 inputs are also available for capturing images from additional video displays.

The module provides periodic updates of RGB images. For maximum flexibility, the board holds sufficient memory to accommodate 1600 x 1200 x 24-bit colour images and refresh rates up to 85Hz. For maximum capability, the A/D samples at up to 170MHz, with a clock inversion option that allows larger images to be sampled by interleaving 2 consecutive frames.

The Data Management Module (DMM) initiates the capture of video information and specifies its configuration. This includes:

- The video channel to be digitized.
- The sources of the vertical and horizontal syncs.
- The coefficients for the PLL-generated pixel clock (or selection of an external clock).
- The dimensions (number of samples and lines) of the captured frame.

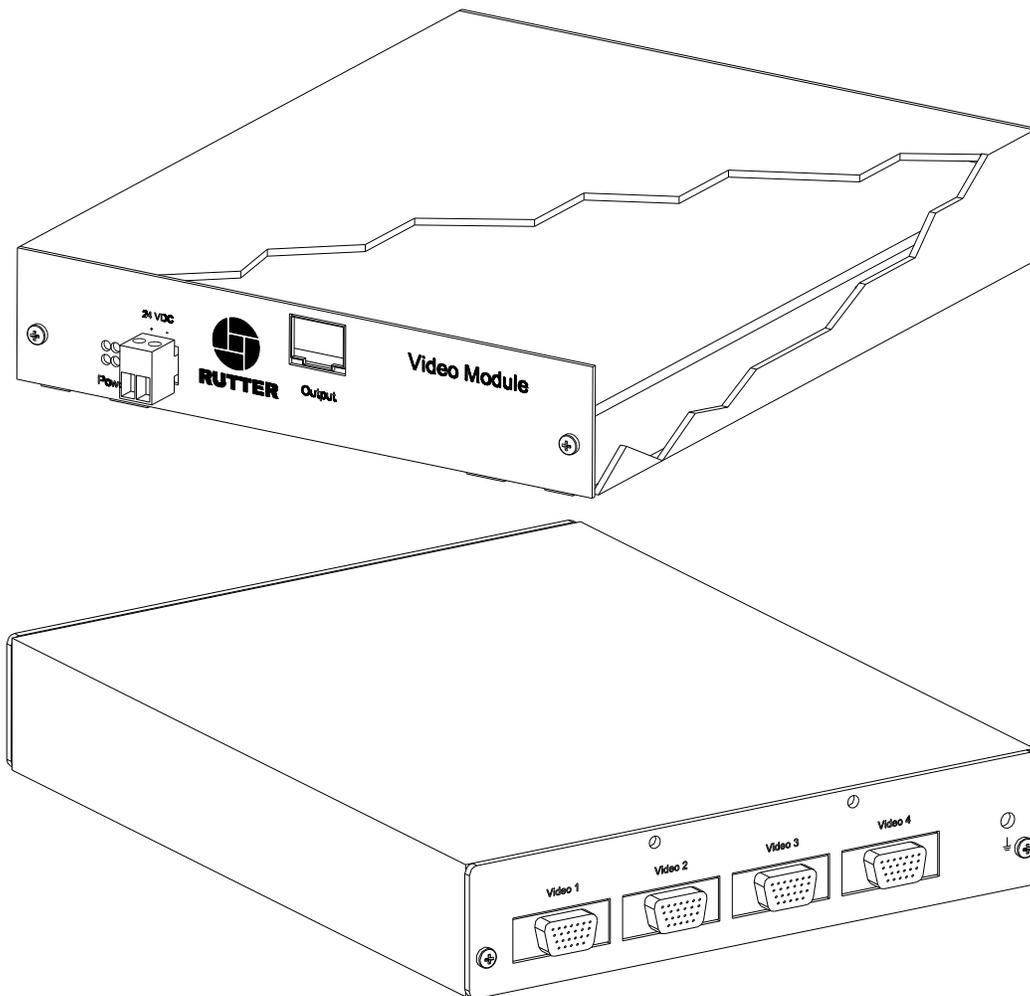


Figure 1-12 - Video Module

## Chapter 1: System Overview

### 1.1.2.3 NMEA Input Modules

The **NMEA Input Modules** provide connection to all IMO-required data items in both NMEA 0183/IEC 61162 and limited ASCII data formats. NMEA modules multiplex up to 8 NMEA-0183 data streams from shipboard systems onto a single RS-232/422 serial data channel, and simultaneously on an Ethernet connection (UDP). Captured data is sent to the DMM via an Ethernet connection for storage and eventual retrieval.

These modules use embedded microprocessor technology with real-time buffer storage to handle simultaneous arrival of data on multiple channels without conflict. Additionally:

- An efficient anti-collision algorithm preserves the integrity of the data even at high incoming data rates.
- Data is handled on a first-in-first-out basis, assembled, and then transmitted via the serial output port to the receiving computer or data logger.

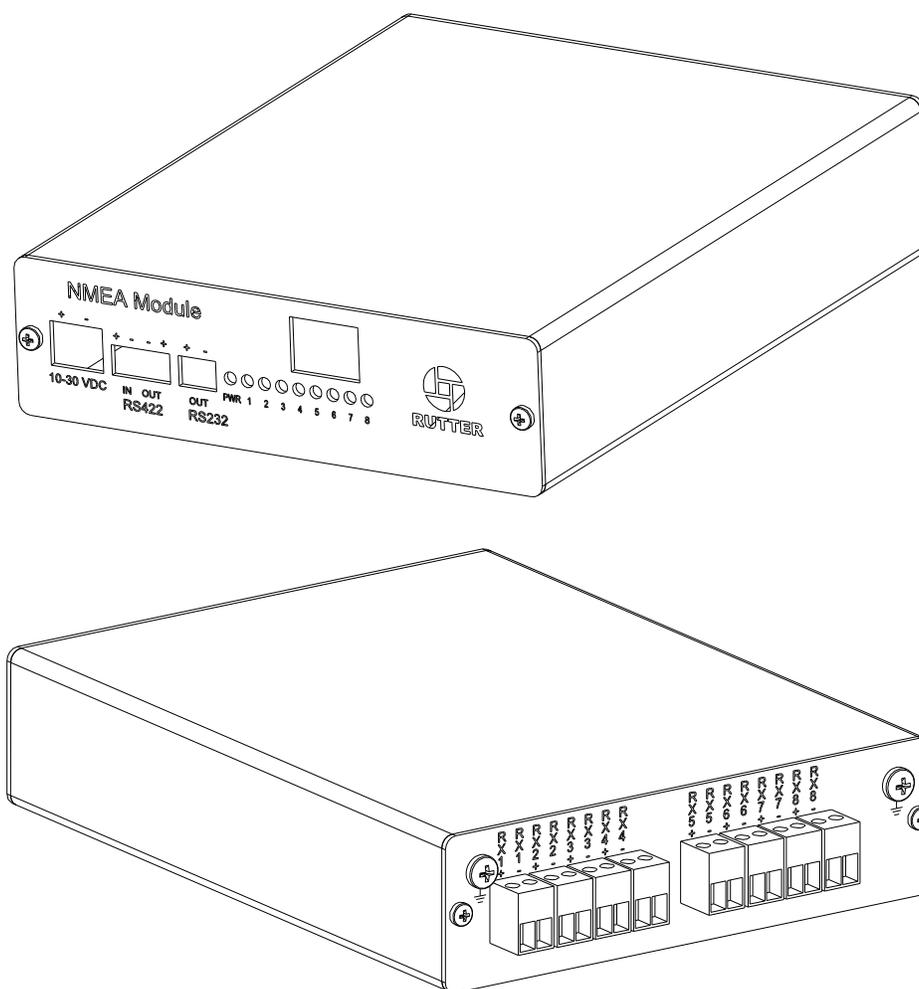


Figure 1-13 – NMEA Input Module

## Chapter 1: System Overview

### 1.1.3 Operation & Alarm Unit (OAU)

The **Operation & Alarm Unit (OAU)** provides a visible and audible alarm in the event of a VDR-100G2 error condition. Using an output connection to a vessel's central bridge alarm system, the OAU alerts an Integrated Bridge System (IBS) of any VDR-100G2 system failures or error conditions. The alarm unit is also used to initiate an IMO required download operation on the VDR-100G2.

The OAU has 3 primary functions:

- Alert the ship's officer on watch of any detected failure within the VDR-100G2.
- Allow a user to secure recorded data. This action must be taken within 24 hours of any incident to prevent the recording of the incident from being overwritten.
- Allow a user to copy current or secured data to the USB Memory Stick (applicable only to VDR-100G2 version 4.05.00 and later).
- Allow a user to connect or disconnect, as well as copy secured data, to the optional RSM.

The unit has a simple menu interface which allows a user to secure the recorded data and enable or disable the optional RSM. It is equipped with:

- Audible and visual alarm indicators
- A 12-button keypad
- A 4 x 20 character LED
- An output for monitoring in a central alarm system

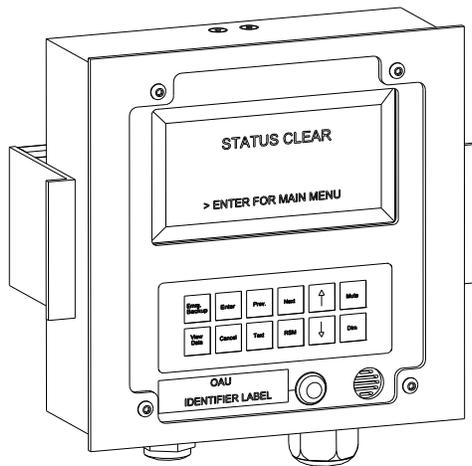


Figure 1-14 - Operation & Alarm Unit

### 1.1.4 Final Recording Medium (FRM/SFRM)

The **Final Recording Medium (FRM/SFRM)** is a solid-state storage unit capable of storing 12 hours of VDR-100G2 data in compliance with IMO resolution A.861(20.).

Additional information:

- The primary function of the FRM/SFRM is to provide a protective capsule for the IMO required data acquired by the VDR. This data will be used, in the event of an incident, by an accident investigation team.
- The FRM/SFRM is mounted on the exterior deck of the ship and connected to the DMM.
- The FRM/SFRM receives data from the VDR via an Ethernet link.

## Chapter 1: System Overview

### 1.1.4.1 L3 HVR/SVR Fixed FRM/SFRM Capsule

The L3 HVR/SVR Fixed FRM/SFRM Capsules contain non-volatile memory (Flash), intended to store ship parameters in real time. The storage memory will continually store the last 12 hours (minimum) of received data. The L3 HVR-01 Fixed FRM Capsule and the L3 SVR-01 Fixed SFRM Capsule contain 1.75 GB of non-volatile memory. The L3 HVR-02 Fixed FRM Capsule and the L3 SVR-02 Fixed SFRM Capsule contain 2 GB of non-volatile memory.

The interface between the VDR-100G2S and the memory capsule is a standard 10/100 Base-T Ethernet connection using TCP/IP standard protocol.

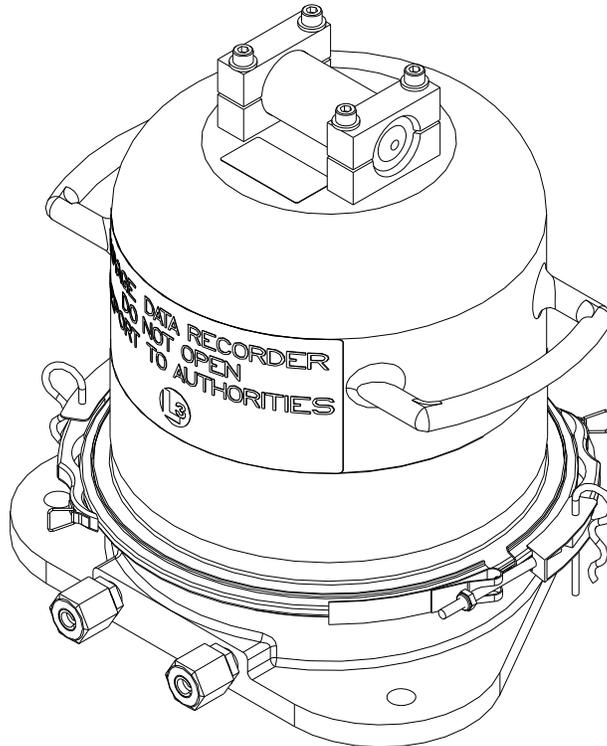


Figure 1-15 – VDR-100G2 – L3 HVR-01 Fixed FRM Capsule

## Chapter 1: System Overview



Figure 1-16 - VDR-100G2 – L3 HVR-02 Fixed FRM Capsule

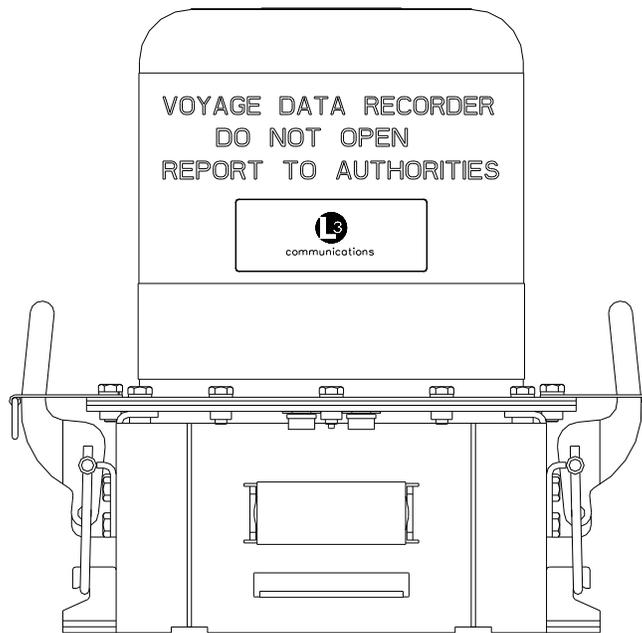


Figure 1-17 - VDR-100G2S – L3 SVR-01 Fixed SFRM Capsule

## Chapter 1: System Overview

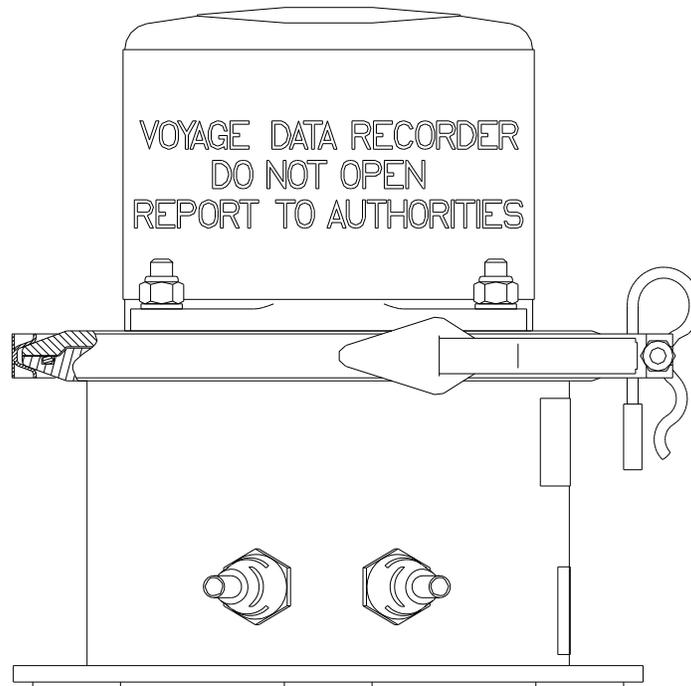


Figure 1-18 - VDR-100G2S - L3 SVR-02 Fixed SFRM Capsule

### 1.1.4.2 JoTron Float-Free SFRM Capsule

The JoTron Float-Free SFRM Capsule is a combined SFRM and Cospas-Sarsat EPIRB (Emergency Positioning Indicating Radio Beacon), approved for use with the VDR-100G2S.

The capsule contains a memory module with a standard 1.75 GB storage capacity and 10Mb Ethernet with TCP/IP interface. The capsule will store 12 hours of captured data. In a situation where a ship may be sinking, the capsule will float free while transmitting both its position and MMSI for at least seven (7) days.

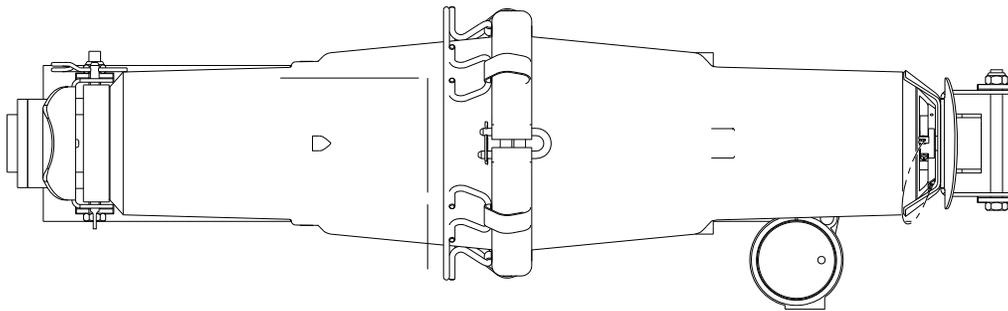


Figure 1-19 - Jotron Float-Free SFRM Capsule

## Chapter 1: System Overview

### 1.1.4.3 Rutter-ACR Float-Free SFRM Capsule

The Rutter-ACR Float-Free SFRM Capsule contains non-volatile memory (Flash), intended to store ship parameters in real time. The storage memory will continually store the last 12 hours (minimum) of received data.

The capsule contains a memory module with 4 GB of storage capacity. The interface between the VDR-100G2S and the memory capsule is a standard 10/100 Base-T Ethernet connection using TCP/IP standard protocol. Power for the capsule is provided over the same Ethernet cable using PoE (Power Over Ethernet). This feature has the advantage in that a separate power cable is not required.

In a situation where a ship may be sinking, the capsule will float free while transmitting both its position and MMSI for at least 7 days.

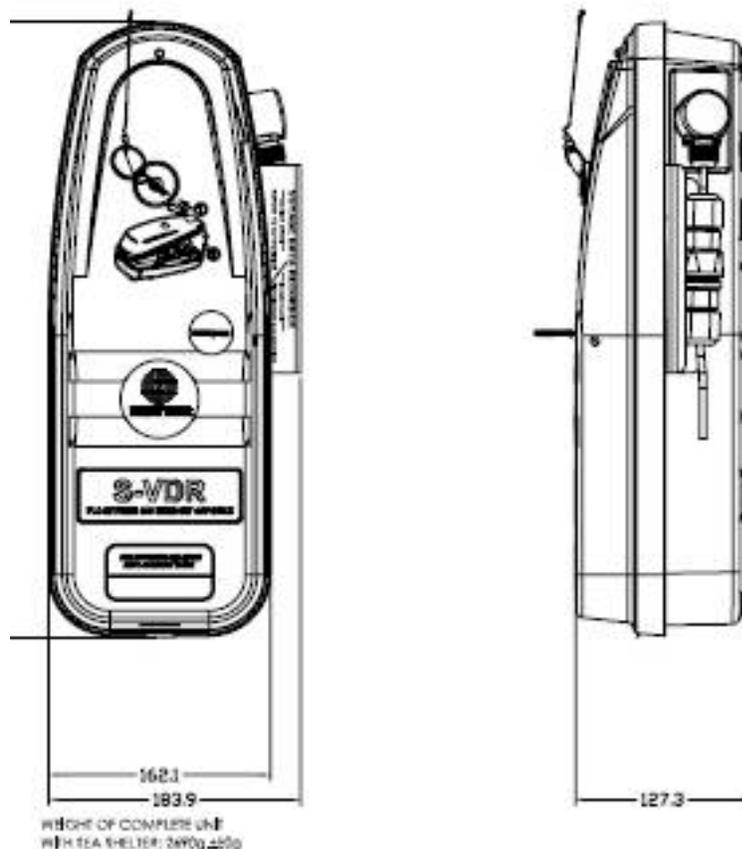


Figure 1-20 - Rutter-ACR Float-Free SFRM Capsule

### 1.1.4.4 Rutter FRM (RUT-02447) Fixed Capsule

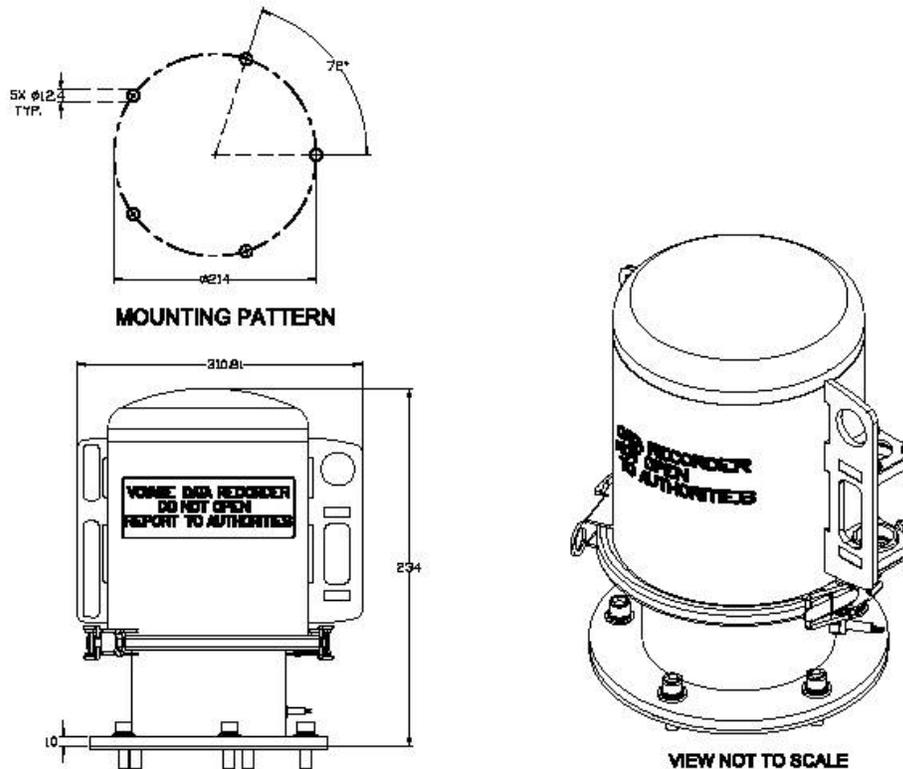


Figure 1-21 - The Rutter FRM (RUT-02447) Capsule

The Rutter FRM (RUT-02447) Fixed Capsule contains non-volatile memory (Flash), intended to store ship parameters in real time. The storage memory will continually store the last 12 hours (minimum) of received data.

The capsule contains a memory module with 4GB of storage capacity. The interface between the VDR-100G2S and the memory capsule is a standard 10/100 Base-T Ethernet connection using TCP/IP standard protocol.

### 1.1.5 Remote Storage Module (RSM)

The **Remote Storage Module (RSM)** is an optional data storage device which provides the ability to archive longer periods of recorded data, or a means to transport copies of recorded data.

The module:

- Has an Ethernet interface to accept data from the VDR and a USB2.0 port which allows the stored data to be retrieved and/or reviewed on any modern PC.
- Sufficient to archive 250GB of data, or can be used to retrieve several previously secured data sets.

When the RSM is supplied as a data retrieval device, a universal AC adapter is included. When supplied with the extended archiving software module, universal AC and 24VDC power supplies are included.

## Chapter 1: System Overview

The RSM is similar to the FRM, except:

- It is not designed to survive extreme conditions.
- It has a much larger storage capacity.
- It is small and easy to transport.

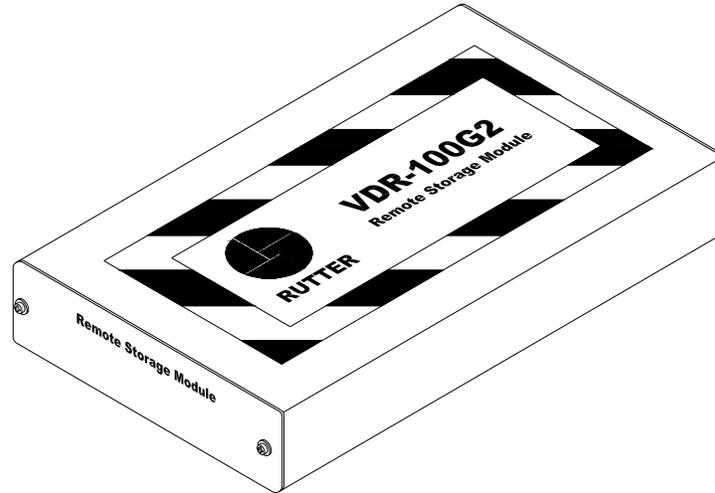


Figure 1-22 - Remote Storage Module

### 1.1.6 External Data Interfaces

The **External Data Interfaces**, used to sense data signals from ship's equipment in order to provide 61162/NMEA0183 compliant data sentences, are recorded via the NMEA Modules described earlier in this documentation. Non-compliant data can be recorded using one (1) of the following interfaces:

#### DataAnalog

The DataAnalog Input Module monitors the status of eight (8) analog input signals and indicates the voltage or current which corresponds to the equipment setting on each input channel via an NMEA-0183/IEC 61162 format data sentence transmitted once per second. The DataAnalog interface has eight (8) channels and can simultaneously monitor signals from four (4) separate systems while maintaining isolation between them. This interface is ideally suited to measure the electrical indications for order and response from four (4) shipboard systems (i.e., Rudder Order/Response, ME RPM Order/Response, Pitch Order/Response, Bow Thruster Order and Response).

#### DataDiscrete

Discrete inputs can be monitored via Rutter Technologies' DataDiscrete interface unit. Discrete inputs are data items recorded simply as open/closed or on/off. These discrete inputs reflect their status by the presence or absence of discrete voltage levels or by the closure of a set of relay contacts. The DataDiscrete input module monitors discrete input points and outputs an NMEA-0183/IEC 61162 format data sentence to represent them. This output is connected to the VDR-100G2 through a NMEA input channel on the NMEA Module. The DataDiscrete interface is a microprocessor-based unit that incorporates 24 opto-isolated inputs arranged in four (4) banks of six (6) (with each bank having its own common return).

## Chapter 1: System Overview

### Additional Interfaces

A number of additional Rutter Technologies interfacing devices, including the DataGyro, DataProtocol, DataSplitter, and DataSynchro can be supplied to convert data from shipboard systems to an output sentence in compliance with the IEC 61162/NMEA0183 format. For further details, contact Rutter Technologies Inc. or an authorized Rutter dealer.

See *Appendix C – Data Interface Documentation* for further details.

## 1.2 Client / Playback PC

An optional Client PC connected to the DMM via an Ethernet connection may be used for two (2) purposes:

- Downloading data from the VDR
- Data playback

When the Client / Playback PC is connected to the VDR-100G2 via an Ethernet connection, previously recorded data may be downloaded at any time during normal system operation without interrupting the VDR-100G2 recording process. This downloaded data may then be replayed via the playback software.

The playback software presents radar video and IEC 61162 data on the PC display and outputs the audio through the system sound card. The audio channels may be mixed on playback or played back separately, permitting localization of sound sources. During playback, all the primary navigation data required for operating an electronic chart system or an electronic chart display and information system is available via the serial port on the playback PC. Software associated with the optional Client PC is described in *Section **Error! Reference source not found.** - **Error! Reference source not found.*** below.

### 1.2.1.1 Minimum Requirements

- Pentium III or higher processor
- 256 MB of memory
- SVGA Video port and monitor (it is recommended that the monitor be 15" or larger and supports a non-scrollable resolution of 1024x768 or greater)
- Audio hardware with PC speakers or headphones
- 100 Base-TX Ethernet Interface
- USB 2.0 Port
- Serial data port (if external ECDIS display support is required)
- 16X DVD-R/DVD-RW drive
- 80 GB or larger internal Hard Disk Drive
- USB, AT or PS/2 mouse and keyboard
- Power Supply: Dual Input Voltage: 115V at 60 Hz; or 220V at 50 Hz
- English O/S Edition: Windows 2000 or Windows XP (recommended).

### 1.3 System Overview Drawings

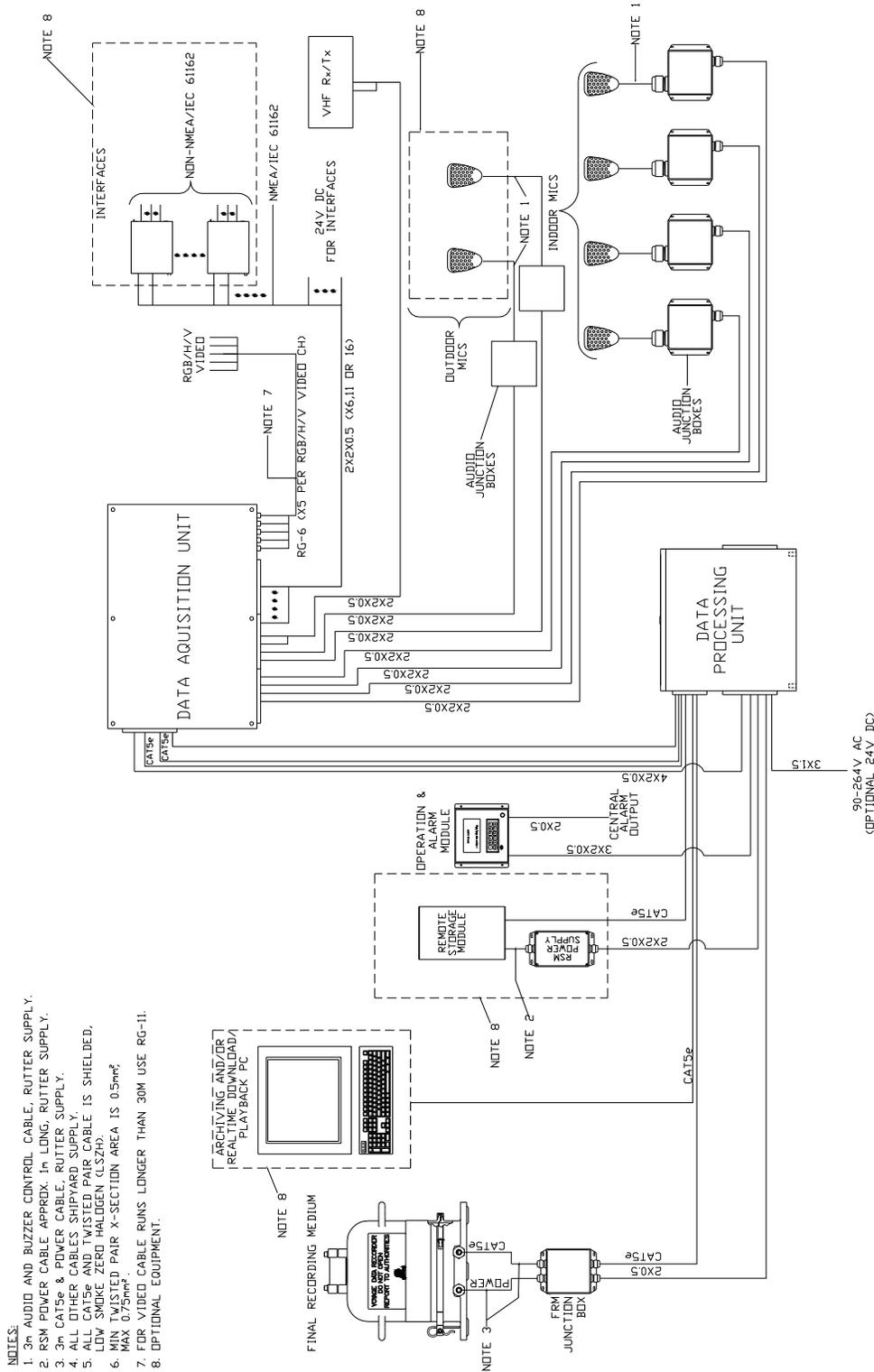


Figure 1-23 - System Overview (with DAU)



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## 2 VDR-100G2 TECHNICAL SPECIFICATIONS

The following tables contain a summary of the technical specifications for the Rutter VDR-100G2 system components:

Power Consumption	
AC Power (220VAC) Units prior to Serial Number 20107XX0900	Normal Operating Current (approx): 1.0 A @ 220VAC (approx. 220 Watts) Max Operating Current (approx): 2.9 A @ 220 VAC (during battery charge) Recommended Ship Main Breaker: 10 A @ 220VAC
AC Power (120VAC) Units prior to Serial Number 20107XX0900	Normal Operating Current (approx): 2.0 A @ 120VAC (approx. 220 Watts) Max Operating Current (approx): 5.3 A @ 120 VAC (during battery charge) Recommended Ship Main Breaker: 15 A @ 120VAC
AC Power (220VAC) Units after (and including) Serial Number 20107XX0900	Normal Operating Current (approx): 1.0 A @ 220VAC (approx. 220 Watts) Max Operating Current (approx): 2.0 A @ 220 VAC (during battery charge) Recommended Ship Main Breaker: 10 A @ 220VAC
AC Power (120VAC) Units after (and including) Serial Number 20107XX0900	Normal Operating Current (approx): 2.0 A @ 120VAC (approx. 220 Watts) Max Operating Current (approx): 4.0 A @ 120 VAC (during battery charge) Recommended Ship Main Breaker: 15 A @ 120VAC
DC Power (24 VDC)	Normal Operating Current (approx): 9 A @ 24VDC Max Operating Current (approx): 26.7 A @ 24VDC Recommended Ship Main Breaker: 30 A @ 24VDC

DPU Specifications	
Weight	43.2Kg
Dimensions	350 x 400 x 400mm (H x W x D)
Input Power	85 -264 VAC 50-60Hz (optional 24VDC)
Output Power	24VDC to FRM, optional DAU, Alarm Module, optional Remote Storage and optional interfaces
Data Ports	Ethernet input from Audio, Video, and NMEA Modules Ethernet Output to FRM Ethernet Output to Optional Remote Storage and/or Download PC RS232 Input/Output for Alarm Module RS232 Input/Output for Power Control Module
Battery Backup Power	2 Hrs @ -15 Deg C for Audio system, Alarm Module, DMM, and FRM
Data Storage Capacity	24 hours of most current data (Units prior to S/N: 20105020037, with the exception of S/N: 20105020034, have a standard storage capacity of 12 hours of current data) Plus multiple secured data sets and 30 days extended NMEA

## Chapter 2: Technical Specifications

<b>DAU Specifications (the DAU Cabinet is optional and not applicable to VDR-100G2S)</b>	
Weight	16.8Kg
Dimensions	400 x 600 x 150mm (H x W x D)
Input Power	24VDC from DPU
Output Power	24VDC to remote interfaces (Max 6A)
Audio Input Capacity	8, 12, or 16 Audio inputs Flexible Microphone and VHF/Line level combinations
Video Input Capacity	Up to 4 video input ports 170MHz pixel rate with 2
Data Input Capacity	8 or 16 NMEA 0183/IEC61162 Data Input ports. Interfaces for converting non-standard signal formats are to be DIN rail mounted as close to the signal source as practical. The following interfaces are available for remote mounting: <ul style="list-style-type: none"> <li>• DataAnalog analog signals interface</li> <li>• DataDiscrete contact signal interface</li> <li>• DataGyro gyrocompass interface</li> <li>• DataSynchro synchro type gyrocompass interface</li> <li>• DataSplitter NMEA splitter interface</li> <li>• DataProtocol protocol conversion interface</li> </ul>

<b>FRM/SFRM Specifications</b>	
Weight	L3 HVR-02 Fixed FRM Capsule: 10.9kg; L3 SVR-02 Fixed SFRM Capsule: 10.4kg; Jotron Float-Free SFRM Capsule: 3.5kg; Rutter-ACR Float-Free SFRM Capsule (EPIRB Only): 1.021kg; Rutter FRM (RUT-02447) Capsule: 18kg
Dimensions	L3 HVR-02 Fixed FRM Capsule: Height: 218.3mm, Diameter: 206.5mm, Base Width: 182.39mm L3 SVR-02 Fixed SFRM Capsule: Height: 215.17mm, Diameter: 206.5mm, Base Width: 182.39mm JoTron Float-Free SFRM Capsule: Height: 695mm, Depth: 226mm, Width: 205mm Rutter-ACR Float-Free SFRM Capsule (EPIRB Only): Height: 178mm, Depth: 108mm, Width: 92mm Rutter FRM (RUT-02447) Capsule: Height: 350mm, Diameter: 220mm
Input Power	24VDC
Memory Type	L3 HVR-02 Fixed FRM Capsule: Solid State L3 SVR-02 Fixed SFRM Capsule: Solid State Rutter FRM (RUT-02447) Capsule: Solid State Jotron Float-Free SFRM Capsule: Solid State Rutter-ACR Float-Free SFRM Capsule: Solid State
Capacity	12-hour minimum ( 1.75GB )

## Chapter 2: Technical Specifications

OAU Specifications	
Weight	1.4Kg
Dimensions	With front mounting plate: 144 x 144 x 52.3mm Without front mounting plate: 136.6 x 136.6 x 50mm
Input Power	24VDC
Audible Alarm	60dBA

Indoor Microphone Assembly Specifications	
Weight	0.95Kg
Dimensions	Mic: 64 x 92 x 31mm / Box: 80 x 149.1 x 56.5mm
Input Power	Phantom Power

Optional Outdoor Microphone Specifications	
Weight	1.17Kg
Dimensions	Mic: 64 x 92 x 31mm / Box: 85.1 x 129.9 x 65.7mm
Input Power	Phantom Power

Optional RSM Specifications	
Weight	1.36Kg
Dimensions	35 x 127 x 214mm
Input Power	24VDC or Universal AC with external power supply
Capacity	250GB

Optional RSM 24VDC Power Supply Specifications	
Weight	1.0Kg
Dimensions	138 x 166.2 x 50mm
Input Power	24VDC

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## 3 PLANNING

In order to successfully complete a VDR-100G2 installation, it is recommended that adequate time be allotted for an installation planning stage. This section provides information on required tools, cabling specifications, compass safe distances, and power requirements.

Additionally, dimensional information is provided below for VDR-100G2 components, including the DAU, DPU, FRM, OAU, external interfaces such as the DataDiscrete, DataAnalog, and DataProtocol, and bridge microphones.

### 3.1 Required Tools

At minimum, the following tools are required for a VDR-100G2 installation:

- Multi-meter
- Wire Ferrule Crimper
- No. 2 Phillips
- Socket Wrench with 15" extension and 13mm Deep Well Socket
- Diagonal Cutters
- RG6/11 Coax Crimper
- RJ45 Crimper
- Wire Stripper
- Terminal Screwdriver
- No. 30 Torx Screwdriver
- Set Allen Keys (Metric)
- Laptop with 10/100 base-T Ethernet Interface

### 3.2 Cabling Specification

Recommended cable types for the VDR-100G2 are specified in *Table 3-1 - Cabling Specifications*. Cables must be marine grade. Exact cable types will vary due to ship type and various regulatory agency requirements. Please consult the agency responsible for the ship in question.

Data Type	Specification	Description
NMEA 0183 / IEC61162	2x2x0.5	Twisted pair with an overall shield. Individual conductors are stranded. Two pair per cable
OAU	3x2x0.5	Twisted pair with an overall shield. Individual conductors are stranded. Three pair per cable
Audio, VHF Recording and Buzzer Activation	2x2x0.5	Twisted pair with an overall shield. Individual conductors are stranded. Three pair per cable
Radar Video Recording	RG6 A/U < 30m RG11 A/U > 30m	75 Ohm Coaxial Cable. The actual number of cables will vary depending on the type of video source.
TCP/IP for Download / Playback Computer and Final Recording Medium	Category 5e FTP	The Ethernet interface is a 10/100base-FTP (shielded twisted pair), category 5e with flammability per IEC 95.
Power for Final Recording Medium	3x1.5	Power consumption is assumed to be 7 Watts. The maximum cable length should be 75 meters or less.
Power for Main Cabinet	3x1.5	90-264Vac - 50/60Hz (Optional 19-28VDC)
Power for Interfaces	2x0.5	24VDC

*Table 3-1 - Cabling Specifications*



**Note!** Rutter Technologies recommends the above specifications. Alternate cables may be suitable for particular installations. Contact Rutter Technologies for verification prior to using cabling other than that specified in the table above.

### 3.2.1 Additional Cable Information

In addition to the above specifications, the information provided below may be useful:

#### 3.2.1.1 Data Cables

0.5mm<sup>2</sup> cable - 2 twisted pair

Reference: TX@(I) 2X2X0.5

Type: Marine Grade – Low Smoke, Halogen Free, Fire Retardant

Approval: ABS, BV, DNV, GL, LRS or RINA

0.5mm<sup>2</sup> cable - 4 twisted pair

Reference: TX@(I) 4X2X0.5

Type: Marine Grade – Low Smoke, Halogen Free, Fire Retardant

Approval: ABS, BV, DNV, GL, LRS or RINA

0.75mm<sup>2</sup> cable - 2 twisted pair

Reference: TX@(I) 2X2X0.75

Type: Marine Grade – Low Smoke, Halogen Free, Fire Retardant

Approval: ABS, BV, DNV, GL, LRS or RINA

0.75mm<sup>2</sup> cable - 4 twisted pair

Reference: TX@(I) 4X2X0.75

Type: Marine Grade – Low Smoke, Halogen Free, Fire Retardant

Approval: ABS, BV, DNV, GL, LRS or RINA

#### 3.2.1.2 Power Supply Cable

3x1.5mm<sup>2</sup> cable

Reference: MPRX@ 3x1.5

Type: Marine Grade– Low Smoke, Halogen Free, Fire Retardant

Approval: ABS, BV, DNV, GL, LRS or RINA

#### 3.2.1.3 Video Cable

75 ohm Coaxial cable - RG11 for cable lengths > 30m

Reference: FLAMEX RG11AU

Type: Marine Grade – Low Smoke, Halogen Free, Fire Retardant

75 ohm Coaxial cable – RG6 for cable lengths < 30m

Reference: FLAMEX RG11AU

Type: Marine Grade – Low Smoke, Halogen Free, Fire Retardant

Approval: ABS, BV, DNV, GL, LRS or RINA

#### 3.2.1.4 FRM Cable

FTP Category 5e cable

Reference: LSZH 4PR 24AWG FF5100 021807 M OF45264

Type: Marine Grade – Low Smoke, Halogen Free, Fire Retardant

## Chapter 3: Planning

Approval: ABS, BV, DNV, GL, LRS or RINA

### 3.3 Power Requirements

The VDR-100G2 has the option of being powered by either AC or DC voltage (specified at the time of order as it is not field configurable):

- The AC input range is 85-264V @ 47-63Hz
- The DC input range is 19-28V
- The output of both power supplies is 27.6VDC @ 18.5A MAX, which is the normal operating voltage of the VDR. If a battery test is executed by the power controller, then the power supply output will drop to 21.5V for duration of 30min.

The power supply also acts as a battery charger, either charging low batteries (bulk) or keeping them fully charged (trickle). The battery input is reverse polarity protected by a crossbar diode and a replaceable fuse.

### 3.4 Data Processing Unit (DPU)

The DPU's cable entry system is a combination of cable plate and grommets. In this system, both the plate and the grommets are split. This allows the cable entry plate to be opened, and cables with molded or pre-wired connectors to be inserted without any modifications. The use of a metal coating, in addition to grommets with conductive tape, help discharge unwanted interferences from the cable sheaths. The DPU is also equipped with a fan and intake vent for cooling.

The DPU measures 400mm x 400mm x 350mm (W x H x D) and is designed to be deck mounted.

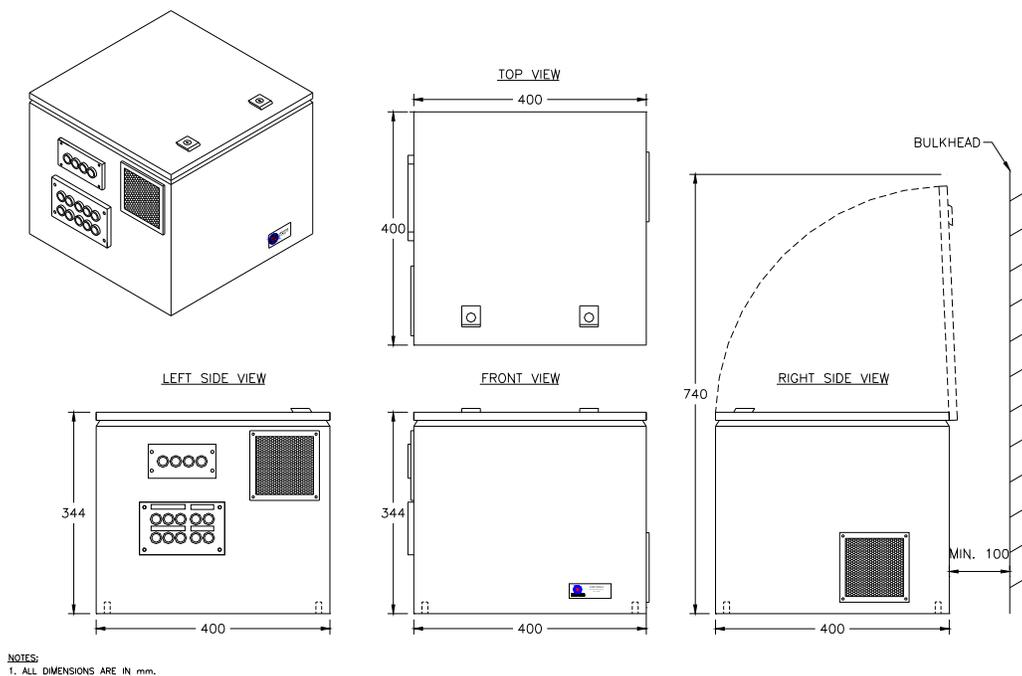


Figure 3-1 - DPU Dimensions

### 3.5 Data Acquisition Unit (DAU)

The DAU is an optional EMC shielded enclosure with a bolt on cover. Similar to the DPU, the DAU's cable entry system is a combination of cable plate and grommets. In this system, both the plate and the grommets are split, allowing the cable entry plate to be opened, and cables with molded or pre-wired connectors to be inserted without any modifications. The use of a metal coating, in addition to grommets with conductive tape, help discharge unwanted interferences from the cable sheaths. Coaxial cable used for video signals are easily connected with BNC connectors.

The DAU measures 600mm x 400mm x 150mm and is designed to be bulkhead mounted.

**NOTES:**

1. ALL DIMENSIONS ARE IN mm.

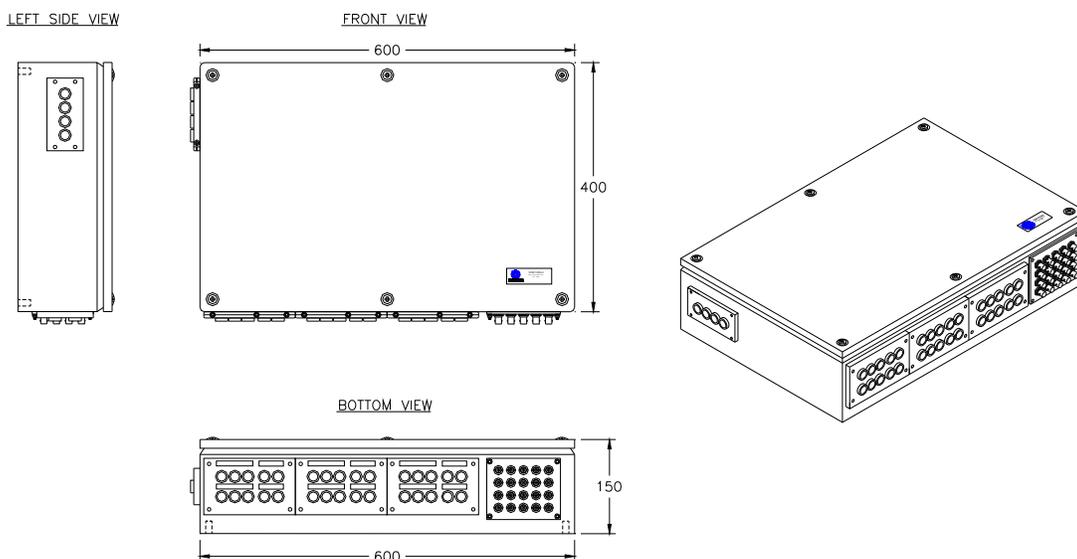


Figure 3-2 - DAU Dimensions

### 3.6 Operation & Alarm Unit (OAU)

The OAU can be **surface** or **flush** mounted:

- It is normally installed in the main conning console but can be placed in any convenient location on the bridge.
- It should be installed on the bridge where it will be **easily accessible** to the operator.

Figure 3-3 - OAU Dimensions illustrates the original OAU, shipped with all VDR-100G2 units prior to serial number 20105050061.

Figure 3-4 - OAU Dimensions (Revised Unit) illustrates the revised OAU. This revised OAU is applicable to all VDR-100G2 units shipped from serial number 20105050061 and forward.

## Chapter 3: Planning

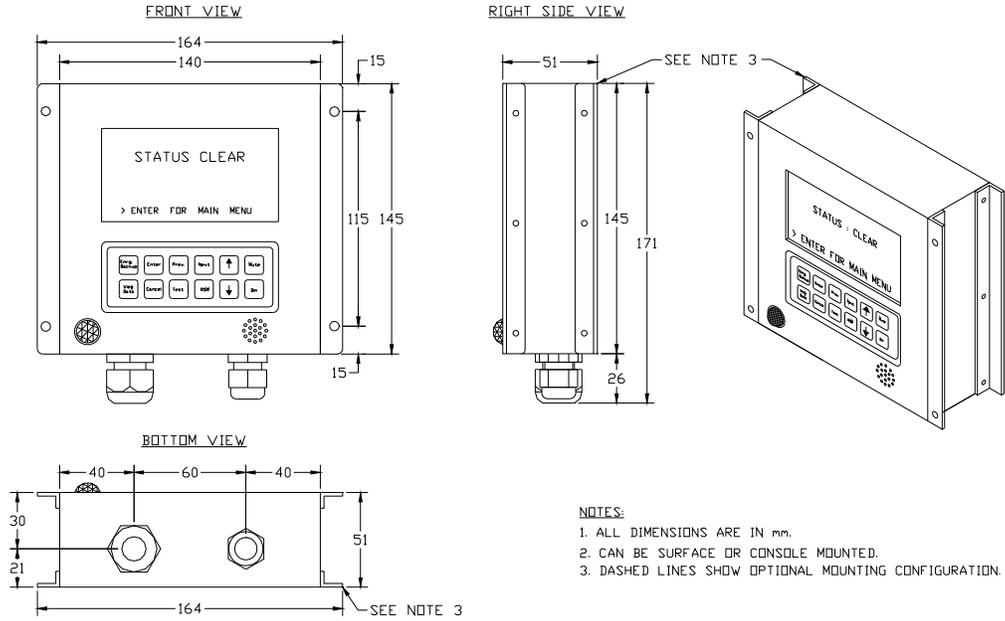


Figure 3-3 - OAU Dimensions

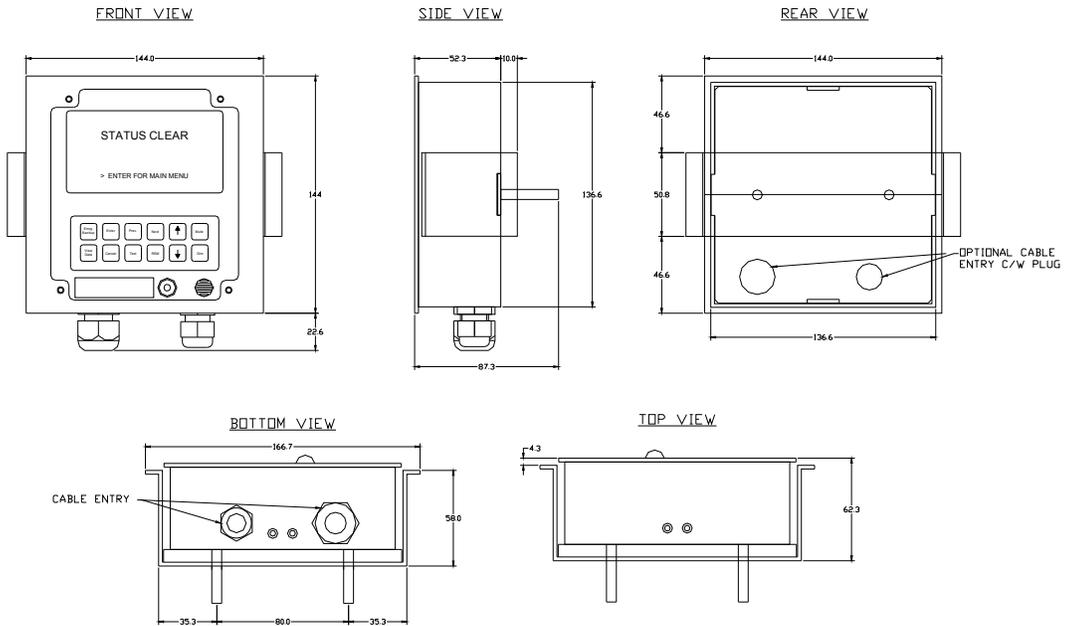


Figure 3-4 - OAU Dimensions (Revised Unit)

### 3.7 Remote Storage Module (RSM)

This module should be mounted in close proximity to the alarm module, where it is easily accessible.

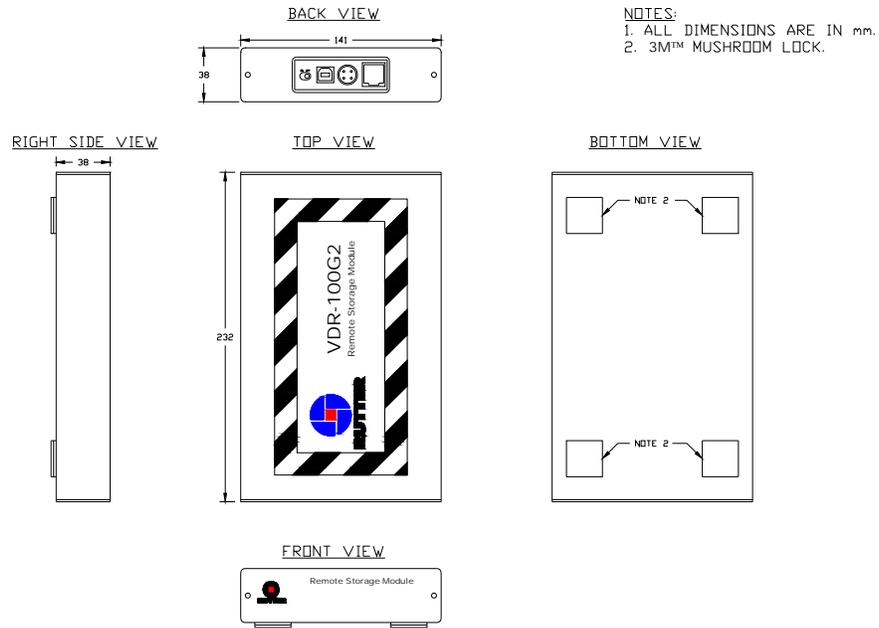


Figure 3-5 - RSM Dimensions

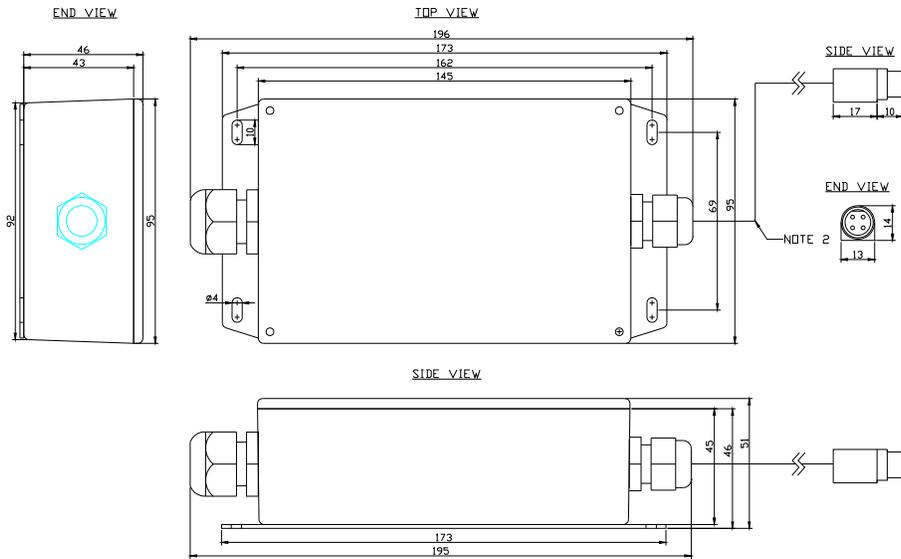


Figure 3-6 - 24 VDC RSM Dimensions

### 3.8 Bridge Microphones

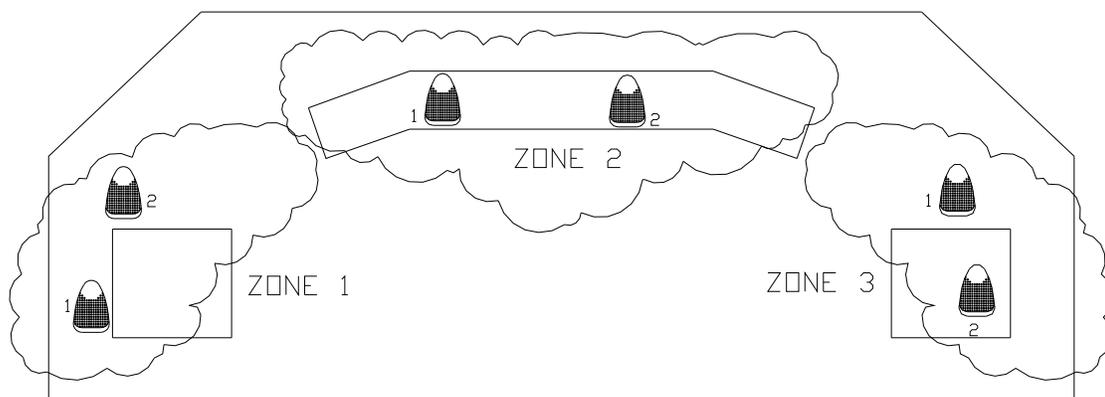
The placement of microphones and audio test sources on the bridge is critical to ensure that all required areas on the bridge that require audio recording are monitored. The areas to be covered are defined in IEC 61996 including:

- Conning stations
- Radar displays
- Chart tables
- All other bridge workstations

The microphones should be installed such that the audio from intercoms, PA systems, and bridge alarms are recorded as far as is practicable.

The bridge is divided, for recording purposes, into physical areas called zones. The number of microphones required to cover the bridge determines the number of zones. In the following diagram, the areas enclosed by clouds represent zones for audio recording. The boxed areas indicate bridge panels or workstations.

*Figure 3-7 - Typical Microphone Zoning (6 Microphones)* illustrates a bridge zoning arrangement for the base VDR-100G2 system, complete with six (6) microphones. The zoning on this system provides three (3) zones with two (2) microphones in each zone.



*Figure 3-7 - Typical Microphone Zoning (6 Microphones)*

Audio testing is performed simultaneously across each zone. The audio test sources for like-numbered microphones (i.e., microphone number two (2) from each zone) are simultaneously activated during testing. For further explanation of microphone installation and testing (including a description of zoning), see *Section 9 - AUDIO TEST SOURCE SETUP*.

It is very important that careful consideration be given to the placement of microphones and the zoning of the bridge, to ensure the bridge audio recording meets the IEC 61996 standard.

## Chapter 3: Planning

### 3.8.1 Coverage Patterns

Care must be taken to avoid over-coverage due to the ambient bridge noise. The external and internal microphone(s):

- have a pickup angle (-3 dB) of 130°,
- have a coverage area of approximately 3m from the front of the microphone,
- should be installed in front of and above the area to be monitored. They can also be installed in front of and below the area to be monitored, depending on the physical configuration of the area.

During the installation of microphones, consider the following:

- All areas are monitored and have adequate coverage.
- Individual microphones should be installed at a distance of at least 4m apart to guarantee there is no over-coverage of an area. Over-coverage will create problems when trying to determine the location of the source when replaying the recorded audio.
- Exterior microphones should be positioned such that they are **shielded from the direct exposure to sea spray and precipitation.**

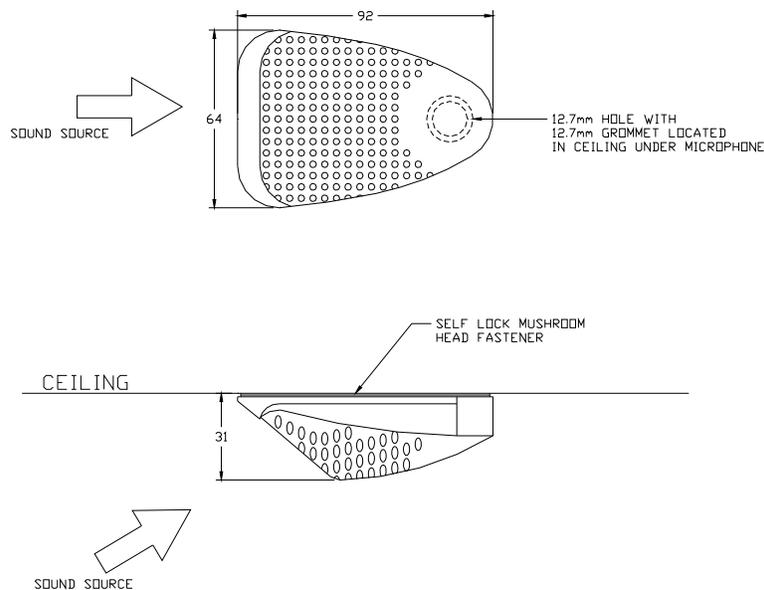


Figure 3-8 - Sound Direction Pick-Up

### 3.9 Final Recording Medium (FRM/SFRM)

The FRM/SFRM protective capsule shall be sited near the bridge on the external deck area of the vessel to maximize the probability of its survival and recovery following an incident. As outlined in IEC 61996, the capsule shall be positioned clear of rigging and other potential obstructions and as near to the centerline of the ship as practically possible.

Criteria to be considered when assessing the optimum position shall include but not be limited to the following:

1. Separation from fuel or other potential fire sources.
2. Separation from probable sources of mechanical damage.
3. Operational environment for continued serviceability.
4. Accessibility for copying of recorded data and for routine maintenance.
5. Facilitation of underwater removal and retrieval by both divers and ROVs. There shall be a clear unobstructed space near the capsule to allow an ROV or diver to work.

The FRM/SFRM is supplied with an interconnect cable. This cable must connect to the VDR-100G2 through a junction box (not provided with VDR-100G2). The Rutter-ACR Float-Free SFRM Capsule, which is supplied with a PoE Ethernet connect box (PS-100), does not require a junction box for connectivity.

The junction box must be shielded and connected to the hull of the vessel. The junction box is normally mounted on the exterior deck and located near the FRM/SFRM and positioned within range of the interconnect cable. All hull penetrations for cables must be fitted with waterproof glands (not provided with VDR-100G2).

- NOTES: UNLESS OTHERWISE SPECIFIED
1. RETRIEVABLE PORTION OF RECORDER IS FLUORESCENT ORANGE. FRONT AND BACK LABELS ARE REFLECTIVE WHITE BACKGROUND WITH BLACK LETTERING. NAMEPLATE IN DETAIL A IS LIGHT GRAY WITH BLACK MARKING.
  2. WEIGHT: 30LBS [13.6kg] NOMINAL (DEPENDENT ON FINAL CONFIGURATION)
  3. DO NOT MOUNT HVR WITHIN 24 INCHES [59cm] OF OTHER STRUCTURES. KEEP AREA AROUND UNIT CLEAR.
  4. ETHERNET CABLE SHALL BE SHIELDED TWISTED PAIR CATEGORY 5, EA/TIA 56B OR IEC 60225. MAX CABLE LENGTH FROM VDR TO PC IS 246 FEET [75 METERS].
  5. MAX CABLE LENGTH FOR AC OR DC POWER IS 246 FEET [75 METERS].
  6. ALL CABLES ARE TO BE COMPLIANT WITH IEC 92.
  7. TIGHTEN SCREWS (ITEM 13) EVENLY TO CREATE A UNIFORM SPACE BETWEEN UPPER AND LOWER BRACKETS (ITEM 12). THEN TORQUE TO SPECIFICATIONS. BOTH SPACES BETWEEN UPPER AND LOWER BRACKETS TO BE WITHIN  $\pm 0.030$  OF EACH OTHER.
  8. TORQUE NUTS ON V-BAND CLAMP (ITEM 10) TO 2045 INCH POUNDS.

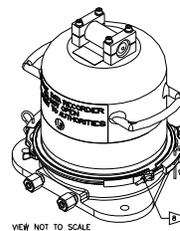
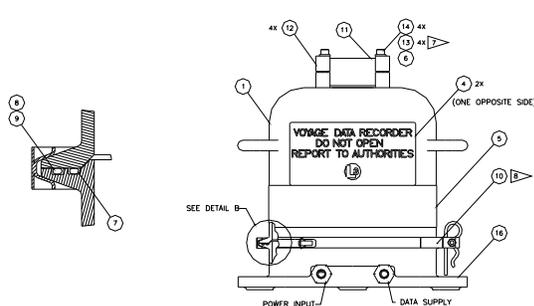
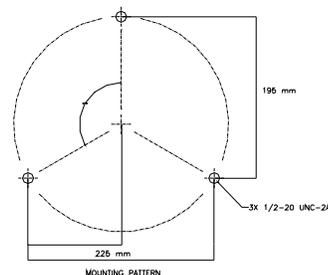
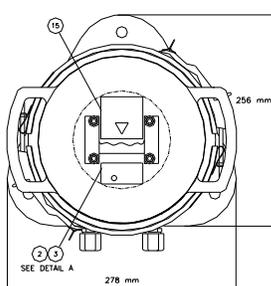


Figure 3-9 –L3 HVR-01Fixed FRM Capsule

## Chapter 3: Planning

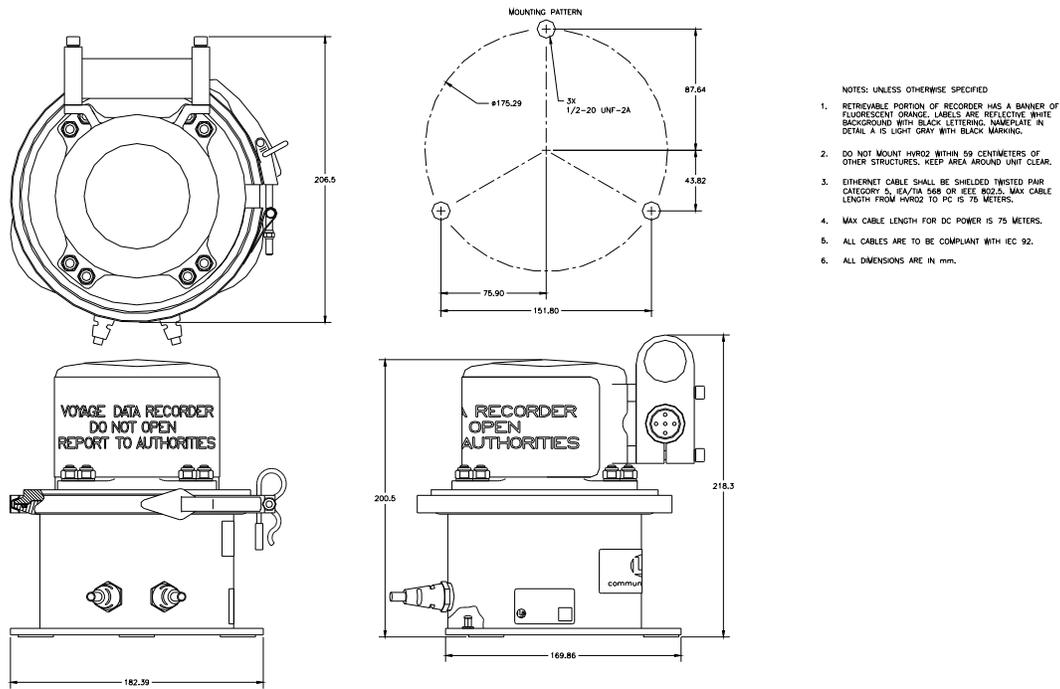


Figure 3-10 - L3 HVR-02 Fixed FRM Capsule

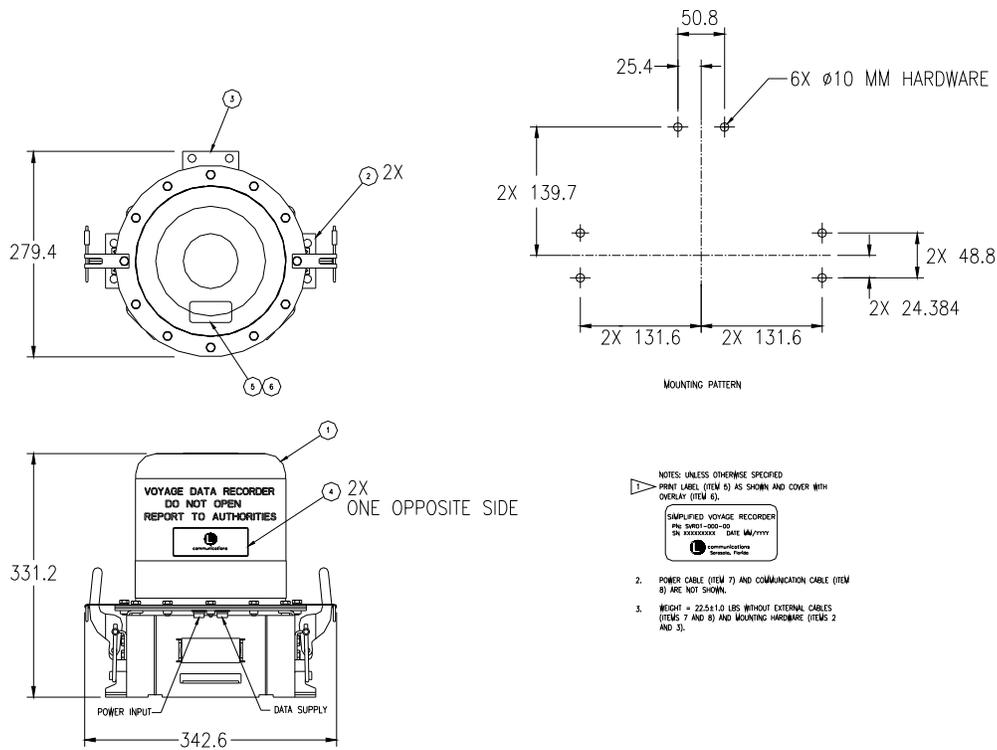


Figure 3-11 - L3 SVR-01 Fixed SFRM Capsule

### Chapter 3: Planning

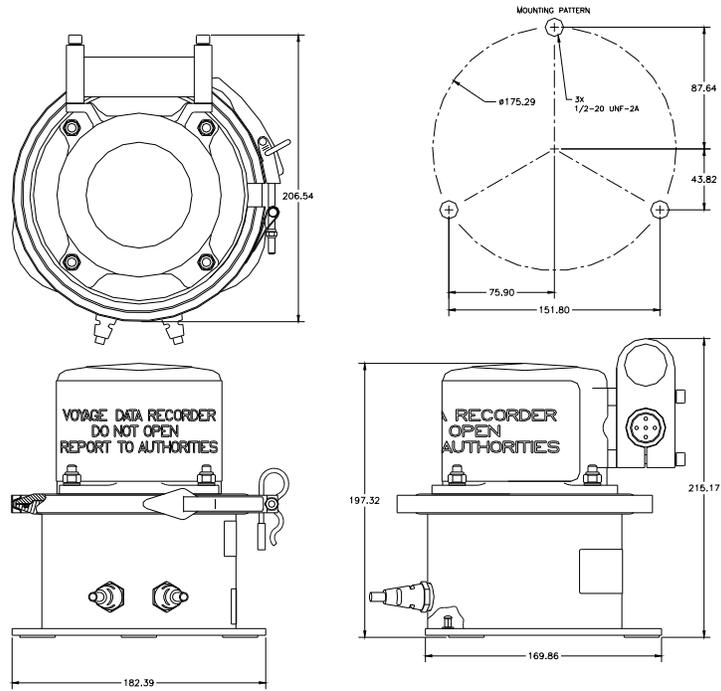


Figure 3-12 - L3 SVR-02 Fixed SFRM Capsule

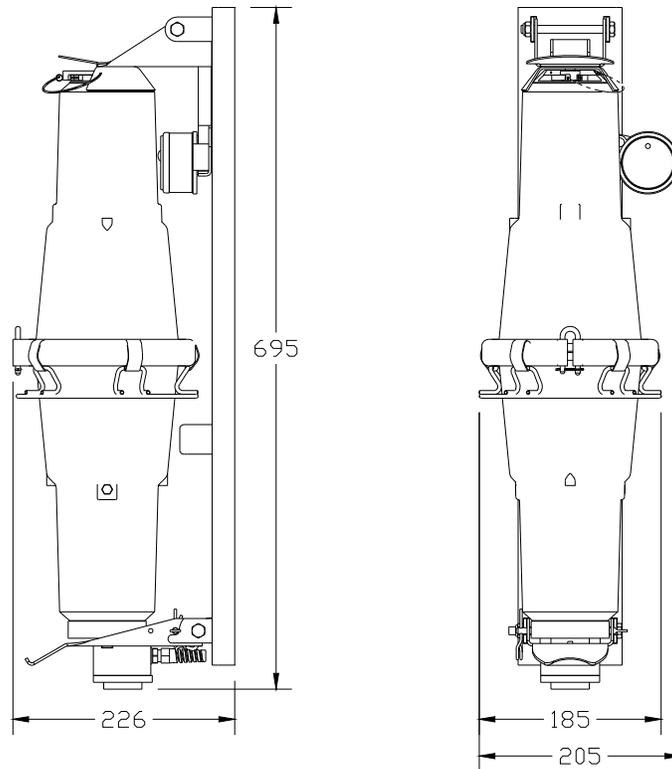


Figure 3-13 - VDR-100G2S – Jotron Float-Free SFRM Capsule

## Chapter 3: Planning

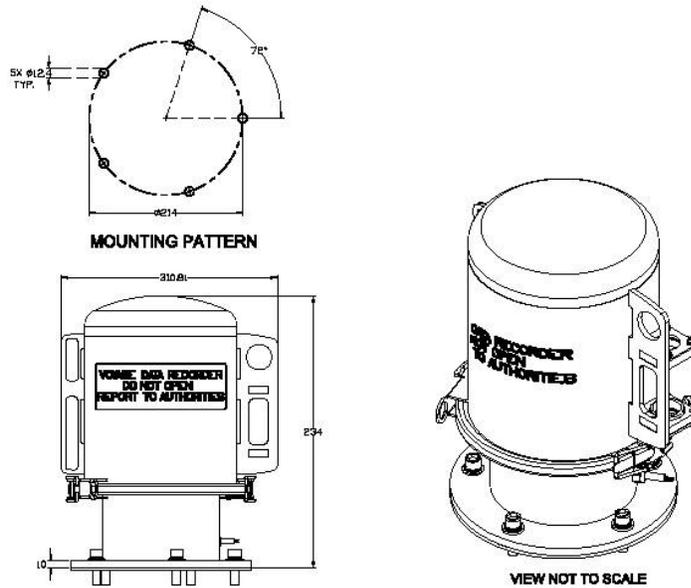


Figure 3-14 - Rutter FRM (RUT-02447) Capsule

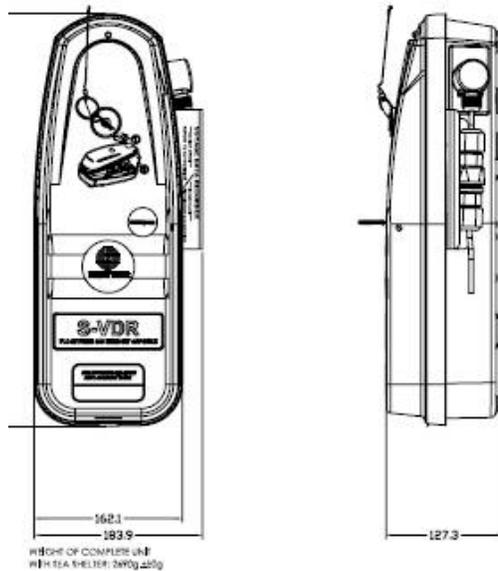


Figure 3-15 - Rutter-ACR Float-Free SFRM Capsule



**Note!** The mounting pattern provided in Figure 3-11 - L3 SVR-01 Fixed SFRM, Figure 3-12 - L3 SVR-02 Fixed SFRM Capsule, Figure 3-13 - VDR-100G2S – Jotron Float-Free SFRM Capsule and Figure 3-15 - Rutter-ACR Float-Free SFRM Capsule above, is applicable to the **VDR-100G2S Simplified FRM only.**

### Compass Safe Distance

Compass safe distance (CSD), as stated in *IEC 60945 Section 11.2*, determines the distances above which any onboard equipment will not cause an unacceptable deviation of the ship's standard and steering compasses. The table below provides CSD information for the DPU, DAU, OAU, RSM, NMEA Module, and Video Module.

Equipment	Safe Distance to:		Reduced Safe Distance to:	
	Standard Magnetic Compass	Steering Magnetic Compass	Standard Magnetic Compass	Steering Magnetic Compass
DPU	3,80m	2,40m	2,30m	1,45m
DAU	3,90m	2,60m	2,35m	1,60m
OAU	1,15m	0,70m	0,70m	0,50m
RSM	0,85m	0,55m	0,55m	0,35m
NMEA Module	0,30m	0,30m	0,30m	0,30m
Video Module	1,75m	1,05m	1,05m	0,65m
Audio Module	1,75m	1,05m	1,05m	0,65m
FRM	0,60m	0,40m	0,40m	0,30m
Microphone(s)	0,30m	0,30m	0,30m	0,30m
Outside Microphone(s)	0,30m	0,30m	0,30m	0,30m

*Table 3-2 - VDR-100G2 Component Compass Safe Distance (CSD)*

### 3.10 Documentation

The final planning requirement for a VDR-100G2 installation is to prepare the installation documentation. This documentation should contain detailed interconnect drawings that include:

- Connection points in the VDR-100G2 DPU terminal block, external interfaces, and shipboard systems.
- Sufficient detail to allow the installation technician to complete the interconnection of all components.
- Cable types and sizes.
- Cable numbers which will allow an installation technician to label cables after they are installed.
- Other information relevant to the installation.

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## 4 MOUNTING

### 4.1 Unit Mounting Locations

#### 4.1.1 Installing the DPU and DAU

##### 4.1.1.1 Mounting the DPU

The Data Processing Unit (DPU) cabinet is installed on the prepared base as shown in *Figure 4-1 – DPU Mounting*.



**NOTE:** It is important to note that the DPU cabinet **must** be mounted so that it opens like a lap-top computer with the base affixed to a horizontal surface, the front of the unit facing out towards the operator, the top hatch opening up and folding back away from the operator.

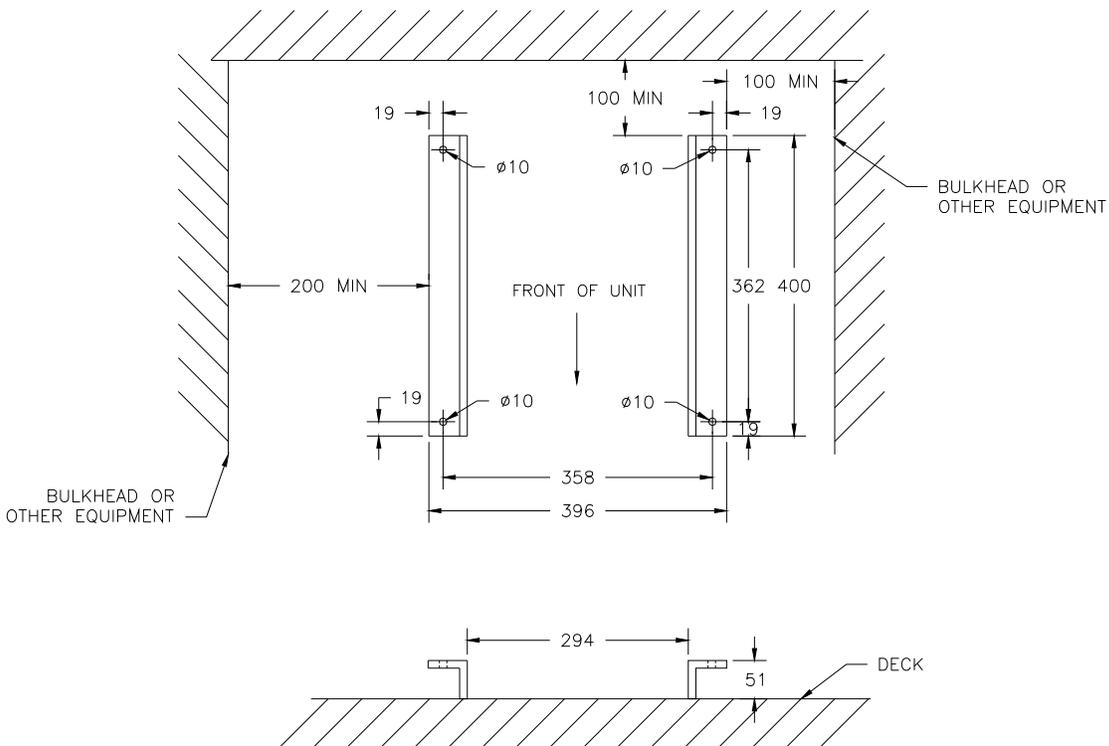


Figure 4-1 – DPU Mounting

After the plinth is installed on the base mount, the DPU cabinet is installed on the plinth. There should be a minimum clearance of:

- **200mm** from the left side (cable entry) of the cabinet to allow for easy access to the fan and cable entry plate.
- A minimum of 100mm of clearance from all other sides of the cabinet to allow for proper ventilation and maintenance.
- The top hatch will require 400mm of clearance to fully open.

## Chapter 4: Mounting

### 4.1.1.2 Mounting the DAU

The Data Acquisition Unit (DAU) is designed to be bulkhead mounted. It requires a clearance of at least **400mm** from the bottom of the unit to the deck to allow for adequate cable entry spacing. All other sides of the unit should have a minimum of 100mm clearance to allow for proper ventilation and maintenance.

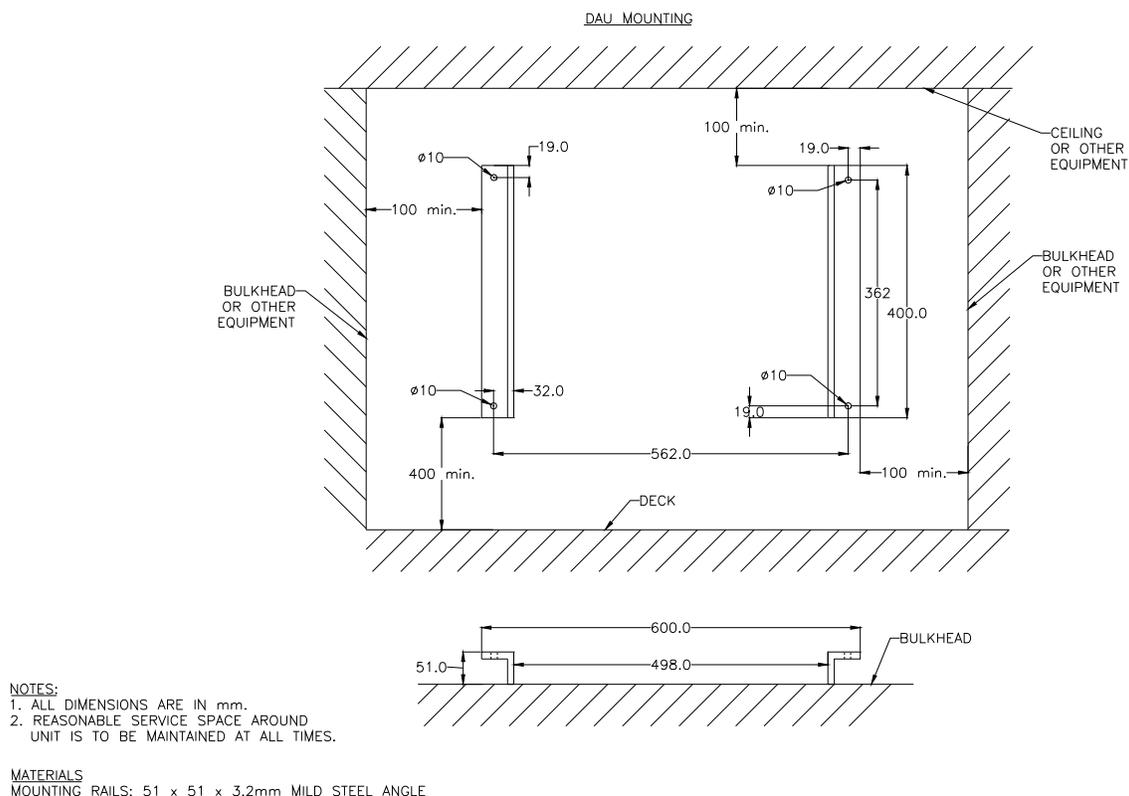


Figure 4-2 - DAU Mounting

### 4.1.2 Mounting the Operation & Alarm Unit (OAU)

There are 2 versions of the OAU. *Figure 4-3 - Operation & Alarm Unit* illustrates the original unit (shipped prior to Serial Number: 20105050061), while *Figure 4-4 - Operation & Alarm Unit (Revised Unit)* illustrates the revised unit (shipped after and including Serial Number: 20105050061).

The **original version** of the OAU can be either surface or flush mounted. The positioning of mounting hardware will depend on the how the unit will be mounted.

- To **surface** mount the original OAU, reposition the module's side tabs to the rear of the unit and mount.
- To **flush** mount the original OAU, the side tabs must remain at the same level as display/keypad face.

## Chapter 4: Mounting

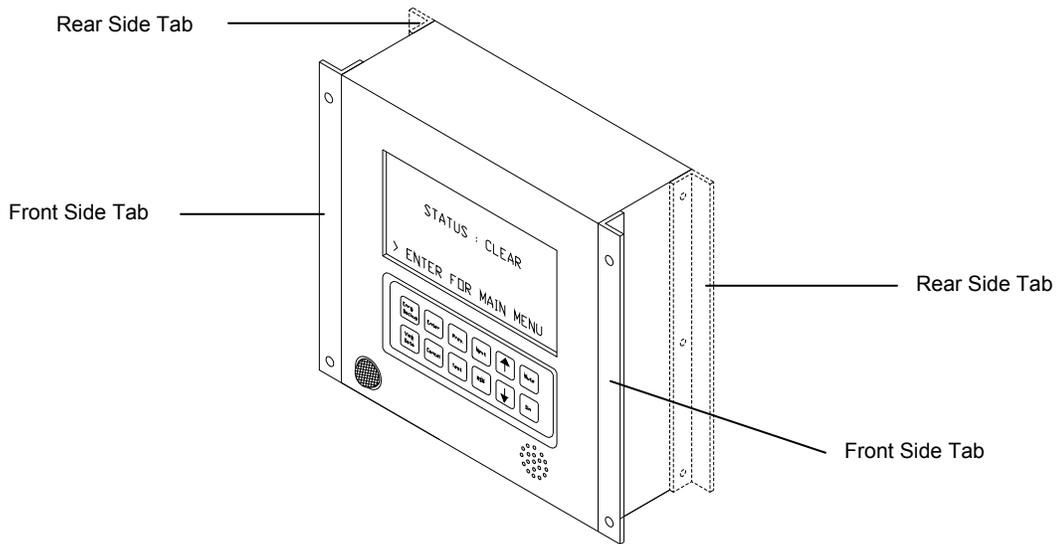


Figure 4-3 - Operation & Alarm Unit

The revised version of the OAU can be either surface or flush mounted.

- To **surface** mount the revised OAU, the mounting bracket and bracket screws must be removed. The unit can then be mounted using the two (2) vacant screw holes at the rear of the unit.
- To **flush** mount the revised OAU, an appropriately sized hole must be cut in the console, the mounting bracket positioned against the inside of the hole, and the unit mounted and tightened to the bracket via the two (2) bolts at the rear of the unit.

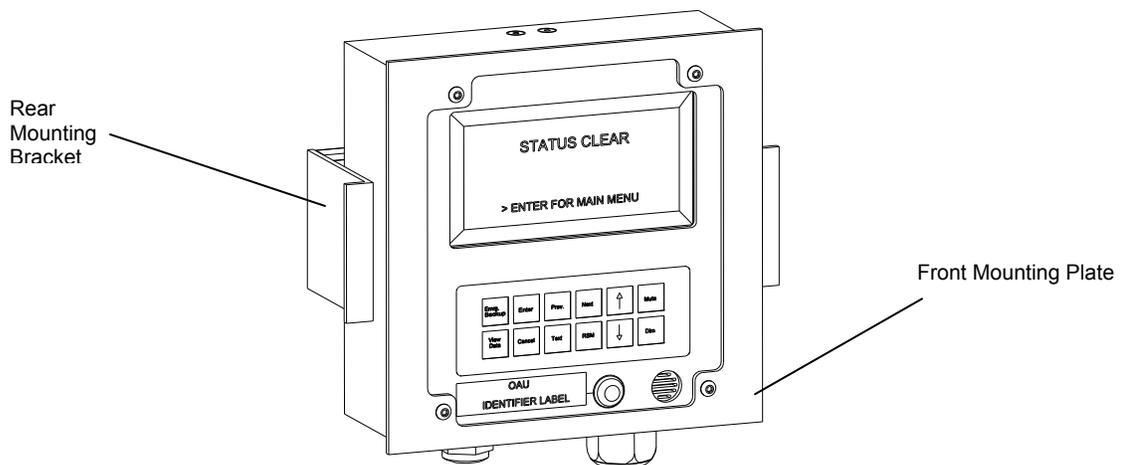


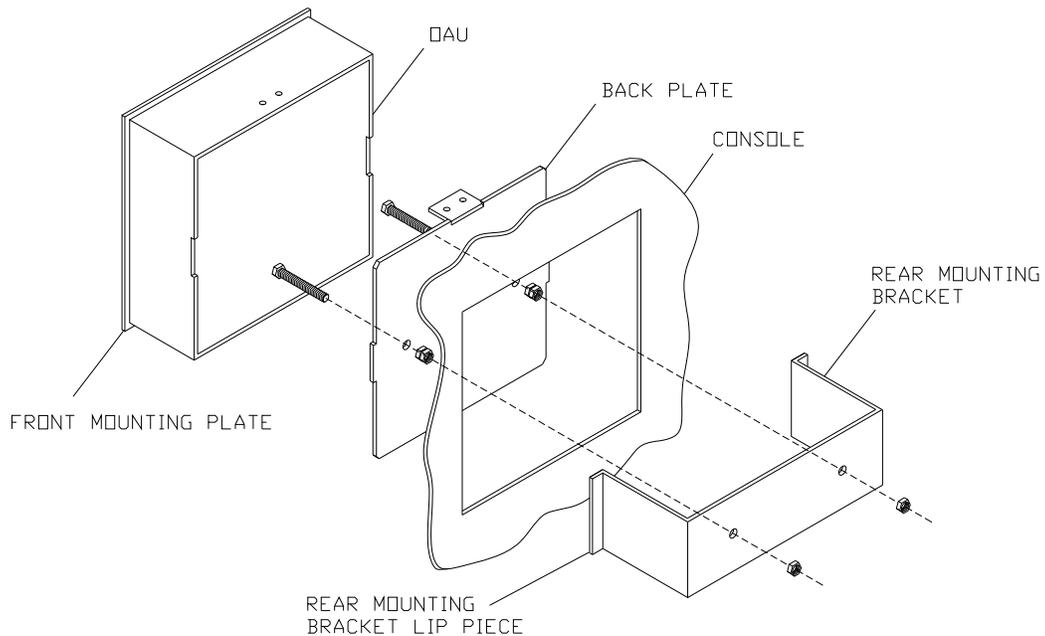
Figure 4-4 - Operation & Alarm Unit (Revised Unit)

## Chapter 4: Mounting

### 4.1.2.1 Installing the OAU with Mounting Bracket

The steps below provide a procedure for mounting the revised version of the OAU (also refer to *Figure 4-5 - OAU Mounting Assembly*):

1. Remove the back plate of the OAU.
2. Remove the glands located at the bottom of the unit and the silver hole-caps located on back cover plate of the unit. Reinstall the glands in the back plate holes and the silver hole-caps in the holes at the bottom of the unit.
3. Install the two 35mm hex screws (long bolts) through the two visible screw holes in the back cover. They should extend out through the back cover of the OAU.
4. Secure each screw to the back plate with a double nut.
5. Complete the wiring of the OAU to the VDR.
6. Re-install the back cover.
7. Insert the OAU through the mounting hole cut in the bridge console.
8. Install the rear mounting bracket over the long bolts. The rear mounting bracket must be installed so that its lip pieces touch the underside of the bridge console.
9. Install washers and nuts on each bolt and tighten to secure the OAU. **DO NOT** over-tighten, as this will bend the back cover.



*Figure 4-5 - OAU Mounting Assembly*

## Chapter 4: Mounting

### 4.1.3 VDR Data Port

The VDR Data Port is a standard RJ45 wall jack. It should be mounted in a position on the bridge where a PC can be easily connected using a straight-through Ethernet cable.

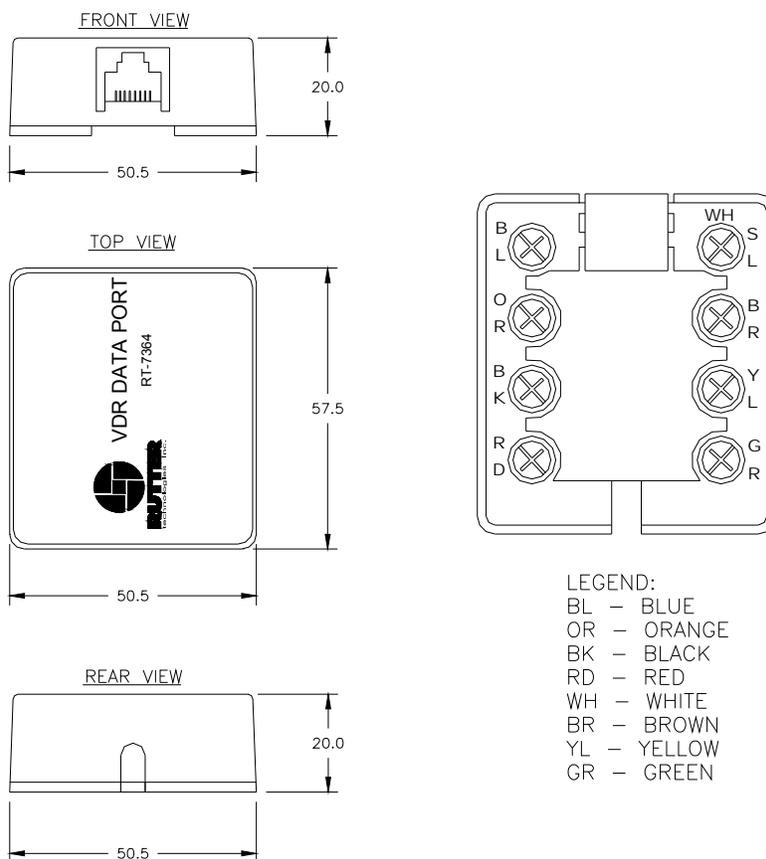


Figure 4-6 - RJ45 Wall Jack

To mount the Data Port, remove the wall jack top cover and screw into position.

### 4.1.4 Remote Storage Module (RSM)

The RSM (see *Figure 3-5 - RSM Dimensions* for unit dimensions) is accompanied with a 24VDC Power Supply and AC adapter.

## Chapter 4: Mounting

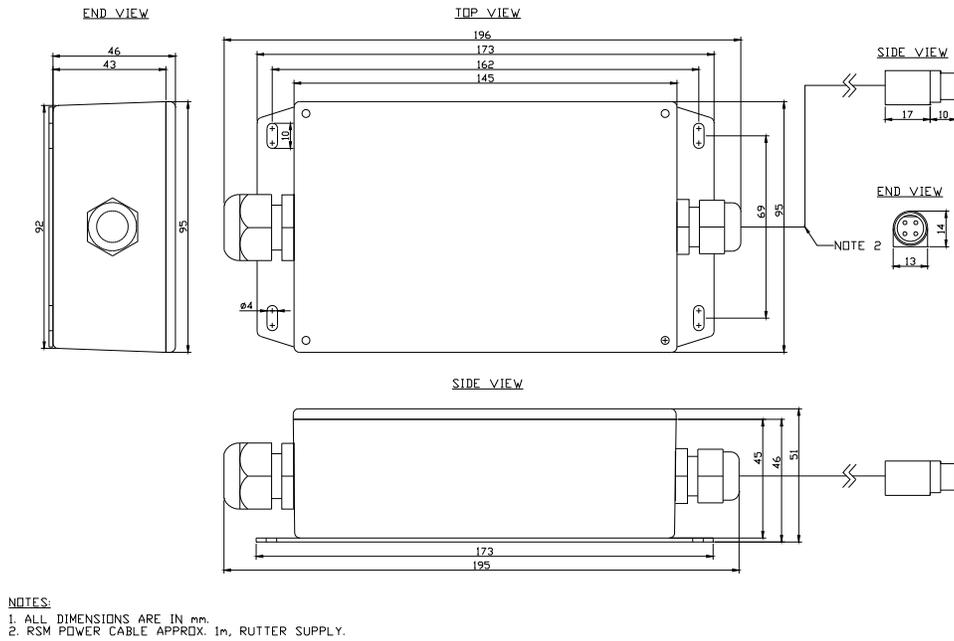


Figure 4-7 - RSM Power Supply

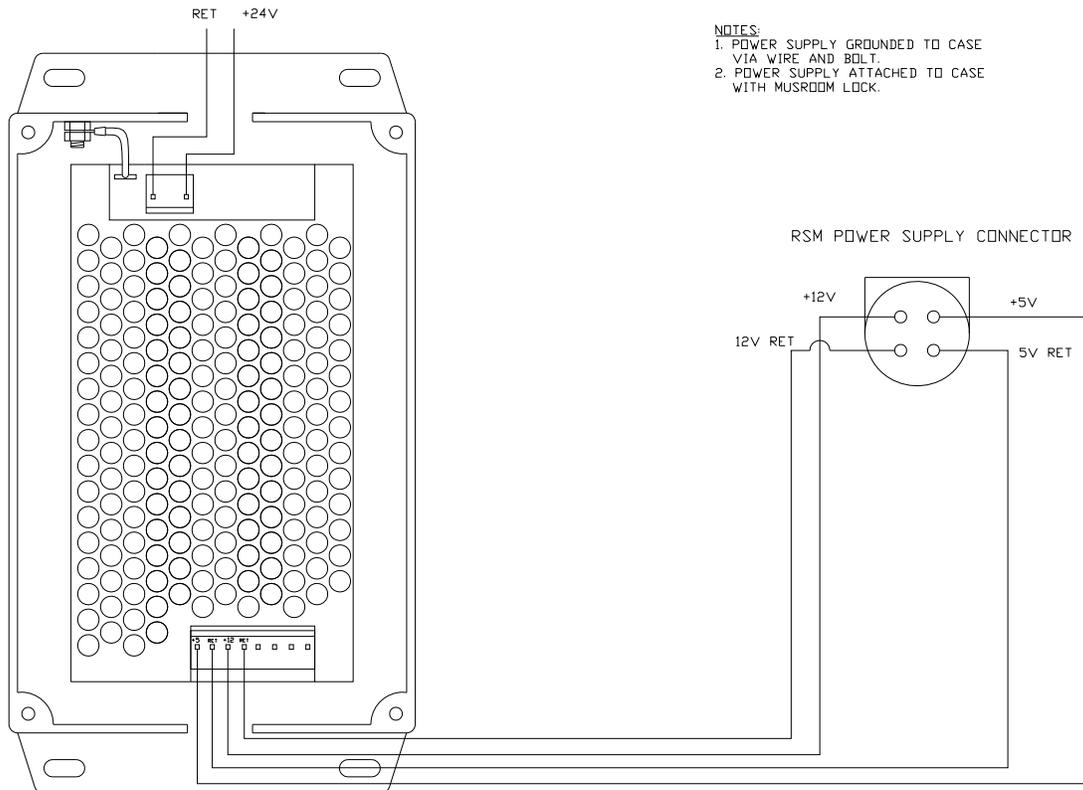


Figure 4-8 - RSM Power Supply - Internal View

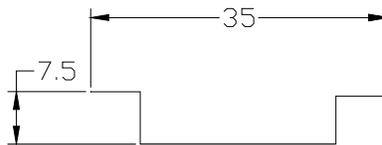
## Chapter 4: Mounting

If the RSM is to be mounted on the bridge of the ship, it must be done using the industrial strength Velcro-type fastening material attached to the four (4) corners at the bottom of the unit.

### 4.1.5 External Interface Modules

The external interface modules are supplied for mounting on 35mm “Top Hat” style DIN Rail. The DIN Rail is mounted in the location desired and the external interface unit is mounted on the rail. DIN Rail is **not** supplied with the external interface units.

*Figure 4-9 - DIN Rail* shows the typical dimensions of the DIN Rail required for mounting an external interface. It is acceptable to use DIN Rail that is deeper than 7.5mm (15mm deep DIN rail is commonly available), as long as the 35mm width is maintained.



*Figure 4-9 - DIN Rail*



**Note!** The Audio Module, when not installed in the DAU, **must** be grounded to the ship's hull.

### 4.1.6 Internal Microphones and Audio Junction Boxes

The microphone locations are determined during the installation planning stage (see *Section 3.8 - Bridge Microphones*).

The dimensions of the indoor microphone and audio junction box are shown in *Figure 4-10 – Internal Microphone with Audio Junction Box*.

The audio junction box must be installed **within the 2m cable length to the microphone and audio test source location**. The provided cable, attached to the devices, should not be changed.

Audio coverage from the external microphone is omni-directional. Therefore, the assembly should be installed in a manner which allows the coverage range to encompass the area to be recorded (the area behind the microphone will not be covered.)



**NOTE!** The Audio Junction Box is normally installed behind the ceiling panels.

## Chapter 4: Mounting

### 4.1.6.1 Internal Microphone Mounting

The internal microphone is installed with an integrated audio test source and internally mounted wiring junction box. See Figure 4-10 – Internal Microphone and Audio Junction Box.



**NOTE:** It is important that the surface on which any microphone is to be mounted is clean, dry and smooth. The Mushroom-Lock fastener's adhesive must make complete contact with the mounting surface or the adhesive may fail to adhere. Clean the surface thoroughly and remove any loose material, such as paint flakes and labels.

The microphone may be mounted to an existing surface or it may be mounted on the microphone junction box. If it is mounted on the junction box then the microphone junction box must be installed in a location that ensures the microphone will provide the required coverage area.

If these surface conditions cannot be met, then, as an alternative, the microphone can be secured with hardware supplied by the installer. The choice of hardware depends on the surface where the microphone is to be installed and the style of mounting selected by the installer.

To mount the microphone with additional hardware:

1. Temporarily remove the microphone cover;
2. Carefully drill the mounting holes in the sides of the microphone PCB or assembly to match the mounting hardware;



**NOTE:** Do not over tighten the hardware or the microphone base may crack or split.

3. Mount the microphone with the selected hardware; and
4. Replace the microphone cover.

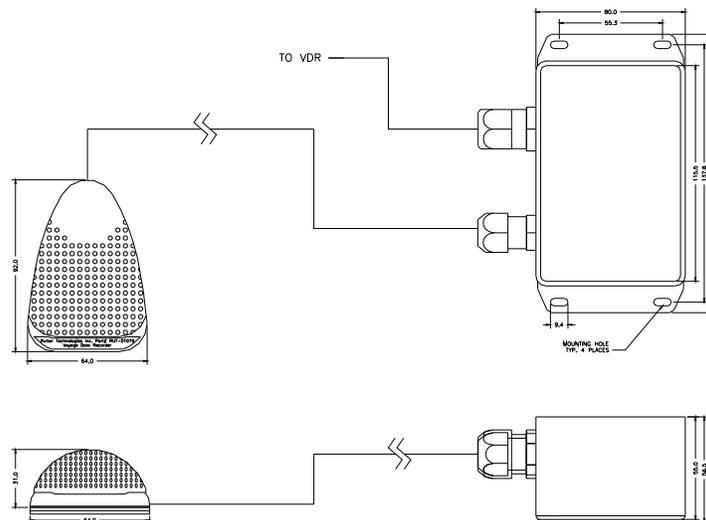


Figure 4-10 – Internal Microphone with Audio Junction Box

## Chapter 4: Mounting

### 4.1.7 External Microphone and Audio Junction Box

The external microphone is installed with an integrated audio test source and externally mounted wiring junction box. *Figure 4-11 - External Microphone and Junction Box* illustrates the microphone and junction box.



**NOTE 1:** It is important that the surface on which any microphone is to be mounted is clean, dry and smooth. The Mushroom-Lock fastener's adhesive must make complete contact with the mounting surface or the adhesive may fail to adhere. Clean the surface thoroughly and remove any loose material, such as paint flakes and labels.

**NOTE 2:** It is important that all externally mounted microphones are installed in **protected** locations. Ideally, the microphone should be installed as to allow for **minimum exposure to sea spray and rain**. It is **recommended** to mount the unit with the microphone facing downward.

The microphone may be mounted to an existing surface or it may be mounted on the microphone junction box. If it is mounted on the junction box then the microphone junction box must be installed in a location that ensures the microphone will provide the required coverage area.

If these surface conditions cannot be met, then, as an alternative, the microphone can be secured with hardware supplied by the installer. The choice of hardware depends on the surface where the microphone is to be installed and the style of mounting selected by the installer.

To mount the microphone with additional hardware:

1. Temporarily remove the microphone cover;
2. Carefully drill the mounting holes in the sides of the microphone PCB or assembly to match the mounting hardware;



**NOTE:** Do not over tighten the hardware or the microphone base may crack or split.

3. Mount the microphone with the selected hardware; and
4. Replace the microphone cover.

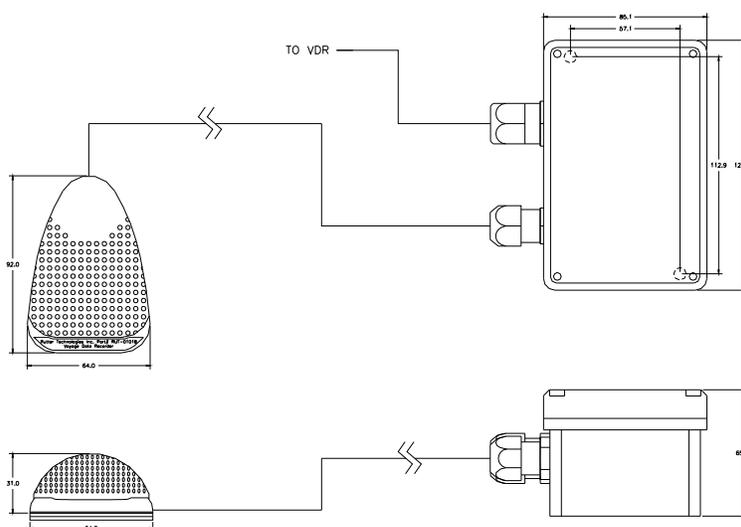


Figure 4-11 - External Microphone and Junction Box

## Chapter 4: Mounting

Audio coverage from the external microphone is uni-directional. Therefore, the assembly should be installed in a manner which allows the coverage range to encompass the area to be recorded (the area behind the microphone will not be covered.)

### 4.2 Final Recording Medium

Refer to *Sections 3.9 - Final Recording Medium (FRM/SFRM)* and *5.7 -*

## Chapter 4: Mounting

*Final Recording Medium* for information regarding the mounting of the FRM.

## 5 CABLING AND INTERCONNECTIONS

---

This section provides essential cabling and interconnection information.



**Note!** All cabling should be clearly labeled at all connection points to allow for easier identification, particularly at all VDR-100G2 entry points.

### 5.1 Ethernet Interconnection

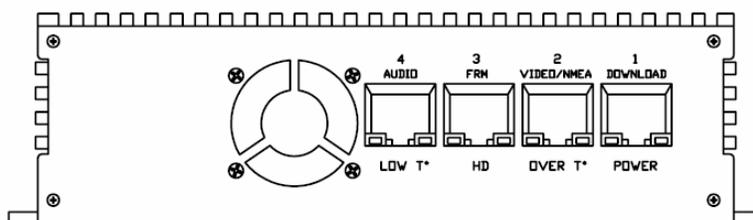


Figure 5-1 - DMM Port Connections

The **Audio Module** output is connected directly to the DMM via a crossover Ethernet cable, which is plugged into LAN Port 4 of the DMM.

The **FRM** is connected directly to the DMM via a crossover Ethernet cable, which is plugged into LAN Port 3 of the DMM.

The **Video Module** output is connected via a straight through Ethernet cable to the HUB located in the DPU. The NMEA Module Ethernet output is also connected via a straight through Ethernet cable to this same HUB. The Hub is connected directly to the DMM via a straight through Ethernet cable into LAN Port 2.

A **DPU hub** is connected to LAN Port 1 of the DMM directly via a straight through Ethernet cable. This hub can be used to connect a **Download PC, RSM, Maintenance PC, or a secondary FRM**.

If a combination of the Download PC, RSM, Maintenance PC, **or a secondary FRM** are to be connected to LAN Port 1 simultaneously, it is required that each device be plugged into the Hub located in the DPU via a straight through Ethernet cable.

Refer to *Figure 1-1 - VDR-100G2 Block Diagram* for additional information on component interconnections.

## Chapter 5: Cabling and Interconnections

### 5.1.1 DMM / Data Module IP Address

The IP Address for each of the data modules and associated DMM ports is listed below.

Port / Module	IP Address
DMM Download Port (1)	200.200.200.200
Download PC	200.200.200.XXX
DMM Video/NMEA Port (2)	192.168.199.1
Video Module	192.168.199.228
DMM FRM Port (3)	192.168.0.189
FRM	192.168.0.X
DMM Audio Port (4)	192.168.200.189
Audio Module	192.168.200.228

Table 5-1 - DMM / Data Module IP Address

## 5.2 Power Distribution

The DPU contains a set of 14 terminal block connections. With the exception of Terminal Block Position 15, these connections host the power supplied to the various interfaces and modules that constitute the VDR-100 G2 system.



**Note!** Terminal Block Position 15 is reserved for OAU Serial Data connections.

The DPU terminal block wiring is indicated in *Table 5-2 - DPU Terminal Block Wiring Plan* below:

Devices	C	B	A	Term	
Utility (Ship's Emergency Power) AC = 85-264V @ 47-63Hz	GND	Neutral	Hot	21	
Utility (Ship's Emergency Power) DC = 19-28V	GND	Ret -	+		
Final Recording Medium (FRM)	GND	Ret -	24+	20	EP*
Remote Storage Module (RSM)	GND	Ret -	24+	19	EP*
Hub (Optional)	GND	Ret -	24+	18	EP*
Audio Module	GND	Ret -	24+	17	EP*
Operation & Alarm Unit (OAU)	GND	Ret -	24+	16	EP*
OAU Data	COM GND	RX	TX	15	
Video Module	GND	Ret -	24+	14	
NMEA Module 1	GND	Ret -	24+	13	
NMEA Module 2	GND	Ret -	24+	12	
NMEA Module 3	GND	Ret -	24+	11	
Hub	GND	Ret -	24+	10	
Interface 1	GND	Ret -	24+	9	
Interface 1	GND	Ret -	24+	8	
Optional Final Recording Medium (FRM) #2 (terminal to be installed by technician during installation)	GND	Ret -	24+	7	

Table 5-2 - DPU Terminal Block Wiring Plan

\* EP = Essential Power

## Chapter 5: Cabling and Interconnections

The DAU, when available, contains 6 total terminal block connections, broken into 2 physical blocks:

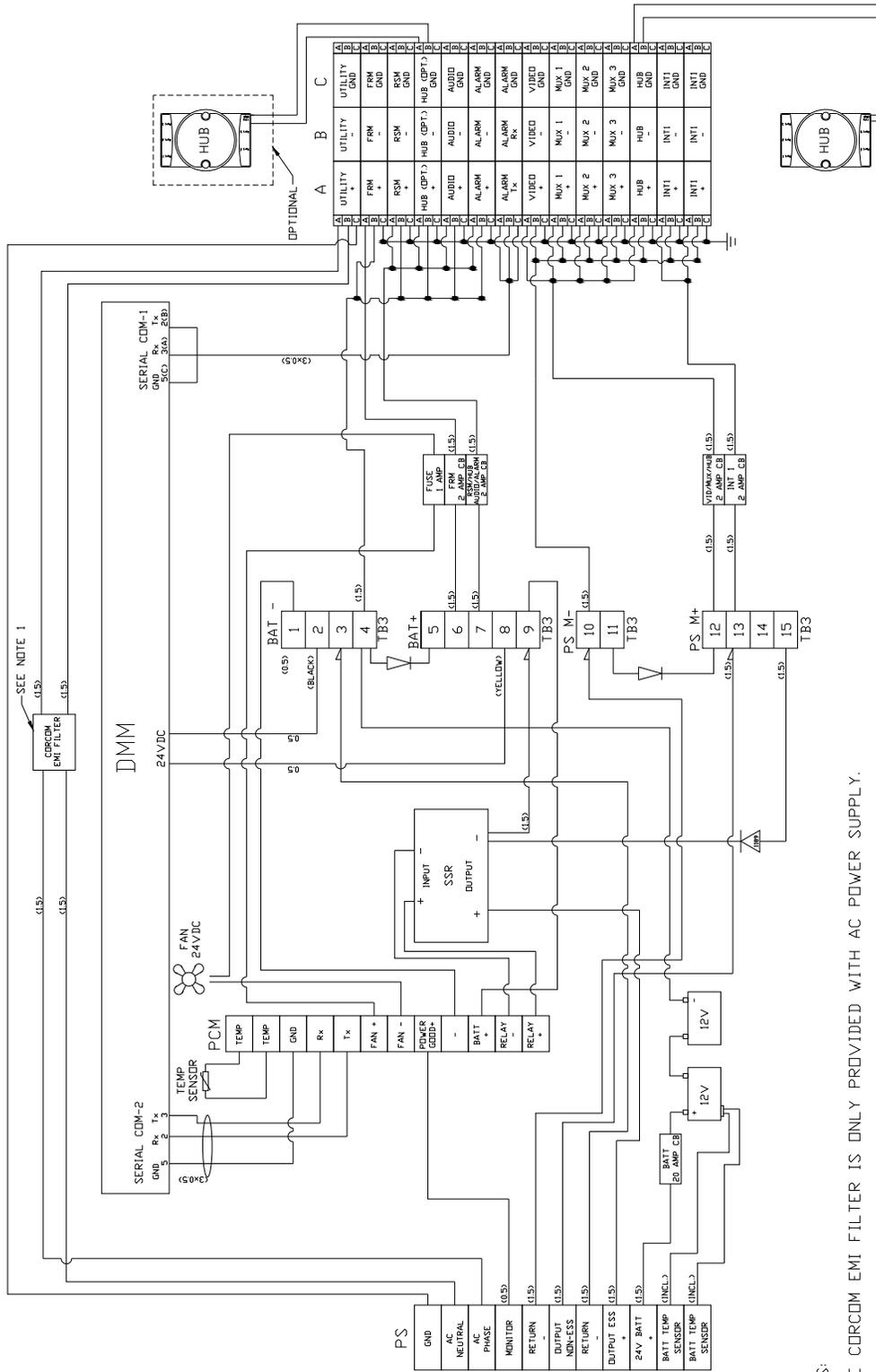
Devices		C	B	A	Term	
Video		GND	Ret -	24+	25	
Hub		GND	Ret -	24+	24	
NMEA		GND	Ret -	24+	23	
Audio		GND	Ret -	24+	22	EP

*Table 5-3 - DAU Terminal Block (One)*

Devices		C	B	A	Term	
Interface 1		GND	Ret -	24+	27	
Interface 1		GND	Ret -	24+	26	

*Table 5-4 - DAU Terminal Block (Two)*

# Chapter 5: Cabling and Interconnections



- NOTES:
1. THE CORCOM EMI FILTER IS ONLY PROVIDED WITH AC POWER SUPPLY.
  2. NUMBERS IN BRACKETS INDICATE CONDUCTOR SIZE. NUMBERS WITHOUT BRACKETS INDICATE WIRE NUMBERS.

Figure 5-2 - DPU Power Overview

## Chapter 5: Cabling and Interconnections

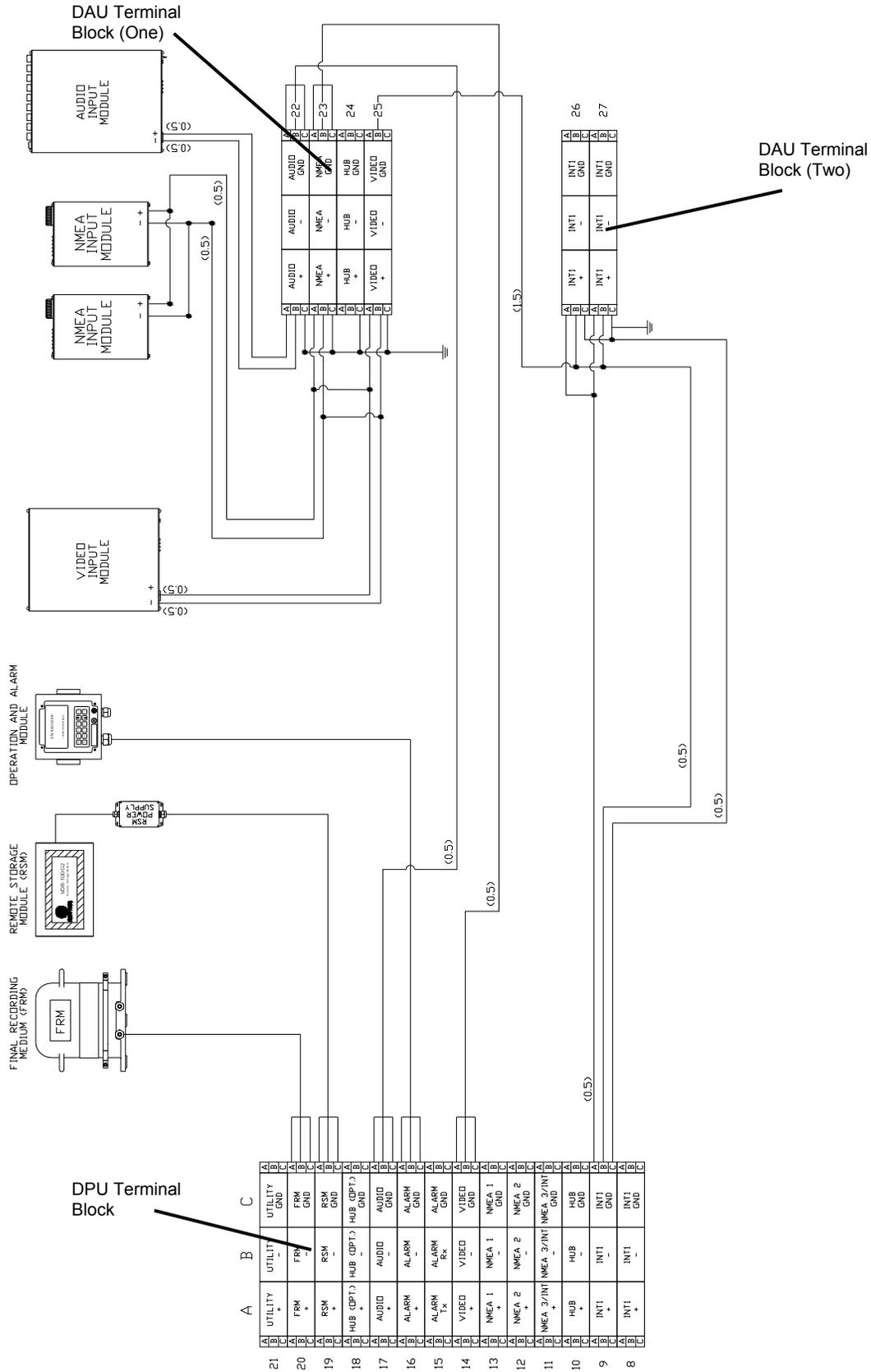


Figure 5-3 - DAU Power Overview



Figure 5-4 - Terminal Block Letter Labeling

### 5.3 Cable Entry System

The VDR-100G2 is equipped with cable entry panels, similar to that illustrated in *Figure 5-5 - 10-Hole Cable Entry Plate* below.

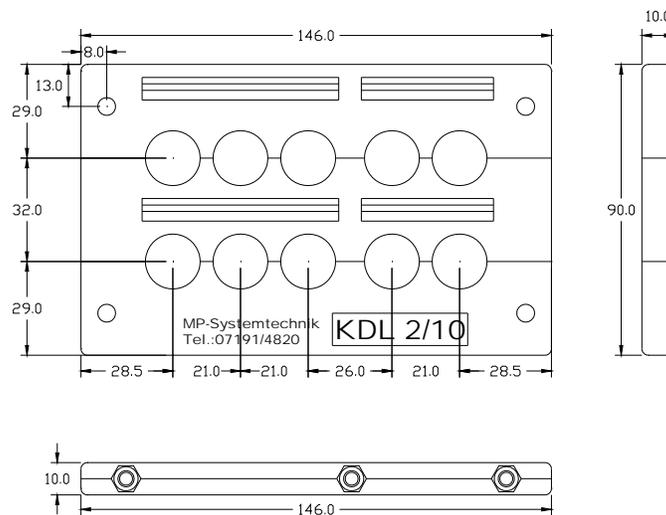


Figure 5-5 - 10-Hole Cable Entry Plate

To install the appropriate cables using a cable entry plate, follow the instructions below:

1. Remove the entry plate from its cut-out position.
2. Select the split grommets to suit the various cable sizes.
3. Open the entry gland by removing the hexagon screws.
4. Remove the cable insulation, in order to reveal the metal screen; the metal screen should then be grounded to the internal ground bolt.
5. Position the grommets over the cable and affix cable ties if required.
6. Insert the assembled grommets into the entry plate.
7. Place blank grommets into the entries not used.
8. Close and screw up the entry plate.
9. Screw the entry plate to its original cut-out position.

## 5.4 Video Input Connections

The video inputs are connected via the female BNC bulkhead connectors located at the bottom of the DAU. All video data is connected to the DAU using RG-11, RG-6, or other approved coaxial cable. Additionally, the number of cables used is dependant upon the video source:

- A composite video source may have a single video cable (with video and sync combined).
- A colour radar source may have five (5) video cables (red, green, blue, H-sync, and V-sync).

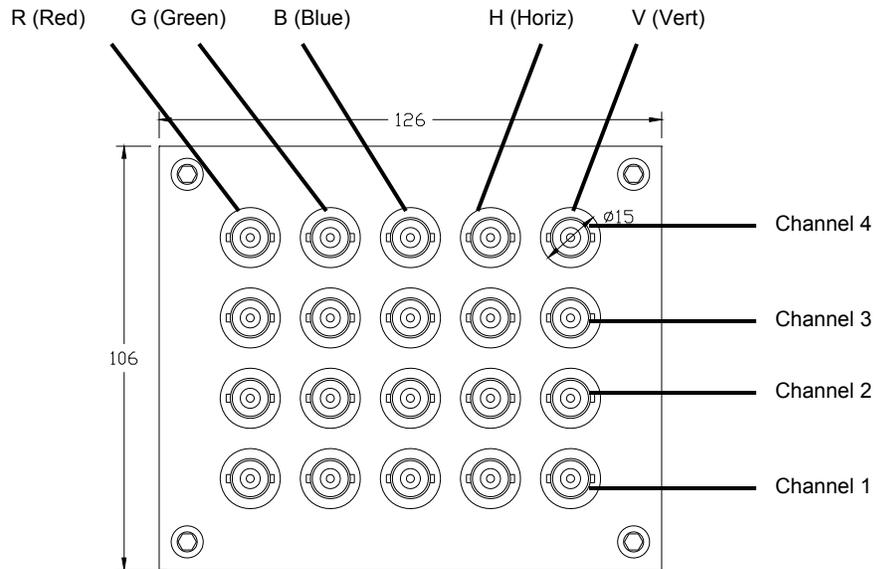


Figure 5-6 - DAU Video Input Connections

Coaxial video cables from the vessel's video source must be fitted with male BNC connectors, which are then connected to the appropriate BNC female bulkhead connectors. If the video feed occurs over multiple cables, it is important to ensure that all video cables are connected to the bulkhead connectors that correspond to proper signal type (i.e., red=red, green=green, blue=blue, etc.)

## 5.5 Audio Connections

The microphones, buzzers, and corresponding junction boxes are connected to the VDR-100G2 via the Audio Module:

- The microphone junction box is wired to the VDR-100G2 Audio Module using a two-pair shielded cable;
- The microphone junction box connects to the microphone and buzzer;
- The microphone is connected to the terminal blocks in the audio junction box; and
- The buzzer is connected to the terminal blocks in the audio junction box.



**Note!** The Audio Module, when installed externally (no DAU), **must** be grounded to the ship's hull.

### 5.5.1 Audio Module Inputs

The basic Audio Module has 4 channels with 2 inputs each for a total of 8 inputs. Optionally the Audio Module may be supplied with 6 or 8 channels (12 or 16 inputs respectively).

Inputs to the Audio Module are **field configurable** and can change to customize a particular installation. Only the primary VHF being recorded is connected to Channel 1. Once all microphones have been connected, any additional VHFs can be connected to the first available free channels.

**Example 1:** If the primary VHF and 4 microphones have been connected and there are no other microphones to connect then any additional VHF may be connected to Channel 4

**Example 2:** If the primary VHF and 6 microphones have been connected and there are no other microphones to connect then any additional VHF may be connected to Channel 5.

The table below illustrates a typical configuration for the basic and the expanded module.

Base - 8 Input Module	Channel 1	Input 1	VHF Tx/Rx or VHF Tx
		Input 2	VHF Rx
	Channel 2	Input 3	Internal Mic #1
		Input 4	Internal Mic #2
	Channel 3	Input 5	Internal Mic #3
		Input 6	Internal Mic #4
	Channel 4	Input 7	External Mic #1
		Input 8	External Mic #2
Optional - 12-Input Module	Channel 5	Input 9	VHF(2)Tx/Rx or VHF (2)Tx
		Input 10	VHF(3) Tx/Rx or VHF(2) Rx
	Channel 6	Input 11	Internal Mic #5
		Input 12	Internal Mic #6
Optional - 16-Input Module	Channel 7	Input 13	Internal Mic #7
		Input 14	Internal Mic #8
	Channel 8	Input 15	Internal Mic #9
		Input 16	Internal Mic #10

Table 5-5- Audio Module Configuration



**Note!** It is **highly recommended** that there **not be more than 1 VHF** connection on the **first eight (8) inputs** of the Audio Module.

## Chapter 5: Cabling and Interconnections



**Note!** It is **highly recommended** to connect internal microphones in groups (i.e., if a vessel has four (4) internal microphones and two (2) external microphones, the internals should be connected to Input 3-4, and Input 5-6 with the two (2) externals connected to Input 7-8).

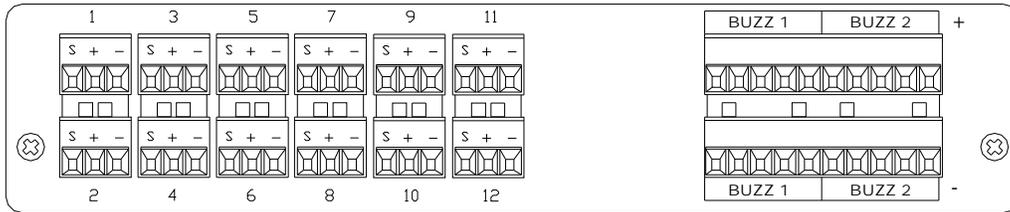


Figure 5-7 – 12-Input (6-Channel) Audio Module

For ease of installation it is recommended to organize the audio cabling from left to right following the input configuration of the Audio Module.



**Note!** When preparing the cables for connecting to the Audio Module, it is important to leave an adequate amount of wire pigtails to make the necessary connections to both the microphone and associated buzzer (located on the right hand side of the Audio Module) input connection points.

### 5.5.2 Buzzer Connections

When connecting microphone buzzers to the rear of the Audio Module, refer to the Figure below for an illustration of the buzzer connectors and their associated channel inputs:

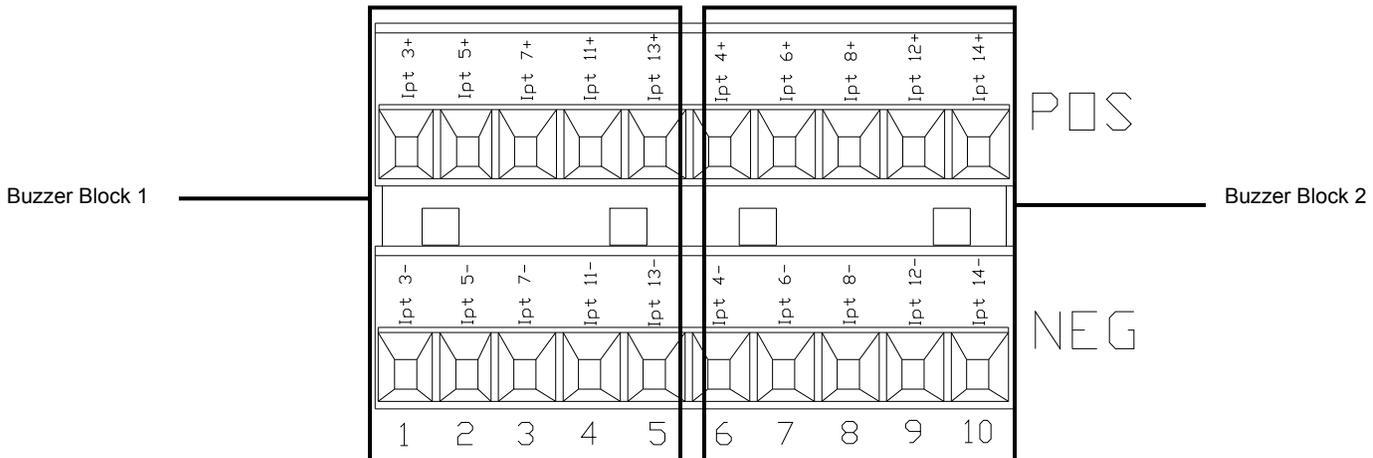


Figure 5-8 – Audio Module Buzzer Connections

For example, an inside microphone connected to Input 1 (Channel 3) would connect to buzzer connection point #1 (positive and negative). An inside microphone connected to Input 4 (Channel 3) would connect to the sixth buzzer connection.

## Chapter 5: Cabling and Interconnections

If the Audio Module has 16 Channels, it will be necessary to connect two (2) microphone buzzer connections to one (1) buzzer connection point. For example, Input 14 and 16 can both be connected to buzzer connection point #10, while Input 13 and 15 can both be connected to buzzer connection point #5.



**Note!** *The Audio Module must be grounded to the ship if installed outside of the DAU.*

### 5.5.3 Internal Microphone and Buzzer

**NOTES:**

1. CABLE FROM MICROPHONE TO JUNCTION BOX IS 2M LONG WITH AN OUTSIDE DIAMETER OF 6.5mm.

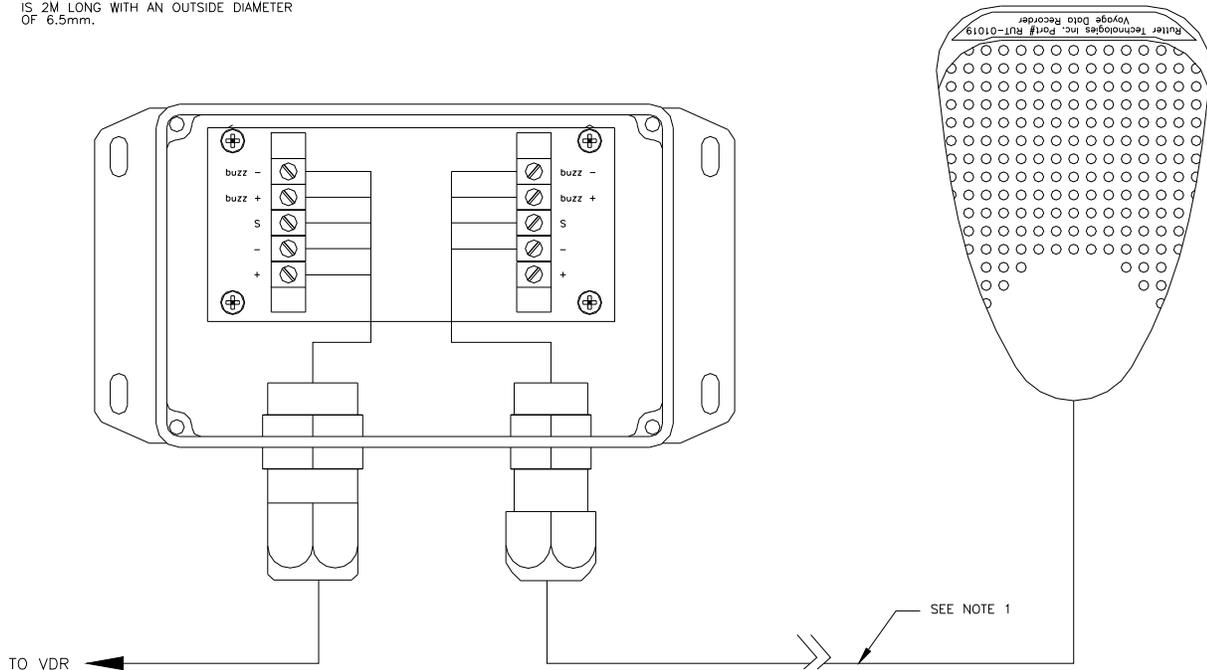


Figure 5-9 - Internal Microphone Terminal Block



**Note!** The conductor marked “SHLD”, “S”, or “Audio Channel Shield” should not be grounded to the internal ground bolt of the DPU. It should be connected directly to the SHLD input at the rear of the Audio Module.

	CHANNEL		
Input 1	S H L D	P □ S	N E G
Input 2	S H L D	P □ S	N E G

Figure 5-10 - Audio Module - Individual Channel Connections

To minimize wiring from the audio junction boxes to the VDR-100G2, it is possible to connect the VDR-100G2 cable from all the audio junction boxes to a central junction box and run a single multi-lead cable back to the VDR-100G2. This central junction box **is not** provided with the VDR-100G2.

Each internal microphone/buzzer unit is connected, via the audio junction box, to the Audio Module. If applicable, the cables connecting these microphones will be routed to the cable entry point location on the left hand side of the DAU.

### 5.5.4 External Microphone Assembly

The external microphone assembly contains the outside microphone, audio test source, and wiring junction box. See *Figure 4-11 - External Microphone and Junction Box* for an illustration of the microphone and junction box.

The interconnections required for the external microphone assembly are similar to the internal microphone as described in *Sections 5.5 -*

## Chapter 5: Cabling and Interconnections

Audio Connections, 5.5.1 - Audio Module Inputs, and 5.5.2 - Buzzer Connections above.

**NOTES:**

1. CABLE FROM MICROPHONE TO JUNCTION BOX IS 2M LONG WITH AN OUTSIDE DIAMETER OF 6.5mm.

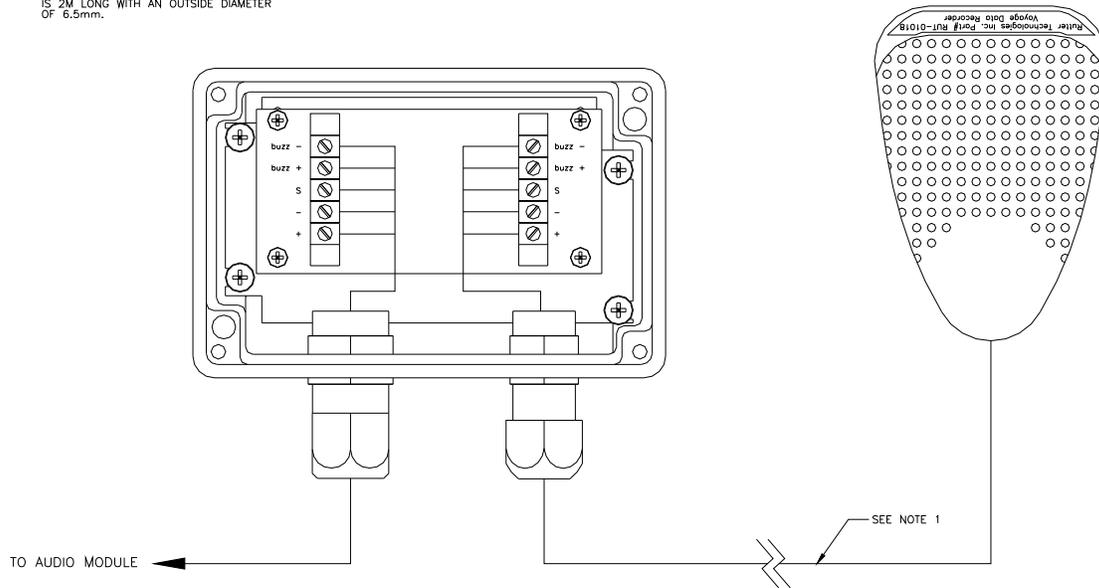


Figure 5-11 - External Microphone Terminal Block

### 5.5.5 VHF Audio Connection

Connection between the Audio Module and a VHF source is dependant on the type of VHF source:

- A Simplex VHF source will connect to Input 1 (Channel 1).
- A Duplex VHF source will connect to Inputs 1 and 2 (Channel 1).
- There is no buzzer connection when connecting a VHF source.
- Line level output will connect to the +, - terminals of the Audio Module.

The interconnections required for the VHF are similar to those described in *Section 5.5 -*

Audio Connections above.

## 5.6 Operation & Alarm Unit

The OAU provides a VDR alarm output via a 24 VDC signal, active upon a VDR alarm. The unit connects to the bridge alarm panel via a one-pair cable. If the bridge alarm panel requires a dry-contact connection then a relay must be installed to change the 24VDC output to a dry-contact.

The unit connects to the DPU using a three-pair cable.

The original version of the OAU, illustrated in *Figure 5-12 - Bottom View of OAU*, connects via two (2) cable entry glands located at the bottom of the unit. The revised version of the OAU, illustrated in *Figure 5-13 - Bottom View of OAU (Revised Unit)* and *Figure 5-14 - Rear View of OAU (Revised Unit)*, can be connected via two (2) cable entry glands located at the bottom of the unit or, optionally, through 2 cable entry points located at the rear of the unit.

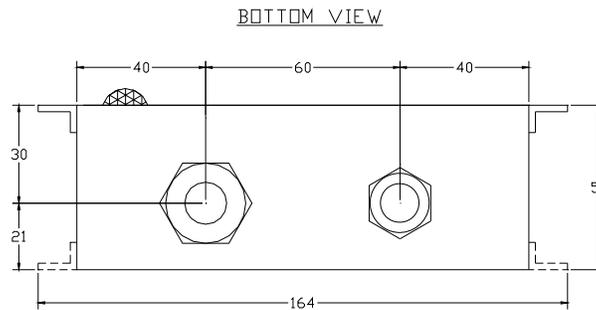


Figure 5-12 - Bottom View of OAU

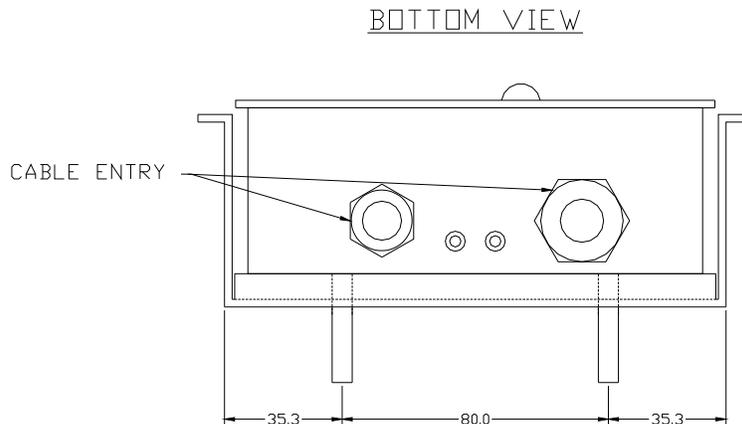


Figure 5-13 - Bottom View of OAU (Revised Unit)

## Chapter 5: Cabling and Interconnections

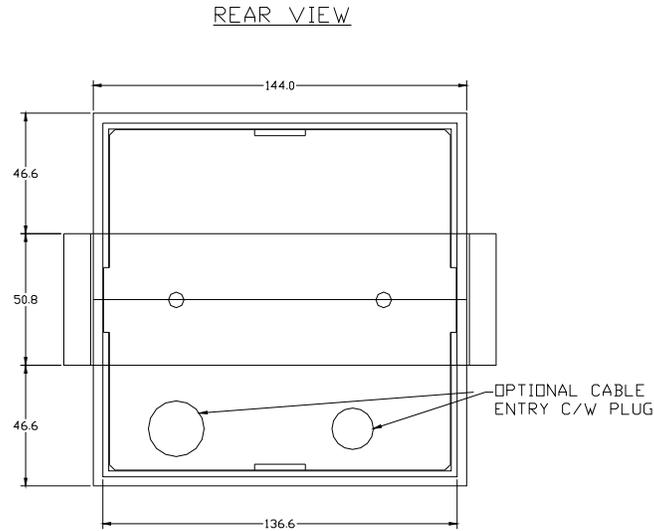
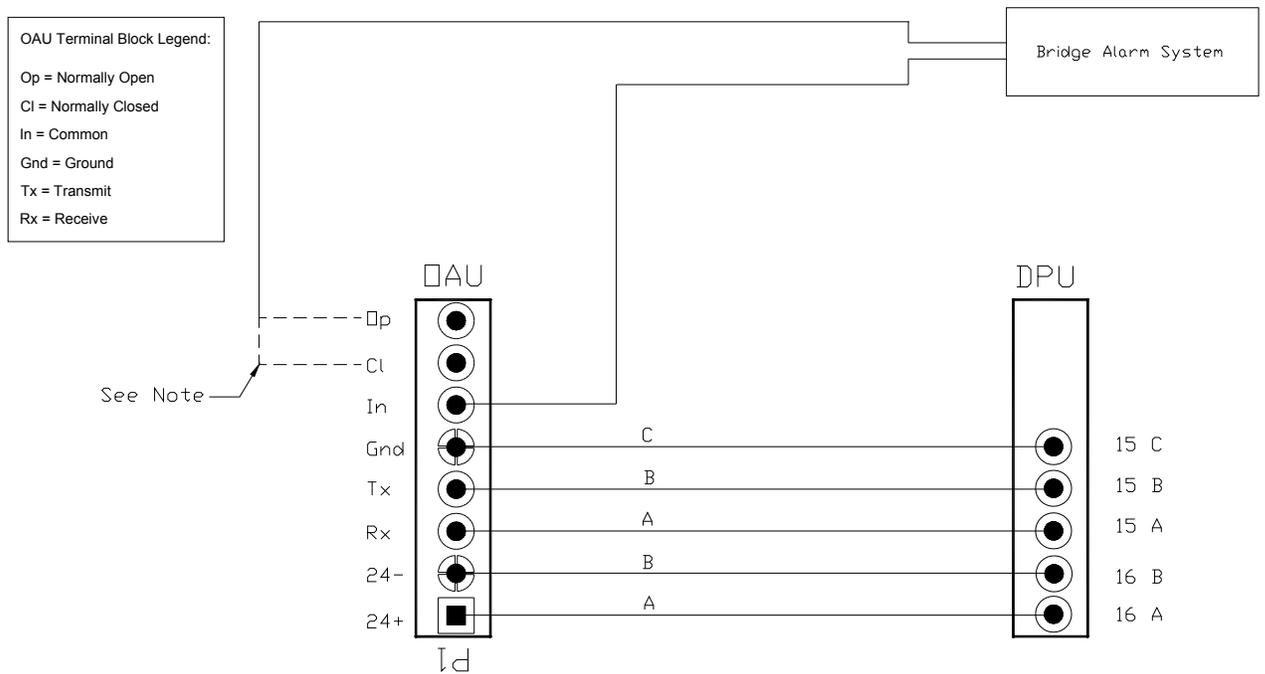


Figure 5-14 - Rear View of OAU (Revised Unit)



**Note:**  
The Normally Open and Normally Closed connection points are dry contacts. The connection to the Bridge Alarm System will be dependant upon the requirements of a particular system. The dashed lines indicate possible connections.

Figure 5-15 - OAU to DPU Terminal Block Connections. VDR Serial No 20XXXXX1150 and forward.

## Chapter 5: Cabling and Interconnections

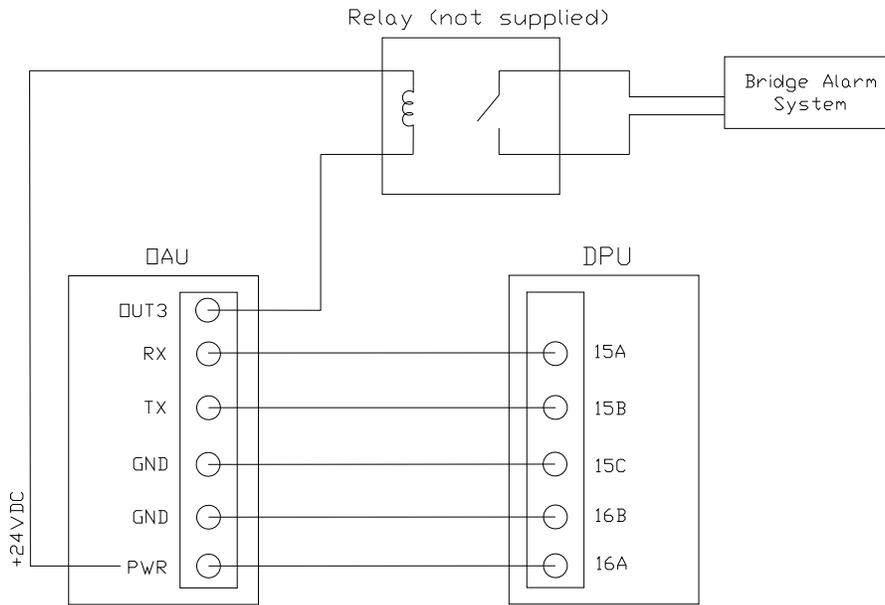


Figure 5-16 - OAU to DPU Terminal Block Connections (w/ optional relay). All units prior to VDR Serial No 20XXXXX1150.



**Note!** Communications between the DPU and OAU are via a crossover connection.

## 5.7 Final Recording Medium

The FRM is connected to the VDR-100G2 via a DC power cable and an Ethernet interface cable. The Ethernet cable is a 10-base-T/STP (shielded twisted pair), Category 5e with flammability per IEC 95:

- The DC power cable connects to the terminal block in the DPU terminal block 24 VDC supply.
- The Ethernet connection is via a RJ45 connector. This is connected to Ethernet port 3 on the DMM.
- **The connection between the DMM and the FRM is a crossover cable.**

The wiring of the connections between the RJ45 connector (illustrated in *Figure 5-18 - RJ45 Connector*) and the FRM is illustrated in *Figure 5-17 - FRM Connections to L3 HVR-02 Fixed FRM Capsule (Revised Unit)*. However, the connections shown pertain **only** to the L3 HVR-02 Fixed FRM Capsule. Refer to the FRM manufacturer's installation manual to confirm all FRM installation information.

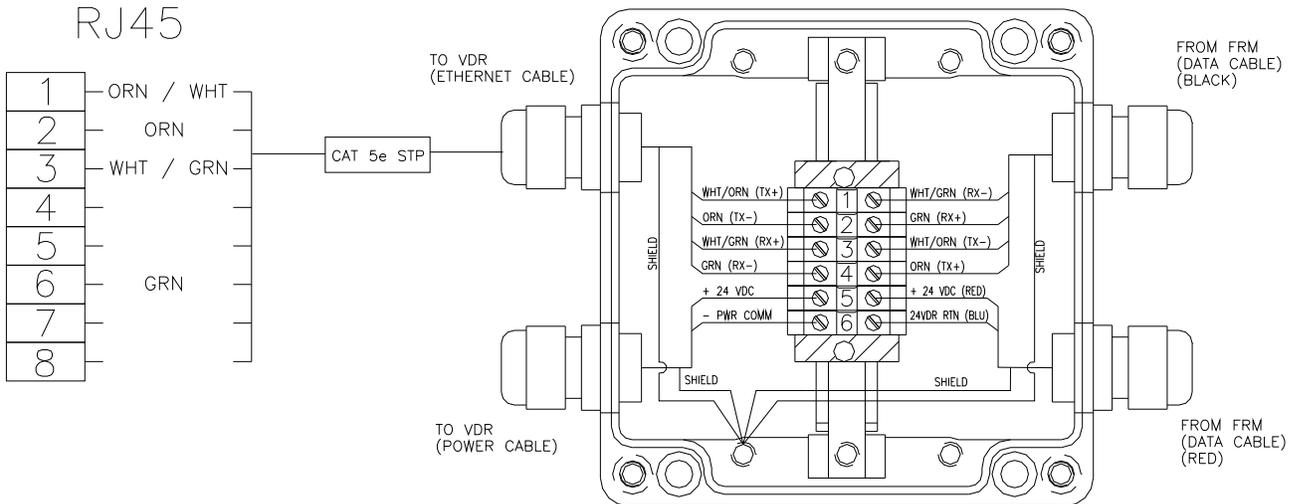


Figure 5-17 - FRM Connections to L3 HVR-02 Fixed FRM Capsule (Revised Unit)



**Note!** The wiring shown in Figure 5-17 - FRM Connections to L3 HVR-02 Fixed FRM Capsule (Revised Unit) is a crossover connection. Care must be taken to ensure there is only 1) crossover. 2 crossover connections have the same affect as a straight-through connection.

The junction box adjacent to the FRM on the vessel's outside deck **is not** supplied with the VDR-100G2. It connects the cables provided with the FRM to the cables connecting to the VDR-100G2.

## Chapter 5: Cabling and Interconnections

This junction box can be located inside, but **must** be located within the cable distance of the FRM cables. It must also be fully screened and connected to the vessel's hull. If mounted outside, it must also be waterproof.

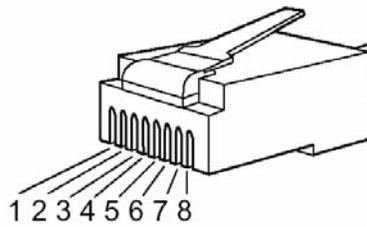


Figure 5-18 - RJ45 Connector



**Note!** It is **highly** recommended that cabling connecting the FRM to the VDR-100G2 is installed through a gooseneck conduit (see Figure 5-19 - Sample VDR-100G2S SFRM Installation for a sample FRM installation.)

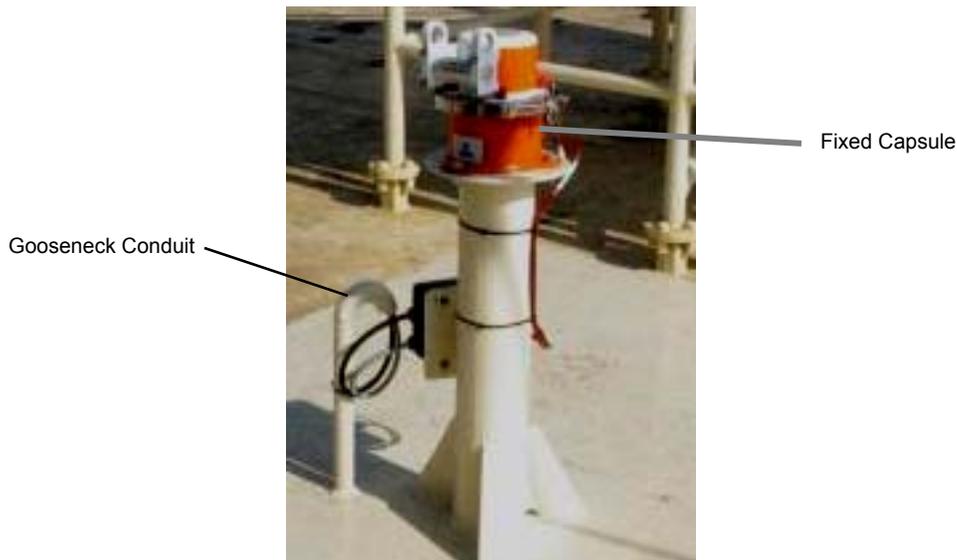


Figure 5-19 - Sample VDR-100G2S SFRM Installation

### 5.8 Remote Storage Module

The optional RSM is powered by a 24VDC power cable (included).

Data is transferred via a straight-through Category 5e Ethernet cable.

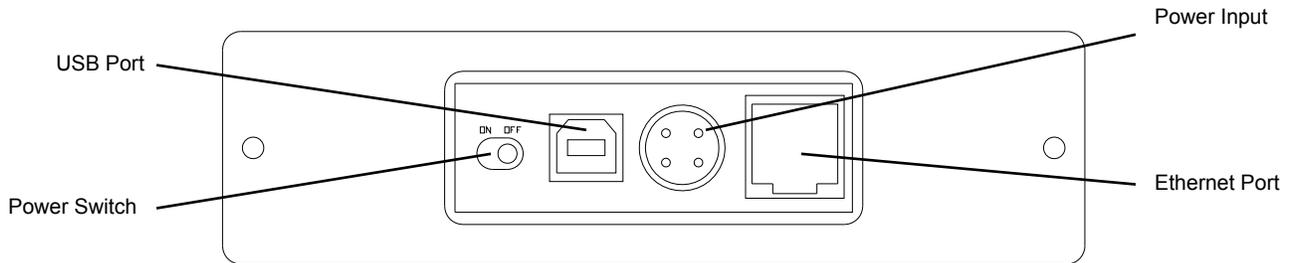


Figure 5-20 - RSM Connection Points

The power cable:

- Enters the DPU via the terminal block access point.
- Connects to the terminal block as specified in *Table 5-2 - DPU Terminal Block Wiring Plan*.

The Ethernet cable:

- Enters the DPU via the DMM access point.
- Requires a shielded RJ45 connector.
- Is terminated at the hub located in the DPU.

### 5.9 External Interface Modules

It is recommended that the external systems to which the installer is connecting have the power removed until the connections are finished. If this is not possible, care must be taken to ensure that the systems are not damaged.

If it is necessary to connect to a live system, the connections on the VDR-100G2 external interface module should be complete first. Continuously monitor the vessel's system to ensure the connections to the external interface modules do not affect their operation.

## 6 INITIAL POWER-UP

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### 6.1 Software Modules

While recording, the Data Management Unit (DMM) is required to carry out the following functions simultaneously:

- Capture video through the Video Module.
- Record bridge audio and radio communications audio through the Audio Module.
- Record serial data through the NMEA 0183/IEC 61162 NMEA Module.
- Synchronize time to UTC/GMT through a GPS receiver feed or other time references via a NMEA Module input.
- Monitor the status of Power Supply and backup battery from the Power Control Module through a serial communications port.
- Provide Server Services to download client(s) in a Fast Ethernet LAN configuration.
- Store all data to a Final Storage Medium and allow user-initiated backups to a redundant removable storage system, while still allowing this data to be downloaded via the LAN for playback purposes.
- Generate an alarm if an error condition develops in the VDR-100G2.

The DMM system software is a Windows XP application program. The program is designed to support a multi-threaded operation, providing optimum CPU utilization for simultaneous data acquisition, synchronization, and compression of multiple data streams. The following section describes the system software operation.

### 6.2 Power On

Once the unit has been mounted for operation, it is necessary to power on the VDR-100G2 system. The VDR is designed for continuous operation and once connected to ship's power should remain on during the remainder of the installation process. This procedure will also serve as a functional test of the unit.

The Power Control Module will switch to the backup battery for energy in the event of a power interruption. If a power interruption is scheduled for more than 2 hours, the VDR-100G2 may be shut down to preserve battery life. If necessary during a VDR installation, a shut down can be initiated from the Windows XP desktop prior to turning off the DMM.

The following steps provide a procedure for powering on the VDR-100G2:

1. Open the cover of the DPU.
2. Ensure the 4 2A breakers are **off**. The secondary FRM configuration will have 5 2A breakers.
3. Close the 20A circuit breaker.
4. Apply ship's power to the VDR-100G2.
5. Close the 4 2A breakers one at a time to ensure that each applicable component is receiving power. The secondary FRM configuration will have 5 2A breakers.
6. Connect either the required PC peripherals (mouse, keyboard, etc.) or a PC client via an Ethernet connection to establish remote desktop connection to the DMM (see *Section 7 - CONNECTING TO THE DPU* for more information on establishing a remote desktop connection with the DMM.)

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## 7 CONNECTING TO THE DPU

When accessing the internal O/S of the DMM, it will be first necessary to connect either a keyboard/mouse/monitor, or use a remote desktop connection established from a maintenance computer.

Follow the applicable procedures provided below to access the DMM's O/S.

### 7.1 Using a Keyboard, Mouse, and Monitor

1. Open the top hatch of the DPU.
2. Connect the keyboard, mouse, and monitor to the DMM front panel.

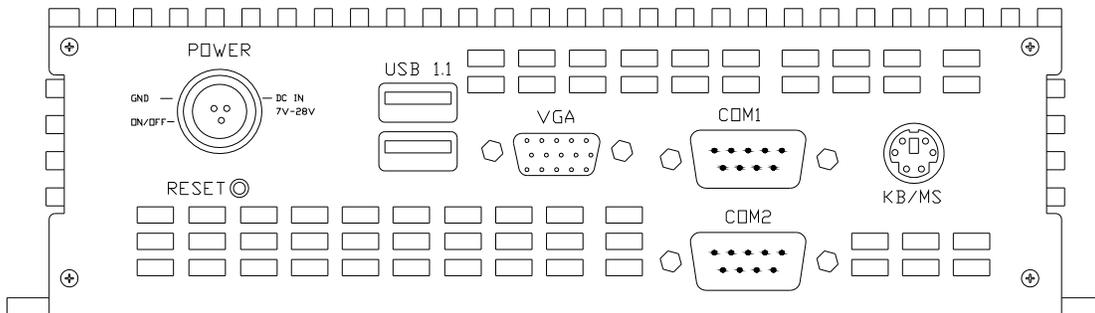


Figure 7-1 - Data Management Module Input Ports

3. Once the monitor has been turned on, the record application (VDR\_Record) should be visible. Shut down this application to terminate the recording process (a password is required.)
4. Once the record application has been terminated, log off the current user account and log in as an Administrator (will require an Administrator password.)
5. Once in administrative mode, effect any changes necessary. Software can be loaded to the DMM via USB memory sticks.
6. All changes to DMM software and/or operating system **MUST** be committed to the flash memory of the DMM in order for them to take effect. To do so:
  - Locate and double-click the *commit.exe* icon on the desktop.



Figure 7-2 - commit.exe Icon

7. Restart the DMM via Start > Shut Down.
8. The DMM will reboot and all record application software will restart.
9. Verify that all applicable applications have restarted and are performing correctly.
10. Unplug the keyboard, mouse, and monitor.
11. Close and lock the top hatch of the DPU.

### 7.2 Using Remote Desktop

To utilize a remote desktop when accessing the DMM's operating system, a technician must ensure that the connecting PC has, at minimum, the following features/settings:

- XP Professional Operating System or higher.
- HVR Download Utility.
- Computer name **must not** be "VDR".
- Within the IP range of 200.200.200.x (where 'x' can be any IP other than 200.)

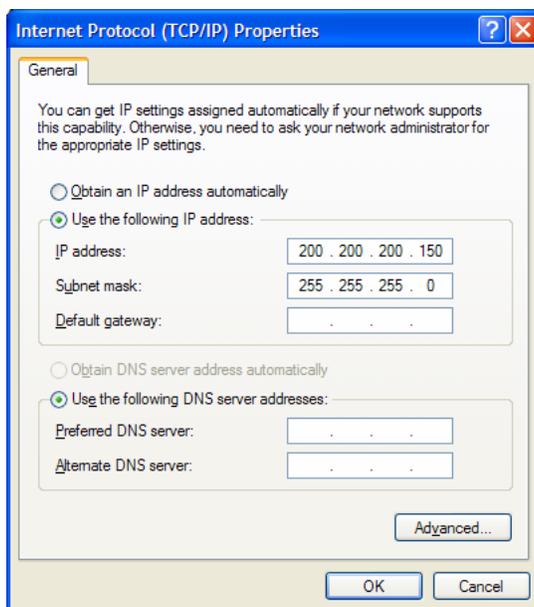


Figure 7-3 - IP Range

1. Open the top hatch of the DPU.
2. Connect the Remote Desktop PC to the VDR via one of the following methods:
  - Download (LAN1) port at the rear of the DMM.
  - The download hub located within the DPU.
  - The exterior VDR Data Port.
3. It is now possible to connect via the Remote Desktop. Go to Start > All Programs > Accessories > Communications > Remote Desktop Connection.
4. In the "Remote Desktop Connection" dialog window, click "Options >>" and enter the following settings:

Computer: 200.200.200.200  
User name: MyUser  
Password: Rutter  
Domain: WORKGROUP

## Chapter 7: Connecting to the DPU

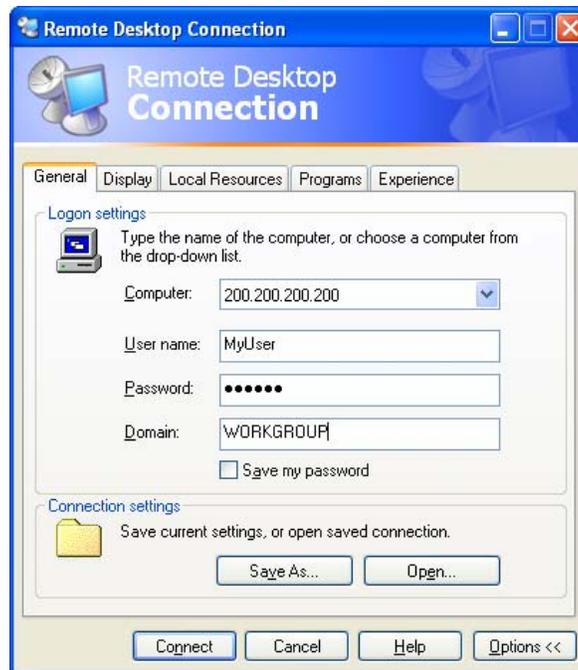


Figure 7-4 - Logon Settings

5. Click the “Connect” button.
6. The DMM operating system desktop will display and the record application (VDR\_Record) should be visible.
7. Select the Watchdog application located in the task bar (adjacent to the “Start” button). In the Watchdog window, select the “Cancel” button and enter VDR when prompted to enter a password.
8. Once the Watchdog application has been shut down, shut down the VDR Record application to terminate the recording process (a password is required.)
9. Log off the MyUser account via Start > Log Off.



Figure 7-5 - MyUser Logoff

10. Reconnect to the VDR-100G2 via the Remote Desktop using the following settings:

Computer: 200.200.200.200  
User name: Administrator  
Password: [Enter applicable administrative password here]  
Domain: WORKGROUP

## Chapter 7: Connecting to the DPU

11. To browse the network in order to obtain software from a shared folder on the remote PC, click Start > Run... Enter the name of the remote PC in the "Run..." dialog window (for example, \\RemotePC and click "OK".
12. Note that Remote Desktop software is also available for technicians using Windows 2000 software. To obtain this software, please contact the Rutter Technologies Support Department.
13. All changes to DMM software and/or operating system **MUST** be committed to the flash memory of the DMM in order for them to take effect. To do so:
  - Locate and double-click the *commit.exe* icon located on the desktop (see *Figure 7-2 - commit.exe Icon*). Accept the automated restart.



**Note!** *If necessary to log on using an administrator account after restart, wait approximately 2 minutes.*

## 8 VDR RECORD OPERATING INSTRUCTIONS

---

The VDR\_Record application must be operated **only by a Rutter Technologies Inc representative or other authorized service personnel.**

During normal operation, the VDR\_Record application is neither visible nor accessible to the user. However, during installation, commissioning and servicing there are several features within the VDR\_Record application that are used for testing and configuration purposes. These features, along with several of the standard Windows applications features, are found in the menu bar as outlined below.

### 8.1 File Menu

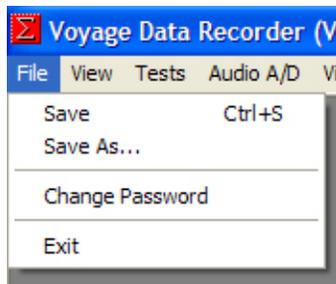


Figure 8-1 - File Menu

**Save** – Saves the selected window to the VDRapps folder on the internal drive. The video capture shall be saved as a bitmap.

**Save As** – Allows the option to choose the folder to which the selected file will be saved.

**Change Password** – Allows a user to change the Record application password.

**Exit** – Closes the VDR\_Record application. The application cannot close if any of the test modes are selected.

### 8.2 View Menu

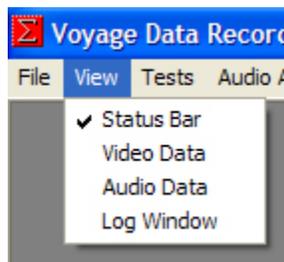


Figure 8-2 - View Menu

## Chapter 8: VDR Record Operating Instructions

**Status Bar** – Activates the Status bar at the bottom of the application. The default for this option is enabled.

**Video Data** – Selects the video data window to be displayed.

**Audio Data** – Selects the audio data window to be displayed.

**Log Window** – Selects the Log window to be displayed.

### 8.3 Tests Menu

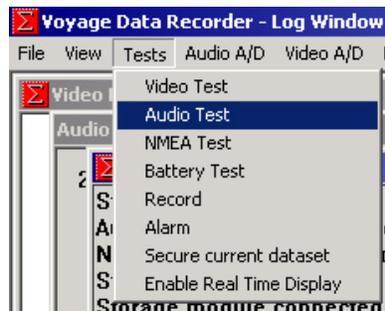


Figure 8-3 - Tests Menu



**Note!** Only 1 test mode may be operated at a time.

**Video Test** – Activates the VDR Video test mode. In this mode it will perform video captures and display the resultant image in the Video Data window. The file size of the captured image, the time of capture and the channel on which the image was captured will be displayed in the Log Window as defined in the VDRPARAMS.INI file.

**Audio Test** – Activates the VDR Audio Test mode. In this mode the bridge audio levels and VHF signals will be displayed in the Audio Data window and the calculated RMS levels for each zone will be displayed in the Log Window as defined in the VDRPARAMS.INI file.

**NMEA Test** – Activates the VDR NMEA Test mode. In this mode all the NMEA data, as it is received, will be displayed in the Log Window as defined in the VDRPARAMS.INI file.

**Record** – Activates the VDR record mode. In this mode the record status and errors will be reported in the Log Window. Video, audio, or NMEA data will not be displayed.

**Alarm** – Performs a one-time communications test with the OAU. A successful test will display the message *Storage error* in the Log Window and the OAU will display *Status: Storage Error* and sound the audible alarm for two (2) seconds.

**Secure current dataset** – Secures and timestamps the most recent 24 hours of captured data.

**Enable Real Time Display** – Enables the Real Time Display software option for a period of three (3) hours. A message will appear in the Log Window indicating that the option has been turned on. The time remaining will display if the option is selected while the software option is enabled. If the Real Time Display software option has been purchased, this option is not available.

### 8.4 Audio A/D Menu

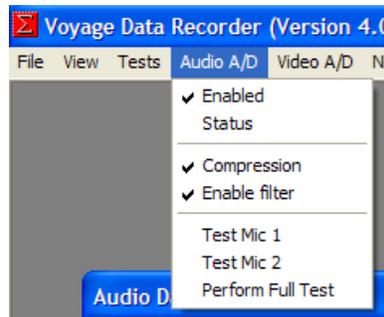


Figure 8-4 - Audio A/D Menu

**Enabled** – Default is set to Enabled. Enables the audio capture by the VDR audio subsystem and stores the audio data to the DPU during recording.

**Status** – Displays the current status of the Audio A/D module in the Log Window.

**Compression** – Default is set to enabled. Enables the ADPCM compression of the Audio during recording.

**Enable filter** – Default is set to enabled. Enables the low pass filtering for the audio ports during recording.

**Test Mic 1** – Activates audio test source # 1 in each of the audio channels. The VDR\_Record application must be in either Audio test or Record mode for this test to be conducted. The results of the test will be displayed in the Log Window. If the test is performed in Audio Test mode the chirp from the test source may be observed as a spike in the Audio Data window.

**Test Mic 2** – Activates test source # 2 in each of the audio channels. See Test Mic 1 for additional details.

**Perform Full Test** – Activates the microphone self test procedure immediately. The test will use the settings in the VDRPARAMS.INI file and the results will be displayed in the Log Window. The VDR\_Record application must be in either Audio Test or Record mode to conduct this test.

## 8.5 Video A/D Menu



Figure 8-5 - Video A/D menu

**Enabled** – Default is set to enabled. Enables the video capture by the VDR video subsystem and stores the video data to the DMM during recording.

**Status** – Displays the status of the Video A/D module in the Log Window.

## 8.6 NMEA A/D Menu

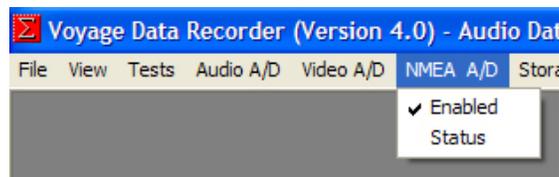


Figure 8-6 - NMEA A/D menu

**Enabled** – Default is set to enabled. Enables the NMEA capture by the VDR video subsystem and stores the NMEA data to the DMM during recording.

**Status** – Displays the current status of the NMEA A/D module in the Log Window.

## 8.7 Storage Menu

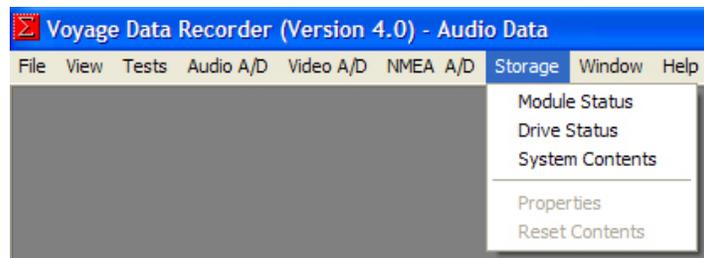


Figure 8-7 - Storage Menu

**Module Status** – Displays the current status of the overall Storage module and the four (4) individual modules (Video, Audio, NMEA and Hardened) in the Log Window.

## Chapter 8: VDR Record Operating Instructions

**Drive Status** – Displays the current status of the DMM.

**System Contents** – Displays the start and end time of the NMEA, Audio and Video data sets currently recorded on the DMM internal drive.

**Properties** – This menu will not be available if the VDR\_Record application is in record mode. There are two (2) additional items under the Properties menu:

- **Location** – Displays the location of where the primary data set will be saved. Enables mirroring of the data set to another location.
- **Advanced Controls** – Sets the number of data blocks to be packaged into one file.

Changes to these settings will take place immediately in the recording but will not be written to the VDRPARAMS.INI until the VDR\_Record application is closed.

**Reset Contents** – Deletes the recorded data set on the internal DMM drive.

### 8.8 Window Menu

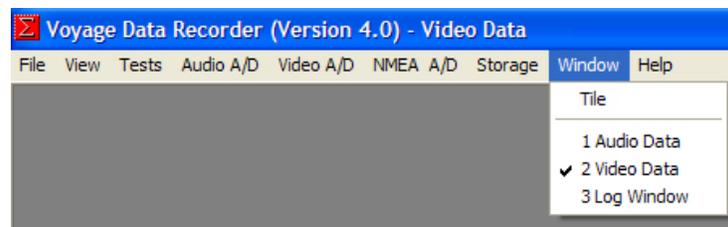


Figure 8-8 - Window Menu

**Tile** – Arranges all open windows so they are displayed on the screen simultaneously.

1. Video Data – Selects the Video Data as the active window.
2. Audio Data – Selects the Audio Data as the active window.
3. Log Window – Selects the Log Window as the active window.

### 8.9 Help Menu

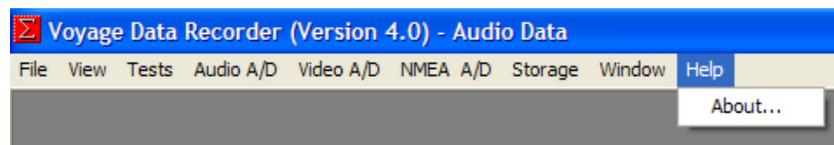


Figure 8-9 - Help Menu

**About** – Display the version number of the Serial Number and Product Key applicable to each VDR Record application.

## Chapter 8: VDR Record Operating Instructions



*Figure 8-10 - Help Menu 'About' Dialog Box*

The Serial Number and Product Key listed in the “About” dialog box will differ between each VDR unit. These numbers are used to enable special features and can be important when troubleshooting potential software issues.

## 9 AUDIO TEST SOURCE SETUP

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The microphone locations are determined during the installation planning phase. A maximum of 8 independent audio channels is supported. Each channel supports a maximum of 2 inputs. Typically the sources are either 2 inside microphones, 2 outside microphones, or a transmit (Tx) and receive (Rx) VHF radio line.

Channels with similar sources can be mixed in software to form a zone. Up to 4 microphones or 2 radios can be assigned to a zone. A zone is referred to in the *vdrparams.ini* file as an OutputChannel. The zoning of audio recording allows for simultaneous activation of buzzers, which are used as a test source for microphone operation. Buzzers are paired with the microphones and can be connected to 1 of 2 independent controls (BuzzRef1 or BuzzRef2).

In the case where a ship will have 12 microphones installed on the bridge there will be 3 zones. The microphones should be installed starting on the port side of the bridge and continuing to the starboard side.

### 9.1 Understanding Zones

A Zone is determined by the number of channels placed in individual OutPutChannelX fields in the *vdrparams.ini*. For example, consider a vessel that has 12 internal bridge microphones and 1 VHF source. The VHF source will occupy the 2 inputs on Channel 1, leaving the following microphone connection arrangement:

- Mics 1 & 2 = Channel 2
- Mics 3 & 4 = Channel 3
- Mics 5 & 6 = Channel 4
- Mics 7 & 8 = Channel 5
- Mics 9 & 10 = Channel 6
- Mics 11 & 12 = Channel 7

The channels entered into the first four (4) OutPutChannelX fields of the VDRPARAMS.INI file are communicated to the FRM. Two (2) channels can be entered per OutPutChannelX field (with the exception of a VHF channel which must have a dedicated OutPutChannelX field). Using the 12 microphone example provided above, the OutPutChannelX fields would be similar to the following:

- OutPutChannel1 = 1
- OutPutChannel2 = 2, 3
- OutPutChannel3 = 4, 5
- OutPutChannel4 = 6, 7

This installation configuration allows all 12 of the bridge microphones (and the single VHF) to be recorded to the FRM. In this configuration there are three (3) microphone zones:

- Zone 1 = Channel 2 & 3
- Zone 2 = Channel 4 & 5
- Zone 3 = Channel 6 & 7

Since a maximum of 2 channels can be mixed per OutPutChannelX field, a maximum of 4 inputs can be placed in 1 zone.

## Chapter 9: Audio Test Source Setup

A zone, wherever possible, must contain microphones recording similar information. For example, since you cannot mix an internal microphone channel with an external microphone channel, external microphones must be contained within their own zone. See *Sections 9.4.1 - Microphone Installation - Sample One* and *9.4.2 -*

*Microphone Installation – Sample Two* for more detailed examples of configuring the microphone parameters and zones.

## 9.2 Audio Setup

The Audio Diagnostics application will allow a user to auto-configure the audio section of the VDRPARAMS.INI file.

Alternatively, the audio information can also be manually set-up and adjusted. In either case, the Detection Threshold will need to be **manually** configured.

### 9.2.1 Audio Diagnostics (AudioConfigSuite) Application

The Audio Diagnostics (ADi) application is used to capture and configure audio data from bridge microphones, externally mounted microphones, and VHF radio sources where applicable.

There are two (2) methods available for starting the application:

- Via the Start menu (Start > All Programs > Utilities > AudioConfigSuite).
- The application's executable file is located in the C:\VDRApps folder. Double-click the AudioConfigSuite.exe icon to open the application.



**Note!** It is also **recommended** to copy the **AudioConfigSuite.exe** and **RutterACS.dll** files to the D:\ drive and **operate** the application from that destination in order to avoid any potential virtual memory problems. Note that the Start menu should not be used if attempting to run the application from the D:\ drive.

Prior to operating the ADi application, the VDR\_Record application **must be stopped** and closed.

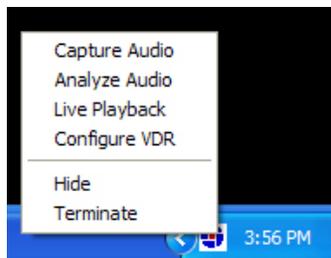


Figure 9-1 - Taskbar Menu

Once started, the ADi application will place an icon (Rutter Technologies symbol) in the desktop task bar. The icon can be used to:

- Initiate the capture of audio (Capture Audio)
- Analyze the amplitude of captured audio (Analyze Audio)
- Playback captured audio in real time (Live Playback)
- Store configured audio settings to the VDRPARAMS.INI file (Configure VDR)
- Minimize the application interface and/or menu (Hide)
- Exit the application (Terminate)

## Chapter 9: Audio Test Source Setup

### 9.2.1.1 Configure VDRPARAMS.INI

The ADi application can also be used to properly configure the audio section of the VDRPARAMS.INI file. The steps provided below outline the procedure for configuring the INI file:

1. Right-click the ADi icon in the taskbar and select 'Configure VDR'.
2. In the VHF Channel dialog box, indicate which channels are reserved for VHF. For example, if channels 1 and 5 are connected for VHF, enter 1 and 5 in the text fields. Or if there is only a single VHF, connected to channel 1, enter "1" in the VHF1 text field and "0" in the VHF2 text field. Once the channels have been entered press "OK".

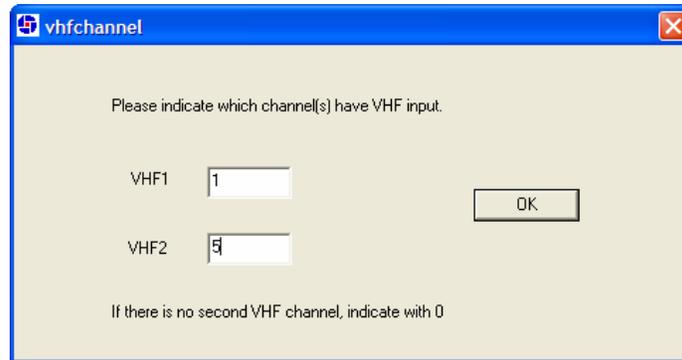


Figure 9-2 - VHF Channel Dialog Box

3. Once the VHF channels have been entered, the Audio Configuration dialog box will appear. This dialog box will be used to input specific information about microphone connections and audio channel mixing.

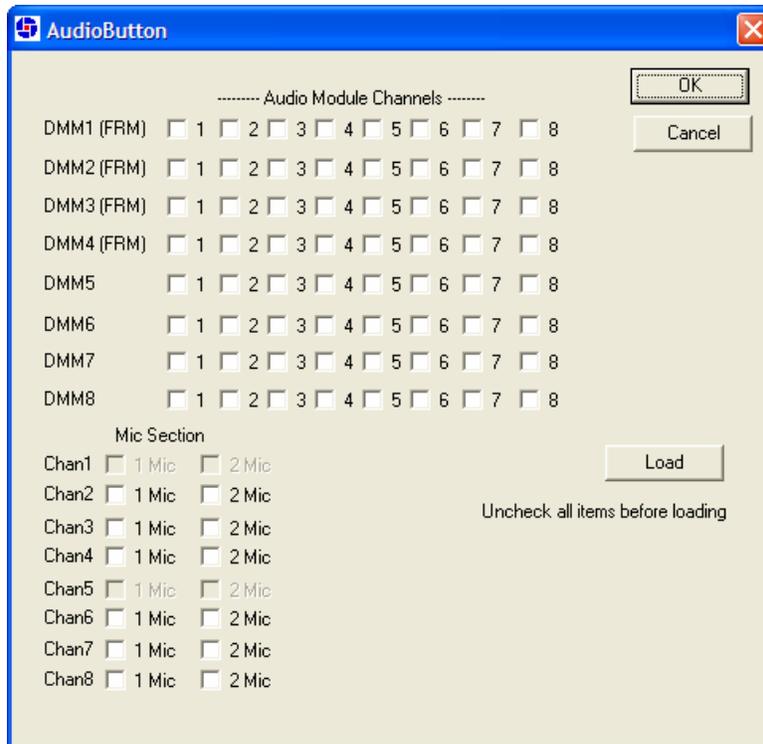


Figure 9-3 - Audio Configuration Dialog Box

## Chapter 9: Audio Test Source Setup

4. Start by selecting the number of microphones on each channel (located in the 'Mic Section' of the dialog box.) Channels that have been specified for VHF connections will be unavailable (grayed out.) If there are two (2) microphones on a channel, select only the "2 Mic" selection box.
5. Once the number of microphones per channel has been entered, choose which channels to mix using the "Audio Module Channels" section located at the top of the dialog box. The first four (4) DMM rows (DMM1 – DMM4) indicate the four (4) channels which will communicate to the FRM for final recording medium storage.
6. The settings from a previous VDRPARAMS.INI file can be loaded into the Audio Configuration dialog box by pressing the "Load" button. However, ensure all items are unchecked when attempting to load previous settings.
7. To save settings, press the "OK" button.

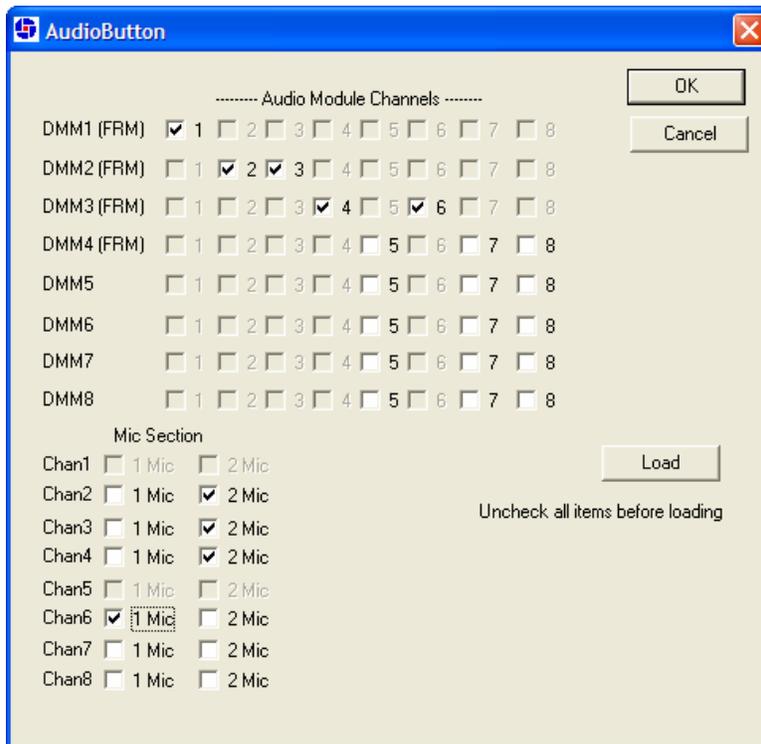


Figure 9-4 - Audio Configuration Dialog Box Example

Using *Figure 9-4 - Audio Configuration Dialog Box Example* as an example entry:

- DMM1 (FRM) selection box 1 has been selected. This indicates that information from Channel 1 will be stored to the FRM and not mixed with any other audio channels. Note that since Channel 1 has been specified as being a VHF connection, it cannot be mixed with other channels.
- DMM2 (FRM) selection boxes 2 and 3 have been selected. This indicates that audio information from Channels 2 and 3 will be mixed and stored to the FRM. A maximum of two (2) channels can be mixed. Once two (2) channels are selected the other selection boxes in that row will be unavailable.
- DMM3 (FRM) selection boxes 4 and 6 have been selected. This indicates that audio information from Channels 4 and 6 will be mixed and stored to the FRM. Selection box 5 could not be selected for mixing as it is connected to a VHF source.

## Chapter 9: Audio Test Source Setup

The following sections detail VDRPARAMS.INI file and audio configuration information for use when manually configuring audio (i.e., without using the Audio Diagnostics application.)

### 9.2.1.2 Initiate Audio Capture

To initiate the capture of audio data, complete the steps provided below:

1. Right-click the Rutter icon in the desktop task bar and select 'Capture Audio' from the pop-up list.
2. Right-click the Rutter icon in the desktop task bar and select 'Live Playback' from the pop-up list.
3. In the "Channel Selection Dialog" box, select the channel(s) to be analyzed. By default, all channels are grayed. There are **three (3) options** available:
  - **Grey Checkbox:** An amplitude readout (2 second delay) with no live audible playback (default).
  - **White Checkbox w/ Black Check:** An audible playback (10 second delay) through connected speakers in addition to an amplitude readout (2 second delay).
  - **Empty White Checkbox:** No playback (either audible or readout) for associated non-checked channel.



Figure 9-5 - Audio Channel Selection Dialog Box

4. Once the correct audio channels and playback option has been selected, press "OK".

### 9.2.1.3 Analyze Captured Audio

Once the desired channels are selected, their RMS values may be analyzed. To open the Audio Analysis window, right-click the ADi icon in the taskbar and select 'Analyze Audio' from the selections available. See *Figure 9-1 - Taskbar Menu* for an illustration of the ADi menu.



**Note!** If the Channel 2 checkbox is the first audio channel selected in the Channel Selection Dialog box, the RMS value for Channel 2 will appear for RMS Value #1 in the Audio Analysis window.

For example, a user has selected Channels 2, 3, and 4 in the Channel Selection Dialog box and each has a RMS value of 1.54, 8.34, and 1.04 respectively. Therefore, 1.54 (Channel 2) will appear under RMS value field 1, 8.34 (Channel 3) will appear under RMS value field 2, and 1.04 (Channel 4) will appear under RMS value field 3.

## Chapter 9: Audio Test Source Setup

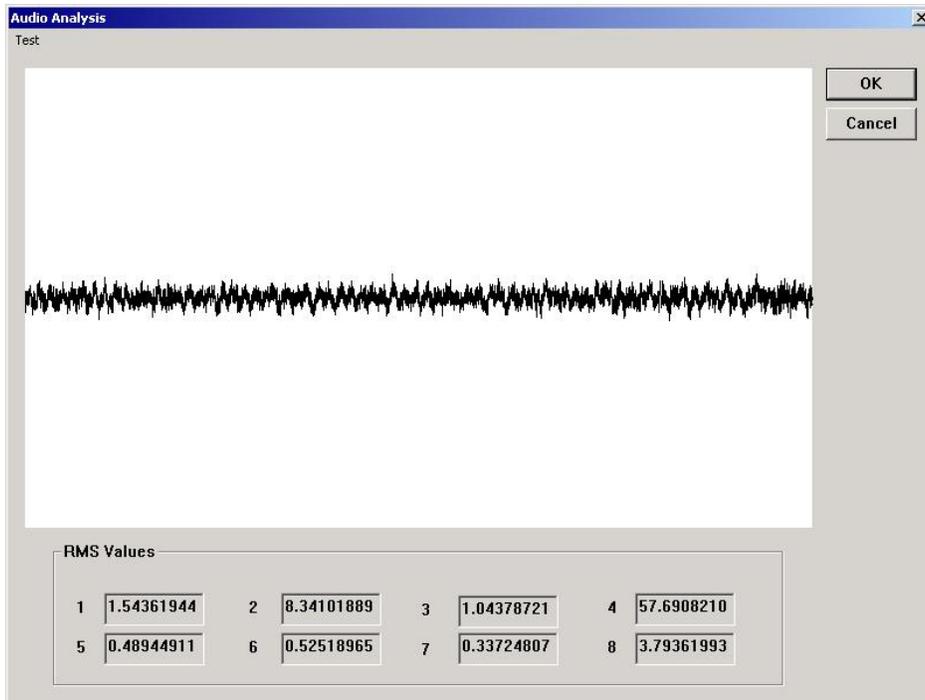


Figure 9-6 - RMS Value Readout

1. To test the microphones, open the Test menu, select “Buzzer 1”, and note the RMS Values for the microphones associated with that buzzer. Repeat for Buzzer 2.

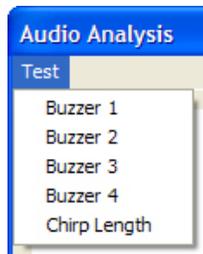


Figure 9-7 - Audio Analysis Test Menu



**Note!** Although there are four (4) buzzer options available in the Test menu, **only** Buzzer 1 and Buzzer 2 are applicable to the VDR-100G2 audio set-up.

2. The chirp length associated with the buzzer tests can also be set using the “Chirp Length” option in the Test menu. By selecting this option, a value bar will appear allowing for a chirp length user adjustment of 0 to 255 milliseconds.



**Note!** To complete the audio installation, a technician **must still** calculate Detection Threshold levels. To calculate the Detection Threshold, see Section 9.2.3 - Detection Threshold.

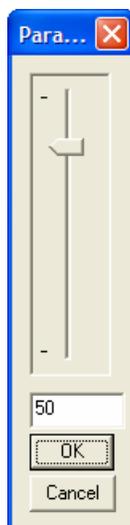


Figure 9-8 - Chirp Length Selector

### 9.2.2 Manual Audio Configuration

While the Audio Diagnostics application offers the most effective means of configuring the VDR's audio information, it can also be manually configured.

#### 9.2.2.1 VDRPARAMS.INI File

Several entries in the AUDIO section of the VDRPARAMS.INI file reflect the number of bridge audio channels and radio channels to be recorded. The VDRPARAMS.INI file is located in the C:\WINDOWS directory of the DMM internal hard drive and may be accessed via the shortcut on the desktop.

- **MikesOnMixer** reflects the number of microphones on each channel.
- **numVHFChannels** reflects the number of channels connected to record radios, PA systems, bridge telephone, etc.
- **VHF-ChannelX** indicates the channel(s) on which the radio(s) are being recorded.
- **ChannelEnabledX** reflects if the applicable channel is enabled or disabled.
- **MikeRetryInterval** reflects the wait period for the retrieval of a failed mic test.

The number of channels sampled by the VDR-100G2 is set in the **NumOutputChannels** field of the INI file. The system will activate the first N input channels for which the **ChannelEnabled** field is set to 1. The gain for each channel is set at the factory. The factory default setup is:

1. VHF audio on inputs 1, 2, 9, and 10.
2. Bridge audio (inside microphones) on inputs 3, 4, 5, 6, 11, 12, 13, and 14.
3. Outside microphones on inputs 7, 8, 15, and 16.

#### 9.2.2.2 Testing Microphones

For the bridge audio self-testing, the system will generate a tone on the audio test source, receive it on the microphone, and detect this tone in the captured data block. Numerous entries in the INI file are used to configure this process.

The VDR-100G2 can perform self-testing of all microphone ports. For each two (2) channel microphone port a "chirp" test will be performed on all buzzer block 1 microphones (channel

## Chapter 9: Audio Test Source Setup

inputs 3, 5, 7, 9, 11, 13, 15) followed by a test of the buzzer block 2 microphones (channel inputs 4, 6, 8, 10, 12, 14, 16).

The number of microphones to test on each channel is set in the INI file using the Audio Diagnostics Application. One (1) microphone on each channel is tested simultaneously. Each channel has its own detection threshold, which is loaded from the INI file via the **DetectionThreshold1**, **DetectionThreshold2**, and **DetectionThreshold3** fields.

To calculate the Detection Threshold, see *Section 9.2.3 - Detection Threshold*,

### 9.2.3 Detection Threshold

The **Detection Threshold** level is used only as a test value and does not have an affect on the level of the audio recorded. It is used as a baseline for two (2) measurements during the audio self-test. The first measurement will determine the average noise level in order to establish if there is a sufficient lack of background noise (too much background noise will not allow the test to conduct properly). The second measurement will determine the chirp level which will allow the VDR to check for abrupt changes in audio registering above the detection threshold.

#### 9.2.3.1 Record Application – Log Window

It is important to note, prior to beginning the audio self-test, that the Channel numbers listed in the VDR Record application Log Window are associated with the *ChannelEnabled* fields in the VDRPARAMS.INI file. The Log Window only numbers channels that are “turned on” (equal 1) in the INI file.

Consider the two (2) following examples:

##### Example 1

The Audio Module has the following connections:

Channel 1 = VHF  
Channel 2 = Mic 1, Mic 2  
Channel 3 = Mic 3, Mic 4  
Channel 4 = Mic 5, Mic 6  
Channel 5 = VHF 2  
Channel 6 = Mic 7, Mic 8  
Channel 7 = Empty  
Channel 8 = Empty

For example, an INI file contains the following ChannelEnabled fields:

```
ChannelEnabled1=1  
ChannelEnabled2=1  
ChannelEnabled3=1  
ChannelEnabled4=1  
ChannelEnabled5=1  
ChannelEnabled6=1  
ChannelEnabled7=0  
ChannelEnabled8=0
```

During a buzzer/audio test, the Log Window will read similar to the following:

Mike 1 test – chirp detected on channel 2 – 669.459 (159.906)

## Chapter 9: Audio Test Source Setup

Mike 1 test – chirp detected on channel 3 – 669.459 (159.906)  
Mike 1 test – chirp detected on channel 4 – 669.459 (159.906)  
Mike 1 test – chirp detected on channel 6 – 669.459 (159.906)

### Example 2

The Audio Module has the following connections:

Channel 1 = VHF  
Channel 2 = Mic1, Mic2  
Channel 3 = Empty  
Channel 4 = Mic 3, Mic4  
Channel 5 = Empty  
Channel 6 = Mic 5, Mic 6  
Channel 7 = Mic 7  
Channel 8 = Empty

For example, an INI file contains the following ChannelEnabled fields:

```
ChannelEnabled1=1  
ChannelEnabled2=1  
ChannelEnabled3=0  
ChannelEnabled4=1  
ChannelEnabled5=0  
ChannelEnabled6=1  
ChannelEnabled7=1  
ChannelEnabled8=0
```

During a buzzer/audio test, the Log Window will read similar to the following:

```
Mike 1 test – chirp detected on channel 2 – 669.459 (159.906)  
Mike 1 test – chirp detected on channel 3 – 669.459 (159.906)  
Mike 1 test – chirp detected on channel 4 – 669.459 (159.906)  
Mike 1 test – chirp detected on channel 5 – 669.459 (159.906)
```

If a *ChannelEnabled* field is not enabled, the Log Window sequentially numbers the next enabled channel. This is illustrated in Example 2. In that example, ChannelEnabled1 is a VHF connection and therefore does not register a chirp in the Log Window; ChannelEnabled2 has its RMS values listed as channel 2; however, because the *ChannelEnabled3* field equals 0, the Log Window lists the RMS values for *ChannelEnabled4* as channel 3.

### 9.2.3.2 Microphone Self-Test and Detection Threshold Calculation Procedure

The microphone self-test is performed as follows:

1. The speaker for one (1) mic on each channel is turned on for the period specified in the INI file – the **ChirpLength** field (ChirpLength is specified in milliseconds: default is 30).
2. The RMS for the entire data record (one (1) second) is computed.
3. If the RMS value is greater than  $0.707 * \text{detection threshold}$ , the test is aborted. If this happens the background noise level is assumed to be too high to reliably pick out the speaker chirp.
4. If the test is not aborted, an RMS value is computed for each sub-interval; each sub-interval is half the ChirpLength duration.
5. If the RMS for any sub-interval exceeds the detection threshold, the chirp is declared detected and the microphone operational.

## Chapter 9: Audio Test Source Setup

- Once the test source on each channel has been activated, the detection results are reviewed. Any mic that has failed the test will be retried. The VDR-100G2 will wait for the period specified in the INI file (the **MikeRetryInterval** field) before retrying the test. The test will be retried a maximum number of times (as specified in the INI file – the **MaxMikeRetrys** field.) If any mic fails all self-test attempts, an alarm will be generated. The alarm will not clear until all mics have been successfully tested.

To configure the audio testing:

- Ensure the VDR\_Record application is running in the Audio Test mode. See *Section 8.3 - Tests Menu*.
- The test is performed by starting and stopping the mic test in rapid succession. Select “Test Mic 1” from the “Audio A/D” menu and immediately deselect the audio test (Tests > Audio Test). *Figure 9-9 - Channel 1, Mic 1 Test* displays the result of the tone generated from the audio test source.

The audio histogram will be divided into equal sections. The number of sections will depend upon the **OutPutChannel** fields, set in the INI file. Each section represents one (1) second of audio for each OutPutChannel field. An audio “spike” will be observed for each mic that is connected to the Buzzer 1 connection block (see *Figure 5-8 – Audio Module Buzzer Connections*) on the Audio Module.

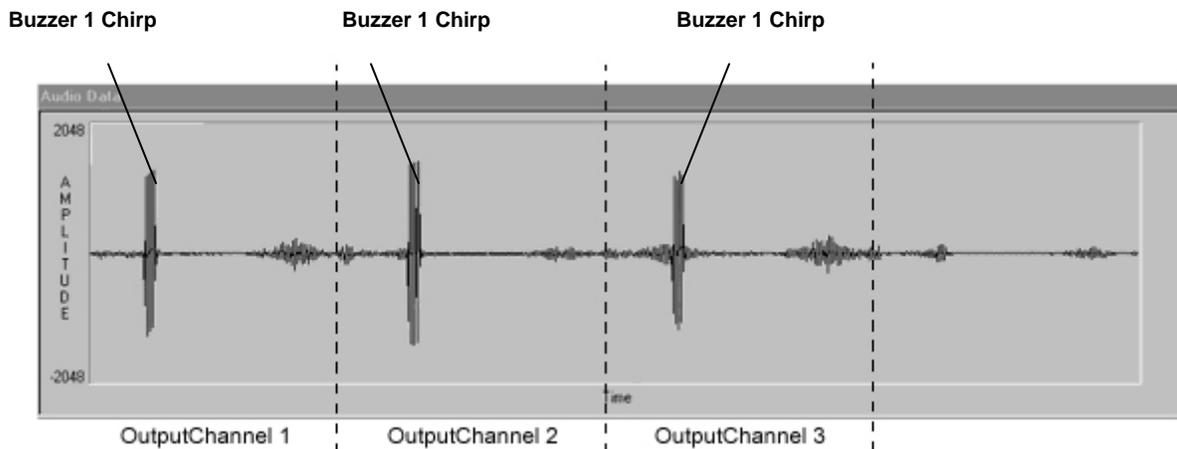


Figure 9-9 - Channel 1, Mic 1 Test

- Review the test results in the Log Window as illustrated in *Figure 9-10 - Microphone Test Results*. The first number listed is the RMS value computed for a sub-interval. The number in parentheses “( )” is the RMS for the entire data record (1 second). A successful test should show results similar to the following:



**Note!** The audio spikes shown in the audio histogram are related to the audio module channels **after** they have been mixed via the OutPutChannel fields of the INI file (output audio).

However, the mic (mike) test values, shown in the Log Window, are associated with the input audio (audio as it is captured via the module’s audio channels **before** it is mixed).

## Chapter 9: Audio Test Source Setup

- a. Mike 1 test – chirp detected on channel 1 – 669.459 (159.906)
- b. Mike 1 test – chirp detected on channel 2 – 601.567 (104.807)
- c. Mike 1 test – chirp detected on channel 3 – 624.567 (124.707)

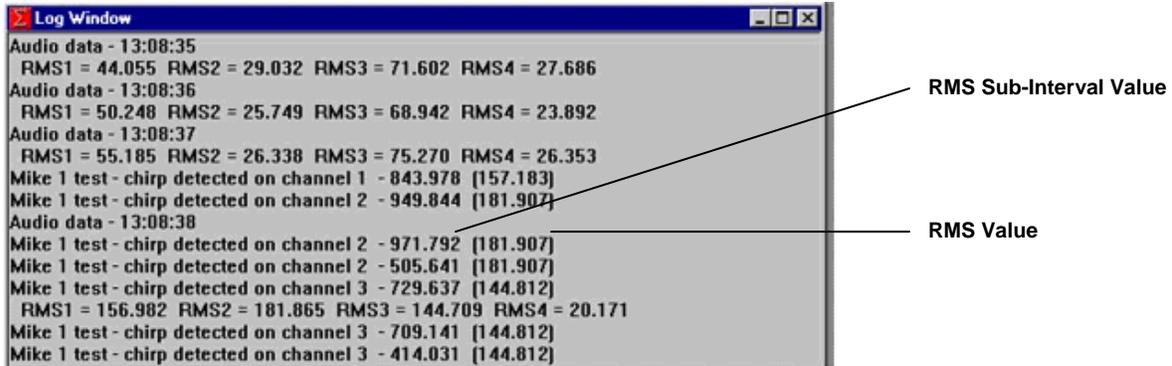


Figure 9-10 - Microphone Test Results

4. Make note of the values displayed.
5. Select the Audio test mode again and repeat steps 2 through 4 for “Test Mic 2”. This will test all mics connected to the Buzzer 2 connection block on the Audio Module.



**Note!** If a test was aborted or a microphone is not detected, the test **must be** repeated. The values displayed for each test will vary depending on the amount of noise on the bridge at the time the audio test was performed. A chirp not detected on channel X will be displayed even if there is no microphone installed for that channel. This is a result of each channel being tested for a microphone during the test, this will not display an error during the audio testing while in record mode.

6. For information on determining the proper detection threshold, see Section 9.2.3.3 - Sample Calculation of Detection Thresholds below.



**Note!** If the DetectionThreshold is set too high, the chirp from the test source will not be detected and the test will fail. If the DetectionThreshold is set too low the microphone test will be aborted. This will not create a failure but the microphone testing will not be valid.

The Detection Threshold Calculations are meant as a guide to place the values within an operating range. It may be necessary to set the Detection Threshold levels lower than the calculated value to ensure reliable testing.

7. Repeat the steps taken to determine the threshold value for Channel 1 for each available channel as necessary.



**Note!** The audio testing procedure and calculation of the detection threshold for each channel should be repeated several times to ensure the audio testing is correctly configured.

## Chapter 9: Audio Test Source Setup

8. Open the VDR\_PARAMS.INI file from the Windows desktop.
9. Scroll to the [AUDIO] section and edit the following settings for bridge audio testing configuration.
  - a. **DetectionThreshold1**
  - b. **DetectionThreshold2**
10. Save the changes and close the VDR\_PARAMS.INI file.
11. Select "Record" under the Test menu and conduct the audio test. The VDR should pass the audio test within one (1) hour of recording. If the bridge is extremely noisy, the test may not pass until after multiple retries.

### 9.2.3.3 Sample Calculation of Detection Thresholds

This section provides an example for calculating Channel Detection thresholds. Below is an example of how to calculate Channel Detection Thresholds. Please note that this example calculates the threshold for Channel 1 **only**. In order to correctly calculate all available channel detection thresholds, the steps provided below must be completed for each of the channels.

Also note that although Channel 1 is usually reserved for VHF connection, the below example is configured as if a microphone is connected to Channel 1.

1. Conduct an audio test for each available microphone and record the results (it is common for each microphone to produce more than one (1) result).
  - a. Mike 1 test – chirp detected on channel 1 – 971.378 (300.967)
  - a. Mike 1 test – chirp detected on channel 1 – 1081.232 (300.967)
  - b. Mike 1 test – chirp detected on channel 2 – 903.644 (261.255)
  - b. Mike 1 test – chirp detected on channel 2 – 943.323 (261.255)
  - c. Mike 1 test – chirp detected on channel 3 – 990.313 (316.459)
  - c. Mike 1 test – chirp detected on channel 3 – 922.433 (316.459)
  - a. Mike 2 test – chirp detected on channel 1 – 998.937 (321.623)
  - a. Mike 2 test – chirp detected on channel 1 – 1067.232 (321.623)
  - b. Mike 2 test – chirp detected on channel 2 – 956.135 (290.967)
  - b. Mike 2 test – chirp detected on channel 2 – 982.204 (290.967)
  - c. Mike 2 test – chirp detected on channel 3 – 1010.550 (324.374)
  - c. Mike 2 test – chirp detected on channel 3 – 1211.322 (324.374)

To make the necessary calculations easier, organize each of the audio results in channel groups (as below):

RMS Sub- Interval / RMS Value

- 
- a. Mike 1 test – chirp detected on channel 1 – 971.378 (300.967)
  - a. Mike 1 test – chirp detected on channel 1 – 1081.232 (300.967)
  - a. Mike 2 test – chirp detected on channel 1 – 998.937 (321.623)
  - a. Mike 2 test – chirp detected on channel 1 – 1067.232 (321.623)
  
  - b. Mike 1 test – chirp detected on channel 2 – 903.644 (261.255)
  - b. Mike 1 test – chirp detected on channel 2 – 943.323 (261.255)
  - b. Mike 2 test – chirp detected on channel 2 – 956.135 (290.967)
  - b. Mike 2 test – chirp detected on channel 2 – 982.204 (290.967)
  
  - c. Mike 2 test – chirp detected on channel 3 – 1010.550 (324.374)

## Chapter 9: Audio Test Source Setup

- c. Mike 2 test – chirp detected on channel 3 – 1211.322 (324.374)
  - c. Mike 1 test – chirp detected on channel 3 – 990.313 (316.459)
  - c. Mike 1 test – chirp detected on channel 3 – 922.433 (316.459)
2. Once each of the channels has been grouped together, use the RMS values to determine the highest value received for each channel.

RMS Sub- Interval / RMS Value

- a. Mike 1 test – chirp detected on channel 1 – 971.378 (300.967)
- a. Mike 1 test – chirp detected on channel 1 – 1081.232 (300.967)
- a. Mike 2 test – chirp detected on channel 1 – 998.937 (**321.623**)
- a. Mike 2 test – chirp detected on channel 1 – 1067.232 (321.623)

For Channel 1, the highest RMS value is from mike 2 (**321.623**)

Using the highest available RMS value, complete the following calculation to obtain the Detection Threshold:

Highest RMS Value / 0.707 = Threshold for Channel X

$$321.623 / 0.707 = 454.912$$

3. Next, make note of the lowest RMS Sub-Intervals for each channel:

RMS Sub- Interval / RMS Value

- a. Mike 1 test – chirp detected on channel 1 – **971.378** (300.967)
- a. Mike 1 test – chirp detected on channel 1 – 1081.232 (300.967)
- a. Mike 2 test – chirp detected on channel 1 – 998.937 (321.623)
- a. Mike 2 test – chirp detected on channel 1 – 1067.232 (321.623)

For Channel 1, the lowest RMS sub-interval is from mike 1 (971.378)

The lowest sub-interval **should be higher** than the calculated Channel Detection Threshold.

In the above example, because the lowest RMS sub-interval of channel 1 (971.378) is a higher value than the calculated Channel Detection Threshold (425.696), the calculated value is good to use as your Detection Threshold for Channel 1.

If the calculated values do not meet the above-mentioned requirements, it will be necessary to restart the Detection Threshold calculation process. It is important to remember that **the bridge must be quiet when performing a microphone test**, as a noisy bridge will produce undesired results.

### 9.2.3.4 Test Bridge Audio

To test the Bridge Audio, a short audio test must be completed. When recording bridge audio, it is important to speak clearly and in a normal voice tone within a normal distance to each microphone. A normal voice procedure includes the words “Testing Microphone 1 on OutputChannel 1” followed by a voice count from 1 to 5 (or 10), a reverse count back to 1, ending with the words “Test Out”. The procedure for testing Bridge Audio is as follows:

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1. Start the VDR\_Record application.
2. Ensure the VDR\_Record application is operating in record mode.
3. Conduct the voice test as described above, repeating for each microphone.
4. Note the start and finish time of each test.
5. Wait one minute in order to allow the system to complete the writing of the audio block.
6. Use the download computer to download a small data set containing voice audio tests (see *Section 16 - DATA RETRIEVAL* for download instructions).
7. Play back the data to ensure bridge audio was recorded properly.

It is preferable to conduct the Bridge Audio test during a quiet time on the bridge in order to prevent the interference of unnecessary noise with the voice recording. The presence of unnecessary noise may create a sound environment not normal to the bridge and, as a result, invalidate the test.

### 9.2.3.5 Test VHF Radios

To test the VHF Audio, a short broadcast must be completed. When broadcasting on VHF, ensure that no transmissions are made that could be confused with anything other than a test transmission. A normal voice procedure is to say the word “Test” followed by a voice count from 1 to 5 (or 10) and reverse the count back to 1, finishing the transmission with words “Test Out”. The procedure for testing VHF is as follows:

1. Check the VHF wire connection to the VDR to ensure it is correct.
2. Start the VDR\_Record application.
3. Ensure the VDR\_Record application is operating in record mode.
4. Transmit the voice test as described above. When transmitting, ensure that the VHF is switched to a channel that cannot be confused with any local distress or working frequencies.
5. Make note of time of test.
6. Use a second VHF radio (not connected to VDR) to broadcast a second test on the same frequency to ensure that the audio received is recorded correctly. Again note the time of the broadcast and receipt test.
7. Download a small data set (using the Download PC) containing transmit and receive VHF audio tests (see *Section 16 - DATA RETRIEVAL* for download instructions).
8. Playback the data to ensure both transmit and receive data is recorded properly.
9. Repeat steps 1 to 8 for any additional radios connected to the VDR.

## 9.3 Audio Module Internal Processing Board

The Audio Module’s internal processing board may need to be adjusted to meet distinctions particular to each audio installation.

**IMPORTANT!** When attempting to open the Audio Module, **DO NOT** remove the rear (channel and buzzer) plate. Access to the internal processing board should **only** be attempted by removing the front plate. The front plate **must** be removed **first**, followed by the **removal of the black (top) casing**, which slides away from the silver (bottom) casing.

**DO NOT** attempt to pull the internal processing board away from the silver (bottom) casing.



**Note!** Before beginning any physical adjustments to the internal processing board, **power must be removed** from the Audio Module unit.

## Chapter 9: Audio Test Source Setup

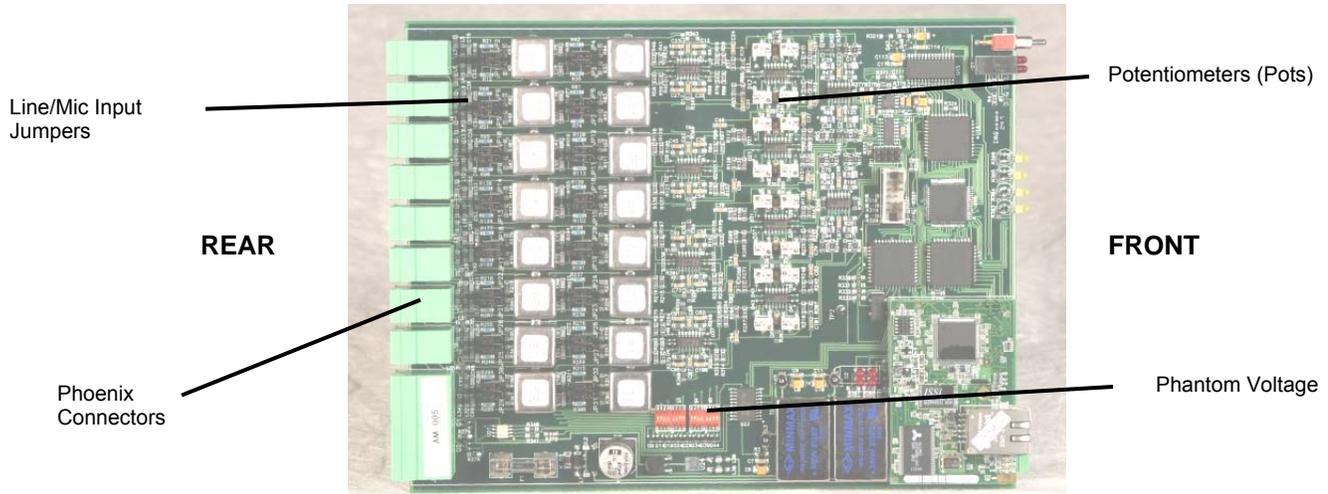
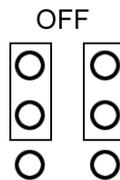


Figure 9-11 - Audio Module Internal Processing Board

### 9.3.1 Setting Line/Mic Input

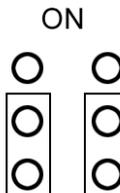
**Line** input is selected for VHF connections, while a **Mic** input is selected for a microphone connection.

To select **Line** input, the jumpers for the associated input must be adjusted to OFF. To do so, the two (2) clips must cover the **top** four (4) pins.



**Note!** When this document refers to the top four (4) jumper setting pins, it is referring to the four (4) pins farthest from the phoenix connectors (located at the rear of the unit). Similarly, when referring to the bottom four (4) pins, it is referencing the four (4) pins closest to the connectors. See Figure 9-11 - Audio Module Internal Processing Board above.

To select **Mic** input, the jumpers for the associated input must also be switched to ON. To do so, the two (2) clips must cover the **bottom** four (4) pins.



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The table below provides information pertaining to Jumper numbers and their associated Input numbers.

Jumper	Input	Factory Default
JP 1,2	Input 1	OFF
JP 3,4	Input 2	OFF
JP 5,6	Input 3	ON
JP 7,8	Input 4	ON
JP 9,10	Input 5	ON
JP 11,12	Input 6	ON
JP 13,14	Input 7	ON
JP 15,16	Input 8	ON
JP 17,18	Input 9	OFF
JP 19,20	Input 10	OFF
JP 21,22	Input 11	ON
JP 23,24	Input 12	ON
JP 25,26	Input 13	ON
JP 27,28	Input 14	ON
JP 29,30	Input 15	ON
JP 31,32	Input 16	ON

Table 9-1 - Jumper to Audio Module Input Associations

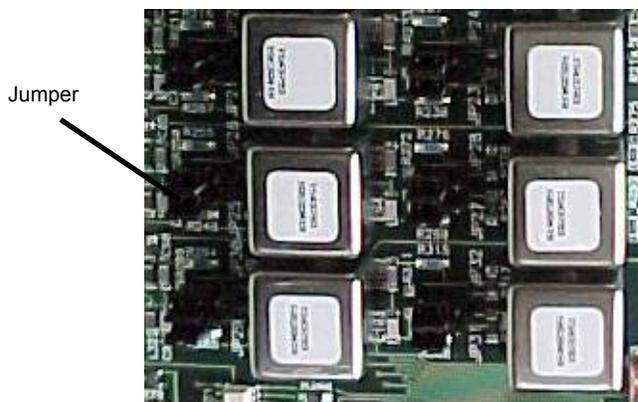


Figure 9-12 - Jumpers

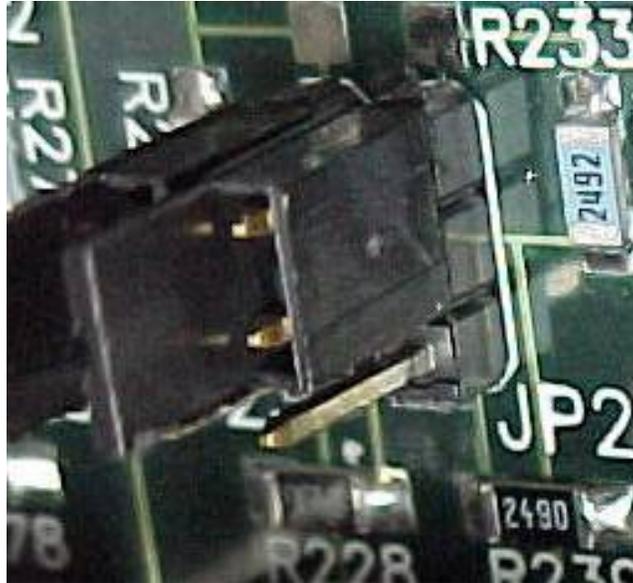


Figure 9-13 - Jumper Close-Up (in OFF position)

### 9.3.2 Adjusting Phantom Voltage

Phantom voltage is used to power the preamplifier of a condenser-type microphone. The following table details the different models of microphones, their type, and phantom voltage status.

Part	Part No	Type	Phantom Voltage
Outdoor Microphone (New)	RUT-01018-AA	Condenser	ON
Outdoor Microphone (Old)	RT-930 & RT-930A	Dynamic	OFF
Indoor Microphone (Old & New)	RT-2100 / RUT-01019-AA	Condenser	ON
VHF	N/A	N/A	OFF

Table 9-2 - Phantom Voltage Status



**Note!** Phantom voltage is adjusted differently depending on the Revision Number of the Audio Module. The Revision Number of the Module can be determined by its Serial Number, which is located at the bottom of the unit. See Sections below for more information.

#### 9.3.2.1 Adjusting Phantom Voltage on Audio Module (Rev.3)

The phantom voltage in Revision 3 Audio Modules (**Serial Number AMX011168 and higher (except AMX011170 and AMX011195)**) is adjusted via DIP-Switches S2 – S5 (as shown in Figure 9-14 - Phantom Voltage DIP-Switches (Revised Unit)) and must be:

## Chapter 9: Audio Test Source Setup

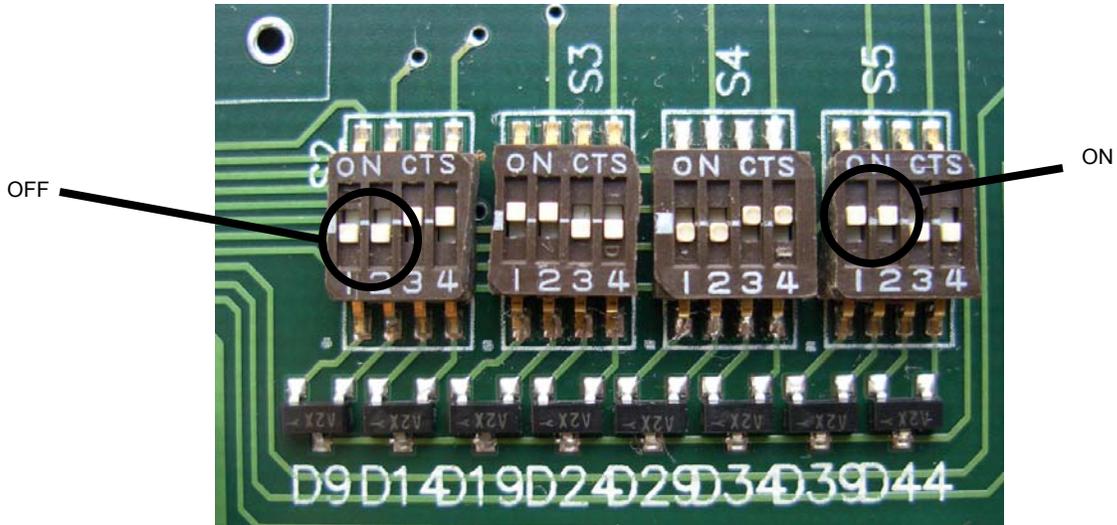


Figure 9-14 - Phantom Voltage DIP-Switches (Revised Unit)

See the table below for the Phantom Voltage Block, DIP-Switch, and Audio Module Input associations.

Phantom Voltage Block	Switch	Input	Factory Default
S5	4	Input 1	OFF
S5	3	Input 2	OFF
S5	2	Input 3	ON
S5	1	Input 4	ON
S4	4	Input 5	ON
S4	3	Input 6	ON
S4	2	Input 7	OFF
S4	1	Input 8	OFF
S3	4	Input 9	OFF
S3	3	Input 10	OFF
S3	2	Input 11	ON
S3	1	Input 12	ON
S2	4	Input 13	ON
S2	3	Input 14	ON
S2	2	Input 15	OFF
S2	1	Input 16	OFF

Table 9-3 - Phantom Voltage to Audio Module Input Associations (Revised Unit)

## Chapter 9: Audio Test Source Setup

### 9.3.2.2 Adjusting Phantom Voltage on Audio Module (Rev.2 & Earlier)

The phantom voltage in Revision 2 (and earlier) Audio Modules (**Serial Number AMX011168 and earlier (but including AMX011170 and AMX011195)**) is adjusted via DIP-Switches S2 – S5.

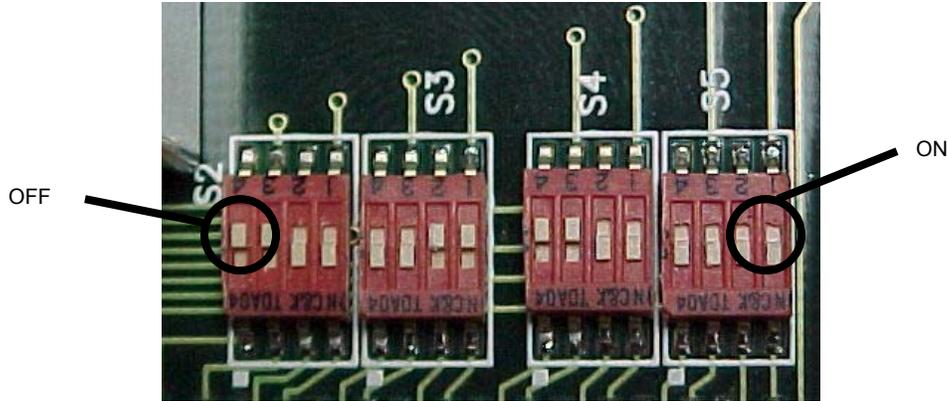


Figure 9-15 - Phantom Voltage DIP-Switches (Rev2 and Earlier)

See the table below for the Phantom Voltage Block, DIP-Switch, and Audio Module Input associations.

Phantom Voltage Block	Switch	Input	Factory Default
S5	1	Input 1	OFF
S5	2	Input 2	OFF
S5	3	Input 3	ON
S5	4	Input 4	ON
S4	1	Input 5	ON
S4	2	Input 6	ON
S4	3	Input 7	OFF
S4	4	Input 8	OFF
S3	1	Input 9	OFF
S3	2	Input 10	OFF
S3	3	Input 11	ON
S3	4	Input 12	ON
S2	1	Input 13	ON
S2	2	Input 14	ON
S2	3	Input 15	OFF
S2	4	Input 16	OFF

Table 9-4 - Phantom Voltage to Audio Module Input Associations (Original Unit)

### 9.3.3 Adjusting the Gain

If the volume of the audio captured is either too low or too high, it will be necessary to adjust the gain (adjust the resistance value). To adjust the gain a technician must tune the potentiometers (pots). A multimeter, which provides an Ohm reading, is required for this process.

Before adjusting the gain, it is necessary to understand which pots correspond to which input. *Figure 9-16 - Pot/Input Relation* below illustrates the pot/input relation.

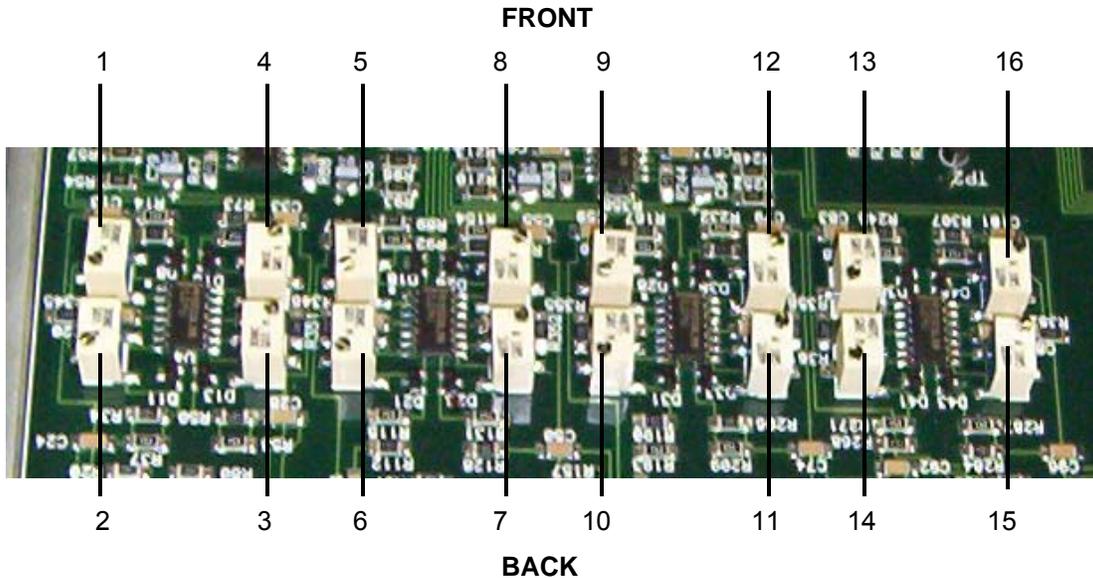


Figure 9-16 - Pot/Input Relation

To receive a resistance reading, first remove power to the module. Contact the two (2) multimeter probes to the two (2) pot leads. See *Table 9-5 - Recommended Resistance Readings* below for **recommended** resistance readings. Please note that the resistance readings do not have to exactly match these numbers. They are provided here only as recommendations.

Recommended Resistance Reading	
Internal Microphones (Old & New)	45k Ohms
Outdoor Microphones (Old - RT-930)	200k Ohms
Outdoor Microphones (New - RUT-01018-AA)	45k Ohms
VHF	Dependant upon VHF manufacturer.

Table 9-5 - Recommended Resistance Readings



**Note!** There are 3) leads for each pot. Only 2 of these leads are used to receive a resistance reading. In the case of the Rutter Technologies' Audio Module, Lead 1 and Lead 2 are the 2 leads which must be utilized.

## Chapter 9: Audio Test Source Setup

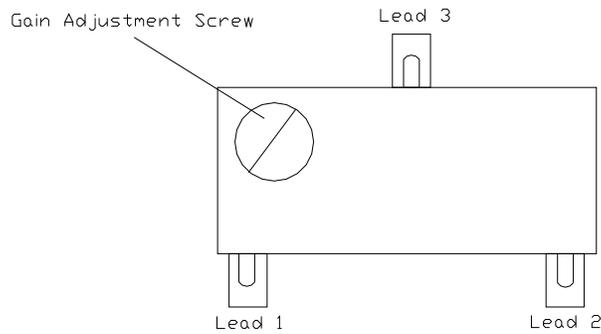


Figure 9-17 - Pot Leads

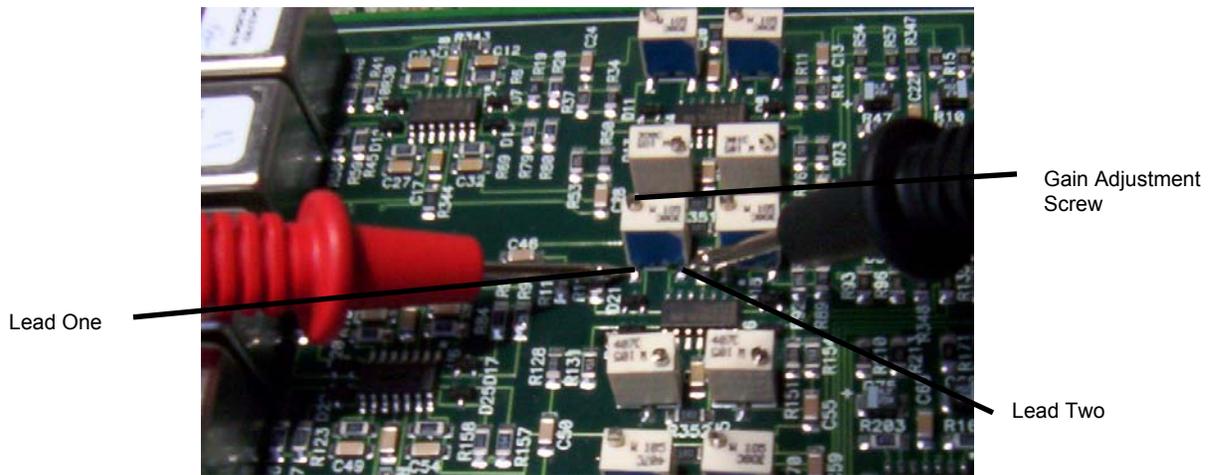


Figure 9-18 - Pot Lead Resistance Reading

To increase the gain of the selected input, the Gain Adjustment Screw located at the top of the pot must be turned clockwise.

### 9.4 Audio Installation Examples

Provided below are two (2) examples for adjusting the VDRPARAMS.INI file to properly represent the microphone installation.

It is important to remember that only the channels specified in the first four (4) OutputChannel fields (OutputChannel1, OutputChannel2, OutputChannel3, and OutputChannel4) of the VDRPARAMS.INI file are secured to the FRM. A user can enter a maximum of two (2) channels in one OutputChannel field. For example, OutputChannel2 may mix Channel 2 and Channel 3. Since the first OutputChannel field must be used for the VHF, this allows information from a maximum of 12 microphones to be secured to the FRM.

## Chapter 9: Audio Test Source Setup

### 9.4.1 Microphone Installation - Sample One

Ship Example 1 has five (5) Internal Microphones and two (2) External Microphones installed on the bridge. There is a single VHF source.

Note in *Figure 9-20 - Sample Audio Module Connections for Ship Example 1* below that Mics 1 and 2 are connected to Channel 2, Mics 3 and 4 are connected to Channel 3, and Mic 5 is connected to the top input of Channel 4. The two (2) exterior mics (6 and 7) are connected to Channel 5. An external microphone **must not** be placed on the same channel as an internal microphone.

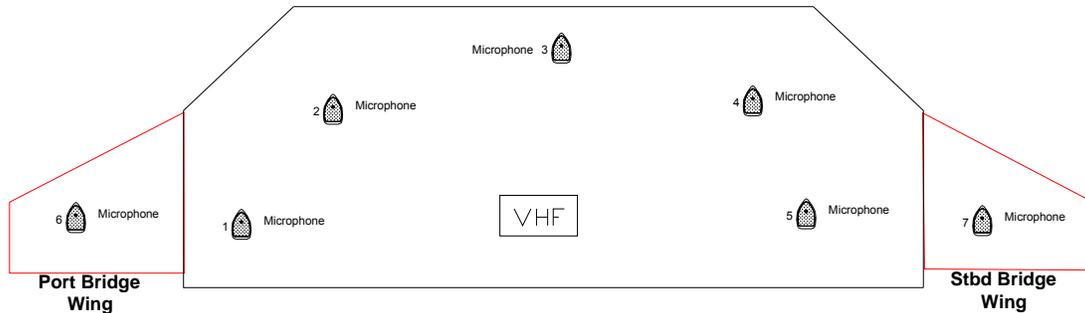


Figure 9-19 - Sample Mic Layout for Ship Example 1

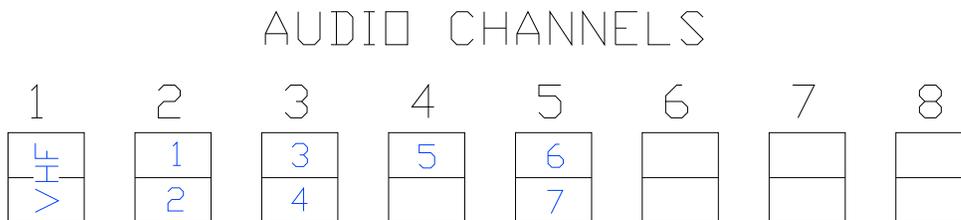


Figure 9-20 - Sample Audio Module Connections for Ship Example 1



**Note!** In this example, the vessel has only one (1) VHF. As microphones are shown to be connected to Audio Module Channel #5, that channel must be reconfigured for internal microphones. This requires accessing the internal processing board. The Phantom Voltage DIP-Switch and Jumper setting must be set to ON, and the resistance value of the associated potentiometers (pots) must be adjusted down.

2. Open the VDRPARAMS.INI file from the Windows desktop
3. Scroll to the [AUDIO] section and edit the following settings to reflect the ship configuration:

## Chapter 9: Audio Test Source Setup

Parameter	Typical Value	Remarks
NumChannels	5	
ChannelEnabled1	1	0 = disabled, 1 = enabled
ChannelEnabled2	1	0 = disabled, 1 = enabled
ChannelEnabled3	1	0 = disabled, 1 = enabled
ChannelEnabled4	1	0 = disabled, 1 = enabled
ChannelEnabled5	1	0 = disabled, 1 = enabled
ChannelEnabled6	0	0 = disabled, 1 = enabled
ChannelEnabled7	0	0 = disabled, 1 = enabled
ChannelEnabled8	0	0 = disabled, 1 = enabled
NumOutputChannels	4	Software mixing - provide list of channels to mix (max. 2 per channel)
OutputChannel1	1	
OutputChannel2	2	
OutputChannel3	3,4	
OutputChannel4	5	
OutputChannel5	5	Because <b>NumOutputChannels</b> field is 4, anything beyond the OutputChannel4 field is ignored
OutputChannel6	6	
OutputChannel7	7	
OutputChannel8	8	
numVHFChannels	1	Default is 1
VHF-Channel1	1	
VHF-Channel2	0	
MikesOnMixer1	2	0 to 2; refers to 1st mic channel. Here it is Channel 2.
MikesOnMixer2	2	
MikesOnMixer3	1	
MikesOnMixer4	2	
MikesOnMixer5	0	
MikesOnMixer6	0	
MikesOnMixer7	0	
MikesOnMixer8	0	
DetectionThreshold1	300	Test signal RMS must exceed value before detected
DetectionThreshold2	300	
DetectionThreshold3	300	
DetectionThreshold4	300	
DetectionThreshold5	300	
DetectionThreshold6	300	
DetectionThreshold7	300	
DetectionThreshold8	300	
ChirpLength	50	Mic self-test signal length, in ms (100 ms max)
MikeRetryInterval	3600	In seconds
MaxMikeRetrys	11	Retry this many times before declaring failure
ControlMode	2	1 = hold 1 of 3 bits high ; default is 1 2=set bits 1 and 2 to binary count and hold bit 3 high

*Table 9-6 - AUDIO Parameter Typical Values: Example 1*

## Chapter 9: Audio Test Source Setup

4. Save the changes and close the VDR\_PARAMS.INI file
5. If the VDR\_Record application is recording, it must be stopped and recording restarted for the changes to take effect.

In the example above, Audio Module Channels 3 and 4 (containing input connections for microphones 3, 4, and 5) are mixed on OutPutChannel3.

### 9.4.2 Microphone Installation – Sample Two

Ship Example 2 has nine (9) Internal Microphones installed on the bridge and four (4) Internal Microphones installed in the engine room. There is one (1) VHF source.

Note in *Figure 9-22 - Sample Audio Module Connections for Ship Example 2* below that Mics 1 and 2 are connected to Channel 2, Mics 3 and 4 are connected to Channel 3, and Mics 5 and 6 are connected to Channel 4, Mics 7 and 8 are connected to Channel 5, and Mic 9 is connected to the top input of Channel 6. The four (4) interior mics located in the engine room (10, 11, 12, and 13) are connected to Channels 7 and 8. Since the four (4) engine room mics are located in a separate section of the ship from the nine (9) Bridge mics, they are not placed on the same channel as the Bridge mics.

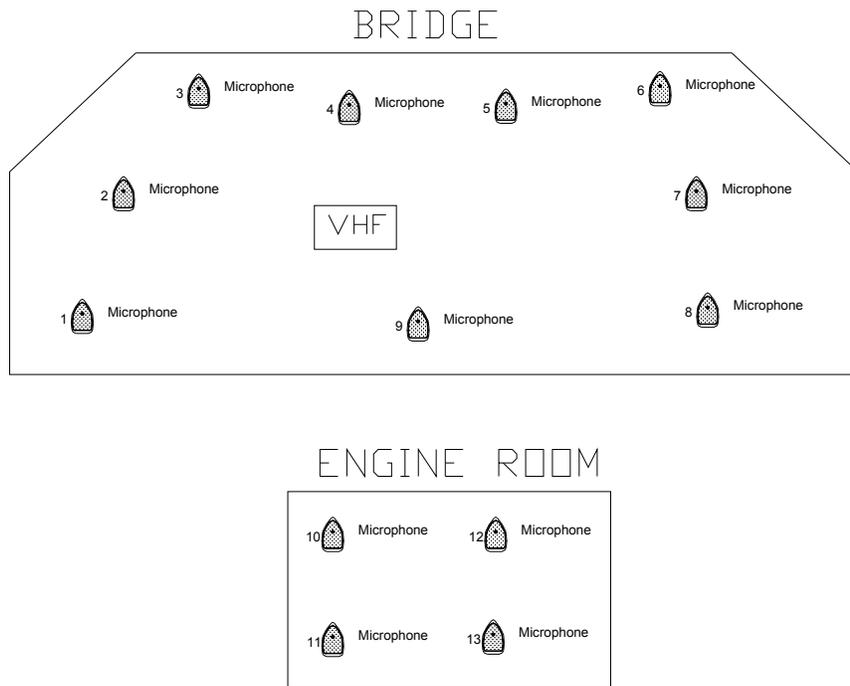


Figure 9-21 - Sample Mic Layout for Ship Example 2

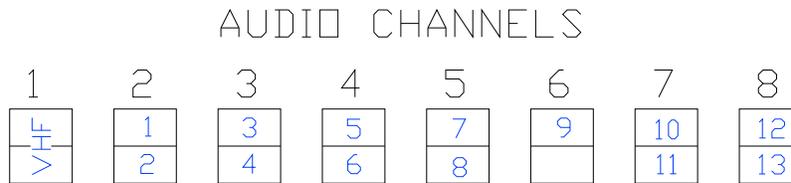


Figure 9-22 - Sample Audio Module Connections for Ship Example 2

1. Open the <vdrparams.ini> file from the Windows desktop
2. Scroll to the [AUDIO] section and edit the following settings to reflect the ship configuration:

## Chapter 9: Audio Test Source Setup

Parameter	Typical Value	Remarks
NumChannels	8	
ChannelEnabled1	1	0 = disabled, 1 = enabled
ChannelEnabled2	1	0 = disabled, 1 = enabled
ChannelEnabled3	1	0 = disabled, 1 = enabled
ChannelEnabled4	1	0 = disabled, 1 = enabled
ChannelEnabled5	1	0 = disabled, 1 = enabled
ChannelEnabled6	1	0 = disabled, 1 = enabled
ChannelEnabled7	1	0 = disabled, 1 = enabled
ChannelEnabled8	1	0 = disabled, 1 = enabled
NumOutputChannels	6	Software mixing: provide list of mix channels (max. 2 per channel)
OutputChannel1	1	
OutputChannel2	2,3	
OutputChannel3	4	
OutputChannel4	5,6	
OutputChannel5	7	
OutputChannel6	8	
OutputChannel7	7	
OutputChannel8	8	
numVHFChannels	1	Default is 1
VHF-Channel1	1	
VHF-Channel2	0	
MikesOnMixer1	2	0 to 2; Refers to 1st mic channel. Here it is Channel 2.
MikesOnMixer2	2	
MikesOnMixer3	2	
MikesOnMixer4	2	
MikesOnMixer5	1	
MikesOnMixer6	2	
MikesOnMixer7	2	
MikesOnMixer8	0	
DetectionThreshold1	300	Test signal RMS must exceed this to be declared detected
DetectionThreshold2	300	
DetectionThreshold3	300	
DetectionThreshold4	300	
DetectionThreshold5	300	
DetectionThreshold6	300	
DetectionThreshold7	300	
DetectionThreshold8	300	
ChirpLength	50	Mic self-test signal length, in ms (100 ms max)
MikeRetryInterval	3600	In seconds
MaxMikeRetrys	11	Retry this many times before declaring failure
ControlMode	2	1 = hold 1 of 3 bits high ; default is 1 2 = set bits 1 and 2 to binary count and hold bit 3 high

*Table 9-7 - AUDIO Parameter Typical Value Settings: Example 2*

## Chapter 9: Audio Test Source Setup

3. Save the changes and close the *vdr\_params.ini* file
4. If the VDR\_Record application is recording, it must be stopped and recording restarted for the changes to take effect.

In the example above, Audio Module Channels 2 and 3 (containing input connections for microphones 1, 2, 3, and 4) are mixed on OutPutChannel2. Audio Module Channels 4 and 5 (containing input connections for microphones 5, 6, 7, and 8) are mixed on OutPutChannel3. Audio Module Channel 6 is mixed on OutPutChannel4. This arrangement allows all bridge microphones to be recorded to the FRM.



**Note!** The **NumOutputChannels** field must equal the number of **OutPutChannelX** fields that are in use.

## 10 VIDEO SETUP

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The Video Module performs video capture, digitization, and storage of RGB, RGBHV, Monochrome, and composite video display signals from a radar, ECDIS, or other video source. Normally only the primary radar is recorded; however, VDR-100G2 can capture and record images from up to three (3) additional different video sources. During installation, the video system must be configured to accept each source's video resolution, interlacing, refresh rate, etc.

The normal capture interval is 15 seconds, or four (4) images per minute for each video source. When the capture interval elapses, the system first determines the format of the input signal. Information is gathered from the VidChan\*.INI file (dependant upon the VIDEOFORMAT entry.) If more than one (1) source is specified by the MAXSOURCES entry, signals present on the Control Input/Output connector are used to indicate the currently active source. The video signal configuration is then read and a new image is captured. If the system is configured for two (2) or more video channels, the next channel in the sequence is selected.

If the video module fails to capture an image due to absent video signals (i.e., radar is OFF), an entry is made in the error log. However, this failure **will not generate a system alarm**. A system alarm is **only** triggered when a failure is detected in the video capture hardware.

To configure the VDR-100G2 video capture:

1. Edit the VDRPARAMS.INI file to set up basic video information.
2. For each video source, edit the VidChan\*.INI file to set up the video format and configuration.
3. Test input sources.

### 10.1 Edit [VIDEO] Parameters

The *vdrparams.ini* file, located in the C:\WINDOWS directory on the DMM, must be edited to reflect the ship's video configuration. This file contains numerous fields used to indicate these settings. The following steps outline how to edit the file to reflect a ship configuration:

1. Close the VDR\_Record software.
2. Open the *vdrparams.ini* file from the Windows desktop.
3. Scroll to the [VIDEO] section and edit the following settings to reflect ship configuration:
  - a. **numSources** – the number of video sources to be captured (1 - 4).
  - b. **transferRate** – time, in milliseconds, between captures (15000 for one (1) video source, 7500 for two (2) video sources, 5000 for three (3) video sources, 3750 for four (4) video sources);
  - c. **blocks** – images to be stored in each one (1) minute block (4 \* **numSources**);
4. Save and close the *vdrparams.ini* file.
5. Restart the VDR\_Record application.

## Chapter 10: Video Setup

The following table provides video parameter settings for the Video section of the <vdrparams.ini> file:

Parameter	Typical Value	Remarks
Blocks	8	Number of capture intervals per file.
numSources	2	1 to 4. Video sources must be connected in sequential order.
enhancedCompression	0	0=disabled; 1=enabled
maxColors	256	Maximum number of colours in output image (ignored if enhancedCompression is enabled)
noiseClipping	0	1= Enabled (default)  Computes the black threshold and clips the 10 lowest intensity values. Ignored if enhanced compression is disabled or if the video format is not RADAR.

Table 10-1 - video parameter settings for [VIDEO] section of <vdrparams.ini> file

### 10.2 Edit VIDCHAN\*.INI Files

Included with the VDR are several sample INI files which can be used for the majority of available video signals. Selection of the proper VIDCHAN\*.INI file is determined after consideration of the following 3 items:

1. HSYNC and Pixel Clock timing (Clock and Syncs Parameters).
2. Video voltage level (Video Parameters).
3. Optimization of video quality (Video Parameters).

Each video channel has a separate INI file: VidChan1.INI, VidChan2.INI, VidChan3.INI, and VidChan4.INI. VIDCHAN\*.INI files are located in the C:\VDRApps directory.

#### 10.2.1 CLOCK Parameters

Parameter	Typical Value	Remarks
HsRate1	80.0	HSYNC rate in kHz for default source
Pclk1	135.0	The exact pixel clock frequency (in MHz) for the system (as specified by the display's manufacturer)
VCO1	2	Normally set based on the pixel clock rate (0=12-37MHz, 1=37-74MHz, 2=74-140MHz, 3=140-170MHz).
CPmp1	6	0 to 7. Normally set based on values reported from VideoConfigSuite.exe.
N1	0	If set to zero, defaults to PClk1*1000/HsRate1
Phase1	0	0 to 31: Sharpens the image by accommodating for delays due to cable length and stray capacitance.
XDim1	1288	Sets the captured width. It's recommended to set the XDimension 8 larger than the desired image, since the X-offset is adjustable only in multiples of 8.
XOffset1	300	Shifts the image to remove black pixels at left edge.
YDim1	1024	Sets the captured height.
YOffset1	40	Shifts the image to remove black lines from top.

Table 10-2 - CLOCK Parameter Typical Value Settings

## Chapter 10: Video Setup

### 10.2.2 SYNCS Parameters

Parameter	Typical Value	Remarks
HPOL1	1	0, or 1. HSYNC Polarity. Changing this value will increase the margin at the left of the image. Choose the value which produces the widest margin, then adjust with XDim1.
VPOL1	1	0 or 1. VSYNC Polarity. Captured images will not be rectangular if the incorrect value is chosen.
XCLAMPPOL1	-1	-1=Internal, 0= Negative, or 1= Positive.
XCOASTPOL1	1	-1=Internal, 0= Negative, or 1= Positive.
PreCoast1	0	0 to 255. Number of clock synchronization pulses to skip prior to COAST signal
PostCoast1	0	0 to 255. Number of clock synchronization pulses to skip after COAST signal
SyncThreshold1		0 to 255. For composite signals only, used to differentiate a VSYNC from a HSYNC.
VCO1	2	Must be present and must be same value as in [CLOCK] section
CPmp1	6	Must be present and must be same value as in [CLOCK] section
N1	0	Must be present and must be same value as in [CLOCK] section

Table 10-3 SYNCS Parameter Typical Value Settings

### 10.2.3 VIDEO Parameters

Parameter	Typical Value	Remarks
RGain1	75	0 to 255. Specifies A/D range for the red video line.
GGain1	75	0 to 255. Specifies A/D range for the green video line.
BGain1	75	0 to 255. Specifies A/D range for the blue video line.
ROff1	128	0 to 255. Specifies DC offset for the red video line.
GOff1	0	0 to 255. Specifies DC offset for the green video line.
BOff1	0	0 to 255. Specifies DC offset for the blue video line.
CVolt1	0	0 = clamp to min voltage. 1 = clamp to midscale.
CPlace1	8	Specifies when clamp occurs in pixel clocks from trailing edge of HSYNC.
CLength1	20	Specifies number of black pixels that participate in the DC restore clamp circuitry.
VideoFormat1	1	RADAR = 1, CHART = 2

Table 10-4 - VIDEO Parameter Typical Value Settings

### 10.2.4 Customize Entries in the VIDCHAN\*.INI Files

Each entry in the VIDCHAN\*.INI file indicates the voltage level, timing, and signal characteristics of the video source. The values generated by VideoConfigSuite.exe are based on VESA and Industry Standards and are adequate in order to capture initial images.

If video capture does not initiate, the most likely reason is an incorrect state of the VPOL1 field. If provided with a channel number, VideoConfigSuite.exe will capture and save a sample image to verify the proper state of the VPOL1 field. The image will be saved to the filename *TestImage.bmp*. The image will be annotated with a calibration grid to verify the proper alignment of the video.

In certain cases it may be necessary to optimize the video in order to correct the colour balance.

### 10.3 Video Diagnostics (VideoConfigSuite) Application

The Video Diagnostics (VDi) application is used to capture and properly adjust images from a ship's radar source(s).

There are two (2) methods available for starting the application:

- Via the Start menu (Start > All Programs > Utilities > VideoConfigSuite)
- The application's executable file is located in the C:\VDRApps folder. Double-click the VideoConfigSuite.exe icon to open the application.



**Note!** It is also **recommended** to copy the **VideoConfigSuite.exe** and **RutterVCS.dll** files to the D:\ drive and **operate** the application from that destination in order to avoid any potential virtual memory problems. Note that the Start menu should not be used if attempting to run the application from the D:\ drive.

Prior to operating the VDi application, the VDR\_Record application **must be stopped** and closed.

## Chapter 10: Video Setup

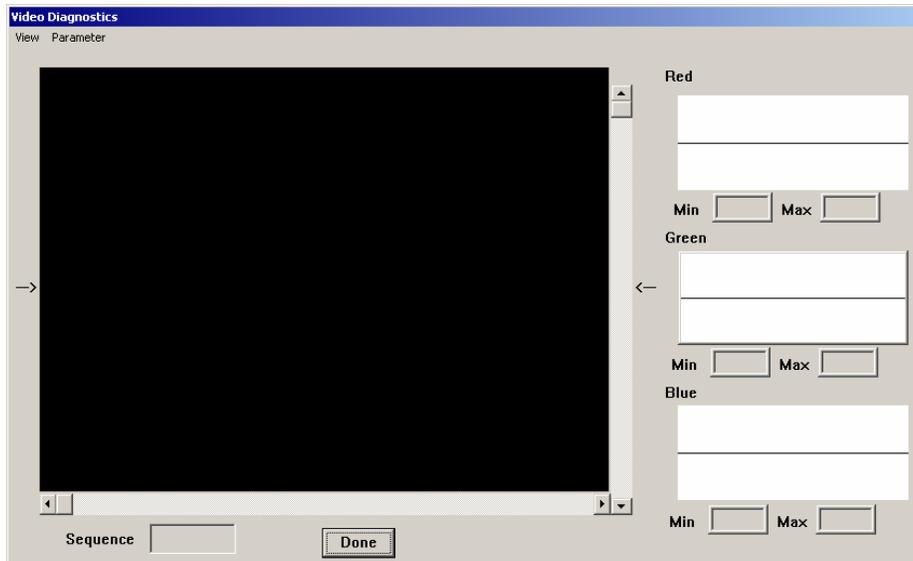


Figure 10-1 - Video Diagnostics User Interface

Once started, the VDi application will place an icon (Rutter Technologies symbol) in the desktop task bar. This icon can be used to:

- Initiate the capture of video (Capture Video)
- View captured video (View Video)
- Save configured settings (Save Settings)
- Minimize the application interface (Hide)
- Exit the application (Terminate)

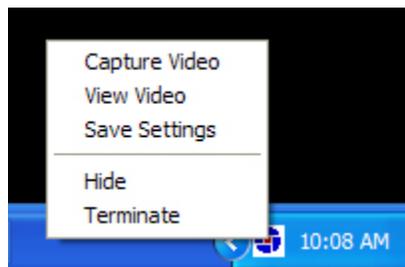


Figure 10-2 - Taskbar Menu

Additional information:

- Maximum image height is 4095 pixels and maximum width is 2047 pixels.
- Maximum image size is 2062500 samples, which can accommodate images up to 1650x1250.

### 10.3.1 Initiate Video Capture

To initiate the capture of video, complete the steps provided below:

1. Right-click the Rutter icon in the desktop task bar and select 'Capture Video' from the pop-up list.

## Chapter 10: Video Setup

2. In the Channel Selection box, select the radio button corresponding to the video channel to capture and press "OK".

If the channel uses Composite Syncs, select the "Composite" check box and indicate, via the associated radio buttons, if the composite sync is on a separate TTL output or encoded in the input on the video channel.

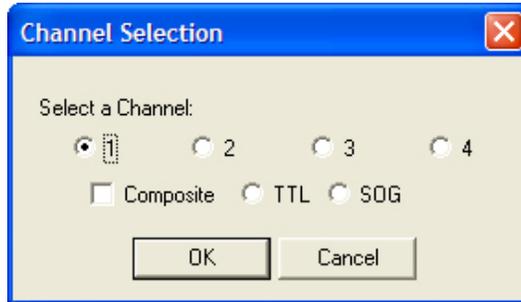


Figure 10-3 - Channel Selection Dialog Box

3. An Auto-Detection window will now appear containing the following information:

UDP Message:

**Video Card IP Address (/I)**

**Video Card Port (/P) in hexadecimal**

**VSync (/V) in hexadecimal**

**HSync (/H) in hexadecimal**

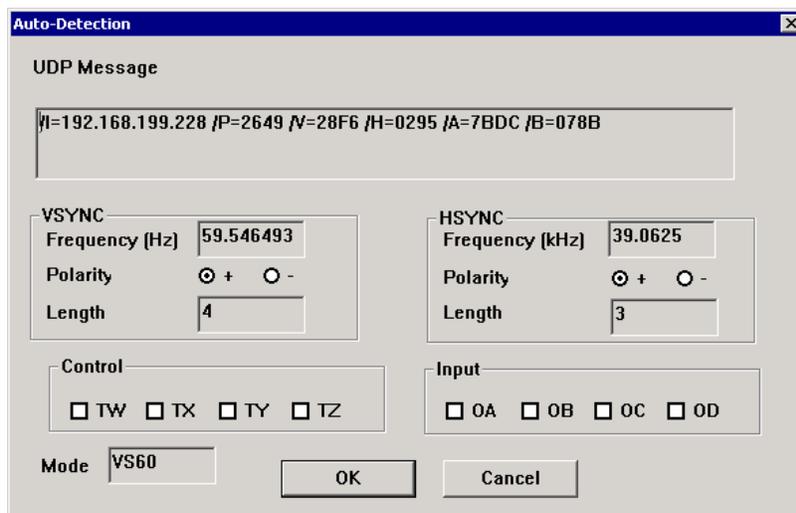


Figure 10-4 - Auto-Detection Information Box

VSYNC Information:

**Frequency (Hz)**

**Polarity**

**Pulse Length**

HSYNC Information:

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Frequency (Hz)  
Polarity  
Pulse Length



**Note!** It is important to write down both the Frequency and Polarity of the HSYNC and VSYNC for later use.

Mode:

The information available in the Mode text box indicates the detected mode of the capture. For example, a recognized VESA mode at 60Hz could read VV60 (VGA 640x480).

4. If auto-detection fails (is unable to detect video mode), an “Auto Detection Failed” dialog box will appear requesting the manual input of the VSync and HSync rates.

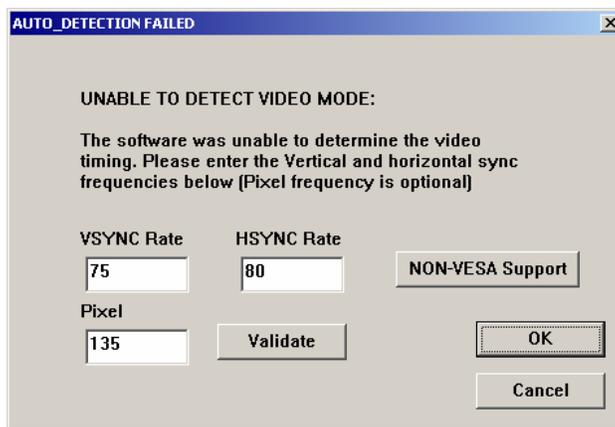


Figure 10-5 - Auto-Detection Failure

5. To choose a default video mode configuration, press the “NON-VESA Support” button. In the file selection window, select the D:\VideoConfigSuite folder and select ‘INI Files [\*.ini]’ in the “Files of type:” dropdown box. Choose the applicable default INI file and press the “Open” button.

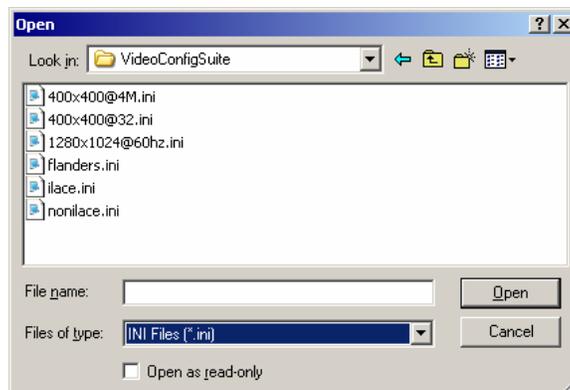


Figure 10-6 - Selecting a Default .INI File

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6. Select 'View Video' from the task bar menu to view the VDi user interface. There may be a short delay (approximately 5 seconds) while the application is capturing the image.

### 10.3.1.1 Interlaced Image

A video source may provide an interlaced image upon capture. An interlaced image will appear similar to the image shown in *Figure 10-7 - VDi User Interface with Interlaced Image Capture* with the captured image appearing vertically two (2) or three (3) times within the VDi Capture Window. If capturing an interlaced image, complete the steps provided below to adjust the video capture:

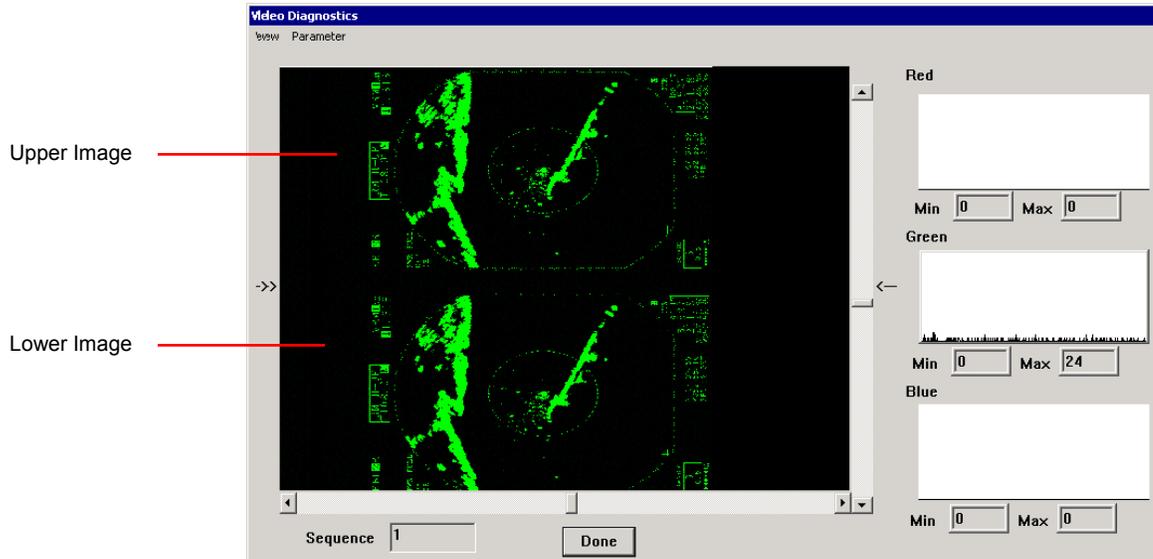


Figure 10-7 - VDi User Interface with Interlaced Image Capture

1. Open Parameter > VPOL and ensure it is set to the same setting (negative or positive) as indicated in the Auto-Detection Information Box. Repeat for the HPOL setting (Parameter > HPOL). If either is different, change them to the setting indicated in the Auto-Detection Information Box (for example, if the Auto-Detection indicated the VPOL is negative use the Parameter > VPOL menu item to ensure it is set to negative once the image has been captured.)
2. If the image(s) captured are not both entirely visible, the image height must be adjusted. Notice in *Figure 10-7 - VDi User Interface with Interlaced Image Capture* that the bottom portion of the lower image is not visible in the VDi Capture Window. Therefore the image height must be increased to make this lower portion visible. Select Parameter > Dimensions > Image Height and adjust the height as necessary.

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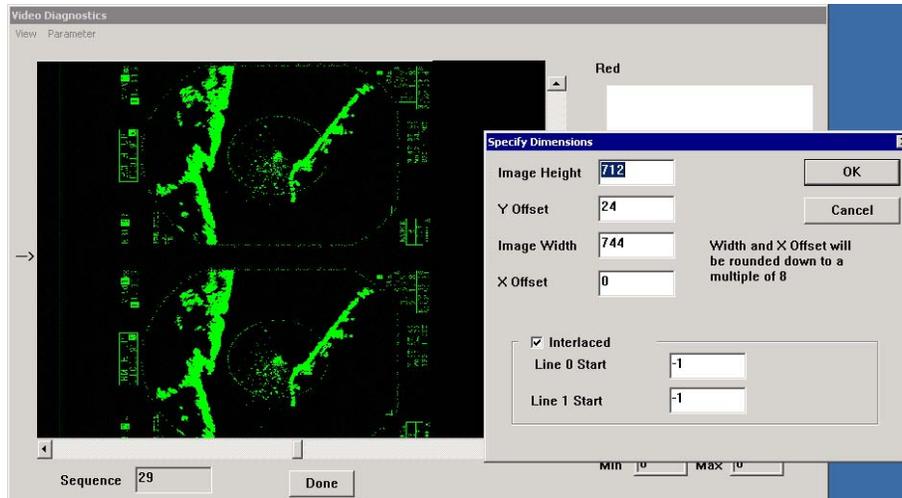


Figure 10-8 - Adjusting Image Height

3. In the examples illustrated in *Figure 10-8 - Adjusting Image Height* and *Figure 10-9 - Image Height Adjusted*, the image height was adjusted from 712 to 772, allowing the upper and lower images to fit correctly into the VDi Capture Window.

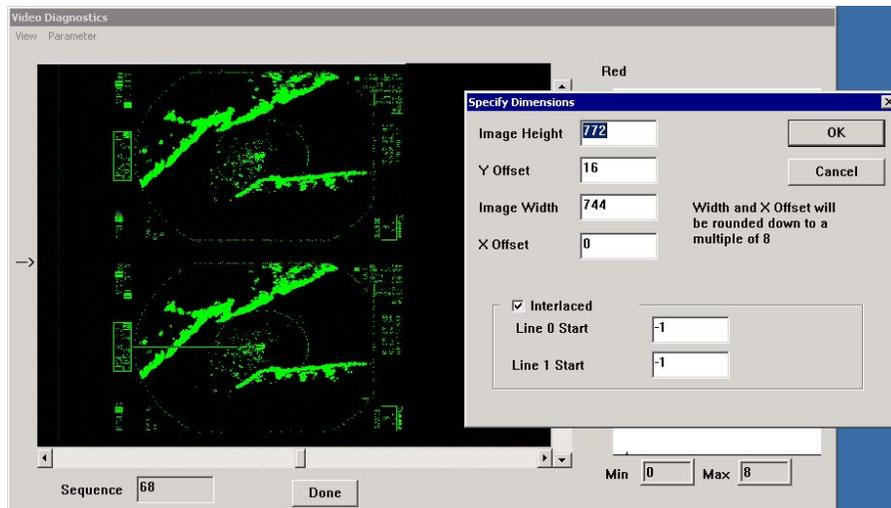


Figure 10-9 - Image Height Adjusted

4. Once the image(s) are both entirely visible, ensure a small amount of black space still appears at the top of the VDi Capture Window. This space will allow for further necessary adjustments. To increase the amount of black space, decrease the Y-Offset (Parameter > Dimensions > Y Offset) setting. In most cases, this setting will only need to be decreased slightly (for example, if the setting is 24 adjust to 16.)
5. Zoom in on the upper image (using, for example, a 4X zoom) and find its uppermost pixel. Once that pixel has been located, right-click to acquire its x and y coordinates (see *Figure 10-10 - Uppermost Pixel Coordinates – Upper Image.*)

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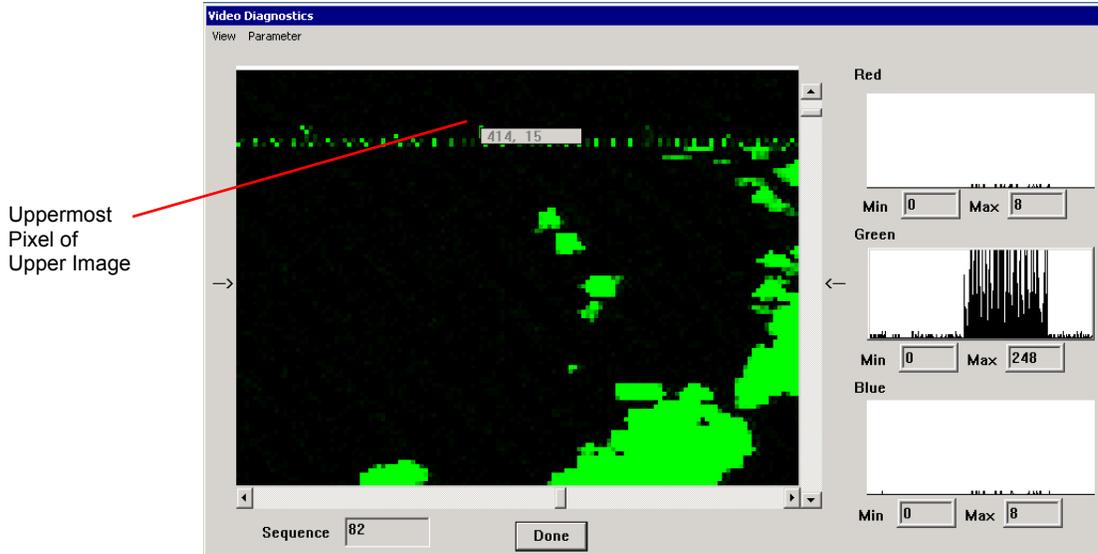


Figure 10-10 - Uppermost Pixel Coordinates – Upper Image

6. Once these coordinates have been found, scroll down to the lower image and find its uppermost pixel (see *Figure 10-11 - Uppermost Pixel Coordinates - Lower Image.*)

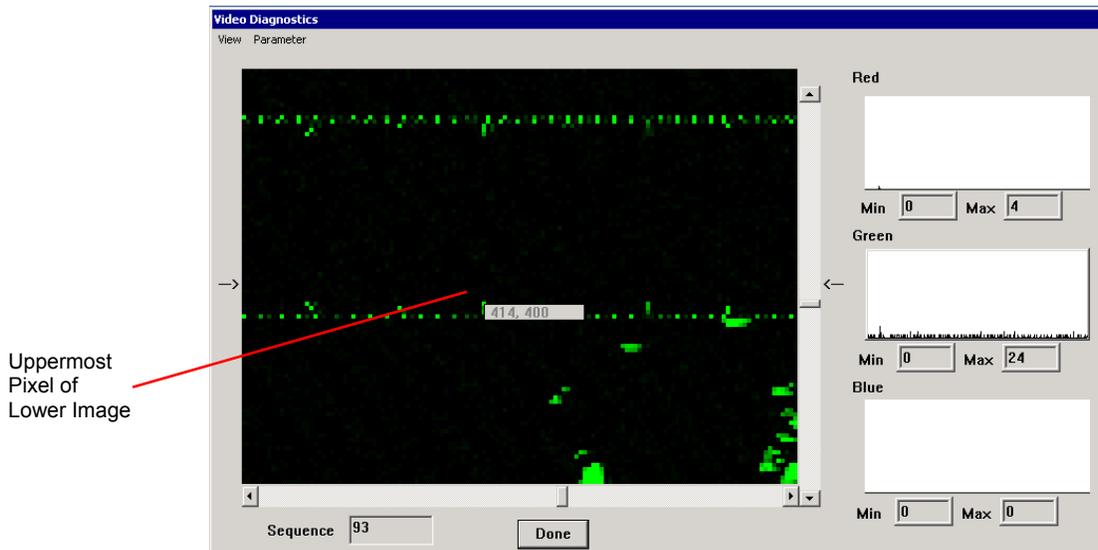


Figure 10-11 - Uppermost Pixel Coordinates - Lower Image

7. Open the Dimensions dialog box (Parameter > Dimension). Select the "Interlaced" check box. Enter the y coordinate of the uppermost pixel (upper image) in the "Line 0 Start" text box and the y coordinate of the uppermost pixel (lower image) in the "Line 1 Start" text box. Press "OK".

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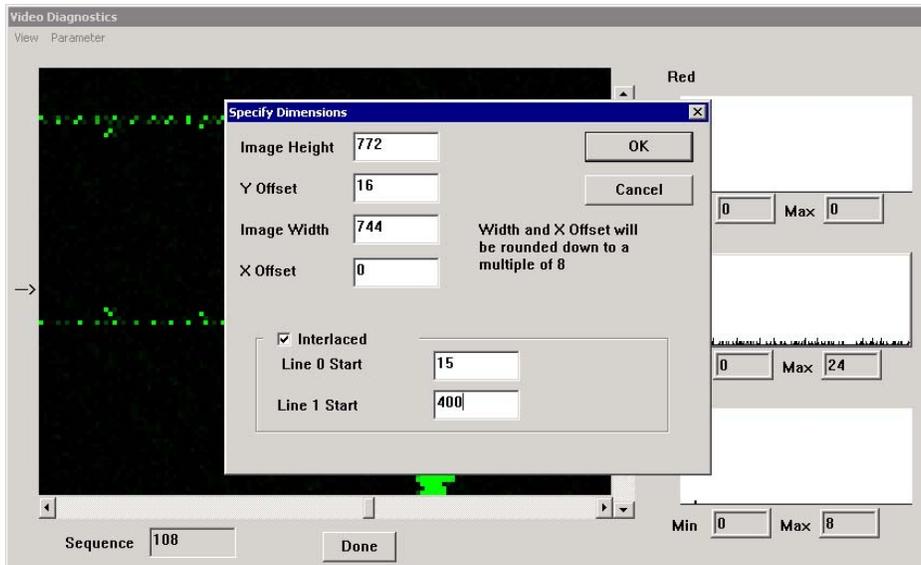


Figure 10-12 - Entering Interlacing Coordinates

- Once the pixel coordinates have been entered the image will appear corrected (see *Figure 10-14 - Corrected Interlaced Image* for an example.) If the image does not appear corrected, it is highly likely that the wrong pixel coordinates were entered in Step 6 above. Looking at numbers that appear in the image give a good indication of the quality of the corrected image (see *Figure 10-13 - Incorrect Interlacing* for an example.) If the image has been interlaced incorrectly, enter the coordinates used prior to Step 6 and repeat Steps 4 to 7.

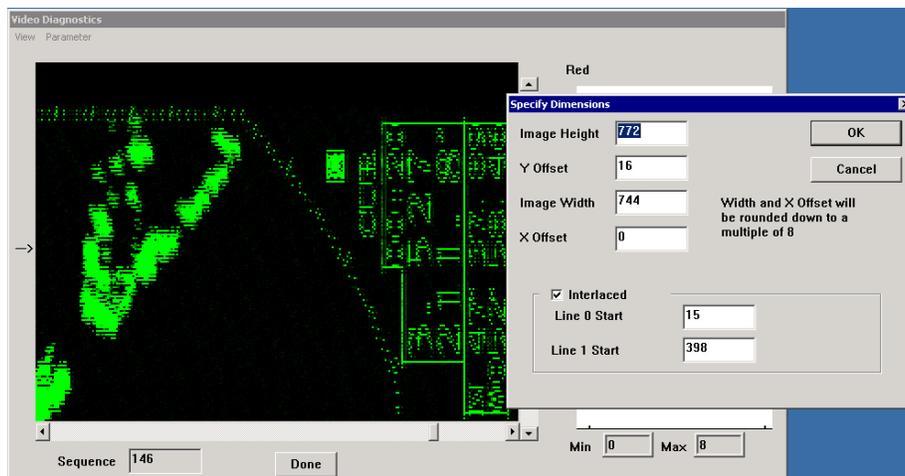


Figure 10-13 - Incorrect Interlacing

- Once the image has been properly interlaced, complete *Section 10.3.2 - Adjusting the Captured Image* to finish correcting the image.

## Chapter 10: Video Setup

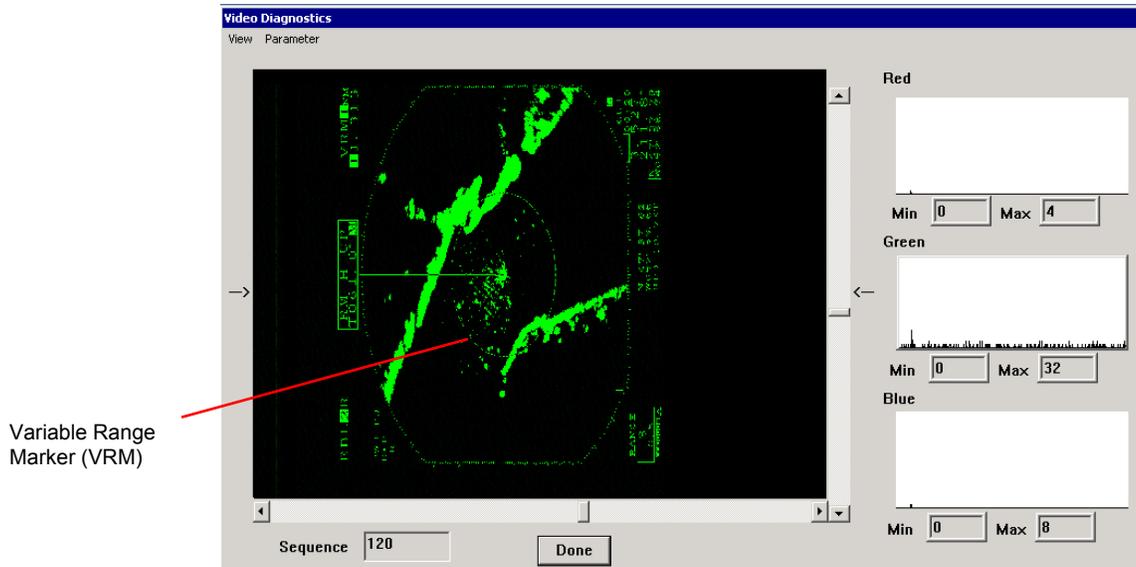


Figure 10-14 - Corrected Interlaced Image

### 10.3.1.2 Interleaved Image

If the image being captured has a resolution of 1600 x 1200 pixels or greater, it may appear repeated within the VDi Capture Window. In order to correct this image, complete the following steps:

1. Open Parameters > Dimensions and, in the Dimensions dialog box, use the X and Y Offset fields to move the image as close to the top left hand corner of the Capture Window as possible. Note that it may be more efficient to use the View > Zoom option to ensure the corner of the image is placed as close to the top left of the Capture Window as possible.
2. With the image in place, and using the 'Zoom' option again, determine the Y-coordinates at the top edge of both images (the x and y coordinates can be obtained by placing the cursor over the top edge of each image and right-clicking the mouse button).
3. Open the Dimensions dialog box again (Parameters > Dimensions) and click the 'Interleaved' check box. The 'Line 0' and 'Line 1' fields will activate. Enter the Y-coordinates, obtained during the prior step, in these fields with 'Line 0' accepting the top image Y-coordinate and 'Line 1' accepting the bottom image Y-coordinate. Click OK.
4. If the bottom or top edge of the newly combined single image is cut off by the top or bottom of the screen, use the 'Image Height' option in the Dimensions dialog box (Parameters > Dimensions) to ensure the entire image is visible.
5. For further fine tuning, zoom the new image and use available Sharpness options (Parameters > Sharpness) to improve it.

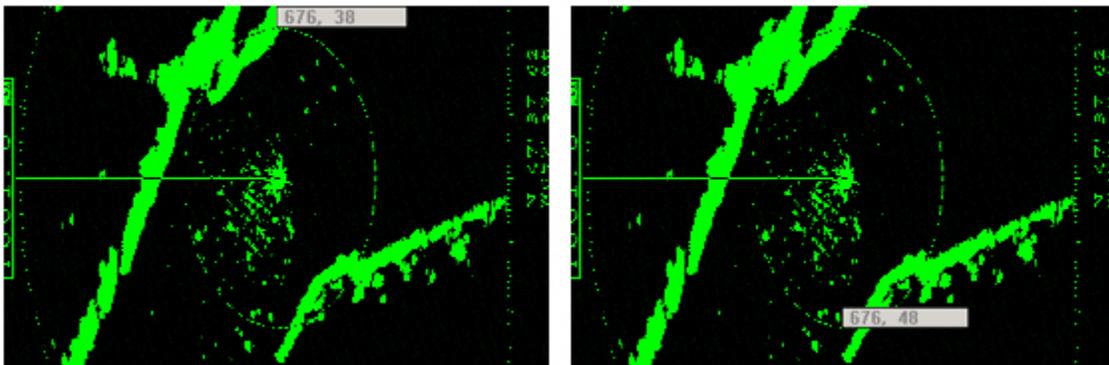
### 10.3.2 Adjusting the Captured Image

Once the image has been captured (or adjusted in the case of an interlaced image), it must be corrected to ensure a proper capture. A proper capture should fill the VDi Capture Window while maintaining the visibility of all four (4) image edges. Follow the steps provided below to properly adjust the captured image:



**Note!** It is **recommended** to write down all settings before making any changes as it may become necessary to revert back to previous information.

1. Once the image has been captured to the VDi Capture Window, ensure the proper VPOL and HPOL information is set.
  - Open the 'Parameter' menu item, select 'HPOL' and note which setting is currently selected. Ensure it is the same (negative or positive) as indicated in the Auto-Detection Information Box during initial capture. Repeat for VPOL.
  - Example: The Auto-Detection Information Box indicated a negative HPOL setting. Open Parameter > HPOL and ensure 'Neg' is selected.
2. Locate a circle on screen. A circle will allow a user to determine if the image requires recalibration. If the circle appears more in the shape of an oval than circular, it will be necessary to recalibrate the image to ensure a proper aspect ratio.
  - A Variable Range Marker (VRM) or Range Rings, available on most radar images, will provide an effective circular image that can be used for recalibration. See *Figure 10-14 - Corrected Interlaced Image* for an example of a VRM.
  - Once a circle has been found, use the cursor to find coordinates for the top, bottom, left, and right edges (see *Figure 10-15 - Circle Coordinates - Top & Bottom* and *Figure 10-16 - Circle Coordinates - Left & Right*).



*Figure 10-15 - Circle Coordinates - Top & Bottom*

## Chapter 10: Video Setup

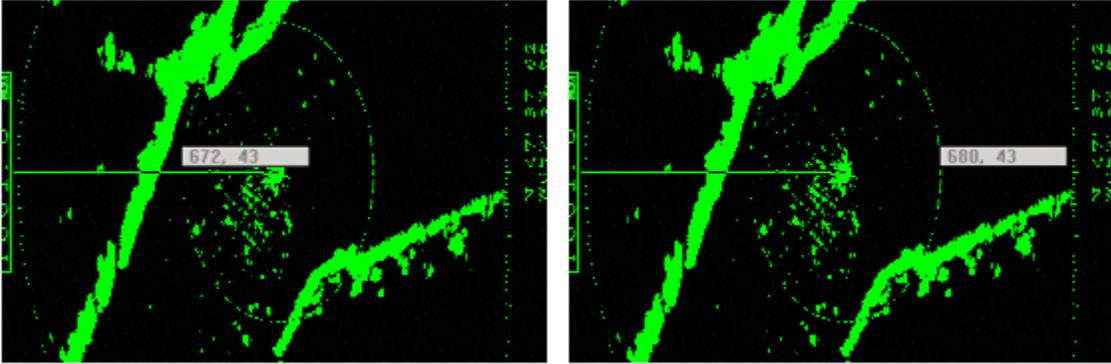


Figure 10-16 - Circle Coordinates - Left & Right

- Open the Parameter > Sharpness > Recalibrate. In the Recalibration dialog box, **note the number currently displayed in the 'PLL Multiplier' text field** (for example, in *Figure 10-17 - Enter Recalibration Coordinates* the 'PLL Multiplier' number is '800'.)
- Enter the top edge y coordinate in the Y1 field, the bottom edge y coordinate in the Y2 field, the left edge x coordinate in the X1 field, and the right edge x coordinate in the X2 field. Press "Recalibrate", followed by "OK".
- If the resultant image has improved but appears to need further recalibration, find the coordinates for the four (4) edges of the improved circle. If the resultant image appears to have worsened with the changes, open Parameter > Sharpness > Recalibrate, enter the previously noted 'PLL Multiplier' number ('800' in the example above), press "OK", and attempt to find the edge coordinates again.

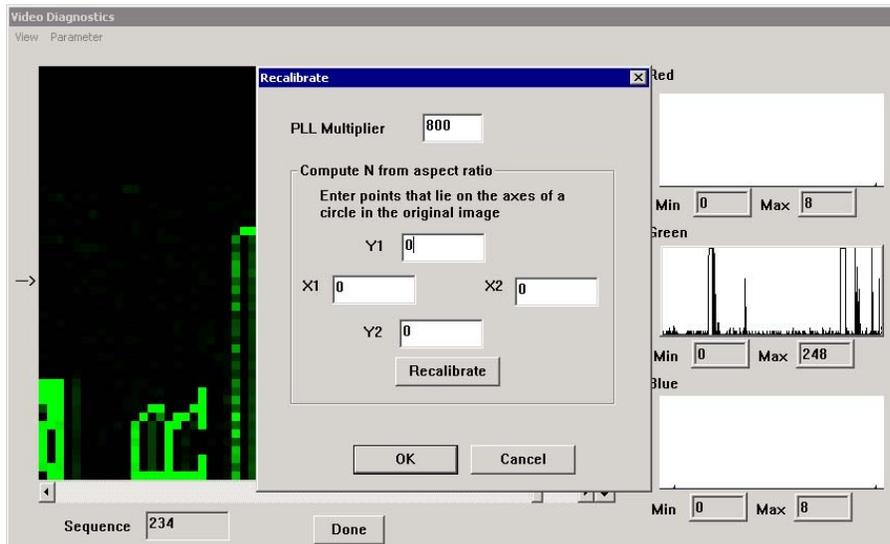


Figure 10-17 - Enter Recalibration Coordinates

3. Next, the position of the image within the VDi Capture Window will need to be adjusted. Using the mouse, position the "cross-hair" over the upper left corner of the image and left-click to obtain the current x, y coordinates.

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- With many radar images, it may be difficult to determine the true upper left corner of the captured image. Using an image similar to that shown in the Figures above, a user will likely have to adjust the image's position a number of times to ensure it is as close as possible to the top left corner without losing any part of the image.

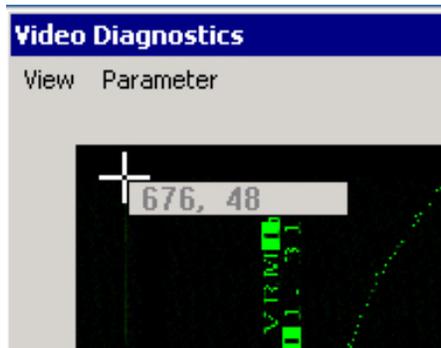


Figure 10-18 - Image Corner

- Via the 'Parameter' menu (Parameters > Dimensions), open the 'Dimensions' dialog box.

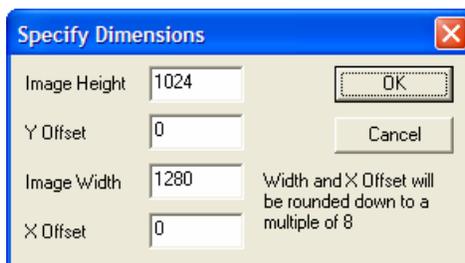


Figure 10-19 - Dimension Dialog Box

- Enter the x coordinate into the "X Offset" field and the y coordinate into the "Y Offset" field. Both width and "X Offset" coordinates will be rounded down to a multiple of eight (8). It is recommended to leave a small amount of black space to help determine RGB settings.
- Increasing the "Y Offset" will move the image upward, while increasing the "X Offset" will move the image leftward.
- If the entire image is not being captured in the VDi Capture Window once it has been moved to the upper left corner, it may be necessary to adjust the image height and/or width.
- Example: Right-clicking the corner of the image provides 250 (x) and 34 (y) coordinates. Open the 'Dimensions' dialog box. Enter 34 in the "Y Offset" field. Enter 248 in the "X Offset" field (although the x coordinate was 250, entering 248 allows a small amount of black space to remain and is a multiple of eight (8)).

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4. Once the image position has been adjusted properly, the user may need to adjust the image phase in order to reduce any visible noise, banding, and/or soft edges.
  - Open Parameter > Sharpness > Phase, move the slider bar to a number between 0 and 31, and press the “OK” button. Notice if the image quality has improved and make further adjustments accordingly.
  - Example: The image has a great deal of visible noise (pixilation) at its left edge. Open the ‘Phase’ control slider, adjust to 16, and press “OK”. The left edge of the image is now much clearer and uniform. Reopen the ‘Phase’ control slider, adjust to 14, and press “OK”. The left edge of the image is now sharp.
5. Once the image phase has been sharpened, if minor oscillation still appears in the image it may be necessary to adjust the image CPMP.
  - Open Parameter > Sharpness > CPMP, move the slider bar to a number between 0 and 3, and press the “OK” button. Notice if the image quality has improved and make further adjustments accordingly.
  - Example: The image has varied individual lines of oscillation at its left edge. Open the ‘CPMP’ control slider, adjust to 1, and press “OK”. The left edge of the image is now much clearer and uniform. Reopen the ‘Phase’ control slider, adjust to 2, and press “OK”. The left edge of the image is now sharp.
6. Once the image has been adjusted correctly, right-click the Rutter VDi icon in the taskbar and select “Save Settings”.



**Important! It is not mandatory** to adjust the captured image so that it completely fills the entire capture window. It is more important to maintain the original aspect ratio as closely as possible.

The image should be adjusted so that it is as close as possible to the top and left edges of the capture window. The goal is to obtain the least amount of black space on the right and bottom of the capture window while maintaining the original aspect ratio.

## 10.4 VDi Menu Overview

This section provides an overview of the menu items available in the Video Diagnostics application.

### 10.4.1 View Menu

The ‘View’ menu provides two (2) options:

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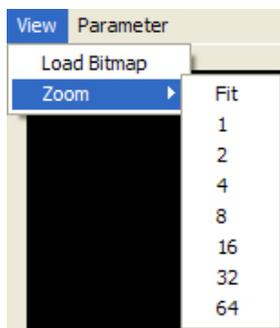


Figure 10-20 - Zoom Menu

### 10.4.1.1 Load Bitmap

Selecting this option opens a file selection window from which a user must choose a saved bitmap file to load to the Image window for viewing.

### 10.4.1.2 Zoom

Selecting one of the available numbers will zoom the image currently in the Image window to that chosen extent (i.e., selecting '8' zooms the image 8X its original extent). 'Fit' will cause the image the edges of the image to fill to the edges of the Image window.

## 10.4.2 Parameter Menu

The 'Parameter' menu provides seven (7) options:

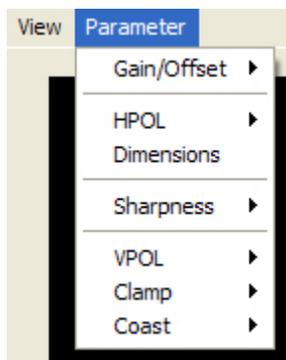


Figure 10-21 - Parameter Menu

### 10.4.2.1 Gain/Offset

Fine-tuning the gain and/or offset helps to create a more uniform image by adjusting the signal response of each pixel.

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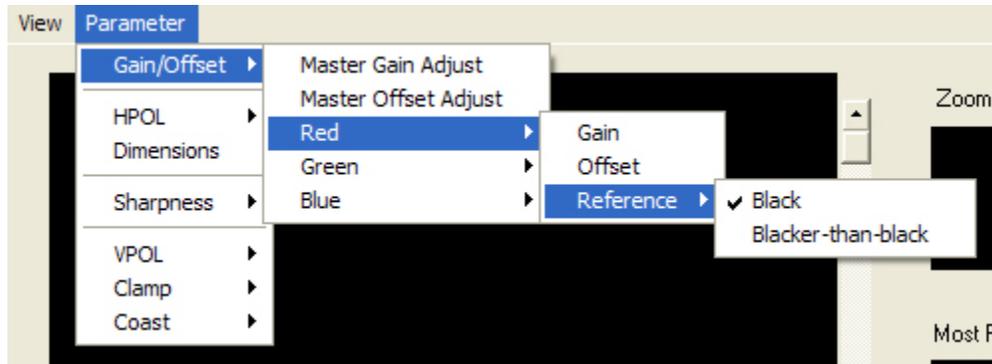


Figure 10-22 - Gain / Offset Menu

- Master Gain Adjust: This option adjusts the gain of the entire image, rather than that of the individual RGB values. Adjusting the gain stretches the image vertically in the capture window. The range available for adjustment is 0 to 255.
- Master Offset Adjust: This option adjusts the offset of the entire image, rather than that of the individual RGB values. Adjusting the offset shifts the image up and down in the capture window. The range available for adjustment is 0 to 255.
- Red, Green, Blue: It is possible to set the gain and offset for each colour. The range available for adjustment is 0 to 255.

### 10.4.2.2 HPOL (Horizontal Polarization)

HPOL is used to establish the truest amount of black space available in the captured image. Complete the following steps to establish the correct HPOL setting:

1. Upon capture of the image, select Parameter > HPOL > Pos and note how much black space is visible on the left side of the image in the Image window.
2. Select Parameter > HPOL > Neg and note if the amount of black space has increased (widened).
3. If the black space has **increased**, Neg is the correct setting. If the black space has **decreased**, Pos is the correct setting.

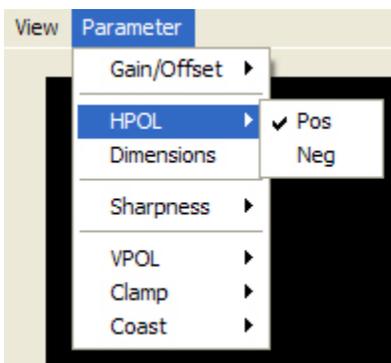


Figure 10-23 - HPOL Menu

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### 10.4.2.3 Dimensions

When selecting the 'Dimensions' menu item, a 'Specify Dimensions' dialog box will appear. It is possible to enter the following information:

- **X/Y Offset:** These entries allow the user to set the location of the top left corner of the captured image. Left-clicking on the top left corner of the captured image in the Image window will provide the current X/Y coordinates of that point. To move it to a different X/Y coordinate location, enter the desired coordinates in the X/Y Offset fields of this dialog box.
- **Image Width/Height:** To adjust the width and height of the captured image as it is displayed in the Image window, enter the desired dimensions into the appropriate text boxes.
- **Interleaved:** Converts two consecutive 800x1200 sub-sampled images into a fully sampled 1600x1200 image.
- **Interlaced:** Used to adjust interlaced images using specific coordinates taken from the captured image.

### 10.4.2.4 Sharpness

There are three (3) options available to help create a sharper image:

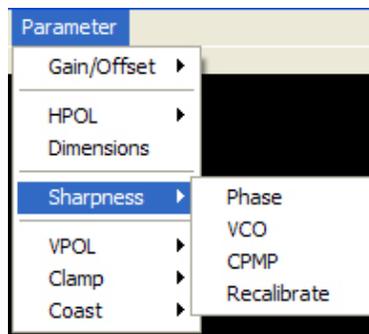


Figure 10-24 - Sharpness Menu

- **Phase:** Adjusting the phase allows for the reduction of noise and/or soft edges that may be apparent in objects visible in the captured image. The range available for adjustment is 0 to 31.
- **VCO (Voltage Controlled Oscillators):** The range available for adjustment is 0 (default) to 3. The VCO setting **should not be adjusted** unless the captured image is **severely** distorted. VCO range can be selected in accordance with the following chart:

Pixel Rate Range (MHz)		VCORNGE Setting	VCO Gain, $K_{VCO}$ (MHz/V)
Lower	Upper		
Min	37	00	150
37	74	01	150
74	140	10	150
140	Max	11	180

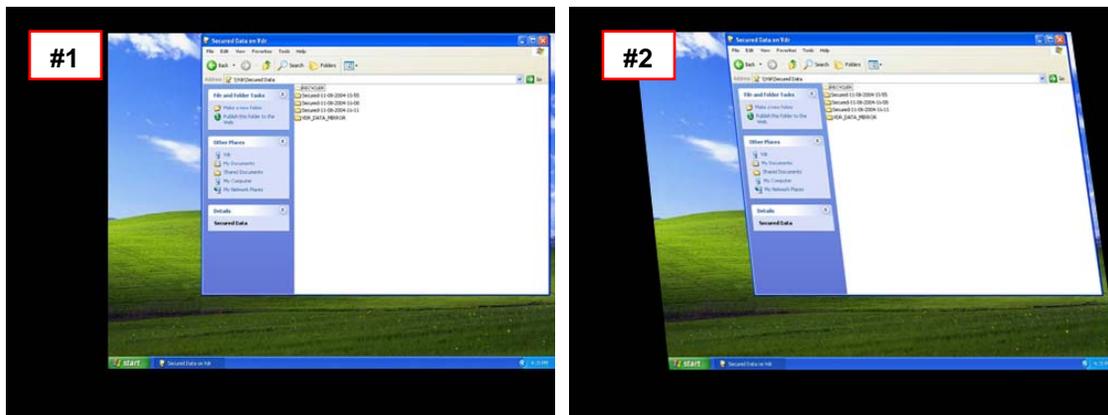
Table 10-5 - VCO Range Chart

## Chapter 10: Video Setup

- **CPMP (Charge Pump):** Adjusting this option allows a user to repair the appearance of oscillation (wavering) that may be visible in the image. Oscillation, if it exists, will be most apparent at either the top of the image or near straight black lines.
- **Recalibrate:** Allows a user to adjust the calibration of a captured image. To effectively recalibrate an image, a user should locate a circle within the captured image and record the x and y coordinates of each of the circle's four (4) axis points (0, 90, 180, 270). When recalibrating an image, a user should always note the 'PLL Multiplier' number as it may be necessary to revert to a previous calibration (entering a previous PLL Multiplier number will revert the image back to the associated previous calibration.)

### 10.4.2.5 VPOL (Vertical Polarization)

VPOL is used to correct skewed images. Upon initial capture, the image should appear in a perfect 4:3 ratio (similar to image #1 below). If it is vertically skewed (similar to image #2 below), VPOL must be adjusted.



Complete the following steps to establish the correct VPOL setting:

1. Upon capture of the image, if it appears skewed select Parameter > VPOL > Pos.
2. If the skewing is not corrected, select Parameter > VPOL > Neg.
3. Note which setting establishes a correct 4:3 ratio.

### 10.4.2.6 Clamp

In the absence of an HSYNC signal, it may be necessary for the circuitry to “clamp” onto the VSYNC signal.

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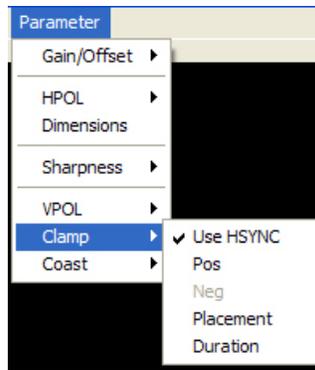


Figure 10-25 - Clamp Menu

- **Use HSYNC:** In the absence of a VSYNC signal, the video capture circuitry will use the HSYNC signal. This is the default setting
- **Pos & Neg:** The Pos setting overrides the usage of the HSYNC signal and, effectively, disables the “Clamp” command. The Neg setting is unavailable (disabled).
- **Placement & Duration:** Only applicable if set to HSYNC. When set to HSYNC, these items allow for the sampling of video to determine voltage corresponding to the image’s black levels.

### 10.4.2.7 Coast

In the absence of a VSYNC signal, it may be necessary for the circuitry to obtain the HSYNC signal.

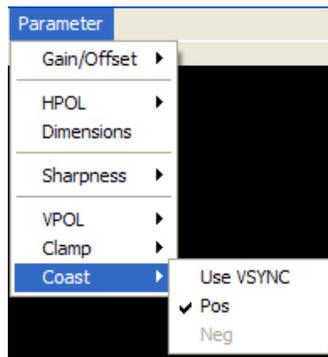


Figure 10-26 - Coast Menu

- **Use HSYNC:** In the absence of an HSYNC signal, the video capture circuitry will use the VSYNC signal. This is the default setting.
- **Pos & Neg:** The Pos setting overrides the usage of the VSYNC signal and, effectively, disables the “Coast” command. The Neg setting is unavailable (disabled).

### 10.5 Sync-on-Green (SOG)

If a video source transmits via Sync-on-Green (SOG), the associated VIDCHAN\*.INI file (located in the C:\VDRApps directory) must be adjusted to include the following parameters:

```
[CLOCK]
HsRate1=xx.xxx
XDim1=512
YDim1=800
```

```
[SYNCS]
Source1=AD9887
N1=yyyy
```

The HSync value (HsRate1=xx.xxx) can be obtained from the VideoConfigSuite application. The overall x dimension (N1=yyyy) is selected based upon the following:

- For HSync < 50: Set to 1200
- For HSync between 50 to 70: Set to 1400
- For HSync > 70: Set to 1600

It is recommended to use actual HSync value from the manufacturer's radar (for example, the STN Atlas 6900 radar has a HSync of 37.5000 KHz). If HSync information is not immediately available from the radar manufacturer, complete the following procedure:

1. Open the VideoConfigurationSuite application.
2. Right-click the Rutter icon in the desktop task bar and select 'Capture Video' from the pop-up list.
3. In the Channel Selection box, select the radio button corresponding to the video channel to capture, the "Composite" checkbox, and the "SOG" radio button. Press "OK".
4. The HSync and VSync values will appear in the subsequent Auto-Detection window. Record the HSync value and its polarity. Press "Cancel".
5. Press "Cancel" in the AUTO\_DETECTION\_FAILED window.
6. Enter the HSync information and parameter information discussed at the beginning of this section into the applicable VIDCHAN\*.INI file and save the file.
7. Right-click the Rutter icon in the desktop task bar and select 'Capture Video' from the pop-up list.
8. In the Channel Selection box, select the radio button corresponding to the video channel to capture, the "Composite" checkbox, and the "SOG" radio button. Press "OK".
9. Press "Cancel" in the Auto-Detection window.
10. In the AUTO\_DETECTION\_FAILED window, press "NON-VESA Support".
11. In the Windows file selection window, choose the VIDCHAN\*.INI file which was altered and saved in *Step 5* above.
12. Right-click the Rutter icon in the desktop task bar and select 'View Video' from the pop-up list.

The above procedure will provide an image in the VideoConfigSuite application that can be properly configured in accordance with *Section 10.3 - Video Diagnostics (VideoConfigSuite) Application*.

If the HSync value was obtained via the VideoConfigSuite application, it is recommended to carefully check that the VCO, CPMP, and Phase are correct for the captured image.

### 10.6 Test Video Inputs

1. Start the VDR\_Record application.
2. Deselect 'Record' from the 'Tests' menu.
3. Select 'Video Test' from the 'Tests' menu.
4. Maximize the Video Data window.
5. Ensure the video is captured correctly (entire screen, correct colour presentation and brightness/contrast and sharpness).
6. Once the settings are correct, place the VDR\_Record application in record mode for several minutes.
7. Download the new data from the VDR on the playback station and play back the video data. Refer to *Section 16 - DATA RETRIEVAL* and *Section **Error! Reference source not found.** - **Error! Reference source not found.*** for download and playback instructions:
  - a. Ensure the video is presented correctly. If not, stop recording and make the necessary changes to the configuration.
  - b. If the top edge of the image capture is not captured correctly, edit the VIDCHAN\*.INI file and increase the value assigned to CPMP1 field.
  - c. If a colour is not presented correctly on each capture, edit the VDRPARAMS.INI file video section so that the **enhancedCompression** field is set to **0**;
  - d. If the captured image has a primarily black background and noise is present at the low end of the captured signal, this noise can be removed by editing the VDRPARAMS.INI file video section so that the **noiseClipping** field is set to **1**.



**Note!** This setting must be used with care, as it may set most of the image to black if there is no noise near the black level. This setting is only used if enhanced compression is enabled.

8. Repeat steps 1 through 7 until the video presentation is correct.

### 10.7 Set-Up Laptop for Video Module Connection

In certain limited situations, it may be necessary to connect to the Video Module via a laptop PC. To make this connection, complete the steps below:

1. Connect the laptop to the Ethernet port (labeled "Output") located at the front of the Video Module.
2. On the laptop's desktop screen, open the Control Panel (Start > Control Panel).
3. Double-click the 'Network Connections' icon, right-click the now visible 'Local Area Connection' icon, and select 'Properties' from the right-click menu.
4. Select "Internet Protocol (TCP/IP)" in the connection pane and press the 'Properties' button.
5. Select the 'Use the following IP address' radio button, enter 192.168.199.1 in the 'IP address' field and 255.255.255.0 in the 'Subnet mask' field. Press 'OK'.
6. Select the 'Advanced' tab and press the 'Settings' button in the 'Windows Firewall' section.
7. Select the 'Advanced' tab and press the 'Settings' button in the 'Network Connection Settings' section.
8. Press the 'Add' button and in the "Service Settings" window:
  - Enter **Video TCP** in the 'Description of service' field.
  - Enter **192.168.199.228** in the 'Name or IP address' field.
  - Enter **3659** in the 'External Port number for this service' field.
  - Enter **3659** in the 'Internal Port number for this service' field.
  - Select the **TCP** radio button.

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- Press 'OK'.
9. Press the 'Add' button and in the "Service Settings" window:
    - Enter **Video UDP** in the 'Description of service' field.
    - Enter **192.168.199.228** in the 'Name or IP address' field.
    - Enter **2649** in the 'External Port number for this service' field.
    - Enter **2649** in the 'Internal Port number for this service' field.
    - Select the **UDP** radio button.
    - Press 'OK'.
  10. Press 'OK' in the "Advanced Settings" and "Windows Firewall" windows. Press 'Close' in the "Local Area Connection Properties" window.

# 11 NMEA SETUP

The VDR-100G2 base system is composed of 1 Navigation Sensor Multiplexor (otherwise referred to as a NMEA Input Module) for the capture of 8 NMEA 0183/IEC 61162 compatible inputs. A 4 input version and a 4 with VHW (water speed and heading) version is also available.

In some situations shipboard data sources either have no serial data or generate serial data that does not meet the IEC 61162 standard. To access these data sources, analog, and digital signal interface units may need to be utilized. These interfaces convert the information from non-standard data sources into the IEC 61162 data format. The converted data source can then be connected to any of the serial inputs of multiplexor interface for recording. Refer to *Appendix C – Data Interface Documentation*.

The NMEA Module is configured using the *NMEAModuleConfig.exe* configuration utility via an Ethernet connection.

## 11.1 Checking the NMEA Module Configuration

To check the current NMEA Module configuration, complete the following steps:

1. Ensure that **only one (1) NMEA Module is connected** at one time. **ALL** inputs must be disconnected as each Module **must** be configured **individually**.
2. Ensure a crossover Ethernet cable is connected directly from the Module to the technician PC (or DMM if configuring from the DMM).
3. Start the *NMEAModuleConfig.exe* configuration utility.

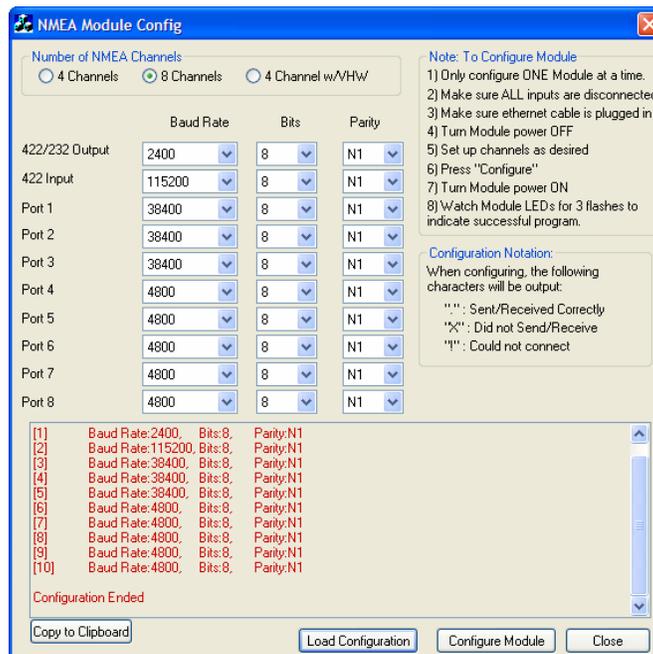


Figure 11-1 - NMEA Module Configuration Utility

## Chapter 11: NMEA Setup

4. In the *Number of NMEA Channels* section, select the radio button that corresponds to the applicable Module (4 Channels, 8 Channels, or 4 Channel w/VHW) being configured.
5. Click the “Load Configuration” button, located at the bottom of the configuration utility window.



**Note!** A dialog box will appear asking the user to cycle power on the Module. **DO NOT** click ‘OK’ at this point.

6. Disconnect and reconnect the power connection.
7. Click ‘OK’. The configuration will be broadcast for five (5) seconds after the Module is powered on and **will appear in the text box** at the bottom of the utility and in the selection boxes.

### 11.2 Configuring the NMEA Module

To configure the NMEA Module, complete the following steps:

1. Ensure that **only one (1) NMEA Module is connected** at one time. **ALL** inputs must be disconnected as each Module **must** be configured **individually**.
2. **Disconnect power** from the NMEA Module.
3. Ensure a crossover Ethernet cable is connected directly from the Module to the technician PC (or DMM if configuring from the DMM).
4. Start the *NMEAModuleConfig.exe* configuration utility.
5. In the *Number of NMEA Channels* section, select the radio button that corresponds to the applicable Module (4 Channels, 8 Channels, or 4 Channel w/VHW) being configured.
6. Choose the desired Baud Rate, Bits, and Parity for each port. Any channel not in use should be left at its 4800-8-N1.



**Note!** If any of the input channels are set to a baud rate of 38, 400, the RS232 and RS422 outputs will be disabled.

7. Press “Configure Module”.



**Note!** A warning will appear if a combined data input rate larger than the data output rate is selected, but these settings can still be programmed. If these settings are programmed, it is the responsibility of the technician to verify that data from the RS232 and RS422 outputs will not be corrupted.

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8. A message box will appear stating "Ensure that only ONE module is connected to the system". Click 'OK'.
9. **Apply power** to the NMEA Module.
10. Once power is applied to the NMEA Module a reboot sequence will be displayed on the LEDs. If the NMEA Module is the 8-Channel or 4-Channel w/VHW version:
  - The last five (5) LEDs will illuminate for approximately five (5) seconds and turn off. The first three (3) LEDs will flash twice then illuminate for approximately five (5) seconds and turn off.

If the NMEA Module is the 4-Channel version:

- The first four (4) LEDs will flash.

If the three (3) LEDs (8-Ch or 4-Ch w/VHW) or four (4) LEDs (4-Ch) **remained** illuminated for the full duration of the programming or the reset sequence, the programming was unsuccessful; if it was unsuccessful, cycle power to the unit.



**Note!** While the NMEA Module is performing its reboot sequence, a series of X's will appear in the text window. Once the sequence is complete and the programming starts, the X's will be replaced by a series of dots (.....) to indicate that programming is occurring correctly. The image below shows a correct programming sequence. If the software is unable to connect, a series of exclamation points will be visible in the text window.

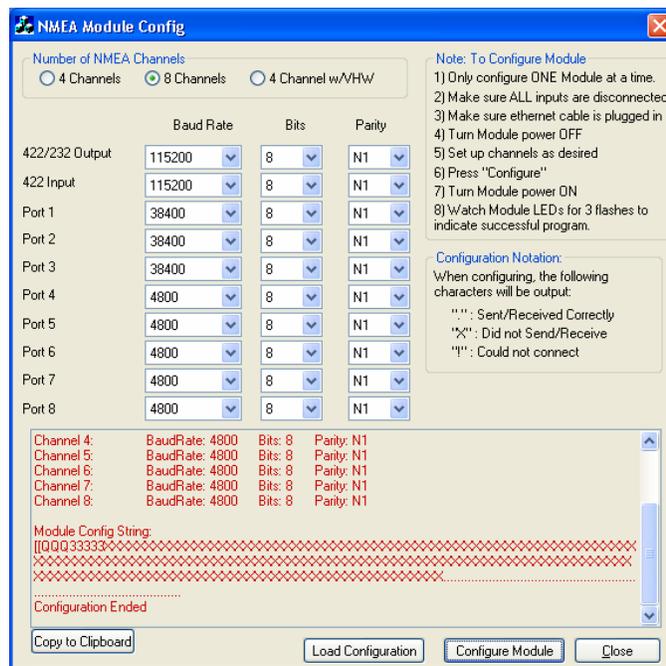


Figure 11-2 - Configuration Utility Reboot Sequence

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11. Press the “Stop” button at the bottom of the Configuration window once the first 3 LEDs are no longer illuminated.



**Note!** Once the NMEA Module configuration is complete, it is recommended to verify that the settings have been programmed correctly by completing the ‘Checking the NMEA Module Configuration’ procedure located at the beginning of this document.

### 11.3 NMEA Module ID – DIP Switch Settings

The NMEA Module ID (MUX ID) is jumper configured. To configure the MUX ID, locate Switch S1. There is a four (4) position jumper switch, with the first three (3) positions used for MUX ID.

Switch 1	Switch 2	Switch 3	MUX ID
ON	ON	ON	MUX ID 0
OFF	ON	ON	MUX ID 1
ON	OFF	ON	MUX ID 2
OFF	OFF	ON	MUX ID 3
ON	ON	OFF	MUX ID 4
OFF	ON	OFF	MUX ID 5
ON	OFF	OFF	MUX ID 6
OFF	OFF	OFF	MUX ID 7

Table 11-1 - Switch Settings - MUX ID

Note that if the MUX ID = 0, no channel or MUX identifiers are included in the output string.

### 11.4 AIS Connection

The NMEA Module is capable of accepting AIS data. Note that if an AIS is connected, there must be an AISMuxID entry added to the NMEA section of the VDRPARAMS.INI file (see *Section 11.5 - Edit [NMEA] Parameters* for further information).



**Note!** AIS data **must** be connected on **Channel 1**.

- Channel 1 is the only channel available that accepts 38,400 baud at high data.
- Channels 2 and 3 accept 38,400 baud at normal data.

## 11.5 Edit [NMEA] Parameters

Parameter	Typical Value	Remarks
TimeString	ZDA	NMEA String to use for time (ZDA, GGA, GLL or RMA) or PC for failsafe
TimeMuxID	12	Mux ID where time data is input
AISLocation	3	Location where AIS data is input; default is 3
AISMuxID	11	Mux ID where AIS data is input

Table 11-2 - NMEA Parameter Typical Values

For the base system, a single NMEA Module is configured via DIP-switch settings as described in *Appendix C – Data Interface Documentation*. The *RootInputMUXChannelCount* field allows for cascading additional NMEA devices, but this field is **ignored** for the **base VDR**.

### 11.5.1 AIS Data Parsing

If recording AIS data, there is an **option to not** record it to the FRM. If this option is chosen, AIS data will only be stored to the internal hard discs of the VDR.

To **not** record AIS data to the FRM, the *EnableAISParsing* string in the NMEA section of the VDRPARAMS.INI file must be set to 1. For example:

**EnableAISParsing = 1**

The default value for this string is 0.

A sample AIS string may read:

```
11!AIVDM,1,1,,B,139Kcl002W0TMVvPK@bGIV;N0HKO,0*7B
```

In the above sample, the “11” header indicates that the AIS data is being received on the first (1) channel of the first (1) NMEA Module (Mux).

Another sample AIS string may read:

```
1323!AIVDM,1,1,,B,139Kcl002W0TMVvPK@bGIV;N0HKO,0*7B
```

In this sample, there are two cascading NMEA Modules. The “1323” header indicates that the AIS data is being received from the AIS on the third (3) channel of the second (2) NMEA Module (Mux), then input through the third (3) channel of the first (1) NMEA Module (Mux).

## 11.6 Test NMEA Sources

To ensure compliance with IMO regulations, information from each NMEA source must be verified and validated using the methods in the following sections. Begin each test by following the steps provided below:

1. Start the VDR\_Record application.
2. Deselect record under the 'Tests' menu.
3. Select 'NMEA Test'.
4. Observe data from the time source is present in the NMEA data window. The \$GPZDA and \$GPGLL NMEA strings must be present, however other strings may be observed as well.



**Note!** If data is not present, reverse the polarity of the connection and try again. If the data is scrolling too fast to distinguish the data, stop the NMEA test and scroll up the window until the source is found.

5. Observe with each NMEA source that data is presented in the NMEA data window.
6. Make note in the configuration file of the identity of the NMEA source and the relevance of the information. For more information on editing the configuration file refer to *Section 17 - SYSTEM CONFIGURATION FILE*.

## 11.7 NMEA Error Codes

The error codes in the NMEA data from the NMEA Module identify the NMEA module and it's port that has the error. These errors occur when either the data format or speed does not match the received data, or the received data is corrupted.

The error message is in the format NerrorXX, where N is the NMEA ID and XX is the code as listed below.

Code	8-Port NMEA Module	4-Port NMEA Module
A	232/422 Output	232/422 Output
B	422 Input	422 Input
C	Input 1	Input 1
D	Input 2	Input 2
E	Input 3	Input 3
F	Slave/Master Link	Input 4
SA	Output to Slave	NA
SB	Input Port 4	NA
SC	Input Port 5	NA
SD	Input Port 6	NA
SE	Input Port 7	NA
SF	Input Port 8	NA

Table 11-3 - NMEA Error Codes

For example, error message 1errorSD on an 8 Channel NMEA Module would indicate that the data on input Port 6 has the wrong data format or speed or is corrupt.

## 11.8 Test Analog Sources

1. Prior to connecting the inputs to the Analog device, the source voltage levels should be verified:
  - a. Maximize the source level (i.e., place a 100% order to Stbd on the bow thrusters).
  - b. Measure the source level and make note of the Analog value at 100%.
2. Connect the inputs to the interface. Ensure that correct polarity is maintained so that a positive order or response from the source will display a positive result on the VDR.
3. Make note of the digital value displayed in the Log Window for the particular source and edit the configuration file to reflect this. These values are necessary for playback and data recovery in the event of an incident.



**Note!** Refer to Appendix C – Data Interface Documentation for additional information regarding Analog output string format.

4. Reduce the source level to approximately 75%; (ex., place a 100% order to Port on the bow thrusters).
5. Repeat step 3.
6. Adjust the source level to the midpoint (i.e., place a 0% order to on the bow thrusters).
7. Repeat step 3.
8. Repeat steps 1 through 7 for the remaining analog sources.

## 11.9 Test Discrete Inputs (Dry/Hot Contacts, Relays, Etc)

1. Contact connections should be verified.
2. Make note of which contact is connected to which point, identify the normal state of the contact and edit the configuration file accordingly.



**Note!** Refer to Appendix C – Data Interface Documentation for additional information regarding Discrete output string format.

3. Repeat steps 1 and 2 for the remaining Discrete inputs.

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## 12 OPERATION & ALARM UNIT TEST

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The OAU has 2 main purposes:

- It provides a visible and audible alarm in the event that it receives an error message from the VDR-100G2, and
- It is used to initiate the copying of data from the VDR to the DMM internal hard drive.

The functionality of these features shall be verified during installation.

1. The VDR\_Record application should be loaded and in the record mode.
2. Pull the power input to the DPU.
3. Observe a “Power Failure” message is reported on the LCD and audible alarm is sounded.
4. Push the ‘Mute’ button to silence the audible alarm.
5. Perform a download to the DMM internal drive (see *Section 14.1 - Securing Data*):
  - a. Observe a download progression message (for example, “20% Complete”).
  - b. Allow the download to complete displayed on the alarm panel.
  - c. Push the ‘Enter’ button to acknowledge the completed download.
6. Plug the power input back into the DPU.
7. Observe the “Power Failure” message is cleared on the OAU.

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## 13 FINAL RECORDING MEDIUM SETUP

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### 13.1 FRM System Overview

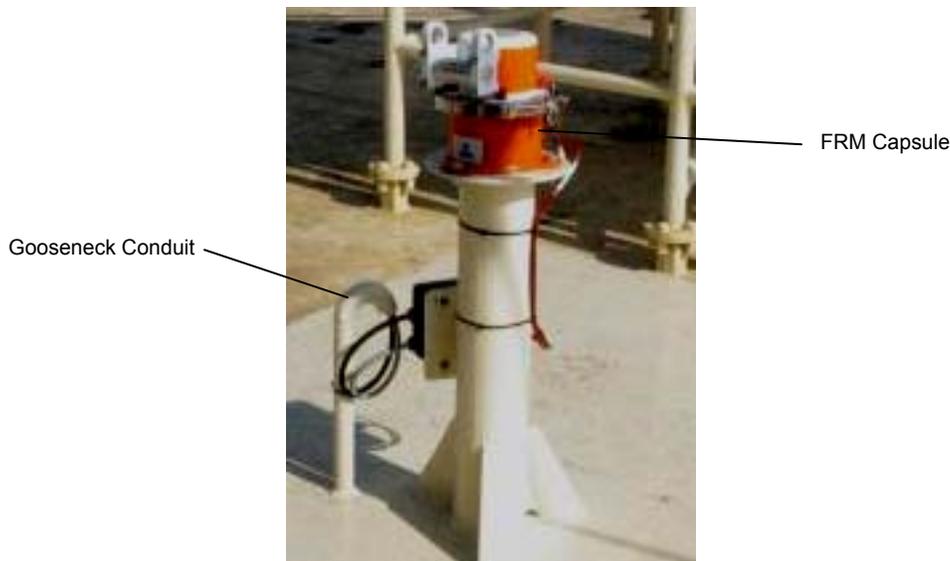
The **Final Recording Medium (FRM)** is a solid-state storage unit capable of storing a minimum of 12 hours of VDR-100G2/S data in compliance with IMO resolution A.861(20.). The difference between a FRM and SFRM are: FRM can only be a fixed capsule; SFRM may be supplied as float-free or fixed. The SFRM does not have to meet the penetration factor.

The primary function of the FRM/SFRM is to provide a protective capsule for the IMO required data acquired by the VDR. This data will be used, in the event of an incident, by an accident investigation team.

- The FRM/SFRM is mounted on the exterior deck of the ship and connected to the DMM.
- The FRM/SFRM receives data from the VDR via an Ethernet link.
- The SFRM is available in two types: float free and fixed.

**Capsule Specifications:** The FRM is required to meet the following specifications

- Pin Penetration:
  - 100 mm pin diameter,
  - 250 kg dropped from 3 meters
- Fire Protection: 50,000 BTU/sq foot/hour
  - 60 minutes at 1100°
  - 10 hours at 260°C
- Shock: IEC 68-2-27 50g's, 11ms, half-sine shock
- Immersion: 6,000 meters depth



*Figure 13-1 - Sample VDR-100G2S FRM Installation*

The SFRM is required to meet the Fire Protection, Shock, and Immersion specifications but IS NOT required to meet the Pin Penetration specs.

The VDR-100G2 supports the use of single or dual capsules in a fixed or Float-free configuration. Each FRM or SFRM has unique setup properties and the following sections should be consulted prior to setting up the FRM.



**Note!** An FRM Configuration Sheet is available in Appendix A – FRM Maintenance Sheet and should always be completed during an FRM set-up. In the event of an incident this information must be available in order to retrieve data from the FRM.

### 13.1.1 General Setup

To configure an S/FRM for recording, the S/FRM must be enabled in the <vdrparams.ini> file.

To open the <vdrparams.ini> file :

1. Log on as administrator;
2. Open <vdrparams.ini > on desktop screen;
3. Locate the [STORAGE] section in the <vdrparams.ini> file;
4. Edit the following lines in the [Storage] section:

[STORAGE]

```
hardenedStorage = 1           // 0=disable, 1=enable, 2 = Dual FRM, default is 0
hardenedFormat = 1           // 1=L3 HVR/SVR, 2=PMC, 3=Jotron, 4=Rutter-ACR Float-free, 5=Rutter Fixed
secondaryHardenedFormat = 4 // 1=L3 HVR/SVR, 2=PMC, 3=Jotron, 4=Rutter-ACR Float-free, 5=Rutter Fixed
```

The following tables provide explanations/details on each of the lines from the [Storage] section

<b>hardenedStorage</b>	
The 'hardenedStorage' line enables recording to the FRM and is used to indicate whether it is used in a single or double FRM configuration. The default value is 0 which specifies that no FRM is used with the system.	
hardenedStorage = 0	Indicates that no FRM is connected to the system.
hardenedStorage = 1	Indicates that an FRM is connected to the system in a single FRM configuration
hardenedStorage = 2	Indicates that the VDR is operating in dual FRM mode. In this configuration, the fixed capsule must be configured as the primary and the Float-free FRM is configured as the secondary FRM.

*Table 13-1 - 'hardenedStorage' enables recording to the FRM.*

<b>hardenedFormat</b>	
The 'hardenedFormat' line is used to indicate the manufacturer of the primary FRM in use. If a fixed FRM capsule is used in dual FRM mode with a Float-free SFRM capsule, the fixed FRM capsule is <u>always</u> set as the primary FRM.	
hardenedFormat = 1	Indicates that either the L3 HVR Fixed FRM Capsule or L3 SVR Fixed SFRM Capsule is used as the primary (or only) FRM.
hardenedFormat = 2	Indicates that the Litton PMC Fixed FRM Capsule is in use as the primary (or only) FRM.
hardenedFormat = 3	Indicates that the JoTron Float-free SFRM Capsule is in use as the primary (or only) FRM.
hardenedFormat = 4	Indicates that the Rutter-ACR Float-free SFRM Capsule is in use as the primary (or only) FRM.
hardenedFormat = 5	Indicates that the Rutter FRM (RUT-02447) Fixed Capsule is in use as the primary (or only) FRM.

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Table 13-2 - 'hardenedFormat' indicates the manufacturer of the primary FRM.

<b>secondaryHardenedFormat</b>	
The 'secondaryHardenedFormat' line is used to indicate the manufacturer of the secondary FRM in use. If a fixed FRM capsule is used in dual FRM mode with a Float-free SFRM capsule, the fixed FRM capsule is <b>always</b> set as the primary FRM. If the VDR is operating in a single FRM configuration, this value is ignored.	
secondaryHardenedFormat = 3	Indicates that the JoTron Float-free SFRM Capsule is in use as the secondary FRM.
secondaryHardenedFormat = 4	Indicates that the Rutter-ACR Float-free SFRM Capsule is in use as the secondary FRM.

Table 13-3 – 'secondaryHardenedFormat' showing secondary FRM manufacturer.

**Example 1:** Shows an L3 HVR-01/02 Fixed FRM Capsule (or L3 SVR-01/02 Fixed SFRM Capsule) in single FRM mode. The secondary format will be ignored in this case.

[STORAGE]

```
hardenedStorage = 1           // 0=disable, 1=enable, 2 = Dual FRM, default is 0
hardenedFormat = 1           // 1=L3 HVR/SVR, 2=PMC, 3=Jotron, 4=Rutter-ACR Float-free, 5= Rutter Fixed
secondaryHardenedFormat = 4 // 1=L3 HVR/SVR, 2=PMC, 3=Jotron, 4=Rutter-ACR Float-free, 5= Rutter Fixed
```

**Example 2:** Shows a JoTron Float-free SFRM Capsule in single FRM mode. The secondary format will be ignored in this case.

[STORAGE]

```
hardenedStorage = 1           // 0=disable, 1=enable, 2 = Dual FRM, default is 0
hardenedFormat = 3           // 1=L3 HVR/SVR, 2=PMC, 3=Jotron, 4=Rutter-ACR Float-free, 5=Rutter Fixed
secondaryHardenedFormat = 4 // 1=L3 HVR/SVR, 2=PMC, 3=Jotron, 4=Rutter-ACR Float-free, 5= Rutter Fixed
```

**Example 3:** Shows a Rutter FRM (RUT-02447) Capsule as primary with a Rutter-ACR Float-free SFRM Capsule as secondary operating in dual FRM mode.

[STORAGE]

```
hardenedStorage = 2           // 0=disable, 1=enable, 2 = Dual FRM, default is 0
hardenedFormat = 5           // 5=L3 HVR/SVR, 2=PMC, 3=Jotron, 4=Rutter-ACR Float-free, 5=Rutter Fixed
secondaryHardenedFormat = 4 // 1=L3 HVR/SVR, 2=PMC, 3=Jotron, 4=Rutter-ACR Float-free, 5=Rutter Fixed
```

## 13.2 Fixed Capsules

Fixed capsules are designed to be mounted externally on the bridge top of the ship and are designed to ensure that critical VDR data can survive the following environmental conditions:

- Impact shock: 50 half sine-wave pulse for 11 milliseconds;
- Fire Exposure: 1,100 degrees centigrade for one hour and 26 degrees centigrade for 10 hours;
- Deep Sea Pressure: 30 days under water at MPa (equivalent to 6,000 m depth).

Fixed capsules can be supplied with either a VDR as an FRM or as an. In the case of fixed FRMs for VDRs, the fixed capsule must additionally meet the penetration standard of SVDR which is 250 kg mass dropped 3 metres impacting with 100 mm diameter pin;

### 13.2.1 Rutter Fixed FRM Capsule

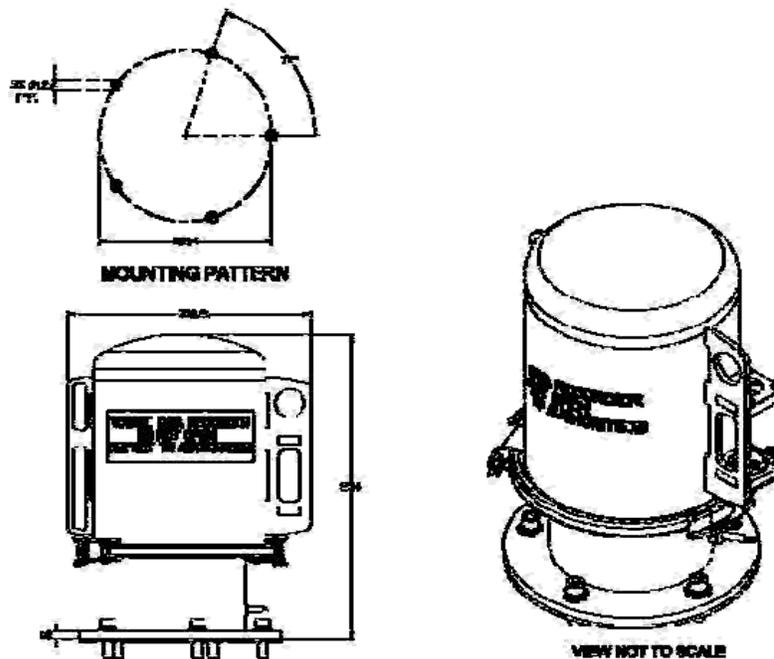


Figure 13-2- Rutter FRM (RUT-02447) Fixed Capsule

The Rutter FRM (RUT-02447) Fixed Capsule is an armoured stainless steel (A316) capsule. It is coloured bright orange for ease of location in the event of an incident.

The Rutter FRM (RUT-02447) Fixed Capsule is designed to be mounted externally close to the bridge—typically on the bridge top—and is fitted with an acoustic beacon to aid underwater recovery by a Remotely Operated Vehicle (ROV) or diver in the event of an incident. The protected memory is stored in the retrievable capsule and is connected by a quick-release cable-connector assembly to the deckmount which contains the server-central processing unit.

The Rutter FRM (RUT-02447) Fixed Capsule has the capacity to store audio, radar video and other data for 12 hours with a 4 GB storage capacity. The Rutter FRM (RUT-02447) Capsule will retain the data for more than 10 years when the power supply is removed.

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The Rutter FRM (RUT-02447) Capsule has a release mechanism to facilitate underwater recovery both by a diver or a ROV. Suitable handles are provided to ensure that the capsule may be retrieved safely after release.

The manufacturer should be contacted to extract the data, when the Rutter FRM (RUT-02447) Capsule has been damaged after an incident, e.g. the capsule was exposed to fire or the ship has sunk. Alternatively, authorities may apply to the manufacturer for instructions on how to retrieve the recorded data.

### 13.2.1.1 Planning for the Rutter FRM (RUT-02447) Fixed Capsule

The Rutter FRM (RUT-02447) Capsule is supplied with interconnect cables. These cables must connect to the VDR-100G2/S through a junction box (**not provided with VDR-100G2/S**). The junction box is normally mounted on the exterior deck and located near the FRM and positioned within range of the interconnect cable. All hull penetrations for cables must be fitted with waterproof glands (**not provided with VDR-100G2/S**).

Plan to mount the Rutter FRM (RUT-02447) Capsule near the bridge on the external deck to increase the probability of its survival and recovery after an incident. The capsule must be positioned clear of rigging and other potential obstructions **and as near to the centreline of the ship as practically possible**. Criteria to be considered when assessing the optimum position shall include but not be limited to the following:

1. Separation from fuel or other potential fire sources;
2. Separation from probable sources of mechanical damage;
3. Operational environment for continued serviceability;
4. Accessibility for copying of recorded data and for routine maintenance;
5. Facilitation of underwater removal and retrieval by both divers and ROVs;
6. Clear unobstructed space around the capsule to allow an ROV or diver to work; and
7. Mounted away from sound absorbing materials such as honeycomb structure, tarpaulin fabrics, clothing, cargo, etc to ensure that the Rutter FRM (RUT-02447) Capsule beacon operates correctly.

### 13.2.1.2 Mounting the Rutter FRM (RUT-02447) Capsule

The selection of a mounting location should provide for convenient access during inspection intervals. The mounting location should also provide clearance for removing the beacon from its mounting cradle.

The Rutter FRM (RUT-02447) Capsule is supplied with an interconnect cable (3 meters of Ethernet cable). This cable must connect to the VDR-100G2/S through a junction box (not provided with VDR-100G2/S). The junction box must be shielded and connected to the hull of the vessel.

The Rutter FRM (RUT-02447) Capsule and deckmount are delivered completely assembled and sealed. **DO NOT** open the capsule at the time of installation. Simply mount the capsule on the deck and connect the cables to the junction box to complete the installation. Two methods may be used to affix the deckmount to the deck;

1. Standard: Weld the supplied mild/steel (or aluminium when specifically ordered with the – A option of the installation package) deckplate to the deck and subsequently fastening the Rutter Fixed FRM deckmount to it by means of the 5 x M12 bolts supplied. **To avoid corrosion issues, the isolation sleeves as well as the neoprene rubber insulating plate should always be used.**

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2. Alternatively (when welding is impossible): drill 5 holes into or through the deck, optionally tapping M12 holes, and fixing the Rutter Fixed FRM capsule by means of the bolts provided. **To avoid corrosion issues, the isolation sleeves as well as the neoprene rubber insulating plate should always be used.**

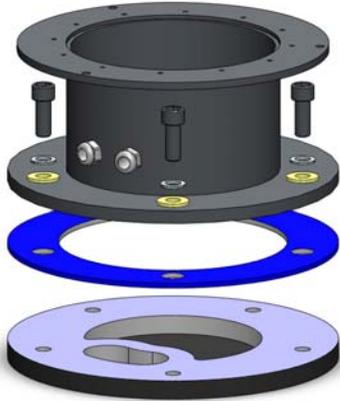


Figure 13-3- Fastening the deckmount assembly to the deck.

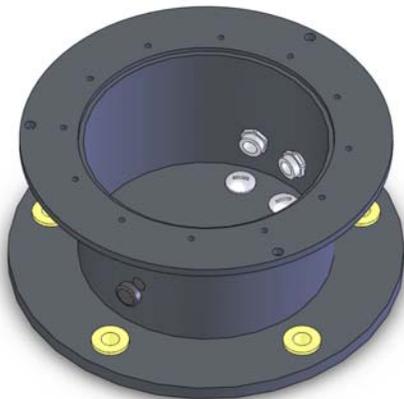


Figure 13-4 - When feeding the cables (through the deck) from the bottom, alternative cable entries may be used by interchanging the cable glands and blind plates.

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### 13.2.1.3 Connecting the Rutter FRM (RUT-02447) Fixed Capsule

The wiring of the connections between the VDR-100G2 and the selected FRM is via the RJ45 connector (illustrated in Figure 13-5 - RJ45 Connector).

The junction box adjacent to the FRM on the vessel's outside deck **is not** supplied with the VDR-100G2/S. It connects the cables provided with the FRM to the cables connecting to the VDR-100G2/S.

This junction box can be located inside, but **must be located** within the cable distance of the FRM cables. It must also be fully screened and connected to the vessel's hull. If mounted outside, it must also be waterproof.

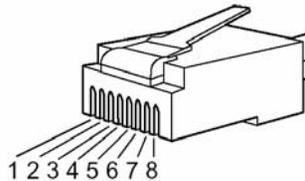


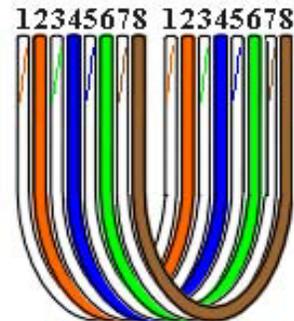
Figure 13-5 - RJ45 Connector

Rutter uses the 568B standard for all straight-thru Ethernet cables.

Rutter uses the crossover standard noted below for all cross-over Ethernet cables.

Straight through 568B			
Connector 1		Connector 2	
1 Tx+	white/orange	1 Tx+	white/orange
2 Tx-	orange	2 Tx-	orange
3 Rx+	white/green	3 Rx+	white/green
4 N/A		4 N/A	
5 N/A		5 N/A	
6 Rx-	green	6 Rx-	green
7 N/A		7 N/A	
8 N/A		8 N/A	

Table 13-4 Straight-through Ethernet cable set ups



STRAIGHT-THRU  
568B

Crossover			
Connector 1		Connector 2	
1 Tx+	white/orange	1 Tx+	white/green
2 Tx-	orange	2 Tx-	green
3 Rx+	white/green	3 Rx+	white/orange
4 N/A		4 N/A	
5 N/A		5 N/A	
6 Rx-	green	6 Rx-	orange
7 N/A		7 N/A	
8 N/A		8 N/A	

Table 13-5 – Cross-over Ethernet cable set ups



CROSSOVER

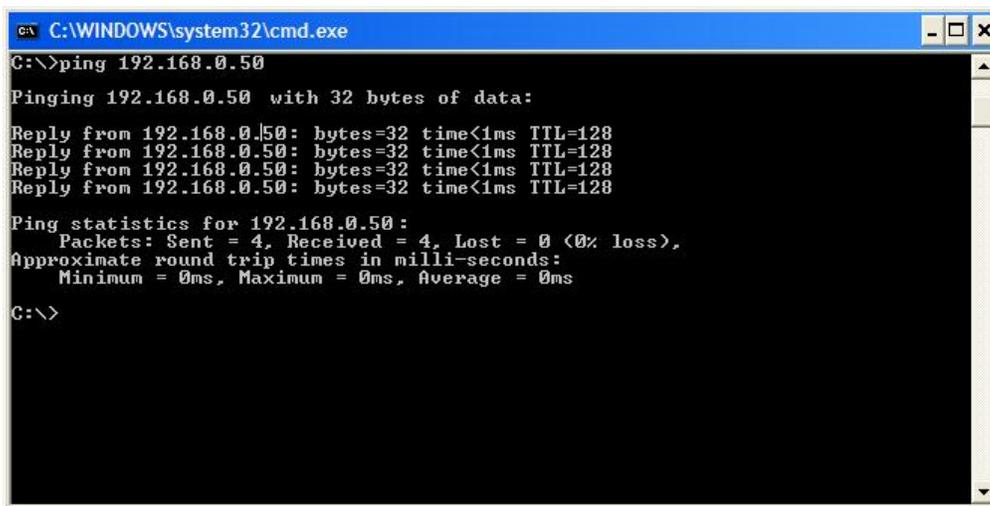


**Note!** It is **highly** recommended that cabling connecting the Rutter FRM (RUT-02447) Capsule to the VDR-100G2/S is installed through a gooseneck conduit (see Figure 5-19 - Sample VDR-100G2S SFRM Installation for a sample FRM installation.)

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### 13.2.1.4 Testing Rutter FRM (RUT-02447) Fixed Capsule Physical Connection

1. Confirm that the cable connections between the Rutter FRM (RUT-02447) Capsule and the VDR are correct;
2. Open the Command Prompt from: Start menu>All Programs>Accessories>Command Prompt on the VDR;
3. The Command Prompt window will open;
4. At the C:\> prompt, type ping 192.168.0.50;
5. Select the Enter button on the keyboard;
6. Observe that 4 replies are received from the Rutter FRM (RUT-02447) Capsule;



```
C:\WINDOWS\system32\cmd.exe
C:\>ping 192.168.0.50
Pinging 192.168.0.50 with 32 bytes of data:
Reply from 192.168.0.50: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.50:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

Figure 13-6 - Pinging the Rutter FRM (RUT-02447) Capsule

7. Once communications has been verified, close the Command Prompt window.

**NOTE:** If the request times out, check the Rutter FRM (RUT-02447) Capsule cable connections.

### 13.2.1.5 Set FRM Port's IP Address—Rutter FRM (RUT-02447) Fixed Capsule

The default IP address of the Rutter FRM (RUT-02447) Fixed Capsule is 192.168.0.50. The VDR's factory configuration for the FRM Ethernet port IP address is 192.168.0.189. If this address is not correctly set, communication between the VDR and the Rutter FRM (RUT-02447) Capsule will not be possible. The FRM port must be in the same range as the Rutter FRM (RUT-02447) Capsule, with the last segment different than the VDR (as shown below.).

To change the IP segment of the VDR's FRM Ethernet port:

1. Select the Start menu;
2. Open the Control Panel;
3. Double-click the Network Connections icon;
4. Right-click on the SFRM icon;
5. Select Properties from the pop-up menu.
6. In the Local Area Connection Properties window, highlight "Internet Protocol (TCP/IP)";
7. Select the "Properties" button directly under the available options;
8. The "Internet Protocol (TCP/IP) Properties" window will open;
9. Select the "Use the following IP address" radio button;
10. Enter 192.168.0.189 (the last number can be any number from 2 to 254, **except 50.**)
11. Select the "OK" button in the Internet Protocol (TCP/IP) Properties;
12. Select the "OK" button in the Local Area Connection Properties; and
13. The connection should now be established.

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### 13.2.1.6 Configuring the Rutter FRM (RUT-02447) Capsule

To begin setting up the Rutter FRM (RUT-02447) Capsule support:

1. Log on as administrator
2. Locate the `<vdrparams.ini>` file on the desktop;
3. Open the file;
4. Locate the [STORAGE] section of the open file; and
5. Ensure entries are set as shown below:

[STORAGE]

```
hardenedStorage = 1           // 0=disable, 1=enable, 2 = Dual FRM, default is 0
hardenedFormat = 5           // 1=L3 HVR/SVR, 2=PMC, 3=Jotron, 4=Rutter-ACR Float-free, 5=Rutter Fixed
secondaryHardenedFormat = 4 // 1=L3 HVR/SVR, 2=PMC, 3=Jotron, 4=Rutter-ACR Float-free, 5= Rutter Fixed
```

```
RutterFixed-compressNMEA = 0           // 0 = disable, 1=enable; default is 0
```



**Note:** *The Rutter FRM (RUT-02447) Fixed Capsule does not need to be partitioned.*

### 13.2.2 L3 HVR/SVR Fixed FRM/SFRM Capsules

The externally mounted L3 HVR/SVR Fixed FRM/SFRM Capsules are certified to meet or exceed requirements for the environmental qualification categories of IEC 60945, and the survivability requirements of IEC 61996-2.

The L3 HVR/SVR Fixed FRM/SFRM Capsules are designed specifically for the Voyage Data Recorder (VDR) and Simplified Voyage Data Recorder (S-VDR) as required in *IEC 61996.2* and *the MSC.163(78) performance standards* and includes an expandable 2 GB solid state memory with a storage capacity of more than 12 hours of voyage data including radar, audio, and sensor.

#### 13.2.2.1 Planning for the SVR-02 Fixed SFRM Capsule

The FRM/SFRM is supplied with interconnected cables. These cables must connect to the VDR-100G2/S through a junction box (**not provided with VDR-100G2/S**). The junction box must be shielded and connected to the hull of the vessel. The junction box is normally mounted on the exterior deck and located near the SFRM and positioned within range of the interconnect cable. All hull penetrations for cables must be fitted with waterproof glands (**not provided with VDR-100G2/S**).

The L3 HVR/SVR Fixed FRM/SFRM Capsule setup is the same regardless of whether it is set up as single or dual mode FRM.



**Note!** Prior to beginning the set-up of a L3 HVR/SVR Fixed FRM/SFRM Capsule, it is necessary to determine if the unit's series and type: HVR-01, SVR-01, HVR-02, SVR-02, or SVR-03.

#### 13.2.2.2 L3 HVR/SVR Fixed FRM/SFRM Capsule Partitions Overview

Due to changes made by the manufacturer, there are two available L3 FRM capsule types including the HVR series and the SVR series:

1. L3 HVR-01 Fixed FRM Capsule
2. L3 HVR-02 Fixed FRM Capsule

There are also three available L3 SFRM capsules:

1. L3 SVR-01 Fixed SFRM Capsule
2. L3 SVR-02 Fixed SFRM Capsule
3. L3 SVR-03 Fixed SFRM Capsule



**NOTE:** The SVR-01 / SVR-02 / SVR-03 and HVR-01 / HVR-02 are physically distinct. But there are only two setup processes for these five capsules. There is one setup processes for all FRM capsules. And there is one setup process for all SFRMs. The planning, mounting configuring, recording and testing for all L3 Fixed FRM/SFRM capsules follows exactly the same procedure regardless of whether the capsule being installed is an FRM or an SFRM..

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The table below is provided to clarify the set-up information for the different L3 capsules which may be encountered during an installation. The numbers provided below indicate the values applicable to the different L3 capsules:

Version	Total Granules	Bytes per Granule	AUDIO Partition	VIDEO Partition	NMEA Partition
HVR-01	111990	16384	65925	39474	6591
HVR-02	15990	131072	9413	5636	941
SVR-01	111990	16384	65925	39474	6591
SVR-02	15990	131072	9413	5636	941
SVR-03	15990	131072	9413	5636	941

Table 13-6 – L3 capsule partition sizes



**Note!** A granule is a logical unit of file storage on an L3 FRM/SFRM Capsule. The total number of granules added to the 'Granules' fields cannot exceed the 'Partitioning Granules in Crash Module' (listed at the top of the form).

### 13.2.2.3 Mounting L3 HVR/SVR Fixed FRM/SFRM Capsules

The L3 HVR/SVR Fixed FRM/SFRM Capsules are mounted near the bridge on the external deck area of the vessel to increase the probability of its survival and recovery following an incident. As outlined in IEC 61996, the capsule shall be positioned clear of rigging and other potential obstructions and as near to the centerline of the ship as practically possible.



**NOTE:** Refer to diagrams in the appendix for specific L3 HVR/SVR capsule details.

Criteria to be considered when assessing the optimum position shall include but not be limited to the following:

1. Separation from probable sources of mechanical damage.
2. Separation from fuel or other potential fire sources.
3. Operational environment for continued serviceability.
4. Accessibility for copying of recorded data and for routine maintenance.
5. Facilitation of underwater removal and retrieval by both divers and ROVs. There shall be a clear unobstructed space near the capsule to allow an ROV or diver to work.

The L3 HVR/SVR Fixed FRM/SFRM Capsule is supplied with an interconnect cable. This cable must connect to the VDR-100G2/S through a junction box (not provided with VDR-100G2/S).

The junction box must be shielded and connected to the hull of the vessel. The junction box is normally mounted on the exterior deck and located near the FRM/SFRM and positioned within range of the interconnect cable. All hull penetrations for cables must be fitted with waterproof glands (not provided with VDR-100G2/S).

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### 13.2.2.4 Connecting the L3 HVR/SVR Fixed FRM/SFRM Capsule Fixed SFRM

The wiring of the connections between the VDR-100G2 and the L3 HVR/SVR Fixed FRM/SFRM Capsule is via the RJ45 connector (illustrated in Figure 13-7 - RJ45 Connector).

The junction box adjacent to the FRM/SFRM on the vessel's outside deck **is not** supplied with the VDR-100G2/S. It connects the cables provided with the FRM to the cables connecting to the VDR-100G2/S.

This junction box can be located inside, but **must** be located within the cable distance of the SFRM cables. It must also be fully screened and connected to the vessel's hull. If mounted outside, it must also be waterproof.

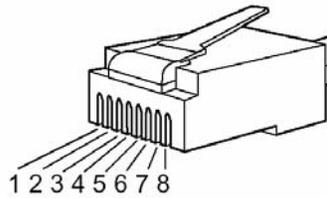


Figure 13-7 - RJ45 Connector

Rutter uses the 568B standard for all straight-thru Ethernet cables.

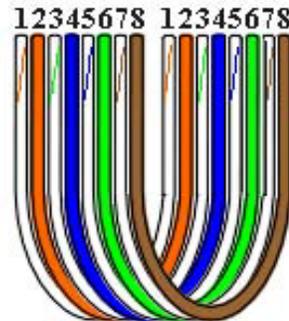
Rutter uses the crossover standard noted below for all cross-over Ethernet cables.

Straight through 568B			
Connector 1		Connector 2	
1 Tx+	white/orange	1 Tx+	white/orange
2 Tx-	orange	2 Tx-	orange
3 Rx+	white/green	3 Rx+	white/green
4 N/A		4 N/A	
5 N/A		5 N/A	
6 Rx-	green	6 Rx-	green
7 N/A		7 N/A	
8 N/A		8 N/A	

Table 13-7 Straight-through Ethernet cable set ups

Crossover			
Connector 1		Connector 2	
1 Tx+	white/orange	1 Tx+	white/green
2 Tx-	orange	2 Tx-	green
3 Rx+	white/green	3 Rx+	white/orange
4 N/A		4 N/A	
5 N/A		5 N/A	
6 Rx-	green	6 Rx-	orange
7 N/A		7 N/A	
8 N/A		8 N/A	

Table 13-8 – Cross-over Ethernet cable set ups



STRAIGHT-THRU  
568B



CROSSOVER



**Note!** It is **highly** recommended that cabling connecting the FRM/SFRM to the VDR-100G2/S is installed through a gooseneck conduit (see Figure 5-19 - Sample VDR-100G2S SFRM Installation for a sample FRM installation.)

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### 13.2.2.5 VDR-100G2 with L3 HVR-01 Fixed FRM Capsule Setup

The partition sizes provided in this section are applicable only to the L3 HVR-01 Fixed FRM Capsule. (For more information on the L3 HVR-02 Fixed FRM Capsule partition sizes, refer to *Section 13.2.2.2: L3 HVR/SVR Fixed FRM/SFRM Capsule Partitions Overview.*):

1. Open Internet Explorer from the VDR desktop;
2. In the address bar enter <http://192.168.0.2/hvrhome.htm>; and
3. The HVR HTML Interface will appear;



**Note!** If the Web page does not appear, ensure the address is not redirected to a proxy server. Under 'Tools' menu, select 'Internet Options', Select 'Connection's tab and select 'LAN Settings'. Ensure that "Use a proxy server" is **not** checked.

4. Select Flash Setup;
5. Enter L3HVR as the password;
6. In the Update Devices form, the fields must be edited according to part number:
  - a. Position 0, insert 65925 into the granules field and AUDIO for Stream Name field,
  - b. Position 1, insert 6591 into the granules field and NMEA for Stream Name field,
  - c. Position 2, insert 39474 into the granules field and VIDEO for Stream Name field,
  - d. Position 3, insert 0 into the granules field and leave Stream Name blank,
  - e. Position 4, insert 0 into the granules field and leave Stream Name blank, and
  - f. Position 5, insert 0 into the granules field and leave Stream Name blank,
7. Select 'Submit Changes'; and
8. Close Internet Explorer.

### 13.2.2.6 VDR-100G2S with L3 SVR-01 Fixed SFRM Capsule Setup

The set-up of the L3 SVR-01 Fixed SFRM Capsule can be completed using the procedure and information in Section 13.2.2.5: VDR-100G2 with L3 HVR-01 Fixed FRM Capsule Setup

**Note!** A granule is a logical unit of file storage on an L3 FRM/SFRM Capsule. The total number of granules added to the 'Granules' fields cannot exceed the 'Partitioning Granules in Crash Module' (listed at the top of the form).

### 13.2.2.7 Mounting L3 HVR/SVR Fixed FRM/SFRM Capsules

The L3 HVR/SVR Fixed FRM/SFRM Capsules are mounted near the bridge on the external deck area of the vessel to increase the probability of its survival and recovery following an incident. As outlined in IEC 61996, the capsule shall be positioned clear of rigging and other potential obstructions and as near to the centerline of the ship as practically possible.

**NOTE:** Refer to diagrams in the appendix for specific L3 HVR/SVR capsule details.

Criteria to be considered when assessing the optimum position shall include but not be limited to the following:

6. Separation from probable sources of mechanical damage.
7. Separation from fuel or other potential fire sources.
8. Operational environment for continued serviceability.
9. Accessibility for copying of recorded data and for routine maintenance.
10. Facilitation of underwater removal and retrieval by both divers and ROVs. There shall be a clear unobstructed space near the capsule to allow an ROV or diver to work.

The L3 HVR/SVR Fixed FRM/SFRM Capsule is supplied with an interconnect cable. This cable must connect to the VDR-100G2/S through a junction box (not provided with VDR-100G2/S).

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The junction box must be shielded and connected to the hull of the vessel. The junction box is normally mounted on the exterior deck and located near the FRM/SFRM and positioned within range of the interconnect cable. All hull penetrations for cables must be fitted with waterproof glands (not provided with VDR-100G2/S).

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### 13.2.2.8 Connecting the L3 HVR/SVR Fixed FRM/SFRM Capsule Fixed SFRM

The wiring of the connections between the VDR-100G2 and the L3 HVR/SVR Fixed FRM/SFRM Capsule is via the RJ45 connector (illustrated in Figure 13-7 - RJ45 Connector).

The junction box adjacent to the FRM/SFRM on the vessel's outside deck **is not** supplied with the VDR-100G2/S. It connects the cables provided with the FRM to the cables connecting to the VDR-100G2/S.

This junction box can be located inside, but **must** be located within the cable distance of the SFRM cables. It must also be fully screened and connected to the vessel's hull. If mounted outside, it must also be waterproof.

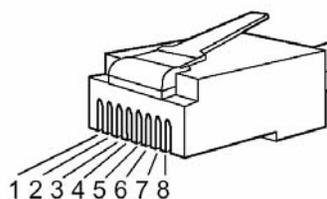


Figure 13-7 - RJ45 Connector

Rutter uses the 568B standard for all straight-thru Ethernet cables.

Rutter uses the crossover standard noted below for all cross-over Ethernet cables.

Straight through 568B	
Connector 1	Connector 2
1 Tx+ white/orange	1 Tx+ white/orange
2 Tx- orange	2 Tx- orange
3 Rx+ white/green	3 Rx+ white/green
4 N/A	4 N/A
5 N/A	5 N/A
6 Rx- green	6 Rx- green
7 N/A	7 N/A
8 N/A	8 N/A

Table 13-7 Straight-through Ethernet cable set ups

Crossover	
Connector 1	Connector 2
1 Tx+ white/orange	1 Tx+ white/green
2 Tx- orange	2 Tx- green
3 Rx+ white/green	3 Rx+ white/orange
4 N/A	4 N/A
5 N/A	5 N/A
6 Rx- green	6 Rx- orange
7 N/A	7 N/A
8 N/A	8 N/A

Table 13-8 – Cross-over Ethernet cable set ups

**Note!** It is **highly** recommended that cabling connecting the FRM/SFRM to the VDR-100G2/S is installed through a gooseneck conduit (see Figure 5-19 - Sample VDR-100G2S SFRM Installation for a sample FRM installation.)

### 13.2.2.9 VDR-100G2 with L3 HVR-02 Fixed FRM Capsule Setup

The partition sizes provided in this section are applicable only to the L3 HVR-02 Fixed FRM Capsule. For more information on the L3 HVR-01 Fixed FRM Capsule partition sizes, refer to *Section 13.2.2.2: L3 HVR/SVR Fixed FRM/SFRM Capsule Partitions Overview*.

1. Open Internet Explorer from the VDR desktop;
2. In the address bar type <http://192.168.0.2/hvrhome.htm>;
3. Press the “Enter” key;
4. The HVR HTML Interface will appear;



**Note!** If the Web page does not appear, ensure the address is not redirected to a proxy server. Under ‘Tools’ menu, select ‘Internet Options’, Select Connection’s tab and select ‘LAN Settings’. Ensure that “Use a proxy server” is **not** checked.

5. Select Flash Setup.
6. Enter L3HVR as the password;
7. In the Update Devices form, the fields must be edited according to part number:
  - a. Position 0, insert 9413 into the granules field and AUDIO for Stream Name field,
  - b. Position 1, insert 941 into the granules field and NMEA for Stream Name field,
  - c. Position 2, insert 5636 into the granules field and VIDEO for Stream Name field,
  - d. Position 3, insert 0 into the granules field and leave Stream Name blank,
  - e. Position 4, insert 0 into the granules field and leave Stream Name blank, and
  - f. Position 5, insert 0 into the granules field and leave Stream Name blank;
8. Select ‘Submit Changes’; and
9. Close Internet Explorer.

### 13.2.2.10 VDR-100G2S with L3 SVR-02 Fixed SFRM Capsule Setup

The set-up of the L3 SVR-02 Fixed SFRM Capsule can be completed using the procedure and information in *Section 13.2.2.9: VDR-100G2 with L3 HVR-02 Fixed FRM Capsule Setup*.

### 13.2.2.11 VDR-100G2S with L3 SVR-03 Fixed SFRM Capsule Setup

The set-up of the L3 SVR-03 Fixed SFRM Capsule can be completed using the procedure and information in *Section 13.2.2.9: VDR-100G2 with L3 HVR-02 Fixed FRM Capsule Setup*.

### 13.2.2.12 Test the L3 HVR/SVR Fixed FRM/SFRM Capsule Physical Connection

Confirm the cable connections between the L3 HVR/SVR Fixed FRM/SFRM Capsule and the VDR.

1. Open the Command Prompt from: *Start menu>All Programs>Accessories>Command Prompt* on the VDR;
2. The Command Prompt window will open;
3. At the C:\> prompt, type ping 192.168.0.2;
4. Hit the Enter button on the keyboard;
5. Observe that 4 replies are received from the FRM/SFRM Capsule;



```
C:\WINDOWS\system32\cmd.exe
C:\>ping 192.168.0.2
Pinging 192.168.0.2 with 32 bytes of data:
Reply from 192.168.0.2: bytes=32 time<1ms TTL=128
Ping statistics for 192.168.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
C:\>
```

Figure 13-8 - Pinging the L3 HVR-01 or SVR-01 Fixed FRM/SFRM Capsule

**NOTE:** If the request times out, check the HVR-02 Fixed FRM Capsule cable connections.

6. . Close the Command Prompt window when communication is verified.

### 13.2.2.13 Setting the FRM Port's IP Address—L3 HVR/SVR Fixed FRM/SFRM Capsules

The default IP address of the L3 HVR/SVR Fixed FRM/SFRM Capsules is 192.168.0.2. The VDR's factory configuration for the FRM Ethernet port IP address is 192.168.0.189. If this address is not correctly set, communication between the VDR and the L3 HVR/SVR Fixed FRM/SFRM Capsule will not be possible. The FRM port must be in the same range as the L3 HVR/SVR Fixed FRM/SFRM Capsule, with the last segment different than the VDR (as shown below.). To change the IP segment of the VDR's FRM Ethernet port:

1. Click the Start menu;
2. Open the Control Panel;
3. Double-click the Network Connections icon;
4. Right-click on the SFRM icon;
5. Select Properties from the pop-up menu.
6. In the Local Area Connection Properties window, highlight "Internet Protocol (TCP/IP)";
7. Click the "Properties" button directly under the available options;
8. The "Internet Protocol (TCP/IP) Properties" window will open;
9. Select the "Use the following IP address" radio button;
10. Enter 192.168.0.189 (the last number can be any number from 3 to 254.);
11. Click the "OK" button in the Internet Protocol (TCP/IP) Properties;
12. Click the "OK" button in the Local Area Connection Properties; and
13. The connection should now be established.

### 13.2.2.14 Configuring L3 HVR/SVR Fixed FRM/SFRM Capsules

To begin setting up an L3 HVR/SVR Fixed FRM/SFRM Capsule support:

1. Log on as administrator;
2. Locate the <vdrparams.ini> file on the desktop;
3. Open the file;
4. Locate the [STORAGE] section of the open file; and
5. Set the entries as shown below:

[STORAGE]

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```
hardenedStorage = 1           // 0=disable, 1=enable, 2 = Dual FRM, default is 0
hardenedFormat = 1           // 1=L3 HVR/SVR, 2=PMC, 3=Jotron, 4=Rutter-ACR Float-free 5=Rutter Fixed
secondaryHardenedFormat = 4 // 1=L3 HVR/SVR, 2=PMC, 3=Jotron, 4=Rutter-ACR Float-free, 5= Rutter Fixed
L3HVR-compressNMEA = 1       // 0 = disable, 1=enable; default is 1
```



**NOTE:** It is necessary to compress NMEA data when recording to L3 HVR-01 and SVR-01 Fixed FRM/SFRM capsules. Disable compression in the INI file by changing the value of '0'. (Setting is in the [STORAGE] section of the <vdrparams.ini> file).

### 13.2.2.15 Start Recording to the L3 HVR/SVR Fixed FRM/SFRM Capsule

1. Start the VDR\_Record application from the desktop;
2. Observe the following messages are presented in the Log Window:
  - a. The L3 HVR/SVR Fixed FRM/SFRM Capsule is ready,
  - b. Successfully saved <vdrparams.ini> to the L3 capsule,
  - c. Successfully saved vdr-cfg.txt to the L3 capsule;
3. Minimize the VDR\_Record application;
4. Open the error log;
5. Observe the following messages are written in the error log:
  - a. Stream audio (type AUDIO) connected,
  - b. Stream nmea (type NMEA) connected,
  - c. Stream video (type VIDEO) connected,
  - d. The L3 HVR is ready.
  - e. Successfully saved <vdrparams.ini> to the L3 capsule, and
  - f. Successfully saved <vdr-cfg.txt> to the L3 capsule;
4. Allow the VDR to record to the L3 HVR/SVR Fixed FRM/SFRM Capsule for 12 continuous hours.

### 13.2.2.16 Confirm the L3 HVR/SVR Fixed FRM/SFRM Capsule is Recording

1. Allow the VDR to record for 12 continuous hours;
2. Stop recording after 12 hours by deselecting Record under the test menu of the VDR\_Record application;
3. Minimize the VDR\_Record application;
4. Open the FRM download application via the Start menu (Start > Programs > Utilities);
5. Choose the data stream(s) to download Audio, Video, and NMEA data or individual streams.

*For example, to download only the Audio stream, deselect the "Download NMEA" and "Download Video" stream options leaving only and leave the "Download Audio" stream option checked. If all 3 options are checked, all 3 streams will be downloaded.*

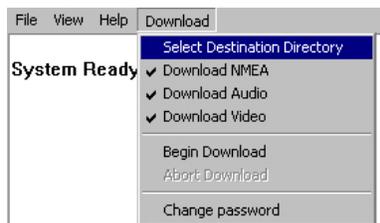


Figure 13-9 - Download Stream Options

6. Select "Begin download" under the Download menu;
7. Enter uppercase VDR for the password;
8. Select a location to save the downloaded files;



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**Note!** The download from the L3 FRM/SFRM may take up to 4 hours to complete and the data will be downloaded to the DMM's internal hard drive.

9. From the Technician PC, open the playback application;
10. Select the FRM\_Download data set to playback.
11. Observe the beginning and end time (system contents) of the data set to ensure that 12 hours of data have been recorded to the FRM/SFRM.
12. Select the beginning of the data set to start playback;
13. Observe that video, audio and NMEA have been recorded;
14. Observe that the start time of each stream is in fact 12 hours previous to the end time.
15. Stop playback;
16. Select the middle of the data set to playback;
17. Observe that video, audio, and NMEA have all been recorded.
18. Select the end of the data set to start playback;
19. Observe that video, audio and NMEA have all been recorded for 12 hours.
20. Stop playback; and
21. Exit the application.

### 13.3 Float-free SFRM Capsules

The Float-free SFRM capsule is a buoyant capsule that serves as an FRM and Cospas-Sarsat EPIRB. If the buoyant capsule and its bracket are submerged, it automatically floats free and activates the EPIRB (Emergency Positioning Indicating Radio Beacon). When activated, the EPIRB gives an immediate alarm, transmitting the ship ID and position in a primary alarm for the search and rescue authorities.

Only activate the EPIRB in an emergency situation. For periodic testing, a test function is implemented. No emergency signal is transmitted during the self-test. During the test cycle the EPIRB does a self-test of the transmitters and the battery status. The battery of the EPIRB will last for at least 168 hours after it is activated.

#### 13.3.1 Rutter-ACR Float-free SFRM Capsule Setup

The Rutter-ACR Float-free SFRM Capsule contains non-volatile memory (Flash), intended to store ship parameters in real time. The storage memory will continually store the last 12 hours (minimum) of received data.

The interface between the VDR-100G2 and the memory capsule is a standard 10/100 Base-T Ethernet connection using TCP/IP standard protocol. Data is transferred from the DMM to the FRM via a 10/100Base-T Ethernet LAN connection via TCP/IP protocol.

Power for the capsule is provided over the same Ethernet cable using PoE (Power Over Ethernet). A separate power cable is not required.

##### 13.3.1.1 Planning for the Rutter-ACR Float-free SFRM Capsule

The Rutter-ACR Float-free SFRM Capsule uses PoE technology, eliminating the requirement for a separate junction box.

The Rutter-ACR Float-free SFRM Capsule is connected to the VDR-100G2 via an Ethernet interface cable, through a PoE Ethernet connect box (PS-100). The PS-100 is mounted inside the DPU, and is connected to the VDR via a DC power cable and an Ethernet interface cable. Ethernet cables are 10-base-T/STP (shielded twisted pair), Category 5e with flammability per IEC 95:

- The DC power cable connects from the DPU terminal block 24VDC supply to the PS-100.
- The Ethernet connection is via an RJ45 connector. This is connected from Ethernet port 3 on the DMM to the PS-100 Ethernet connect box.
- The connection between the DMM and the PS -100 is straight through.
- The cable from the PS-100 to the capsule is crossover.

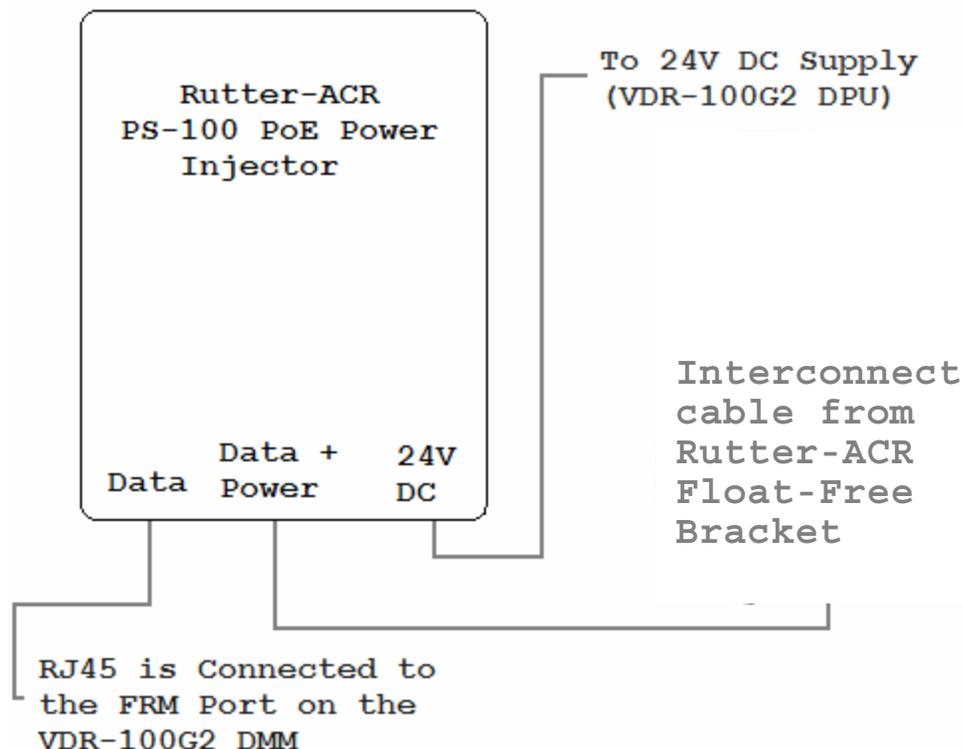


Figure 13-10 - Rutter-ACR Float-free SFRM Capsule Cable Connections

### 13.3.1.2 Mounting the Rutter-ACR Float-free SFRM Capsule

The Rutter-ACR Float-free SFRM Capsule shall be located near the bridge on the external deck area of the vessel to increase the probability of its survival and recovery following an incident. As outlined in IEC 61996, the capsule shall be positioned clear of rigging and other potential obstructions and as near to the centre line of the ship as is practically possible.

Criteria to be considered when assessing the optimum position shall include but not be limited to the following:

1. Separation from probable sources of mechanical damage;
2. Separation from fuel or other potential fire sources;
3. Operational environment for continued serviceability;
4. Accessibility for copying of recorded data and for routine maintenance;
5. Distance from the VDR-100G2 DPU: The maximum distance allowed for PoE is 75 metres

The Rutter-ACR Float-free SFRM Capsule is supplied with an interconnect cable. All cables extending through a ship hull must be fitted with waterproof glands (not provided with VDR-100G2/S) and must be protected by gooseneck conduit if extending through a deck.

The Rutter-ACR Float-free SFRM Capsule comes with a power/data interface box (PS-100) to provide power to the capsule and data to and from the VDR. The PS-100 must be mounted vertically inside the DPU with the power source connection at the bottom and the Ethernet RJ45's connections at the top.

### 13.3.1.3 Connecting the Rutter-ACR Float-free SFRM Capsule

The wiring of the connections between the VDR-100G2 and the Rutter-ACR Float-free SFRM Capsule is via the RJ45 connector (See Figure 13-11 - RJ45 Connector ).

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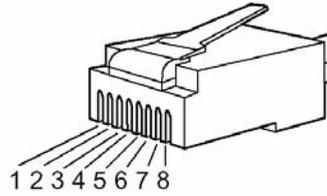


Figure 13-11 - RJ45 Connector

Rutter uses the 568B standard for all straight-thru Ethernet cables.

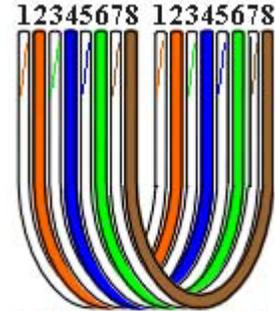
Rutter uses the crossover standard noted below for all cross-over Ethernet cables.

Straight through 568B			
Connector 1		Connector 2	
1 Tx+	white/orange	1 Tx+	white/orange
2 Tx-	orange	2 Tx-	orange
3 Rx+	white/green	3 Rx+	white/green
4 N/A		4 N/A	
5 N/A		5 N/A	
6 Rx-	green	6 Rx-	green
7 N/A		7 N/A	
8 N/A		8 N/A	

Table 13-9 Straight-through Ethernet cable set ups

Crossover			
Connector 1		Connector 2	
1 Tx+	white/orange	1 Tx+	white/green
2 Tx-	orange	2 Tx-	green
3 Rx+	white/green	3 Rx+	white/orange
4 N/A		4 N/A	
5 N/A		5 N/A	
6 Rx-	green	6 Rx-	orange
7 N/A		7 N/A	
8 N/A		8 N/A	

Table 13-10 – Cross-over Ethernet cable set ups



STRAIGHT-THRU  
568B



CROSSOVER



**Note!** It is **highly** recommended that cabling connecting the Rutter-ACR Float-free SFRM Capsule to the VDR-100G2 is installed through a gooseneck conduit (see Figure 5-19 - Sample VDR-100G2S SFRM Installation for a sample FRM installation.)

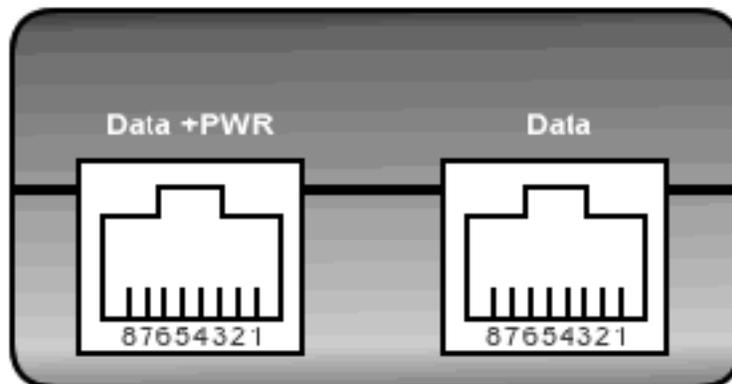


Figure 13-12 – Rutter-ACR Float-free SFRM Capsule Data and Power

### 13.3.1.4 Rutter-ACR Float-free SFRM Capsule Power

PoE technology brings power, as well as data transfer, to the capsule via a standard twisted-pair Ethernet cable. The industry standard is 48 VDC as the Injected PoE voltage. Power out from the PoE Power Injector (PS-100) is a balanced output.

- Pins 4 & 5 are positive
- Pins 7 & 8 are negative

### 13.3.1.5 Test Rutter-ACR Float-free SFRM Capsule Physical Connection

1. Confirm the cable connections between the SFRM and the VDR;
2. Open the command prompt from Start/All Programs/Accessories/Command Prompt on the VDR;
3. At the C:\> prompt, Enter ping 192.168.0.100;
4. Observe that 4 replies are received from the Rutter-ACR Float-free SFRM Capsule;

```
C:\WINDOWS\system32\cmd.exe
C:\>ping 192.168.0.100

Pinging 192.168.0.100 with 32 bytes of data:

Reply from 192.168.0.100: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.100:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>
```

Figure 13-13 - Pinging the Rutter-ACR Float-free SFRM Capsule

**NOTE:** If the request times out, check Rutter-ACR Float-free SFRM Capsule cable connections.

5. Once communications has been verified, close the command prompt window.

### 13.3.1.6 Set IP Address for Rutter-ACR Float-free SFRM Capsule Port

The default IP address of the Rutter-ACR Float-free SFRM Capsule is 192.168.0.100. The VDR's factory configuration for the FRM Ethernet port IP address is 192.168.0.189. If this address is not set correctly, the VDR and the FRM will not communicate. The FRM port must be in the same range as the Rutter capsule, with the last segment different than the VDR (as shown below.). To change the IP segment of the VDR's FRM Ethernet port:

1. Click the Start menu;
2. Open the Control Panel;
3. Double-click the Network Connections icon;
4. Right-click on the SFRM icon;
5. Select Properties from the pop-up menu.
6. In the Local Area Connection Properties window, highlight "Internet Protocol (TCP/IP)";
7. Click the "Properties" button directly under the available options;
8. The "Internet Protocol (TCP/IP) Properties" window will open;
9. Select the "Use the following IP address" radio button;
10. Enter 192.168.2.189 (last number can be any number from 2 to 254, **except 100.**);
11. Click the "OK" button in the Internet Protocol (TCP/IP) Properties;
12. Click the "OK" button in the Local Area Connection Properties.
13. The connection should now be established.

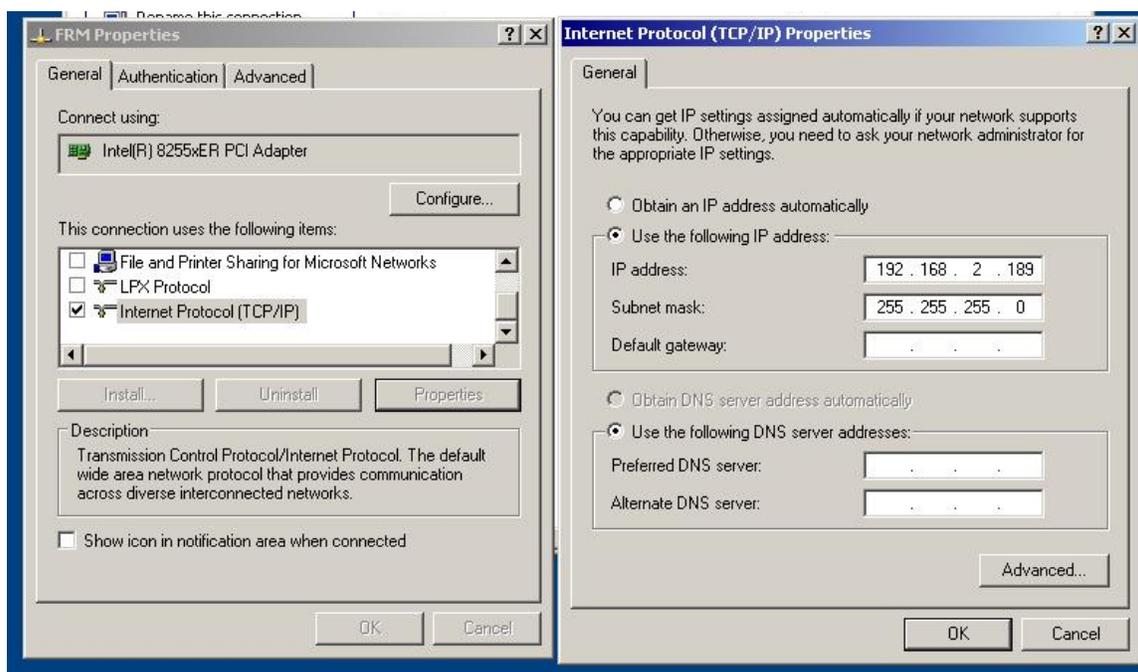


Figure 13-14 - Establishing TCP/IP Address

### 13.3.1.7 Configuring the Rutter-ACR Float-free SFRM Capsule

The Rutter ACR Float-free capsule arrives from the factory configured for the ship on which it is being installed. The software uses the IP address to automatically locate and stream data to the capsule.

- 4 GB (8 GB capacity optional); and
- No partitions

To set up the Rutter-ACR Float-free SFRM Capsule:

1. Log on as administrator;
2. Open <vdrparams.ini> from desktop;

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3. Locate the [STORAGE] section of the file; and
4. Ensure entries are as shown below:

[STORAGE]

```
hardenedStorage = 1           // 0=disable, 1=enable, 2 = Dual FRM, default is 0
hardenedFormat = 4           // 1=L3 HVR, 2= PMC, 3 = Jotron, 4 = ACR
secondaryHardenedFormat = 4 // 1=L3 HVR, 2= PMC, 3 = Jotron, 4 = ACR
```

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### 13.3.1.8 Start Recording to the Rutter-ACR Float-free SFRM Capsule

1. Start the VDR\_Record application from the desktop;
2. Observe the following messages are presented in the Log Window:
  - a. Hardened Storage module ready,
  - b. Configuration saved to the hardened storage.
3. Minimize the VDR\_Record application and open the error log;
- 4.
5. Observe the following messages are written in the error log:
  - Stream audio (type AUDIO) connected,
  - Stream nmea (type NMEA) connected,
  - Stream video (type VIDEO) connected,
  - Hardened Storage module ready, and
  - Configuration saved to the hardened storage;
6. Allow the VDR to record for 12 continuous hours.

### 13.3.1.9 Confirm the Rutter-ACR Float-free SFRM Capsule Recording

Once the VDR has recorded for 12 continuous hours the installer can check to confirm that the Rutter-ACR Float-free SFRM Capsule is capturing selected data streams:

1. Deselect Record under the test menu of the VDR\_Record application. If downloading data on DMM computers, go to Step 3.
2. Disconnect the Rutter-ACR Float-free SFRM Capsule from the VDR
3. Connect the Rutter-ACR Float-free SFRM Capsule to a free Ethernet port on the Technician PC.
4. Confirm the Ethernet port on the Technician PC has an IP address on the same subnet (192.168.0.x) as the Rutter-ACR Float-free SFRM Capsule's IP address.
5. If it is necessary to change the Technician PC Ethernet port address follow these steps:
  - a. Open the Control Panel via the Start menu,
  - b. Double-click the Network Connections icon,
  - c. Right-click on the Ethernet port icon,
  - d. Select Properties from the pop-up menu,
  - e. In the Local Area Connection Properties window, highlight "Internet Protocol (TCP/IP)" ,
  - f. Click the "Properties" button located directly below the available options,
  - g. The Internet Protocol (TCP/IP) Properties window will open,
  - h. Select the "Use the following IP address" radio button,
  - i. Enter 192.168.0.10 (Last number may be number from 2 to 254, **except 100.**),
  - j. Click the "OK" button in the Internet Protocol (TCP/IP) Properties,
  - k. Click the "OK" button in the Local Area Connection Properties,
  - l. The connection should now be established;
6. Launch the FRM Download application;
7. Use the FRM Download application to download the recorded data from the Rutter-ACR Float-free SFRM Capsule.
8. The application will indicate when the download is completed;
9. Exit the FRM Download application;
10. Open the Playback application on the Technician PC;
11. Select the downloaded FRM data set to playback;
12. Observe the beginning and end time (system contents) of the data set to ensure that 12 hours of data have been recorded to the FRM.
13. Select the beginning of the data set to start playback;
14. Observe that video, audio and NMEA have been recorded and that the start time of each stream is 12 hours previous to the end time;

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15. Stop playback;
16. Select the middle of the data set to playback;
17. Observe that video, audio, and NMEA have all been recorded.
18. Select the end of the data set to start playback;
19. Observe that video, audio and NMEA have all been recorded for 12 hours;
20. Stop playback; and
21. Exit the application.

### 13.3.2 JoTron Float-free SFRM Capsule Set-Up

The JoTron Float-free Capsule is a combined SFRM and EPIRB approved for use with the VDR-100G2S.

The capsule contains a memory module with a standard 1.75GB storage capacity and 10Mb Ethernet with TCP/IP interface. Data is transferred from the DMM to the FRM via a 10/100Base-T Ethernet LAN connection via TCP/IP protocol. The capsule will store 12 hours of captured data. In a situation where a ship may be sinking, the capsule will float free while transmitting both its position and MMSI for at least 7 days.

#### 13.3.2.1 Planning for the JoTron Float-free SFRM Capsule

The SFRM is supplied with an interconnect cable. This cable must connect to the VDR-100G2/S through a junction box (**supplied with the JoTron capsule**). The junction box is normally mounted on the exterior deck and located near the SFRM and positioned within range of the interconnect cable.

This junction box can be located inside, but **must** be located within the cable distance of the SFRM cables. It must also be connected to the vessel's hull.



**Note!** It is **highly** recommended that cabling connecting the SFRM to the VDR-100G2/S is installed through a gooseneck conduit (see Figure 5-19 - Sample VDR-100G2S SFRM Installation for a sample SFRM installation.)

The JoTron Float-free, final recording medium capsule is connected to the VDR-100G2/S via a DC power cable and an Ethernet interface cable. The Ethernet cable is a 10-base-T/STP (shielded twisted pair), Category 5e with flammability per IEC 95:

- The DC power cable connects to the terminal block in the DPU terminal block 24 VDC supply.
- The Ethernet connection is via a RJ45 connector. This is connected to Ethernet port 3 on the DMM.
- **The connection between the DMM and the SFRM is a crossover cable.**

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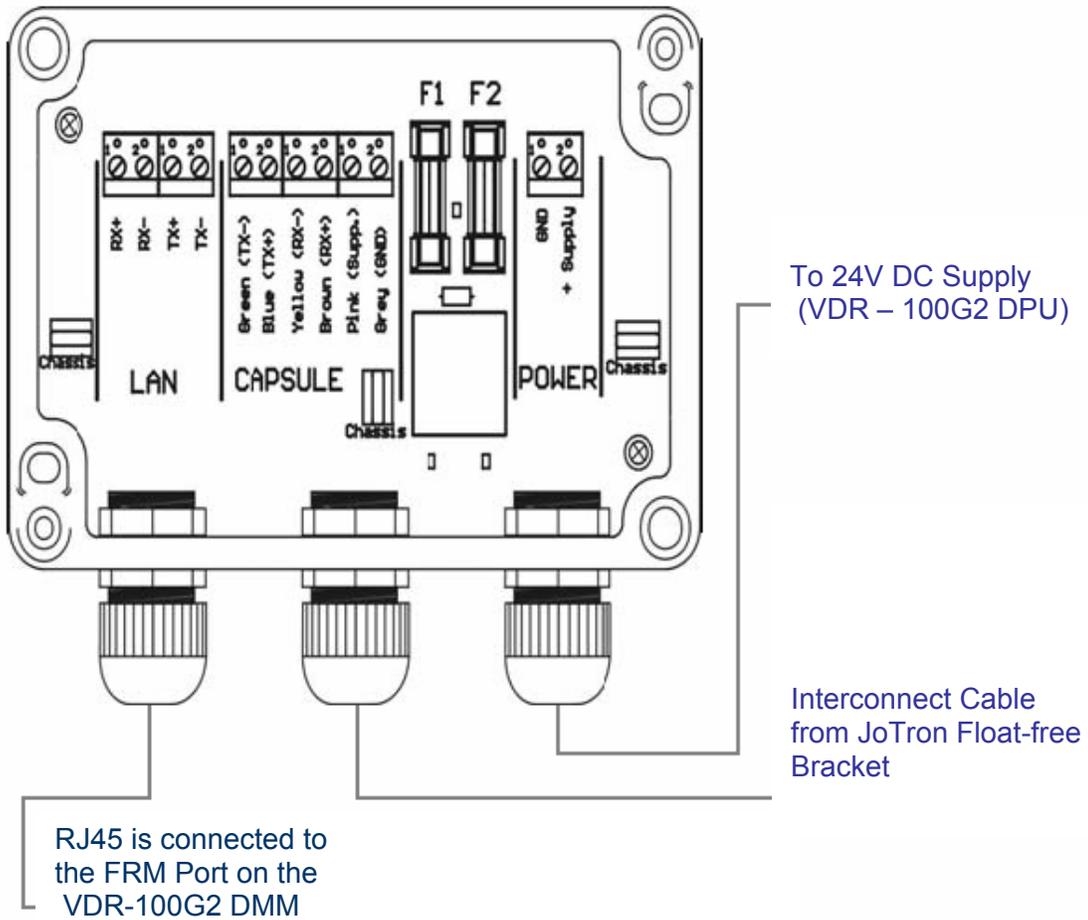


Figure 13-15 - JoTron Float-free SFRM Capsule Junction Box Connections

Pin nr	Wire color bracket and connection box	Wire color capsule	Function
1	Blue	White	Ethernet Tx +
2	Green	Red	Ethernet Tx -
3	Brown	Green	Ethernet Rx +
4	Yellow	Brown	Ethernet Rx -
5	Pink	Yellow	+ Supply
6	Grey	Black	GND

Table 13-11 - JoTron Float-free SFRM Capsule Data and Power Connection

Refer to the FRM manufacturer's installation manual to confirm all FRM installation information.

### 13.3.2.2 Mounting the JoTron Float-free SFRM Capsule

The JoTron Float-free SFRM protective capsule must be located on the external deck near the bridge to increase the probability of its survival and recovery following an incident.

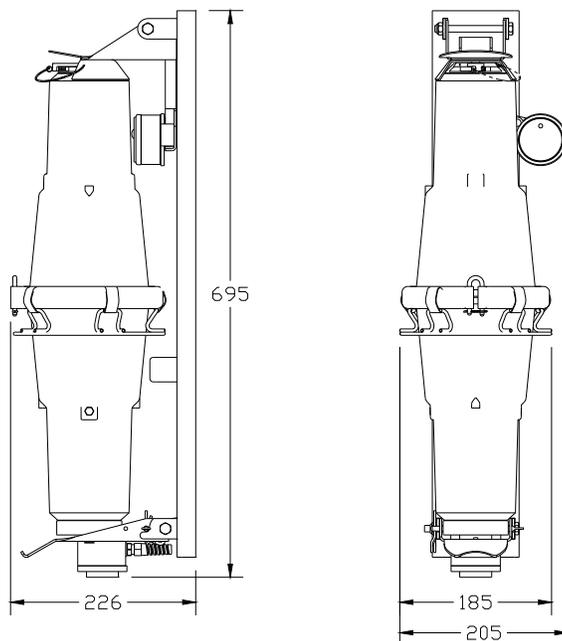


Figure 13-16 - JoTron Float-free SFRM Capsule



**Note!** The mounting pattern provided in Figure 13-16 - JoTron Float-free SFRM Capsule above, is applicable to the **VDR-100G2S Simplified FRM only**.

Criteria to be considered when assessing the optimum position shall include but not be limited to the following:

1. Separation from fuel or other potential fire sources;
2. Separation from probable sources of mechanical damage;
3. Operational environment for continued serviceability; and
4. Accessibility for copying of recorded data and for routine maintenance.

The SFRM is supplied with an interconnect cable. This cable must connect to the VDR-100G2/S through a junction box that is supplied with the JoTron float free capsule.

The junction box must be connected to the hull of the vessel. The junction box is normally mounted on the exterior deck and located near the SFRM and positioned within range of the interconnect cable. All hull penetrations for cables must be fitted with waterproof glands (**not provided with VDR-100G2/S**) and should be protected by a gooseneck conduit.

### 13.3.2.3 Connecting the JoTron Float-free SFRM Capsule

The wiring of the data connection between the VDR-100G2 and the FRM is via the RJ45 connector (illustrated in Figure 13-17 - RJ45 Connector ).

The junction box adjacent to the JoTron Float-free SFRM connects the cables provided with the SFRM to the cables connecting to the VDR-100G2/S.

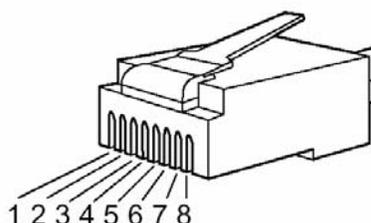


Figure 13-17 - RJ45 Connector

Rutter uses the 568B standard for all straight-thru Ethernet cables.

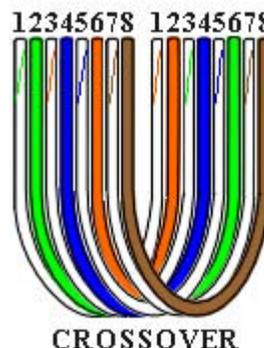
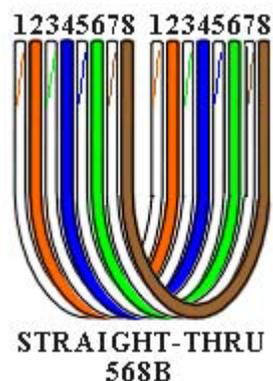
Rutter uses the crossover standard noted below for all cross-over Ethernet cables.

Straight through 568B			
Connector 1		Connector 2	
1 Tx+	white/orange	1 Tx+	white/orange
2 Tx-	orange	2 Tx-	orange
3 Rx+	white/green	3 Rx+	white/green
4 N/A		4 N/A	
5 N/A		5 N/A	
6 Rx-	green	6 Rx-	green
7 N/A		7 N/A	
8 N/A		8 N/A	

Table 13-12 Straight-through Ethernet cable set ups

Crossover			
Connector 1		Connector 2	
1 Tx+	white/orange	1 Tx+	white/green
2 Tx-	orange	2 Tx-	green
3 Rx+	white/green	3 Rx+	white/orange
4 N/A		4 N/A	
5 N/A		5 N/A	
6 Rx-	green	6 Rx-	orange
7 N/A		7 N/A	
8 N/A		8 N/A	

Table 13-13 – Cross-over Ethernet cable set ups



**Note!** It is **highly** recommended that cabling connecting the JoTron Float-free SFRM Capsule to the VDR-100G2 is installed through a gooseneck conduit (see Chapter 5: Figure 5-19 - Sample VDR-100G2S SFRM Installation for a sample FRM installation.)

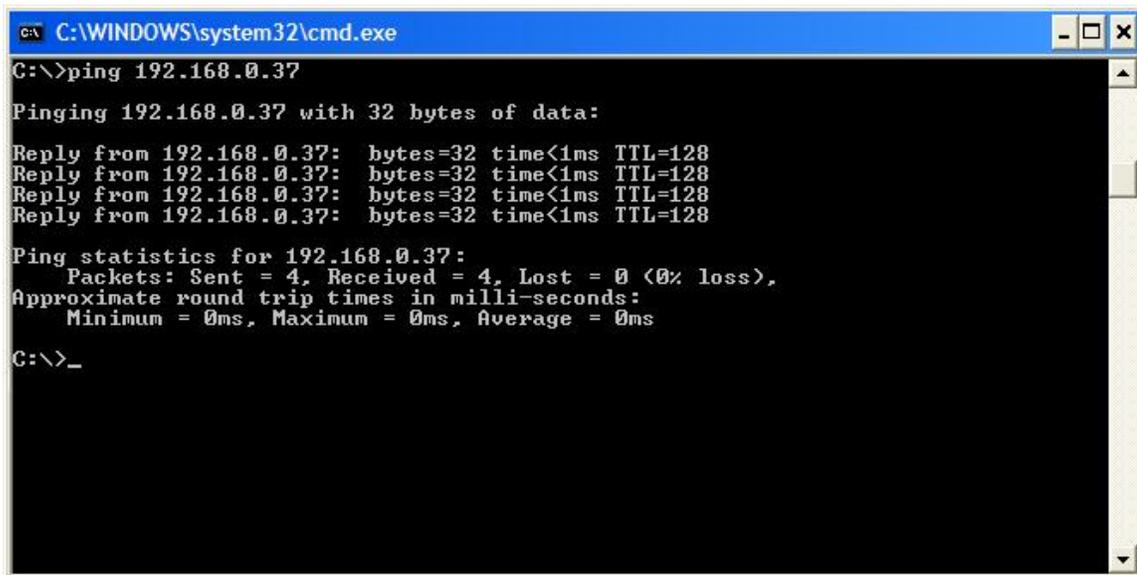
### 13.3.2.4 Test the JoTron Float-free SFRM Capsule Physical Connection

To confirm the cable connections between the FRM and the VDR:

1. Open the command prompt from Start/All Programs/Accessories/Command Prompt on the VDR;
2. At the C:\> prompt, type `ping 192.168.0.37` and hit Enter on the keyboard;
3. Observe 4 replies are received from the JoTron Float-free SFRM capsule;

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4. If the request times out, check the JoTron Float –free SFRM capsule cable connections (see Figure 13-18 - Pinging the JoTron Float-free SFRM Capsule)



```
C:\WINDOWS\system32\cmd.exe
C:\>ping 192.168.0.37

Pinging 192.168.0.37 with 32 bytes of data:

Reply from 192.168.0.37:  bytes=32  time<1ms  TTL=128

Ping statistics for 192.168.0.37:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\>_
```

Figure 13-18 - Pinging the JoTron Float-free SFRM Capsule

5. Once communications has been verified, close the command prompt window.

### 13.3.2.5 Setting the FRM Port's IP Address - JoTron Float-free SFRM Capsule

The default IP address of the JoTron Float-free SFRM Capsule is 192.168.0.37. The VDR's factory configuration for the FRM Ethernet port IP address is 192.168.0.189. If this address is not correctly set, communication between the VDR and the JoTron Float-free SFRM Capsule will not be possible. The FRM port must be in the same IP range as the JoTron Float-free SFRM Capsule, with the last segment different than the VDR (as shown below.). To change the IP segment of the VDR's FRM Ethernet port:

1. Open the Control Panel via the Start menu;
2. Double-click the Network Connections icon;
3. Right-click on the FRM icon and select Properties from the pop-up menu;
4. In the Local Area Connection Properties window, highlight "Internet Protocol; (TCP/IP)" and click the "Properties" button located directly below the available options;
5. In the subsequent Internet Protocol (TCP/IP) Properties window, select the "Use the following IP address" radio button
6. Enter 192.168.0.189 (the last number can be any number from 2 to 254, **except 37.**)
7. Click the "OK" button in the Internet Protocol (TCP/IP) Properties;
8. Click the "OK" button in the Local Area Connection Properties; and
9. The connection should now be established.

### 13.3.2.6 Configuring the JoTron Float-free Capsule

To set up the JoTron Float-free SFRM:

1. Log on as administrator;
2. Open <vdrparams.ini> from the desktop;
3. Locate the [STORAGE] section of the file; and
4. Ensure entries are as shown below:

[STORAGE]

hardenedStorage = 1 // 0=disable, 1=enable, 2 = Dual FRM, default is 0

hardenedFormat = 3 // 1=L3 HVR, 2= PMC, 3 = Jotron, 4 = ACR

secondaryHardenedFormat = 4 // 1=L3 HVR, 2= PMC, 3 = Jotron, 4 = ACR

NetworkHVR-compressNMEA = 1



*NOTE: If no video data is being captured then it is not necessary to compress NMEA data. NMEA data must be compressed ONLY if video data is being captured. To enable compression, the above entry in the INI file must be changed to a setting of 1. (This setting is found in the [STORAGE] section of the <vdrparams.ini> file)*

The JoTron Float-Free capsule does not require the set-up of partitions. For complete physical installation information, please refer to the *JoTron SVDR Technical Manual*.

### 13.3.2.7 Start Recording to the JoTron Float-free SFRM Capsule

1. Start the VDR\_Record application from the desktop;
2. Observe the following messages are presented in the Log Window:
  - a. The JoTron Float-free SFRM Capsule is ready;
  - b. Configuration saved to the hardened storage
3. Minimize the VDR\_Record application and open the error log.
4. Observe the following messages are written in the error log:
  - a. Stream audio (type AUDIO) connected
  - b. Stream nmea (type NMEA) connected
  - c. Stream video (type VIDEO) connected
  - d. Hardened Storage module ready
  - e. Configuration saved to the hardened storage
4. Allow the VDR to record for 12 continuous hours.

### 13.3.2.8 Confirm JoTron Float-free Recording

To confirm that the JoTron Float-free SFRM Capsule has successfully saved 12 continuous hours of data, the data must be downloaded and reviewed using the Plaback application. To download data recorded with record application version 4.07 and later see Section 13.3.2.8.1. To download data recorded with record application version 4.06 and earlier, see Section 13.3.2.8.2.

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### 13.3.2.8.1. For Data Recorded with Record App. Ver. 4.07.00 and later

1. Once the VDR has recorded for 12 continuous hours, deselect Record under the test menu of the VDR\_Record application to stop recording;
2. If downloading via the DMM computer go to Step 3
3. Disconnect the JoTron Float-free SFRM Capsule from the VDR and connect it to a free Ethernet port on the Technician PC. The Ethernet port on the Technician PC must be configured to have an IP address on the same subnet (192.168.0.x) as the JoTron Float-free SFRM Capsule IP address. To change the Technician PC Ethernet port address follow these steps:
  - a. Open the Control Panel via the Start menu.
  - b. Double-click the Network Connections icon.
  - c. Right-click on the Ethernet port icon;
  - d. Select Properties from the pop-up menu.
  - e. In the Local Area Connection Properties window, highlight "Internet Protocol (TCP/IP)":
  - f. Click the "Properties" button located directly below the available options;
  - g. The Internet Protocol (TCP/IP) Properties window will open;
  - h. Select the "Use the following IP address" radio button;
  - i. Enter 192.168.0.10 (for last number enter any number from 2 to 254, **except 37.**)
  - j. Click the "OK" button in the Internet Protocol (TCP/IP) Properties,
  - k. Click the "OK" button in the Local Area Connection Properties,
  - l. The connection should now be established;

1. Launch the FRM Download application;
2. Use the FRM Download application to download the recorded data from the Rutter-ACR Float-free SFRM Capsule.
3. The application will indicate when the download is completed;
4. Exit the FRM Download application;
5. Open the Playback application on the Technician PC;
6. Select the downloaded FRM data set to playback;
7. Observe the beginning and end time (system contents) of the data set to ensure that 12 hours of data have been recorded to the FRM.
8. Select the beginning of the data set to start playback;
9. Observe that video, audio and NMEA have been recorded and that the start time of each stream is 12 hours previous to the end time;
10. Stop playback;
11. Select the middle of the data set to playback;
12. Observe that video, audio, and NMEA have all been recorded.
13. Select the end of the data set to start playback;
14. Observe that video, audio and NMEA have all been recorded for 12 hours;
15. Stop playback; and
16. Exit the application.

### 13.3.2.8.2. For Data Recorded with Record App. Ver. 4.06.00 and earlier

When the VDR connects to the Jotron SFRM, the FRM storage is normally automatically mapped as the "X:\\" drive on the VDR. In some cases, this mapping does not appear in Windows Explorer. Both cases are outlined below:

1. If the "X:\\" drive appears in Windows Explorer, copy the contents of the drive to the technician's PC;
2. If the "X:\\" drive does not appear on the VDR, the data must then be mapped to the VDR.

To map the Jotron capsule as a new drive, choose 'Map Network Drive' from the Tools menu of Windows Explorer. The drive will have to be mapped as follows:

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\\192.168.0.37\VDR  
username: 'vdr'  
password: 'jotvdr'

Once the mapped drive has been established, copy the contents of the drive to the E:\ drive of the VDR or directly to the technician's PC.

*NOTE: If X is not available choose a new network drive letter—See the example below which uses W:\.*

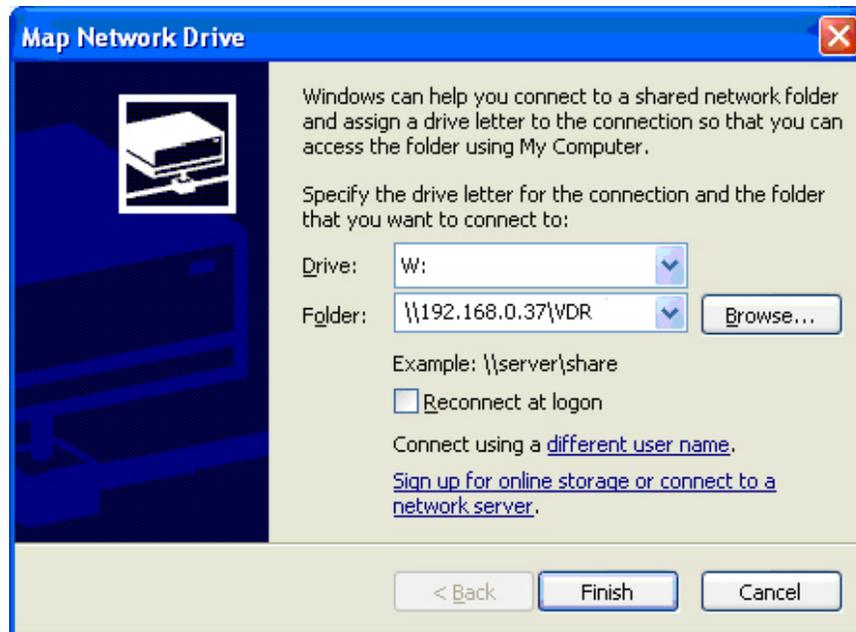


Figure 13-19 - Map Network Drive (JoTron)

3. Once the contents have been copied, check the `<vdrparams.ini>` file to ensure the downloaded NMEA data is not compressed. As outlined in **Error! Reference source not found.2 Error! Reference source not found.:**
  - `<NetworkHVR-compressNMEA = 1>` indicates that the NMEA data is being compressed,
  - `<NetworkHVR-compressNMEA = 0>` indicates that the NMEA data is **not** being compressed:
4. To decompress NMEA data, run the `<decompressNMEA.exe>` file in the C:\VDRApps folder;
5. The data will be decompressed in the directory where it is stored—it will not be copied to a different directory;
6. From the Technician PC, open the Playback application and select the data set for play back;
7. Observe the beginning and end time (system contents) of the data set to ensure that 12 hours of data have been recorded to the FRM;
8. Select the beginning of the data set to start playback;
9. Check to ensure that video, audio and NMEA have been recorded;
10. Check to ensure that the start time of each stream is 12 hours previous to the end time;
11. Stop playback;
12. Select the middle of the data set in play back;
13. Check to ensure that video, audio, and NMEA have all been recorded;

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14. Select the end of the data set to start play back;
15. Check to ensure that that video, audio and NMEA have all been recorded for 12 hours;
16. Stop playback; and
17. Exit the application.

### 13.4 Dual Capsule FRM/SFRM

The Rutter Technologies VDR100-G2 supports the use of 2 FRM devices at the same time. This configuration currently supports the use of the L3 HVR-/02 Fixed FRM Capsule or Rutter FRM (RUT-02447) Capsule as a fixed device and the JoTron Float-free SFRM Capsule or the Rutter-ACR Float-free SFRM Capsules as a Float-free device. Additional capsules may be added in the future. Support for 3 devices simultaneously is not supported.

#### 13.4.1 Planning for Dual Capsule Setup

As of version 4.05.00 of the <VDR\_Record.exe> application, the Rutter Technologies VDR100-G2 will support the use of 2 FRM devices at the same time. The FRM capsule should be installed according to the guidelines and specific FRM mounting instructions.

#### 13.4.2 Install Capsule on Download Hub

When using a secondary capsule, a second hub must be provided in the DPU cabinet. The hub is mounted in the best accessible location that allows for passage of Ethernet cabling in the cabinet.

The download hub allows for connection of the following items simultaneously:

1. Rutter-ACR Float-free SFRM Capsule or JoTron Float-free SFRM Capsule
2. VDR Data port
3. Remote Storage Module
4. Download PC

Connect the secondary capsule to a free port on the download hub and confirm communication is available again using the ping command.

#### 13.4.3 Setting up the Primary FRM

The Primary FRM in a dual capsule configuration is always set up on the FRM port. There is no special setup for this capsule. Depending on the selected primary FRM, refer to the appropriate sections in this chapter to configure, connect and test the primary FRM.

#### 13.4.4 Set up Secondary Capsule

As of version 4.07.00 of the VDR\_Record application, only the JoTron Float-free SFRM Capsule or the Rutter-ACR Float-free SFRM Capsule may be used as a secondary capsule. There are several steps to configuring the capsule to function as a secondary unit.

#### 13.4.5 Connecting and Testing the Secondary FRM

Depending on the selected secondary capsule, refer to the appropriate sections in this chapter to configure, connect and test the secondary FRM: Section 13.3.2: Rutter-ACR Float-free SFRM Capsule Setup and Section 13.3.1: JoTron Float-Free SFRM Capsule Set-Up.

### 13.4.6 Configuring the VDR For Dual FRM Operation

To begin setting up the Dual FRM support, first locate the file <C:\Windows\vdrparams.ini> and open it using Notepad. Once open, locate the [STORAGE] section of the file.

To configure an L3 HVR-01/02 Fixed FRM Capsule as primary with a Rutter-ACR Float-free SFRM Capsule as secondary, use:

[STORAGE]

```
hardenedStorage = 2           // 0=disable, 1=enable, 2 = Dual FRM, default is 0
hardenedFormat = 1           // 1=L3 HVR/SVR, 2=PMC, 3=Jotron, 4=Rutter-ACR Float-free, 5=Rutter Fixed
secondaryHardenedFormat = 4 // 1=L3 HVR/SVR, 2=PMC, 3=Jotron, 4=Rutter-ACR Float-free, 5=Rutter Fixed
```

To configure a Rutter FRM (RUT-02447) Capsule with a Rutter-ACR Float-free SFRM Capsule, use:

[STORAGE]

```
hardenedStorage = 2           // 0=disable, 1=enable, 2 = Dual FRM, default is 0
hardenedFormat = 5           // 1=L3 HVR/SVR, 2=PMC, 3=Jotron, 4=Rutter-ACR Float-free, 5=Rutter Fixed
secondaryHardenedFormat = 4 // 1=L3 HVR/SVR, 2=PMC, 3=Jotron, 4=Rutter-ACR Float-free, 5= Rutter Fixed
```

**Note:**

- *A fixed capsule is ALWAYS connected as the primary FRM on the FRM port.*
- *A second hub must be installed and connected to download port.*
- *The Secondary FRM must be in 200.200.200.x IP segment and connected to download hub.*

### 13.4.7 Changing the IP of the Rutter-ACR Float-free SFRM Capsule

The secondary FRM, it is installed on the download hub. The download hub may still be in use for RSM operations and for download PC operations.

The IP address on the Rutter-ACR Float-free SFRM Capsule must be changed to be in the same IP segment as the download port of the VDR. To change the IP address of the Rutter-ACR Float-free SFRM Capsule:

1. Disconnect the primary capsule from the FRM port—this will be replaced later.
2. Confirm the IP of the FRM Ethernet port on the DMM to be in the same segment as the default IP address of the Rutter-ACR Float-free SFRM Capsule (i.e. 192.168.0.189). The last number can be any number from 2 to 254 except 100.
3. Connect the Rutter-ACR Float-free SFRM Capsule to the FRM Ethernet port and confirm that communication is available via the ping command in a DOS prompt window (Start>All Programs>Accessories>Command Prompt) – ping 192.168.0.100;
4. Press Enter on the keyboard;
5. Ensure communication is established;
6. Open the Rutter Float-free IP Config Utility via the Start-Utilities menu or by double clicking the utility file in the VDRApps folder.
7. Set the new IP address to 200.200.200.100 for the Rutter-ACR Float-free SFRM Capsule.
8. Once the IP is changed, communication is no longer possible from the FRM port;
9. Recycle the power on the Rutter-ACR Float-free SFRM Capsule

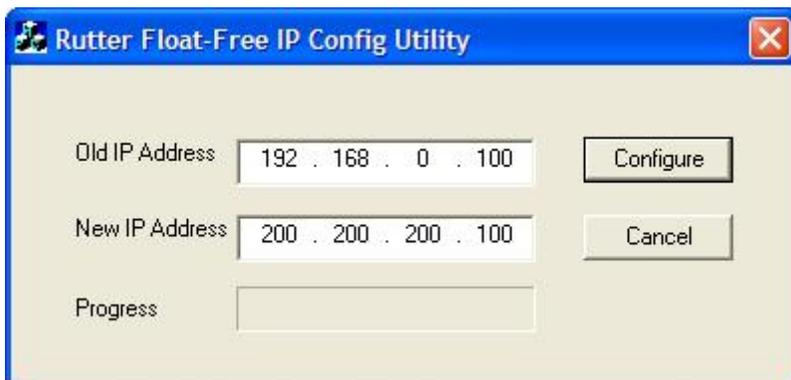


Figure 13-20 - Rutter Float-free IP Config Utility

10. Move the Ethernet cable to the Download port;
11. Confirm that communication with the capsule is available using the DOS command to ping 200.200.200.100.
12. Return the fixed capsule's Ethernet cable to the FRM port.

### 13.4.8 Changing the IP of the JoTron Float-free SFRM Capsule

The IP address on the JoTron Float-free SFRM Capsule must, therefore, be changed to be in the same IP segment as the download port of the VDR. To change the IP address of the JoTron Float-free SFRM Capsule:

1. Disconnect the primary capsule from the FRM port – this will be replaced later.
2. Confirm the IP of the FRM Ethernet port on the DMM is in the same segment as the default IP address of the JoTron Float-free SFRM Capsule (i.e. 192.168.0.189) The last number can be any number from 2 to 254 except 37;

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3. Connect the JoTron Float-free SFRM Capsule to the FRM Ethernet port and confirm that communication is available via the ping command in a DOS prompt window: (Start>All Programs>Accessories>Command Prompt) – ping 192.168.0.37;
4. Press Enter on the keyboard;
5. From Windows Internet Explorer, type in the address *http://192.168.0.37* and hit the Config button;
6. To change the IP address of the JoTron Float-free SFRM Capsule enter the Admin password “jotadmin”;
7. Click “Login”
8. In the “Select IP address to use” field’ enter the new IP address 200.200.0.37;
9. Click OK
10. Click the “Save and Reboot” button to save these settings



Figure 13-21 - JoTron Float-free SFRM Capsule Web Interface

Alternatively, the installer can use Windows Explorer to change the JoTron Float-free SFRM Capsule's IP address:

1. Type in \\192.168.0.37 and hit enter.
2. Right click on the “Admin” Box.
3. Click “Connect to network station”.
4. Select a free station letter.
5. Click” Connecting using a different user name”.
6. In user name field enter ‘admin’, and in the password field enter ‘jotadmin’.
7. Press “Finished” key.
8. Open and change the “config.txt” file in “Word PAD” to match your configuration.
9. Store the changes. The JoTron Float-free SFRM Capsule will reboot with the new settings.
10. From “My Computer” right click and remove new letters used by SAMBA.

## 13.5 Using the FRM Download Application

### 13.5.1 Downloading Data Using the FRM Download Application

The following steps outline the procedure to use the FRM Download Application to retrieve data from an FRM/SFRM:



**Note!** This section is not applicable to downloading data from a JoTtron Float-free SFRM Capsule connected to VDR-100G2 systems running VDR Record Application 4.06.00 and earlier. To download Jottron data recorded using VDR Record Application 4.06.00 and earlier directly to the VDR-100G2, refer to Section 13.3.2.8.2: For Data Recorded with Record App. Ver. 4.06.00 and earlier

1. Logon as Administrator on the VDR-100G2 and use the **FRM Download Application** to download data directly from the FRM/SFRM;
2. Start the FRM Download Application by clicking:  
**Start>All Programs>Rutter>VDR>FRM Download**  
(OR locate the FRM <Download.exe> file in the VDR-100G2 <C:\VDRApps\> folder, and double-click to start the application.)



Figure 13-22 – VDR FRM Download Application

3. Select Download Menu>Download Wizard>FRM/SFRM type;

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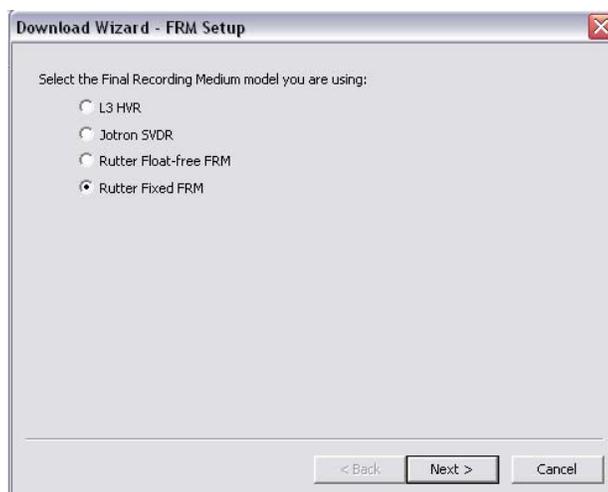


Figure 13-23 – Download Wizard FRM Setup Page

3. Select “Use default settings to connect to FRM” and click next.



Figure 13-24 Download Wizard FRM Connection Settings Page

4. Select the data types you wish to download (Ensure all are selected).
5. Use the ‘Browse’ button to select a suitable location to extract the contents of the FRM/SFRM to. When downloading directly to the VDR-100G2, it is recommended that the data be downloaded to the ‘E:\’ drive. This directory is ‘shared’ and is accessible to a Playback PC via the download port on the VDR-100G2. Alternatively, data may be copied directly to an attached RSM or Download USB Drive.



**Note!** In either case, there must be sufficient free memory space to accommodate the entire downloaded data set. For some FRM/SFRM, 4GB of free memory space may be required.

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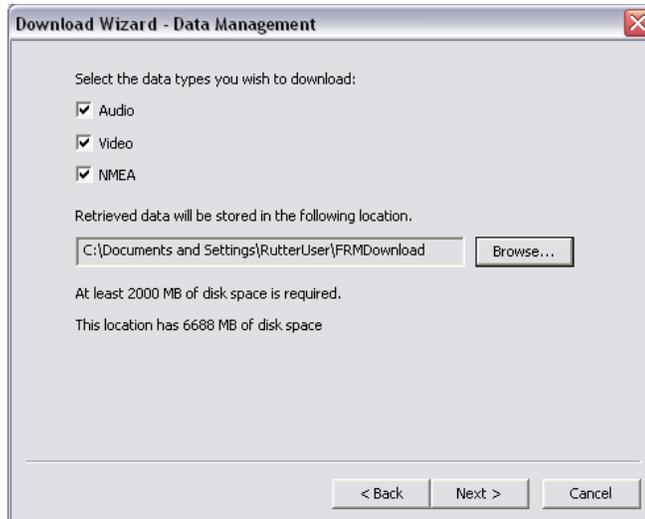


Figure 13-25 - Download Wizard Data Management Page

6. Enter the password to begin the download process. The default password is 'VDR' (case sensitive).



**Note!** Depending on the FRM/SFRM design, the download process may take anywhere from 15 minute up to 4 hours.

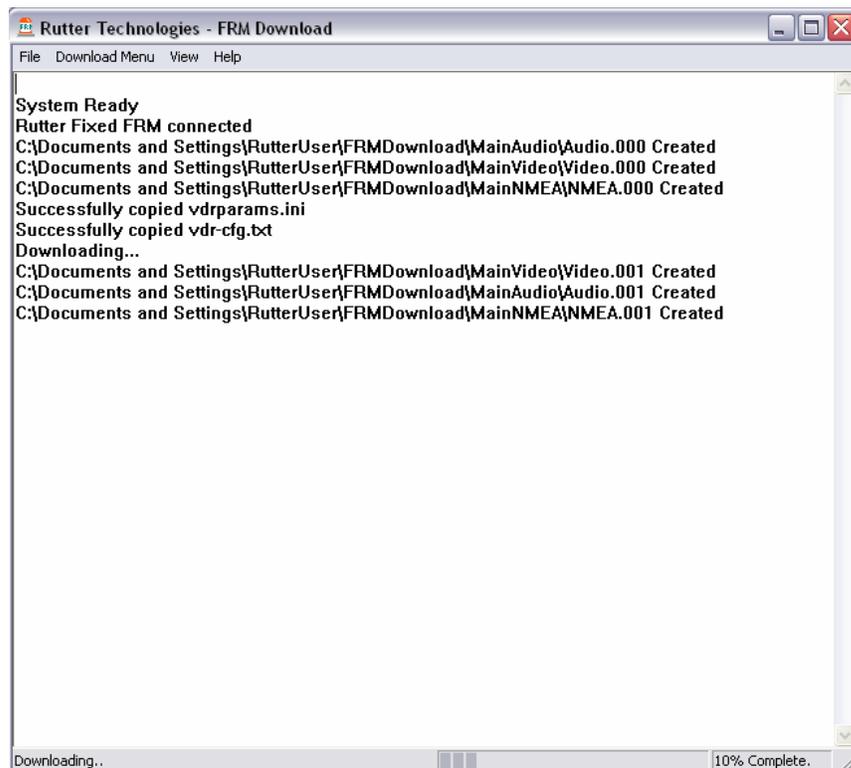


Figure 13-26 – Download in Progress

7. When the download has completed successfully, a message will appear in the log window of the FRM Download application indicating the download has completed along with the elapsed download time and the average speed of the download.

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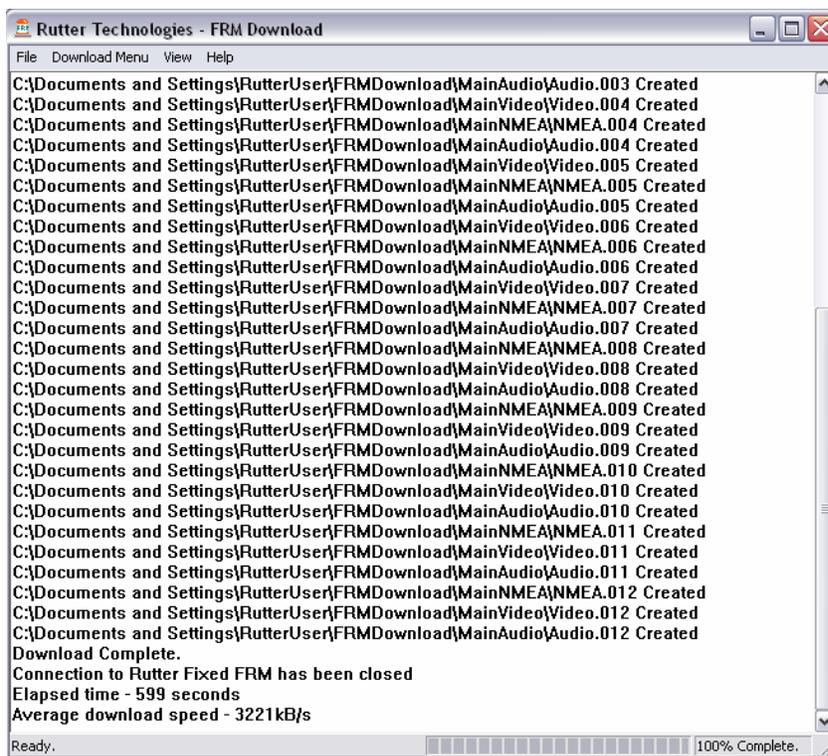


Figure 13-27 – Download Complete.

- When the download is complete, disconnect from the FRM/SFRM by selecting "File Menu" and then clicking "Exit" ;
- The downloaded data may now be moved to a Playback PC running the Rutter Playback software for review. See Section Copying the Downloaded Data to a Playback PC for details.

### 13.5.2 JoTron Float-free SFRM Capsule (version 4.06.00 and earlier)

This section is applicable to the JoTron Float-free SFRM Capsule only, to retrieve data recorded using VDR-100G2 Record Application versions 4.06.00 and earlier

- Logon as Administrator;
- Copy the contents of the X:\ drive to the E:\ drive on the VDR-100G2.



**NOTE:** This directory is 'shared' and is accessible to a Playback PC via the download port on the VDR-100G2. Alternatively, data may be copied directly to an attached RSM or Download USB Drive.

- Open < vdrparams.ini > file and check *NetworkHVR-compressNMEA*.
  - If the entry is set to = 1 go to step 4 below.
  - If the entry is set to =0 then go to step 5 below;
- If the NMEA data is compressed, run the <decompressNMEA.exe>file located in the C:\VDRApps folder in order to decompress the data.

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5. The downloaded data may now be moved to a Playback PC running the Rutter Playback software for review. See Section 13.5.3: Copying the Downloaded Data to a Playback PC for details.

### 13.5.3 Copying the Downloaded Data to a Playback PC

Data may be moved to a Playback PC running the Rutter Playback Application for review. See Chapter 18 - **Error! Reference source not found.** for details of installing and using the Rutter Playback software.

#### 13.5.3.1 Copying the Downloaded Data via Drive Mapping

With data downloaded to the VDR-100G2's E:\ drive, connect the Playback PC to the VDR-100G2's Download Ethernet port to retrieve the data. The following steps illustrate this procedure:

1. The Playback PC must be in the same IP segment as the VDR-100G2's Download Ethernet port. The VDR-100G2's Download Ethernet port occupies IP address 200.200.200.200. The Playback PC must be in the same range, with the last segment different than the VDR-100G2 (as shown below.) To change the IP segment:
  - a) Open the Control Panel via the Start menu.
  - b) Double-click the Network Connections icon.
  - c) Right-click on the Local Area Connection icon and select Properties from the pop-up menu.
  - d) In the Local Area Connection Properties window, highlight "Internet Protocol (TCP/IP)" and click the "Properties" button located directly below the available options.
  - e) In the subsequent Internet Protocol (TCP/IP) Properties window, select the "Use the following IP address" radio button and enter 200.200.200.2 (the last number can be any number from 2 to 254, **except 200 and 100.**)
  - f) Click the "OK" button in the Internet Protocol (TCP/IP) Properties and the Local Area Connection Properties.

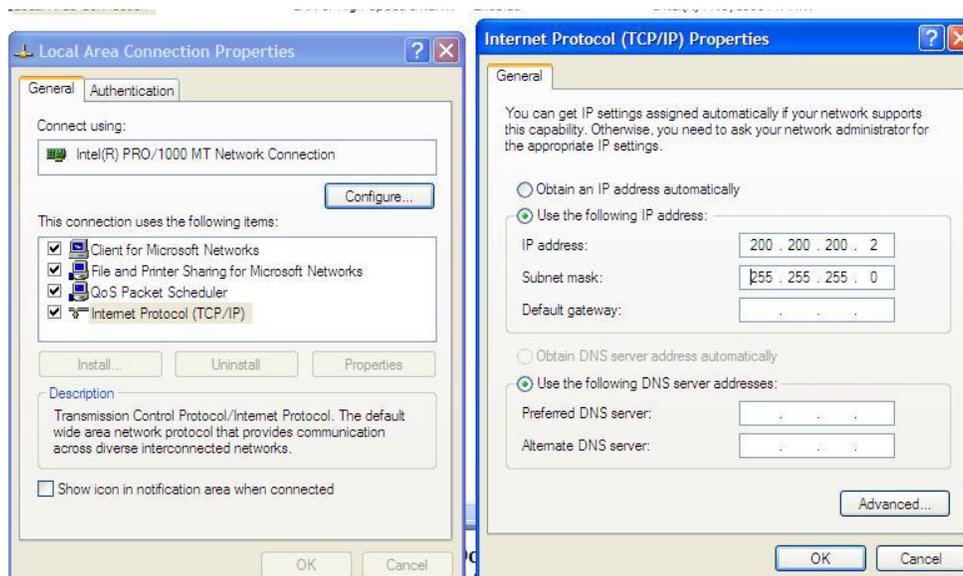


Figure 13-28- Establishing TCP/IP Address

2. Locate the VDR Data Port, a RJ45 wall jack, mounted on the bridge.

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Figure 13-29 - VDR Data Port

3. Connect the Playback PC to the VDR Data Port via a straight-through Ethernet cable.
4. Open Windows Explorer;
5. Select Tools;
6. Select Map Network Drive;
7. Select a drive letter not in use by the Playback PC;
8. Enter '\\200.200.200.200\Secured Data' in the 'Folder' text box; and
9. Select Finish.

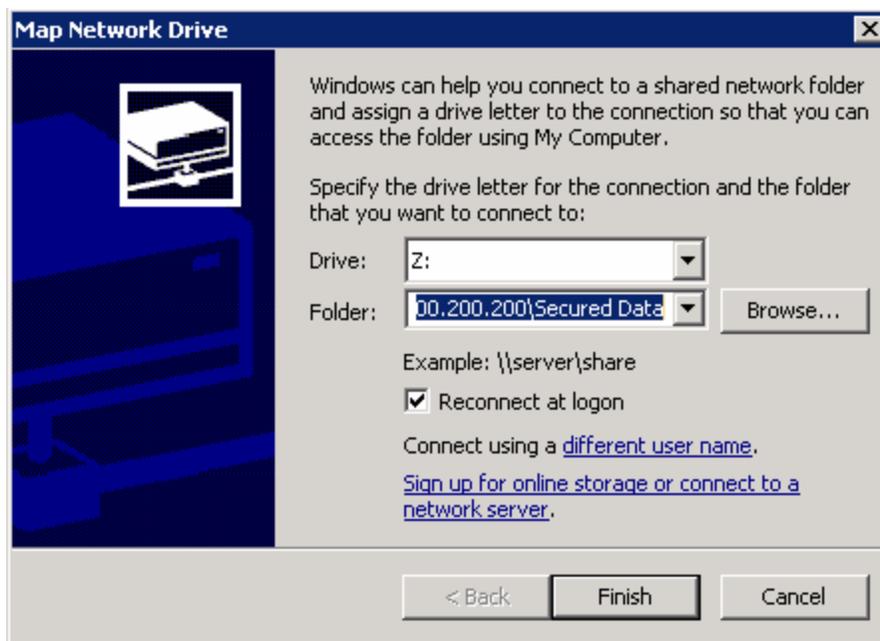


Figure 13-30 – Mapping the Secured Data Drive

10. At the prompt, enter 'MyUser' for the user name and 'Rutter' for the password.



**NOTE:** These entries are case-sensitive.



Figure 13-31 – Enter Password and User name



**NOTE:** When the Playback PC connects to the 'Secured Data' drive on the VDR-100G2, it will appear in Windows Explorer.

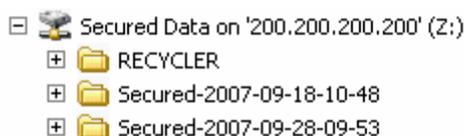


Figure 13-32 – The Mapped Secured Data Drive

11. Select the downloaded data set of interest, and copy it to the Playback PC.

### 13.5.3.2 Copying the Downloaded Data Via RSM/Download USB Drive

If data was downloaded to the VDR-100G2's RSM or Download USB Drive, the data can be copied directly to the Playback PC.

Remove the device containing the downloaded data from the VDR-100G2, and connect it to the Playback PC. When connected, the downloaded data may be copied off of the device, or the Playback software may be used to play back the data directly off of the device. (See Sections 15.1.4 *Disconnecting the RSM* and 15.2 **Error! Reference source not found.** for details on disconnecting the RSM from the VDR-100G2 and connecting it to the Playback PC.

### 13.5.3.3 Downloading FRM/SFRM Data Directly to the Playback/Client PC

It may be preferred to download the FRM/SFRM data directly to the Client/Playback PC instead of to the VDR-100G2. To download data directly from the FRM/SFRM to a Client PC, the Client PC must have the following:

- A 100 Base-TX Ethernet Interface (RJ45).
- Rutter Technologies Inc. proprietary FRM Download Application software.



**Note!** The following information is only applicable to the Rutter FRM (RUT-02447) Capsule, the L3 HVR/SVR Fixed FRM/SFRM Capsule and the Rutter-ACR Float-free SFRM Capsule. For information on connecting to the JoTron Float-free SFRM Capsule, refer to the manufacturer's technical manual.

## Chapter 13: Final Recording Medium Setup

### 13.5.3.4 Connecting to a Rutter FRM (RUT-02447) Capsule or L3 HVR/SVR Fixed FRM/SFRM

1. Remove the power and Ethernet cable from the Junction Box.
2. Connect the Ethernet cable to the Client PC.

### 13.5.3.5 Connecting to a Rutter-ACR Float-free SFRM Capsule

The Rutter-ACR Float-free SFRM Capsule uses PoE technology to provide power and data connectivity between it and the VDR-100G2. The following steps illustrate how to connect the Rutter-ACR Float-free SFRM Capsule directly to a Client PC:

1. Locate the Rutter-ACR Float-free SFRM Capsule and its associated PoE Power Injector (PS-100). The PoE Power Injector is located inside the DPU;
2. Remove the Ethernet cable between PoE Power Injector and the DMM;
3. Connect the Ethernet cable to the Client PC. The Ethernet connection may be made with the existing Ethernet cable. It is not necessary to change either of the Ethernet cables from straight-through to cross-over or from cross-over to straight-through.

### 13.5.3.6 Connecting to a JoTron Float-free SFRM Capsule

For information on connecting to the JoTron Float-free SFRM Capsule to a Client PC, refer to the manufacturer's technical manual.

### 13.5.3.7 Installing the FRM Download Application

Prior to downloading data from the FRM/SFRM directly to the Client PC, the FRM Download Application must be installed on the Client PC. The FRM Download Application will be installed to **C:\Program Files\Rutter\FRM Download\** by default. There will be a shortcut added to the Start menu upon completion of the installation.

To complete the installation of the FRM Download Application, complete the steps listed below:

1. Copy the FRM Download Application installer (FRM Download Setup.exe) from the VDR Data Recovery CD supplied by Rutter Technologies Inc. to the desktop of the Client PC.
2. Once copied, locate the file entitled 'FRM Download Setup.exe' and double-click it.



Figure 13-33 – Installation Executable File

3. Read the information on the welcome page of the setup wizard and click 'next'.

## Chapter 13: Final Recording Medium Setup



Figure 13-34 – Setup Wizard Welcome Page

2. At the "Choose Components" window ensure "Windows Services for Unix" is checked if the FRM Download Application will be used with a Rutter Fixed Capsule;

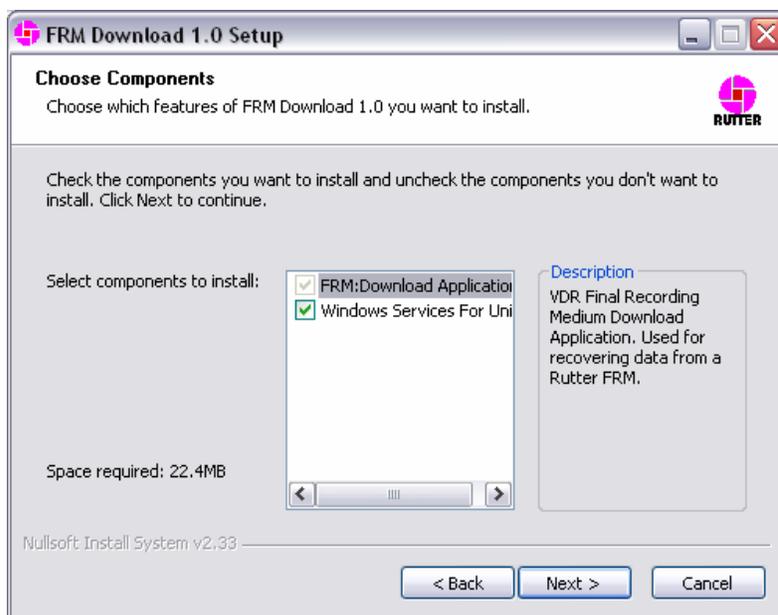


Figure 13-35 - Setup Wizard Component Selection Page

3. Choose the directory to which the FRM Download Application will be installed. Click 'Install' to proceed with the installation.



**Note!** Due to limitations with the installation process of 'Windows Services for Unix', this component will be installed to "C:\SFU" by default.

## Chapter 13: Final Recording Medium Setup

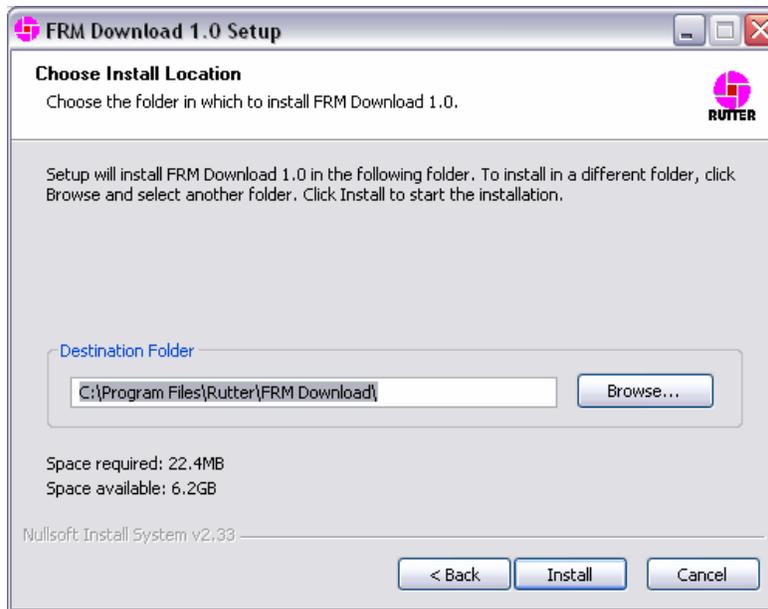


Figure 13-36 – Setup Wizard Install Location Page

4. Installation will proceed until the process is completed

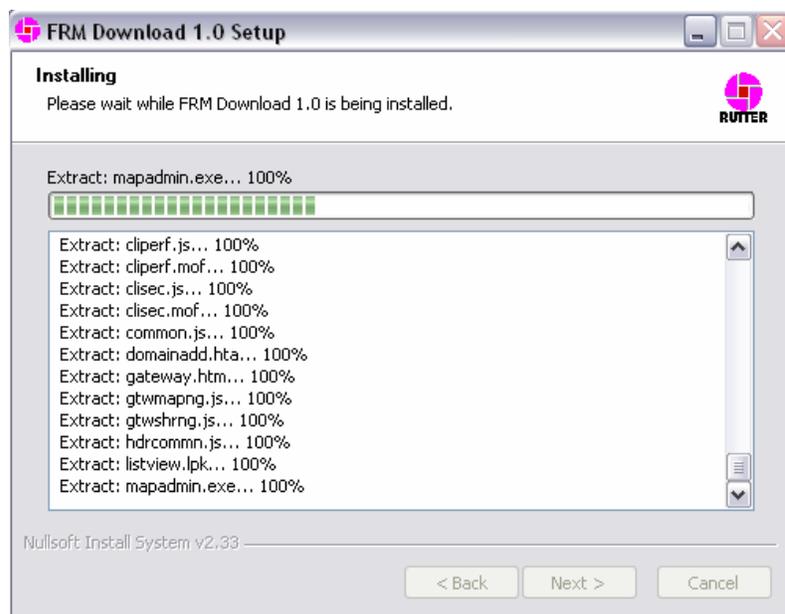


Figure 13-37 – Installing the Application Files

5. Once the FRM Download Application setup wizard has completed, click 'Finish' to complete the installation process.

## Chapter 13: Final Recording Medium Setup



Figure 13-38 – Setup Completed

### 13.5.3.8 Copy <vdrparams.ini>

Copy the <vdrparams.ini>file to the 'C:\WINDOWS' folder from the VDR Data Recovery Software CD supplied by Rutter Technologies Inc.

### 13.5.3.9 Setting the Client PC IP Address

The IP address of the Client PC must be altered to match the IP of the FRM/SFRM (excluding the last segment). The FRM/SFRM IP is provided in the vdrparams.ini file.

- To change the Client PC's IP address, open the 'Control Panel' > 'Network and Dial-up Connections' > 'Local Area Connection' and click the 'Properties' button.
- In the subsequent 'Local Area Connection Properties' window select 'Internet Protocol (TCP/IP)' in the 'Components checked are used by this connection:' selection area and click the 'Properties' button.
- In the subsequent 'Internet Protocol (TCP/IP) Properties' window, select the 'Use the following IP address' radio button and enter the appropriate FRM/SFRM IP address in the 'IP Address:' field.
- The last segment will have to be changed to a number between 3 and 255, but **cannot** be the same number as the FRM/SFRM IP address (i.e., if the FRM/SFRM IP address is 192.168.0.2, the Client PC address may be entered as 192.168.0.3).

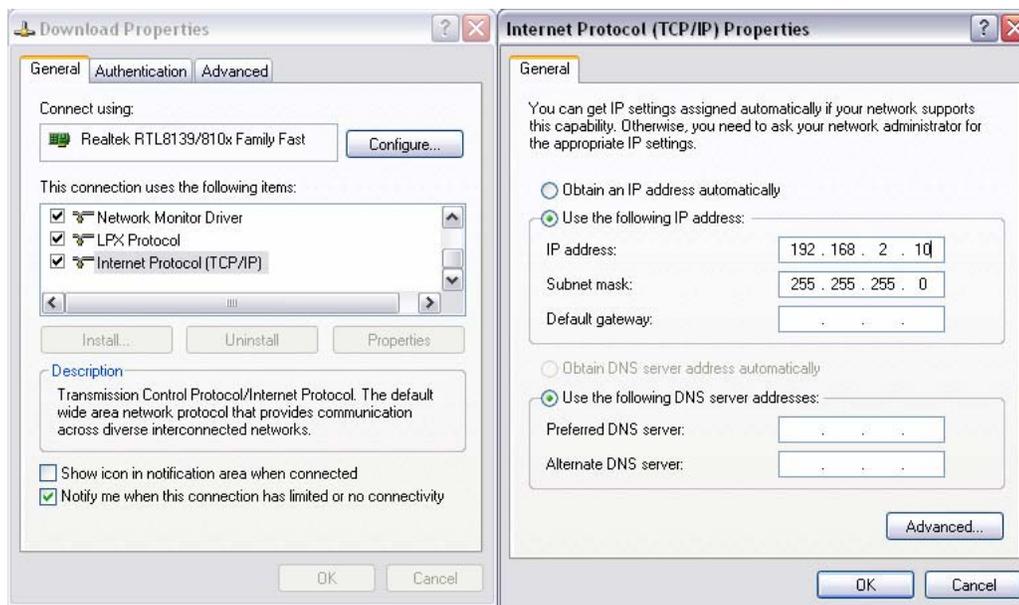


Figure 13-39 – TCP/IP Configuration

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## 14 USER GUIDE

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The following section provides a user guide for operating the VDR-100G2/S. All user-level operation occurs via the OAU. The OAU provides the ability to secure data as well as offering audible alarms that alert the user to potential problems with the unit and/or component connections.

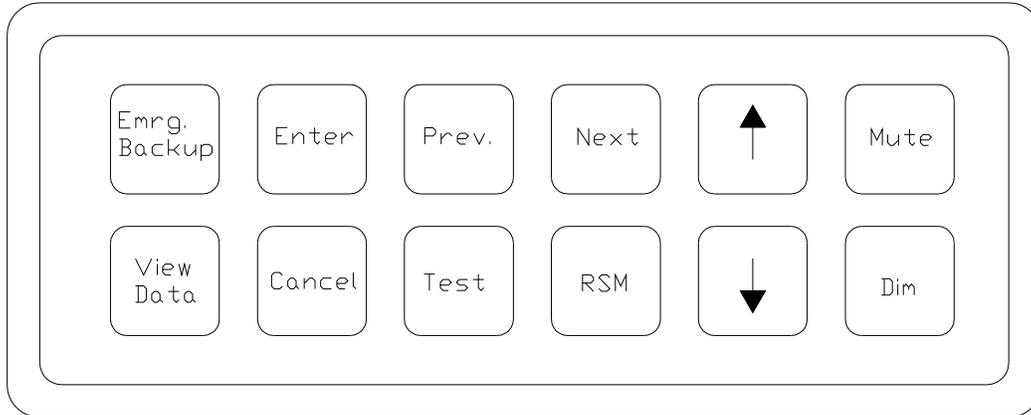


Figure 14-1 - OAU Menu Pad

### 14.1 Securing Data

To secure data to the DMM, complete the following steps:

1. Press the “Emrg Backup” button on the OAU menu pad. The following message will appear on the OAU’s LCD:

“Perform Emergency Backup of VDR Data”  
“> Enter to Confirm”

2. Press the “Enter” button on the OAU menu pad. The following message will appear:

“Downloading Data”  
“Please Wait...”

3. Allow the download to complete. A progression message may appear (i.e., “20% Complete”) dependant upon the size of the download.

### 14.2 Viewing Secured Data

To view previously secured data sets, complete the following steps:

1. Press the “View Data” button on the OAU menu pad.

2. Secured data sets appear two (2) per screen. If more than two (2) secured data sets exist, press the “Prev” and/or “Next” buttons on the menu pad to scroll through all sets available. Data sets appear from oldest to newest and are recorded with the following time format: yyyy-mm-dd-hr-mt (where yyyy=year, mm=month, dd=day, hr=hour, and mt=minute).

### 14.3 Securing Data to the Remote Storage Module

For instructions on securing data to the RSM, see *Section 15 - Remote Storage Module*.

### 14.4 Muting Audible Alarm

To mute the audible alarm, press the “Mute” key on the OAU menu pad.

### 14.5 Dimming the Display

To dim or brighten the LCD display, press the “Dim” key on the OAU menu pad.

There are four (4) LCD brightness levels ranging from off to bright.

### 14.6 Test Screen

To obtain the VDR Record software version number or the unique DMM Hardware ID, press the “Test” key on the OAU menu pad.

An example of the information provided via the “Tests” menu, is as follows:

```
**Test Screen**  
Version: 4.02.00  
ID: 55N5SS5S55X21
```



**Note!** It is essential to record the DMM Hardware ID correctly, as an incorrect ID could cause a loss of features in various VDR software applications.

Press the “Cancel” button to return to the main screen.

## 14.7 Alarm Code Description

Listed below are the alarm codes that may appear on the OAU LCD display:

Alarm Code	Description
System Error	Communication with the Record Application has been lost
Video Error	Communication with the Video Module has been lost
Audio Error	Communication with the Audio Module has been lost
FRM Error	Communication with the Final Recording Medium has been lost
Power Fail	Loss of utility power
PCM Error	Communication has been lost with the Power Control Module
Remote Error	Communication has been lost with the Remote Storage Module
Serial Error	Communication has been lost with the NMEA Module
Mic Error	Communication has been lost with one of the microphones
Disk Error	Failure to secure a data set
GPS Error	Failure to record GPS data

*Table 14-1 - Alarm Code Description*

Pressing the “Mute” button acknowledges the alarm code and silences the alarm.

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## 15 RSM AND USB MEMORY STICK

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The primary means of removing data recorded by the VDR-100G2 is via the USB Memory Stick (version 4.05.00 of the vdr\_record.exe application and later). Each VDR from Serial No. 2010702820 forward includes a USB Memory Stick. For units built prior to this time, the primary means of removing data is via the RSM. Refer to *Table 15-1 - USB Memory Stick vs. RSM* below for a comparison of versions for copying data.

There are no changes in OAU functionality between these units and versions:

- **Where a unit is fitted with a USB Memory Stick and version 4.05.00 of the software, data copied using the RSM menu will be copied to the USB Memory Stick. Where a unit has no USB Memory Stick, data is copied to the RSM (if fitted).**
- A VDR with a USB Memory Stick may also have an optional Remote Storage Module (RSM) for the purposes of automatic archiving.

Unlike the FRM, which contains only data required by IMO regulations, the USB Memory Stick and/or RSM, dependant upon customer requirements, may contain a much larger and highly detailed data set.

For units without a USB drive, read this section to understand that the RSM will perform the same data copying functionality without need for software or hardware changes.

Comparison of VDR-100G2 Units with USB Memory Stick vs. RSM		
VDR Fitted with	Data Copy Destination (when using OAU)	Auto Archive
USB Memory Stick Only	USB Memory Stick	RSM
RSM Only	RSM	RSM
Both RSM & USB Memory Stick	USB Memory Stick	RSM

*Table 15-1 - USB Memory Stick vs. RSM*



**Important!** The configuration (*Vdr-cfg.txt*) and parameters (*vdrparams.ini*) files, which may be used to correctly interpret playback information, are stored and located in the root directory of the removable drive.

A portable copy of the recorded data can be obtained by copying data from the DMM internal hard drive to the USB Memory Stick or RSM. Copying data to the USB Memory Stick (or RSM) does not affect the normal recording operation of the VDR-100G2.

The OAU is used to initiate copying of data to the USB Memory Stick (or RSM) for removal and analysis purposes.

To playback the data from the USB Memory Stick, a PC will require the following:

- The minimum requirements for a PC outlined in *Section 16.1 - Optional Client Download PC*.
- Rutter Technologies' playback software.



**Important!** The configuration (*Vdr-cfg.txt*) and parameters (*vdrparams.ini*) files, which may be used to correctly interpret playback information, are stored and located in the root directory of the removable drive.

### 15.1 Copying Data to the USB Memory Stick/RSM

To retrieve data using the OAU, it is necessary to ensure the USB Memory Stick/RSM is connected and recognized by the G2 system. Complete the following steps:

2. If not already connected, insert the USB Memory Stick into the available USB port or attach the Ethernet and power cable from the RSM to the DPU.
3. Press the “RSM” button on the OAU menu pad.
4. At the main menu screen of the OAU, two (2) options are displayed:
  - “Copy Data”
  - “RSM Archiving”



**Note!** The RSM **cannot be simultaneously connected** via Ethernet to the VDR while connected to the Client PC via a USB connection.

4. Ensure the “Copy Data” option is highlighted (blinking cursor is adjacent to the option.) Once highlighted, press the “Enter” button on the OAU menu pad.
5. Three (3) options are now displayed:
  - “Copy Current Data”: allows a user to retrieve a full 24-hour data set. See *Section 15.1.1 - Copy Current Data*.
  - “Copy Secured Data”: allows a user to retrieve specific segments that have been previously secured and may range in length of time. See *Section 15.1.2 - Copying Secured Data*.
  - “Copy Extended NMEA”: allows a user to retrieve extended NMEA data. See *Section 15.1.3 - Copying Extended NMEA Data*.

**Important!** If Auto Archiving is enabled, **do not** physically disconnect the Remote Storage Module before disconnecting it from the system via the OAU. See *Section 15.1.4 - Disconnecting the RSM for instructions on disconnecting via the OAU*.

*It is also recommended to power off the unit prior to physically disconnecting it.*



Once the RSM is physically disconnected from the DMM, it will take approximately one (1) minute for the system to recognize this disconnect. **DO NOT** reconnect the RSM before this one (1) minute wait period has elapsed, as it will not be recognized by the system. If the RSM is accidentally reconnected before the one (1) minute wait period has elapsed, physically disconnect the RSM from the DMM and wait one (1) minute before physically reconnecting. Once the RSM is physically connected, connect to the DMM software via the OAU.

### 15.1.1 Copy Current Data

To copy the current data from the internal drive of the DMM to the RSM, the following steps must be completed:

- Press the “RSM” key on the OAU menu pad
- Highlight ‘Copy Data’ and press ‘Enter’ on the OAU menu pad
- Highlight ‘Copy Current Data’ and press ‘Enter’ on the OAU menu pad

The full data set residing on the internal drive of the DMM will be copied to the RSM. As the data is copied, the OAU display may indicate the percentage of data that has been copied dependant upon the size of the download. To cancel the download, simply press “Cancel” on the OAU menu pad.

### 15.1.2 Copying Secured Data

Data sets can be secured on the internal drive of the DMM at any time via the OAU menu pad. If sufficient space does not exist on the internal drive to secure a data set, the oldest secure data set will be automatically deleted. Therefore, it is convenient to copy any one of these secure data sets to the USB Memory Stick/RSM.

Secured data sets can be copied to the USB Memory Stick/RSM for longer term storage or for portability to shore side facilities. To copy a secured data set to the USB Memory Stick/RSM, the following steps must be completed:

- Press the “RSM” key on the OAU menu pad.
- Highlight ‘Copy Data’ and press ‘Enter’ on the OAU menu pad.
- Highlight ‘Copy Secured Data’ and press ‘Enter’ on the OAU menu pad.
- All available secured data sets (displayed in yyyy-mm-dd-hr-mt format) will become visible. Secured data sets appear two (2) per screen. If more than two (2) secured data sets exist, press the “Prev” and/or “Next” buttons on the menu pad to scroll through all sets available. The total number of data set screens available is shown on the screen (for example, “Page 3/21”).
- Once the desired data set is highlighted, press the “Enter” key on the OAU keypad. Press the “Enter” key again to confirm the download.

The selected secured data set will be copied to the USB Memory Stick/RSM. As the data is copied, the OAU display will indicate the percentage of data that has been copied. To cancel the download, simply press “Cancel” on the OAU menu pad.

### 15.1.3 Copying Extended NMEA Data

The VDR100G2 can optionally store up to 185 days of NMEA data. This data can then be copied to the USB Memory Stick/RSM by the following steps:

1. Press the “RSM” key on the OAU menu pad.
2. Highlight ‘Copy Data’ and press ‘Enter’ on the OAU menu pad.
3. Highlight ‘Copy Extended NMEA Data’ and press ‘Enter’ on the OAU menu pad.

All Extended NMEA data will then be copied to the USB Memory Stick/RSM. As the data is copied, the OAU display will indicate the percentage of data that has been copied. To cancel the download, simply press “Cancel” on the OAU menu pad.

### 15.1.4 Disconnecting the RSM

When Auto Archiving is enabled, it is important to disconnect via the OAU keypad prior to physically disconnecting from the VDR. To check if Auto Archiving is enabled, press the “RSM” key on the OAU keypad; if “RSM Archiving” appears as a menu option, it is enabled.

To disconnect the RSM:

1. Press the “RSM” key on the OAU menu pad.
2. Press the down (↓) arrow to select the “RSM Archiving” option on the OAU LCD display and press the “Enter” key.
3. Select “Disable Extended Archiving” and press the “Enter” key on the OAU menu pad.
4. Power off the RSM (switch RSM Power Switch to “Off” position).
5. Remove all cable connections from the RSM.

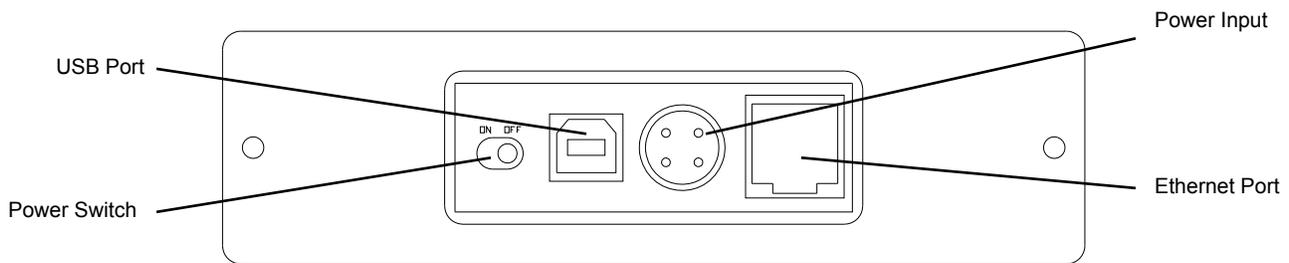


Figure 15-1 - Rear View of RSM Unit



**Important!** Do **not** disconnect the USB Memory Stick during data transfer. If data is being transferred to the Memory Stick the blue light located on the body of the Memory Stick will flash rapidly. Once data transfer is complete the blue light will stay solid.

## 15.2 Connecting Client PC to RSM

To retrieve data from the RSM using the Client PC, complete the following steps:

1. Physically disconnect the RSM Ethernet cable and connect it to the Client PC using an “A to B mini” USB cable.
2. The RSM will be visible on the Client PC as a connected hard drive.

## 16 DATA RETRIEVAL

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The VDR-100G2 is supplied with several options for accessing and replaying data in order to reconstruct voyages:

- The primary method of retrieving data is via the 4GB USB Memory Stick. The copying of data to the USB memory stick is initiated at the OAU via the RSM button (see *Section 16.4 - Remote Storage Module*)
- The Remote Storage Module (RSM). The download is initiated at the OAU (see *Section 16.4 - Remote Storage Module*).
- An alternate method is to download data via a client PC connected to the VDR by a LAN connection. All necessary software is optional and resident on the client PC (see *Section 16.2 - Installation of Download Software on Client PC*).

### 16.1 Optional Client Download PC

If the customer should choose to make use of the optional download client PC, additional copies of the playback software are supplied. The Download/Playback client PC should be a Pentium class or equivalent, and IEC 60945 certified if installed on the Bridge. The computer system should, as a minimum, include:

- Pentium III or higher processor
- 256 MB of memory
- SVGA Video port and monitor (it is recommended that the monitor be 15" or larger and supports a non-scrollable resolution of 1024x768 or greater)
- Audio hardware with PC speakers or headphones
- 100 Base-TX Ethernet Interface
- USB 2.0 Port
- Serial data port (if external ECDIS display support is required)
- 16X DVD-R/DVD-RW drive
- 80 GB or larger internal Hard Disk Drive
- USB, AT or PS/2 mouse and keyboard
- Power Supply: Dual Input Voltage: 115V at 60 Hz; or 220V at 50 Hz
- English O/S Edition: Windows 2000 or Windows XP (recommended)

### 16.2 Installation of Download Software on Client PC

There are two (2) steps necessary to install the Download application onto the client PC:

1. Copy the Download application (VDR\_Download.exe) from the supplied media to the desktop of the download computer, or if an install file is supplied, double-click the "Install VDR Download.exe" file.
2. Configure the download computer as a 'Client' for the 'Download Application' to connect to the VDR-100G2 and retrieve the recorded data. To do this, the download PC must be in the same IP segment as the download port on the VDR. The VDR's download port occupies IP address 200.200.200.200. The client PC must be in the same range, with the last segment different than the VDR (as shown below.) To change the IP segment:
  - Open the Control Panel via the Start menu.
  - Double-click the Network Connections icon.

## Chapter 16: Data Retrieval

- Right-click on the Local Area Connection icon and select Properties from the pop-up menu.
- In the Local Area Connection Properties window, highlight “Internet Protocol (TCP/IP)” and click the “Properties” button located directly below the available options.
- In the subsequent Internet Protocol (TCP/IP) Properties window, select the “Use the following IP address” radio button and enter 200.200.200.2 (the last number can be any number from 2 to 254, **except 200.**)
- Click the “OK” button in the Internet Protocol (TCP/IP) Properties and the Local Area Connection Properties.

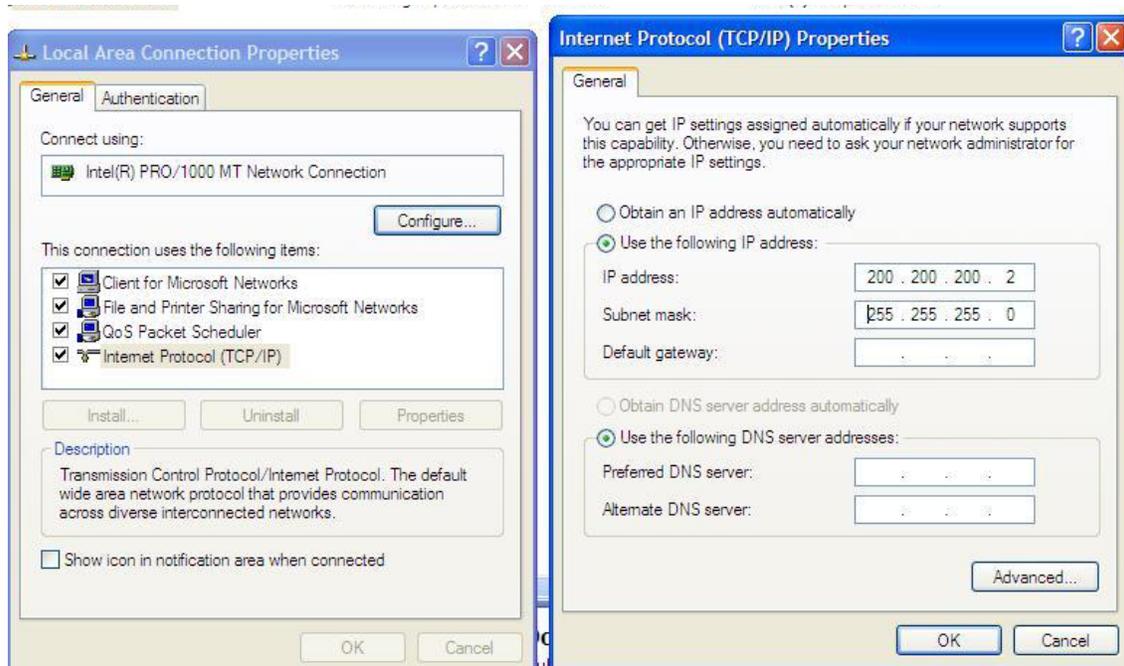


Figure 16-1 - Establishing TCP/IP Address

### 16.2.1 Starting the Download Process

Start the download utility by double-clicking the download.exe icon located on the Windows desktop. See *Figure 16-2 - Download Software Main Screen* for an example of the download utility.

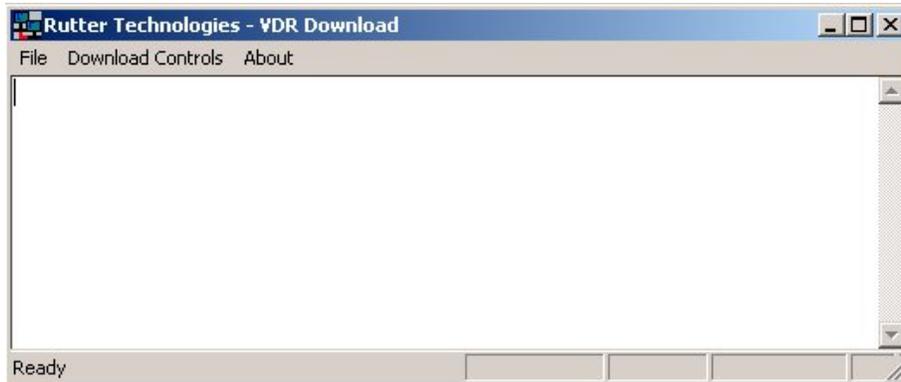


Figure 16-2 - Download Software Main Screen

### 16.2.2 Begin the Download

Complete the following steps to begin the download of the current data set:

6. Select 'Start download' from the 'Download Controls' menu.



Figure 16-3 - Download Controls Menu

7. Enter a password when prompted.
8. Once prompted with the 'Download Settings' window (see *Figure 16-4 - Download Settings Window*), choose from the following available settings:
  - 'Download complete data set'.
  - 'Download partial data set' – once this option has been chosen, 'Start' and 'Stop' times become available. Using the appropriate slide-bar, set the time frame that will begin and end the downloaded data set.
  - 'Normal data set'.
  - 'Extended NMEA data set' – this option allows for the download of the extended NMEA data set only.

## Chapter 16: Data Retrieval

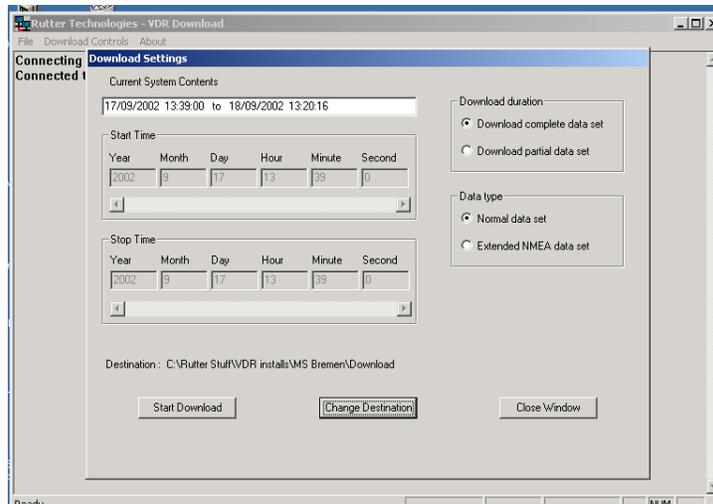


Figure 16-4 - Download Settings Window

4. Confirm that the stated download destination is correct. If it is not, press the 'Change Destination' button, select the correct destination from the file window, and press 'OK'.
5. Press the 'Start Download' button.
6. Confirm all settings are correct in the confirmation window and press 'OK' (if they are not, press 'Cancel' and make the appropriate changes in the 'Download Settings' window).

Name	Size	Type	Date Modified
MainAudio		File Folder	8/23/2005 10:14 AM
MainNMEA		File Folder	8/23/2005 10:12 AM
MainVideo		File Folder	8/23/2005 10:13 AM
AudioDir.vdr	57 KB	VDR File	8/23/2005 10:14 AM
NMEADir.vdr	56 KB	VDR File	8/23/2005 10:14 AM
vdr-cfg.txt	1 KB	Text Document	8/18/2005 1:55 PM
vdrparams.ini	5 KB	Configuration Settings	8/18/2005 1:55 PM
VideoDir.vdr	57 KB	VDR File	8/23/2005 10:14 AM

Figure 16-5 - Sample Download Directory

Once a download is complete, "MainAudio", "MainNMEA", and "MainVideo" folders are visible. The vdrparams.ini and vdr-cfg.txt files are also downloaded and saved to the specified download directory. See *Figure 16-5 - Sample Download Directory* for an example of a typical download directory.

### 16.2.3 Download Secured Data Set

Complete the following steps to download one (1) of multiple secured data sets from the DMM's internal hard drive:

1. Select 'Download Secured Dataset' from the 'Download Controls' menu.
2. A download progress window will appear indicating that the application is receiving information from the DMM.

## Chapter 16: Data Retrieval

3. In the subsequent 'Download Secured Datasets' window, all available secured datasets will be visible. Each dataset shows the date it was initially secured, file size, and start and end time.

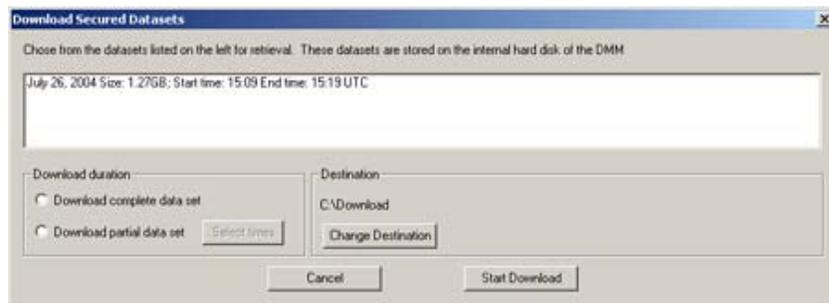


Figure 16-6 - Download Secured Datasets

4. Select the appropriate dataset from the list.
5. To download a complete dataset, choose the "Download complete data set" radio button under 'Download duration'. To download a partial dataset, choose "Download partial data set".
6. If choosing to download a partial dataset, a window will appear from which the time range to be downloaded must be chosen. The associated scroll bar is used to select a start and/or end time (the exact time may also be entered directly in to the time fields.)



Figure 16-7 - Partial Download Window

7. To choose a directory to which the datasets will be downloaded, other than the one listed under 'Destination', press the "Change Destination" button and follow standard Windows procedure for selecting a desired directory.
8. Once the duration and destination are correct, press 'Start Download'.
9. Enter a password and press 'OK'.
10. A "Download Settings" dialog will appear providing confirmation information for the dataset to be downloaded. If all information is correct, press 'OK' to begin the download.

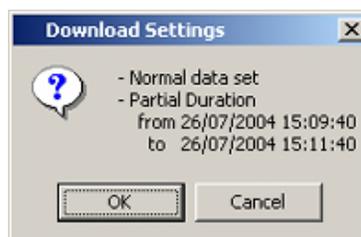


Figure 16-8 - Confirm Download Settings

### 16.2.4 Extended NMEA Download

The Extended NMEA data set is a VDR-100G2 option, which supports the recording of up to 185 days of NMEA data to the DMM. When an extended NMEA download occurs, no video or audio data is included in the download. To select the extended NMEA download, check the 'Extended NMEA Download' located in the 'Download Settings' window (see *Figure 16-4 - Download Settings Window*).



**Important!** The extended NMEA data set must be purchased as an option and configured on the VDR-100G2 during installation. If the VDR-100G2 is not configured for the extended NMEA data set, this option will not function in the download software.

### 16.2.5 Complete vs. Partial Download

A 'complete' download is the process of downloading a full 24-hour data set from the DMM. As a user may want only a 'partial' download, a 'Download partial data set' option is available. Select either 'Download complete data set' or 'Download partial data set' in the 'Download Settings' window (see *Figure 16-4 - Download Settings Window*) to download the desired data set.

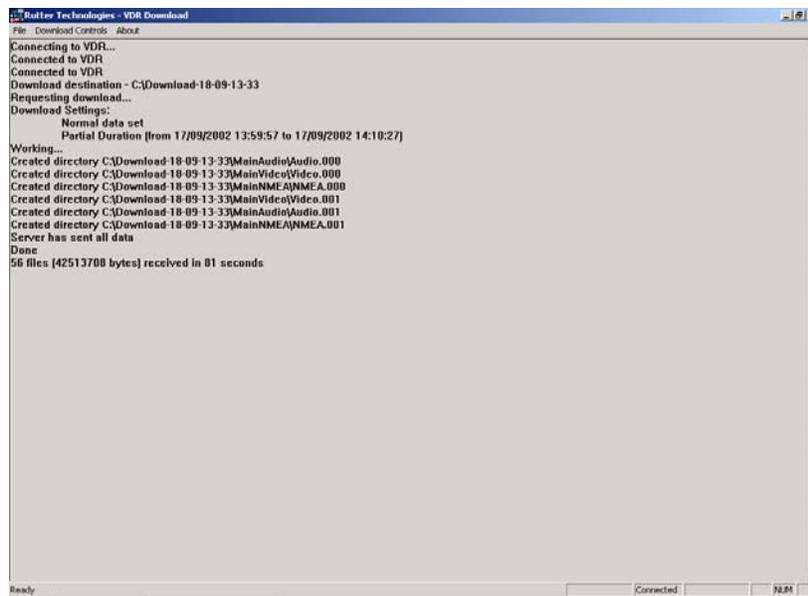


Figure 16-9 - Completed Download

### 16.2.6 Error Log and Battery Log

To download the error log or battery log file, select the applicable item ('Download Error Log' or 'Download Battery Log') from the 'Download Controls' menu (see *Figure 16-3 - Download Controls Menu*). The system will prompt the user to select a location to save the log file.

### 16.2.7 Disconnecting from the VDR

To disconnect, simply choose 'Exit' from the 'File' menu.

### 16.3 USB Memory Stick

The USB Memory Stick is the primary means of retrieving a secure data set recorded by the VDR.

The method for initiating a download to the USB Memory Stick is the same as the method for initiating a data download to the RSM. See *Section 15 - R* for information on downloading to the USB Memory Stick.

### 16.4 Remote Storage Module

If installed, the Removable Storage Module (RSM) provides a means of copying data recorded by the VDR.

See *Section 15 - R* for information on downloading to the RSM.

### 16.5 Retrieving Secured Data via Download Port

To retrieve data from the secured directory, the retrieval PC must, as a minimum, conform to the following features/settings:

- XP Professional Operating System or higher
- Computer name **must not** be "VDR"
- Within the IP range of 200.200.200.x (where 'x' can be any IP other than 200)
- Workgroup name must be **WORKGROUP**

Once the above listed conditions have been met, the secured data download can begin. To do so:

1. Connect a crossover Ethernet cable from the PC to the download port of the VDR.
2. Click Start > Run... on the Windows desktop of the retrieval PC, type [\VDR](#), and click 'OK'.
3. If prompted, enter MyUser as a username and Rutter as a password.
4. Double-click the "Secured Data" directory icon which appears in the "VDR" window.

## Chapter 16: Data Retrieval

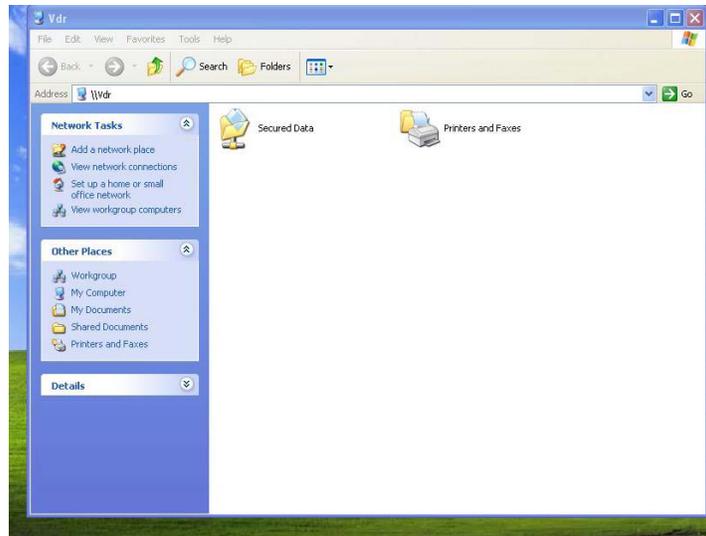


Figure 16-10 – “Secured Data” Directory Icon

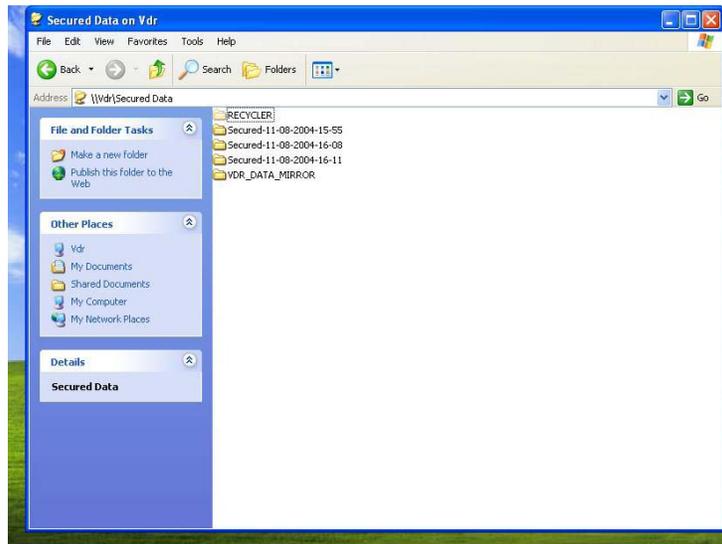


Figure 16-11 - Secured Data

5. Select all data available and copy it to the retrieval PC.

# 17 SYSTEM CONFIGURATION FILE

Rutter Technologies' VDR Configuration Utility is an application tool designed to help in the creation of configuration and parameter files during the installation of the Rutter Voyage Data Recorder (VDR). By entering the correct installation parameters into the fields provided, the Configuration Utility will produce both a `vdrcfg.txt` and `vdrplayback.ini` file.

The utility takes advantage of standard Windows-type functionality. A menu bar and tool bar are available to help the user carry out all basic program functions including file saving.

## 17.1 Installation

There is no installation process for this utility. To access the executable file:

- Locate and decompress (or “unzip”) the `VDRConfig.zip` file to a desired folder.
- Locate and double-click the `VDRConfig.exe` file now visible to open the Configuration program.

The program will open with the contents of the ‘General’ tab visible (see *Figure 17-1 - General* below). The title bar will read “Untitled – VDR Configuration Utility v1.0” until information has been saved, after which time the saved file name will appear in place of “Untitled”.

## 17.2 General

The ‘General’ tab requires the input of general information regarding various aspects of the installation including ship and VDR data.

Untitled - VDR Configuration Utility v3.1

File Edit View Help

General Primary Storage Secondary Storage Video Proprietary Strings Audio Navigation Fire Doors Water Doors Hull Openings Alarms Propulsi

Enter general information about the VDR configuration here - version of software, shipname, etc. All fields must be filled before the installation is finished.

Last Modified:

Software Version:  Ship:  MMSI #:

Software Date:  Customer:  Call Sign:

VDR Model: VDR-100 Installer:  Approval Authority:

VDR S/N:  IMO Vessel ID#:  Classification Society:

Number of EPFS present:  1  2  3  4

EPFS Number	Distance from Bow	Distance from Centerline	Direction from Centerline	Deck
1	<input type="text" value="0m"/>	<input type="text" value="0m"/>	<input type="radio"/> Port <input checked="" type="radio"/> Starboard	<input type="text"/>

Other Comments on General Info for Configuration File:

For Help, press F1

Figure 17-1 - General

## Chapter 17: System Configuration File

The following fields must be completed:

### **Software Version & Software Date**

Enter the version number and date of the VDR Record application software. Both the version number and date can be found by opening the VDR Record software interface

### **VDR Model**

From the accompanying drop-down box, select the VDR model applicable to the installation. Options available for selection are VDR-100, VDR-100G2, Simplified VDR, and DRS.

### **VDR S/N**

Enter the VDR's serial number, which can be found on the VDR identification plate located at the side of the unit in the lower right corner. An example of a VDR serial number is RT1981651973

### **Ship**

Enter the name of the ship on which the VDR is being installed.

### **Customer**

Enter the name of the customer for whom the VDR is being installed.

### **Installer**

Enter the name of the person carrying out the installation of the VDR.

### **IMO Vessel ID#**

Enter the International Maritime Organization (IMO) identification number specific to the vessel on which the VDR is being installed.

### **MMSI #**

Enter the Maritime Mobile Service Identity (MMSI) radio identification number specific to the vessel on which the VDR is being installed.

### **Call Sign**

Enter the Call Sign specific to the vessel on which the VDR is being installed.

### **Approval Authority**

From the options available in the accompanying drop-down box, select the approval authority applicable to the installation. The "BSH Nr. 6543/080304/2003" is the default option. Dependant upon the instructions of the Classification Society involved in certifying the installation it may be necessary to select one of the other six (6) options available.

### **Classification Society**

Enter the name of the Classification Society responsible for final inspection of the VDR installation.

## Chapter 17: System Configuration File

### Number of EPFS Present

Select the radio button which represents the correct number (1, 2, 3, or 4) of Electronic Position Fixing System(s) (EPFS) present on the ship. If more than one EPFS is selected, the software will make the applicable number of rows available for data entry (see *Figure 17-2 – EPFS* below).

Number of EPFS present:  1  2  3  4

EPFS Number	Distance from Bow	Distance from Centerline	Direction from Centerline	Deck
1	<input type="text" value="0m"/>	<input type="text" value="0m"/>	<input type="radio"/> Port <input checked="" type="radio"/> Starboard	<input type="text"/>
2	<input type="text" value="0m"/>	<input type="text" value="0m"/>	<input type="radio"/> Port <input checked="" type="radio"/> Starboard	<input type="text"/>
3	<input type="text" value="0m"/>	<input type="text" value="0m"/>	<input type="radio"/> Port <input checked="" type="radio"/> Starboard	<input type="text"/>

Figure 17-2 – EPFS

For each EPFS present the user must:

- Enter its “Distance from Bow” in meters
- Enter its “Distance from Centerline” in meters
- Select either the *Port* or *Starboard* radio button to indicate its “Direction from Centerline”
- Enter the *Deck* number and, if necessary, name on which it is located

### Other Comments

This text field allows the user to enter any additional information deemed important in achieving a complete configuration file.

## 17.3 Primary Storage

The ‘Storage’ tab requires the input of information specific to the Final Recording Medium (FRM) unit (see *Figure 17-3 – Primary Storage* below).

Untitled - VDR Configuration Utility v3.1

File Edit View Help

General Primary Storage Secondary Storage Video Proprietary Strings Audio Navigation Fire Doors Water Doors Hull Openings Alarms Propulsi

Final Recording Medium

Type:  Distance from Bow:

Part Number:  Serial Number:  Distance from Centerline:

Date of Manufacture:  Model:  Direction from Centerline:  Port  Starboard

Beacon Serial Number and Battery Expiry Date:  Deck:

Memory Partition Information

Total Bytes in Crash Module:

Number of Bytes per Granule:

Currently Unassigned Granules:

Unit Allocations And Stream Names

Position	Number of Granules	Stream Name	Position	Number of Granules	Stream Name
0	<input type="text" value="0"/>	<input type="text"/>	3	<input type="text" value="0"/>	<input type="text"/>
1	<input type="text" value="0"/>	<input type="text"/>	4	<input type="text" value="0"/>	<input type="text"/>
2	<input type="text" value="0"/>	<input type="text"/>	5	<input type="text" value="0"/>	<input type="text"/>

Other Comments on storage for Configuration File:

For Help, press F1

Figure 17-3 – Primary Storage

## Chapter 17: System Configuration File

The following fields must be completed:

### **Type**

From the accompanying drop-down box, select the FRM model and manufacturer applicable to the installation. Options available are L3 HVR (default), Litton PMC, Jotron SVDR, Rutter FRM (RUT-02447) Fixed, Rutter-ACR Float-Free, or Not Installed.

If the “Litton PMC” option is chosen, a **Model** field will become visible below the **Serial Number** field. Enter the Litton model number, which can be found on the FRM identification plate at the top of the unit.

### **Part Number**

Enter the FRM’s part number, which can be found on the FRM identification plate located at the top of the unit. An example of a L3 HVR part number is HVR00-000-00

### **Serial Number**

Enter the FRM’s serial number, which can be found on the FRM identification plate located at the top of the unit. An example of a L3 FRM serial number is 000199364

### **Date of Manufacture**

Enter the FRM’s date of manufacture, which can be found on the FRM identification plate located at the top of the unit.

### **Beacon Serial Number and Battery Expiry Date**

Enter the beacon serial number and battery expiry date, both of which can be found on the beacon (located at the top of the unit on the L3 HVR or bottom of the unit on the Litton PMC).

### **Distance from Bow**

Enter the distance of the FRM unit from the ship’s bow.

### **Distance from Centerline**

Enter the distance of the FRM unit from the ship’s centerline.

### **Direction from Centerline**

Select either the Port or Starboard radio button to indicate the FRM unit’s direction from the ship’s centerline.

### **Deck**

Enter the *Deck* number and, if necessary, name on which the FRM unit is located.

### **FRM IP Address**

Enter the IP address of the FRM unit. The IP address of the L3 HVR is 192.168.0.2.

### **FRM Subnet Address**

Enter the subnet address of the FRM unit. The subnet address of the L3 HVR is 255.255.255.0.

### **Default Gateway IP**

Enter the default gateway IP of the FRM unit. The default gateway IP address of the L3 HVR is 192.168.0.1.

### **Memory Partition Information**

## Chapter 17: System Configuration File

This section is only visible for the L3 HVR unit. If another FRM type is in use, the user can skip the following three entries.

### Total Bytes in Crash Module / Number of Bytes per Granule / Currently Unassigned Granules

To access this information, follow the instructions provided below:

- Open an Internet Explorer browser on the VDR desktop.
- In the address bar at the top of the browser interface type **192.168.0.2/hvrhome.htm** and press the **Enter** key.
- Select the “Flash Setup” button located on the left side of the screen.
- Enter **L3HVR** as the password.

### Unit Allocations and Stream Names

Enter the **Number of Granules** (or Number of Bytes if referring to the Litton PMC unit) and **Stream Name** for each applicable position (see *Figure 17-4 - Unit Allocations and Stream Names* below for an example of information added for this section).

Unit Allocations And Stream Names					
Position	Number of Granules	Stream Name	Position	Number of Granules	Stream Name
0	<input type="text" value="78393"/>	<input type="text" value="AUDIO"/>	3	<input type="text" value="0"/>	<input type="text"/>
1	<input type="text" value="5600"/>	<input type="text" value="NMEA"/>	4	<input type="text" value="0"/>	<input type="text"/>
2	<input type="text" value="27997"/>	<input type="text" value="VIDEO"/>	5	<input type="text" value="0"/>	<input type="text"/>

Figure 17-4 - Unit Allocations and Stream Names

For the L3 HVR unit this information can be obtained using the steps provided in the **Memory Partition Information** section above.

For the Litton PMC unit locate and open the **console.exe** file/application. Once open, select **Display** from the file menu and **PMC Partition Directory** from the subsequent list.

### Other Comments on Storage for Configuration File

Enter any additional comments relevant to the storage aspect of the configuration/installation.

## 17.4 Secondary Storage

If the VDR is equipped with a secondary FRM, the 'Secondary FRM' tab will require the input of information specific to the secondary FRM unit (see Figure 17-5 - Secondary Storage below).

Figure 17-5 - Secondary Storage

The following fields must be completed:

### Type

From the accompanying drop-down box, select the FRM model and manufacturer applicable to the installation. Options available are L3 HVR, Litton PMC, Jotron SVDR, Rutter Fixed, Rutter Float-Free or Not Installed (default).

If the "Litton PMC" option is chosen, a **Model** field will become visible below the **Serial Number** field. Enter the Litton model number, which can be found on the FRM identification plate at the top of the unit.

### Part Number

Enter the FRM's part number.

### Serial Number

Enter the FRM's serial number.

### Date of Manufacture

Enter the FRM's date of manufacture.

**Beacon Serial Number and Battery Expiry Date**

Enter the beacon serial number and battery expiry date, both of which can be found on the beacon.

**Distance from Bow**

Enter the distance of the FRM unit from the ship’s bow.

**Distance from Centerline**

Enter the distance of the FRM unit from the ship’s centerline.

**Direction from Centerline**

Select either the Port or Starboard radio button to indicate the FRM unit’s direction from the ship’s centerline.

**Deck**

Enter the *Deck* number and, if necessary, name on which the FRM unit is located.

**FRM IP Address**

Enter the IP address of the FRM unit.

**FRM Subnet Address**

Enter the subnet address of the FRM unit.

**Default Gateway IP**

Enter the default gateway IP of the FRM unit.

**Memory Partition Information**

This section is only visible for the L3 HVR unit. If another FRM type is in use, the user can skip the following three entries.

**Total Bytes in Crash Module / Number of Bytes per Granule / Currently Unassigned Granules**

To access this information, follow the instructions provided below:

- Open an Internet Explorer browser on the VDR desktop.
- In the address bar at the top of the browser interface type **192.168.0.2/hvrhome.htm** and press the **Enter** key.
- Select the “Flash Setup” button located on the left side of the screen.
- Enter **L3HVR** as the password.

**Unit Allocations and Stream Names**

Enter the **Number of Granules** (or Number of Bytes if referring to the Litton PMC unit) and **Stream Name** for each applicable position (see Figure 17-6 - Unit Allocations and Stream Names below for an example of information added for this section).

Unit Allocations And Stream Names					
Position	Number of Granules	Stream Name	Position	Number of Granules	Stream Name
0	78393	AUDIO	3	0	
1	5600	NMEA	4	0	
2	27997	VIDEO	5	0	

Figure 17-6 - Unit Allocations and Stream Names

## Chapter 17: System Configuration File

For the L3 HVR unit this information can be obtained using the steps provided in the **Memory Partition Information** section above.

For the Litton PMC unit locate and open the **console.exe** file/application. Once open, select **Display** from the file menu and **PMC Partition Directory** from the subsequent list.

### Other Comments

Enter any additional comments relevant to the storage aspect of the configuration/installation.

## 17.5 Video

The 'Video' tab requires the input of information specific to the video configuration (see *Figure 17-7 - Video* below).

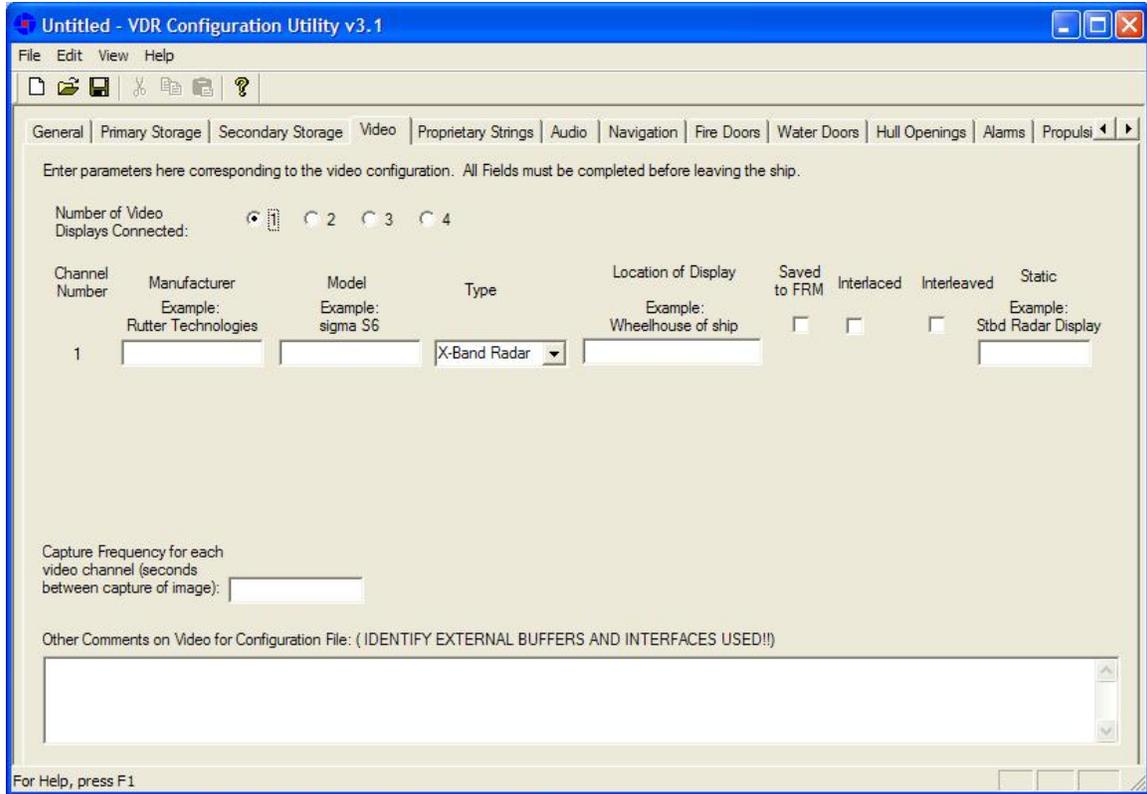


Figure 17-7 - Video

The followings fields must be completed:

### Number of Video Displays Connected

Select the radio button (1, 2, 3, or 4) appropriate to the number of video displays connected to the VDR. If more than one Video Display is selected, the software will make the applicable number of rows available for data entry (see *Figure 17-8 - Video Channel Information* below).

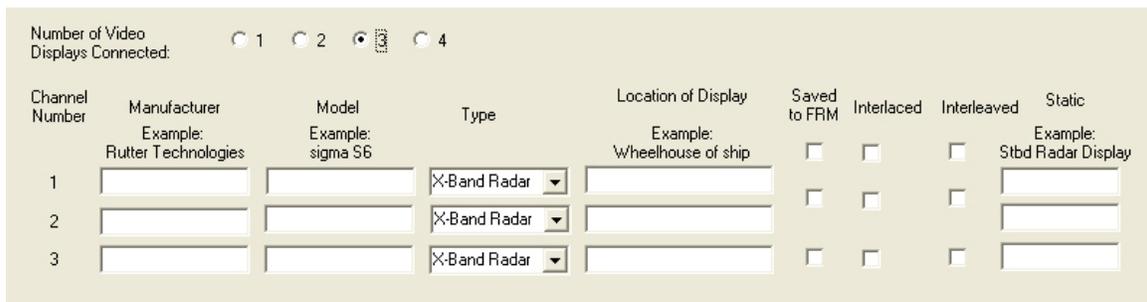


Figure 17-8 - Video Channel Information

### Manufacturer

Enter the name of the video capture component's manufacturer.

### Model

Enter the name of the model name of the video capture component.

### Type

From the drop down box select the type of video capture component in relation to the channel number. Options available for selection are S-Band Radar, X-Band Radar, ECDIS, and CCTV.

### Location of Display

Enter the location on the ship where the video capture component is located.

### Saved to FRM

If the video capture is saved to the FRM, this checkbox must be checked.

### Interlaced or Interleaved

Checking either the "Interlaced" or "Interleaved" checkbox disables the other and makes Image "Start" text boxes available. These "Start" fields correspond to the start point of the odd and even lines of an interlaced or interleaved image. This information is available via the Rutter Technologies Video Configuration software (see *Section 10.3 - Video Diagnostics (VideoConfigSuite) Application* for further information on this software).



Figure 17-9 - Image Start Points

### Static

Enter the onscreen name of the video capture component.

### Capture Frequency for each Video Channel

Enter the number of seconds between the capture of each image. This number is dependant upon the number of video sources present. One (1) source will have a capture interval of 15 seconds, two (2) sources will be 7.5 seconds, three (3) sources will be 5 seconds, and four (4) sources will be 3.75 seconds.

### Other Comments

Enter any additional comments relevant to the video capture aspect of the configuration/installation.

## 17.6 Proprietary Strings

Various systems may output data strings which must be manually interpreted. The Proprietary tab allows a user to enter these data strings which are broadcast from proprietary data sources.

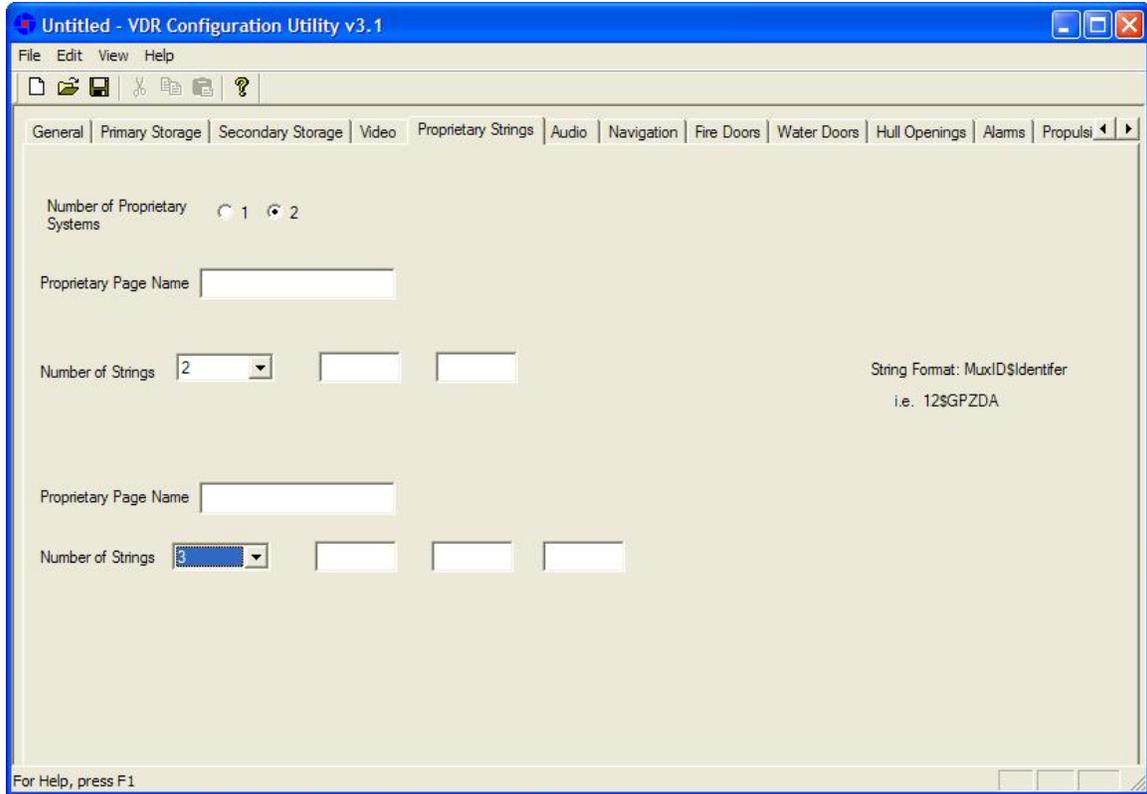


Figure 17-10 - Proprietary Strings

If proprietary strings are entered, the following fields must be completed:

### Number of Proprietary Systems

Select the radio button (1 or 2) which represents the number of Proprietary Systems from which strings will be entered.

### Proprietary Page Name

Enter a name for the tab that will be created for each Proprietary system. It will be necessary to enter two (2) names if two (2) systems are specified.

### Number of Strings

Use the available drop-down to select the number of strings available from the associated proprietary system. The number of strings selected will cause the same number of text boxes to appear to the right of the drop-down box. Enter the strings in these available text boxes (one per box).

## 17.7 Audio

The 'Audio' tab requires the input of information specific to the audio configuration (see *Figure 17-11 – Audio* below).

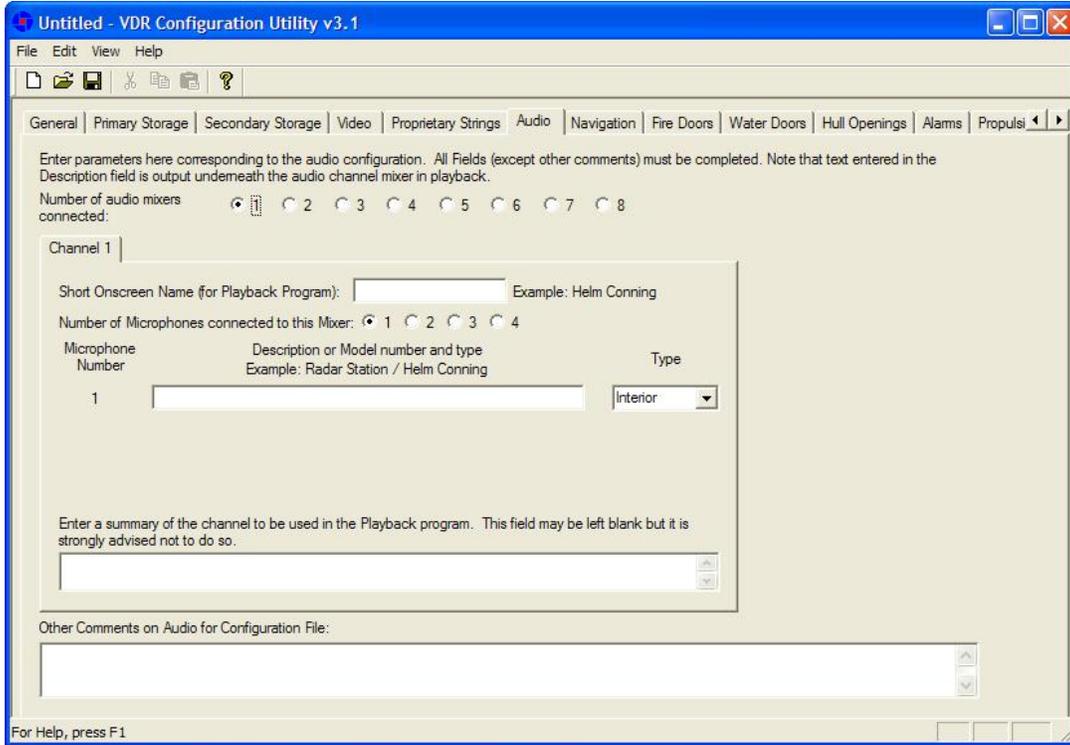


Figure 17-11 – Audio

The followings fields must be completed:

### Number of Audio Output Channels

Select the radio button (1, 2, 3, 4, 5, 6, 7, or 8) appropriate to the number of audio channels connected to the VDR. If more than one Audio Channel is selected, the software will make the applicable number of Channel tabs available for data entry (see *Figure 17-12 - Audio Channel Information* below).

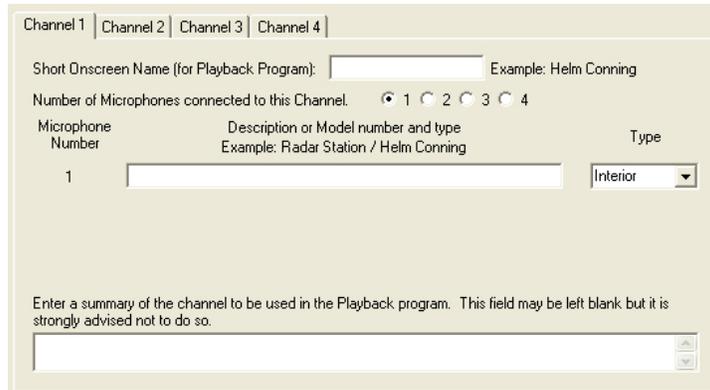


Figure 17-12 - Audio Channel Information

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The following fields are all contained within individual Audio Channel tabs. After entering all relevant information for the first Channel, click the 'Channel 2' tab and complete all fields. This information will have to be entered for each Audio Channel connected.

### Short Onscreen Name

Enter a name for the mixer which will be utilized by the Playback program. It is recommended to use a name that denotes the location of the mixer.

### Number of Microphones Connected to this Channel

Select the radio button (1, 2, 3, or 4) appropriate for the number of microphones connected to the audio channel. If more than one microphone is selected, the software will make the applicable number of "Microphone Number" rows available for data entry (see *Figure 17-12 - Audio Channel Information* above).

### Location of Microphone

Enter a brief description of the microphone. It is recommended to include such descriptors as location and type.

### Type

From the drop down box select the type of microphone used. Options available for selection are Interior, Exterior, UHF, VHF, PABX, Telephone, Intercom, and ECR Audio.

### Enter a Summary

Enter a complete description of the Channel and all connected microphones.

### 17.8 Navigation

The 'Navigation' tab requires the input of configuration information for the Wind Device, Depth Device, Heading Device, and Speed Device. It is also necessary to enter configuration information for the Global Positioning System (GPS). Each Device (and GPS) has its own button (see *Figure 17-13 – Navigation* below). To enter configuration information, the user must press the appropriate button to open a data entry window.

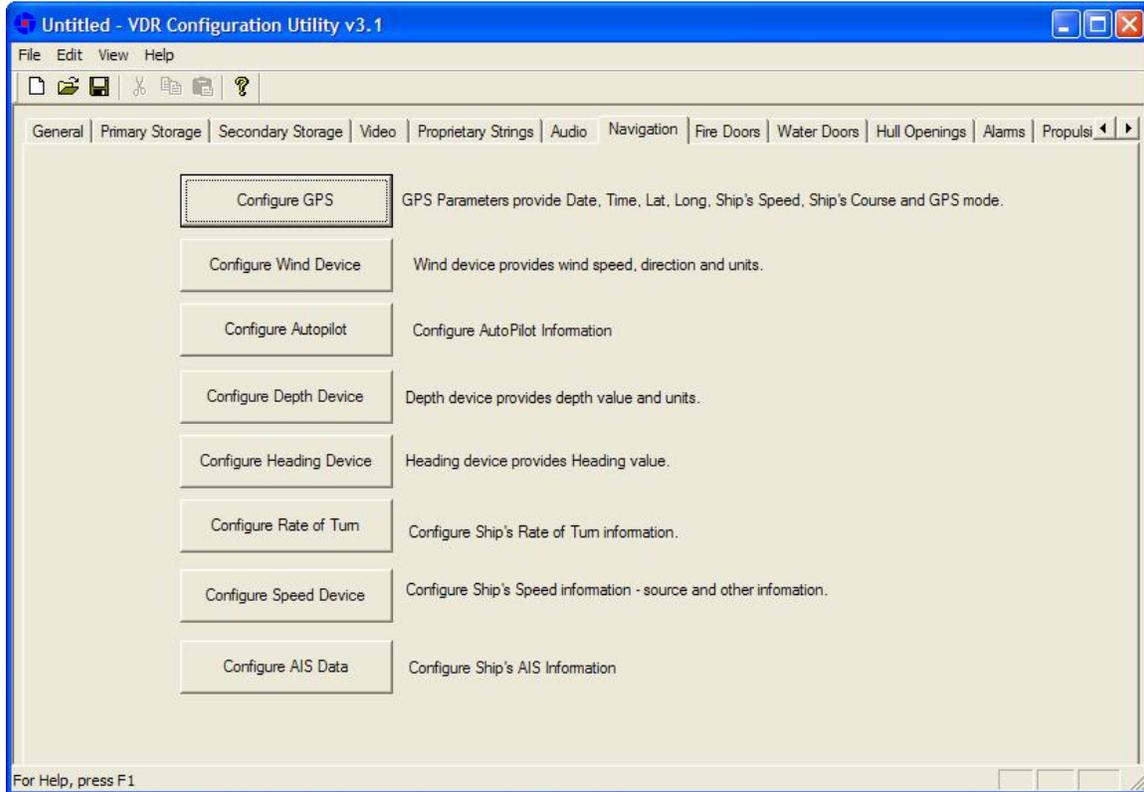


Figure 17-13 – Navigation

#### Configure GPS

By clicking the 'Configure GPS' button the user will open the 'Configure GPS Device' window (see *Figure 17-14 - Configure GPS Device* below). This window requires the input of GPS parameters including date, time, latitude, longitude, ship's speed, ship's course, and GPS mode.

#### GPS Manufacturer

Enter the name of the manufacturer of the configured GPS device.

#### GPS Model

Enter the model name/number of the configured GPS device.

#### GPS Location

Enter the location of the configured GPS device onboard the ship.

#### Talker ID

The first two alphanumeric characters of the NMEA sentence's Address Field identify the Talker. When entering the Talker ID for a GPS device, these two letters will always be "GP".

## Chapter 17: System Configuration File

### Input Channel on VDR

In most instances, the GPS will be connected directly to COM1 on the DMU. However, there are instances where this may not be the case. Options available for selection are Channel1, Channel2, Channel3, Channel4, and DataMux Channel.

### DataMux Channel

If the “DataMux Channel” option is selected in the “Input Channel on VDR” field, it will be necessary to enter the MUX channel to which the DataMux is connected.

Configure GPS Device

GPS Manufacturer:  GPS Model:

GPS Location:  Talker ID:

Input Channel on VDR:  DataMux Channel:

Enter below the NMEA sentences recorded by the VDR corresponding to the field listed at the left. For example, Date may be taken from the RMC or ZDA strings.

Date:  Sample string:

Time:  Sample string:

Latitude:  Sample string:

Longitude:  Sample string:

Course over Ground:  Sample string:

GPS Mode:  Sample string:

Datum:  Sample string:

Enter any additional information below that may be necessary - samples of other strings produced by the GPS or further information needed to assist in interpreting a non-standard string entered in the sample box.

Figure 17-14 - Configure GPS Device

For each of the available NMEA sentence drop-down fields (Date, Time, Latitude, Longitude, Course over Ground, GPS Mode, and Datum), select the appropriate string type and enter a sample string in the adjacent text field.

The following options are available in the various drop-down fields:

- **ZDA** – Time & Date
  - \$--ZDA,hhmmss.ss,xx,xx,xxxx,xx,xx\*hh<CR><LF>
- **RMC** – Recommended Minimum Specific GNSS Data
  - \$--RMC,hhmmss.ss,A,llll.ll,a,yyyy.yy,a,x.x,x.x,xxxxx,x.x,a\*hh<CR><LF>
- **GGA** – Global Positioning System Fix Data
  - \$--GGA,hhmmss.ss,llll.ll,a,yyyy.yy,a,x,xx,x.x,x.x,M,x.x,M,x.x,xxxx\*hh<CR><LF>
- **GLL** – Geographic Position – Latitude/Longitude
  - \$--GLL,llll.ll,a,yyyy.yy,a,hhmmss.ss,A,a\*hh<CR><LF>
- **VTG** – Course Over Ground and Ground Speed
  - \$--VTG,x.x,T,x.x,M,x.x,N,x.x,K,a\*hh<CR><LF>
- **DTM** – Datum Reference
  - \$--DTM,ccc,a,x.x,a,x.x,a,x.x,ccc\*hh<CR><LF>

### Configure Wind Device

By clicking the 'Configure Wind Device' the user will open the 'Configure Wind Device' window (see *Figure 17-15 - Configure Wind Device* below). This window requires the input of information relevant to the recording of wind speed and direction.

*Figure 17-15 - Configure Wind Device*

#### Wind Information

From the drop down box select the device or string from which wind information is collected. Options available for selection are MWV, VWR, NavAnalog, DataAnalog, or DataSynchro.

- **MWV** – Wind Speed and Angle
  - \$--MWV,x.x,a,x.x,a,A\*hh<CR><LF>
- **VWR** – Relative (Apparent) Wind Speed and Angle
  - \$--VWR,x.x,a,x.x,N,x.x,M,x.x,K\*hh<CR><LF>

#### Talker ID

The first two alphanumeric characters of the NMEA sentence's Address Field identify the Talker. When entering the Talker ID for a GPS device, these two letters will always be "GP".

### Configure Depth Device

By clicking the 'Configure Depth Device' the user will open the 'Configure Depth Device' window (see *Figure 17-16 - Configure Depth Device* below). This window requires the input of information relevant to ship depth.

Configure Depth Device

Depth may be configured for the DBT or DPT strings. Enter the other information needed here as indicated.

Depth Device Manufacturer:  Model Identifier:

Device Location:  Talker ID:

DataMux Channel:

String to use for Depth:  Field for Value:

Field for Units:

Sample of Depth String:

Enter any other information relating to depth below. This may include other Depth strings being recorded and a sample of each.

OK Cancel

Figure 17-16 - Configure Depth Device

#### Depth Device Manufacturer

Enter the name of the manufacturer of the depth device.

#### Device Location

Enter the ship location of the depth device.

#### Talker ID

The first two alphanumeric characters of the NMEA sentence's Address Field identify the Talker. When entering the Talker ID for a depth device, these two letters will typically be "SD".

#### DataMux Channel

Enter the DataMux channel to which the heading device is connected.

#### String to Use for Depth

From the drop down box select the string from which depth information is collected. Options available for selection are DBT (Depth Below Transducer) or DPT (Depth).

- **DBT** – Water depth referenced to the transducer
  - \$--DBT,x.x,f,x.x,M,x.x,F\*hh<CR><LF>
  - If DBT is selected from the drop-down box, the user must enter the appropriate **Field for Value** and **Field for Units**
- **DPT** – Water depth relative to the transducer and offset of the measuring transducer. Positive offset numbers provide the distance from the transducer to the waterline. Negative offset numbers provide the distance from the transducer to the part of the keel of interest.
  - \$--DPT,x.x,x.x,x.x\*hh<CR><LF>
  - If DPT is selected from the drop-down box, the user must enter the appropriate **Field for Depth to Transducer** and **Field for Depth below Transducer**

## Chapter 17: System Configuration File

### Sample of Depth String

Enter a sample of the depth string. See the DBT and DPT string formats provided in **String to Use for Depth** provided above.

### Configure Heading Device

By clicking the 'Configure Heading Device' the user will open the 'Configure Heading Device' window (see *Figure 17-17 - Configure Heading Device* below). This window requires the input of information relevant to ship heading.

Configure Heading Information

Heading may be configured for the HDG or HDT strings. Enter the other information needed here as indicated.

Heading Device Manufacturer:  Model:

Device Location:  Talker ID:

DataMux Channel:

String to use for Heading:  Field for Value:   
Field for Units:

Sample of Heading String:

Enter any other information relating to heading below. This may include other heading-related strings being recorded and a sample of each.

OK Cancel

Figure 17-17 - Configure Heading Device

### Heading Device Manufacturer

Enter the name of the manufacturer of the depth device.

### Device Location

Enter the ship location of the heading device.

### Talker ID

The first two alphanumeric characters of the NMEA sentence's Address Field identify the Talker. When entering the Talker ID for a heading device, these two letters will typically be "HC".

### DataMux Channel

Enter the DataMux channel to which the heading device is connected.

### String to Use for Heading

From the drop down box select the string from which heading information is collected. Options available for selection are HDT (Heading, True) or HDG (Heading, Deviation & Variation).

- **HDT** – Actual vessel heading in degrees True produced by any device or system producing true heading.
  - \$--HDT,x.x,T\*hh<CR><LF>
  - If HDT is selected from the drop-down box, the user must enter the appropriate **Field for Value** and **Field for Units**
- **HDG** – Heading (magnetic sensor reading), which if corrected for deviation, will produce Magnetic heading, which is offset by variation will provide True heading.
  - \$--HDG,x.x,x.x,a,x.x,a\*hh<CR><LF>

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- If HDG is selected from the drop-down box, the user must enter the appropriate **Field for Value**

### Sample of Heading String

Enter a sample of the depth string. See the HDT and HDG string formats provided in **String to Use for Depth** provided above.

### Configure Speed Device

By clicking the 'Configure Speed Device' the user will open the 'Configure Speed Source' window (see *Figure 17-18 - Configure Speed Device* below). This window requires the input of information relevant to ship speed.

Configure Speed Source

Use this dialog to configure the ship's speed source. This may be either a speed log, the GPS, or both.

Speed source on ship: **GPS** NOTE: GPS must be configured using the Configure GPS button on the Navigation page for the GPS parameters entered below to be effective.

GPS

Speed string: **RMC** Sample string:

Enter any other information relating to the speed log below. This may include other speed log strings being recorded and a sample of each.

Figure 17-18 - Configure Speed Device

### Speed Source on Ship

From the drop down box select the device from which ship speed information is collected. Options available for selection are GPS, Speed Log, or Both. The option selected will determine the information which will need to be entered in this window.

**GPS** is the default selection and will require the following information:

#### Speed String

From the drop down box select the appropriate speed string. Options available for selection are:

- **RMC** – Recommended Minimum Specific GNSS Data
  - \$--RMC,hhmmss.ss,A,llll.ll,a,yyyy.yy,a,x.x,x.x,xxxxx,x.x,a\*hh<CR><LF>
- **VBW** – Dual Ground/Water Speed
  - \$--VBW,x.x,x.x,A,x.x,x.x,A,x.x,A,x.x,A\*hh<CR><LF>
- **VDR** – Set and Drift
  - \$--VDR,x.x,T,x.x,M,x.x,N\*hh<CR><LF>

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- **VHW** – Water Speed and Heading
  - \$--VHW,x.x,T,x.x,M,x.x,N,x.x,K\*hh<CR><LF>
- **VTG** – Course Over Ground and Ground Speed
  - \$--VTG,x.x,T,x.x,M,x.x,N,x.x,K,a\*hh<CR><LF>

### Sample String

Enter a sample of the speed string. See the RMC, VBW, VDR, VHW, and VTG string formats provided in **Speed String** provided above.

If **Speed Log** is chosen from the 'Speed Source' drop-down box, a Speed Log section becomes visible in the 'Configure Speed Source' window (see *Figure 17-19 - Speed Log* below). The following information must be entered:

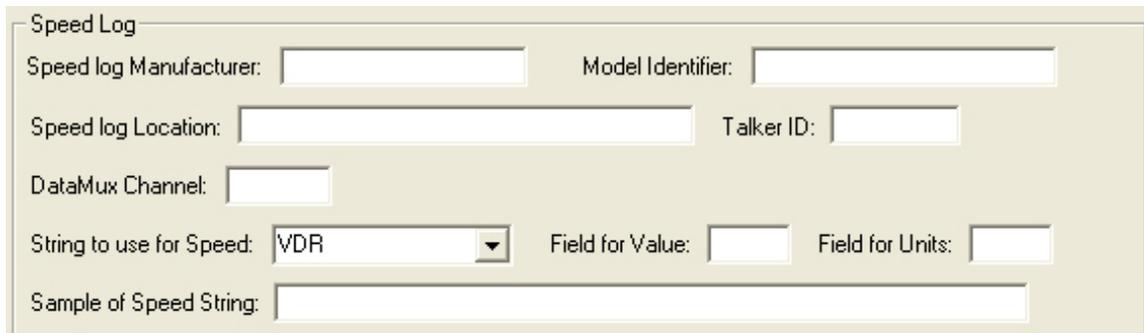


Figure 17-19 - Speed Log

### Speed Log Manufacturer

Enter the name of the speed log manufacturer.

### Speed Log Location

Enter the ship location of the speed log device.

### Talker ID

The first two alphanumeric characters of the NMEA sentence's Address Field identify the Talker. When entering the Talker ID for a speed log device, these two letters will typically be "VD", "VM", or "VW".

### DataMux Channel

Enter the DataMux channel to which the speed log device is connected.

### String to Use for Speed

From the drop down box select the string from which speed log information is collected. Options available for selection are VDR, VTG, VBW, VHW, or RMC (see **Speed String** above for format information on each of these strings).

### Sample of Speed String

Enter a sample of the speed string. See the RMC, VBW, VDR, VHW, and VTG string formats provided in **Speed String** provided above.

If **Both** is chosen from the 'Speed Source' drop-down box, both the **GPS** and **Speed Log** section becomes visible in the 'Configure Speed Source' window. Both sections must be completed following the outline provided for GPS and Speed Log above.

## 17.9 Fire Doors

The 'Fire Doors' tab requires the input of configuration information for the ship's Fire Doors (see *Figure 17-20 - Fire Doors* below).

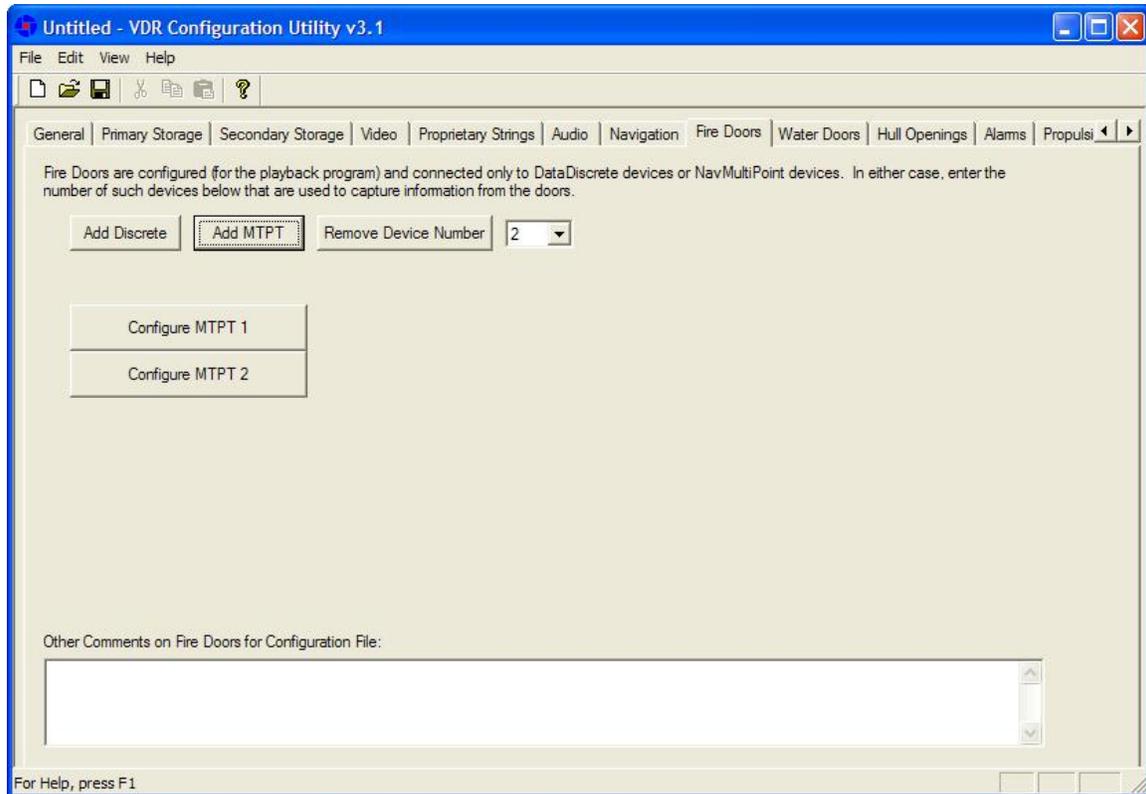


Figure 17-20 - Fire Doors

### Add Discrete or Add MTPT

To add a Discrete or MultiPoint device click the appropriate button provided ('Add Discrete' or 'Add MTPT').

Once the appropriate device has been added a "Configure Device" button becomes visible (this occurs for each "Add Discrete" or "Add MTPT" button-press). To configure the device, press the associated button.

If a Discrete or MultiPoint button is added incorrectly, it can be removed by selecting the number of the incorrect device from the "Remove Device Number" drop-down box and clicking the "Remove Device Number" button. In *Figure 17-20 - Fire Doors* above, device number 2 has been selected in the drop-down box for removal; once the "Remove Device Number" button is clicked in this example, the "Configure MTPT 2" will be removed.

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### Configure Device

Enter information specific to the DataDiscrete or NavMultiPoint device, dependant upon which device you have chosen to add (see *Figure 17-21 - Configure DataDiscrete Device* below). The following information must be entered:

Field(s) To Be Configured	Description of value associated with bit (e.g. alarm text to display) where applicable	Onscreen Name (Max 15 chars)	Type of Control
<input checked="" type="checkbox"/> A1		Door 6188	Open/Closed (Open=0)
<input checked="" type="checkbox"/> A2		Door 6186	Open/Closed (Open=0)
<input checked="" type="checkbox"/> A3		Door 6158	Open/Closed (Open=0)
<input checked="" type="checkbox"/> A4		Door 6131	Open/Closed (Open=0)
<input checked="" type="checkbox"/> A5		Door 6124	Open/Closed (Open=0)
<input checked="" type="checkbox"/> A6		Door 6109	Open/Closed (Open=0)
<input checked="" type="checkbox"/> B1		Door 6104	Open/Closed (Open=0)
<input checked="" type="checkbox"/> B2		Door 6091	Open/Closed (Open=0)
<input checked="" type="checkbox"/> B3		Door 6102	Open/Closed (Open=0)
<input checked="" type="checkbox"/> B4		Door 6082	Open/Closed (Open=0)
<input checked="" type="checkbox"/> B5		Door 6073	Open/Closed (Open=0)
<input checked="" type="checkbox"/> B6		Door 6056	Open/Closed (Open=0)
<input checked="" type="checkbox"/> C1		Door 6055	Open/Closed (Open=0)
<input checked="" type="checkbox"/> C2		Door 6054	Open/Closed (Open=0)
<input checked="" type="checkbox"/> C3		Door 6053	Open/Closed (Open=0)
<input checked="" type="checkbox"/> C4		Door 6026	Open/Closed (Open=0)
<input checked="" type="checkbox"/> C5		Door 6033	Open/Closed (Open=0)
<input checked="" type="checkbox"/> C6		Door 6016	Open/Closed (Open=0)
<input checked="" type="checkbox"/> D1		Door 6021	Open/Closed (Open=0)
<input checked="" type="checkbox"/> D2		Door 6014	Open/Closed (Open=0)
<input checked="" type="checkbox"/> D3		Door 6019	Open/Closed (Open=0)
<input checked="" type="checkbox"/> D4		Door 5177	Open/Closed (Open=0)
<input checked="" type="checkbox"/> D5		Door 5179	Open/Closed (Open=0)
<input checked="" type="checkbox"/> D6		Door 3181	Open/Closed (Open=0)

Figure 17-21 - Configure DataDiscrete Device

#### MUX Channel

Enter the MUX channel to which the DataDiscrete or NavMultiPoint is connected.

#### Full NMEA Identifier

Enter the NMEA identifier for the device being configured. For example, the first DataDiscrete would have a *DIS01* identifier. Note that '\$' should **not** be entered as a part of the identifier into these text fields as it is added automatically in the INI file.

#### Field(s) to be Configured

Check the appropriate number of checkboxes to indicate which fields must be configured (are connected to fire doors).

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### Description of Value

For each checkbox (Field(s) to be Configured) marked with a check, a description of the value associated with that field should be entered. For example, a user may enter "Firedoor #1" as a value description.

### Onscreen Name

Enter an onscreen name for the field being configured. For example, a user may enter "Firedoor #1" as an onscreen name. This name will be used for the door in the playback software and is **limited to 15 characters**.

### Type of Control

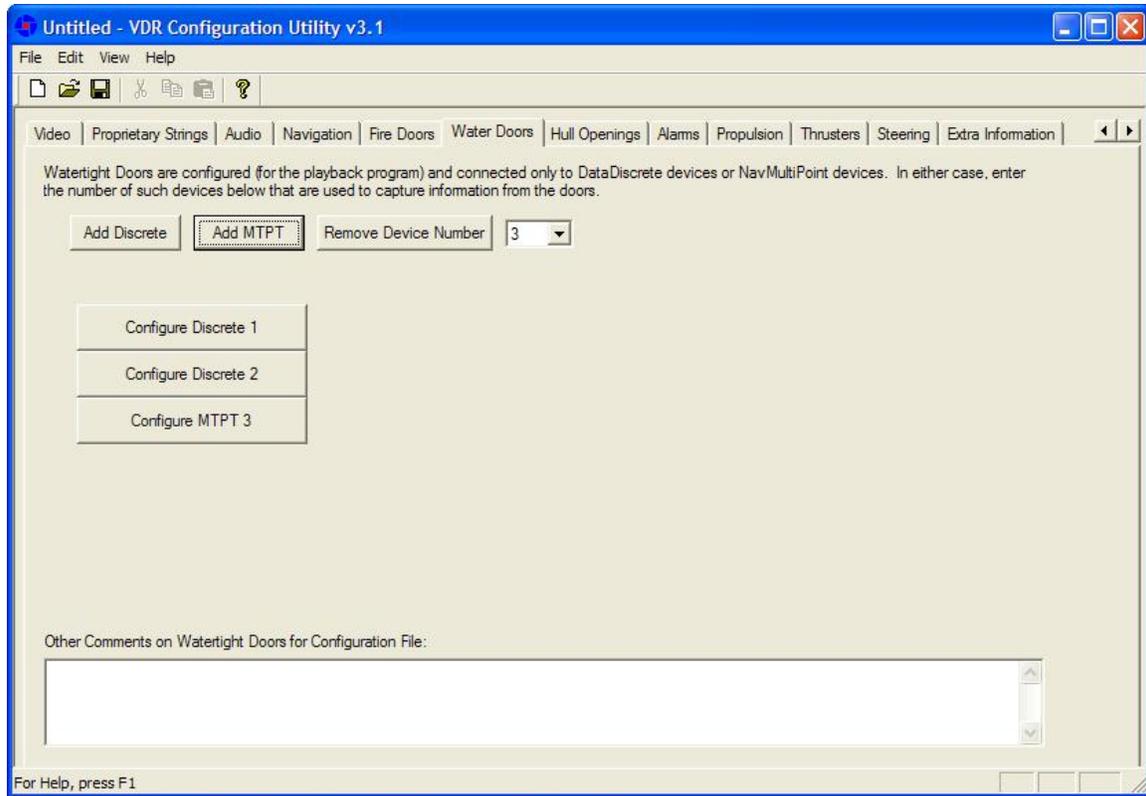
From the drop down box select the type of control associated with the appropriate field. Options available for selection are ON/OFF (ON=0), ON/OFF (ON=1), Open/Closed (Open=0), or Open/Closed (Open=1).

Once all necessary information has been entered press the 'OK' button to save and close the Configure Device window.

To add and configure more than one device, select the appropriate device radio button and press the "Configure Device x" (where 'x' represents the device number) that becomes visible. Repeat the steps provided above to configure the device.

### 17.10 Water Doors

The 'Water Doors' tab requires the input of configuration information for the ship's Watertight Doors (see *Figure 17-22 - Water Doors* below).



*Figure 17-22 - Water Doors*

#### **Add Discrete or Add MTPT**

To add a Discrete or MultiPoint device click the appropriate button provided ('Add Discrete' or 'Add MTPT').

Once the appropriate device has been added a "Configure Device" button becomes visible (this occurs for each "Add Discrete" or "Add MTPT" button-press). To configure the device, press the associated button.

If a Discrete or MultiPoint button is added incorrectly, it can be removed by selecting the number of the incorrect device from the "Remove Device Number" drop-down box and clicking the "Remove Device Number" button. In *Figure 17-22 - Water Doors* above, device number 3 has been selected in the drop down box for removal; once the "Remove Device Number" button is clicked in this example, the "Configure MTPT 3" will be removed.

#### **Configure Device**

Enter information specific to the DataDiscrete or NavMultiPoint device, dependant upon which device you have chosen to add (see *Figure 17-21 - Configure DataDiscrete Device* above). For a description of the information to be entered in the device configuration window, refer to the *Configure Device* section of the *Fire Doors* section above.

## 17.11 Hull Openings

The 'Hull Openings' tab requires the input of configuration information for the ship's Hull Openings (see *Figure 17-23 - Hull Openings* below).

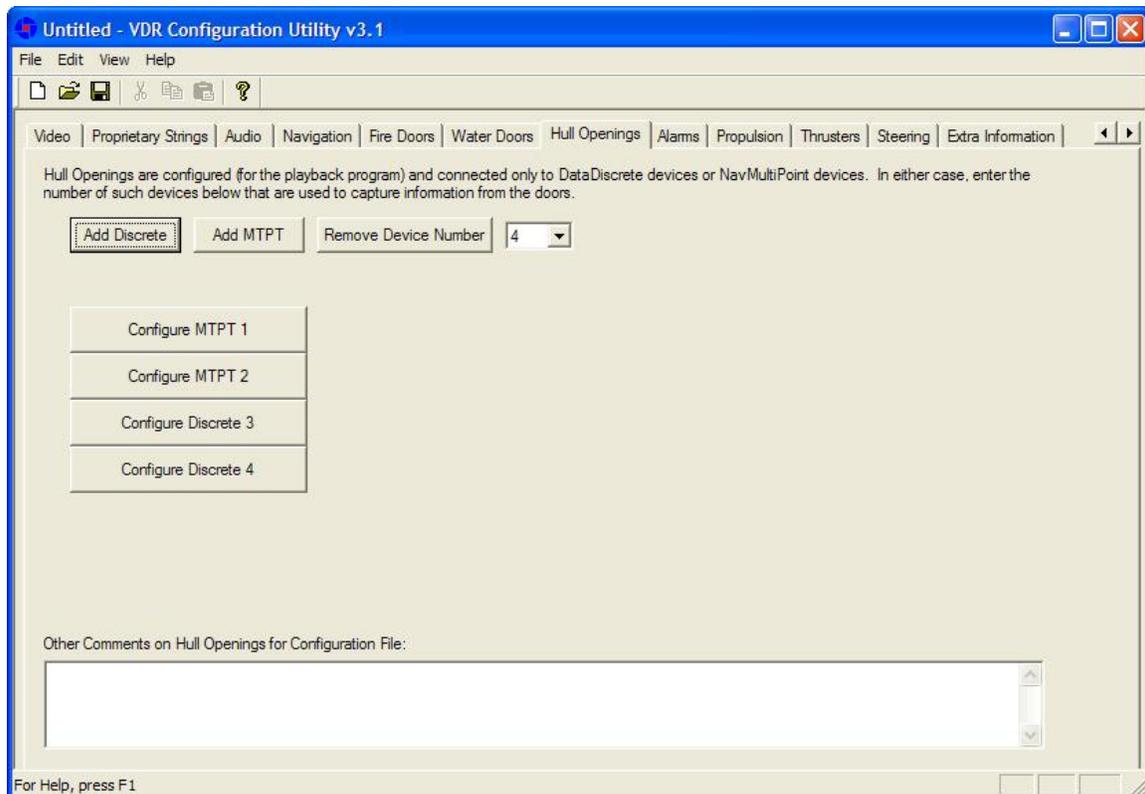


Figure 17-23 - Hull Openings

### Add Discrete or Add MTPT

To add a Discrete or MultiPoint device click the appropriate button provided ('Add Discrete' or 'Add MTPT').

Once the appropriate device has been added a "Configure Device" button becomes visible (this occurs for each "Add Discrete" or "Add MTPT" button-press). To configure the device, press the associated button.

If a Discrete or MultiPoint button is added incorrectly, it can be removed by selecting the number of the incorrect device from the "Remove Device Number" drop-down box and clicking the "Remove Device Number" button. In *Figure 17-23 - Hull Openings* above, device number 4 has been selected in the drop down box for removal; once the "Remove Device Number" button is clicked in this example, the "Configure Discrete 4" will be removed.

### Configure Device

Enter information specific to the DataDiscrete or NavMultiPoint device, dependant upon which device you have chosen to add (see *Figure 17-21 - Configure DataDiscrete Device* above). For a description of the information to be entered in the device configuration window, refer to the *Configure Device* section of the *Fire Doors* section above.

### 17.12 Alarms

The 'Alarms' tab requires the input of configuration information for the ship's alarms (see *Figure 17-24 – Alarms* below).

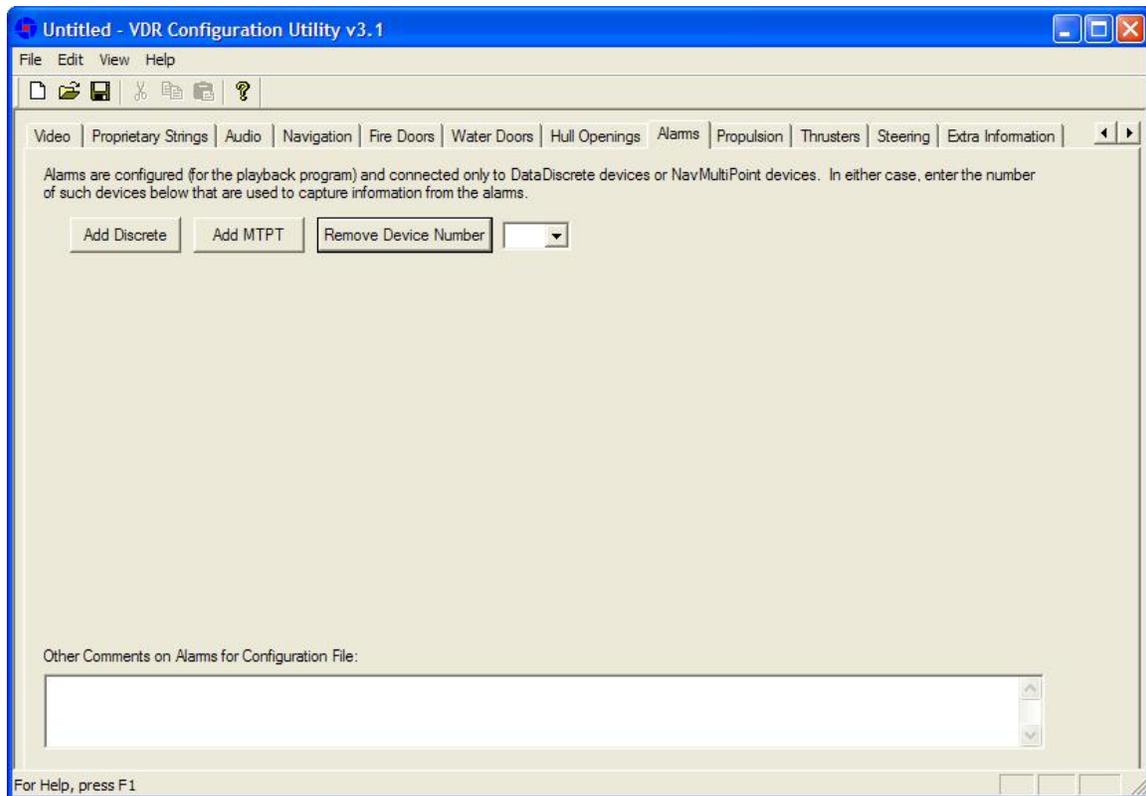


Figure 17-24 – Alarms

#### Add Discrete or Add MTPT

To add a Discrete or MultiPoint device click the appropriate button provided ('Add Discrete' or 'Add MTPT').

Once the appropriate device has been added a "Configure Device" button becomes visible (this occurs for each "Add Discrete" or "Add MTPT" button-press). To configure the device, press the associated button.

If a Discrete or MultiPoint button is added incorrectly, it can be removed by selecting the number of the incorrect device from the "Remove Device Number" drop-down box and clicking the "Remove Device Number" button.

#### Configure Device

Enter information specific to the DataDiscrete or NavMultiPoint device, dependant upon which device you have chosen to add (see *Figure 17-21 - Configure DataDiscrete Device* above). For a description of the information to be entered in the device configuration window, refer to the *Configure Device* section of the *Fire Doors* section above.

### Selecting Alarms to Display

When selecting alarms to display, consideration should be given to the nature of the alarm. For example, many ships have a bridge alarm indicating engine start air pressure low. While this is an important piece of information, it is not a crucial alarm because it is often always active while a ship is sailing. If this alarm is selected in the VDR Configuration Utility, a constant alarm will be apparent during the playback of data. Therefore, alarms should be limited to items such as fire alarms, equipment failures, and items that indicate some type of emergency. All other lesser alarm indicators can be recorded in the information section at the bottom of the Alarms tab.

## 17.13 Propulsion

The 'Propulsion' tab requires the input of configuration information for the ship's propulsion system (see *Figure 17-25 - Propulsion* below). The entered information also configures Shafts, Azipods, and Waterjets.

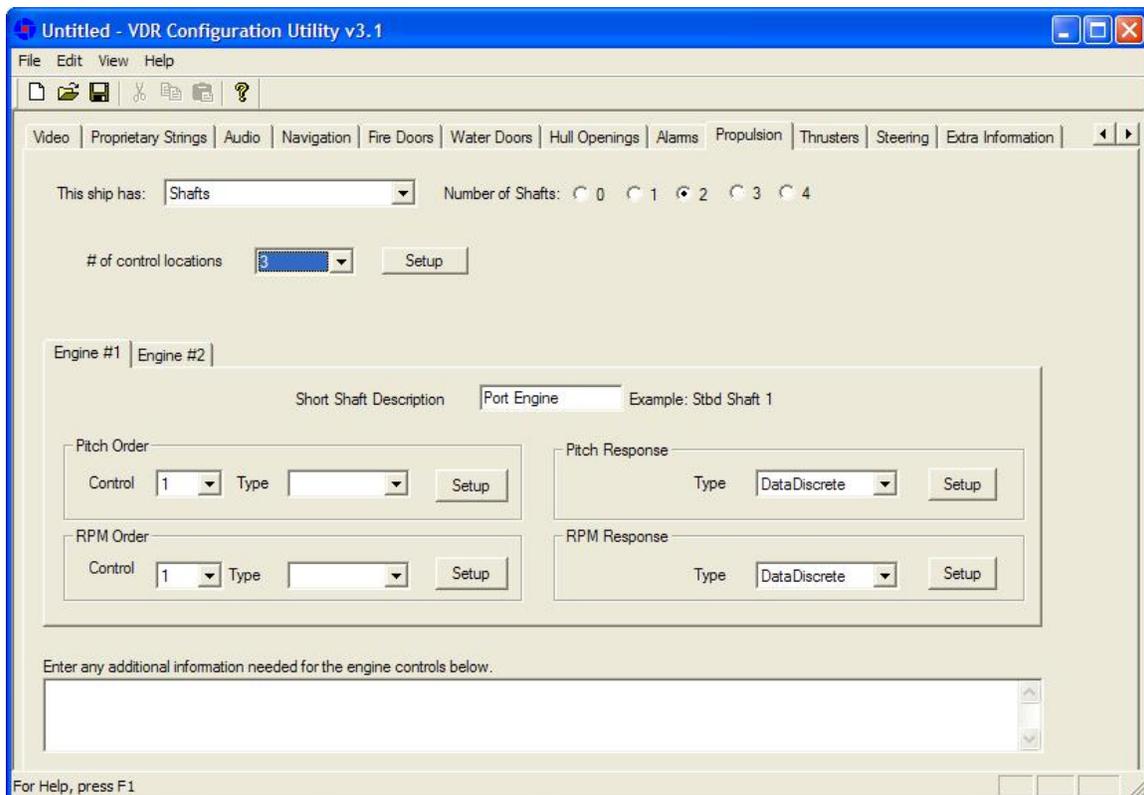


Figure 17-25 - Propulsion

### This Ship Has

From the drop down box(es) select the type of propulsion system in use. Options available for selection in the first drop-down box are Shafts, Azipods, and Waterjets.

Dependant on the propulsion system available aboard a particular ship and the number of systems chosen (via the "Number of Systems" radio buttons), information will need to be added for the components of that system in the tabbed sections at the bottom of the window.

### Number of Control Locations

The number of control locations refers only to the engine RPM or pitch order and will need to be provided **only** if more than one signal appears in the data for a single engine order. For example, if an analog device supplies 3 different fields for Port Wing, Stbd Wing and bridge engine order, then 3 control locations will be needed. If the engine order is taken from the same field for all locations, then only a single control location needs to be specified. If this pull-down box is not used, then it is assumed that there is only single signal denoting engine order. An example of this is as follows:

```
Engine Data is on 13$ANL02
  Channel 1 Pitch Order (Stbd Wing)
  Channel 2 Pitch Order (Bridge)
  Channel 3 Pitch Order (Port Wing)
```

In the above example, 3 locations are needed. The control location is normally specified via a DataDiscrete and is setup by clicking on the “Setup” button found to the right of the pull down box (for specifying number of control locations.)

The “Setup” button located next to the “# of Control Locations” pull down box and is used to provide discrete information for control locations. At this time, only a DataDiscrete device can be used to indicate the location of control. Clicking the button will cause a “Configure DataDiscrete” window to appear (see *Figure 17-21 - Configure DataDiscrete Device*).

The control locations are configured in order, i.e, the first point configured on the DataDiscrete will correspond to control location 1, the second corresponds to control location 2, etc.

### Engine Description

In the tabbed sections, enter information relevant (for example, Order and Response) to the propulsion system chosen. Provide a descriptive name for the engine in question that will allow a Playback software user to recognize it. For example, the first Starboard Engine could be named Stbd Engine 1.

### 17.13.1 NMEA Engine Data on Conditional Sentence – Example 1

The following example illustrates a sample setup for a ship with engines that broadcast NMEA data sentences. The example uses a Rolls-Royce KaMeWa system, which broadcasts a number sentence with the \$PRRS message. To understand the setup, the sentence format must first be understood. In this example, the sentence appears as follows:

```
$PRRS,no,val1,val2,val3,val4,val5,val6,val7,val8,val9,val10,val11,*hh<CR><LF>
```

Note that the string number field (“no”) specifies the equipment from which the sentence is broadcast. The interpretation of each string value field (“valX”) is dependant upon the string number field. For example, the value in the first string value field (“val1”) is interpreted as a Lever Command only if a “6” appears in the string number field. As a result, this string is called a conditional sentence.

This example illustrates how to complete the Engine #1 tab if the sentence is broadcast from the port propeller.

Message Item	Format	Range	Unit	Usage
Header	\$PRRS	\$PRRS		\$P = Proprietary data RRS = Rolls Royce Sweden
No	6	6		1 = Outer water jets 2 = Water jet rpm commands 3 = Inner water jets 4 = Bow tunnel thruster 5 = Stern tunnel thruster 6 = Port main propeller 7 = Stbd main propeller
Val1	Real	-100 ... +100	%	Lever Command
Val2	Real	-100 ... +100	%	Pitch Response
Val3	Real	-100 ... +100	%	RPM command
Val4	Real	-100 ... +100	%	RPM response
Val5				
Val6				
..				
..				

Table 17-1 - \$PRRS String Values - Example

1. In the “Pitch Order” section, choose the data type from the associated (“Type”) drop-down box. For this example, select “NMEA data”.

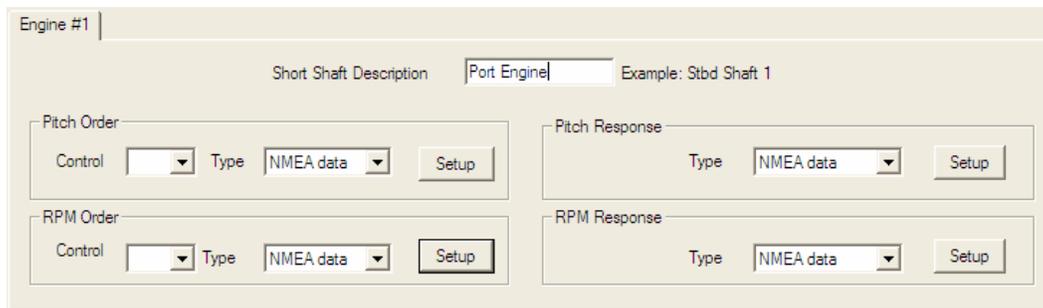
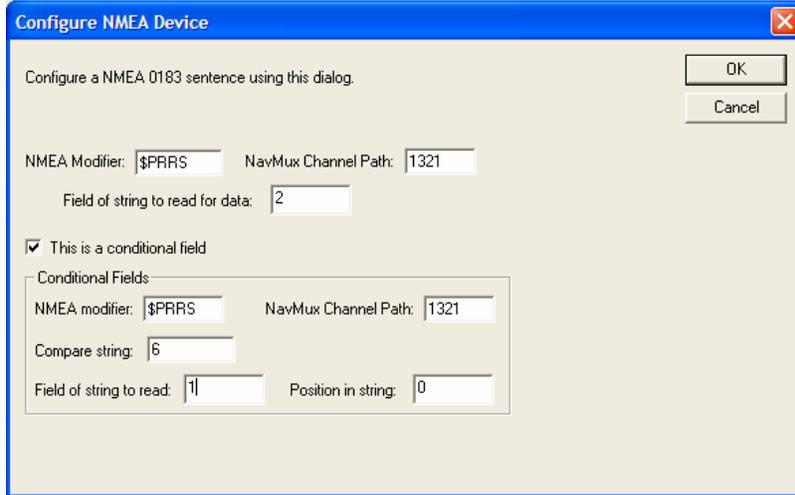


Figure 17-26 - Engine Description - Example

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2. Setup the Lever Command. Click the adjacent “Setup” button and enter the values as shown in *Figure 17-27 - Lever Command Setup - Example* below. In the “Configure NMEA Device” window shown in this figure the target value is specified to read from field 2 if a “6” appears in field 1. Then press the “OK” button.
3. The remaining items (RPM Order, Pitch Response, and RPM Response) are set up in the same manner as “Pitch Order” in Step 2 above.



*Figure 17-27 - Lever Command Setup - Example*

### 17.13.2 NMEA Data from XDR Sentence – Example 2

This second example for configuring a NMEA 0183 sentence will use the XDR sentence. This is a common sentence defined in both the IEC61162 and NMEA 0183 standards. It makes use of tags or identifiers to broadcast multiple pieces of information using the same sentence. For example, in a XDR sentence, 4 fields (a, x.x, a, c-c) identify the Transducer Type, Measurement, Units of Measurement, and Transducer ID. These four (4) fields may be repeated up to 6 times (for a total of 24 fields) in 1 string.

```
$--XDR,a, x.x, a, c—c,.....,a, x.x, a, c—c,*hh<CR><LF>
```

```
| | | |
```

```
| | | ----- Transducer ID (Tag)
```

```
| | ----- Units of measurement
```

```
| ----- Measurement
```

```
----- Transducer Type, Transducer #1
```

In this case, the XDR sentence can be broadcast multiple times from the same system to display values. For example:

```
11$ERXDR,T,78.0,R,MC042,T,78.1,R,MC043*58
```

In this case, view the groups of 4.  
T – transducer type = Tachometer  
0 – measurement = 78.0  
R – units = R = RPM  
MC042 – Transducer ID tag identifying engine actual RPM (this will vary between systems).

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A second measurement appears in the second group of 4 fields, possibly indicating engine ordered RPM. Now we can set up the values for playback. This example will be similar to the example in *Section 17.13.1 - NMEA Engine Data on Conditional Sentence – Example 1* in that NMEA data is specified.

Once the Setup button to configure the applicable NMEA device is pressed, information as illustrated in Figure 17-28 - XDR String - Example should be entered. In the figure below, the playback will look in field 4 to find the string 'MC042', if it is found, it will display the measurement found in field 2. If the string 'MC042' is not found in field 4, then the playback will assume that the string does not indicate the engine RPM, but another value.

Configure a NMEA 0183 sentence using this dialog.

NMEA Modifier:  NavMux Channel Path:

Field of string to read for data:

This is a conditional field

Conditional Fields

NMEA modifier:  NavMux Channel Path:

Compare string:

Field of string to read:  Position in string:

Figure 17-28 - XDR String - Example

## 17.14 Thrusters

The 'Thrusters' tab requires the input of configuration information for the ship's thrusters (see *Figure 17-29 - Thrusters* below). If there are no thrusters in use on the vessel, it is only necessary to select the '0' radio button associated with 'Number of Thrusters'.

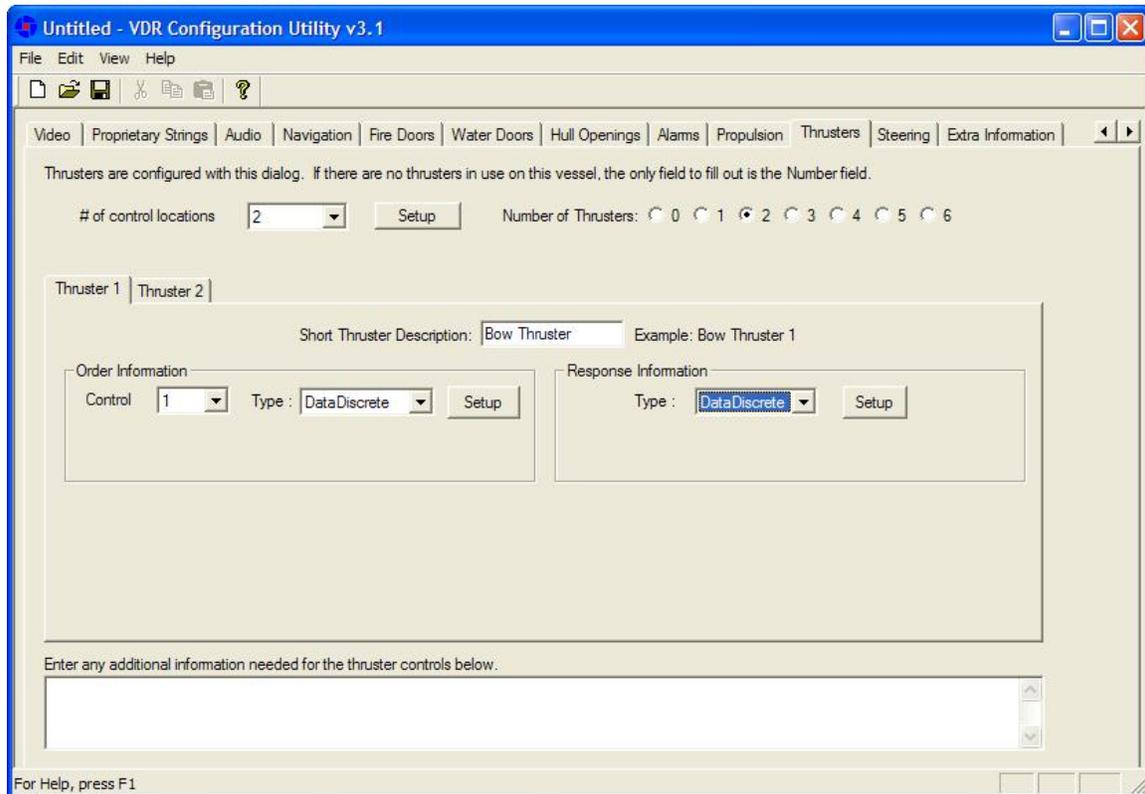


Figure 17-29 - Thrusters

### Number of Thrusters

Dependant on the number of thrusters selected (via the "Number of Thrusters" radio buttons), information will need to be added for those thrusters in the tabbed sections at the bottom of the window.

### # of Control Locations

See the "*# of Control Locations*" section under the *Propulsion* heading above for a description of the use of control locations and their setup. Note that while the control information may be the same, it must be entered separately for engines and thrusters.

### Thruster Description

In the tabbed sections, enter information relevant (for example, Order and Response) to the applicable thruster. In the "Short Thruster Description" field, provide a descriptive name for the engine in question that will allow a Playback software user to recognize it (for example, Bow Thruster 1).

Order and Response information (as well as, in some cases, Fixed Information) will need to be added, including the "Type" of input device recording that information. It will be necessary to

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configure the entered input device. Click the 'Setup' button and enter the relevant information in the configure device window.

Where more than one (1) control location is specified, a location must be selected prior to selecting an input device. For example, the following steps would be completed to configure a ship with three (3) control locations on the thruster order.

1. Select the number of thrusters via the radio buttons.
2. Select Thruster 1 via the tab selection.
3. Select the number of control locations (3).
4. On the Thruster 1 tab:
  - a. Select Control location 1.
  - b. Select the input device type.
  - c. Click Setup and enter the order data.
  - d. Repeat A, B and C for control locations 2 & 3.
  - e. Select an input device for response.
  - f. Click Setup to enter response data.
5. Repeat step 4 for All additional thrusters.

## 17.15 Steering

The 'Steering' tab requires the input of configuration information for the ship's steering system (see *Figure 17-30 – Steering* below).

### Number of Rudders

Select the appropriate radio button in order to indicate the 'Number of Rudders'. If azipods are the propulsion method, 'Number of Azipods' will appear in place of 'Number of Rudders' and the radio button selection will default to the number of azipods selected earlier under the *Propulsion* tab. That number will also be represented in the number of Rudder/Azipod information tabs visible.

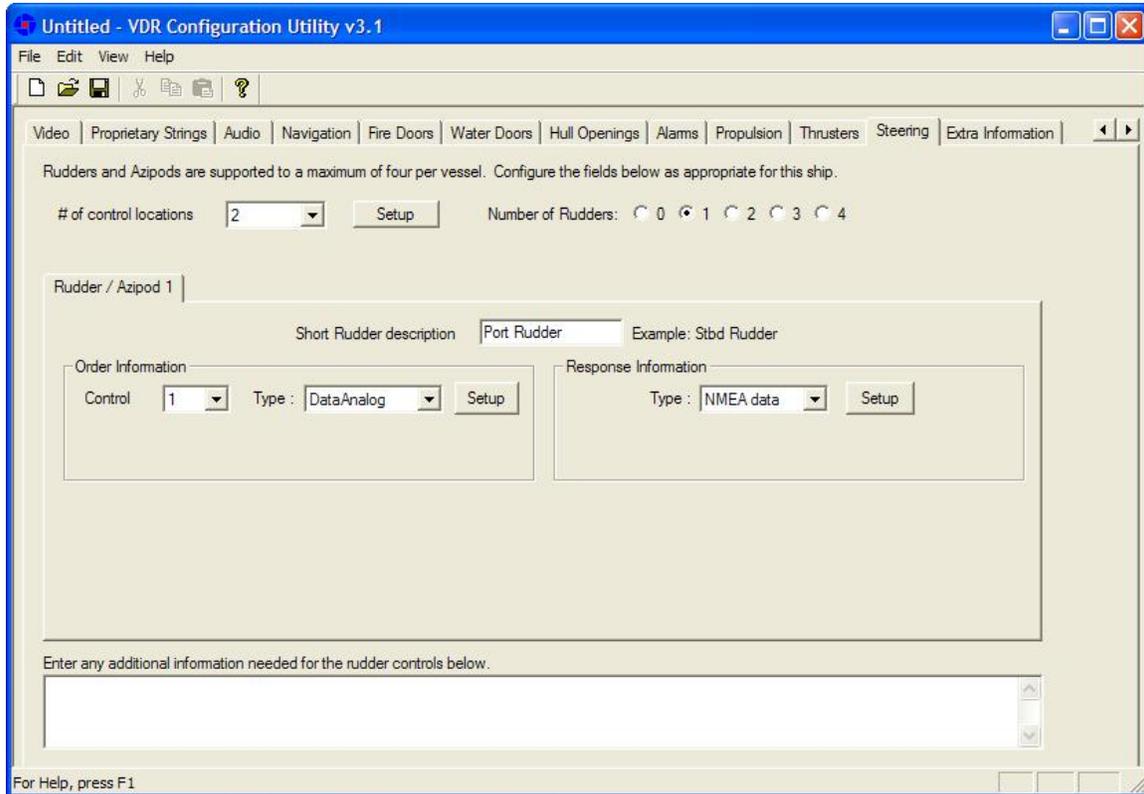


Figure 17-30 – Steering

### Short Rudder Description

Provide a descriptive name for the applicable rudder/azipod that will allow a Playback software user to recognize it. For example, the first Starboard Rudder could be named Stbd Rudder.

Order and Response information will need to be added, including the type of input device recording that particular information. It will be necessary to configure the entered input device. Click the 'Configure Rudder/Azipod x Input Device(s)' button and enter the relevant information in the configure device window. Refer to "*How to Input Thruster Data*" in the *Thrusters* section for instructions on setting up control locations and the input of data for each location.

### Additional Steering Notes

Note that "# of control locations" does not refer to the setting up of steering modes (i.e., FU, NFU, trackpilot, Override, Autopilot, etc.). This only refers to instances where more than 1 signal is

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used to specify a single rudder order, and the Discrete interfaces specified are used to determine which signal is the correct one to use.

### 17.15.1 Two Rudders with Two Steering Locations – Example 1

This example is for a ship that has two (2) rudders controlled from two (2) locations (port and stbd control locations). Signals for the rudders are independent, which makes it necessary to specify both control locations (if the signals were available at a common location, there would be no need to specify control locations).

In a situation where there are two (2) control locations, the station in command must be indicated (normally via a data discrete device). For example, data from the port control station could be provided on Data Analog 01 (\$ANL01) in field 1 and data from the stbd control location on \$ANL01 in field 3. In this case, a separate signal must be present which indicates which station is in command.

1. To set up control locations, first indicate the number of control locations (in this case, two) on the pull-down box on the main rudders tab.
2. Press the setup button to open a data discrete setup window.

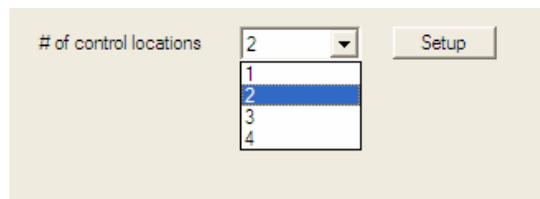


Figure 17-31 - Control Locations - Example

3. In this situation the DataDiscrete is set up in the same manner as any other application of the data discrete device. The first entry in the discrete contact list corresponds to control location #1 by default; the second belongs with #2, and so on. The Onscreen Name is not used in this page. Press “OK” to return to the rudder setup page.

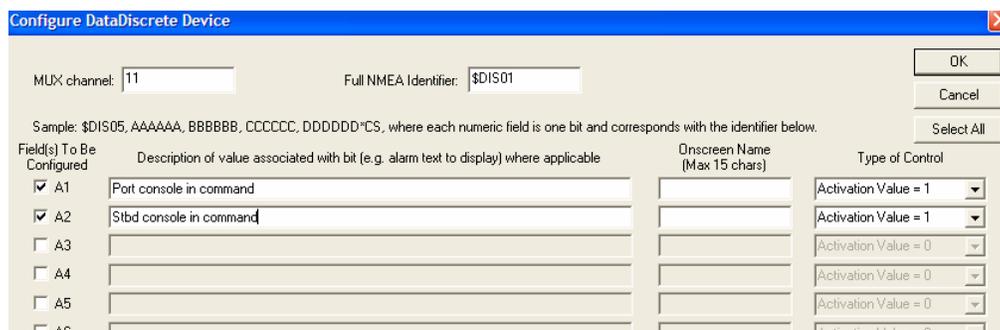


Figure 17-32 - DataDiscrete Configuration - Example

4. It is now necessary to set the number of rudders. Select the number of rudders using the available “Number of Rudders” radio buttons.
5. A number of tabs will appear corresponding to the number of rudders selected. For the first rudder, in the “Order Information” section, select “1” from the “Control” drop down box. Select the data source in the adjacent ‘Type’ drop down box (in most situations, the data source will be a Data Analog device).

## Chapter 17: System Configuration File

6. Press the “Setup” button to input the data for the Data Analog device. This setup is standard for propulsion, rudder, and thruster data provided by a Data Analog device.

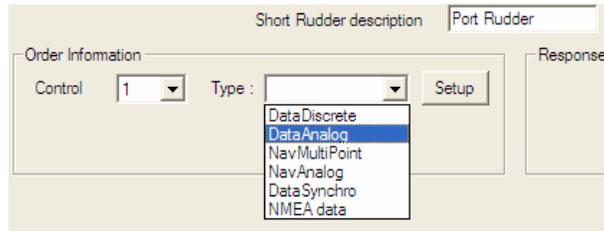


Figure 17-33 - Control Type - Example

7. When the ‘Configure a DataAnalog Device’ window appears, the Mux channel and NMEA Identifier should be specified as shown below. The field in which the data appears must also be specified.
8. Once this data field has been selected, pressing the “Configure Data Points” button will open an additional window that allows the installation technician to specify what values on the DataAnalog correspond to exact rudder positions. In each case, it is important to specify the extreme range of the rudder and also include the midship or ‘0’ position.
9. Once all the rudder position data has been entered for rudder # 1 order, select “Control Location” number “2” from the Order Information box and repeat the above steps to enter all pertinent order information for the second (STBD) control station.

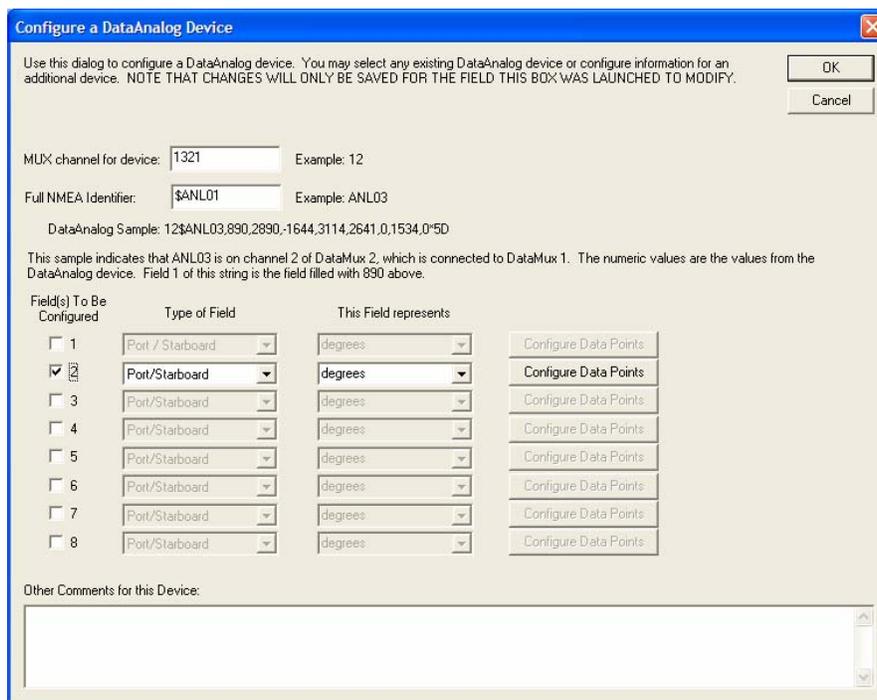


Figure 17-34 - DataAnalog Configuration - Example

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Configure Analog Field Values

Enter the values here that relate the analog output to the actual instrument value. For example, an engine that ranges from 100% astern to 100% ahead may have the following entries:

100% Ahead	4060	20% Astern	-780
80% Ahead	3300	40% Astern	-1690
60% Ahead	2460	60% Astern	-2440
40% Ahead	1680	80% Astern	-3350
20% Ahead	800	100% Astern	-4050
STOP	80		

Enter the STOP value in the fields below as 0.

Actual Instrument Value			DataAnalog Value
<input type="text" value="35"/>	*	<input checked="" type="radio"/> Port <input type="radio"/> Starboard	<input type="text" value="2458"/>
<input type="text" value="30"/>	*	<input checked="" type="radio"/> Port <input type="radio"/> Starboard	<input type="text" value="2145"/>
<input type="text" value="20"/>	*	<input checked="" type="radio"/> Port <input type="radio"/> Starboard	<input type="text" value="1526"/>
<input type="text" value="10"/>	*	<input checked="" type="radio"/> Port <input type="radio"/> Starboard	<input type="text" value="745"/>
<input type="text" value="0"/>	*	<input type="radio"/> Port <input checked="" type="radio"/> Starboard	<input type="text" value="-12"/>
<input type="text" value="10"/>	*	<input type="radio"/> Port <input checked="" type="radio"/> Starboard	<input type="text" value="-765"/>
<input type="text" value="20"/>	*	<input type="radio"/> Port <input checked="" type="radio"/> Starboard	<input type="text" value="-1498"/>
<input type="text" value="30"/>	*	<input type="radio"/> Port <input checked="" type="radio"/> Starboard	<input type="text" value="-2167"/>
<input type="text" value="35"/>	*	<input type="radio"/> Port <input checked="" type="radio"/> Starboard	<input type="text" value="-2349"/>
<input type="text"/>	*	<input checked="" type="radio"/> Port <input type="radio"/> Starboard	<input type="text" value="0"/>

Figure 17-35 - Analog Field Values - Example

### 17.16 Extra Information

The text box provided under the 'Extra Information' tab allows an area for the user to enter any additional information regarding the ship's configuration which he/she feels may be relevant to the VDR installation in question.

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## 18 PLAYBACK SOFTWARE

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The playback module accompanies the base model VDR and is resident on the download client PC. Additional playback software is available for use in shore-side offices. This additional software is necessary for the playback of data on the RSM or other media once it has been removed from the ship and transported to the office environment.



**Important! The computer on which the Playback application is being installed must have its regional and language options adjusted to English.** This may be done by double clicking the 'Regional Options' icon in the Control Panel window and selecting 'English' from the language drop down list. It is recommended that either 'English (United States)' or 'English (Canada)' is selected. However, any of the available English options are acceptable.

The Playback application has two modes of operation. In Playback mode, the user can replay saved data sets. In Real Time Display mode, the Playback application will replay real time Audio and NMEA data that is received from the VDR. Audio data is not available during Real Time Display mode.

### 18.1 Playback Installation - Client/Standalone PC

The installation of playback software is automated and requires little interaction. The install is performed via a self-extracting executable file and is automatically installed to the **C:\Program Files\Rutter\VDR** directory, with a shortcut placed on the Windows desktop. The install file will normally be named "Install VDR Playback.exe".

To begin the installation, complete the steps listed below:

1. On the installation CD, double click the file 'Install VDR Playback.exe'.

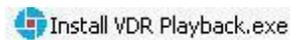


Figure 18-1 - Installation Executable File

2. Choose the directory to which the executable will be installed.



Figure 18-2 - Choose Installation Directory

## Chapter 18: Playback Software

3. A prompt will appear asking the user to clarify creating the install directory. Click **Yes** to create it. If **No** is chosen the user will be prompted to choose an alternative directory.

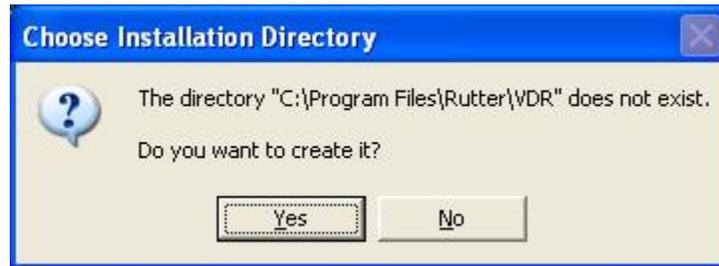


Figure 18-3- Choose Installation Directory

After clicking “yes” to create the installation directory the following prompt will appear indicating the status of the installation.

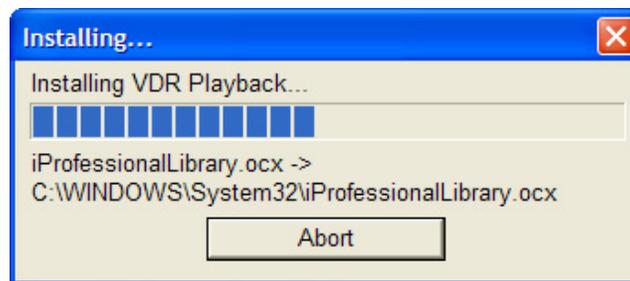


Figure 18-4 - Installing Message Window



**Note!** To stop the installation, click the ‘Abort’ button on the ‘Installing...’ message window.

4. Click **Yes** to reboot computer to finish the VDR Playback installation. Clicking **No** will allow a reboot at a later time.



Figure 18-5 - Reboot warning

When the installation is complete, a shortcut to VDR Playback will be placed on the Windows desktop.

## 18.2 Starting the Playback Application

To start the playback application, double click the playback icon located on the desktop (as mentioned in step 4 of the installation process above). The application will look similar to *Figure 18-6 - Playback Software* shown below.

Please note the playback application interprets information provided in the ship's *vdr-cfg.txt* file. Therefore, the playback interface may contain elements and controls different from what appears below.

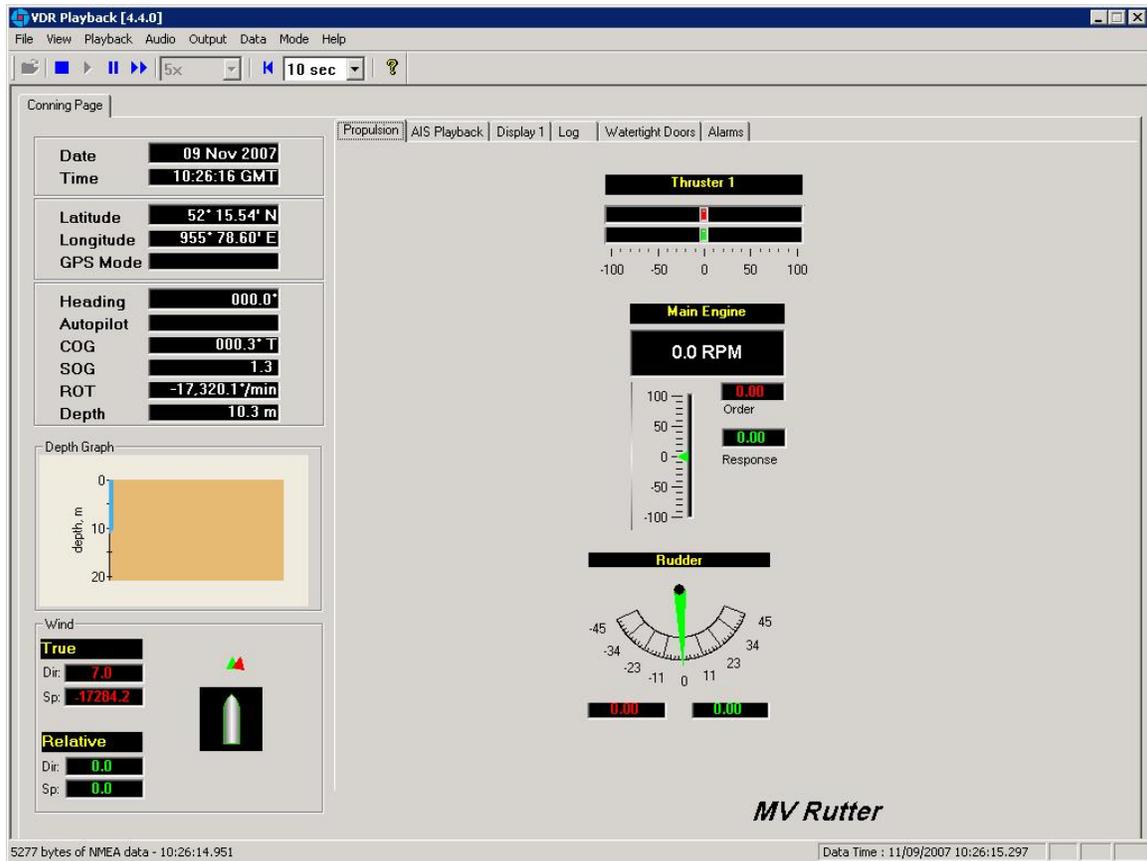


Figure 18-6 - Playback Software

### 18.2.1 Configuration File

The vessel information displayed in the Playback application is automatically configured via the ship's configuration file. This file is created by the installation technician during the installation of the VDR and should be stored in an easily accessed location on the local hard drive of the playback PC.

Upon start-up of the Playback application, the configuration file can be loaded using the File | Configure menu item.

## Chapter 18: Playback Software



Figure 18-7 - Configuration File Selection - Menu Item

A dialog window will appear allowing the user to select the applicable file. Once the file has been selected the Playback application will prompt the user as seen in Figure 18-8 – Restart Warning below. Clicking **OK** will restart VDR Playback and automatically load the selected configuration file. If desired, the configuration file can be changed at any time, simply select the File | Configure menu item, as above, and choose an alternative file.

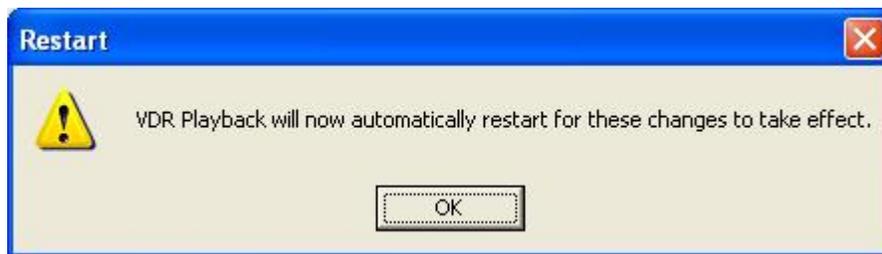


Figure 18-8 - Restart Warning

With the VDR-100G2, the ship's configuration file will accompany every available data set. When a data set is selected the configuration file will be automatically reloaded as necessary.

### 18.3 Choosing Data for Playback

Follow the instructions below to select a data set for playback:

1. From the **File** menu choose **Select Data Set**. A dialog box will appear.
2. Locate the folder containing the downloaded data. The Playback application will automatically search for and select the `<AudioDir.vdr>` index file as seen below. Click **Open** to proceed.

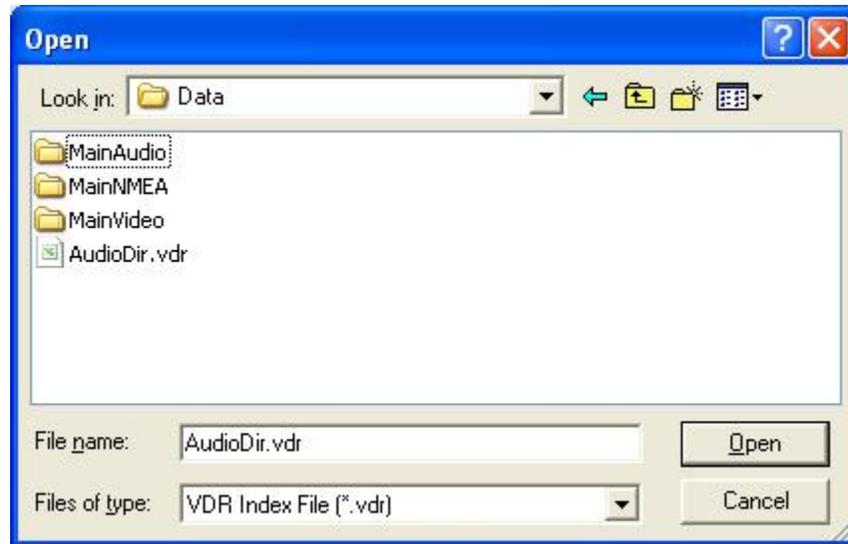


Figure 18-9- Locating downloaded data

The .vdr files accompany every download and act as an “index” to the actual data files. These files are named according to the data items they reference: *AudioDir.vdr* for audio, *NMEADir.vdr* for NMEA data and *VideoDir.vdr* for video data. Select **All Files** from the **Files of Type** drop down box to view all .vdr index files. Selecting any one of these three files will open a data set for playback.



**Note!** If the download directory does not display 3 files with extensions of “.vdr”, it is possible that the Microsoft operating system is treating them as hidden files.

To ensure that the .vdr files are being displayed and not hidden by the operating system, follow these steps:

1. Open Windows Explorer;
2. Select **Folder Options** from the **Tools** menu;
3. Select the **View** tab;
4. Ensure that **Show Hidden Files and Folders** is selected;
5. Press the **OK** button;

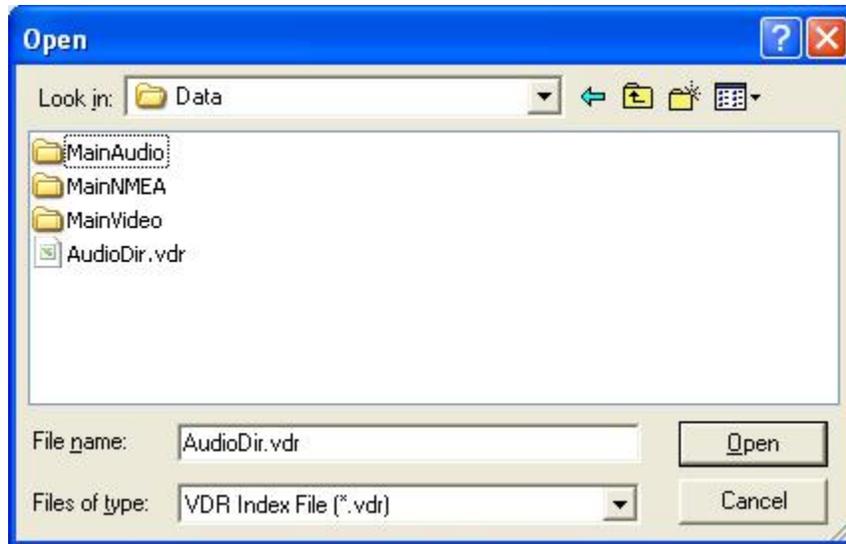


Figure 18-10 - Choose a .vdr File

If Playback cannot locate the vdr-cfg.txt file a prompt will appear as seen in Figure 18-11 – Playback Configuration File Not Found below. If the configuration file has already been pre-selected using **Configure** from the **File** menu then click **Cancel**. Otherwise, click **OK** to select the configuration file contained on the local hard drive or other media.

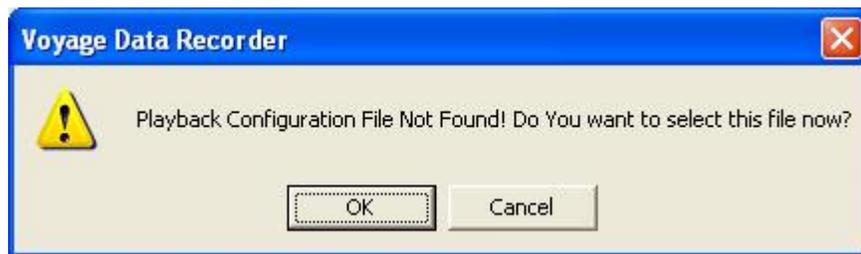


Figure 18-11 - Playback Configuration File Not Found

### 18.3.1 Unarchive Extracted Data

Data for playback can also be chosen from a previously extracted data archive. If a portion of data has been previously extracted and archived it can be opened for playback via the **File | Unarchive Extracted Data** file menu option.



Figure 18-12 - Unarchive Extracted Data

To playback the archived data after selecting the **Unarchive Extracted Data** file menu option, locate the .rfa (archive) file and select a folder to which the data can be extracted. Once extracted, an applicable configuration file will need to be selected in order to continue playback.

## 18.4 Enabling Ethernet Broadcasts

To enable the Playback software and Client PC to broadcast data across a network for use with a separate Electronic Charting System (ECS) or other software, select **Output | Enable Ethernet Broadcast from the main menu**. If a checkmark appears adjacent to this option, broadcasting is currently enabled. To disable this option, ensure no checkmark appears adjacent to this selection.



Figure 18-13 - Enabling Ethernet Broadcasting

The broadcast will occur on UDP Port 4450 and 4451. Refer to the relevant ECS manual to properly enable a PC to receive an Ethernet broadcast from Rutter Technologies' Playback software.

## 18.5 Starting Data Playback

To start the data playback, complete the following steps:

1. Ensure Real Time Display mode is disabled. Select **Mode** from the main menu. If a checkmark appears adjacent to the “Real Time Display” option, Real Time Display mode is currently enabled. To disable this option, ensure no checkmark appears adjacent to this selection by clicking it. A prompt will appear indicating Playback mode is enabled
2. Select a data set for playback.

*To view the current dataset selected, select **Playback | System Contents** from the main menu.*

3. To begin playback of the selected data set, choose **Playback | Start** from the main menu.
4. A dialog box will appear asking for a password. The default password is “VDR”. Click **OK** and a second dialog box will appear asking for a start time.



*The password **is case sensitive**. It must be typed in the text box as “VDR”*

5. Use the scroll bar (or enter a time in the text boxes) to select a playback start time.
6. Click **OK** to begin the playback.

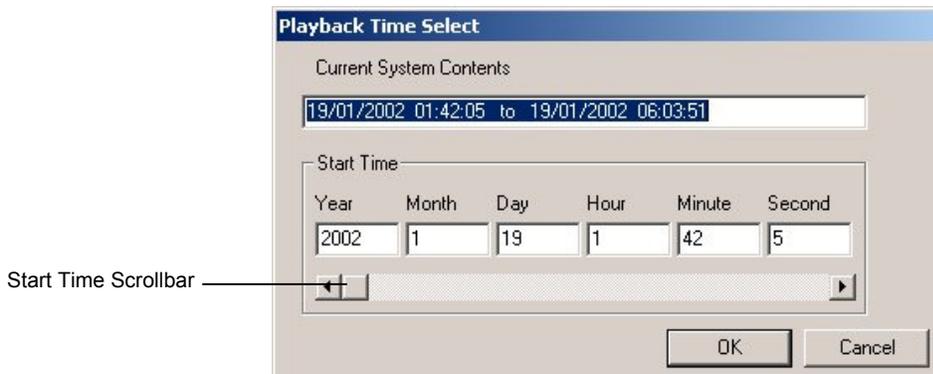


Figure 18-14 - Choose Start Time For Playback

## 18.6 Configuring the Client to Receive Real Time Data

Configure the Client PC for the VDR Playback application to connect to the VDR-100G2 and receive the recorded data. To do this the Client PC must be in the same IP segment as the download port on the VDR. The VDR's download port occupies IP address 200.200.200.200. The client PC must be in the same range, with the last segment different than the VDR (as shown below.) To change the IP segment:

1. Open the **Control Panel** via the Start menu.
2. Double-click the **Network Connections** icon.
3. **Right-click** on the **Local Area Connection** icon, and select **Properties** from the pop-up menu.
4. In the Local Area Connection Properties window, highlight **Internet Protocol (TCP/IP)** and click the **Properties** button located directly below the available options.
5. In the subsequent Internet Protocol (TCP/IP) Properties window, select the **Use the following IP address** radio button and enter 200.200.200.2 (the last number can be any number from 2 to 254, **except 200.**)
6. Click the **OK** button in the Internet Protocol (TCP/IP) Properties and the Local Area Connection Properties.

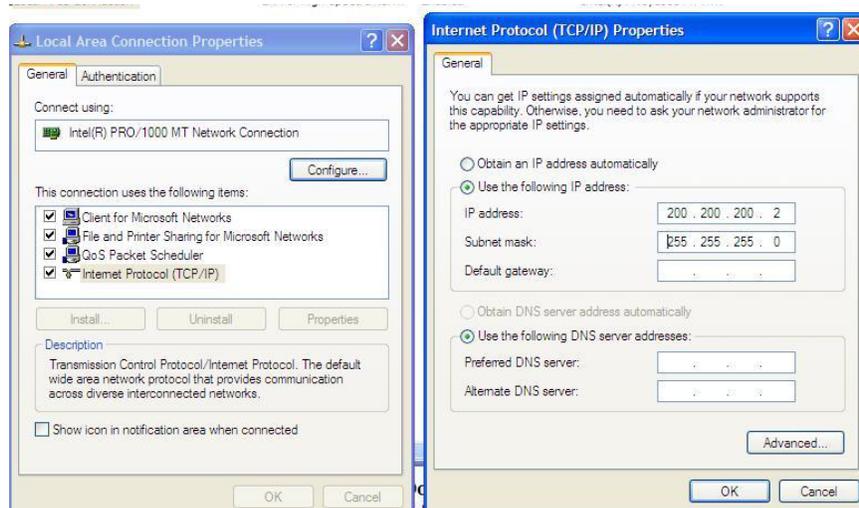


Figure 18-15 - Establishing TCP/IP Address

## 18.7 Enabling Real Time Display Mode

The Playback application has two modes of operation. In playback mode, the user can replay saved data sets. In Real Time Display mode (RTD), the Playback application will replay real time Video and NMEA data received from the VDR. Audio data is not available during Real Time Display Mode.



**Note!** Prior to enabling Real Time Display on the Playback application, the Client PC must be connected to the VDR's download port (or the Ethernet switch that may be attached to the VDR's download port) via Ethernet. Refer to Section 18.6

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Configuring the Client to Receive Real Time Data for details.

To activate the Real Time Display mode of the Playback Application, select **Mode | Real Time Display** from the main menu. If a checkmark appears adjacent to this option, Real Time Display mode is currently enabled. To disable this option, ensure no checkmark appears adjacent to this selection.

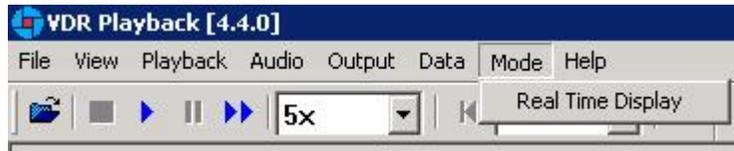


Figure 18-16 - Enabling Real Time Display Mode

When Real Time Display mode is enabled, a pop-up window will appear indicating that Real Time Display has been enabled.



Figure 18-17 - Real Time Display Mode Confirmation

Many of the normal Playback mode options are disabled when operating in Real Time Display mode, as they are not applicable. All disabled options will be gray in colour, such that they are still visible but not available for selection.

### 18.8 Starting the Playback in Real Time Display Mode

To start the playback of real time data, complete the following steps:

1. Refer to section 18.2.1 Configuration File to select a valid configuration file.
2. Choose **Playback | Start** from the main menu or press the 'Play' button located on the 'Controls' toolbar.

Play

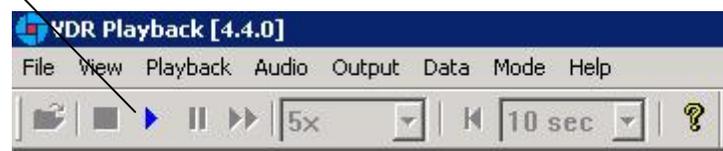


Figure 18-18 - Controls Toolbar

3. A dialog box will appear asking for a password. The default password is "VDR". The password **is case sensitive**. Type the password in the text box provided and click OK. Upon entering the correct password Real Time Display playback will begin.

### 18.9 Passwords

There are 2 passwords required to playback data. The first password is necessary to playback a selected data set or to playback real time data. The default password is "VDR" (case sensitive).

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It is supplied with the software and can be changed by choosing **Set Password** from the **Playback** menu. A dialog box will appear asking for the old and new passwords.

The second password is for playback of recorded audio data. The default password is “VDR” (case sensitive). It can be changed by choosing **Set Password** from the **Audio** menu.

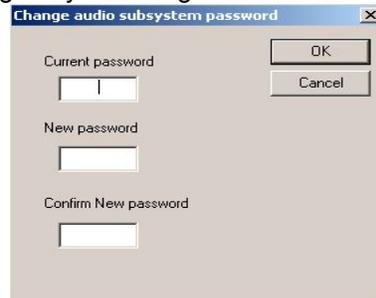


Figure 18-19 - Change Password

### 18.10 Playback Controls

Playback can be controlled via the **Playback** menu items or by using the buttons located on the Controls toolbar. Both options offer a full range of controls, including the ability to run the playback in fast time (with the additional option of choosing replay speed). **Error! Reference source not found.** Figure 18-20 – Controls Toolbar provides an illustration of the toolbar. If available for use, buttons will appear blue in colour. If unavailable for use, buttons will be gray in colour .

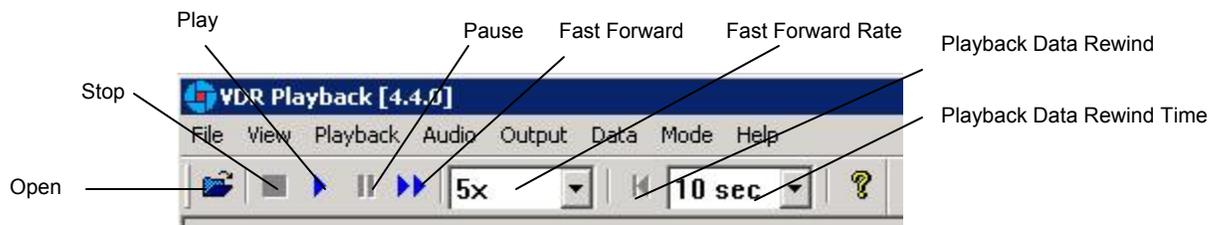


Figure 18-20 - Controls Toolbar

A description of each of the buttons on the Controls toolbar are listed below.

**Open:** Opens a dialog prompting the user to select a new data set for playback.

**Stop:** Stops the playback of the current data set or stops the playback of real time data.

**Play:** Begins the playback of the selected data set or begins the playback of real time data.

**Pause:** Pauses the playback of the current dataset. Press the pause button again to continue playback.

**Fast Forward:** Used to speed up or fast forward the playback of the current data set. To return the playback to normal operation, press the “Fast Forward” button a second time.



**Note!** The ‘Fast Forward Rate’ drop down box cannot be manipulated once a playback has started.

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**Fast Forward Rate:** Specify the rate at which to fast forward the playback of the current data set.

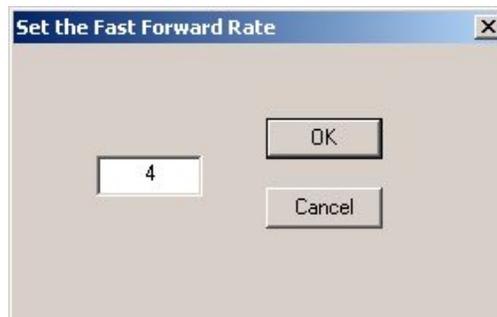
**Playback Data Rewind:** When clicked, rewinds playback to the interval specified in the Playback Data Rewind Time drop down.

**Playback Data Rewind Time:** Select the time interval to rewind the playback of the current data set when the Playback Data Rewind button is clicked.



**Note!** Many of the controls available during Playback mode are not applicable during Real Time Display mode therefore they are disabled (grayed).

Select **Playback | Set Playback Rate** from the main menu to adjust the speed of the replay. A dialog box will appear requiring a time compression rate. Enter any integer from 2 to 24 (inclusive) in the text box provided and click **OK** (see *Figure 18-21 - Set Fast Forward Rate*).



*Figure 18-21 - Set Fast Forward Rate*

The Controls toolbar can be hidden by deselecting **Controls** from the **View** menu. By default it is visible therefore a check will appear adjacent to this option. Deselecting it will remove this check mark.

### 18.11 Audio Volume & Channel Selection

Audio data includes continuous bridge audio and radio communications. The configuration of audio will differ between ships but is generally arranged in 2 to 4 banks.

Individual channels contain audio data corresponding to an area of the bridge, bridge wings, or radio communications. Each channel may be reviewed individually or in conjunction with other channels during playback. For example, a user may wish to play back audio data recorded in the centre of the bridge while turning off external microphones where wind noise may be present.

## Chapter 18: Playback Software

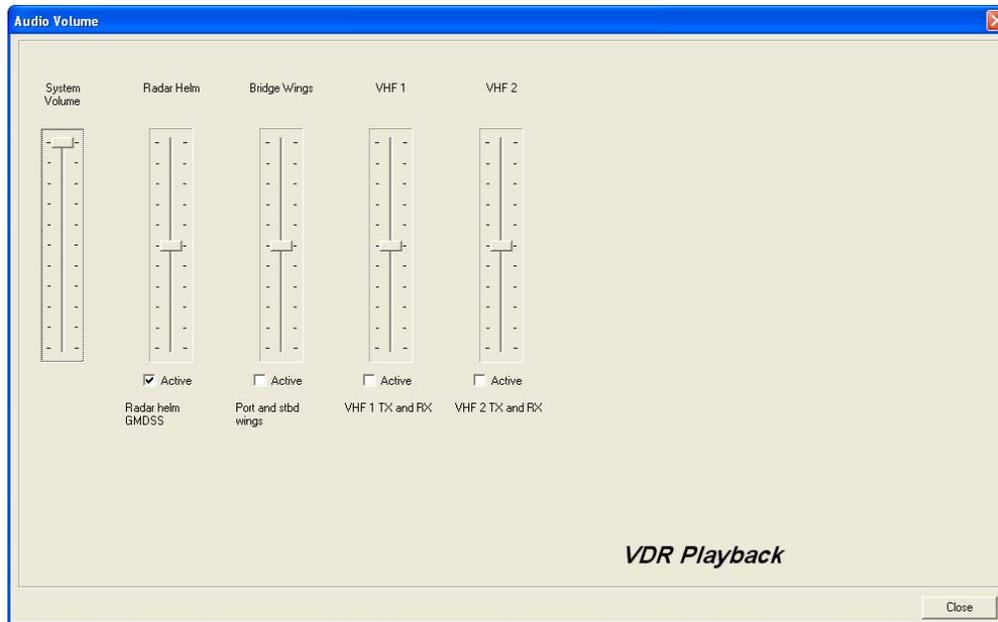


Figure 18-22 - Audio Interface

To activate the audio portion of a playback, choose **Unlock Audio** from the **Audio** menu (see *Figure 18-23 – Audio Menu*). A prompt will appear requiring a password. The default password supplied with the VDR-100G2 is “VDR”. Enter the password in the text box provided and click **OK** to activate audio and make each channel in the **Audio** menu selectable.

Once unlocked, audio data will be available for the remainder of the time VDR Playback is open. Audio can be adjusted by opening the **Audio Volume** window (see *Figure 18-22 - Audio Interface*) via the “Audio Volume” option from the **Audio** menu.



Figure 18-23 – Audio Menu

There are 2 ways to activate an available audio channel:

1. Select the appropriate audio channel from the **Audio** menu; or,
2. Open **Audio | Adjust Volume...** and click the ‘Active’ checkbox below the appropriate channel. The Audio must be unlocked first to manipulate the checkboxes.

Also, if required, it is possible to print the audio status to the ‘Log’ Tab Screen by selecting ‘Status’ from the ‘Audio’ file menu.

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To silence a playback, simply uncheck each channel either on the 'Audio' menu or via the 'Active' checkbox.



**Note!** Audio data is not available during Real Time Display mode, thus all Audio options are disabled, including all audio options under the 'Audio' file menu.

### 18.12 Conning Page

The Conning Page is the default information page available upon start-up. Use the VDR Config Utility to configure VDR Playback to display information in the fields provided on this page. Refer to Section 17: System Configuration File for instructions on using the VDR Config Utility. The Conning Data Tab contains the following information:

- Date – Date of playback information
- Time – Time of playback information
- Latitude – Ship's latitude
- Longitude – Ship's longitude
- GPS Mode – Global Positioning System: SPS, DGPS (Differential GPS), PPS, RTK (Real Time Kinematic), FRTK (Float Real Time Kinematic), and DRM (Dead Reckoning Mode)
- Heading – Ship's heading
- Autopilot – Indicates the presence or non-presence of a heading control system (On/Off)
- COG – Ship's Course Over Ground
- SOG – Ship's Speed Over Ground
- Depth – Depth of ship
- ROT – Ship's Rate Of Turn

#### 18.12.1 Depth Graph

The Depth Graph provides an illustration, in meters (m), of the ship's depth.

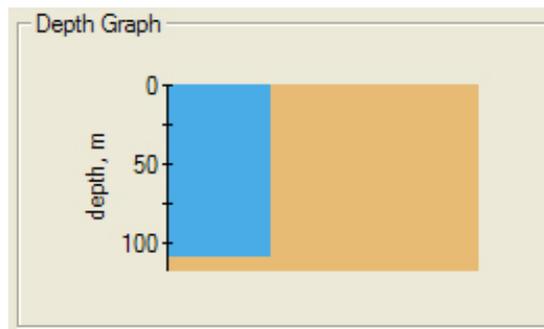


Figure 18-24 - Depth Graph

### 18.13 Wind Information

The Wind Information pane contains data regarding the wind's True and Relative Direction (Dir) and Speed (Sp).

A compass is also provided in order to illustrate wind direction based on ship's heading. The red arrow indicates True wind direction while the green arrow indicates Relative wind direction. The ship graphic indicates the ship's heading.

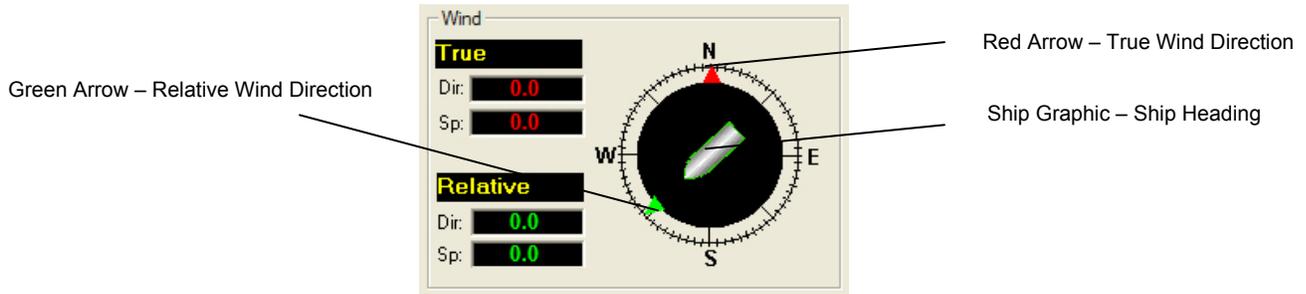


Figure 18-25 - Wind Information

### 18.14 Propulsion Tab

The Propulsion Tab is custom designed for each individual ship according to propulsion systems, bow thruster configuration and NMEA strings broadcast by bridge electronics. These displays are dependant upon the *vdr-cfg.txt* file created for a particular ship.

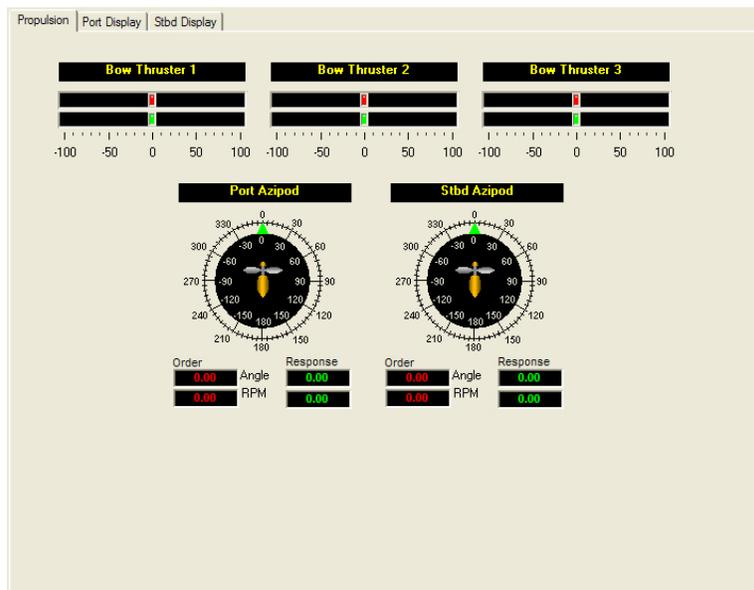


Figure 18-26 – Sample Propulsion Tab

## 18.15 Video Channel Display Tab(s)

Radar data is captured at 15-second intervals. If multiple radar images are available for video capture, capture times will be staggered but still allow for individual captures at 15-second intervals.

There are a number of options available when viewing the radar data:

- To display the radar data in its own window, choose View > Full Size Video > Video Channel.
- To close this window, click the 'x' in the top right corner.
- To move the radar image (once in its own window) in order to make a particular section visible without adjusting the window dimensions, click and drag by placing the mouse pointer over a section of the image, pressing the left mouse button and moving the mouse;
- To view the whole radar image available in its own window select View > Fit to Window > Video Channel;
- To save the radar image as a .bmp file, select File > Save > Video Channel. A dialogue will open allowing a save location to be chosen.

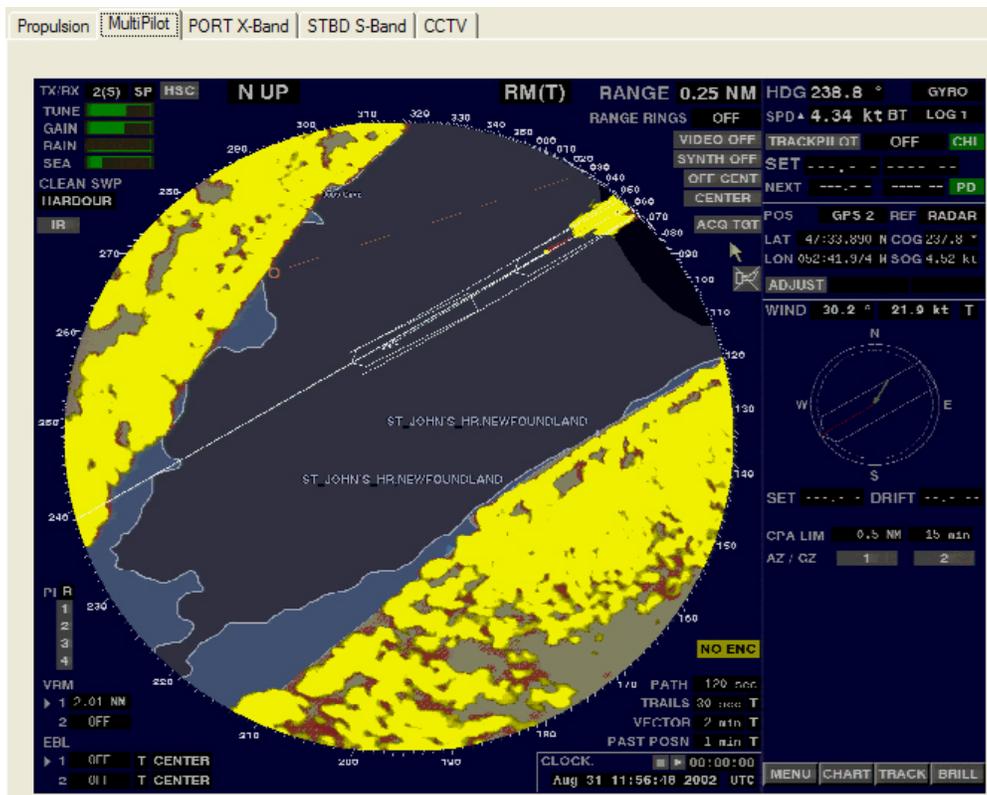


Figure 18-27 – MultiPilot Tab

The images are captured directly from the radar display. Therefore, any radar supporting ECDIS or chart displays will have the ECDIS or chart image recorded.

## 18.16 Proprietary Tab

If proprietary data is present in the data playback, a "Proprietary" conning tab may appear. This tab window will present the available proprietary data in sentence format.

## 18.17 AIS Playback Tab

The 'AIS Playback' Tab Screen displays information captured from the ship's AIS.

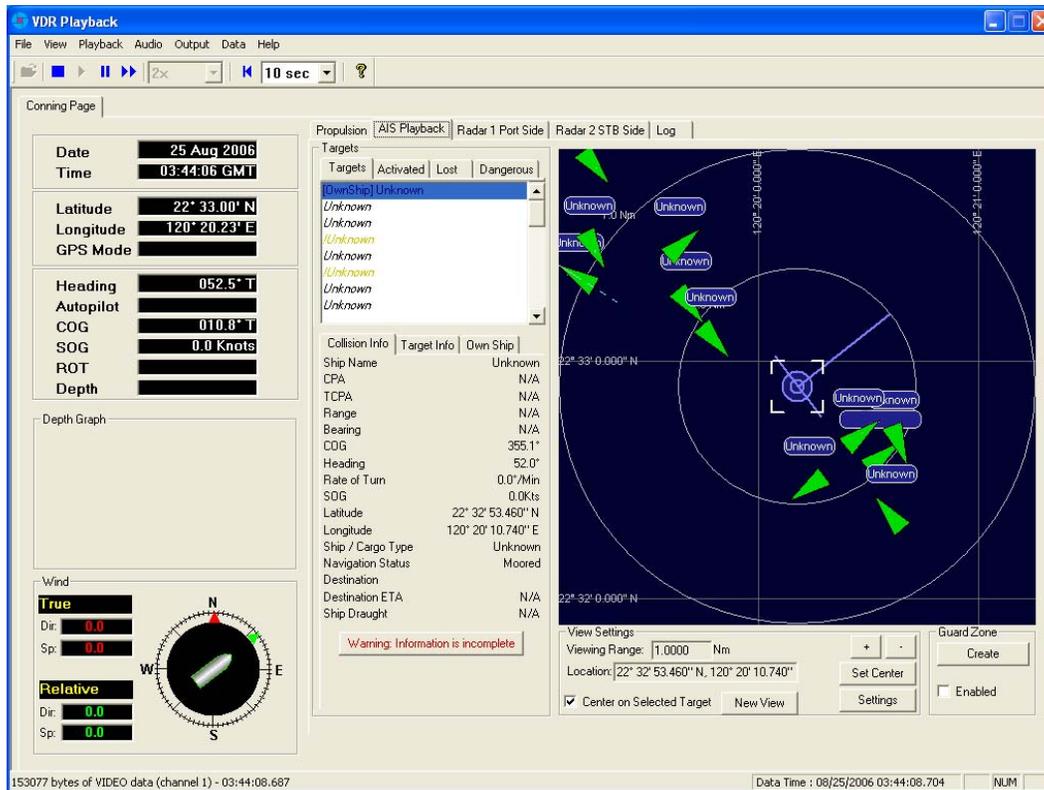


Figure 18-28 - AIS Playback Tab

There are a number of features available within the AIS Playback tab screen that allows a user to better interpret the downloaded information.

### 18.17.1 Targets

The Targets section of the AIS Playback tab screen provides a range of information about all targets visible in the playback window.

- **Targets Tab** – provides a list of all targets available within the AIS view screen. If a target's information becomes unavailable it remains in the list but a line is drawn through its name (it is also added to the "Lost" tab list (see below)).
- **Activated Tab** – provides the name of the target selected by the user in the AIS view screen.
- **Lost Tab** – provides a list of targets for which information is no longer available.
- **Dangerous Tab** – provides a list of all targets that are currently on a dangerous course relative to ownship.

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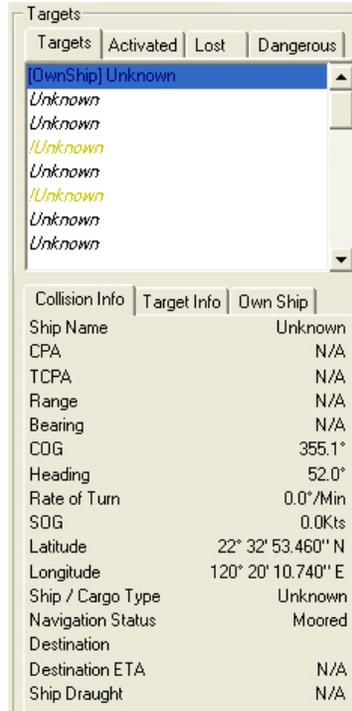


Figure 18-29 - Targets Information Section

Specific target information is also available in the following tabs (located below the above mentioned tabs):

- **Collision Info** – provides information specific to a selected target's navigational course.
- **Target Info** – provides registered information (e.g., MMSI, IMO, etc.) specific to a selected target.
- **Own Ship** – provides registered and navigational information for ownship regardless of what target is selected.

### 18.17.2 View Settings

The View Settings section allows a user a high level of control over the AIS playback view screen.

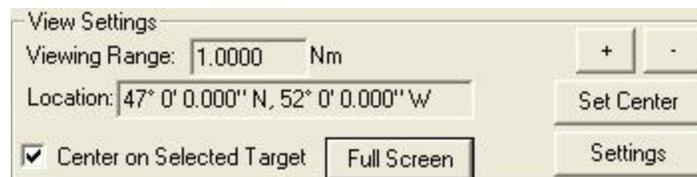


Figure 18-30 - View Settings Section

- **Viewing Range** – It is possible to increase or decrease the viewing range of the AIS playback view screen by pressing the "+" and "-" buttons located in the upper right of the View Settings section. Note that if using a wheel mouse the viewing range can also be increased/decreased by moving the wheel while the pointer is located in the view screen. The viewing range is listed in nautical miles.
- **Location** – The latitude and longitude of the selected target is listed.
- **Center on Selected Target** – If this checkbox is selected the view screen will center on the selected target in the Target List.

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- **Set Center Button** – To set the center point of the view screen, press the “Set Center” button, position the mouse pointer on a location on the view screen and left-click. This point will now be the center point of the view screen. Turning on the “Center on Selected Target” checkbox overrides this control.
- **Full Screen** – Opens a dedicated AIS Playback window.
- **AIS Display Settings** – The “Settings” button located in the View Settings section opens an “AIS Display Settings” window. The settings in this window allow the user to adjust the AIS Playback display.

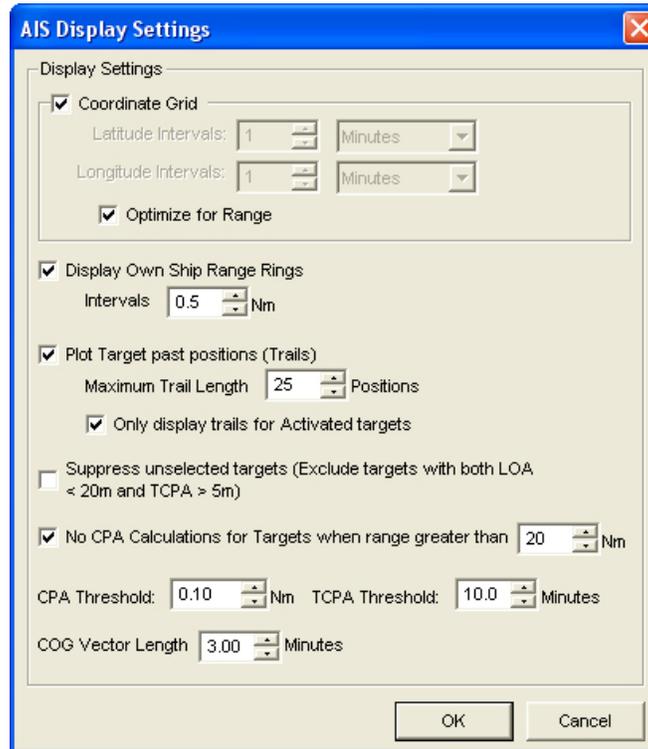


Figure 18-31 - AIS Display Settings Window

- CPA (Closest Point of Approach)
- TCPA (Time to Closest Point of Approach)
- COG (Course Over Ground)
- LOA (Length Over All)

### 18.17.3 GuardZone

The GuardZone section allows a user to create a guard zone in the view screen. To create a guard zone press the “Create” button, place the mouse cursor in the view screen area and left-click in the locations required to create a guard zone shape. Double-click to complete the guard zone formation.

The guard zone can be enabled or disabled by checking or unchecking the “Enabled” checkbox.



Figure 18-32 – GuardZone enable/disable

### 18.18 Log Tab

The ‘Log’ Tab Screen displays the size of each type of data block and the time it was recorded. When viewed in compressed time (fast forward), the size of data blocks written at each time-period is displayed, but the actual NMEA strings are not. When played back in normal time, the ‘Log’ Tab Screen will also display the NMEA strings.

‘Log’ information can be controlled via the Controls toolbar. To scroll illustrated information, press the ‘Pause’ button on the Controls toolbar and use the ‘Log’ scrollbar to navigate.



Figure 18-33 - Log Window

### 18.18.1 Error Codes

The following table provides a list of error codes and descriptions that may be observed in the Log Window of the Playback application:

Error Code	Alarm Message	Binary Bit Position
99\$0	Status Clear	0000000000
99\$1	Storage Error	0000000001
99\$2	Video Error	0000000010
99\$4	Audio Error	0000000100
99\$8	NMEA Error	0000001000
99\$16	Power Error	0000010000
99\$32	Microphone Error	0000100000
99\$64	FRM Error	0001000000
99\$128	Lyngso Error	0010000000
99\$256	Power Comms Error	0100000000
99\$512	Remote Error	1000000000
99\$1024	GPS Error	1000000000

Table 18-1 - Playback Log Window

In the event of simultaneous errors, it will be necessary to convert the displayed error code to its binary counterpart. A multiple error will display multiple 1-bits in the binary string, which can then be interpreted. For example, the error code 99\$17 converts to a binary string of 0000010001, representing a simultaneous Storage and Power error.

## 18.19 Fire Doors Tab

The Fire Doors Tab Screen displays information regarding the status of the ship's fire doors. The colour of the light adjacent to the door name, dependant upon the configuration, indicates an active (often indicated with the colour red) or non-active (often indicated with the colour green) door or opening.

Should the number of fire doors exceed the initial screen space, a scroll bar will become visible allowing a user to view all available.

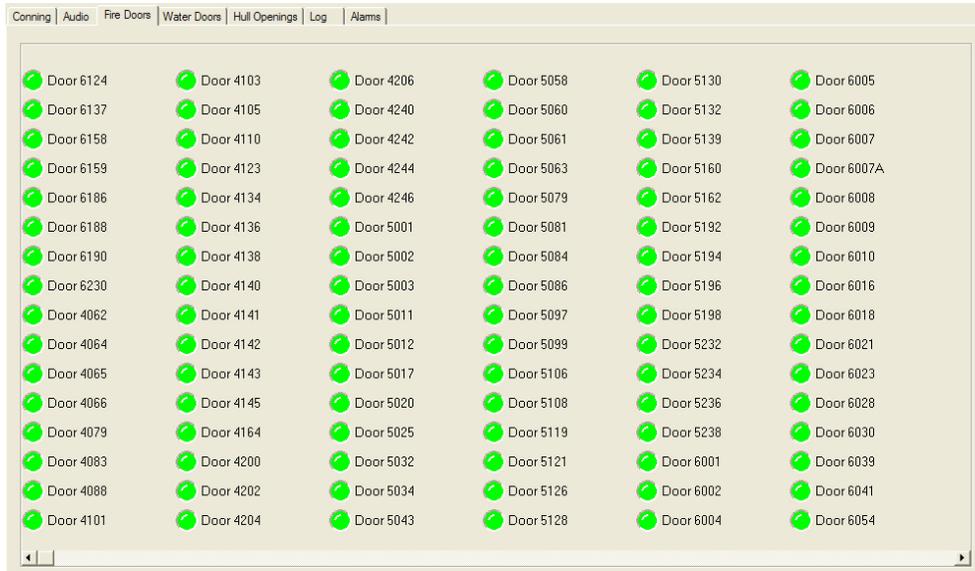


Figure 18-34 - Fire Doors Tab

## 18.20 Water Doors Tab

The Water Doors Tab Screen displays information regarding the status of the ship's water doors. The colour of the light adjacent to the door name, dependant upon the configuration, indicates an active (often indicated with the colour red) or non-active (often indicated with the colour green) door or opening.

Should the number of water doors exceed the initial screen space, a scroll bar will become visible allowing a user to view all available.

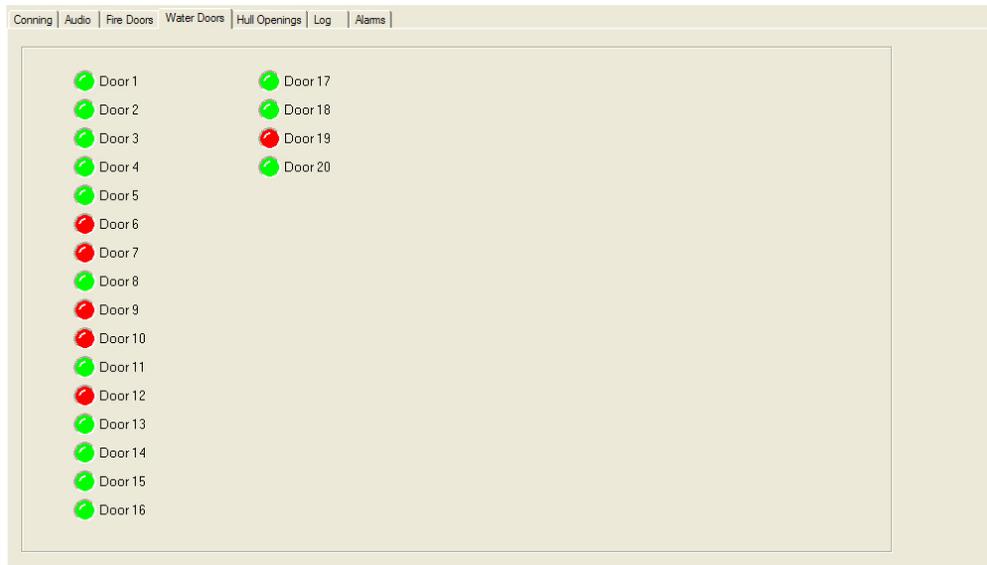


Figure 18-35 - Water Doors Tab

### 18.21 Hull Openings Tab

The Hull Openings Tab Screen displays information regarding the status of the ship's hull openings. The colour of the light adjacent to the door name, dependant upon the configuration, indicates an active (often indicated with the colour red) or non-active (often indicated with the colour green) door or opening.

Should the number of hull openings exceed the initial screen space, a scroll bar will become visible allowing a user to view all available.

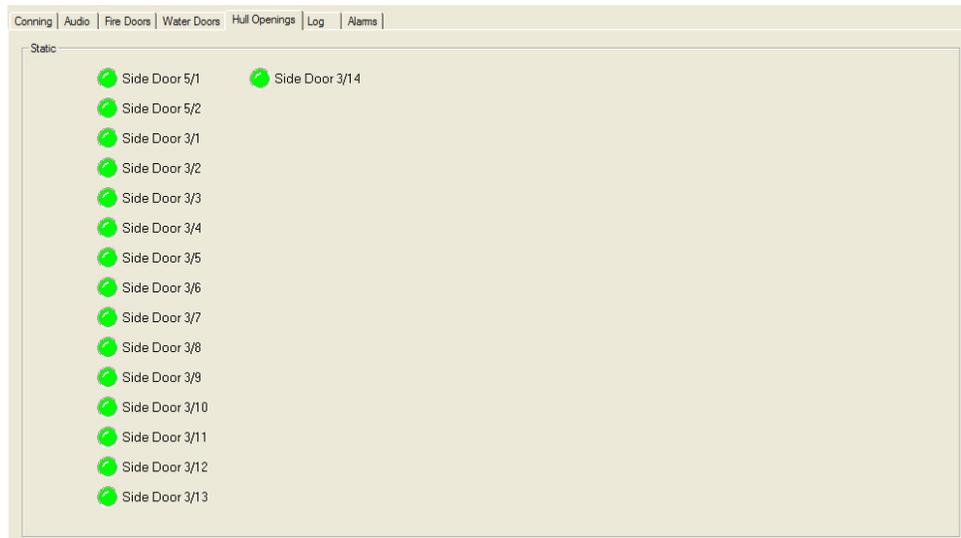


Figure 18-36 - Hull Openings Tab

### 18.22 Alarms Tab

An alarm is an "on" event, only displaying when triggered. When an alarm occurs, the word "ALARM" will display in the lower left corner of the Playback interface. The Alarms tab allows a user to view information pertaining to all triggered alarms.

### 18.23 Data Extraction

The volume of data contained in downloaded VDR data sets can be very large. In many instances it may be desirable to access smaller portions of the data without downloading the entire data set. As a result it is possible to copy only a specific portion of a data set, which can then be easily removed to a separate location for analysis or e-mailed to a third party.



**Note!** The Data Extraction option is not available during Real Time Display mode. The 'Data Extraction' option under the 'Data' file menu is disabled while the Playback application is operating in Real Time Display mode.

### 18.23.1 Opening Data Extraction Window

To extract a specific portion of data, begin the playback of captured data. Once data is in active playback mode allow it to play until the beginning point of the portion desired for extraction is reached:

Select “Data Extraction” option from the “Data” file menu.

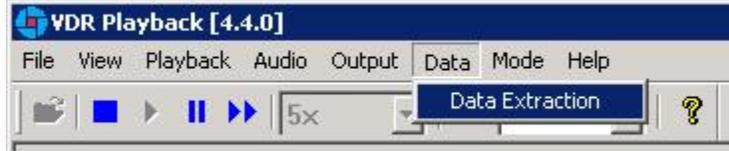


Figure 18-37 - Data Extraction Option

The Data Extraction window will open (see *Figure 18-38 - Data Extraction Window* below). This may take a number of seconds. The start time will automatically appear as the point in the playback where the Data Extraction window was opened.

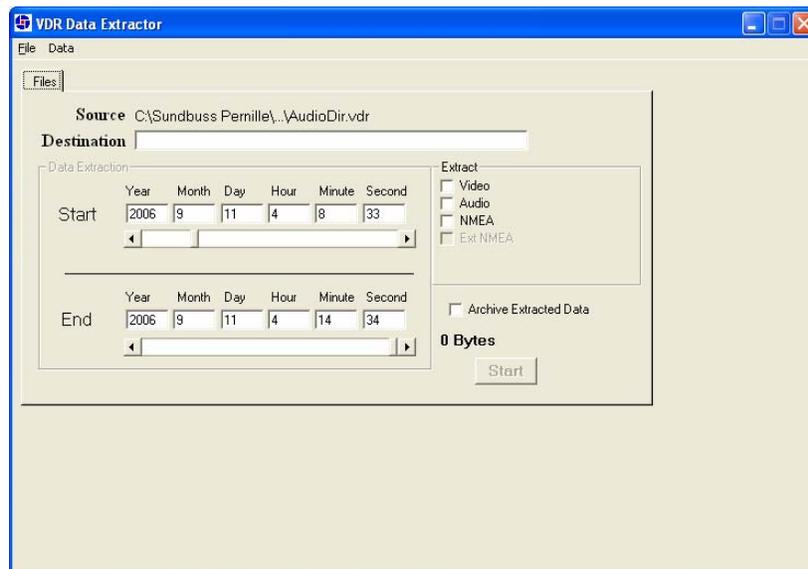


Figure 18-38 - Data Extraction Window

### 18.23.2 Selecting Data for Extraction

With the Data Extraction window open select a segment of data to extract and an extraction destination.

1. Three data stream options (Video, Audio, and NMEA) are available for download. Check the adjacent checkbox to select the desired data stream. If no data stream is selected the Start and End scroll bars will not be available.

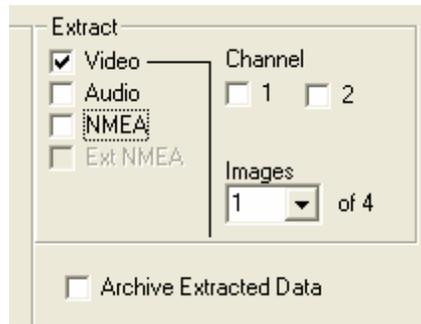


Figure 18-39 – Available data Streams

2. When the “Video” checkbox is selected additional options will appear. The Data Extraction utility may take several seconds to display this information. The user will have the option to download individual Video channels as required (if available).
3. There is also an option to select 1 to 4 video images per minute i.e. selecting “1” allows a user to reduce the size of the Video data extraction to one image capture per minute.

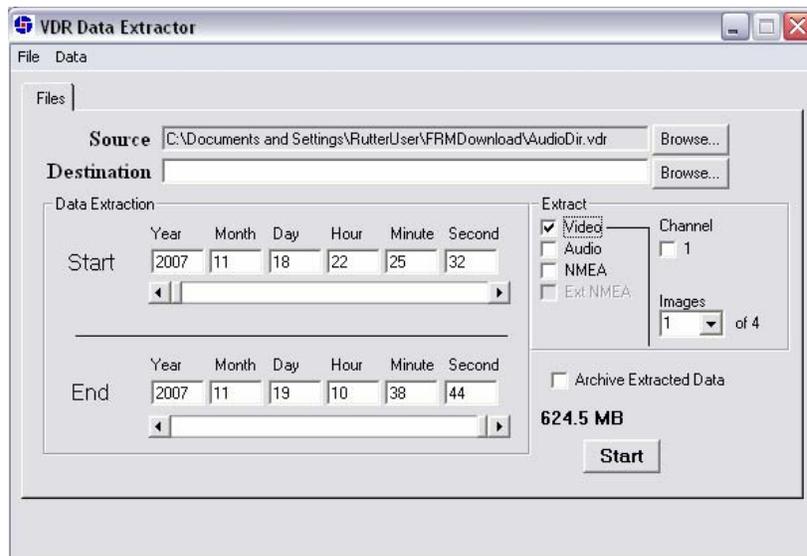


Figure 18-40 - Data Stream Options w/ Video Selected

4. Select a destination directory by clicking the “Browse” button adjacent to the “Destination” textbox. Alternatively, choose “Choose Destination Dir” from the “Data” menu.



**NOTE: The destination directory *MUST NOT* be the same directory as the source directory and *MUST NOT* contain any other files.**

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5. Select a Start and End time for the extracted segment. As mentioned above, the Start time automatically appears as the time when the Data Extraction window was opened. However, this can be changed.

To adjust either the Start or End time, move the applicable scroll bar. The file size of the extracted segment will appear to the right of the End scroll bar. This is particularly useful, for example, when attempting to extract a segment to copy to a recordable Compact Disc.

6. To create an archived file of the extracted data at the same time as the extracted data is being copied to the selected destination folder, select the “Archive Extracted Data” checkbox.
7. To start the data extraction, press the “Start” button located in the lower right of the Data Extraction window. A progress bar will appear at the bottom of the window to indicate the progress of the extraction.
8. Once completed, the Data Extraction window can be closed via the “Exit” option from the “File” menu.

### 18.24 Closing the Playback Application

The application cannot be closed while a voyage playback is running. To close the application follow these instructions:

1. Stop the playback by selecting **Stop** from the **Playback** menu, or by pressing the ‘Stop’ button in the Controls toolbar.
2. Press the ‘Close’ (x) button in the upper right hand corner of the application’s main window, or choose **Exit** from the **File** menu.

When the VDR Playback application is restarted, it will restart in the mode in which it was operating when closed. For example, if the VDR Playback application was in Real Time Display mode when it was closed, on the next restart it will open in Real Time Display mode.

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# 19 GENERAL AND CORRECTIVE MAINTENANCE

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## 19.1 General Inspection Procedures

The VDR-100G2 is designed to require a very low level of maintenance. However, the VDR and its peripheral devices should undergo a regular inspection to verify all connections are intact. If necessary, a few general maintenance tasks may be required.

It is necessary to inspect the VDR-100G2 and all of its peripheral devices. This includes the Data Processing Unit (DPU), Data Acquisition Unit (DAU – if applicable), the Operation and Alarm Unit (OAU), Remote Storage Module (RSM - if applicable), Interfaces (if applicable) and Microphones.

On first inspection, the DPU should be locked to prevent tampering. Once the DPU is opened, the following items will indicate normal system operation:

- The Data Management Module (DMM) is operational with its fan spinning and LAN port LEDs blinking.
- All LAN, serial, and power cables are firmly attached to the DMM.
- Battery wires are firmly attached to the battery terminals.
- All circuit breakers with load are in the closed (no white showing, button depressed) position.
- The DPU fan is operational. The air filter should be inspected and replaced if necessary.

The DAU should be covered with six (6) screws. Once removed, the Audio, Video, and NMEA Module (and the Hub) should have power and blinking LEDs to indicate data. All modules should be firmly attached to the DAU DIN-Rail and all cables should be firmly attached.

The OAU should have no alarms, indicating “Status: Clear”. Also, a test should be executed to verify that the display, LED, and buzzer function normally. To do so, press the OAU’s “TEST” button then, after verification, press the “CANCEL” button. For alarm code descriptions, refer to *Section 19.2.1 - Alarm Code Description*.

The RSM and Interfaces (if applicable), should be firmly mounted, have all cables securely attached, and have blinking LEDs.

All Microphones should be securely attached and appear to be functional.

### 19.1.1 Air Flow Check

It is essential that proper airflow is maintained within the DPU. There is one (1) fan system, accessible via the top hatch of the DPU, which provides an air intake and exhaust.

The air intake fan located at the top corner of the DPU draws air into the unit to cool internal components. This fan intake should be cleaned at least once every three (3) months. Similarly, the fan exhaust is located at the bottom corner opposite the intake fan and expels warm air away from the unit. It also should be cleaned at least once every three (3) months.

A thermostat located near the intake fan controls the temperature at which the fan will begin operation. The default setting is 10° C.

### 19.1.2 FRM Maintenance

It is necessary to visually inspect the FRM unit in order to ensure it has not been tampered with and has maintained integrity. As a minimum, follow the steps provided below during visual inspection:

1. Ensure the capsule is undamaged in any way.
2. Check to ensure the integrity of the securing brackets. There should be **no** signs of tampering.
3. Check to ensure the exterior paint and labeling are fully visible and in excellent condition. There should be **no** signs of chipping or flaking.

### 19.1.3 Battery Beacon Voltage Test

The Acoustic Location Beacon of the FRM consists of a self-contained battery, an electronic module, and a transducer. It is housed in a cylindrical watertight aluminum case capable of withstanding high-G impact shock and deep-water immersion.

The beacon is a battery-powered device, which radiates a pulsed acoustic signal into the surrounding water upon activation by its water-sensitive switch.



**Note!** The beacon shall be tested on a yearly basis to ensure both it and the battery are in good working condition. The Install Date of the beacon's battery must be recorded in the Rutter Technologies' Annual Recertification Checklist.

The beacon manufacturer's manual should be used as the chief reference point when performing the yearly checks mentioned in the note above.

#### 19.1.3.1 Dukane 42A12D Beacon Test Set

The Dukane 42A12D Beacon Test Set can perform an operational test on the L3HVR Acoustic Underwater Beacon.



Figure 19-1 - Dukane 42A12D Beacon Test Set

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The 42A12D unit can perform an operational test on a beacon without removing the beacon from its mount. The steps below outline the unit's operation procedure:

1. Turn the GAIN control to a fully clockwise position. A pronounced background noise should be present. Lack of noise may indicate a dead battery.
2. Set the TUNING control to approximately mid-scale. Rubbing fingers in front of the microphone should produce a "rushing" noise from the speaker.
3. Actuate a beacon under test by immersing the water switch in tap water, or by shorting the water switch terminal to the case by means of a shorting tab.
4. Set the GAIN control at a comfortable listening level.
5. Point the microphone of the Test Set towards the water switch end of the Beacon for best results. If the Beacon is mounted, position the Test Set for maximum unobstructed signal. Beacon operation will be indicated by an audible pulsing tone.
6. The tuning control permits reception of an acoustic signal operating anywhere within the 30 to 45 kHz frequency range. The audio response is peaked at approximately 3200Hz; therefore, the test set should be tuned to produce an output signal of approximately this frequency to achieve greatest sensitivity.

Additionally, the use of a high impedance voltmeter (input impedance of 10M ohms) is required to test the battery voltage. The steps below outline this procedure:

1. For the **L3 HVR** unit: Place the positive probe of the high impedance voltmeter on the Water Switch Primary and the negative probe on the Water Switch Battery (the beacon does not have to be opened).



Figure 19-2 - L3 HVR Beacon

2. Measure the battery voltage. The beacon battery voltage is acceptable if it has a range of 2.97V or greater.
3. If the battery voltage is below the minimum acceptable voltage (2.97V), the beacon should be replaced (or the battery must be changed in the beacon).

For 42A12D maintenance procedures refer to the manufacturer's documentation.

## 19.2 Corrective Maintenance

### 19.2.1 Alarm Code Description

Listed below are the alarm codes that may appear on the OAU LCD display:

Alarm Code	Description
System Error	Communication with the Record Application has been lost
Video Error	Communication with the Video Module has been lost
Audio Error	Communication with the Audio Module has been lost
FRM Error	Communication with the Final Recording Medium has been lost
Power Fail	Loss of utility power
PCM Error	Communication has been lost with the Power Control Module
Remote Error	Communication has been lost with the Remote Storage Module
Serial Error	Communication has been lost with the NMEA Module
Mic Error	Communication has been lost with one of the microphones
Disk Error	Failure to secure a data set
GPS Error	Data is failing to record on TimeMuxID parameters entry

*Table 19-1 - Alarm Code Description*

Pressing the “Mute” button acknowledges the alarm code and silences the alarm.

### 19.2.2 Error Codes

The following table provides a list of error codes and descriptions that may be observed in the Log Window of the Playback application:

Error Code	Alarm Message	Binary Bit Position
99\$0	Status Clear	0000000000
99\$1	Storage Error	0000000001
99\$2	Video Error	0000000010
99\$4	Audio Error	0000000100
99\$8	NMEA Error	0000001000
99\$16	Power Error	0000010000
99\$32	Microphone Error	0000100000
99\$64	FRM Error	0001000000
99\$128	Lyngso Error	0010000000
99\$256	Power Comms Error	0100000000
99\$512	Remote Error	1000000000
99\$1024	GPS Error	10000000000

Table 19-2 - Error Code - Playback Log Window

In the event of simultaneous errors, it will be necessary to convert the displayed error code to its binary counterpart. A multiple error will display multiple 1-bits in the binary string, which can then be interpreted. For example, the error code 99\$17 converts to a binary string of 0000010001, representing a simultaneous Storage and Power error.

### 19.2.3 NMEA Error Codes

The error codes in the NMEA data from the NMEA Module identify the NMEA module and it's port that has the error. These errors occur when either the data format or speed does not match the received data, or the received data is corrupted.

The error message is in the format NerrorXX, where N is the NMEA ID and XX is the code as listed below.

Code	8-Port NMEA Module	4-Port NMEA Module
A	232/422 Output	232/422 Output
B	422 Input	422 Input
C	Input 1	Input 1
D	Input 2	Input 2
E	Input 3	Input 3
F	Slave/Master Link	Input 4
SA	Output to Slave	NA
SB	Input Port 4	NA
SC	Input Port 5	NA
SD	Input Port 6	NA
SE	Input Port 7	NA
SF	Input Port 8	NA

Table 19-3 - NMEA Error Codes

For example, error message 1errorSD on an 8 Channel NMEA Module would indicate that the data on input Port 6 has the wrong data format or speed or is corrupt.

### 19.2.4 Retrieving Secured Data via Remote Desktop

Refer to *Section 16.5 - Retrieving Secured Data via Download Port* for instructions on retrieving data from the secured directory using a Remote Desktop connection.

### 19.2.5 Upgrade of DMM Operating System

An upgrade to the Operating System (O/S) can be loaded to the DMM via a Compact Flash card and the DMM's Compact Flash Card Connection port. An image of the O/S is loaded to the Compact Flash card which, in turn, is inserted into the DMM's Compact Flash Card Connection port. Once inserted, the O/S must then be further configured for use. The following sections offer a detailed guide for upgrading and configuring the O/S.



**Note!** *If connecting a PS2 keyboard and/or mouse to the DMM but it does not work, it may be necessary to pull power from the DMM and power up with keyboard connected.*

#### 19.2.5.1 Removing the Compact Flash Card

To remove the Compact Flash card from the DMM, follow the steps provided below:

1. Via the VDR-100G2's Windows desktop, log on to the Administrator account (if currently logged into the MyUser account, log off via Start > Log Off).
2. Shut down the DMM (Start > Shut Down).
3. Open the top hatch of the DPU (this will require VDR-100G2 keys).
4. Remove the power cable from the DMM.
5. Remove the front panel of the DMM (the front panel contains USB connections).
6. The Compact Flash card is located on the underside of the DMM motherboard. Gently pull the card outward.

#### 19.2.5.2 Compact Flash

The O/S is copied to the Compact Flash card using a Compact Flash Card Reader. In a sample situation, the O/S image may be contained on a CD provided by Rutter Technologies. To transfer this image from the provided CD to the Compact Flash card:

1. Insert the CD into a PC.
2. Insert the Compact Flash card (with a 512MB NTFS file system) into a Compact Flash Card Reader and connect to the PC using an available USB port.
3. Transfer the O/S image from the CD to the Compact Flash card.

#### 19.2.5.3 Installation of Operating System

Once the Compact Flash card has been modified to contain the required O/S image, it is necessary to reinstall the card into the DMM. To do so, follow the steps provided below:

1. Plug the updated Compact Flash card into the Compact Flash Card Connection port located on the underside of the DMM.
2. Once the Compact Flash card has been securely connected, reattach the DMM front panel and close the DPU top hatch.
3. To reboot the DMM, reattach the power cable.



**Note!** *Prior to rebooting the DMM ensure all PS2 devices (i.e., keyboard and/or mouse) are connected.*

**19.2.5.4 Adjusting BIOS Settings**

If the storage size of the Compact Flash card being installed is different than that of the card being removed (for example, a 256MB card is being removed to install a 512MB card), the BIOS settings must be adjusted.

Follow the steps provided below to adjust the BIOS settings for the installation of a new Compact Flash card of differing storage size:



**Note!** *These settings only need to be adjusted if the card being installed is a different storage size than the one being removed (i.e., when removing a 256MB card and replacing it with a 512MB card).*

1. Power on the DMM (connect power).
2. At the Operating System select screen, press CTRL + ALT + DEL to cause the system to restart.
3. Press the Delete key <DEL> to enter the BIOS Setup blue screen.
4. Select "Basic CMOS Configuration" and press <Enter>.
5. Using the down arrow key, scroll down to highlight the "Ide 0 : > 1" line of the "ATA DRV Assignment" section (located in the lower portion of the BIOS screen).
6. Press the right arrow key to highlight the Sector column (**Sec**). Once highlighted, use the <Page Up> or <Page Down> keys to decrease or increase the highlighted number.

Compact Flash Card Storage Size	Sectors
512MB	63
256MB	32

7. Once the correct Sector number has been selected, press the right arrow key to highlight the Heads column (**Hds**). Once highlighted, use the <Page Up> or <Page Down> keys to decrease or increase the highlighted number.

Compact Flash Card Storage Size	Heads
512MB	16
256MB	16

8. Once the correct Heads number has been selected, press the right arrow key to highlight the Cylinders column (**Cyls**). Once highlighted, use the <Page Up> or <Page Down> keys to decrease or increase the highlighted number.

Compact Flash Card Storage Size	Cylinders
512MB	993
256MB	980

9. Once the above changes have been made, press the <Esc> key. Scroll down the subsequent screen and select "Write to CMOS and exit".
10. A "Save changes and exit" message box will appear. Press the <Y> key to save all changes and exit.

11. The DMM will reboot with updated BIOS settings.

### 19.2.5.5 Setting Security Features

Once the updated O/S has been booted, it is necessary to set various security features. To do so, follow the steps provided below:

1. Once the DMM has booted with the updated O/S installed, a logon screen will be visible. Log in using the Administrator account.
2. Wait approximately five (5) minutes to allow the O/S to auto-install new hardware settings. Once the hardware settings are installed, restart the O/S if prompted.
3. Upon reboot, log in using the Administrator account.

### 19.2.5.6 Set MyUser AutoLogon and Permissions

1. Type `ewfmgr c:` in the Run command line (Start > Run...) to verify the Enhanced Write Filter (EWF) was installed. A DOS window will appear and disappear quickly. If an error message occurs, contact Rutter Support.
2. Open the Control Panel (Start > Control Panel) and double-click the "Tweak UI" icon.
3. Select the "Logon" tab, check the "Log on automatically at system startup" checkbox, ensure the logon name is MyUser, set the password to "Rutter", and click "OK".
4. Right-click the Windows 'Start' button and select 'Explore' from the subsequent pop-up list.
5. Right-click the VDR\_DATA\_MR drive and select Properties.
6. Select the Sharing tab and click the "New Share" button at the bottom of the Properties window.
7. Set the Share Name to be "Secured Data".
8. Click the "Permissions" button, verify all users have Read Only access, and click "OK".
9. Click "OK" when finished and "OK" again to close the Properties window.

### 19.2.5.7 Set Security Features for VDR\_DATA\_MR Drive

1. In Windows Explorer, right-click the VDR\_DATA\_MR: drive and select '**Properties**'.
2. Select the '**Security**' tab and click the '**Advanced**' button on the bottom left corner.
3. In the Advance Security Settings window, click the '**Add**' button.
4. Type '**MyUser**' into the "Enter object name to select" text field and click '**OK**'.
5. Ensure the following **Deny** checkboxes are selected:
  - Create Files/Write Data
  - Create Folders/Append Data
  - Write Attributes
  - Write Extended Attributes
  - Delete Subfolders and Files
  - Delete
6. Ensure the following **Allow** checkboxes are selected:
  - List Folder Read Data
  - Read Attributes
  - Read Extended Attributes
  - Read Permissions
7. Click "OK" to close the "Permission Entry" window, "OK" to close the "Advanced Security Settings" window, and "OK" to close the "Properties" **window**.

### 19.2.5.8 Set Security Features for VDR\_DATA

1. In Windows Explorer, right-click the VDR\_DATA drive and select Properties.
2. Select the "Security" tab and click the "Advanced" button.

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3. In the “Advanced Security Settings” window, click the “Add” button.
4. Type “MyUser” into the “Enter object name to select” text field and click “OK”.
5. Select the top “Deny” check box in the “Permissions” list field to ensure all permissions **are denied** and click “OK”.
6. Click “OK” to close the “Permission Entry” window, “OK” to close the “Advanced Security Settings” window, and “OK” to close the “Properties” window.

### 19.2.5.9 Set Security Features for C:\ Drive Folders

1. Open Windows Explorer and select the C:\ drive so that all folders contained on the drive are visible in the right window pane.
2. Select all **folders except** the VDRApps folder (pressing the CTRL key while clicking each individual folder allows a user to highlight multiple folders at one).
3. Right-click and select Properties.
4. Select the Security tab and click the “Advanced” button.



**Note!** When selecting the Security tab a message may appear indicating that the selected folders do not currently have similar security settings. Select “Yes” to allow the O/S to coordinate the security settings for these folders.

5. In the “Advanced Security Settings” window, click the “Add” button.
6. Type MyUser in the “Enter the object name to select” text field, and click “OK”.
7. Ensure the following **Deny** checkboxes are checked (selected):
  - Create Files/Write Data
  - Create Folders/Append Data
  - Write Attributes
  - Write Extended Attributes
  - Delete Subfolders and Files
  - Delete
8. Click “OK” to close the “Permission Entry” window, “OK” to close the “Advanced Security Settings” window, and “OK” to close the “Properties” window.

### 19.2.5.10 Set Security for VDRApps Folder

1. Open Windows Explorer, select the C:\ drive, right-click the VDRApps folder, and select Properties.
2. Select the Security tab and click the “Advanced” button.
3. In the “Advanced Security Settings” window, click the “Add” button.
4. In the Advanced Security Settings window, click the “Add” button, type MyUser in the “Enter the object name to select” text field, and click “OK”.
5. Set all files to “Deny” **except** the following (which must be set to “Allow”):
  - Traverse Folder / Execute File
  - List Folder / Read Data
6. Click “OK” to close the “Permission Entry” window and “OK” to close the “Properties” window.

### 19.2.5.11 Set Restrictions for Files

1. In Windows Explorer, access C:\WINDOWS\system32\
2. In the Tools menu of Explorer, select “Folder Options”.
3. Select the “View” tab and in the “Advanced settings” selection box:
  - Select the “Show hidden files and folders” radio button

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- Ensure the “Hide protected operating system files (Recommended)” check box is **not** checked
  - Click “OK”
4. Arrange the files by ‘Type’ (right click anywhere in the window and, in the pop-up list, select ‘Arrange Icons By’ > ‘Type’) and select the following files (holding the CTRL key while clicking the file names allows a user to select multiple items):

Executable (.exe) Files		
cmd	odbcad32	sndvol32
cliconfig	packager	syncapp
cscript	rasphone	sysedit
drwatson	regedt32	taskmgr
eventvwr	regsvr32	winhelp
grpconv	rsmui	winlogon
mmc	rundll32	wscript
mplay32	runonce	
msdtc	shrpwb	

Control Panel (.cpl) Applications		
appwiz	main	powercfg
desk	mmsys	sysdm
inetcpl	ncpa	timedate
intl	nusrmgr	telephon

5. Once selected, right-click the above files and select Properties.
6. Select the “Security” tab and click the “Advanced” button.
7. In the “Advanced Security Settings” window, click the “Add” button.
8. Type “MyUser” into the “Enter object name to select” text field and click “OK”.
9. Select the top “Deny” check box in the “Permissions” list field to ensure all permissions **are denied** and click “OK”.
10. In Windows Explorer, access C:\ and select the following files:

C:\ Files		
io.sys	ntdetect.com	msdos.sys
	ntldr	

11. Once selected, right-click the above files and select Properties.
12. Select the “Security” tab and click the “Advanced” button.
13. In the “Advanced Security Settings” window, click the “Add” button.

## Chapter 19: General and Corrective Maintenance

14. Type "MyUser" into the "Enter object name to select" text field and click "OK".
15. Select the top "Deny" check box in the "Permissions" list field to ensure all permissions **are denied** and click "OK".
16. Click "OK" to close the "Permission Entry" window, "OK" to close the "Advanced Security Settings" window, and "OK" to close the "Properties" window.
17. In Windows Explorer, access C:\WINDOWS and select the following files:

C:\WINDOWS Files		
notepad.exe	regedit.exe	

18. Once selected, right-click the above files and select Properties.
19. Select the "Security" tab and click the "Advanced" button.
20. In the "Advanced Security Settings" window, click the "Add" button.
21. Type "MyUser" into the "Enter object name to select" text field and click "OK".
22. Select the top "Deny" check box in the "Permissions" list field to ensure all permissions **are denied** and click "OK".
23. Click "OK" to close the "Permission Entry" window, "OK" to close the "Advanced Security Settings" window, and "OK" to close the "Properties" window.
24. Open the Run command line (Start > Run...)
25. Type ewfmgr c: -enable and click "OK".
26. Reopen the Run command line and type ewfmgr c: -commit and click "OK".

Once each of the above sections is completed, reboot the DMM via Start > Turn Off Computer > Restart.

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## 20 SPARE PARTS LIST

---

### 20.1 Spares Kit

- 1A fuse - Qty: 1
- 25A fuse - Qty: 1
- 10A fuse - Qty: 1
- Red LED - Qty: 1
- Air filter - Qty: 1

### 20.2 Installation Kits

The following kits are specific to particular VDR-100G2 components:

#### 20.2.1 DPU Install Kit

- M8 screw - Qty: 4
- M8 washer - Qty: 4
- PS/2 splitter - Qty: 1 (supplied with DMM)
- RJ-45 wall jack - Qty: 1
- Label - Qty: 1
- RJ-45 plugs - Qty: 12
- Operation Manual - Qty: 1
- Grommets - see *Table 20-1 - Grommets Required* below for grommet information.
- Cardboard box - Qty: 1
- Software - Qty: 1

#### 20.2.2 DAU Install Kit

- M8 screw - Qty:4
- M8 washer - Qty: 4
- Grommets - see *Table 20-1 - Grommets Required* below for grommet information.

#### 20.2.3 RSM (RSM 120/160) Kit

- RSM AC power supply
- Ethernet cable
- USB cable
- RSM (120G or 160G)

20.2.4 RSM (RSMA 120/160) Kit

- Straight Ethernet cable for hub (same as the cable used to connect existing hub to DMM)
- Hub with mushroom lock attached to back
- Power Cable with ferrules and labels for hub (same as the cable used to connect existing hub to power)
- RSM AC power supply
- RSM DC power supply
- Ethernet cable
- USB cable
- RSM (120G or 160G)

Unit	Entry Glands	Grommets Required			
		Blank	6 mm	12 mm	15 mm
DPU	10 + 4	6	6	6	6
DAU	30 + 4	12	6	16	12

Table 20-1 - Grommets Required

**APPENDIX A: VDR-100G2/G2S INSTALLATION  
CHECKLIST & FRM MAINTENANCE SHEET**

## Appendix

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## Appendix

# Installation Checklist

It is **required** that the technician implementing this procedure mark the boxes located to the right of the items to indicate acceptance of the item.

If the item has been completed the technician must mark the **YES** column in order to indicate compliance with associated item (non-compliance should be indicated by marking the **NO** column).

Once all items in each section have been checked, the **technician** should then initial and date his/her findings directly below the items.

The ship can be dockside for this procedure.

Please print technician name: \_\_\_\_\_

## Installation

### Test Conditions

- None Applicable

#### 1a. VDR & Component Mounting

	YES	NO	N/A
All bolts are tightened.			
There is easy access to cable entries and hatches.			
There is space from all sides of the DPU (as outlined in Rutter Technologies <i>VDR-100G2/G2S Installation &amp; Maintenance Manual</i> ).			
There is space from all sides of the DAU if applicable (as outlined in Rutter Technologies <i>VDR-100G2/G2S Installation &amp; Maintenance Manual</i> ).			
OAU is mounted correctly in an easily accessible position at the bridge.			
VDR Data Port is mounted in proximity to a computer workspace.			
Microphones are oriented to provide best audio coverage of all work spaces.			

Technician Initialed: \_\_\_\_\_ Date: \_\_\_\_\_

#### 1b. Mounting of FRM Capsule

Capsule is installed in accordance with IEC requirements.			
All bolts are tightened.			
Cables are connected securely and are watertight.			

Technician Initialed: \_\_\_\_\_ Date: \_\_\_\_\_

## Appendix

### 1c. Cable Installation

Cables from each Audio Junction Box to Audio Module are installed.			
Cables from each external interface (i.e., DataAnalog, DataGyro, etc) are installed.			
Cables from each NMEA source are installed.			
Cables from the radar/video source (if applicable) are installed.			
Cables from the FRM are installed.			
Ship's emergency power cable is installed.			
Cable from OAU is installed.			
Any optional cables are installed.			
Cables are marked with number and/or source designation according to the cable plan.			
Ensure for each cable terminated at the VDR that the source end is connected to the proper output.			
Ensure that each interface power cable is connected to the required power supply terminal of the VDR.			
The power cable from the FRM capsule is connected to a 24VDC power supply.			
Ship's emergency cable is connected inside DPU.			
Ensure the ship's breaker is switched off.			

Technician Initialed: \_\_\_\_\_ Date: \_\_\_\_\_

## Appendix

Additional Comments / Observations:



Please strike out any lines left empty above.

## Appendix

# Set to Work & Commissioning

### Test Conditions

- VDR is powered on.
- VHF source is powered on.
- Radar(s) is (are) powered on.
- Sensors / Data sources are transmitting data.
- Ship at sea or engines operational (as required).

### 2a. Bridge & VHF Audio is configured for recording

	YES	NO	N/A
Detection threshold has been set.			
Microphone test is passing successfully for <b>all</b> microphones.			
Audio is clear during data playback on all recorded channels.			
Both transmit and receive of VHF is being recorded properly.			
VHF audio is clear upon playback of data.			

Technician Initialed: \_\_\_\_\_ Date: \_\_\_\_\_

### 2b. Video sources are configured for recording

Video Channel 1 testing is passing successfully.			
Video Channel 1 appears correctly during playback.			
Video Channel 2 testing is passing successfully.			
Video Channel 2 appears correctly during playback.			
Video Channel 3 testing is passing successfully.			
Video Channel 3 appears correctly during playback.			
Video Channel 4 testing is passing successfully.			
Video Channel 4 appears correctly during playback.			

Technician Initialed: \_\_\_\_\_ Date: \_\_\_\_\_

**Appendix**

**2c. All NMEA data sources are available and configured**

Ensure breakers in DPU are switched ON.				
Ensure that the following NMEA data is being recorded and configuration is reflected correctly (mark the applicable 'YES', 'NO', or 'N/A' box):				
<b>Data</b>	<b>Notes</b>	<b>YES</b>	<b>NO</b>	<b>N/A</b>
Date and time				
Ship's position and datum used				
Speed (water and/or ground)				
Heading (true)				
Depth (echosounder)				
All IMO-mandatory Bridge Alarms				
AIS				
Rudder Order/Response				
Engine Order/Response				
Thruster Order/Response				
Hull openings / watertight doors				
Accelerations and hull stresses				
Wind speed and direction				

Technician Initialed: \_\_\_\_\_ Date: \_\_\_\_\_

**2d. OAU is functioning properly**

Audible alarm is functioning correctly.			
All keypad buttons are functioning correctly.			
LCD Display is displaying appropriate alarms.			
Alarm display shows status clear when alarm clears.			
Download to DMM internal drive is working via appropriate keypad press and confirmation of the download.			

Technician Initialed: \_\_\_\_\_ Date: \_\_\_\_\_

**Appendix**

**2e. FRM Recording is configured**

Check that breaker is switched on.			
The FRM is formatted as described in the Installation manual.			
The FRM is enabled and set to correct capsule type in the VDRPARAMS.INI file.			
Configuration file is being sent to the capsule.			
Data can be downloaded from the capsule using the download software.			
All 12 hours of required IMO data is present.			

Technician Initialed: \_\_\_\_\_ Date: \_\_\_\_\_

**2f. Power Subsystem is functioning properly**

All devices powered from Power Supply are operating.			
When power is removed a power failure alarm is generated in the log window.			
When power is restored a power restore message will appear in the log window.			
Activate an "Emergency Download" to secure the data for later inspection.			

Technician Initialed: \_\_\_\_\_ Date: \_\_\_\_\_

**2g. VDR Data Port and RSM (if installed) is functioning properly**

Connect laptop PC to VDR Data Port to check for confirm communication with VDR.			
If applicable, download to the RSM from OAU functions correctly.			

Technician Initialed: \_\_\_\_\_ Date: \_\_\_\_\_

**2h. VDRPARAMS.INI Configuration Test**

The STORAGE section has correct video channel being sent to the capsule.			
The AUDIO section should have proper number of mixers, microphones, and VHF set.			
The VIDEO section should have the number of sources, the transfer rate and the number of blocks set correctly.			

Technician Initialed: \_\_\_\_\_ Date: \_\_\_\_\_

## Appendix

### 2i. Final Pre-Commissioning Steps

VDR-CFG.TXT is edited to reflect installation.			
Five (5) minutes of data consisting of information from all source equipment connected to VDR.			
Download client computer, if provided, is configured for download and playback.			

Technician Initialed: \_\_\_\_\_ Date: \_\_\_\_\_

### 2j. Commissioning Complete

Commissioning Form is complete.			
All papers have been signed by Service Supplier.			
Copies of Type Approval Certificate(s) have been provided to Ship.			
Operation manual(s) are provided to Ship.			
Keys provided to Owner.			

Technician Initialed: \_\_\_\_\_ Date: \_\_\_\_\_

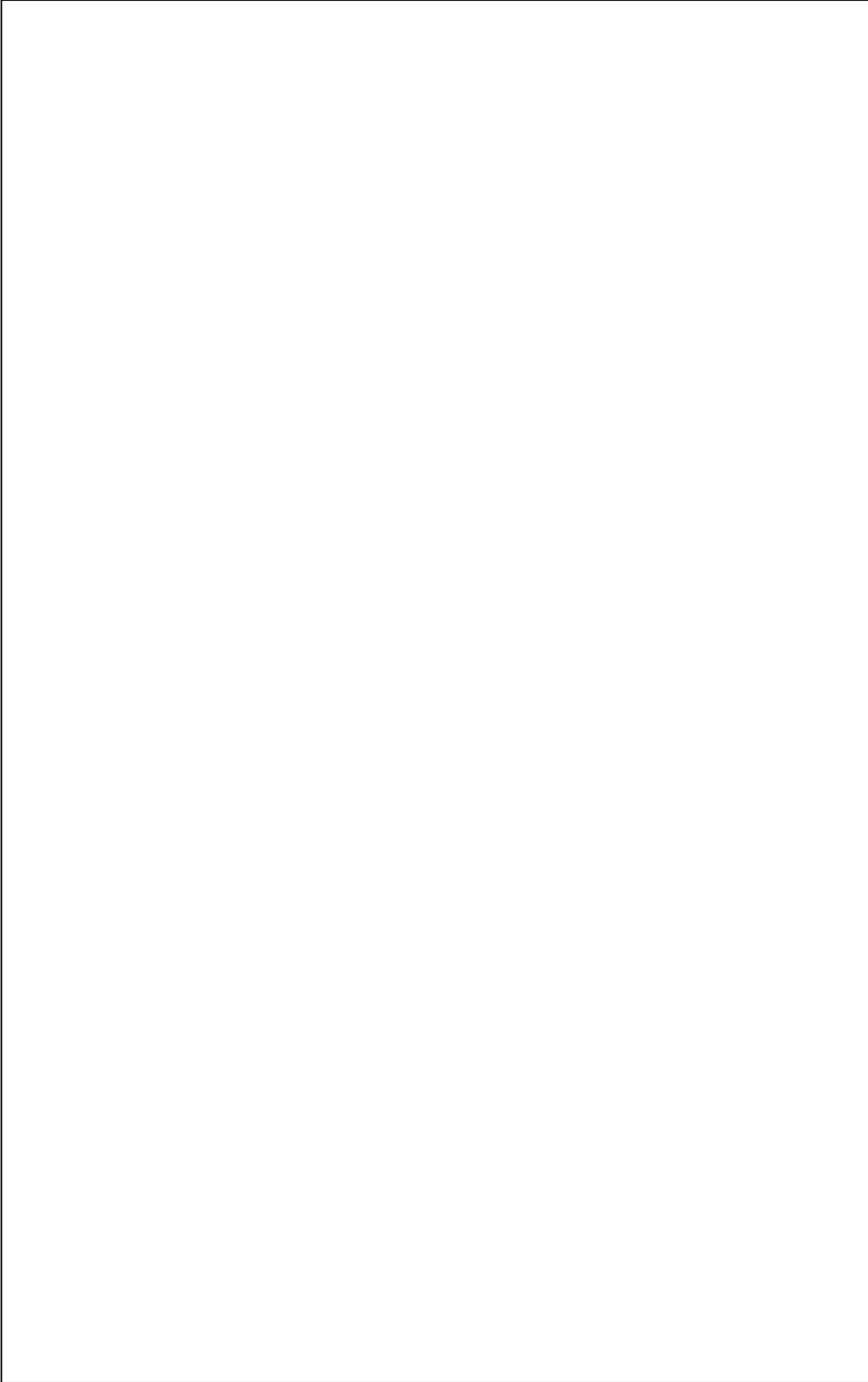
### 2k. Final Preparations for Recording

Windows OS Recycle Bin is empty.			
Copy of VDRApps folder is copied and sent to Rutter Technologies (includes VDR Configuration file and VDR Parameters file).			
Sample 5 minute data capture has been sent to Rutter Technologies.			
VDR is set to normal operation.			

Technician Initialed: \_\_\_\_\_ Date: \_\_\_\_\_

## Appendix

Additional Comments / Observations:



Please strike out any lines left empty above.

## Appendix

### FRM Maintenance Sheet

The following items should be completed (where applicable) for the Final Recording Medium (FRM) unit installed during the installation.

#### FRM Type

Fixed Capsule

Float-Free Capsule

Part No.:	Capsule Serial No.:
Software Version No.:	Model No.:
Beacon Serial No. (if applicable):	Beacon Date (if applicable):
Float-Free Capsule Mounting Bracket Serial No. (if applicable):	
Float-Free Hydrostatic Release Serial No. (if applicable):	

#### Network Parameters

FRM IP Address	
FRM SubNet	
Default Gateway IP	

#### FRM Memory Partition Configuration (L3 Units Only)

Total Granules in Crash Module	
Number of Bytes Per Granule	
Currently Unassigned Granules	

#### Granule/Byte Allocation and Stream Names

Position	Number of Granules (L3)	Stream Name
0		
1		
2		
3		
4		

## Appendix

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**APPENDIX B: VDR-100G2/G2S COMMISSIONING  
FORM**

## Appendix

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## Appendix



# VDR-100G2 / G2S Installation Commissioning Form

Complete all relevant sections. Data items must be marked with a "✓" or "X" in the "OK" field to indicate satisfactory inspection. If a data item is not applicable to the particular installation, the "Comments" field must be marked "N/A". Dates should be in the dd-mmm-yyyy format (day-month-year, e.g. 12-Nov-2006).

A satisfactory operational status means that all major operating facilities and requirements of the equipment or unit have been tested and found to function in accordance with the relevant SOLAS regulations and associated IMO performance standards.

Ship Name: \_\_\_\_\_ IMO Number: \_\_\_\_\_

VDR Model: \_\_\_\_\_ VDR Serial No: \_\_\_\_\_

FRM Model: \_\_\_\_\_ FRM Serial No: \_\_\_\_\_

### Data Items

Items	YES	NO	N/A	Comments
Date and time (A.861/5.4.1)				
Ship's position (A.861/5.4.2)				
Speed (A.861/5.4.3)				
Heading (A.861/5.4.4)				
Bridge audio (A.861/5.4.5)				
Communications audio (A.861/5.4.6)				
Radar data (A.861/5.4.7)				
Echo sounder (A.861/5.4.8)				
Main alarms (A.861/5.4.9)				
Rudder order & response (A.861/5.4.10)				
Engine order & response (A.861/5.4.11)				
Hull openings (doors) status (A.861/5.4.12)				
Watertight & fire door status (A.861/5.4.13)				
Wind speed & direction (A.861/5.4.15)				

For further information, please refer to IEC 61996: Shipborne Voyage Data Recorder (VDR) Performance Requirements – Methods of testing and required test results and/or IEC 61996-2: Part 2 - Simplified voyage data recorder (S-VDR).

**Additional Comments**

--

\* Please strike out any space left empty above.

**Representative Acceptance**

Reference documents: IMO Resolution A.861(20) / MSC 163 (78)

This is to certify that a survey of the voyage data recorder / simplified voyage data recorder has been carried out in accordance with the relevant regulations of the Convention and as described above:

Service Supplier		
Technician Name		Signature
Location		
Date		

Classification Society / Flag Authority		
Surveyor Name		Signature
Society		
Location		
Date		

Ship Owner		
Representative Name		Signature
Location		
Date		

## **APPENDIX C: DATA INTERFACE DOCUMENTATION**

## Appendix

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## Appendix

### DataAnalog – 8 Channel Analog to Digital Converter

The DataAnalog interface monitors the status of 8 analog input signals, and indicates the voltage or current on each input channel via an NMEA-0183/IEC 61162 format data sentence transmitted once per second. Using a 12-bit A/D converter, the interface represents the signal level measured at the input with a value between -4096 and +4094 in the output data sentence. The DataAnalog inputs are arranged in four isolated groups of two, which share a common return. This arrangement provides the ability to simultaneously monitor signals from four separate systems while maintaining electrical isolation between those systems. It is ideally suited to measure the electrical indications for order and response from 4 shipboard systems (i.e., Rudder Order/Response, ME RPM Order/Response, Pitch Order/Response, Bow Thruster Order and Response). The internal voltage divider circuit on the inputs can be configured to measure bi-polar (+/- 5V or +/- 10V), uni-polar (0 to 5V or 0 to 10V), and current (4 to 20 mA) indicators. The RS232/422 output baud rate is also configurable. In addition to the 8-channel DataAnalog interface described above, a 4-channel version is also available.

The DataAnalog is certified by the Canadian Standards Association as meeting the rigorous EMC and environmental resistance criteria defined by IEC 60945. The inputs are high impedance, output ports are opto-isolated, and the power input is DC/DC isolated. This will ensure the safe, reliable operation of the DataAnalog and all devices connected to it. It is easily installed and will provide dependable, uninterrupted service in the extreme environments typically found aboard vessels.

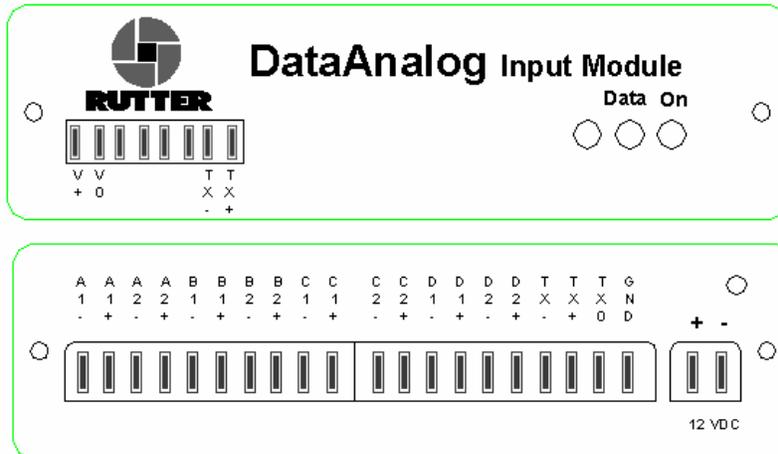
Features include:

- Output channel activity LED indicators;
- Power LED indicator;
- Configurable input voltage ranges, and output baud rates;
- Configurable NMEA-0183/IEC 61162 sentence identifiers (up to 64 unique ID's);
- 19" inch rack or DIN rail mountable (mounting brackets available);
- Max wire size for smaller gauge Phoenix plug connectors, used on interface front panel connectors, is 20 AWG or 0.5 sq. mm. Max wire size for the larger Phoenix connectors, used on interface rear panel connectors, is 18 AWG or 0.75 sq mm;
- Power and data output connectors on both front and back panels.

#### Technical Specifications

Power Required: 12VDC to 24VDC  
 Current Draw: 12VDC @ 300mA (over voltage and reverse polarity protected)  
 Dimensions: 38.1mm X 134.1mm X 190.5mm  
 Weight: 0.60 KG  
 Input: Unipolar: 0 to 5V, 0 to 10V Bipolar: +/- 5V, +/- 10V Current: 4 to 20 mA  
 Output: RS-232, RS-422 and Current Loop. Baud rates of 4800, 9600, 19.2k, and 57.6k baud (8N1), (DIP switch selectable)

#### Connection Information



*DataAnalog Front (Top) and Back (Bottom) View*

## Appendix

### Front panel connection info:

Connector	Description
V+	12VDC Input power (Also Available on the back panel) * see below
Vo	12VDC Input power common (Also Available on the back panel) * see below
Tx-	RS422 Data Output (neg) (Also Available on the back panel)
Tx+	RS422 Data Output (pos) (Also Available on the back panel)

### Back panel connection info \*\*see below:

Connector	Description
A1-	System A input, Channel 1 (neg)
A1+	System A input, Channel 1 (pos)
A2-	System A input, Channel 2 (neg)
A2+	System A input, Channel 2 (pos)
B1-	System B input, Channel 1 (neg)
B1+	System B input, Channel 1 (pos)
B2-	System B input, Channel 2 (neg)
B2+	System B input, Channel 2 (pos)
C1-	System C input, Channel 1 (neg)
C1+	System C input, Channel 1 (pos)
C2-	System C input, Channel 2 (neg)
C2+	System C input, Channel 2 (pos)
D1-	System D input, Channel 1 (neg)
D1+	System D input, Channel 1 (pos)
D2-	System D input, Channel 2 (neg)
D2+	System D input, Channel 2 (pos)
Tx-	RS422 Data Output (neg)
Tx+	RS422 Data Output (pos)
Tx0	RS232 Data Output (neg)
GND	RS232 Data Output (pos)
+ (12VDC)	12VDC Input power
- (12VDC)	12VDC Input power common

\* **Warning!** Connect power to either the front OR rear of the interface. Only one power input is required.



\*\* **Note!** Like-lettered system inputs share a common ground. For example, input A1 shares a common ground with input A2. Likewise, B1 shares a common ground with B2, C1 with C2, and D1 with D2.

### Input Configuration

The internal voltage divider circuits, on the inputs, can be configured to measure bipolar (+/- 5V or +/- 10V), unipolar (0 to 5V or 0 to 10V), and current (4 to 20 mA) indicators.

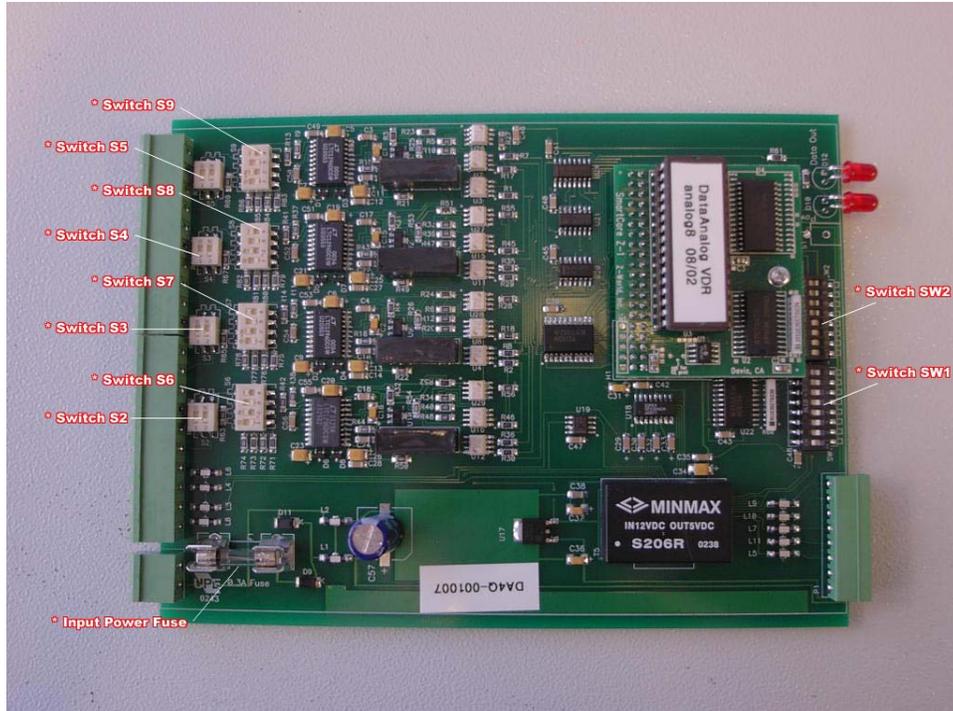
**Note!** Both the bipolar and unipolar settings apply to groups of channels (i.e., if channel 1 is set to measure bipolar, channel 2 is automatically set to measure bipolar as well; the same is true of the unipolar setting).

Switch SW2 is used to change each 2 input group between bipolar and unipolar mode. Positions 1 to 4 set the channel pairs to unipolar or bipolar mode (i.e., SW2 pos 1 'ON' sets channels A1 and A2 to bipolar mode). Switches S2 to S9 control the internal input voltage divider settings. Switches S2, S3, S4, and S5 are used to include/short the resistors on the inputs. Switches S6, S7, S8 and S9 are used to include/short the pull down resistors between the inputs and grounds. To access these switches:

- Unplug the input connectors;
- Unscrew the two screws located on the front panel of the DataAnalog enclosure in order to remove it;
- Slide the circuit board out of the enclosure.

See *DataAnalog PCB* below for further information regarding switch location.

## Appendix



DataAnalog PCB

To configure each DataAnalog input channel, the switches should be set according to the following tables. The subscripts on the switch labels indicate which switch position is applicable.

### High Impedance Settings

If switches S2 to S5 are closed (on), and switches S6 to S9 are open (off), the input impedances will be very high (approximately 3.3M Ohms), however in this mode it can only measure +/- 5V or 0-5V. These switches do not have to be made collectively. Channel A may be set for high impedance, meanwhile Channel B may be set for +/-10V(low impedance).

**Note!** It is important to note that the source equipment is to be checked to ensure the analog does not affect the source equipment during power off on the analog. If the source equipment is affected, the addition of a 1M Ohm resistor added in series to the input of the channel will increase the input impedance, thus reducing the likelihood of affecting the source equipment.

To measure beyond the 5V range with the high impedance setting, an external voltage divider with high resistance values is necessary. For example, to measure +/- 30V on channels A1 and A2 with a 1M ohm input impedance, close (Turn On) S5, open (Turn Off) S9, and close SW2(1) (these changes set the analog channel for +/-5V); place an 850K resistor in series with the input channel, and a 150K resistor between the input channel and the common. Such changes **should only** be instituted if the voltage is above 5V.

In order to support voltage and current ranges below the specifications given above, additional amplifying isolators may need to be incorporated into the interfacing plan. Please contact Rutter Technologies' Product Support Department for further information on obtaining applicable amplifying isolators.

## Appendix

	Channel A1				Channel A2			
	SW2 <sub>1</sub>	S5 <sub>1</sub>	S9 <sub>4</sub>	S9 <sub>3</sub>	SW2 <sub>1</sub>	S5 <sub>2</sub>	S9 <sub>2</sub>	S9 <sub>1</sub>
0-5V	OFF	ON	ON	OFF	OFF	ON	ON	OFF
0-10V	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF
+/-5V	ON	ON	ON	OFF	ON	ON	ON	OFF
+/-10V	ON	OFF	ON	OFF	ON	OFF	ON	OFF
4-20mA	OFF	ON	OFF	ON	OFF	ON	OFF	ON
+/-5V (HI*)	ON	ON	OFF	OFF	ON	ON	OFF	OFF
0-5V (HI*)	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF

	Channel B1				Channel B2			
	SW2 <sub>2</sub>	S4 <sub>1</sub>	S8 <sub>4</sub>	S8 <sub>3</sub>	SW2 <sub>2</sub>	S4 <sub>2</sub>	S8 <sub>2</sub>	S8 <sub>1</sub>
0-5V	OFF	ON	ON	OFF	OFF	ON	ON	OFF
0-10V	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF
+/-5V	ON	ON	ON	OFF	ON	ON	ON	OFF
+/-10V	ON	OFF	ON	OFF	ON	OFF	ON	OFF
4-20mA	OFF	ON	OFF	ON	OFF	ON	OFF	ON
+/-5V (HI*)	ON	ON	OFF	OFF	ON	ON	OFF	OFF
0-5V (HI*)	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF

	Channel C1				Channel C2			
	SW2 <sub>3</sub>	S3 <sub>1</sub>	S7 <sub>4</sub>	S7 <sub>3</sub>	SW2 <sub>3</sub>	S3 <sub>2</sub>	S7 <sub>2</sub>	S7 <sub>1</sub>
0-5V	OFF	ON	ON	OFF	OFF	ON	ON	OFF
0-10V	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF
+/-5V	ON	ON	ON	OFF	ON	ON	ON	OFF
+/-10V	ON	OFF	ON	OFF	ON	OFF	ON	OFF
4-20mA	OFF	ON	OFF	ON	OFF	ON	OFF	ON
+/-5V (HI*)	ON	ON	OFF	OFF	ON	ON	OFF	OFF
0-5V (HI*)	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF

	Channel D1				Channel D2			
	SW2 <sub>4</sub>	S2 <sub>1</sub>	S6 <sub>4</sub>	S6 <sub>3</sub>	SW2 <sub>4</sub>	S2 <sub>2</sub>	S6 <sub>2</sub>	S6 <sub>1</sub>
0-5V	OFF	ON	ON	OFF	OFF	ON	ON	OFF
0-10V	OFF	OFF	ON	OFF	OFF	OFF	ON	OFF
+/-5V	ON	ON	ON	OFF	ON	ON	ON	OFF
+/-10V	ON	OFF	ON	OFF	ON	OFF	ON	OFF
4-20mA	OFF	ON	OFF	ON	OFF	ON	OFF	ON
+/-5V (HI*)	ON	ON	OFF	OFF	ON	ON	OFF	OFF
0-5V (HI*)	OFF	ON	OFF	OFF	OFF	ON	OFF	OFF

\* HI represents high impedance settings

**Warning! Incorrect switch settings and exceeding the selected range can damage the DataAnalog.**

### Output Format

DataAnalog:

**\$ANLXX,[A<sub>1</sub>],[A<sub>2</sub>],[B<sub>1</sub>],[B<sub>2</sub>],[C<sub>1</sub>],[C<sub>2</sub>],[D<sub>1</sub>],[D<sub>2</sub>] \*AA**

where:

- XX is set between 00 to 63 (see *NMEA-0183/IEC 61162 String Identifier Configuration* section below)
- A<sub>1-2</sub>, B<sub>1-2</sub>, C<sub>1-2</sub>, D<sub>1-2</sub> are values between -4096 and +4094 that represent the voltage or current on the corresponding input channel
- AA is the checksum.

Example: **\$ANL12,1234,2344,-3456,-4094,1234,2344,-3456,-4094\*F5**

## Appendix

### Output Baud Rate Configuration

The DataAnalog output baud rate can be configured using the DIP Switch SW1 located on the DataAnalog circuit board. To access these switches:

- Unplug the front panel input connector;
- Unscrew the two screws located on the front panel of the DataAnalog enclosure in order to remove the panel;
- The DIP Switches are accessible at the front of the circuit board.

See *DataAnalog PCB* above for further information on the location of the DIP Switch for baud rate selection.

Output Baud Rate	SW1 <sub>7</sub>	SW1 <sub>8</sub>
4800	OFF	OFF
9600	ON	OFF
19200	OFF	ON
57600	ON	ON

### NMEA-0183/IEC 61162 String Identifier Configuration

Should more than one DataAnalog be required, it is necessary to program a unique string identifier for each. The DataAnalog identifier can be programmed using the DIP Switch located on the DataAnalog circuit board. To access this switch:

- Unplug the front panel input connector(s);
- Unscrew the two screws located on the front panel of the DataAnalog enclosure in order to remove the panel;
- Slide the circuit board out of the enclosure.

The DIP Switch for configuring the string identifier is labelled SW1, located as shown above (*DataAnalog PCB* above). The following table provides information on the switch settings necessary for programming the DataAnalog String Identifier:

ID	SW1 <sub>6</sub>	SW1 <sub>5</sub>	SW1 <sub>4</sub>	SW1 <sub>3</sub>	SW1 <sub>2</sub>	SW1 <sub>1</sub>
00	OFF	OFF	OFF	OFF	OFF	OFF
01	OFF	OFF	OFF	OFF	OFF	ON
02	OFF	OFF	OFF	OFF	ON	OFF
03	OFF	OFF	OFF	OFF	ON	ON
04	OFF	OFF	OFF	ON	OFF	OFF
05	OFF	OFF	OFF	ON	OFF	ON
06	OFF	OFF	OFF	ON	ON	OFF
07	OFF	OFF	OFF	ON	ON	ON
08	OFF	OFF	ON	OFF	OFF	OFF
09	OFF	OFF	ON	OFF	OFF	ON
10	OFF	OFF	ON	OFF	ON	OFF
11	OFF	OFF	ON	OFF	ON	ON
12	OFF	OFF	ON	ON	OFF	OFF
13	OFF	OFF	ON	ON	OFF	ON
14	OFF	OFF	ON	ON	ON	OFF
15	OFF	OFF	ON	ON	ON	ON
16	OFF	ON	OFF	OFF	OFF	OFF
17	OFF	ON	OFF	OFF	OFF	ON
18	OFF	ON	OFF	OFF	ON	OFF
19	OFF	ON	OFF	OFF	ON	ON
20	OFF	ON	OFF	ON	OFF	OFF
21	OFF	ON	OFF	ON	OFF	ON
22	OFF	ON	OFF	ON	ON	OFF
23	OFF	ON	OFF	ON	ON	ON
24	OFF	ON	ON	OFF	OFF	OFF
25	OFF	ON	ON	OFF	OFF	ON
26	OFF	ON	ON	OFF	ON	OFF
27	OFF	ON	ON	OFF	ON	ON
28	OFF	ON	ON	ON	OFF	OFF
29	OFF	ON	ON	ON	OFF	ON
30	OFF	ON	ON	ON	ON	OFF
31	OFF	ON	ON	ON	ON	ON

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32	ON	OFF	OFF	OFF	OFF	OFF
33	ON	OFF	OFF	OFF	OFF	ON
34	ON	OFF	OFF	OFF	ON	OFF
35	ON	OFF	OFF	OFF	ON	ON
36	ON	OFF	OFF	ON	OFF	OFF
37	ON	OFF	OFF	ON	OFF	ON
38	ON	OFF	OFF	ON	ON	OFF
39	ON	OFF	OFF	ON	ON	ON
40	ON	OFF	ON	OFF	OFF	OFF
41	ON	OFF	ON	OFF	OFF	ON
42	ON	OFF	ON	OFF	ON	OFF
43	ON	OFF	ON	OFF	ON	ON
44	ON	OFF	ON	ON	OFF	OFF
45	ON	OFF	ON	ON	OFF	ON
46	ON	OFF	ON	ON	ON	OFF
47	ON	OFF	ON	ON	ON	ON
48	ON	ON	OFF	OFF	OFF	OFF
49	ON	ON	OFF	OFF	OFF	ON
50	ON	ON	OFF	OFF	ON	OFF
51	ON	ON	OFF	OFF	ON	ON
52	ON	ON	OFF	ON	OFF	OFF
53	ON	ON	OFF	ON	OFF	ON
54	ON	ON	OFF	ON	ON	OFF
55	ON	ON	OFF	ON	ON	ON
56	ON	ON	ON	OFF	OFF	OFF
57	ON	ON	ON	OFF	OFF	ON
58	ON	ON	ON	OFF	ON	OFF
59	ON	ON	ON	OFF	ON	ON
60	ON	ON	ON	ON	OFF	OFF
61	ON	ON	ON	ON	OFF	ON
62	ON	ON	ON	ON	ON	OFF
63	ON	ON	ON	ON	ON	ON

### Replacing the Input Power Fuse

To access the DataAnalog's circuit board:

- Unplug the front panel input connectors;
- Unscrew the two screws located on the front panel of the DataAnalog enclosure in order to remove the panel;
- Slide the circuit board out of the enclosure.

Refer to *DataAnalog PCB* above for fuse location. The input power fuse is a 500mA fast-blow glass cartridge fuse, 5 X 20 mm size. When replacing the fuse, ensure the fuse clips are secured to the new fuse. If in doubt, squeeze the clips prior to insertion of the new fuse to tighten the grip.

## Appendix

### DataDiscrete Input Module

The DataDiscrete interface monitors the status of 24 discrete input signals, and indicates the on/off status of each channel via an NMEA-0183/IEC 61162 format data sentence. For applications where more than 24 discrete signals need to be monitored, up to ten DataDiscrete modules can be connected together, indicating the status of up to 240 input points in a single data stream.

When discrete signals need to be monitored from multiple systems, the DataDiscrete inputs are arranged in four (4) groups of six (6) with each group having a common return. This arrangement provides the ability to simultaneously monitor voltages from four (4) separate systems while maintaining electrical isolation between those systems. The DataDiscrete can detect both AC and DC sources, and can be configured for high or low input voltages.

The DataDiscrete is certified by the Canadian Standards Association as meeting the rigorous EMC and environmental resistance criteria defined by IEC 60945. The input and output ports are opto-isolated and the power input is DC/DC isolated. This will ensure the safe, reliable operation of the DataDiscrete and all devices connected to it. It is easily installed and will provide dependable, uninterrupted service in the extreme environments typically found aboard vessels.

Features include:

- Input/output channel activity LED indicators;
- Power LED indicator;
- Configurable input voltage ranges;
- Configurable NMEA-0183/IEC 61162 sentence identifiers (up to 64 unique ID's);
- 19" inch rack or DIN rail mountable (Mounting brackets available);
- Phoenix plug connectors (the maximum wire size on front and rear connectors is 20 AWG or 0.5mm<sup>2</sup>);
- Power and data output connectors on both front and back panels.

#### Technical Specifications

Power Required: 12 or 24 VDC (reverse polarity and over voltage protected)

Current Draw: 180 mA @ 12 VDC

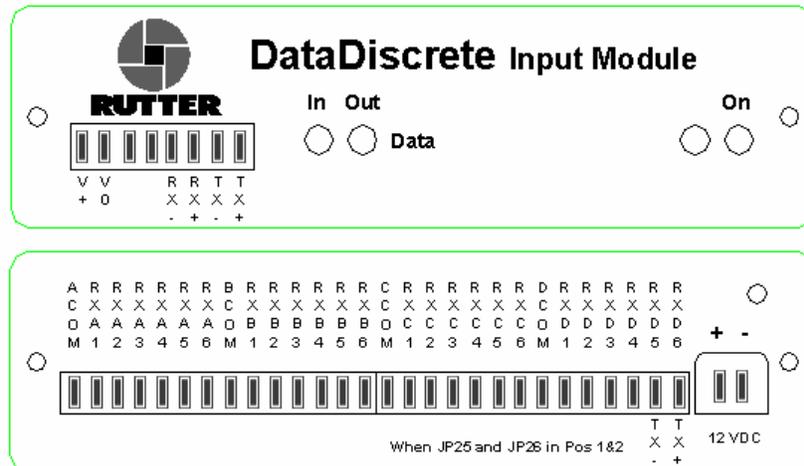
Dimensions: 38.1mm X 134.1mm X 190.5mm

Weight: 0.60 KG

Input: Low voltage: 3 to 50 V; High voltage: 25 to 140 V

Output: RS-422 at 4800 (8N1)

#### Connection Information



DataDiscrete Front (Top) and Back (Bottom) View

## Appendix

### Front panel connection info:

Connector	Description
V+	12VDC Input power (Also Available on the back panel) * see below
Vo	12VDC Input power common (Also Available on the back panel) * see below
Rx-	RS422 Data Input (neg)
Rx+	RS422 Data Input (pos)
Tx-	RS422 Data Output (neg) (Also Available on the back panel)
Tx+	RS422 Data Output (pos) (Also Available on the back panel)

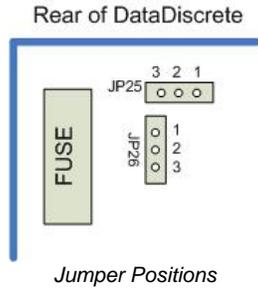
### Back panel connection info:

Connector	Description
ACOM	System A Common (neg)
RXA1	System A input, Channel 1 (pos)
RXA2	System A input, Channel 2 (pos)
RXA3	System A input, Channel 3 (pos)
RXA4	System A input, Channel 4 (pos)
RXA5	System A input, Channel 5 (pos)
RXA6	System A input, Channel 6 (pos)
BCOM	System B Common (neg)
RXB1	System B input, Channel 1 (pos)
RXB2	System B input, Channel 2 (pos)
RXB3	System B input, Channel 3 (pos)
RXB4	System B input, Channel 4 (pos)
RXB5	System B input, Channel 5 (pos)
RXB6	System B input, Channel 6 (pos)
CCOM	System C Common (neg)
RXC1	System C input, Channel 1 (pos)
RXC2	System C input, Channel 2 (pos)
RXC3	System C input, Channel 3 (pos)
RXC4	System C input, Channel 4 (pos)
RXC5	System C input, Channel 5 (pos)
RXC6	System C input, Channel 6 (pos)
DCOM	System D Common (neg)
RXD1	System D input, Channel 1 (pos)
RXD2	System D input, Channel 2 (pos)
RXD3	System D input, Channel 3 (pos)
RXD4	System D input, Channel 4 (pos)
RXD5/TX-	System D input, Channel 5 (pos) / RS422 Data Output (neg) **
RXD6/TX+	System D input, Channel 6 (pos) / RS422 Data Input (pos) **
+ (12VDC)	12VDC Input power
- (12VDC)	12VDC Input power common

## Appendix

**\* Warning! Connect power to either the front OR rear of the interface. Only one power input is required. Power connections are parallel.**

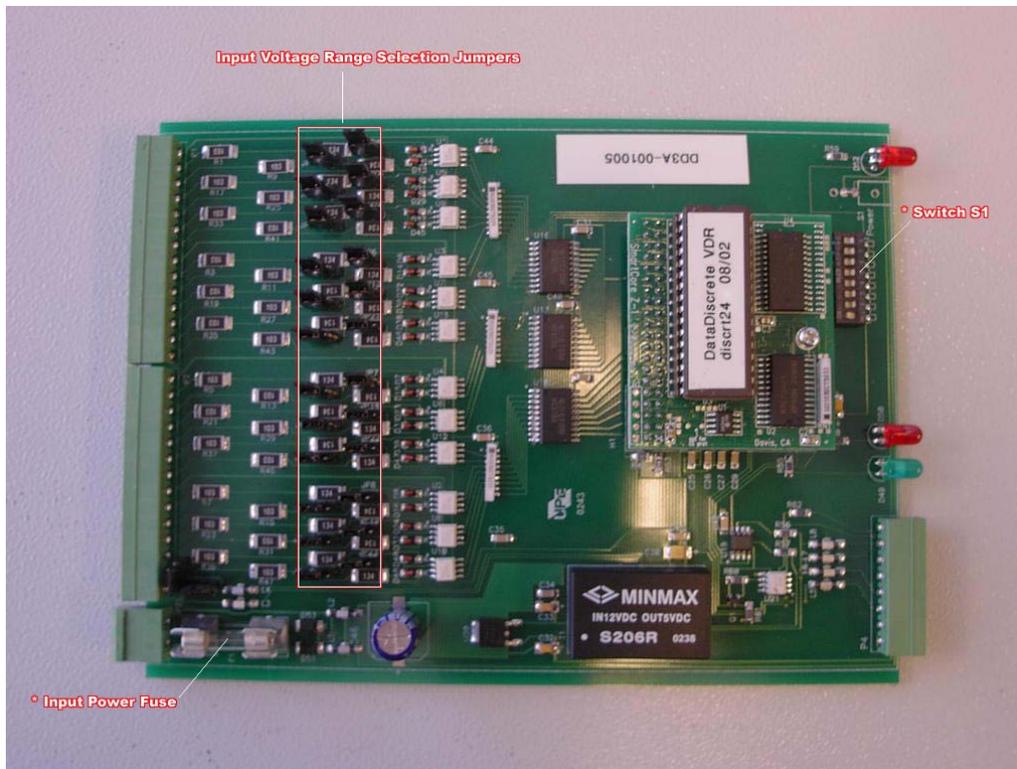
\*\* These connection points can be used as either a discrete input channel, or optionally, as a RS422 data output, depending on the position of jumpers JP25 and JP26 on the circuit board. When JP25 and JP26 are in positions 1 and 2, the connectors are RXD5 and RXD6 (default setting). When JP25 and JP26 are set to positions 2 and 3, the connectors are TX- and TX+.



### Input Configuration

Each DataDiscrete input channel can be configured to monitor high or low voltage signals by placing or removing jumpers on the DataDiscrete circuit board. Each input channel has an associated jumper, which changes the input impedance according to the voltage to be monitored. To access these jumpers:

- Unplug the front panel input connectors;
- Unscrew the two (2) screws located on the front panel of the DataDiscrete enclosure in order to remove the panel;
- Slide the circuit board out of the enclosure. See *DataDiscrete PCB* above for location of the input voltage range selection jumpers.



*DataDiscrete PCB*

## Appendix



The jumpers for input range are labelled JP1 to JP24 on the DataDiscrete input circuit board.

**Note!** The jumpers are located in line with each channel. Numbering is **not** consecutive.

The input voltage range is configured as follows:

Jumpers On: Low Voltage input (3 to 50V)

Jumpers Removed: High Voltage input (25 to 140V)



**Warning!** Exceeding the selected voltage range will damage the DataDiscrete.

**Note!** The DataDiscrete will not indicate the presence of voltages below the low end of the selected range. Exceeding the selected voltage range will damage the DataDiscrete.

### Output Format

The format of the NMEA-0183/IEC 61162 output sentence is as follows:

**\$DISXX,A<sub>1</sub>A<sub>2</sub>A<sub>3</sub>A<sub>4</sub>A<sub>5</sub>A<sub>6</sub>,B<sub>1</sub>B<sub>2</sub>B<sub>3</sub>B<sub>4</sub>B<sub>5</sub>B<sub>6</sub>,C<sub>1</sub>C<sub>2</sub>C<sub>3</sub>C<sub>4</sub>C<sub>5</sub>C<sub>6</sub>,D<sub>1</sub>D<sub>2</sub>D<sub>3</sub>D<sub>4</sub>D<sub>5</sub>D<sub>6</sub>\*AA**

where:

- XX is set between 00 to 63 (see *NMEA-0183/IEC 61162 String Identifier Configuration* below);
- A<sub>1-6</sub>, B<sub>1-6</sub>, C<sub>1-6</sub>, D<sub>1-6</sub> indicate the status of input channels (1 for 'ON', 0 for 'OFF');
- AA is the checksum.

Example: **\$DIS12,000100,111101,000000,001100,\*F7**

### Onboard DIP-Switch Settings

An 8-switch dip-switch is located on the front of the input circuit board adjacent to the power switch.

- Positions 1 through 6 change the output designation number from 0 to 63 in binary format (see String Identifier table in *NMEA-0183/IEC 61162 String Identifier Configuration* section below), without restarting (i.e., all 6 in the ON position would give an output of \$DIS63).
- Switches 7 and 8 control the output repetition rate, as follows (Code version 09/03):

Switch	7	8	Maximum No of DataDiscrete: Daisy-Chaining
1 Hz	OFF	OFF	3
1/3 Hz	ON	OFF	4
1/6 Hz	OFF	ON	5
1/10 Hz	ON	ON	10

- Changes to the output repetition rate can also be made without restarting the device.



**Note!** The above provided daisy-chain settings allow for a maximum string return.

### Discrete Input Voltage Levels

	Minimum Voltage Levels (V)	Maximum Voltage Levels (V)
Low Voltage Input (Jumpers ON)	3	60
High Voltage Input (Voltage OFF)	(130K res 23.0 VDC)	170
AC Input	(130K res 18 VDC)	120

## Appendix

### Front 8-Pin Phoenix Connector Pin-Out

Refer to the following table for pin-out information:

Front 8-Pin Pin-Out
Pin 1 – Vin
Pin 2 – PGND
Pin 3 – TX0
Pin 4 – GND
Pin 5 – RX0
Pin 6 – RX0RET
Pin 7 – TX0-
Pin 8 – TX0+

### NMEA-0183/IEC 61162 String Identifier Configuration

Up to ten DataDiscrete modules may be connected together to monitor up to 240 discrete signals. In order for the equipment to correctly identify and monitor each input channel, it is necessary to program a unique string identifier for each DataDiscrete module. The DataDiscrete identifier can be programmed using the DIP Switch located on the DataDiscrete circuit board. To access these switches:

- Unplug the front panel input connectors;
- Unscrew the two (2) screws located on the front panel of the DataDiscrete enclosure in order to remove the panel;
- Slide the circuit board out of the enclosure.

The DIP Switch for string identifier configuration selection is located as shown above (see *DataDiscrete PCB* above).

The table on the next page provides information on the switch settings necessary for programming the DataDiscrete String Identifier:

## Appendix

ID	S1 <sub>6</sub>	S1 <sub>5</sub>	S1 <sub>4</sub>	S1 <sub>3</sub>	S1 <sub>2</sub>	S1 <sub>1</sub>
00	OFF	OFF	OFF	OFF	OFF	OFF
01	OFF	OFF	OFF	OFF	OFF	ON
02	OFF	OFF	OFF	OFF	ON	OFF
03	OFF	OFF	OFF	OFF	ON	ON
04	OFF	OFF	OFF	ON	OFF	OFF
05	OFF	OFF	OFF	ON	OFF	ON
06	OFF	OFF	OFF	ON	ON	OFF
07	OFF	OFF	OFF	ON	ON	ON
08	OFF	OFF	ON	OFF	OFF	OFF
09	OFF	OFF	ON	OFF	OFF	ON
10	OFF	OFF	ON	OFF	ON	OFF
11	OFF	OFF	ON	OFF	ON	ON
12	OFF	OFF	ON	ON	OFF	OFF
13	OFF	OFF	ON	ON	OFF	ON
14	OFF	OFF	ON	ON	ON	OFF
15	OFF	OFF	ON	ON	ON	ON
16	OFF	ON	OFF	OFF	OFF	OFF
17	OFF	ON	OFF	OFF	OFF	ON
18	OFF	ON	OFF	OFF	ON	OFF
19	OFF	ON	OFF	OFF	ON	ON
20	OFF	ON	OFF	ON	OFF	OFF
21	OFF	ON	OFF	ON	OFF	ON
22	OFF	ON	OFF	ON	ON	OFF
23	OFF	ON	OFF	ON	ON	ON
24	OFF	ON	ON	OFF	OFF	OFF
25	OFF	ON	ON	OFF	OFF	ON
26	OFF	ON	ON	OFF	ON	OFF
27	OFF	ON	ON	OFF	ON	ON
28	OFF	ON	ON	ON	OFF	OFF
29	OFF	ON	ON	ON	OFF	ON
30	OFF	ON	ON	ON	ON	OFF
31	OFF	ON	ON	ON	ON	ON
32	ON	OFF	OFF	OFF	OFF	OFF
33	ON	OFF	OFF	OFF	OFF	ON
34	ON	OFF	OFF	OFF	ON	OFF
35	ON	OFF	OFF	OFF	ON	ON
36	ON	OFF	OFF	ON	OFF	OFF
37	ON	OFF	OFF	ON	OFF	ON
38	ON	OFF	OFF	ON	ON	OFF
39	ON	OFF	OFF	ON	ON	ON
40	ON	OFF	ON	OFF	OFF	OFF
41	ON	OFF	ON	OFF	OFF	ON
42	ON	OFF	ON	OFF	ON	OFF
43	ON	OFF	ON	OFF	ON	ON
44	ON	OFF	ON	ON	OFF	OFF
45	ON	OFF	ON	ON	OFF	ON
46	ON	OFF	ON	ON	ON	OFF
47	ON	OFF	ON	ON	ON	ON
48	ON	ON	OFF	OFF	OFF	OFF
49	ON	ON	OFF	OFF	OFF	ON
50	ON	ON	OFF	OFF	ON	OFF
51	ON	ON	OFF	OFF	ON	ON
52	ON	ON	OFF	ON	OFF	OFF
53	ON	ON	OFF	ON	OFF	ON
54	ON	ON	OFF	ON	ON	OFF
55	ON	ON	OFF	ON	ON	ON
56	ON	ON	ON	OFF	OFF	OFF
57	ON	ON	ON	OFF	OFF	ON
58	ON	ON	ON	OFF	ON	OFF
59	ON	ON	ON	OFF	ON	ON
60	ON	ON	ON	ON	OFF	OFF
61	ON	ON	ON	ON	OFF	ON
62	ON	ON	ON	ON	ON	OFF
63	ON	ON	ON	ON	ON	ON

## Appendix

### Connecting Multiple DataDiscrete Modules

Up to ten DataDiscrete modules may be connected together to monitor up to 240 discrete signals. To connect multiple modules:

- Ensure all DataDiscrete modules are configured with unique NMEA-0183/IEC 61162 String Identifiers (described above);
- Connect the output of the first DataDiscrete (pins TX+ and TX-, located on the front of the module) to the data input of the second DataDiscrete (pins RX+ and RX-, located on the front of the panel);
- The output of the second module is connected to the input of the third, third to the fourth, etc., until all required DataDiscrete modules are connected (to a maximum of ten).
- **Warning! If more than 10 DataDiscrete modules are connected, data will be lost!**

The output of the connected DataDiscrete modules is available via the output of the last module in the chain. As noted in the *Onboard DIP-Switch Settings* section above, 10 DataDiscrettes can be daisy-chained at a 1/10 Hz broadcast rate, 5 at 1/6 Hz, 4 at 1/3 Hz, and 3 at 1 Hz.

### Replacing the Input Power Fuse

To access the DataDiscrete's circuit board:

- Unplug the front panel input connectors;
- Unscrew the two (2) screws located on the front panel of the DataDiscrete enclosure in order to remove the panel;
- Slide the circuit board out of the enclosure.

Refer to *DataDiscrete* above for fuse location. The input power fuse is a 500mA fast-blow glass cartridge fuse, 5 X 20 mm size. When replacing the fuse, ensure the fuse clips are secured to the new fuse. If in doubt, squeeze the clips prior to insertion of the new fuse to tighten the grip.

## NMEA Input Module

For information on the NMEA Input Module (Navigation Sensor Multiplexor) see *Section 11 - NMEA SETUP*.

## **APPENDIX D: SOFTWARE DOWNLOAD (FTP)**

## Appendix

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## Appendix

Rutter Technologies may require, from time-to-time, approved technicians to download updated software via a Rutter FTP site. Access to this site will require a Rutter Technologies provided password.

The following instructions are provided as a step-by-step procedure for downloading software via this FTP site:

1. Open an Internet browser, enter the following address: <ftp://www.ruttertech.com> in the "Address" field, and press "Enter".
2. When prompted, enter a Rutter Technologies provided User Name and Password combination. Note that both User Name and Password are case sensitive.
3. To download, right-click the applicable file and select "Copy" from the pop-up list.
4. Select a location on the PC's local hard drive where the file should be downloaded, right-click in this space, and select "Paste" from the pop-up list.

## **APPENDIX E: APPROVAL DRAWING PACKAGE**

## Appendix

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**VDR-100G2**  
**Approval Drawings**  
**Revision 14.0**

**NB XXXX**



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# VDR-100G2

Approval Drawings	
Project:	NB XXXX
Rev:	14
Date:	18 March 2008

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# VDR-100G2 Specifications

RUT-TD-02-006 Rev1.3

## VDR-100G2

The VDR-100G2 is a modular, Ethernet-based data acquisition and storage system. It is designed to collect and maintain a secure, retrievable record of information related to the position, movement, physical status, and command/control of a marine vessel. This unit is designed to meet all requirements of the International Maritime Organization (IMO).

### Data Processing Unit (DPU)

The **Data Processing Unit (DPU)** receives and processes information provided from the various Audio, Video, and NMEA Modules. This information is processed in the Data Management Module (DMM) for archiving on the DMM's internal hard drive, the Remote Storage Module (RSM – optional), and the Final Recording Medium (FRM). The DPU also houses the Power Control Module (PCM).

### Data Acquisition Unit (DAU) \*Optional

The **Data Acquisition Unit (DAU)** is an **optional** component that may house the main data acquisition modules:

- Audio Module
- Video Module
- NMEA Module.

The modules are used to capture ship information and output acquired data through an Ethernet port, transmitting it to the DPU for processing and storage. The DAU also contains an Ethernet switch which provides the ability to combine video and NMEA data into a single Ethernet link.

### Video

The **Video Module** is a standalone video capture and broadcast device. The module digitizes incoming video signals and outputs the video data through an Ethernet port. It has one (1) input port for capturing images from a dedicated buffered output port of the primary radar. Two (2), three (3), and four (4) input video modules are also available for capturing images from additional video displays.

### Audio

The base unit VDR-100G2 includes an **Audio Module** which allows connection of six (6) surface-mountable microphones and audio test sources, including audio junction boxes. The audio system may be easily expanded to six (6) or eight (8) audio channels as required.

Two (2) radio inputs are provided for continuous recording of transmit and receive audio from either VHF or HF radio (line level input). These inputs may be easily expanded as required.

## **NMEA-0183 / IEC 61162 Data**

The **NMEA Module(s)** provide connection to all IMO-required data items in both NMEA 0183/IEC 61162 and limited ASCII data formats. NMEA modules multiplex up to eight (8) NMEA-0183 data streams from shipboard systems and output simultaneously onto a single RS-232/422 serial data channel and an Ethernet connection (UDP).

## **Operation & Alarm Unit (OAU)**

The **Operation & Alarm Unit (OAU)** provides a visible and audible alarm in the event of a VDR-100G2 error condition. Using an output connection to a vessel's central bridge alarm system, the OAU alerts to any potential VDR-100G2 system failures or error conditions. The alarm unit is also used to initiate the securing of IMO required datasets on the VDR-100G2.

## **Remote Storage Module (RSM)**

The **Remote Storage Module (RSM)** is an optional data storage device which provides the ability to archive longer periods of recorded data, or a means to transport copies of secured datasets. When the RSM is supplied as a data retrieval device, a universal AC adapter is included. When supplied with the extended archiving software module, universal AC and 24VDC power supplies are included.

## **Final Recording Medium (FRM)**

The **Final Recording Medium (FRM)** is a solid-state storage unit capable of storing 12 hours of VDR-100G2 data in compliance with IMO resolution A.861(20.). The VDR-100G2 will support the VDR FRM or the S-VDR FRM.

## **Recording Duration**

The minimum recording duration is 24 hours, based on the sample intervals required by IMO.

## **Soft Downloading**

An optional client PC connected to the DMM via an Ethernet connection may be used for two (2) purposes:

- Downloading data from the VDR.
- Data playback.

When the Playback PC is connected to the VDR-100G2 via an Ethernet connection, previously recorded data may be downloaded at any time during normal system operation without interrupting the VDR-100G2 recording process. This downloaded data may then be replayed via the playback software.

## **Playback Software**

Playback software is supplied to allow immediate play back of downloaded data. NMEA data is available on a serial port for output to electronic chart / ECDIS systems or a simulator.

## Weight & Dimensions

<b>DPU Specifications</b>	
Weight	43.2Kg
Dimensions	350 x 400 x 400mm (H x W x D)

<b>DAU (Optional) Specifications</b>	
Weight	16.8Kg
Dimensions	400 x 600 x 150mm (H x W x D)

<b>OAU Specifications</b>	
Weight	1.4Kg
Dimensions	With front mounting plate: 144 x 144 x 52.3mm Without front mounting plate: 136.6 x 136.6 x 50mm

<b>Indoor Microphone Assembly Specifications</b>	
Weight	0.75Kg
Dimensions	Mic: 64 x 92mm Box: 149 x 119 x 50mm

<b>Outdoor Microphone (Optional) Specifications</b>	
Weight	1.2Kg
Dimensions	138 x 166.2 x 50mm

<b>RSM (Optional) Specifications</b>	
Weight	1.36Kg
Dimensions	35 x 127 x 214mm



# Bundesrepublik Deutschland

Federal Republic of Germany

## Bundesamt für Seeschifffahrt und Hydrographie

Federal Maritime and Hydrographic Agency



BUNDESAMT FÜR  
SEESCHIFFFAHRT  
UND  
HYDROGRAPHIE

## EC QUALITY SYSTEM (MODULE D) CERTIFICATE

Bundesamt für Seeschifffahrt und Hydrographie (Federal Maritime and Hydrographic Agency) as the notified body performing EC conformity assessment procedures in compliance with EC Council Directive 96/98/EC of 20 December 1996 on Marine Equipment, last amended by EC Council Directive 2002/75/EC of 2 September 2002, hereby certifies that the manufacturer

Rutter Technologies  
70 Brookfield Rd.  
St. John's, NL, A1E 3T9  
Canada

maintains and applies a quality system in accordance with the requirements of the Maritime Equipment Directive Annex B, Module D.

### Scope:

A.1/4.29 Voyage Data Recorder (VDR)

\*\*\*\*\*

Date of issue: 24.11.2005

Issued by: Bundesamt für Seeschifffahrt und Hydrographie

Expiry date: 23.11.2008

Identification number 0735

Registration no.: BSH/4613/04901/05

This certificate consists of 2 pages



by order

Schulz-Reifer



**Places of production** (if different from client or where there are several)

Rutter Technologies  
63 Thorburn Rd.  
St. John's, NL, A1B 4G1  
Canada

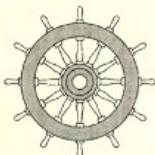
**Restrictions:**

\*\*\*

**Notes:**

This certificate authorises in conjunction with the EC Type Examination (Module B) Certificate of the equipment listed in the scope to affix the "Mark of Conformity" (wheelmark).

This certificate loses its validity if the manufacturer makes any changes or modifications to the approved quality system, which have not been notified to, and agreed with the notified body named on this certificate and/or after lapse of time, withdrawal or revocation of the EC Type Examination (Module B) Certificate.

**"Wheelmark" Format and application:**

**0735/yy**

example

yy      Last two digits of the year in which mark is affixed.  
0735    Notified Body number undertaking quality surveillance

**Notice on legal remedies available:**

Objection to this document may be filed within one month after notification. The objection must be filed in writing to, or put on record at, Federal Maritime and Hydrographic Agency, Bernhard-Nocht-Str. 78, 20359 Hamburg, Germany

**Annex to**  
**EC QUALITY SYSTEM (MODULE D) CERTIFICATE**  
**No. BSH/4613/04901/05**



BUNDESAMT FÜR  
SEESCHIFFFAHRT  
UND  
HYDROGRAPHIE

Item		Module B Certificate data		
		Registration number	Date of issue	Notified Body
		USCG Approval No.	date of issue	
A.1/4.29	Voyage Data Recorder (VDR)	6543/080332/2004	27.08.2004	0735
A.1/4.29	Voyage Data Recorder (VDR)	6543/080304/2003	13.05.2003	0735
A.1/4.29	Voyage Data Recorder (VDR)	6543/080214/2002	12.12.2002	0735
A.1/4.29	Voyage Data Recorder (VDR)	6543/080332/1/2004	22.11.2004	0735
		165.150/EC0735/080332	22.11.2004	
A.1/4.29	Voyage Data Recorder (VDR)	4612/4290082/05	2005-08-17	0735
		165.150/EC0735/4290082	2005-08-17	

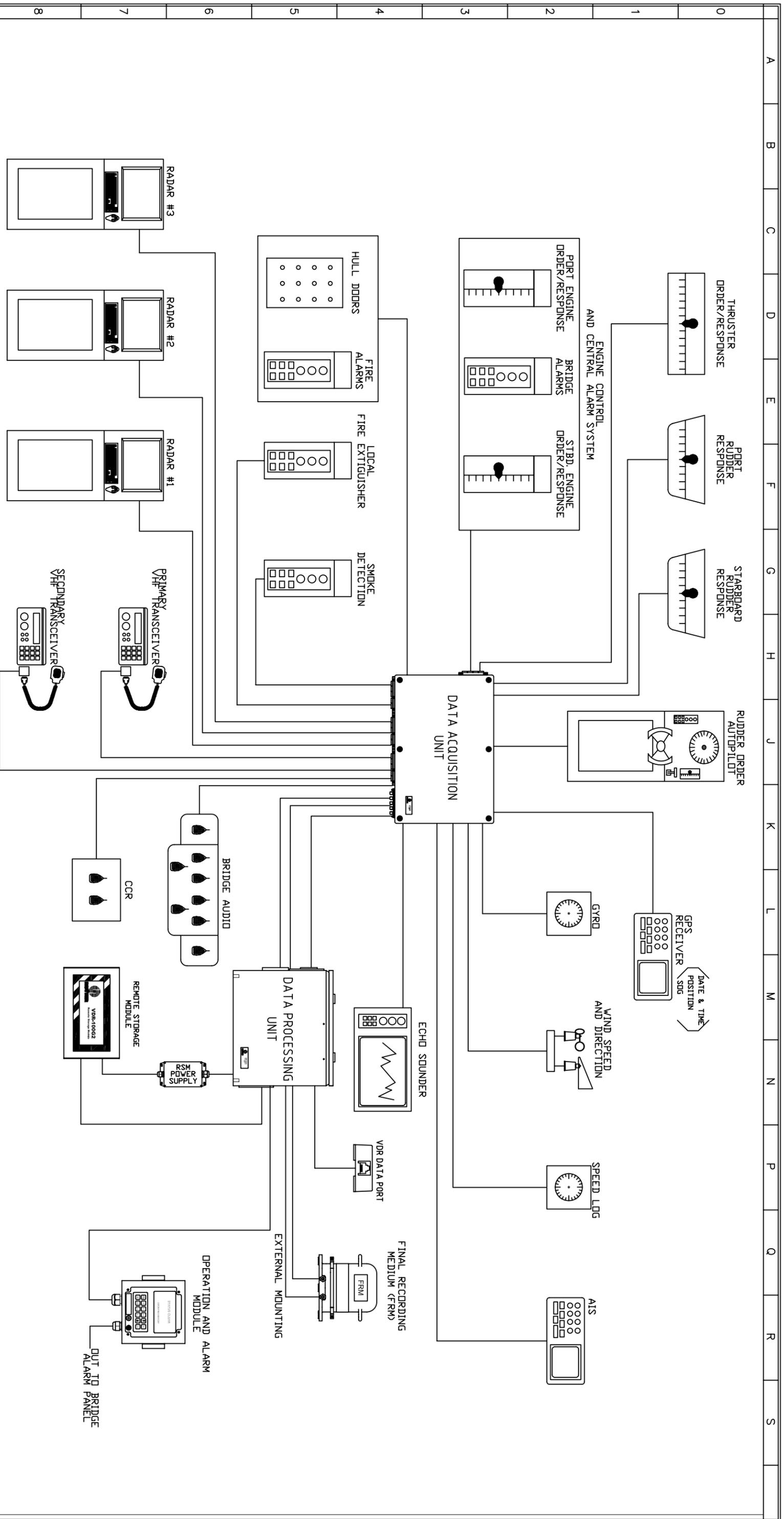
Hamburg, 2005-11-24



**Notice on legal remedies available:**

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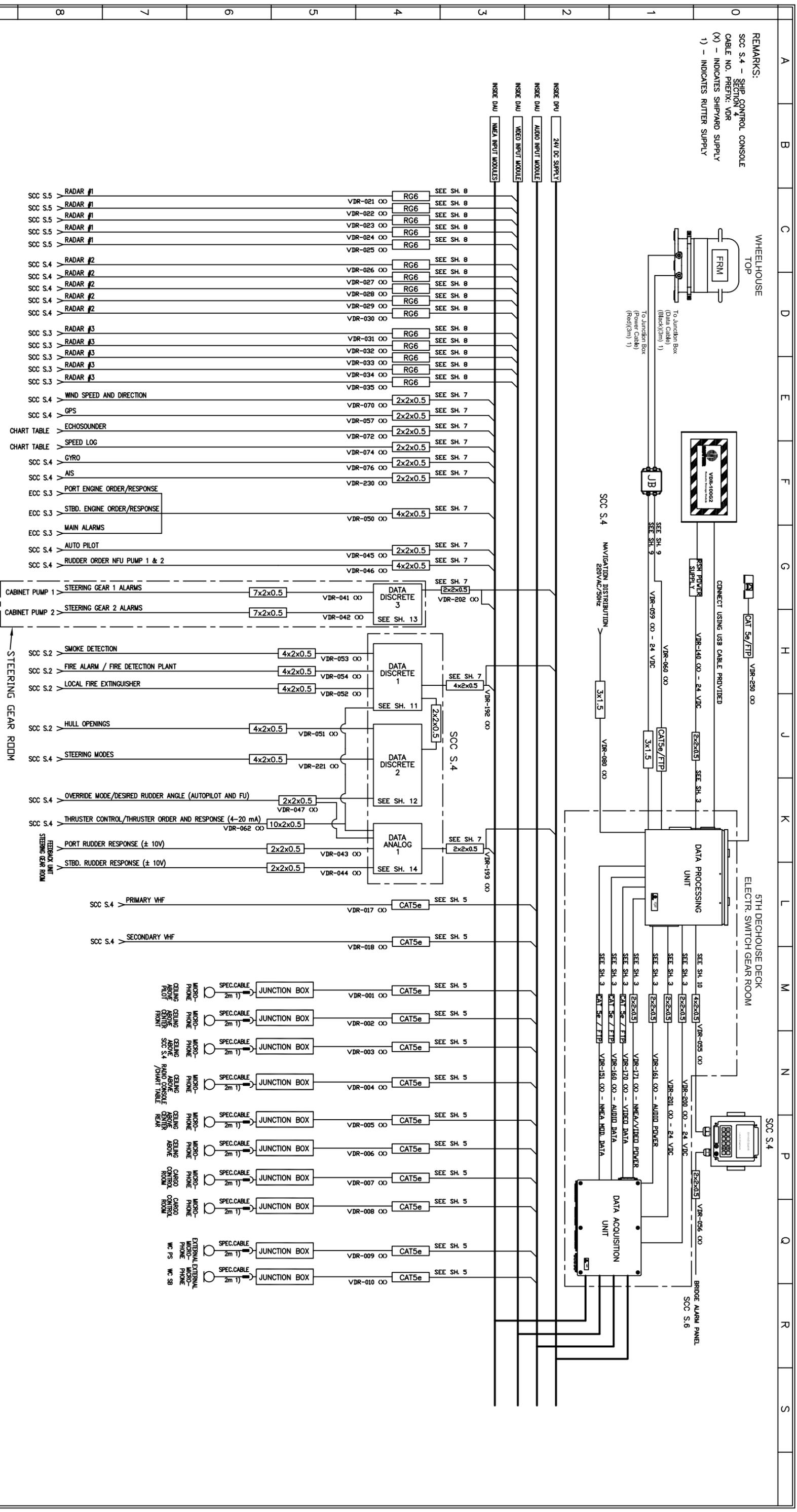
MSC 163(78)	Sensor signals / S-VDR Part Numbers	System / Equipment Designation Model/Manufacturer	Connected to	Location	Cable No.	Cable Type	Signal type / IEC 61162-sentence
5.4.1 5.4.2	Time, Date & Position (primary GPS)		NMEA Input Module		VDR - 057	2x2x0,5	IEC-61162/ZDA
5.4.3	Speed (SOG or STW) from Ship's Speed Log		NMEA Input Module		VDR - 074	2x2x0,5	IEC-61162/VBW
5.4.4	Heading from (Gyro) Compass		NMEA Input Module		VDR - 076	4x2x0,5	IEC-61162/HDT
5.4.5	Microphone #1		Audio Input Module	Bridge	VDR - 001	CAT 5e	Analogue audio
5.4.5	Microphone #2		Audio Input Module	Bridge	VDR - 002	CAT 5e	Analogue audio
5.4.5	Microphone #3		Audio Input Module	Bridge	VDR - 003	CAT 5e	Analogue audio
5.4.5	Microphone #4		Audio Input Module	Bridge	VDR - 004	CAT 5e	Analogue audio
5.4.5	Microphone #5		Audio Input Module	Bridge	VDR-005	CAT 5e	Analogue audio
5.4.5	Microphone #6		Audio Input Module	Bridge Wing	VDR - 006	CAT 5e	Analogue audio
5.4.5	Microphone #7		Audio Input Module	Bridge Wing	VDR - 007	CAT 5e	Analogue audio
5.4.6	Communication from Primary VHF		Audio Input Module		VDR - 017	CAT 5e	Analogue audio
5.4.6	Communicatin from Secondary VHF		Audio Input Module		VDR - 017	CAT 5e	Analogue audio
5.4.7	Main Radar Video		Video Input Module		Standard cable	BNC / VGA	VGA
5.4.7	Secondary Radar Video		Video Input Module		Standard cable	BNC / VGA	VGA
5.4.8	Other Radar Video		Video Input Module		Standard cable	BNC / VGA	VGA
5.4.8	AIS		NMEA Input Module		VDR - 230	2x2x0,5	IEC-61162/VDM, OSD
5.4.9	Echo Sounder		NMEA Input Module		VDR - 072	2x2x0,5	IEC-61162/DPT
5.4.9	Wind Speed & Direction		NMEA Input Module		VDR - 070	2x2x0,5	IEC-61162/MWV



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RUTTER JOB #		DRAWING #		TITLE	
		E-IN-01096		Basic System Components	
DRAWING REV #		RCR #		DRAWN BY	
12		4405		R. ANTLE-KING	
SHIP YARD				SCALE	
B. PITTMAN				NTS	
APPROVAL DATE		SHIP NAME		ORIGINAL DATE	
17NOV06				16NOV06	
DESCRIPTION		SHIP NAME		FILENAME	
APPROVAL DRAWING				NBXXXX_basicsystem_1A	
REV		DATE		APPROVED BY	
1		17NOV06		B. PITTMAN	
				RUTTER TECHNOLOGIES INC.	
				St. John's, NL A1E 4P3	
				Tel: 709-368-4213 Fax: 709-368-1337	
				RUTTER	
				SHEET	
				1	

REMARKS:  
 SCC S.4 - SHIP CONTROL CONSOLE  
 SECTION 4  
 CABLE NO. PREFIX: VDR  
 (X) - INDICATES SHIPYARD SUPPLY  
 (1) - INDICATES RUTTER SUPPLY



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REV	DESCRIPTION	DATE	APPROVED BY	SHIP YARD	SHIP NAME	ORIGINAL DATE	FILENAME	SHEET
1	APPROVAL DRAWING	10JAN07	B. PITTMAN			17NOV06	NBXXXX_block_wiring_2A	2

RUTTER JOB #  
 DRAWING #  
 E-IN-01098

DRAWING REV #  
 RCR #  
 13  
 4538

TITLE  
 VDR Block Wiring

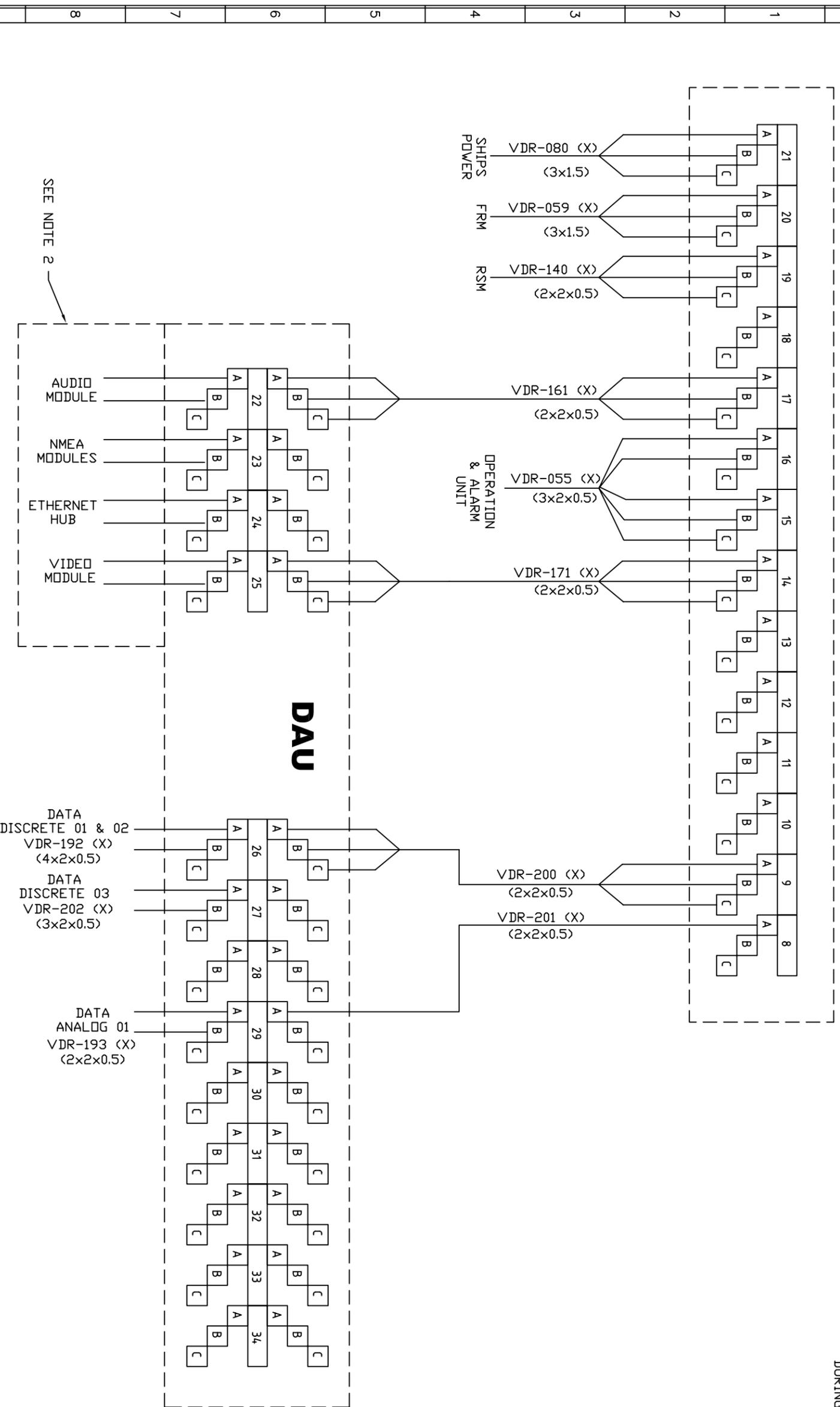
DRAWN BY  
 R. ANTLE-KING

SCALE  
 NTS

RUTTER TECHNOLOGIES INC.  
 St. John's, NL A1E 4P3  
 Tel: 709-368-4213 Fax: 709-368-1337

# DPU

- NOTES:  
 1. DASHED LINE INDICATES COMPONENTS SHOWN ARE INSIDE EACH UNIT.  
 2. INDICATES THAT THESE CONNECTIONS ARE MADE DURING ASSEMBLY.



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REV	APPROVAL DRAWING DESCRIPTION	DATE	APPROVED BY	SHIP YARD	SHIP NAME	ORIGINAL DATE	FILENAME	SHEET
1		17NOV06	B. PITTMAN			17NOV06	NBXXXX_sys_wiring_DPU_DAU_3A	3

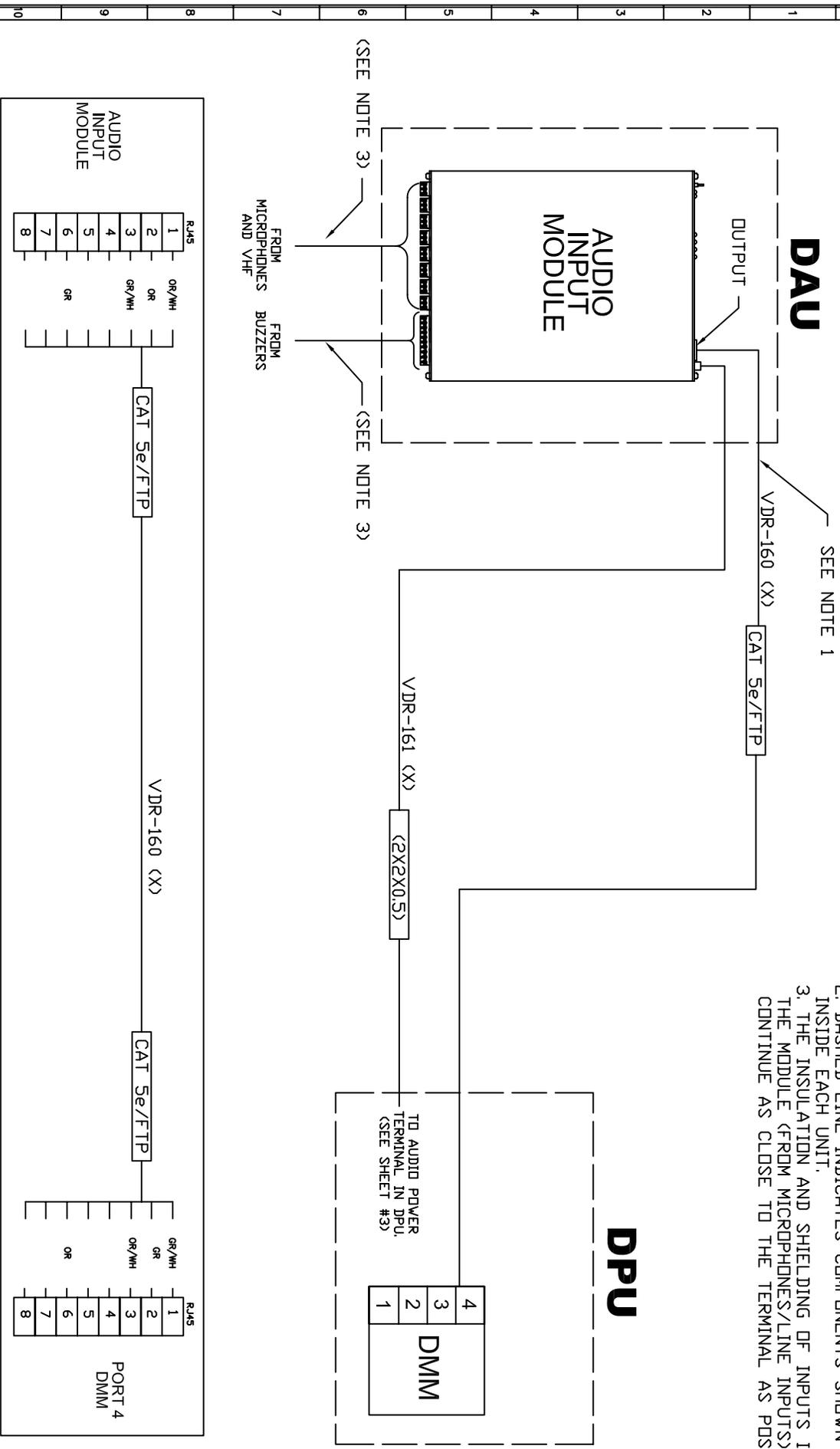
  

RUTTER JOB #	DRAWING #	TITLE	DRAWN BY
	E-IN-01100	DPU/DAU Power Connections	R. ANTLE-KING
DRAWING REV #	RCR #	SCALE	
12	4410	NTS	

ST. JOHN'S, NL A1E 4P3	TEL: 709-368-4213	FAX: 709-368-1337
RUTTER TECHNOLOGIES INC.		

- NOTES:**
1. SHIELDED CAT5e MARINE GRADE COMPLETE WITH SHIELDED RJ45 MALE CONNECTORS.
  2. DASHED LINE INDICATES COMPONENTS SHOWN INSIDE EACH UNIT.
  3. THE INSULATION AND SHIELDING OF INPUTS INTO THE MODULE (FROM MICROPHONES/LINE INPUTS) MUST CONTINUE AS CLOSE TO THE TERMINAL AS POSSIBLE.

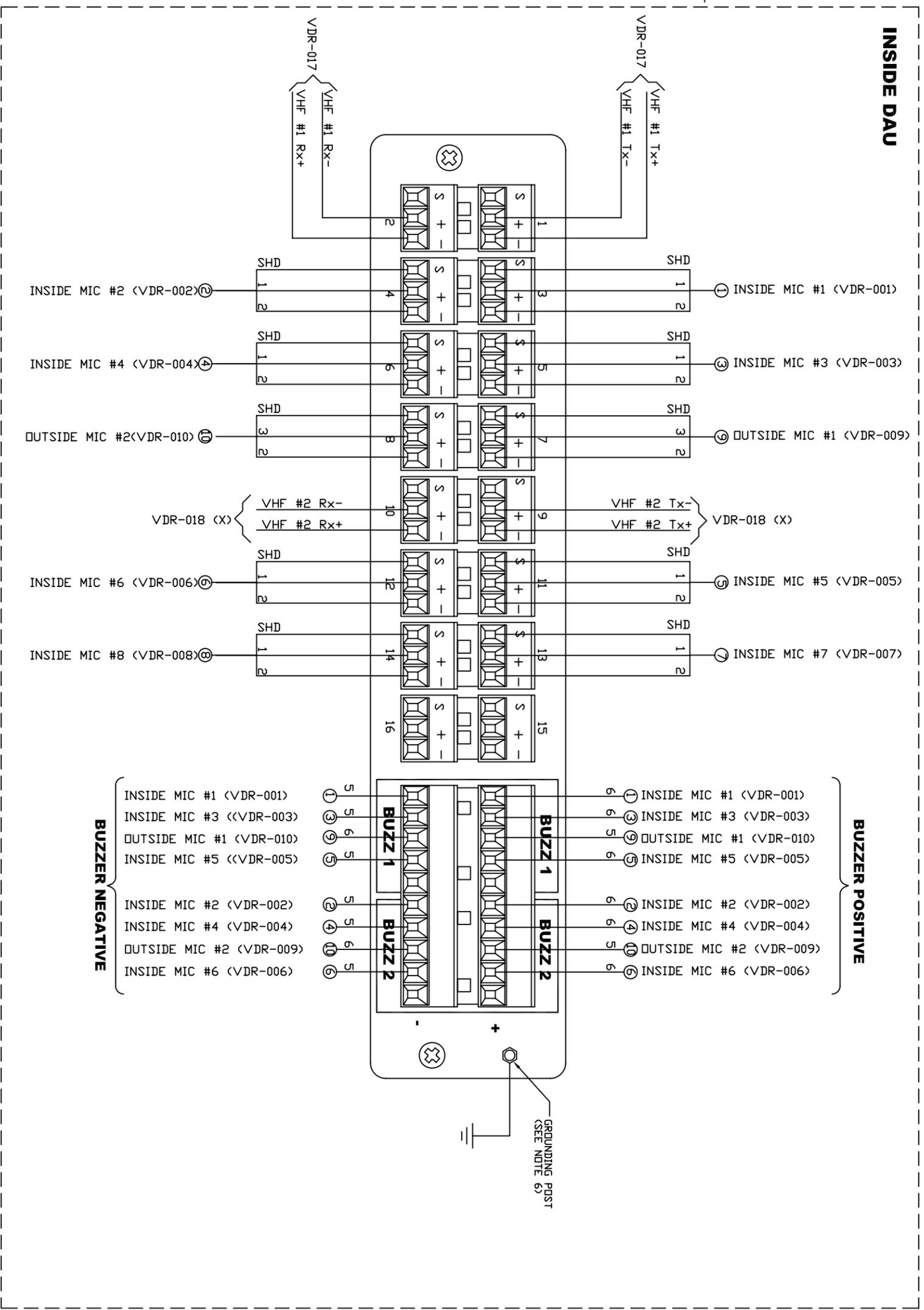


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REV	DESCRIPTION	DATE	APPROVED BY	RUTTER JOB #	DRAWING #	TITLE	DRAWN BY	SCALE	ORIGINAL DATE	FILENAME	SHEET
1	APPROVAL DRAWING	24JAN08	B. PITTMAN	DRAWING REV # 13	E-IN-01102	Audio Connections	M. DOUGLAS	NTS	24JAN08	RUTTER NBXXXX_audio_sys_4A	4
2	APPROVAL DRAWING	17NOV06	B. PITTMAN	SHIP YARD	RGR # 5522						

- NOTES:
1. CONDUCTOR NUMBERS INTO MODULE CORRESPOND WITH TERMINAL BLOCK IN EACH MICROPHONE.
  2. CABLE NUMBERS ARE BASED ON STANDARDS FOR RUTTER AND ARE SUBJECT TO CHANGE WHERE REQUIRED.
  3. CABLE LABELS (⊗) ARE TO BE FOLLOWED THROUGHOUT DRAWING FOR CONNECTIONS.
  4. MICROPHONE SHIELDS CONNECTED TO TERMINAL S MUST NOT BE CONNECTED TO THE DAU CHASSIS (SHIP'S HULL).
  5. THE INSULATION AND SHIELDING OF INPUTS INTO THE MODULE (FROM MICROPHONES/LINE INPUTS) MUST CONTINUE AS CLOSE TO THE TERMINAL AS POSSIBLE.
  6. THE AUDIO MODULE MUST BE GROUNDED TO THE SHIP IF INSTALLED OUTSIDE THE DAU.
  7. REFER TO INSTALLATION AND MAINTENANCE MANUAL SECTION 5.5

**INSIDE DAU**



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REV	DESCRIPTION	DATE	APPROVED BY	SHIP YARD	SHIP NAME	ORIGINAL DATE	FILENAME	SHEET
1	APPROVAL DRAWING	21FEB07	B. PITTMAN			17NOV06	NBXXXX_audio_wiring_5A	5

RUTTER JOB #	DRAWING #	TITLE	DRAWN BY	FILENAME
	E-IN-01103	Audio Module Connections	R. ANGLE-KING	NBXXXX_audio_wiring_5A

DRAWING REV #	RCR #	SCALE	NTS
13	4658		

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RUTTER TECHNOLOGIES INC.		

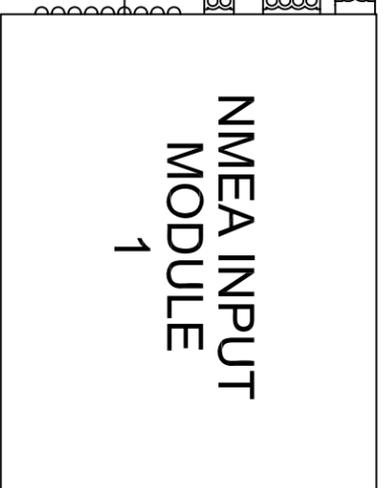
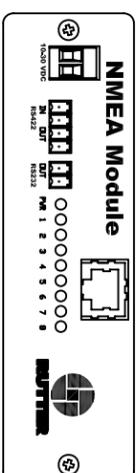
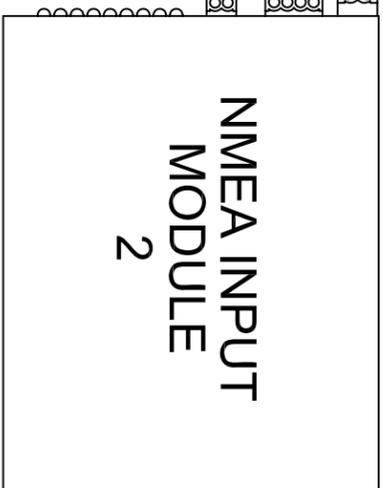
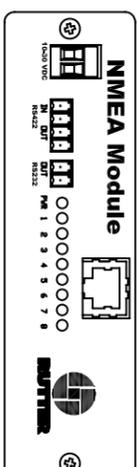


# INSIDE DAU

VDR-151 (X) CAT Se/FTP  
 TO ETHERNET  
 PORT IN DPU  
 (SEE SHEET #6)

VDR-152 (X) (2X2X0.5)  
 TO NMEA POWER  
 TERMINAL IN DPU  
 (SEE SHEET #3)

VDR-154 (X) (2X2X0.5)



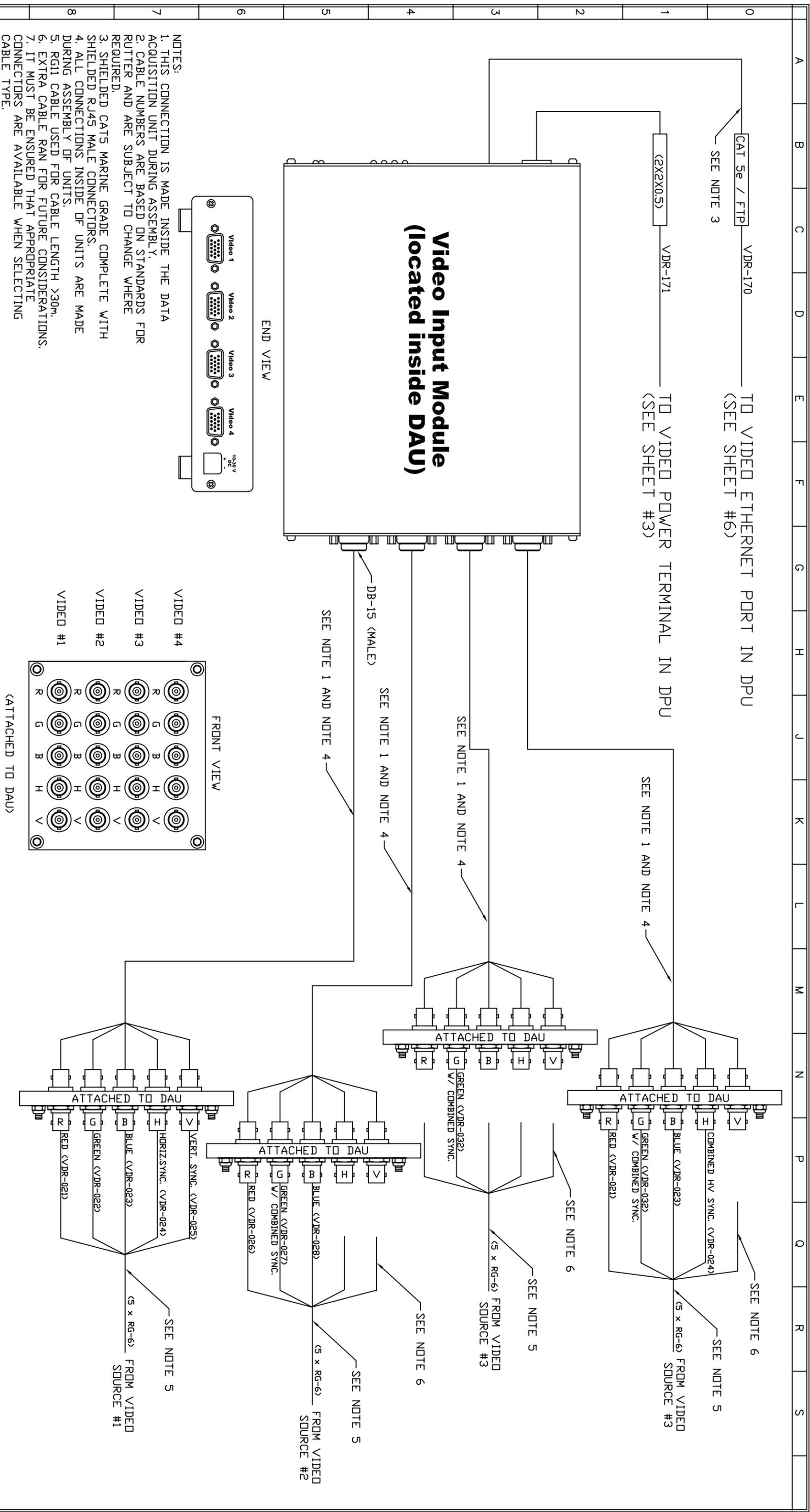
SEE NOTE 1

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- NOTES:
1. SHIELDED CAT5e MARINE GRADE COMPLETE WITH SHIELDED RJ45 END CONNECTORS.
  2. ALL CONNECTIONS INSIDE OF UNITS ARE MADE DURING ASSEMBLY OF UNITS.
  3. CONNECTION MADE WHEN UNIT IS ASSEMBLED.
  4. REFER TO INSTALLATION AND MAINTENANCE MANUAL.

RUTTER JOB #		DRAWING #		TITLE	
		E-IN-01105		NMEA Connections	
DRAWING REV #		RCR #		DRAWN BY	
13		5490		M. DOUGLAS	
SHIP YARD		SHIP NAME		ORIGINAL DATE	
B. PITTMAN				23JAN08	
APPROVAL DATE		APPROVED BY		FILENAME	
17NOV06		B. PITTMAN		NBXXXX_NMEA_wiring_7A	
APPROVAL DESCRIPTION		DATE		SHEET	
APPROVAL DRAWING		24JAN08		7	
APPROVAL DRAWING		17NOV06			
DESCRIPTION		DATE			
REV		DATE			

**RUTTER TECHNOLOGIES INC.**  
 St. Johns, NL A1E 4P3  
 Tel: 709-368-4213 Fax: 709-368-1337



REV	DESCRIPTION	DATE	APPROVED BY	SHIP YARD	SHIP NAME	ORIGINAL DATE	FILENAME	SHEET
1	APPROVAL DRAWING	21NOV06	B. PITTMAN			23JAN08	NBXXXX_vid_wiring_8A	8
2	APPROVAL DRAWING	24JAN08	B. PITTMAN					

RUTTER JOB #	DRAWING #	TITLE	DRAWN BY	SCALE	FILENAME
	E-IN-01106	Video Connections	M. DOUGLAS	NTS	NBXXXX_vid_wiring_8A

VIDEO 1	VIDEO 2	VIDEO 3	VIDEO 4
VIDE0 #4	VIDE0 #3	VIDE0 #2	VIDE0 #1

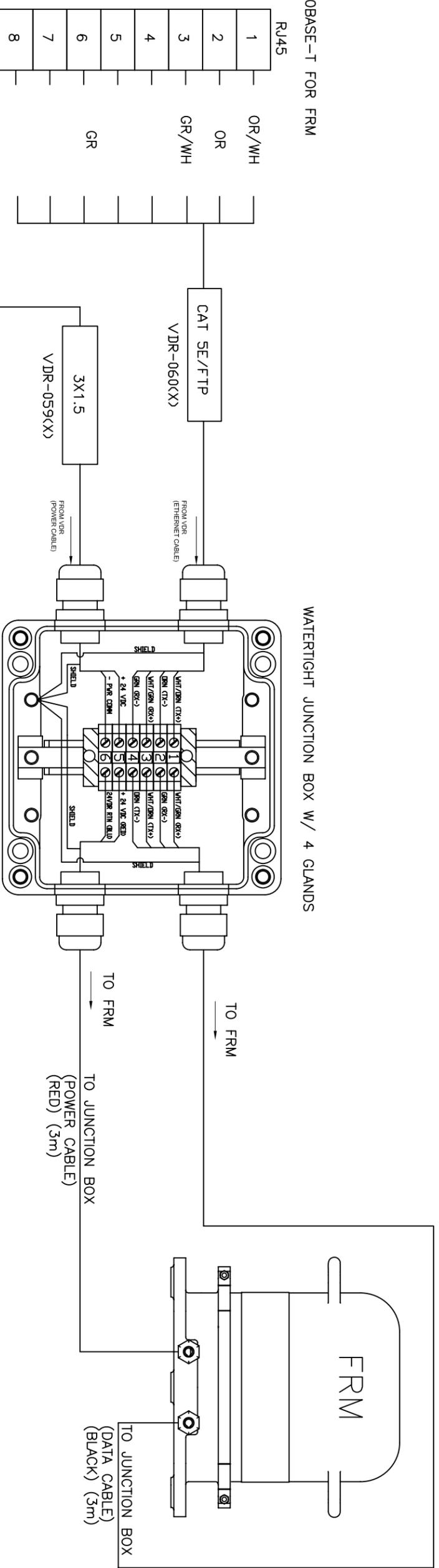
  

APPROVAL DRAWING	24JAN08	B. PITTMAN	SHIP YARD
APPROVAL DRAWING	21NOV06	B. PITTMAN	APPROVED BY

ST. JOHN'S, NL A1E 4P3	TEL: 709-368-4213	FAX: 709-368-1337
RUTTER TECHNOLOGIES INC.		

- NOTES:  
 1. WATERTIGHT JUNCTION BOX IS TO BE USED IF FRM JUNCTION BOX IS MOUNTED OUTSIDE.  
 2. REFER TO INSTALLATION AND MAINTENANCE MANUAL



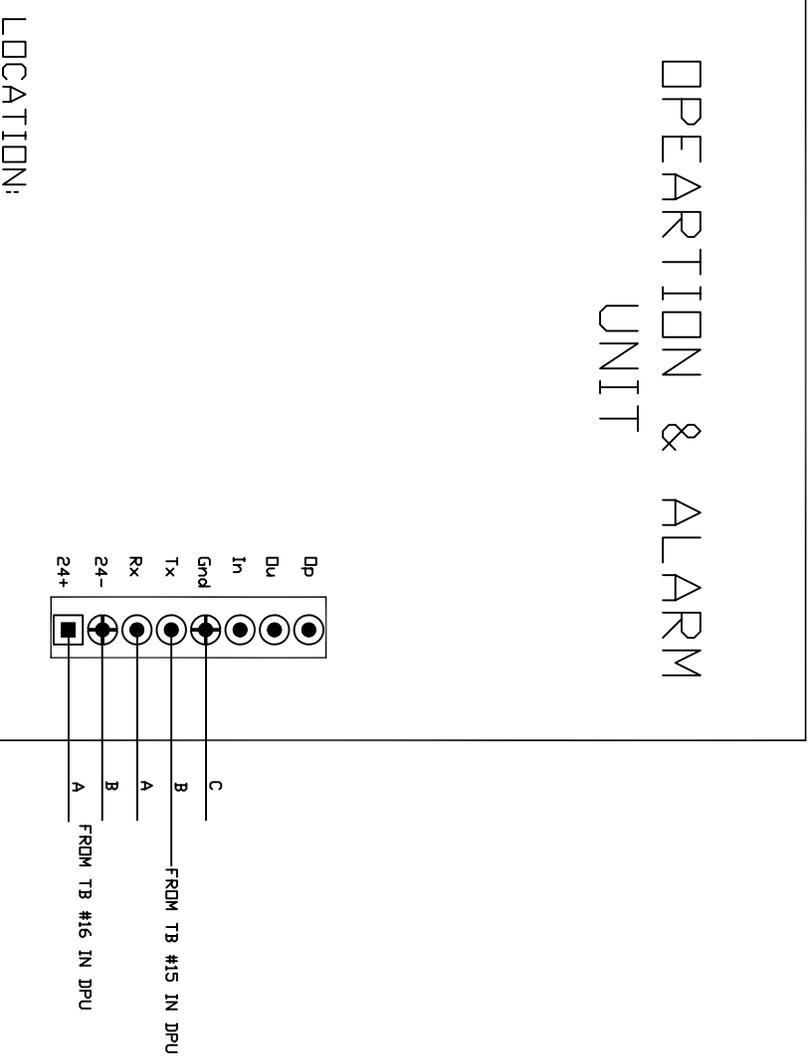
LAN 10BASE-T FOR FRM

1	OR/WH	
2	OR	
3	GR/WH	
4		
5		
6	GR	
7		
8		

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RUTTER JOB #		DRAWING #		TITLE		DRAWN BY		FILENAME		SHEET	
		E-IN-01107		L3 SVR02/HVR02 FRM Connections		M. DOUGLAS		NBXXXX_FRM_L302_sys_9A		9	
DRAWING REV #		RCR #		SCALE		ORIGINAL DATE		RUTTER TECHNOLOGIES INC.			
13		5579		NTS		20FEB08		St. John's, NL A1E 4P3 Tel: 709-366-4213 Fax: 709-368-1337			
SHIP YARD		SHIP NAME		APPROVAL DRAWING		APPROVED BY					
B. PITTMAN				20FEB08		B. PITTMAN					
B. PITTMAN				17JAN08		B. PITTMAN					
B. PITTMAN				17NOV06		B. PITTMAN					
APPROVAL DRAWING		APPROVAL DRAWING		APPROVAL DRAWING		APPROVAL DRAWING					
DATE		DATE		DATE		DATE					
APPROVED BY		APPROVED BY		APPROVED BY		APPROVED BY					
B. PITTMAN		B. PITTMAN		B. PITTMAN		B. PITTMAN					
B. PITTMAN		B. PITTMAN		B. PITTMAN		B. PITTMAN					
B. PITTMAN		B. PITTMAN		B. PITTMAN		B. PITTMAN					

# DEPARTION & ALARM UNIT



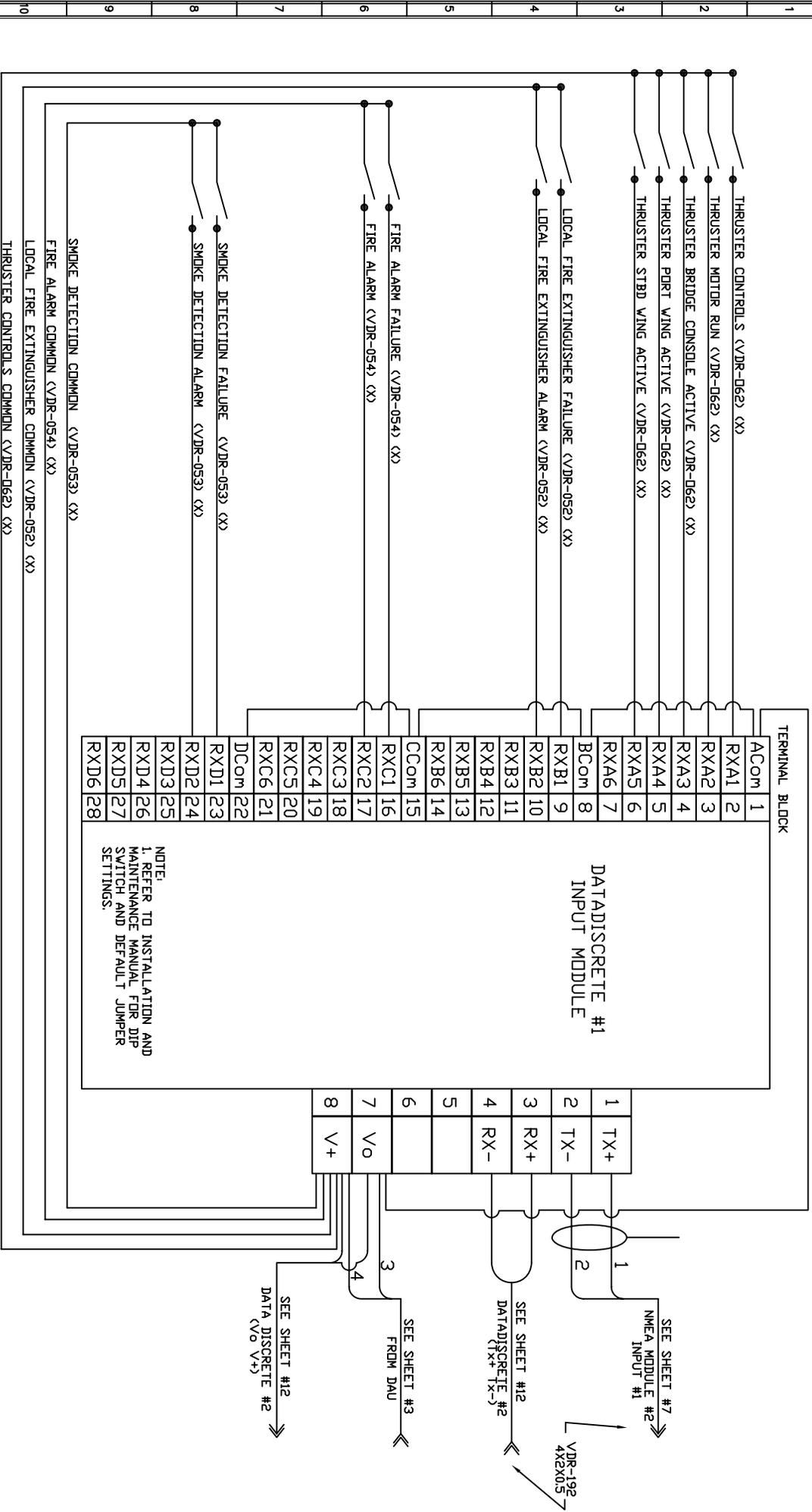
**NOTE:**

1. REFER TO INSTALLATION AND MAINTENANCE MANUAL SECTION 5.7
2. THE DAU TO VDR CONNECTION INFORMATION SHOWN IS APPLICABLE FOR VDR-100G2/G2S SERIAL NUMBER 20XXXXX1150 AND FORWARD.

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	RUTTER JOB #	DRAWING #	TITLE	DRAWN BY	SCALE	RUTTER TECHNOLOGIES INC.
		E-IN-01252	Alarm Module Connections	R. ANTLE-KING	NTS	St. Johns, IN ATE 4P3 Tel: 709-368-4213 Fax: 709-368-1337
	DRAWING REV #	ROR #	SHIP NAME	ORIGINAL DATE	FILENAME	
	12	4868		02MAY07	NBXXXX_alarm_sys_10b	
1	APPROVAL DRAWING DESCRIPTION	02MAY07 DATE	B. PITTMAN APPROVED BY			
REV						SHEET 10

NOTES:  
1. TO BE SUPPLIED IF NEEDED.



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RUTTER JOB #	DRAWING #
ROUTER JOB #	E-IN-01109
DRAWING REV #	RCR #
13	5493
TITLE	
DataDiscrete #1 Connections	
DRAWN BY	
M.DOUGLAS	
SCALE	
NTS	
ORIGINAL DATE	
16JAN08	
FILENAME	
NBXXXX_interface_wiring_11A	
SHEET	
11	

REV	DESCRIPTION	DATE	APPROVED BY
1	APPROVAL DRAWING	17NOV06	B. PITTMAN
2	APPROVAL DRAWING	24JAN08	B. PITTMAN

SHIP YARD

SHIP NAME

SHIP YARD

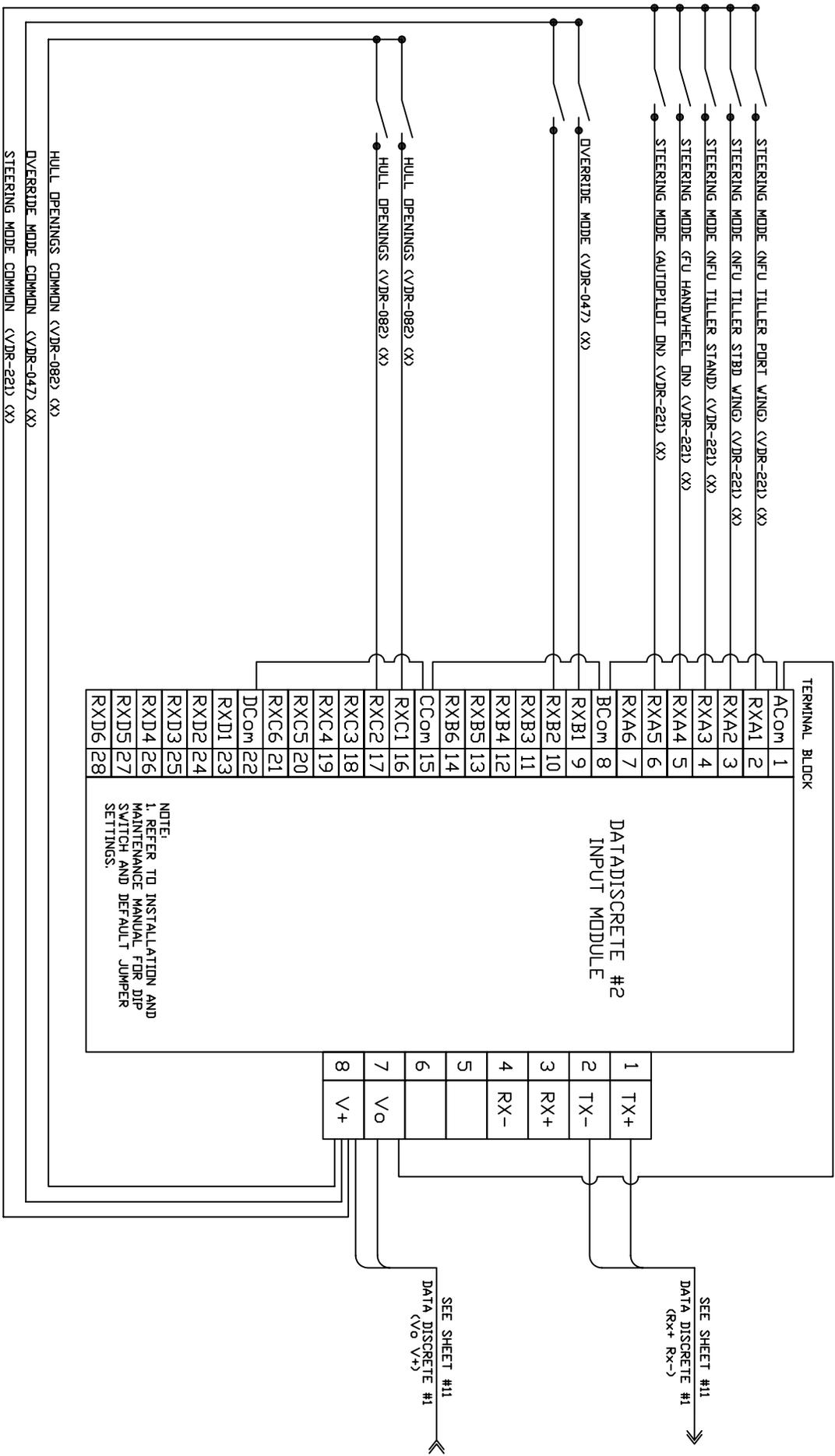
SHIP NAME

SHIP YARD

SHIP NAME

RUTTER TECHNOLOGIES INC.  
St. John's, NF A1E 4P3  
Tel: 709-368-4213 Fax: 709-368-1337

NOTES:  
1. TO BE SUPPLIED IF NEEDED.



DATADISCRETE #2  
INPUT MODULE

NOTE:  
1. REFER TO INSTALLATION AND  
MAINTENANCE MANUAL FOR DIP  
SWITCH AND DEFAULT JUMPER  
SETTINGS.

SEE SHEET #11  
DATA DISCRETE #1  
(Rx+ Rx-)

SEE SHEET #11  
DATA DISCRETE #1  
(V+ V-)

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RUTTER JOB #		DRAWING #		TITLE		DRAWN BY		SCALE	
17NOV06		E-IN-01110		DataDiscrete #2 Connections		M.DOUGLAS		NTS	
APPROVAL DATE		APPROVED BY		SHIP YARD		SHIP NAME		ORIGINAL DATE	
17NOV06		B. PITTMAN		13		SHIP YARD		16JAN08	
APPROVAL DESCRIPTION		APPROVED BY		DRAWING REV #		RCR #		FILENAME	
APPROVAL DRAWING		B. PITTMAN		13		5492		NBXXXX_interface_wiring_12A	
APPROVAL DRAWING		B. PITTMAN		24JAN08				SHEET	
REV		DATE		DESCRIPTION				12	



RUTTER TECHNOLOGIES INC.  
St. John's, NF A1E 4P3  
Tel: 709-368-4213 Fax: 709-368-1337



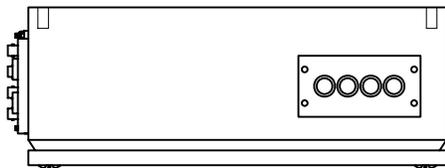




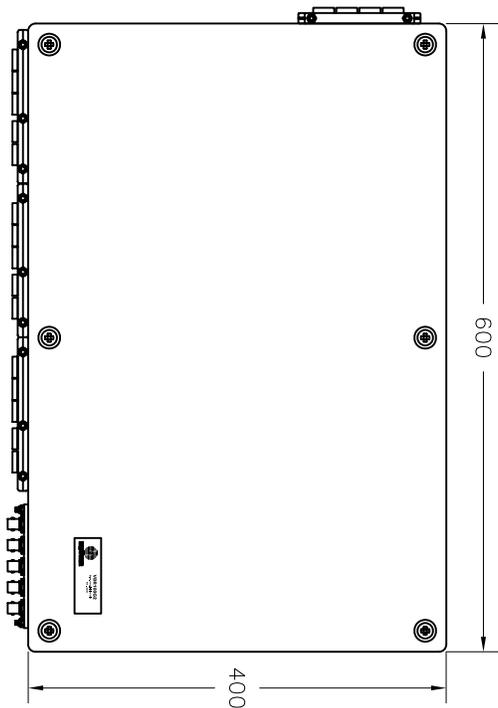


NOTES:  
1. ALL DIMENSIONS ARE IN mm.

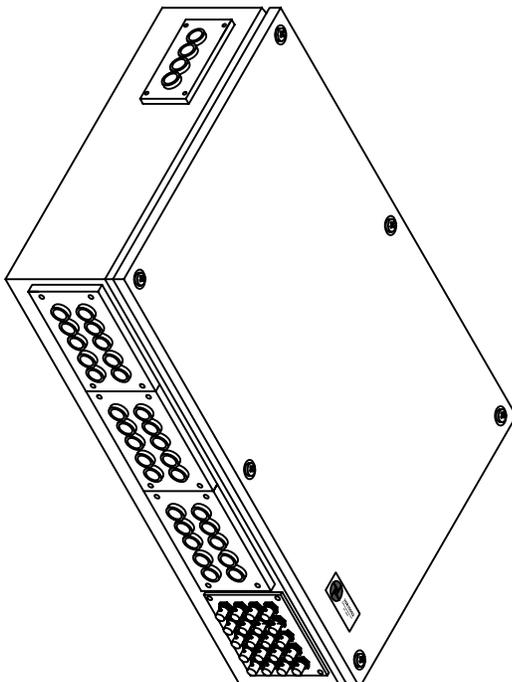
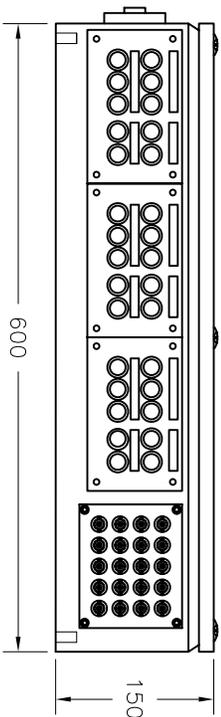
LEFT SIDE VIEW



FRONT VIEW



BOTTOM VIEW



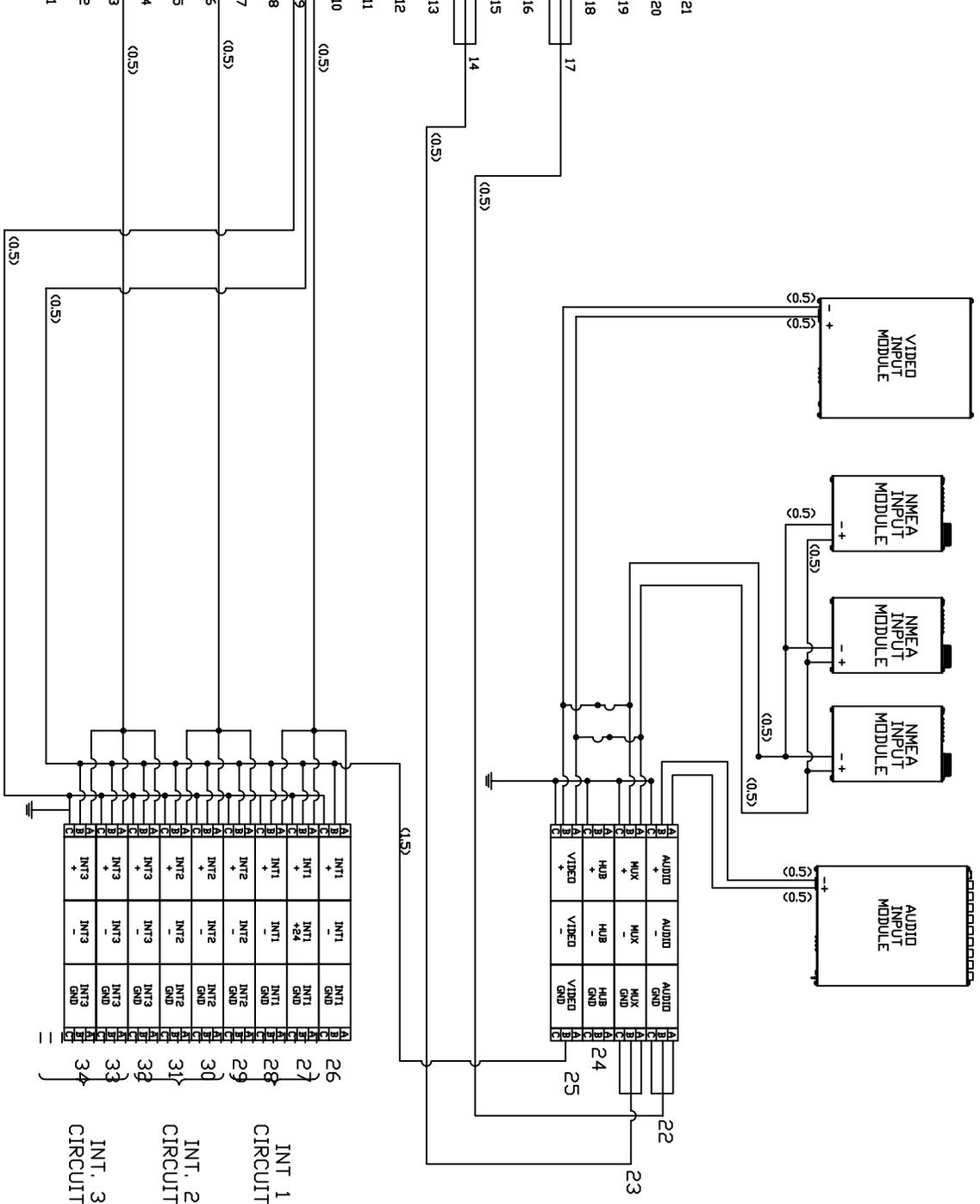
WEIGHT  
16.8 kg

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TITLE		Data Acquisition Unit (DAU)	
APPROVAL DRAWING	5449	14JAN08	B.PITTMAN
APPROVAL DRAWING			
REV	DESCRIPTION	RCR	DATE
1			21JULY04
			APPROVED BY
			T. BARKER
DRAWN BY		M. DOUGLAS	
ORIGINAL DATE		10JAN08	
SCALE	DRAWING #	FILENAME	
NTS	E-IN-00801	RUTTER TECHNOLOGIES INC. St. John's, NF A1E 4P3 Tel: 709-568-4213 Fax: 709-368-1337	
		VDR-201_DAU	



A			B			C		
A	UTILITY	+	UTILITY	-	UTILITY	UTILITY	A	21
B	FRM	+	FRM	-	FRM	FRM	B	20
C	RSM	+	RSM	-	RSM	RSM	C	19
A	HUB	+	HUB	-	HUB	HUB	A	18
B	AUDIO	+	AUDIO	-	AUDIO	AUDIO	B	17
C	ALARM	+	ALARM	-	ALARM	ALARM	C	16
A	ALARM	TX	ALARM	KS	ALARM	ALARM	A	15
B	VIDEO	+	VIDEO	-	VIDEO	VIDEO	B	14
C	MUX 1	+	MUX 1	-	MUX 1	MUX 1	C	13
A	MUX 2	+	MUX 2	-	MUX 2	MUX 2	A	12
B	MUX 3	+	MUX 3	-	MUX 3	MUX 3	B	11
C	HUB	+	HUB	-	HUB	HUB	C	10
A	INT1	+	INT1	-	INT1	INT1	A	9
B	INT1	+	INT1	-	INT1	INT1	B	8
C	INT1	+	INT1	-	INT1	INT1	C	7
A	INT2	+	INT2	-	INT2	INT2	A	6
B	INT2	+	INT2	-	INT2	INT2	B	5
C	INT2	+	INT2	-	INT2	INT2	C	4
A	INT3	+	INT3	-	INT3	INT3	A	3
B	INT3	+	INT3	-	INT3	INT3	B	2
C	INT3	+	INT3	-	INT3	INT3	C	1



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TITLE

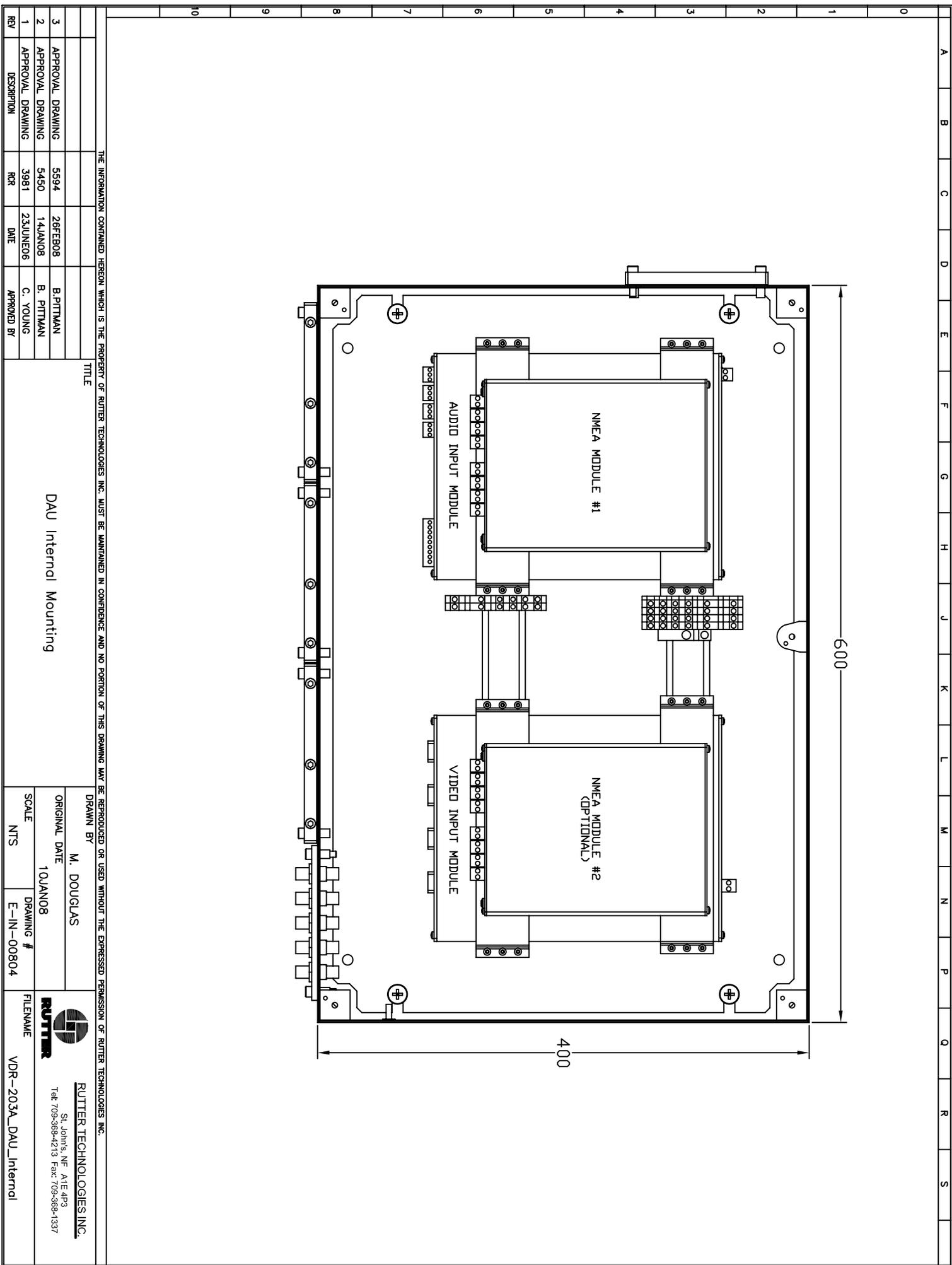
DAU Power Distribution Diagram

REV	DESCRIPTION	ROR	DATE	APPROVED BY
1	APPROVAL DRAWING	3628	07MAR05	T. BARKER

DRAWN BY	T. HEFFERNAN
ORIGINAL DATE	07MAR05
SCALE	NTS
DRAWING #	E-IN-00803


**RUTTER TECHNOLOGIES INC.**  
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 Tel: 709-368-4213 Fax: 709-368-1337

FILENAME: VDR10062-006A\_DAU\_POWER\_DIST



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REV	DESCRIPTION	ROR	DATE	APPROVED BY
3	APPROVAL DRAWING	5594	26FEB08	B. PITTMAN
2	APPROVAL DRAWING	5450	14JAN08	B. PITTMAN
1	APPROVAL DRAWING	3981	23JUNE06	C. YOUNG

TITLE

DAU Internal Mounting

DRAWN BY  
M. DOUGLAS

ORIGINAL DATE  
10JAN08

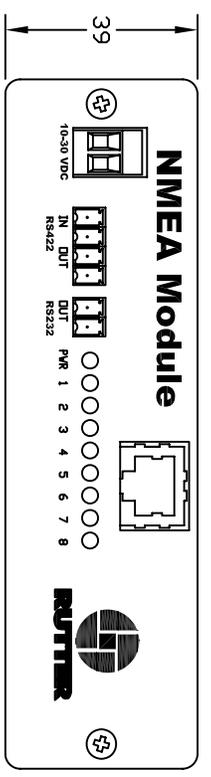
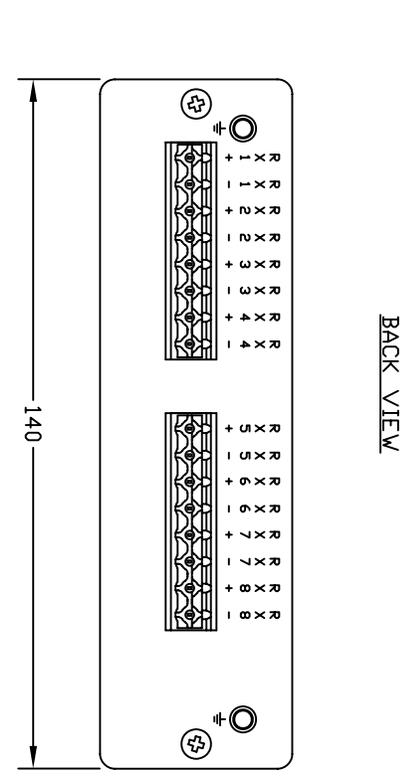
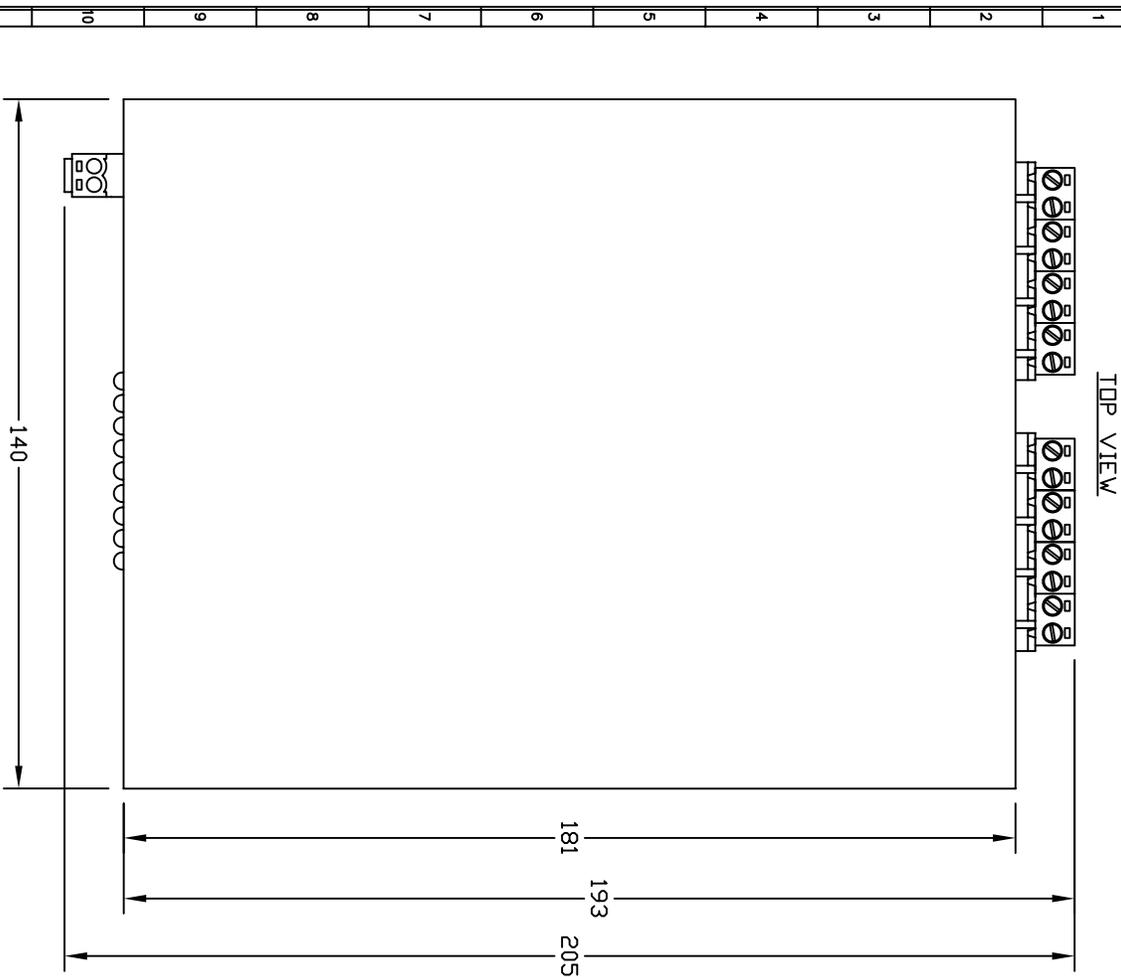
SCALE  
NTS

DRAWING #  
E-IN-00804

**RUTTER**

RUTTER TECHNOLOGIES INC.  
St. John's, NF A1E 4P3  
Tel: 709-566-4213 Fax: 709-566-1337

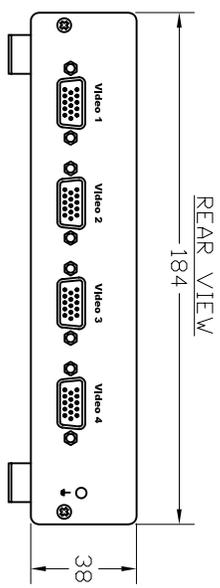
FILENAME  
VDR-203A\_DAU\_Internal



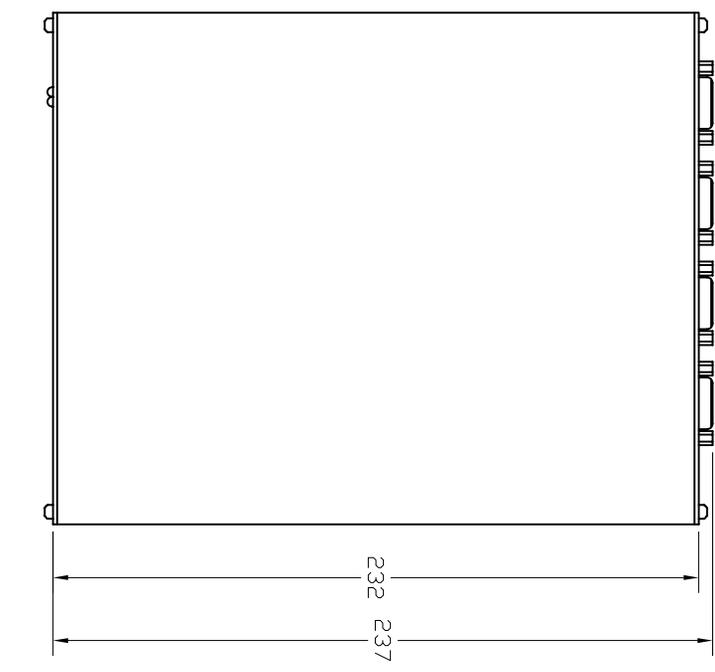
THE INFORMATION CONTAINED HEREON WHICH IS THE PROPERTY OF RUTTER TECHNOLOGIES INC. MUST BE MAINTAINED IN CONFIDENCE AND NO PORTION OF THIS DRAWING MAY BE REPRODUCED OR USED WITHOUT THE EXPRESSED PERMISSION OF RUTTER TECHNOLOGIES INC.

REV	DESCRIPTION	R/R	DATE	APPROVED BY	TITLE
2	APPROVAL DRAWING	5451	14JAN08	B.PITTMAN	NMEA Module
1	APPROVAL DRAWING	3750	20MARCH06	C. YOUNG	
DRAWN BY M. DOUGLAS					SCALE NTS
ORIGINAL DATE 10JAN08					
DRAWING # E-IN-00921					FILENAME VDR100G2-206-A_NMEA_Module
 RUTTER TECHNOLOGIES INC. St. John's, NF A1E 4P3 Tel: 709-368-4213 Fax: 709-368-1337					

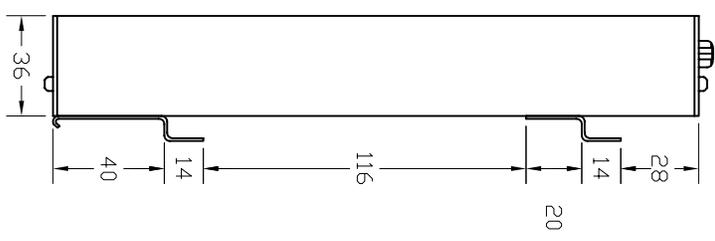
NOTES:  
1. ALL DIMENSIONS ARE IN mm.



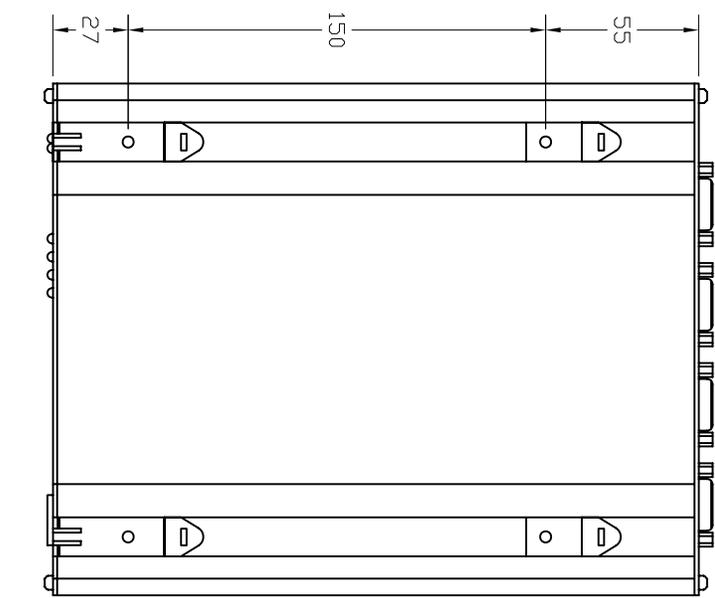
REAR VIEW



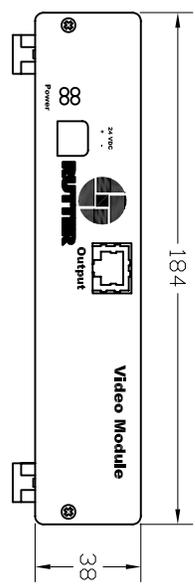
TOP VIEW



SIDE VIEW



BOTTOM VIEW

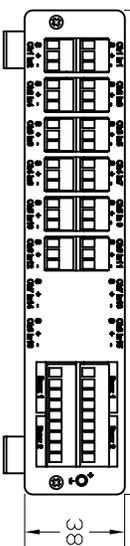


FRONT VIEW

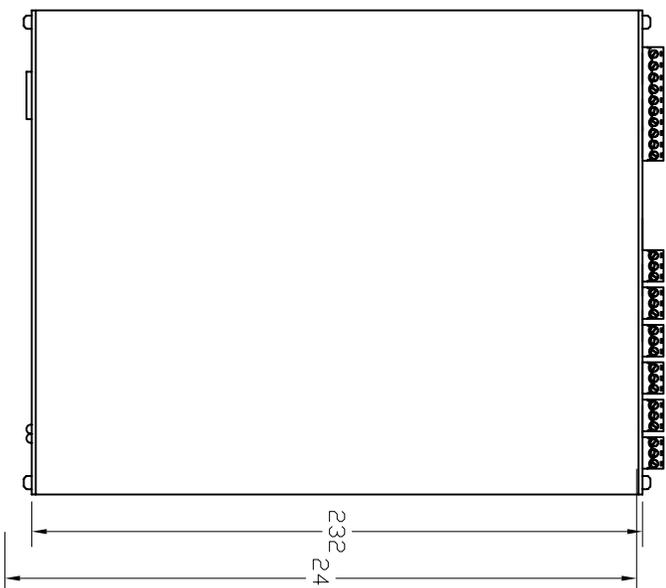
THE INFORMATION CONTAINED HEREON WHICH IS THE PROPERTY OF RUTTER TECHNOLOGIES INC. MUST BE MAINTAINED IN CONFIDENCE AND NO PORTION OF THIS DRAWING MAY BE REPRODUCED OR USED WITHOUT THE EXPRESSED PERMISSION OF RUTTER TECHNOLOGIES INC.

3	APPROVAL DRAWING	5453	14JAN08	B. PITTMAN	Video Module
2	APPROVAL DRAWING		09AUG06	G. BREEN	
1	APPROVAL DRAWING		17JULY06	C. YOUNG	
REV	DESCRIPTION	ROR	DATE	APPROVED BY	
DRAWN BY					M. DOUGLAS
ORIGINAL DATE					10JAN08
SCALE					NTS
DRAWING #					E-IN-00807
FILENAME					RUTTER
RUTTER TECHNOLOGIES INC.					St. John's, NF A1E 4P3 Tel: 709-568-4213 Fax: 709-388-1337
VDR-207_VIDEO_MODULE					

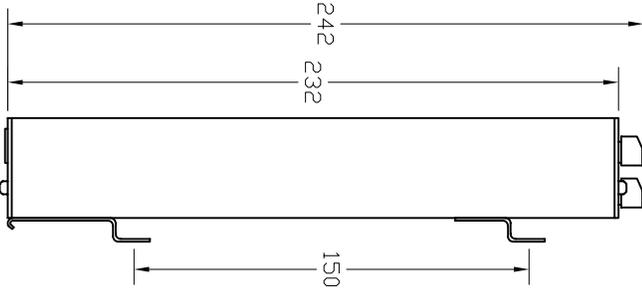
REAR VIEW  
184



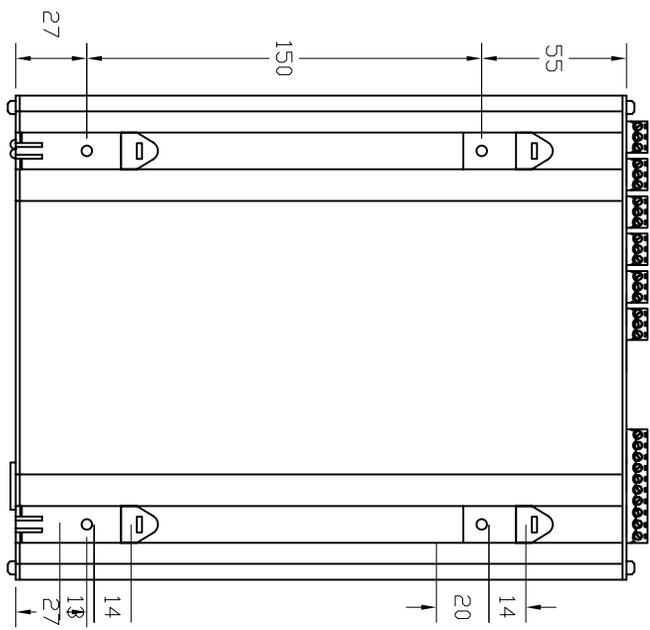
TOP VIEW  
232 240



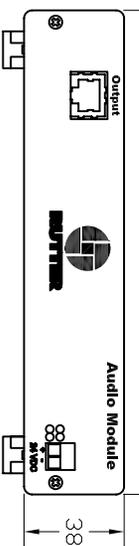
SIDE VIEW  
242 232 150



BOTTOM VIEW  
55 150 27 14 14 20 14 14 27



FRONT VIEW  
38

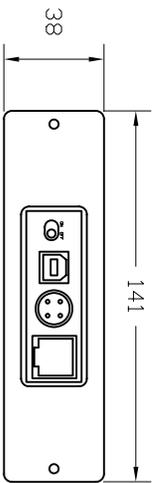


NOTES:  
1. ALL DIMENSIONS ARE IN mm.

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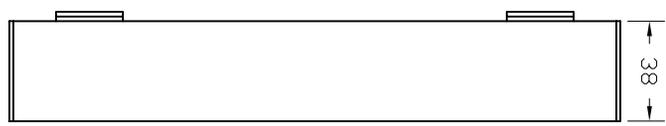
TITLE		Audio Input Module	
3	APPROVAL DRAWING	5454	14JAN08
2	APPROVAL DRAWING		09AUG06
1	APPROVAL DRAWING		21JULY04
REV	DESCRIPTION	RCR	DATE
			APPROVED BY
DRAWN BY		M. DOUGLAS	
ORIGINAL DATE		10JAN08	
SCALE		NTS	
DRAWING #		E-IN-00809	
FILENAME		VDR-208_AUDIO_MODULE	
RUTTER TECHNOLOGIES INC.		St. John's, NF A1E 4P3	
Tel: 709-368-4213 Fax: 709-368-1337			

NOTES:  
 1. ALL DIMENSIONS ARE IN mm.  
 2. **3M™** MUSHROOM LOCK.

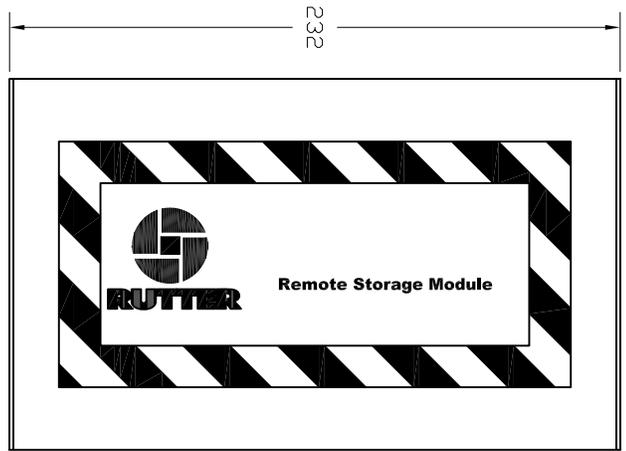


BACK VIEW

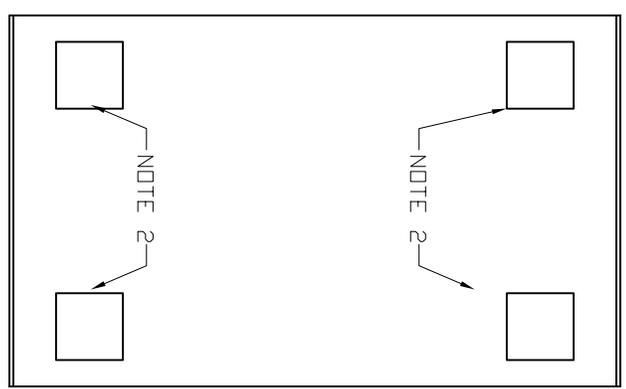
SIDE VIEW



TOP VIEW



BOTTOM VIEW



FRONT VIEW



WEIGHT

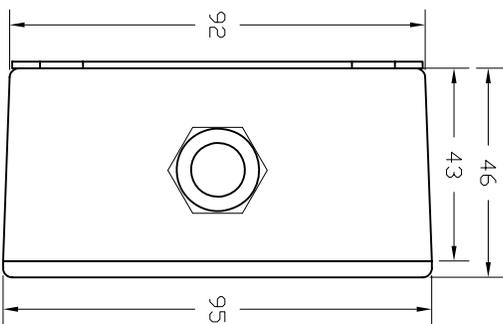
12 kg

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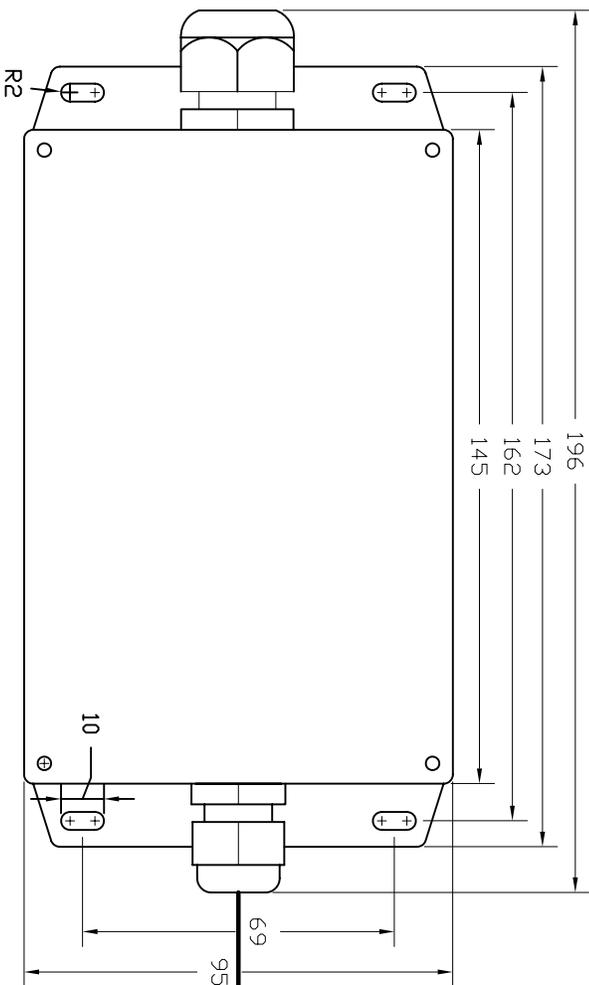
TITLE		Remote Storage Module (RSM)	
REV	DESCRIPTION	RDR	DATE
1	APPROVAL DRAWING	RJR	21JULY04
2	APPROVAL DRAWING	B. PITTMAN	14JAN08
3	APPROVAL DRAWING	T. BARKER	21JULY04
4	APPROVAL DRAWING		
5	APPROVAL DRAWING		
6	APPROVAL DRAWING		
7	APPROVAL DRAWING		
8	APPROVAL DRAWING		
9	APPROVAL DRAWING		
10	APPROVAL DRAWING		
DRAWN BY		M. DOUGLAS	
ORIGINAL DATE		10JAN08	
SCALE		DRAWING #	
NTS		E-IN-00810	
FILENAME		RUTTER	
RUTTER TECHNOLOGIES INC.		St. John's, NF A1E 4P3	
VDR-301_RSM		Tel: 709-968-4213 Fax: 709-368-1337	

- NOTES:  
 1. ALL DIMENSIONS ARE IN mm.  
 2. RSM POWER SUPPLY CABLE APPROX. 1m, RUTTER SUPPLY.

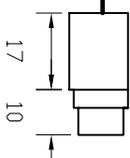
END VIEW



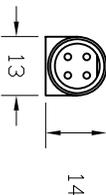
TOP VIEW



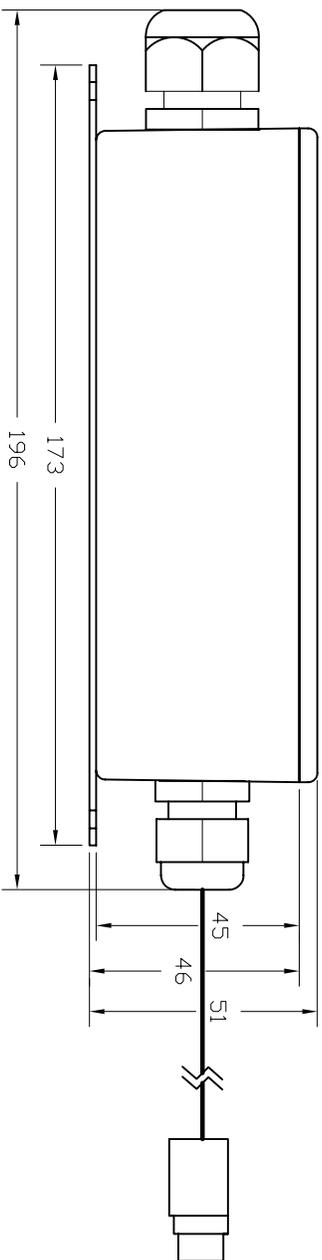
SIDE VIEW



END VIEW



SIDE VIEW



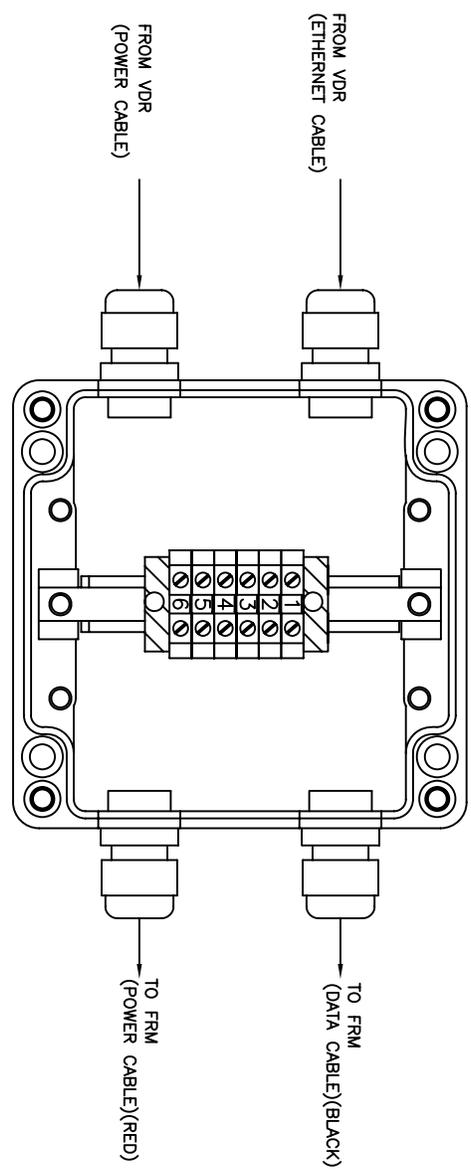
WEIGHT  
0.75 kg

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TITLE		RSM Power Supply	
REV	DESCRIPTION	RCR	DATE
1	APPROVAL DRAWING	B. PITTMAN	14JAN08
2	APPROVAL DRAWING	T.BARKER	21JUL04
DRAWN BY		M. DOUGLAS	
ORIGINAL DATE		10JAN08	
SCALE		NTS	
DRAWING #		E-IN-00811	
FILENAME		VDR-302_RSM_POWER_SUPPLY	
RUTTER TECHNOLOGIES INC.		St. John's, NF A1E 4P3 Tel: 709-368-4213 Fax: 709-368-1337	

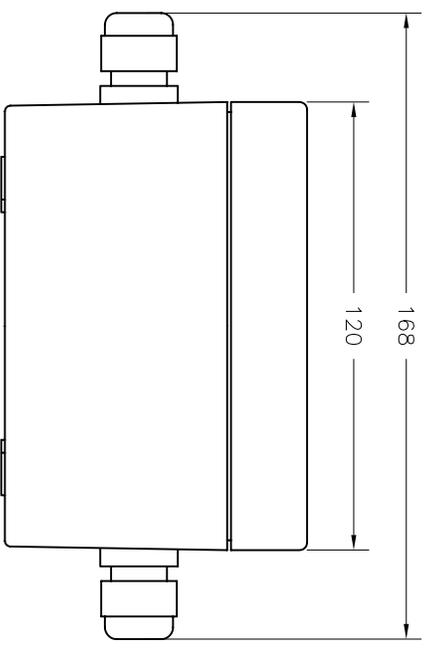
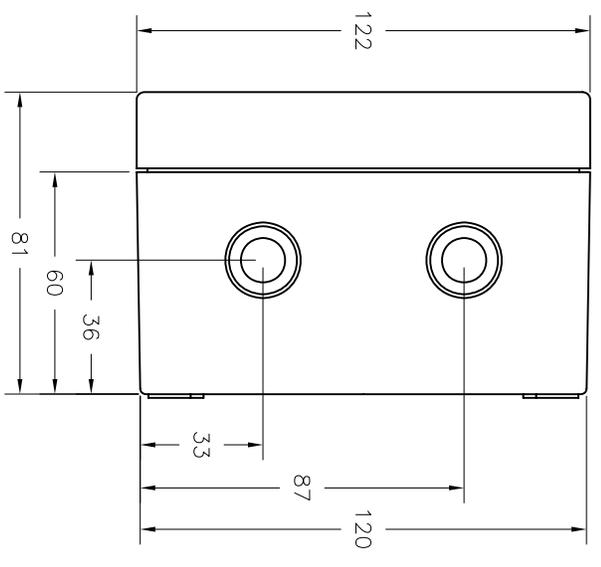
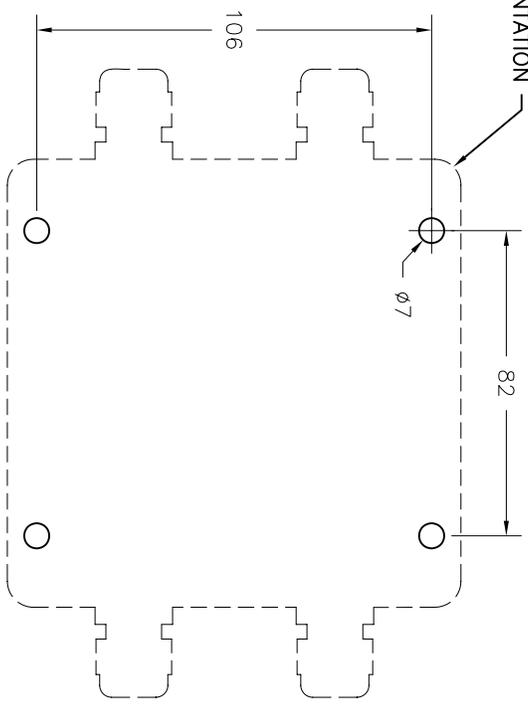


A B C D E F G H J K L M N P Q R S



DASHED LINE SHOWS BOX ORIENTATION

MOUNTING HOLE PLAN

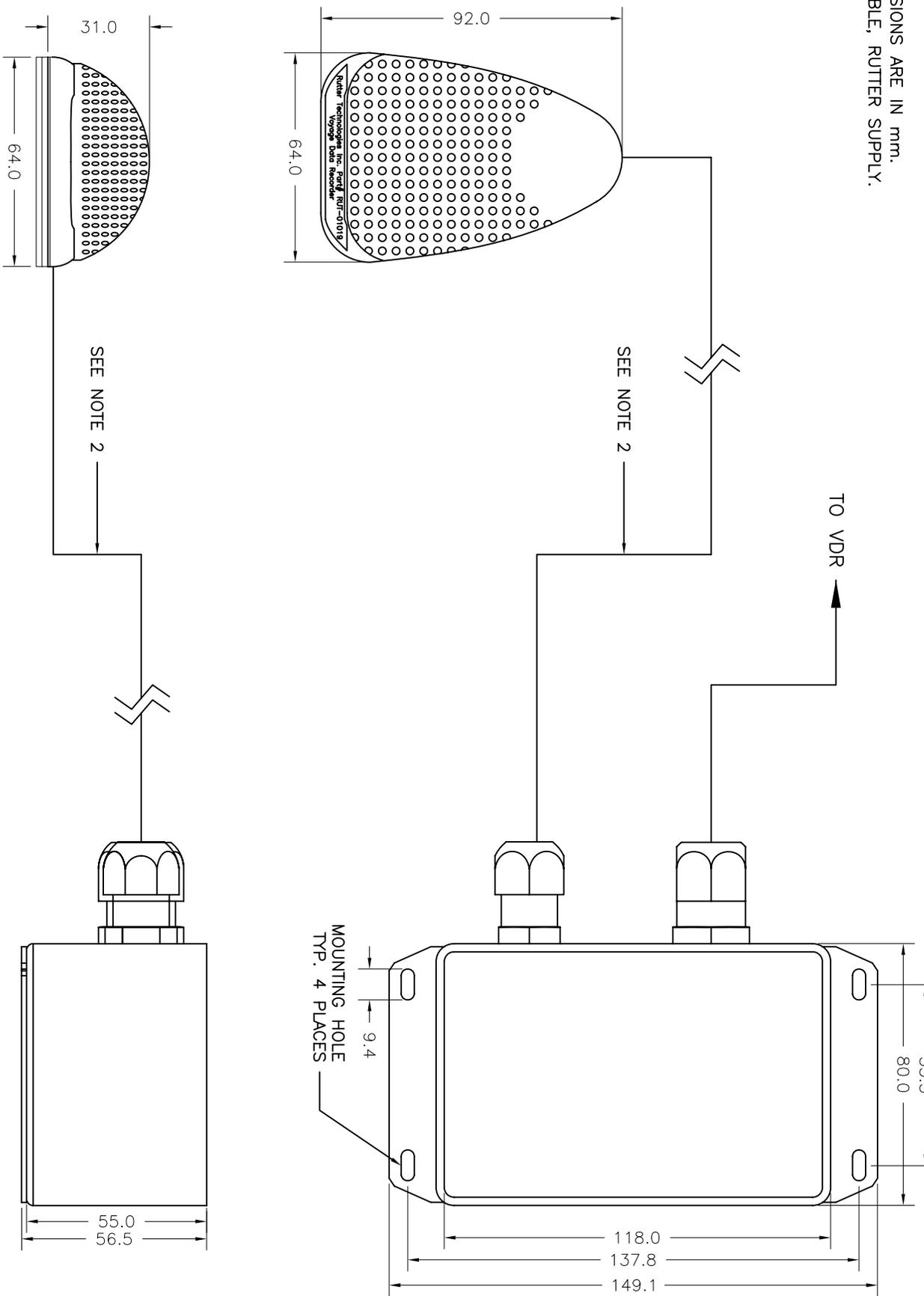


NOTES:  
1. ALL DIMENSIONS ARE IN mm.

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TITLE		FRM Junction Box	
APPROVAL DRAWING	5460	14JAN08	B. PITTMAN
APPROVAL DRAWING		17JULY06	C. YOUNG
REV	DESCRIPTION	RCR	DATE
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
DRAWN BY		M. DOUGLAS	
ORIGINAL DATE		10JAN08	
SCALE		DRAWING #	
NTS		E-IN-00813	
RUTTER TECHNOLOGIES INC.		RUTTER TECHNOLOGIES INC.	
St. John's, NF A1E 4P3		Tel: 709-568-4213 Fax: 709-368-1337	
VDR-304C_FRM_JIB			

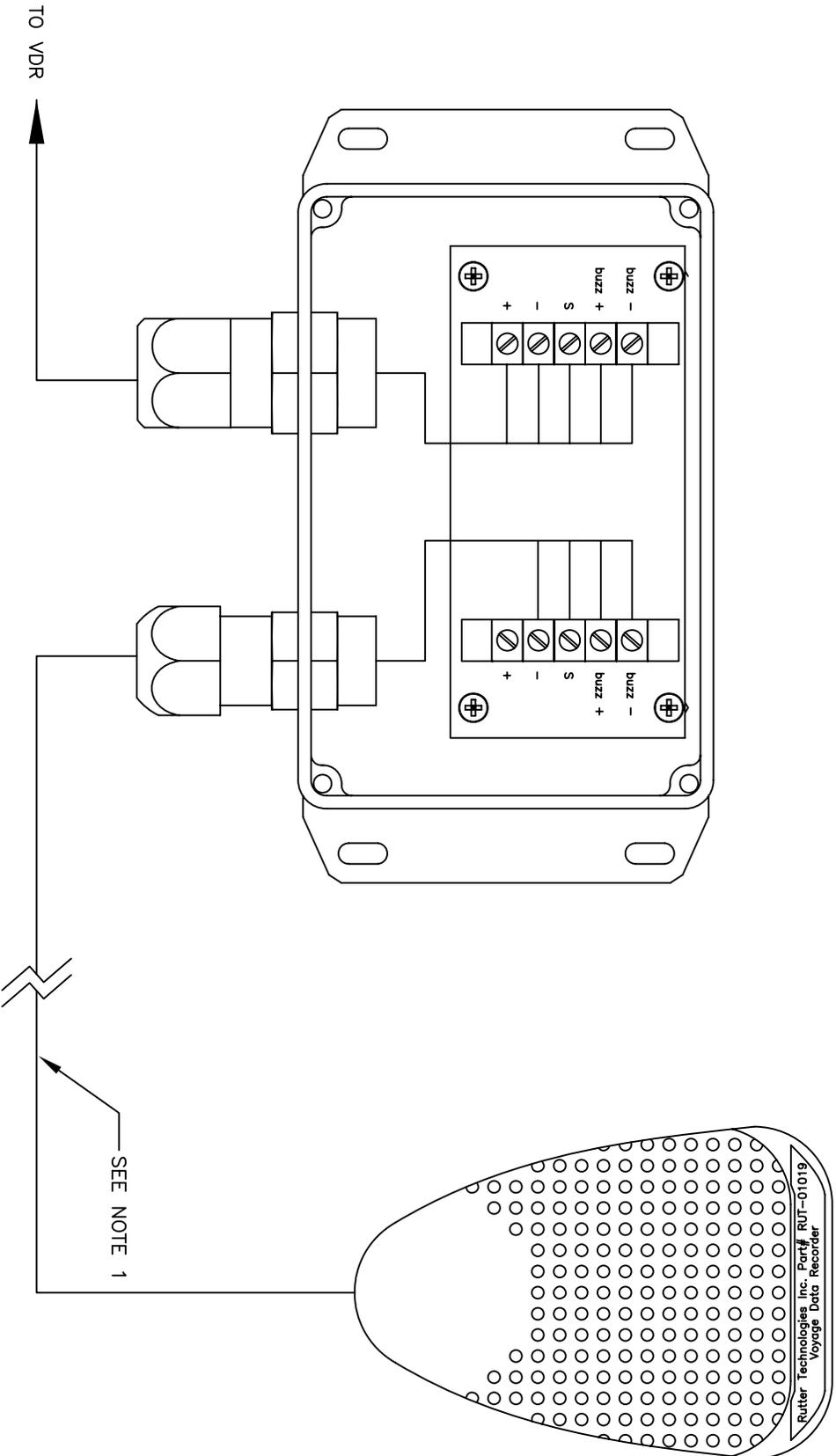
- NOTES:**
1. ALL DIMENSIONS ARE IN mm.
  2. 2m OF CABLE, RUTTER SUPPLY.



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REV	DESCRIPTION	RQR	DATE	APPROVED BY	TITLE	DRAWN BY	ORIGINAL DATE	SCALE	DRAWING #	FILENAME
2	APPROVAL DRAWING	5463	14JAN08	B. PITTMAN	Indoor Microphone - Dimensional	M. DOUGLAS	10JAN08	NTS	E-IN-00960	 <b>RUTTER TECHNOLOGIES INC.</b> St. John's, NF A1E 4P3 Tel: 709-368-4213 Fax: 709-368-1337
1	APPROVAL DRAWING	3860	18MAY06	B. PITTMAN						

- NOTES:**
1. CABLE FROM MICROPHONE TO JUNCTION BOX IS 2M LONG WITH AN OUTSIDE DIAMETER OF 6.5mm.



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REV	DESCRIPTION	QTY	DATE	APPROVED BY	TITLE	SCALE	DRAWING #	FILENAME	
3	APPROVAL DRAWING	5464	14JAN08	B. PITTMAN	Indoor Microphone Internal Connection	ORIGINAL	10JAN08	RUTTER	
2	APPROVAL DRAWING	4193	29AUG06	G. BREEN		DRAWN BY			M. DOUGLAS
1	APPROVAL DRAWING	3860	03MAY06	B. PITTMAN		ORIGINAL DATE			10JAN08
REV	DESCRIPTION	QTY	DATE	APPROVED BY	TITLE	SCALE	DRAWING #	FILENAME	
						NTS	E-IN-00961	VDR-306c_Indoor_Mic_Connection	

Indoor Microphone Internal Connection

DRAWN BY  
M. DOUGLAS

ORIGINAL DATE  
10JAN08

SCALE  
NTS

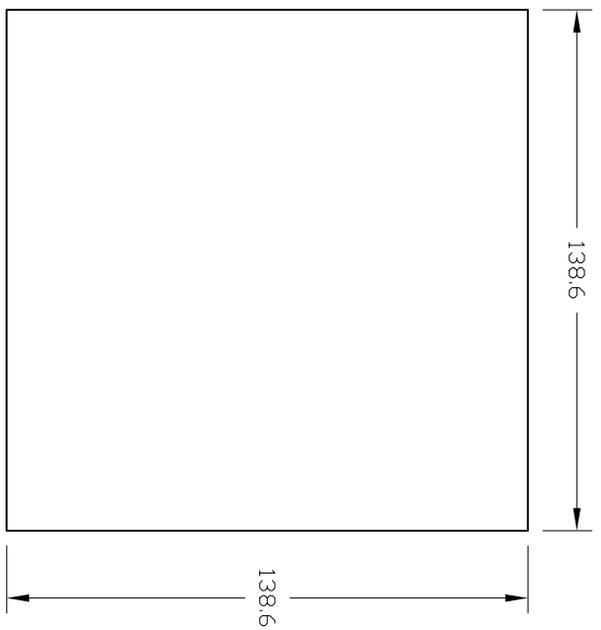
**RUTTER TECHNOLOGIES INC.**  
 St. John's, NF A1E 4P3  
 Tel: 709-368-4213 Fax: 709-368-1337



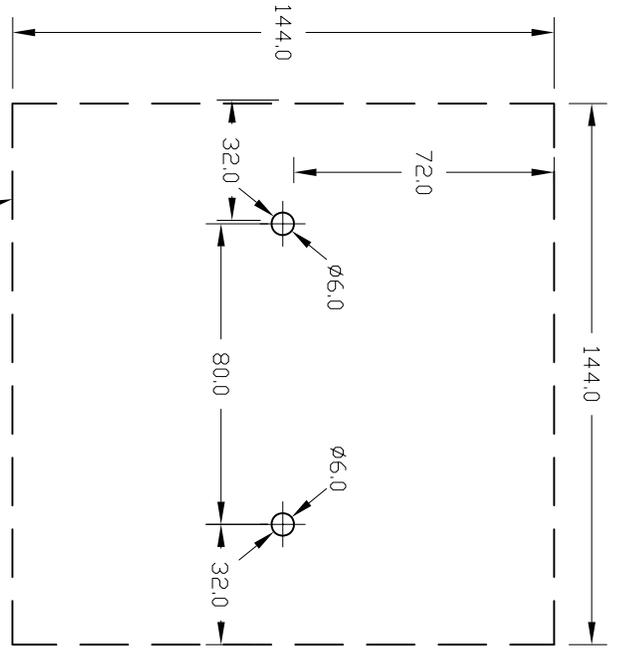
A B C D E F G H J K L M N P Q R S

NOTES:  
1. ALL DIMENSIONS ARE IN mm.

FLUSH MOUNT CUTOUT



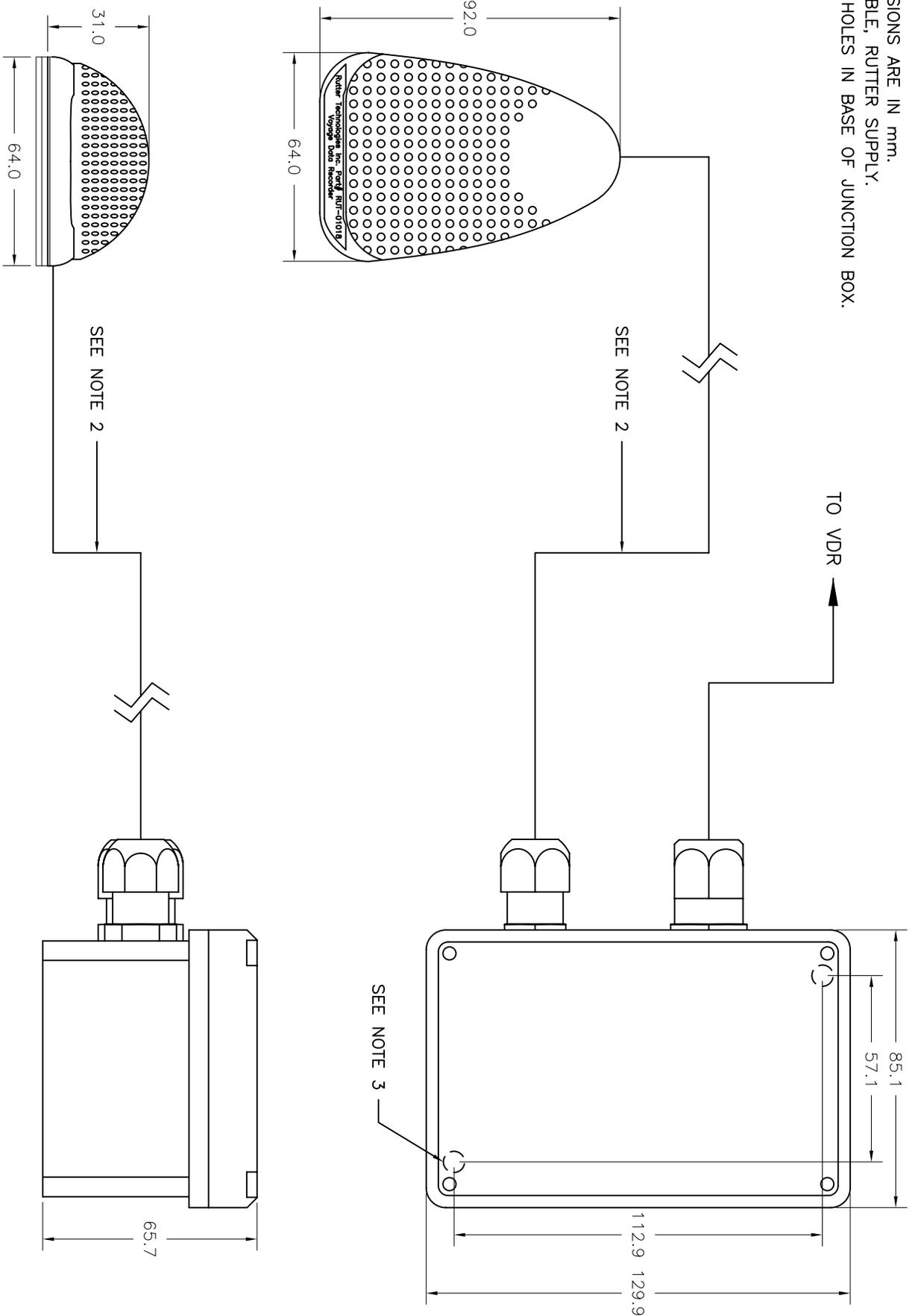
SURFACE MOUNT DRILL HOLE PATTERN



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TITLE		Alarm Module Mounting Options	
REV	DESCRIPTION	ROR	DATE
1	APPROVAL DRAWING	ROR	04MAY05
2	APPROVAL DRAWING	5467	14JAN08
DRAWN BY		M. DOUGLAS	
ORIGINAL DATE		10JAN08	
SCALE		DRAWING #	
NTS		E-IN-00817	
RUTTER TECHNOLOGIES INC.		RUTTER TECHNOLOGIES INC.	
St. John's, NF A1E 4P3		St. John's, NF A1E 4P3	
Tel: 709-368-4213 Fax: 709-368-1337		Tel: 709-368-4213 Fax: 709-368-1337	
VDR-313B_OAU_Mounting		VDR-313B_OAU_Mounting	

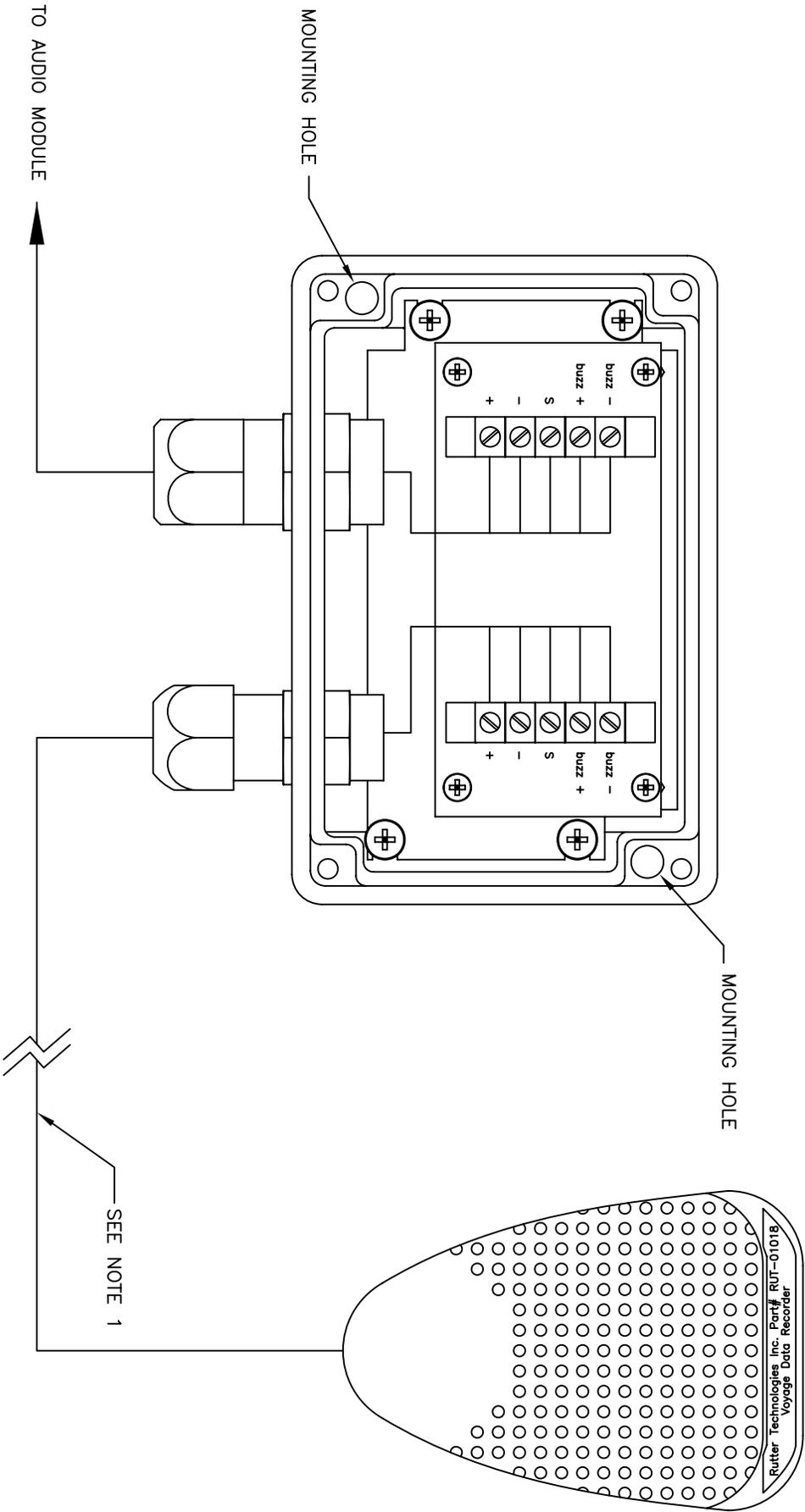
- NOTES:**
1. ALL DIMENSIONS ARE IN mm.
  2. 2m OF CABLE, RUTTER SUPPLY.
  3. MOUNTING HOLES IN BASE OF JUNCTION BOX.



REV	DESCRIPTION	RQR	DATE	APPROVED BY	TITLE	DRAWN BY	ORIGINAL DATE	SCALE	DRAWING #	FILENAME
2	APPROVAL DRAWING	5468	14JAN08	B. PITTMAN	Outdoor Microphone - Dimensional	M. DOUGLAS	10JAN08	NTS		RUTTER
1	APPROVAL DRAWING	3860	16MAY06	B. PITTMAN		St. John's, NF A1E 4P3 Tel: 709-368-4213 Fax: 709-368-1337				
<p>THE INFORMATION CONTAINED HEREON WHICH IS THE PROPERTY OF RUTTER TECHNOLOGIES INC. MUST BE MAINTAINED IN CONFIDENCE AND NO PORTION OF THIS DRAWING MAY BE REPRODUCED OR USED WITHOUT THE EXPRESSED PERMISSION OF RUTTER TECHNOLOGIES INC.</p>										

0	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

- NOTES:
1. CABLE FROM MICROPHONE TO JUNCTION BOX IS 2M LONG WITH AN OUTSIDE DIAMETER OF 6.5mm.

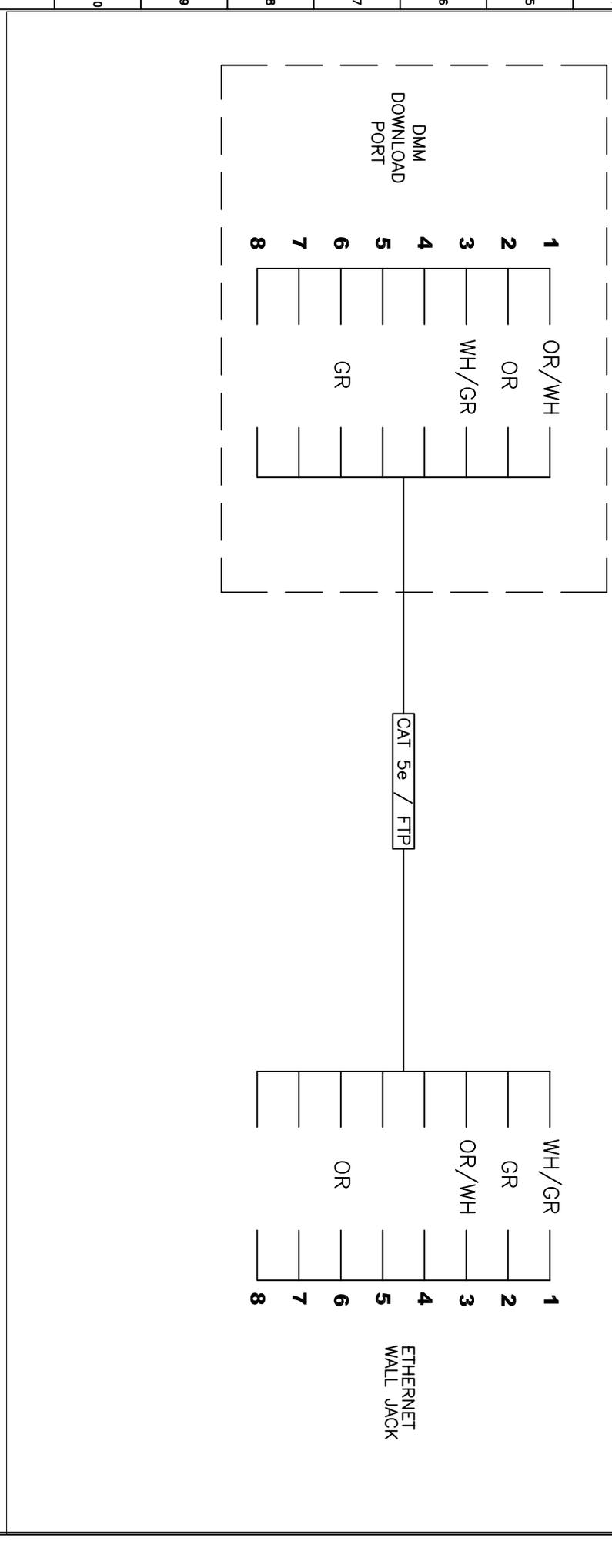


THE INFORMATION CONTAINED HEREON WHICH IS THE PROPERTY OF RUTTER TECHNOLOGIES INC. MUST BE MAINTAINED IN CONFIDENCE AND NO PORTION OF THIS DRAWING MAY BE REPRODUCED OR USED WITHOUT THE EXPRESSED PERMISSION OF RUTTER TECHNOLOGIES INC.			
TITLE		Outdoor Microphone Internal Connection	
3	APPROVAL DRAWING	5465	14JAN08
2	APPROVAL DRAWING	3660	09AUG06
REV	DESCRIPTION	RCR	DATE
			APPROVED BY
			B. PITTMAN
			G. BREEN
DRAWN BY		M. DOUGLAS	
ORIGINAL DATE		10JAN08	
SCALE		DRAWING #	
NTS		E-IN-00962	
RUTTER TECHNOLOGIES INC.		RUTTER	
St. John's, NF A1E 4P3		VDR-310b, Outdoor_Mfc_Connection	
Tel: 709-968-4213 Fax: 709-368-1337			

REV		DESCRIPTION	RCR	DATE	APPROVED BY
1	APPROVAL DRAWING	5469	14JAN08	B. PITTMAN	
2	APPROVAL DRAWING	5469	14JAN08	B. PITTMAN	
1	APPROVAL DRAWING	09FEB05		B. PITTMAN	

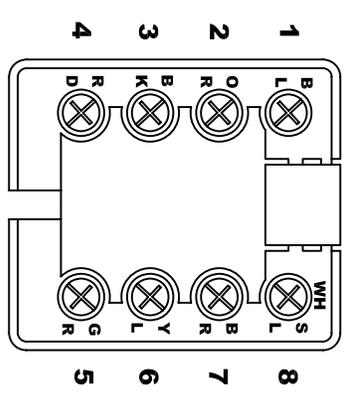
  

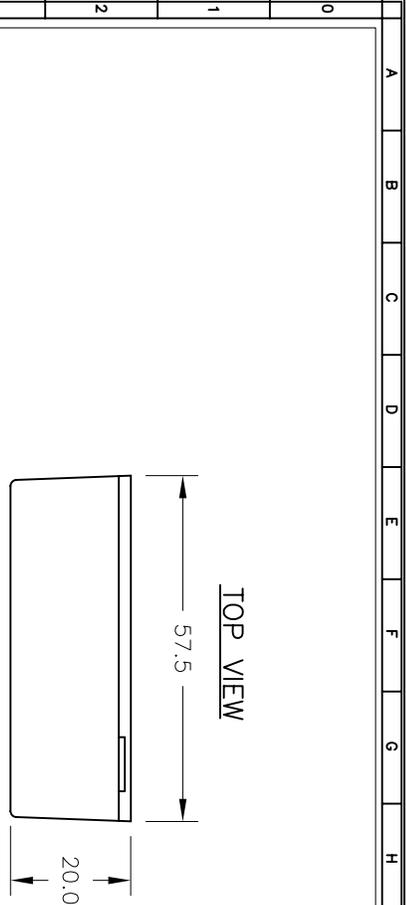
THE INFORMATION CONTAINED HEREON WHICH IS THE PROPERTY OF RUTTER TECHNOLOGIES INC. MUST BE MAINTAINED IN CONFIDENCE AND NO PORTION OF THIS DRAWING MAY BE REPRODUCED OR USED WITHOUT THE EXPRESSED PERMISSION OF RUTTER TECHNOLOGIES INC.	
TITLE	Ethernet Wall Socket/DMM Connection
DRAWN BY	M. DOUGLAS
ORIGINAL DATE	10JAN08
SCALE	NTS
DRAWING #	E-IN-00821
FILENAME	VDR-318_DPU_to_Jack
<b>RUTTER TECHNOLOGIES INC.</b> St. Johns, NE A1E AP3 Tel: 709-968-4213 Fax: 709-368-1337	



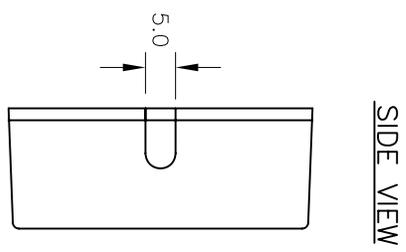
INSIDE DPU

- LEGEND:
- BL - BLUE
  - OR - ORANGE
  - BK - BLACK
  - RD - RED
  - WH - WHITE
  - BR - BROWN
  - YL - YELLOW
  - GR - GREEN

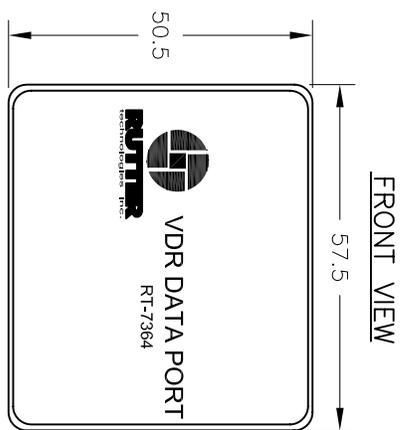




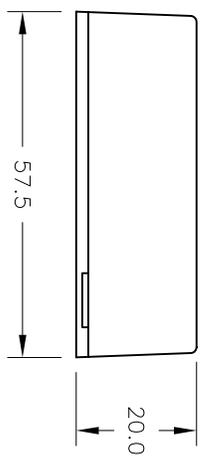
TOP VIEW



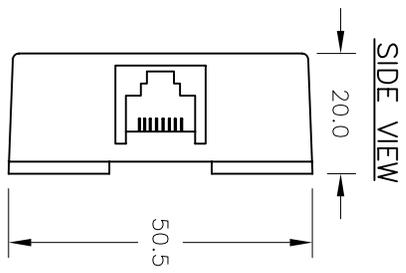
SIDE VIEW



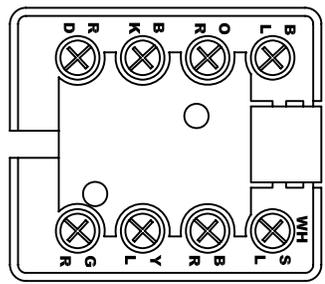
FRONT VIEW



BOTTOM VIEW

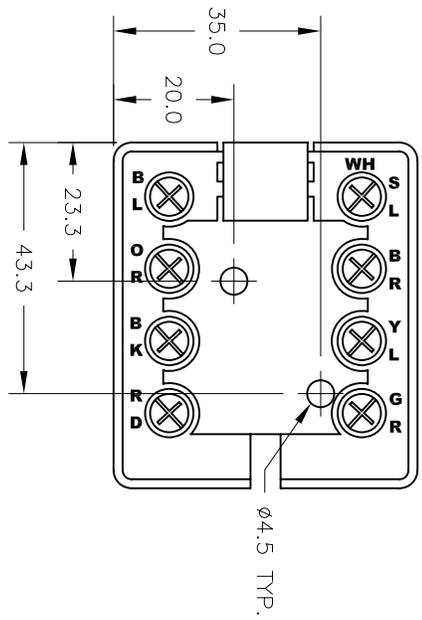


SIDE VIEW



INTERNAL VIEW

- LEGEND:
- BL - BLUE
  - OR - ORANGE
  - BK - BLACK
  - RD - RED
  - WH - WHITE
  - BR - BROWN
  - YL - YELLOW
  - GR - GREEN

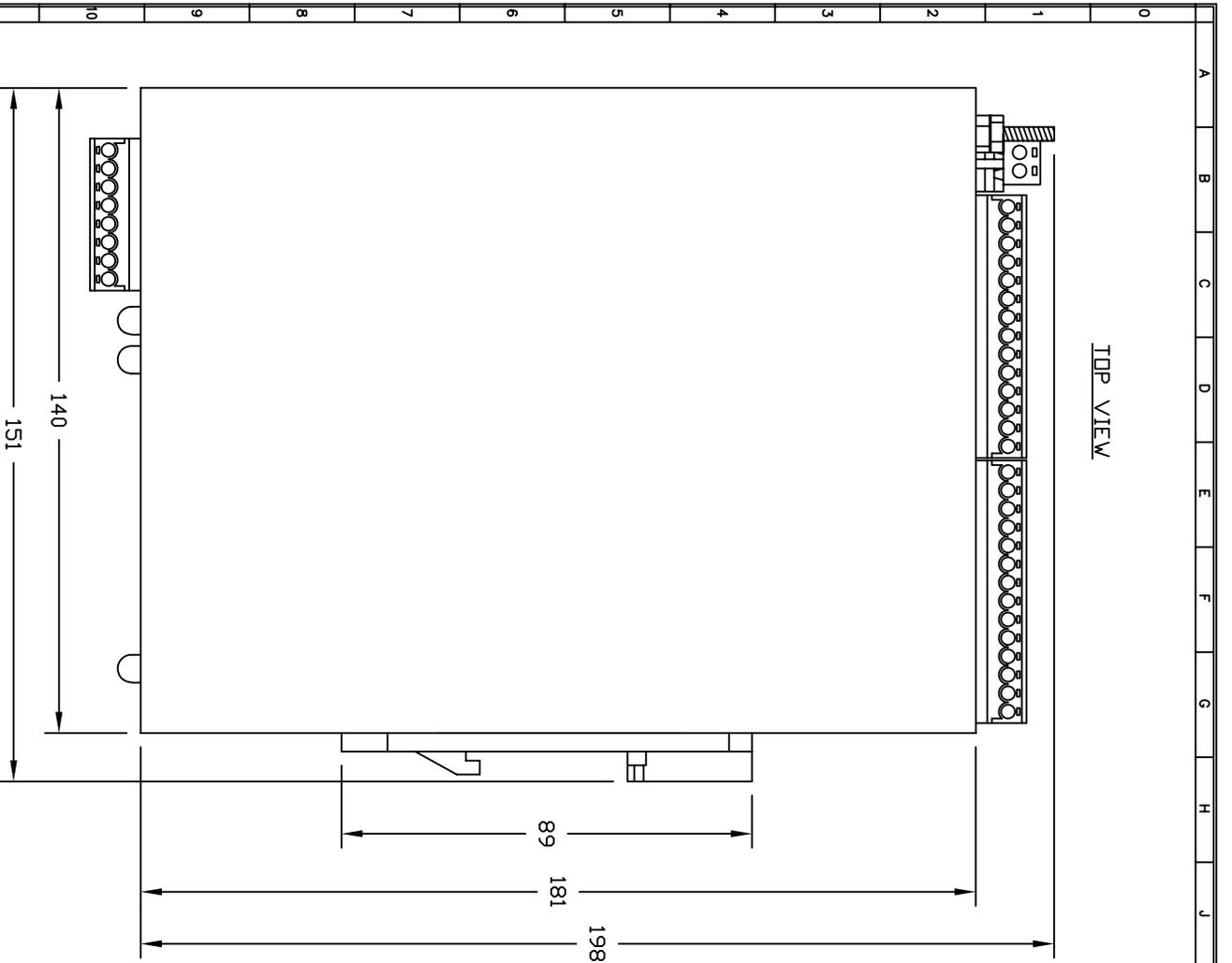


INSIDE VIEW

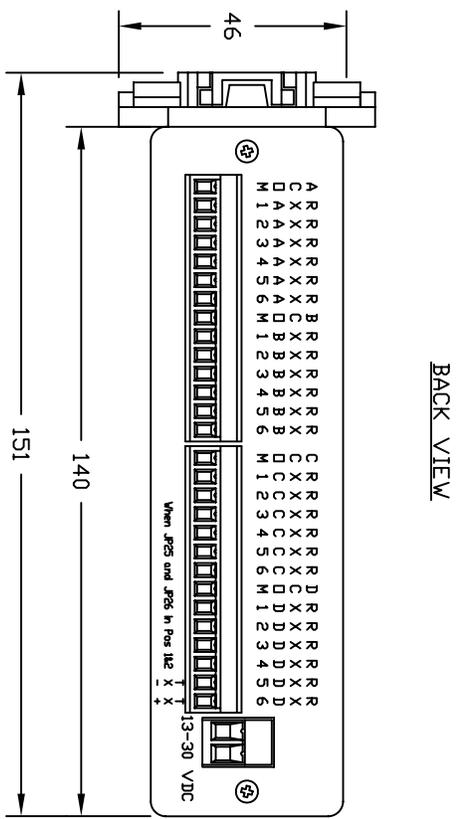
NOTES:  
1. ALL DIMENSIONS ARE IN mm AND ARE FOR REFERENCE ONLY.

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TITLE			
Ethernet Wall Socket			
REV	DESCRIPTION	RCR	DATE
1	APPROVAL DRAWING		01APR05
2	APPROVAL DRAWING	5470	14JAN08
		APPROVED BY	
		I. ROBBINS	
		B. PITTMAN	
		14JAN08	
		5470	
DRAWN BY			
M. DOUGLAS			
ORIGINAL DATE			
10JAN08			
SCALE			
NTS			
DRAWING #			
E-IN-00820			
FILENAME			
VDR-320_Ethernet_Jack			
RUTTER TECHNOLOGIES INC.			
St. John's, NF A1E 4P3			
Tel: 709-368-4213 Fax: 709-368-1337			

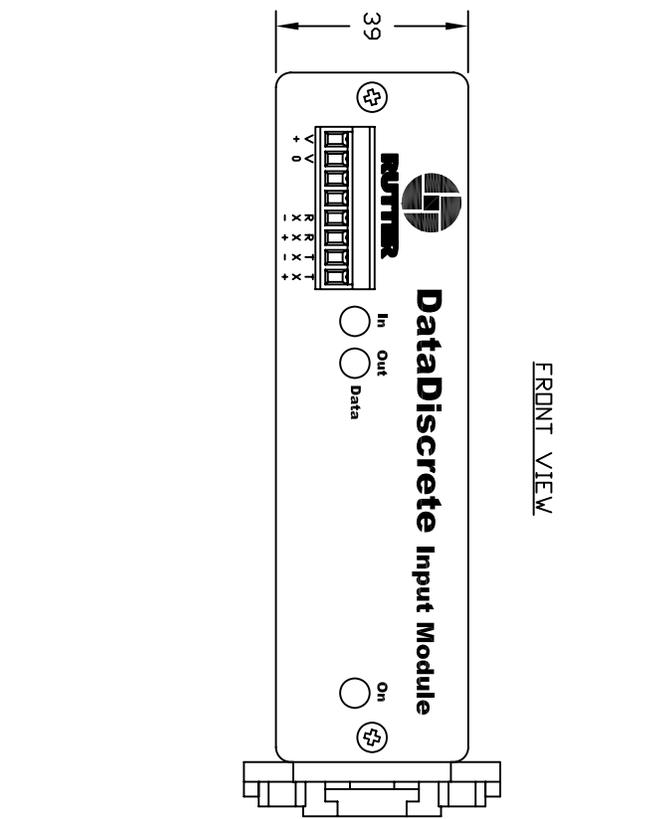




TOP VIEW



BACK VIEW



FRONT VIEW

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REV	DESCRIPTION	ROR	DATE	APPROVED BY	TITLE
1	APPROVAL DRAWING	5671			Data Discrete
2	APPROVAL DRAWING	3628	04FEB04	I. ROBBINS	
DRAWN BY M. DOUGLAS					
ORIGINAL DATE 14MAR08					
SCALE NTS					
DRAWING # E-IN-00823					
FILENAME VDR-138-Datadiscrete					
RUTTER TECHNOLOGIES INC. St. John's, NF A1E 4P3 Tel: 709-368-4213 Fax: 709-368-1337					



# Scope of Supply

Date : 2006

Project Name: NB XXXX

Owner:

QTY	UNIT	DESCRIPTION
1	RT-2600	<b>Data Acquisition Unit c/w:</b> 3 RT-2604 NMEA Input Modules (16 input channels total) 1 RT-2603 8 Channels Audio Input Module 1 RT-2632 Video Input Module
1	RT-2700	Data Processing Unit
1	RT-2150	Alarm and Operation Module
1	RT-2151	Remote Storage Module
3	RT-333	DataDiscrete – DIN rail mounted
1	RT-323	DataAnalog – DIN rail mounted
1	RT-940	Final Recording Medium (FRM) Capsule, 1.75 GB capacity,
1	RT-916	FRM Junction Box
8	RT-2100	Indoor Audio Kits
2	RT-930	Outdoor Audio Kits
2	RT-2302	VDR-100G2 Operation Manual

## Spare Parts List

<b>Rutter Part N°</b>	<b>Description</b>	<b>Qty</b>	<b>Location Used</b>
RT-7510	LED (RED) 10mm 5V	1	Alarm Module
RT-7519	Fuse (1A)	1	Fan Fuse Block
RT-7526	Fuse (25A)	1	Power Supply
RT-7120	Intake Filter	1	DPU

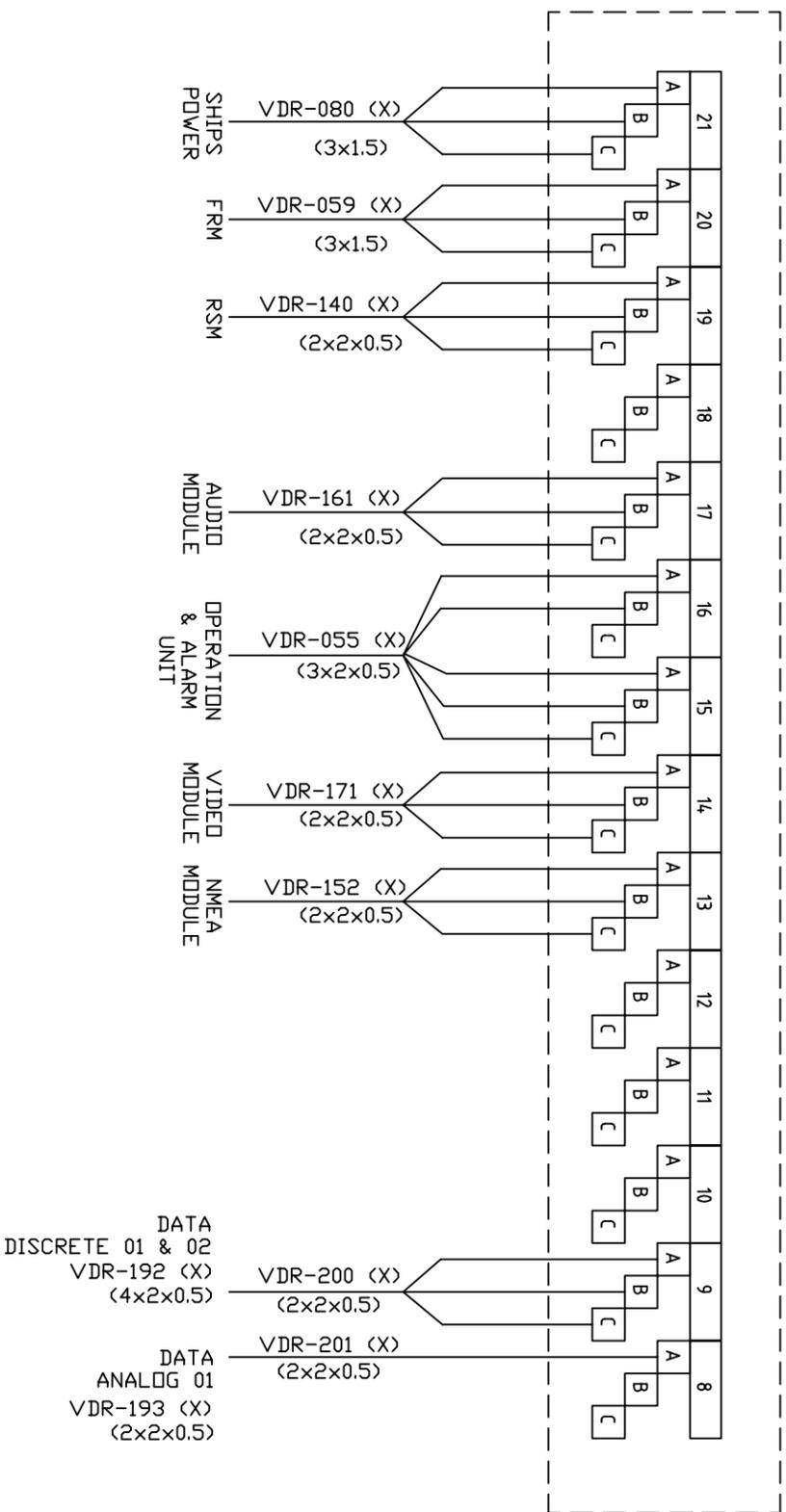
# Appendix





A B C D E F G H J K L M N P Q R S

# DPU



NOTES:  
 1. DASHED LINE INDICATES COMPONENTS SHOWN ARE INSIDE EACH UNIT.  
 2. INDICATES THAT THESE CONNECTIONS ARE MADE DURING ASSEMBLY.

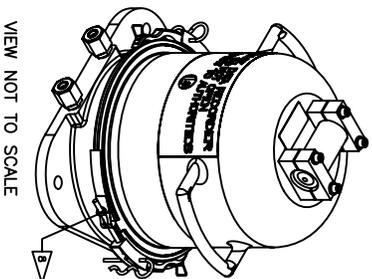
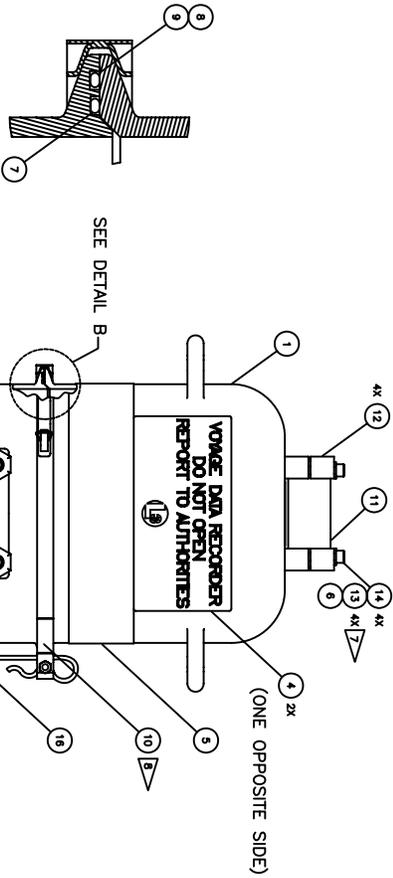
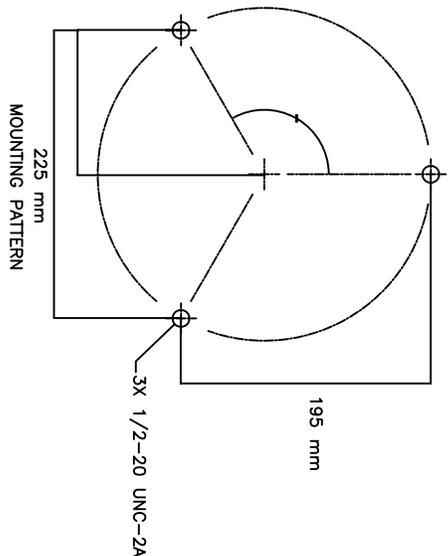
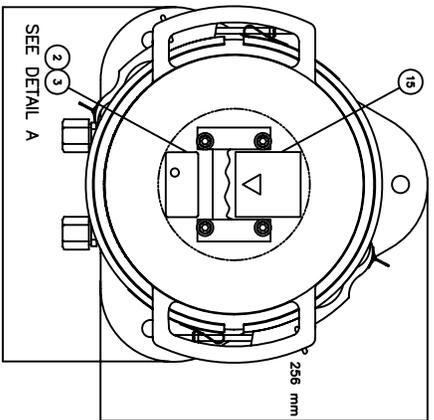
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RUTTER JOB #		DRAWING #		TITLE	
		E-IN-01101		DPU Power Connections	
DRAWING REV #		RCR #		DRAWN BY	
12		4411		R. ANTLE-KING	
SHIP YARD		SHIP NAME		ORIGINAL DATE	
17NOV06		B. PITTMAN		17NOV06	
DATE		APPROVED BY		FILENAME	
17NOV06		B. PITTMAN		NBXXXX_sys_wiring_DPU_SDS_3A	
APPROVAL DRAWING		SHIP YARD		RUTTER TECHNOLOGIES INC.	
DESCRIPTION		SHIP NAME		St. John's, NL A1E 4P3	
17NOV06		B. PITTMAN		Tel: 709-368-4213 Fax: 709-368-1337	
DATE		APPROVED BY		SHEET	
17NOV06		B. PITTMAN		3	



NOTES: UNLESS OTHERWISE SPECIFIED

1. RETRIEVABLE PORTION OF RECORDER IS FLUORESCENT ORANGE. FRONT AND BACK LABELS ARE REFLECTIVE WHITE BACKGROUND WITH BLACK LETTERING. NAMEPLATE IN DETAIL A IS LIGHT GRAY WITH BLACK MARKING. WEIGHT: 30LBS [13.6kg] NOMINAL (DEPENDENT ON FINAL CONFIGURATION)
2. DO NOT MOUNT HVR WITHIN 24 INCHES [59cm] OF OTHER STRUCTURES. KEEP AREA AROUND UNIT CLEAR.
3. ETHERNET CABLE SHALL BE SHIELDED TWISTED PAIR CATEGORY 5, IEA/TIA 568 OR IEEE 802.5. MAX CABLE LENGTH FROM VDR TO PC IS 246 FEET [75 METERS].
4. MAX CABLE LENGTH FOR AC OR DC POWER IS 246 FEET [75 METERS].
5. ALL CABLES ARE TO BE COMPLIANT WITH IEC 92.
6. TIGHTEN SCREWS (ITEM 13) EVENLY TO CREATE A UNIFORM SPACE BETWEEN UPPER AND LOWER BRACKETS (ITEM 12), THEN TORQUE TO SPECIFICATIONS. BOTH SPACES BETWEEN UPPER AND LOWER BRACKETS TO BE WITHIN  $\pm 0.50$  OF EACH OTHER.
7. TORQUE NUTS ON V-BAND CLAMP (ITEM 10) TO 20 $\pm 5$  INCH POUNDS.



WEIGHT  
13.6Kg

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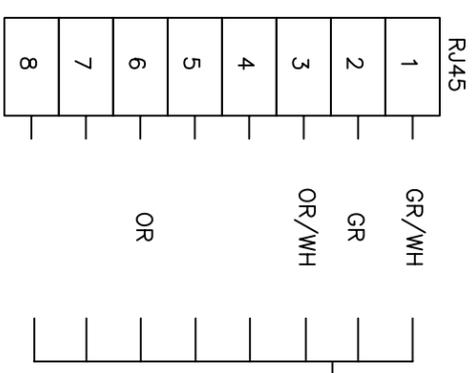
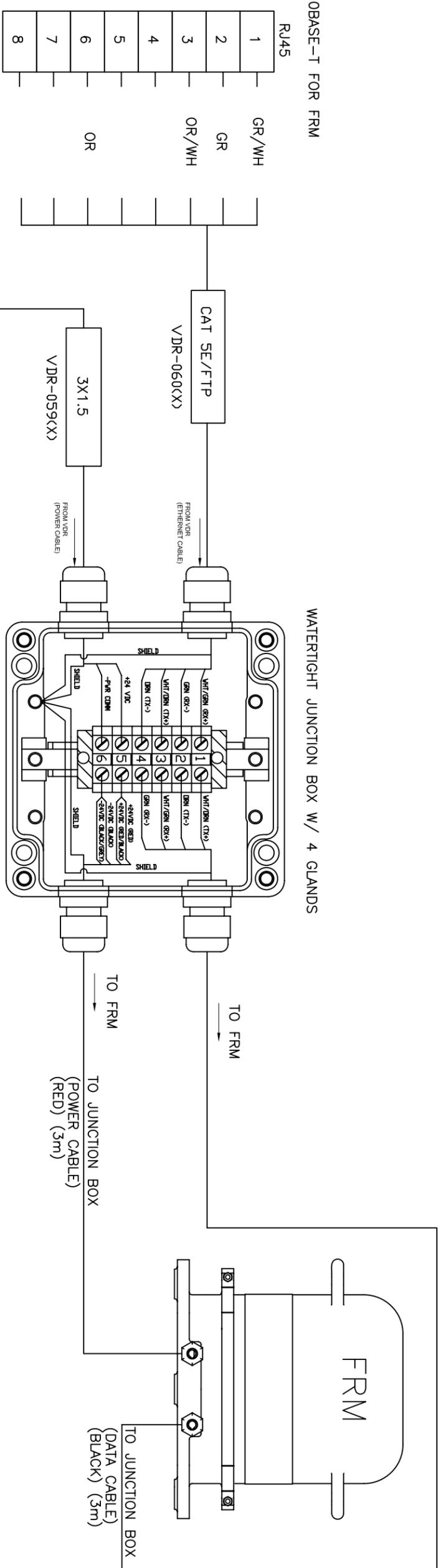
REV	DESCRIPTION	RDR	DATE	APPROVED BY	TITLE
2	APPROVAL DRAWING	5457	14JAN08	B. PITTMAN	L3HVR01
1	APPROVAL DRAWING		20JAN04	I.ROBBINS	
REV	DESCRIPTION	RDR	DATE	APPROVED BY	

DRAWN BY	M. DOUGLAS	RUTTER TECHNOLOGIES INC.
ORIGINAL DATE	10JAN08	St. Johns, NE A1E 4P3
SCALE	NTS	Tel: 709-968-4213 Fax: 709-368-1337
DRAWING #	E-IN-00812	FILENAME
		VDR-303_HVR_FRM

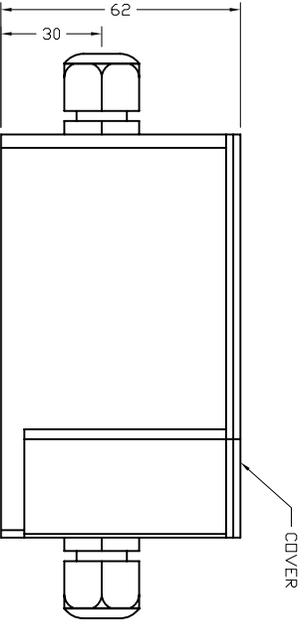
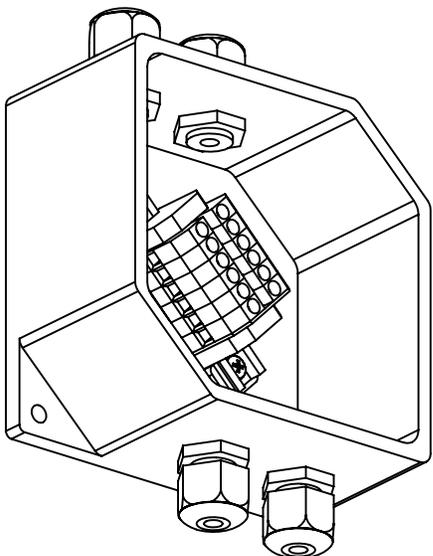
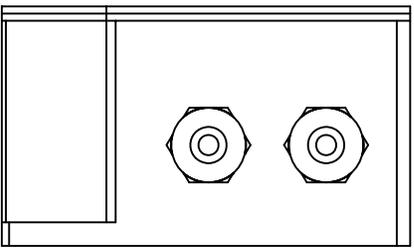
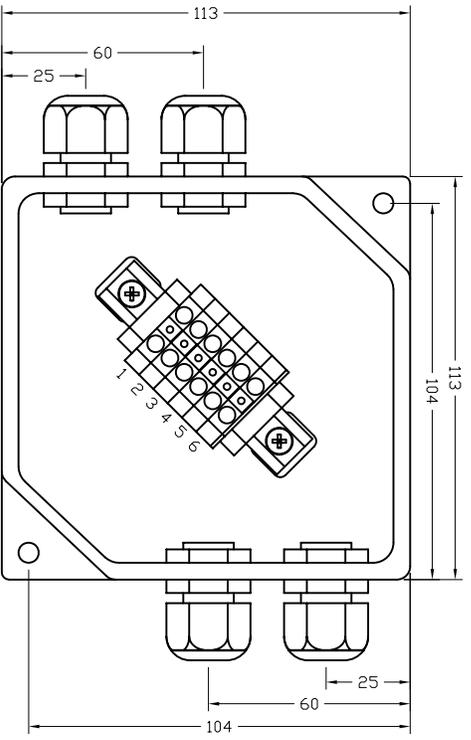


- NOTES:  
 1. WATERTIGHT JUNCTION BOX IS TO BE USED IF FRM JUNCTION BOX IS MOUNTED OUTSIDE.  
 2. REFER TO INSTALLATION AND MAINTENANCE MANUAL



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RUTTER JOB #		DRAWING #		TITLE		DRAWN BY		FILENAME		SHEET	
E-IN-01545		5563		L3 SVR03/HVR03 FRM Connections		M. DOUGLAS		NBXXXX_FRM_L303_SYS_9A		9	
DRAWING REV #		RCR #		SHIP NAME		SCALE		ORIGINAL DATE		RUTTER TECHNOLOGIES INC.	
13		5563		L3 SVR03/HVR03 FRM Connections		NTS		18FEB08		St. John's, NL A1E 4P3 Tel: 709-368-4213 Fax: 709-368-1337	
SHIP YARD		APPROVED BY		SHIP YARD		SHIP NAME		SHIP YARD		SHIP NAME	
B. PITTMAN		APPROVED BY		B. PITTMAN		SHIP NAME		SHIP YARD		SHIP NAME	
20FEB08		DATE		20FEB08		SHIP NAME		SHIP YARD		SHIP NAME	
APPROVAL DRAWING		DATE		20FEB08		SHIP NAME		SHIP YARD		SHIP NAME	
DESCRIPTION		DATE		20FEB08		SHIP NAME		SHIP YARD		SHIP NAME	
REV		DATE		20FEB08		SHIP NAME		SHIP YARD		SHIP NAME	



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REV	DESCRIPTION	RCR	DATE	APPROVED BY
2	APPROVAL DRAWING	5461	14JAN08	B. PITTMAN
1	APPROVAL DRAWING		01MAR07	B. PITTMAN

TITLE  
FRM Junction Box

DRAWN BY  
M. DOUGLAS

ORIGINAL DATE  
10JAN08

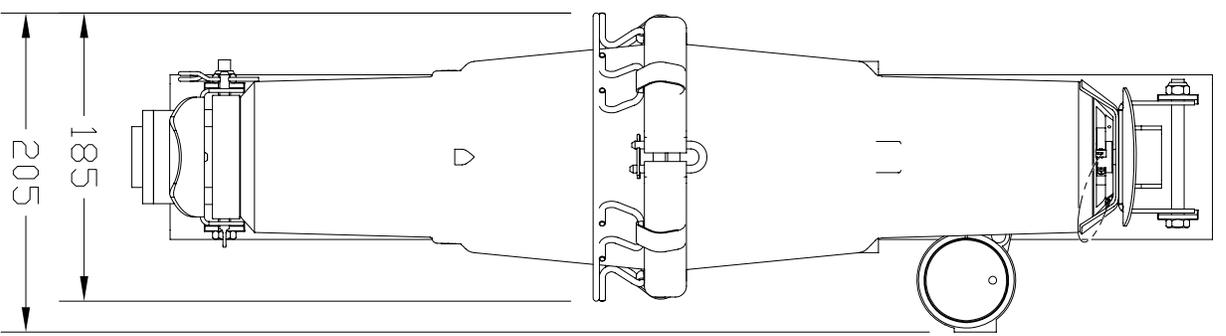
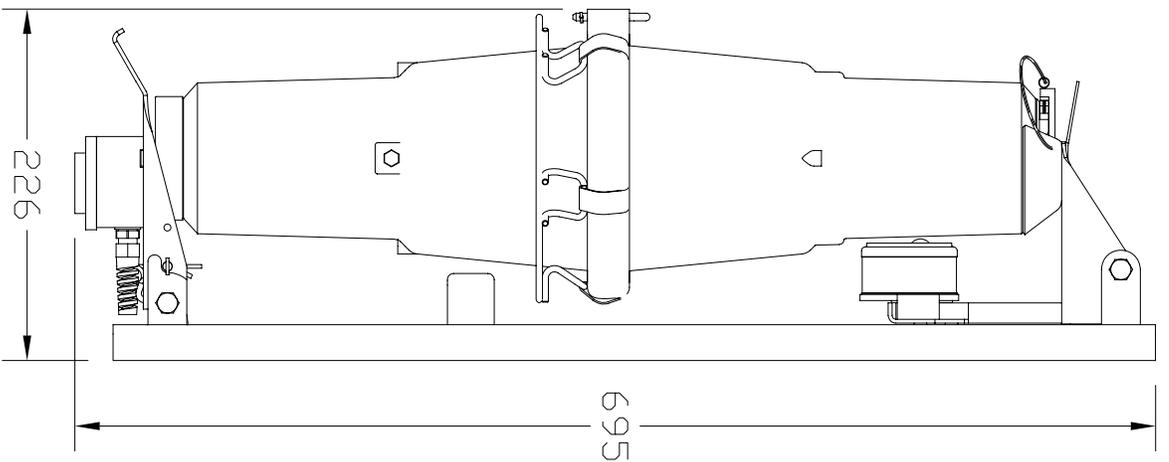
SCALE  
NTS

DRAWING #  
E-IN-01218

**RUTTER**

RUTTER TECHNOLOGIES INC.  
St. John's, NF A1E 4P3  
Tel: 709-366-4213 Fax: 709-366-1337

FILENAME  
VDR-304D\_FRM\_JB



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REV	DESCRIPTION	ROR	DATE	APPROVED BY
2	APPROVAL DRAWING	5471	14JAN08	B. PITTMAN
1	APPROVAL DRAWING	3987	23JUN06	C. YOUNG

TITLE  
 Jotron Float Free Capsule in Bracket

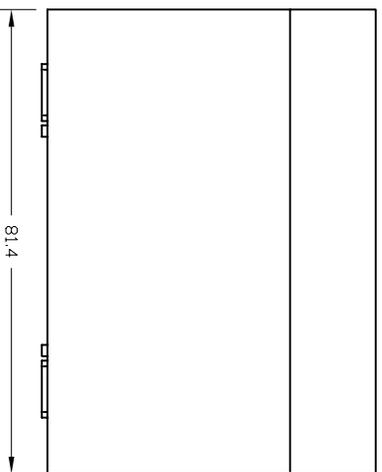
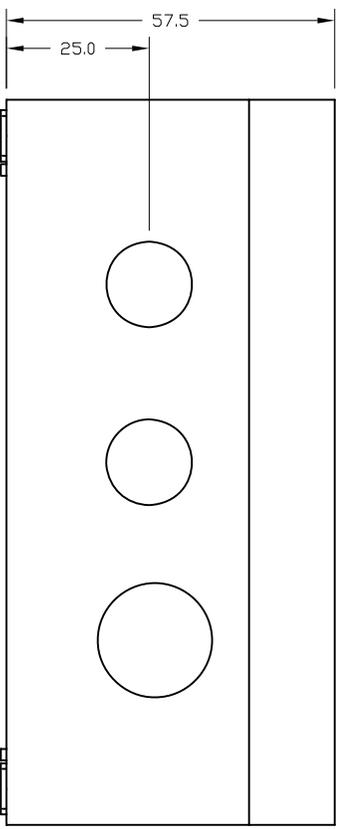
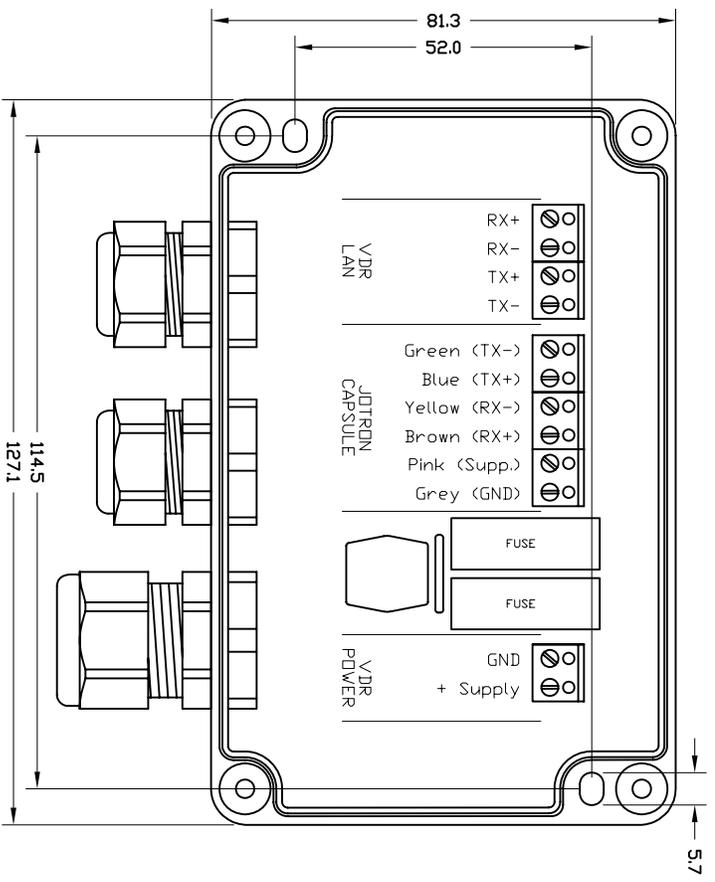
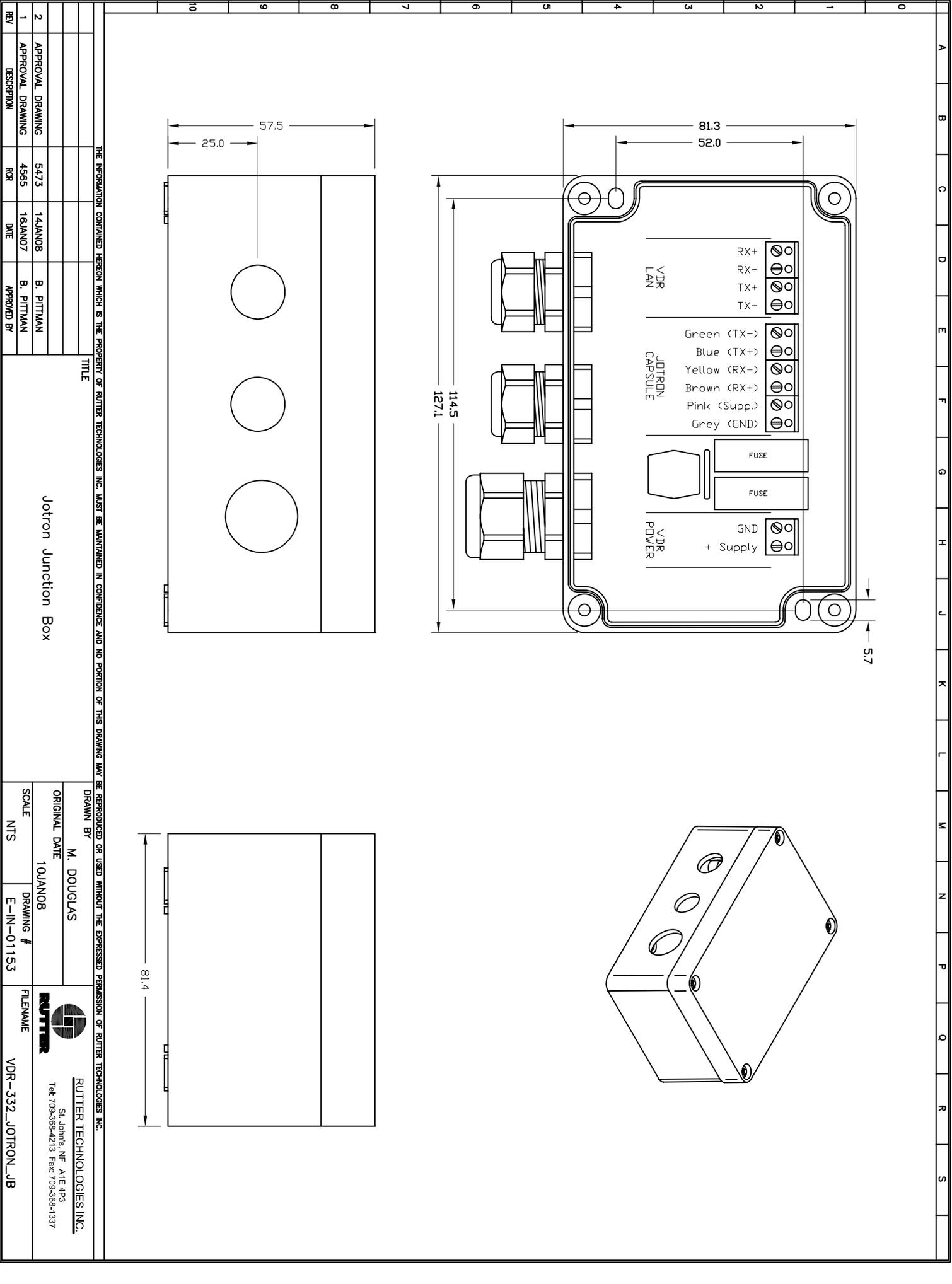
DRAWN BY  
 M. DOUGLAS  
 ORIGINAL DATE  
 10JAN08  
 SCALE  
 NTS

DRAWING #  
 E-IN-01006  
 FILENAME  
 VDR-330\_Jotron\_S-VDR\_Capsule



**RUTTER TECHNOLOGIES INC.**  
 St. John's NF A1E4P3  
 Tel: 709-366-4213 Fax: 709-366-1337





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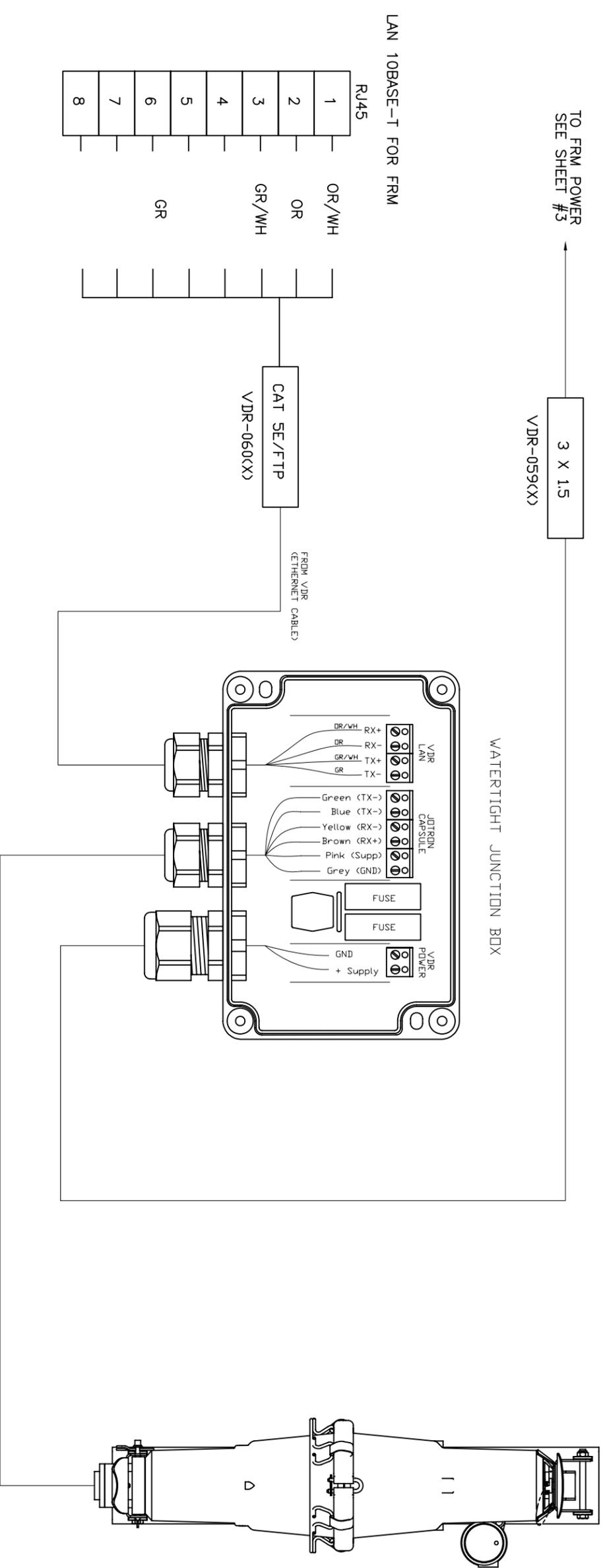
REV	DESCRIPTION	RCR	DATE	APPROVED BY
2	APPROVAL DRAWING	5473	14JAN08	B. PITTMAN
1	APPROVAL DRAWING	4565	16JAN07	B. PITTMAN

TITLE	
Jotron Junction Box	

DRAWN BY	M. DOUGLAS
ORIGINAL DATE	10JAN08
SCALE	NTS
DRAWING #	E-IN-01153
FILENAME	VDR-332_JOTRON_JB

**RUTTER TECHNOLOGIES INC.**  
 St. John's, NF A1E 4P3  
 Tel: 709-368-4213 Fax: 709-368-1337

NOTES:  
 1. WATERTIGHT JUNCTION BOX IS TO BE USED IF FRM JUNCTION BOX IS MOUNTED OUTSIDE.



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RUTTER JOB #		DRAWING #		TITLE					
		E-IN-01496		Jotron FRM Connections					
DRAWING REV #		RCR #		DRAWN BY		SCALE			
1		5513		M.DOUGLAS		NTS			
SHIP YARD		SHIP NAME		ORIGINAL DATE		FILENAME			
				05DEC07		NBXXXX_FRM_JT_sys_9A			
APPROVAL DRAWING		20FEB08		B. PITTMAN		RUTTER TECHNOLOGIES INC.			
APPROVAL DRAWING		24JAN08		B. PITTMAN		St. John's, NL A1E 4P3			
DESCRIPTION		DATE		APPROVED BY		Tel: 709-366-4213 Fax: 709-368-1337			
REV						SHEET			
						9			

REV	DESCRIPTION	RCR	DATE	APPROVED BY
2	APPROVAL DRAWING	5474	14JAN08	B. PITTMAN
1	APPROVAL DRAWING	4586	23JAN07	B. PITTMAN

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TITLE

ACR Float Free

DRAWN BY M. DOUGLAS

ORIGINAL DATE 29NOV07

SCALE NTS

DRAWING # E-IN-01160

**RUTTER**

RUTTER TECHNOLOGIES INC.

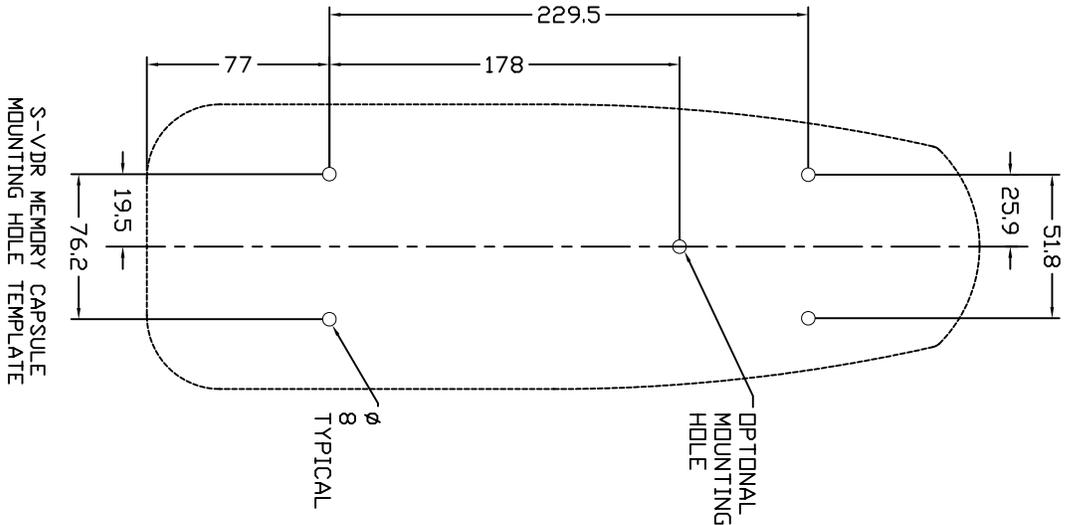
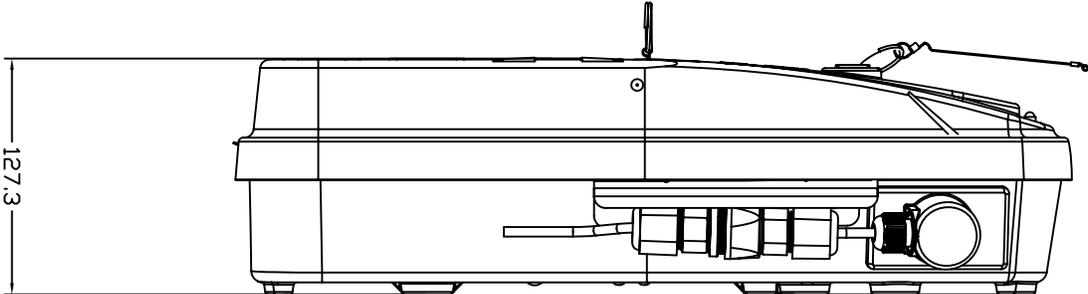
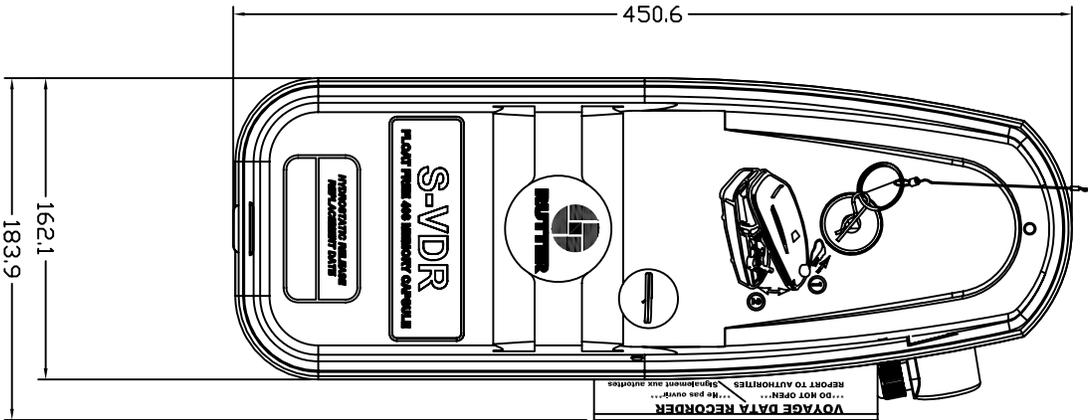
St. John's, NF A1E 4P3

Tel: 709-368-4213 Fax: 709-368-1337

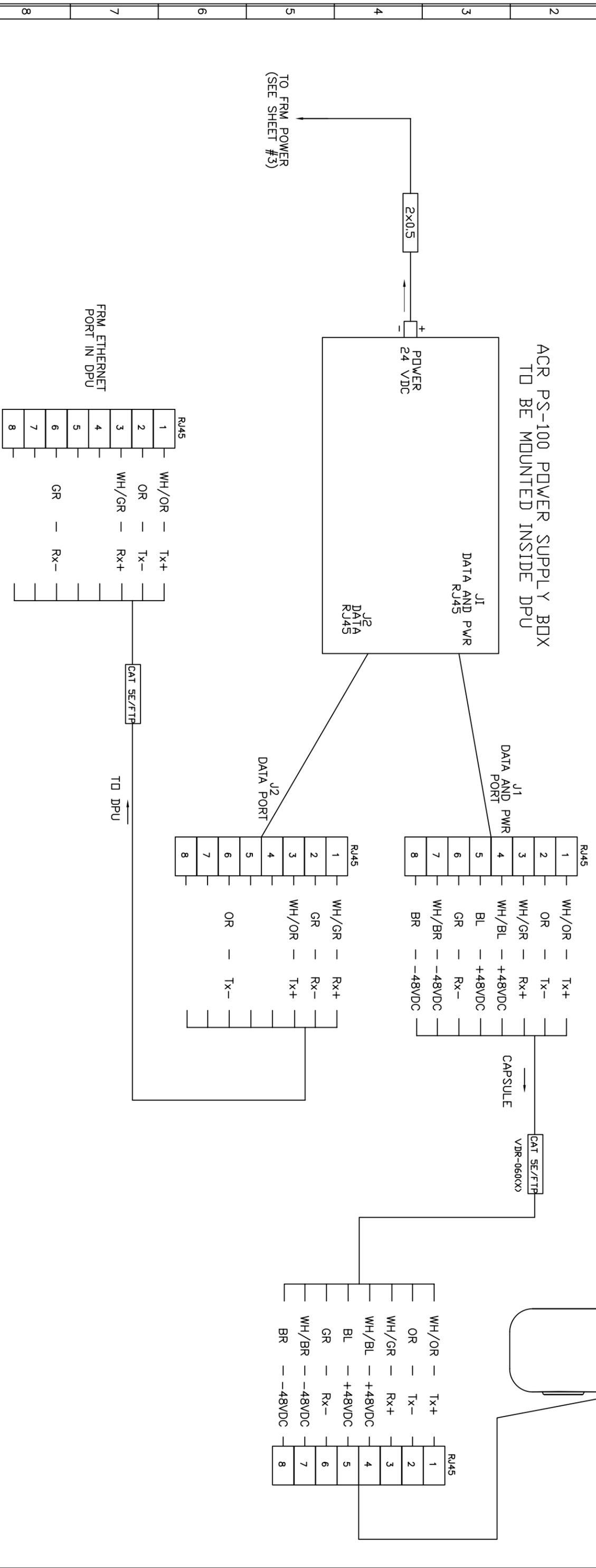
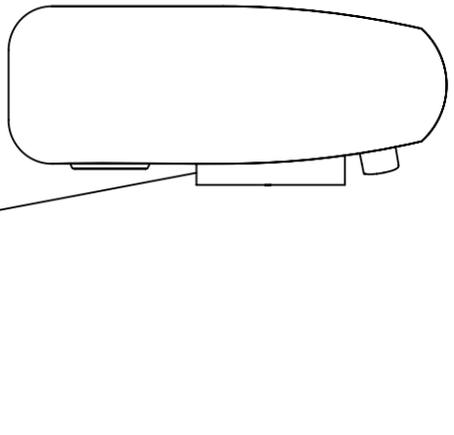
FILENAME VDR-340\_ACR\_FLOATFREE

10	9	8	7	6	5	4	3	2	1	0
A	B	C	D	E	F	G	H	J	K	L

WEIGHT OF COMPLETE UNIT  
WITH SEA SHELTER: 2690g ±50g



RUTTER FLOAT FREE  
CAPSULE



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RUTTER JOB #		DRAWING #		TITLE		DRAWN BY		FILENAME	
		E-IN-01379		ACR Capsule Connections		M.DOUGLAS		NBXXXX_FRM_ACR_SYS_9A	
DRAWING REV #		RCR #		SHIP NAME		SCALE		RUTTER TECHNOLOGIES INC.	
1		5477				NTS		St. John's, NL A1E 4P3	
DATE		APPROVED BY		SHIP YARD		ORIGINAL DATE		Tel: 709-368-4213 Fax: 709-368-1337	
24SEPT07		B. PITTMAN				20FEB08		SHEET	
APPROVAL DRAWING		APPROVAL DRAWING						9	
20FEB08		B. PITTMAN							
APPROVAL DRAWING		APPROVAL DRAWING							
24SEPT07		B. PITTMAN							
DESCRIPTION		DATE		APPROVED BY		SHIP YARD		SHEET	
REV								9	



